Commission for
Communications Regulation

Submissions to Consultation

Utilisation of the 71-76 GHz and 81-86 GHz Spectrum Bands

Submissions received from respondents

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1 AJIS LLC

AJIS LLC
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Comments Regarding ComReg's Consultation 07/85: "Utilisation of the 71-76 GHz and 81-86 GHz Spectrum Bands"

Executive Summary

AJIS congratulates ComReg on producing this consultancy on using the higher millimetre-wave bands for high data rate fixed wireless systems.

The wide bandwidth available at 71-76 / 81-86 GHz ("70/80 GHz"), coupled with the favourable propagation characteristics make these bands ideally suited for multi-gigabit per second transmissions with high availability over distances of 1 to 3 km, offering for the first time a true cost and performance competitive wireless alternative to fibre-based solutions in Ireland. Already the bands are freely opened in the UK and other European nations, the US and several other countries, enabling a multitude of high capacity broadband connectivity applications to be envisaged and realised.

About AJIS

AJIS LLC is a wireless technology consultancy with a focus on supporting the millimetre-wave bands. Dr. Jonathan Wells, AJIS founder and principal partner, was part of the WCA Above 40 GHz Development Committee that petitioned the FCC to originally open the 70/80 GHz bands, and has since been active on the CEPT and ETSI committees that have opened up the mm-wave bands and defined the working rules in Europe. Dr. Wells has worked with regulators in Europe, Africa, Latin America, Middle East, India and Asia to define rules and open the mm-wave bands for high-capacity wireless interconnectivity around the world.

Response to ComReg's Request for Comments

ComReg specifically asks the question: *Do you agree with ComReg's proposed utilisation of the 71-76 GHz and 81-86 GHz bands for fixed point to point radio links? If you do not agree with all or any part of this proposal, please provide reasons for your answer.*

AJIS agrees with ComReg's proposed utilisation, but requests that two additional parameters be incorporated to harmonise Ireland with the band usage in the UK and other parts of Europe. Specifically:

1. ComReg's proposed band plan is only partially as recommended by CEPT. It is requested that the full CEPT band plan be permitted.
2. ComReg's proposed utilisation does not deal with licensing methodology. It is requested that a "light licensed" methodology, as enabled in the UK and the USA be implemented.

The rational behind both these requests are detailed below.

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1. Implementation as per the full CEPT band plan.

Consultation 07/85 correctly indicates that CEPT Recommendation ECC/REC/(05)07[1] defines the channel arrangements for the 70/80 GHz bands. However the consultation only details part of CEPT's recommendation – that for 10 GHz duplex radios. CEPT also permits radios of less than 10 GHz duplex spacing operating within the same 71-76 GHz or 81-86 GHz sub-band.

ComReg is referred to Annex 3 of ECC/Rec/(05)07. Figures A3.1 and A3.3 are as per Appendix A of ComReg's consultation, showing the combining of channels (single and aggregated 250 MHz arrangements) from the 71-76 and 81-86 GHz bands into a single FDD arrangement with a duplex separation of 10 GHz. However CEPT also permits the use of single and aggregated channels with less than 5 GHz duplex spacing within the same 71-76 GHz or 81-86 GHz sub-band. Figures A3.2 and A3.4 of ECC/Rec/(05)07, reproduced below for convenience, show this permitted arrangement.

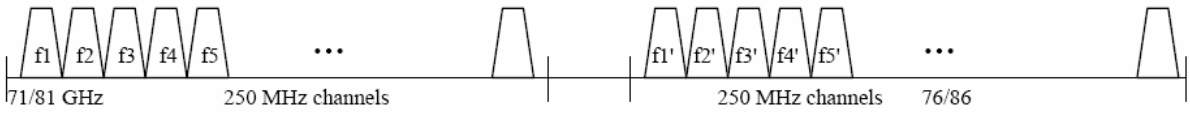

Fig. A3.2. Combining the channels from single 71 - 76 GHz or 81 - 86 GHz band into an FDD arrangement with duplex separation of less than 5 GHz

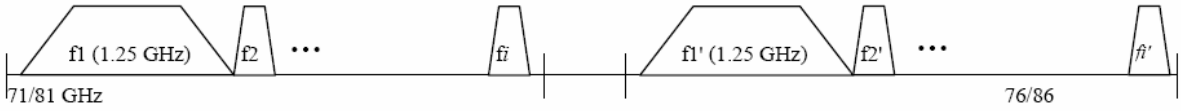

Figure A3.4: Example of aggregating multiple 250 MHz channels, possibly alongside with original 250 MHz wide channels within the single band 71 - 76 or 81 - 86 GHz

ComReg's proposed implementation does not permit operation with a sub-5 GHz duplex spacing, as permitted by CEPT. In addition to fully complying with CEPT recommendations, the sub-5 GHz duplex spacing should also be permitted for the following additional reasons:

- Several equipment vendors choose to operate with narrow band duplex spacing in the 71-76 GHz sub-band, taking advantage of reduced equipment costs and better propagation characteristics. By prohibiting such equipment, (which are permitted in other parts of Europe) ComReg is reducing the number of equipment options available in Ireland, to the determent of open competition in the country.
- Encouraging vendors to operate in just one sub-band, particularly the 71-76 GHz sub-band, will simplify any out-of-band emission concerns appropriate for the protection of sensitive radio astronomy, satellite and space research systems in the 86-92 GHz bands.

Therefore this paper requests that ComReg extend the 70/80 GHz band utilisation proposal to fully implement CEPT's recommendations, and allow all duplexer spacings as permitted by CEPT.

It should be noted that this request does not in any way violate or contradict any requirements set out in the consultation's Appendix B or in the ETSI 70/80 GHz technical specifications[2].

[1] CEPT Recommendation ECC/REC/(05)07, "Radio Frequency Channel Arrangements for Fixed Service Systems Operating in the Bands 71-76 GHz and 81-86 GHz"
[2] ETSI TS 102 524, "Fixed Radio Systems; Point-to-Point equipment; Radio equipment and antennas for use in Point-to-Point Millimetre wave applications in the Fixed Services (mmwFS) frequency bands 71 GHz to 76 GHz and 81 GHz to 86 GHz"

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2. Implementation of a "light licensing" methodology.

The licensing methodology for the 70/80 GHz bands is not discussed in ComReg's consultation. This is relevant to these bands and so a brief summary and recommendation is presented here in the context of other administrations in Europe and around the world.

The unique nature of mm-wave wireless systems (for example, highly directional transmissions and relatively short propagation distances) lends themselves to a simplified registration and coordination scheme. In addition, the very wide bandwidths available, enabling very high data rates, means that traditional license fees based on "Euros per MHz" or "Euros per Mbps" can deter usage and prohibit services in this band. Therefore countries such as the USA and the UK which have already opened the 70/80 GHz bands have adopted a "light licensing" methodology whereby licences can be procured quickly and easily, at a price that encourages adoption and implementation.

In the USA, the FCC has introduced an internet-based licensing process for the 70/80 GHz bands. Applicants coordinate links via one of three database managers who provide competitive access to a single, central link database. The role of the database managers includes:

- Coordinating commercial links with federal government links.
- Administering interference protection procedures based on first-in-time registration.
- Determining if links are subject to further analysis due to concerns such as being close to international borders or radio astronomy quiet zones.

In the UK, Ofcom has set up a similar internet-based scheme based around a simple database maintained by Ofcom. Since the risk of interference is very small, Ofcom do not require a link interference analysis. Coordination is done on a simple "first come, first served" time-stamped basis.

In the USA, the FCC permits 70/80 GHz equipment licensing on a link-by-link basis at a change of typically US$500 for a 10 year license (effectively US$50 per year). In the UK, Ofcom similarly requires link-by-link licensing at a charge of £50 per year. The recent Australian consultation on the use of 70/80 GHz bands floated a suggested annual license fee of AU$180 per year.

Therefore this paper requests that ComReg extend the 70/80 GHz band utilisation proposal to include a discussion on licensing. A "light licensing" methodology, similar to that implemented in the UK and USA is recommended, whereby licensees can quickly and easily apply for a licence, at a fee that encourages adoption and utilisation of the new bands.

2 LM Ericsson Ireland Ltd.

COMREG DOCUMENT NO 07/85

Date
22/07/2007

Reference (Document No)
LMI COMREG-07:0007/85

Your Date

Your Reference
COMREG DOCUMENT NO 07/85

Attending to this matter
John Holland

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

Dear Ms Devey

RE: COMREG DOCUMENT NO 07/85 – CONSULTATION ON UTILISATION OF THE 71-76 AND 81-86 GHZ SPECTRUM BANDS

LM Ericsson ("Ericsson") would like to avail of the opportunity to respond to this ComReg consultation.

In its consultation paper, ComReg posed a single consultation question, in which respondents were asked if they agreed with ComReg's proposed utilisation of the 71-76 GHz and 81-86 GHz bands for fixed point-to-point radio links.

In response, Ericsson confirms that it is in agreement with ComReg's proposed utilisation of the 71-76 GHz and 81-86 GHz bands for fixed point-to-point radio links. Like ComReg, Ericsson recognises the potential for these bands to be used to carry very high data transmissions over relatively short distances. We agree with ComReg's assessment that radio links of this sort could prove to be a feasible alternative to fibre, especially where – as ComReg notes – speed and ease of installation are important for operators. As an example of this, we could envisage the possible use of such links by the mobile operators, given the increasing density of cell sites and the higher bandwidth requirements arising from the deployment of 3G/HSPA networks. We believe that, if it is licensed for use in this way, there will be demand for this spectrum and ComReg is to be commended for its proposal to enable access to this valuable resource.

ComReg mentions that standards have been approved within ETSI and CEPT for the use of fixed wireless services within these two bands. In this context, Ericsson believes that it would be helpful to apprise ComReg of the relevant proceedings within ETSI on this issue.

and CEPT SE19, and thus be in a position to take account fully of the outcome of the standardisation process when deciding definitively in their utilisation plans for this spectrum.

I hope these brief comments will be of use to ComReg in determining an appropriate way forward on the utilisation of these spectrum bands. If I can be of any more assistance on this issue, for example in relation to the discussions currently underway within ETSI and CEPT, please let me know.

Yours Sincerely,

John Holland

CTO
LM Ericsson Ireland

3 O2 Communications (Ireland) Ltd.

22 November 2007

Ms Sinead Devey
ComReg
Irish Life Centre
Abbey Street
Dublin 1

Dear Sinead

71-76GHz and 81-86GHz Bands

O2 Ireland supports the proposal to open access to the 70/80GHz for the provision of point to point fixed links. These bands are available and unused in Ireland at the moment, and it does not seem there will be a competing requirement to use this spectrum for any other application in the medium term. The applications where these bands may be used might be limited, however they provide an additional option for short-haul high capacity links, so should contribute to the market.

In most cases, the useable length of these links is likely to be under 2 Km, and the antennae will have a gain in excess of 43dB with a very narrow beam-width. This will make it possible to have a high density of re-use of channels in the bands without causing harmful interference. One of the primary advantages of this type of solution is that they should be quick and simple to deploy. On this basis, O2 believes ComReg should consider making some of the spectrum licence exempt or available using a simplified licensing/notification process – facilitating their rapid deployment.

Yours Sincerely

_____

Tom Hickey

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Docklands, Dublin 2
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www.o2.ie

4 Rayawave Inc.

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

Reference: Submission re ComReg 07/85

Summary

Rayawave is pleased to see that ComReg is considering using the higher millimetre-wave (MMW) bands for high data rate fixed wireless systems. The 71-76 GHz and 81-86 GHz frequency bands are ideally suited for multi-gigabit per second transmissions over shorter distances. In particular this technology will be very useful to fill the gap between high capacity fiber backbones and the enterprise end-user in "Last Mile" networks, as well as for service providers seeking very cost competitive connectivity solutions to built and/or augment backbone networks in Ireland. The MMW bands are already freely opened in the UK and several other European countries as well as in the United States and several other countries. The move by ComReg to open these bands will improve the competitiveness of Ireland based companies in a global market that increasingly relies on an effective communications infrastructure during daily operations.

Response to ComReg's Consultation 07/85

Although we agree in general with ComReg's proposed utilisation of the 71-76 GHz and 81-86 GHz bands for fixed point to point radio links there are two specific additions to the consultation paper we would like to consider to be taken into consideration. In the following we will address these two additions and provide specific reasons for our request.

To harmonise Ireland with the MMW band usage in the UK, other parts of Europe, and the US we respectfully request that two additional parameters to be incorporated:

1. ComReg's proposed frequency band plan only partially implements CEPT Recommendation ECC/REC/(05)07. It is requested that the full CEPT frequency band plan will be permitted to fully harmonize the use of the MMW spectrum with rulings already implemented in other countries.

2. We respectfully request to implement a "light licensed" methodology that is similar to the ones already implemented in the UK and the USA for example.

The rational behind both these requests are detailed below.

1. Implementation of the full CEPT frequency band plan.

The ComReg Consultation 07/85 correctly indicates that CEPT Recommendation ECC/REC/(05)07[1] outlines the channel arrangements for the 70/80 GHz frequency bands. However, the consultation only details the part of the CEPT recommendation that is referring to 10 GHz duplex radios operation. CEPT also permits radios of less than 10 GHz duplex spacing operating within a single 71-76 GHz or 81-86 GHz sub-band.

ComReg is referred to Annex 3 of ECC/Rec/(05)07. Figures A3.1 and A3.3 are as per Appendix A of ComReg's consultation, showing the combining of channels (single and aggregated 250 MHz arrangements) from the 71-76 and 81-86 GHz bands into a single FDD arrangement with a duplex separation of 10 GHz. However CEPT also permits the use of single and aggregated channels with less than 5 GHz duplex spacing within the same 71-76 GHz or 81-86 GHz sub-band. Figures A3.2 and A3.4 of ECC/Rec/(05)07, reproduced below for convenience, show this permitted arrangement.

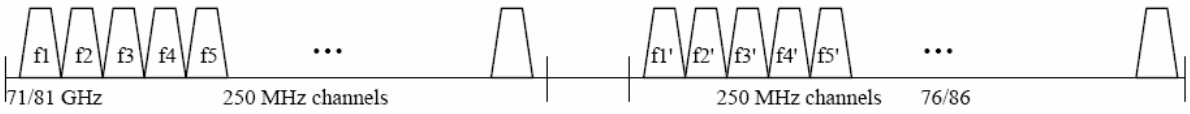

Fig. A3.2. Combining the channels from single 71 - 76 GHz or 81 - 86 GHz band into an FDD arrangement with duplex separation of less than 5 GHz

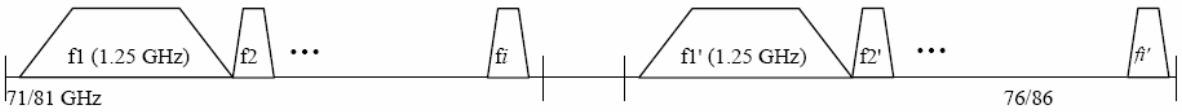

Figure A3.4: Example of aggregating multiple 250 MHz channels, possibly alongside with original 250 MHz wide channels within the single band 71 - 76 or 81 - 86 GHz

Presently, the ComReg's proposed implementation does not permit operation with a sub-5 GHz duplex spacing, as permitted by CEPT. *Consequently, and other than stated in the consultation paper, ComReg would not follow the CEPT recommendation in Ireland but implement only a subset of this recommendation.*

In addition to fully complying with CEPT recommendations, there are additional reasons why the sub-5 GHz duplex spacing should be permitted:

[1] CEPT Recommendation ECC/REC/(05)07, "Radio Frequency Channel Arrangements for Fixed Service Systems Operating in the Bands 71-76 GHz and 81-86 GHz"

- Several equipment vendors choose to operate with narrow band duplex spacing in the 71-76 GHz sub-band, taking advantage of reduced equipment costs and better propagation characteristics. By prohibiting such equipment, which is permitted in other parts of Europe and the United States, ComReg is reducing the number of equipment options available in Ireland. This move will impact the overall market competitiveness of enterprise users and Service Providers in Ireland since they wouldn't be allowed to use potentially higher performance and less expensive MMW radio equipment in Ireland that is commonly used in other CEPT member states that implemented the full scope of CEPT Recommendation ECC/REC/(05)07.

- Encouraging vendors to operate in just one sub-band, particularly the 71-76 GHz sub-band, will actually simplify any out-of-band emission concerns appropriate for the protection of sensitive radio astronomy, satellite and space research systems in the 86-92 GHz bands.

Therefore this paper requests that ComReg extend the 70/80 GHz frequency band utilisation proposal to fully implement CEPT Recommendation ECC/REC/(05)07, and allow all duplexer spacings as permitted by CEPT.

It should be noted that this request does not in any way violate or contradict any requirements as lined out in the Appendix B of the consultation paper or in the ETSI 70/80 GHz technical specifications[2].

2. Implementation of a "light licensing" methodology.

The ComReg's consultation does not discuss the licensing methodology for the 70/80 GHz bands in Ireland. This is relevant to these bands and so a brief summary and recommendation is presented here in the context of other administrations in Europe and around the world.

The unique nature of mm-wave wireless systems (for example, highly directional transmissions and relatively short propagation distances) lends themselves and motivated regulators around the world to implement a simplified registration and coordination scheme. In addition, and due to the very wide bandwidth channels available, the traditional license fees based on "Euros per MHz" or "Euros per Mbps" can deter usage and/or even prohibit services in this band. Therefore for example countries such as the USA and the UK which have opened the 70/80 GHz bands have adopted a "light licensing" methodology. In this way licences can be procured quickly and easily and a minimum of administrative overhead, and at a price points that encourages the adoption and implementation of MMW radio technology.

In the USA for example, the FCC has introduced an Internet-based licensing procedure for applications in the 70/80 GHz frequency bands. Applicants perform the registration and

[2] ETSI TS 102 524, "Fixed Radio Systems; Point-to-Point equipment; Radio equipment and antennas for use in Point-to-Point Millimetre wave applications in the Fixed Services (mmwFS) frequency bands 71 GHz to 76 GHz and 81 GHz to 86 GHz"

coordinate links via one of three database managers who provide competitive access to a single, centralized database. Within this scheme the database managers perform the task of:

- Coordinating commercial links with federal government links.
- Administering interference protection procedures based on first-in-time registration.
- Determining if links are subject to further analysis due to concerns such as being close to international borders or radio astronomy quiet zones.

In the UK, Ofcom has set up a similar internet-based scheme for link registration based around a simple database maintained by Ofcom. Since the risk of interference is very small, Ofcom does not require a link interference analysis. Same as in the United States, coordination is done on a simple "first come, first served" time-stamped basis.

In the USA, the FCC permits 70/80 GHz equipment licensing on a link-by-link basis at a change of typically US$500 for a 10 year license (effectively US$50 per year). In the UK, Ofcom similarly requires link-by-link licensing at a charge of £50 per year. The recent Australian consultation on the use of 70/80 GHz bands floated a suggested annual license fee of AU$180 per year.

Therefore this paper requests that ComReg extends the 70/80 GHz band utilisation proposal to include a brief discussion on licensing. A "light licensing" methodology, similar to that implemented in the UK and USA is recommended, whereby licensees can quickly and easily apply for a licence, at a fee that encourages adoption and utilisation of these new high capacity frequency bands.

Respectfully,

Dr. Heinz Willebrand
CEO & President
Rayawave

About the Responding Party

The Responding Party, Rayawave, Inc., is an equipment provider of MMW radio systems located in the United States. We offer a complete product line of MMW radio products operating in the 71-76 GHz frequency band. Our products were recently granted the official ETSI approval according to the R&TTE Directive 1999/5/EC and they are in full compliance with the CEPT Recommendation ECC/REC/(05).

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5 Vodafone Ireland Ltd.

Vodafone Response to the ComReg Consultation on Utilisation of the 71-76 GHz and 81-86 GHz Spectrum Bands

Introduction

Vodafone welcomes the opportunity to respond to ComReg's consultation document on the utilisation of the 71-76 GHz and 81-86 GHz bands. Our response to the consultation question posed by ComReg is set out below.

Response to Consultation Question

Q. 1. Do you agree with ComReg's proposed utilisation of the 71-76 GHz and 81-86 GHz bands for fixed point to point radio links ? If you do not agree with all or any part of this proposal, please provide reasons for your answer.

Yes. Vodafone agrees with ComReg's proposed utilisation of these bands for fixed point to point radio links. This innovative proposal is welcome as it offers the prospect of relieving congestion in other spectrum bands currently being used for fixed point to point links. With the currently poor availability of fibre backhaul, the proposed use of the 71-76 GHz and 81-86 GHz bands offers operators a solution to backhaul very high capacity over MicroWave Radio in a commercially viable way.

The consultation document refers to tests that have been carried out which determined that these spectrum bands are suitable for the deployment of high capacity radio links. Vodafone would appreciate ComReg making the results of these tests carried out under ComReg's trial licensing regime available for analysis by interested parties.

6 WiFi Projects Ltd. (trading as Wireless Projects)

Wireless Projects
Ireland's Certified Wireless Professionals

To whom it may concern,

Yes, I agree that ComReg should open the 71-76Ghz and 81-86Ghz frequency bands. I believe the opening up of the 71-76Ghz and 81-86Ghz spectrum bands as being very positive for Ireland Inc. The introduction of high-capacity links of 1-10Gbps is a good development for our communications infrastructure.

It will allow operators to cost effectively extend communication networks to places where a fibre or cable solution would prove too costly or time-consuming due to inaccessibility, planning delays etc.

Given Ireland's relatively poor performance ranking in OECD broadband statistics for June 2007 - Ireland ranked 22 out of 30 countries - the possibility of extending broadband backhaul networks using these new frequencies is of great benefit and should have a positive effect on broadband availability, price and uptake.

This spectrum should also provide an opportunity for 'Triple-Play' providers to deliver all Voice, Video and Data requirements to residential developments.

From a commercial perspective organisations that currently use fibre or GigE networks will now be able to quickly implement wireless redundancy and wireless extensions at relatively low costs.

From an NGN perspective high frequency spectrum allowing Multi-Gigabit capacities means that wireless NGNs are now a real alternative, providing many opportunities for both existing operators and new entrants. This new spectrum may even be used to interconnect existing fibre deployments.

Best Regards

_____

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7 YYC (Enterprises) Ltd.

ComReg's Consultation 07/85

Utilisation of the 71-76Ghz and 81-86 Ghz spectrum in Ireland.

YYC (Enterprises) Ltd. strongly supports ComReg's plans to allow commercial use of this part of the spectrum in Ireland. By opening up this part of the spectrum applications, that may be today restricted due to cost or bandwidth, should become possible. However, in order for Ireland to gain the full commercial advantage from this spectrum YYC believes that two key elements are required:

1. Any technical areas in the proposed regulation have to be technology neutral. By adopting a technology neutral approach to regulation ComReg will be allowing commercial / market pressures to decide upon the most appropriate technology for any particular application.
2. That the spectrum licensing regime adopted in Ireland be similar to that in the USA and UK. That is, a light touch regulatory environment with a simple straight forward licensing process and a fee structure that encourages use of the spectrum.

YYC feel that the above points are worthy of consideration by ComReg as, in our opinion, they are fundamental to ensuring that Ireland gains the most from this opening up of spectrum.

8 Christophe Bernigaud

Note: This submission has been edited by ComReg.

Yes I agree with the utilisation of the 71-76 GHz and 81-86 GHz Spectrum Bands for high speed internet access around the whole of Ireland for commercial and residential use…we are now living in the 21st century and have to give a mean to our developments dreams… I also wish this will bring down the internet access cost at a residential level [redacted] ,we need opening the market place to be e-Ireland that we promote to be.

9 John Wood

In the Consultation Paper, it is stated that “successful radio tests have been carried out....demonstrating that it is possible .....to carry very high speed transmissions”. This is one such application for use of the very large spectrum bandwidth available in these frequency allocations.

No doubt a commercially available radio link has been studied. However there are potentially many more applications possible than just the deployment of high capacity radio links and to exclude other usages would be counterproductive to opening a new band of spectrum.

Ofcom has decided (Statement November 2006) after industry consultation, that in order to achieve maximum flexibility, with the minimum possible amount of restrictions, a channel plan (i.e. CEPT ECC/Rec(05)07) should not be mandated in the bands. Ofcom believes that in not mandating a channel plan innovation will be encouraged. I would agree with this approach although having some control over defining FDD and 10GHz duplex would be beneficial to provide good frequency co-ordination. Hover the single biggest restriction to innovation is the “Minimum Radio Interface Capacity (RIC) specifications that you set out in Appendix B as extracts from TS 102 524. This will severely restrict the opportunity for innovation. If applied, then the lowest capacity possible is 150Mb/s and the equipment costs will be forced unnecessarily high, making the eventual deployments uneconomic. Ofcom in their Radio Interference Requirements (2000) have stated “there is no regulatory requirements for operators to use equipment specified in TS 102 524”. I would therefore refer to the TS specification but specifically remove the Minimum RIC requirement as it restricts innovation.

Also the Consultation Paper mentions “beams reduce the potential for interference between multiple radio links”. This is particularly true of the use of these high frequencies. I would agree with the proposed TX EIRP limits and implied antenna ERP’s as it provides insurance that some amount of frequency co-ordination can be achieved to achieve best spectrum utilisation.

10 Peter Lawless

This is something that must happen in order for Ireland Inc. to achieve the digital parity with our European counterparts.

11 Rory Stones

I agree that the frequencies being used for high capacity links are suitable.

12 Thomas Edwards

Yes, the 71-76 & 81-86 Ghz bands should be opened for multi-gigabit high capacity point to point networks.