



Commission for
Communications Regulation

Consultation Paper

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

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All responses to this consultation should be clearly marked:-
“Reference: Submission re ComReg 07/85” as indicated above,
and sent by post, facsimile, e-mail or on-line at www.comreg.ie
(current consultations), to arrive on or before 5.30 pm on 22
November 2007, to:

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

Ph: +353-1-8049600 Fax: +353-1-804 9680 Email:
marketframeworkconsult@comreg.ie

Please note ComReg will publish all respondents submissions
with the Response to this Consultation, subject to the provisions
of ComReg’s guidelines on the treatment of confidential
information – ComReg 05/24

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1 Executive Summary

This consultation document considers the utilisation of the 71-76 GHz and 81-86 GHz spectrum bands and proposes that these bands be made available for very high capacity fixed point to point radio links. Currently the 71-76 GHz and 81-86 GHz bands are not allocated or used by any radio frequency service in Ireland, and there is little or no evidence available to ComReg to suggest a demand for any other radio usage apart from radio links.

Successful radio tests have recently been carried out in Ireland in these bands under ComReg's wireless test and trial licensing regime. These tests identified radio links as a potentially suitable service for the 71-76 GHz and 81-86 GHz spectrum band.

The new innovative technology used in these tests demonstrated that it is possible to deploy radio links in these bands that are capable of carrying very high speed data transmissions (e.g. in the range 1 GBit/s to 10 Gbit/s) over relatively short distances (e.g. 1-3 km). Such radio links could prove to be a viable alternative to optical fibre, particularly where speed and ease of installation are key factors.

Recently, standards have been approved within the European Telecommunications Standards Institute ("ETSI") and the European Conference of Postal and Telecommunications Administrations ("CEPT") for the use of fixed wireless services in the 71-76 GHz and 81-86 GHz band. The availability of international standards helps to ensure compliance with international requirements and avoid harmful interference to other users.

ComReg therefore believes that its proposal to allow the deployment of the high capacity fixed point to point radio link services in the 71-76 GHz and 81-86 GHz band is in keeping with ComReg's overall objective to ensure the efficient management and use of radio spectrum in Ireland.

This document opens a public consultation on this proposal. The consultation period will run until November 22nd, 2007 after which ComReg will review the submissions received and make its final decision on the availability of the bands in question.

2 Introduction

2.1 Current Radio Frequency Allocation

Table 1 below details the current international and national radio frequency allocations in the 71-76 GHz and 81-86 GHz frequency bands as set out in Ireland's Radio Frequency Plan (see ComReg Document 07/81).

Table 1: Current International & National Radio Frequency Allocations for the 71-76 GHz and 81-86 GHz frequency bands

Frequency Band (GHz)	ITU Allocation and Footnotes applicable to Ireland	European Common Allocation	National Usage
71-74	FIXED FIXED-SATELLITE (s-E) MOBILE MOBILE-SATELLITE (s-E)	FIXED FIXED-SATELLITE (s-E) MOBILE MOBILE-SATELLITE (s-E) EU27	None
74-75.5	FIXED FIXED – SATELLITE (s-E) MOBILE BROADCASTING BROADCASTING-SATELLITE Space Research (s-E) 5.559A, 5.561	FIXED FIXED-SATELLITE (s-E) MOBILE BROADCASTING BROADCASTING-SATELLITE Space Research (s-E) 5.561	None
75.5-76	FIXED FIXED-SATELLITE (s-E) BROADCASTING BROADCASTING-SATELLITE MOBILE Space Research (s-E) 5.561 5.559A	FIXED FIXED-SATELLITE (s-E) BROADCASTING BROADCASTING-SATELLITE Amateur Amateur-satellite 5.561, EU2, EU25	None
81-84	FIXED FIXED-SATELLITE (E-s) MOBILE MOBILE-SATELLITE (E-s) RADIO ASTRONOMY Space Research (s-E) 5.149, 5.561A	FIXED FIXED-SATELLITE (E-s) MOBILE MOBILE-SATELLITE (E-s) RADIO ASTRONOMY Space Research (s-E) 5.149, EU27, 5.561A	None
84-86	FIXED FIXED-SATELLITE (E-s) MOBILE RADIO ASTRONOMY 5.149	FIXED FIXED-SATELLITE (E-s) MOBILE RADIO ASTRONOMY 5.149	None

As highlighted in Table 1 above, currently the 71-76 GHz and 81-86 GHz bands are not allocated or used by any radio frequency service in Ireland.

2.2 Suitability of the 71-76 GHz and 81-86 GHz bands for Fixed Radio Links

Successful radio tests have recently been carried out in Ireland in the 71-76 GHz and 81-86 GHz spectrum bands under ComReg's test and trial licensing regime. New innovative technology was deployed in these tests which demonstrated that it is possible to deploy radio links in these bands that are capable of carrying very high speed data transmissions (e.g. in the range 1 GBit/s to 10 Gbit/s) over a relatively short distance (e.g. 1-3 km).

The successful conclusion of these tests identified radio links as a potentially suitable service for the 71-76 GHz and 81-86 GHz spectrum bands. Additionally, these bands have a number of unique characteristics that may be of interest to many telecommunications service providers and systems designers when deploying high capacity links.

In comparison to the other radio link frequency bands open in Ireland¹, these bands have a very high bandwidth availability of up to $2 \times 4.75 \text{ GHz}^2$. This very high bandwidth availability allows radio link equipment deployed in these bands to carry very high transmission capacities. Consequently, such radio links could prove to be a viable alternative to optical fibre links, particularly if speed and ease of installation is a key factor in the deployment of the link.

Additionally, the unique propagation characteristics of these bands are such that the spectrum in these bands can be re-used in a highly efficient manner. This is possible due to the highly directional 'pencil sized' beams that are deployed in these bands. These beams reduce the potential for interference between multiple radio links, thereby increasing the potential for re-use of radio link frequency channels in a particular geographic area.

2.3 International Standardisation

Standards for the use of fixed wireless services in the 71-76 GHz and 81-86 GHz bands have been approved within the European Telecommunications Standards Institute ("ETSI") and the European Conference of Postal and Telecommunications Administrations ("CEPT").

CEPT Recommendation ECC/REC/(05)07³, defines the channel arrangements for these spectrum bands. These channel arrangements are outlined in Appendix A of this consultation paper.

ETSI document TS 102 524⁴, sets out a number of technical radio equipment and antenna requirements for point to point fixed radio systems operating in these bands. These requirements are outlined in Appendix B to this document.

¹ See ComReg Document 98/14R4 for further details
<http://www.comreg.ie/fileupload/publications/ComReg9814R4.pdf>

² The next highest bandwidth availability is $2 \times 100 \text{ MHz}$ in the 58 GHz band and $2 \times 55 \text{ MHz}$ in the 18 GHz band.

³ Radio Frequency Channel Arrangements for Fixed Service Systems Operating in the Bands 71-76 GHz and 81-86 GHz, available from www.ero.dk

3 Utilisation of the 71-76 GHz and 81-86 GHz bands

ComReg believes that the deployment of high capacity fixed point to point radio link services in the 71-76 GHz and 81-86 GHz bands is in keeping with ComReg's objective to ensure the efficient management and use of radio spectrum in Ireland, and the four key strategic goals for spectrum management as defined in ComReg's spectrum strategy document⁵. These goals are to:

1. Facilitate access to radio spectrum, particularly for innovative technologies and services;
2. Maximise the economic and social benefits arising from the use of radio spectrum;
3. Promote the efficient use of scarce radio spectrum resources; and
4. Ensure compliance with international requirements and the avoidance of harmful interference.

The previous chapter highlighted the new innovative nature of this service and its ability to carry very high transmission capacity radio links.

There is increasing demand from users for such high capacity radio links as an alternative to optical fibre. Additionally, the evidence available to ComReg, coupled with the lack of demand heretofore, suggests that there is little or no demand for spectrum in these bands from other potential users, such as mobile, amateur or satellite services.

The radio characteristics of these bands facilitate the efficient re-use of spectrum in these bands, and the recent approval of appropriate international standards will ensure compliance with international requirements and the avoidance of harmful interference.

ComReg therefore proposes to allocate the 71-76 GHz and 81-86 GHz bands for fixed radio link services as outlined below.

3.1 ComReg's proposed utilisation

ComReg proposes that:

- The 71-76 GHz and 81-86 GHz spectrum bands are allocated to high capacity fixed point to point radio link usage in Ireland.

⁴ 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, available from www.etsi.org

⁵ ComReg Document 05/72 - <http://www.comreg.ie/fileupload/publications/ComReg0572.pdf>

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- Radio links licensed in these bands are to be licensed under the existing Radio Link Licence Regulations (S.I. No. 319 of 1992) and based on the existing radio link licensing scheme for point to point links above 1 GHz⁶.
- The frequency channel arrangements for radio links in these bands are to be based upon CEPT Recommendation ECC/REC/(05)07, in a duplex FDD arrangement, with a duplex separation of 10 GHz , as described in Appendix A to this document.
- In common with other licensed radio services, all radio equipment used to provide radio link services must comply with the Radio and Telecommunications Terminal Equipment Directive 1999/5/EC (the R&TTE Directive) which was enacted into Irish law on 5 June 2001 by Statutory Instrument 240 of 2001. Harmonised standards under the R&TTE Directive, published by the European Telecommunications Standards Institute (ETSI) and CENELEC, can be used to demonstrate compliance to the essential requirements of the R&TTE Directive.⁷.
- The antenna and radio equipment used in these bands must adhere to technical requirements as set out in ETSI document TS 102 524, as described in Appendix B to this document.

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.

⁶ See ComReg Document 98/14R4
<http://www.comreg.ie/fileupload/publications/ComReg9814R4.pdf>

⁷ A list of the harmonised standards under the R&TTE Directive is maintained at
<http://europa.eu.int/comm/enterprise/newapproach/standardization/harmstds/reflist/radiotte.html>

4 Legislation

A Wireless Telegraphy Licence is required under Section 3 of the Wireless Telegraphy Act 1926 to keep and operate apparatus for wireless telegraphy.

The specific regulations governing the issue of Radio Link licences are contained in the Wireless Telegraphy (Radio Link Licence) Regulations, 1992 (S.I. 319 of 1992). Please note that these Regulations should be read in light of the new regulatory framework, and in conjunction with Appendix F of ComReg document 03/84.

Interested parties should be aware that any Radio Link licence granted by ComReg is for the keeping and operation of the apparatus for wireless telegraphy, which is specified in the licence. Any licence issued by ComReg does not free the licensee from complying with any other statutory obligations (e.g. planning permission).

Radio link licensees must also comply with ComReg's General Authorisation scheme governed by the European Communities (Electronic Communications Networks and Services) (Authorisation) Regulations 2003 (S.I. 306 of 2003), as amended by European Communities (Electronic Communications Networks and Services) (Authorisation) (Amendment) Regulations 2007 (S.I. 372 of 2007). See ComReg documents 03/81, 03/82R, 03/83 and 03/102 for more information on the General Authorisation scheme.

5 Submitting Comments

All comments are welcome.

The consultation period will run from Thursday, October 25th 2007 to Thursday, November 22nd, 2007, during which the Commission welcomes written comments on any of the issues raised in this paper.

Having analysed and considered the comments received, ComReg will review the appropriate utilisation for the 71-76 GHz and 81-86 GHz spectrum band and will publish a report on the consultation which will, inter alia, summarise the responses to the consultation.

In order to promote further openness and transparency, ComReg will publish all respondents' submissions to this consultation, subject to the provisions of ComReg's guidelines on the treatment of confidential information – ComReg 05/24. We would request that electronic submissions be submitted in an unprotected format so that they can be appended into the ComReg submissions document for publishing electronically.

Please note

ComReg appreciates that many of the issues raised in this paper may require respondents to provide confidential information if their comments are to be meaningful.

As it is ComReg's policy to make all responses available on its web-site and for inspection generally, respondents to consultations are requested to clearly identify confidential material and place confidential material in a separate annex to their response

Such Information will be treated subject to the provisions of ComReg's guidelines on the treatment of confidential information – ComReg 05/24

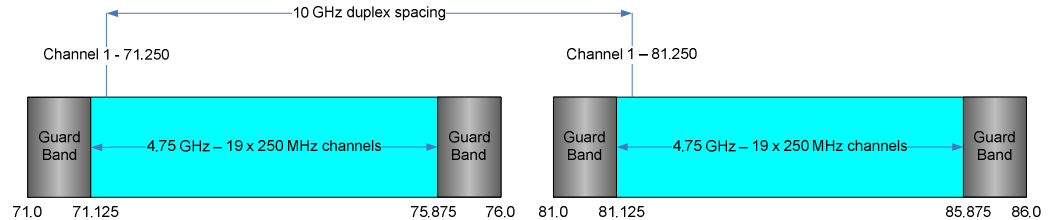
Appendix A – CEPT Recommendation ECC/REC/(05)07 channel arrangement

CEPT ECC Recommendation (05)07⁸ sets out the frequency channel arrangement for fixed services operating in the 71-76 GHz and 81-86 GHz bands. The following provides a brief description of this recommendation.

71-76 GHz & 81-86 GHz band structure

Figure 1 below shows the 71-76 GHz and 81-86 GHz band structure, as defined in CEPT ECC Recommendation (05)07. Within each 5 GHz band, nineteen 250 MHz channels are defined, with a 125 MHz guard band at either end of each 5 GHz band. Channels are deployed in a duplex FDD arrangement, with a duplex separation of 10 GHz.

Figure 1: 71-76 GHz & 81-86 GHz band structure

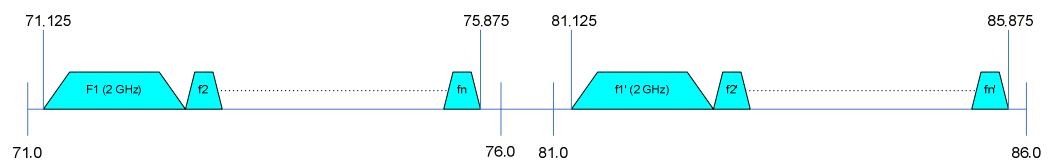


Aggregation of channels

When wider channels are required, for example with very high bit rate and very high system gain applications, then a flexible number of successive 250 MHz channels may be aggregated into FDD channels, as illustrated in Figure 2 below.

It is possible to aggregate all nineteen channels together to form a 2 x 4.75 GHz FDD radio link.

Figure 2 - Example of aggregating multiple 250 MHz channels, possibly alongside original 250 MHz wide channels



⁸ "Radio Frequency Channel Arrangements for Fixed Service Systems Operating in the Bands 71-76 GHz and 81-86 GHz" (available from www.ero.dk)

Appendix B – ETSI TS 102 524 radio equipment and antenna requirements

The following outlines the applicable radio equipment and antenna requirements as set out in ETSI TS 102 524⁹:

- Minimum Radio Interface Capacity: The Radio Interface Capacity (RIC) must exceed the minimum RIC given in Table 2 of TS 102 524 shown below:

Table 2: Minimum RIC Values

Channels (MHz)	Minimum RIC values (Mbps)					
	Class 5H	Class 5L	Class 4H	Class 4L	Class 2	Class 1
250	1000	900	750	600	300	150
500	2000	1800	1500	1200	600	300
750	3000	2700	2250	1800	900	450
1000	4000	3600	3000	2400	1200	600
1250	5000	4500	3750	3000	1500	750
1500	6000	5400	4500	3600	1800	900
1750	7000	6300	5250	4200	2100	1050
2000	8000	7200	6000	4800	2400	1200
2250	9000	8100	6750	5400	2700	1350
2500	10000	9000	7500	6000	3000	1500
2750	11000	9900	8250	6600	3300	1650
3000	12000	10800	9000	7200	3600	1800
3250	13000	11700	9750	7800	3900	1950
3500	14000	12600	10500	8400	4200	2100
3750	15000	13500	11250	9000	4500	2250
4000	16000	14400	12000	9600	4800	2400
4250	17000	15300	12750	10200	5100	2550
4500	18000	16200	13500	10800	5400	2700
4750	19000	17100	14250	11400	5700	2850
N.A.= Not applicable						

- Minimum Antenna Gain: The antenna gain shall be a minimum of 43 dBi;
- Output Power Limitation: The maximum total output power at antenna port should not exceed 30dBm.
- Maximum EIRP: The maximum EIRP, including any tolerance, shall not exceed +45 dBW;

⁹ "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." Available at www.etsi.org.

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- EIRP Spectrum Density Mask: The maximum power shall be limited to within the EIRP Spectral Density mask illustrated in Figure 2 of TS 102 524 shown below:

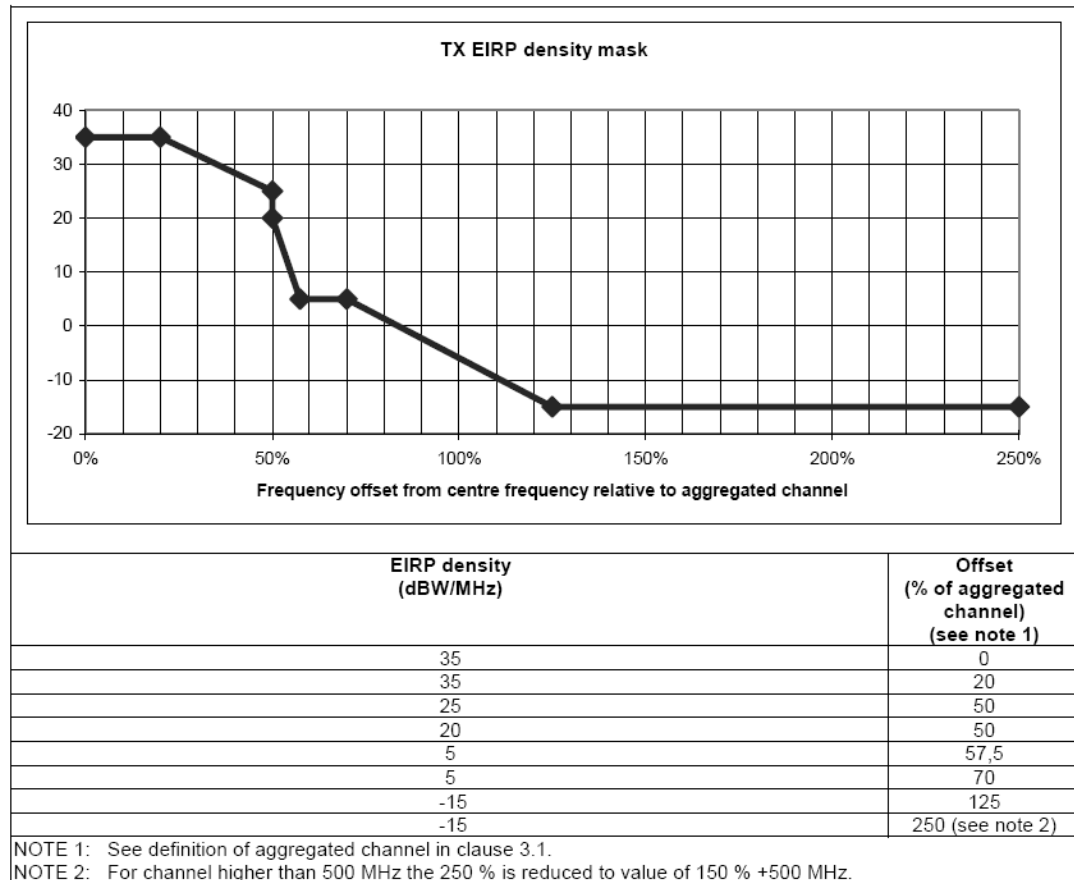


Figure 2: Tx EIRP spectral density mask

Appendix C – Consultation Question

List of Questions

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..... 6