Commission for
Communications Regulation

Submissions to Information Notice 10/38

Inputs received on potential uses and future licensing options of the 2.6 GHz spectrum band

Submissions received from respondents

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An Coimisiún um Rialáil Cumarsáide
Commission for Communications Regulation
Abbey Court Irish Life Centre Lower Abbey Street Dublin 1 Ireland
Telephone +353 1 804 9600 *Fax* +353 1 804 9680 *Email* info@comreg.ie *Web* www.comreg.ie

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1 Anixter Distribution Ireland Ltd

Anixter Distribution Ireland Limited
641 Jordanstown Drive,
Greenogue Business Park
Rathcoole
Co. Dublin, Ireland

Tel: +353 1 257 2000
Fax: +353 1 257 2020
www.anixter.com

Ms Sinead Devey
Commission for Communications Regulation
Irish Life Centre, Abbey Street
Freepost
Dublin 2

21st June 2010

Dear Sinead,

My name is Brendan McDonald and I hold the position of Regional Vice President for Anixter, a Global Company with offices and warehousing here in Ireland which employs twenty people locally.

I write to you on behalf of UPC Ireland and forward my full support to them in granting them their MMDS licence when it is up for renewal in 2014.

Anixter delivers cable, connectors and several hundred other consumable line items to UPC for the building and maintaining of the network. We employ 20 people in Ireland and several of these are engaged in maintaining sales and logistic support to UPC.

UPC is a key customer and currently central to the continued success of Anixter in Ireland. I believe that in giving UPC the licence it will be very beneficial to all, particularly in securing employment in the many companies that provide products and services.

It will encourage all the competition to keep their pricing in line to compete for the business for the future.

Should you wish to discuss this further please do not hesitate to contact me directly

Yours Faithfully

Brendan McDonald
RVP Ireland & the Nordics

2 Anna O'Connor

Submission re ComReg 10/38

I would like ComReg to consider UPC application for renewal of the license spectrum for MMDS transmissions.

I am a UPC customer and I am very satisfied with the service they provide and also the competitive pricing.

I encourage competition in the market otherwise Sky digital would have the monopoly. UPC also contribute to the local economy and provide employment in Ireland.

Yours Sincerely,

Anna O'Connor.

3 Broadcasting Authority of Ireland

MMDS is an established television distribution system that serves approximately 100,000 homes. It provides consumer choice and valuable competition in the pay tv market. It is a terrestrial platform that falls within Irish regulation. Its cost base and territorial service area also has many advantages for indigenous broadcasters. Legislative provisions also ensure that community television services can access this distribution platform. It provides a valuable public service and should be retained.

A balance needs to be obtained between the provision of MMDS and other future services. MPEG4 encoding may not reduce the future spectrum requirements for MMDS as undoubtedly more HD content will be required. MMDS can be supported, even for a short licence duration of 5 years, by allocating a significant proportion of the current 2.6GHz band to TDD. FDD opportunities can be explored in other bands and to a lesser extent in the 2.6GHz band. ComReg could consider, as part of its next stage in consultation, reviewing spectrum use and efficiency in the 1.8GHz and other bands to ensure the potential for 4th generation networks.

4 Connacht Rigging Services

Connacht Rigging Services,
Drimbane,
Ballyhaunis,
Co. Mayo

16/06/10

To whom it may concern,

I am writing to you regarding the renewal of the UPC's MMDS licence (2.6 GHz). Connacht Rigging Services (CRS) is a small company in the rigging industry. We employ 6 people at present. 95% of our work is with UPC. We have been working in this area since MMDS was introduced.

The importance to the company CRS that UPC retains the said licence is imperative. If this licence renewal is unsuccessful, I shudder to think about the future of this company and its employees. Another company goes to the wall. As well as that please show some consideration to all the people that have benefited greatly from this service and who also have been loyal customers down through the years.

Yours sincerely,

Georgie Hannan,
Director, C.R.S

5 City Television Network

City television network

Ms Sinead Devey
Commission for Communication Regulation
Irish Life Centre
Abbey Street
Freepost
Dublin 1
Ireland

23rd June 2010

Re: **Call for input on potential uses and future licensing options of the 2.6 GHz spectrum band**

Dear Ms Devey,

Please find enclosed our submission in relation to the above.

If you have any queries please do not hesitate to contact me.

Kind regards,

City Channel, 88/89 Furze Road, Sandyford Industrial Estate, Dublin 18
T: + 353 1 2937777 F: + 353 1 2937810 W: www.city.ie

Channel South, Unit 4, East Link Business Park, Carrigtwohill, Co. Cork
T: +353 21 488 2433 F: + 353 21 491 9925 W: www.channelsouth.ie

SUBMISSION TO THE COMMISSION FOR COMMUNICATIONS REGULATION (COMREG)

Call for input on potential uses and future licensing options of the 2.6 GHz spectrum band

Submitted by City Channel Television Network

Background

City Channel is Ireland's only network of local television stations. The company launched in Dublin in October 2005. Since launch, the City Channel audience has grown at an impressive rate with the expansion of the UPC digital network adding new subscribers on a monthly basis. The network is available on cable and MMDS.

The network expanded significantly in 2008 with the addition of new local franchises in Cork, Limerick and Waterford through ***Channel South***. The addition of these homes has brought the City Channel network penetration to over 400,000 homes and offers a potential audience base of 1.2m potential viewers daily.

Local Television is a growing but affordable advertising medium. With a rapidly developing audience and a practical approach to TV advertising, City Channel offers small businesses owners a realistic and cost effective way to get their message onto an exciting and successful platform.

City Channel currently reaches 225,000 homes and **57%** of all multi channels TV homes in the Dublin region. Channel South enjoys strong penetration in Munster broadcasting in to 140,000 homes across Munster and 30,000 in the greater Galway area reaching over **47%** of all Munster multi-channel TV homes across the region.

Market conditions & sales strategy

The company sees it's positioning as an "add on" medium where national and brand advertisers use the network to "fill in" parts of their local reach. The channels produce a range of local content, something not generally covered by national channels. It is the local nature of this content that gives the network its market differentiation.

Like all media in Ireland, the company has suffered from the impact of the economic downturn as a network funded exclusively from advertising and sponsorship. As the network is only available on cable and MMDS it is not Nielsen rated and therefore bases its entire its sales strategy exclusively on "reach" or overall homes in which its channels are available to be seen.

The removal of MMDS homes or homes fed by MMDS will have the net effect of reducing the City Channel network audience size by over 20%, something which would have a devastating impact on the company, particularly in the current market. We estimate a reduction in revenues of upwards of 25%.

Employment

In addition to reduction in market size for the company the elimination of MMDS will most likely result in the company reducing its operating size and a consequential reduction in employment of up to 30% of the company's workforce.

Impact of Sky

City Channel network is also concerned about the impact the elimination of MMDS could have on the market dominance of Sky television.

Sky charge two fees to channels- a carriage fee and an EPG fee thus making it a very expensive method of transmission/carriage for any small channel group.

We have undertaken exhaustive research on this topic and have consistently reached the conclusion that the cost associated with access to the Sky platform make it an economically unviable option for City Channel and without MMDS in Ireland it is our belief that Sky would operate a near monopoly.

The option of DTT as a secondary platform for our network has receded – so despite the heralding of enormous technical advances in digital and other technologies in the past ten years, City Channel actually faces a potential substantial reduction in its potential audiences if the removal of MMDS proceeds.

Framework & Conclusion

We understand that UPC's MMDS platform is regulated through long term licences under the supervision of ComReg and that the regulator is currently seeking input into its consultation process. It is our considered view that in the absence of any developmental platform, such as DDT, it is vitally important to companies like City Channel that UPC's renewal is allowed.

It is an important aspect of the rural transmission framework and a vital element of our overall business strategy .

6 Declan O'Meara

24.06.'10

Ms. Sinead Devey,
ComReg,
Irish Life Centre,
Abbey Street,
Freepost,
Dublin 1.

Re: Submission re ComReg 10/38

Dear Sinead,

I'm a UPC Customer and I'm very happy with the service and competitive pricing.

I would like ComReg to favourably consider UPC application for renewal of the licence spectrum for MMDS transmissions. Encourage competition in the market, otherwise Sky would have monopoly on 70K houses, control of viewing content and control of pricing.

UPC contribute to the local economy, Irish Exchequer and provide jobs in Ireland.
UPC contribute to Irish Media plurality, the ability for MMDS subscribers to receive all 'must carry' channels (due to ComReg's regulation of UPC, which is not applicable to Sky).

Commercial DTT will not have the same capacity as either MMDS or satellite and if ever launched, would not be a comparable service offering for Irish consumers.

Yours sincerely,

Declan O'Meara,
Declan O'Meara.

7 Digiweb

Ms Sinead Devey
COMREG
Abbey Court, Irish Life Centre,
Abbey Street, Dublin 1

29th June 2010

Object: Input on potential uses and future licensing options of the 2.6 GHz spectrum band

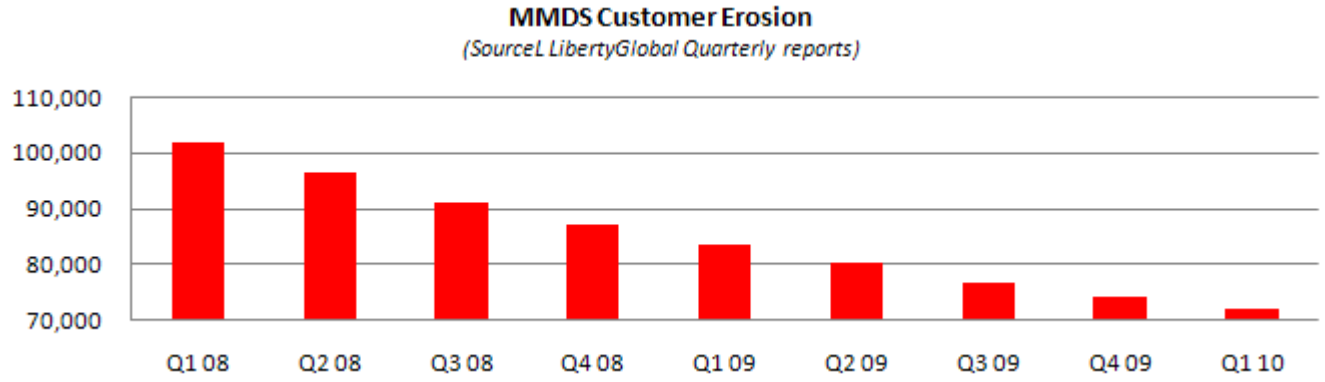
Dear Ms Devey,

One of the key missions of ComReg is to "ensure *the efficient management and use of the radio frequency spectrum*". Looking at the situation in the 2.6 GHz spectrum band, your organization should have no hesitation to act swiftly, given the increasing obsolescence of the MMDS (Multichannel Multipoint Distribution Service) technology, and the huge opportunity offered with Wimax/LTE applications.

- **Current use and trends**

MMDS has been designed as a solution for sparsely populated areas. Its current use is therefore predominantly rural. There have been limited initiatives undertaken by UPC/Liberty Global in order to maintain a same level of activity in the spectrum/technology. No MPEG4 upgrade has been yet considered; a move which would have considerably up scaled the current level of service.

This has caused the customer base to erode by almost 30% in the space of two years (101,700 at Q1 2008 – 72,200 at Q1 2010). Given the current churn level, a minimal amount of subscribers might still be operating by 2014.



Looking at the overall operations from LibertyGlobal, Ireland's MMDS represents a marginal activity with only 0.4% of the 'Video' customer base in 2009 (Source: LG 10K). We can't see that Corporation considering MMDS as one of their core businesses, and would therefore expect them to divest in the short or medium term from this technology. It should be noted they already did so in Slovenia in June 2009, one of only three countries where they had MMDS operations in place.

- **Future use and trends**

Economies of Scale in the telecom market are absolutely critical, especially for a country like Ireland. Given the small size of our domestic market, it is critical for us to use a well standardized platform supported by a wide array of manufacturers. The harmonization undertaken by the EC in the 2.6 GHz band provides the opportunity to benefit from economies of scale at European level.

Dozens of high-profile manufacturers are competing in offering Mobile Wimax and LTE at the best cost. The European 2.6 GHz market is growing steadily with the inclusion of Norway, Sweden, Finland, Netherlands and Denmark. So where is Ireland standing? Currently it forms part of a group with other small countries such as Slovakia, Lithuania or Latvia, where MMDS is still in operation. As it stands, Ireland will stick to this group and miss the 2.6 GHz innovation trail.

- **DTT, Replacement of MMDS and Exit options**

We consider the DTT platform to represent the natural replacement to MMDS. We also believe that ComReg should consider revoking, buying back, or allow spectrum trading with the 2.6 GHz band.

- **Next actions**

The MMDS licences are expiring in 2012 (Ntl) and 2014 (Chorus). It is our understanding that the Dublin, Galway and Waterford urban areas could be freed up as early as 2012 for the provision of Mobile Data and Voice applications (LTE & Mobile Wimax). It is also our understanding that UPC is not offering MMDS services in those areas. We would therefore encourage ComReg to issue initial licences in those areas as early as 2012 – followed by an extension at national level in 2014.

This scenario offers some key advantages:

1. It gives sufficient time to UPC to see its base churning away, and moving to DTT

2. It will not impose any obligations on UPC to upgrade its MMDS network to MPEG4, even though it might lose the licence thereafter.

3. It will allow new operators to roll out their services as soon as 2012 in key urban areas, and 2014 thereafter

4. ComReg will not have to resort to revocation in order to speed up the process. Much needed reforms in buy-back action / spectrum trading might also be considered post 2012.

Yours sincerely,

Jean-Charles Caillère
Business Analyst

Tel: 01 2569208
Email: jccaillere@digiweb.ie

8 Dublin Community Television

Response to

Call for input on potential uses and licensing options of the 2.6 GHz spectrum band

Reference Number: 10/38

On Behalf of

Dublin Community Television (DCTV)

22/06/2010

DCTV welcomes the call by the Commission for Communications Regulation for input on part of the spectrum currently assigned to television broadcasts. As an important common resource the use and exploitation of spectrum licenses has an impact on all Irish People and ComRegs call is a timely opportunity to consider some of the relevant issues. In many ways the recent failure of commercial licensing and operational negotiations for other parts of the spectrum also offer an opportunity to consider non-market aspects to the licensing and uses of electromagnetic spectrum. It is perhaps pertinent to note that we will be making these arguments to an email address marketframeworkconsult@comreg.ie .

It should also be noted that DCTV has a business relationship with the operators of the MMDS system which currently is licensed for the 2.6GHz spectrum, in that DCTV has a channel on the UPC basic digital cable package. The station is not currently carried on any of the MMDS systems UPC deploys.[1]

However, when launching a new, entirely Irish owned resource-poor TV channel we did find UPC as an important support to a sector which has been acknowledged by the European Parliament as ".. strengthen(ing) media pluralism, as they provide additional perspectives on issues that lie at the heart of a given community".[2] We note that a number of other small Irish channels have been supported in this way along with the other Irish

[1] DCTV transmits on channel 802 of the basic UPC digital cable subscription package. Cork Community Television transmits at channel 803 on the same package.

[2] European Parliament Resolution on Community Media. http://www.europarl.europa.eu/sides/getDoc.do?type=TA&reference=P6-TA-2008-0456&language=EN&ring=A6-2008-0263

community television stations licensed under the 2001-09 Broadcasting Acts. We feel that the nature of the cable and terrestrial services currently offered by UPC but on networks built over a lengthy period have been an important contribution to the shape and richness of the Irish broadcasting and media landscape.[3]

Inherent in the definitions of community media adopted by DCTV and the other Irish community TV stations is the concept of universal access, that every resident and member of the relevant community should be able to access their community TV station, preferably without a subscription fee. Currently Ireland's licensed community TV stations on the digital cable packages are available to about 350,000 subscribers but not subscribers to the MMDS system. For Dublin Community Television this covers virtually the entire UPC customer base in the areas it holds a community content license for excepting a small section of Fingal and other more rural areas of the City and County of Dublin. While we would like to be carried on the MMDS system in these areas a more pressing priority for the station has always been access to the 40% of sets served by a satellite dish or to achieve carriage on some of the spectrum assigned to DTT[4].

However, we feel there are a number of important considerations in favour of the retention of the 2.6 GHz spectrum for television broadcasting using MMDS regardless of whether DCTV has a carriage agreement.

Cable and MMDS supports small and medium Irish Broadcasters

- DCTV is aware that the support given to small scale Irish based operations on both cable and MMDS services has made the development of an indigenous efficient TV broadcasting sector happen in a way that the wider footprint and market scale of satellite provision (and access to the various EPGs) would not have allowed. We feel that this makes a strong case for supporting the provision of multiple technical solutions for the provision of wide band video services. Where wired cable networks are not in place or viable, MMDS provides a viable alternative to satellite.

Broadcast Spectrum can be used in the interests of Public Service and Social Benefit

- It is important that we do not equate the lack of demand from commercial operators for spectrum to broadcast television services as the lack of a need for this spectrum and for the inability of the Irish people to make effective use of spectrum as it becomes available. If we are to nurture a creative society, to make full use of the convergence of media production and distribution technologies, to learn again to excel as a nation of storytellers and communicators we should not

[3] Historically the many small local networks of cabled homes in Ireland often saw early experiments in community, local and information channels which were not carried on terrestrial signals. Internationally the cable network often supports local and community television broadcasting in a variety of manners adding significantly to media pluralism.

[4] This is not to understate the importance of MMDS carriage to community television. The concentration of MMDS subscribers' in particular geographic areas makes it difficult for a station which has a remit to cover that area. For example, DCTV recently brought a first class primary school group to its studio for a storytelling shoot – but none of the children or parents have access to the station as Balbriggan is only served by MMDS not cable. The situation is more widespread for other community TV channels.

be removing spectrum from the public sphere, to reduce the number of options that Irish people have to distribute their content and to access each others. We feel that walling off spectrum for the use of private packet networks simply because a market mechanism has failed to allocate spectrum would be a poor reaction.

Cable and MMDS are important for true media plurality

- Combined with the low cost of access and high level of possible granularity of channel mixes, the regulatory framework has supported, and has the potential to expand, the role of MMDS and other locally focussed broadcast systems in enhancing media plurality. As the notion of the public sphere in broadcasting seems to diminish a case could be made that the must-carry obligation[5] on digital cable and MMDS operators offers the potential for other objectives such as social benefit to be included in the allocation and regulation of public resources such as the 2.6 GHz spectrum.

Ciaran Moore
Station Manager, DCTV

[5] S 76(4) of the 2009 Broadcasting Act http://bai.ie/pdfs/BroadcastingAct2009.pdf

9 EMR Integrated Solutions

MP & E Trading Co. Ltd
Unit 11 Dunboyne Business Park, Dunboyne, Co. Meath
T: 01 8013131 / F: 01 8013166
Web: www.emrsolutions.ie / Directors: M Quinn, P Thornton
VAT No.: IE4618583I / Company Reg: 82403

Ms. Sinead Devey
Commission for Communications Regulation
Irish Life Centre
Abbey Street
Freepost
Dublin 1

18th June 2010

Re: Call for input on potential uses and licensing options of the 2.6 GHz spectrum band

Dear Sinead,

EMR Integrated Solutions (EMR) provide UPC Ireland (UPC) with services which includes the design and roll out of new point to point microwave links to Government and Enterprise clients plus upgrades of UPCs existing transmission and backhaul networks.

EMR is keen for UPC to obtain renewal of the 2500-2690Mhz spectrum band licenses to 2019 which will enable EMR and UPC to provide a real and valuable alternative solutions to the Irish TV market.

Non renewal of the 2500-2690Mhz spectrum band by ComReg to UPC could have a significant impact on EMRs projected growth plans over the next 5 as we have an existing 5 Year contract with UPC for all their Wireless backhaul requirements.

Yours Sincerely

Derek Glynn
Chief Operations Officer

Mobile: +353 (86) 8311592
Office: +353 (1) 8013131
Fax: +353 (1) 8013166
Email: derek.glynn@emrsolutions.ie

10 Helen McCarthy

F.A.O. Sinead Daly

I would like ComReg to favourably consider UPC's applicaiton for renewal of the licence spectrum for MMDS transmissions. It is vital to encourage competition in this market as the alternative is for SKY to end up with a monopoly on 70K houses. This will result in control of viewing content and more importantly control of pricing which is not in the best interests of the consumer.

Every company is struggling to survive in this current economic climate and I believe that UPC contribute to the local economy and provide valuable employment. I also believe that UPC are obliged by regulation to ensure that we receive our home based chanels and that this does not apply to Sky.

While I am certainly not an expert in this area, my understanding is that commercial DTT will not have the same capacity as either MMDS or satellite and if ever launched, would not be a comparable service offering for Irish consumers.

I hope you will take the above points on board when making your assessment.

Kind regards,

Helen McCarthy

11 Imagine

Potential Uses and Future Licensing Options of the 2.6GHz Spectrum Band

Imagine Communications Group Response to the Information Notice

1. Introduction

Imagine welcomes the opportunity to respond to this Information Notice.

Imagine is currently deploying next generation WiMAX services throughout Ireland.

The potential release of additional spectrum in the 2.6GHz band is to be welcomed and will help to further strengthen the provision of wireless broadband services in Ireland.

2. Imagine Response

Types of Services

The demand for mobile broadband services is increasing rapidly and is having a detrimental impact on the level of service that is being provided to existing users of 3G wireless networks.

> "60% of users rate mobile broadband coverage as poor and 76% are not satisfied with mobile broadband speeds", Thinkbroadband.[1]
>
> "64% of users are reported as unhappy with the speed of their mobile broadband service and just 11% are happy", Mobilegenie.[2]
>
> "Mobile Broadband providers deliver a quarter of advertised speeds", Broadband-expert.[3]
>
> "3G was going to give 1Mb but in some places you were lucky to get 300Kb" Professor Michael Walker, group R&D director at Vodafone, Wireless 2.0 Summit, July '09

O2 also admitted problems with its London 3G network as a result of increased data requirements of iPhone users.

Therefore there is a demonstrable need for additional spectrum for deployment of 4G wireless services which have greatly enhanced service and capacity levels.

In addition, Ireland has some of the highest fixed line costs in the world (as per the ITU "Measuring the Information Society" report). These high costs reflect the lack of competition in the access network for home phone and broadband services.

Based on the above, Imagine believes that there are demonstrable requirements for both mobile and fixed line replacement services in the Irish market. These needs could be met by the release of this additional spectrum for 4G wireless services.

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[1] www.thinkbroadband.co.uk Mobile Broadband Survey, Sept 2009

[2] www.broadbandgenie.co.uk, Mobile Broadband Poll, July 2009

[3] www.broadband-expert.co.uk, Mobile Broadband Survey, Sept 2009.

Technical Criteria

The 2.6GHz band is allocated by the ITU as an IMT band (WRC-07) and as such it is standardised across international markets for mobile broadband services. This means that there is a credible long-term roadmap for service deployment in this band using IMT technologies.

In particular, WiMAX already has a strong foothold in this band with Clearwire rolling out a multi-billion dollar deployment across the US. In addition, Yota in Russia, Mobily in Saudi Arabia and UQ in Japan are all rolling major national infrastructure based on WiMAX in these frequencies and the resultant eco-system provides for affordable standard access devices and lots of innovative and niche products that facilitate m2m and a myriad of cross network hand-off strategies thus providing a richer and better experience for the consumer. As such there is a full suite of WiMAX Forum certified products available for deployment in this band to-day. This includes tri-band devices and global roaming across networks in the 2.3, 2.5, and 3.5GHz spectrum bands.

Channel Spacing

WiMAX rev e channel profiles are 5MHz, 8.75MHz, 10MHz, and 20MHz. Of these, the 10MHz and 20MHz profiles are supported by Intel WiMAX chipsets for CPE and laptops. Therefore our preference is for a 10MHz channel spacing as the most appropriate to ensure maximum compatibility both with base station equipment and with end-user devices.
For WiMax deployment FDD does not apply and therefore there is no need for a centre gap. Providing a centre gap could be seen as an inefficient use of spectrum and should be made available for TDD usage.

Licence Award Criteria

Imagine does not agree that an auction mechanism should be used to award this spectrum. Rather the award process should be designed to ensure that the spectrum is awarded to bidders that will bring enhanced competition and value to the market.

Should an auction be used, utility clauses should be applied. This would ensure that greater competition is facilitated through the deployment of services to end users thus facilitating the wider public good. Without utility conditions it is possible that spectrum will be hoarded to restrict the deployment of new competitive services in the market.

In awarding the spectrum consideration needs to be given to ensuring sufficient competition is maintained in the mobile broadband market.

12 Irish Rural Link

Irish Rural Link submission to Comreg in response to call for input on potential uses and future licensing options of the 2.6 GHz spectrum band

June 2010

Contact Person: Seán O'Leary
Email: sean@irishrurallink.ie
Tel: 090 6482744

Irish Rural Link
Nasc Tuaithe na hÉireann

1. Introduction

1.1 Irish Rural Link represents those living in rural areas at local, national and international level. This submission is to highlight the value of MMDS services to rural households as the bulk of UPC Ireland's MMDS subscribers are outside of urban areas.

1.2 Up to 100,000 - predominantly rural - households will be affected most by any changes to the licensing of the 2.6 GHz band as a result of the conclusions of this consultation. This will potentially affect up to 250,000 people. Irish Rural Link see no reason to remove the current license holder, especially considering that they employ significant numbers and are regulated in Ireland and benefit the local economy while offering a valuable service to rural households.

2. Value of MMDS to rural households

2.1 The call for input notes that MMDS is an outreach technology for the non cabled areas of Ireland and Irish Rural Link's membership is generally drawn from such areas. MMDS has economic, societal and cultural benefits for those living in rural areas.

Firstly, the availability of the service ensures consumer choice since the MMDS service is the only alternative to BSkyB - the other provider of managed pay TV services in rural Ireland. Consumer choice is further enhanced by the fact that the pricing and associated terms and conditions of the MMDS service take into account the lifestyles of rural communities. Indeed preservation of this consumer choice is dependent on maintenance of the MMDS service in the absence of which, BSkyB would have a monopoly in rural Ireland. Such a scenario would not only be detrimental to consumer choice itself but it may also have negative impacts on the pricing of BSkyB's own service since it would not have to contend with competition from another pay TV service provider.

From a cultural standpoint, MMDS service also plays an important role in supporting indigenous content and in particular providing a platform for local (including public service, commercial and community) TV channels.

It is for these reasons and in the context of Comreg's own regulatory remit to promote competition it should give due consideration to the existing use of the 2.6 GHz band. Irish Rural Link believes that UPC's licences should be renewed so as to ensure continuation of the MMDS service.

3. Other uses of the 2.6 GHz spectrum band

3.1 Irish Rural Link's work in relation to the National Broadband Scheme means we have developed a significant interest in, and knowledge of, mobile broadband. We not convinced that the 2.6. GHz band is suitable for mobile broadband for rural communities which we believe would be better catered for at a number of lower frequencies, all of which will be available (some of which well) before 2014. Such bands include the Digital Dividend, liberalisation of the 900 MHz and 1800 MHz bands as well as 2100 MHz and 2300 MHz bands. All these and particularly those at the lower frequencies will be better suited to delivering mobile broadband across Ireland – and in particular rural Ireland.

Irish Rural Link would caution against any proposal that would foresee the shutting down of UPC's managed pay TV service in rural Ireland and no replacement service (TV or otherwise) is made available in its place. Irish Rural Link would have grave concern that the cessation of the MMDS service will result in loss of a TV service (with no mobile broadband replacement service) in rural Ireland while the vacating of the band would benefit only urban communities that would possibly obtain yet another mobile broadband internet service provider (or product).

4. Economic Benefits

4. 1 As an organisation with local members committed to developing the local economy Comreg must consider the importance of UPC in terms of investment and jobs and their decision in this matter must be a significant consideration in this consultation.

5. Conclusions

5.1 Ending MMDS at the same time as digital switchover will affect rural households disproportionately. Offering a quality service going forward will require the upgrading of infrastructure but we believe this process offers Comreg an opportunity to provide certainty to UPC and a platform for increasing investment and improving the range and quality of services offered to rural households while ensuring continued benefits to the local economy.

About Irish Rural Link

Irish Rural Link, formed in 1991, is a national network of organisations and individuals campaigning for sustainable rural development in Ireland and Europe. IRL, a non-profit organisation with charitable status, has grown significantly since its inception and now directly represents nearly 500 community groups with a combined membership of 25,000.

Irish Rural Link's vision is "of vibrant, inclusive and sustainable rural communities that contribute to an equitable and just society".

The network provides a structure through which rural groups and individuals representing disadvantaged rural communities in small settlements and the open countryside, can articulate their common needs and priorities, share their experiences and present their case to policy-makers at local, national and European level. Our mission is to influence national and European development policies and programmes, particularly in favour of those who are marginalised as a result of poverty and social exclusion in rural areas.

13 Joe Eivers

Attention of Ms Sinead Devey,
Iam a Chorus/UPC subscriber for many years and am very happy with the services and packages offered by UPC over this time.I understand that the spectrum thatMMDS isbroadcast out on is up for renewal.If UPC were to lose the current licence to broadcast on MMDS to the 70,000 homes in rural Ireland (as per your website document) ,I would only have the option of receiving pay TV from SKY. SKY TV would then have a monopoly on the customers living in rural areas.I believe that it is important to retain a competitive market and as such would like to see UPC retain their broadcast spectrum,to give people a choice of provider and keep pricing competitive as well as a high quality service.

I live in an area where terrestrial TV signal is poor and I dont have access to the cable network. The only other provider in the locality would be SKY, if UPC were to discontinue their MMDS transmissions. If I were to become a SKY subscriber taking on the same range of channels and the same number of set top box's which I currently have at my home (3). I would have to pay SKY significantly higher monthly premiums, than I currently pay UPC.

I would hope that your company would favourably consider UPC's application to renew their licence for their MMDS TV transmissions and continue to support competition in the Irish TV sector.

Joe Eivers,

14 Kathleen Millar

18th June 2010

Submission re ComReg 10/38

Dear Ms Devey,

I am a MMDS customer of Chorus now UPC, I live in an area where terrestrial TV signal is not very strong or clear. I am very happy with the channel packages provided by UPC. The only other provider in the locality would be SKY and for a similar range of channels and multi-room viewing I have, I would have to pay them a significantly higher premium monthly. UPC represent value for money to me.

If UPC were to lose this licence to broadcast, SKY would then have a market monopoly on the 74,000 customers in the MMDS area, I believe that it is important to retain a competitive environment in the Irish TV market. If SKY were the only market player in the rural areas, there could be no limit to the potential price increases that could be imposed and there could be restrictions on the variety and range of channels received.

UPC are strong supporters of Irish jobs and contribute to the Irish economy.
I would hope that your company would look favourably on UPC's application to renew their licence for their MMDS rural transmissions and continue to support competition in the TV sector.

Yours sincerely Kathleen Millar

Kathleen Millar

15 KN Networks Services (Ireland) Ltd

network services

2-4 Crag Avenue Business Park
Clondalkin Industrial Estate
Clondalkin, Dublin 22

t +353 (1) 4575000
f +353 (1) 4575001
e info@knns.ie
w www.knns.ie

Ms. Sinead Devey
Commission for Communications Regulation
Irish Life Centre
Abbey Street
Freepost
Dublin 1

01 June 2010

Re: Call for input on potential uses and future licensing options of the2.6 GHz spectrum

Dear Sinead,

I write to you in respect of the above mentioned licence which I believe is under review in the coming years with a view to extending for a further 5 years until 2019.

KN Network Services are engaged in the provision and maintenance of the transmission sites that support the MMDS network and employ 10 full time staff on this work throughout the country. This work is of huge benefit to our business and forms critical employment for those who are engaged on it.

In addition to the employment provided through MMDS it provides much needed competition in the rural parts of our country where options are limited when choosing a service provider.

In light of the above we would encourage Comreg to extend this licence for the five years following 2014 and provide both competition and employment in this area.

Thanking you in advance.

Yours Sincerely,

Donagh Kelly
Group Managing Director

16 LA Services

L A Services

54 Ballybane Industrial Est
Tuam road
Galway

Phone 091 765438 091765842

Fax 091765439
info@laservices.net

Ms. Sinead Devey
Commission for Communications Regulation
Irish Life Centre
Abbey Street
Freepost
Dublin 1
Ireland

Submission: Re ComReg 10/38

Dear Ms Devey

L A Services has been operating in Galway for over twenty years in the TV aerial /CATV industry. Since winning a contract for service with UPC our business has grown and we now service Counties Donegal, Mayo, Sligo, Leitrim, Roscommon, Westmeath, Clare Offaly and Tipperary as well as Galway.

It is our experience that UPC provides a much needed outreach technology to rural homes and communities and removes the monopoly situation with service providers by giving consumers a choice.

Counting technicians and administrative staff I have 25 employees on payroll. In today's economic climate many small businesses are ceasing trading and unemployment levels are at an all time high. Should UPC lose the licence our Company would certainly struggle to remain in business and should we survive it would be on a much smaller scale. Many of our skilled workforce would have no option but to join the legions of those on Social Welfare.

We surveyed our staff to ascertain how many are MMDS customers. Out of 25 employees and 3 Directors 24 are MMDS customers and all would wish to continue availing of the superb service delivered by UPC.

It would be our wish the decision makers for allocation of licences would give due consideration to these issues.

Yours faithfully
Tomas Lynch MD

L A Services

17 Limerick Chamber

Limerick Chamber's Submission re ComReg 10/38

Limerick Chamber of Commerce, with over 500 members, is the leading business representative organisation in the Mid-West Region. We understand that the communications regulator has commenced a review of the services that are provided in the 2500-2690MHz spectrum band. This is the band that is currently used by UPC to provide its nationwide multi-channel MMDS TV distribution service, a service that is widely used by customers in rural Ireland.

Limerick Chamber fully supports the renewal of UPC's licences and would oppose any decision by ComReg to allow this spectrum to be used for other services (e.g. mobile broadband) as it would result in the early closure of UPC's MMDS TV service. This would have the following negative impacts:

- **there would no longer be a choice of multi-channel pay-TV provider for customers living in rural areas of Ireland, thus giving one player a monopoly in relation to this important service;**
- **over 100,000 households in rural Ireland will be disrupted and lose their multi-channel TV service;**
- **the economy of Ireland would face a negative impact of at least €129 million;**
- **there would be a consequent loss of employment in Ireland and a reduction in Irish VAT receipts.**

The alternative use of this spectrum is for mobile broadband but it only makes sense for the mobile operators to use the spectrum for this purpose in dense urban environments (i.e. in Dublin), where other available spectrum bands could easily be used instead (e.g. 1800MHz). As a result, if this spectrum is released for use in this way on a nationwide basis, we understand it will remain completely unused across much of the country.

We support UPC's proposed solution that the 2500-2690MHz band be maintained for MMDS while mobile broadband services in dense urban areas be provided over other spectrum bands that are designated for mobile services and are already available for use by the mobile operators. If this solution is adopted, mobile broadband services can still be rolled out while rural households will continue to enjoy a choice of provider for multi-channel pay-TV services.

The Regulator must encourage and promote competition and not take any action that results in the removal of a service leaving a monopoly in place. This would not be good for the consumer or the industry and the removal of these licences would mean customers in rural areas would no longer have a choice. We strongly urge you to renew the MMDS licences so that this important and valued service can continue to be provided to customers in rural Ireland.

Ends.

18 Louis Fisher

To Sinéad Devey,

With regard to your call for input on potential uses and future licensing options of the 2.6 GHz spectrum band, I would like to request ComReg to favourably consider the application from UPC for renewal if the licence spectrum for MMDS transmission for the following reasons:

- I am a UPC customer and have been for many years and I am very happy with the quality of the service I receive and the price I pay for that service;
- I do not consider that it is in the interests of customers that SKY should have a monopoly position anywhere in the Irish market;
- UPC contributes to the Irish economy by providing jobs in Ireland and paying taxes to the Irish exchequer;
- UPC contributes to Irish media plurality, the ability for MMDS subscribers to receive all 'must-carry' channels (due to ComReg's regulation of UPC, which is not applicable to Sky);
- Commercial DTT will not have the same capacity as either MMDS or satellite and if ever launched, would not be a comparable service offering for Irish consumers.

I would request that ComReg takes my views on board in consideration of the 2.6 GHz licences.

Sincerely,

Louis Fisher

19 Marie Kilgallen

Ms Marie Kilgallen
Skreen
Dromard
Co.Sligo

Ms Sinead Devey
ComReg
Irish Life Centre
Abbey Street
Freepost
Dublin 1

Ref: ComReg 2.6 GHz band

Dear Ms Devey,

As a MMDS customer of UPC, I would be interested in UPC retaining the spectrum licence 2.6GHz for a further five years.

I live in a rural area where terrestrial TV signal is not very strong. I am a UPC subscriber and am very happy with the service provided. For a similar range of channels and multi-room viewing I would have to pay SKY, the only other provider in the locality, a higher premium monthly. UPC in this regard represent value for money to me.

If UPC were to lose this licence to broadcast, I would have no choice but to consider becoming a SKY customer or have no TV service. Because there would be no competition in this rural market, SKY would then have a monopoly, there would be no limit to the potential price increases that could be imposed and there could be restrictions on the variety and range of channels received. I believe that it is important to retain a competitive environment in the Irish audiovisual market.

UPC are strong supporters of Irish jobs and contribute to the Irish economy. They contribute to the Irish exchequer which I understand SKY do not.

For the above reasons I would hope that your company would look favourably on UPC application to renew their licence for their MMDS transmissions.

Yours sincerely

Marie Kilgallen
Marie Kilgallen

20 Meteor Mobile Communications Ltd

Response to Call for Input on potential uses and future licensing options of the 2.6GHz spectrum band

Document Number 10/38

25 June 2010

CONTENT

EXECUTIVE SUMMARY

Meteor Mobile Communications Ltd, "Meteor", welcomes the opportunity to provide input in respect of future licensing in the 2.6GHz band (2500-2690MHz). Meteor strongly believes that this band is strategically significant to the future development of advanced mobile broadband services in Ireland. The 2.6GHz band is subject to a Commission Decision (2008/477/EC) which aims to harmonise the conditions for the availability and efficient use of the band. As a consequence of this decisive action there is strong evidence that this band will be exploited across Europe for the delivery of advanced mobile broadband services using Long Term Evolution (LTE) technology. If made available, use of this band would greatly facilitate the Government's ambitions to build a 'Smart Economy'[1].

As noted above, the 2.5 – 2.69 GHz band has been identified by the European Commission as the IMT expansion band and is seen as the preferred band for mobile broadband services in Europe and elsewhere in the world. The suitability of the spectrum band is largely due to the large amount of spectrum available (190 MHz) and enabling technologies such as LTE and WiMAX which will deliver bit rates of up to 150 Mbit/s, using 20 MHz channels.

Based on the populations where the band has already being released or will soon be released, i.e. Austria, France, Poland and the UK there is already a very large target market (268 million people) in the EU for suppliers of equipment in this band, with the associated economies of scale that this brings.

International trends to date strongly indicate that LTE will be the dominant technology deployed, as this is the preferred evolution strategy for incumbent mobile operators. Indeed, Telia Sonera launched LTE in the 2.6GHz band in Stockholm and Oslo in December 2009. Many other networks will follow shortly, using the 2.6 GHz band, the 800 MHz band or a combination of both. Even if the 2.6 GHz band becomes available in 2012/14, Ireland will be two to four years behind the trend in Europe.

As of the 31/03/2010, UPC has 72,100 MMDS subscribers[2]. Due to the take up of Satellite TV services in Ireland, the number of MMDS subscribers has been dropping by approximately 14,500 subscribers per year since December, 2006. Tying up 190 MHz of key spectrum across all of Ireland (70,000 square km) for a very small number of subscribers, and subscriber numbers that are decreasingly dramatically year on year, is extremely inefficient in terms of spectrum use, particularly where alternative solution, such as Satellite TV and Terrestrial TV are available. In contrast, by making the 2.6 GHz band available in the urban areas alone, over 2 Million people could avail of speeds up to 150 Mbit/s, from up to 4 separate operators. Meteor would argue, therefore, that it is in the greater good of consumers and of the Irish economy in general to make the 2.6 GHz band available as soon as possible.

In answering this Call For Input, Meteor has put forward its views on the range of factors we believe that ComReg must consider in its forthcoming review of the current and future use of the band.

Based on our analysis in the remainder of this submission we strongly believe that the current licences should not be renewed and that plans should be put in place to release the band for alternative uses as soon as practicable. In parallel spectrum reform must be progressed to ensure that a more flexible licensing regime is put in place to facilitate competitive market evolution and the promotion of investment.

[1] Building Ireland's Smart Economy – A framework for sustainable renewal
[2] Liberty Global Reports, First Quarter, 2010 Results

1 THE NEED FOR REFORM

Inconsistent approach to licence expiry

There is an obvious inconsistency in the approach to licence renewal and legislation between MMDS licences and other licences, such as GSM 900/1800 MHz. The MMDS licences which currently serve 72,100 subscriptions and consume approximately 190 MHz of spectrum, are being considered for licence renewal. While the GSM 900 MHz licences serve 4.8[3] million subscriptions and consume 70 MHz of spectrum are being excluded from any form of licence renewal.

Licensing reform

The 2.6GHz band has been in use in Ireland for the distribution of broadcast TV since 1991 following decisions taken by the Government in 1988. The original licences were initially for a 10 year term. Following a review in 1998 (see ODTR 98/33, 98/63) new legislation was put in place (SI 73 of 1999) and new MMDS licences were issued to the existing licences with effective expiry dates of 18th April 2014. The new licences introduced the potential of possible renewal for a further five years. If the MMDS licences are extended for a further five years Ireland will miss out on the opportunities presented for the 2.6GHz band by the EC Decision.

Meteor has, in response to previous DCENR and ComReg consultations over the years, called for review and reform of the national spectrum licensing regime to inject flexibility into the system. The issue at hand highlights yet again the need for real reform to be swiftly introduced. The speed of change in the communications sector continues to accelerate. The regulatory regime must facilitate rather than hinder change. A review addressing the future use of the 2.6GHz band is overdue particularly in light of the 2008 EC Decision. The question mark hanging over the 2.6GHz band has created an unreasonable level of uncertainty.

Decisions were taken and enshrined in legislation in 1999 (and carried forward into SI 529 of 2003). The MMDS legislation, Regulation 8(1) appears to impose a restriction that ComReg may not, in any circumstances, review the operation of the licences with regard to their continuing in force prior to 18th April 2010. Meteor is not aware of the rationale for this restriction. In addition we note ComReg's intention in 2003 (ComReg 03/105) and in 2005 (ComReg 05/36) to review use of the band and to develop a coherent strategy to facilitate 3G use in the band. It is assumed, therefore, that in the absence of such reviews occurring, that ComReg has felt itself constrained by what is set out in statute. It is disappointing that decisions taken in 1999 have created this situation. Plans should already be underway to open this band for electronic communications services in accordance with the 2008 EC Decision. A more flexible approach to licensing is required.

Meteor has in previous submissions requested that spectrum licensing should move away from prescribed durations. Fixed durations can only be selected in a subjective manner. As evidenced in the case of 900MHz licences the prescribed durations bear no resemblance to the life cycles of investment, service sustainability, or technology. There is no question that the current use of the 900MHz is band is economically optimal and spectrally efficient. It seems clear to us that existing users of the band should be supported, through flexible licensing, in their aims to deliver evolved competitive mobile services in the 900MHz band to the benefit of the citizens and the economy of Ireland.

Meteor maintains that spectrum licences should be issued with indefinite terms, subject to a minimum term after which the regulator may, in certain circumstances, seek to recover the

[3] ComReg Quarterly Key Data Report - Data as of Q1 2010

spectrum after an appropriate notice period is served. Such circumstances should be limited to:

- International decisions
- Sub-optimal economic use
- Inefficient spectrum use

Alternatively, but to the same effect, licences could be issued with rights of renewal, subject to periodic reviews taking into account:

- International decisions
- Optimal economic use
- Efficient spectrum use

It is appropriate, and in the interest of supporting investment that spectrum licensees should have some degree of certainty / predictability as to the tenure of their licence and we believe this can be accommodated through minimum terms and sufficient notice periods if, following a review, spectrum licences are to be revoked or not renewed (depending on the licensing model chosen).

Holistic approach to spectrum availability

While Meteor welcomes the opportunity to contribute to the development of policy in respect of the 2.6GHz band we would reiterate the call for ComReg to take a holistic approach to the consideration of IMT harmonised spectrum availability to facilitate the evolution of advanced mobile broadband services. As highlighted in our responses to previous band specific consultations (covering licensing of 800MHz, 900MHz, 1800MHz and 2300MHz), the future licensing of IMT harmonised spectrum should not be approached on a piecemeal basis.

ComReg's forthcoming review in respect of the 2.6GHz provides a real opportunity to undertake such a holistic review. Policy decisions in respect of the 2.6GHz band can only be taken having fully explored the inter-relationship of the use of this band in Ireland with other IMT harmonised bands. Due consideration must be given to the national timing, availability, capacity demand of the bands, and other factors including trends in Europe of operator and vendor focus to unlock the significant economies of scale that can accrue from harmonised spectrum use. Ireland stands to be a major beneficiary as a fast follower of international harmonisation.

Indeed, Irish mobile operators have consistently requested that ComReg use a holistic approach to spectrum availability. This is essential for secure and solid strategic and business planning, leading to optimum investment decisions. This is particularly true in the current economic climate.

The recent German auction was a very good example of this holistic approach where the 800 MHz, 1800 MHz, 2100 MHz and 2.6 GHz band were released in a single auction.

2 REVIEWING THE CURRENT USE OF THE BAND

The MMDS licences allow for a one-off review and renewal period and, as such, do not conform with models employed for other spectrum bands currently in use in Ireland. However the review to be conducted should consider the use of the spectrum in line with the three criteria listed. In a broader licensing regime a fourth criterion may also be relevant i.e. is the use of the spectrum supporting a societal objective. This criterion is not relevant in the case of the MMDS licences given the ubiquitous nature of analogue and digital TV broadcast services on other platforms.

The forthcoming review should therefore seek to address the following:

International decisions

- Will continued use for MMDS impact on UK plans to use the 2.6GHz band in accordance with the Decision?

The Commission Decision has harmonised the 2.6 GHz for electronic Communication Services (ECS). While the use of MMDS is technically within the letter of the law, as MMDS is a form of electronic communication Service, it could be strongly argued that this is not in the spirit of the law, as it is clear the 2.6 GHz band was really designated for next generation mobile broadband services, supporting higher capacities and bit rates.

The Commission Decision has been in force since December, 2008. Hence, MMDS systems should have been modified to fit within the specified BEMs. Indeed prior to the Commission Decision, Irish studies[4] presented to the Radio Spectrum Committee concluded that "the in-block power levels contained in the annex to Decision 2008/477/EC can be applied to MMDS. As far as out of band BEMs are concerned there were no specific conclusions from Ireland. However, there are general means (e.g. filtering, internal guard bands) to ensure compliance of MMDS systems with the technical parameters of the Decision".

Therefore, the following issues should now be addressed by the regulator:

- Is MMDS compliant with the BEM, in block and out of block?
- If not, when will they be compliant?
- Has a bilateral agreement been made with the UK for non compliance with the BEM?
- The impact of BEM non compliance on alternative ECS use of the 2.6 GHz band
- The impact of BEM compliance on licence renewal

We note that the European Commission has recently highlighted concern that the current licensing of the band does not seem to be compliant with the Decision and that Irish Authorities are in correspondence with the European Commission in this respect[5]. In the interest of transparency we would welcome visibility of this correspondence.

[4] Radio Spectrum Committee – RSCOM08-39
[5] 15th Progress Report on the Single European Electronic Communications Market - 2009

Optimal economic use
Assessment needs to be given to the following:

- Whether the current use for TV broadcast services the best economic use of the spectrum?
- Whether the MMDS service is declining in use?
- The benefits that may accrue if the spectrum is assigned in a harmonised manner?

In a liberalised technology neutral environment, combined with a framework to facilitate spectrum trading the significance of this criterion diminishes, as the market, rather than the regulator can determine the optimal economic use of the spectrum. However in the absence of a reformed framework in Ireland, ComReg must consider optimal economic use in its forthcoming review.

The 2.5 – 2.69 GHz band has been identified as the IMT expansion band and is seen as the preferred band for mobile broadband services in Europe, and elsewhere in the world. This is due to the large amount of spectrum available (190 MHz), enabling technologies such as LTE and WiMAX to deliver bit rates of up to 150 Mbit/s, using 20 MHz channels. In June, 2008 the European Commission Decision, aimed at harmonising the conditions for availability and efficient use of the 2500 – 2690 MHz band for terrestrial systems capable of providing electronic communication services in the community, was issued. Member states were allowed 6 months to enter this Decision into force.

The use of Block Edge Masks (BEM) is key to ensuring harmonisation, whilst safeguarding technology neutrality. The BEMs are clearly identified in the Decision.

Many countries have started the process of making the 2.6 GHz band available. To date, the following countries have released the 2.6 GHz spectrum. In general, the CEPT band plan has been adhered to i.e. encompassing both FDD spectrum (2 x 70 MHz) and TDD spectrum (1 x 50 MHz).

Country	Date	Population
Norway	13/11/2007	4,681,134
Sweden	08/05/2008	9,220,986
Finland	23/11/2009	5,312,800
Netherlands	26/04/2010	16,445,593
Denmark	10/05/2010	5,493,621
Germany	20/05/2010	82,110,097

Other European countries will also make this spectrum available. Austria plans to release the band in 2010, while the UK intends to release the band as part of the larger Digital Britain plan. And, most recently, on 24 June 2010, the Polish telecoms regulator Office of Electronic Communications (UKE), published its intention to launch a tender for Long Term Evolution (LTE) radio spectrum in the 2600 MHz Band later this year. Licences are expected to be awarded in early 2011.

In France, ARCEP[6] launched a public consultation on the methods to be employed for awarding "4G" spectrum licences in the 800 MHz and 2.6 GHz frequency bands as part of a long-term process of investment in ultra-fast mobile networks. The 2.6 GHz band, which is currently used by the Ministry of Defence, is to be freed up region by region, for the most part between 2010 and 2012.

[6] http://www.ranscope.com/france-arcep-says-you-decide-with-public-consultation-on-4g-spectrum-approach

In addition, the 2.6 GHz band is also available elsewhere in the world, with South Africa auctioning this spectrum at present. Clearwire (USA) has requested 3GPP to standardize TD-LTE for operation in the band 2496 – 2690 MHz. In Russia, Yota has announced that it will move away from WiMAX and deploy LTE in the 2.6GHz band.[7]

Based on the populations where the band has already being released or will soon be released, i.e. Austria, France, Poland and the UK there is already a very large target market (268 million people) in the EU for suppliers of equipment in this band, with the associated economies of scale that this brings.

International trends to date strongly indicate that LTE will be the dominant technology deployed, as this is the preferred evolution strategy for incumbent mobile operators. Indeed, Telia Sonera launched LTE in the 2.6GHz band in Stockholm and Oslo in December 2009, currently enabling speeds up to 50 Mbit/s using 10 MHz channels. This will shortly increase to 20 MHz channels with bit rates up to 100 Mbit/s. During Q2 - Q3 2010 LTE coverage in the 2.6 GHz band will be extended to the following Swedish cities: Lund, Västerås, Göteborg, Malmö, Uppsala och Linköping. In Norway, LTE will be deployed in 4 more cities in 2010. A new LTE modem will also provide support for 2G and 3G networks and is scheduled for delivery in Q2 2010.

In Sweden[8], Tele2 Sweden and TeleNor Sweden are jointly building an LTE network (Net4Mobility). The JV includes spectrum sharing in 900 MHz and 2.6 GHz. LTE launch is targeted for end 2010.

LTE network will be deployed by Danish mobile network operator, TDC[9] within the next few months, using the 2.6 GHz band. The initial deployment has been planned in Copenhagen and Aarhus and from here the process will extend to the most densely populated areas in the rest of Denmark.

According to Carsten Dilling[10], President of TDC Operations & Wholesale, LTE is one of the cornerstones of TDC's network strategy which is aimed at giving customers the best broadband experience in Denmark and LTE supports the increasing need for higher network capacity and speed in the coming years, and it is therefore important that the company start using the technology and gather experience as quickly as possible.

The above overview of both European and international developments, it is clearly seen that the 2.6 GHz band will be the most harmonised band for very high speed (up to 100 Mbit/s) mobile broadband across Europe and elsewhere in the world. If this band only becomes available in 2012/2014, Ireland will be 2/4 years behind many countries in Europe, leaving Ireland at a distinctive disadvantage in terms of services available to businesses and consumers and ultimately in terms of wealth creation.

If the spectrum is tied up by MMDS until 2017/19, the disadvantage will be severely compounded.

[7] Dailywireless.org-2010/05/24 – Yota dumps WiMAX
[8] GSA 7/06/2010 "Evolution to LTE"
[9] www.WirelessFederation.com/news - 04.20.10
[10] www.WirelessFederation.com/news - 04.02.10

MMDS use is in decline

Ireland, alongside Latvia, Lithuania, Slovakia and Portugal (Madeira island) use MMDS in the 2.6 GHz band.

As of the 31/03/2010, UPC has 72,100 MMDS subscribers[11]. Due to the take up of Satellite TV services in Ireland, the number of MMDS subscribers has been dropping by approximately 14,500 subscribers per year since December, 2006. The following MMDS subscriber table is based on Liberty global reports.

Date	31/12/06	31/12/07	31/12/08	31/12/09
MMDS Subscribers	117,800	105,200	87,200	74,300

If we extrapolate a continued fall off in MMDS subscribers at 14,500 per annum, then we can expect approximately 16,300 MMDS subscribers in service at 31/12/2013. Even, if we use a more conservative figure of 10,000 per annum, there would still only be 34,300 MMDS subscribers at 31/12/2013.

31/12/2013 is a relevant date for consideration, as the majority of the MMDS licences expire on the 19/04/2014. However, the 31/12/2011 is also a relevant date, as the MMDS licences for Dublin, Waterford and Galway expire on the 19/04/2012. These licences were shortened by two years due to the non compliance[12] of the Digital MMDS rollout with the licence conditions for these areas (licences were held by NTL at the time). While MMDS uses 144 MHz of licensed spectrum nationally (across several licences), ComReg have also indicated that frequency separation of 20 MHz (40 MHz in total) are required to avoid interference with users in adjacent frequencies. This effectively ties up the whole of the 2500 – 2690 MHz band.

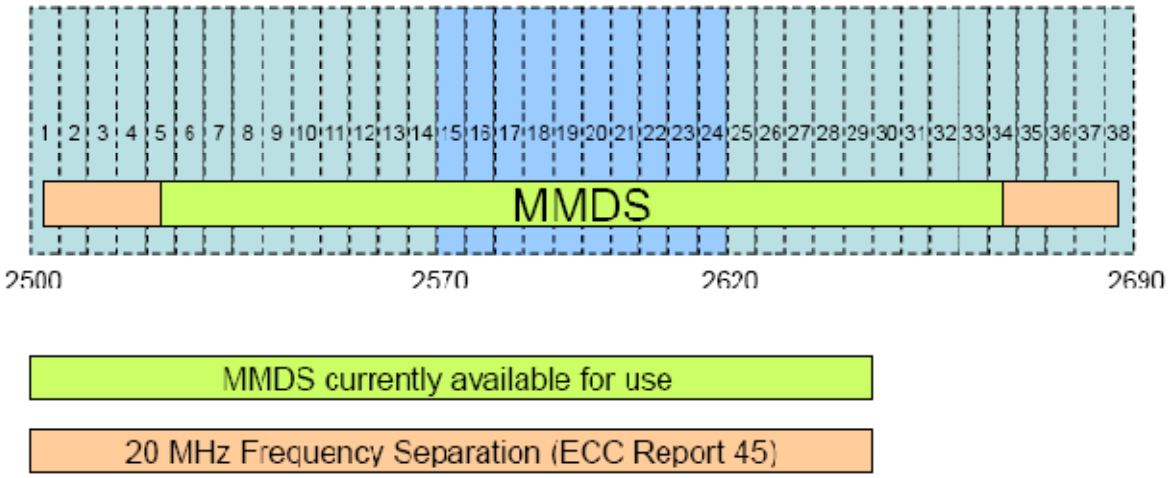

Figure 1 Current use of MMDS in Ireland and the 2.6 GHz band

Tying up 190 MHz of key spectrum across all of Ireland (70,000 square km) for a very small number of subscribers (16k to 72k) is extremely inefficient in terms of spectrum use. Particularly where alternative solution, such as Satellite TV and Terrestrial TV, are available. By making the 2.6 GHz band available in the urban areas alone, over 2 Million people could avail of speeds up to 150 Mbit/s, from up to 4 separate operators. It is in the greater good of consumers to make the 2.6 GHz band available as soon as possible.

[11] Liberty Global Reports, First Quarter, 2010 Reports

[12] ODTR media release 8/11/2002 "Regulator accepts ntl's Guarantee on MMDS Digital Roll Out" – pres081102.pdf

2.3GHz band as an alternative to the 2.6 GHz band
ComReg has consulted on the availability of up to 70 MHz of spectrum in the 2.3 GHz band for WAPECS like services. While this is a welcome opportunity to enable access to more spectrum for operators, the 2.3 GHz is not a substitute for the 2.6 GHz band on two grounds

- The 2.6 GHz band potentially offers up to 190 MHz of spectrum compared to the 70 MHz (National licences) associated with the 2.3 GHz band
- The 2.3 GHz band is not available or harmonised across Europe and is more closely associated with the potential use of TDD – LTE in China and India.
- Due to the lower bandwidth available and the nature of TDD user throughputs there is less available spectrum in the 2.3GHz Band than in the 2.6 GHz Band, with related societal and economic welfare implications

Techniques used to improve spectrum efficiencies and possible coexistence between MMDS and Mobile broadband technologies
One approach which could be considered to allow the co existence of MMDS and other ECS might be to use the following in terms of MMDS:

- Use BEM as per the Commission Decision in 5 MHz channels
- Spectrum efficiency techniques such as MPEG 4 (rather than the existing MPEG 2 format)
- A tighter frequency reuse pattern

If the MMDS spectrum requirements could be restricted to 50 MHz and comply with the BEM, then the unpaired 50 MHz (identified as TDD in Figure 2) might be used for MMDS distribution. This would leave 2 x 70 MHz for mobile BB services. Due to the channel arrangement for FDD, to allow an extra 10 mhz for unpaired operation, would reduce FDD spectrum by 20 MHz. Hence this solution would only be appropriate if the MMDS requirements could be constrained to 50 MHz.

Meteor's recommendation is that the band should be released by award for ECS, and UPC has the option to acquire some of the unpaired spectrum to support MMDS beyond licence expiry.

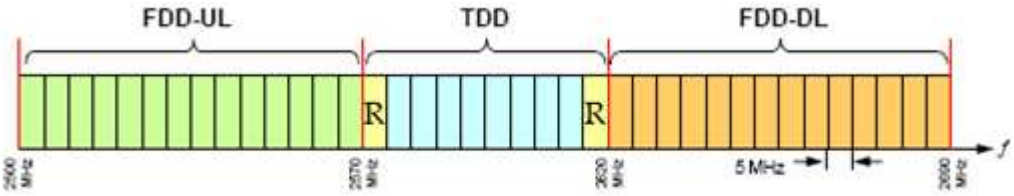

Figure 2 CEPT band plan for 2.6 GHz

Expiry of MMDS licences in Dublin, Waterford and Galway
As mentioned earlier, the MMDS licences for Dublin, Waterford and Galway were shortened by two years due to the non compliance[13] of the Digital MMDS rollout with the licence conditions for these areas (licences were held by NTL at the time).

One of the conditions stated for acceptance of NTL's guarantee to roll out Digital MMDS in November 2002 was that "ntl has guaranteed to Telecoms Regulator Etain Doyle that ninety-five percent of homes covered by ntl's MMDS licensed systems in Dublin, Waterford and Galway will be capable of receiving a digital service by 1 June 2003."

Therefore, in reviewing existing MMDS licensing, the following should be addressed:

- The fact that the initial licence conditions for Digital MMDS were not met
- Whether or not NTL achieved the target of 95% of homes in Dublin, Wateford and Galway set by the ODTR by 1/06/03?

Non use of MMDS in Cable areas – Inherent inefficiencies
ComReg prohibits the use of MMDS in areas served by cable. However, due to the high power of MMDS base stations, signal can still carry over into these cabled areas. If one assumes co sharing of spectrum this effectively means the cable area may not be serviceable by either MMDS or mobile broadband in the 2.6 GHz band,. The above scenario would compound the inefficient use of spectrum.

Therefore, the following should be taken into account when reviewing these MMDS licences.

- To what extent does MMDS coverage extends into cabled areas?
- Have any subscribers been served by MMDS in cable areas?

CONCLUSION

On balance, from our analysis above, it seems to Meteor that the review should naturally conclude that the current MMDS licences should not be renewed. The current use is not compliant with the 2008 Commission Decision. Use of the service is in decline. There are economically more advantageous uses for the spectrum.

Meteor would urge ComReg to undertake and complete the review as quickly as possible so that an open award process, in conjunction with other unassigned IMT harmonised spectrum, may be progressed.

[13] ODTR media release 8/11/2002 "Regulator accepts ntl's Guarantee on MMDS Digital Roll Out" – pres081102.pdf

21 Motorola, A/S. Ltd

Intended for Public Disclosure

Ms. Sinead Devey
Commission for Communications Regulation
Irish Life Centre
Abbey Street
Freepost
Dublin 1
Ireland

Reference: Submission re ComReg 10/38

Motorola response to: "Call for input on potential uses and future licensing options of the 2.6 GHz spectrum band"

June 25, 2010

Introduction

Motorola is pleased to have the opportunity to contribute to the Commission for Communications Regulation's "Call for input on potential uses and future licensing options of the 2.6 GHz spectrum band."

The further improvement of Ireland's communications infrastructure is an important undertaking that offers the potential to enable further significant economic and social advancement.

Background

We fully understand the special Irish situation with regards to the current use of the majority of this band for MMDS systems and how current EU legally binding measures, such as 2008/477/EC through intensive consultation with the Radio Spectrum Committee (RSCOM08-39) is potentially fully compliant with the BEM's with the Technical Annex of 2008/477/EC and as such with the principle of Technology Neutrality under the EU WAPECS regime.

Motorola is of the opinion, that this indeed is good news for a future smooth transition in Ireland to new, mobile technology platforms, which may reap the benefits of the EU single market in this band between 2014 and 2019 and beyond as the band gets cleared from MMDS according to national demand.

Motorola, A/S., Global Government Affairs-EMEA
Sydvestvej 15
DK-2600 Glostrup
Denmark

Intended for Public Disclosure

A proposal for a smooth transition

As MMDS licenses gradually expire after 2014 we expect this process to evolve in fragments across the 2.6 GHz band as unpaired MMDS segments become available.

In general, in order to fulfil the need of a new mobile operator a minimum total lot of 20 MHz will typically be required for top level IMT technology. Given the way spectrum becomes available in fragments we take the view that unpaired lots of at least 20 MHz (TDD based platforms) could be licensed if FDD profiles are not possible given the nature of the MMDS transition going forward.

TDD based technologies can accommodate flexibility in the transition during changing spectrum environment since only a single contiguous spectrum block is need as opposed to a specific paired block of spectrum.

If however paired FDD spectrum can be established in the post-MMDS times, we take the view that the minimum lot size should be 2x10 MHz per operator but assess that any additional lots per operator could be allocated with a granularity of 2x5 MHz so that 2x15 MHz and larger pairings are available. This would increase flexibility and foster competition which provides a valuable service to consumers. Smaller bandwidths than 10 MHz could the opportunity for operators to migrate to technologies which provide the most competitive broadband services to the residents of Ireland.

With the best regards

Questions in the first instance should be directed to

Motorola
Steffen Ring, Senior Director
Global Government Affairs,
Spectrum and Regulatory Matters
Steffen.ring@motorola.com

22 Paul McMonagle

Dear Sir / Madam,

I understand that there is a possibility that UPC may loose the frequency they require to operate the MMDS service throughout Ireland. I wish to lodge my objection to this short sighted move. I work for UPC and am I with others will be at certain risk of loosing our jobs should your plan succeed. I was involved with the mmds launch in 1990 and it was welcomed in all area,s accept those with local deflector system. The MMDS was the first service to offer people RTE2 & TV3 & TG4 in some area,s who previously could not receive them due to coverage issues by RTE.

MMDS operates with a sucessful range of services and a very much improved back up service over the last number of years. The experience lost to the industry if this goes ahead will be immense.

UPC have invested heavilly to bring this service from a basic of 8 analogue channels to the current offering of digital TV & Radio channels including the Digital Video Recorder.

The local spend due to MMDS in every town in the Country from Employees and Contractors is much higher then Sky. this has a knock on spend for other industries etc.

The proposed notion should be dismissed and in fact I suggest that your Dept should support UPC by offering assistance to launch a triple play product to MMDS subscribers, we receive requested every day for a broadband / Voip products from our Customers.

I hope this is looked at seriously.

Yours Sincerely,

Paul McMonagle,

23 Peter O'Brien

Dear Ms. Sinead Devey,

I am writing to you to express my interest in the re-issuing of the MMDS license. I have been a availing of MMDS for about 17 years through the various companies that have operated it which is now under UPC. I am a very satisfied customer with the status quo and wish to remain so. While initially MMDS represented my only option for multichannel, it is now the best value option for me. The alternative being sky, are a little suspect in my opinion. Even the current ad campaign which espouses its good value of €22 a month has small print down below George Hook that states prices will increase from 1/9/2010, to what I don't know.

I don't like the idea of sky having a monopoly in the country. considering their track record of turning sporting events into pay per view rather than showing them on their sports channels I feel that the more operators there are who sell the channels and not the events in their packages can only be a good thing for increasing access.

In fairness to UPC, they operate a good service and its best to have the option of MMDS with them and possibly not avail of it rather than have no option at all and want to avail of it.

Yours Sincerely,

Peter O'Brien

24 Ray Daly Communications Ltd

RD Communications Ltd
Unit 12
Waterford Business Park
Cork Road
Waterford
Telephone: 00 353 51 580041
Email info@rdcomm.ie

15th June 2010

Submission Re: ComReg 10/38"

Ms. Devey
My name is Ray Daly and I am Managing Director of RD Communications Ltd, operating from Waterford City and servicing the south east area as a MMDS contractor to UPC Ireland. I employ 22 people and given the current difficult trading environment, if UPC Ireland were to lose their MMDS licence our company will in all probability cease trading with the subsequent loss of the above employees.

I have been working in the TV aerial / CATV industry for approximately 32 years and before the arrival of MMDS, terrestrial TV in areas outside of cabled areas was a world away from the services provided in those same areas today. Illegal deflector operators were unregulated and at their whim could effectively decide if and when rural communities could watch TV, indeed in certain areas before the advent of MMDS, certain area had difficulty in receiving RTE analogue terrestrial reception in the VHF band, with ghosting, reflections, co channel etc. MMDS solved all of the above with the addition of the RTE channels to the MMDS platform.

Today UPC provide an excellent service to rural communities with back up service guaranteed and free, as opposed to SKY TV, where aftercare service is consumer led and sometimes with great difficulties hard to nail down, pre repair itemised and fixed prices and people suitably qualified to address same.

We at RD Communications Ltd have a vested interest in UPC continuing to operate the excellent service they currently provide and it is our hope they will continue to do so in the future consolidating local, secure, sustainable, tax generating employment. UPC provide real choices and competition in the market place and for them not to be able to do so in the future would be a retrograde step

Hoping those responsible for allocating the MMDS licence will take cognisant of all the above in their decision.

Yours: _____
Ray Daly (Managing Director)

25 Rigney Dolphin

Unit10-11, IDA Industrial Estate, Cork Road, Waterford.

Ms. Sinead Devey
Commission for Communications Regulation
marketframeworkconsult@comreg.ie

18-06-10

Re: Future licensing options of the 2.6 GHz spectrum band

Dear Ms Devey

Rigney Dolphin Group provide outsource, business process solutions for a wide range of clients including UPC. Specifically we provide customer service, sales and technical support.

As such the current call for input on the future use of the 2.6Ghz spectrum band is of direct concern to us.

Rigney Dolphin has been a supplier of services to UPC for three years and would strongly support the continuation of this service. Their continued presence in the market impact directly not only on us but also on the local economy.

We would like to voice its support for the continuation of UPC's MMDS service in the 2.6Ghz band.

Yours sincerely

Dr Frank Dolphin
Chairman

26 Setanta Sports Ireland

Michael O'Rourke
CEO
Setanta Sports Ireland
Broadcasting House
3A Princes Street South
Dublin 2
Ireland

Ms Sinead Devey
Commission of Communication Regulation
Block DEF
Abbey Court
Irish Life Centre
Lower Abbey Street
Dublin 1

23rd June 2010

Ref: Call for input on potential uses and future licensing options of the 2.6 Ghz spectrum band

Dear Ms Devey

Setanta Sports fully supports UPC Ireland's application for the renewal of the MMDS licences in order to ensure the continued provision of television services to over 100,000 homes based primarily in the rural community in Ireland.

Setanta Sports Ireland has a long standing relationship with UPC having entered in to agreement in 2002 to make our Premium Sports Channel part of the UPC basic television service. This channel was subsequently rolled out to UPC MMDS base in 2003 and continues to provide a wide variety of premium sports such as Premier League football and GAA to this customer base.

Setanta Sports believes that the removal of these licences would adversely affect competition and limit the options available to this base to receive and enjoy premium Irish sports at an affordable price.

Yours sincerely

Michael O'Rourke
CEO
Setanta Sports Ireland

27 Shane Daly

Ms Sinead Devey
ComReg
Irish Life Centre
Abbey Street
Dublin 1

Hi Sinead

I would like to make the following submission regarding the “licensing options” document posted on your web site

http://www.comreg.ie/publications/information_notice_-_call_for_input_on_potential_uses_and_licensing_options_of_the_2_6_ghz_spectrum_band.583.103624.p.html

I live in south Dublin, and my TV service is provided by UPC’s MMDS service - I cannot receive cable TV

My only other option for multi channel TV would be to subscribe to a satellite service provider such as Sky TV

The MMDS service provided by UPC is excellent and more competitively priced than any comparable Sky packages.

If in the future if Sky were to be the sole provider of such TV services they would have a monopoly, thus putting them in a position where they could control both viewing content and pricing

This I believe would be a backward step in providing customer choice and ensuring Ireland maintains a competitive market

UPC’s ability to provide an MMDS service also impact on the local economy providing jobs and revenue for the government, coupled with the fact that as ComReg regulates UPC’s it ensures that Irish TV station are provided as standard

In the future if DTT is ever rolled out it will not be a comparable service, in that it would not be able to provide the same number of channels that UPC currently can on the MMDS system and so I don’t think this will be a viable alternative solution in Ireland for customers using UPC

So to conclude and for the above reasons I would like to encourage ComReg to favourably consider UPC application for renewal of the licence spectrum for MMDS transmissions in 2014, so that I can continue to revive an excellent service at the most completive price

Regards
Shane Daly

28 Telefonica O2 Ireland Ltd

The 2.6GHz Spectrum Band

Potential Use and Licensing Options

25th June 2010

Introduction

The 2.6GHz band (2500MHz to 2690MHz) will play an important part in the delivery of mobile broadband services, and O2 (Telefonica O2 Ireland) commends ComReg on the approach it has taken to review future use of the band. This is a practical approach to the review and it should inform ComReg's consideration of the various issues involved. O2 expects that it will produce a better result than if ComReg had just issued proposals for consideration. It is O2's expectation that all of the responses received will be published, and that there will be a further opportunity to make comments before any decision is made. On that basis, this is an initial input and does not dwell on ComReg's functions, procedures, etc.

Holistic Approach

In a number of recent consultations, O2 has raised the importance of having a holistic approach to spectrum planning and licensing. Operators need to plan the roll-out of networks and delivery of services for a number of years in advance. There are a number of radiofrequency bands with different characteristics that would be considered for use, and operators need to plan around equipment availability, propagation characteristics, and spectrum availability. At present, operators will be considering the use of several bands, including 800MHz, 900MHz, 1.8GHz, 2.1GHz, 2.3GHz, and 2.6GHz for mobile or portable broadband services. Not all of this spectrum is currently available, however operators need to know what quantity of spectrum will be available in which bands, and in which timeframe so that they can properly assess their demand for any one band. O2 would ask ComReg to ensure, given its responsibility to implement a spectrum strategy for Ireland, that a clear allocation strategy is in place for the above spectrum ranges. O2 would ask ComReg to ensure, given its responsibility to implement a spectrum strategy for Ireland, that a clear allocation strategy is in place for the above spectrum ranges. O2 hopes, in the meantime, that this consultation process will quickly clarify the availability of the 2.6GHz band at least.

O2 recognises that 2.6GHz is not "a green field site" but is an important band for developing the competitive market and for NGA in Ireland. ComReg need to figure out a way to make the transition while avoiding holding back the deployment of LTE, but also avoiding unnecessary disruption to existing services.

Demand for Access to Spectrum

There are a number of trends in the electronic communications sector that are well accepted at this time, including:

- The volume of data transiting communications networks is going through a period of unrelenting growth. Driven by richer applications and content, this is set to continue for as long as any commentator is brave enough to make a prediction.
- More and more, consumers wish to have mobile and nomadic access to communications services. Most emerging applications or services quickly move from fixed-only to mobile and fixed access, and many are being developed specifically as mobile applications. There are now substantially more mobile access paths than fixed, both globally and in Ireland. More voice minutes are carried on mobile than on fixed networks, and the proportion of data carried on mobile networks is also growing, driven by Smartphones and Broadband Dongles.

- Convergence between traditional broadcasting and other electronic communications services is already here, with increasing non non-real time consumption of content, the use of media players, and the emergence of large and small-screen viewing.
- There is a general move to services based in "the cloud", that will again increase the demand for access at various times and locations
- A disconnect has emerged between traffic and revenue - rather than track the growth in demand for capacity, revenues are generally falling. Operators need to find a way to deliver more throughput at lower cost.
- While technology advances mean that we will get more throughput from existing spectrum assignments, a substantial release of sub-5GHz spectrum will be needed in the coming years for networks to be able to meet growing demand for capacity.

The roll-out of next generation access (NGA) networks is seen as critical for the development of a competitive economy, and ComReg has previously acknowledged the need to make liberalised spectrum available in sufficient quantities to facilitate the roll-out of NGA networks.

2.6GHz is a Core Band

There are many advantages for both operators and consumers if networks can be rolled out on standardised bands. This includes the availability of a broad range of consumer equipment, and scale manufacturing to reduce costs, but also planning, capability, and compatibility information that make up a complete eco-system within which the service can work. Standardised equipment also increases the possibility of roaming. 2.6GHz is a Core Band in Europe for mobile communications and will be the first band in widespread use throughout Europe for LTE services. A number of European Regulators have already assigned this spectrum for mobile communications services, including Norway, Sweden, Finland, The Netherlands, Denmark, and Germany. Many other European and non-European NRAs are currently preparing for the release of the spectrum, including the UK, Austria, and South Africa.

The European Commission Decision on the band (2008/477/EC) clearly sets out the intention that the 2.6GHz band should be available throughout the EU, under harmonised conditions:

> *"Article 1*
> This Decision aims at harmonising the conditions for the availability and efficient use of the 2 500-2 690 MHz band for terrestrial systems capable of providing electronic communications services in the Community.
>
> *Article 2*
> No later than six months after entry into force of this Decision Member States shall designate and subsequently make available, on a non-exclusive basis, the 2 500- 2 690 MHz band for terrestrial systems capable of providing electronic communications services, in compliance with the parameters set out in the Annex to this Decision."

The decision envisages that the spectrum will be made available on a service and technology neutral basis, in accordance with the WAPECS principles, however as can be noted from the recitals, it is clear that the use should be standardised:

> "(3) It is expected that the wireless broadband electronic communications services for which the 2 500- 2 690 MHz band is to be designated will to a large extent be pan-European in the sense that users of such

> electronic communications services in one Member State could also gain access to equivalent services in any other Member State."

2.6GHz will be a standardised band for LTE services throughout most European countries, and European standard equipment compatible with existing mobile services will be available. The band can play an important role in role in meeting demand for capacity in mobile NGA networks, and ComReg should bring forward the release of spectrum for these services.

Current Status in Ireland

Unlike many other European countries, we are not starting from a "Green Field" position in Ireland as there is existing use of the band to provide MMDS service. While two separate licences exist, covering different geographies and expiring in 2012 and 2014, both are held ultimately by a single company - UPC. The services provided include both analogue and digital technology, and the current assignment is such that almost the entire band is used. This means de facto that a single operator currently controls the entire band – no other service or service provider can gain access to the band.

In Ireland, MMDS services are provided under the Wireless Telegraphy Act 1926, as licensed in accordance with the Programme Services Distribution Regulations (SI 529 of 2003). Two licences are in effect, the Chorus licence which expires in 2014, and the ntl: licence which expires in 2012 having had its original term reduced. The Regulations provide for a possible extension:

> 8 (1) The Commission will, after 18 April 2010, and subject to such conditions and restrictions as are prescribed in regard thereto by these Regulations, and after such public consultation (if any) as the Commission considers appropriate, review the operation of all such licences so granted and continuing in force and may, subject to such terms and conditions as may be specified by the Commission, renew any such licences which are in force on that date for a further period of up to 5 years from 19 April 2014.
>
> (2) Where the Commission makes a determination under paragraph (1), not to renew a licence, it may by notice in writing served on the licensee, require him or her, from the date of receipt of the notice, until the expiration of the licence term to comply with such measures relating to the upkeep of the system as may be specified in the notice.

O2 notes that there is no automatic right of extension, but that ComReg must carry out a review of the licences, and the regulations clearly envisage that there might be no extension as they provide for the upkeep of the system until expiry without extension. This current consultation gives effect to the commencement of ComReg's review, and as stated previously, O2 expects that there will be further consultation prior to ComReg making any decision.

Any review of the use of the band must take into consideration the benefit of competition and innovation that a release of the spectrum to the market would bring, and conversely any opportunity cost arising from an extension.

The review should also consider the efficiency with which the current MMDS systems use the spectrum, as envisaged in paragraph 3.3 of the RSC Working Document (RSCCOM 08-39):

> "Taking into account the long expiration deadline, it is likely that the availability referred to in Article 2 of the Decision could be hampered. Consequently, it is important that MMDS is treated in accordance with the EC Decision as outlined in Scenario 2 (Section 3.2) above. Furthermore, an investigation should take place to which extent the MMDS operator is using the frequencies efficiently and whether the occupation of the entire 2500-2690 MHz band is justified. For example, it could be argued that when MMDS operation changes from analogue to digital (necessitating a change of customer equipment anyway), state of the art technologies, including MPEG4 compression, should be used to ensure efficient and effective spectrum use.

ComReg's review should take a view on the quantity of spectrum in the band that would be required for MMDS if MPEG4 digital service was used exclusively. As part of the consultation process, ComReg should publish a report on the current use showing the number of subscribers by technology, in each geographical area.

Extension Precludes Change of Use

O2 further notes that the MMDS Regulations and the Licences provide for the distribution of broadcast television services only. The provision of Broadband data access or other two-way services are not permitted under the MMDS licences. Any extension to the licences that can be granted under the Regulations would necessarily include the continuation of the same restrictions, meaning that the spectrum remains "locked in" under the current Regulations. Any change of scope would be outside of the extension provided for under the Regulations and would require ComReg to offer the spectrum to the market through an open transparent and non-discriminatory process.

Orderly Transition

While O2 believes ComReg must release the spectrum to the market at the earliest opportunity it is acknowledged that existing services will need to be migrated or re-tuned in a manner that avoids unnecessary disruption to consumers. If the spectrum is to be offered to the market in an open process, then it is possible that UPC would retain some or all of the band. In this case there would be no disruption and UPC would be free to manage the transition to new technology. However ComReg should seek if possible to avoid the possibility of significant disruption to existing services. O2 can understand that UPC would not want to face the possibility that access to the entire band could be withdrawn at very short notice. As discussed below, O2 believes it may be possible to release spectrum on a service and technology neutral basis, while at the same time maintaining MMDS service where it is most required – at least for long enough to allow for an orderly migration.

Licensing and Transition Options

O2 is of the view that there are significant benefits to be gained by releasing the 2.6GHz spectrum on a service and technology neutral basis. The primary emerging demand in the band will be to provide next-generation mobile access using LTE technology. O2 believes it should be possible to make an orderly transition from the current situation whereby MMDS licences cover the entire usable band, but in a restricted and probably inefficient way.

There are three different dimensions by which the existing MMDS services and any new applications could be separated – time, frequency, and geography. Providing a sufficient separation on any one, or more of these dimensions could allow for a transition whereby the demand for release of spectrum can be met when and where needed, but also disruption to consumers can be avoided.

Geographic/Time Separation

MMDS was introduced in Ireland for the purpose of bringing multichannel TV to suburban and rural areas that would not be served by Cable. Multichannel TV service is available nationwide via Satellite, and in addition almost 880,000 or 70% of homes are passed by Cable TV. It is the 30% of homes outside of Cabled areas for whom MMDS currently provides an alternative to satellite, and in general these are in rural areas. O2 does not believe that the ongoing use of the 2.6GHz band for television broadcasting service can be justified in areas where Cable is generally available. The transition from MMDS may take longer in rural areas.

By contrast, the first demand for use of LTE in the 2.6GHz band is likely to be in urban areas where networks become congested. ComReg should examine the possibility of introducing LTE in urban areas early while allowing MMDS to continue operation for longer in more rural areas. This would facilitate the early introduction of LTE where needed, while also minimising disruption to the existing MMDS customers who are most dependant on it – those in rural areas. This solution would be dependent on geographic separation being sufficient to avoid interference between the two systems.

Frequency Separation

The entire 2.6GHz band spans 190MHz (2500MHz 2690MHz). To avail of standardised equipment, the band plan used in Ireland will need to follow that in the EC Decision. It allows for flexibility of use, however where Frequency Division Duplex (FDD) is to be used, it specifies a duplex separation of 120MHz. In other countries where the band has recently been licensed/auctioned, it has been divided into three sections, FDD uplink and FDD downlink separated by a band for Time Division Duplex (TDD). O2 is of the view that availability of TDD standardised equipment will lag FDD somewhat. This creates the possibility to release FDD spectrum early, while allowing MMDS to continue operation using the central 50MHz TDD block for some time. As LTE is likely to grow from urban areas, and MMDS is likely to retreat to rural areas, there will be some geographic separation between the two services at any time. This should minimise the need for guard-bands or restrictions at the edges of the TDD block.

Licensing Options

The early availability of spectrum is important, but also certainty about availability so that operators can plan the use of spectrum in their networks. That is not to say that the availability should always be delayed in order to give certainty. ComReg should not wait until bands have been released from use to plan the reallocation and make assignments. Realistic dates should be set and the assignment process should proceed in advance of the spectrum being vacated, so that the new use can commence without delay when the spectrum has been vacated.

ComReg could use one of many methods for assignment, so long as it meets with ComReg's general obligations, including that it is transparent, fair, and objective. Auction may be a suitable method of assignment, however this will depend on the specific details proposed. O2 repeats that it is

important for ComReg to take a holistic approach to the release of spectrum, rather than piecemeal one band at a time.

Licence Conditions

Given the scale of investment required, the growth in demand for capacity, and the decoupling of revenue from traffic, there are many sound reasons why operators might chose to collaborate in the build-out of LTE networks. This will need to emerge from the market, however nothing in the terms and conditions should prevent such collaboration. Licences should be service and technology neutral, and should permit spectrum sharing, and spectrum pooling, etc.

29 THELINOR

THELINOR

TV & Mór

Input on potential uses and licensing options of the 2.6 GHz spectrum band

Hi,

Please find below the response regarding the Call for input on potential uses and licensing options of the 2.6 GHz spectrum band.

Company Background

Thelinor Limited are a Dublin based company employing over 60 people our core business in the installation and maintenance of Digital TV products on behalf of UPC, Of the digital TV installed 50% would be on the MMDS network, The company founder come from a strong background in MMDS and have over 15 years experience in this field, They have seen it grow from an analogue based 12 channel system to a 9 multiplex system offering over 100 hundred TV and radio stations. Thelinor have invested heavily in this area of its business as it feels it is a viable technology

Use of Spectrum

UPC currently use 2 transmission systems in this bandwidth in Ex chorus DVB-T with 14 multiplex's and in ex NTL areas DVB-C with 9 multiplex's both carrying a similar channel lineup. Should UPC be awarded an extension of the license this would allow UPC to invest in the networks to unify them across all areas using the most up to date technology, Using today's technology as MPEG4 with DVB-C or DVB-T 2 would allow UPC to dramatically improve the use of Bandwidth offering its customer services of that comparable to customer fed off traditional HFC network

Thelinor participated in an MMDS Wireless Broadband trial with UPC using Bandwidth in this spectrum along with Bandwidth in the 2.3 spectrum which worked extremely well and proved very successful. This in itself is another avenue that could be explored by UPC and Comreg .This would see an estimated 85% of the population covered with high speed broadband service in a very short period of time. Bringing Ireland up to be one of the best when offering broadband to its population.

Competition in the market

The license renewal will see the continuation of fair competition in the TV market as Ireland does not have its own Satellite system. The only option for customer living out the HFC network would be service provided by BSKYB this in itself would give BSKYB a monopoly in the TV market in Ireland and offer zero competition to the consumer

While Thelinor recognise that the launch of DTT is immanent the offering that will be available on the commercial side will be in no way comparable to that offered by BSKYB and indeed UPC

Conclusion

Thelinor believes that UPC have shown a strong commitment to the Irish market and have invested heavily to upgrade networks to offer customers a Real and efficient whilst offering value for money.

Should the license remain with UPC Thelinor firmly believes that a significant investment would be made to dramatically increase the quality and range of services offered through MMDS. This in turn will create employment and offer customers real value for money and fair competition.

Thank you for taking the time to read this response.

Slán Go Foill

Dave Thompson

Managing Director

Thelinor LTD

30 Three Ireland

Ms Sinead Devey
Commission for Communications Regulation
Irish Life Centre
Lower Abbey Street
Dublin 1
BY REGISTERED POST AND EMAIL: sinead.devey@comreg.ie

25 June 2010

Dear Sinead

SUBMISSION RE: COMREG 10/38

I refer to ComReg Doc. No. 10/38, *"Call for input on potential uses and future licensing options of the 2.6 GHz spectrum band"*. Hutchison 3G Ireland Limited ("3") welcomes the opportunity to provide the following input. ComReg should make the 2.6 GHz spectrum band available as soon as possible and should not renew the MMDS licences currently held by UPC (Ireland) Limited ("UPC") in this band. 2.6 GHz is critical to the future of broadband in Ireland. It provides mobile operators with the spectrum they need in order to effectively compete with fixed and cable next generation networks. If ComReg does not make 2.6 GHz available as soon as possible, Ireland will lag behind the rest of Europe in relation to the roll-out of LTE and next generation broadband. LTE will be rolled out in 2.6 GHz from 2016. 3 looks forward to a prompt, full and forthright consultation in respect of this matter.

ComReg should make the 2.6 GHz spectrum band available as soon as possible

ComReg should make the 2.6 GHz spectrum band available as soon as possible and should not renew the MMDS licences currently held by UPC in this band. Section 12 (1)(b) of the Communications Regulation Act, 2002, as amended provides that it is an objective of ComReg to ensure the efficient management and use of the radio frequency spectrum. Regulations 8 (1) and (2) of the Wireless Telegraphy (Multipoint Microwave Distribution System) Regulations 2003 provide:

"(1) The Commission will, after 18 April 2010, and subject to such conditions and restrictions as are prescribed in regard thereto by these Regulations, and after such public consultation (if any) as the Commission considers appropriate, review the operation of all such licences so granted and continuing in force and may, subject to such terms and conditions as may be specified by the Commission, renew any such licences which are in force on that date for a further period of up to 5 years from 19 April 2014.

(2) Where the Commission makes a determination under paragraph (1), not to renew a licence, it may by notice in writing served on the licensee, require him or her, from the date of receipt of the notice, until the expiration of the licence term to comply with such measures relating to the upkeep of the system as may be specified in the notice."

They do not create any presumption in favour of renewal. If ComReg were to renew the MMDS licences currently held by UPC, it would be contrary to European Union State Aid law.

Article 107 of the Treaty on the Functioning of the European Union provides:

"Save as otherwise provided in this Treaty, any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall, in so far as it affects trade between Member States, be incompatible with the common market."

There are four elements to this prohibition: (i) transfer of State resources; (ii) economic advantage; (iii) selectivity; and (iv) effect on competition and trade. Taking each of these in turn: (i) renewal of the MMDS licences currently held by UPC involves the transfer of State resources; (ii) it confers an economic advantage on UPC that it would not have received in the normal course of business; (iii) it is selective in that it provides UPC with an opportunity to remedy its failure to properly plan for the expiry of its MMDS licences in 2014 but does not provide for a similar benefit for H3GI, a competitor of UPC in the retail market for broadband services in Ireland; and (iv) it has an effect on competition and trade: UPC is involved in an economic activity and operates in a market in which there is trade between Member States. It is not necessary for ComReg to renew the MMDS licences currently held by UPC in order to protect consumers from significant service disruption. Firstly, UPC can bid appropriately for spectrum in the 2.6 GHz band. Secondly, if it is unsuccessful in obtaining 2.6 GHz spectrum, it can extend its cable infrastructure to provide its services to the affected customers. Finally, there is sufficient competition in the Irish market to provide services to the customers of UPC in the event that it were to lose or effectively lose its licence.

2.6 GHz is critical to the future of broadband in Ireland

2.6 GHz is critical to the future of broadband in Ireland. It provides mobile operators with a significant amount of spectrum for the purposes of both capacity and speed. As a result, it provides mobile operators with the spectrum they need in order to effectively compete with fibre and cable next generation networks.

If ComReg does not make 2.6 GHz available as soon as possible, Ireland will lag behind the rest of Europe in relation to the roll-out of LTE and next generation broadband

If ComReg does not make 2.6 GHz available as soon as possible, Ireland will lag behind the rest of Europe in relation to the roll-out of LTE and next generation broadband. LTE will be rolled out in 2.6 GHz from 2016.

3 looks forward to a prompt, full and forthright consultation in respect of this matter.

Yours sincerely

MARK HUGHES
Head of Regulatory

31 TV3 Television Network Ltd

Ms. Sinead Devey,
Commission for Communication Regulation,
Irish Life Centre,
Lower Abbey Street,
Dublin 1.

14th June 2010.

Ref: ComReg Document 10/38
– Call for input on potential uses in future licensing options of the 2.6 GHz spectrum band

Dear Ms. Devey,

TV3 wishes to comment on the above referenced Consultation. Whilst TV3 is not a platform provider or direct user of the spectrum referred to above, TV3 believes that it is important that any spectrum that is currently used to provide Irish audiences with television services, particularly those not in the hands of a State monopoly, should be maintained. This is important for the following reasons:

(a) It is necessary to have a variety of mechanisms available for the Irish audience to obtain its television programming. This is important to encourage a diversity of service providers and to ensure that no one provider (State owned or otherwise) has a monopoly of provision of these types of services. It is important that customers have a variety of providers in order to ensure fair and competitive pricing in the market.

(b) The 2.6GHz spectrum band is currently used to provide multi-channel Pay-TV to a great many homes in rural Ireland. If this spectrum were allowed to be used for other services a large number of homes in the more rural parts of the country would lose their Pay-TV service.

(c) Furthermore, MMDS service providers are obliged to provide all subscribers with all "must carry" channels. If this situation changes it would mean that some viewers could be left without access to Irish Free to Air channels and the Irish broadcasting sector would lose valuable support.

TV3 Television Network Limited, Westgate Business Park, Ballymount, Dublin 24, Ireland
Tel: +353 1 419 3333 Fax: +353 1 419 3302 www.tv3.ie

(d) The use of spectrum for the provision of television services in Ireland, particularly with regard to the long term, would appear, at the time of writing (June 2010), to have been almost entirely provided by the State broadcast system. It is essential that other providers be in a position to provide this service. This is particularly important in the context of the recent collapse of commercial DTT in Ireland.

If you have any queries, please contact me.

Yours sincerely,

David McMunn
Director of Government Regulatory and Legal Affairs

TV3 Television Network Limited, Westgate Business Park, Ballymount, Dublin 24, Ireland
Tel: +353 1 419 3333 Fax: +353 1 419 3302 www.tv3.ie

32 UPC (Ireland) Ltd

Potential uses and future licensing options for the 2.6 GHz spectrum band

UPC Ireland's response to
ComReg's Call for Input

June 2010

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Tables and Figures

Executive Summary

UPC welcomes the opportunity to respond to ComReg's Call for Input on the uses of and potential licensing options for the 2.6 GHz spectrum band. As the long-standing occupant of this band, UPC has a particular interest in ComReg's future plans for how this spectrum will be used .

UPC also welcomes ComReg's recognition that, unlike many other EU Member States, the 2.6 GHz band is not a 'green field' spectrum band in this country. On the contrary, the 2.6 GHz band is used in Ireland for the provision of UPC's nationwide MMDS TV service, which is a service of important social value and one that is relied upon by approximately 250,000 people in Ireland.

The fact that an existing service of such importance is being provided over the 2.6 GHz band to a large number of customers makes ComReg's decision on future usage of the band a very important one. Should ComReg decide that MMDS can no longer be provided using the 2.6 GHz band, the service will have to be terminated, thus depriving these customers of their muli-channel TV service. The loss of such a service in this way would be a development without precedent in this country.

UPC views this review as an important opportunity for Ireland to secure an enhanced competitive environment for pay-TV services on a nationwide basis. This is because UPC intends to embark upon a significant upgrade of its MMDS network immediately following ComReg's decision to extend the current MMDS licence term to 2019 as provided for under the current licences.

[redacted]

The existing MMDS network, which is currently available on a nationwide basis almost exclusively outside of cable areas, is an important complement to UPC's cable TV offering, and is in effect an alternative digital terrestrial television platform, albeit one operating at 2.6 GHz rather than in the prime UHF band and providing a channel line-up far in excess of what would have been possible via the now stalled commercial DTT initiative. With the enhancements described above, the MMDS network can fulfill a key role in helping to achieve national policy aims in relation to the delivery of digital broadcasting services on a countrywide basis while ensuring consumers outside of cable areas have a choice of pay-TV provider.

In contrast, a decision by ComReg not to renew UPC's MMDS licences would have major negative consequences, both for the customers that would be directly impacted by the resultant closure of the service and for the wider pay-TV market, given such a decision would prevent the expansion of competition for pay-TV services and would instead hand a *de facto* monopoly to BSkyB within this market across much of the country.

UPC is fully cognisant of moves being made at EU level to harmonise use of the 2.6 GHz band for electronic communications services and the company is aware that the 2.6 GHz band is being viewed as one of a number of bands which could be used to provide next

generation mobile broadband services. In UPC's view, however, this development does not, nor should not, mean that the provision of MMDS services is no longer permitted within the band from 2014 onwards.

If the 2.6 GHz band were to be reassigned in order to support the rollout of mobile broadband services, it would only be used for this purpose (certainly up to 2019) within the greater Dublin area and so the band would lie entirely idle across most of the country. Such an outcome, which could only happen as a result of the closure of UPC's nationwide MMDS service, could not be justified on the grounds of promoting spectrum efficiency, the development of competition or the advancement of social policy.

While the continuation of UPC's MMDS service relies entirely on its ability to retain access to its existing spectrum allocation in the 2.6 GHz band, the rollout of mobile broadband services is in no way contingent on the availability of spectrum within this band. In fact, the underutilised 1800 MHz band – which is already allocated for mobile services – has superior properties in the area of radio propagation compared to the 2.6 GHz band and it is already available for use as the main high-capacity band for mobile broadband services in Ireland.

A policy approach that promotes the use of the 1800 MHz band (along with 800 MHz, 900 MHz and 2.1 GHz) for mobile broadband services while the 2.6 GHz band is maintained for MMDS would mean that existing and planned services could both be catered for in an efficient and effective way. Such an approach would make the best possible use of this scarce resource and it would also represent a 'win-win' outcome for operators, customers and the economy as a whole.

Options aimed at sharing the 2.6 GHz band would not result in the same kind of positive outcome. Approaches involving sharing in time (i.e. renewing the MMDS licences for less than five years) would render uneconomic UPC's planned network investment whereas frequency sharing would render the current service uncompetitive and would require incremental investment to enable a sub-optimal pay-TV service and so would, in effect, result in the same outcome as a decision not to renew the licences from 2014. An approach involving geographic sharing, while theoretically possible, would require further study and, in any event, should only be countenanced at a point in time where the mobile operators are in a position to demonstrate a clear need for spectrum within the band in specific geographic areas.

1 Introduction

UPC Communications Ireland Limited ("UPC") welcomes ComReg's publication of its call for input on potential uses and future licensing options of the 2.6 GHz spectrum band (the "Call for Input").[1] UPC is pleased to provide its response to ComReg on this issue.

As ComReg points out in the Call for Input, the majority of the 2.6 GHz band (i.e. 144 MHz, out of a total of 190 MHz) is currently licensed to provide multi-channel TV services using Multipoint Microwave Distribution System ("MMDS") technology. UPC is the long-standing service provider in this band and the current MMDS licences that UPC holds were issued to NTL and Chorus in 1999. The applicable legislation provides for their expiry in April 2014 (with an express possibility of renewal).

UPC is committed to making its high quality multi-channel TV service available to the maximum number of customers on a nationwide basis and so it continues to view its MMDS platform as an important complement to its cable footprint. UPC has firm plans to invest significantly to upgrade the MMDS network to enable it to become a strong nationwide pay-TV option for customers. As a result, for the reasons we detail in this response, UPC requests ComReg to avail of the option open to it within the MMDS licensing framework and extend its licence to provide its MMDS service in the 2.6 GHz band until 2019.

In making this request, UPC is fully aware of spectrum licensing developments internationally in the 2.6 GHz (and related) bands and, in particular, the moves being made in other countries to makes this spectrum available for the provision of other services, notably mobile broadband. As we demonstrate in this response, however, ComReg should be in a position to make sufficient spectrum available to support both the deployment of next generation mobile broadband services while maintaining the provision of the MMDS service in the 2.6 GHz band. Such an approach would, as we explain in our response, reap the greatest economic benefit for Ireland, make the most efficient use of the spectrum and be compatible with the regulatory and licensing frameworks at EU and national level.

The remainder of our response to ComReg is structured as follows:

- In Section 2, we set the context for ComReg's review of the 2.6 GHz band, providing some background detail on UPC and its MMDS service and discussing briefly the main issues that ComReg needs to take account of in deciding on future usage of the band;
- In Section 3, we put forward UPC's vision for the future provision of the MMDS service in the 2.6 GHz band;
- In Section 4, we summarise the economic case for maintaining MMDS within the 2.6 GHz band, where we draw on independent analysis undertaken for UPC by Analysys Mason;
- In Section 5, we discuss issues relating to efficient spectrum usage in the band and examine the various options for sharing spectrum;

[1] ComReg Document No. 10/38, dated 14th May 2010.

- In Section 6, we consider regulatory and licensing issues relating to the future provision of the MMDS service within the band;
- In Section 7, we set out our proposals on how we believe ComReg should move forward in relation to the licensing of the 2.6 GHz band.

2 Context for review of 2.6 GHz band

In this part of our response, we set the context – from UPC's perspective – for ComReg's review of the licensing options for the 2.6 GHz band. In doing so, we provide some background on UPC and its MMDS service before considering briefly the main issues that ComReg will need to take account of in deciding on future usage of the band.

2.1 Background on UPC

UPC is a wholly-owned subsidiary of UPC Broadband, which, in turn, is the European division of Liberty Global, Inc., the world's leading international cable operator. UPC Broadband provides television, broadband internet and telephone services to approximately 13 million customers throughout 10 European countries.

UPC's approach to service delivery across its various markets is one that is characterised by product leadership and by innovation. This is evidenced both by UPC's delivery of a triple-play product offering to customers, comprising a bundled broadband, pay-TV and voice telephony service, but also by the way the company continually seeks to develop and enrich its product offering. In pay-TV, this has led to the rollout of more sophisticated end-user equipment and the provision of High Definition TV (HDTV) services, while in broadband, it has led to ever-higher bandwidth speeds and other service enhancements for end-users.

UPC's Irish arm consists of an amalgamation of the former Chorus and NTL operations. UPC acquired Chorus in 2004 and NTL in 2005. The company was rebranded as UPC in May 2010.

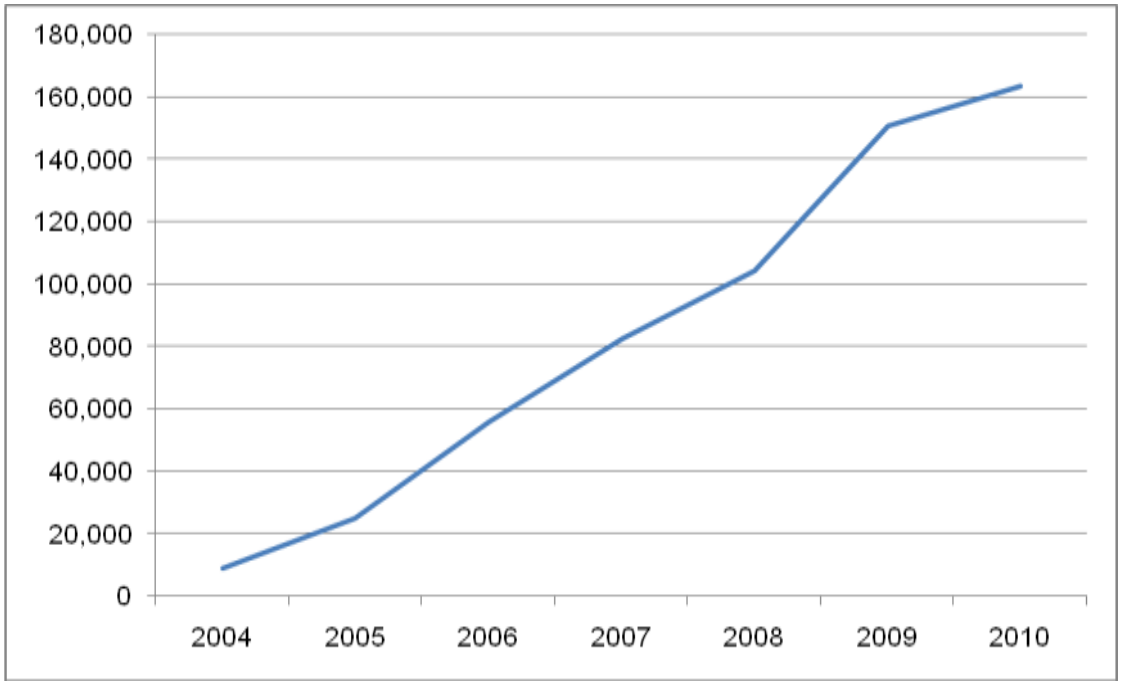
UPC's cable platform is primarily located in five cities – Dublin, Cork, Waterford, Galway and Limerick - and it extends into additional larger towns such as Carlow, Athlone, Portlaoise, Sligo, Mullingar and Newbridge. Over 75% of the network is upgraded to two-way capability, with 63% of its cabled homes served by a network with a bandwidth of at least 550MHz. The percentage breakdown for Digital Video, Broadband Internet and fixed line voice capability is 95%, 75% and 65% respectively across its homes passed. In rural Ireland, UPC offers a digital multi-channel TV service across its MMDS platform.

In addition, UPC Ireland offers to business customers a complete range of telecommunications solutions including voice, data and internet services to the Corporate, Public Sector, Wholesale and SME markets. UPC Ireland is also a trusted partner to Government, health and education authorities and has a strong track record in delivering reliable, fully managed solutions to public safety and public sector organisations.

Building and laying fibre-rich networks enables UPC to develop its broadband service further and it is now preparing to introduce a upgraded services offering download speeds in excess of 100Mbps to around half of all Irish homes. This plan involves a financial commitment with a total spend of over [redacted] by the end of [redacted].

In the five years since its entered the Irish market, UPC has established itself as a significant platform competitor in the Irish broadband market. As Figure 1 shows, cable broadband connections have grown very significantly since UPC entered the Irish market.

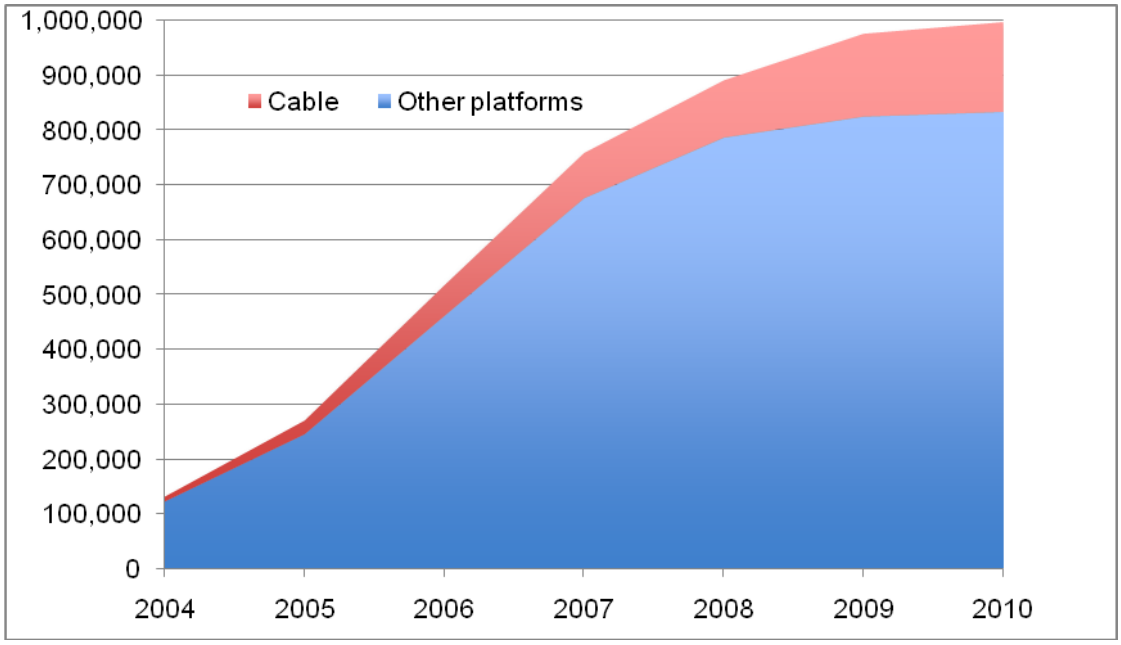
Figure 1: Cable broadband connections, 2004-2010



Source: ComReg Quarterly Reports. All data, apart from 2010, relate to year-end position. 2010 data refer to Q1.

Prior to UPC's market entry, Ireland was one of the weakest broadband markets within the EU and cable was not a significant delivery platform for broadband services. In the years since then, cable has, under UPC's ownership, emerged strongly to become the principal alternative platform to the incumbent's DSL network for fixed broadband connections, and this alternative platform approach has helped to drive upwards the level of national broadband penetration. This development is illustrated in Figure 2 below.

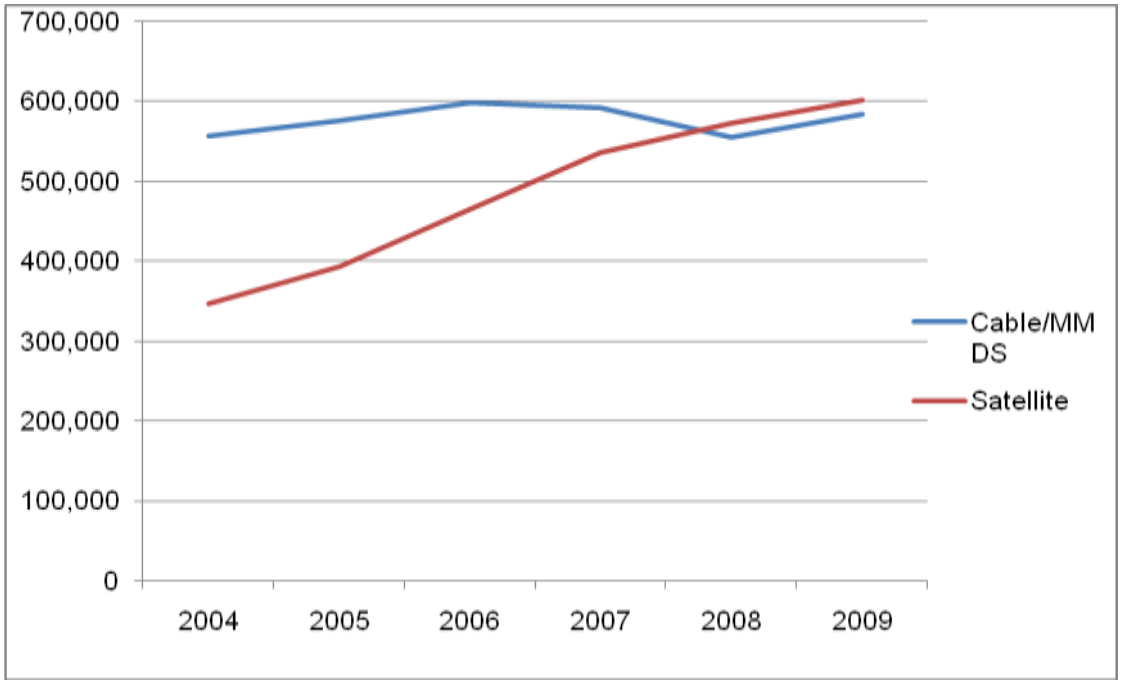
Figure 2: Fixed broadband connections, 2004-2010



Source: ComReg Quarterly Reports. Mobile broadband connections are not included. "Other platforms" comprises DSL, FWA, satellite and optical fibre connections. All data, apart from 2010, relate to year-end position. 2010 data refer to Q1.

Since entering the Irish market, UPC has also competed strongly with BSkyB in the pay-TV sector. BSkyB is the largest pay-TV provider in the UK and its Irish operations benefit from this overall scale, making it very difficult to compete with such a strong entity in this market segment. As Figure 3 below shows, BSkyB has been an aggressive competitor to UPC over the past five years within the Irish pay-TV market, during which time BSkyB has grown substantially the number of pay-TV customers using its platform. Over the same period, the total number of cable and MMDS connections has stagnated, mainly due to the high levels of rural customers churning from MMDS to satellite. As a result, as Figure 3 illustrates, satellite has now become the leading delivery platform for pay-TV services within country.

Figure 3: Pay-TV customers in Ireland, 2004-9



Source: Screen Digest.

2.2 UPC's MMDS service

UPC's current MMDS network, which the company uses to provide a multi-channel TV service to 100,000 households in different parts of the country originated from the various licences for MMDS services which were granted to a number of different companies pursuant to regulations made by the Minister for Communications in 1989.[2] Over time, these different licences became consolidated under common ownership, a process that culminated with UPC's acquisition of NTL and Chorus. As a result, UPC is now licensed to provide its MMDS on a nationwide basis utilising spectrum in the 2.6 GHz band.

At the outset, the MMDS service provided by NTL and Chorus (and the other predecessor providers) was an analogue one but the switchover to digital provision was completed on both networks in 2002. At the outset, the MMDS service provided by NTL and Chorus (and the other predecessor providers) was an analogue one but the switchover to digital provision was completed on both networks in 2002. In converting its network to digital, [redacted][3],[4].

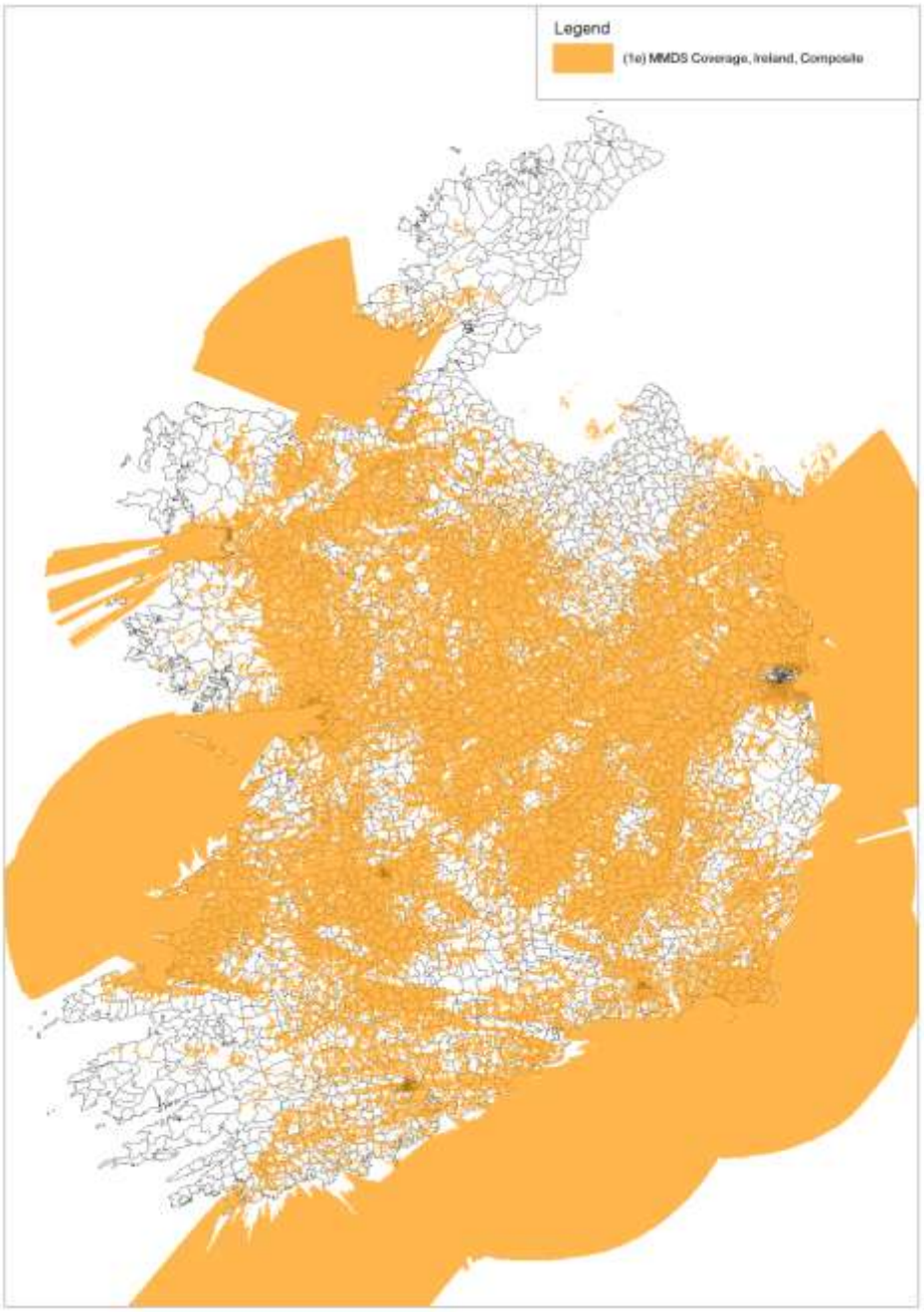
2 Wireless Telegraphy (Television Programme Retransmission) Regulations, 1989 (SI No. 39 of 1989), available at: http://www.irishstatutebook.ie/1989/en/si/0039.html.

3 [redacted]

4 [redacted]

UPC's MMDS network is a nationwide one, comprising 578 different site locations – which include primary hub sites, sites supporting MMDS feeds to end-user local cable networks and local "beambender" sites – scattered around 23 different counties.[5] The network footprint of UPC's MMDS network is illustrated in Figure 4 below.

Figure 4: MMDS network coverage map



Source: UPC

5 [redacted].

It is worth noting that the MMDS coverage illustrated in Figure 4 is, in fact, a conservative representation, as it does not take into account the additional coverage that is provided via the large number of 'beambenders' that are deployed around the country.

UPC estimates that the total number of people within the country who depend on MMDS for their TV service currently stands at approximately 250,000. This figure is derived from the total number of households served by MMDS (both directly and where the MMDS network is used to provide an end-user cable feed) and the average number of persons in private households within the State.[6] Table 1 below provides details, on a county-by-county basis, of where UPC's MMDS customers reside.

Table 1: Households with MMDS, by county

redacted

[redacted][7]

Source: UPC

The current number of MMDS households is, however, just over 30,000 less than the number recorded at the end of 2007.

[6] Latest CSO estimates (for 2006) put the national average number of persons per private household at 2.8. See: http://www.cso.ie/statistics/numprivhseholds.htm.

[7] **[redacted]**

below illustrates the development of the MMDS customer base in recent years.

Figure 5: MMDS households, 2007 - 2010

[redacted]

Source: UPC. Numbers do not include MMDS households where the end-user connection is provided by cable but where the connection to the end-user is fed via MMDS.

Figure 5 clearly shows that [**redacted]**

[redacted].[8]

[redacted]

[redacted]

2.3 Review of 2.6 GHz band – the main issues at stake

There are a number of important issues at stake in ComReg's review of the potential uses of the 2.6 GHz spectrum band. As ComReg correctly notes, this band is not a "green field" one and the fact that MMDS services are currently licensed within it means that there is no possibility of using the band for other services before 2014 at the earliest.

In deciding the way forward in relation to the 2.6 GHz band, ComReg must take account of the fact that several thousand customers – most of whom reside in rural areas – rely on the existing MMDS network to receive their multi-channel pay-TV service. As a result, any decision by ComReg not to extend the current MMDS licences beyond the current expiry date of 2014 will have stark ramifications for these customers. It would deprive them of a valued service and would mean that their only option for obtaining a pay-TV service would be to do so from BSkyB, which would have become the *de facto* monopoly provider of pay-TV services across much of the country.

As ComReg points out in the Call for Input, the conditions for making the 2.6 GHz band available to support the provision of electronic communications services (ECS) have already been harmonised throughout the Community by way of an EC Decision.[9] Arising from this, a number of EU Member States have already assigned spectrum in the 2.6 GHz band to operators who are using it to support the provision

8 [redacted]

9 Call for Input, para. 1.1.

of next generation mobile broadband services.[10] A key question for ComReg to decide is whether or not the time is right to make spectrum in this band – either in whole or in part – available for use in this manner within this country.

This question is a stark one for ComReg because, depending on what it decides, it could lead to the early cessation of an existing service of social value, one that is relied upon by 250,000 people. Although the current MMDS licences do not expire until 2014, any decision in the coming months not to renew the licences would be likely to result in increased churn from MMDS to satellite, with the result that continued maintenance of the MMDS platform would quickly become unviable. The loss of such an important service in this way would be without precedent in this country and would result in significant dislocation for many customers. The fact that such service loss could occur at around the same time as analogue switch-off (ASO) of free-to-air TV is set to happen would therefore add greatly to the potential confusion and disruption felt by customers in relation to the provision of TV services generally.

UPC firmly believes that the extension of the existing MMDS licences as provided for and originally conceived up until 2019, is fully justified. Such a move would trigger immediate and significant investment in the platform, which will result in an enhanced nationwide multi-channel terrestrial digital TV service being made available to customers on a nationwide basis as an important complement to UPC's cable TV offering.

Renewal of the MMDS licences is justified on economic grounds and, as we discuss later in this response, using the spectrum in this way would generate the greatest benefits for the Irish economy. We also show that new mobile broadband services can easily and efficiently be accommodated using other spectrum bands, in particular the under-utilised 1800 MHz band. [redacted].

[redacted].

[10] So-called "4G" mobile services have already been launched by Telia-Telenor in Stockholm and Oslo using the 2.6 GHz spectrum band.

3 UPC's vision for the future of its MMDS service

In this section of our response, we set out UPC's vision for the future provision of an enhanced MMDS service, one that is capable of providing customers living in those areas outside UPC's cable footprint with a significantly enhanced multi-channel pay-TV service. In doing so, we start with a discussion on current developments within the pay-TV market, we describe how the MMDS service can be improved in order to take account of these developments and we discuss the level of investment that would be required to make this reality.

3.1 Pay-TV market developments

The Irish pay-TV market is a well-developed one in terms of customer numbers. Recent ComReg data shows that, at end-2009, there were multi-channel TV connections in 1,228,000 homes accessed via cable, MMDS or satellite.[11] This comprises 78% of all TV connections within the country. The vast majority of these connections are pay-TV ones: latest estimates show that 116,000 homes accessed in this way (i.e. 9% of all homes with such a connection) are of the 'Freesat'[12] variety.[13]

The latest ComReg figures also show that digital services accessed via cable, MMDS or satellite account for 62% of all TV connections[14] and, quoting separate research, ComReg show that the take-up of digital TV services in Ireland was close to the EU average in December 2008.[15]

Television remains a key service for consumers, with viewers in Ireland typically spending 22 hours[16] per week watching TV. Whilst the current standard for broadcast is Standard Definition (SD) technology, HDTV is becoming increasingly prevalent, driven by:

- the growing number of households with HD-ready displays
- the apparent decline in quality of SD services on flat-panel displays
- the emergence of new HD-capable technologies
- the desire to watch high-profile sporting events in HD quality.

The shift to HD-enabled TV sets is set to accelerate in the coming years, according to recent projections made by Screen Digest. This analysis estimates that the number of HD-enabled households in Ireland will rise to 558,000 (i.e. 38% of all TV households) by 2013, as illustrated in Figure below.

11 ComReg Quarterly Report Q4 2009 (ComReg Document 10/19), Figure 5.1.1. ComReg state (footnote 42) that MMDS connections were included under "cable and satellite" for the purposes of this analysis.

12 'Freesat' is a UK satellite service that is available in Ireland due solely to the accidental overspill of the satellite signal onto the island of Ireland. It is an unmanaged service in the sense that, once it is installed, the customer has no contract with any TV provider and so cannot avail of any customer support service if difficulties arise in relation any aspect of the service.

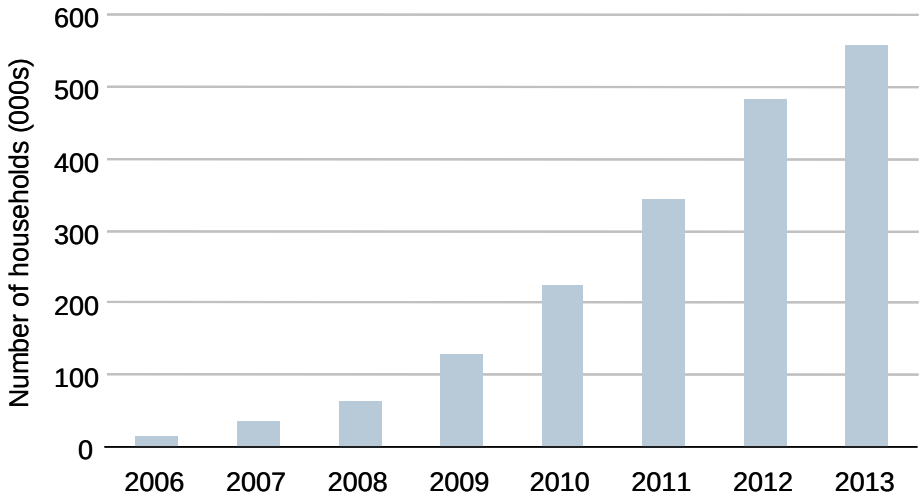
13 AC Nielson research, January 2010.

14 ComReg Quarterly Report Q4 2009.

15 Ibid., Figure 5.2.1.

16 Source: Eurodata TV Worldwide.

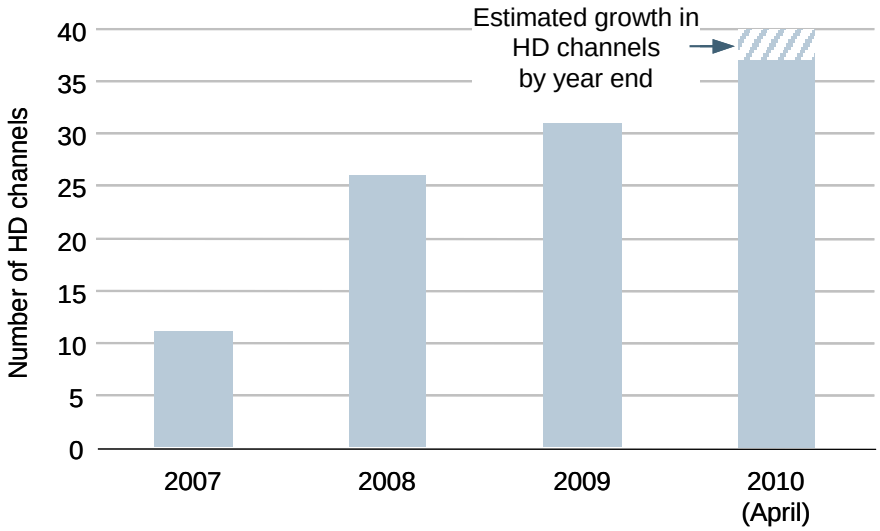
Figure 6: HD-enabled households in Ireland



Source: Screen Digest

The rise in HD-sets TV sets is matched by a sharp rise in the numbers of HD channels that have been made available to Irish TV viewers. This is illustrated in Figure 7 below.

Figure 7: Availability of HD channels in Ireland



Source: Screen Digest, Analysys Mason. HD channels available to Irish viewers comprise both pay-TV and free-to-view, including international and overspill.

The ongoing rise in the number of HD channels that are being made available to customers (mainly, not not exclusively, on a pay-TV basis), as well as through the increasing deployment of DVRs amongst the pay-TV customer base shows that TV services in Ireland are becoming increasingly sophisticated and innovative. BSkyB, by virtue of its strong market position in the UK, has been able to establish a

significant presence in the Irish pay-TV market where, as we have already discussed, it has succeeded in making its satellite service the leading delivery platform for pay-TV services.

UPC is self-evidently the only credible competitor to BSkyB for pay-TV services in Ireland. Within our cable footprint (where we are also in a position to offer triple-play services), UPC is confident of its ability to meet head-on the competitive threat posed by BSkyB and we are determined to maintain our position as the leading provider of pay-TV services within these areas of the country. However, UPC also has ambitious plans to challenge BSkyB's increasing dominance in the provision of pay-TV services in those parts of the country that lie outside the cable footprint and the renewal of our MMDS licences are central to these plans. It should be noted, however, that the non-renewal of the MMDS licences will indirectly impact the cable network as we will have a lower number subscribers and revenues which will have negative consequences both for cable TV services and for broadband.

3.2 The role of an enhanced MMDS service

As we have shown above, there is significant demand from Irish customers for digital pay-TV services, which are evolving and developing rapidly. It is in this context that UPC sees that its MMDS platform can play an important role in enabling customers who live in areas outside its cable footprint to avail of its digital TV service, as an alternative to the TV services that are available on satellite, i.e. BSkyB's pay-TV offering and the unmanaged 'Freesat' service. As such, UPC views its MMDS platform as a crucial complement to its cable network, as it provides the company with the ability to offer a broadly similar pay-TV service on a nationwide basis.

Once UPC has received confirmation that ComReg is willing to extend its MMDS licences until 2019, the company will be in a position to enhance its MMDS service significantly in order to make it a serious competitor to BSkyB, in the way that its TV service provided over cable already is.

[redacted]

This planned investment programme by UPC will position MMDS as a serious alternative pay-TV platform in those areas outside the company's cable footprint. It will also mean that all customers, especially those living in rural areas, will continue to have a choice of pay-TV provider and will ensure that no customers are left in the position where their only option for pay-TV is to avail of the service provided by BSkyB. In contrast, a decision by ComReg not to extend the MMDS licence term beyond 2014 will, as we have already discussed, lead to the loss of a valuable service that is currently used by 250,000 people and would hand a *de facto* monopoly to BSkyB in relation to the provision of pay-TV services across much of the country.

An MMDS service enhanced in the manner planned by UPC will result in the deployment of a credible alternative to BSkyB's satellite offering and as discussed earlier will be a superior alternative nationwide digital terrestrial TV platform in terms of available channels, including increasingly important HD content. Although UPC's upgraded MMDS network will not operate in the frequency bands that are assigned for Digital Terrestrial Television (DTT), it will become a *de facto* DTT service, with the added benefit that the efficient use of spectrum in the 2.6 GHz band to provide the MMDS service will mean (in particular once MPEG-4 compression is deployed) that

far more channels will be available to viewers than would be the case with DTT. In addition, unlike DTT, UPC's MMDS network is already in place and so it is capable of being upgraded rapidly, once confirmation is received from ComReg that the licence term will be extended to 2019.

3.3 Redacted

As noted above, UPC will **[redacted]**

4 Economic case for maintenance of UPC's MMDS service

There is a strong economic case for extending UPC's MMDS licence term until 2019. In order to quantify the economic benefits of such a move, UPC commissioned an independent report from Analysys Mason which examines the relative benefits to Ireland of extending the current licence term to 2019 or freeing up the spectrum band for other uses. Analysys Mason's report on this issue is appended to this response at Annex 2 but its principal findings are summarised below.

Analysys Mason's assessment considered the economic benefits to Ireland under two scenarios – one where UPC's licences are renewed by ComReg and one where they are not. Analysys Mason have concluded that Ireland will benefit economically by EUR129 million if the provision for extension of these licences is applied.

In contrast, Analysys Mason estimate that of the total EUR179 million of benefits (up to 2019) resulting from the introduction of next-generation mobile broadband technologies in Ireland, only EUR0.5 million would be foregone if the 2.6GHz band continued to be used for MMDS until 2019, with the better-suited 1800MHz band used instead to support the provision of mobile broadband services. During the period 2014–2019, it is clear that Ireland would generate significantly greater incremental economic benefit from the continuation of UPC's national MMDS service in the 2.6GHz band than it would gain from the most likely alternative use of this spectrum (the provision of additional capacity for mobile broadband subscribers using next-generation mobile broadband technologies in Dublin and possibly other main cities).

4.1 Continued use of 2.6 GHz band for MMDS

Analysys Mason have concluded that the renewal of UPC's licences will yield many benefits for Ireland, including the following:

- UPC's subscribers will continue to generate VAT receipts for the Irish government amounting to approximately EUR15 million over the period 2010–2014[17];
- Irish consumers, particularly those in rural Ireland, will continue to have a choice of pay-TV providers;
- UPC's MMDS-related direct expenditure in Ireland of approximately EUR8–11 million per annum will continue – this includes the continued employment of 50 staff in UPC Ireland whose jobs are associated with the provision of MMDS, as well as direct expenditure on network operations, customer operations and marketing which also has further multiplier effects;
- The profits generated to date by UPC from the provision of MMDS have been re-invested to support the expansion of UPC's next-generation cable infrastructure and this would continue to be the case in the future;
- The availability of the MMDS service will ensure that media plurality continues to exist, and MMDS will continue to provide support for the distribution of Irish public service and community TV channels. Although difficult to quantify, the

[17] Cumulative value, undiscounted.

value that Irish consumers attribute to these wider societal benefits should not be underestimated. Such social value was recognised when UPC was short-listed for the corporate and social responsibility category of the ICT Excellence Awards. In addition distribution on BSkyB's platform is often not a viable option for start-up channels due to the high transponder cost and the lack of an early page EPG position. To date, UPC has supported many Irish broadcasters for their distribution needs. However were the MMDS platform to be lost cable alone may no longer offer sufficient scale for any broadcaster whose economic model is dependent on advertising and it will also no longer offer a national presence for these channels with the result that future channel innovation may cease entirely in the Irish market;

- **[redacted]**
- UPC's MMDS offering to its target customer base (mostly located outside the main cities) will remain competitive. This will help to prevent alternative providers (e.g. BSkyB) from unduly raising their prices (as they could in the absence of direct competition), and so ensure that less wealthy households can continue to afford a key source of information and entertainment
- UPC will continue to generate significant welfare benefits in Ireland through the provision of services to its nationwide customer base, over and above what would be achieved if its subscribers were forced to migrate to an alternative TV platform at a higher price point

Analysys Mason have sought to quantify the *incremental* value (over and above that generated in a scenario where UPC's licences are not renewed) of many of the above benefits. We estimate that the incremental value is equivalent to an NPV of EUR129 million over the period 2010 to 2019 as indicated in Table 2 below.

Table 2: Economic benefit of MMDS licence renewal

Incremental economic benefit of licence renewal	Amount (EUR million)
Producer surplus	32.8
Consumer surplus	27.7
UPC expenditure	51.2
VAT receipts	13.3
Consumer disruption	4.4
Social value	Not quantified
Total incremental benefit from renewing UPC's licences	**129.4**

Source: Analysys Mason

4.2 Use of 2.6GHz band for mobile broadband services

In contrast, if UPC's licences are not renewed, we have calculated that the economic benefits for Ireland resulting from the best alternative use of the spectrum would be significantly reduced. In such a scenario a highly likely outcome is that the spectrum would be acquired by mobile broadband service providers, primarily the four existing mobile operators (e.g. through an open auction process). We estimate that such an outcome would provide relatively limited incremental economic benefits for Ireland, since:

- The benefits of deploying next-generation mobile broadband technologies (e.g. LTE and WiMAX) in urban areas – especially Dublin – using the 2.6GHz band could mostly be realised using alternative frequency bands, in particular the 1800MHz band that is already dedicated to the provision of mobile services and the 2300MHz when it becomes available later this year:
  - in view of the pace of 2G-to-3G migration, mobile operators should be able to make sufficient spectrum in the 1800MHz band available by 2014 for the highest-speed technologies such as LTE;
  - Analysys Mason's discussions with major network equipment and user terminal manufacturers indicate that equipment operating in the 1800MHz band will be widely available no more than 12 months after equivalent equipment operating in the 2.6GHz band, and in any case before 2014 (which is the earliest date that the 2.6GHz spectrum could become available in Ireland);
  - Analysys Mason's calculations indicate that the 1800MHz spectrum would be sufficient to allow three operators to deploy networks offering the highest-speed LTE services, which in turn would reduce the cost of mobile broadband service provision for mobile operators. In addition, 1800MHz

spectrum has better propagation characteristics than the 2.6GHz band and so is more beneficial to the mobile operators. As discussed earlier, although use of the 2.6GHz band in addition to the 1800MHz band could support further operators, it is unlikely that more than three next-generation mobile networks will be deployed in Ireland. Even in this unlikely scenario, the additional benefits for Ireland's consumers of more mobile networks are minimal, particularly when compared to the benefits for Irish households of having a second nationwide pay-TV operator;

- ComReg will shortly award 100MHz of unpaired spectrum in the 2.3GHz band, which is well suited for the deployment of WiMAX networks. This frequency band is also being made available for WiMAX in Singapore, Hong Kong, India, New Zealand and China, and so equipment will be commercially available before the 2.6GHz spectrum is released in Ireland.

- Outside Dublin, and possibly the other main cities, the 2.6GHz spectrum would mostly remain unused if acquired by mobile broadband providers, since deployment of the next-generation mobile broadband technologies outside highly populated areas would only be economic over lower-frequency bands such as the 900MHz band. In contrast, UPC's MMDS platform is available across almost all of Ireland, reaching more than 92% of the population

- The proceeds accruing to the Irish government from any auction of 2.6GHz spectrum are likely to be limited, based on auctions that have taken place to date in Europe and Asia. Indeed the most recent auction which was just concluded in the Netherlands generated just EUR2.6m for paired spectrum (likely to be used for LTE), and the unpaired spectrum (likely to be used for WiMAX) was not sold

- If mobile operators had access to the majority of the 1800MHz, 2.1GHz and 2.6GHz bands, significant amounts of this spectrum could be unused/underutilised during the period 2014–2019. High-frequency spectrum is generally in plentiful supply – for example, one-third of the 1800MHz band is unassigned. Indeed many European mobile operators are actively developing plans for LTE deployment in the 1800MHz band and LTE services are likely to be offered in this band by 2012 (i.e. two years before the current UPC licences expire). Recent public statements made by Elisa in Finland and Bouyges in relation to their plans to deploy LTE in the 1800 MHz band are annexed to this response. There is a possibility that if all the high-frequency spectrum bands were made available to mobile operators prior to 2019, instead of making the spectrum available for other parties, the mobile operators could 'hoard' spectrum due to concerns over potential loss of profits if other operators were to enter the market

- Use of the 2.6GHz band to provide mobile broadband services would not yield any significant wider societal benefits – this band is suited for use in urban areas where households already typically have two or more next-generation broadband connectivity options, and its use to provide high-speed broadband services to less populated areas (e.g. to reduce the digital divide) would be uneconomic. The generation of such societal benefits requires low-frequency bands.

Analysys Mason estimate that the introduction of next-generation mobile broadband technologies in Ireland would generate a total economic benefit of EUR179 million (NPV over the period 2010–2019), but almost all of this benefit would be realised

without making the 2.6GHz band available for mobile broadband services. Analysys Mason's modelling indicates that if the 2.6GHz band were made available for mobile broadband, the incremental economic benefit to Ireland would be only EUR0.5 million (over the period 2010–2019) as illustrated in Table 3 below. Even this is based on the optimistic assumption that four LTE networks and one mobile WiMAX network would be deployed.

Table 3: Economic benefit of using 2.6 GHz for mobile broadband

Incremental economic benefit from use of 2.6GHz instead of 1800MHz for mobile broadband	Amount (EUR million)
Producer surplus (loss)	(16.1)
Consumer surplus (gain)	16.2
VAT (gain)	0.4
Social value	Minimal
Total incremental benefit from mobile broadband using the 2.6GHz band	**0.5**

Source: Analysys Mason

Comparing the EUR0.5 million incremental benefit of using the 2.6GHz band for mobile broadband services with the EUR129 million of benefits generated by UPC's continuing use of the spectrum between 2010 and 2019, from a purely quantitative perspective it is clearly in Ireland's best interests to renew UPC's licences. Furthermore, as discussed above, renewal of UPC's licences would also provide many non-quantifiable wider societal benefits, such as media plurality.

5 Spectrum issues

5.1 Efficient spectrum usage

Under Article 8(2) of the Framework Directive, national regulatory authorities are required to promote competition in the provision of electronic communications networks, services and associated facilities and services by, inter alia, encouraging efficient use and ensuring the efficient management of radio frequencies and numbering resources. This is reflected in ComReg's statutory objectives as set out in Section 12 of the Communications Regulation Act, 2002.

The meaning of "efficient use" and "efficient management" of radio frequencies is not necessarily well defined. ComReg itself implicitly recognises[18] that technical and economic efficiency may not be the same thing, and indeed that "efficiencies may have to be compromised in order to safeguard the provision of certain public services such as safety, defence and public broadcasting". Technical efficiency may be achieved by, for instance, using the modulation scheme which gives the greatest throughput per MegaHertz of frequency for a given application; however, if that appication is not the one which is most highly valued by users, then economic or social efficiency may be compromised. On the other hand, applications such as analogue broadcasting, which perform an important social function in ensuring widespread free-to-air television distribition but which use far more spectrum than modern digital systems, are recognised as being technically inefficient and are being phased out.

In purely technical terms, efficient use of spectrum may be thought of as ensuring the maximum utilisation of spectrum. Spectrum use has a number of dimensions: frequency, space and time. Clearly, a spectrum management system which leaves large blocks of frequencies unused, thus creating an artificial scarcity, is inefficient. Equally, if spectrum is heavily used in some areas but unused over substantial parts of the national territory, this is also inefficient. Finally, if spectrum is used intensively during certain times of the day, week or year, but unused at other times, and if other users are not allowed to access it during off-peak periods, this cannot be described as efficient.

ComReg's Spectrum Strategy Statement notes, *inter alia*, the following action aimed at promoting the efficient use of scarce spectrum resources:

ComReg seeks to optimise use of the spectrum resource by encouraging the use of spectrum efficient radio systems and the use of the most appropriate frequency band for each application ***in order to maximise spectrum usage in critical frequency bands****; [emphasis added]*

5.2 Plans for spectrum release and liberalisation

In its Call for Input, ComReg has noted that the 2.6GHz spectrum is subject to EC Decision 2008/477/EC ("the EC Decision"), which harmonises the availability of the band for terrestrial systems capable of providing electronic communications services. While the technical conditions set out in the Annex to the EC Decision provide for

[18] See: http://www.comreg.ie/radio_spectrum/spectrum_management.540.html.

service-neutral and (within limits) technology-neutral licensing, in practice ***stated*** demand for this band across Europe is likely to come from mobile operators.

The 2.6GHz band is one of several which are, or are about to become, available to mobile and other operators in Europe. The usefulness of these bands to mobile operators, in particular, depends on the frequency. Lower frequencies have better propagation characteristics – they travel farther for a given emitted power level – while there tends to be greater bandwidth available at higher levels. For this reason, mobile operators tend to seek a mix of lower level frequencies (800 or 900 MHz) to provide geographical and indoor coverage, and higher level frequencies (1800 MHz, 2.1 GHz, 2.3 GHz, 2.6 GHz) to provide high data throughput capacity where it is needed – generally, and certainly initially, in urban centres with a high population density.

One consequence of this is that the use of the higher frequencies purely for mobile (or Electronic Communications Services in general) tends to be highly inefficient in spatial or geographic terms. If bands are allocated on a national basis, they will tend to be used early in cities, and this usage is likely to grow over time. In rural areas, on the other hand, where demand for capacity is lower, these frequencies may be used lightly or not at all.

The following is a quick summary of national and European plans for the award of spectrum in the relevant bands:

- The “Digital Dividend” spectrum in the 790-862MHz band will be made available through the switchover of television broadcasting from analogue to digital. The aim is for this transition to be completed by end 2012, although releasing the feed-up spectrum may take longer. The European Commission supports the idea of a harmonised approach to the digital dividend. However, only Germany has so far awarded this spectrum (see below).
- The 900MHz (suitable for meeting coverage requirements) and 1800MHz (suitable for meeting capacity requirements) licences awarded in the 1990s are now close to their expiry dates. The European Commission has amended the GSM Directive[19] to allow 3G technologies to be used in the 900MHz band, and has also harmonised both bands for the provision of terrestrial electronic communications services. While some regulators have simply extended the term of existing licences while amending the technical conditions to reflect the EC Directives, ComReg plans to auction all the spectrum in both bands.
- ComReg is currently considering options for the release of spectrum in the 2.3GHz band, only a small amount of which is currently in use in a small number of geographic areas (for Rurtel and Dáil TV). ETSI group Broadband Radio Access Networks is currently working on producing a System Reference Document for broadband wireless systems in the frequency range 2300 MHz to 2400 MHz. This technical document will set out standards and specifications for technologies within the band. ComReg is proposing to release 70MHz of the spectrum for national licences and 30MHz for Local Area and Closed User Group licences. Because of its relatively narrow range, this spectrum cannot provide the requisite channel separation for Frequency Division Duplex (FDD) operation and is thererfore available for Time Division Duplex (TDD) systems such as WiMAX.

[19] Via Directive 2009/114/EC

Table 4 below summarises ComReg's current plans for the release of spectrum in the Digital Dividend, 2.3GHz and 2.6GHz bands:

Table 4: Planned release dates of various frequency bands

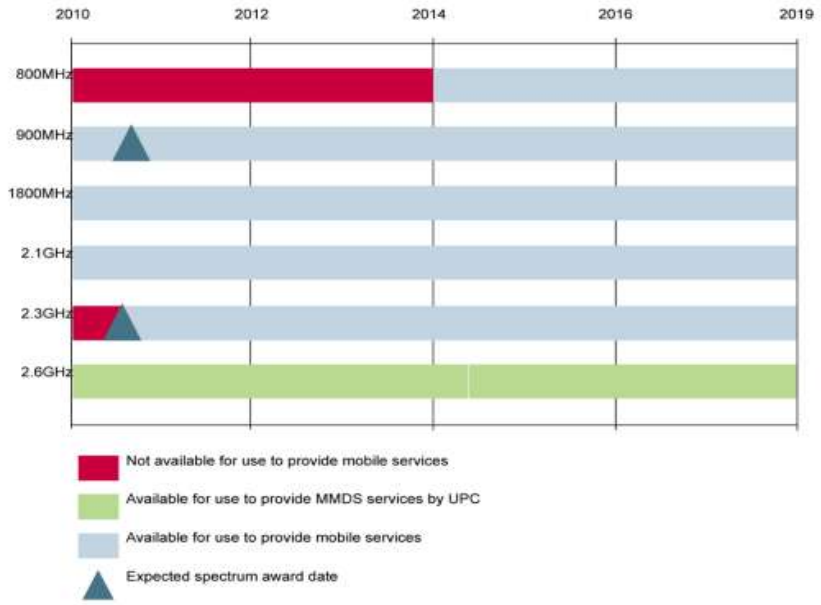
Frequency Band	*Release Planned*
790-862 MHz (Digital Dividend)	Circa 2015[20]
2300 – 2400 MHz	2010
2500 – 2690 MHz (2.6 GHz)	Circa 2013 or 2018[21]

Source: ComReg Q&A page on release of 900/1800 MHz spectrum[22]

5.3 Demand for spectrum in the various frequency bands

As the report carried out for UPC by Analysys Mason indicates, by 2014 the 1800MHz spectrum will be a valid alternative to the 2.6GHz band in Ireland and will provide sufficient capacity for three operators to deploy high-speed mobile broadband services. The position regarding the expected date for the availibility of spectrum in the various frequency bands to support mobile services is illustrated in Figure below.

Figure 8: Availability of main frequency bands for mobile services



Source: Analysys Mason

20 Contingent on analogue TV switch off and digital switchover. This date may also change.

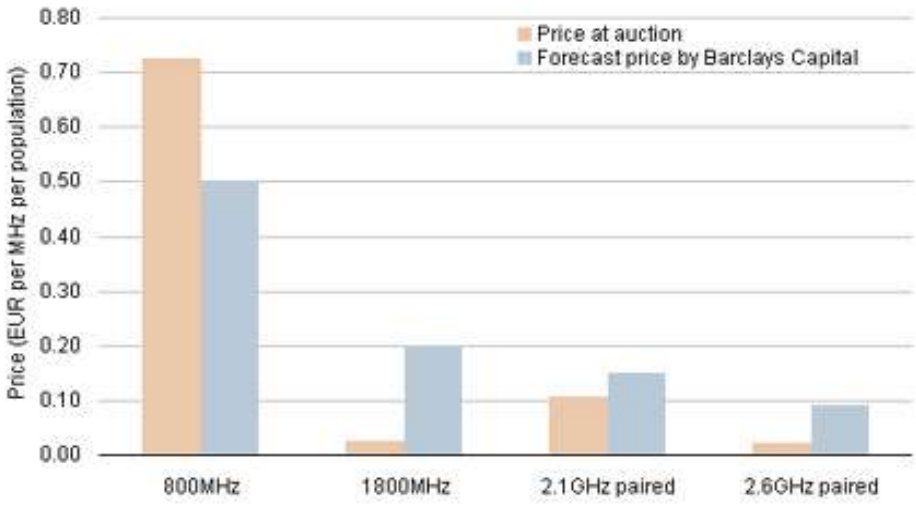
21 For consideration in 2010.

22 See: http://www.comreg.ie/radio_spectrum/recent_questions_and_answers.713.1007.html

Although the mobile operators may claim that 2.6GHz spectrum is essential to the future deployment of LTE, recent auction results indicate that these claims should not be entertained too seriously. Norway, Sweden, Finland, Germany, the Netherlands and Denmark have held 2.6 GHz auctions in recent months. Proceeds from these auctions in terms of €/MHz/pop have been relatively low when compared to past auctions of other spectrum bands, and appear to be declining. Other auctions have tended towards €1.1/MHz/pop, and rose to over €3.0/GHz/pop during the 2.1GHz auctions in 2000. Prices for 2.6GHz spectrum in Europe have ranged from a high of €0.20/MHz/pop in Denmark, through €0.02/MHz/pop in Germany, to a low of €0.002/MHz/pop in the Netherlands. In Finland and Norway, fewer operators bid for the spectrum than the number of available licences.

It is interesting to note that in Germany, where a "big bang" auction was held, out of a total of 360MHz of spectrum across four different bands (800MHz, 1800MHz, 2.1GHz and 2.6GHz) the price achieved for 800MHz was far higher than that for 2.6GHz and was well in excess of forecasts. Details of the outcome of the German auction are summarised in Figure below.

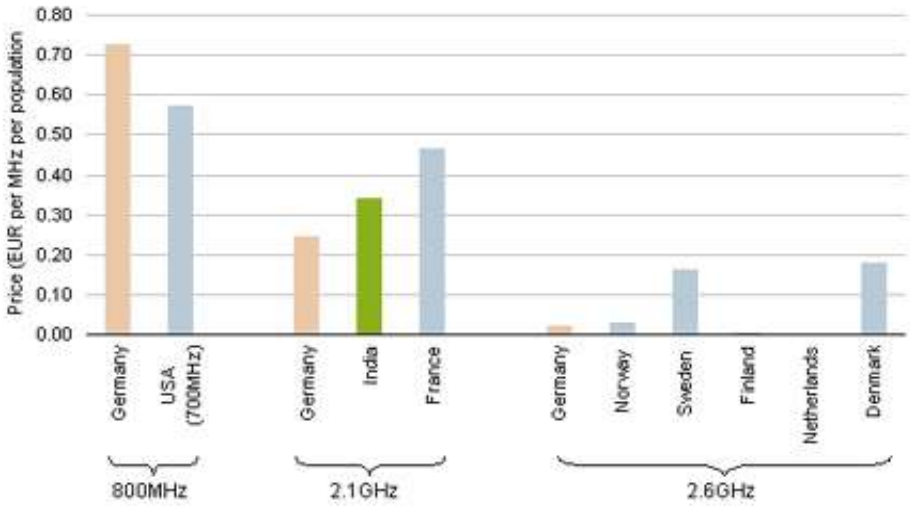
Figure 9: Forecast and actual prices in the German spectrum auction



Sources: BNetzA, Barclays Capital, Analysys Mason

This trend is borne out by other auction results, which confirm that operators are willing to pay far higher prices for lower than higher frequencies, suggesting that the stated demand for the 2.6GHz band may well be exaggerated. Details of these auction results are summarised in Figure below.

Figure 10: Prices of 800MHz, 2.1GHz and 2.6GHz auctons



Source: Analysys Mason

Mobile operators have a number of other viable options for frequencies to meet capacity requirements in densely populated areas. Some operators around the world are considering the 1800MHz and 2.1GHz bands for deploying LTE. These are viable alternatives to the 2.6GHz band, particularly if existing GSM or UMTS networks using 1800MHz of 2.1GHz can be decommissioned, thus freeing up spectrum. The 1800MHz band is superior to 2.6GHz, as operators will be moving away from GSM in the near future, while the use of UMTS on the 2.1GHz band is expected to continue for some time (the current Irish licences for 2.1GHz expire in 2022 (Vodafone, O2 and H3G) and 2027 (Meteor)). The 1800MHz band also has better propagation characteristics than 2.6GHz.

Research by Analysys Mason has shown that all major network equipment and handset vendors anticipate supporting LTE in the 1800MHz band, and therefore a good range of devices is likely to be available well before the UPC expiry date of 2014. By 2012 it is expected that equipment to deploy LTE at 800MHz or 2.6GHz will be fully available. Equipment to deploy LTE at 1800MHz is expected to be available at the same time or shortly thereafter (less than 12 months later).

As Ireland has a relatively low population density, and therefore less need for the additional GSM capacity overlay provided by 1800MHz spectrum, operators may be able to release a large proportion of their 1800MHz spectrum allocations for a new technology. Based on forecasts of subscriber migration from 2G to 3G, Analysys Mason expect that mobile operators will be able to free up over 2X60MHz of spectrum in the 1800MHz band by 2014 for new uses.

This analysis is borne out by comments from industry players. At the recent conference on LTE, a presentation by Dr. Eetu Prieur from Elisa, the market-leading Finnish mobile operator, identified LTE at 1800MHz as the most promising option for many markets, noting that it would be available for the mass market in time to meet

demand.[23] Terminal availability would be only 6-12 months after LTE at 2.6GHz, which he described as "not an issue": "LTE at 1800MHz can be estimated to be ready for mass market in 2012 with first network deployments and terminals in volume".[24] Similarly, Bouygues Telecom has commenced LTE trials in Orleans and has identified 1800MHz as the optimal band for early introduction of LTE as GSM is phased out of the band. At the same conference, Vincent Lemoine of Bouyges stated that the 2.6GHz band would be used for LTE at a later date than would the 1800MHz band and even then would be used solely for "back-up and capacity extension".[25]

In short, therefore, UPC considers that there are many spectrum opportunities which will present themselves well before 2014 for the enhancement of mobile networks. The 2.6GHz band is therefore by no means essential for the deployment of LTE, and there are multiple other suitable spectrum bands available to allow mobile operators to develop 4G services. Indeed, the mobile operators themselves have begun to express a clear preference for 1800MHz spectrum over 2.6GHz. On the other hand, there is no alternative spectrum available which could be used for MMDS, as no equipment is manufactured for any other band. Allocating spectrum ***which is currently fully utilised*** for a valued customer service to a service which would only use it in part, and that not for some time to come, would not represent efficient use. UPC's preferred position is for its existing licences to be renewed in full, and on similar conditions, until the final end date of 2019 set out in the Regulations. Recognising, however, the competing demands for this band, and ComReg's obligations to comply with Decision 2008/477/EC, UPC has considered the options for **[redacted].**

5.4 Broadcasting spectrum and Digital Switchover

Digital transmission allows for much greater efficiency in the use of spectrum than analogue. For most commercial applications, this creates an automatic incentive for the spectrum user to switch to digital transmission, thus increasing the capacity of the band. Mobile telephony, for instance, moved from analogue to digital transmission in the the late 1990s and has introduced successive generations of technology which allow data, music and video transmission over the same bandwidth which once carried voice only. Public service broadcasters, which may be limited in the number of channels available and whose funding may be wholly or partially dependent on a licence fee, do not face the same financial incentives, and Digital Switchover (DSO) in free-to-air broadcasting is happening much later than it did for mobile communications or for commercial broadcasting.

Among the various modes of terrestrial television broadcasting which use spectrum, it is notable that MMDS is among the most efficient. Digital Terrestrial Television (DTT), which has been allotted 320 MHz of prime spectrum in the UHF band (from 470 to 790 MHz), has been allocated at least six national multiplexes (from a total of

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23 *Coverage Optimized Mobile Broadband Solutions: UMTS900 with HSPA Evolution and LTE1800*, Dr. Eetu Prieur, Elisa, LTE World Summit, Amsterdam, 18th May 2010. A copy of this presentation is provided at Annex 2 to this response.

24 Ibid., Slide 18.

25 *Boosting the Capacity of a Network with LTE100*, Vincent Lemoine, Radio Expert, Bouyges Telecom, LTE World Summit, Amsterdam, 18th May 2010. See Slide 9. A copy of this presentation is provided at Annex 3 to this response.

eight), each of which can transmit up to 8 Standard Definition channels, 2 High Defintion channels or a combination of both. MMDS, on the other hand, using only 190MHz with MPEG-4 compression technology, can transmit up to 352 SD channels, 88 HD channels or a combination of the two. MMDS therefore already embodies a far greater degree of technical, and therefore economic, efficiency in its use of spectrum than DTT. Indeed, since it appears that the commercial model of DTT is experiencing difficulties and a pay-DTT service may never be rolled out, MMDS may be the only source of terrestrial digital pay-TV for many people for the foreseeable future. It is a service which is currently physically present, which has a network infrastructure installed and which has an existing customer base. If Irish citizens living outside major cities are to have any choice of pay-TV provider, it looks increasingly likely that MMDS is 'the only game in town'.

It may also be appropriate for ComReg to consider how the unused spectrum below 790MHz (which, as has already been noted, is highly valued by mobile operators) could be made available for alternative uses if it is not to be used for DTT.

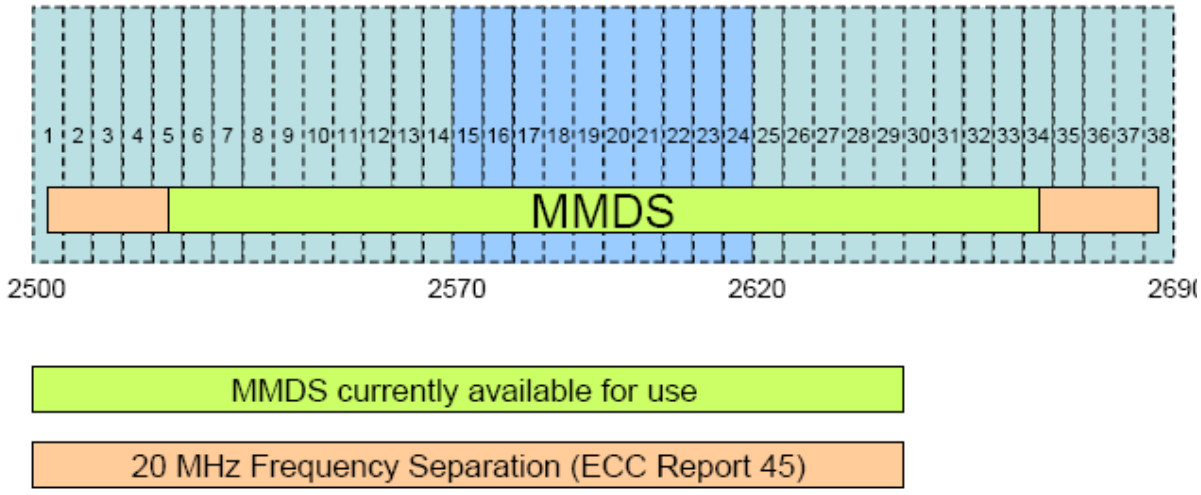
It is worth noting that the spectrum capacity allocated to RTÉ in its capacity as national broadcaster for digital transmission is far greater than that needed to transmit its current bouquet of channels. This is an implicit recognition of the fact that, if each broadcast medium is to be able to compete successfully in the digital era, it must be able to increase and enhance its service offering. UPC wants not just to keep its MMDS service at the current level, but to improve and expand it so that it can offer a service comparable to BSkyB's in terms of the number and quality of channels offered. If free-to-air broadcasting retains only the capacity it had within the analogue era, it will become very much a legacy service which is inferior to cable and satellite, and the same is true of MMDS.

In summary, UPC's view is that, given the right circumstances, MMDS can offer a service to rural dwellers which is already technically efficient, and can become more so if UPC makes its planned investment; which represents an economically valuable use of the spectrum; and which is likely to represent the only form of choice of pay-TV platform in these areas. However, this is predicated on MMDS being given sufficient spectrum (in both geographic and bandwidth terms) to allow it to compete on equal terms with BSkyB.

5.5 Options for [redacted]

[redacted]

Figure 5: MMDS channel plan in 2.6 GHz band



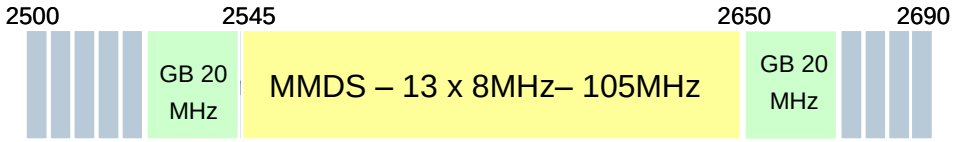
Source: ComReg

[redacted

Figure 6: CEPT band plan for 2.6 GHz band

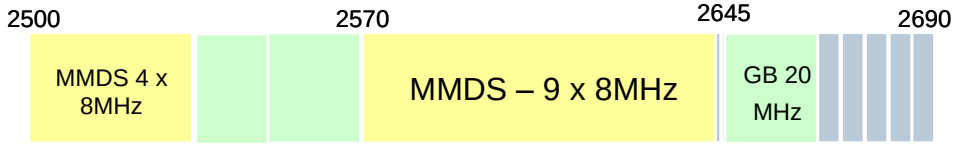
CEPT band plan

Fixed segments: 2x70MHz FDD + 50MHz TDD



MMDS Spanning centre of band

45MHz made available – but gap between bands < 120MHz



Splitting MMDS

Guard bands prevent the use of paired spectrum

Source: CEPT

[redacted]

Figure 7 below illustrates.

Figure 7: MMDS Transmit to Base Station Receive

Source: **[redacted]** *study for UPC*

[redacted]

Figure 8 **redacted]**

Figure 8:]

Source: **[redacted]** *study for UPC*

[redacted.]

6 Regulatory and licensing issues

6.1 Background

In order to provide MMDS services in Ireland, UPC is required to hold licences to use wireless telegraphy apparatus pursuant to the Wireless Telegraphy Act, 1926 (as amended) (the "WTA").

These licences are granted by ComReg in exercise of its powers under the Communications Regulation Act, 2002 (the "2002 Act"). In the exercise of its powers to grant WTA licences, ComReg is required to comply with applicable EU law which is set out in an EU regulatory framework for electronic communications. These EU measure have, to a large extent, been transposed into Irish law by a series of statutory instruments.

Since 6 November 2003, NTL and Chorus have held WTA licences in respect of their MMDS services pursuant to the Wireless Telegraphy (Multipoint Microwave Distribution System) Regulations, 2003 (the "2003 Regulations").

The 2003 Regulations include express provisions on licence renewal, set out in Regulation 8. This provides that ComReg should review the operation of the licences and on conclusion of that review, it may renew the licences for a further period of up to 5 years from 19 April 2014.

In its inclusion of an express reference to the renewal of the licences , the Irish legislation governing the 2003 licences is unusual and is in contrast, for example, with the statutory and licence framework under which mobile operators operate. Given this express reference, renewal is therefore compliant with Irish law and UPC intends to seek renewal of their MMDS licences up to 2019.

UPC considers that ComReg should, in its review, focus on the operation of the licences, as set out in the 2003 Regulations. UPC is confident that it has been compliant with the terms of the 2003 licences, and that any objective review would conclude that it has provided a valuable service, in particular to rural areas which would otherwise have no alternative provider of pay TV. We feel that there should be a strong presumption in favour of renewal until 2019, and that the licences should not be restricted without strong objective justification.

UPC also notes the new requirement on ComReg arising from the revision of the regulatory framework for electronic communications, to give due weight to the need to maximise benefits for users and to facilitate the development of competition, in deciding whether to renew licences (see section "Compatibility with general EU framework for spectrum management", below). Failure to renew the licences would deprive existing users of a valued service, prevent them from reaping the benefits of UPC's planned investment in MMDS, and eliminate competition in the market for pay TV in rural areas.

UPC is aware that ComReg must comply with all relevant national and European legislation. We are confident that renewal of the licences will achieve this and will be compatible with ComReg's objectives and strategy, for the reasons set out in the following section.

6.2 Compatibility with ComReg's statutory objectives and functions

ComReg's primary objectives in carrying out its statutory functions[26] in relation to spectrum management are to:

- promote competition;
- contribute to the development of the internal market;
- promote the interests of users within the Community, and
- ensure the efficient management and use of the radio frequency spectrum.

Continued use of the 2.6 GHz spectrum to provide MMDS services would promote competition in the broadcasting transmission market, since the removal of MMDS would effectively create a monopoly for pay TV in large parts of the country. It would also promote the interests of users, since otherwise they would be deprived of a service which they clearly value. The issue of the efficient management and use of the spectrum has been dealt with in Section 5.

6.3 Compatibility with ComReg's Spectrum Strategy

ComReg's Spectrum Management Strategy Statement 2008 – 2010[27] notes the important role played by the wireless telecommunications sector in the Irish economy. ComReg estimates that over 30,000 people are directly employed in the sector and at a conservative estimate, the economic contribution of the radio sector in 2006 (the most recent data available) amounted to approximately €3 billion, or 1.67% of total GDP for that year. In furtherance of its responsibility for the efficient management and use of the radio spectrum, ComReg's spectrum strategy includes a number of strategic goals, namely:

- Facilitating access to radio spectrum, particularly for innovative technologies and services;
- Maximising the economic and social benefits arising from the use of radio spectrum;
- Promoting the efficient use of scarce radio spectrum resources; and
- Ensuring compliance with international requirements and the avoidance of harmful interference.

UPC believes that the continued use of the 2.6GHz spectrum for MMDS services contributes to, and is consistent with, all of these goals. **[redacted]** This submission clearly demonstrates that use of the spectrum for MMDS, as opposed to other applications, maximizes the economic as well as the social benefits arising from its use. Retaining MMDS in the band would be efficient in terms of spectrum use, as the entire spectrum would be used throughout the nation; other uses would be likely to be concentrated in Dublin only, with the spectrum lying fallow throughout the rest of the country. Finally, UPC is satisfied that this use of the spectrum would be in

[26] The Communications Regulation Act 2002 ("the 2002 Act") and the Wireless Telegraphy Acts set out, amongst other things, functions and objectives of ComReg in relation to spectrum management. Apart from licensing and making regulations in relation to licences, these functions include the management of Ireland's radio frequency spectrum in accordance with ministerial Policy Directions under Section 13 of the 2002 Act.

[27] ComReg Document 08/50.

compliance with Ireland's international obligations and would not create harmful interference.

6.4 Compatibility with EU framework for spectrum management

The current EU regulatory framework[28] requires that Member States:

- Only limit the number of licences where this is necessary to protect against harmful interference;
- Where they do issue individual licences, do so on the basis of objective, transparent, non-discriminatory and proportionate criteria;
- Promote the harmonisation of use of radio frequencies across the Community.

The 2002 Package[29] gave the Commission, for the first time, the right to adopt binding decisions on technical implementing measures and deadlines for harmonisation of use of radio spectrum throughout the EU. The 2.6 GHz band is the subject of such a decision, the implications of which are discussed in the section below.

A new amending package of Directives has been passed by the Parliament and the Council, and is due to be implemented by Member States by 25 May 2011. Several aspects are potentially relevant to the renewal of the UPC licences:

- The Framework Directive has been amended to favour technology- and service-neutral licensing.
- The revised Framework Directive also contains provisions aimed at bringing existing licences into line with the principles of technology and service neutrality.
- New conditions which Member States must consider before deciding whether to ***renew*** licences have been set out[30]. These include the need to give due weight to ***the need to maximise benefits for users and to facilitate the development of competition***. [Emphasis added]
- The Framework also contains references to the important social, cultural and economic value of spectrum.

The new requirement on Member States to give consideration to user benefits when deciding upon licence renewal adds weight to the proposition that an orderly transition of MMDS from the 2.6 GHz band should be allowed to occur over a reasonable time period – up until 2019 - given the significant consumer disruption involved, and the lack of any other viable competitor to BSkyB in rural areas. As outlined in Section 4, MMDS has important economic and societal benefits for Ireland, including the maintenance of consumer choice, media plurality, employment and exchequer revenues. The recent failure of attempts to secure a commercial DTT operator means that UPC's MMDS service is the only foreseeable alternative in the

28 Based on the 2002 Directives, transposed into Irish law in 2003

29 Decision No. 676/2002/EC of the European Parliament and of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community ("Radio Spectrum Decision").

30 In Article 7 of the Authorisation Directive, as amended by Article 3(5) of the Better Regulation Directive. These criteria previously applied to the issuing of licences, but have now been extended to cover their renewal also.

digital terrestrial pay-TV market. (Indeed, even if the commercial DTT service originally envisaged were up and running, its capacity limitations mean that it would not be a viable competitor in the pay TV market, given the demand for increased numbers of channels and for High Definition and 3D services).

Non-renewal of the licences would, in UPC's submission, run contrary to the regulatory objectives set out in the EU legislation. Up to 300,000 users will lose a valued service for which there is evident demand, while the rollout of LTE or other services in the 2.6GHz is highly uncertain – so that users in rural areas could lose MMDS without getting access to any other service. At the same time, as there is only one other pay TV provider (BSkB) in the Irish market (which is not subject to Irish regulation), the elimination of MMDS would have a devastating effect on the development of competition in the pay TV market.

6.5 Compatibility with Decision 2008/477/EC

This EC Decision[31] requires Member States, within six months of the date of the Decision (i.e. by 13 December 2008) to "designate and subsequently make available, on a non-exclusive basis, the 2 500 – 2 690 MHz band for terrestrial systems capable of providing electronic communications services, in compliance with the parameters set out in the Annex to this Decision". By way of derogation from this requirement, Member States may request transitional periods that may include sharing arrangements.

While Ireland will need to demonstrate compliance with this Decision, the measure does not, of its own right, create any impediment to the renewal of the MMDS licences for the period to 2019. Several Member States (Ireland, Lithuania, Latvia, Slovakia and Portugal) have MMDS in the band. Bulgaria and France have national security services. The latter two have sought and received official derogations from the decision, while Ireland, and the other countries with MMDS in the band, have not sought derogations. However, as noted in the Call for Input, because of the presence of MMDS in all or part of the band in several Member States, an Explanatory Memorandum[32] was drawn up by the Radio Spectrum Committee to explain how MMDS may be handled within the scope of the EC Decision.

Ireland falls into the third category of MMDS deployment as noted in the Explanatory Memorandum – "substantial to total frequency use, long expiration deadline". The Explanatory Memorandum notes that MMDS can be handled within the scope of the EC Decision, but calls on Member States with this level of deployment of MMDS to investigate the extent to which the MMDS operator is using the frequencies efficiently and whether the occupation of the entire 2.6GHz band is justified. ComReg states that it will first reflect on responses received to the Call for Input before investigating this matter.

[redacted].

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31 Commission Decision of 13 June 2008 on the harmonisation of the 2 500 – 2 690 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community

32 Document RSCOM08-39: Radio Spectrum Committee Working Document – Explanatory Memorandum on MMDS in the 2 500 – 2 690 MHz Band.

[redacted].

In other frequency bands which are covered by EC Decisions, ComReg has adopted a phased approach which respects the rights of existing users while moving towards compliance with the EC Decision. For instance, ComReg recently issued an Information Notice (Document 10/29 of 8 April 2010) on the end date of the FWALA licensing scheme in the 3.6GHz band. This band is now subject to Decision 2008/411/EC (Commission Decision of 21 May 2008 on the harmonisation of the 3400 – 3800MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community), which requires all Member States to designate and make available the band for fixed, nomadic and mobile wireless access systems. In the Information Notice, ComReg sets an end date of 31 July 2017 for the FWALA scheme, implying that the band will continue to be covered by the local area licensing scheme until then (UPC notes that ComReg intends to consult shortly on the narrow issue of the introduction of mobility into the 3.6GHz band in line with the requirements of the EC Decision; however, mobility within a restricted local area, without roaming, is unlikely to be what was intended by the drafters of the EC Decision).

UPC also notes that ComReg, in previous spectrum decisions, has recognised that geographic sharing of frequencies can be both useful and spectrally efficient. The FWALA scheme itself allows allows the same frequencies to be re-used in different geographical areas, subject to technical criteria to avoid interference. Channel E in the 3.6GHz band (3 410 – 3 424MHz paired with 3 510 – 3 524MHz) is shared between FWALA services in the greater Dublin area, Cork County Borough, Limerick County Borough and Waterford County Borough, on the one hand, and eircom's FWPMA network in the rest of the country.

[redacted].

7 UPC's proposals for moving forward

As we have discussed in this response, the review process relating to future use of the 2.6 GHz spectrum band that ComReg has initiated gives rise to a number of key issues that, depending on what decision ComReg reaches, will have far-reaching consequences in relation to the availability of competitive pay-TV services across much of the country.

UPC understands the developments that are being made internationally in relation to spectrum harmonisation and that ComReg is obliged to consider the future use of the 2.6 GHz band in this light. ComReg does, however, have significant room for manoeuvre in relation to how far and how fast in moves in relation to harmonising this spectrum for possible alternative uses and, unlike many other national regulators within the EU, it has to take account of the fact that the band is already being used for an important service of social value.

Thousands of customers rely on MMDS for their pay-TV service today and UPC has ambitious plans to invest significantly to enhance this delivery platform to enable it to rapidly become a more competitive alternative to BSkyB's satellite alternative. UPC will only, however, be able to proceed with this investment if ComReg agrees to extend the MMDS licences until 2019.

If ComReg decides instead not to renew the MMDS licences, then the existing MMDS customer base will face the loss of a TV service that they clearly value. In addition, all pay-TV customers who reside in those parts of the country outside UPC's cable footprint will have no competitive choice for pay-TV services, as BSkyB will be handed a *de facto* monopoly over significant parts of the country and across all of rural Ireland.

UPC is aware that the 2.6 GHz band is likely to be of interest to other players, notably the mobile operators who are likely to put forward the claim that they need access to the band for the deployment of mobile broadband services. UPC notes, however, that mobile broadband is likely to be rolled out using a number of different spectrum bands and that the 2.6 GHz band is only likely to be used in dense urban areas. As a result, if the band is reallocated for mobile broadband it will remain largely unused by the mobile operators across much of the country.

Such an inefficient use of spectrum is not an approach that ComReg should encourage, not least given the fact that the mobile operators have spectrum in other bands, notably at 1800 MHz and 2.1 GHz, which they do not use on a nationwide basis at the present time. Instead, ComReg should be looking for a more imaginative solution, one that facilitates the maximum rollout of mobile broadband, while at the same time ensuring that MMDS services are allowed to continue to be provided on a nationwide basis.

In this regard, UPC believes that the most sensible solution would be for high-capacity mobile broadband rollout to be concentrated in the largely underused 1800 MHz band, with UPC being allowed to retain its current spectrum allocation in the 2.6 GHz band for continued provision of its MMDS service. If, however, ComReg is of the view that some form of sharing is required in relation to the 2.6 GHz band, then it is UPC's position that the only feasible option in this regard (albeit one that would

require further careful study) would be one based on a geographic split. Under such a solution, the band might, at some future point in time, be used for mobile broadband services within the Dublin area (which is the only place it is ever likely to be used for such services), while it is retained as a band for MMDS services elsewhere. This is far from an ideal outcome from UPC's perspective but it is a solution which might enable the continuing provision of MMDS across much of the country and so should be examined as a possible option by ComReg, if ans when the mobile operators are in a position to demonstrate a clear need for spectrum in the band in specific areas of the country.

Annex 1: UPC Ireland's response to ComReg's Call for Input (Confidential version, containing business secrets)

Annex 2: Analysys Mason report for UPC Ireland (Confidential – contains business secrets)

Report for UPC Ireland

Maximising the benefits to Ireland of the 2500–2690MHz spectrum band

6 May 2010

Ref: 16742-184

analysys mason

Contents

Analysys Mason Limited
Suite 242
The Capel Building
Mary's Abbey
Dublin 7
Ireland
Tel: +353 1 602 4755
Fax: +353 1 602 4777
dublin@analysysmason.com
www.analysysmason.com

Registered in Ireland IR304061

1 Executive summary

1.1 Summary Findings

UPC currently provides over 70 000 households with pay-TV services over an MMDS platform. Its 15-year licences (originally issued to ntl and Chorus in 1999) have a renewal provision for five years. The existing platform, although already 'all digital', uses older technologies and will require investment if subscriber numbers are to grow. UPC recognises the potential for MMDS to offer a 21st-century TV service to Ireland's rural population, and [redacted].

This report has been prepared by Analysys Mason Limited (Analysys Mason) to assess the economic and societal impact to Ireland that would arise if the provision in UPC Ireland's (UPC's) MMDS licences allowing for a five year extension was not applied by ComReg leading to a cessation of the MMDS service. We also compare this impact to any benefits that might arise if the 2500–2690MHz (2.6GHz) band currently used to provide MMDS was used for alternative purposes (such as for next-generation mobile broadband networks). The conclusions of this work are that:

- If UPC's licences are not extended, 700 000 rural households will no longer have a choice of pay-TV provider, and BSkyB will have a pay-TV monopoly in these areas. Commercial DTT will not have the capacity to either meet consumer requirements for pay-TV or offer competition to Sky in these areas.
- Ireland will be EUR129 million worse off economically if MMDS services cease in 2014 including the loss of EUR11million of annual local economy spend and the loss of VAT out of the Irish economy (Sky is a foreign VAT payer).
- There is only negligible benefit if this band is used for mobile broadband, as alternative vacant spectrum bands (1.8GHz, 800MHz, 2.3GHz) offer similar (or superior) features.
- Release of the 2.6GHz band will not lead to an increase in rural broadband deployments, and the spectrum which is currently used for MMDS is likely to lie idle in these areas as it is unsuited to rural deployment.
- Loss of the MMDS service could also lead to a decline in programming choice for Irish consumers and a reduction in media plurality.

The alternative **use of the 2.6GHz spectrum for next-generation mobile broadband would actually widen the digital divide as it would be deployed only in dense urban areas and this would mean that rural populations which were affected by the cessation of MMDS would not see any tangible benefit.**

1.2 Detailed findings and Analysis

Consumer need and competition

Renewal of the licences will ensure that approximately 700 000 homes outside the main cities continue to benefit from a competitive pay-TV service offering to BSkyB. TV is a key service for Irish consumers, with users typically spending 22 hours per week[1] watching TV. Pay-TV services provide a significant source of information and entertainment to 78% of Irish households. The Irish pay-TV market is one of Europe's most sophisticated, with one of the highest levels of digital penetration and the Irish have been among the early adopters of digital video recorders (DVRs) and high-definition (HD) technology. We expect this to trend to continue and strengthen, given the growth in HD and sales of HD-ready TV sets.

Commercial DTT is not a suitable replacement for MMDS as it lacks the necessary standard-definition (SD) and HD capacity desired by consumers and required for UPC to provide a competitive TV service to that of BSkyB.

As new forms of entertainment such as social networking and video delivered to PCs become more prevalent, this consumption appears to be incremental to TV rather than substitutional. Hence, the maintenance of effective competition in this core service and ensuring prices are kept to a minimum while new TV services such as high-definition TV (HDTV) and 3DTV are developed are important issues for the vast majority of Irish households.

Once certainty on the extension of the licences is provided, UPC has indicated that it is committed to providing all Irish households with a competitive TV service, by investing in further development of its MMDS service. Following confirmation of licence renewal, [redacted].

As a result, it will provide greater value to existing subscribers, be able to capture new subscribers, and ensure that Irish consumers retain a choice of pay-TV providers. A combination of growing demand for HD content, growth in the number of HD channels on other platforms (currently close to 50 HD channels are available on satellite), and the increasing number of HD-ready households in Ireland (and other markets) suggests that HDTV is the future viewing standard, and it is likely that the majority of TV viewing will migrate from SD in the coming years.

[1] Source: Eurodata TV Worldwide.

Alternative uses of 2.6GHz

If UPC's licences are not extended, the most likely alternative use of the 2.6GHz spectrum would be for the deployment of next-generation mobile broadband technologies such as LTE or WiMAX in the main population centres. During the period 2014–2019, we expect there to be sufficient spectrum in other frequency bands to support three competing high-speed LTE networks (1800MHz band) and a number of WiMAX networks (2.3GHz band). The principal advantage of 2.6GHz spectrum is that it could theoretically support additional competing mobile broadband network deployments. However, increasing network consolidation/sharing by mobile operators and the limited success of WiMAX in developed markets means it is questionable whether such additional competition would arise in practice. Furthermore, consumers and businesses in urban centres (where 2.6GHz spectrum would be used for next-generation mobile broadband) already have access to next-generation fixed broadband networks. **Use of the 2.6GHz spectrum for next-generation mobile broadband would mean that rural populations which were affected by the cessation of MMDS would not see any tangible benefit, and this in turn would further widen the digital divide.**

Whilst use of the 2.6GHz band for next-generation mobile network deployments would be in line with plans for use of the band elsewhere in Europe, our analysis indicates that the optimal use of the spectrum in Ireland prior to 2019 is different from that in other EU Member States due to the particular circumstances in Ireland, namely:

- In Ireland, **the 2.6GHz band is currently used to provide a valuable and financially viable service (MMDS) across the whole of the country** (both urban and rural areas). As indicated above, the MMDS platform provides TV directly to over 70 000 subscribers and supports a further 26 000 indirect cable TV subscribers. As we discuss below, considerable economic value (including wider societal benefits) is generated from this service, much of which would be lost if UPC's MMDS platform ceased to operate.

- **The MMDS platform is the only form of digital TV competition to satellite for many households**, since the population distribution across the country means that cable TV passes only 50% of households and the DTT service has yet to launch and faces an uncertain future. In any case, the DTT platform will be limited to between 4 and 6 multiplexes in the medium term, providing approximately 40 SD channels (or a small number of HD channels both of which may vary on channel quality), and as a result is not a viable competitive offering to MMDS and satellite. Consequently the MMDS platform plays an enormously important role in constraining overall market prices for pay-TV services, for which there are around 1.2 million subscribers (out of a total of 1.6 million homes). If UPC was unable to provide TV services over MMDS, Irish consumers – particularly those in rural Ireland – wishing to use an equivalent service would only have one option for a managed pay-TV service (satellite). This could lead to a rise in prices by BSkyB, and in turn could deprive some less wealthy rural households of a key source of information and entertainment, as well as resulting in economic welfare losses for consumers.

- All of the economic benefits arising from the provision of mobile services in urban areas can be realised by mobile operators using the **415MHz of spectrum available in other frequency bands dedicated to mobile services** (800MHz, 900MHz, 1800MHz and 2.1GHz). Similarly, the economic benefits arising from the provision of WiMAX service can be delivered using the existing 3.5GHz band and the 100MHz of spectrum that is planned to be made available in the 2.3GHz band. As we discuss below, an additional 190MHz of spectrum in the 2.6GHz band would provide very limited incremental benefit in Ireland.

- By European standards, **Ireland has a low population density**, with 40% of the population living in areas which are classified as rural. One third of the population lives in the greater Dublin area and around 53% of the population lives in Dublin, Cork, Waterford, Limerick and Galway (i.e. the five largest cities). In addition, Irish cities themselves have a low population density. As a result, there is a lower requirement for additional spectrum to increase mobile network capacity in the main cities.

In any event renewal of the licences is compatible with the national and EU regulatory frameworks. UPC has undertaken extensive legal and regulatory analysis and is satisfied that the continued offer of MMDS services in this spectrum band would be consistent with these regulatory regimes. The current EU regulatory framework promotes harmonisation of spectrum usage and provides that licences are awarded on the basis of objective, transparent, non-discriminatory and proportionate criteria. In addition, a new EU regulatory framework due to come into force in May 2011 favours technology- and service-neutral licensing. In particular, the new framework underlines the need to give due consideration to the benefits for users, and facilitate the development of competition, and it refers to the important social, cultural and economic value of spectrum. Renewal is also compliant in terms of national regulation, as UPC's MMDS licences are exceptional in that they do include express provisions for renewal.

In summary, Ireland is in a special situation, because the economic and wider societal benefits that arise from provision of MMDS over the 2.6GHz band outweigh the very limited benefits that would arise from using the band to provide additional capacity for another service in very limited geographical areas of the country, where, in any event, alternative spectrum bands for such services are already available. Overall, we estimate that non-renewal of UPC's licences would deprive the Irish economy of approximately EUR129 million of benefits and would lead to the loss of 50 direct and many more indirect jobs associated with the provision of this service in Ireland.

Consequently a different approach is required in Ireland, and our analysis indicates that renewal of UPC's licences until April 2019 is the best way for ComReg to fulfil its obligations to promote the efficient use of scarce spectrum, promote infrastructure competition, and protect the interests of Irish users and Ireland's own national interests. We provide an overview of the analysis supporting this conclusion in Section 1.3 below.

1.3 Assessment of economic and societal benefits

For our assessment, we have considered the economic benefits to Ireland under two scenarios – one where UPC's licences are renewed by ComReg and one where they are not. We have concluded that Ireland will benefit economically by EUR129 million if the provision for extension of these licences is applied.

In contrast, we estimate that of the total EUR179 million of benefits (up to 2019) resulting from the introduction of next-generation mobile broadband technologies in Ireland, only EUR0.5 million would be foregone if the 2.6GHz band continued to be used for MMDS until 2019 – and this itself is based on the arguably optimistic assumption that four LTE networks and one mobile WiMAX network would be deployed in Ireland prior to 2019 if the 2.6GHz band were available for mobile broadband technologies. During the period 2014–2019, it is clear that Ireland would generate significantly greater incremental economic benefit from the continuation of UPC's national MMDS service in the 2.6GHz band than it would gain from the most likely alternative use of this spectrum (the provision of additional capacity for mobile broadband subscribers using next-generation mobile broadband technologies in Dublin and possibly other main cities).

1.3.1 Benefits arising from continued use of the 2.6GHz band for MMDS through renewal of UPC's licences

Renewal of UPC's licences will yield many benefits for Ireland, including the following:

- **UPC's subscribers will continue to generate VAT receipts** for the Irish government amounting to approximately EUR15 million over the period 2010–2014[2]
- **Irish consumers, particularly those in rural Ireland, will continue to have a choice of pay-TV providers**
- **UPC's MMDS-related direct expenditure in Ireland of approximately EUR8–11 million per annum will continue** – this includes the continued employment of 50 staff in UPC Ireland whose jobs are associated with the provision of MMDS, as well as direct expenditure on network operations, customer operations and marketing which also has further multiplier effects
- **[redacted]**
- **The availability of the MMDS service will ensure that media plurality continues to exist, and MMDS will continue to provide support for the distribution of Irish public service and community TV channels**. Although difficult to quantify, the value that Irish consumers attribute to these wider societal benefits should not be underestimated. Such social value was

[2] Cumulative value, undiscounted.

recognised when UPC was short-listed for the corporate and social responsibility category of the ICT Excellence Awards

- **UPC will [redacted]**

- **UPC's MMDS offering to its target customer base (mostly located outside the main cities) will remain competitive**. This will help to prevent alternative providers (e.g. BSkyB) from unduly raising their prices (as they could in the absence of direct competition), and so ensure that less wealthy households can continue to afford a key source of information and entertainment

- **UPC will continue to generate significant welfare benefits** in Ireland through the provision of services to its nationwide customer base, over and above what would be achieved if its subscribers were forced to migrate to an alternative TV platform at a higher price point

We have sought to quantify the *incremental* value (over and above that generated in a scenario where UPC's licences are not renewed) of many of the above benefits. We estimate that the incremental value is equivalent to an NPV of EUR129 million over the period 2010 to 2019.

1.3.2 Benefits arising from use of the 2.6GHz band for next-generation mobile broadband services in the event of non-renewal of UPC's licences

In contrast, if UPC's licences are not renewed, we have calculated that the economic benefits for Ireland resulting from the best alternative use of the spectrum would be significantly reduced. In such a scenario a highly likely outcome is that the spectrum would be acquired by mobile broadband service providers, primarily the four existing mobile operators (e.g. through an open auction process). We estimate that such an outcome would provide relatively limited incremental economic benefits for Ireland, since:

- **The benefits of deploying next-generation mobile broadband technologies (e.g. LTE and WiMAX) in urban areas – especially Dublin – using the 2.6GHz band could mostly be realised using alternative frequency bands**, in particular the 1800MHz band that is already dedicated to the provision of mobile services:

  – in view of the pace of 2G-to-3G migration, mobile operators should be able to make sufficient spectrum in the 1800MHz band available by 2014 for the highest-speed technologies such as LTE

- our discussions with major network equipment and user terminal manufacturers indicate that equipment operating in the 1800MHz band will be widely available no more than 12 months after equivalent equipment operating in the 2.6GHz band, and in any case before 2014 (which is the earliest date that the 2.6GHz spectrum could become available in Ireland)

- our calculations indicate that the 1800MHz spectrum would be sufficient to allow three operators to deploy networks offering the highest-speed LTE services, which in turn would reduce the cost of mobile broadband service provision for mobile operators. In addition, 1800MHz spectrum has better propagation characteristics than the 2.6GHz band and so is more beneficial to the mobile operators. As discussed earlier, although use of the 2.6GHz band in addition to the 1800MHz band could support further operators, it is unlikely that more than three next-generation mobile networks will be deployed in Ireland. Even in this unlikely scenario, the additional benefits for Ireland's consumers of more mobile networks are minimal, particularly when compared to the benefits for Irish households of having a second nationwide pay-TV operator

- ComReg will shortly award 100MHz of unpaired spectrum in the 2.3GHz band, which is well suited for the deployment of WiMAX networks. This frequency band is also being made available for WiMAX in Singapore, Hong Kong, India, New Zealand and China, and so equipment will be commercially available before the 2.6GHz spectrum is released in Ireland

- **Outside Dublin, and possibly the other main cities, the 2.6GHz spectrum would mostly remain unused if acquired by mobile broadband providers**, since deployment of the next-generation mobile broadband technologies outside highly populated areas would only be economic over lower-frequency bands. In contrast, UPC's MMDS platform is available across almost all of Ireland, reaching more than 92% of the population

- **The proceeds accruing to the Irish government from any auction of 2.6GHz spectrum are likely to be limited**, based on auctions that have taken place to date in Europe and Asia. Indeed the most recent auction which was just concluded in the Netherlands generated just EUR2.6m for paired spectrum (likely to be used for LTE), and the unpaired spectrum (likely to be used for WiMAX) was not sold

- **If mobile operators had access to the majority of the 1800MHz, 2.1GHz and 2.6GHz bands, significant amounts of this spectrum could be unused/underutilised during the period 2014–2019**. High-frequency spectrum is generally in plentiful supply – for example, one-third of the 1800MHz band is unassigned. There is a possibility that if all the high-frequency spectrum bands were made available to mobile operators prior to 2019, instead of making the spectrum available for other parties, the mobile operators could 'hoard' spectrum due to concerns over potential loss of profits if other operators were to enter the market

- **Use of the 2.6GHz band to provide mobile broadband services would not yield any significant wider societal benefits** – this band is suited for use in urban areas where

households already typically have two or more next-generation broadband connectivity options, and its use to provide high-speed broadband services to less populated areas (e.g. to reduce the digital divide) would be uneconomic. The generation of such societal benefits requires low-frequency bands.

We estimate that the introduction of next-generation mobile broadband technologies in Ireland would generate a total economic benefit of EUR179 million (NPV over the period 2010–2019), but almost all of this benefit would be realised without making the 2.6GHz band available for mobile broadband services. Our modelling indicates that if the 2.6GHz band were made available for mobile broadband, the incremental economic benefit to Ireland would be only EUR0.5 million (over the period 2010–2019), and even this is based on the optimistic assumption that four LTE networks and one mobile WiMAX network would be deployed.

Comparing the EUR0.5 million incremental benefit of using the 2.6GHz band for mobile broadband services with the EUR129 million of benefits generated by UPC's continuing use of the spectrum between 2010 and 2019, from a purely quantitative perspective it is clearly in Ireland's best interests to renew UPC's licences. Furthermore, as discussed above, renewal of UPC's licences would also provide many non-quantifiable wider societal benefits, such as media plurality.

1.4 The way forward

In summary, we conclude that the particular circumstances in Ireland mean that extension of UPC's licences until April 2019, as provided for in the terms of the licence, is the best means for ComReg to maximise the benefits of the 2.6GHz band for Ireland. ComReg should therefore aim to apply the provision for a five-year extension as soon as possible, as this will enable UPC to begin its investment in upgrading its network and subscriber base to the most spectrally efficient technologies.

Renewal of UPC's licences is consistent with ComReg's obligations and overall spectrum management policies, which include:

- **promoting infrastructure competition** – renewal of UPC's licences will ensure that 700 000 Irish homes retain a choice between two comparable pay-TV service providers – rather than being served by a monopoly operator

- **promoting the efficient use of scarce radio spectrum resources –** renewal of its licences will enable UPC to [redacted]. In addition, UPC will use the spectrum throughout Ireland (and particularly in rural areas), whereas its use for mobile broadband would be limited to the most dense population centres, particularly Dublin, with the spectrum remaining unused in the rest of the country.

- **promoting the interests of users** – renewal will ensure that UPC's 70 000 existing MMDS customers are not deprived of a service which they clearly value

- **facilitating access to radio spectrum, particularly for innovative technologies and services** – as indicated previously, renewal will enable UPC to invest in new technologies and offer innovative services such as HDTV to 700 000 homes

- **maximising the economic and social benefits arising from the use of radio spectrum** – as detailed in this report, renewal of UPC's licences is estimated to yield approximately EUR129 million of economic benefits for Ireland in the period up to 2019, together with numerous unquantifiable wider societal benefits.

- **ensuring compliance with international requirements and the avoidance of harmful interference** – UPC's proposed use of the 2.6GHz band will reduce UK overspill to a level which will enable the band to be used in Northern Ireland and the west of Britain.

We understand that UPC has examined the legal and regulatory situation in detail and is satisfied that renewal of the MMDS licences is compatible with EU and Irish law. The conclusions from UPC's analysis is that the offer of MMDS services in the 2.6GHz band is compliant with the EU regulatory framework and indeed there is no impediment in this framework to the renewal of the MMDS licences until 2019, as summarised below:

- The current EU regulatory framework promotes harmonisation of spectrum usage and provides that licences are awarded on the basis of objective, transparent, non-discriminatory and proportionate criteria. In addition, the updated EU regulatory framework (due to come into force in May 2011) favours technology- and service-neutral licensing. In particular, it underlines the need to give due consideration to the benefits for users, facilitating the development of competition, and also refers to the important social, cultural and economic value of spectrum.

- From a national regulatory standpoint, UPC provides MMDS services pursuant to the Wireless Telegraphy Act, 1926 (as amended). UPC's 2.6GHz licences are issued by ComReg in compliance with the Wireless Telegraphy (Multipoint Microwave Distribution System) Regulations 2003 ("the 2003 Regulations"), in exercise of its powers under the Communications Regulation Act, 2002. The 2003 Regulations stipulate that these licences expire in April 2014 and exceptionally include express provisions on licence renewal, set out in Regulation 8. In this respect, the 2003 licences are unusual; for example, they are in contrast to the statutory and licence framework under which mobile spectrum has been licensed.

- UPC recognises ComReg's obligations to ensure compliance with harmonisation decisions of the EC in relation to spectrum, but considers that the renewal of its licences is not inconsistent with these decisions. In the first place, what is being proposed is a transitional arrangement for a limited time period. Secondly, the operation of MMDS in the 2.6GHz band is compliant with

the relevant EC Decision[3] as well as with ComReg's statutory objectives and its spectrum strategy.

Overall, from Ireland's perspective there are very limited benefits to be gained from ComReg making the 2.6GHz band available for mobile broadband services in 2014, especially as there are numerous other spectrum bands (e.g. 1800MHz, 2.3GHz, 800MHz) which are equally (or more) suitable for the deployment of next-generation mobile broadband technologies in urban and rural areas. In contrast, if ComReg failed to renew UPC's licence, Ireland would forego significant benefits between 2010 and 2019. Furthermore, licence renewal would be for a period of five years during which time ComReg would be able to evaluate the changing market situation, to determine what use(s) of the 2.6GHz spectrum would be likely to maximise the benefits to Ireland from 2019 onwards.

3 'Commission Decision of 13 June 2008 on the harmonisation of the 2500–2690MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community' reference 2008/477/EC, published in the Official Journal of the European Union, 24 June 2008.

2 Introduction

This report has been prepared by Analysys Mason Limited (Analysys Mason) under contract to UPC Ireland (UPC) to assess the benefits for Ireland that would arise from the renewal of UPC's licences to use the 2500–2690MHz (2.6GHz) band to provide MMDS.

2.1 Background to the provision of UPC's MMDS service

UPC currently uses the 2.6GHz band to provide TV services to over 70 000 homes using MMDS technology, and also provides backhaul feeds to cable head-ends which in turn serve another 26 000 homes.

In order to provide MMDS services in Ireland, ntl and Chorus (both now UPC Ireland (UPC)) are required to hold licences to use wireless telegraphy apparatus pursuant to the Wireless Telegraphy Act, 1926 (as amended) (the "WTA").

These licences are granted by ComReg in exercise of its powers under the Communications Regulation Act, 2002 (the "2002 Act"). In exercising its powers to grant WTA licences, ComReg is required to comply with applicable EU law, which is set out in an EU regulatory framework for electronic communications. These EU measure have, to a large extent, been transposed into Irish law by a series of statutory instruments.

Since 6 November 2003, ntl and Chorus have held WTA licences in respect of their MMDS services pursuant to the Wireless Telegraphy (Multipoint Microwave Distribution System) Regulations, 2003 (the "2003 Regulations").

The 2003 Regulations include express provisions on licence renewal, set out in Regulation 8. This provides that ComReg should review the operation of the licences, and on conclusion of that review it may renew the licences for a further period of up to 5 years from 19 April 2014. In this respect, the 2003 licences are unusual (for example, they are in contrast with the statutory and licence framework under which mobile operators operate).

This report describes our analysis of the situation in Ireland, the results of which indicate that licence renewal would be in the best interests of Ireland, since this would enable significant benefits to be derived from the spectrum that would otherwise largely be foregone.

2.2 The role of UPC's MMDS service in the Irish audiovisual sector

The role that the audiovisual media sector plays in any society is quite unique. It encompasses the offer of public and commercial services that fulfil important cultural, social and public policy objectives. While new media distribution channels are on the increase, TV remains the primary source of information and entertainment – not just in Ireland, but right across the EU. TV

programme services, and the transmission platforms over which these are offered, therefore remain an integral part of society.

In the following subsections we provide an overview of the Irish TV market and MMDS's role in that market.

2.2.1 TV transmission in Ireland

Viewers in Ireland predominantly access TV programme services through four separate transmission systems: terrestrial, cable, MMDS and satellite. IPTV is available on a very limited basis, and although there are currently no mobile TV services, ComReg intends to issue one mobile TV licence by the end of 2010 which enable the eventual winner of the licence to offer services in the five urban centres only.

Across the existing four platforms, there are essentially two markets for the provision of TV services to consumers: free (to air) TV and pay TV. RTÉ offers three public service (PSB) channels (RTÉ 1, Network 2, TG4) and commercial channels on a free-to-air (FTA) basis over its terrestrial platform. Pay-TV services are offered by UPC and BSkyB over their cable, MMDS and satellite platforms.

2.2.2 The pay-TV market in Ireland

Pay-TV services in Ireland originated from a demand in the market for a reliable multi-channel service. Initially this demand was satisfied, at least in urban centres, by development of the cable transmission platform, and later on a national basis (in non-cabled areas) by the MMDS platform. The entry of BSkyB to the Irish market introduced an alternative nationwide provider of pay-TV services.

The value that Irish TV viewers attribute to multi-channel services should not be underestimated. Pay-TV penetration rates in Ireland are among the highest in Europe, and it is estimated that of the 1.46 million Irish TV homes, 78% subscribe to either UPC or BSkyB. This creates a very competitive market between the two companies – a fact that has been repeatedly acknowledged by the Irish Competition Authority[4].

2.2.3 The importance of MMDS to rural Ireland

In rural Ireland, the availability of *managed* pay-TV services is currently limited to BSkyB and UPC's MMDS service.[5] Despite competition from BSkyB, UPC retains a significant base of MMDS subscribers. If UPC's MMDS service ceased to exist, there would be significant disruption

[4] M/05/024 UGC (Chorus) /ntl, Determination of the Competition Authority, November 4, 2005. p29; *Pay TV exclusivity in apartment developments*, The Competition Authority, August 2009; and http://www.tca.ie/images/uploaded/documents/2009-08-14%20Pay-TV%20Exclusivity%20Guidance%20Note.pdf

[5] "Managed" services denotes pay-TV services that are only available on a subscription basis.

to these subscribers, as they would lose service and be forced to migrate to BSkyB in order to continue receiving a managed multi-channel TV service.

It is unlikely that these customers (or Irish consumers, more generally) will be able to obtain a comparable alternative service from either a commercial DTT service provider or Freesat.[6] Firstly, DTT will not have the same network capacity as UPC's MMDS platform. This means that a DTT commercial provider will be unable to offer like-for-like service or even the same quantity of services that are currently offered on UPC's MMDS platform. In addition, the viability of a commercial DTT service is uncertain given the difficulties experienced to date by those involved in contract negotiations for the launch of a service alongside RTÉ's own FTA service.[7]

With regard to the Freesat service, this is operated out of the UK and as such falls under UK jurisdiction. Because it is only available in Ireland due to overspill it is not a 'managed' service, which means that in the event of any problems with the service there is no point of contact or support services for Irish consumers. In addition, the accidental nature of this overspill means there is no guarantee that the service will continue to be available in the future.

Given these considerations, if UPC's 2.6GHz licences are not renewed, there will only be one provider of pay-TV services in rural Ireland (i.e. BSkyB). Such a situation is not in the interests of Irish society at large and more particularly UPC's established MMDS customer base.

2.3 The wider European context and alternative use of the 2.6GHz band

The European Commission's 2.6GHz Decision[8] requires Member States to make the 2.6GHz band available under technical conditions which make the band suitable for providing mobile broadband technologies such as LTE and WiMAX. Across Europe, there is interest in this band from mobile operators and other potential broadband wireless service providers; three countries have held auctions and many others are planning to award this band in 2010 or 2011. If UPC's licences are not renewed, a likely outcome is that the majority of the spectrum will be awarded to the mobile operators (e.g. through an open auction process), and UPC will be obliged to terminate its MMDS platform.

Due to the 2.6GHz band's propagation characteristics and the amount of spectrum that is available, we would expect mobile operators to use the band as an additional capacity overlay in urban areas for next-generation mobile broadband networks which will potentially enable the highest-speed services to be provided to customers and lead to a reduction in the unit cost of providing mobile broadband services. In less densely populated areas, it would be more appropriate to use a low-

6 Freesat is a UK satellite service which is available in Ireland due to an accidental overspill of the satellite signal onto the island of Ireland. It is not a managed pay-TV service in Ireland.

7 DTT, which will be available on a national basis, is expected to launch RTE's FTA service by the end of the year, but to date, no details have been announced regarding the launch of a pay-TV service on this platform.

8 'Commission Decision of 13 June 2008 on the harmonisation of the 2500-2690MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community' reference 2008/477/EC, published in the Official Journal of the European Union, 24 June 2008.

frequency band to provide mobile broadband and it is unlikely that the 2.6GHz spectrum will be utilised in these areas prior to 2019 (if at all).

2.4 Structure of this report

In the remainder of this report we provide details of the economic analysis we have undertaken of the best use of the 2.6GHz band in Ireland:

- Section 3 describes the benefits that would arise from continued use of the 2.6GHz band, following renewal of UPC's licences
- Section 4 describes the benefits that would arise in the event that UPC's licences were not renewed, and the 2.6GHz band was used to provide mobile broadband services
- Section 5 presents our overall conclusions from the study and discusses the best way forward.

The report includes two annexes containing supplementary material:

- Annex A provides further details of our approach to quantification of the incremental economic benefits arising from UPC's continued provision of MMDS using the 2.6GHz band
- Annex B provides further details of our approach to the quantification of the incremental benefits arising from use of the 2.6GHz band for the provision of mobile broadband services.

3 Benefits arising from renewal of UPC's licences

In this section we present the benefits to Ireland from renewal of UPC's 2.6GHz licences. We have quantified the *incremental* benefits from renewal of UPC's licences by considering which benefits would remain and which would be lost if UPC's licences were not renewed and subscribers were forced to migrate to alternative platforms.

In the following sections, we consider benefits arising in a number of areas:

- UPC's plans to invest in spectrally efficient technologies (Section **Error! Reference source not found.**)
- UPC's use of these spectral efficiency gains to enhance its service offering and remain competitive (Section 3.2)
- the Irish welfare benefits (producer and consumer surplus) generated from UPC's use of the 2.6GHz band (Section 3.3)
- the economic benefits that UPC's MMDS business generates through employment of personnel and UPC's other indirect costs (Section 3.4)
- the benefits to Ireland from UPC's payment of VAT (Section 3.5)
- avoidance of customer disruption if UPC's licences are renewed (Section 3.6)
- the wider social and societal benefits generated by UPC's provision of services in sparsely populated areas (Section 3.7).

Finally, in Section 3.8 we summarise the overall benefits to Ireland from renewal of UPC's licences.

3.1 [redacted]

[redacted]

3.2 Providing an enhanced and highly competitive pay-TV service offering to customers

TV is a key service for consumers, with viewers in Ireland typically spending 22 hours[9] per week watching TV. As new forms of entertainment such as social networking and video delivered to PCs become more prevalent, this consumption appears to be incremental to TV rather than substitutional.

Whilst the current standard for broadcast is SD technology, HDTV is becoming increasingly prevalent. HDTV is a widescreen, high-resolution, significantly enhanced TV service. DigiTag (an industry body for broadcasters, manufacturers, network operators and regulators involved in DTT) attributes the demand for HDTV services to a number of factors, including:

- the growing number of households with HD-ready displays
- the apparent decline in quality of SD services on flat-panel displays
- the emergence of new HD-capable technologies
- the desire to watch high-profile sporting events in HD quality.

In the UK, Ofcom's *Digital Progress Report*[10] recorded sales of HD-ready TV sets in the UK exceeding 3030 million by the end of 2009. The report also explained that of the 3.3 million TV sets bought by UK consumers in the final quarter of 2009, 70% were HD-ready models.

In March 2009, Screen Digest forecast that the number of HD-enabled households in Ireland would grow to 558 000 (38% of all TV households) by 2013, as shown in Figure 3.1.

9 Source: Eurodata TV Worldwide.

10 *The Communications Market: Digital Progress Report, Digital TV, Q4 2009*: see http://www.ofcom.org.uk/research/tv/reports/dtv/dtv_2009_q4/dtv_2009_q4.pdf

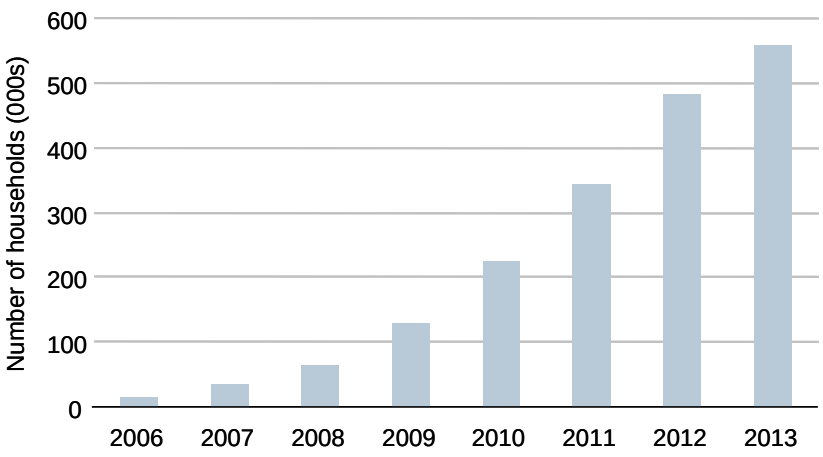


Figure 3.1: HD-enabled households in Ireland [Source: Screen Digest, March 2009]

The number of HD channels available in Ireland has grown steadily over the last four years:

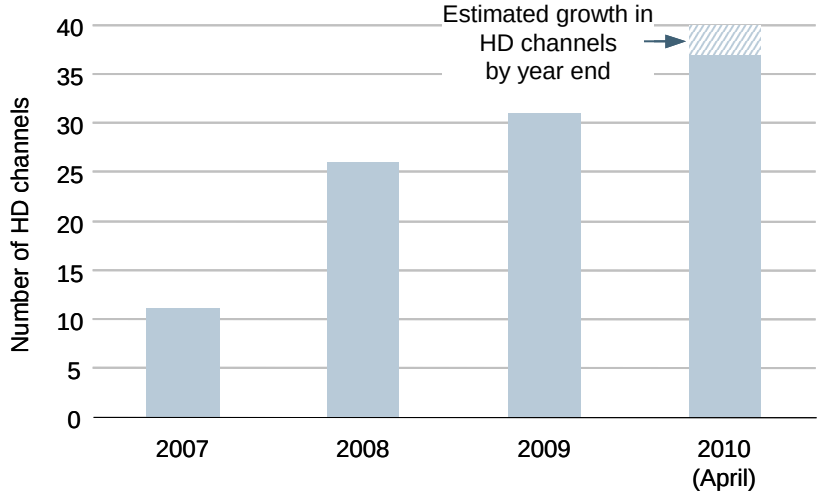


Figure 3.2: Number of HD channels 'available' in Ireland at year end (pay/free-to-view, including international and overspill channels) [Source: Screen Digest, Analysys Mason]

This is consistent with the situation in other countries, as illustrated in Figure 3.3 below. It can be seen that the number of HD channels in all markets is growing.

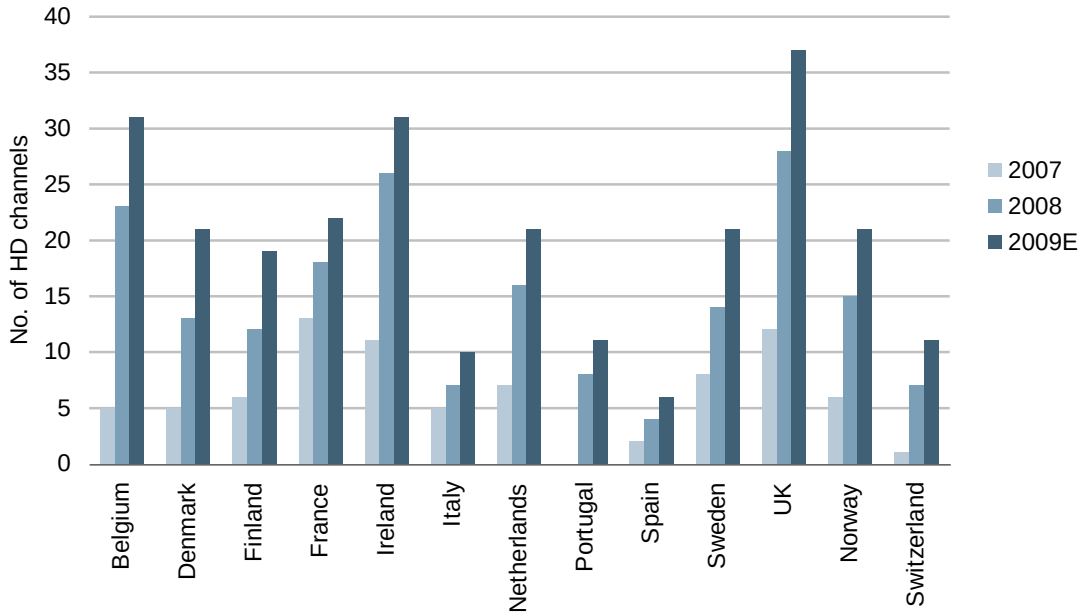


Figure 3.3: Number of HD channels in selected European markets [Source: Screen Digest]

In a recent Ofcom report[11], BSkyB commented that "Such has been the consumer demand for HD that Sky+ HD is the fastest selling additional TV product ever offered by Sky". It is clear that the provision of HD services will be an important part of TV viewing in the future, and the requirement to deliver HD is essential for a pay-TV platform.

The capacity provided by its satellite platform allows BSkyB to offer a wide selection of channels (currently 587) in SD and HD in Ireland, as well as additional services (e.g. interactive and data services). In order to compete successfully with BSkyB, UPC currently uses the entire capacity of the 2.6GHz band to deliver a comprehensive selection of SD channels. [redacted].

UPC currently uses the entire 2.6GHz spectrum band to provide a wide selection of TV channels to its MMDS customers. In order to continue providing an attractive, competitive offering to customers, UPC needs to increase the capacity of its MMDS network to carry more services, including both additional SD video channels and the introduction of HD video channels. In this section we discuss the reasons why UPC considers it so important to make such improvements to the MMDS service offering (including the introduction of HDTV and personal video recorders (PVRs), such as UPC's Digital+ product) in order to ensure that 92% of Irish households are able to benefit from a competitive service offering to BSkyB.

11 See http://www.ofcom.org.uk/consult/condocs/third_paytv/statement/paytv_statement.pdf

Figure 3.4 illustrates the number of video channels that could be offered using the 22 channels in the 2.6GHz [redacted]

Redacted

Figure 3.4: [redacted]

We understand from UPC that the majority of BSkyB's subscribers are located in areas where cable TV services are not available. By renewing UPC's licences to 2019, ComReg will avoid granting BSkyB a pay-TV monopoly across a large area of the country, covering 50% of households. Such a monopoly could provide BSkyB with an opportunity to increase prices throughout the country (in both cable and non-cable areas). Although such price increases might lose BSkyB some subscribers in areas where cable TV services are available, this would be more than offset by the additional revenues from the remaining subscribers (particularly in areas without cable TV, where no alternative comparable pay-TV service is available).

3.3 Continuing generation of welfare benefits in Ireland

UPC's MMDS platform currently generates welfare benefits in the form of the private value it generates for Ireland. Private value captures the direct benefits to individuals from their own consumption of a service (i.e. the value that consumers place on that service), less the costs of producing the service. In economic terms, this is equal to the sum of consumer and producer surplus.

If UPC's licences are renewed, these benefits will continue until the eventual licence expiration in 2019. Indeed, licence renewal is likely to increase the level of benefits generated: UPC will [redacted], which would attract more consumer interest, higher revenues and a larger producer surplus.

In contrast, if UPC's licences are not renewed and it has to close its MMDS platform in 2014, the private value generated for Ireland by UPC's service will end abruptly in 2014. Furthermore, the total private value generated will begin declining from the time it becomes clear that UPC's licences are not to be renewed; there will be no commercial incentive for UPC to continue investing in MMDS and fewer subscribers will join a service that is going to close.. Although most MMDS subscribers are likely to migrate to BSkyB, which will be likely to lead to an increase in producer surplus for BSkyB, this increased producer surplus will mainly benefit the UK economy, where BSkyB is registered.

We have developed a commercial model to forecast the revenues and costs of UPC's MMDS operations in both scenarios: one where UPC's licences are renewed and the other where the licences are not renewed. The **producer surplus** generated for Ireland is calculated by taking a ten-year (2010–2019) NPV of the free cashflows, which can be derived from the model. The difference in the NPV values between the two scenarios is equivalent to the incremental producer surplus derived from renewal of UPC's licences, which we have calculated as EUR32.8 million. Details of the assumptions behind these calculations can be found in Annex A.

Furthermore, if UPC's licences are not renewed, there will be a likely reduction in **consumer surplus**. We expect that the vast majority of UPC's MMDS subscribers would migrate to BSkyB's service in this scenario (with other subscribers migrating to a less attractive service e.g. pay TV or FTA TV on other platforms such as DTT). If the subscribers migrating to BSkyB pay EUR39.2 per month (BSkyB's estimated average revenue per user (ARPU)), this will lead to a loss in consumer surplus (as UPC's ARPU for MMDS is EUR32.5 per month).

Over the same ten-year period, we have calculated this loss in consumer surplus to be EUR27.7 million. Details of the assumptions behind this calculation can be found in Annex A.

Therefore, we estimate the total incremental private value to Ireland (consumer surplus and producer surplus) from renewal of UPC's licences to be EUR60.5 million over the period 2010–2019.

3.4 Continuation of UPC's direct expenditure in Ireland

Ireland will continue to benefit from the **employment** generated by UPC's MMDS business if its licences are renewed. UPC currently has 50 staff, equating to 37 full-time equivalent (FTE) staff working on its MMDS business. In the scenario where UPC closes its MMDS platform, 37 FTE positions could be lost, with a negative impact on employment in Ireland:

- 30 staff focus entirely on the MMDS business; all of these positions would be at risk
- 27 staff work on both UPC's MMDS and cable businesses; there would inevitably be some redundancies among these positions.

Furthermore, we believe that only limited additional employment will be created among alternative service providers. In the scenario where UPC closes its MMDS platform, it can be assumed that most of its MMDS subscribers will migrate to BSkyB since this will be the only comparable managed pay-TV service. It is unlikely that BSkyB will create an equivalent of 37 FTE positions, to compensate for the positions lost at UPC. In fact, BSkyB will probably only require a few more staff, to accommodate the increase in subscriber numbers (e.g. for customer care) and these positions would almost certainly be located outside Ireland.

Ireland also benefits directly from the **indirect costs** of UPC's MMDS business. These include network operations costs, customer operations and customer care costs, billing and collection costs, general and administrative costs, and marketing costs. Each of these costs is an investment

in the Irish economy and has multiplier effects leading to economic benefits that are far higher than the NPV of UPC's projected total indirect costs. For example, UPC's marketing activities result in increased spend in the Irish marketing, advertising and PR industries, hence sustaining more employment and also indirectly increasing the revenues in other industries for marketing channels (TV, radio, etc.).

We have modelled two scenarios to quantify the value to Ireland of the loss of indirect costs:

- In the first scenario, we assume that UPC's licences are renewed, leading to a continuation and improvement in UPC's MMDS service through increased investment
- In the second scenario, we assume that UPC's licences are not renewed, leading to lower investment from 2010 and a gradual loss of subscribers until the closure of UPC's MMDS platform in 2014.

In both scenarios, we have calculated the value to Ireland of indirect costs by taking a ten-year NPV of projected indirect costs, for the period 2010–19. The difference in value between the two scenarios is equivalent to the economic value to Ireland of renewing UPC's licences. We have calculated this value to be EUR51.2 million. Details of the assumptions behind this calculation can be found in Annex A.

3.5 Continuing payment of VAT in Ireland

UPC and BSkyB are the only major pay-TV providers in Ireland. UPC pays VAT in Ireland but BSkyB does not. Therefore, any migration of UPC subscribers to BSkyB due to closure of the MMDS platform will lead to a decline in VAT receipts in Ireland, and will have a negative economic impact on Ireland.

We note that BSkyB is expected to begin paying VAT to the Irish Exchequer, once a new EU Directive is implemented in 2015. Nevertheless, over the period 2010–2014 inclusive, the migration of UPC's MMDS subscribers to BSkyB in anticipation of the closure of UPC's service will have a negative impact on Ireland's VAT revenues.

To quantify the value of VAT to Ireland from UPC's MMDS platform, we have modelled two scenarios:

- In the first scenario, we assume that UPC's licences are renewed
- In the second scenario, we assume that UPC's licences are not renewed and its MMDS platform is closed in 2014.

In both scenarios, we have calculated a ten-year NPV for UPC's VAT payments, for the period 2010–19. The difference in NPVs between the two scenarios is equivalent to the value that is generated from VAT payments through renewal of UPC's licences. We have calculated this value to be EUR13.3 million. Details of the assumptions behind this calculation can be found in Annex A.

3.6 Avoidance of consumer disruption

In the scenario where UPC's licences are not renewed, there will be significant disruption to UPC's MMDS subscriber base of more than 70 000. These subscribers, who live outside UPC's cable coverage, will be forced to terminate their subscriptions with UPC, which will involve cancelling any direct debit payments and un-installing (and/or removing) any equipment such as set-top boxes and MMDS antennas. These subscribers will then be forced to assess alternative TV service options and spend time ordering, installing and learning how to use the chosen new service. The only alternative pay-TV service available is from BSkyB, and subscribers migrating to BSkyB may have to buy new equipment to receive this service and would need to have a satellite dish installed on their premises.

The total cost of consumer disruption is difficult to quantify, as it is challenging to capture the total costs of the various potential disruptive effects arising from the closure of a TV service. However, we have quantified a selection of the costs:

- cost of new equipment for MMDS subscribers migrating to BSkyB
- cost of repair in case of equipment faults, for MMDS subscribers who migrate to BSkyB (UPC does not charge for the equivalent repair service)
- other avoidable costs (the time value of disruption from selecting, ordering, installing and using a new pay-TV service).

We have calculated these costs to be EUR4.4 million, which is equivalent to a lower-bound economic impact on Ireland from consumer disruption.

Details of the assumptions behind this calculation can be found in Annex A.

3.7 Wider social and societal benefits

There are also wider social and societal benefits from UPC's MMDS service that cannot be quantified, but are nevertheless highly significant to Ireland. In the scenario where UPC's licences are not renewed, these benefits will be lost to Irish citizens outside UPC's cable footprint. This section presents examples of these benefits.

3.7.1 UPC's contribution to media plurality in Ireland

Media plurality is a concept that encompasses media ownership and all measures that ensure access to a variety of information sources and opinions for all types of media service. With respect to the TV landscape, all types of TV service – public, commercial and community – play an important role in creating pluralism. These, in addition to the availability of a range of distribution channels for such content, are seen as paramount to maintaining plurality.

The importance attributed to the role and influence that TV programme services can have on a society is reflected by the ability of national governments to introduce rules that preserve plurality and reflect the political and cultural values of their society. These rules apply to any FTA and pay-

TV service providers that fall within the legal jurisdiction of that country. It is for this reason that UPC, not BSkyB, is the only pay-TV service provider that has to respect any existing or future rules on media plurality in Ireland.

3.7.2 'Must carry' services

'Must carry' is a term that refers to specifically designated TV channels which a pay-TV provider must include in its TV packages. In most cases the platform provider is not allowed to charge the TV channels the normal transmission costs associated with carrying the signal on its transmission network. In Ireland, RTÉ 1, Network 2, TV3 and TG4 are 'must carry' channels on all of UPC's transmission networks.

Any other public service channels that emerge in the future (such as the Oireachtas and Film channels, as referenced in the recent 2009 Broadcasting Act) are also likely to be classified as 'must carry' channels.

3.7.3 Carriage and EPG fees

By virtue of their 'must carry' status, UPC does not charge the Irish PSB channel providers for the costs associated with including these channels in its TV packages. Such costs would normally include a fee for carriage on the platform as well as a charge associated with the position that is allocated to the channel on UPC's Electronic Programme Guide (EPG)[12]. While there are no specific rules about where these channels should be listed in UPC's EPG, the company has always voluntarily allocated preferential EPG positions to the Irish PSB channels (e.g. RTÉ 1 is 101 and Network 2 is 102 on UPC's EPG).

BSkyB is not bound by these 'must carry' provisions and is therefore not obliged to make these TV channels available to the Irish public. BSkyB charges fees for carrying these channels on its platform and including them in its EPG. [13]

3.7.4 Support for indigenous channels

UPC plays a key role in supporting Irish channel providers:

- **UPC works very closely with the state broadcaster in supporting its new and emerging services** (such as the *RTÉ Player*), despite having no regulatory obligation to do so. The two organisations are already working together, and we understand that this collaboration extends to new ancillary services currently under development by the broadcaster

[12] An Electronic Programme Guides (EPB) is the name given to the application that lists and numbers channels by a TV service provider.

[13] See http://corporate.sky.com/documents/pdf/20c24d2e1c62406594e1a79de5f917db/bskyb_sssl_price_list_oct09.

- Where it is technically feasible and capacity exists, **UPC provides carriage, free of charge, to local community TV channels**. For example, it currently carries pilots of two community channels (Dublin and Cork) on its cable footprint. Without this support, we understand that community channels would be unable to secure a broadcasting licence from the Broadcasting Authority of Ireland (BAI), since issue of a licence to these channels is dependent on them securing a carriage agreement with a platform provider. UPC is the platform of choice and indeed is the only managed pay-TV service provider that currently offers carriage to these channels. Due to a lack of capacity on its MMDS network, UPC is currently unable to include these channels in its MMDS service but has indicated that it would be very happy to do so if capacity became available. UPC also carries Dublin, Galway and Cork versions of the 'City Channel' on its cable and ntl MMDS footprints.

- **UPC supports a number of Irish-owned commercial channels**. These include Dublin, Galway, Cork and Limerick versions of the 'City Channel' and 'Channel South', which are available on its cable and MMDS footprints. In addition, the company offers the Setanta Ireland sports channel as part of its basic channel package for both analogue and digital services (whereas BSkyB offers this as a premium channel only) and was the first party to offer carriage and a preferential EPG position to 3e (formerly Channel 6). Support for these channels ensures greater access to Gaelic sports and Irish language programming, as these channels, particularly Setanta Ireland, provide extensive coverage of Gaelic games (National League hurling and football) and rugby (Magners League).

UPC believes that, without its support, it is doubtful whether any of these channels (with the exception of RTÉ) would have a viable business case, since they are likely to lack the funds necessary to pay BSkyB's carriage and EPG fees. The loss of UPC's MMDS subscriber base would make it more difficult for UPC to maintain the same levels of support which in turn might jeopardise the continued existence of most of these channels.

In summary, the closure of UPC's MMDS service would have a negative effect on social value to Ireland. Although difficult to quantify, such social value was widely recognised when UPC was short-listed for the corporate and social responsibility category of the ICT Excellence Awards.

3.8 Summary

If UPC's licences are not renewed, we estimate that this would result in **a loss of around EUR129 million in economic value to Ireland between 2010 and 2019 (NPV)**, as shown in Figure 3.5. This would arise from a combination of loss of producer surplus, reductions in consumer surplus, reductions in VAT receipts, reduced UPC expenditure, and losses from consumer disruption.

Incremental economic benefit	*Amount (EUR million)*
Producer surplus	32.8
Consumer surplus	27.7
UPC expenditure	51.2
VAT receipts	13.3
Consumer disruption	4.4
Social value	*Not quantified*
Total incremental benefit from renewing UPC's licences	***129.4***

Figure 3.5: Incremental value to Ireland of UPC's MMDS service [Source: Analysys Mason]

Finally, several wider societal benefits delivered by UPC's MMDS service will also be lost if UPC's licences are not renewed. Although difficult to quantify, there are clear benefits from media plurality and direct regulation associated with UPC's MMDS service.

4 Benefits arising from non-renewal of UPC's licences

In this section we seek to quantify the incremental benefits arising from other potential uses of 2.6GHz spectrum, if UPC's licences are not renewed. As discussed in Section 2, we view the most likely alternative use of the spectrum as being for the deployment of next-generation mobile technologies (such as LTE and WiMAX) to provide mobile broadband services. We have therefore compared the benefits arising to Ireland if the 2.6GHz band is made available for this service from 2014 with the benefits that arise if 2.6GHz spectrum is not available and an alternative spectrum band (1800MHz) is used instead.

We have structured this section as follows:

- Section 4.1 discusses the feasibility of using the 1800MHz band to deploy next-generation mobile broadband technologies as an alternative to use of the 2.6GHz band
- Section 4.2 quantifies the incremental economic benefits to Ireland if the 2.6GHz spectrum band is used for the provision of mobile broadband services
- Section 4.3 describes the wider social and societal benefits to Ireland if the 2.6GHz spectrum band is used to provide mobile broadband services.

4.1 Feasibility of using 1800MHz spectrum for next-generation mobile broadband

There are several spectrum bands which may be used to provide next-generation mobile broadband services, including the 800MHz, 900MHz, 1800MHz, 2100MHz and 2.6GHz bands. For the deployment of WiMAX networks, the 2300MHz band is an alternative option: ComReg plans to award this band later in 2010, and as it is already being used in several Asian markets user terminals will be widely available.

The lower-frequency bands (i.e. 800MHz and 900MHz) are expected to be used by mobile operators, primarily to provide nationwide mobile broadband coverage, while the higher-frequency bands (i.e. 1800MHz, 2.6GHz and possibly 2100MHz) are expected to be used to provide additional network capacity in densely populated areas (i.e. the main cities in Ireland, and particularly the Dublin area). Mobile operators will wish to deploy next-generation mobile broadband networks using a combination of one low-frequency spectrum band (to provide widespread coverage) and one high-frequency spectrum band (to provide additional capacity in the most populated areas). If UPC's licences are not renewed, the spectrum band will become available to other uses in 2014. Numerous mobile network operators worldwide are considering use of the 2.6GHz spectrum band for provision of mobile broadband services, while several others intend to use the 1800MHz band. Our analysis indicates that by 2014 the 1800MHz spectrum band will be a valid alternative to the 2.6GHz band in Ireland and will provide sufficient capacity for three operators to deploy high-speed mobile broadband services.

Overall our analysis suggests that almost all of the economic benefits arising from the provision of mobile services in urban areas can be realised by mobile operators using the 415MHz of spectrum which is already available to them in other dedicated frequency bands for mobile services (800MHz, 900MHz, 1800MHz and 2.1GHz) – the additional 190MHz of spectrum in the 2.6GHz band would provide very limited incremental benefit in Ireland. Figure 4.1 highlights the expected date of availability of spectrum in Ireland in each of these bands for mobile services (and the 2.3GHz band for mobile broadband services).

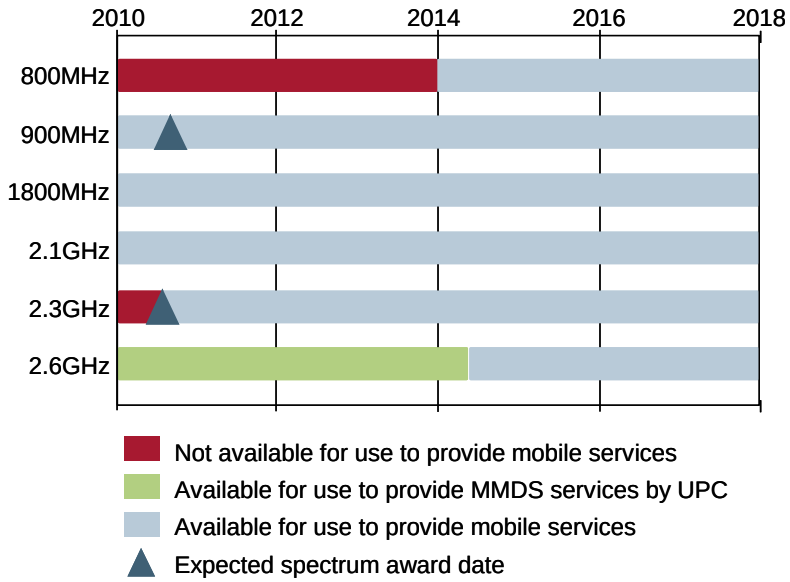


Figure 4.1: Availability of main frequency bands for mobile services including 2.3GHz for mobile broadband services [Source: Analysys Mason]

4.1.1 Propagation characteristics and spectrum quantity

Both the 1800MHz and 2.6GHz bands are generally considered as 'high-frequency' bands by mobile network operators and can be used to provide additional network capacity in areas of high population density. Ireland does not have many densely populated areas when compared with other European countries, and so high-frequency spectrum is likely to be used to provide additional network capacity only in the main cities. Moreover, population density in the most populated areas of Ireland (e.g. central Dublin) is typically lower than the population density in the most populated areas of other countries (e.g. central Paris).

The 1800MHz and 2.6GHz spectrum bands have similar propagation characteristics; in fact, base stations transmitting at 1800MHz can cover slightly larger areas than those transmitting at 2.6GHz (assuming similar topography and mast height). In addition, each band has relatively large amounts of paired spectrum available: the 2.6GHz band has up to 70MHz and the 1800MHz has 75MHz. It is widely acknowledged that provision of the highest-speed mobile broadband services using LTE technology will require 2×20MHz of spectrum per operator.

As such, a mobile broadband network operator could use either band to provide highest-speed mobile broadband services, assuming there is enough free spectrum available and vendors are able to supply network equipment and handsets for the specific band.

4.1.2 Migration of subscribers from 2G to 3G networks

At present, mobile operators in Ireland use the 900MHz and 1800MHz bands to provide 2G services using GSM technology. However, the number of GSM connections in Ireland has been declining steadily since 2007 as subscribers migrate to 3G, and this trend is expected to continue in the short to medium term. By 2012, 55% of all mobile connections in Ireland are expected to be 3G connections, while 43% will be on GSM. By 2014, fewer than 25% of mobile connections in Ireland are expected to be on GSM[14]. The expected migration from 2G to 3G is shown in Figure 4.2.

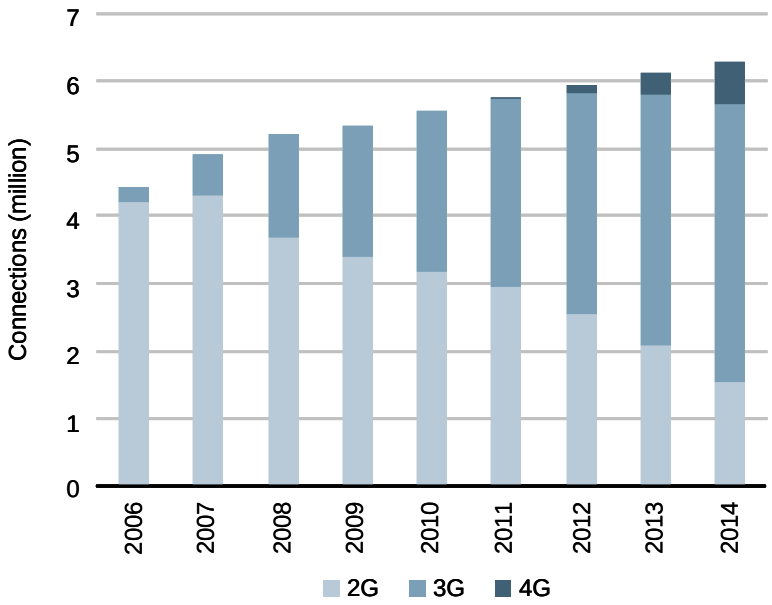


Figure 4.2: Forecast of migration from 2G to 3G and 4G technologies in Ireland [Source: Analysys Mason]

Liberalisation of the 900MHz spectrum from 2011 could accelerate this migration as availability of 3G services extends further across the population/land in Ireland: this is due to the enhanced coverage and significant improvement in economics that would arise from use of the 900MHz band to provide coverage in rural areas, compared with the 2.1GHz band.

Currently, the 1800MHz spectrum band is used to provide capacity overlay for operators' 900MHz GSM networks. As subscribers migrate from GSM to UMTS, this additional capacity is less likely to be required. With this reduction in the demand for GSM capacity over time, mobile operators in Ireland may be able to release a large portion of their 1800MHz spectrum allocations for a new mobile broadband technology, such as LTE.

4.1.3 Availability of 1800MHz spectrum in 2014

Based on forecasts of subscriber migration from 2G to 3G, we expect that mobile operators will be able to free up over 2×60MHz of spectrum in the 1800MHz band by 2014 for new uses. This analysis is detailed below, and summarised in Figure 4.3.

14 Analysys Mason estimates.

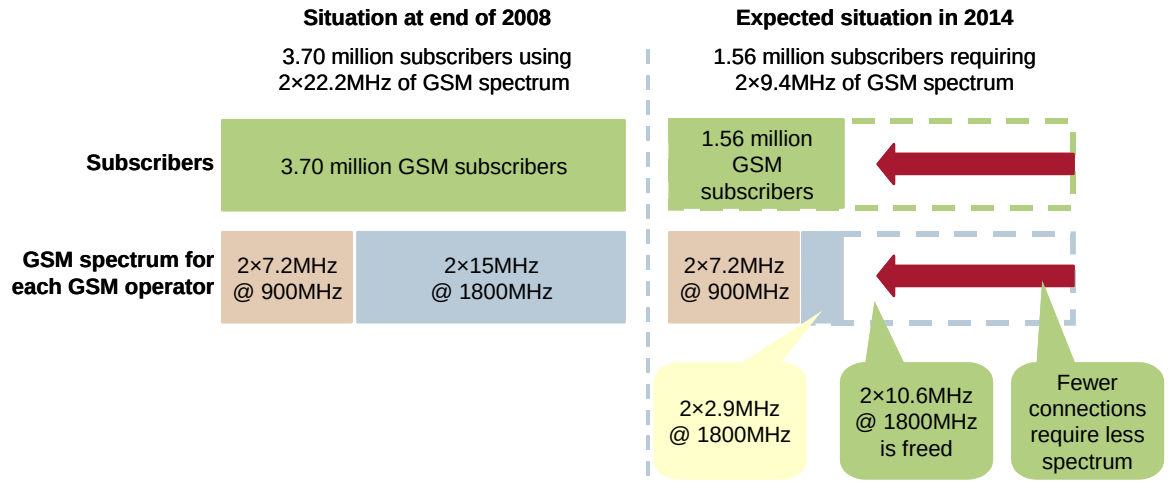


Figure 4.3: Expected reduction in 1800MHz spectrum required for provision of GSM capacity [Source: Analysys Mason]

At present, Meteor, O_2 and Vodafone have 900MHz and 1800MHz spectrum in Ireland, which they use to carry GSM services. Each operator holds 2×7.2MHz of 900MHz spectrum and 2×15MHz of 1800MHz.

There were approximately 3.70 million 2G connections in Ireland at the end of 2009[15]. We expect the number of 2G connections to decline to 1.56 million by 2014. Based on an assumption that at the end of 2008 the amount of 900MHz and 1800MHz spectrum used to provide capacity on 2G networks was at least sufficient to ensure acceptable quality-of-service levels, on a pro-rata basis this indicates that the amount of spectrum required to provide acceptable 2G network service levels in 2014 amounts to approximately 2×9.4MHz per operator. This is illustrated in Figure 4.3. In practice this is likely to be an over-estimate, since the total amount of spectrum is only needed in the most populated areas (e.g. central Dublin), and subscribers in these areas are likely to migrate from 2G networks to 3G networks earlier than subscribers across Ireland as a whole.

In the upcoming 900MHz auction in Ireland, an individual operator will be able to bid for a maximum of 2×10MHz of spectrum. We expect that the existing 2G network operators will seek to acquire 2×10MHz each, and use this to continue to operate their 2G networks as well as deploying 3G networks. The remaining 5MHz is expected to be secured by a new entrant to the 900MHz band.

If a mobile operator uses 2×5MHz of 900MHz spectrum for GSM (and the other 2×5MHz for 3G) then, based on the above estimate, the operator will require 2×4.4MHz of 1800MHz spectrum to service its 2G subscriber base in 2014. Altogether, the three operators will require 2×13.2MHz in the 1800MHz band. There is currently 2×75MHz of capacity in the 1800MHz band, and the

15 ComReg Key Data Report – Q4 2009 (ComReg Document 10/19), Section 4. ComReg reports that, at the end of 2009, there were 5 302 345 mobile subscriptions (2G and 3G) and (in Figure 4.2.5) that 70% of these (i.e. 3.7 million) were 2G.

remaining 2×61.8MHz of 1800MHz spectrum could be used for provision of mobile broadband using new technologies.

4.1.4 Availability of mobile broadband equipment for the 1800MHz band

A key consideration for mobile network operators is how soon mobile broadband network equipment and handsets will be available for the 1800MHz band. It is important that network equipment is available in time to allow thorough testing prior to network roll-out, and that a range of handsets is available for consumers.

As part of Analysys Mason's ongoing research programmes, to ascertain the expected timeline for availability of network equipment and handsets for the 1800MHz band, we conducted a series of interviews with mobile operators and equipment vendors, focusing particularly on their plans for LTE over the 1800MHz band. The interviews were carried out between July 2009 and March 2010. We found that mobile operators and vendors are engaged in discussions on the provision of LTE equipment for the 1800MHz band. We received the following comments regarding demand for LTE over 1800MHz:

- *"There are several operators looking at LTE 1800. There is definitely more interest in this band than in 2100[MHz]."* – Major equipment vendor
- *"LTE 1800 is more interesting than LTE 2600 and LTE 2100, and we see a potential launch in 2011/12. However, there needs to be more than just us in the market to ensure handset volumes will be there."* – Major European mobile network operator
- *"We are in active discussions with two operators on LTE 1800, one of which is in Europe."* – Huawei.

In addition, SmarTone–Vodafone, an operator in Hong Kong, has publicly commented on its plans to deploy LTE over the 1800MHz band:

- *"The investment in new spectrum further demonstrates our long term commitment to 4G LTE on 1800 MHz. Our implementation of 4G LTE on 1800 MHz instead of 2500/2600 MHz offers the benefit of better radio in-building coverage, an important advantage in the Hong Kong cityscape. It also provides the best values for our shareholders and customers."* – SmarTone-Vodafone.

The vendors we interviewed were either currently testing or had already tested LTE network equipment and handsets for the 1800MHz band, and expected this equipment to be widely available within 12 months of LTE equipment for the 800MHz and 2.6GHz bands. As all major network equipment and handset vendors anticipate supporting LTE in the 1800MHz band, a good range of devices is likely to be available. Most vendors interviewed agreed that initial LTE devices will be modems, and handsets supporting VoIP are expected to be launched approximately one year after data devices.

We received some positive comments regarding LTE network equipment and handsets in the 1800MHz band from vendors:

- *"There is interest in LTE 2600 and LTE 900 but LTE 1800 is coming. There is not only interest in MEA but also APAC where operators have 1800MHz and not 900MHz."* – NSN
- *"There are many chipset manufacturers supporting LTE 1800 and 2600. LTE 1800 could be driven by the likes of Orange and T-Mobile, who have lots of 1800MHz. We anticipate deployments in 2011."* – Alcatel-Lucent
- *"We expect the first commercial deployment will be in 2011 and will initially be small scale but will catch up to LTE 2600 rapidly. We need to have the capability to support several bands in chipsets before commercial networks are deployed. We believe handsets will not be an issue for operators considering deploying LTE 1800."* – Major global device manufacturer.

All vendors interviewed agreed that demand from mobile operators would be the primary driver of the mass-market production of LTE equipment for the 1800MHz band.

Based on these interviews, we have compiled a timeline indicating the expected availability of LTE equipment in the 2.6GHz, 800MHz and 1800MHz bands, as shown in Figure 4.4. By 2014, we expect that there will be widespread availability of both network equipment and handsets to support LTE over the 1800MHz band.

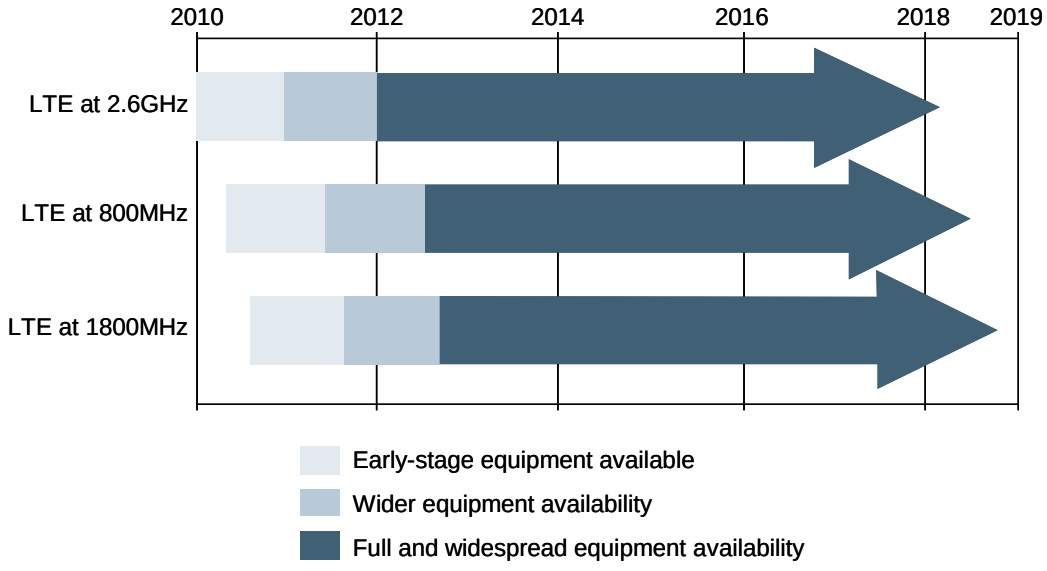


Figure 4.4: Expected timeline for availability of LTE equipment for the 2.6GHz, 800MHz and 1800MHz spectrum bands [Source: Analysys Mason]

4.2 Incremental economic benefits of 2.6GHz spectrum for provision of mobile broadband

The provision of mobile broadband services will generate welfare benefits for Ireland. The 2.6GHz spectrum band could be used for the provision of mobile broadband in the most densely populated urban areas such as Dublin (for example, using LTE or WiMAX technologies), in combination with use of the 800MHz band in less populated areas. However, as indicated above, the 1800MHz band is a viable alternative to the 2.6GHz band. As UPC's licences do not expire until 2014, the 2.6GHz band will not be available for mobile broadband before this date. By 2014, it is very likely that there will have been sufficient migration of mobile subscribers from 2G to 3G to allow operators to use 1800MHz spectrum for LTE (as discussed in Section 4.1.2 above). Therefore, whether or not 2.6GHz spectrum is made available to mobile and WiMAX operators, it is realistic to assume that mobile broadband services will be launched anyway and private value will be generated from these services in Ireland.

The private value generated by mobile broadband services is equivalent to the producer surplus to Ireland plus the consumer surplus to Ireland. To quantify the incremental private value gained from the provision of mobile broadband services using 2.6GHz spectrum, we have modelled two scenarios (as shown in Figure 4.5) – one to examine what might occur if UPC's licences were renewed (namely that three mobile operators would launch services using the 1800MHz band) and one to examine what might occur if UPC's licences were not renewed (in which case four mobile operators and a WiMAX operator may all launch services in urban areas). This latter scenario is likely to be optimistic – in practice, it is unlikely that five competing networks will be deployed in Ireland, given:

- the increasing global trend for mobile operators to share network infrastructure
- the collapse in WiMAX network launch plans in developed markets, as a result of doubts about the commercial feasibility of the business and uncertainty over availability of user equipment (e.g. subscriber handsets) that will support WiMAX and older mobile technologies such as GSM.

Scenario	*Mobile broadband service providers and spectrum bands used*
A: UPC's 2.6GHz licences are renewed	• 2.6GHz spectrum not used for mobile broadband • Three mobile operators launch LTE with 1800MHz (and 800MHz in rural areas) • One mobile operator launches LTE with 800MHz only • No mobile WiMAX operator using 2.6GHz band
B: UPC's 2.6GHz licences are not renewed	• Four MNOs launch LTE with 2.6GHz/1800MHz in urban areas (and 800MHz in rural areas) • One WiMAX operator launches with 2.6GHz

Figure 4.5: Mobile broadband scenarios modelled [Source: Analysys Mason]

Furthermore, the 2.3GHz band is a suitable alternative for the deployment of WiMAX networks – therefore our economic analysis may also overstate the competitive benefits of use of the 2.6GHz band for the deployment of a WiMAX network.

For both scenarios, we have developed a model to calculate the incremental private value generated from mobile broadband services. The detailed assumptions of the model are provided in Annex B.

In both scenarios, we assume that mobile broadband services will be launched in 2014. This assumption reflects the timing of 800MHz, 1800MHz and 2.6GHz spectrum availability in Ireland, as well as the likely international availability of LTE equipment. In the event that 2.6GHz spectrum is not made available for mobile broadband services, it is most likely that other spectrum bands will be used. However, in this scenario, it is also assumed that there will be less market competition, as there will be less high-frequency spectrum available for mobile broadband services.

Producer surplus is generated from profits derived from the provision of mobile broadband services. To quantify this, we have modelled the incremental revenues from mobile broadband services (which we consider as an uplift to subscriber ARPUs) and related costs over the period 2010–2019. We then calculated the free cashflow on an annual basis. The producer surplus is equivalent to the NPV of the free cashflow. The difference in NPV between the two scenarios is the incremental economic benefit gained from using 2.6GHz for mobile broadband services.

Consumer surplus is generated from revenues of mobile broadband services; it is equivalent to the shaded area in Figure 4.6.

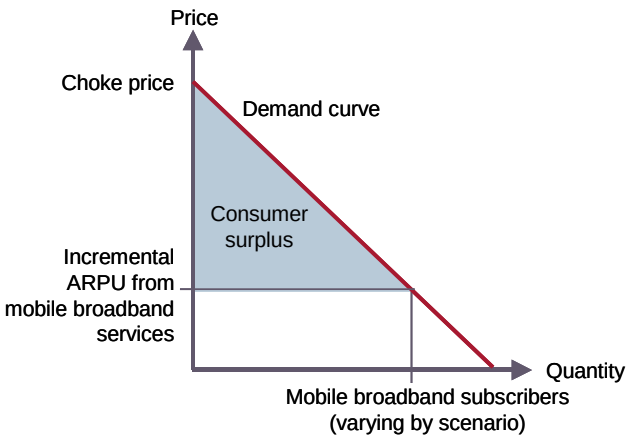


Figure 4.6: Approach to estimation of consumer surplus from mobile broadband services [Source: Analysys Mason]

The results shown in Figure 4.7 below suggest that the total incremental private value of using 2.6GHz spectrum for mobile broadband services is just EUR0.1 million. This value is relatively insignificant, since we assume that 1800MHz spectrum could be used for the provision of mobile broadband services in urban areas even in the absence of 2.6GHz spectrum. If 2.6GHz is made available for mobile broadband (Scenario B), we assume that there would be more competition in the market, leading to lower producer surplus but higher consumer surplus. Our modelling

suggests that these effects may be evenly balanced and so there is little difference in the incremental private value to Ireland between the two scenarios. Details of the assumptions behind our calculations can be found in Annex B.

	Producer surplus (EUR million)	*Consumer surplus (EUR million)*	*Total private value (EUR million)*
Scenario A (2.6GHz not available for mobile broadband)	52.3	126.3	178.6
Scenario B (2.6GHz available for mobile broadband)	36.2	142.5	178.7
Incremental value from mobile broadband services	**–16.1**	**16.2**	**0.1**

Figure 4.7: Producer surplus and consumer surplus results table [Source: Analysys Mason]

The use of 2.6GHz spectrum for mobile broadband services may also generate additional value to Ireland from increased VAT receipts. If the availability of 2.6GHz spectrum for mobile broadband services leads to higher market revenues, arising from a small incremental increase in subscriber take-up, a higher amount of VAT will be generated. To quantify this, we have modelled the VAT that would be paid on the revenues in both scenarios, and have calculated a ten-year NPV for the period 2010–19. The difference between NPV values for the two scenarios is equivalent to the incremental value from VAT of using 2.6GHz spectrum for mobile broadband services in Ireland. We have calculated this incremental value to be EUR0.4 million. Details of the assumptions behind this calculation can be found in Annex B.

4.3 Wider social and societal benefits

The provision of next-generation mobile broadband services will generate wider social and societal benefits for Ireland. These benefits are difficult to quantify, but include the provision of high-speed broadband services on a nationwide basis and the consequent reduction of the 'digital divide'. However, these benefits are to be gained primarily in rural areas as urban areas are already well served by next-generation fixed broadband networks based on cable, fixed wireless and DSL broadband. Mobile broadband service providers are most likely to use 800MHz to reach rural customers because of the wider wave propagation characteristics of this band compared to 2.6GHz spectrum. Therefore most of the social and societal benefits from mobile broadband are likely to be gained from the use of 800MHz spectrum and not from the use of 2.6GHz spectrum.

It can be argued that the availability of 2.6GHz spectrum could lead to a more competitive mobile broadband market if more than three competing next-generation mobile broadband networks are deployed, which in turn would reduce prices and hence have benefits for society in Ireland. However, the increase in competition would mainly be in urban areas, where there will be strong competition from both fixed and mobile broadband providers whether or not 2.6GHz spectrum is available for mobile broadband services.

Furthermore, in the absence of the availability of 2.6GHz spectrum, mobile broadband service providers are likely to use 1800MHz and/or 800MHz spectrum instead. Therefore, 2.6GHz spectrum is not a constraining factor in the provision of mobile broadband services.

For these reasons, we conclude that making 2.6GHz spectrum available for mobile broadband services has little incremental social and societal benefit for Ireland.

4.4 Summary

Overall, we have estimated that the introduction of next-generation mobile broadband technologies in Ireland would generate a total economic benefit of EUR179 million (NPV over the period 2010–2019). However, almost all of this value would be realised without the need to make the 2.6GHz band available for mobile broadband services. Our modelling indicates that if the 2.6GHz band was made available for mobile broadband, the incremental economic benefit that this would bring to Ireland would be EUR0.5 million (over the period 2010–2019), and this is based on the optimistic assumption that four LTE networks and one mobile WiMAX network would be deployed. This incremental benefit is relatively low, especially when compared to the EUR129 million incremental value to Ireland from UPC continuing to use the 2.6GHz band for MMDS.

Economic benefit from use of 2.6GHz spectrum for mobile broadband	*Scenario B (EUR million)*
Producer surplus (loss)	(16.1)
Consumer surplus (gain)	16.2
VAT (gain)	0.4
Social value	Minimal
Total incremental value from mobile broadband	***0.5***

Figure 4.8: Summary of quantifiable economic benefits to Ireland of mobile broadband services [Source: Analysys Mason]

Furthermore, there is a risk that the EUR0.5 million in economic benefits from mobile broadband services will not actually materialise in 2014. Mobile operators will be able to pay a higher price than UPC for 2.6GHz spectrum, given the substantial cashflows generated across their businesses. The operators are likely to perceive that there is a risk associated with not acquiring 2.6GHz spectrum; i.e. the risk that competitors will acquire this spectrum and offer more competitive services. Although this is unlikely to be the case, given the potential to use other spectrum bands to launch equivalent services, the perceived threat may still exist. In such circumstances, having acquired 2.6GHz spectrum, the mobile operators could delay launching mobile broadband services until there is sufficient demand to make this commercially viable, and so service launch may actually occur some time after 2014.

The economic benefits generated by mobile broadband services will therefore depend on there being sufficiently high demand for mobile broadband in urban areas in 2014 to make it economically viable for mobile broadband providers to invest in a network. Without sufficient demand for mobile broadband, there is a high risk that 2.6GHz spectrum remains unused or underutilised; in such circumstances, mobile network operators would be ‘hoarding’ 2.6GHz

spectrum (potentially in addition to underutilised 1800MHz spectrum), and no benefits would be gained from this spectrum band.

5 Proposed way forward for Ireland

Our assessment suggests that it is in the best interests of Ireland for the 2.6GHz band to continue to be used for MMDS in the period 2014–2019:

- **Continuation of the MMDS service would ensure that approximately 700 000 homes outside the main cities continue to benefit from a competitive pay-TV service offering** to BSkyB. Pay-TV services provide a key source of information and entertainment to 78% of Irish households, and other wireless platforms available in Ireland (such as DTT) do not have the capacity to provide a service offering that can compete with satellite. Cessation of the MMDS service would therefore be to the detriment of Irish society as a whole, and rural Ireland in particular, as it would give BSkyB a monopoly outside the urban centres

- **The quantifiable economic benefits of MMDS significantly outweigh those associated with the next-best alternative use – for the deployment of next-generation mobile broadband networks in urban centres – in the period to 2019**. We estimate that the incremental economic benefits of continued use of the 2.6GHz band for MMDS up to 2019 amount to EUR129 million (NPV over 2010–2019), compared with the incremental economic benefit of using 2.6GHz for mobile broadband services of only EUR0.5 million (NPV over 2010–2019). This is because the benefits arising from the deployment of next-generation mobile broadband technologies such as LTE and WiMAX could be realised through the use of alternative frequency bands such as 1800MHz and 2.3GHz. Continuation of the MMDS service would enable UPC to continue employing the 37 FTE personnel involved in provision of the service and ensure the continued indirect expenditure and its associated multiplier effects,

- **The MMDS platform provides wider societal benefits** that are difficult to quantify. In particular, availability of the MMDS service will ensure that media plurality continues to exist and provide continued support for the distribution of Irish public service and community TV channels to 700 000 homes outside the main cities.

To ensure that the benefits of the 2.6GHz band are maximised in Ireland, **we recommend that ComReg makes a decision to renew UPC's licences until April 2019 and confirms this to UPC as soon as possible**. [redacted].

Renewal of UPC's licences is consistent with ComReg's obligations and overall spectrum management policies, which include:

- **promoting infrastructure competition** – renewal of UPC's licences will ensure that 700 000 Irish homes retain a choice between two comparable pay-TV service providers – rather than being served by a monopoly operator

- **promoting the efficient use of scarce radio spectrum resources –** renewal of its licences will enable UPC to [redacted]. In addition, UPC will use the spectrum throughout Ireland, whereas its use for mobile broadband would be limited to the most densely populated areas (most likely only Dublin) with the spectrum remaining unused in the rest of the country

- **promoting the interests of users** – renewal will ensure that UPC's 70 000 existing MMDS customers are not deprived of a service which they clearly value and in which they have made an investment (e.g. deployment of an MMDS antenna)

- **facilitating access to radio spectrum, particularly for innovative technologies and services** – as indicated previously, renewal will enable UPC to invest in new technologies and bring innovative services such as HDTV and/or 3DTV to 700 000 homes

- **maximising the economic and social benefits arising from the use of radio spectrum** – as detailed in this report, renewal of UPC's licences is estimated to yield approximately EUR129 million of economic benefits for Ireland in the period up to 2019, together with numerous unquantifiable wider societal benefits

- **ensuring compliance with international requirements and the avoidance of harmful interference** – UPC's proposed use of the 2.6GHz band will reduce overspill into the UK to a level which will enable the band to be used without interference both in Northern Ireland and the western parts of England and Wales.

We understand that UPC has examined the legal and regulatory situation in detail and is satisfied that renewal of the MMDS licences is compatible with EU and Irish law. The conclusions from UPC's analysis can be summarised as follows:

- The current EU regulatory framework promotes harmonisation of spectrum usage and provides that licences are awarded on the basis of objective, transparent, non-discriminatory and proportionate criteria. In addition, the updated EU regulatory framework (due to come into force in May 2011) favours technology- and service-neutral licensing. In particular, it underlines the need to give due consideration to the benefits for users, facilitating the development of competition, and also refers to the important social, cultural and economic value of spectrum. The offer of MMDS services in the 2.6GHz band is compliant with the EU regulatory framework and indeed there is no impediment in this framework to the renewal of the MMDS licences until 2019.

- From a national regulatory standpoint, UPC provides MMDS services pursuant to the Wireless Telegraphy Act, 1926 (as amended). UPC's 2.6GHz licences are issued by ComReg in compliance with the Wireless Telegraphy (Multipoint Microwave Distribution System) Regulations 2003 ("the 2003 Regulations"), in exercise of its powers under the

Communications Regulation Act, 2002. The 2003 Regulations stipulate that these licences expire in April 2014 and include express provisions on licence renewal, set out in Regulation 8. In this respect, the 2003 licences are unusual; for example, they are in contrast to the statutory and licence framework under which mobile spectrum has been licensed.

- UPC recognises ComReg's obligations to ensure compliance with harmonisation decisions of the EC in relation to spectrum, but considers that the renewal of its licences is not inconsistent with these decisions. In the first place, what is being proposed is a transitional arrangement for a limited time period. Secondly, the operation of MMDS in the 2.6GHz band is compliant with the relevant EC Decision[16] as well as with ComReg's statutory objectives and its spectrum strategy. In addition, a new EU Framework Directive, due to be transposed into national legislation by May 2011, provides that Member States have the ability to specify services in a particular band if these satisfy "general interest objectives" that promote "cultural and linguistic diversity and media pluralism".

Overall from Ireland's perspective, there are very limited benefits to be gained from ComReg making the 2.6GHz band available for mobile broadband services in 2014, especially as there are numerous other spectrum bands (e.g. 1800MHz, 2.3GHz, 800MHz) which are equally (or more) suitable for the deployment of next-generation mobile broadband technologies in urban and rural areas. In contrast, if ComReg failed to renew UPC's licence, Ireland would forego significant benefits between 2010 and 2019. Furthermore licence renewal would be for a period of five years during which time ComReg would be able to evaluate the changing market situation, to determine what use(s) of the 2.6GHz spectrum would be likely to maximise the benefits to Ireland from 2019 onwards.

16 'Commission Decision of 13 June 2008 on the harmonisation of the 2500–2690MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community' reference 2008/477/EC, published in the Official Journal of the European Union, 24 June 2008.

Annex A: Quantification of economic benefits from UPC's provision of MMDS services

This annex details our methodology and the assumptions we made in quantifying the economic benefits from UPC's continued provision of MMDS services. For each benefit, we have modelled two scenarios:

Scenario	*Description*
Scenario A	• UPC's 2.6GHz licences are renewed • UPC's MMDS service continues and is upgraded to provide more channels, including HD channels
Scenario B	• UPC's 2.6GHz licences are **not** renewed • UPC's MMDS service is terminated in 2014 and there is no further investment in MMDS

Figure A.1: Scenarios modelled [Source: Analysys Mason]

The identified categories of economic benefit and their respective values are summarised in the following table:

Economic benefit	*Scenario A (EUR million)*	*Scenario B (EUR million)*	*Incremental benefit*
Producer surplus	55.8	3030.0	32.8
Consumer surplus	0.0	–27.7	27.7
VAT	0.0	–13.3	13.3
UPC expenditure	0.0	–51.2	51.2
Consumer disruption	0.0	–4.4	4.4
Social value	*Not quantified*	*Not quantified*	*Not quantified*
Total economic benefit	*55.8*	*–73.6*	*129.4*

Figure A.2: Economic benefits from UPC [Source: Analysys Mason]

Throughout the economic analysis we have used 3.5% discount rate, which represents a typical treasury social rate.

Below, we provide more detail of our methodology and assumptions for calculating each category of economic benefit.

Producer surplus

The producer surplus generated in each scenario is equal to the NPV of the free cashflow generated between 2010 and 2019. To quantify this, we developed a commercial model to forecast the expected cashflows from UPC's MMDS operations in each scenario.

Our forecast of producer surplus involved the following steps:

- Subscriber figures were forecast for both scenarios, based on historical trends and future product offering. Historical subscriber churn figures were used to estimate the number of gross additional subscribers in each year.
- Revenues were forecast using existing UPC MMDS service prices. (The commercial model factors in an uplift to account for expected price increases.)
- The cost of goods sold (COGS) was calculated using existing costs. (Expected future changes in costs were taken into account.)
- The indirect costs associated with each scenario were forecast based on the expected term of operations. These included operations, administrative and marketing costs.
- The capital expenditure associated with upgrading UPC's MMDS system to MPEG-4 was taken into account. Additional capital expenditure was assumed to include hardware and installation costs associated with providing all new and existing customers with MPEG-4 compatible set-top boxes.
- Subtracting costs and capital expenditure from revenues yielded the free cashflow for each scenario. The NPV of the free cashflows from 2010–2019 provided the producer surplus for each scenario.

We made the following assumptions in the commercial model, to calculate the producer surplus for each scenario:

- In Scenario A, UPC's licences expire in 2019, while in Scenario B they expire in 2014.
- In Scenario A, subscribers are expected to grow by 0.71% in 2011, and then by 1.5% per annum from 2012 to 2016. There is no subscriber growth in 2017, and 75% of subscribers are lost in 2018, with the remaining 25% lost as MMDS operations cease in 2019.
- In Scenario B, UPC's MMDS subscribers decline steadily between 2010 and 2014. In absolute terms, the subscriber base declines by approximately 13 000 per annum in 2010 and 2011, 15 000 in 2012, and 19 000 in 2013. The remaining 10 000 subscribers are lost in 2014.
- The commercial model assumes that the percentages of UPC subscribers [redacted] remain constant at [redacted].

- The direct costs of providing MMDS services are expected to remain constant between 2011 and 2019.
- It is assumed that network operations costs will increase by 2% per annum in 2010, 2011 and 2012, and remain stable from 2013 to 2019.
- The commercial model assumes that, if UPC's licences are extended, spectrum licence fees will remain unchanged.
- All other indirect costs, both fixed and variable (i.e. based on subscribers) are expected to remain unchanged.
- The capital expenditure required to [redacted].
- In Scenario A, it is assumed that 10 000 existing UPC MMDS subscribers will have their set-top boxes upgraded to MPEG-4 in each of 2010, 2011 and 2012. All new subscribers will be provided with (new) MPEG-4 compatible set-top boxes.
- The capital expenditure associated with connecting a new subscriber is the cost of the set-top box, labour costs and an additional cost for MMDS (as additional time and effort is required to set up antennae, etc.), which totals EUR269 per subscriber.

Figure A.3 shows the steps taken and assumptions made in diagrammatic form.

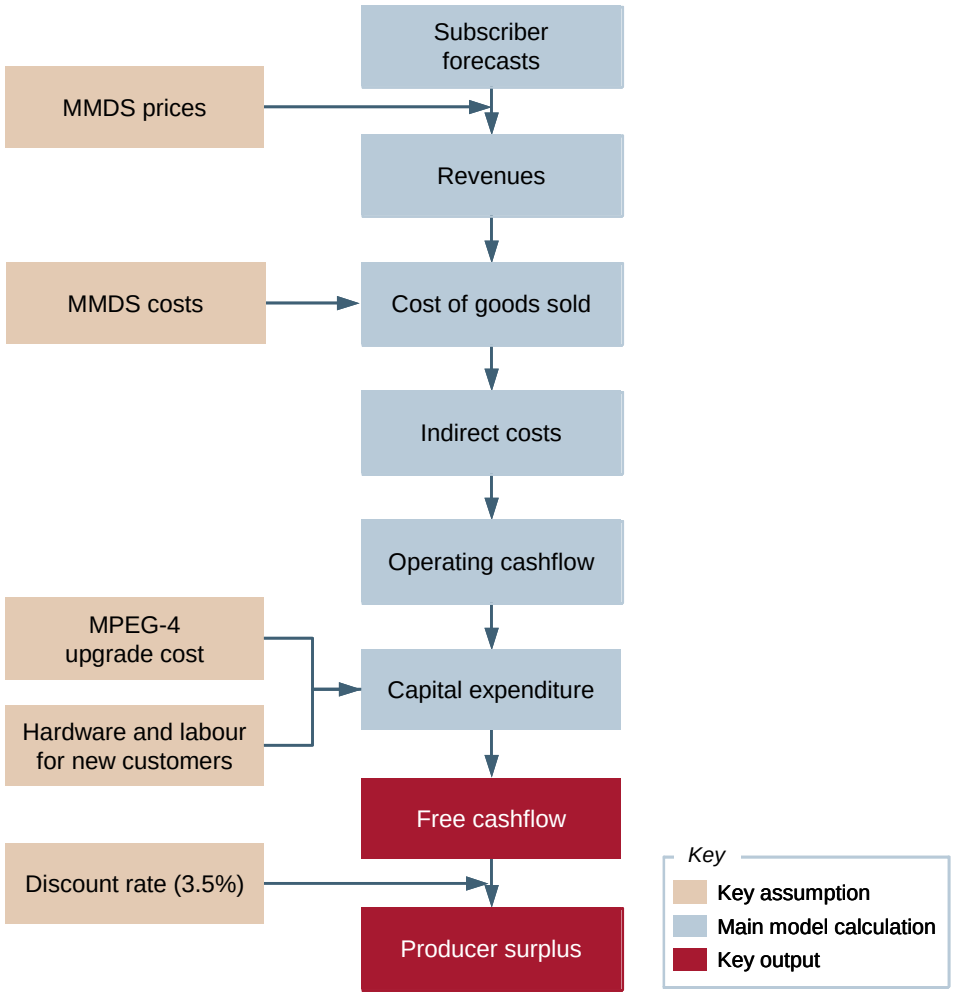


Figure A.3: Key assumptions, calculations and outputs of commercial model to calculate producer surplus [Source: Analysys Mason]

Consumer surplus

If UPC's licences are not renewed (Scenario B), it is assumed that most MMDS subscribers will migrate to BSkyB. The difference in price between UPC's service and BSkyB's service results in a change in consumer surplus. Ideally, this analysis would compare the price of a BSkyB package that is equivalent (in terms of channels available) to the average UPC MMDS package. However, because UPC's and BSkyB's packages have different structures, it is difficult to make a direct comparison between packages offered by the two providers. Therefore, our analysis involves comparing the ARPUs for UPC and BSkyB.

As BSkyB's ARPU is estimated to be higher than UPC's MMDS ARPU, migration of UPC's subscribers to BSkyB would lead to a loss in consumer surplus, as shown in Figure A.4.

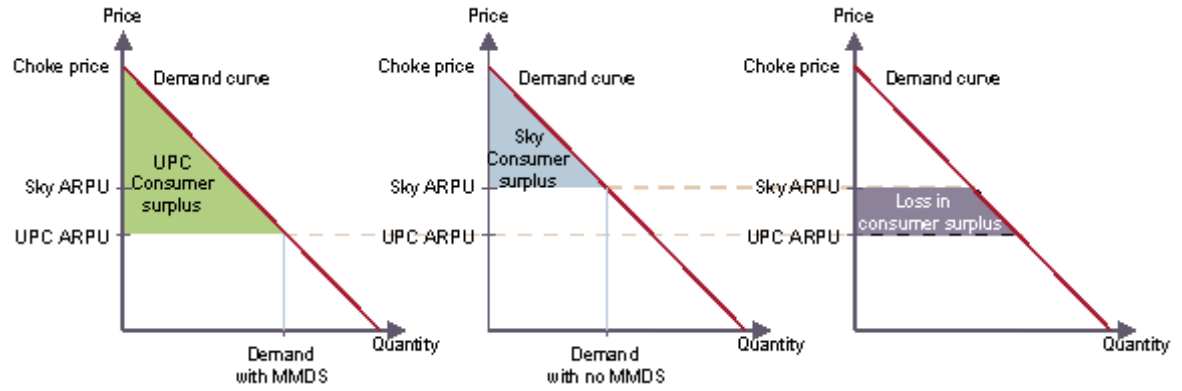


Figure A.4: Loss in consumer surplus resulting from migration of UPC's MMDS subscribers to BSkyB [Source: Analysys Mason]

A ten-year NPV of consumer surplus in Scenario B would be lower than in Scenario A, due to the loss of MMDS subscribers. However, as most of the MMDS subscribers leaving UPC would migrate to BSkyB, these new BSkyB subscribers would generate consumer surplus; albeit lower consumer surplus than they were generating as UPC subscribers (because BSkyB is assumed to have a higher ARPU).

Our calculation of the loss in consumer surplus involved the following steps:

- For Scenario A, the consumer surplus generated from UPC's MMDS subscribers was calculated for the period 2010–2019
- For Scenario B, the consumer surplus generated from UPC's MMDS subscribers is calculated for the period 2010–2019. Added to this is the consumer surplus generated from UPC's MMDS subscribers who migrate to BSkyB. We assumed that 90% of subscribers who leave UPC's MMDS service will migrate to BSkyB. As in the commercial model, we assumed that these subscribers will migrate to BSkyB gradually between 2010 to 2014.
- The difference in total consumer surplus between Scenario A and Scenario B was calculated, and an NPV (2010–19) of this was calculated.
- This NPV is equivalent to the loss in consumer surplus if UPC's licences are not renewed.

In calculating the loss of consumer surplus we made the following assumptions:

- UPC's ARPU was assumed to be EUR32.5 in 2009, increasing gradually to EUR35.4 in 2019
- BSkyB ARPU was assumed to be EUR39.2 in 2009, increasing at the same rate as UPC's ARPU to EUR42.8 in 2019. In 2009, BSkyB's reported blended ARPU for the UK and Ireland was EUR41, including broadband and telephony services. Assuming that the 18% of BSkyB's customers who subscribe to broadband and telephony services spend EUR10 per month on these services; video ARPU would be EUR39.2

- The assumed choke price[17] is EUR65.8 in 2010, increasing at the same rate as UPC's ARPU to reach EUR70.9 in 2019. The choke price for 2010 was calculated using UPC's 2010 ARPU, UPC 2010 revenue-generating unit (RGUs) and an assumed elasticity of –1

- Subscriber forecasts for UPC were taken from the commercial model, described above in the *Producer Surplus* section of this annex.

VAT

BSkyB does not pay VAT in Ireland but UPC does, and so if UPC closes down its MMDS service its subscribers are likely to migrate to BSkyB or possibly a cheaper DTT service, which would result in lower VAT income for the Irish government.

In Scenario B, where UPC's licences are not renewed, most (though probably not all) of the MMDS subscribers will migrate to BSkyB. We have calculated the revenues that these migrating subscribers would have generated with UPC; these revenues will not be subject to VAT as BSkyB is not expected to pay VAT in Ireland until 2015. From this, we calculated the value of VAT lost to Ireland from the closure of UPC's MMDS service. In quantifying this, we made the following assumptions:

- 90% of subscribers who leave UPC's MMDS subscribe will migrate to BSkyB

- In calculating the revenues that subscribers who migrate to BSkyB would have generated if they stayed at UPC, we applied 21% VAT to derive the annual value of VAT lost to Ireland. (Note that this will only apply until 2014, as it is likely that BSkyB will have to pay VAT in Ireland from 2015)

- We calculated a ten-year NPV (2010–19) of the potential VAT lost.

UPC expenditure

In the scenario where UPC's licences are not renewed and its MMDS business closes, the benefits to Ireland from the indirect costs from the MMDS business will be lost. The annual value of these indirect costs over the period 2010–2019 is taken from the commercial model.

Most of UPC's indirect costs for MMDS have a benefit to Ireland. Each indirect cost category is shown in the following table, as well as the percentage of that cost which is assumed to have an economic benefit to Ireland.

17 A choke price is the price at or above which demand falls to zero.

Indirect cost	*% of cost that is of benefit to Ireland*
Network operations	80%
Customer operations and customer care	100%
Billing and collection	100%
General and administrative	100%
Marketing	100%

Figure A.5: UPC's MMDS indirect costs that have an economic benefit to Ireland [Source: Analysys Mason, UPC]

Considering each of Scenario A and Scenario B separately, we took the forecast indirect costs from the commercial model and then applied the percentage of cost that is of benefit to Ireland (in Figure A.5) to these costs. From this, we calculated the total indirect costs from UPC's MMDS operations that benefit Ireland over the period 2010–2019.

For each year, we subtracted the value in Scenario B from the value in Scenario A to calculate the total indirect costs lost to Ireland from the closure of UPC's MMDS service.

We calculated a ten-year NPV (2010–2019) of the total indirect costs lost to Ireland.

Consumer disruption

In Scenario B, where UPC's licences are not renewed, the resulting closure of its MMDS service will be disruptive to existing subscribers. We have identified three areas of cost from consumer disruption:

- **Cost of new equipment for subscribers**: in Scenario B, it is assumed that most subscribers will migrate to BSkyB. For new BSkyB subscribers who do not take up the HD service, there is a EUR49 charge for new equipment (a set-top box). It is assumed that of the subscribers migrating to BSkyB (assumed to be 90% of MMDS subscribers, as detailed above), 50% will choose not to take up the HD service. We have calculated the total annual cost of this new equipment, and have calculated a ten-year NPV of the equipment costs.

- **Cost of equipment repair**: after a one-year warranty period, BSkyB charges EUR100 per technician visit if a subscriber's set-top box needs repair. UPC does not make an equivalent charge. In Scenario B, for UPC's MMDS subscribers who migrate to BSkyB it is assumed that 5% of boxes fail each year, after the first-year warranty period. We calculated the total annual cost for equipment repair for the period 2010–2019, and a ten-year NPV of the equipment repair costs.

- **Other avoidable costs**: this includes the time value of selecting and ordering a new service, the time value and potential costs of installing a new service, the time value of changing payment methods (e.g. direct debit) and the time value of learning how to use a new service. It is assumed that the disruption per MMDS subscriber leaving is equivalent to five hours. Assuming that the average salary of a subscriber is EUR25 000, the total cost per person is estimated to be EUR14.3. Using the subscriber forecasts in the commercial model, we were able to calculate the annual cost of disruption, and a ten-year NPV of the disruption costs.

Annex B: Quantification of economic benefits from use of 2.6GHz band for mobile broadband

This annex details our methodology and the assumptions we made in quantifying the economic benefits from using the 2.6GHz band to provide mobile broadband services. For each benefit, we have modelled two scenarios:

Scenario	*Description*
A: UPC's 2.6GHz licences are renewed	• 2.6GHz spectrum not used for mobile broadband • Three mobile operators launch LTE with 1800MHz (and 800MHz in rural areas) • One mobile operator launches LTE with 800MHz only • No mobile WiMAX operator using 2.6GHz band
B: UPC's 2.6GHz licences are **not** renewed	• Four MNOs launch LTE with 2.6GHz/1800MHz in urban areas (and 800MHz in rural areas) • One WiMAX operator launches with 2.6GHz

Figure B.1: Mobile broadband scenarios modelled [Source: Analysys Mason]

The identified categories of economic benefit and their respective values are summarised in the following table:

	Scenario A (EUR million)	*Scenario B (EUR million)*
Producer surplus	52.3	36.2
Consumer surplus	126.3	142.5
VAT	0.0	0.4

Figure B.2: Economic benefit from mobile broadband services [Source: Analysys Mason]

Throughout the economic analysis we have used a 3.5% discount rate, which represents a typical treasury social rate.

Below, we provide more detail of our methodology and assumptions for calculating each category of economic benefit.

Producer surplus

To calculate the producer surplus from mobile broadband services, we developed a model to calculate the incremental free cashflow from mobile broadband. Figure B.3 provides an overview of the model structure.

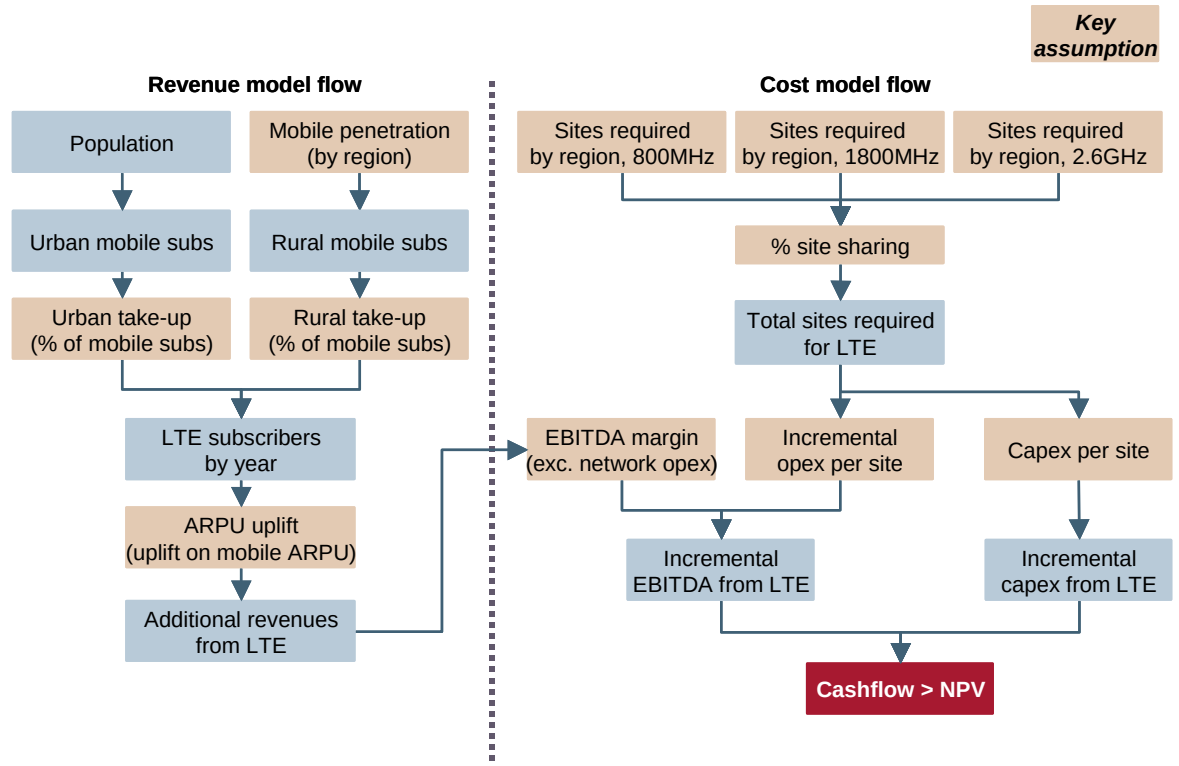


Figure B.3: Model of free cashflow from mobile broadband services [Source: Analysys Mason]

Mobile broadband revenues are driven by an assumed percentage take-up of mobile broadband by mobile subscribers and a percentage uplift on ARPU. We made a number of key assumptions:

- Mobile subscriber forecasts assume that mobile penetration increases from 117% in 2009 to 130% in the long run; it is assumed that mobile penetration is highest in Dublin, followed by Cork, then Galway, Limerick and Waterford, with rural Ireland having the lowest penetration
- In both scenarios, next-generation mobile broadband is assumed to be launched in Ireland from 2014
- In Scenario A, where 2.6GHz is not available, it is assumed that mobile operators use 1800MHz or 800MHz for LTE
- In Scenario A, an ARPU uplift of 10.0% is assumed for mobile broadband services in 2014, declining slowly to 8.7% in the long run; this is equivalent to an incremental ARPU of EUR3.1 in 2014, declining to EUR2.7 in the long run
- In Scenario B, an ARPU uplift of 9.4% is assumed for mobile broadband service in 2014, declining slowly to 8.2% in the long run; this is equivalent to an incremental ARPU of EUR2.9 in 2014, declining to EUR2.6 in the long run

  - The ARPU uplift is expected to be lower in Scenario B than Scenario A, due to the higher level of competition in the mobile broadband market in Scenario B

- In Scenario A, the take-up of mobile broadband in the first year of launch is assumed to be 4.6% in urban areas and 3.7% in rural areas, increasing to around 100% in the long run
- In Scenario B, the take-up of mobile broadband in the first year of launch is assumed to be 4.9% in urban areas and 3.9% in rural areas, increasing to around 100% in the long run
  - The early take-up of mobile broadband services is expected to be higher in Scenario B than Scenario A due to the higher level of competition in the mobile broadband market in Scenario B

Mobile broadband costs are driven by the number of new network sites. Our key assumptions are:

- In Scenario A, it is assumed that an equivalent of 3.5 full networks are built, with the fourth service provider having a less extensive network than its competitors
- In Scenario B, it is assumed that an equivalent of 4.5 full networks are built, with the WiMAX operator building a less extensive network than the four competing LTE mobile operators
- Each full competitor is assumed to require 800 urban LTE sites and 700 rural sites
- It is assumed that 50% of sites are built in the first year of LTE launch, increasing to 80%, 90% and 100% in the second, third and fourth years of operations, respectively
- 25% of sites in urban areas and 50% of sites in rural areas are assumed to be shared
- Capex per site is assumed to be EUR20 000
- Incremental opex per site is assumed to be EUR200.

Using the modelled revenues and costs, the free cashflow from mobile broadband services can be calculated in both scenarios. A ten-year NPV (2010–2019) is calculated for the free cashflow, which is equivalent to the producer surplus.

Consumer surplus

For both scenarios, the consumer surplus generated from mobile broadband services is calculated using the total incremental revenues from mobile broadband services and a choke price.

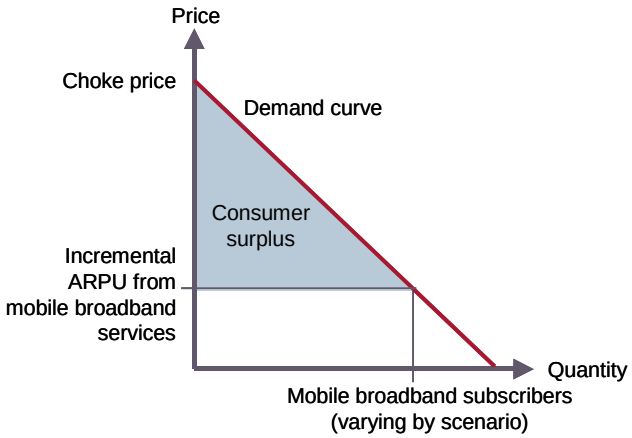


Figure B.4: Approach to estimation of consumer surplus [Source: Analysys Mason]

In calculating the consumer surplus we made the following assumptions:

- Annual mobile broadband ARPU and subscribers are taken from the model (assumptions detailed above in the *Producer surplus* section)
- A choke price is calculated assuming an elasticity of –1; the choke price in 2014 is assumed to be EUR5.9 per month.

VAT

The use of 2.6GHz spectrum for mobile broadband services may generate additional value to Ireland from increased VAT receipts. If the availability of 2.6GHz spectrum for mobile broadband services leads to higher market revenues, from a small incremental rise in subscriber take-up, a larger amount of VAT would be generated. To quantify this, we have modelled the VAT that would be paid on the revenues in both scenarios, and calculated a ten-year NPV (for the period 2010–19). The difference between the two NPV values is equivalent to the incremental value from VAT of using 2.6GHz spectrum for mobile broadband services in Ireland.

Annex 3: Presentation by Dr. Eetu Prieur, Elisa, at the LTE World Summit, Amsterdam, 18th May 2010

Coverage Optimized Mobile Broadband Solutions: UMTS900 with HSPA Evolution and LTE1800

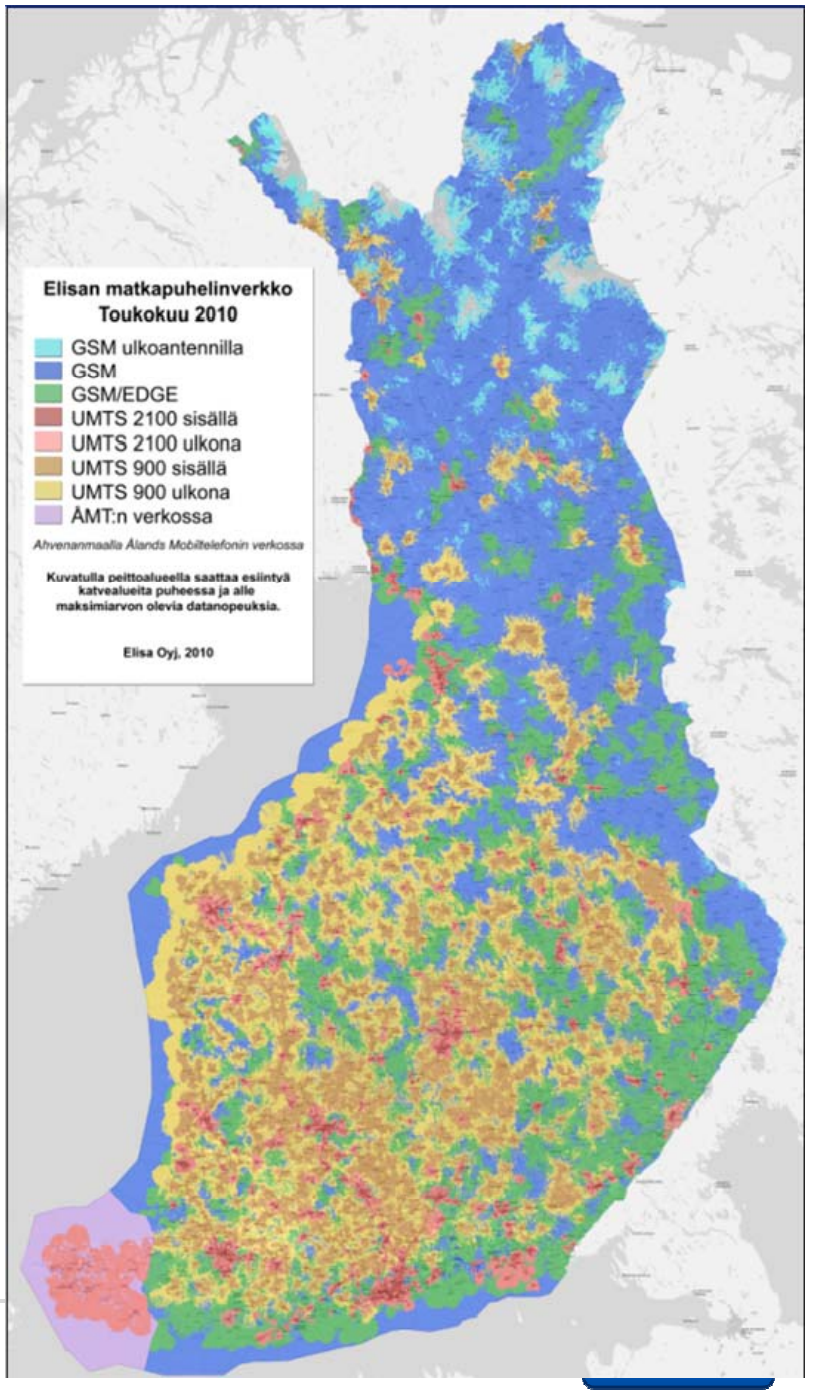
LTE World Summit, Amsterdam

18.5.2010

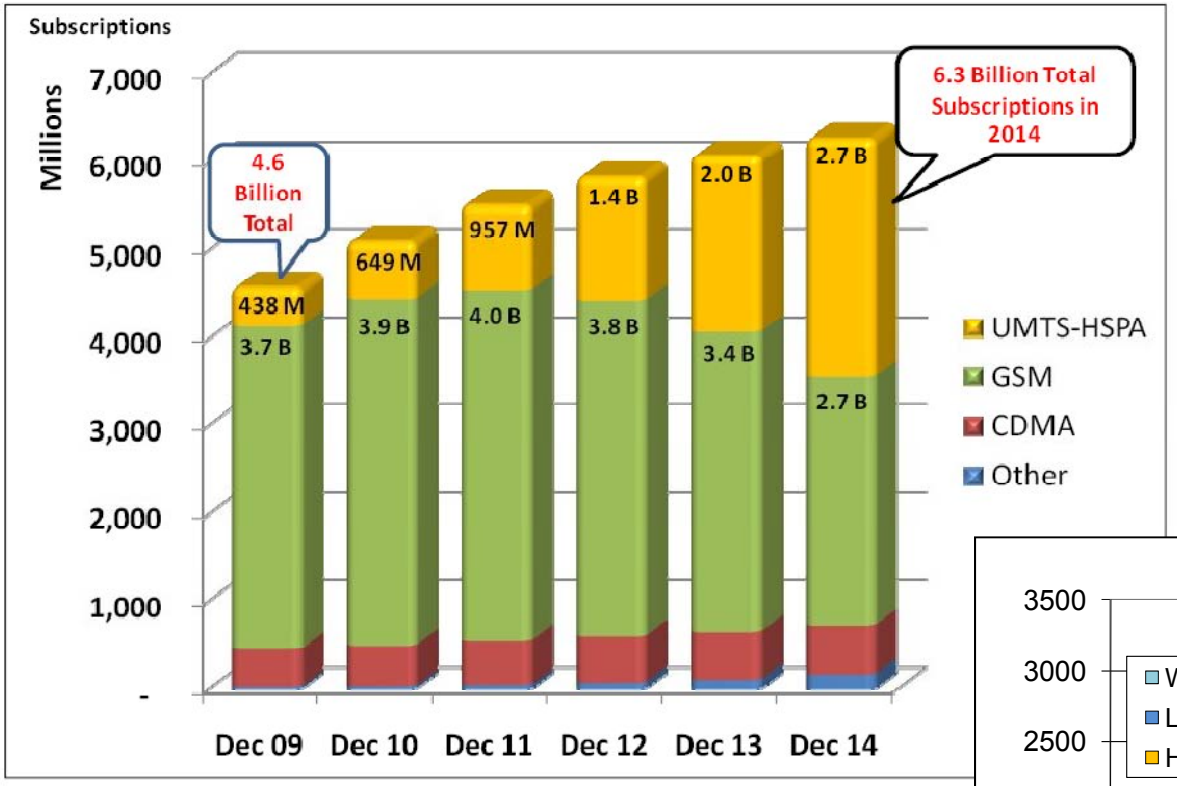
Dr. Eetu Prieur, Elisa

Elisa-Finland in brief

- Founded 1882
- World's first GSM network launched in 1991
- Revenue in 2009 was EUR 1.5 billion
- The number of personnel is 3 000
- 3 million mobile subscriptions, 38% market share, market leader (Finland: 5.4M inhabit., 17 per km^2)
- 1.2 million fixed subs (market leader) including 0.5 million ADSL subs (market leader)
- HSDPA 21 Mbps and HSUPA 5.7 Mbps
- World's first UMTS900 network launched in 2007
- LTE license for both 1800 and 2600 MHz in 2010
- Subsidiary in Estonia, both for mobile and fixed



Wireless broadband forecasts: HSPA domination

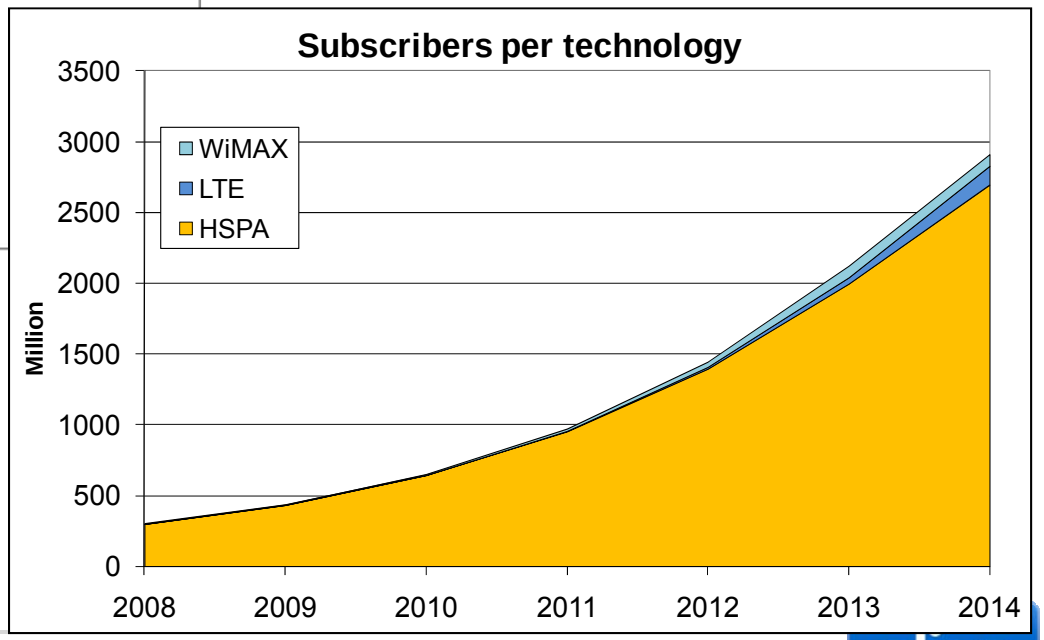


	2008	2009	2010	2011	2012	2013	2014
WiMAX	0.5	2.8	7.5	16.7	37.1	82.1	
LTE	0.0	0.0	0.5	3.5	13.1	44.5	131.5
HSPA	304	438	649	957	1400	2000	2700

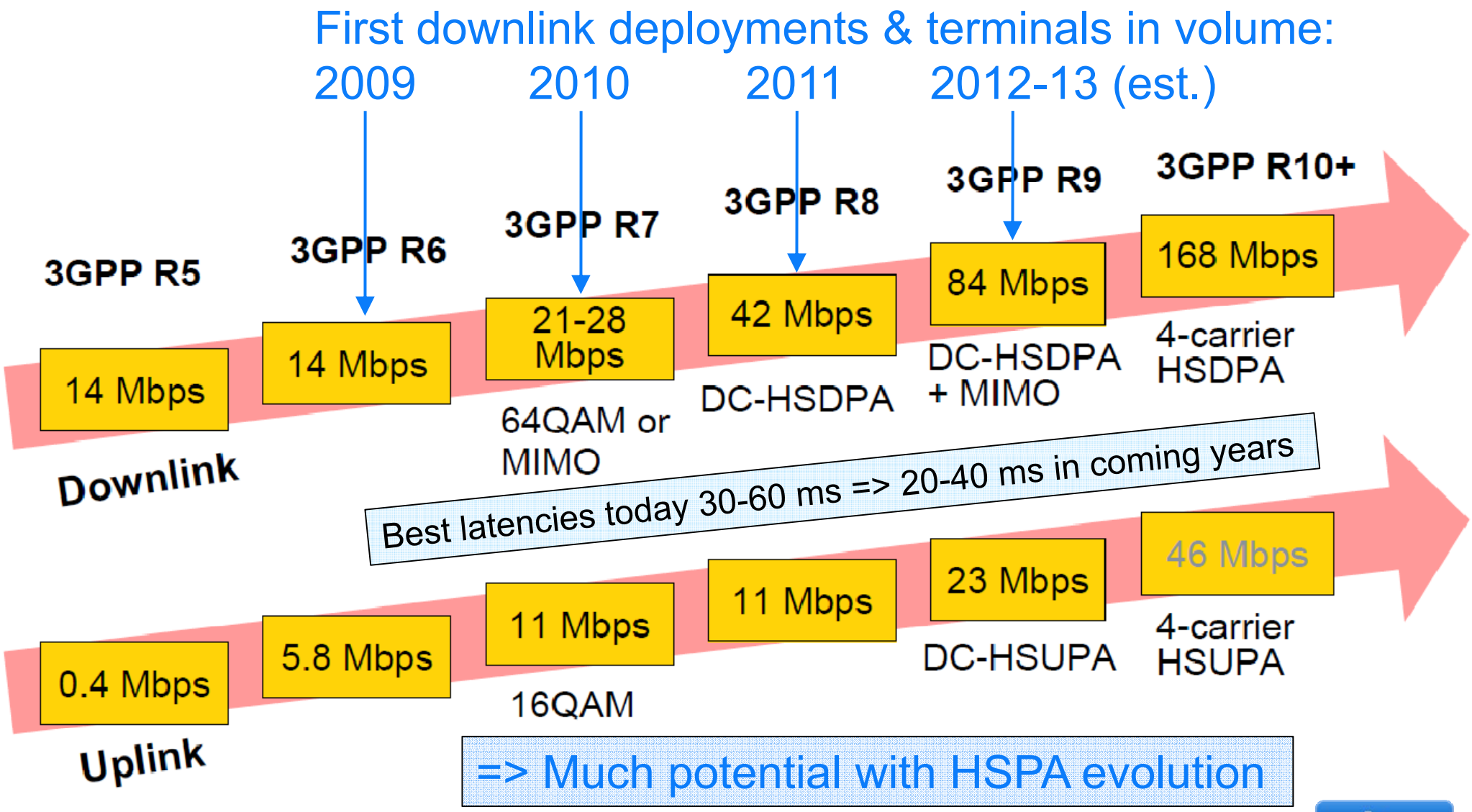
Source: Informa Telecoms & Media, WCIS+, June 2009

HSPA mass market:

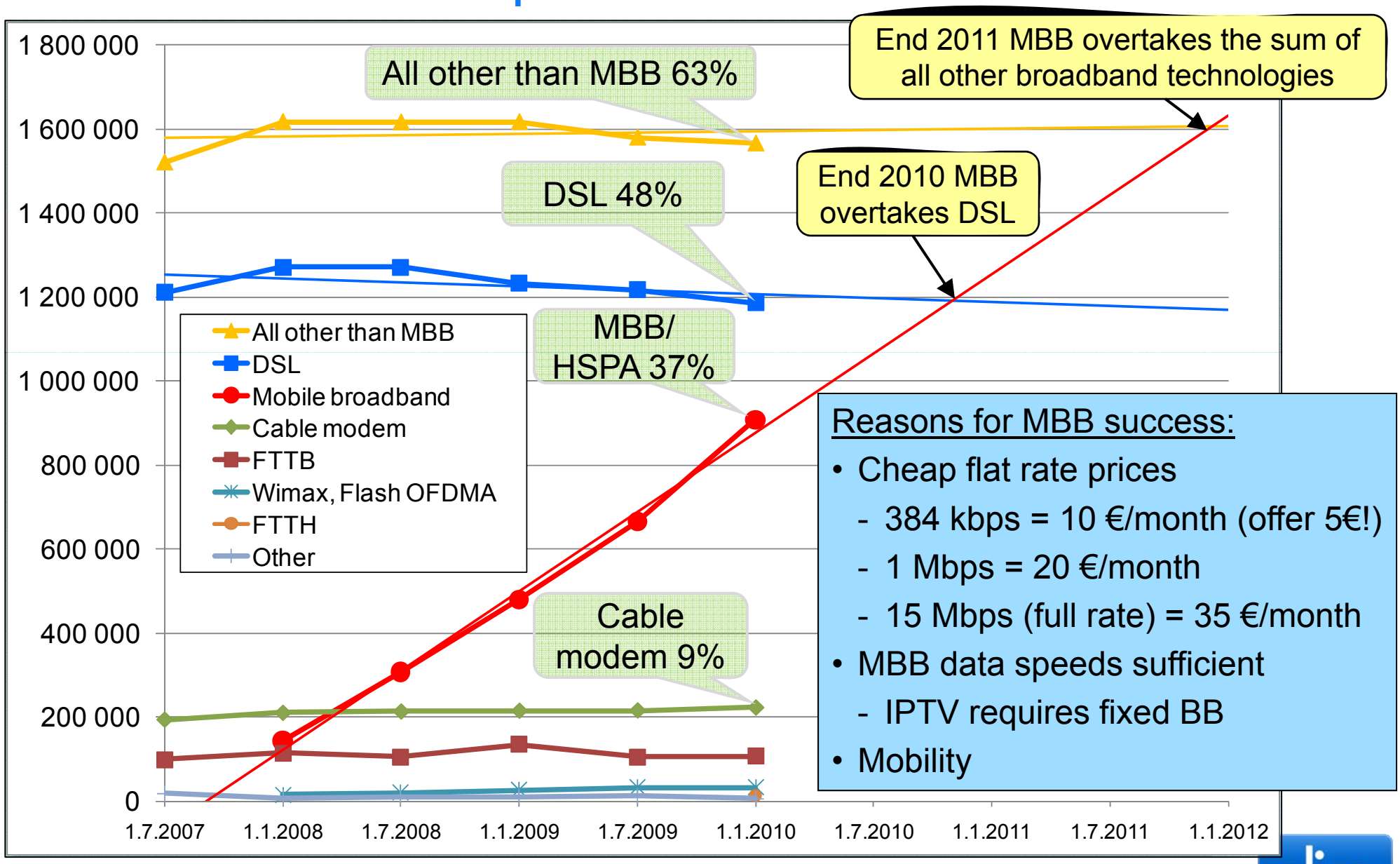
- Big variety of terminals + low cost
- Existing networks + evolution
- Available spectrum + UMTS900
- Sufficient user experience so far



HSPA evolution, theor. max. user speed and carrier capacity



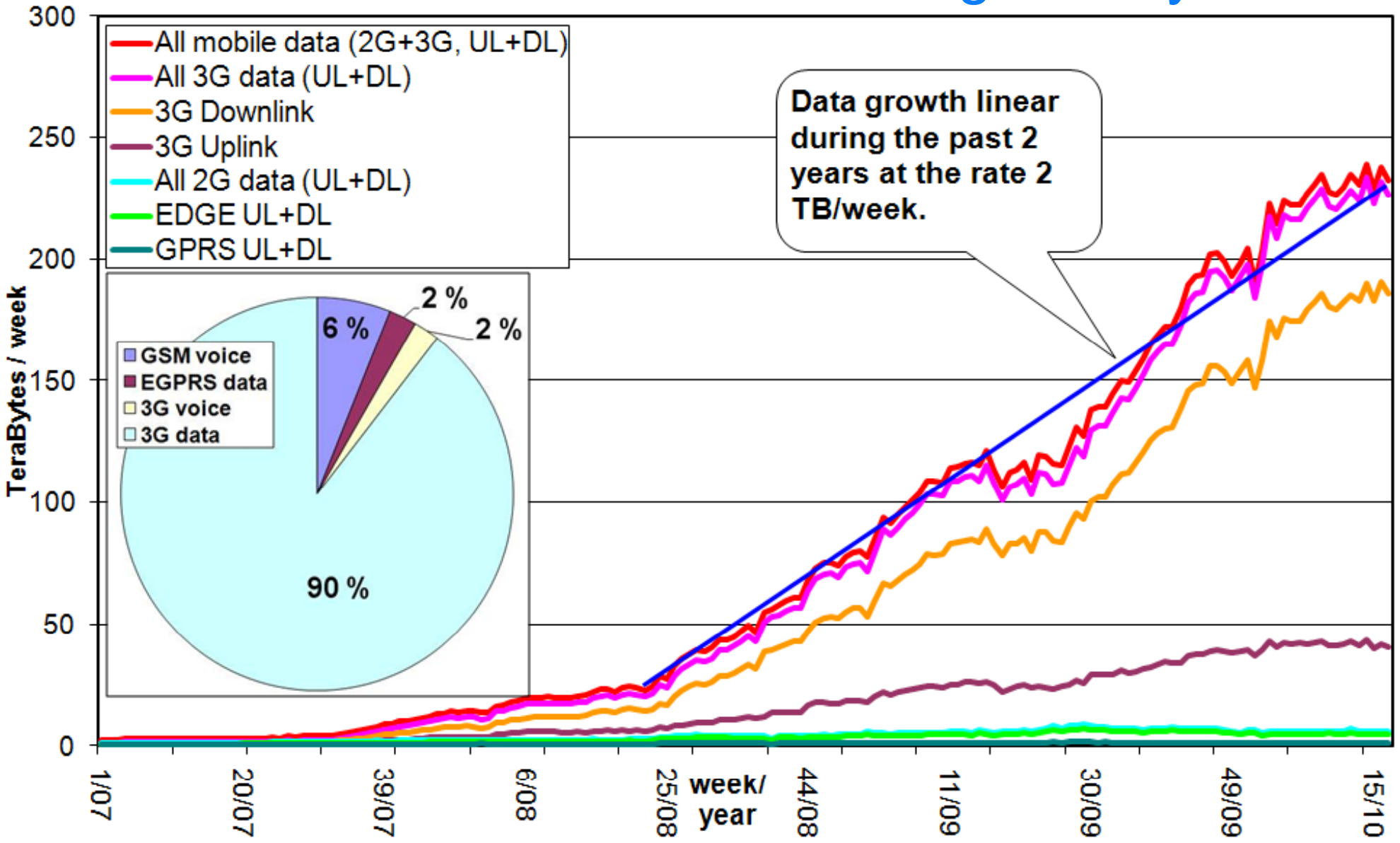
Broadband subscriptions in Finland



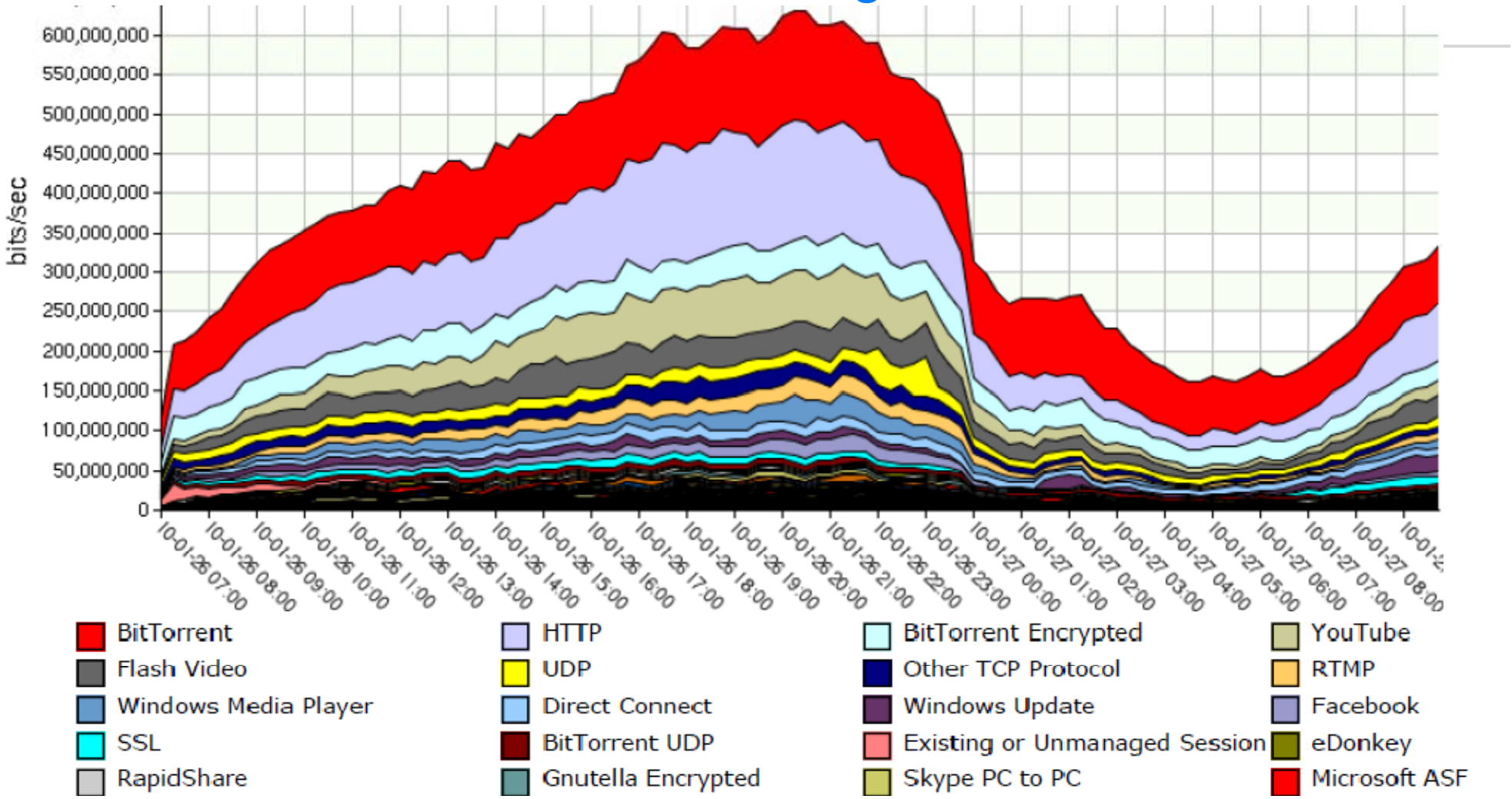
Reasons for MBB success:

- Cheap flat rate prices
  - 384 kbps = 10 €/month (offer 5€!)
  - 1 Mbps = 20 €/month
  - 15 Mbps (full rate) = 35 €/month
- MBB data speeds sufficient
  - IPTV requires fixed BB
- Mobility

3G mobile data traffic still increasing heavily



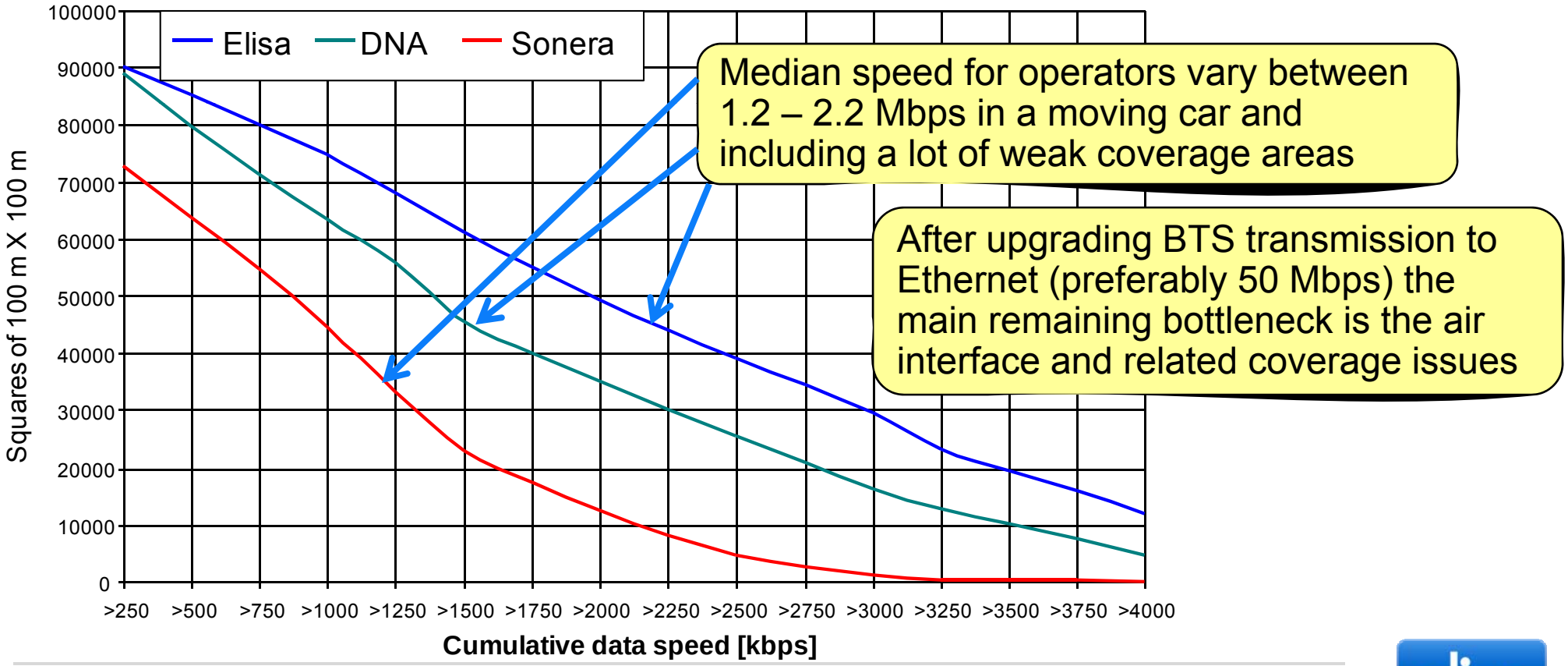
Downlink traffic distribution during 27 hours in one GGSN



- Downlink: streaming, peer-to-peer and web browsing each about 30%
- Uplink: peer-to-peer at least 60%, web browsing about 10%, streaming 5%
- **QoS mechanisms** in RAN applied to protect premium users

Comparison of data speeds in Finnish 3G networks

- Measurements made by European Communications Engineering (http://www.eceltd.com)
- Drive tests with over 12 000 kilometers in Finland, measurements mainly in the moving car
- Download of 50 MB file repeatedly, using 3 USB modems connected to 3 laptops
- Car was driven in the main roads inside and outside of 100 cities until 3G coverage was ended
- One measurement point is the average of the data speeds in one 100 m X 100 m square



HSPA+ offers enormous network capacity

ADSL analogy:

- ADSL 2010: 500 000 homes, BH-traffic 35 Gbps → 70 kbps/home
- Assume similar mobile data usage: 70 kbps/user (20 GB/month/user)
- Assume 1000 subs/BTS → BH-traffic 70 Mbps/BTS
- HSPA+ capacity in loaded network about 8 Mbps/sector

  → 3+3+3 configuration HSPA+ base stations would be sufficient

Heavy assumption!

Remarks:

- 1000 subs/BTS is a relatively high value, especially outside urban areas
- Fixed broadband takes much of the traffic load + possible offload to LTE
- Quality of service (QoS) can help manage the traffic load
- BTS transmission capacity: possible bottleneck, Ethernet is the only choice!

=> HSPA+ network capacity satisfies most traffic predictions for the coming years. In many cases the most critical issue is **the coverage**.

Demand for HSPA coverage everywhere

- Customers getting more and more dependent on the internet access
- Mobility getting increasingly important
- Increasing demand to have HSPA coverage everywhere, also rural areas
- (Mobile) internet used mostly indoors
- Comparison to GSM voice service: it's needed everywhere

=> HSPA (or mobile internet) should work everywhere!

- UMTS2100 and other high spectrum technologies have tough business case
- UMTS900 suits here very well!

Why UMTS900 (or HSPA at 900 MHz)?

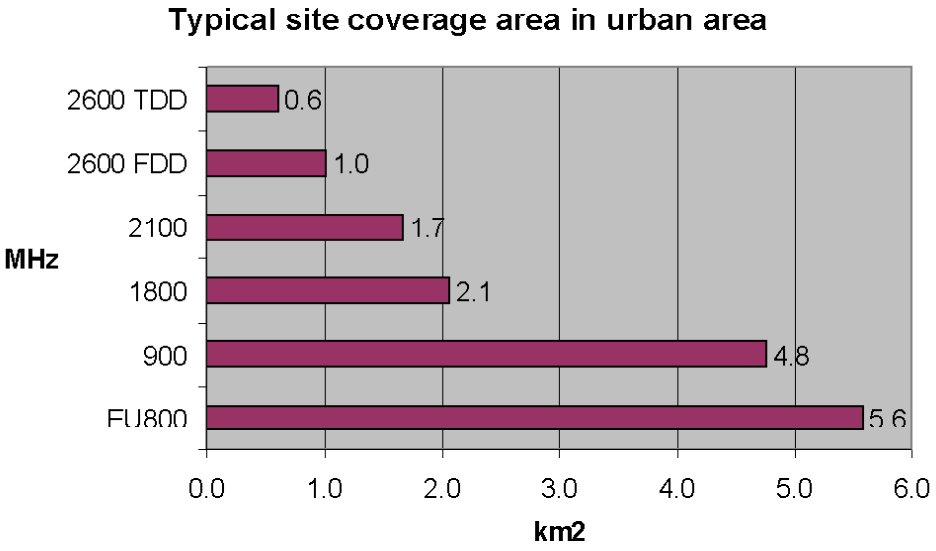
In principle, only for one reason:

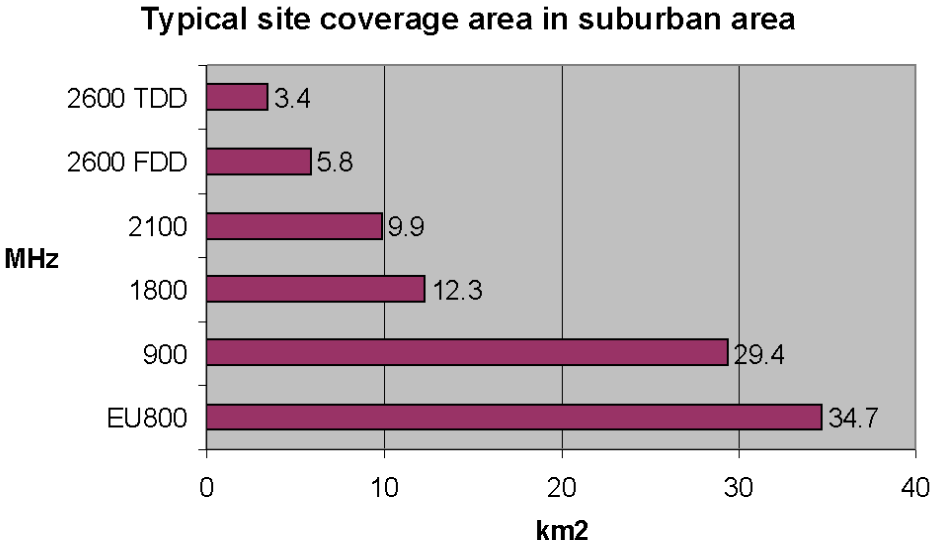
- Network costs for HSPA coverage at 900 MHz can be only about one third compared to the costs for HSPA coverage at 2100 MHz
- Especially attractive for rural area HSPA coverage

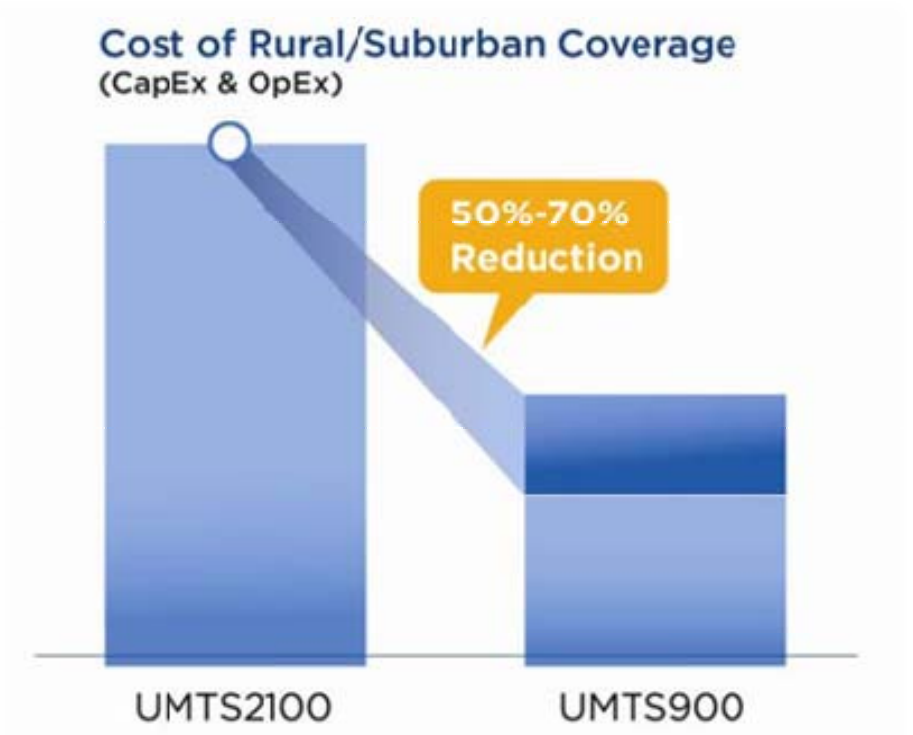
Other reasons:

- Better indoor coverage in urban areas (10 .. 20 dB)
- Possible to reuse existing GSM900 sites and infrastructure => relatively easy rollout for an existing GSM900 operator (typically GSM voice coverage area corresponds to 1 Mbps data coverage area for UMTS900)

Coverage Impact of the Spectrum

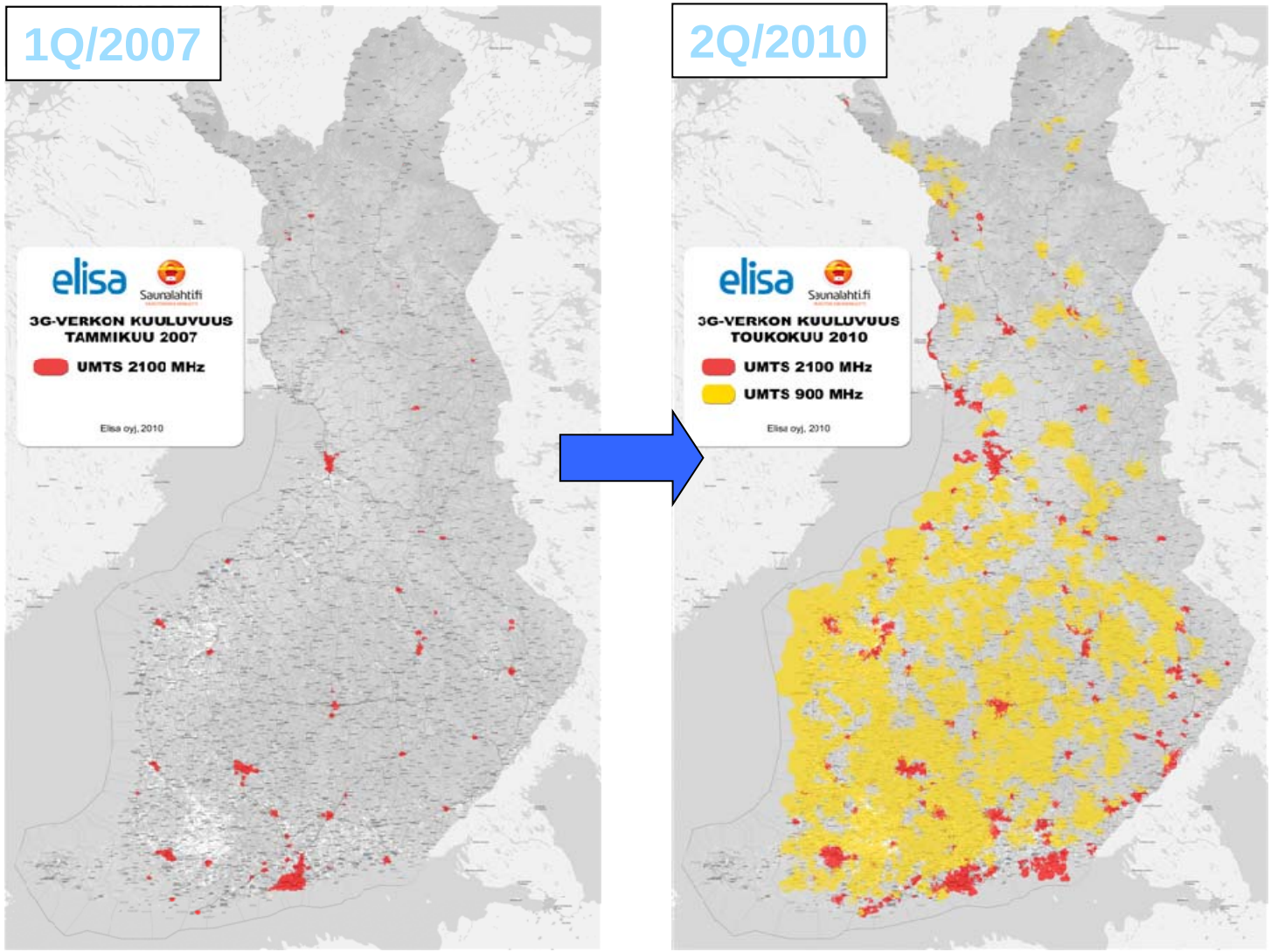






Mobile network <u>costs are proportional to the number of sites</u> => larger coverage area means less costs

Elisa 3G coverage 2007-2010



= UMTS900
= UMTS2100

3 times more UMTS2100 sites compared to UMTS900 sites.

Still UMTS900 has much larger coverage area.

Field Experience of UMTS900

Item under analysis	Expected performance	Verified
Coverage area compared to UMTS 2100 MHz	3 times larger	3...5 times larger
Indoor coverage compared to UMTS 2100 MHz	10..20 dB better	Verified
Required spectrum	4.2 MHz enough for UMTS900	Verified
Co-existence with GSM900	No significant interference	Verified
HSPA throughput at UMTS2100 MHz cell edge	Doubled	More than doubled
1 Mbps coverage area for UMTS900	Similar to voice coverage area for GSM900	Verified

≥ 14 networks, refarming ≥ 24 countries, devices ≥ 300

UMTS900 deployment status
www.gsacom.com

Country	Operator	Status
Australia	Optus	Launched
Australia	Vodafone	Launched
Belgium	Mobistar	Launched
Belgium	Proximus	Launched
Bulgaria	Globul	Testing
Estonia	Elisa	Launched
Finland	Elisa	Launched
Finland	DNA	Launched
Finland	TeliaSonera	Launched
France	SFR	Pilot network
Ghana	MTN Ghana	In deployment
Greece	Cosmote	Testing
Greenland	Tele Greenland	In deployment
Hong Kong	CSL Limited	In deployment
Iceland	Siminn	Launched
Latvia	LMT	Launched
New Zealand	Vodafone	Launched
Norway	TeleNor	Planned
Norway	Netcom	Planned
Poland	Aero2	Launched
Russia	All operators	Trials
South Africa	Cell C	In deployment
Spain	Telefonica	Testing
Sweden	3	In deployment
Thailand	AIS	Launched
Thailand	DTAC	In deployment
Venezuela	Digitel	Launched

Refarming status
www.gsacom.com

Country	Re-farming status
Australia	UMTS900 is allowed
Belgium	UMTS900 is allowed
Estonia	UMTS900 is allowed
Finland	UMTS900 is allowed
France	UMTS900 is allowed
Germany	Under consideration
Ghana	UMTS900 is allowed
Greece	Under consideration
Greenland	UMTS900 is allowed
Hong Kong	UMTS900 is allowed
Iceland	UMTS900 is allowed
Indonesia	UMTS900 is allowed
Ireland	Under consideration
Italy	UMTS900 is allowed
Latvia	UMTS900 is allowed
New Zealand	UMTS900 is allowed
Norway	UMTS900 is allowed
Poland	UMTS900 is allowed
Portugal	Under consideration
Romania	UMTS900 is allowed
Russia	Under consideration
Saudi Arabia	UMTS900 is allowed
Singapore	UMTS900 is allowed
Spain	Under consideration
South Africa	UMTS900 is allowed
Sweden	UMTS900 is allowed
Switzerland	UMTS900 is allowed
Thailand	UMTS900 is allowed
UAE	UMTS900 is allowed
UK	Under consideration
Venezuela	UMTS900 is allowed

EU frees new spectrum for new and faster mobile services

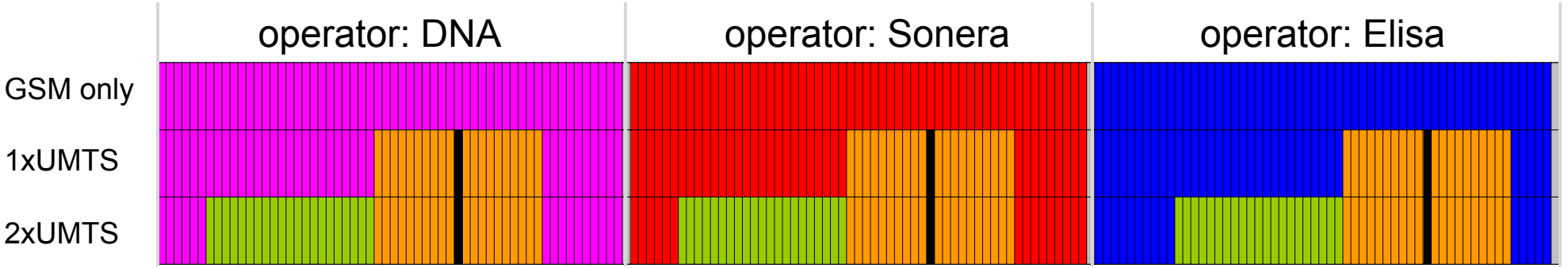
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/1192&type=HTML&aged=0&language=EN&guiLanguage=en

Brussels, 27 July 2009
Europe took an important step towards a new generation of mobile services today. The Council of Ministers followed the European Parliament in approving a proposal from the European Commission to modernise European legislation – the so-called GSM Directive – on the use of the radio spectrum needed for mobile services. The updated Directive now allows the 900 MHz frequency band to be used to provide faster, pan-European services such as mobile internet while ensuring the continuation of GSM services. Industry **savings of up to € 1.6 billion** are expected from the reform of the GSM Directive. The renewed Directive will enter **into force this October**.

321 UMTS900 devices announced (GSA 7.4.2010). Number more than doubled in 9 months.

900 MHz Allocation and Refarming in Finland

- 11.4 MHz or 57 GSM carriers per operator (DNA 58)
- Each operator has allocated UMTS900 carrier in such a way that 2nd UMTS carrier can be activated later without moving 1st carrier.
  - 2nd carrier assumes that GSM900 traffic must be very low. We can have max 16 GSM carriers together with 2xUMTS, which implies max GSM 1+1+1
  - the use of AMR HR and 1800 MHz makes refarming easier (later possibly Orth. Sub Channel)

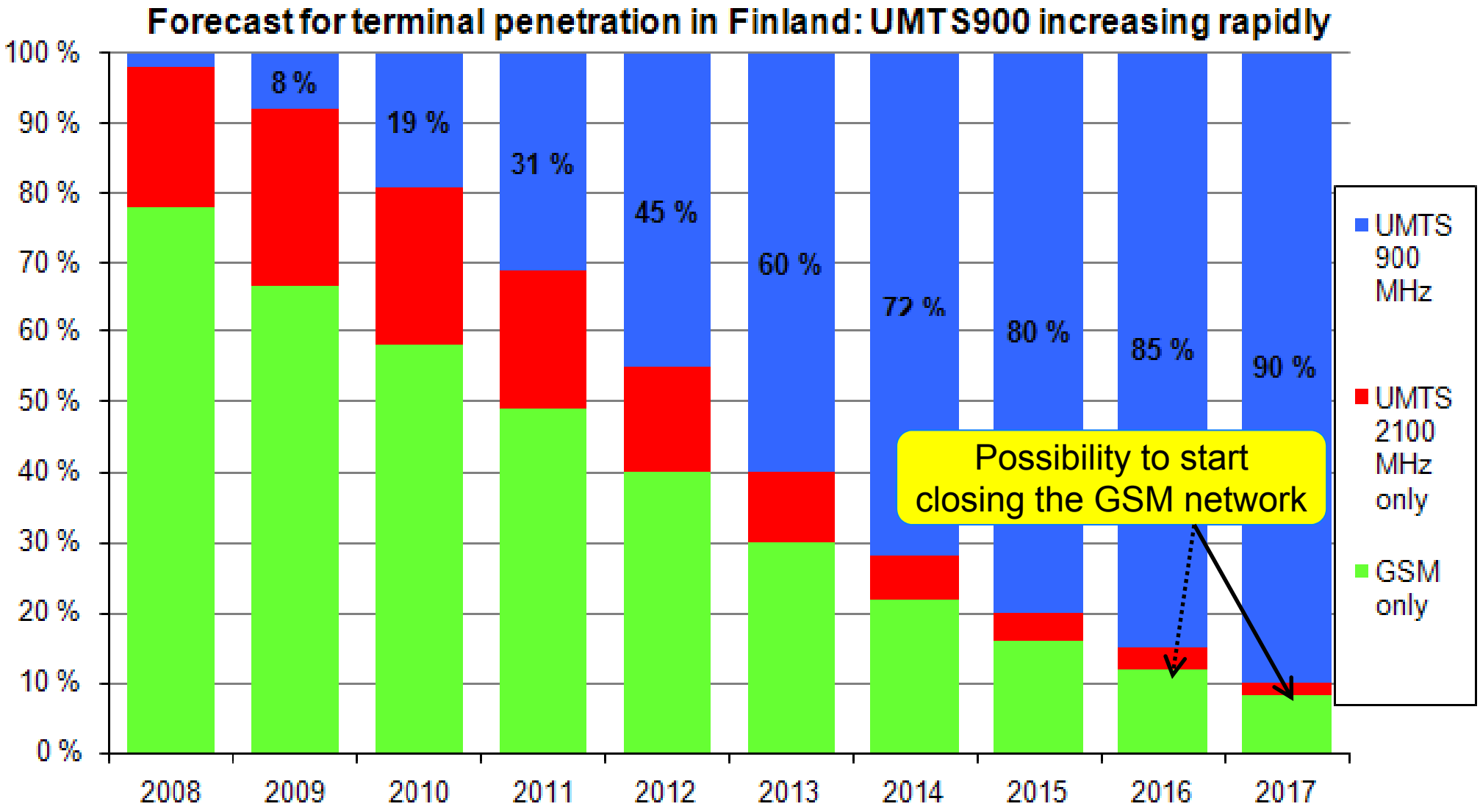


= DNA
= Sonera
= Elisa
= Current UMTS900 center frequency
= Current UMTS900 channel occupancy (4.2 MHz)
= Potential future 2nd UMTS900 carrier (4.2 MHz)
= Guard carrier

⇒ Possibility for dual cell UMTS900
⇒ Theor. max. peak bit rate of 84 Mbps, similar speed to LTE using 10 MHz bandwidth which is the assumed case at LTE coverage band (800 MHz or digital dividend)

A possible scenario for terminal penetration in Finland

- UMTS900 in practically every 3G terminal => penetration gets very high



LTE1800 – promising option for many markets

+ Main motivation: coverage area about 2X larger than LTE2600.
+ Possibility to reuse antenna lines of UMTS2100 or GSM1800.
+ Possibility to deploy multi-RAN BTS with simultaneous LTE&GSM.
+ 1800 MHz (ITU band 3) widely available in Europe and APAC.
+ Not big regulatory issues: 1800 band often technology neutral.

+ Spectrum need for full LTE data speed 18.4 MHz when GSM and LTE base stations at same sites (coordinated case).
+ Often easier to refarm than 900 MHz.

Coordinated GSM-LTE case	Required spectrum
20 MHz LTE	18.4 MHz
15 MHz LTE	13.8 MHz
10 MHz LTE	9.4 MHz

- Terminal availability 6-12 months after LTE2600: not a real issue.
- LTE1800 can be estimated to be ready for mass market in 2012 with first network deployments and terminals in volume.

=> LTE1800: promising and available for mass market in time

Summary

- HSPA can offer sufficient speed and capacity for the coming years.
- HSPA service needed everywhere, coverage often an issue.
- UMTS900 saves max. 50-70% of costs in rural/suburban areas.
- UMTS900 a proven solution already with 10+ commercial networks.
- UMTS900 improves coverage also in urban areas.
- Former issues with regulation and terminals practically solved.
- Refarming is time consuming but worth the effort.
- LTE1800 provides 2 times larger coverage area than LTE2600.

=> UMTS900 is a 100% clear go, the focus is now on the details for the most efficient deployment.

=> When LTE needed, LTE1800 is a promising option for LTE

Thank You!

Dr. Eetu Prieur

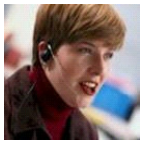
eetu.prieur@elisa.fi

Annex 4: Presentation by Vincent Lemoine, Bouyges Telecom, at the LTE World Summit, Amsterdam, 18th May 2010

Bouygues Telecom key figures

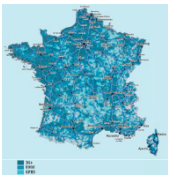
> 10 **Millions** customers in France
> **400K ADSL subscribers**

9000 employees
Including **2000** Customer Relation Staff



4000 points of sale
600 Bouygues Telecom Clubs
6 Customer Services Centers

>**98**% of GSM coverage, >**94**% EDGE
13300 sites + shared network in rural areas



>**81**% of HSPA coverage
rollout started in 2007

More than **170 countries covered** in the world including 100% of the European market

Turnover 2009: **5368 M€**
Net Profit 2009 : **471 M€**

BOOSTING THE CAPACITY OF A NETWORK WITH LTE 1800

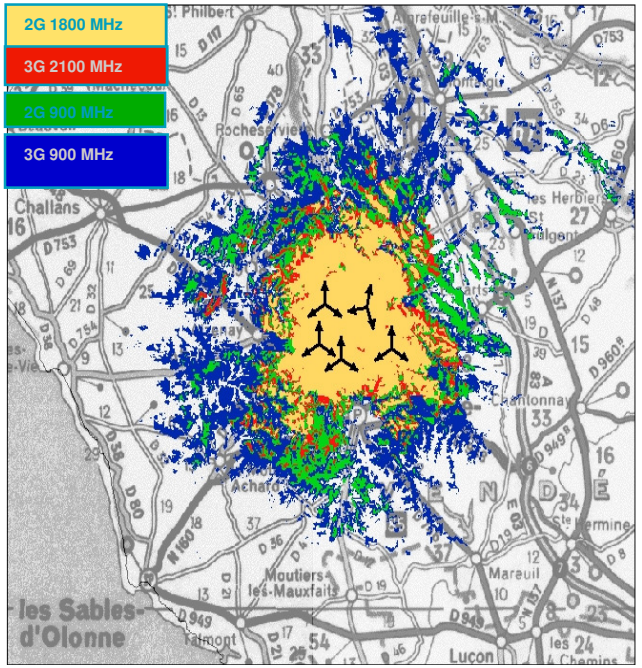
VINCENT LEMOINE
RADIO EXPERT

LTE WORLD SUMMIT
18 MAY 2010

BOUYGUES TELECOM'S STRATEGY FOR RADIO ACCESS

UMTS coverage must be extended to GSM coverage
900 and 2100 MHz bands dedicated to UMTS
Bouygues Telecom will further invest in HSPA

- Keep GSM coverage
- Completion of the UMTS deployment in 2100
- Deployment of UMTS 900 to reach GSM coverage (rural and indoor coverage in urban)
- Improve the user experience with HSPA post Release 6 features



3

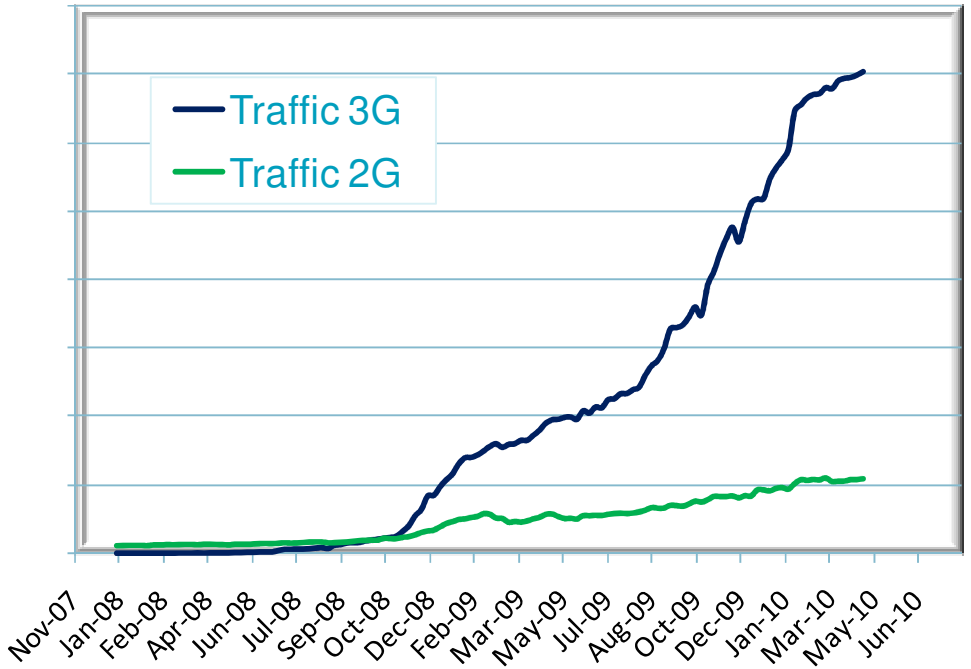
TRAFFIC EVOLUTION

Capacity issues with 900 and 2100 MHz frequency bands
New usage : Always on – HSPA not optimized
Cost per bit

Reasons for 3G traffic rapid rise :

- New handsets = new usage
  data cards, smartphones
- Penetration rate for 3G handsets

➔ traffic:
- x 10 during 2008,
- x 3.5 during 2009



NETWORK CAPACITY

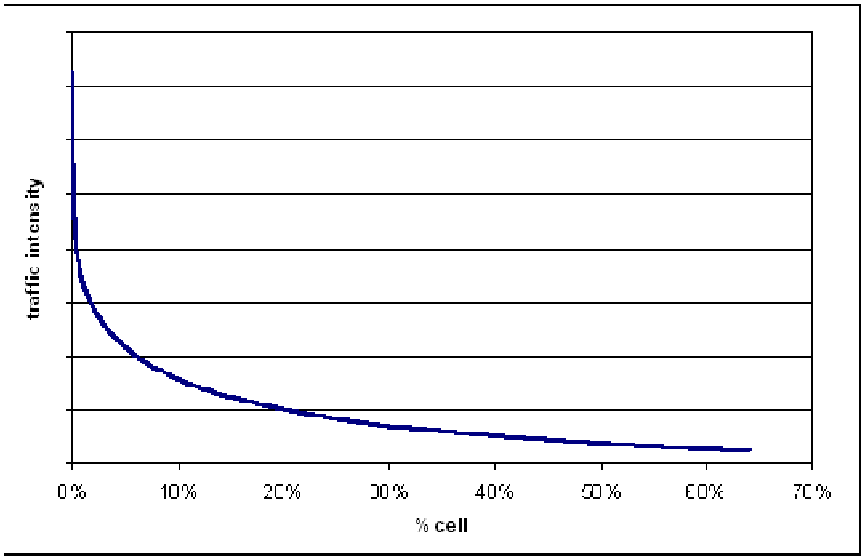
Going to LTE is a strategic decision
LTE must be deployed in clusters in order to justify the investment in handsets, frequency and technology knowledge

The capacity of the network is the used capacity, not the installed

Cost effective solution : adding carriers to the congested cells.

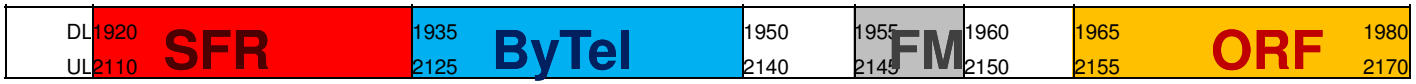
Densification, hotspots, femtocells, Wifi, …

- ➔ New spectrum for high data rate applications
- ➔ New technology more efficient (spectral and cost)



FRENCH SPECTRUM FOR RADIO ACCESS NETWORKS

GSM or UMTS

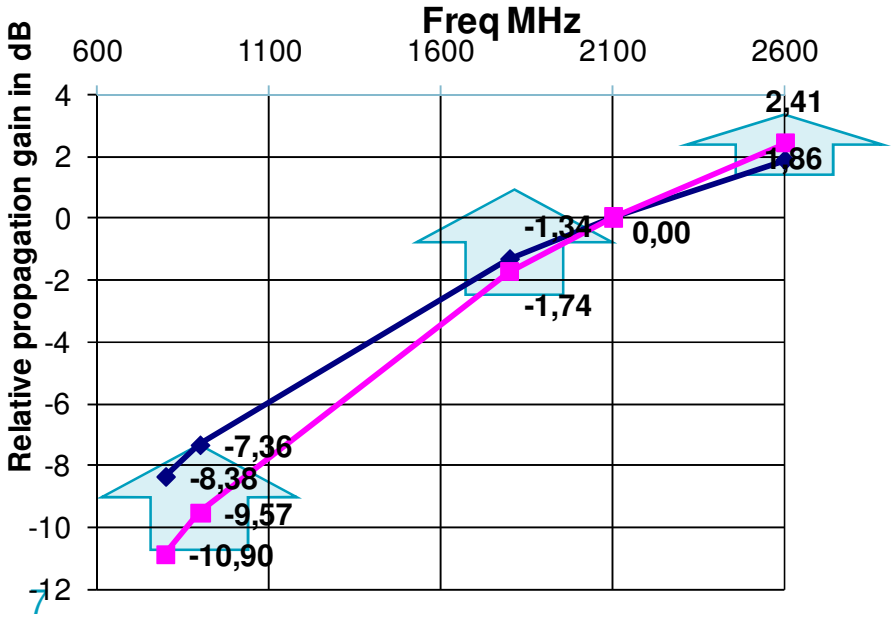


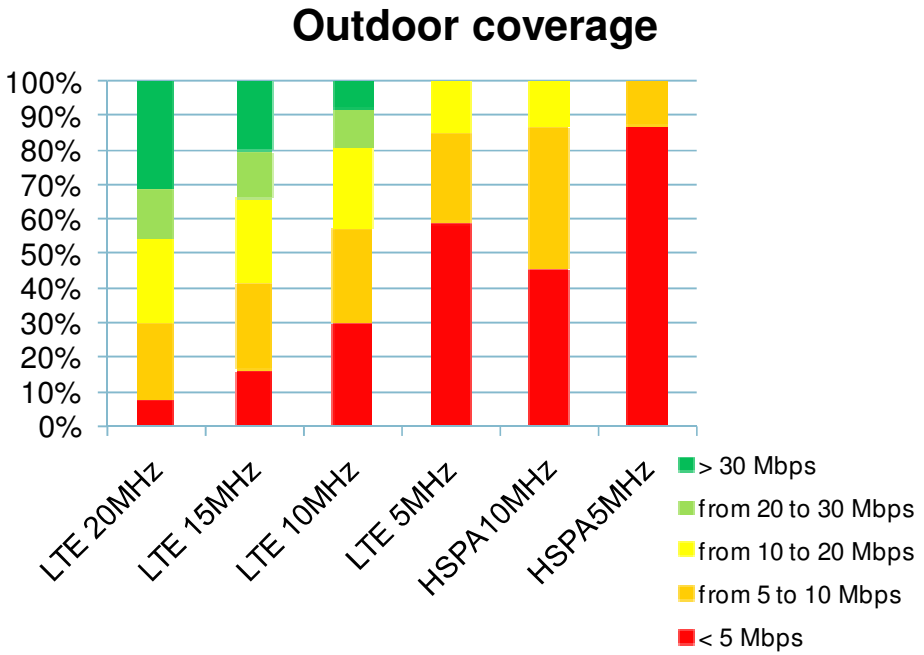
UMTS

- 2 remaining 2.1 GHz blocks : auction 11 May 2010
- 2.6 GHz :
  - Auction planned before the end of 2010
- 1.8 GHz:
  - Already allocated, refarming to be started
- Digital dividend :
  - Allocated to the development of high data rate wireless technologies : coverage obligations
  - Limited bandwidth per operator, expensive band, remaining technical issues

THE DIFFERENT PATHS TO LTE

	Coverage	Performances
2600 MHz	-	
2100 MHz	-	Optimal
1800 MHz	-	Risks due to the limited duplex gap
900 MHz	++	Limited channelization
Digital Dividend	++	Cohabitation issues with DVB-T





THE DIFFERENT PATHS TO LTE

	Deployment	Ecosystem	FDD Bandwidth
2600 MHz	New antennas	Best choice for early introduction of LTE	70MHz
2100 MHz		UMTS	60MHz
1800 MHz	Reuse of existing antennas	GSM/LTE	75MHz
900 MHz	New antennas if three technologies in the same band	GSM/UMTS	35 MHz
Digital Dividend	New antennas	Band for LTE Not harmonized Remaining technical issues	30 MHz

THE DIFFERENT PATHS TO LTE

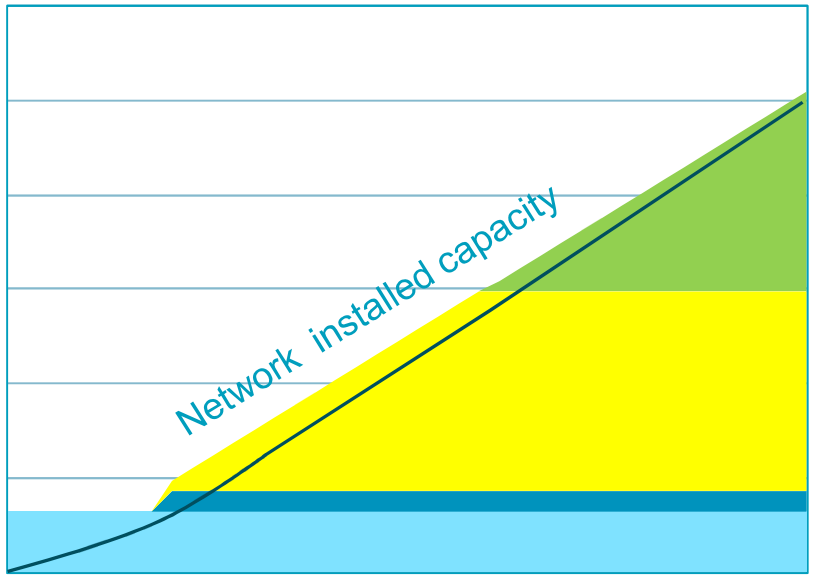
2,6 GHz — *Back-up and capacity extension* — LTE

2,1 GHz — 3G

1,8 GHz — GSM / LTE

900 MHz — GSM

800 MHz — *Ideal for indoor and rural coverage*
No technology migration! — LTE



3G	5 MHz @ 900 MHz	LTE	20 MHz @ 1800 MHz
3G	15 MHz @ 2.1 GHz	LTE	20 MHz @ 2600 MHz

TECHNICAL AND REGULATORY ISSUES
INDUSTRY CHALLENGES FOR LTE 1800

- DCS1800 defined as 3GPP Band 3 for UMTS and LTE

- Ongoing technical work on coexistence issues at CEPT, probably no supplementary constraint
  ➔ Update of the COMMISSION DECISION 2009/766/EC

- First LTE 1800 handsets expected in 2011
  Mass production could be considered in S2 2012
  new WI at GCF for the interoperability testing in 1800
  - 1800 is the fourth band after 2.6GHz, 2.1GHz and 700MHz before Digital Dividend

- Infrastructures will be available this year.

LTE 1800 TRIAL IN ORLEANS

- Bouygues Telecom is performing a trial at 1800
- First results to be presented at next LSTI meeting in Shanghai mid June.

4 sites/12 cells in Orléans
MIMO : 2*2
Bandwidth : 10MHz
Manufacturer : Alcatel Lucent

LTE 1800 TRIAL IN ORLEANS

Ambition :

- Bouygues Telecom has a strong interest for LTE 1800
- Build the LTE 1800 ecosystem
- Understand the technology

Test plan :

- LSTI Tests
- Cohabitation between GSM and LTE in band 3 : co-siting, carrier spacing, separation distance between technologies using the same frequencies
- Performance comparison with HSPA

CONCLUSION

Bouygues Telecom believes in HSPA technology in 900 and 2100 MHz bands

Traffic evolution and new usage ➔ necessity of new spectrum and new technology

1800 refarming, the best compromise : availability, cost, performance and ecosystem

Bouygues Telecom believes LTE 1800 is the best opportunity to boost the capacity of its network

33 UTV Television Ltd

Call for input on potential uses and future licensing option of the 2.6 GHz spectrum Band – ComReg Doc 10/38 – UTV Television (UTV Ltd) response

Introduction:

UTV Television welcomes the opportunity to submit our high level comments to this consultation. The future of the current MMDS services is of high importance to our business, our clients and our audience.

UTV Ltd is the Channel 3 (ITV) licence holder for Northern Ireland - a commercial television service licensed by the UK Office of Communications (Ofcom). UTV was the first television broadcaster to launch on the island of Ireland in 1959. We are part of Ireland's broadcasting heritage and even following the launch of RTE, TG4 and TV3 and multi-channel television being widely available from Great Britain, UTV remains the 4th most watched channel in peak time in the Republic of Ireland.

Carriage in the Republic of Ireland is exclusively through the UPC platforms of cable and MMDS. This re-transmission is possible because of the European Audio Visual Directive (formerly Television Without Frontiers).

Submission:

UTV is deeply concerned about the potential consequences of any change in the current use of the 2.6Ghz spectrum.

We recognise the EU spectrum standardisation Directives, but would argue that the social, consumer and economic benefit of the current use are greater than any alternative licensing options.

Indeed member states are permitted to make restrictions on the services spectrum can be used for if certain general interest objectives can be defined. These include "the promotion of cultural and linguistic diversity and media pluralism, for example the provision of radio and television broadcasting service".[1]

If the MMDS spectrum were lost and the service discontinued the significant cultural, news and current affairs and diverse programming offered by UTV would be lost to rural Ireland.

To re-emphasise, UTV is not available on Sky or expected to be available on DTT in the Republic of Ireland, so the programming which has been available for 50 years to much of rural Ireland will be lost. Currently the service is available to around 100,000 homes.

[1] Decision No.676/2002/EC of the European Parliament and of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community

In addition with the current failure to secure a commercial DTT provider in Ireland, the demise of the MMDS television services will leave the market in multi-channel television to Sky alone. This cannot be a good thing for the consumer or for indigenous Irish creative industries and broadcasters.

Advertisers would also suffer if MMDS were to be switched off as a key part of UTV's audience would be left without the service and therefore could not be reached. With airtimes sales across all broadcasters under extreme pressure at the moment, any action which would reduce audience reach would be of great concern to UTV, the advertising agencies and their clients.

We understand from UPC that should their licences be extended, then UPC has an investment plan to extend the reach of these services enabling an expansion of this user base.

This investment plan includes new compression techniques, enhancing services and the introduction of HD channels.

We have seen parts of the UPC submission to this consultation and we fully support their proposed solution which will allow the continuation of MMDS in the 2.6Ghz band.

UTV understands there may be parties that may indicate an interest in providing alternative services in this band (such as mobile broadband services). UTV understands that other spectrum bands would be much better suited to offer these services. This spectrum is likely to be liberalised in the coming years and, in any event, before 2014.

Final statement:

UTV strongly urges ComReg to continue the licensing of this spectrum for MMDS purposes. Our business would be significantly damaged if distribution via this spectrum were to end due to the reduction in potential audience available to receive the service.

There would be plurality or service and cultural losses for the audience receiving their services via MMDS - UTV is a channel providing high quality Irish content.

In addition competition in the television market would be diminished and in some areas lost altogether as Sky would be the only multi-channel offering available to much of rural Ireland.

We are happy to discuss with ComReg any of the issues raised in our submission and look forward to the publication of the results of this consultation.

Michael Wilson
Managing Director
UTV Television
Ormeau Road
Belfast BT7 1EB

24 June 2010

34 Vodafone Plc

Vodafone Response to the ComReg Call For Input on Potential Uses and Future Licensing Options of the 2.6 GHz Spectrum Band

Ref. ComReg Document 10/38

Response Date: 25 June 2010

Introduction

Vodafone appreciates the opportunity to respond to ComReg's call for input on the potential uses of, and future licensing options for, the 2.6 GHz band. We welcome ComReg's decision to commence the process of formally seeking the views of stakeholders on the future arrangements for this spectrum band at this time, following directly upon the initial date at which the existing MMDS licences in the band can be reviewed (18th April 2010) as specified in the 2003 Regulations. It is important that regulatory certainty in relation to future licensing arrangements for the 2.6 GHz band, and other key spectrum bands identified as suitable for the provision of electronic communications services, is provided as early as possible in order to maximise the potential for efficient investment and optimal assignment of spectrum to the benefit of consumers and the wider society. In this regard Vodafone believes it is essential that, following receipt of all information and views provided in response to the call for input ComReg moves as expeditiously as possible, consistent with the necessity for a full and thorough assessment of all relevant factors, to publish and consult on comprehensive proposals both for future licensing of the 2.6 GHz band and, to the fullest extent possible, the licensing of other relevant spectrum bands.[1]

The rapid take up in broadband enabled wireless devices (including mobile broadband modems and smart phones) and the associated exponential growth in mobile data volumes arising from increasing use of applications such as user generated content, file sharing, and video content, is placing ever greater demands on the network infrastructure and spectrum resources of wireless and mobile broadband providers. It is clear that substantial additional spectrum below the 5 GHz range will be required to be allocated for wireless/mobile broadband service provision in a timely manner if the expected strong future growth in demand for high speed mobile data services in the future is to be effectively accommodated.

In the context of the ongoing rapid growth in mobile data volumes, Vodafone considers that the central factor that must be taken into account in deciding on the future licensing and use of the 2.6 GHz band in Ireland is the European Commission Decision 2008/477/EC (The ECC Decision) which has designated spectrum between 2500-2690 MHz for the provision of wireless broadband electronic communications services, and the expectation stated in the ECC Decision that these services will be available on a pan European basis. In Vodafone's view it is imperative that spectrum bands that have been designated for provision of advanced wireless broadband services on a pan European basis are made available for this purpose in Ireland within timeframes that are broadly aligned with when these spectrum bands become available in other EU member states if the industry and consumers are to realise the benefits of economies of scale in equipment manufacture, and interoperability of services with other European countries. It is also important that the specific arrangements for the allocation of 2.6 GHz band conforms to the fullest extent possible with the bandplan and parameters as set down in the ECC Decision. Given the major economic and social value that will arise from the provision of next generation mobile broadband services in the future, significant delay in the allocation of the harmonised bands in Ireland relative to other EU countries would incur a substantial opportunity cost in both economic and social terms.

ComReg's spectrum policy needs to be holistic, taking account of the interdependency of decisions regarding different spectrum bands that are to varying degrees substitutable or complementary for uses such as the provision of advanced mobile broadband services. The issue of the future licensing options for the 2.6 GHz band cannot effectively be considered in isolation from the licensing approach to the 800 MHz, 1800 MHz and 2.3 GHz bands, among others. The demand

[1] *For example the 800 MHz, 1800 MHz and 2.3 GHz bands.*

from existing and potential licensees for spectrum in the 2.6 GHz band will be heavily influenced by the timing of availability, and conditions of access, of spectrum in these other bands and stakeholders will therefore require full visibility at the outset of the future licensing arrangements for all these bands to enable efficient investment in the provision of services such as high speed mobile broadband. Vodafone considers that the most efficient approach would therefore be to determine the future arrangements for the spectrum in these various bands at the same time. In this regard, we note in particular the approach taken in Germany where a competition in May awarded spectrum in 4 different spectrum bands (800 MHz, 1800 MHz, 2 GHz and 2.6 GHz) at the same time. Vodafone considers that a similar approach would also be optimal for Ireland as it would avoid the uncertainty and risk of inefficient spectrum allocation outcomes that would arise from decisions on the licensing of spectrum in individual bands (and any associated spectrum assignment processes) occurring at different times. The opportunity to simultaneously consider and consult on proposals for the future licensing of the 800 MHz, 2.3 GHz and 2.6 GHz bands, at a minimum, should now be availed of by ComReg.

In addition to the ECC Decision and the requirement to allocate more spectrum for mobile and wireless broadband services to accommodate anticipated future growth in mobile data volumes, the existing use of the 2.6 GHz band for the provision of programme services using MMDS must also be taken into account in respect of the future licensing options for the band. A regulatory impact assessment (RIA), in the form of a comprehensive cost-benefit analysis setting out, and quantifying to the fullest extent possible, the benefits and costs of the alternative options available, will be required to conclusively establish the optimal approach to future licensing of the 2.6 GHz band. It is important in this regard that the full range of viable options for future licensing of the spectrum are considered.

It is Vodafone's view that the benefits of assignment of the 2.6 GHz band primarily for the provision of wireless broadband services to end users no later than 2014 far exceed the costs and, for the reasons set out elsewhere in this response, this approach is likely to generate a much larger net benefit than alternative licensing options for the band.

Vodafone's preliminary position in relation to the future approach to licensing and use of the 2.6 GHz band is set out in full in the subsequent sections of this document.

Current MMDS Licences in the 2.6 GHz Band

Vodafone considers that at this juncture it is important that ComReg evaluate whether, and to what extent, there is a rationale for continued provision of programme content using MMDS in the 2.6 GHz band beyond the expiry of current licences in 2012 and 2014. Technological and competitive factors such as the essentially ubiquitous availability and growth in take-up of both pay-TV and free-to-air satellite broadcast services, and the prospective provision of free-to air and commercial DTT services by RTE, and potentially other players in the period preceding or directly following the expiry of current MMDS licences indicates that there are, and will in future be, good service alternatives for existing customers currently obtaining pay-television services on the basis of the MMDS platform. The issue of existing MMDS customers losing access to pay television services in the event that MMDS services were to be phased out by 2014 does not therefore appear to arise.

While there are currently approximately 74,000 subscribers to MMDS services, Vodafone notes that the subscriber base for MMDS services has fallen considerably over the last two years. Figure 5.1.1 of ComReg's Quarterly Key Data Report for Q4 2008 (ComReg document 09/17) recorded 88,933 subscribers to MMDS services at that time, which was itself down more than 15.5% from a

figure of approximately 105,000 subscribers in Q4 2007. This trend indicates that MMDS as a platform for delivery of pay television services appears to be in long term decline, a factor of particular importance when assessing the case for a renewal of existing MMDS licences beyond their current expiry dates.

The base of subscribers to MMDS services declined in both 2008 and 2009 at annualised rates of over 15%. If this rate of decline in the subscriber base were to continue then there would be less than 40,000 subscribers to MMDS services at the time that the existing licences are due to expire in April 2014.

In the context of ComReg's statutory objective of ensuring the efficient use of spectrum, it is Vodafone's view that continued allocation beyond 2014 of essentially the entire 190 MHz of spectrum in the 2.6 GHz band for the provision of programme services using MMDS, when there are fewer than 75,000 end users of the service (and the numbers of subscribers served can reasonably be expected to decline significantly in the medium term) is very difficult to justify in the context of ComReg's statutory objective to ensure the efficient use of the spectrum. In particular, the number of end users served per MHz allocated for MMDS licences compares poorly relative to the number of subscribers served per MHz of spectrum currently allocated to the provision of mobile voice and data services in the 900 MHz, 1800 MHz and 2.1 GHz bands.

The general availability, currently and prospectively, of effective alternatives to obtaining pay TV services via the MMDS platform, when considered in the context of the steady decline that has been observed in the MMDS subscriber base, raises the question of whether the continued licensing of essentially the entire 2500-2690 MHz band to the provision of MMDS services after 2014 is the optimal use of the spectrum resource. In light of the limited spectrum available for the provision of electronic communications services such as mobile and wireless broadband in frequencies harmonised below 2 GHz for this purpose, a very strong case would have to be made to justify the continued reservation of most of the relatively more abundant spectrum in the 2.6 GHz band in Ireland for MMDS services beyond 2014, when such a decision would result in Ireland failing to conform with the ECC Decision. We would thereby forego the enormous benefits in terms of economies of scale in equipment manufacture and pan European service interoperability for wireless broadband services that the ECC Decision is intended to achieve.

Reasons that could be advanced in support of continued licensing of MMDS services after 2014 appear to have, at best, limited validity and do not warrant this licensing approach, which would seriously hamper or preclude the implementation of the ECC Decision. For example it may be argued that the availability of programme content distributed by the MMDS platform is important in providing additional competition to the other terrestrial and satellite broadcasting services available, particularly in rural areas of the country. While this argument may have had some validity in the past, the essentially ubiquitous availability and strong take up of satellite services and the improved range and quality of programme services to be offered by RTE on the basis of its national DTT multiplex licence, together with potential future competition from commercial DTT service following analogue switch off, indicates that any incremental value of MMDS services from a competitive perspective is now limited, and likely to be substantially further reduced by 2014. Indeed from a competitive perspective, it could reasonably be argued that the availability of pay TV services providing using MMDS in the 2.6 GHz band may have actually reduced the commercial attractiveness, and therefore the demand for, DTT multiplex licences available for operators other than RTE by reducing the size of the addressable market. If the existing MMDS services have actually constrained the development of competition in broadcast services using the DTT platform then their effect on competition in the market for the provision of TV services may be neutral at best.

On the basis of the available evidence it is therefore Vodafone's view that it cannot be maintained that the continued use of the greater part of the 2.6 GHz spectrum by MMDS services after 2014 is the optimal licensing approach.

Optimal Future Use of the 2.6 GHz Band

It is now generally recognised by policymakers that next generation mobile broadband services will play a key role in stimulating economic competitiveness and social inclusion. At the same time the very strong growth in take-up of mobile broadband in recent years, together with the trend toward use of more bandwidth intensive applications on mobile devices is driving the requirement to allocate significant additional spectrum below 5 GHz so as to effectively cater for the anticipated dramatic growth of mobile data volumes in the medium term.

A range of studies have been conducted which have established the enormous value that will arise from the allocation of spectrum released as part of the Digital Dividend in the UHF band to advanced mobile broadband services on a harmonised pan-European basis. Vodafone would submit that there would also be considerable economic and social benefits from the timely allocation of spectrum that has similarly been identified for next generation wireless/mobile broadband services in other bands, such as the 2.6 GHz band.

As set out previously in this response, major benefits would arise for Ireland from an approach to the licensing of the 2.6 GHz band that is aligned with other European jurisdictions, for example in terms of the availability of competitively priced equipment reflecting the benefits of economies of scale from production for a large market. Adoption of a licensing approach consistent with that set out in the ECC Decision should also facilitate inter-operability of mobile broadband services between EU member states. Given the robust competition observed in the provision of mobile broadband services in Ireland these benefits would accrue primarily to consumers.

While the benefits of allocation of the 2.6 GHz band in Ireland primarily for the provision of mobile broadband services would be substantial, the existing use of the 2.6 GHz band for the provision of programme services using MMDS must clearly also be taken into account in respect of the future licensing options for the band.

Vodafone believes that a regulatory impact assessment (RIA), in the form of a comprehensive cost-benefit analysis setting out, and quantifying to the fullest extent possible, the benefits and costs of the alternative options available, will be required to effectively establish the optimal approach to future licensing of the 2.6 GHz band. Relevant factors that should be assessed in the RIA should include, in addition to the economic, competitive, and social impacts already referred to, any costs of migrating MMDS customers to services using alternative spectrum that would not otherwise have been incurred.

The Regulatory Impact Assessment must consider as an option the approach that would most fully conform to the ECC Decision – the allocation of the 2500-2690 MHz band primarily for the provision of wireless broadband services to end users on the basis of the band plan and technical conditions set down in the Annex to the ECC Decision, at least upon the expiry of the existing MMDS licences in the band.

For the purposes of the RIA, the impact of the option of continued use of some part of the 2.6 GHz spectrum for distribution of programme services using MMDS (potentially as the base case option) However it is Vodafone's view that this option should only be assessed on the basis of the most

efficient possible use of the frequencies that would be strictly required for that purpose. Given ComReg's statutory objective to ensure the efficient use of the spectrum, it is vital that the option of continued use of the 2.6 GHz band for MMDS should only be assessed in the context of MPEG 4 compression technology (or any more spectrally efficient technology that may subsequently be developed) being deployed.

It is important that the full range of options for future licensing of the spectrum need to be considered. For example if a licensing option could feasibly be implemented allowing timely allocation of sufficient spectrum (especially FDD spectrum) for provision of wireless broadband services to end users while also potentially allowing access to some TDD spectrum for continuing MMDS provision, subject to addressing interference concerns, then it should also be assessed.

It is Vodafone's view however that the benefits of allocation of the 2.6 GHz band primarily for the provision of wireless broadband services to end users no later than 2014 would far exceed the costs and, for the reasons set out elsewhere in this response, would generate a much larger net benefit than alternative licensing options. Vodafone considers that any impacts for end users of existing MMDS services from the licensing options – where present- need to be taken into account. However it is our view that any implications for end users of pay TV services currently provided via MMDS using frequencies in the 2.6 GHz band from licensing approaches in conformity with the ECC Decision should be capable of being effectively addressed.

2.6 GHz Spectrum Assignment Issues

As ComReg has acknowledged, a number of countries have recently held competitions and subsequently awarded spectrum in the 2.6 GHz band. The approach taken in Germany, where an award process was recently held for the simultaneous award of spectrum in the 2.6 GHz, 2.1 GHz, 1800 MHz and 800 MHz bands is particularly significant. Vodafone believes that the same general licensing approach as adopted in Germany (and currently being propose in other countries such as the U.K.) of holding a single award process for the assignment of spectrum across multiple bands that have been harmonised for the provision of electronic communications services would be the most efficient approach to adopt in Ireland. This method of allocating spectrum across multiple bands in one award process properly takes account of the fact that the issues of the future use and licensing of spectrum in any one frequency band cannot effectively be considered in isolation from spectrum in other bands that is to a considerable degree potentially substitutable, or complementary for the provision of the same services, such as mobile broadband.

This approach would maximise regulatory certainty and choices for actual and potential spectrum licensees and avoid the significant risk of inefficient spectrum allocation outcomes that could arise if spectrum in individual spectrum bands was assigned in sequential award processes. Vodafone considers that the opportunity to simultaneously consider and consult on proposals for the future licensing of the 800 MHz, 2.3 GHz and 2.6 GHz bands, at a minimum, should therefore now be availed of by ComReg.

Without prejudice to the above view that the simultaneous assignment of spectrum across multiple bands is the optimal approach, Vodafone believes that there are a number of key elements that must be incorporated in the approach to the future licensing of the 2.6 GHz band specifically. These are set out, at a high level, below:

Technology Neutrality

Vodafone strongly supports a technology neutral approach to the future licensing of spectrum in the 2.6 GHz band. Subject to ensuring adequate protection from interference and satisfying harmonisation requirements, users of the spectrum should have the ability to select the technology which allows the most efficient provision of services to their customers.

Spectrum Bandplan

The spectrum block size should be either 2 X 5 MHz (FDD) or 5 MHz (TDD) so as to provide maximum flexibility to users of the spectrum. The structuring of spectrum in the band should adhere to the CEPT bandplan for the 2.6 GHz band, with 2 X 70 MHz of spectrum for FDD operation and 50 MHz of spectrum for TDD in the duplex centre gap.

Vodafone believes that to maximise the benefits from use of the 2.6 GHz band in conformity with the ECC Decision, all spectrum blocks should be awarded on a national basis.

Spectrum Caps

It may be necessary to implement spectrum caps to ensure a fair allocation between operators. The appropriate spectrum cap should take account of the fact that a key use for 2.6 GHz spectrum allocated in conformity with the ECC decision is likely to be for additional capacity in areas of high demand (such as urban hotspots) in the provision of advanced wireless broadband services using technologies such as LTE or WiMax. A key aspect of the potential benefit of 2.6 GHz spectrum for provision of capacity for provision of wireless broadband services is the relatively large amount of spectrum available in the band (if the CEPT bandplan is adhered to) which makes it optimal for this use in delivering the best end user experience. Accordingly, with regard to FDD spectrum, Vodafone considers that the maximum amount of spectrum that could be assigned to any individual operator in the 2.6 GHz band should be not less than 2 X 20 MHz.

Coverage and Other Licence Conditions

In the context of the likely use of the 2.6 GHz spectrum for the purposes of providing additional capacity for the provision of advanced wireless broadband services to end users in areas of high demand, with wide area coverage for the services being provided using spectrum in other bands, it is Vodafone's view that no coverage obligations should attach to future licensees for spectrum in the 2.6 GHz band. This would be consistent with the approach adopted in those European countries where spectrum in the 2.6 GHz band has been awarded. As ComReg has highlighted, 2.6 GHz spectrum recently awarded in the Scandinavian countries and the Netherlands has been awarded without, or with very limited, coverage obligations. Vodafone does however consider that, consistent with ensuring efficient use of the spectrum, there should be at least a general requirement that the spectrum be utilised efficiently within a reasonable time period following the award of licences for spectrum in the 2.6 GHz band.

Vodafone considers that 2.6 GHz licences should be awarded for a minimum period of 20 years, but ideally ComReg should consider moving toward a regime of tradable perpetual licences for both the 2.6 GHz and other spectrum bands. This would maximise regulatory certainty for licensees and promote efficient investment.

Other licence conditions that may be imposed should be objectively justified and proportionate. In particular licence conditions should not be overly prescriptive as this would reduce the flexibility of licensees to respond to changes in the needs of subscribers to the services provided.

Vodafone considers that it is important to avoid the risk of fragmentation of spectrum between operators and the associated loss of spectrum efficiency. Accordingly the conditions for licences for spectrum in the 2.6 GHz band should not preclude the sharing or pooling of spectrum between operators to make use of the wider channels that would optimise the user experience for their respective broadband customers.

Spectrum Award Process

Vodafone considers that market mechanisms should be used in the allocation of future licences for spectrum in the 2.6 GHz band. Although the existing MMDS licences in the band are currently scheduled to expire in 2012 and 2014, a spectrum award process for new licences consistent with the ECC Decision and CEPT bandplan (ideally in the context of simultaneous award of spectrum in other substitutable bands) may be feasible significantly in advance of these dates.

In relation to the design of an award process, it is important that licence applicants would be facilitated in obtaining contiguous spectrum blocks where desired. Features such as package bidding and use of a two stage process may be optimal to incorporate in the award process to allow this.

Conclusion

It should be noted that the views provided in this submission represent Vodafone's preliminary position on the optimal approach to the future licensing and use of the 2.6 GHz band. We look forward to the opportunity to provide views on the detailed proposals in relation to the future arrangements for this band, and other related spectrum bands, when these are published and consulted upon by ComReg.

35 Western Development Commission

Call for input on potential uses and future licensing options of the 2.6 GHz spectrum band

Submission to Commission for Communications Regulation

Western Development Commission

June 2010

Western Development Commission
Dillon House
Ballaghaderreen
Co. Roscommon
Phone: 094 986 1441
www.wdc.ie

Call for input on potential uses and future licensing options of the 2.6 GHz spectrum band

Submission from the Western Development Commission

1.0 Introduction and Background

The Western Development Commission (WDC) welcomes this opportunity to present its views on potential uses and future licensing options of the 2.6 GHz spectrum band. In this submission we set out the WDC's views.

The WDC is a statutory body whose primary purpose is to promote, foster and encourage economic and social development in the Western Region (counties Donegal, Sligo, Leitrim, Mayo, Galway, Roscommon and Clare). This is a predominantly rural region of relatively few large centres, many small towns and scattered settlement.

The WDC works in co-operation with national, regional and local bodies involved in western development to:

- review and monitor development policy and its implementation in the region, identify any changes and adjustments needed and make appropriate proposals to government departments and agencies;
- identify and implement development initiatives, or facilitate their implementation by other relevant organisations; and
- assist businesses, social enterprises and projects through operating the WDC Investment Fund.

As part of its remit, and of its strategic aim of contributing to the creation of a high quality economic and social environment in the Western Region, the WDC has been active in highlighting the infrastructure deficits that affect the region's ability to attract inward investment and to grow indigenous enterprises. Lack of access to quality broadband telecommunication infrastructure is one of the deficits inhibiting many businesses already operating in the region, and discourages others from locating there.[1]

The WDC was represented on the Information Society Commission (ISC)[2] and chaired the Broadband Working Group. The ISC strategy documents *Ireland's Broadband Future* and *21st Century Infrastructure* provided thorough analyses of the significance of broadband infrastructure for Ireland's economic growth and competitiveness, and drew attention to the continuing gap in broadband access between larger towns and smaller centres.

[1] The WDC provided an analysis of broadband issues in *The State of the West* (2001) and *Telecommunications in the Western Region* (2002). The issue of broadband access as a constraint for enterprises also emerged from research for *Creative West: The creative sector in the Western Region* (2009) and *Rural Businesses at Work* (2007).

[2] The Information Society Commission was an advisory body to the Taoiseach from 2001-2004. See www.ISC.ie

The WDC in its *Submission to Department of Communications, Energy and Natural Resources Public Consultation on Spectrum Policy* (November 2008), made several points of relevance to the issues raised in this call for input. The WDC's submission to the Department of Communications, Energy and Natural Resources, is attached in the annex for ease of reference.

The WDC response to the DCENR's Proposed Principles for Spectrum Policy proposed some inclusions to the principles governing the use of spectrum policy in Ireland. Those principles of relevance to the current call are set out below.

1. Spectrum management should be dynamic and responsive to stakeholders needs

The regulatory framework for spectrum should:

- *Foster competition, growth and innovation in the use of spectrum.*
- *Promote flexible, open and responsive management of spectrum.*
- *Provide clarity and certainty to stakeholders and the general public regarding spectrum usage.*
- *Take account of the national policy objectives for those sectors that are dependent on spectrum.*
- *Take account of developments in spectrum management in the international environment, such as the ITU at the global level and the European Union and CEPT at the European level.*
- *Take account of the opportunities for collaboration on a North-South basis.*

The WDC agrees that this principle should underpin spectrum management in Ireland. However it believes that an additional point should be added as follows:

- **Take account of the requirements of rural and less populated regions of Ireland and should recognise that wireless access to high quality services may be the only terrestrial option available for the businesses and residences located in these areas.**

2. Access to spectrum should be easy

- *Regulations on access to spectrum should accord with the principles of Better Regulation.*
- *In authorising the right to use spectrum, the approach adopted should be appropriate for the uses/sectors under consideration.*
  - *Market mechanisms may be appropriate where the use of spectrum is directly subject to market forces (e.g. provision of electronic communications services).*
  - *Where the use of spectrum is not subject to market forces or is required for the provision of security, social, cultural objectives, other mechanisms may be more appropriate.*

The WDC agrees that this principle should underpin spectrum management in Ireland, however it believes that an additional bullet point should be added as follows:

- **Recognise explicitly that adequate coverage of rural areas may not happen if left to the market alone. Spectrum used for rural coverage may not be subject to market forces and mechanisms other than market mechanisms may be appropriate for the allocation of such spectrum.**

3. Electronic communications services for consumers

Where the use of spectrum is intended to provide a consumer service:

- *Consumers should be able to connect radio equipment and telecommunications terminal equipment of their choice (provided that these comply with relevant standards) to any network.*
- *Consumers should be able to access and distribute any lawful content and use any lawful applications and/or services of their choice.*
- *The emergence of a range of commercial network access models should be encouraged.*

The WDC agrees that this principle should underpin spectrum management in Ireland, however it believes that additional points should be added as follows:

- **Consumers in all locations should have access to all services provided utilising the spectrum.**
- **Consumers living or working in locations where access from alternative sources of high speed broadband is not available are catered for through the use of wireless access.**
- **The emergence of a range of commercial network access models based on licensed and unlicensed spectrum should be encouraged.**

Apart from recognition that these principles are very important to service provision in rural areas generally and the Western Region in particular, below are the additional concerns of the WDC in relation to this call for input.

MMDS and Rural Access
While quality and competitive broadband provision in rural areas is the primary concern, the WDC considers quality service provision generally in rural areas a critical issue.

The Comreg information notice indicates that the current MMDS coverage, providing outreach technology in non-cabled areas (most of which are rural areas), covers some 700,000 homes of which approximately 10% are MMDS subscribers. This potentially provides cover for in excess of 2 million persons and MMDS services to possibly 250,000 persons.

These services are of importance to such households, providing various Pay TV services.
The WDC would be keen to ensure that, where such services are currently provided in rural areas, they continue to be licensed and supported. This is not to suggest that service improvements and additional investment is not required, rather it is to ensure that there is a continuing minimum level of service and an environment of certainty which would allow further investment.

The WDC would also be concerned about any outcome which would lead to a monopoly in service provision as this would impact on consumer choice and on current and future quality and service availability. The availability of MMDS in many parts of the country ensures consumer choice as it is the only alternative managed Pay TV service to BSkyB. The WDC believes it would be important to avoid the creation of a monopolistic situation where ultimately consumer choice, price, quality and service availability are negatively impacted.

Alternative uses of the 2.6 GHz spectrum band
The WDC is particularly interested in ensuring that quality broadband at a competitive price is available to all parts of the Western Region, an objective that has yet to be achieved. Any

implications there may be for spectrum licensing and use for mobile broadband are therefore very relevant. In this context, the WDC also acknowledges the possibilities arising out of spectrum compression technologies.

While it is likely that the 2.6 GHz band is not currently suitable for mobile broadband use in rural areas and there may be other more suitable frequencies, it is possible that new technologies may change this. The WDC believes that the case for removing the MMDS service from rural areas in order to provide an additional service to urban centres, which in many cases already has extensive service provision, is not evident.

Conclusions
Due to the more limited choice of service in rural areas, these areas will be further disadvantaged if the MMDS service were to be withdrawn.

The WDC believes it is important that where spectrum is available, it is important that it is used to provide **some** service - either MMDS, mobile broadband or other, to rural areas.

As stated at the outset, the WDC welcomes this opportunity to present its views on potential uses and future licensing options of the 2.6 GHz spectrum band and its relevance to the Western Region. We hope that our concerns are clear and our suggestions constructive.

If there are any queries in relation to the points raised in this input, we would be happy to discuss it further. Please contact

Deirdre Frost
Policy Analyst
Western Development Commission
Dillon House
Ballaghaderreen
Co Roscommon
Tel: 094 986 1441
e-mail: deirdrefrost@wdc.ie

Western Development Commission
June 2010

Annex A

Public Consultation on Spectrum Policy

Submission to Department of Communications, Energy and Natural Resources

Western Development Commission
November 2008

Western Development Commission
Dillon House
Ballaghaderreen
Co. Roscommon
Phone: 094 986 1441
www.wdc.ie

Public Consultation on Spectrum Policy

Submission from the Western Development Commission

1.0 Introduction and Background

The Western Development Commission (WDC) welcomes this opportunity to present its views on spectrum policy and hopes that it can contribute to advancing thinking in this important area. In this submission we set out the WDC's views, particularly with regard to the relevance of spectrum policy for the delivery of broadband infrastructure to rural regions.

The WDC is a statutory body whose primary purpose is to promote, foster and encourage economic and social development in the Western Region (counties Donegal, Sligo, Leitrim, Mayo, Galway, Roscommon and Clare). This is a predominantly rural region of relatively few large centres, many small towns and scattered settlement.

The WDC works in co-operation with national, regional and local bodies involved in western development to:

- review and monitor development policy and its implementation in the region, identify any changes and adjustments needed and make appropriate proposals to government departments and agencies;
- identify and implement development initiatives, or facilitate their implementation by other relevant organisations; and
- assist businesses, social enterprises and projects through operating the WDC Investment Fund.

As part of its remit, and of its strategic aim of contributing to the creation of a high quality economic and social environment in the Western Region, the WDC has been active in highlighting the infrastructure deficits that affect the region's ability to attract inward investment and to grow indigenous enterprises. Lack of access to quality broadband telecommunication infrastructure is one of the deficits inhibiting many businesses already operating in the region, and discourages others from locating there.[3]

The WDC was represented on the Information Society Commission (ISC)[4] and chaired the Broadband Working Group. The ISC strategy documents *Ireland's Broadband Future* and *21st Century Infrastructure* provided thorough analyses of the significance of broadband infrastructure for Ireland's economic growth and competitiveness, and drew attention to the continuing gap in broadband access between larger towns and smaller centres.

[3] The WDC provided an analysis of broadband issues in *The State of the West* (2001) and *Telecommunications in the Western Region* (2002).

[4] The Information Society Commission was an advisory body to the Taoiseach from 2001-2004. See www.ISC.ie

While significant advances have been made in rollout nationally and in larger regional centres, using fixed, wireless and mobile technologies, progress in rural areas has been limited. Even where wireless and mobile technologies have been deployed, services are often patchy, unstable, and with limited capacity.

It is for this reason that the WDC regards the use of the so-called 'digital dividend' from the switchover from analogue to digital TV, to enable high speed broadband services to be rolled out in rural areas, as an unprecedented opportunity to bridge the 'digital spatial divide'. Indeed, the EU Commissioner for Information, Society and Media has identified the spread of rural broadband as a key positive impact of this switchover which is expected to take place by 2012, freeing up spectrum capacity for use by television, mobile telephony and fixed broadband services.

The *DCENR Report of the Working Group on Spectrum Policy* referred to the 25-30% of the spectrum in the UHF broadcast band that would potentially be available for use after the move to digital television. One of the key uses of this spectrum could be the provision of quality broadband access to rural areas.

In October 2008, the US Federal Communications Commission (FCC) Office of Engineering released a report *Evaluation of the Performance of Prototype TV-Band White Space Devices*. The Commission conducted laboratory and field tests of prototype 'white space' (vacant TV channel spaces) devices, and is about to authorise licences for the operation of new low-power devices in the TV broadcast spectrum at locations where individual channels/frequencies are not being used for authorised services. This will allow the use of 'white spaces' for the provision of affordable broadband, particularly in rural or urban areas not covered by mainstream providers. The FCC has also approved a proposal to open up parts of the radio spectrum for unlicensed users.

Studies in the UK suggest that around 100MHz of white space spectrum may be available in 90% of locations, in addition to the 25-30% of spectrum referred to above.

2.0 General Spectrum Policy

The *DCENR Report of the Working Group* on Spectrum Policy makes the distinction between spectrum where market forces ensure assignment through the use of market mechanisms, and spectrum where assignment is not subject to market forces, for example spectrum assigned for use in public safety, security etc. While this distinction is welcome, the WDC feels that these categories are broad and the policy should explicitly identify rural and less populated geographical areas as requiring more than market assignment mechanisms to ensure that the residents and businesses of these areas can avail of wireless access to services such as high quality broadband. The WDC believes that specific measures need to be put in place to ensure that rural and less populated areas of Ireland have access to the services that use the spectrum, including high quality broadband.

Services that use spectrum for the delivery of wireless broadband include:

- mobile and nomadic broadband services which are required in all locations in the state;

- fixed broadband[5] services to residential and business customers.

Mobile and nomadic services – coverage in rural areas

Spectrum policy has a part to play in ensuring that the voice and data mobile networks are extended into rural areas and consideration should be given to:

- coverage requirements when national licences are being issued;
- measures to ensure that the opportunities afforded through digital dividend spectrum and/or spectrum re-farming are used to extend rural coverage.

Use of wireless to deliver Next Generation Access to high quality broadband

It is important that spectrum policy takes cognisance of the role of wireless in Next Generation Access (NGA). Whilst most commentators would agree that fibre optic-based networks such as Fibre to The Home, Fibre to the Curb and Fibre to the Building provide the most future proofed method of NGA, it is important to recognise that it will be many years, if ever, before these technologies will be available to more than even 50% of the population in Ireland. It is clear that the only option for many locations will be either copper-based or wireless solutions. Use of copper for the delivery of broadband is dependent on its quality and the customers distance from the exchange and therefore is only a small part of the solution for NGA in rural and less populated areas of Ireland, with the remainder depending on wireless access technologies.

Spectrum policy needs to acknowledge that the use of wireless technologies will be the only alternative for the provision of NGA in many parts of Ireland. The policy needs to explicitly recognise this fact and take account of the knock-on economic, environmental and social benefits of spectrum to the development of the more rural parts of Ireland.

Spectrum policy required to cater for rural residences and business

Spectrum policy needs to ensure that national wireless services are rolled out to rural areas as well as urban areas and also recognise the special requirements of those areas that are unlikely to receive services delivered via cable and/or deep fibre networks for a long time, if ever.

Policy can cater for the rural situation via a number of options:

- obligations in national licences;
- geographical licensing schemes such as the successful Fixed Wireless Access Local Access (FWALA) scheme in the 3.5GHz and 10.5GHz bands;
- encouraging use of the white space or interleaved spectrum;
- putting in place clear device parameters for use in an unlicensed spectrum regime, including the unlicensed use of white space.

2.1 Management of spectrum

The *DCENR Report of the Working Group on Spectrum Policy* states:

[5] Fixed broadband service could be provided using mobile technologies such as WiMax or HSPA, the distinction here is that users generally access the service from their home or place of work.

> *If access to spectrum is free, service providers have no incentive to minimise their use of this resource and thereby release it for other possible uses. Price-based incentives can encourage service providers to behave more efficiently, in their own interests. These incentives can take the form of either direct pricing of the spectrum, or trading. A spectrum fee will prompt a real examination of requirements and an exploration of options for reducing them. If the spectrum they hold is made tradable, service providers are faced with the opportunity cost of using spectrum. If they hold on to spectrum that they don't need, they are forgoing the revenue they might otherwise earn by selling or leasing it. Incentives of this sort remove some of the burden of deciding the most efficient use from the spectrum manager or regulator, because parties are motivated to act in their own interests while, at the same time, serving the interests of good spectrum management.*

While we agree that price-based incentives can encourage service providers to behave more efficiently and that these incentives will remove some of the burden of deciding the most efficient use from the spectrum manager or regulator, there are other factors which will influence operators actions and the spectrum manager will need to have the tools to monitor the spectrum and intervene if necessary.

For example, service providers may fear damage to their existing assets (e.g. interference or additional competition). In principle, service providers should still be able to quantify these in monetary terms and thus value their access to the spectrum. However, these fears could lead to service providers placing a high value on their spectrum, making the price uneconomical for secondary users.

Service providers may not want to release any spectrum in rural areas even if they don't use it themselves, for a variety of reasons including:

- maintaining 'real options' i.e. an alternative or choice that becomes available with a business investment opportunity at some point in the future;
- reduced flexibility in planning and maintaining the network;
- the risk of not being able to meet future changes in demand in some scenarios (e.g. new housing build, data demand growth).

For instance, operators might place a particularly high value on the 'real options' if the spectrum was in high demand and trading illiquid (because they might have to consider the cost of alternative solutions in different bands, for example, if they did need additional capacity). If a service provider needed nationally available spectrum in the future this would deter it from selling regional pieces because it might be too difficult to repurchase them if needed. Moreover, if a purchaser had added a lot of value to it by building, for instance, a €1bn network, it would not be easy for another operator to 'buy back' such spectrum and compensate the original purchaser. However, if service providers are permitted to allow for such contingencies assets are potentially left unused.

By the same token, service providers can demand a high compensation price for such risks. This might undermine the business case of the alternative or secondary user.

Other practical measures to counteract these tendencies and maximise use of the spectrum include:

- basing charges on an ongoing fee rather than payment up-front so as to incentivise the service provider to monitor its use of its spectrum;
- 'use it or lose it' clauses with some 'minimum requirements and timing'. This, for example, has been discussed in Spain in view of the "zero" efforts shown by some of the parties awarded DTT multiplexes, so that a compelling content proposition is not being developed;
- making some spectrum available on a regional or geographic basis;
- allowing differences in spectrum pricing between areas of high population density (where there is spectrum congestion) and those areas where population density is lower – this will, of course, require careful definition of geographic areas covered by regional licences.

2.2 The existing Fixed Wireless Access Local Access (FWALA) scheme

In 2003, ComReg launched the FWALA scheme to provide licence spectrum in the 3.5GHz and 10.5GHz bands. The scheme was well designed and has contributed to a successful Fixed Wireless Access sector in Ireland. The design included:

- designated geographical areas where a licensee had exclusive access to a band of spectrum;
- simple application procedure;
- simple procedures and processes to ensure minimum interference;
- 7 year license term;
- low cost.

The take up of the scheme and the number of wireless customers served by the licensed service providers using the FWALA spectrum is testament to the success of the scheme. The total number of wireless subscribers represents in excess of 15% of all fixed broadband subscribers in Ireland. This is by far the highest penetration level of Fixed Wireless subscribers in Europe.

The WDC recommends that similar geographically-based schemes are an integral part of spectrum policy in Ireland, allowing for the growth of regional providers of broadband in those areas that are not attractive to all wireless providers.

As rural-based networks are coverage rather than capacity limited and technologies which use lower frequencies have greater range than technologies that use higher frequencies (all other factors being equal), consideration should be given to earmarking some lower frequency spectrum for this purpose.

3.0 Use of Digital Dividend

3.1 Allocation to non broadcasting services

Typically, non broadcast users such as Vodafone or O_2 are licensed to operate across a band of spectrum nationally. Other users of spectrum such as Digiweb, Irish Broadband and Clearwire have licensed bands of spectrum which are confined to specific geographic areas.

The *DCENR Report of the Working Group on Spectrum Policy* states that it is expected that some 25 to 30% of the spectrum currently reserved for broadcast services will be made available for non broadcast services such as broadband access, mobile broadband and mobile TV.

The WDC recognises the importance of both regional and national licences and recommends that part of the digital dividend spectrum is allocated to each.

The ITU World Radio Conference (WRC) in 2007 identified 790-862MHz for mobile services (on a co-primary basis with broadcasting) – hence there is an emerging interest around the top end of the digital dividend spectrum for mobile/broadband. The WRC decision came about following studies conducted in Europe and other regions which considered a number of factors – ability to re-tune existing equipment, likely worldwide availability of spectrum, harmonisation with US 700MHz spectrum allocations and handset design amongst other things. Taking all of those things together, the top end of the spectrum came out as preferred for mobile/broadband.

While the WDC would support the use of this spectrum in this way, we would suggest that some spectrum in the lower frequency ranges is earmarked for regional technology/service neutral schemes such as FWALA.

In addition, innovation should be encouraged through well-designed licence exempt parameters and the availability of trial licences throughout the spectrum band.

3.2 Allocation to broadcasting

Broadcasting spectrum is licensed in a different way to other services, as it is not licensed as a single national or regional band but is licensed on a per site basis. RTÉ is not allocated a band which they use nationally; instead transmitters on particular mountain tops (such as Threerock overlooking Dublin) are allocated a number of distinct channels within the band. This allocation method means that there are areas of "white space" or unused spectrum in the broadcasting bands throughout the country which if managed properly could possibly be used by other users.

White space or interleaved spectrum

One way forward is to allow users to access spectrum without a licence, subject only to certain operating conditions, for example transmission power. This is known as a spectrum commons. A further method is to establish an agreement or protocol allowing a secondary user (at user other than the spectrum owner) to transmit on a frequency when it is not being used by the owner (also known as the primary user), the primary user is able to transmit at any time in the spectrum for which it holds a licence, but secondary users may transmit in this spectrum only if it is clear that the transmission will not cause interference to the primary user. This is known as the white space method (sometimes also called interleaving or white space interleaving).

Interference is the major challenge: is there a solution?

The current owners of spectrum, who in the case of the TV bands are part of the broadcasting and programme-making and special events (PMSE) sectors, are concerned that secondary users will

introduce interference and reduce the overall quality of service that the primary user can offer. They cite the hidden node problem as a particular issue.

The hidden node is a well-recognised phenomenon in radio-spectrum planning: two or more nodes share a common channel by means of some agreed protocol, but, due to certain propagation conditions, one node is unable to sense any other node and transmits. This transmission causes interference to all other nodes in the network. In the case of the TV broadcasting spectrum, the hidden node might be a low-power transmitter that is unaware of the active broadcasting network and so begins to transmit, disrupting the TV broadcast.

There are two methods for overcoming the hidden node problem, and these are sufficient for all practical purposes:

- using a beacon signal;
- limiting the power of secondary transmissions.

A beacon signal is transmitted in tandem with the TV broadcast, typically as part of it or using a separate transmitter and the broadcast tower network. The beacon lists the frequencies upon which transmission will cause no interference to the primary user, and the secondary user may only use one of these. The secondary user is not allowed to transmit if the beacon signal is not detected.

Although there are ways of limiting the interference effect that may satisfy requirements on deployment, a comprehensive solution to the problem of interference is not trivial and will probably demand the development of novel radio technologies called cognitive radios. Cognitive radio is the term used to describe an intelligent radio which has the ability to sense its presence in time and space and, based upon past usage habits and an ability to 'learn', can offer the user the most viable communications path, measured in terms of quality of service, cost and channel preference. The benefits of a cognitive radio are numerous, but in the context of this submission a cognitive radio would incorporate the functionality required to operate as a secondary user in a spectrum-sharing application in any one of a number of channels without interfering with the primary user. Some current wireless communications devices, like WLAN and DECT phones, have a basic ability to sense the level of interference and to switch to an alternative channel, but this is insufficient to fulfil the requirements of a white space spectrum-sharing scenario.

Developments in the USA and the UK

Since 2002, the USA has been leading the enquiry into how to overcome the challenges of using white space. Although any benefits will be limited to the USA in the short term, in the longer term the outcome of this investigation will have a significant impact for Europe and possibly the rest of the world. The value of spectrum, and the social and economic benefits of its efficient use, is likely to push Europe to follow the same route as the USA. This is unlikely to happen unless certain regulatory and technical challenges are overcome. These include analogue switch off, and agreeing methods to overcome the hidden node problem (see above). If these technical challenges can be overcome and allocation of white space is allowed, the impact will be substantial, changing the way in which spectrum is assigned, services are deployed and spectrum is traded.

In the UK, Ofcom has given details of its plans for the release of spectrum in the so-called white spaces between digital TV signals after switchover. It follows the announcement in the summer on the award of cleared spectrum that will become available after analogue switch off.

A recent Ofcom consultation covers the geographical white spaces that will exist between transmitter areas. The capacity can be used for new low power services including national or local broadcasts, special events and possibly mobile TV or mobile broadband.

The first white space will be released early next year in Carlisle, Cardiff and Manchester. Later phases will offer combined spectrum, allowing national services, with the final awards being made in 2011.

Users would be able to decide themselves which technology they use and the licences would be tradable.

In addition, Ofcom are considering the use of unlicensed spectrum. In September of this year, Professor William Webb of Ofcom provided some insight into their thinking by highlighting the following points:

- the end point is a statutory instrument exempting cognitive devices;
- there is a need to set technical parameters to prevent interference;
- workshops and consultation are ongoing;
- Ofcom will work with Europe and internationally.

4.0 WDC Response to the DCENR's Proposed Principles for Spectrum Policy

This section provides the formal response to the consultation questions as detailed in the consultation paper:

1. Do you agree that the principles listed should underpin the future management of spectrum in Ireland? If you disagree, please state your reasons.
2. Are there other principles that you think should be considered? If so, please state them and your reasons for doing so.
3. In respect of each of the principles listed, are there other issues that should be considered in the context of that principle? If so, please state them.
4. Do you have any other comments that the Department should consider in the development of a national spectrum policy?

4.1 Agreement on principles themselves and other issues that should be considered in the context of the principles (consultation questions 1 and 3)

1. Spectrum management should be dynamic and responsive to stakeholders needs

The regulatory framework for spectrum should:

- *Foster competition, growth and innovation in the use of spectrum.*

- *Promote flexible, open and responsive management of spectrum.*
- *Provide clarity and certainty to stakeholders and the general public regarding spectrum usage.*
- *Take account of the national policy objectives for those sectors that are dependent on spectrum.*
- *Take account of developments in spectrum management in the international environment, such as the ITU at the global level and the European Union and CEPT at the European level.*
- *Take account of the opportunities for collaboration on a North-South basis.*

The WDC agrees that this principle should underpin spectrum management in Ireland. However it believes that an additional point should be added as follows:

- Take account of the requirements of rural and less populated regions of Ireland and should recognise that wireless access to high quality services may be the only terrestrial option available for the businesses and residences located in these areas.

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- *Regulations on access to spectrum should accord with the principles of Better Regulation.*
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  - *Where the use of spectrum is not subject to market forces or is required for the provision of security, social, cultural objectives, other mechanisms may be more appropriate.*

The WDC agrees that this principle should underpin spectrum management in Ireland, however it believes that an additional bullet point should be added as follows:

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- Consumers living or working in locations where access from alternative sources of high speed broadband is not available are catered for through the use of wireless access.

- The emergence of a range of commercial network access models based on licensed and unlicensed spectrum should be encouraged.

4. Clarity on rights and access to spectrum

In line with best practice, there should be clear rules on, inter alia:

- *The rights and obligations of spectrum users, including:*
  - *Licence duration and position regarding renewal of licence.*
  - *Rights and obligations regarding change of use of the spectrum (flexibility & neutrality).*
  - *Rights and obligations concerning interference.*
  - *Trading rights.*
- *The rights and obligations of the State, including:*
  - *Rights to charge for licenses.*
  - *Right to place conditions on the use of spectrum.*
  - *Rights to change licence conditions.*
  - *Rights to withdraw licences and recover spectrum, if necessary.*
  - *Obligations concerning monitoring and enforcement of spectrum use.*
  - *Rights to lay down trading rules and to limit over-concentration of spectrum.*
- *Procedures for how to apply for spectrum for new and innovative services.*
- *How access to the spectrum is determined (first-come, first-served, auction etc).*

Safeguards should also be provided against the over-concentration of spectrum in the hands of established operators that would prevent new entrants from acquiring spectrum.

The WDC agrees that this principle should underpin spectrum management in Ireland, however it believes that additional bullet points should be added as follows:

- 'Use it or lose it' clauses – safeguards.
- Base charges on an ongoing fee rather than payment up-front so as to incentivise the service provider to monitor its use of its spectrum.

In addition, the WDC recommend that the rights and obligations of spectrum users would be extended to include:

- Rights and obligations regarding geographical coverage.

5. Promoting research and innovation

Access to spectrum is an essential prerequisite for research and innovation in wireless technologies. Spectrum policy should promote competitiveness, encourage research and innovation and facilitate international unique experimentation in Ireland. For example, the test-and-trial regime for new wireless technologies and services should continue to be developed so as to maintain responsiveness to the industry's R&D requirements and the development of services for end users.

The WDC agrees that this principle should underpin spectrum management in Ireland

6. Technology & service neutrality

Taking account of national policy objectives and provided that the associated electronic communications network complies with the relevant technical obligations related to spectrum:

- *Technology and service neutrality should be promoted, where relevant.*
- *The bands in which the principle of technology and service neutrality will or will not be applicable should be specified.*
- *Any limitations on applying the principle of technology and service neutrality in any given band should be specified.*

The WDC agrees that this principle should underpin spectrum management in Ireland.

7. Efficient use of spectrum

In assessing the efficient use of spectrum the focus should not be on economic factors alone. Social and policy objectives also need to be considered.

- *The parameters used to assess efficiency should be appropriate for the use/sector involved as well as the current state of technology development for that use/sector.*
- *A balance should be struck between efficient use, flexibility/technology neutrality and promoting innovative development.*
- *There is a need to balance the benefits of flexibility of use with benefits of harmonised use taking account of meeting the public good and international obligations.*
- *Spectrum pricing should be used to promote the efficient use of spectrum for commercial purposes, where it is congested.*

The WDC agrees that this principle should underpin spectrum management in Ireland, however it believes that the third bullet point should be expanded to explicitly define public good as including digital inclusion.

8. Spectrum pricing should deliver a fair return to the State

The spectrum is a finite natural resource that enables the provision of essential services for both public service and commercial purposes. The price of spectrum to the user should reflect its economic value to that user. Spectrum pricing is made up of two components – the cost of administering/managing the spectrum and the cost of leasing the spectrum.

- *All users should contribute to the cost of administering/managing the spectrum.*
- *The State should get a fair return for the use of this natural resource for commercial purposes.*

The WDC does not necessarily agree that this principle, in its present form, should underpin spectrum management in Ireland.

The price of spectrum needs to reflect both the economic value to the service provider, and the downstream economic value to the regions served by the wireless services.

The WDC believes that spectrum policy needs to explicitly recognise that a fair return for the use of this natural resource for commercial purposes is not measured by licence charges only and that the measurement of return needs to take account of, inter alia:

- indirect returns such as the impact on the environment;
- spectrum congestion;
- digital inclusion.

9. Monitoring and enforcement

Liberalising the way spectrum is managed and used increases the potential for interference to arise.

- *The approach to monitoring and enforcement should be regularly reviewed so as to be able to respond to any interference issues that may arise within a liberalised spectrum management environment.*

The WDC agrees that this principle should underpin spectrum management in Ireland.

4.2 Are there other principles that you think should be considered? (consultation question 2)

The WDC believes that the principle of promoting access for all citizens in the state to high quality broadband should be considered through:

- Obligations in national licences.
- The provision of geographically limited licences in a model similar to the present successful FWALA scheme.
- Continuing to encourage the use of licence exempt spectrum and expanding the licence exempt regime to include the use of white space or interleaved broadcast UHF spectrum. A simple regime detailing minimum specifications which must be met could be considered.

The WDC's reasons for proposing considering this principle are:

- For many of these areas, wireless access may be the only option for businesses and residents to receive high quality broadband services. Fixed technologies such as cable, VDSL and FTTx will not be available in the foreseeable future, and while wireless technologies cannot match the quality and specification of many fixed technologies today, there are wireless technologies which will offer a reasonable quality of service provided enough bandwith at the correct frequencies is made available.
- To reduce the gap between quality of service in urban and rural areas (the so called digital spatial divide) and foster digital inclusion.

4.3 Other comments that the Department should consider in the development of a national spectrum policy (consultation question 4)

Comments outlined in Sections 2, 3 and 4 of this response

As stated at the outset, the WDC welcomes this opportunity to present its views on spectrum policy which we consider to be fundamental to the knowledge society to which Ireland aspires, and which is strongly based on telecommunication and information technologies. We hope that are concerns are clear and our suggestions constructive.

If there are any queries in relation to the points raised in this submission, we would be happy to discuss it further. Please contact

Dr Patricia O'Hara
Policy Manager
Western Development Commission
Dillon House
Ballaghaderreen
Co Roscommon
Tel: 094 986 1441
e-mail: patohara@wdc.ie

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For more information, contact:
Chair, Regulatory Working Group
rwg-chair@wimaxforum.org

To: Ms. Sinead Devey
Commission for Communications Regulation
Irish Life Centre
Abbey Street
Freepost
Dublin 1
Ireland

E-Mail: marketframeworkconsult@comreg.ie

Reference: Submission re ComReg 10/38

Call for input on potential uses and future licensing options of the 2.6 GHz spectrum band.

WiMAX Forum® Response

The WiMAX Forum®[1] welcomes the opportunity to provide its views and comments concerning the public consultation document identified above.

The WiMAX Forum is an industry-led, not-for-profit organisation formed to certify and promote the compatibility and interoperability of broadband wireless products based upon the harmonized IEEE 802.16/ETSI HiperMAN standard. A WiMAX Forum goal is to accelerate the introduction of these systems into the marketplace. WiMAX Forum Certified™ products are interoperable and support broadband fixed, portable and mobile services. Along these lines, the WiMAX Forum works closely with service providers and regulators to ensure that WiMAX Forum Certified systems meet customer and government requirements. For more information about the WiMAX Forum and its activities, please visit www.WiMAXForum.org.

In Annex 1, the WiMAX Forum is pleased to submit comments on the consultation document identified above.

Yours Sincerely

Jayne Stancavage
WiMAX Forum
Chair - Regulatory Working Group

[1] "WiMAX," "Mobile WiMAX," "Fixed WiMAX," "WiMAX Forum," the WiMAX Forum logo, "WiMAX Forum Certified," and the WiMAX Forum Certified logo are trademarks of the WiMAX Forum.

Annex 1

The Commission welcomes written views on the potential uses and future licensing options of the 2.6GHz band:

The WiMAX Forum is an industry-led, not-for-profit organisation formed to certify and promote the compatibility and interoperability of broadband wireless products based upon the harmonized IEEE 802.16/ETSI HiperMAN standard. A WiMAX Forum goal is to accelerate the introduction of these systems into the marketplace. WiMAX Forum Certified™ products are interoperable and support broadband fixed, portable and mobile services.

The WiMAX Forum supports the award of the 2500 – 2690 MHz spectrum for broadband mobile communications at the earliest opportunity. The WiMAX Forum considers this range of frequencies as one of the key global bands for mobile WiMAX technology. Mobile WiMAX products for this band are commercially available[2] on the market today.

The WiMAX Forum fully supports the technology and service neutrality concepts at the core of the European Commission Decision 2008/477/EC stemming from the European WAPECS approach.

The WiMAX Forum recognises the least restrictive technical licence conditions (Block Edge Mask) detailed in the Annex of the Decision but fully supports operator cooperation as the best way to maximize the efficient utilization of the spectrum. This is recognized in the EC Decision as a good basis for managing inter-operator interference challenges and the Block Edge Mask is identified as an applicable measure only in the absence of bilateral or multilateral agreements between neighbouring networks.

To support current commercialisation of the band, the WiMAX Forum has defined equipment certification profiles for TDD Mobile WiMAX equipment based on the IEEE 802.16-2009 standard for the entire 2500-2690MHz frequency range using 5MHz and 10MHz channel widths. Equipment aligned with this profile is included in the IMT air interface family as OFDMA-TDD-WMAN identified in ITU-R Recommendation M.1457.

The first 2.6GHz Mobile WiMAX products achieved WiMAX Forum Certification in April 2008 and currently over 184 have now been certified against the 2.6GHz band profile and are being deployed in commercial networks on a worldwide basis today.

The WiMAX Forum estimates that by 2011 there will be more than 1000 Mobile WiMAX Certified™ commercially available products. The WiMAX Forum currently has a network of six certification labs in China, Korea, Spain, U.S. and two in Taiwan with the possibility of further capacity in Malaysia.

Mobile WiMAX devices and networks will support a full range of mobile broadband services. The WiMAX Forum fosters an open IP based network architecture that makes it simple to create a multi-service environment. WiMAX Forum profiles based on the IEEE 802.16-2009 standard support mobile, nomadic and fixed services. WiMAX Forum network specifications also support interworking with IMS core systems thus enabling a multi-service environment encompassing today's 3G services. WiMAX 802.16-2009 also supports QoS based on multiple service types thus allowing the provisioning of multiple types of services to different users based on defined metrics.

[2] http://www.wimaxforum.org/certification/certified-product-showcase

For the European market, ETSI has a published Harmonised Standard EN302 544 for Broadband Data Transmitting Systems in the 2.6GHz band. Mobile WiMAX devices meet this standard in order to comply with the RTTE Directive and therefore be ready for the European market.

The WiMAX Forum has noted the interest in Ireland in licensing the 2300-2400MHz band for mobile broadband applications and this is also an important band for WiMAX technology. It is anticipated that most products would be able to support both of these frequency bands and the WiMAX Forum has already announced the first WiMAX Certified MIMO 2.3GHz mobile products.

The WiMAX Forum continues to advocate the licensing of suitable spectrum for mobile broadband applications at the earliest opportunity in order to meet the governmental and policy objectives behind broadband provision. The WiMAX Forum has contributed previously to ComReg activities[3],[4] relating to the potential licensing of the 2300-2400MHz band and the WiMAX Forum understands that this band could be available for licensing on a much shorter timeframe compared to the 2500MHz band. Therefore the WiMAX Forum maintains the view that ComReg should continue to expeditiously address the 2300-2400MHz band whilst developing the process to release the 2.6GHz band in order to support the demand for mobile broadband services which has been expanding at an ever increasing rate in recent times[5].

[3] WiMAX Forum Submission re: ComReg 09/499: Release of Spectrum in the 2300 – 2400 MHz band; July 2009

[4] 2300MHz band briefing session: http://www.comreg.ie/_fileupload/publications/ComReg1030.pdf

[5] ComReg Media Release PR 24110 Submission re ComReg 09/499: "ComReg report shows strong support for NGB in Ireland".