Commission for
Communications Regulation

Submissions to Consultation

Review of the Period 2008 – 2010 & Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013.

Submissions received from respondents

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Contents

1 Aviat Networks

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Reference: Submission re ComReg 11/28

Dear Sirs,

Aviat Networks welcomes the opportunity to be able to contribute to the spectrum consultation process initiated by ComReg.

The consultation paper "Review of the Period 2008 – 2010 & Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013" covers a very wide range of subject areas and by itself provides an interesting insight into ComReg's vision for the future. However, this response from Aviat Network will only focus on the small number of points raised by the consultation paper that are of prime interest to Aviat Networks current business direction.

Aviat Networks believes that the demand for more and more high bandwidth services from consumers and business, especially those expected to be available on smartphone and tablet devices, is driving an ever increasing demand for more spectrum. However whilst access spectrum appears to be the headline grabbing aspect of this, it is important to remember the increased traffic to the end user requires greater capacity for backhaul and thus suitable spectrum for these parts of the networks. With this in mind Aviat Networks notes with pleasure that ComReg has identified potential new spectrum for microwave point to point links.

Section 3.4 Spectrum Opportunities.

Aviat Networks wishes to express its support for the opening of the fixed point to point bands at 26GHz, 28GHz and 31GHz.

Section 6.3.2 Proposed ComReg Strategy for Terrestrial Fixed Services

*Given the benefits identified from the use of Adaptive Coding & Modulation (ACM) in terrestrial Fixed Links, ComReg is proposing to make the deployment of ACM mandatory for all **new** fixed link applications across all fixed link frequency bands from 01 June 2012.*

Aviat Networks supports the use of Adaptive Coding & Modulation (ACM) as a technique to enable links to operate at their maximum capacity at all times, but with the ability to reduce capacity during fade conditions in order to maintain link operation and increase link availability. Maintaining link availability is critical when the link is carrying important traffic such as emergency services traffic etc.

However, ACM is not suitable for use on all links, e.g. TDM (native E1) links. Many operators have concerns over prioritization of E1's and as a consequence have been very reluctant to implement ACM on such links.

In summary, Aviat Networks believes that ComReg should strongly encourage the use of ACM, but leave the final decision on implementation to the individual operator based upon their own operational requirements and considerations.

*With a view to encouraging spectrum efficiency in congested frequency bands, ComReg is proposing to make dual polarisation mandatory for all **new** fixed link applications, where more than one link is required on the same path in the same frequency band, from 1 June 2012.*

Aviat Networks agrees that dual polarisation is a useful tool in cases of path and spectrum congestion, but notes that different polarizations can perform differently in terms of fading etc.

Furthermore cost considerations also need to be considered as we believe that maintaining a low cost base makes the use of microwave attractive to all parties and that by mandating XPIC on every link adds to the overall cost of those link.

In summary, Aviat Networks believes that ComReg should strongly encourage the use of dual polarization (XPIC), but again leave the final decision to the individual operator based upon their own operational requirements and considerations.

ComReg is now seeking views on the following issues related to the potential opening of new Fixed Link bands:

- *equipment availability for different bands as this may determine the demand profile for each band;*

Aviat Networks current products can support the 27.5-29.5GHz and 31.8 – 33.4 GHz bands.

Whilst in general we welcome the opening up of new bands, care needs to taken to create a critical mass of user demand for these new bands so that equipment vendors may have a viable market for which to invest R&D resource. In this respect, opening of bands in Ireland that are already or about to be opened in other countries, whether CEPT region or globally, is the way forward, together with the adoption of ITU-R and ERC recommended band plans.

- *is the maximum capacity as determined by the limit of 28 MHz bandwidths in some bands a limiting factor?;*

- *in bands that do not have greater than 28 MHz bandwidth – should ComReg permit channel aggregation?;*

Aviat Networks supports the allowance of channel aggregation where bandwidth allows this happen. Channel aggregation is a useful tool where capacity demands are constantly high.

- *which bands are best suited for the provision of particular applications? For example, Closed Circuit Television (CCTV) services for which ComReg has received some interest in the use of the 50 GHz band.*

Aviat Networks believes service neutrally from a regulatory perspective will help operators select the most appropriate frequency band for their application.

Yours faithfully

Ian Marshall
Regulatory Manager
Aviat Networks

2 BT Communications Ireland Ltd

BT Communications Ireland Ltd ("BT") response to ComReg Consultation Paper entitled:

Review of the Period 2008 – 2010 & Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013. ComReg Document number 11/28.

Issue 1 - 24th May 2011

Introduction

As an active communications provider in Ireland and a user of spectrum we welcome the opportunity to comment on the review and strategy for managing spectrum. For clarity we will limit our comments to a small number of key issues and to certain aspects of the spectrum strategy related to future access.

1. **Allocation of Spectrum and Auctions** – We can appreciate ComReg's view that allocations of spectrum based simply on price are attractive and offer a level of simplicity and transparency and we generally support this process. However, one concern we have is that the auction rules should ensure that key valuable spectrum is not offered to a single provider, but is split into packages so that multiple parties can enter the market. I.e. no one provider should be able to buy the entirety of spectrum auctioned.

   Our concern is that a player could entrench existing dominance and damage the competitive environment.

2. **Administrative Incentive Pricing (AIP) –** We fully agree the efficient use of spectrum should be encouraged and consider AIP should be used to address the potential problem of 'hoarding'. We consider spectrum hoarding to be very inefficient and this proposal will create a disincentive for such.

3. **Freeing up Spectrum –** To encourage investment in Ireland and for the benefit of competition and the economy we consider ComReg should now actively be seeking to free up as much spectrum as possible at the earliest opportunity for re-allocation in both a

technology and service neutral way. Where harmonised approaches to certain bands exist across Europe these should be considered, however the aim should be to use spectrum to stimulate investment and the economy during these difficult times.

4. **Future Broadband Access Spectrum** – As the industry faces the challenge of implementing high speed broadband services ComReg's management of access spectrum is critical to the future of Broadband in Ireland. For example mobile fourth generation Long Term Evolution (LTE) equipment is now on the horizon for high speed mobile access and there are a variety of other higher bands becoming suitable for fixed wireless access as technology is evolving.

   We consider it vital ComReg manage this area actively and transparently so as to ensure access competition can thrive in Ireland. Our concern is to ensure dominant players do not entrench their dominance leading to anti-competitive practices undermining the opening of the market. We would have concerns about the operation of 'beauty' contests in this area whilst re-iterating our concerns above that spectrum should be offered in packages to enable multiple players to successfully gain spectrum in any auction.

5. **Band specific responses** – we note specific reference to many different frequency bands, both currently in use and potential new bands. However there are two notable absences from the document, namely 37.5 – 39.5 GHz ("38 GHz") which we understand to be currently available, and 40.5 – 43.5 GHz ("40 GHz"), which we understand to be a potential new band. The absence of the latter is particularly surprising, considering that it could offer greater market interest than the other potential new bands which have been specifically identified (Table 5 of the consultation) around and above 50 GHz. We also note recent auctions in UK which have demonstrated demand for licences in bands up to and including the 40GHz band. We believe that ComReg should expedite the offering of licences in all of these bands, and those licences should be issued on a service and technology neutral basis.

   Furthermore, we appreciate the opportunity to request flexible use of bands such as the 26GHz band part of which has been designated for point to point only licensing. The national licences were issued as either point to point (PTP) or point to multipoint (PMP). Since these were issued as national licences, we believe that there's no technical justification for retaining such constraints on this band, since the licence holder should be able to co-ordinate their own links, irrespective of whether they are PTP or PMP. We therefore urge ComReg to consider amending existing national licences of PTP & PMP blocks in the 26GHz band, to remove this distinction between topologies, such that licence holders should be permitted to use their allocations for either use. Such an amendment would also accord with the principle of service and technology neutrality, which is being widely encouraged by the European Union and CEPT regulations, and in particular with the *General Regulatory Principles* of the draft "Decision of the European Parliament and of the Council establishing the first Radio Spectrum Policy Programme".

End

3 DigitalEurope

DIGITALEUROPE

Brussels, 23 May 2011

DIGITALEUROPE Response to the ComReg's Public Consultation on the Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013.

DIGITALEUROPE is pleased to have the opportunity to respond to ComReg's consultation on the proposed strategy for managing radio spectrum 2011-2013. ComReg requested industry views on potential spectrum opportunities detailed in Table 3 of the consultation. DIGITALEUROPE is pleased to provide its views hereafter:

Potential Spectrum Opportunities (ComReg's consultation Table 3)	**DIGITALEUROPE views**
800 MHz Digital Dividend	Making the Digital Dividend (800 MHz band) available for wireless broadband is key for providing broadband access to rural areas which have limited broadband access today. It is essential that co-existence between TV and mobile broadband services operating in the so called UHF band is achieved in a practical, cost efficient and cooperative manner. See DIGITALEUROPE views on the Radio Spectrum Policy Programme (http://www.digitaleurope.org/fileadmin/user_upload/document/20101119_DIGITALEURO_1290434585.pdf)
880 – 892.8 MHz paired with 925 – 937.8 MHz	DIGITALEUROPE supports the timely availability of the 900 MHz band for mobile broadband services. The very large market penetration of 900 MHz mobile broadband terminals means that most users would benefit immediately from deployment of networks in this band. See DIGITALEUROPE views on Mobile Broadband (http://www.digitaleurope.org/fileadmin/user_upload/document/DIGITALEUROPE_Views__1301479440.pdf)

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1452 – 1492 MHz (L-band)	Downlink multimedia services are developing with the growth of consumption of interactive multimedia service combined with the trend towards mobility. The L-band offers the combination of significant capacity (40MHz) and adequate propagation properties in order to support value added services related to the delivery of downlink multimedia services. DIGITALEUROPE supports the adoption by the ECC of a harmonised technology neutral band plan for the band 1452-1492 MHz for the delivery of broadcast & downlink multimedia services with the required quality of service in line with the Maastricht agreement (MA02revCO07). See DIGITALEUROPE response to ECC consultation on L-band (http://www.digitaleurope.org/index.php?id=1081&id_article=528)
2300 – 2400 MHz	The 2.3 GHz band (2300 – 2400 MHz) has been identified in the ITU for IMT applications and would provide a considerable resource to support mobile broadband data services especially in traffic hot-spots. DIGITALEUROPE supports the timely availability of the 2.3 GHz band for mobile broadband. See DIGITALEUROPE views on Mobile Broadband (http://www.digitaleurope.org/fileadmin/user_upload/document/DIGITALEUROPE_Views__1301479440.pdf)
2500 – 2690 MHz	Continuous growth and impact of wireless mobile broadband on GDP strongly depends on the timely availability of sufficient radio spectrum to accommodate the huge mobile broadband traffic growth in metro areas and to satisfy end-users' demand for an excellent communication experience in terms of QoS. DIGITALEUROPE supports the timely availability of the 2.6 GHz band for mobile broadband. See DIGITALEUROPE views on Mobile Broadband (http://www.digitaleurope.org/fileadmin/user_upload/document/DIGITALEUROPE_Views__1301479440.pdf)

ABOUT DIGITALEUROPE

DIGITALEUROPE is the voice of the European digital economy including information and communication technologies and consumer electronics. DIGITALEUROPE is dedicated to improving the business environment for the European digital technology industry and to promoting our sector's contribution to economic growth and social progress in the European Union.

DIGITALEUROPE ensures industry participation in the development and implementation of EU policies. DIGITALEUROPE's members include 61 global corporations and 37 national trade associations from across Europe. In total, 10,000 companies employing two million citizens and generating €1 trillion in revenues. Our website provides further information on our recent news and activities: http://www.digitaleurope.org

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4 Digiweb

1- *ComReg welcomes all feedback on the Test and Trial Ireland licensing programme (p16).*

Digiweb Response: We fully support the concept of the "Test & Trial" Ireland licensing programme. Digiweb feels the framework of the programme is properly set and well performing. We would suggest ComReg to interact with other government bodies in order to make the "Test & Trial" even easier to access. As an example, Enterprise Ireland delivers various R&D funds for small and medium companies. The prospect of "bundling" the Test & Trial program with an R&D fund coud boost its potential, and may open the scheme to a larger base of start-ups.

2- *ComReg would welcome views and empirical evidence on these issues and notes that the following points would also need to be considered when discussing the notion of indefinite licences (p25).*

Digiweb Response: It is understood that licence duration may have to be introduced in certain situations. However, ComReg should have a clear idea on the pay back time involved when setting up the duration, depending on whether the operator will upgrade or build a completely new network. Apart from the spectrum "sweet spot" <1GHz, it is not absolutely clear that a licence duration should be set outside of the occasional need of ComReg to re-farm the band.

3- *ComReg welcomes feedback on the spectrum management issues raised in this section (p28).*

Digiweb Response: Firstly, Digiweb strongly supports the organisation of a combinatorial auction for the assignment of spectrum as long as more than one party expressed interest for the band. There may be some cases where limited interest in a "niche" spectrum market should convince ComReg to carry on with direct licensing, as long as sufficient time has been given to other parties to raise an interest for the band.

Digiweb noted the availability of spectrum in the band 1.9 / 2 GHz (Table 3: Potential Spectrum Opportunities). We would advise Comreg to facilitate the expression of interest for the band, by displaying more clearly the spectrum opportunity on its website.

We fully support the establishment of spectrum trading, which would be monitored by ComReg in order to ensure competition is maintained in the market place. Digiweb believe that this mechanism should unlock the competitive landscape in many cases.

Digiweb strongly encourage the creation of a spectrum cap. ComReg would rightly observe that the market place is composed of a variety of different strategic groups, some being large multinationals, some other being medium indigenous companies. We believe it is important to introduce spectrum caps so that some leeway can be given to small and medium organisations to innovate and grow. The question is important as such a policy could foster the development of true competition as opposition to the market stagnation inherent to oligopolistic situations.

4- *ComReg is seeking expressions of interest (See Table 3) in the future use of the 2010 – 2025 MHz band (p41).*

Digiweb Response: The strong potential offered by the upcoming TDD LTE technology standard should considerably increase the appeal of the 2010-2025 MHz to leading players in the market. The release of the spectrum should be considered alongside the introduction of a spectrum cap. Digiweb would personally be strongly interested by the band, based on the new TDD LTE developments.

5- *ComReg invites feedback on the two proposals above (p47).*

Digiweb Response: We would propose to apply that decision more gradually in order to allow an operator to re-use non-fully depreciated microwave kit when possible. The ACM and polarization requirements could be introduced from the 1st of June 2012 for congested areas only. That policy could be then extended to the full territory from the 1st of June 2013. Digiweb believe this proposal would suit all parties interest and roadmap.

6- *ComReg is now seeking views on the following issues related to the potential opening of new Fixed Link bands (p48):*

a. *equipment availability for different bands as this may determine the demand profile for each band;*

Digiweb Response: ComReg should leave maximum flexibility and release all European and International harmonised bands mentioned. The demand profile evolves very rapidly, so we would recommend full availability of the spectrum.

b. *is the maximum capacity as determined by the limit of 28 MHz bandwidths in some bands a limiting factor?;*

Digiweb Response: Yes, ComReg could possibly offer sub-sections of 7 / 14 MHz which could be aggregated when required, leaving maximum leeway to the operator?

c. *in bands that do not have greater than 28 MHz bandwidth – should ComReg permit channel aggregation?;*

Digiweb Response: See above.

d. *which bands are best suited for the provision of particular applications? For example, Closed Circuit Television (CCTV) services for which ComReg has received some interest in the use of the 50 GHz band*

Digiweb Response: No comment.

FWALA Scheme situation

Digiweb Comment: ComReg should appreciate the ongoing entrepreneurship displayed by many indigenous companies operating under the FWALA scheme, and amend its policy actions so that such a spirit can be fostered. The ending of the FWALA 3.5 GHz scheme undermine the work of many operators, and causes some fundamental uncertainty on their ability to continue to invest or indeed stay in business. Operators such as Digiweb, Imag!ne or PermaNET to name a few have displayed a strong innovative attitude and should be supported. While few players have exited the market, there remain several players who remain committed to design new solutions based on the band available.

[Redacted]

The scope for increasing service to end users and increasing the reach of networks is greatly dependant on suitable frequency being available and certainty around the duration of any license to facilitate a proper return on investment. The investment involved will not be recovered if ComReg were to cease the FWALA scheme on the 10.5 GHz band, just as it did on the 3.5 GHz spectrum. We would therefore strongly recommend ComReg to discuss with the FWALA operators on the best way to ensure their business viability while also meeting the Regulator's aim to re-farm the band.

7- *ComReg is seeking expressions of interest in making this new spectrum available at this time (p55)*

Digiweb Response: A multitude of technological options are now being offered in the band 3.4 GHz / 3.6 GHz, starting by WiMax and LTE. It is also strongly recommended to release spectrum in the band, as Irish operators could make the most of a fully harmonised band, benefiting from the manufacturer's economy of scale and of the "standards war" which has considerably upped the performance proposed to the end-customer.

8- *ComReg is also prepared to consider the use of existing guard bands in the 3.6 GHz band for additional bandwidth limited licences at the same time – if sufficient and justified demand is expressed by interested parties (p55).*

Digiweb Response: See above. ComReg can confidently release the maximum spectrum possible in the band 3.4 / 3.6 GHz as all the conditions are met so that competition can thrive on this platform.

9- *ComReg invites feedback on the spectrum efficiency measures detailed in this section (p83).*

Digiweb Response: The Administrative Incentive Pricing (AIP) should be designed not only to dispose of licence holder not effectively using their asset, but also incentivizing operators to take risk in non harmonized spectrum. Therefore, ComReg could consider the incentive system the other way, but using its pricing strategy to attract new entrants in spectrum band offering less favourable business case.

As for the second digital dividend, we strongly advise ComReg to auction the spectrum once the band is fully harmonized. There would be no benefit to proceed to an early release without full harmonization.

5 Eircom / Meteor

eircom Group

Response to ComReg Consultation Paper
Review of the Period 2008-2010 & Proposed Strategy for Managing the Radio Spectrum 2011-2013

ComReg Document 11/28

24 May 2011

DOCUMENT CONTROL

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Accordingly, you are requested to contact a member of eircom Group's Regulatory Operations where there is a request by any party to have access to records which may contain any of the information herein, and not to furnish any information before eircom/meteor has had an opportunity to consider the matter.

The comments submitted to this consultation are those of Meteor Mobile Communications Ltd. and eircom Ltd, collectively referred to as 'eircom Group'.

Executive Summary

eircom Group welcomes the opportunity to comment on ComReg's proposed strategy for managing the radio spectrum.

eircom Group believes that ComReg's proposed activities must be grounded with reference to the achievement of overall strategic objectives as articulated by DCENR in its recent Spectrum Policy Statement. In particular "*The provision of spectrum to facilitate the development of innovative services and applications and to provide access to broadband in remote areas of the country is central to government policy in this regard.*"

In our submission to ComReg 10/105 eircom Group called for reform of spectrum rights in addition to technology and service neutrality. We requested ComReg to establish truly liberalised flexible spectrum rights including rights with indefinite duration (or at the very least with rights to licence renewal), spectrum trading, spectrum sharing and spectrum pooling. In our view such rights must be established in advance of issuing any new licences to maximise the societal and economic potential of the spectrum.

We are disappointed to note that ComReg has not identified any specific activities for the duration of the proposed plan related to establishing more flexible spectrum rights, including the advancement of a proportionate policy framework for:

- Spectrum transfer and leasing
- Spectrum sharing and pooling
- Indefinite licence durations (or at the very least clearly articulated renewal rights)

eircom Group is also concerned that ComReg appears to consider that such reforms should not apply to harmonised spectrum bands. ComReg's position is at odds with the direction of European spectrum policy. We request ComReg to immediately commence a work programme, involving all stakeholders, to advance policy development and to implement these additional reforms. In the absence of such flexible spectrum rights the societal objective of higher speed broadband services for all will not be achievable without significant State intervention.

A holistic approach is required to achieve strategic objectives for the provision of wireless electronic communications services. Interested parties require clarification as to the rights to be attached, timing of release and availability of all harmonised bands in advance of any award process in respect of the 800, 900, and 1800MHz bands. As highlighted below we request ComReg to:

- Rapidly conclude its review of the future use of the 2.6GHz band
- Clarify its position in respect of 2.3GHz band availability
- Undertake a comprehensive review to establish policy in respect of the timing of release of spectrum in the 3.5GHz to 3.6GHz range following closure of the FWALA / BWALA schemes.
- Clarify its position on the future licensing of spectrum currently deployed for WDMDS following expiry of the current licences in 2015.

Response to Consultation

eircom Group welcomes the opportunity to comment on ComReg's proposed strategy for managing the radio spectrum. The consultation paper provides an overview of recent activities and ComReg's proposed activities within a two to three year time horizon in respect of specific frequency bands. Brief reference is also made to activities that may be relevant beyond the near term period of focus. The paper offers some insight to ComReg's thinking on broader policy issues. As such the paper is a useful input for stakeholders to inform their own plans and activities and provides a good starting point to advance establishment of a strategy for spectrum management.

1 A strategic perspective is required

We also welcome the recent publication of the Department for Communications Energy and Natural Resource (DCENR) Spectrum Policy Statement (SPS) dated September 2010 which requires ComReg to manage the national radio spectrum resource in accordance with the specified policy objectives and principles. ComReg states[1] it has given due consideration to the Spectrum policy Statement. However it is not at all clear how ComReg expects its proposed activities over the next two to three years to link with and support the achievement of DCENR's national spectrum strategy objectives and principles.

We believe ComReg's proposed strategy document could be greatly enhanced by grounding the proposed activities with reference to the achievement of overall strategic objectives. Such objectives may be longer term in nature than the two to three year horizon currently considered however it is important for the economic prospects of Ireland to ensure that near term activities are aligned to the attainment of strategic goals. Strategic objectives may differ by sector. In the case of mobile and wireless broadband services DCENR has established a clear objective in its SPS.

"The management and regulation of the radio spectrum will support and promote the development and operation of efficient, effective and innovative communications technologies and services to deliver economic, social and cultural benefits for Ireland and shall take account of national policy objectives for those sectors that are dependent on spectrum. The provision of spectrum to facilitate the development of innovative services and applications and to provide access to broadband in remote areas of the country is central to government policy in this regard." [emphasis added]

The proposed strategy for managing the radio spectrum is silent on how this objective is to be achieved. This is a significant concern given the challenging targets for the provision of broadband for all that are being considered by the European Parliament, Council, and Commission. As eircom Group highlighted in our response to ComReg 10/105 the consideration of licensing individual bands must take place within the wider and holistic consideration of how best to use the national spectrum resource in the national interest[2]. In our view the current spectrum regulatory framework remains insufficiently flexible, even with service and technology neutrality, to facilitate the achievement of broadband for all objectives.

[1] Section 3.1, ComReg 11/28
[2] See in particular section 2 of eircom Group's response to ComReg 10/105

It is eircom Group's view, as expressed in our response to ComReg 10/105, "*that it is essential that ComReg in the context of its consideration of the licensing of 800 MHz spectrum assesses its very significant potential to address issues of broadband access in rural areas and the best manner in which broadband coverage could be achieved in the context of licensing and the liberalisation of spectrum rights.*

Liberalisation measures, in addition to technology and service neutrality, include flexibile rights to facilitate spectrum pooling & sharing, spectrum trading and the establishment of indefinite licence duration or at the very least a proportionate framework for licence renewal. We discuss these issues in more detail in section 2 below.

We reiterate our request[3] for "*ComReg to engage in wider consultation involving the Minister in charge of communications, the Government, all communications services and network operators, as well as rural communities before proceeding further.*"

2 Reform of the national spectrum regulatory framework must be progressed

In our submission to ComReg 10/105 eircom Group called for reform of spectrum rights in addition to technology and service neutrality. We requested ComReg to establish truly liberalised flexible spectrum rights including rights with indefinite duration (or at the very least with rights to licence renewal), spectrum trading, spectrum sharing and spectrum pooling. In our view such rights must be established in advance of issuing any new licences to maximise the societal and economic potential of the spectrum.

It is our strong view that such reform particularly in respect of spectrum sharing and pooling is essential to facilitate the development of innovative services and applications and to provide access to broadband in remote areas of the country.

2.1 Spectrum sharing and pooling

We note and agree with ComReg's view[4] that "*A "market-based" approach to spectrum management, where appropriate, should lead to more efficient spectrum usage, particularly when combined with the introduction of initiatives at policy level such as spectrum sharing, infrastructure/network sharing and spectrum trading.*"

ComReg considers "*An evolutionary approach to spectrum management would seem the most prudent strategy over the next two years*." We note that ComReg has not identified any specific activities for the duration of the proposed plan related to establishing more flexible spectrum rights, including the advancement of a policy framework for spectrum sharing and pooling.

As highlighted in our response to ComReg 10/105 we believe this debate should be commenced in the near term with all stakeholders, otherwise the societal objective of higher speed broadband services for all will not be achievable without significant State intervention.

[3] Per eircom Group's response to ComReg 10/105
[4] Section 5.1.4, ComReg 11/28

We consider the policy framework to support spectrum pooling and sharing to be a component of spectrum transfer and leasing (collectively referred to as spectrum trading) and as such we request ComReg to immediately commence a work programme to advance policy development in this respect.

2.2 Spectrum trading and indefinite licence duration

In section 4 of ComReg 11/28, ComReg sets out its position in respect of the transfer or lease of individual usage rights, and indefinite licence duration. We note ComReg's view[5] that licence term is independent of the tradability of spectrum rights of use. This is correct. eircom Group believes that each measure will, independently, enhance the efficient and effective use of spectrum. The overall efficiency gains are increased when both measures are deployed.

2.2.1 Spectrum transfer or lease (referred to as spectrum trading)

In respect of the transfer or lease of spectrum rights ComReg notes that in a secondary trading environment controls may be required to mitigate the risk of reductions in competition arising from such trading. We agree that consideration of such mechanisms is appropriate. National legislation to be introduced on 25th May amending the Common Regulatory Framework clearly allows this to be taken forward.

It is however deeply concerning that ComReg believes[6] "*Trading may more likely have a more important role in relation to changing the uses of non-harmonised bands*" and "*for spectrum bands that are harmonised at an EU level, ComReg considers that periodic release of such spectrum in line with the expected cycle of technology and investment is compatible with the aims of the Common Regulatory Framework. In this regard, ComReg notes that periodic re-release of spectrum rights ensures that no entrenched positions develop that may be allowed to sustain themselves indefinitely, and which would be imperious to normal market pressures.*"

ComReg's position gives rise to a number of concerns:

- **ComReg's thinking appears to be out of line with the direction of European policy**

Europe's proposed first Radio Spectrum Policy Programme (RSPP) is currently going through the European Parliamentary proposal and passed the first reading stage on 11th May with an overwhelming majority. The objectives of the RSPP[7] are very much in line with the National policy objective as expressed in DCENR's SPS. The thrust of the RSPP is to promote flexible use of spectrum to support the delivery of wireless broadband communications whilst taking necessary measures to prevent significant harm to competition from the over accumulation of spectrum rights by one or more economic operators. Specifically the RSPP prioritises the

[5] Section 4.2.2, ComReg 11/28
[6] Page 24, ComReg 11/28
[7] RSPP Draft Recital 4 "This first programme should in particular support the Europe 2020 Strategy for smart, sustainable and inclusive growth given the huge potential of wireless services to promote an information-based economy, develop and assist sectors relying on information and communications technologies and overcome the digital divide."

implementation of trading rights in harmonised spectrum bands including 800MHz, 900MHz, and 1800MHz[8].

ComReg states[9] that it has "*considered the potential benefits of spectrum trading for specific licence categories"* in order to reach conclusions on the merits of secondary markets. We assume this analysis underpins ComReg's diverging view from EU policy. Stakeholders have never been afforded the opportunity to comment on this analysis and we consider that ComReg must, as a priority, release its analysis for public consultation.

- **ComReg's thinking is not compatible with the principles of service and technology neutrality**

ComReg considers that periodic re-release of spectrum should be conducted in line with the expected cycle of technology and investment. The application of service and technology neutrality in harmonised spectrum bands renders it impossible to objectively establish finite licence durations for periodic re-release. The technology and service evolutionary cycles are continuous and should not be artificially constrained.

Article 5(2) of the Authorisation Directive establishes "*Where Member States grant rights of use for a limited period of time, the duration shall be appropriate for the service concerned in view of the objective pursued taking due account of the need to allow for an appropriate period for investment amortization*." However the Authorisation Directive acknowledges that spectrum rights may be renewed[10] and does not preclude the granting of rights with indefinite duration.

- **ComReg's position on periodic re-release of spectrum as a mechanism to prevent entrenchment (and presumably Significant Market Power) is flawed**

In section 4.2.1 ComReg considers the merits of auctions as mechanisms to award rights to spectrum use. eircom Group agrees in principle with the use of auctions for the release of new spectrum allocations for commercial use. Alternative approaches may be required to achieve societal objectives and band specific award mechanisms should be considered on a case by case basis taking the various considerations into account against the specific circumstances.

However we do not accept that periodic re-release of spectrum is an appropriate mechanism to prevent entrenchment. For example let us consider ComReg's proposals in respect of the future licensing of the 800MHz, 900Mhz and 1800Mhz bands. ComReg's proposed auction design effectively means that the strongest bidder(s) will win. The strength of a bidder will to a large extent be determined by the bidder's current position in the market, particularly with constrained financial capital markets. As such any existing or accumulating entrenchment in the relevant market, to the extent such entrenchment can be objectively observed, will carry forward and strengthen in the subsequent licensing period. In the recent German 800MHz auction E-Plus, a dynamic competition promoting newer entrant, was unsuccessful in securing spectrum. It remains to be seen whether the competitive dynamic in the German mobile market will be dampened to the benefit of more established (and entrenched) players.

[8] RSPP Article 6(5)
[9] Page 24, ComReg 11/28
[10] Article 7(1)

We note ComReg's position in respect of the use of spectrum caps in competitions[11] and agree that these are important considerations. Clearly the relevant factors must be considered on a case by case basis. ComReg will be aware of our position regarding its spectrum cap proposals in respect of the 800MHz, 900MHz, and 1800MHz award proposals that the proposed global cap of 2x50MHz is too loose. In the context of considering auction as a tool to address entrenchment, ComReg's current proposal creates a high probability of extremely asymmetric outcomes which could lead to further entrenchment.

To the extent ComReg has concerns regarding the competitive functioning of a relevant economic communications market it should undertake a Market Review of that market. Periodic re-release through competitive auction processes is not an appropriate or proportionate mechanism to address entrenchment concerns, to the extent such concerns can be demonstrated to be valid.

- **Legislative basis**

ComReg also raises question marks over the legislative basis for maintaining a spectrum trading regime stating "*It is ComReg's continuing view that the use of spectrum trading needs to be underpinned by primary legislation which takes into account potential concerns including, but not limited to, spectrum hoarding and the distortion of competition. It is expected that such legislation will most likely follow the transposition of the new Framework into Irish law.*"

We would be grateful if ComReg could clarify what additional legislative changes ComReg believes are necessary to facilitate transfer or lease of spectrum rights in addition to the transposition Regulations to be implemented on 25th May 2011. In our view there is no impediment to the immediate commencement of a work programme to develop a proportionate framework for the introduction of secondary trading (including spectrum trading and sharing) in harmonised bands. We appreciate that ComReg may have some reservations in this regard, however as we highlight above these reservations can and should be resolved.

We request ComReg to immediately commence a work programme to advance policy development in respect of establishing a proportionate framework for the establishment of secondary trading rights for harmonised spectrum including the 800, 900, 1800, and 2100MHz bands.

2.2.2 Indefinite licence duration

In its discussion of spectrum trading ComReg expresses a preference for periodic re-release of spectrum which necessarily has a bias towards finite licence durations. As highlighted above eircom Group does not consider that periodic re-release is an appropriate mechanism to address entrenchment concerns.

In section 4.2.3 of the consultation ComReg offers additional views as to why it has a bias towards finite licence durations. ComReg considers that indefinite licences could reduce the ability of Member States and the EC to make major allocation and harmonisation changes. We believe this concern is over-stated and may be a consequence of an overly literal interpretation of the notion of indefinite licences.

[11] Section 4.4, ComReg 11/28

The notion of indefinite licence duration has never been associated in our representations with the issuance of irrevocable spectrum rights. Setting aside considerations of spectrum trading (whose efficiency would be increased when supported by a policy of indefinite duration) there are objective reasons to liberalise licence duration moving away from inflexible finite terms. A fundamental plank of national and EU policy objectives is the need to foster investment. Such investments are long term in nature with lengthy pay-back periods. From eircom Group's perspective the notion of indefinite licences is grounded on the principle that network operators should have the flexibility to maintain continuous investment cycles (consistent with the principles of service and technology neutrality) for so long as it is efficient so to do.

eircom Group fully accepts that European spectrum policy will evolve over time and macro decisions may be taken to make major allocation and harmonisation changes. Generally such macro changes can be foreseen well in advance of their implementation. An appropriate scheme for indefinite licences could be constructed with a guaranteed minimum term (to underpin investment confidence) and a notice period thereafter of sufficient duration (perhaps five years) whereby the right to use may be terminated in the event that it can be objectively justified that the current use of the spectrum is no longer efficient or will be inconsistent with harmonisation measures at the European level.

ComReg questions[12] the validity of the investment uncertainty argument noting "*there is contrary evidence in the Irish market with three of the mobile network operators investing significantly in their networks towards the end of their licence terms.*"

In the last two financial years (1July 2008 to 30 June 2010) eircom Group has invested [✂] in its mobile network. The vast majority of this investment, [✂], has been in respect of our 2100MHz licence (expiry date in 2027). Limited sums have been invested in maintaining existing capabilities provided under our GSM licence given the regulatory uncertainty created by the publication of ComReg 08/57 calling into question our legitimate expectation of licence renewal.

The regulatory uncertainty resulting from ComReg's ongoing review has inhibited rather than promoted investment contrary to ComReg's objectives. It is arguable that under a more flexible licensing regime (with indefinite licences or at the very least clearly defined renewal rights) we would have adopted an investment profile generating greater societal benefits. The root of the problem is the arbitrary nature of finite licence durations and the inflexible nature of current licences. Flexible spectrum rights support continuous investment which is infinitely superior to ComReg's apparent policy approach of periodic re-release which serves to stall service development in the run-up to the re-release process.

There can be no doubt that the provision of mobile services continues to be efficient use of the 900MHz and 800MHz spectrum. Liberalisation measures such as technology and service neutrality seek to enhance market responsiveness to evolutions in technology and service provision. In the absence of any evidence to suggest that current and future use of the bands will in any way be inefficient, regulatory certainty promoting investment confidence should be regulator's priority.

[12] Paragraph 4.2.3, ComReg 11/28

We request ComReg to immediately commence a work programme to advance policy development in respect of establishing a proportionate framework for the establishment of indefinite licences / proportionate renewal rights for harmonised spectrum including the 800, 900, 1800, and 2100MHz bands.

3 Comments on proposed activities

eircom Group offers the following comments on ComReg's proposed activities for managing the radio spectrum.

3.1 Test & Trial Licences: eircom Group considers that the scheme operates well in its current format and shares ComReg's view that it is unnecessary to reserve spectrum for the scheme.

3.2 A holistic approach: eircom Group suggests that it is no longer relevant to make a distinction between Public Mobile Services (section 6.1) and Wireless Broadband Services (section 6.4) for the following reasons:

- There is widespread take up of mobile broadband services that fit easily into ComReg's definition of Wireless Broadband Services
- The future licensing and use of bands such as 2.3GHz, 3.5GHz, 3.6GHz referred to by ComReg in section 6.4 are increasingly relevant to the mobile community. For example, as ComReg highlights[13] "*the 2.3GHz band has great potential to enhance competition and capacity for mobile broadband in Ireland*."

A holistic approach is required to achieve strategic objectives for the provision of wireless electronic communications services. Interested parties require clarification as to the rights to be attached, timing of release and availability of all harmonised bands in advance of any award process. As highlighted below we request ComReg to:

- Rapidly conclude its review of the future use of the 2.6GHz band
- Clarify its position in respect of 2.3GHz band availability
- Undertake a comprehensive review to establish policy in respect of the timing of release of spectrum in the 3.5GHz to 3.6GHz range following closure of the FWALA / BWALA schemes.
- Clarify its position on the future licensing of spectrum currently deployed for WDMDS following expiry of the current licences in 2015.

3.3 Mobile and wireless broadband services

3.3.1 800MHz, 900MHz, 1800MHz: eircom Group has commented extensively on ComReg's proposals in response to the relevant consultations. Whilst we welcome ComReg's confirmation that finalising the consultation process is ComReg's highest priority, we strongly believe, as highlighted above, that further impetus needs to be applied to the establishment of flexible usage rights in respect of these bands. We support ComReg's ongoing work to ensure adequate protection of services in the 800Mhz band and look forward to receiving ComReg's proposals in this regard.

[13] Page 51, ComReg 11/28

3.3.2 2.6GHz Band: We note ComReg's intention to publish a consultation on the future use of this band. ComReg 11/28 is silent on the timing of this consultation. It is over a year since ComReg issued its call for input. ComReg will be aware of our firm view[14] 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. eircom Group requests ComReg to expedite this consultation and rapidly conclude its review. A rapid conclusion is necessary because:

- ComReg currently proposes to hold an award process for harmonised spectrum in the 800, 900 and 1800MHz bands later this year. Interested parties require a holistic view of the timing of availability (and rights to be attached) of substitute / complementary harmonised spectrum in order to effectively participate in the proposed award process.
- A number of existing licences in the band have expiry dates in 2012. These expiry dates were set as a result of past non-compliance. In the absence of a final Decision it is possible that the current licensee could seek to have the licences rolled over on an interim basis, as has happened in respect of two 900MHz licences. This would call into question the effectiveness of ComReg's enforcement measures.
- In the absence of evidence to the contrary it is highly questionable as to whether Ireland is compliant with the in and out of block power levels contained in the annex to Decision 2008/477/EC.
- Timely clearance and release of this band will ensure Ireland reaps the benefits of more efficient use of this band. It should be noted that in the year since ComReg's call for input the number of subscribers using MMDS has seen further continued decline falling from 72,100 to 62,800[15], and that UPC declined the opportunity to roll-out an alternative digital TV distribution platform.

3.3.3 3.5 and 3.6GHz: eircom Group notes ComReg's intention to consult on the future use of these bands in 2013 given that all current licences will expire no later than July 2017. We agree that such a review will be timely given the potential for these harmonised bands to support high speed mobile broadband services.

3.3.4 DECT Guard Band: We note and support ComReg's position that this band is being considered within its broader consideration of the 1800MHz.

3.3.5 WDMDS (400MHz and 900MHz): We note ComReg has made no reference to this licensed spectrum in its planned activities. However the existing licences are due to expire in 2015 and decisions will need to be taken as to the future licensing of the spectrum. A review to determine policy in respect of the future licensing of this spectrum must be undertaken in the 2011 to 2013 timeframe in consultation with the existing licensees and other interested parties.

3.3.6 A second digital dividend: We welcome ComReg's commitment[16] to explore the potential for identifying additional 'Digital Dividend' spectrum. There continues to be significant interest in the broadcast band from a range of interest. We note for example a company in the

[14] As set out in our response to ComReg 10/28

[15] Subscribers as at 31 March 2011 per UPC Hold B.V. first quarter results http://www.lgi.com/PDF/UPC_Holding_BV_Q1_2011_Final.pdf

[16] Section 7.1.5, ComReg 11/28

UK that is promoting the use of so-called white spaces in broadcasting bands to support machine to machine applications. The innovative exploitation of white spaces, which could potentially take place on a licence exempt basis, needs to be carefully balanced with preserving the option of a second digital dividend.

3.4 Broadcast Services

Administrative incentive pricing: We note ComReg's intention to review whether it is appropriate to apply Administrative Incentive Pricing (AIP) in respect of commercial, community and public broadcasters. Such a review may also be appropriate in respect of Public sector use of spectrum were a market-based approach to spectrum release has not been adopted.

3.5 Terrestrial Fixed Services

Medium to long term strategy: eircom Group notes and agrees with ComReg's medium to long term strategy in respect of Fixed Links as set out in the first paragraph of section 6.3.2.

Efficiency measures in existing bands for fixed links: eircom Group agrees with ComReg on the benefits of both ACM and dual polarisation in terms of spectrum efficiency, particularly for new links in areas of high congestion. As networks expand and capacity demand increases in the more congested areas of the network, it is normal practice to upgrade links with newer high capacity equipment. The original equipment can then be redeployed into a less demanding/congested part of the network, where it's capacity is sufficient and there is no strong requirement to use ACM or dual polarisation to maximise spectral efficiency. However, by making ACM and dual polarisation mandatory for all new links from 1st June 2012, unnecessary capital expenditure will be incurred by Operators who redeploy existing equipment. For example, eircom Group has redeployed approximately [✂] systems, as a result of link upgrades, to support its 3G network rollout.

In the interest of striking a balance to promote both spectral efficiency and investment efficiency we would request a degree of flexibility in the application of ACM and dual polarisation. We propose that new links in congested areas should use ACM and dual polarisation as suggested by ComReg. Similarly, ACM and dual polarisation should be mandatory for new links in less congested areas, if new equipment is to be used. However, ACM and dual polarisation should not be mandatory for new links in less congested areas, if redeployed equipment is to be used.

3.6 Licence exempt short range devices

Machine to machine applications: eircom Group notes ComReg's intention to actively participate in ongoing European discussions regarding identification of the need for spectrum for Radio Frequnecy Identification Devices and SRDs in the UHF or existing bands. As highlighted above we believe it is important to ensure that the opportunity for a 'second digital dividend' is preserved whilst developing an appropriate framework for the support of machine to machine applications.

3.7 Maritime services

eircom Group has no comments.

3.8 Aeornautical services

eircom Group has no comments.

3.9 Satellite services

eircom Group has no comments.

3.10 Business radio services

eircom Group has no comments.

3.11 Third Party business radio

eircom Group has no comments.

3.12 Telemetry & Telecontrol systems

eircom Group has no comments.

3.13 Radio Amateur services

eircom Group has no comments.

3.14 Scientific services

eircom Group has no comments.

3.15 Defence forces use of spectrum

eircom Group has no comments.

6 Ericsson

Ericsson response to ComReg consultation 28/11

Review of the Period 2008 – 2010 & Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013.

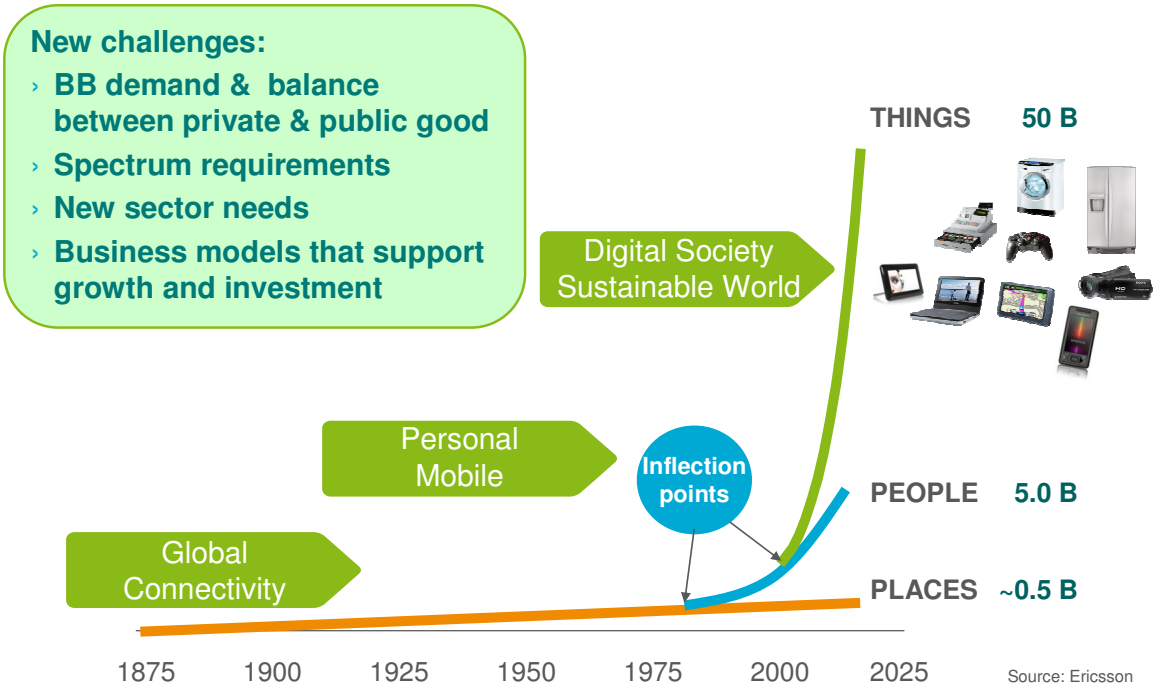
MAY 2011

1. INTRODUCTION AND SUMMARY

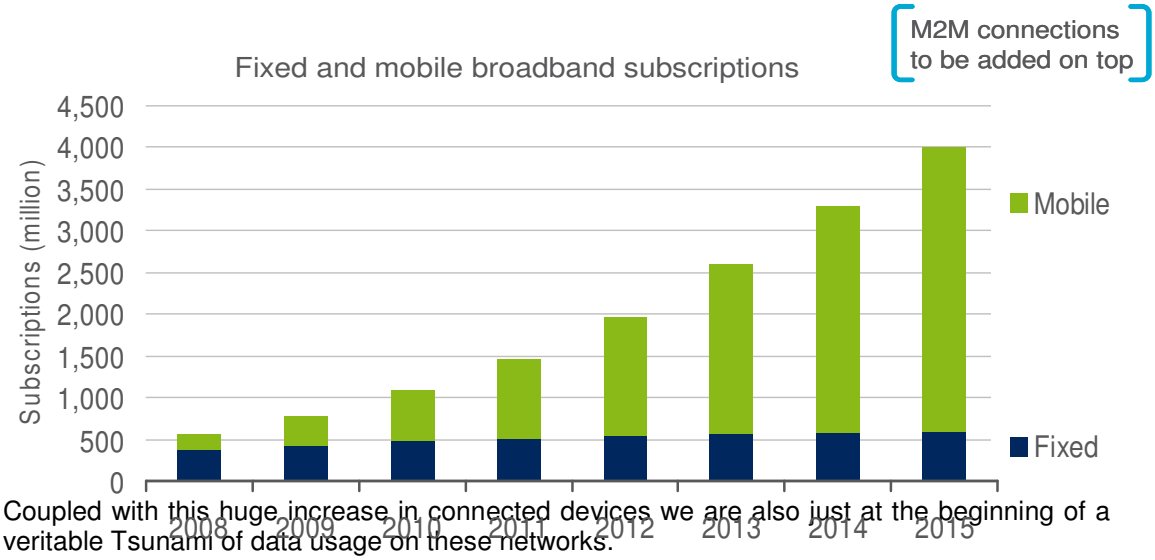
LM Ericsson ("Ericsson") welcomes the opportunity to respond to ComReg's Consultation Paper on Review of the Period 2008 – 2010 & Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013 (ComReg Document 28/11).

In general, Ericsson would like to commend ComReg for their excellent strategy document and the excellent work in handling the many and increasingly complex issues relating to spectrum requirements over the last few years.

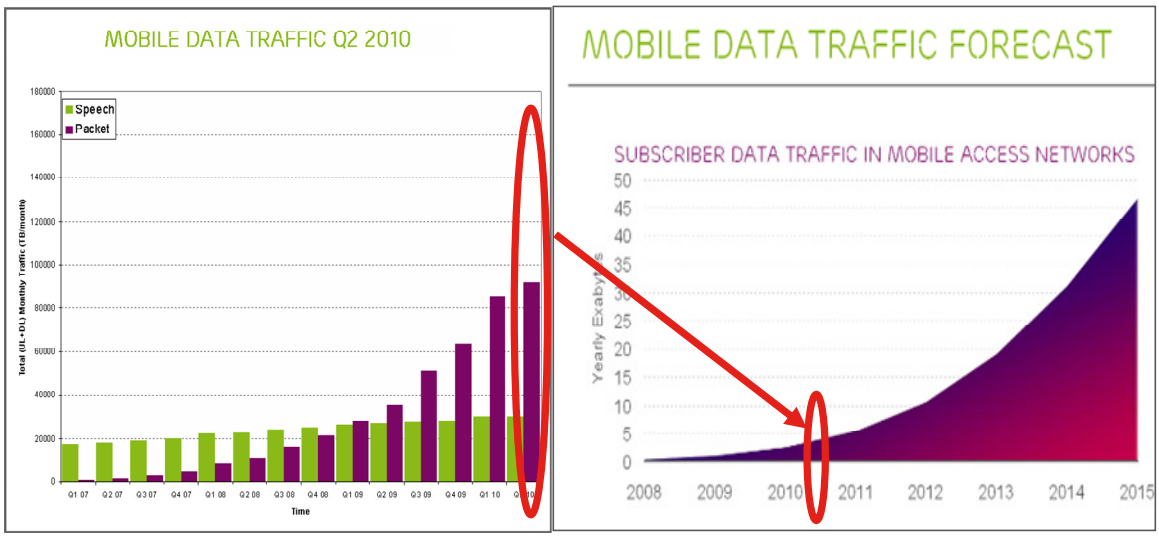
Ericsson is of the view that we are on the cusp of a very big change in telecoms connectivity. We have spent approximately 100 years connecting 0.5 Bn places with fixed communications lines, approximately 25 years connecting 5 Bn people and that over the next 10-15 years over 50 Bn devices will be connected to the network.



Ericsson is also of the view that the majority of broadband and M2M connections will be carried over mobile networks as outlined in the following graph.

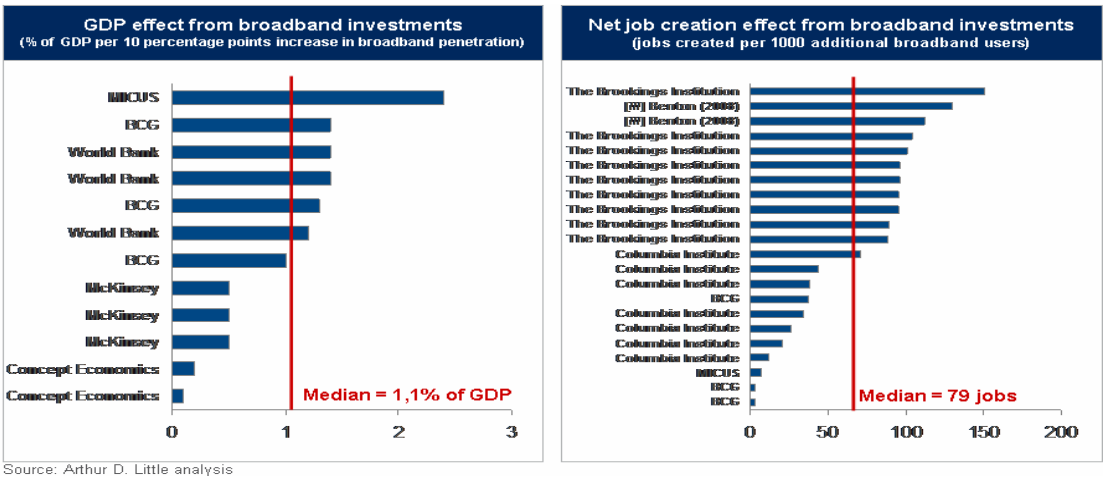


Coupled with this huge increase in connected devices we are also just at the beginning of a veritable Tsunami of data usage on these networks.



The benefits of broadband are well recognized by governments, policy makers and regulators as is evidenced by the Digital agenda for Europe broadband targets.

To illustrate this point research shows that "For every 10 percentage points increase in broadband penetration the isolated economic effect on GDP growth is around 1% of GDP" and "For every 1000 additional broadband users, roughly 80 new jobs are created".



Source: Arthur D. Little analysis

Source: Arthur D Little & Ericsson Report on the Socioeconomic effects of broadband investments.

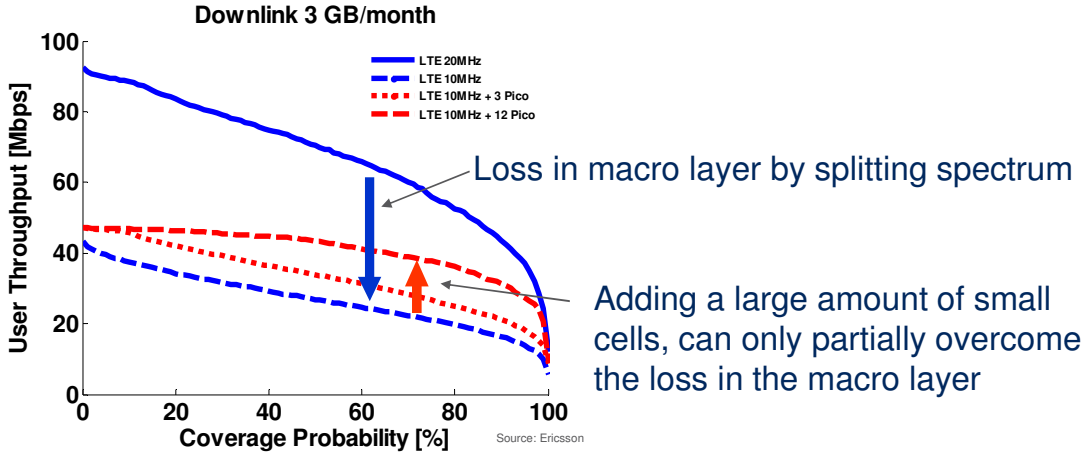
Optimal regulation is essential to maximizing the commercial, social and overall economic benefit of spectrum usage and more spectrum will be needed to meet the broadband needs of society. The following table outlines the perspective of the ITU on spectrum needs for IMT-2000 & IMT-Advanced.

Market Setting	Spectrum Requirements for pre-IMT-Advanced			Spectrum Requirements for IMT-Advanced			Total Spectrum Requirements		
	Y2010	Y2015	Y2020	Y2010	Y2015	Y2020	Y2010	Y2015	Y2020
Higher Market Setting	840	880	880	0	500	840	840	1300	1720
Lower Market Setting	760	800	800	0	420	480	760	1220	1280

Source: REPORT ITU-R M.2078 **Estimated spectrum bandwidth requirements for the future development of IMT-2000 and IMT-Advanced**

Mobile broadband technologies such as UMTS-Advanced are developing rapidly. Ericsson as long ago as February 2010 demonstrated LTE-Advanced live at Mobile World Congress in Barcelona. This demonstrated LTE-Advanced delivering 1Gbps. For this four contiguous 20MHz carriers were used, a full 80MHz of spectrum. Imagine the sort of national infrastructure we could have if a number of operators were able to get access to 80MHz of spectrum below 1GHz.

While aggregating different carriers, utilizing white spaces and small cells can improve the throughput available to end users, contiguous spectrum is really key to delivering the best spectrum efficiency as illustrated in the figure below.



Separate small cell spectrum comes at an increased cost as well as significant deterioration of NW performance

(e.g. allocating 5 MHz separate small cell spectrum will deteriorate average speed by >30%)

LTE is being deployed today and LTE-Advanced is only a few years away from being commercially available. We believe the future need for higher channel bandwidths is something that ComReg needs to be thinking about and planning for.

2. BROADBAND SERVICES

Ericsson is happy to see ComReg is looking to increase the spectrum availability in the market and the following table outlines our views on potential spectrum opportunities detailed in Table 3 of the consultation.

Potential Spectrum Opportunities (ComReg's consultation Table 3)	Ericsson views
800 MHz Digital Dividend	Ericsson is of the view that the majority of broadband and M2M connections will be carried over mobile networks. Making the Digital Dividend (800 MHz band) available for wireless broadband is key for providing cost effective mobile broadband and M2M connectivity particularly in rural areas and for in-building penetration and coverage. The sooner the spectrum is available the sooner the economic benefits can be realized.

880 – 892.8 MHz paired with 925 – 937.8 MHz	Ericsson is of the view that the majority of broadband and M2M connections will be carried over mobile networks. Making the GSM 900MHz band available for wireless broadband is important for providing cost effective mobile broadband and M2M connectivity particularly in rural areas and for in-building penetration and coverage. The sooner the spectrum is available the sooner the economic benefits can be realized.
1710 – 1785 MHz paired with 1805 – 1880 MHz	Ericsson is of the view that the majority of broadband and M2M connections will be carried over mobile networks. Making the 1800 MHz band available for wireless broadband technologies is important for providing cost effective broadband and M2M connectivity particularly in urban areas where high capacity is required. The sooner the spectrum is available the sooner the economic benefits can be realized
1452 – 1492 MHz (L-band)	Ericsson understands that the technology neutral use in a harmonized frequency arrangement for coordinated technologies in the band 1452 - 1492 MHz (1.4 GHz) for enhanced mobile broadcasting, unicasting and other multimedia based applications would meet the shifting consumer demands in Europe. The CEPT Maastricht Special Arrangement already allows for the deployment of mobile broadband and unicasting downlink applications within the band 1.4 GHz, the so called “L-band”, currently applying a downlink frequency arrangement in Europe using a channel raster bandwidth of 1.712 MHz. Considering the new circumstances, Ericsson is supporting coordinated technologies based on the current specifications of the IMT family technology of standards for possible deployments in the band 1.4 GHz: * HSPA (5 MHz channel bandwidth); * LTE (1.4 MHz, 3 MHz, 5 MHz, 10 MHz 15 MHz and 20 MHz channel bandwidths), and * LTE-Advanced (also beyond 20 MHz channel bandwidths), All including the capability of aggregating downlink channels for in-band arrangements as well as aggregating out-band downlink channels paired with downlink channels of different frequency bands to meet shifting traffic demands as to satisfy near-term and longer-term traffic patterns. Ericsson is of view that the currant channel raster of 1.712 MHz could be kept. This current arrangement could be kept unchanged while also be providing for radiocommunication networks using 5 MHz channels in a 5.1 MHz channel arrangement, which could to be operated within three aggregated 1.712 MHz channels, and therefore be allowing for the IMT family of technologies. It is regarded absolutely crucial for a mass-market application, which is expected to be supporting most consumers in Europe with cost efficient services, to have available a harmonized frequency arrangement while having access to the full 40 MHz between the frequencies 1452 – 1492 MHz. A pan-European harmonization would subsequently be providing necessary economies of scale to the benefit of the consumers. Notably, the current data usages on the smartphones will be more common than on desktop computers within few years time. Considering this mobile data use, the usage of video is driving the rapid growth of the mobile data traffic. According to Ericsson’s own estimations, mobile traffic (voice and data) is expected to increase almost 30 times by 2015, largely driven by video. Advanced Smartphone devices will grow four times to 2015 and the generated traffic will grow more than 30 times. In conclusion: * the access for enhanced mobile broadcasting, unicasting and other multimedia based applications to the full bandwidth of 40 MHz in

	the band 1452 – 1492 MHz is therefore paramount to support the business case for development of equipment and to provide for a sufficient ecosystem to support the pan-European consumer demands, * it is regarded necessary for a mass-market application that is expected to supporting most consumers in Europe with cost efficient services to be harmonized on a pan-European basis for a 5.1 MHz channel arrangement structure.
2300 – 2400 MHz	Ericsson is of the view that the majority of broadband and M2M connections will be carried over mobile networks. Making the the band available for wireless broadband is important for providing cost effective mobile broadband and M2M connectivity particularly in urban areas where high capacity is required. The sooner the spectrum is available the sooner the economic benefits can be realized
2500 – 2690 MHz	Ericsson is of the view that the majority of broadband and M2M connections will be carried over mobile networks. Making the the band available for wireless broadband is important for providing cost effective mobile broadband and M2M connectivity particularly in urban areas where high capacity is required. The sooner the spectrum is available the sooner the economic benefits can be realized

2. Terrestrial Fixed Services

2.1 ACM

ComReg is proposing to make the deployment of ACM mandatory for all **new** fixed link applications across all fixed link frequency bands from 01 June 2012. Ericsson is of the opinion that this is probably not a problem, but it would be important to survey of experiences from the operators and other users with ACM experiences to ensure no negative impact. We believe ACM works best in self managed spectrum blocks where the operator has full control over power levels in the channel. To get the maximum benefit from ACM, the link needs to be operated with sufficient fade margin that it can up shift to the highest possible Code Set. Higher levels of modulation such as 512 QAM and 1024 QAM are being introduced. As with all higher levels of modulation, these links will need a relatively quite spectrum to run at the highest code sets.

2.2 Dual Polarisation

ComReg is also proposing to make dual polarisation mandatory for all **new** fixed link applications, where more than one link is required on the same path in the same frequency band, from 1 June 2012. Ericsson fully supports this principle in all frequency bands through the use of XPIC and also integrated dual polarised antennas. Furthermore, to encourage more efficient use of spectrum and capital investment, Ericsson also recommends the use of Protected 2+0 rather than 1+1 Hot Standby systems. Protected 2+0 uses both polarisations to double the path capacity in normal circumstances. Should one radio fail, the effect is to reduce path capacity for best effort traffic while still maintaining availability for high priority traffic. Before implementing such a proposal Ericsson feels it would be important to survey the operators and other users to ensure no negative impact.

2.3 70GHz & 80GHz Bands

Ericsson does not fully understood what is envisaged by ComReg's proposed changes in the 70 GHz & 80GHz bands, but Ericsson would urge caution on changing to a "light licensing" scheme. While it is accepted that there is not a lot of uptake in this band, an unlicensed band would see very little use as we believe most operators would not be prepared to risk operating links in an unknown or possibly unstable environment.

2.3 Other Additional Bands

Ericsson would encourage the opening of more bands, particularly the remaining channels in 26GHz, the new 28GHz band, 32GHz and also 42GHz (not mentioned above). Ericsson does not see much potential for point-to-multipoint applications. In the mobile networks, due to the phenomenal growth in data there is an increasing tendency towards fibre based backhaul. However, not all sites will be suitable for fibre so there will still be a demand for point-to-point radio links. Longer radio paths will continue to be required in rural areas where fibre build costs are more difficult to justify.

2.4 Additional information to be considered

Network topologies are already tending to flatten out, there will be fewer radio link hops to the fibre point-of-presence and the topology is changing to star from a fibre POP rather than chain from a high SDH site. Typical dependencies of sites to fibre hub can be 1:6 in urban areas, perhaps 1:3 in the future. While there should be fewer radio links in the congested urban areas, these links will need to support higher traffic volumes. We believe there will continue be a need for radio based resilience paths as in general outside Metro and national rings fibre paths tend not to be diverse.

Ericsson believes that self managed block allocations of spectrum are to be encouraged as this leads to more efficient use of spectrum. For instance, wider channel bandwidths are more supportive of higher modulation schemes and ACM. Multiple Input Multiple Output (MIMO) microwave radio links will be able to further increase microwave link capacity and it should be easier for operators and users of microwave spectrum to introduce new technologies such as MIMIO within self managed block allocations of spectrum.

7 ESB Networks

Comreg Consultation on Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013 (ComReg Document No: 11/28)

ESB Networks Response to consultation

Status: **Issued**

Date: **24/5/2011**

ESB Networks Response to ComReg Consultation Paper

1. Introduction

ESB Networks (ESBN) welcomes this opportunity to respond to ComReg's consultation paper on proposed strategy for managing the Radio Spectrum 2011 – 2013.

In the operation of Ireland's electricity network ESBN has a significant requirement for Radio Frequency (RF) systems. This requirement will grow in importance over the coming years as the electricity network becomes more sophisticated in order to provide the greater functionality and higher quality of supply that Ireland needs in order to be competitive and move to greater sustainability in energy supply.

Electricity networks are a vital national infrastructure that support economic development and enable supply of electricity to all customers which is an essential service. Electricity networks are fundamental to the delivery of EU and national sustainability targets.

Key National Sustainability Targets for year 2020 include:

1. Supply 40% of the Electrical Energy on the island from Renewable sources. This will require the connection of local level (small) as well as larger renewable generation units.
2. Contribute to an overall reduction in energy usage of 20%.
3. Comply with the EU directive in relation to Smart Metering.
4. 10% of car transportation to be fuelled through electricity

These targets will be enabled by a strong electricity system with ubiquitous embedded intelligence supported by a dedicated, reliable, secure and economic telecommunications infrastructure with adequate bandwidth. This evolution is sometimes described as Smart Networks or Smart Grid. An increasing amount of wireless technology will be required to enable the cost effective provision of the communications service to many of the remote connection points needed to operate the future electricity network.

Based on the work carried out to date in examining currently available communications technologies in the context of *The National Smart Metering Plan - Phase 1 Technology Trials* - we believe that currently available services are far from ideal in terms of performance, total cost of ownership and control.

It is imperative therefore that ESBN is able to access sufficient spectrum to deploy telecommunications systems to continue to carry out its functions in a safe, efficient and effective manner and to meet emerging Smart Metering and Smart Network requirements.

ESBN made a detailed response, dated 28/10/2010, on ComReg consultation document 10/71. Our response on 10/71 provided detailed support for ESBN's position that it needs access to sub 1 GHz spectrum. ESBN's position and the validity of the arguments presented in our submission on ComReg 10/71 have not changed since that submission was made. The current submission provides a summary of the relevant points made in that previous submission and it deals with points raised by ComReg in the current spectrum strategy document.

Summary of proposal in ESBN's response to ComReg 10/71:

A dedicated 10MHz in the sub 1GHz band should be put aside as a critical infrastructure asset for communications to support the Electricity Sector. This will enable Smart Networks to support the long term requirements of the energy industry, its customers and the Irish state. This network will facilitate safety, security of supply, energy efficiency and consumer choice and it will facilitate the adoption of distributed generation from renewable sources.

This would contribute to meeting a number of the strategies that ComReg has set out (section 5.2 of 11/28) for management of Spectrum in Ireland:

- **Innovation:** Facilitate new spectrum based techniques, services and applications.
- Promote investment by providing regulatory certainly and appropriate licensing arrangements
- Ensures the efficient use of scarce radio spectrum resources

Having completed extensive technology trials of a number of options for the communications system for Smart Meters, ESBN has concluded that a wireless solution in the 900 MHz band is a good match to the requirement to serve rural electricity users who constitute about 30% (or 700,000) of the domestic electricity customers in Ireland. Low voltage Power Line Carrier (PLC), an RF mesh system and a Mobile Network service were all tested in the trial. A possible solution is an adaptation of innovative RF solutions currently in use in North America which operate there in licence exempt spectrum between 902MHz and 928MHz. The propagation characteristics of solutions at this frequency provides the required effective link length and building penetration. These are essential in the Irish rural environment. Some of the existing systems have a meshing capability which maximise the performance and capability of the systems, giving good coverage, capacity, latency and availability.

2 Response to specific sections of ComReg 11/28

Response to section 3.4

ESBN notes that the band 1452-1492 MHz is unused in Ireland at present and that ComReg is monitoring developments in the band in Europe.

A portion of this band could provide a good solution to part of the communications requirements for the future electricity network. This spectrum could be used to backhaul aggregated communications traffic for the electricity network and also serve some higher data rate requirements (in the region of 2 Mb/s data throughput) that is expected to be required for some Smart Grid applications. ESBN requests ComReg to consider these points in relation to its position on this frequency band.

Response to section 6.1.2

In section 6.1.2 there is a sub-section headed "Additional Proposals". In this sub-section ComReg states that it proposes to continue to monitor and publish the results of quality of service surveys. ESBN notes this point, however we add the observation that the information published by ComReg under this topic to date is lacking in detail. We note that information derived from the bi-annual surveys taking measurements on the mobile networks is not published in any fashion by ComReg to our knowledge. As a business user making significant use of the mobile communications networks for a variety of services, a greater level of detail on the quality of the mobile service and its geographical reach would be of value to ESBN. We therefore request that ComReg consider how they could publish more information in this area.

Response to section 6.3 - Terrestrial Fixed Services

ESBN notes ComReg's commentary in section 6.3.1 which sets out ComReg's position on the management of certain frequency bands. We note that ComReg has a general policy of technology and service neutrality, though there are exceptions to this in certain cases. In section 6.3 there is an emphasis on applications for terrestrial fixed links requiring high data throughput.

However for telemetry and other applications which are used in connection to the operation of the electricity network, in many cases a relatively low data throughput rate is sufficient. A sub 1 GHz spectrum allocation is required for applications that have many communications end points in order to provide a cost effective wireless solution. One scenario is that a relatively small amount of sub 1 GHz bandwidth (a number of MHz, perhaps less depending on the exact configuration) is sufficient for requirements to 2015, with the amount of bandwidth allocated increasing over time as Smart Grid evolves to greater functionality.

Regarding ComReg's proposal on Adaptive Coding and Modulation (ACM) in section 6.3.2: ESBN questions whether it is appropriate for ComReg to be specific on a technology implementation. ACM undoubtedly offers advantages for many service providers. However there are certain service types where the extra capacity provided

most of the time by ACM is of little or no benefit. ESBN believed that the details of the technology employed should be left to the service operator where at all possible, as the operator is in the best position to decide the optimum equipment, bearing in mind all relevant factors – performance, complexity, cost etc., for their application.

Response to section 6.9.1

On Telemetry & Telecontrol Systems, a subsection in section 6.9.1, ESBN supports ComReg's stated approach to allocate spectrum to telemetry and Telecontrol systems. This proposal will lead to a more efficient use of spectrum compared to the current regime.

8 Hutchison 3G Ireland Ltd

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

24 May 2011

Dear Sinead

RE: SUBMISSION RE COMREG 11/28

Hutchison 3G Ireland Limited ("H3GI") welcomes the opportunity to respond to ComReg Doc. No. 11/28, *"Review of the Period 2008 – 2010 & Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013"* ("ComReg's Proposed Spectrum Strategy Statement"). Under the auspices of the IBEC Telecommunications and Internet Federation ("tif"), H3GI has worked with the other mobile network operators to respond as an industry to ComReg's Proposed Spectrum Strategy Statement and is happy to support tif's response to ComReg's Proposed Spectrum Strategy Statement ("tif Response"). In particular and for the reasons set out in the tif Response, H3GI believes that ComReg needs to: (i) clarify the appropriate balance between the promotion of efficient spectrum use, efficient investment and other objectives; and (ii) introduce spectrum trading, indefinite licences and spectrum sharing. In addition, H3GI believes that ComReg needs to issue detailed proposals in relation to the release of spectrum in the 2.6 GHz band asap and in any event, no later than the end of Q3 2011.

In relation to the 2.6 GHz band, spectrum is currently licensed to UPC for broadcasting purposes until 2014 at the latest. However, the European Commission has adopted a decision harmonising the 2.6 GHz band for terrestrial systems capable of providing electronic communications services in the EU with a particular focus on broadband communications. Recitals 2, 3 and 9, and Article 2 of the European Commission Decision on the harmonisation of the 2.6 GHz band provide:

"The designation of the 2 500-2 690 MHz band for systems capable of providing electronic communications services is an important element addressing the convergence of the mobile, fixed and broadcasting sectors and reflecting technical innovation. The services provided in this frequency band should mainly target end-user access to broadband communications."

"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."

"The results of the mandate to the CEPT should be made applicable in the Community and implemented by the Member States without delay given the increasing requirements identified in studies at European and global levels for terrestrial electronic communications services providing broadband communications."

[redacted]

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"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."

ComReg initiated a review of the use of this band last year with the issue of a Request for Input and H3GI understands that ComReg has engaged external consultants to advise it in respect of this matter. However, it has not yet issued a consultation paper in respect of this matter. In order to ensure that ComReg meets its obligations under the European Commission Decision on the harmonisation of the 2.6 GHz band, H3GI urges ComReg to issue its detailed proposals in relation to the release of spectrum in the 2.6 GHz band asap and in any event, no later than the end of Q3 2011.

Yours sincerely

MARK HUGHES
Head of Regulatory

[redacted]

9 IDA, FDI & Technology Developments

IDA , FDI and technology developments.

IDA Ireland welcomes the opportunity to make a contribution to Comreg's consultation paper, 'Review of the Period 2008 – 2010 & Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013'.

In March 2010, IDA Ireland launched 'Horizon 2020', its strategic blueprint for attracting Foreign Direct Investment (FDI) into Ireland in the coming decade. Foreign direct investment has been, and will continue to be, a catalyst for our national prosperity. FDI companies create hundreds of thousands of high-quality jobs, both for the employees of the investing companies and in the firms, including indigenous firms that provide them with goods and services. Securing such investments can also play a pivotal role in rejuvenating part of a city, a town or region where employment opportunities are limited.

Ireland must ensure that we enhance our broadband infrastructure and deploy Next Generation Networks that enable the most advanced uses of cloud computing technology – all across Ireland. In addition, we must advance teleworking and remote access at home and promote the knowledge economy with access to advanced technologies. This will ensure that society is more adaptable to technological developments and will become familiar with the future potential and capabilities of technology.

IDA Ireland would support:

- The auctioning of Radio Spectrum with a focus on maximising returns to the State in the broadest way. In this respect the initial licence fee is an important element but consideration should also be given to the speed of rollout of investment that will be made to maximise the benefits from this important resource.
- Structuring the timeframe of the licences to ensure that it facilitates maximum investment by for example following best international practice in terms of allowing for appropriate investment returns.
- Structuring the licences in such as way as to incentivise upfront investment as far as possible.

10 IRTS

Review of the Period 2008 – 2010 & Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013

ComReg Document 11/28

Response from the Irish Radio Transmitters Society

Review of the Period 2008 - 2010 & Proposed Strategy for Managing the Radio Spectrum: 2011 - 2013 (ComReg Document 11/28)

Response from the Irish Radio Transmitters Society

Introduction

The Irish Radio Transmitters' Society (IRTS) was founded in 1932. It is a non profit organisation and is the national representative society for licensed radio amateurs in Ireland. Its purpose is to encourage radio experimentation, to provide services to its members and to represent the interests of radio amateurs both nationally and internationally. The IRTS is the member society for Ireland of the International Amateur Radio Union (IARU) which represents the interests of the amateur radio service worldwide. The IARU is a sector member of the Radiocommunication (R) and Telecommunications Development (D) sectors of the International Telecommunications Union and has observer status in the European Conference of Postal and Telecommunications Administrations (CEPT).

The Society welcomes the periodic publication of these strategy documents by ComReg. They give the various interests an opportunity to comment on and influence ComReg's policy on the management of the radio spectrum – a finite and vital national resource.

The Society is pleased at the continuing success of the collaborative arrangement between IRTS and ComReg in relation to running the examination for the Harmonised Amateur Radio Examination Certificate. The continuing demand for radio amateur certification in Ireland, as acknowledged in the document, is considered to be due, in part at least, to the availability of regular examinations under this arrangement.

Review of the Previous Strategy Period (Paragraph 6.10.1)

The implementation of the new Amateur Station Licence Regulations in 2009 with the associated once off lifetime fee structure for amateur station licences was generally

welcomed. A significant benefit of the new Regulations was the reduction in the number of bands requiring special authorisation from seven to three.

The Society is pleased to acknowledge that during the period under review, all of the matters identified as strategic to the then radio experimenter service, some of which had been included on the basis of representations from IRTS, were achieved. In fact some limited access was granted under the Test and Trial licence scheme to the segment 501 – 504 kHz in advance of a common European position being reached on the matter. This was seen by the Society as supportive of the objective of the amateur service in securing a worldwide secondary allocation of about 15 kHz in the 415-526.5 kHz segment at WRC-12.

Proposed ComReg Strategy for Radio Amateur Services (Paragraph 6.10.2)

The Society acknowledges the work done by ComReg in cooperation with IRTS in finalising the revised HAREC standard syllabus for the amateur station licence examination which will come into effect early in the strategy period. The success of the present collaborative arrangements for the examination has been mentioned in the introductory paragraph and the Society is pleased to note that ComReg proposes to further the present relationship with IRTS within the strategy period. The Society looks forward to discussions with ComReg on this matter prior to the expiration of the present agreement in September 2011.

The Society would wish to see the following matters included in the 2011-2013 strategy for the amateur service:

Expansion of the 70 MHz Band

In 1962, an allocation was made available, on special application, at 70 MHz (70.2-70.4 MHz). In February 1973 the band was extended to its present secondary allocation of 70.125-70.450 MHz and in October 2008, under the previous spectrum strategy, was made generally available to licensed experimenters.

As a result of representations by IRTS, ComReg took an initiative through the CEPT WGFM as a result of which a new footnote EU9 was added to the European Common Allocations Table:

> *"EU9 In a growing number of CEPT countries, parts of the band 70.0-70.5 MHz is also allocated to the Amateur service on a secondary basis."*

This was an important initiative as it provided a basis in the European Common Allocations Table, for the first time, for making allocations at 70 MHz to the amateur service. As a result, a significant number of new countries made and are continuing to make such allocations on the basis of the new footnote. At present some twenty one CEPT countries have amateur service allocations in the band.

ComReg, in Document 10/101 of 5 December 2010, announced its intention to reopen third Party business radio licensing. As there was no demand for the low-band VHF channels when these licences were last issued in 2005, it has been decided that licences will not be issued in the band 68.0-87.5 MHz.

In paragraph 6.9 (page 65) of the proposed Spectrum strategy document it is stated that there has been a decline of 35% in the number of business radio licences since 2007. The steep decline in the latter half of 2010 has been mainly due to the transfer of public services onto the Emergency Services Digital Radio (ESDR) network. This is expected to continue as other emergency services move onto the ESDR network and surrender their existing business radio licences.

In the light of the foregoing, IRTS propose that during the period of the proposed strategy the existing band be extended to 70.0-70.5 MHz, an increase of 175 kHz.. This would bring the band into line with that in use by licensed amateurs in Northern Ireland and the UK generally. There is increasing activity on the 70 MHz band particularly in Northern Ireland and in Dundalk/Drogheda which has the potential for interference by licensed amateur stations in Northern Ireland with any residual low-band business radio users. Alignment of the band here with the allocation in Northern Ireland and the reassignment of any remaining low-band business users to frequencies above 70.5 MHz would eliminate the difficulties that would be caused by such interference. Use of the 70 MHz band will increase as amateur allocations are granted by more European administrations.

Increased Number of Channels at 5 MHz

The Society requests that consideration be given to the authorisation of three additional 3 kHz channels in the segment 5.250-5.450 MHz during the period of the proposed spectrum strategy. In July 2008, following consultation with the military authorities, agreement was reached to release to licensed experimenters four 3 kHz channels centred on the following frequencies – 5280, 5290, 5400 and 5405 kHz. The channels were

authorised on a secondary basis and on the basis of individual applications with a maximum power of 200 watts (23dBW) to an antenna with not more than 0 dB gain using the modes A1A, J3E and G1B. This arrangement has worked satisfactorily and so far as we are aware there have been no complaints of interference from the primary user.

The national usage of the segment mentioned above is 'Fixed (Government Services)'. Paragraph 6.12.1 (page 76) of the proposed spectrum strategy indicates that ComReg has established the necessary contacts, at the appropriate level, within the Irish Defence Forces to ensure that matters of common interest can be discussed and issues of interference and management of spectrum can be effectively dealt with. The Society requests that these contacts be used by ComReg to examine the possibility of releasing to the amateur service, within the period of the spectrum strategy, three further 3 kHz channels on a secondary basis centred on the following frequencies – 5300 kHz (allocated in Finland), 5332 and 5348 kHz (allocated in USA, Norway, Finland and Iceland).

10.0 MHz Band - Increase in Power

Like other countries the amateur allocation is 10.100-10.150 MHz secondary. However, while the maximum power level allowed here is 20dBW (100 watts) it is 26dBW (400 watts) in other countries including Northern Ireland and the UK generally. So far as we are aware there have been no cases of interference to any other services by amateur stations operating in the 10 MHz band. Accordingly the Society would like to see the power increased to the standard 26dBW (400 watts) within the period of the strategy

Upgrading the Segment 50.0 - 51.0 MHz to Amateur Primary

The present allocation is 50.0-52.0 MHz on a secondary basis. The initial allocation was 50.0-50.2 MHz and in April 2000 the band was extended to its present limits on individual application. In 2004, the band was made generally available to licensed radio experimenters. The liberalisation of the licensing regime and the extension of the band reflect the fact that interference by experimenter/amateur stations has not taken place despite the fact that two cable television channels were on frequencies relatively near the 50 MHz band.

The segment 50.0-51.0 MHz in the UK is amateur primary and so far as we are aware there has been no interference by amateur stations in Northern Ireland with services south

of the border. The Society would, accordingly, like to see this segment upgraded to amateur primary within the period of the proposed strategy.

3.6 GHz Band

In its response to the consultation on the release of spectrum in the 2300-2400 MHz Band in Document 09/76 of 6 October 2009 in paragraph 4.2.6.2 on page 17 ComReg indicate, that in relation to the amateur usage of spectrum in the 3.5 GHz band, ComReg may review this as part of any consultation which may take place in the future in relation to spectrum in that band. On the basis of the information included in the proposed strategy it seems that any such review will not take place for a number of years. In the meantime the Society requests that ECA Footnote EU17 be implemented and reflected in the Radio Frequency Plan for Ireland and that in addition the segment 3400-3410 MHz be allocated to the amateur service on a secondary basis. The band 3400-3475 MHz is amateur secondary in Northern Ireland and in the UK generally.

OTHER ISSUES

Test and Trial Licences (Paragraph 3.3.1 Page 14)

A number of society members have found the Test Licence issued to IRTS under these arrangements most useful in facilitating the carrying out of experimental work by amateur stations in the frequency segment 501-504 kHz. Through this mechanism, ComReg has joined the increasing number of administrations that have granted facilities to amateur stations to operate somewhere in the region of 500 kHz. The work being done by these stations, in many countries, is supporting the objective of the International Amateur Radio Union (IARU) in securing a worldwide secondary allocation of about 15 kHz for the amateur service in the segment 415-526.5 kHz under Agenda Item 1.23 of the WRC-12 agenda.

It is noted that one of the initiatives in this area was a wireless mesh technology tested and trialled by ESB networks as the communications element of smart meters. Like most users of the HF spectrum the amateur service would not wish to see smart metering implemented using power line telecommunications (PLT) devices which have been shown to have the potential for significant harmful interference to the HF/VHF spectrum despite the use of notching on certain frequencies. GSM technology would seem to be the

preferable option for this purpose. This matter is dealt with further in our comments on paragraph 3.1.1 and Appendix B of the proposed strategy which relate to Compliance and Enforcement.

The 3.6 GHz FWALA Band (3410-3800 MHz) (Paragraph 6.4.1 Page 51)

The Society would like to draw attention to the ECA footnote EU17 which states "**EU17** ***In the sub-bands 3400-3410MHz, 5660-5670 MHz, 10.36-10.37 GHz, 10.45-10.46 GHz the amateur service operates on a secondary basis. In making assignments to other services, CEPT administrations are requested wherever possible to maintain these sub-bands in such a way as to facilitate the reception of amateur emissions with minimal flux densities."*** The Society would wish to see this footnote implemented by ComReg and reflected in the Radio Frequency Plan for Ireland.

The 2.3 GHz Band (Paragraph 6.4.1 Page 51)

In document 09/76 of 6 October 2009, ComReg published its Response to Consultation on the release of spectrum in the 2300-2400 MHz band. While the Society would have liked to see the band below 2330 MHz reserved for current users (amateur ,RURTEL and Dáil TV), the Society nevertheless welcomed the fact that this segment would be reserved for proposed Local Area and Closed User Groups.

The Society also welcomed the statement in paragraph 4.1.3 of Document 09/76 that amateur service access to the band has not changed, and will continue to be available for amateur use on a secondary (non-interference, non-protected) basis. This will continue to include ATV repeaters in the segment 2370-2390 MHz. However, as pointed out in the Society's response to the consultation, a change in use by the services with a primary allocation from one of a specialist nature, where deployment may be limited in either location or time or both, to one involving the provision of consumer based services operating on a 24/7 basis (e.g. Broadband) has the ability to make the band unusable by services with a secondary allocation.

Compliance and Enforcement (Paragraph 3.1.1 page 10 and Appendix B)

The Society welcomes the fact that, in furtherance of its responsibility under the Wireless Telegraphy Act and the 2002 Act of maintaining the integrity of the radio spectrum,

ComReg will significantly increase the number of monitoring stations during 2011 and 2012. Effective monitoring is an essential component of spectrum management particularly in the context of evolving technologies (often licence exempt) which have the potential for significant interference to the radio spectrum.

Of particular concern to the amateur service are Power-Line Transmission (PLT) and Power-Line Adaptors (PLAs). A report by the PA Consulting Group on behalf of Ofcom indicates that their results show that users of sensitive radio systems may increasingly suffer interference from PLT devices. Their conclusion was that notching of amateur bands and the introduction of interference mitigation measures such as power control and smart notching would also be required (Report on "The Likelihood and Extent of Radio Frequency Interference from In-Home PLT Devices" 21 June 2010). A further report, dated September 2008, commissioned by Ofcom from the accredited test house ERA Ltd in relation to Comtrend PLT devices states "It is considered that the Ethernet Power Line Adapters do not meet the Essential Requirements of the EMC Directive; emissions could potentially cause interference to communications equipment." The Essential Requirements of the EMC Directive include that equipment must be designed and manufactured so that the electromagnetic disturbance it creates does not exceed a level above which radio and telecommunications equipment or other equipment cannot operate as intended. The report goes on to state "While radiated emissions failed by up to 10.88 dB at a few spot frequencies, conducted emissions, from 2 to 27 MHz were up to 39.4 dB above the limits apart from discrete notches in the main amateur bands". A report on a more limited experiment by the BBC acknowledged that Power-Line Transmission of data using HF signals injected on the mains wiring has previously been demonstrated to cause interference to reception of HF broadcasting. In relation to newer devices that use VHF frequencies the report went on to state "It was confirmed that the PLAs examined use spectrum from 50 to 300 MHz to achieve greater throughput than is possible at HF ----- Operation of the PLAs caused interference to indoor-portable reception of both FM and DAB broadcasts, in varying degrees from no effect to total disruption. The 'digital cliff' of DAB reception means that when interference occurs the impact is extreme." (BBC Research White Paper WHP 195).

It is acknowledged in the proposed strategy document that EU Decision 876/2008 and EU Regulation 765/2008 in effect made market surveillance mandatory for all regulatory

authorities. Power Line Adapters are freely available here in discount stores and through internet providers. The examples given above demonstrate the need for ComReg to be pro-active in the matter of market surveillance particularly in relation to licence exempt devices some of which have the potential to cause significant harmful interference to HF and VHF frequencies. There is also a need for more stringent requirements in relation to these devices in the matter of power levels (both active and idle), depth of notching over the HF/VHF spectrum and radiation from the devices themselves and the associated mains wiring which, since it is not screened, acts as an effective radiator of interfering signals

At present it seems likely that a new draft standard on emissions from Powerline devices (prEN 50561) will be submitted to a vote of members of CENELEC during 2011. It is of course not clear what the outcome of this will be nor whether, if approved, the EU will adopt it for publication in the Official Journal as a Harmonised Standard. While the draft standard provides for notching of all amateur bands it is considered that the emissions will not be sufficiently attenuated by the levels proposed and the amateur service is seeking that within each excluded frequency range the transmitted signal level within that range, in the proposed standard, shall not exceed the requirements of EN55022:2006.

11 Lo Jack Equipment Ireland Ltd

LO JACK®

Equipment Ireland Ltd

By e-mail to: marketframeworkconsult@comreg.ie

23rd May 2011

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

Subject: Response to Consultation – "Review of the Period 2008 – 2010 & Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013"

Reference: Commission for Communications Regulation Consultation Paper – Document 11/28 (12 April 2011)

Dear Ms. Devey,

LoJack Equipment Ireland Ltd (LJEI) thanks you for the opportunity to respond to this consultation paper.

Our particular interest concerns the topic of "Tracking, Tracing, Paging and Fees" to which mention is made in Section 6.9.1 (Review of Previous Strategy Period) on page 68 of the consultation paper as well as in Section 6.9.2 (Proposed ComReg Strategy for Business Radio Services) in the bullet on the top of page 72. These both concern the potential of the frequency band 169.6 – 169.8125 MHz for use by high power tracing and asset tracking systems.

As to our background, LoJack invented the first Stolen Vehicle Recovery System (SVRS) over 25 years ago, using a VHF frequency to locate and recover stolen assets, mainly operated by official Law Enforcement agencies directly. We are now fully operational in the United Kingdom (Northern Ireland), France, Spain, Portugal, Italy, Belgium, the Netherlands, Germany and Poland. Denmark has also approved our application but the system is not yet operational. Over one million vehicles have been installed throughout Europe with a LoJack transponder unit. We operate under different brands, in the UK we are known as TRACKER Network which is a Licensee of LJEI. LJEI is the global headquarters (excluding North America) of the group, with registered offices in Dublin, Ireland.

A single frequency is used throughout these countries (simplex, centred on 164.1750MHz, with 12.5 kHz channel and very low duty cycle), as thieves do not comply with regulatory restrictions, often moving stolen assets across borders to try to evade police. However, due to the ability of RF to penetrate containers and garages, the single frequency being used in all countries listed, the direct involvement of police and our accumulated experiences, we offer a better than 90% chance of asset recovery on average. It can be noted that use of the above frequency is recognised in the European Common Allocation table as follows: *"The frequency 164.175 MHz is used for existing tracking and asset tracing systems on a national basis."*

Please also note that LoJack is currently in discussions with ComReg as we are keen to proceed with the acquisition of the frequency license in Ireland in order to ensure continuity and to extend the ubiquity of our system within the EU, and in particular with the existing system in UK and Northern Ireland.

When reviewing the Consultation paper, we note with interest the comment in Section 6.9.1 that:
"*ComReg has, in the interim, added this allocation to the National Table of Frequency Allocations. However, as there has been no demand to access this spectrum for such systems, ComReg has refrained from adding these services to its current business radio licensing framework.*"

We further note from Section 6.9.2 that ComReg is seeking to "*provide a regulatory framework for licensing the 169.6 – 169.8125 MHz band for the use of high power tracing and asset tracking systems and high power paging systems under in line with the relevant EC Harmonisation Decision*".

LoJack is conceptually supportive of the use of the band 169.6 to 169.8125 MHz for harmonising ***new*** high power tracking and asset tracing systems, subject to there being a valid market demand for blocking such rare and precious spectrum, and an obligation by ALL European administrations to ensure the same channel be awarded in each case in order to assure true and effective harmonisation. However, because of the actual installed network of both LoJack base stations and mobile transponders in customer vehicles, as well as other related infrastructure, any obligation to have LoJack migrate its operations to a frequency in the band 169.6 to 169.8125 MHz would incur substantial financial requirements and operational complications which the group is not able to sustain.

In order to encourage network efficiency and compatibility in the system, we encourage and welcome ComReg to express their support for existing LoJack system requirements as expressed recently to ComReg's Spectrum Licensing Dept, and which may in future become an EU wide request for equalisation. ComReg's assistance and understanding in this matter is much appreciated!

We remain ready to respond to any questions or requests for additional information that you may have and are pleased to collaborate with ComReg on this matter.

Best regards,

Diego M. Tebaldi
Head, Global Government Regulatory Affairs

12 Qualcomm

Qualcomm Europe Inc.

Qualcomm Response to the Commission for Communications Regulation consultation paper on the Review of the Period 2008 – 2010 & Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013.

May 2011

Executive Summary

Qualcomm welcomes the opportunity to share its views on the Commission for Communications Regulation (ComReg) consultation paper on the Review of the Period 2008 – 2010 & Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013.

Qualcomm could not agree more with ComReg's statement in the foreword of the consultation paper: *Radio frequency spectrum is a valuable national resource, underpinning important economic, social and communications activities.*

Qualcomm congratulates ComReg on its numerous achievements during the period 2008-2010 and believes that ComReg is setting the foundation of a successful future for Ireland. Qualcomm stresses that the importance to complete the liberalisation and award of the 900 MHz band and the award of the 800 MHz band, in order to set the path for the future development of mobile broadband in Ireland.

Qualcomm invites ComReg to focus on two specific areas of interest for the upcoming period 2011-2013:

- Mobile broadband traffic is growing drastically and changing in nature with the rise of mobile multimedia traffic. The **L-band (1452-1492MHz),** as highlighted by ComReg, offers a unique opportunity when used for supplemental mobile downlink, to deliver enhanced mobile multimedia services over 3G/4G networks, to significantly enhance user experience and to facilitate innovative mobile multimedia business models.

- Authorised Shared Access – an evolutionary spectrum authorisation scheme for faster access to high quality spectrum. Policy will need to evolve further to accommodate the level and nature of demand for mobile broadband spectrum. **Authorised Shared Access (ASA)** can enable the timely availability and licensed use of harmonized spectrum for mobile with

predictable Quality of Service, while taking into account specific national circumstances. Member States will play a key role in the definition and implementation of ASA in Europe.

Qualcomm believes that these two priorities can greatly contribute to the success of ComReg's strategy for managing the radio spectrum between 2011 and 2013.

Introduction

Qualcomm details in the following section its proposals to ComReg for its Strategy for Managing the Radio Spectrum: 2011 – 2013 through three main topics:

- the L-band (1.5 GHz) opportunity for delivering enhanced mobile multimedia over supplemental mobile downlink ,
- the availability mobile broadband spectrum (800 MHz, 900 MHz, 1800 MHz, 2.3 GHz, 2.6 GHz),
- the study and implementation of Authorised Shared Access (ASA).

L-band

Qualcomm agrees with ComReg that: *'With the convergence of fixed, broadcasting and mobile services over digital wireless platforms, a regulatory approach promoting flexible use of spectrum is increasingly important.'* and that *'The prospect of a harmonised approach to permitting a range of services in the L-band, which is currently unused in Ireland, is particularly attractive […].'*

The L-band offers a unique opportunity to develop a harmonised solution for the delivery of enhanced multimedia applications over the supplemental mobile downlink (3G/4G) and therefore Qualcomm fully supports ComReg proposal to make available the L-band for converging broadcast and mobile applications and to contribute to the CEPT work in this area.

<u>Market evolution and Business models</u>

Though convergence has been tagged as a key evolution in the digital society for a long time, its practical meaning and application are now materializing with the convergence of broadband and broadcast, multimedia and internet services over the mobile platform. Mobile data traffic is predicted to increase exponentially over the coming years with a particular evolution towards asymmetrical traffic. Figure 1 illustrates this trend with mobile video, a vastly downlink oriented traffic, accounting for 66% of the total traffic in 2014.

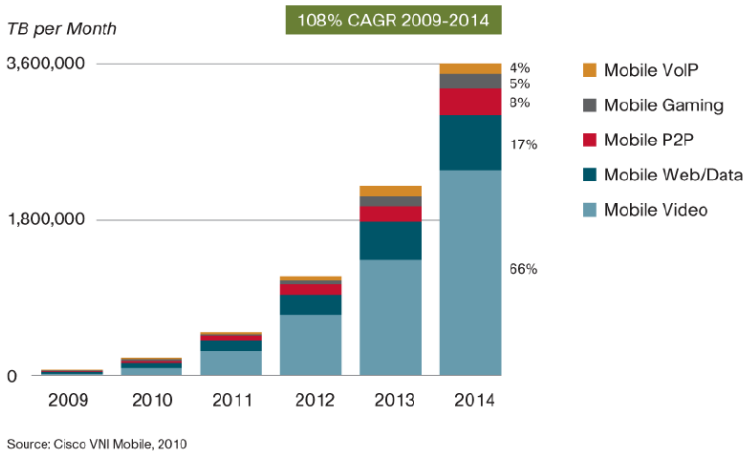


Figure 1: Projected growth of mobile broadband traffic

This asymmetry of mobile traffic has been confirmed by measurements in today's networks (Figure 2) which show that current data asymmetry ratios in the US, Europe and Japan ranges from 4:1 to even 9:1.

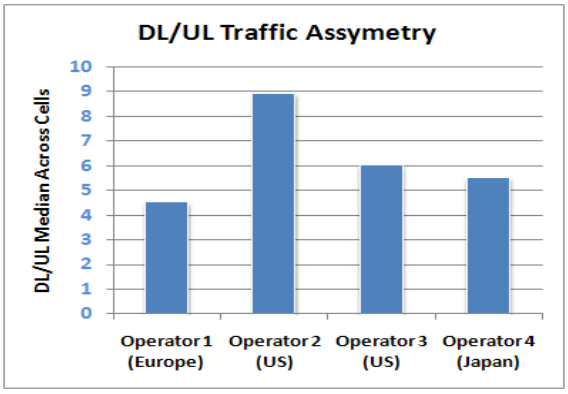


Figure 2: Median Downlink/Uplink Ratios

Furthermore, internet is going mobile through a variety of connected devices (e.g. e-readers and tablets). Their number is projected to grow significantly over the coming years (Figure 3) amplifying the evolution towards asymmetric mobile data traffic and the increase in mobile multimedia consumption.

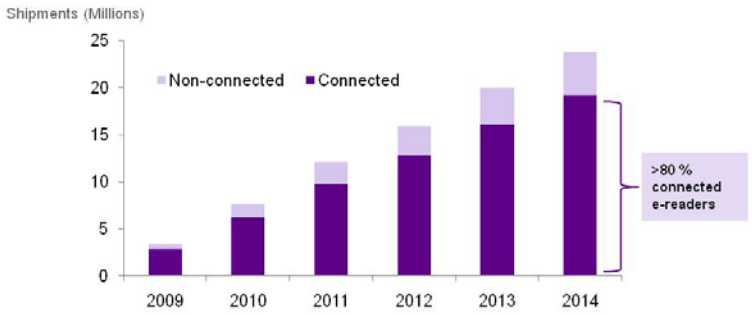


Figure 3: Expansion of the e-readers market

Taking into account that current spectrum allocations for 3G/4G in Europe are symmetrical, the use of 40 MHz in the L-band (1452-1492 MHz) for terrestrial supplemental mobile downlink could therefore bring considerable benefits to appropriately respond to users demand for mobile multimedia services, handle the exponentially growing asymmetric mobile data traffic and foster the convergence of services and applications on the mobile platform.

Technologies and standards

UMTS and LTE mobile technologies can support the delivery of mobile multimedia services and the standards have evolved (UMTS 3GPP standard Release 9 and 10, LTE 3GPP standard Release 10) to include multi-band and multi-carrier aggregation capabilities i.e. using jointly several carriers in different frequency bands to obtain faster data rates, capacities and an enhanced user experience. This enhancement could be used to combine L-band supplemental mobile downlink spectrum with current paired symmetrical mobile bands (e.g. 2.1 GHz, 800 MHz, 900 MHz, 1800 MHz), in order to create an overall asymmetrical channelling arrangement with more downlink capacity. LTE (3GPP standard Release 9) also includes evolved Multimedia Broadcast and Multicast Services capabilities (eMBMS) which would enable to deliver rich mobile multimedia content to users using supplemental mobile downlink L-band spectrum.

The RF band support is a release-independent feature in 3GPP; hence the L-band can be supported starting from UMTS Release 9 devices although L-band numerology and conformance test specifications will be part of a later 3GPP release. A harmonised ECC band plan for supplemental downlink is however required to trigger the L-band standardisation work by 3GPP. At chipset level (baseband and RF transceiver), a solution capable of L-band supplemental mobile downlink entirely leverages the architecture of a UMTS Release 9 dual-carrier dual-band capable chipset. UMTS Release 9 chipset solutions are expected to become available to enable commercial devices in 2013.

Spectrum and Regulatory considerations

The L-band 1452-1492 MHz is currently allocated by the ITU on a co-primary basis to the Mobile, Broadcasting and Fixed Services which enables the use of this spectrum for supplemental mobile downlink to deliver convergent services.

Furthermore, the use of the sub-part 1452-1479.5 MHz for supplemental mobile downlink is compliant with the existing Maastricht Agreement MA02revCO07. Indeed, MA02revCO07 does enable the deployment in the 1452-1479.5 MHz band of a wide range of mobile multimedia technologies, including UMTS and LTE downlink, as concluded by WG FM45 at its December 2010 meeting (FM45(10)235 Annex 7).

In addition, the upper part of the L-band, 1472.5-1492 MHz, subject to an ECC Decision ECC/DEC/(03)02 which designates this frequency band for use by satellite DAB, remains unused across Europe due to the lack of market demand for satellite radio services in the L-band. WorldSpace which used to deliver satellite radio services in the L-band terminated its commercial operation in Europe in 2009. This part of the L-band can also be harmonized and used for terrestrial supplemental mobile downlink alongside the 1452-1479.5 MHz part.

The development and adoption by the ECC of a harmonised band plan for the 1452-1492 MHz band for terrestrial mobile multimedia downlink, on a technology neutral basis, could bring the L-band spectrum into an efficient use in Europe by enabling the deployment of a number of mobile multimedia technologies under various business models.

A harmonized technology neutral ECC band plan for the L-band (1452-1492 MHz) based on 5 MHz blocks, defining the minimal technical restrictions parameters for mobile multimedia downlink is key to enable the efficient use of the spectrum, economies of scale, standardisation and product development while leaving flexibility on a national basis to CEPT administrations to cope with their national market requirements in terms of spectrum availability (part or the whole of the L-band spectrum) taking into account the compatibility with the Maastricht Arrangement.

Economies of scale considerations

The use of the L-band for mobile downlink could also lead to economies of scale in Europe and globally. In a number of countries worldwide, the L-band spectrum has been reserved for use by digital radio (T-DAB services) but remains unused and could therefore be refarmed in a straightforward manner for supplemental mobile downlink. A good example is Canada where Industry Canada has consulted on the adoption for the L-band 1452-1492 MHz of ‘a spectrum utilization policy allowing for flexible use of the spectrum to support a variety of services and technologies for subscription broadcasting, multimedia, fixed and mobile broadband applications. (http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09751.html#band1452a)

Future work

During its May 2011 meeting, the CEPT Frequency Management (FM) decided to create the Project Team FM50, dedicated to the L-band, in order to promote and harmonise the optimum use of the band at European level. The L-band offers a unique opportunity to develop a harmonised solution for the

delivery of enhanced multimedia applications and Qualcomm believes that this usage would bring unmatched benefits for customers and citizen in Ireland and throughout Europe.

Qualcomm fully supports ComReg proposal to contribute to the CEPT work in this area and strongly recommends ComReg to support the harmonized use of the band for mobile multimedia downlink.

Mobile broadband spectrum

Mobile broadband is both a large opportunity for operators and a life changing experience for users. The digital divide, i.e. the inability for a significant percentage of the population to benefit from digital services such as Internet access, is rightfully identified as a key challenge for both society and the economy. Mobile broadband is the key to bridging the digital divide as it allows cost-efficient Internet connectivity over a wide coverage of sparsely populated areas.

Mobile broadband does not only provide internet access to rural areas but also provides *mobile internet access*, which in itself is becoming more and more important to citizens and companies. Services such as e-health or automotive services inherently require mobility and are expected to play a major role, particularly to cater for the need of an aging society, but also as a general infrastructure for the society. Already today, advanced users expect to have a high quality mobile internet access anywhere and everywhere, with a serious impact on the competitiveness of a region when it is not the case.

Any delay in the availability of mobile broadband is likely to have vast consequences on the economic performance of a country like Ireland. In particular, innovation in terms of services will remain limited as long as an ubiquitous infrastructure is not in place. In parallel, delaying the availability of the mobile broadband platform would hurt operators which rely increasingly on data revenues. At the same time, the current explosion of data traffic indicates that it is important to ensure the optimal spectrum efficiency in the long term.

<u>Fast availability of all mobile bands for mobile broadband</u>

We believe that the 900 MHz band should be liberalised and the unused part awarded as soon as possible and considered as a priority, as this band is the key in the next 5 years to the widespread availability of a mobile broadband service in Ireland.

The 800 MHz band should be awarded in order to allow operators to plan the future of mobile broadband in Ireland. The 800 MHz band is a key band to enable the deployment of ubiquitous LTE networks.

The 1800 MHz band should also be liberalised in order to enable operators to develop multiband network deployment strategy relying on low frequency bands for coverage and high frequency bands for capacity.

Consider new spectrum for mobile broadband.

Qualcomm invites ComReg to study the possibility to release more spectrum for mobile broadband throughout the next regulatory period (2011-2013).

The democratisation of mobile broadband creates an explosion of the volume of the mobile traffic.

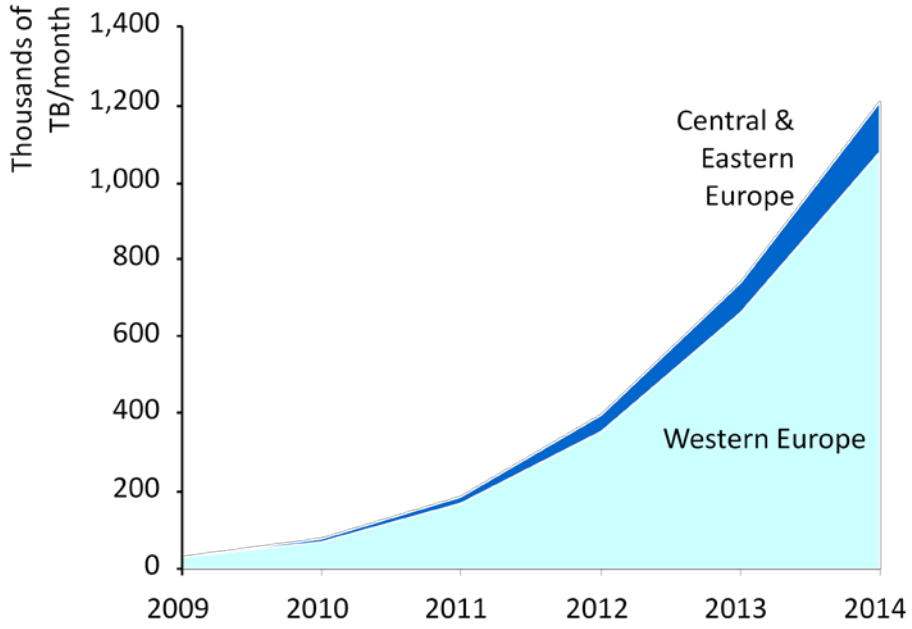


Figure 4: Growth rate of mobile broadband traffic predicted to be more than 100% p.a. (Sources: Cisco Visual Networking Index; Morgan Stanley, Ingenious Consulting)

The explosion of traffic can only be faced by combining several mechanisms, including:

- Increasing the efficiency of air interface technologies (refarming GSM spectrum for HSPA/LTE).
- Using spare capacity in upcoming mobile bands (e.g. 800MHz).
- Densifying the networks.

However, these measures alone will not be sufficient to face such a traffic growth and new spectrum must be found for mobile broadband, in order to avoid a dreaded spectrum crunch where all mobile networks become very congested.

Qualcomm invites ComReg to study the possibility to release new spectrum bands for mobile broadband:

- The **L-band** is a unique opportunity for mobile networks to be in a position to deliver mobile multimedia services with Quality of Service using supplemental mobile downlink. This requires a European harmonisation and studies at CEPT, in the context of the recently created Project Team FM50.

- The **2.3GHz** band is a prime candidate for rapid harmonisation and release in Ireland. However, the band also requires harmonisation at European level in order to drive economies of scale. Authorised Shared Access can pave the way to harmonise the band at European level while acknowledging and catering for national circumstances. Such a course of action would greatly benefit Ireland by triggering the ecosystem for attractive terminals at 2.3GHz.
- In the middle to long term, ComReg could consider the introduction of mobile broadband in the **2.5GHz** band, which is harmonised in other European countries. The **3400-3800MHz** is also considered throughout Europe for mobile broadband, as it offers unique characteristic in terms of support for large bandwidth.

Finally, Qualcomm underlines that harmonisation is a pre-requisite to the identification of any new band for mobile broadband, due to requirement for very large economies of scale.

Authorised Shared Access (ASA)

Historically, the evolution of institutional and policy approaches in Europe has been successful in handling growth in demand for mobile spectrum thus far, through:

- Policy leadership from the Member States and the Commission and technical leadership from CEPT
- Pragmatic evolution: from pure command-and control to a combination of command-and-control and market-based approaches (technology neutrality, harmonised technical conditions and band plans etc.)
- This evolution has enabled Europe to take a leadership position in unlocking harmonised spectrum for mobile broadband (900MHz, 2.1GHz, 2.6GHz, 800MHz).

However, policy would need to evolve further to accommodate the level and nature of demand:

- Freeing up spectrum is a costly and lengthy process
- We are starting to witness delays in harmonised spectrum availability, which impact innovation and investment in Europe (see next slide)
- Parts of the spectrum below 6 GHz are lightly used
- A further evolution in policy is necessary to unlock more harmonised spectrum for mobile broadband to meet market demand in a timely and dynamic manner

Traditionally, the access and use of spectrum for commercial applications has been authorised in two ways: Either licensed or licence-exempt.

"Licensed" means that the usage rights are exclusively granted in time, frequency and geography. For example, a license might last for 25 years, apply to a frequency block and on a national basis. An example of licensed use is the 2 GHz spectrum for the provision of third generation mobile communication services,

"Licence-exempt" or "unlicensed" means that devices which meet certain technical conditions can share the spectrum, be used anywhere and at any time without guarantee of predictable quality of service. An example of licence-exempt use is the 2.4GHz spectrum for the provision of Wi-Fi access services.

Qualcomm and Nokia have submitted a proposal to the RSPG[1] and CEPT[2] calling Europe and Member States to develop and adopt "*a complementary authorisation model for spectrum rights of use, named "Authorised Shared Access" (ASA), which allows for a shared use of spectrum using cognitive radio technologies (geo-location databases, sensing, etc.) based on an individual authorisation model of spectrum rights, which could act as a regulatory enabler to making available, in a timely manner, harmonised spectrum for mobile broadband while overcoming time, resource and political constraints*."

An incumbent user's use of its assigned spectrum could vary in the time, frequency and spatial domains. Alongside the use by the incumbent, a further user, the ASA user, can be granted an ASA right. It is a right to utilise under-used spectrum without interfering with the incumbent user, subject to the terms defined by the relevant authority (government, regulator) and/or upon an agreement with the incumbent user. There may be one or several ASA users per frequency band as there may be one or several incumbent users.

If adopted at European level, ASA will act as a key enabler to unlock access to spectrum allocated to Mobile Service and identified for IMT by successive WRCs while taking into account specific national circumstances. For example, ASA could greatly facilitate the opening of parts of the 2.5GHz in Ireland and 2.3 GHz in other European countries for mobile broadband.

The industry can help push ASA forward, but will require Europe-wide efforts on policy and technical harmonisation. Member States, European Commission and Parliament involvement will be key and will have each a role to play in the definition and implementation of ASA. Inside the CEPT, the Cognitive Radio Correspondence Group will study the concept of ASA and the requirements to implement it as decided by the ECC FM meeting in May 2011..

[1] Qualcomm and Nokia Corporation joint response to RSPG consultation on Cognitive Technologies (http://rspg.groups.eu.int/consultations/consultation_cognitiv_2010/qualcomm_nokia_0114.pdf)
[2] ECC(11)INFO01 (www.ero.dk)

Qualcomm invites ComReg to consider the benefit that ASA could bring to consumers and citizen through an improvement of the spectrum management framework.

13 RTÉ and RTÉNL

RTÉ and RTÉNL Response to the

ComReg Review of the Period 2008 – 2010 & Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013

24th May 2011

Introduction

RTÉ, Ireland's primary Public Service Broadcaster (PSB), together with RTÉNL, welcome the opportunity to respond to ComReg's *Review of the Period 2008 – 2010 & Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013* (ComReg document 11/28). This response reiterates the position outlined in the RTÉ and RTÉNL response to ComReg's consultation in May 2010 on its *Draft Strategy Statement 2010 - 2012* (ComReg document 10/31).

RTÉ and RTÉNL recognise the strategic importance of ComReg as industry regulator at this time of fundamental change in the evolving convergent communications industry. The importance of this industry for Ireland, for both the economy and Irish society, cannot be overemphasised. The pro-active stance taken by ComReg to date in seeking to achieve the greatest possible efficiency and effectiveness of radio spectrum use is to be welcomed, and ComReg's commitment to innovation and experimentation is to be particularly commended.

Broadcasting

Broadcasting is important for Irish society in many ways, especially to ensure social inclusion, cultural diversity, media pluralism and balanced information and debate in society. RTÉ believes that the fundamental democratic principle of ensuring social inclusiveness as demonstrated by a 'one-to-many' (or point to multipoint) broadcast paradigm will continue to be important for citizens and for policy makers, and that this principle must be safeguarded even more so in this era of convergence and technological complexity.

Public Service Broadcasters (PSBs) must deliver content to their audiences via all platforms. The audience must have the right to access content via any platform. PSBs must, therefore, be able to offer a diverse range of media content services according to their universal service obligations. What must be central is the provision of content to the public on a free-to-view and universally accessible basis, subject to legislative and regulatory governance, and fulfilling the PSB remit of 'informing, entertaining and educating' all citizens on an equal basis. RTÉ fully recognises that the merging of broadcasting and broadband services creates a complex communications landscape, but remains resolute that the primary rights of the citizen must be safeguarded as a priority.

Radio Spectrum and Broadcasting

RTÉ is on record, for example in its submission to the European Commission consultation/call for input in preparation for the Radio Spectrum Policy Programme,[1] in stating the importance of any initiatives that can help reinstate regulatory certainty for broadcasters during a time of considerable change in terrestrial broadcasting.

[1] http://ec.europa.eu/information_society/policy/ecomm/radio_spectrum/_document_storage/consultations/2010_rspp/rspp_consultation.pdf

Spectrum is a scarce natural resource, essential for making content available to as many EU citizens as possible and for fulfilling important economic as well as social and cultural functions. Efficient use of spectrum is very important and shall be required from all users. Public service broadcasters across the European Union strongly believe in the potential that new communication technology and digital delivery platforms (i.e. broadband) have for Europe's citizens. RTÉ, in conjunction with its sister PSBs in the European Broadcasting Union[2] (EBU), supports a dynamic approach to spectrum management, which recognizes Member States' competence in the field and respects cultural, audiovisual and media policies. The convergence of broadcasting and broadband enables new and innovative ways for European citizens to engage with content on a variety of platforms and devices. In this, the importance of terrestrial broadcasting however, should not be overlooked.

The terrestrial broadcasting platform is in many countries the primary means of delivering broadcasting services. It plays an important role in fulfilling the universal coverage obligation of the EBU Members which is often part of their public service remit. In many countries coverage of 98% or more of the population and free-to-air access to services are mandatory.

Even in countries where alternative platforms (e.g. cable, satellite or broadband) hold a significant market share, terrestrial broadcasting is usually regarded, alongside these other platforms, as an essential, flexible and reliable way of delivering broadcasting content to a mass audience. This is facilitated by the fact that most of the households in Europe are equipped with suitable installations to receive free-to-air radio and television services, without any subscription.

As with other communication sectors, terrestrial broadcasting networks are also currently being more and more deregulated and exposed to market forces. Telecomms regulation in the EU is largely based on the principles of technology and service neutrality, and promotes competition and market-based approaches. Nevertheless, the EU regulations allow for the application of specific rules to protect terrestrial broadcasting in accordance with general interest objectives, such as audiovisual and media policy.

Broadcasting and broadband are complementary and **both** will be needed in the future for Europe's citizens. Irish and EU spectrum policy should reflect this complementary

[2] The EBU is the world's largest professional association of national broadcasters, whose Active Members are public service broadcasters in 56 countries corresponding to the ITU European Broadcasting Area, which includes all European countries, Central Asia, North Africa and the Middle East. Associate Members include broadcasters from Canada, the USA, Japan, Mexico, Brazil, India and Hong Kong, as well as many others.

The EBU's purpose is to serve and support the interests of its Members, promote cooperation between broadcasters and facilitate the exchange of audiovisual content. The EBU works to ensure that the crucial role of public service broadcasting, which is central to Members' activities, is recognised and taken into consideration by decision-makers.

The organization provides services to the broadcasting community at large, along with expertise specifically to Members on legal, technical and programming issues. It also conducts economic and market analyses and offers targeted training programmes. For more information about the EBU: www.ebu.ch

RTÉ is grateful to the EBU for some of the material used in this introductory section of the present document.

nature of broadcasting and broadband and facilitate future development of both platforms.

Access to spectrum should be associated with coverage and service obligations, as well as with spectrum efficiency requirements for all users. EU spectrum policy should seek to protect and promote public interest, including cultural diversity and different local, regional and national perspectives.

Similar requirements for quality of service, universal access, economic and technical efficiency should be applied to terrestrial broadcasting and wireless broadband networks across all relevant frequency bands.

As the Irish national spectrum management authority ComReg has a key role to play in ensuring that quality spectrum continues to be made available to broadcasting, with sufficient certainty to encourage investment; and sufficient room to allow the broadcasting industry to continue to develop new and innovative services.

Regulatory clarity and certainty are required as they enable broadcasters and associated industry, as well as the public, to make the right investments into future technology and services. It is therefore to be expected that ComReg as the Irish industry regulator will ensure clarity on all these matters for the Irish public.

Comments on Individual Sections

Section 3 – Introduction: Spectrum Management in Ireland

ComReg, in their *Spectrum Management Strategy Statement 2008-2010* (ComReg 08/50) stated the following:

> *The value of broadcasting goes far beyond its economic contribution in terms of fostering civil society, its cultural significance, its role in media pluralism and hence its importance as a public policy objective.*[3]

and that:

> *It is clear that the contributions of the defence, public safety, transport and broadcasting sectors to society and the economy is heavily dependent on access to radio spectrum.*[4]

RTÉ is concerned that the central role fulfilled by Public Service Broadcasting in leveraging the social benefits of spectrum use is not highlighted to the same extent in the current ComReg *Review of the Period 2008 – 2010 & Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013* document. Public Service Broadcasting is not explicitly listed in many places where the social benefits of spectrum use are discussed.

[3] *Spectrum Management Strategy Statement 2008-2010* (ComReg 08/50), p.8.
[4] *Spectrum Management Strategy Statement 2008-2010* (ComReg 08/50), p.9.

Therefore RTÉ suggests that this oversight might be amended so that Public Service Broadcasting should be included in the following sections on page 7 of the current ComReg document quoted below:

- *Maximising social benefits arising from radio spectrum use. For example in relation to public safety, national security and health care.*

In some limited cases, it is recognised that spectrum rights may need to be set aside in order to safeguard the provision of certain public services such as safety and defence or to meet some international obligation related to spectrum use.

By contrast, the *Spectrum Management Strategy Statement 2008-2010* (ComReg 08/50) stated the following:

> *Public policy goals play a significant role in determining spectrum management priorities. Technical efficiencies may have to be compromised in order to safeguard the provision of certain public services such as safety, defence and public broadcasting services.*[5]

This is a key point because maintaining sufficient spectrum resources for established Public Service Broadcasting is becoming increasingly difficult as ComReg, as spectrum managers, experience increasing demands to accommodate commercial, community and local radio stations in the FM broadcast band alongside established public service broadcasting. A clear guideline on the need to make special provisions for public service broadcasting, where necessary, which may not be the most technically efficient but which are effective, is required. This guidance in the previous Strategy Statement provided important regulatory certainty in this matter, and RTÉ requests that this recognition by ComReg, that in achieving certain public policy goals that technical efficiency may have to be compromised in order to ensure the provision of public services, be re-affirmed in their current Strategy proposal. This underlines the argument that effective use of spectrum should not be unnecessarily compromised for the sake of efficient use.

Section 6 Specific Radio Services

RTÉ welcomes ComReg's considerations regarding broadcasting services in Ireland, and wishes to address the following specific aspects.

Section 6.1.2 - Proposed ComReg Strategy for Public Mobile Services

RTÉ recognises the importance for Ireland of adopting an innovative and forward-looking strategy with regard to spectrum use and the development of new radio services, especially with regard to the delivery of audiovisual content across a range of platforms.

[5] *ComReg Spectrum Management Strategy 2008-2010*, p.7.

However, RTÉ also believes that further to the consideration of research into sharing studies between service in the 790-862MHz band, it is important that ComReg develops a solution to allow mobile service in this band to co-exist with broadcast services below 790MHz, as outlined in RTÉ's comments in response to the ComReg 800MHz consultation (*800 MHz, 900 MHz & 1800 MHz spectrum release consultation*, ComReg doc. 10/71), and ComReg's comments in its *Inclusion of the 1800 MHz Band into the Proposed joint award of 800 MHz and 900 MHz Spectrum* document 10/105, section 3.10.3.2., regarding interference mitigation from users the same frequency band. This action being undertaken by ComReg should be included under section 6.1.2. of the current document.

Section 6.2.1 - Digital Audio Broadcasting (DAB)

It should be noted that DAB services from RTÉ are also available in Kildare, Laois, Offaly, Meath and Louth currently.

In relation to DAB/+, an additional strategic objective should be added under Innovation (Section 5.2.1) and also referenced under section 6.2.2 as follows:

> *Engage with BAI and RTÉ as to spectrum requirements and complete spectrum coordination functions to facilitate a national DAB/+ network.*
>
> *Engage with UK authorities and regulators to scope all Island spectrum plan and network.*

Section 6.2.2 - Proposed ComReg Strategy for Broadcasting Services

RTÉ suggests that ComReg undertakes a strategic review and consults on broadcast requirements in the UHF band, given that the current policy goal of providing sufficient spectrum for six national broadcast layers could not be accommodated alongside further digital dividend release (being considered under Section 7.1.5 in this strategy document).

RTÉ believes that such a review is now necessary, given the significant developments since the core six mux strategy was originally proposed, as outlined as follows:

- 800MHz Digital Dividend
- Initial failure of commercial DTT
- Lack of expressions of interest in a Mobile TV service
- Increased interest in mobile/broadband services
- Increased interest in innovative white space applications
- Changing economic landscape and market conditions.

It is RTÉ's view that an updated strategy with respect to UHF broadcast spectrum is essential prior to the commencement of any further digital dividend discussions, or spectrum re-planning exercises.

Administrative Incentive Pricing

In accordance with comments in the DCENR Spectrum Policy Statement[6] on the effective and efficient use of spectrum it would be appropriate to add the term 'effective' to the following sections on page 44 of the current ComReg document, see suggested addition in square brackets below:

> *This is to evaluate whether a reasonable licence fee is currently being charged and if any changes are required to the current licence fee structure to ensure the [effective and] efficient use of the radio spectrum.*
>
> *Examine the current licence fee structure for all broadcast services to encourage the [effective and] efficient use of spectrum.*

Strategy bullet point 4 regarding sharing studies

As indicated in the RTÉ response to section 6.1.2 above, reference should be made in this context to developing a solution that ensures the protection of broadcast services in the band below 790MHz.

Section 7.1.5 - A Second Digital Dividend

With regard to exploring if a second digital dividend could be provided in the 600MHz band, it is noteworthy that the UK is the only European country known to be exploring this option. The UK approach of an isolated digital dividend in the 600MHz band surrounded by broadcast services could prove inefficient for non-broadcast services (given that 'protection clauses' may exist on both sides of the band). This issue should be clarified in the ComReg spectrum strategy document for readers who may not be familiar with realistic capabilities and potential availability of further digital dividend spectrum, and who might therefore incorrectly assume that this spectrum would be similar to the 800MHz band in its potential suitability for mobile/broadband services.

RTÉ agrees with ComReg's suggestion that a number of scenarios will need to be explored in relation to this issue, and would propose that this work be preceded by a full strategic review of broadcast requirements in the UHF band (see comments in response to Section 6.2.2 above).

Section 7.1.6 - L-Band (1.5GHz)

RTÉ suggests that any proposals to release this band should be considered by ComReg in a dedicated full consultation, separate from the current ComReg Spectrum Strategy consultation.

- Submitted by RTE and RTÉNL, 24th May, 2011.

[6] *DCENR, Spectrum Policy Statement, September 2010, p.4.*

14 Silver Spring Networks

Silver Spring Networks' response to ConReg's *Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013*

Silver Spring Networks is grateful for the opportunity to respond to ComReg's proposed strategy and is pleased to provide feedback on several aspects of the strategy. ComReg has proved itself to be a constructive and forward-looking regulator that has consistently administered the management of radio spectrum in Ireland in a way that maximizes its utility for the country. Silver Spring Networks applauds CER's performance and warmly welcomes the proposed strategy. On points of detail, Silver Spring Networks has the following comments to make of the document.

4.2.2 Secondary trading/rights of transfer

We applaud the trend towards spectrum trading, as we applaud the trend towards other forms of spectrum use, which is in evidence across the whole of Europe. In ETSI's ERM TG 28, Short Range Device (SRD) group, the concept of 'light' or 'right' licensing is under consideration. This allows users unlicensed access to the band, but with restrictions to protect groups of applications types that share the band. We believe that this is an excellent means to gain both spectral efficiency and extract societal benefits while serving multiple user constituencies and applications.

5.1.3 Enabling technologies

Silver Spring Networks applauds ComReg's proposals to explore advanced techniques for sharing spectrum and believe that, in this way, the efficiency with which spectrum can be utilized is further maximized. We believe that ComReg should consider the use of Frequency Hopping Spread Spectrum (FHSS) as a further technique for increasing spectral efficiency in suitable bands.

6.5 Licence-exempt SRDs: 6.5.2 Proposed ComReg strategy for SRD

Silver Spring Networks agrees that spectrum should only be made available to SRD applications on the condition that there is a clear and demonstrable need, but that such a need clearly exists for Smart Metering and Smart Grid, and so ComReg should support work being carried out in CEPT and ETSI to release spectrum from 870-876MHz for use in Smart Grids as a minimum.

7.1.7 Machine to Machine Communications

Multiple networking technologies will be required to support the Smart Grid. Smart Grid architectures have distinct networks for backhaul (WAN), meters and other distribution grid devices (NAN, or neighborhood area network), and the home (HAN, or home area network). While they may well play an important role, none of the currently available technologies such as powerline carrier (PLC), cellular (e.g., GPRS, 3G), or fixed consumer broadband can fully meet the requirements described above. The combined requirements of ubiquitous reliable coverage and very low operating cost make the NAN particularly challenging for current technologies.

Powerline carrier (PLC) is an acceptable technology for basic meter reading, but very low throughput and slow, unpredictable response times lead many to question its suitability for the broader set of smart

grid requirements. Its broadband cousin, BPL, offers higher throughput and better responsiveness, but at a very high capital cost and with variable performance in the field. Perhaps next generation technologies will overcome these hurdles, but this remains to be seen. Should these technologies prove useful, many vendors will consider “hybrid” technologies that employ both mesh and PLC

Consumer broadband connectivity (e.g., cable modem, DSL), or fibre to the curb or home, has been experimented with by some small utilities in other countries. However, most utilities are very reluctant to share a mission-critical grid management connection with a consumer who has PCs, routers and other devices connected over the same link. The main concerns are security, performance degradation from other uses such as movie downloading, and fear of disconnection if the consumer’s service is discontinued for any reason. Lack of ubiquity is the biggest challenge of all.

Tower-based, star-topology (non-meshing) systems have also been proposed. These, too, might be well suited for basic meter reading. However, potentially low upstream throughput and long round-trip times may make it difficult to meet the latency requirements for full Smart Grid -- for example, hundreds or thousands of electric vehicles simultaneously presenting security credentials upstream prior to charging. The lack of operating history for these new networks also creates additional risk that many utilities find unappealing. Existing networks offer the ability to leverage past investment in a shared infrastructure. However, these too may have difficulty in fully meeting the requirements:

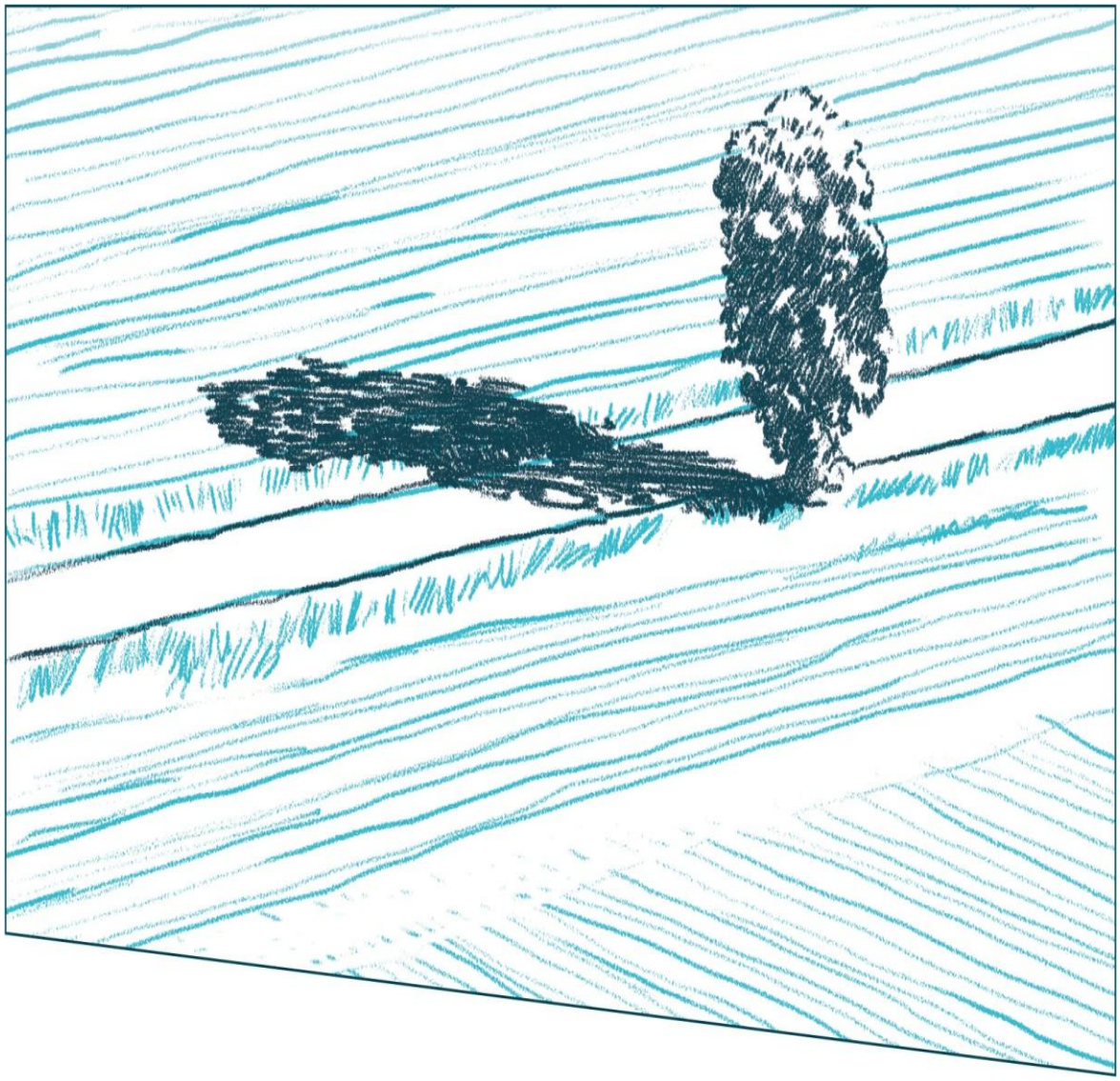
Given the perceived shortcomings of the other currently available solutions, GPRS or 3G are often seen as the “default” choice for smart metering. Given the wide deployment and market power of mobile operators, cellular undoubtedly has a role to play in Smart Grid. Indeed, the coverage to mobile handsets is to be applauded. However, once again, this option will only partially meet requirements at scale, for a number of reasons. By most estimates, GPRS coverage of indoor electric meters is only 80 - 85% owing to the fact that you cannot move your electric meter or other grid devices. The cost of building out the cellular network to provide 100% coverage is likely to be cost-prohibitive, especially given the other requirements to be met: very low capital and operating cost; flat rate “all-you-can eat” pricing independent of time of day and data volume; 15 year service longevity (and no SIM card change-outs) in an industry where planned obsolescence is acceptable and, in fact, occurs every few years.

Network capacity to handle millions of additional smart grid devices at neighborhood level is also a potential concern. For instance, the ability for star-topology, base stations to field tens of thousands of asynchronous “last gasps” during large-scale outages renders is questionable. Even if one makes the generous assumption that ubiquitous coverage can be achieved, operating cost is still likely to be a major deterrent to full Smart Grid use of cellular networks. By comparison, US utilities using wireless mesh in the 900 MHZ band communicate with the meter, and devices beyond the meter, multiple times per day for US$0.24 or less per year.

CER recently published a Smart Metering trials report[1] which highlighted this lack of viable options to provide ubiquitous coverage across the entire Irish landmass and recommending that spectrum be made available in Ireland to allow the introduction of sub-GHz mesh technologies.

[1] Electricity Smart Metering Technology Trials Findings Report, CER, 16 May 2011

15 Telefónica 02



Spectrum Strategy 2011-2013

Response to Consultation 11/28

Telefónica

Introduction

There can be little doubt about the important role that the radio spectrum plays in the lives of everyone today, and this is particularly evident in the explosion of communications services based on radio. We are in the midst of the transition to a connected society where consumers want always-available connectivity with increasing mobility and speed (bandwidth). In consultation paper 11/28 ComReg clearly sets out the contribution made today to the economy and society in general by the use of the radio spectrum. There is no contradicting its significance and no need to further repeat the considerations as expounded by ComReg - Telefonica agrees with ComReg in this matter.

We also agree that Ireland has some natural advantages when it comes to radio spectrum, that we are an Island to the west of Europe, have relatively low use of the spectrum by the Defence Forces, and have a low population density can mean that Ireland has less congestion in certain bands than other European countries. As ComReg states, we have a "relative abundance" of spectrum, and Telefonica believes that Ireland should maximise this advantage for the benefit of society and the economy. ComReg has held up the Test and Trial scheme as an example of how we can take advantage of our position. Telefonica both supports and has used ComReg's Test & Trial scheme, however we believe the benefits it delivers are relatively minor in comparison to the potential benefit of a flexible modern spectrum management regime – particularly for communications services. The greatest benefit can be reaped from the spectrum if we maximise the amount being efficiently used at any time, but this will require a spectrum management regime that facilitates maximum flexibility. It will require a licensing and management framework that allows for rapid change of ownership, technology, and service. Telefonica believes this can best be achieved by modern spectrum management techniques in combination with the application of appropriate conditions when spectrum is assigned.

The licensing and management framework for radio spectrum operated by ComReg today is still built around the Wireless Telegraphy Act as amended. Its primary modus operandi is to give permission for possession of apparatus. ComReg should strive to deliver the most advantageous radio licensing regime as early as possible and the speed with which this is implemented will depend on ComReg's attitude. Telefonica believes ComReg already has quite a degree of scope within existing legislation to introduce modern licences, but must be willing to use that freedom. In the event that certain terms simply cannot be provided because they are excluded under current legislation, then ComReg should as an output of this consultation, produce a detailed request for legislative amendment to be considered by the Minister for Communications, Energy, and Natural Resources. We should not "hang back" and wait for these changes to be imposed, but should instead press ahead so we can gain maximum benefit from the radio spectrum.

Later this year, ComReg will make what will be the most significant single assignment of spectrum in a single process in the history of the State – the proposed assignment of 800MHz, 900MHz, and 1800MHz spectrum. The outcome of that assignment will have significant impact on investment in mobile communications, roll-out of new services, and on the development of the connected society for several years to come. ComReg needs to ensure that its assignment process and the licence terms that apply are optimal for this process, as the result will directly impact the delivery of wireless communications services in Ireland for the foreseeable future.

There are a number of key issues that ComReg should bring into its radio licensing regime in advance of the mobile assignment later this year. This will include an appropriate position on:

- the effect of spectrum fees on uptake, utilisation and network investment
- allowing flexibility of use through technology and service neutrality while also preventing harmful interference
- the effect of licence expiry and licence duration on investment
- the use of auctions and other assignment mechanisms
- the impact of transfer and tradability of licences on efficiency of use
- Spectrum sharing, spectrum pooling and other flexible use options.

In the following document we expand on the above points and also respond to other points in ComReg's draft spectrum strategy.

General Comments

As the National Regulatory Authority, ComReg is responsible for the management and licensing of the radio spectrum in Ireland. The specific requirements on ComReg are contained in a number of different legislative instruments, from the Wireless Telegraphy Act 1926 to the Communications Regulation Act 2002, to the Framework Regulations. ComReg carries out its functions in accordance with the overall policy determined by the Minister for Communications Energy and Natural Resources and as is clear from the consultation document, ComReg carries out a number of ancillary functions like assisting the Minister to represent Ireland at international conferences.

Telefonica welcomes ComReg's publication of its proposed spectrum strategy for the period 2011 to 2013, and supports a significant number of the proposals contained therein. We do however believe that the time has come, and that ComReg has the opportunity, to undertake a much more wide-ranging alteration to its approach to spectrum management. Across the globe, spectrum managers are moving to more liberalised spectrum management regimes, with the aim of taking maximum advantage of their respective resources. Telefonica agrees with ComReg that Ireland has a relative abundance of spectrum, and we now need to ensure that it is assigned to users in a way that maximises its utilisation.

Specifically in relation to the consultation document itself (11/28) Telefonica notes and supports ComReg's approach in relation to the time period covered. While this is essentially a two-year strategy document and needs to focus on the actions to be taken by ComReg in that period, there are several factors that mean the strategy must take account of a much longer planning horizon:

- Investments in networks and services will be considered over a significantly longer period
- Developments in technologies can take a number of years from initial proposal to implementation, and also can require lengthy co-ordination and standardisation work
- Spectrum allocations and changes to designations at international level often require to be initiated several years in advance of utilisation.

There are a number of individual tasks that ComReg must carry out within the timeframe of each specific Spectrum Strategy Statement. These tasks should link directly to ComReg's overall Strategy

Statement, or ideally, both documents should be published together to give a comprehensive plan for ComReg's strategy and planned execution. As in the overall Strategy Statement, ComReg should include a detailed list of measurable tasks and objectives with expected delivery dates. Each subsequent publication of the combined strategy statements should also include a review of the achievement of the objectives in the previous period.

Of utmost importance during the coming strategy period will be ComReg's approach to licensing of the radio spectrum. Telefonica believes ComReg has an opportunity to radically change its approach to management and assignment of spectrum in a way that can facilitate the reaping of maximum benefit from the spectrum for the economy and for end-users. Essentially this requires that the management regime maximises the amount of spectrum that is assigned for use at any time, encourages investment in networks and services that use the spectrum, and facilitates changes in ownership, technology, and service provided. There are a number of conditions that must exist for this, and we have examined these in greater detail in the following section, however in order to be addressed, they will require a change at least to ComReg's approach to licensing, and perhaps also some legislative change.

Telefonica is of the view that ComReg already has a considerable degree of freedom to amend its licensing regime within the current legislative framework and ComReg should take full advantage of that freedom to ensure Ireland can derive maximum benefit from its spectrum. This requires that ComReg is willing to press ahead and include the appropriate conditions both in the manner in which it assigns spectrum, and also in the licence conditions that attach. Several other European countries have already introduced these changes into their spectrum management regimes, and there is no reason for Ireland to be left behind in these developments. We see no reason why ComReg should hold-back or delay in making the changes required. In the event that the existing legislation specifically prohibits ComReg's preferred approach, then ComReg should submit a request to the Minister for Communications for specific legislative amendment.

In 2008, the Minister for Communications, Energy and Natural Resources issued a public consultation on spectrum policy. In the resulting policy statement issued in 2010, the Minister stated that he is "*committed to ensuring that the national spectrum resource is managed and used effectively and efficiently so as to ensure that Ireland does not lag behind in the development of world-class communications infrastructures, technologies and services for the express purpose of raising our competitiveness, contributing to our economic development and improving the quality of life of our citizens*". While Telefonica supports the aspiration of the Minister, the objectives can only be delivered by practical implementation through assignment and licensing. The Report did not propose any specific legislative change, but specified a set of nine policy principles for management of the spectrum resource. Telefonica supports these policy principles, and believes ComReg should now immediately incorporate them into its day-to-day licensing and management of spectrum.

In relation to mobile services, ComReg plans to assign spectrum in three bands later this year, i.e. 800MHz, 900MHz, and 1800MHz. The current proposal is that all of the spectrum in each of these bands will be offered for assignment in a single auction. Telefonica has already provided detailed comments to ComReg throughout the series of consultations held so far, and we will continue to do so. It is not our intention to repeat all of the points in this document, however we believe this assignment will be the most significant single assignment of spectrum in the State to date for the

impact it will have on the industry, end users, and the economy generally. If ever there was a time to get the terms for a spectrum assignment right, this is it. ComReg must ensure that the conditions which will allow for flexible and efficient spectrum utilisation are incorporated before this assignment process is opened.

Specific Considerations

In the above two sections we have explained Telefonica's view that Ireland now needs to radically overhaul its approach to assignment and licensing. There are some specific actions that ComReg should take in this regard as explained in more detail below.

Licence Duration and Expiry – Telefonica has explained its position in relation to licence expiry in some detail to ComReg, particularly in response to consultation documents 08/57, 09/99, and 10/105. In those documents we specifically addressed the consideration of licence duration and expiry with regard to the 900MHz band, and comments made here are without prejudice to any specific points made previously, however the considerations are also relevant to other assignments and licenses.

ComReg's aim must be to ensure that the operators who build networks and provide services can invest in those networks and services on an ongoing basis. There is an obvious difficulty for an operator in making the business case for a multi-year investment if they do not know that they will be permitted to continue to operate the relevant network or service for sufficient duration to recover that investment. Licences that have a fixed expiry date necessarily present this difficulty during the years approaching their expiry.

ComReg seems to reject the above argument in its consultation document, in particular by stating that "*In relation to the investment uncertainty argument ComReg notes that there is contrary evidence in the Irish market with three of the mobile network operators investing significantly in their networks towards the end of their licence terms"*. As only two of the existing mobile licences have ever approached their original expiry date, it is taken that ComReg is counting Telefonica's 900MHz licence in this consideration. Contrary to ComReg's understanding, we would remind ComReg that a commitment was given by its predecessor that this licence could be extended, and any investment by Telefonica was made in this context. In the absence of such understanding, Telefonica certainly would not have been in a position to continue to invest in its GSM network. This is actually a good demonstration of how investors must have security of tenure for a minimum period in order to make ongoing investment.

ComReg seems to take the view that the grant of indefinite term licences somehow would inhibit it as the spectrum manager from introducing amendments to assignments in future. It is difficult to sustain this argument however when comparison is made between certain fixed-term licences and an appropriate indefinite term one. Compare for example the situation at the commencement of the current 2.1GHz licences – ComReg was prepared to issue licences for a twenty-year term. An initial term is needed to give certainty to investors at the commencement of their licence; however following ComReg's argument would imply that this spectrum is effectively "frozen" for twenty years. However a superior outcome could be achieved by the grant of an indefinite licence

incorporating a minimum initial term together with minimum conditions under which notice could be served of a proposal to terminate the licence. One of these conditions would be a minimum notice of proposed termination.

ComReg also cites the potential for stagnation and spectrum hoarding as arguments against indefinite term licences, however there are options available to combat this, including incorporating service and technology neutrality into licences and also facilitating trading of spectrum rights. Telefonica does not believe that the arguments briefly cited in the consultation document against indefinite licences stand up to analysis. In previous consultations Telefonica has referred to Ofcom's position that "*there are a number of reasons why licences with an indefinite term are likely to promote optimal use of the radio spectrum and other relevant objectives*" Telefonica considers that this licence duration issue remains one that requires careful consideration by ComReg in the context of the proposed assignment of spectrum later this year.

Service and Technology Neutrality – While there is an overriding need to make sure services can operate without interference, there are obvious advantages to be gained by allowing service and technology neutral licences. In the first place, this facilitates the evolution through advancing technology as each generation of radio service delivers increased speed and efficiency. It is not possible for ComReg at the time of assignment to anticipate how standards will develop or at what speed. Service and technology neutral licences will give the users of spectrum the ability to switch their service or technology at the optimum time according to how the market develops, ensuring that the utility gained from spectrum is maximised. This flexibility will also facilitate the transfer of spectrum through trading (the less restrictions apply the more attractive spectrum will be for transfer), which in turn prevents stagnation and enhances spectrum utilisation.

Market Mechanisms – Auctions – While Telefonica agrees that auctions can be an appropriate means to assign spectrum in certain cases, there should not be a "blanket policy" in favour of the use of auctions. An auction can be the most efficient means to make spectrum assignment in the case of "virgin" spectrum which is unencumbered. However in many circumstances, particularly where rights to use spectrum are to be renewed, or where there are considerations relating to continuity of service or consumer disruption then a simple auction might not be flexible enough to take the various considerations into account. This must be assessed on a case by case basis as is acknowledged in the consultation document "*ComReg is obliged to choose the most appropriate assignment mechanism having regard to the particular circumstances of each award*" (page 21).

Market Mechanisms – Trading – ComReg's position in relation to spectrum trading appears somewhat contradictory from the consultation document. While ComReg welcomes the revisions to the Regulatory Framework which will implement spectrum trading, and also accepts that there are gains to be made through spectrum trading, yet it does not propose to take any step introduce it in Ireland yet. ComReg states that it awaits legislative change before introducing spectrum trading.However having conducted a thorough review of ComReg's functions and the legislation relevant to radio licensing, Telefonica can find no restriction that would prevent ComReg from granting radio licences that are transferable with appropriate conditions (as previously noted in Telefonica's response to consultation 09/99)

ComReg's position regarding spectrum trading is a prime example of a situation where ComReg can seize the opportunity to press ahead with a modern spectrum management regime. There seems

little argument that radio licences will become tradable at some point in future, and in particular it is likely that the mobile bands will be among the first to be so specified at EU level. However there is no advantage in further delay - ComReg is about to issue licences covering a significant part of the mobile spectrum until 2030 by auction. Advance clarity in relation to tradability of licences would help bidders to crystallise their valuations in advance of that auction.

The current position regarding transferability of licenses is essentially a "fudge". ComReg itself has explained how at least one license has already been transferred or consolidated simply by one licensee acquiring another licensee outright. It seems that the only material asset being acquired in this case was the licence. This is not a satisfactory framework by which to provide for transfer of rights of use of spectrum. It encourages the creation of special purpose companies simply for the purpose of acquiring spectrum rights in a manner that easily transferable.

ComReg cites a number of concerns as a reason to delay the introduction of spectrum trading until legislative change have been made. However Telefonica finds that these concerns are either unfounded, or their resolution is within the control of ComReg itself. The combination of tradable licences that incorporate service and technology neutrality, and indefinite terms provide the optimum suite of terms for efficient usage – it means a licensee can realise a benefit from any unwanted spectrum, and on the contrary must count the cost of not doing so.

Spectrum Sharing and Pooling – There are obvious gains to be made by allowing operators, where appropriate, to pool their spectrum together or just use it together in order to increase the bandwidth that is available as a single block, e.g. a combined block of 10MHz might prove to be more efficient than two individual blocks of 5MHz. ComReg is about to assign mobile licences that will exist until 2030. It is impossible to forecast what form of collaboration between operators will be needed during that time, but ComReg should ensure that the licences issued do not become a barrier to such collaboration. Again, it is most beneficial to provide bidders with the clarity they need before they are required to bid for their licences in an auction.

We would note that ComReg's reference to spectrum sharing in its consultation seems to describe a different type of sharing than that described here – ComReg seems to be addressing the interference-free use of the spectrum by different users operating independently of each other. We refer to the coordinated use of assigned spectrum on a shared basis.

Spectrum Caps – In general, Telefonica does not support the imposition of operator caps on an ongoing basis. They are an inflexible tool that can inhibit the most efficient use of spectrum, for example a spectrum cap might prevent an operator whose network is suffering congestion from obtaining access to additional spectrum in their preferred band. Nevertheless there are circumstances where spectrum caps can be used to facilitate policy objectives, e.g. during an auction or other assignment process. In this case, however the caps should only remain in place until the assignment process is complete, and care must be taken to ensure that they do not prevent desirable outcomes, like spectrum sharing.

Fees – There are a couple of aspects to spectrum fees that require comment in relation to this consultation: administrative incentive pricing and minimum auction fees. In relation to administrative incentive pricing, we note that this is not relevant where spectrum is to be assigned by auction. In addition, Telefonica notes that an effective secondary market for spectrum rights

(facilitated by transferable licences) would achieve the objective of ensuring that spectrum is used efficiently on an ongoing basis.

In relation to the setting of a minimum price for auctions, we would note that Telefonica has provided comments to ComReg in a number of documents relating to the planned assignment of spectrum in the 800MHz, 900MHz, and 1800MHz bands. We await ComReg's response to those comments.

In Paragraph 7.1.1, ComReg states that it is important to link spectrum usage fees to inflation, which raises a number of issues. In the first place, Telefonica does not accept that the general consumer price index is an appropriate reference for the indexation of spectrum fees. The arguments against this linkage have already been presented to ComReg in response to several consultation documents, including document 10/71, and they will not be repeated here.

There is, however one further very specific item that ComReg must clarify; it relates to the proposed planned multi-band auction of spectrum for mobile services. In particular, part of the licence fee (50% of the minimum) will be paid as an annual fee over the duration of the licences. ComReg originally stated in document 09/99 that the annual fee would be index-linked. However when ComReg derived its minimum price, it did so by first benchmarking a market value for a lot of spectrum (in net present value) in the Irish market (which is within a range), and then adjusting the minimum price so as to be at the upper end of that range. However ComReg did not apply any inflation indexation to the annual fees when calculating its minimum fee, and if it were to do so, this would place the minimum for the auction above the maximum of the benchmark range. Telefonica is of the view that it is not appropriate to apply any inflationary adjustment to the annual fee in this case – bidders must already take this into account when developing their valuations and it is reflected in their bidding during the auction.

Telefonica welcomes ComReg's acknowledgement of the pressure on operators to invest in infrastructure "*This growing demand is a challenge for operators as they need to increase overall network capacity as well as provide for significant increases in backhaul to ensure a high quality of service to consumers*"and that "*access to capital, both public and private, poses a real threat to network investment that will require an appropriate policy response*" (page 30). As part of this policy response, ComReg must acknowledge that the fees (minimum or otherwise) it sets for spectrum directly impact both the availability of capital for investment and the incentive to invest. Telefonica further notes ComReg's acknowledgement of the importance of "*enhancing Ireland's competitiveness by ensuring that adequate spectrum is allocated and assigned to users that will add the most value to society*" (page 7). As Telefonica has outlined in detail in its previous submissions, the fees set by ComReg for spectrum directly impact the level of demand for this spectrum and whether adequate spectrum is in fact licensed by it. It is crucial therefore that ComReg appropriately takes these objectives into account in arriving at spectrum licensing fees (minimum or otherwise).

Developing a National Position – ComReg has outlined the various EU and international organisations that are involved in the development of spectrum strategies on a Global, Regional, and National level. What is not at all transparent, however is the mechanism by which national positions are developed. Telefonica is not aware of any formal consultation with the industry to develop national positions, or indeed feedback following decision making conferences or meetings. In the

interests of transparency, ComReg should establish a mechanism to provide for this link-in for interested parties. Telefonica called for the establishment of a National Forum or other mechanism to develop such positions in response to ComReg's previous Spectrum Strategy consultation. While this call has not been rejected, neither has it been accepted.

Strategy for Specific Radio Services

The 2.6GHz Band – This band is of interest to Telefonica because it is harmonised for LTE. As ComReg points out, there are ten licences in operation in this band at present, however they are due to expire at different times from 2012 to 2014. It is already getting late for ComReg to provide clarity regarding its proposed approach to deal with the expiry of these licences. ComReg should now urgently clarify this matter, giving details of the process to its decision, including the timetable involved.

Digital Dividend – Telefonica supports ComReg's proposal to open the band from 790MHz to 862 MHz for reuse commencing from January 2013. The main risk to its availability is a possible delay to Analogue TV Switch-off. ComReg must provide certainty that this will not be delayed when selling the right to use at auction this year. Telefonica welcomes ComReg's comments regarding a second Digital Dividend and would encourage ComReg to pursue a regionally harmonised approach. This would give the greatest efficiency of scale for terminal manufacture.

Fixed Links, ACM – Telefonica supports ComReg's objective behind the proposal to mandate ACM, however has some concerns regarding practical implications in relation to licence power, availability, etc.

At present, operators plan their networks for a specified availability and throughput (bandwidth), and the transmit power is calculated and specified accordingly. Where ACM is used, the radio equipment will switch up and down between different orders of modulation depending on propagation conditions, however higher modulation schemes require a greater link-budget to guarantee a specified availability. In order to achieve the higher throughput for a specified availability, it will be necessary for ComReg to amend its engineering guidelines for transmit power and link length.

ACM should only be made mandatory, under the following conditions:

- This requirement is only applicable to new microwave link deployed post June 1st 2012 i.e. existing links deployed prior to that date or subject to engineering changes shall not be impacted. Licence renewal or minor amendment to licences (e.g. change of antenna, Transmit power, target availability, etc.) should not trigger a requirement to introduce ACM as this would require premature replacement of equipment
- ComReg must provide revised engineering guidelines prior to the introduction of the requirement, and Telefonica believes it will be necessary to consult further on this specific point

Fixed Links, Dual Polarisation (XPIC) - Telefonica has significant concerns in making XPIC operation mandatory in all frequency bands, and believes this should not be implemented. XPIC functionality is generally much more costly in terms of hardware and installation services requiring cross-polarised antennae, more complex outdoor installation, and in some cases additional mast support. There are also different propagation impacts on vertical vs horizontal polarized links at certain frequencies (horizontal polarization requires a higher link budget than vertical at higher frequencies).

Telefonica does not believe that XPIC should be mandated instead of increased channel bandwidth in circumstances where higher throughput is required from a link. In this case both polarisations would need to be engineered to ensure that the minimum availability was achieved on both polarisations, even though propagation conditions are different.

Rather than mandate XPIC, Telefonica believes that ComReg should incentivise operators to use polarisation discrimination to get greater throughput from existing spectrum. One example of how this could be achieved is by allowing operators to add an additional carrier at cross polarisation to existing links without requiring any additional licence fee. For self-managed channels (e.g. 26GHz) the operator already has an incentive to maximise use of their assigned channel.

Fixed Links, New Bands - Telefonica is currently assessing the availability of equipment in the new bands as outlined by ComReg, however we would generally support the making available of additional spectrum and new bands. Our response to some specific questions raised in the consultation follow below:

- *is the maximum capacity as determined by the limit of 28 MHz bandwidths in some bands a limiting factor?* Yes, option for 56MHz channel spacing should be made available – supporting by most Vendor from L6GHz to 42Ghz bands.
- *in bands that do not have greater than 28 MHz bandwidth – should ComReg permit channel aggregation?* Yes, Telefonica would favour the use of channel bundling (copular arrangement) in order to increase the microwave link throughput. Radio link aggregation is a feature now available by main Microwave vendors.

Fixed Links, 26GHz H-L Issue – Telefonica has found recently that the operation of ComReg's policy to avoid H-L interference is causing a significant limitation to our ability to utilise fixed links in the 26GHz band efficiently. We will address this to ComReg in separate correspondence, however this should be considered by ComReg in advance of issuing further licences for this band.

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16 TIF

IBEC Telecommunications and Internet Federation

Submission on
ComReg 11/28-Review of the Period 2008 – 2010 and
Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013

24th May 2011

IBEC Telecommunications and Internet Federation
Submission on
ComReg 11/28-Review of the Period 2008 – 2010 and
Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013

May 2011

Background to TIF:

TIF is the representative body for leading industry and associated interest groups in the field of electronic communications. TIF represents over 70 companies involved in fixed, mobile, wireless, fixed wireless, satellite, broadcasting, cable based service provisions, outsourcing and internet service provision.

The objectives of TIF are to ensure:

- The advocacy of the long-term interests of participants in the electronic communications industry in Ireland.
- The publication and promotion of policy recommendations reflecting the views of operators and users in relation to telecommunications and internet matters.
- The provision of a forum for discussion on relevant issues amongst network operators, telecommunications users, internet service providers, application service providers and other communities of interest.

The telecoms industry contributes approx €4 billion to the Irish economy and employs over 15,000 people. This does not include the number of other ICT and non-ICT industries that rely on a modern telecoms infrastructure to survive. The sector's success is therefore central to economic recovery and the creation of a dynamic enterprise-driven environment that can foster innovation and job creation.

Executive Summary:

TIF welcomes the publication of the Spectrum Policy Statement by the Department of Communications, Energy and Natural Resources' (the "Department") and also the publication of the Commission for Communications Regulation's ("ComReg's") draft Strategy for Managing the Radio Spectrum: 2011 – 2013 ("ComReg's draft Spectrum Strategy Statement"). Spectrum will play an increasingly important role in our day to day lives and in the functioning of our economy in the next few years.

In keeping with Government policy as stated in the Programme for Government; Ireland's policy and regulatory regime for licensing and use of spectrum must allow it to take early advantage of the benefits of the more flexible spectrum management methods that have and will be introduced within other EU countries and globally over the coming years.

In particular, TIF believes the Department and ComReg, should through legislative and licensing conditions and other policy documents:

(i) promote investment and respond to market and regulatory developments;
(ii) clarify the appropriate balance between the promotion of efficient spectrum use, efficient investment and other objectives;
(iii) introduce spectrum trading, indefinite licences and spectrum sharing;
(iv) implement technology neutrality and service neutrality in spectrum licence conditions as far as practical; and

(v) adopt an holistic approach to spectrum allocation and assignment.

Industry wants to contribute to the vision and challenge of the Government, however, in line with the Programme for Government and in order to do so, industry needs clear and decisive leadership from Government. It is not sufficient to "wait and see". With this in mind, TIF hereby requests a meeting with the Department and ComReg to discuss these issues in more detail.

Introduction:

TIF welcomes the publication of the Spectrum Policy Statement by the Department of Communications, Energy and Natural Resources' (the "Department") and also the publication of Commission for Communications Regulation's ("ComReg's") draft Strategy for Managing the Radio Spectrum: 2011 – 2013 ("ComReg's draft Spectrum Strategy Statement"). Spectrum plays a key role in Irish society. It contributes to the economy, social inclusion and innovation. For example, ComReg estimates that the economic contribution made by the use of radio spectrum to the Irish economy for 2009 was approximately €3.6 billion, or 2.2% of total GDP[1], the National Broadband Scheme which bridges the so-called Digital Divide is provided by means of mobile and satellite technology, and smart-meters and other machine to machine applications connected by radio offers the potential to significantly reduce costs and increase efficiency in public and private sector activities. As we move to being an always connected society, wireless communications will play an increasingly important role in our personal lives and in the functioning of our economy. In particular, given the population density in Ireland and the high cost of roll-out of next generation broadband to rural areas, mobile technology will play a key role in the roll-out and take-up of next generation broadband. Given the importance of spectrum to society and in particular, next generation broadband, the publication of these two documents is timely.

However, spectrum users and in particular, the mobile industry, believe that the Department and ComReg need to take steps to ensure that Ireland can take early advantage of the changes in administration of the radio spectrum within Europe recently and the coming years. Ireland should not "stand back" and wait until changes to the spectrum licensing regime are imposed by external developments. We do not want to be a laggard, but should ensure that Ireland reaps the benefit of what is a natural advantage – a relative abundance of spectrum. ComReg should take full advantage of the flexibility that is permitted within the current legislative framework to modernise the management of the radio spectrum. Where there are explicit restrictions in legislation to the principles of a modern flexible spectrum licensing regime, they should be quickly identified, and legislative amendments brought forward as a matter of priority.

In particular, TIF believes the Department and ComReg should through legislative and licensing conditions and other policy documents:

(i) promote investment and respond to market and regulatory developments;
(ii) clarify the appropriate balance between the promotion of efficient spectrum use, efficient investment and other objectives;
(iii) introduce spectrum trading, indefinite licences and spectrum sharing;
(iv) implement technology neutrality and service neutrality in spectrum licence conditions as far as practical; and
(v) adopt an holistic approach to spectrum allocation and assignment.

[1] Page 4.

Such an approach would significantly contribute to the roll-out and take up of next generation broadband, for the benefit of consumers and the economy. In the Programme for Government, the Government states as follows:

"What is needed now … is strong, resolute leadership. … [The Government's] key objective will be to repair our society over the next 5 years and get our people back to work. … By the end of our term in Government Ireland will be recognised as a modern, fair, socially inclusive and equal society supported by a productive and prosperous economy. … With this in mind new ways, new approaches and new thinking will form the constant backdrop to the coalition's style of governance. In all the major areas of public life this determination to modernise, renew and transform our country will be evident over time as our shared programme is implemented. The Government will get our economy moving, restore confidence, fix our banking system and support the protection and creation of jobs."[2]

Industry wants to contribute to this vision and challenge. However, in line with the Programme for Government and in order to do so, industry needs clear and decisive leadership from Government. It is not sufficient to "wait and see". With this in mind, TIF hereby requests a meeting with the Department and ComReg to discuss these issues in more detail.

The appropriate balance between the promotion of efficient spectrum use, efficient investment and other objectives:

The Department and ComReg need to clarify the appropriate balance between the promotion of efficient spectrum use, efficient investment and other objectives. Whilst the Department in its Spectrum Policy Statement states: *"Efficiency of spectrum use will not be based on economic factors alone but will take account of social policy objectives, such as providing access to high quality wireless services to communities not served by the market"*, it does not provide ComReg with guidelines in respect of how to achieve this balance. Significantly, ComReg does not address this issue in its draft Spectrum Strategy Statement.

Overall, the best outcome is achieved when spectrum is in use to support the productive economy and reduce the cost of operation of the users of wireless communication. Spectrum policy must take into account the overall impact of spectrum licensing on national competitiveness. In particular, TIF submits that the minimum reserve prices currently proposed by ComReg in its consultation regarding 800, 900 and 1800 MHz are too high and fail to take account of *inter alia*, investment, macro economic circumstances and these social policy objectives. As a result, there is a significant risk that the proposed auction in respect of 800, 900 and 1800 MHz will fail to deliver the desired benefits for Ireland.

TIF is concerned that the longer term economic benefits arising from spectrum use risk being sacrificed for near term financial considerations. The Department Spectrum Policy Statement proposes the principle that spectrum pricing should deliver a fair return for the State. TIF believes that this principle requires further discussion and understanding. In the near term spectrum fees arising from the award of spectrum may generate a monetary transfer from the private sector to the State. In the current macro-economic environment this transfer of funds will most likely be at the expense of reduced capital investment thereby diminishing the socio-

[2] Pages 1 – 2.

economic benefits that would have accrued from a world class communications infrastructure in the medium term.

TIF notes that, in the case of the sub-1 GHz and 1800 MHz bands, ComReg has proposed the approach of setting minimum prices (a combination of once-off reserve prices and annual fees) based on the outcomes of a number of international spectrum awards, i.e. the starting point for the auction in Ireland has been determined by reference to the finishing point of auctions in other countries. TIF considers that such an approach to the setting of minimum prices for spectrum awards is flawed both in principle and on methodological grounds.

In its recent consultation document on the licensing of the 900 MHz band ComReg states[3] that it "*has determined that the following factors should inform the determination of the minimum price for this award:*

- *the minimum price should not give rise to or increase incentives for collusive behaviour;*
- *the minimum price should deliver a fair return to the State for the use of this finite natural resource and the price of spectrum should reflect its economic value to the user;*
- *the minimum price should not be set so high as to choke off demand;*
- *the minimum price should not be set so low that there is participation by frivolous bidders;*
- *the minimum price should not reflect any "social option value"; and*
- *the administrative costs of running the award process should be recovered from the minimum price set.*"

The first factor is based on the incorrect assumption that it is both necessary and proportionate to use the level of the minimum price as a tool to minimise the incentives for strategic behaviour or collusion in an auction. Yet these concerns can be effectively and fully addressed through the selection of the auction format and the implementation of other measures in the auction rules.

TIF notes that the second key factor identified by ComReg is that an auction may not reveal the true long run economic value of spectrum access (even though one of the reasons for using an auction is that it is claimed to be the best method to determine this value). It is not clear why this is a relevant objective in ComReg's setting of minimum licence prices. As concerns around any scope for collusion in a competitive award process can in any event be effectively addressed through other more direct and effective measures than through the setting of the level of the minimum licence price the economic value of the spectrum can be best determined primarily through the auction process.

The remaining items are hygiene factors and do not justify minimum prices being set based on the outcomes of spectrum awards in different countries, in a range of bands and under differing economic circumstances. Indeed a general 'benchmarking' approach to the setting of minimum licence prices is highly likely to be at odds with ComReg's own view that minimum prices should not be set so high as to choke off demand.

TIF does not believe that the factor that the minimum price should deliver a fair return to the State can be reconciled with ComReg's statutory objectives under the EU

Regulatory Framework and the Communications Act 2002. TIF requests that the Department's intention clarifies this.

To date there have been only two awards of liberalised 800MHz spectrum in Europe, namely Germany and Sweden. In both cases these award processes appear to have been concluded in a competitive manner, with no suggestion of collusive behaviour, with minimum prices significantly lower than those proposed by ComReg for the 900 MHz and 800 MHz bands.

It is also instructive to consider the final prices determined by these awards, considering the price paid per MHz per head of population. In Germany the average price per Mhz per head of population was €0.727 for a fifteen year licence. In Sweden the average price per MHz per head of population was €0.416 for a twenty five year licence. ComReg's proposed minimum price, €25m, yields a price per MHz per head of population of €0.599 for a fifteen year licence. ComReg's proposed minimum price is 17% lower than the outcome market price in Germany. However it must be recognised that the German economy, and hence anticipated returns on the mobile market which will influence the value placed on spectrum, is in a significantly stronger position than the Irish economy. Of even more concern is the comparison between ComReg's proposed price and the outcome of the Swedish award. If the Swedish regulator had set minimum prices at the level proposed by ComReg it is arguable that none of the 800MHz licences would have been awarded. This would have been a highly inefficient outcome. Having taken over three years to develop the assignment mechanism, it would be a disastrous outcome if some spectrum remained unassigned simply because the minimum price was incorrectly determined.

A high minimum price risks preventing socially and economically efficient use of the spectrum. Rather such fees would act simply as a tax on spectrum users and their customers which will undermine the incentives to invest in state of the art communications infrastructure and could result in some, or all, of the spectrum remaining unawarded.

TIF considers that non-trivial minimum prices should be set for spectrum and that these should be at a level no higher than that which would be sufficient to deter frivolous or speculative bidders and ensure that only serious and credible bidders participate in any auction.

We also request the Department to engage with all relevant stakeholders to ensure that what is meant by a fair return to the State is appropriately defined and understood. Later this year, ComReg will undertake what will be the most significant assignment of spectrum in the history of the State. This matter needs to be clarified in advance of that assignment.

Spectrum Trading, Indefinite Licences and Spectrum Sharing:

ComReg is currently consulting in relation to spectrum trading, indefinite licences and spectrum sharing.

Spectrum Trading:

TIF joins with ComReg in welcoming the recent revisions to the Common Regulatory Framework in relation to spectrum trading, and its future implementation in the bands to be identified by the EC. As indicated by a number of studies, there is the potential for notable efficiency gains to be realised from spectrum trading, and we believe that it can be introduced progressively in a manner that advances ComReg's objectives including ensuring the efficient management and use of radio spectrum, the promotion of competition, and contributing to the development of the internal market.

However, TIF notes a generally cautious tone in relation to the consideration by ComReg of possible competition and spectrum management concerns in its observations on spectrum trading in section 4.2.2 of the consultation document. It is relevant to assess potential costs and risks associated with the introduction of spectrum trading, and to seek to address these with effective measures as appropriate. However, TIF believes that the points raised by ComReg do not raise serious obstacles to the timely introduction of spectrum trading in a range of key spectrum bands. If ComReg is willing, then TIF believes that spectrum trading is already possible.

ComReg cites the potential danger of firms in the retail market acquiring spectrum with the intention of hoarding it, so as to preclude market entry. TIF agrees that this may be a valid concern in the absence of any safeguards. However we consider that a "use it or lose it" provision in respect of spectrum bands where spectrum trading is permitted should be sufficient to effectively address this concern in most instances. Where this measure is in place, there would not appear to be sufficient justification for the imposition of additional, more prescriptive measures to address a potential risk of spectrum hoarding.

With regard to the issue of spectrum rights potentially becoming overly concentrated in too few hands to the possible detriment of competition in downstream markets, this is of relevance primarily to spectrum bands below 3 GHz, and in particular the sub-1 GHz spectrum that is most suited to provision of wide area electronic communications services while being inherently scarce. Introduction of spectrum trading in one or more of these bands could be made subject to limits on the amount of spectrum that could be held by any one undertaking, at least over the medium term.

TIF notes ComReg's statement in section 4.2.2 of the consultation document:

"In addition, there may be little incentive for rights holders of spectrum in harmonised bands to trade with competitor firms and initial experience to date in other jurisdictions bears this out. Absent the periodic re-release of spectrum rights, this may lead to stagnation and reduce the ability of Member States and the EC to make major allocation and harmonisation changes to such bands in order to exploit the advantages arising from the internal market."

TIF does not believe that firm conclusions can be made about the efficacy of spectrum trading in harmonised bands at this early stage, and on the basis of the limited number of instances where spectrum trading is already in place. It is not

necessary for trading of spectrum usage rights to be frequent in order to realise its benefits. Moreover the nature of market and technological changes that would influence decisions by rights holders to trade some or all of their spectrum usage rights in particular harmonised bands would appear likely to lead to relatively infrequent spectrum trading activity.

One of the key benefits of facilitating spectrum trading is that, simply as a result of this option being available, the opportunity cost to spectrum usage rights holders of holding the spectrum is fully internalised (at least for commercial undertakings), providing the most effective incentive for efficient use of spectrum by the holder. Assessment of the opportunity cost of spectrum may periodically lead holders of spectrum usage rights to decide to trade some or all of their spectrum usage rights with other undertakings, however perhaps just as importantly it would effectively encourage most efficient use because the option It should be noted that the current draft of the European Commission's proposal for a first Radio Spectrum Policy Programme(RSPP) advocates the introduction of spectrum trading in harmonised bands.

TIF recognises the major benefits of harmonisation of use of key spectrum bands on a pan European and harmonised basis, and the requirement, in some circumstances, to make major allocation and harmonisation changes to such bands to reap the full benefits of the internal market. However, the potential occasional need to effect changes to spectrum allocation and use in order to realise benefits from harmonisation is not inconsistent with the facilitation of spectrum trading. TIF notes that major decisions about changes in use of individual spectrum bands occur relatively infrequently, and decisions to effect such changes at European level are made known significantly in advance of when they are actually required to be implemented. Such decisions would, therefore, not necessarily be constrained by a spectrum trading regime in bands where spectrum usage rights would be of indefinite duration (but with a minimum term upon initial award and a defined minimum notice period of revocation).

TIF also notes ComReg's observation that:

"Trading may likely have a more important role in relation to changing the use of non-harmonised bands, when combined with the freedoms on service and technology neutrality. However trading of long lived/infinite licences in such bands may also be delayed. This can come about as individual rights holders in such spectrum bands may have an incentive to hold out so as to increase the rents that they may extract from the likely new users. This incentive could lead to considerable delays in moving non-harmonised bands into new and better uses…"

TIF considers that it is important that the risk or incentives for 'hold out' should not be overstated. The market price of spectrum at any point in time should, where information relevant to valuation is accessible to market agents, effectively incorporate all available information including expectations of how foreseeable market and technological changes will affect future valuation. Changes in the market price of spectrum will primarily be the result of new information, and it is by no means the case that all new information would act to further increase the market price (termed by ComReg as the rents that existing individual rights holders may extract from likely new users). Indeed it is possible that certain new information (e.g. news that other substitutable bands may be designated for the same use) could actually reduce the rents obtainable. As holding out would be understood by existing rights holders as being uncertain to lead to a higher spectrum price in the future, or even as possibly resulting in the reverse, this potential behaviour may not be an issue in

many circumstances and should not be regarded as a fundamental obstacle to the introduction of spectrum trading. In practice, there has been a general downward trend in spectrum pricing over the past decade in bands assigned using market based mechanisms, e.g. harmonised mobile communications bands.

TIF welcomes ComReg's preliminary position that secondary markets could potentially play a role in ensuring the efficient assignment and use of the spectrum in some areas. Competition and spectrum management considerations (including harmonisation and interference protection requirements) are important to address in the context of the introduction of spectrum trading, however TIF is confident that there are no fundamental issues that would preclude the progressive but timely introduction of spectrum trading in a range of spectrum bands. TIF would, therefore, urge ComReg to complete any necessary prior steps (including advancing any changes to primary legislation that may be considered necessary) in order to implement spectrum trading as soon as possible.

Indefinite Licences:

TIF believes that the introduction of licences of indefinite duration (with a defined initial term and a minimum notice period of up to five years for any revocation) would be key to the effective functioning of a secondary market for spectrum. Introducing indefinite licences would greatly improve the marketability of spectrum and emphasise the opportunity cost of not using licences efficiently. Indefinite licences would allow market players to choose if and when to enter or exit the industry, and instead of facing an arbitrary cut-off date, licensees could match their licence holdings to their business plans.

TIF does not agree that licences of indefinite duration (but with sufficient minimum notice of revocation) are likely to act as a significant impediment to the ability of Member States and the EC introducing major allocation and harmonisation changes. TIF notes that such decisions on major allocation and harmonisation changes are relatively infrequent, are usually the outcome of lengthy and thorough assessment, and are generally notified significantly in advance of when they are required to be implemented. For this reason ComReg has been able to issue licences of long durations of up to 20 years in key bands (e.g. the 2.1GHz band) in the past. For these reasons, it therefore appears that there would be sufficient flexibility in a well designed regime of indefinite duration licences to accommodate any changes required to accommodate harmonisation and the development of the internal market. For the same reasons and the impact of uncertainty regarding future developments referred to previously, the risks of, and incentives for, hold out by existing licence holders and resulting delay are considerably mitigated. In any event ComReg has sufficient powers, in the last resort, to ensure that necessary measures to ensure harmonisation can be undertaken as required.

Whilst ComReg's statement on page 26 of the present consultation paper that licence terms are independent of the tradability of spectrum rights of use under the Common Regulatory Framework is technically correct, for practical purposes there is a clear link, as ComReg itself acknowledges, between the incentives for spectrum trading, and the duration of spectrum usage rights that would be permitted to be traded. Spectrum trading is less likely to be feasible in the context of short licence durations.

TIF considers that the natural candidates for the introduction of this approach are the pending licences for 800MHz, 900MHz, 1800MHz and the current 2.1 GHz licenses. In relation to the 2.1GHz band these licences in this band are not due to begin to

expire for at least ten years and there are, therefore, no issues associated with imminent licence expiry in this spectrum band. The conversion of existing licences in these frequencies to licences of long term indefinite duration (and which in addition are tradeable) would yield substantial benefits in terms of maximising regulatory certainty for operators and facilitating spectrum trading with its associated efficiency benefits.

Spectrum Sharing or Pooling:

Trading of spectrum usage rights is only one aspect of the liberalisation of spectrum rights. In its recent proposals to the Parliament and Council, the European Commission has emphasised the need for flexibility in legislation, proposing to require Member States to "*maximise flexibility in the use of spectrum, to promote innovation and investment, through the application of the principles of technology and service neutrality, the opening of spectrum to new services, and the possibility to trade spectrum rights"*[4] but also to "*foster, in cooperation with the Commission, the collective use of spectrum as well as shared use of spectrum."*[5]

The speed and capacity of next generation mobile broadband services using technologies such as LTE is directly related to carrier bandwidth size. The table below illustrates anticipated performance by bandwidth size[6].

LTE Bandwidth (FDD)	5 MHz	10 MHz	15 MHz	20 Mhz	25 Mhz	30 Mhz
Downlink peak bit rate (Mbit/s)	37	74	110	150	187	225
Average downlink Cell capacity (Mbit/s)	7.5	15	22.5	30	37.5	45
Uplink peak bit rate (Mbit/s)	18.3	36.7	55.1	75.4	94.25	113.1
Average uplink Cell capacity (Mbit/s)	3.25	6.5	9.75	13	16.25	19.5

It is clear that performance (and user experience) improves substantially in a spectrum sharing or pooling environment (20MHz bandwidth) relative to a standalone licence (10MHz bandwidth). The potential to bridge the Digital Divide cannot be overlooked.

TIF believes it is unhelpful that ComReg does not discuss spectrum sharing and the implications of same in detail in its draft Spectrum Strategy Statement.

TIF would welcome confirmation that the current regulatory framework permits spectrum sharing and clarification of:

(i) the position of the Department and ComReg in respect of spectrum sharing; and

(ii) the procedures that would apply in respect of any proposed spectrum sharing arrangement.

[4] Article 3(b) "Proposal for a Decision of the European Parliament and of the Council establishing the first radio spectrum policy programme"

[5] Article 4(1) "Proposal for a Decision of the European Parliament and of the Council establishing the first radio spectrum policy programme"

[6] Peak bit rates only achievable for single user in cell in optimal signal conditions. 2x2MIMO assumed on downlink. Average downlink spectral efficiency assumed approx. 1.5 bit/s per Hz. LTE supports bandwidths up to 20MHz. LTE advanced expected to support bandwidths up to 100MHz

Miscellaneous:

Spectrum Allocation and the Use of Auctions:

TIF supports the increased use of market based tools such as auctions to allocate spectrum in circumstances where this is appropriate. However we consider that the appropriate method of allocating spectrum (whether administrative assignment, comparative selection procedure, or auction) should be determined on a case by case basis. The decision should take account of the details of the context, subject only to the selection criteria being objective, transparent, non-discriminatory, proportionate, and consistent with statutory regulatory objectives. There is no one approach to assigning spectrum that is optimal in all circumstances.

Proposed General Indexation of Annual Spectrum Usage Fees:

TIF would question ComReg's view as set out in section 7.1.1 of the consultation paper that it will increasingly become important to adjust spectrum usage fees on an annual basis to account for the general rate of inflation. ComReg has not set out the necessary detailed analysis to justify its position that keeping spectrum usage fees constant in real terms, by reference to some metric of changes in the general level of consumer prices – such as the CPI, is necessary to maintain proper incentives for holders of spectrum usage rights to make optimal use of this spectrum. Nor does ComReg provide any justification of how such an approach is consistent with other statutory objectives such as the promotion of competition and the welfare of end users.

TIF notes that the existing arrangements in spectrum bands where spectrum usage fees have been determined at the time of initial assignment of spectrum usage rights and have subsequently been left unchanged for the duration of the licence term, have not been demonstrated to have led to inefficient use of spectrum by operators.

ComReg's proposal appears to rely on an implicit assumption that changes in the general price level of the overall economy have a direct impact on the incentives for efficient spectrum use, and therefore the level at which SUFs should be set. However it is not clear that this assumption is appropriate because, as ComReg has itself illustrated in its recent Quarterly Communications Market reports, the evolution of trends in communications prices over time (with their relatively closer linkage to the revenues and profits of operators and consequently the valuation they place on spectrum use) has been very different to that of the general price index. Over a multi-year timeframe the prices of communications services have been falling even as the overall consumer price index has increased. This indicates that the appropriate level of spectrum usage fees bears no clear relation to inflation trends in the overall economy over the multi-year duration of most spectrum licences. Over the past decade spectrum prices have actually declined, while the consumer price index has been significantly positive. An approach of indexing spectrum usage fees to the CPI therefore risks distorting incentives to use spectrum efficiently, rather than promoting optimal spectrum use.

Indexation of spectrum usage fees on an annual basis to changes in the general price level is also problematic from the perspective of regulatory certainty. Uncertainty around how changes in the general price level may affect spectrum usage fees from year to year would complicate decisions on business planning and budgeting on an ongoing basis, in addition to making it more difficult for undertakings to value spectrum (particularly in the context of bidding in competitive spectrum award processes) while also exposing undertakings to inflation risk in the overall

economy that may be only loosely related to the evolution of their own business costs and revenues. There may also be methodological difficulties in that discount rates used in spectrum valuation decisions inherently incorporate consensus expectations about future inflation.

It is, therefore, TIF's position that annual spectrum usage fees that are set at a constant level for the duration of the term of licences are sufficient to ensure efficient spectrum use and, by maximising regulatory certainty, aid efficient business planning and most effectively advances ComReg's statutory objective to promote efficient infrastructure investment.

17 UMTS Forum

UMTS Forum

Response to the COMREG's Public Consultation on: 'Review of the Period 2008 – 2010 & Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013.'

Mobile broadband is changing the way the world communicates. The UMTS Forum helps all players in this dynamic new value chain understand and profit from the opportunities of 3G/UMTS networks and their Long Term Evolution (LTE).

A key aspect of the UMTS Forum's mission is to ensure that the socio-economic opportunities offered by mobile broadband are not unduly restrained by the lack of available spectrum.

In this context, the UMTS Forum welcomes COMREG public consultation on 'Review of the Period 2008 – 2010 & Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013.' as a key contribution to secure the success of mobile broadband in Ireland.

Mobile traffic exposion, spectrum crunch and frequency management policy

Recent report 44 from UMTS Forum, titled 'Mobile traffic forecasts 2010-2020 report', highlights extensive growth of mobile broadband traffic is happening right now and is expected to carry on during the next 10 years. This extensive growth requires responsive action from regulators and industry to secure an appropriate regulatory framework and avoid a dreaded spectrum crunch.

New Report 44 forecasts significant growth in traffic over mobile networks during the decade ahead. The report gauges this as a 33x increase globally in the timeframe 2010-2020, and higher still for a typical Western European country during the same period. This compares favourably with a 27x increase that we forecasted back in 2005 – an era when the iPhone and app stores did not even exist.

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The traffic growth reflected in Report 44 is a result of ever-increasing consumer demand for mobile broadband services. As such, it reflects the growing importance of these services for hundreds of millions of people around the world benefiting from improved social, health and educational services. What's more, mobile broadband services are also a key enabler of many countries' economies, supporting not only individual citizens but the economy as a whole.
So mobile data growth is a challenge, but it is the price to pay for countries that benefit from these innovative services. By definition, the more these services are used, the more the data grows.

The ITU (February 2011) has added its own voice to the discussion, warning that "Governments need to take urgent action now to support mobile broadband growth." Warning of imminent network congestion, the ITU warns that "greater spectrum availability will be imperative if network bottlenecks are to be avoided."

UMTS Forum strongly supports this statement from ITU. Specifically, it's our view that all-important access to mobile broadband services will be artificially limited for many hundreds of millions of people by the inadequate or late availability of spectrum.

So what's to be done about this situation?

The UMTS Forum believes strongly that all identified IMT spectrum should be made available as soon as possible for mobile broadband usage in all countries.

We also recommend that further studies (by the ITU and peer organisations) are needed to ensure that the growth potential for mobile broadband traffic is future-proofed. In other words, we want to be sure that no artificial limitations – like lack of access to a key resource like spectrum – will impede the organic growth of mobile broadband.

Harmonisation and success of mobile broadband

UMTS Forum stresses that success or failure of a wireless project is often critically impacted by the timely availability of attractive and affordable terminals. In turn, this is only possible when a terminal market with significant scale emerges.
Therefore, UMTS Forum supports harmonisation on a scale as large as possible and underlines that harmonisation benefits to customers, countries and industry by providing economies of scale, enabling roaming and mitigating cross-border issues.

UMTS Forum support technology and service neutrality in as long as frequency arrangements are harmonised at least with respect to the duplex method. In general, the UMTS Forum highlights that harmonised band plans are the basis of frequency management. A harmonised channel band plan is always necessary in order to deliver equipment in time, at reasonable costs.

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Potential spectrum opportunities

800, 900, 1800, 2100 and 2600MHz

The five mobile bands 800 (791-281/832-862 MHz), 900 (880-915/925-960 MHz), 1800 (1710-1785/1805-1880 MHz), 2100 (1920-1980/2110-2170) and 2600 MHz (2500-2570/2620-2690 MHz) are critical for the development of mobile broadband in Ireland as they represent the 'core harmonised bands' for the deployment of mobile broadband in Europe.

These five bands have been hamornised at European level for 3G/UMTS networks and their Long Term Evolution (LTE) through CEPT Decisions and European Parliament Decisions.

UMTS Forum believes strongly that all identified IMT spectrum, but especially these five core bands, should be made available as soon as possible for mobile broadband usage in all european countries.

2300 MHz band

UMTS Forum is pleased to submit information on a new UMTS/IMT system which is available to users for mobile broadband services in the band 2300 – 2400 MHz.

This new UMTS/IMT system is based on the LTE 3GPP standards, and will be using an unpaired time division duplex (TDD) access scheme capable of delivering up to 300 Mbps in a 20 MHz radio frequency channel.

UMTS Forum is of the view, with regard to the efficient usage of UMTS/IMT applications, that a band plan based on a spectrum arrangement with a channel granularity of 5 MHz is most suitable. Countries, that so wish, would be able to select from these 5 MHz channels to form suitable block sizes for users. Again, there are different channel bandwidths available, e.g. 5, 10, 15 and 20 MHz, in the LTE specification.

The mobile broadband terminal devices, which operate in the band 2300 – 2400 MHz, may be able to also support some of the usual FDD bands: 800 MHz, 900 MHz, 1800 MHz, 2100 MHz and/or 2.6 GHz.

UMTS Forum is pleased to provide some early information and examples, without claiming that the information is conclusive, from current and planned usage in countries in other regions of the world:

- China is planning to use the whole band for unpaired operations using IMT as soon as possible, subject to the ongoing refarming;

- India is about to license parts of the band through an auction process very soon for mobile usage;
- Indonesia, Malaysia and Singapore have entered a trilateral agreement, where Singapore already has licensed the band, and Malaysia and Indonesia are expected to follow suit in the future;
- Republic of Korea, for many years, allocated this band for the current unpaired mobile usage/services called WiBro,
- Russia, with areas that geographically are both inside and outside of Region 1, has allocated the band for the current unpaired mobile and nomadic operations, and
- Australia issued long-term technology-flexible licenses for this band that can be used for the provision of broadband wireless access services.

UMTS Forum strongly encourages COMREG to make the 2300 MHz band available as soon as possible for mobile broadband usage.

L-band (1452-1492MHz)

As discussed previously, the UMTS Forum supports harmonisation on a scale as large as possible and underlines that harmonisation benefits to customers, countries and industry by providing economies of scale, enabling roaming and mitigating cross-border issues. As a result, the UMTS Forum supports a harmonised approach in the L-band.

The UMTS Forum whishes to inform COMREG that the CEPT has agreed to initiate a review of the 1452-1492 MHz band in order, as expressed in the minutes of the 28th ECC Meeting[1]:

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Proposed steps for the considerations on the future of the L-band
The Chairman of WG FM informed that in response to the request of the ECC meeting in November 2010 WG FM prepared a generic inventory of candidate applications for the 1452 - 1492 MHz band (**Annex 4 to ECC(11)002R1**). Based on the results of the questionnaire on the generic inventory of candidate applications for the 1452 - 1492 MHz band and discussions within WG FM proposals with respect to the purpose and organization of the future work within WG FM for the L-band, were presented. WG FM concluded that a new project team under WG FM will be established. Related ToR will be developed in the May 2011 meeting of WG FM.
The ECC endorsed the approach of WG FM.

The EC Counsellor welcomed the initiative by CEPT to look into the future use of this band. He noted the political interest that this band had attracted in the context of the discussions on the Radio Spectrum Policy Program and the good potential for having a harmonized solution for the use on this band across Europe. He also stated that any national ad hoc action should be avoided in order not to jeopardize this opportunity.

[1] Document ECC(11)027, '*Minutes of the 28th ECC Meeting*'

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The UMTS Forum supports the study at CEPT level of the use of the 1452-1492MHz band for UMTS downlink.
The Maastricht Special Arrangement allows the deployment of UMTS mobile downlink as concluded by FM45 during its December meeting.

HSPA (release 9 and 10) and LTE-advanced (release 10) include the capability of aggregating downlink spectrum in different mobile bands. A UMTS downlink harmonised band plan for the L-band is required to trigger the standardisation work and enable economies of scale.

The access to the full 40MHz for terrestrial UMTS downlink could enable the emergence of an ecosystem linked to a market with significant size. Use of the 1452-1492MHz band for UMTS downlink should be studied as, potentially:

- It could deliver multimedia services, while also providing other innovative and advanced service offerings, by supporting advanced QoS mechanisms.
- It could complement existing mobile broadband bands, in particular to provide mobile internet.
- Additional 40 MHz for downlink broadband. services would enhance the existing downlink capacity of mobile networks.

The L-band could offer an opportunity for global harmonisation for IMT downlink, as in a number of countries worldwide, the lower part of the band (i.e. 1452-1479.5 MHz) has been planned for terrestrial digital radio but remains unused and the upper part of the band (1479.5 -1492 MHz) has been considered for satellite digital radio but also remain unused due to the lack of market demand.

The usage of the 1452-1492MHz band should be considered in the global context of the delivery of mobile multimedia services on current and future mobile broadband frequency bands.

As the RSPG stated in its opinion for the WRC12: “The Digital Agenda within Europe´s strategy 2020 calls that all EU citizens should have access to broadband at sufficient speed. This cannot be achieved without a significant role being played by wireless broadband networks and their spectrum resources should be able to cope with the expected growth of data traffic. Therefore, Member States should support agenda item(s) for WRC-16 addressing the allocation and/or further harmonisation of spectrum, as appropriate, to meet this need.” The L-band should be considered in the context of this overall strategy.

FWALA channel arrangements in the 3.6 GHz band.

UMTS Forum stresses that the 3400-3800MHz band has been identified as IMT-Spectrum in Europe during the last World Radio Conference (WRC 07) and is currently under study in CEPT for the definition of a band plan for mobile broadband in this band.

UMTS Forum believes that COMREG should adopt as a target the harmonisation of the band with usage in other European countries, and in particular to adopt the upcoming harmonised band plan as defined by CEPT.

Jean-Pierre Bienaime,
Chairman of the UMTS Forum

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18 Vodafone

Vodafone response to the ComReg Consultation on Review of the Period 2008-2010 & Proposed Strategy for Managing the Radio Spectrum: 2011-2013

INTRODUCTION

Vodafone welcomes the opportunity to respond to this consultation on ComReg's proposed strategy for managing the radio spectrum for the period 2011-2013. We agree with the analysis of the economic impact of spectrum usage included in the ComReg consultation document which shows that spectrum is a critical natural resource which makes substantial contributions (both direct and indirect) to Ireland's society and economy. It is therefore vital that the management of the radio spectrum is optimised so that spectrum is allocated efficiently to those uses that provide the greatest economic and social benefit to society. Our views in relation to the details of ComReg's proposed spectrum management strategy are set out in full in the subsequent sections of this consultation submission.

General Approach to Spectrum Management

Within the period to be covered by the proposed spectrum management strategy, ComReg will face the challenge of adapting the existing regulatory approach to the management of Ireland's spectrum resource so that it will be capable of effectively addressing future market, technological, and international regulatory developments. In particular Vodafone considers that it will be essential that ComReg take the initiative in introducing flexible and innovative methods such as spectrum trading, and the facility to share or pool spectrum between licensees, in a timely manner. The implementation of technology neutrality and service neutrality in spectrum licence conditions should also be progressed further, subject to harmonisation and interference requirements being met.

Vodafone welcomes the publication of the proposed spectrum management strategy as a measure to increase transparency and regulatory certainty for operators in relation to the future regulatory approach to radio spectrum. As ComReg is aware, decisions on the allocation and use of spectrum across many separate spectrum bands are interdependent, and an approach that gives stakeholders the most complete information possible on plans for spectrum as a whole, is necessary to promote its most efficient use. Vodafone therefore believes that it is important that the current significant uncertainty in relation to the future arrangements for key bands in Ireland, such as the 2.6 GHz band, is resolved quickly, and if at all possible in advance of when key commercial decisions will have to be made by stakeholders in relation to potentially related bands.

Transfer or Lease of Individual Spectrum Usage Rights Between Undertakings

Introduction

Vodafone supports the increased use of market based tools such as auctions to allocate spectrum in circumstances where this is appropriate. However we consider that the appropriate method of allocating spectrum (whether administrative assignment, comparative selection procedure, or auction) should be determined on a case by case basis, taking account of the details of the context, subject only to the selection criteria being objective, transparent, non-discriminatory, proportionate, and consistent with statutory regulatory objectives. There is no one approach to assigning spectrum that is optimal in all circumstances.

Vodafone joins with ComReg in welcoming the recent revisions to the Common Regulatory Framework in relation to spectrum trading, and its future implementation in the bands to be

identified by the EC. As indicated by a number of studies, there is the potential for notable efficiency gains to be realised from spectrum trading, and we believe that it can be introduced progressively in a manner that advances ComReg's objectives including ensuring the efficient management and use of radio spectrum, the promotion of competition, and contributing to the development of the internal market.

It is not clear to Vodafone whether revisions to primary domestic legislation are strictly necessary either to implement spectrum trading, or to address possible concerns around spectrum hoarding and the distortion of competition. However to the extent that such legislative changes may be required Vodafone would urge ComReg to engage with the DCENR to ensure that these can be introduced at the earliest practicable opportunity, and in any even within the time period to be covered by the current proposed spectrum management strategy.

Observations on Spectrum Trading in Context of Statutory Objectives

While Vodafone supports ComReg's general proposal to implement spectrum trading in frequencies identified for this purpose by the EC, we note a generally cautious tone in relation to the consideration by ComReg of possible competition and spectrum management concerns in its observations on spectrum trading in section 4.2.2 of the consultation document. It is relevant to assess potential costs and risks associated with the introduction of spectrum trading, and to seek to address these with effective measures as appropriate. However Vodafone believes that the points raised by ComReg do not raise serious obstacles to the timely introduction of spectrum trading in a range of key spectrum bands.

ComReg cites the potential danger of firms in the retail market acquiring spectrum with the intention of hoarding it, so as to preclude market entry. Vodafone agrees that this may be a valid concern in the absence of any safeguards, however we consider that a "use it or lose it" provision in respect of spectrum bands where spectrum trading is permitted should be sufficient to effectively address this concern in most instances. Where this is measure is in place, there would not appear to be sufficient justification for the imposition of additional, more prescriptive measures to address a potential risk of spectrum hoarding.

With regard to the issue of spectrum rights potentially becoming overly concentrated in too few hands to the possible detriment of competition in downstream markets, this is of relevance primarily to spectrum bands below 3 GHz, and in particular the sub-1 GHz spectrum that is most suited to provision of wide area electronic communications services while being inherently scarce. Although the overall spectrum resource is finite, the relatively greater availability of spectrum at higher frequencies is likely to make acquisition of sufficient spectrum by one undertaking (or a small number of undertakings), to the extent that this could risk distorting competition, neither practically nor economically feasible. For certain key spectrum bands at lower frequencies (e.g. 900 MHz, 800 MHz) it may be appropriate, in principle, to make the introduction of spectrum trading in one or more of these bands subject to reasonable limits on the amount of spectrum that could be held by any one undertaking, at least over the medium term.

Vodafone notes ComReg's statement in section 4.2.2 of the consultation document:

> *"In addition, there may be little incentive for rights holders of spectrum in harmonised bands to trade with competitor firms and initial experience to date in other jurisdictions bears this out. Absent the periodic re-release of spectrum rights, this may lead to stagnation and*

reduce the ability of Member States and the EC to make major allocation and harmonisation changes to such bands in order to exploit the advantages arising from the internal market."

Vodafone does not believe that firm conclusions can be made about the efficacy of spectrum trading in harmonised bands at this early stage, and on the basis of the limited number of instances where spectrum trading is already in place. It is not necessary for trading of spectrum usage rights to be frequent in order to realise its benefits. Moreover the nature of market and technological changes that would influence decisions by rights holders to trade some or all of their spectrum usage rights in particular harmonised bands would appear likely to lead to relatively infrequent spectrum trading activity.

One of the key benefits of facilitating spectrum trading is that, simply as a result of this option being available, the opportunity cost to spectrum usage rights holders of holding the spectrum is fully internalised (at least for commercial undertakings), providing the most effective incentive for efficient use of spectrum by the holder and thereby removing any requirement for the application of the inflexible and interventionist approach of administrative incentive pricing. Assessment of the opportunity cost of spectrum use may periodically lead holders of spectrum usage rights to decide to trade some or all of their spectrum usage rights with other undertakings, but it is not necessary for this to occur frequently in order to effectively encourage most efficient use by rights holders of their existing assignments of spectrum.

Vodafone recognises the major benefits of harmonisation of use of key spectrum bands on a pan European and harmonised basis, and the requirement, in some circumstances, to make major allocation and harmonisation changes to such bands to reap the full benefits of the internal market. However we do not believe that the potential occasional need to effect changes to spectrum allocation and use to realise benefits from harmonisation is necessarily inconsistent with the facilitation of spectrum trading. Vodafone notes that major decisions about changes in use of individual spectrum bands occur relatively infrequently, and decisions to effect such changes at European level are made known significantly in advance of when they are actually required to be implemented. Such decisions would therefore not necessarily be constrained by a spectrum trading regime in bands where spectrum usage rights would be of indefinite duration (but with a minimum term upon initial award and a defined minimum notice period of revocation).

Vodafone also notes ComReg's observation that:

"Trading may likely have a more important role in relation to changing the use of non-harmonised bands, when combined with the freedoms on service and technology neutrality. However trading of long lived/infinite licences in such bands may also be delayed. This can come about as individual rights holders in such spectrum bands may have an incentive to hold out so as to increase the rents that they may extract from the likely new users. This incentive could lead to considerable delays in moving non-harmonised bands into new and better uses…"

Vodafone considers that it is important that the risk or incentives for 'hold out' should not be overstated. The market price of spectrum at any point in time should, where information relevant to valuation is accessible to market agents, effectively incorporate all available information including expectations of how foreseeable market and technological changes will affect future valuation. Changes in the market price of spectrum will primarily be the result of new information, and it is by no means the case that all new information would act to further increase the market price (termed by ComReg as the rents that existing individual rights holders may extract from likely new users).

Indeed it is possible that certain new information (e.g. news that other substitutable bands may be designated for the same use) could actually reduce the rents obtainable. As holding out would be understood by existing rights holders as being uncertain to lead to a higher spectrum price in the future, or even as possibly resulting in the reverse, this potential behaviour may not be an issue in many circumstances and should not be regarded as a fundamental obstacle to the introduction of spectrum trading.

Licence Duration

Vodafone believes that the introduction of licences of indefinite duration (with a defined initial term and a minimum notice period of up to 5 years for any revocation) would be key to the effective functioning of a secondary market for spectrum. Introducing indefinite licences would greatly improve the marketability of spectrum and emphasise the opportunity cost of not using licences efficiently. Indefinite licences would allow market players to choose if and when to enter or exit the industry, and instead of facing an arbitrary cut-off date, licensees could match their licence holdings to their business plans.

Vodafone disagrees with ComReg's view in section 4.2.3 of the consultation document that the fact that mobile operators have continued to invest significantly in their networks toward the end of the terms of some of the spectrum licences that they hold is clear evidence against the position that there is an adverse impact on incentives for investment arising from imminent licence expiry. In the first instance, as Vodafone's existing licence in the 2.1 GHz band is not due to expire for approximately 10 years there are continued strong incentives to invest in our 3G network. Moreover given that it was virtually inconceivable that ComReg would permit 900 MHz licences to expire in May 2011 without licence extension/interim licensing measures being put in place to avert otherwise substantial disruption to mobile customers, Vodafone continued to invest to maintain our 2G network on the valid assumption that such measures would ultimately be implemented.

Vodafone does not agree that licences of indefinite duration (but with sufficient minimum notice of revocation) are likely to act as a significant impediment to the ability of Member States and the EC introducing major allocation and harmonisation changes. Vodafone notes that such decisions on major allocation and harmonisation changes are relatively infrequent, are usually the outcome of lengthy and thorough assessment, and are generally notified significantly in advance of when they are required to be implemented. For this reason ComReg has been able to issue licences of long durations of up to 20 years in key bands (e.g. the 2.1 GHz band) in the past. For these reasons it therefore appears that there would be sufficient flexibility in a well designed regime of indefinite duration tradeable licences to implement any changes required to accommodate harmonisation and the development of the internal market. For the same reasons, and the impact of uncertainty regarding future developments referred to previously, the risks of and incentives for, hold out by existing licence holders and resulting delay are considerably mitigated. In any event ComReg has sufficient powers, in the last resort, to ensure that necessary measures to ensure harmonisation can be undertaken as required.

While ComReg's statement on page 26 of the present consultation paper that licence terms are independent of the tradability of spectrum rights of use under the Common Regulatory Framework is technically correct, for practical purposes there is a clear link, as ComReg itself acknowledges, between the incentives for spectrum trading, and the duration of spectrum usage rights that would be permitted to be traded. Spectrum trading is less likely to be feasible in the context of short licence durations.

Vodafone considers that natural candidates for the introduction of indefinite licence durations are the new licences proposed to be awarded in the 800Mhz, 900Mhz, and 1800Mhz bands, and existing licences in the 2.1 GHz band. In relation to the 2.1GHz spectrum, the licences in this band are not due to begin to expire for at least ten years and there are, therefore, no issues associated with imminent licence expiry in this spectrum band. The conversion of existing licences in these frequencies to licences of long term indefinite duration would yield substantial benefits in terms of maximising regulatory certainty for operators and facilitating spectrum trading with its associated efficiency benefits.

Collaboration Between Wireless Operators

Vodafone considers that the sharing of passive or active infrastructure between operators offers the prospect of major benefits for consumer and overall economic welfare as the consequent improvements in efficiency can accrue to end users in the form of lower prices and higher service quality. We agree with ComReg that each proposed sharing agreement should be assessed on its own merits, and that the implications for competition need to be taken into account in each case.

In the context of the present consultation Vodafone notes that the aggregation or sharing of spectrum rights between operators offers the potential for significant benefits in terms of innovation, efficiency, and consumer welfare. Accordingly we would urge ComReg to ensure, at a minimum, that there are no restrictions (for example in the terms of new spectrum licences) that would preclude spectrum sharing/pooling arrangements of net benefit for overall societal welfare.

Conclusion

Vodafone welcomes ComReg's preliminary position that secondary markets could potentially play a role in ensuring the efficient assignment and use of the spectrum in some areas. Competition and spectrum management considerations (including harmonisation and interference protection requirements) are important to address in the context of the introduction of spectrum trading, however we are confident that there are no fundamental issues that would preclude the progressive but timely introduction of spectrum trading in a range of spectrum bands. We would therefore urge ComReg to complete any necessary prior steps (including advancing any changes to primary legislation that may be considered necessary) in order to implement spectrum trading within the time period of the current review.

Spectrum Efficiency Measures

Administrative Incentive Pricing

Vodafone does not believe that there is any basis for the use of administrative incentive pricing, with the objective of encouraging the most efficient use of spectrum, in bands where spectrum trading is introduced. Spectrum trading alone would achieve ComReg's objective of ensuring the optimal use of radio spectrum. Spectrum fees greater than those required for the recovery of administrative costs would not provide any efficiency benefit over and above the incentives inherent in spectrum trading, rather such fees would act simply as a tax on spectrum users and their customers and may undermine the incentives to trade.

It must be emphasised that commercial undertakings, in particular, face strong incentives to ensure efficient use of spectrum irrespective of whether regulatory measures to encourage this objective are put in place. For users that are already using spectrum as efficiently as possible given existing technologies, administrative incentive pricing may act solely to impose additional costs that could reduce the incentives for investment and/or result in prices for retail communications services for end-users that would be higher than they would be in the absence of this policy. However Vodafone considers that administrative incentive pricing may have a useful role in principle in encouraging more intensive and efficient use of spectrum by public sector entities as they may otherwise be relatively insensitive to the opportunity cost of inefficient spectrum use. We therefore agree with ComReg's proposal to consider administrative incentive pricing in the case of public sector and other non-commercial entities.

Proposed General Indexation of Annual Spectrum Usage Fees

Vodafone would question ComReg's view as set out in section 7.1.1 of the consultation paper that it will increasingly become important to adjust spectrum usage fees on an annual basis to account for the general rate of inflation. ComReg has not set out the necessary detailed analysis to justify its position that keeping spectrum usage fees constant in real terms, by reference to some metric of changes in the general level of consumer prices – such as the CPI, is necessary to maintain proper incentives for holders of spectrum usage rights to make optimal use of this spectrum. Nor does ComReg provide any justification of how such an approach is consistent with other statutory objectives such as the promotion of competition and the welfare of end users.

Vodafone notes that the existing arrangements in spectrum bands where spectrum usage fees have been determined at the time of initial assignment of spectrum usage rights and have subsequently been left changed for the duration of the licence term, have not been demonstrated to have led to inefficient use of spectrum by operators.

ComReg's proposal appears to rely on an implicit assumption that changes in the general price level of the overall economy have a direct impact on the incentives for efficient spectrum use, and therefore the level at which SUFs should be set. However it is not clear that this assumption is appropriate because, as ComReg has itself illustrated in its recent Quarterly Communications Market reports, the evolution of trends in communications prices over time (with their relatively closer linkage to the revenues and profits of operators and consequently the valuation they place on spectrum use) has been very different to that of the general price index. Over a multi-year timeframe the prices of communications services have been falling even as the overall consumer price index has increased. This indicates that the appropriate level of spectrum usage fees bears no clear relation to inflation trends in the overall economy over the multi-year duration of most spectrum licences. An approach of indexing spectrum usage fees to the CPI therefore risks distorting incentives to use spectrum efficiently, rather than promoting optimal spectrum use.

Indexation of spectrum usage fees on an annual basis to changes in the general price level is also problematic from the perspective of regulatory certainty. Uncertainty around how changes in the general price level may affect spectrum usage fees from year to year would complicate decisions on business planning and budgeting on an ongoing basis, in addition to making it more difficult for undertakings to value spectrum (particularly in the context of bidding in competitive spectrum award processes) while also exposing undertakings to inflation risk in the overall economy that may be only loosely related to the evolution of their own business costs and revenues. There may also be methodological difficulties in that discount rates used in spectrum valuation decisions inherently incorporate consensus expectations about future inflation.

It is therefore Vodafone's position that annual spectrum usage fees that are set at a constant level for the duration of the term of licences are sufficient to ensure efficient spectrum use and, by maximising regulatory certainty, aid efficient business planning and most effectively advances ComReg's statutory objective to promote efficient infrastructure investment.

A Second Digital Dividend

Vodafone agrees with ComReg on the importance of realising the benefits of the Digital Dividend for Ireland and on the appropriateness of assessing over the medium term the potential for identifying additional Digital Dividend spectrum. In order to ensure that Ireland can optimally exploit harmonisation on a pan-European basis, Vodafone considers that ComReg should support the emergence of a broad consensus on any appropriate additional Digital Dividend spectrum, and should only make definitive decisions on a second Digital Dividend for Ireland at that point. However it is our view that the 700 MHz band would be optimal as a second Digital Dividend sub-band in Europe.

Strategy for Specific Radio Services

800 MHz, 900 MHz and 1800 MHz Spectrum Bands

Vodafone notes that the future licensing arrangements for the 800 MHz, 900 MHz, and 1800 MHz bands are the subject of a number of ongoing consultations to which we have provided extensive input. We look forward to the publication of ComReg's final decision in relation to the approach to the allocation of spectrum in these bands later this year.

The 2.6 GHz Spectrum Band

Vodafone provided a comprehensive response to ComReg's call for input on the future use of the 2.6 GHz band in 2010 and we would welcome the opportunity to provide our views in a future consultation on ComReg's proposals for spectrum in this band. Given the significant extent to which spectrum in the 2.6 GHz band is likely to be substitutable for 1800 MHz spectrum in particular, Vodafone must however emphasise that it is essential that ComReg makes all reasonable efforts to provide transparency in relation to the intended approach to future use of the 2.6 GHz band prior to any proposed award process for licences in the 800 MHz, 900 MHz, and 1800 MHz spectrum bands. This information is necessary as decisions on the future arrangements for the key spectrum bands suitable for mobile communications use are clearly interdependent.

2010 - 2025 MHz Spectrum Band

[Redacted]

1452-1492 MHz Spectrum Band

[Redacted]

Terrestrial Fixed Services

We welcome the changes that ComReg has made in the last two years to the licensing of fixed radio links. These changes have simplified processes and shortened average turnaround times for the approval of fixed link licence applications and have therefore been of significant benefit to Vodafone in enabling the timely delivery of enhanced mobile communications services to our customers.

Vodafone recognises the importance of promoting efficient use of spectrum for fixed links and we are therefore supportive of the proposal to make ACM mandatory for all new fixed link applications from 1 June 2012. While we also have no objection to a requirement to deploy dual polar systems for all new high capacity fixed links, where more than one link is required on the same path in the same frequency band, Vodafone does not however believe that the deployment of dual polar antennas on low capacity tail links should be mandatory. For the latter category of fixed link, this requirement would impose an unwarranted additional cost and would not be necessary to meet the capacity requirements of those links.

We consider that it is important as a general principle that other proposed efficiency measures such as the intended review of the congested frequency band areas should take utmost account of the need to avoid unduly restricting the options available for the deployment of fixed links, or otherwise adversely affecting efficient business planning by users. Stakeholders must be given the opportunity to provide feedback on the detail of any proposed new measures or changes well in advance of when they would be intended to be implemented.

With regard to the existing frequency bands for fixed links, Vodafone would support the introduction of a different assignment method (such as a light licensing regime or simplified fixed link registration process) for the 70 GHz and 80 GHz bands as we believe that this, together with the greater availability of suitable equipment from vendors, would significantly increase take-up of fixed links in these bands within the next two years. **[Redacted]** In the event that ComReg decides to reopen the 26 GHz block licence scheme for a further round of assignments, Vodafone believes that the terms on which such spectrum licences would be assigned (minimum licence price etc.) should not be more favourable than those for the original 26 GHz National Block Licence Award Process in 2008.

Vodafone is in favour, in principle, of the opening of new frequency bands for fixed links. **[Redacted]**.

We would welcome a review of the Hi-Lo exclusions zones for the 23GHz and 26GHz bands. Currently for designated sites in the 23GHz and 26GHz bands an exclusion zone of 200 metres is applied. Vodafone believes that this is requirement is too conservative and acts as a significant unnecessary limitation to the deployment of links within these bands, particularly in dense urban areas. Vodafone believes that the exclusion zone should be reduced to match the 100 metre zone applied to the 38GHz band.

Vodafone also considers that the use of 56MHz bandwidth links should be allowed on very high capacity trunk systems. The use of very high coding schemes (up to 256QAM and in the near future 512QAM) would ensure that the spectrum would be utilised very efficiently and so rather than applying for multiple licenses for adjacent channels to meet the capacity requirements of trunk radio systems, dual polar systems utilising 56MHz channels will reduce the licensing and equipment overhead while still meeting the capacity requirements.

Test and Trial Licence Scheme

Vodafone strongly supports the current test and trial licence scheme and recognises the benefits it provides in terms of encouraging innovation in wireless technologies.

Assessment of Economic Impact of Spectrum Usage

Vodafone considers that the assessment of the economic impact of spectrum usage conducted as part of the development of ComReg's draft strategy gives a useful indication of the magnitude of the socioeconomic benefits resulting from usage of the national spectrum resource. Vodafone would note that the multiplier of 1.1 used to account for indirect impacts may be too conservative. Multipliers of around 1.4 to 1.5 have been used in other studies of this nature.