



Commission for
Communications Regulation

Guidelines

Guidelines to Applicants for Radio Links Licences

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An Coimisiún um Rialáil Cumarsáide

Commission for Communications Regulation

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1 Introduction

The Commission for Communications Regulation (ComReg) has introduced a new fee structure for Radio Link Licences, under the Wireless Telegraphy (Radio Link Licence) Regulations, 2009 (S.I. 370 of 2009) which replace the Wireless Telegraphy (Radio Link licence) Regulations, 1992 (S.I. 319 of 1992).

This document sets out ComReg’s revised guidelines for applicants for a **radio link licence**, replacing the “Guidelines for Point to Point Radio Link Licences in Spectrum above 1 GHz” (ComReg Document 98/14R6), and “Point-to-Multipoint Radio Link Licence Guidance Notes and Application Form” (ComReg Document 02/11R2).

A licence to keep and operate apparatus for wireless telegraphy is required under Section 3 of the Wireless Telegraphy Act 1926. Radio Link licences are governed by the Wireless Telegraphy (Radio Link Licence) Regulations, 2009 (S.I. 370 of 2009), which replace the Wireless Telegraphy (Radio Link licence) Regulations, 1992 (S.I. 319 of 1992). A holder of a wireless telegraphy licence must also comply with the General Authorisation scheme (governed by the European Communities (Electronic Communications Networks and Services) (Authorisation) Regulations 2003 (S.I. 306/2003) - see ComReg documents 03/81, 03/82R, 03/83 and 03/102) and with the European Communities (Radio Equipment and Telecommunications Terminal Equipment) Regulations 2001 (S.I. 240 of 2001). A holder of a Radio Link licence may keep and operate the apparatus as specified in the licence, for the period of time and subject to the conditions set out therein. The granting of a Radio Link licence does not free a licensee from having to comply with any other legal obligations.

As of 1 December 2009, applications for radio link licences may be made via ComReg’s new online application system¹. This new, paper-free method of dealing with applications will streamline the radio link licensing process. The existing paper-based application system will however continue to be supported. For further information on the application process, please refer to Section 4 of this document.

Furthermore, ComReg proposes to allow equipment which utilises Adaptive Coding and Modulation (ACM) to be deployed in all terrestrial microwave fixed link bands. ACM increases the data capacity of radio links without increasing power consumption or link bandwidth. The increased capacity of individual links allows operators to reduce the total number of links they deploy, thus minimising equipment costs, power consumption and carbon emissions. Further information on ACM can be found in Section 2.10.

Radio links are commonly used for providing high bandwidth connections between two fixed points and in some circumstances radio links can provide an economic alternative to optical fibre and leased lines. There are a large variety of radio link users in Ireland, including fixed and mobile operators, broadcasters, public utilities and the emergency services. Generally these licensees use radio links to provide connections between two points in their network.

¹ www.elicensing.comreg.ie

As Shown in Figure 1 below, the use of radio links in Ireland has increased over the past number of years, and as of the 30th June 2009, there were 9791 Point-to-Point Radio Link Licences in Ireland. This represents a 377% increase in the number of radio links since the year 2000.

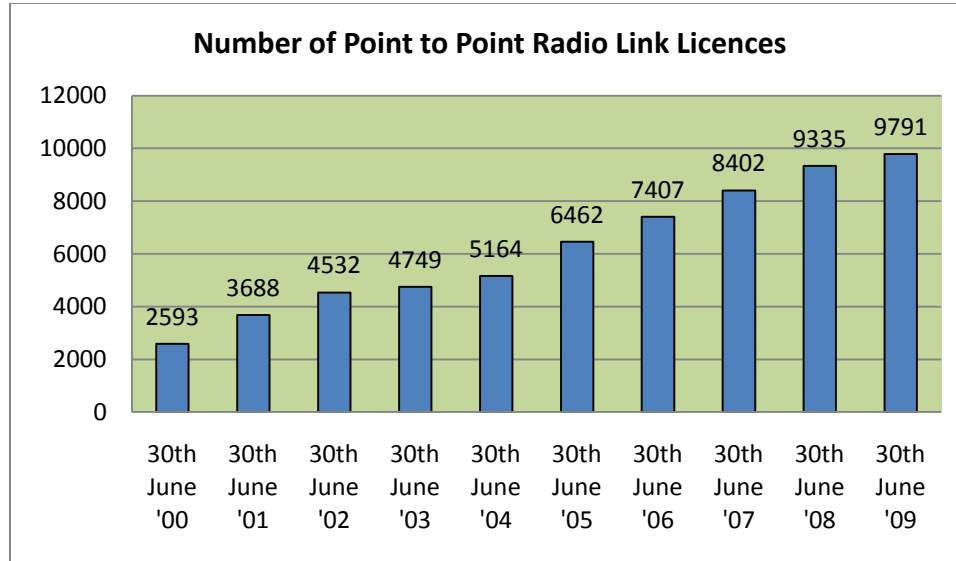


Figure 1 : Number of Point-to-Point licences at 30th June 2009

These guidelines provide information to the applicant on ComReg’s Radio Link licensing scheme. Among other things, these guidelines provide information on:

- The frequency bands available;
- The technical licensing requirements;
- The application process; and
- The licence itself.

ComReg encourages all potential applicants to read these guidelines carefully if they are considering the submission of a radio link licence application to ComReg. Queries regarding these guidelines or on the licensing process can be directed to ComReg’s Licensing Operations Team: via telephone to 01 8049600, or via e-mail to licensing@comreg.ie .

ComReg may revise these guidelines again in the future.

2 Point-to-Point Radio Links: Technical Licensing Requirements

This section sets out the minimum technical requirements that must be met when applying for a point-to-point radio link. As stated in the Spectrum Management Strategy Statement: 2008 – 2010 ComReg will no longer licence new fixed Point-to-Point or Point-to-Multipoint links in the 450 – 470 MHz band after 1 January 2010. In addition ComReg will begin the process of migrating all existing links out of this frequency band.

2.1 Point-to-Point (P-P) Frequency Spectrum Bands

ComReg has reserved a number of frequency bands for point-to-point radio link licensing. These bands are based upon internationally recommended band plans.

Table 5 in Annex 1 of this document sets out the full list of P-P radio link frequency bands available in Ireland and the technical information associated with each band. Only frequency bands and channels as per Table 5 in Annex 1 can be requested for licensing. A summary of the P-P radio link frequency bands in Ireland is set out in **Error! Reference source not found.** below.

Status	Frequency Bands (GHz)
Open	Lower 6, Upper 6, 7, Lower 8, Upper 8, 11, 13, 15 18, 23, 26, 38, 58, 80
Open and under review	Upper 1.3, Lower 1.4 and 2

Table 1: Summary of P-P Radio Link Frequency Bands Ireland

From time to time, ComReg may be required to make changes to the P-P Radio Link frequency bands available in Ireland and/or their technical conditions. Such changes may arise for a number of reasons, including:

- Changes in spectrum allocations in accordance with the requirements of international treaties or regionally negotiated agreements;
- Changes necessitated by EU legislation;
- Changes in order to meet national requirements;
- Changes in the interest of efficient use of spectrum.

Arising from any such changes, existing licensees may be required to modify or cease their radio link operations in order to comply with the revised frequency bands and technical conditions. ComReg will endeavour to provide as much notice as possible to existing licensees in the event that any such changes are required.

2.2 Preferential Frequency Channels

When considering applications for new radio links, the key criteria that ComReg will take into consideration are:

- Radio spectrum efficiency and optimisation of the radio link / network, and
- The current and future availability of radio spectrum.

Where the applicant satisfies these criteria and when appropriate², ComReg may identify one or more preferred frequency channels for the applicant.

If a preferred frequency channel is identified, ComReg will endeavour to grant the applicant use of that channel to the maximum extent possible in accordance with all relevant licence conditions for any radio links to be deployed. A preferred channel does not mean that the licensee has exclusive use of that frequency channel, as ComReg may license other applicants on the same frequency channel. Exclusive use of a frequency channel can only be obtained via a spectrum competition for a block allocation of spectrum.

2.3 Cross-Border Radio Links

It is possible to submit an application for a Cross-Border Radio link (i.e. a radio link which spans both sides of the Republic of Ireland/Northern Ireland border). ComReg can facilitate the licensing of that part of the link which operates up to the border, while Ofcom (UK's Office of Communications) licenses that part of the link which operates on the Northern Ireland side of the border.

2.4 General link planning

In the interests of efficient use of radio spectrum ComReg does not permit the use of frequency diversity or the assignment of separate frequencies for standby purposes, except in the most exceptional of circumstances.

Licensees are encouraged to use radio network resilience techniques to improve the reliability of transmission networks. Such techniques include:

- space diversity;
- 'hot-standby' radio equipment redundancy based on one frequency channel; and
- routing diversity, which involves the construction of networks with ring or mesh architectures.

The following practices are discouraged as they can result in poor spectrum efficiency and excessive interference to other users or services:

² For example, the licensee is a large scale user of radio links and is using radio links in a spectrum efficient manner.

- use of unnecessarily high transmit powers;
- inadequate network planning;
- lack of network resilience; and
- excessive use of star networks requiring a number of frequency channels.

2.5 Link Length planning

In the interests of efficient and orderly use of spectrum, ComReg operates a link length policy. This policy specifies the minimum link length permissible for a frequency band along with necessary transmission capacity. Details of minimum link lengths per frequency band are contained in Table 5 of Annex 1 of this document.

It is only in the most exceptional of circumstances (e.g. High/Low conflicts, see Section 2.6), that ComReg will consider licensing a radio link with a path length which is less than the specified minimum link length.

2.6 High / Low database

When planning a radio link, the applicant must have regard to the compatibility of the radio link with other existing radio users at the same general location. Specific sites and the immediate surrounding area may be designated “transmit high” or “transmit low” in specific frequency bands, depending on the sub-band in which existing links on that site are transmitting.

Prior to submitting a Point-to-Point Radio Link application, the applicant should consult the high/low database on ComReg’s website³ to ensure that their application does not have a high/low designation conflict. A high/low designation conflict arises when site designation in the application conflicts with the existing site designation in ComReg’s database. For example, a High designation is requested in the application for a site that has an existing Low designation. ComReg will not license a link with a high/low designation conflict.

In consulting the high/low database, the applicant should enter accurate site co-ordinates which are based upon measurements taken from a GPS device at the specific mast location. Inaccurate site co-ordinates may lead to licence invalidation.

2.7 Equipment Requirements & Reference databases

ComReg will only grant licences for radio equipment that meets the minimum mandatory technical requirements as set out in Table 5 in Annex 1 of this document.

The minimum equipment requirements relate to the:

- Transmission Capacity Requirement;
- Minimum Antenna Requirement; and
- Mandatory Equipment Class.

³ http://www.comreg.ie/licences/high_low_database.600.highlow.html

ComReg maintains three separate equipment reference databases which are available on ComReg's website⁴:

- Antenna Reference Codes
- Radio Transmitter Reference Codes
- Feeder Reference Codes

Before submitting an application to ComReg for a Point-to-Point Radio Link licence, the specifications of the equipment have to be registered on ComReg's Equipment Reference Code Database. If the equipment is not registered on the database, please complete the Equipment Reference Code Registration Form⁵ and send this to ComReg at refcode@comreg.ie. Please note that ComReg cannot accept radio link applications without a relevant ComReg Equipment Reference Code.

2.8 R&TTE Equipment Compliance

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 the 5th of June 2001 by Statutory Instrument 240 of 2001⁶. 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 Directive⁷.

In relation to radio services in Ireland, ComReg has set out its R&TTE interface requirements in ComReg Document 06/47R⁸. This document outlines both the mandatory and information interface requirements for point-to-point radio links in Ireland.

Licensees are advised to familiarise themselves with ComReg Document 06/47R, as it is the responsibility of the licensee to ensure that all equipment being used is R&TTE compliant.

⁴ http://www.comreg.ie/licences/equipment_reference_codes.601.erc.html

⁵ "Point to Point Radio Links Equipment Reference Code Registration Form" ComReg Document 07/36
<http://www.comreg.ie/fileupload/publications/ComReg0736.pdf>

⁶ European Communities (Radio Equipment and Telecommunications Terminal Equipment) Regulations, 2001 (S.I. No. 240 of 2001) <http://www.irishstatutebook.ie/2001/en/si/0240.html>

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>

⁸ "Interface Requirements for Radio Services in Ireland"
<http://www.comreg.ie/fileupload/publications/ComReg0647R.pdf>
Note: This document is subject to revision and updates.

2.9 Requested radio propagation availability & power

ComReg aims to licence a radio link in the most appropriate frequency band with an assigned bandwidth and transmitter EIRP (Equivalent Isotropic Radiated Power) that are the minimum consistent with capacity and availability requirements for that link.

In submitting an application to ComReg, the applicant should request the minimum transmitter EIRP that is required for the propagation availability and capacity of the link as set out in Annex 2. The channel that is eventually licensed, and the transmitter power, may be different from those requested that were originally requested by the applicant.

To determine the minimum transmitter EIRP (i.e. maximum permissible transmitted power) for a radio link, the applicant should carry out a path calculation (link budget). This path calculation should be based on the same technical parameters as used by ComReg (see **Error! Reference source not found.** below) and take account of the transmitter output power levels, antenna gains, feeder losses and receiver sensitivity levels.

The applicant should submit a .pdf copy of the path calculation to Licensing@comreg.ie in respect of each proposed radio link. The appropriate application reference number (APP No.) must be used to identify the application in question.

Radio Factor	ITU-R Recommendation	Equation No. (or Table/Figure)
Free Space Loss	P. 525-2, Annex 1	4
Gaseous Absorption	P.676-6	22a-22u, 23a-23d, 24, 25a-25e, 26a & 26b, 27
	P.530-11	1
	P.836-3	Figure 4
Rain Attenuation	P.838-3	1, 2, 3, Table 1
	P.837-4	32mm/hr, Figure 2
	P.841-4	3, 4, 5 with Q1 and Beta user adjustable.
	P.530-11	35, 36, 37, 38
Multipath Fading	P.530-11	4, 5, 6, 8, 13, 15, 16 and for an unknown sized body of water, 18, 19, 20, 21, 22, 23, 24, 30, 31
	P.530-11	5 or 39, 40
	P.453-9	Figure 9 (pl user adjustable)

Table 2 Availability formulae used in ComReg’s path calculations

Additionally, the applicant is required to manage any internal interference issues on the same channel, as ComReg only carries out an inter-operator interference checks in its path calculations.

2.10 Adaptive Modulation⁹

An ETSI standard (ETSI EN 301 217-2-2 V1.3.1 (2008-12)) was published which sets out the manner in which Adaptive Modulation and Coding (ACM) should be deployed. ComReg will allow equipment which utilises ACM to be deployed in all terrestrial microwave fixed link bands. In line with this ETSI standard, ComReg requires that a reference mode for a fixed link be defined by the applicant. This reference mode should be capable of delivering the core bit rate (high availability traffic), and utilise the fade margin when possible to *increase* the data rate (for lower priority traffic). An application for a fixed link using ACM must be for the **minimum modulation scheme it will use on the link**.

The Received Signal Level (RSL) will be determined by the RSL of the system in reference mode, and this RSL will be used in assigning an EIRP which in turn will determine level of availability allowable for the given link. The ratio of C/I used to protect the radio link will be determined by the C/I defined for the reference mode.

⁹

http://comreg.ie/publications/use_of_adaptive_coding_and_modulation_in_terrestrial_fixed_link_bands.583.103510.p.html

At all times, the EIRP assigned to the system must be consistent and must not vary from the value stipulated in its licence, even when there is a transition of modulation schemes and capacity. As stated in the ETSI standard: “TX emission should not exceed that of the reference mode”. In doing so, currently licensed links and future links in bands, whether deploying ACM or fixed modulation technology, would not be adversely affected by a system deploying ACM in the same band.

The licence which will be issued to an ACM system will include the modulation scheme and capacity of the reference system. These values will be indicative of the reference system nominated by the licensee, and these values are **not descriptive of the range of capacity and modulation schemes the system can utilise**. (Also refer to the technical paper published by ComReg 09/87)

2.11 Congested Area Links

Increasing congestion in certain frequency bands has prompted ComReg to introduce higher fees for certain spectrum within a specific geographical area, called the “congested area”. Currently the congested area applies to links in Grid 3122 and 3123 in the 18 GHz and 23 GHz frequency bands only (See Figure 2 below). Therefore, if either end of an 18 GHz or 23 GHz link falls within the range E310000 to E320000 and N220000 to N240000, then a congestion charge applies. The higher fee for links within this geographical area reflects the scarcity of spectrum within the area and in those bands. The applicable fees are detailed in Table 4 in Section 8 below.

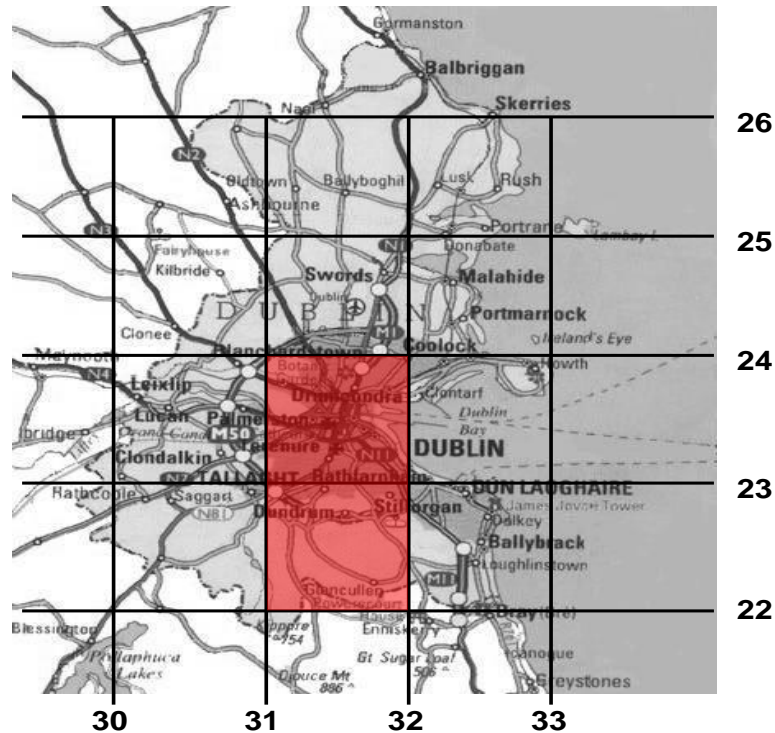


Figure 2: Location of the congested area for 18 GHz and 23 GHz bands

2.12 Single Channel Dual Polarity Links (SCDP)

A single channel dual polarity link (SCDP) is a link having both vertical and horizontal polarisation on the same path and same frequency channel. Under the previous regulations operators that deployed links with both vertical and horizontal polarisation on the same frequency channel from the same sites (SCDP, single channel dual polarised) were charged for two separate radio links and licensed under two individual link licences. Under the new regulations SCDP links will be charged and licensed under a single link licence. This is intended to encourage the efficient use of spectrum and provide an incentive to licensees who have multiple links on the same path to consider using both H and V polarisation on the same frequency channel.

2.13 High Usage Paths

ComReg's seeks to promote radio fixed links as a means of facilitating market entry and the rollout of alternative infrastructure. In high usage areas, established operators whose capacity requirements have grown to the extent that fibre would provide an effective alternative are therefore being encouraged to make this migration, where practicable, in order to release spectrum for new entrants.

With this in mind, under the new regulations an additional 'High Usage' charge will be incurred by operators who have 5 or more licensed radio links over a particular link path. Because an operators' usage of any one particular radio link path varies throughout the year the fee for the High Usage Path will be calculated and invoiced for on a quarterly basis. The High Usage Path fee will be calculated using Table 4 in Section 5 below.

3 Before Applying for a Radio Link Licence

There are many technical parameters that need to be considered when planning a radio link or a network of radio links, and before submitting a radio link licence application to ComReg.

3.1 Planning a radio link

The general aim of planning a radio link is to identify the desired site locations, frequency band and channel spacing to meet the transmission and availability requirements of the radio link. The following may assist the applicant in this process.

- When planning a radio link or a network of radio links, the applicant must ensure optimal radio link spectrum efficiency, and repeat usage of the same frequency channel(s) throughout the network should be maximised.
- Where the applicant already has existing radio link licences, any future applications should be based upon frequency channels already licensed to the applicant.
- When a preferential frequency channel has been identified, the applicant should aim to re-utilise this channel to the maximum extent possible for any planned radio links. Where possible, ComReg will endeavour to facilitate these applications.
- The applicant should check that their desired radio link plan is in compliance with the technical requirements as set out in Table 5 of Annex 1. For example, the radio link plan meets the minimum link length and transmission requirements for the specific frequency band.
- The applicant should check the planned site co-ordinates with reference to ComReg's on-line high/low database¹⁰ to ensure that there are no high / low designation issues. This may eliminate certain site locations in particular frequency bands.
- The applicant should plan their radio link network based on the minimum Equivalent Isotropic Radiated Power (EIRP) necessary to achieve the required availability. Additionally, in order to minimise the risk of interference to others, the most directional antennas possible should be proposed.
- The applicant should engage with their equipment manufacturer to ensure that the desired radio link equipment (i.e. frequency band, transmission capacity etc.) is available, should a radio licence be issued by ComReg.
- The applicant should ensure that there are no internal interference issues on their desired frequency channels, as ComReg does not take internal interference issues into consideration when evaluating a radio link application.

¹⁰ <http://www.comreg.ie/licences/>

The above process should be repeated in order to refine the initial radio plan. Once the applicant has an initial radio plan, they may wish to avail of the free pre-consultation process with ComReg as outlined below.

3.2 ComReg's Pre-Application Consultation Service

ComReg's pre-application consultation service provides the applicant with feedback on their radio link plan and on any potential inter-operator interference issues that may arise. This free service can save time and resources for both the applicant and ComReg and can be used to identify frequency channels for use with prospective links.

To avail of this free service, all applicants are asked to consider the following points before contacting ComReg.

- All data provided for site co-ordinates is accurate, preferably sourced from GPS readings taken at precise mast locations.
- High/Low checks have been carried out at all sites and confirmed.
- If applicable, a preferential channel has been requested.
- Requested availability level for a specified link is in accordance with criteria stipulated in Annex 2, **Error! Reference source not found.**

The applicant is also encouraged to submit a fully completed *.xml to ComReg. This will facilitate direct import of the proposed link/link network data onto the ComReg database and therefore enable ComReg to provide a detailed and timely response. The *.xml file should be sent electronically as a text file to Licensing@comreg.ie. Further information on completing a *.xml file can be found on the ComReg website¹¹.

The on-line application facility should not be used for pre-application consultation submissions

New Applicants

Prior to application, it is prudent that all new applicants engage with ComReg, particularly those planning the implementation of a radio link network.

The scope of the consultation would include, inter alia, the following;

- Support and clarification, provided by ComReg, on any element of the radio link licensing process;

¹¹ http://www.comreg.ie/licences/application_file_-_anx.616.html

- Provision, by the prospective applicant to ComReg, of complete details for their radio link requirements;
- Assessment by ComReg of the radio spectrum usage requirements of the applicant, and liaison with the applicant to examine suitable frequency bands/channels that may be appropriate for the applicants requirements;
- For a large scale, spectrally efficient radio link network, ComReg will consider, as required, the identification of one or more preferential frequency channels for the applicant.

4 The Application Process

4.1 Submitting an Application

Applications for new or amended radio link licences must be submitted to ComReg together with the appropriate fees. All required details must be submitted in accordance with the parameters as set out in this document.

Prior to submitting an application, it is recommended that the applicant has carried out the necessary checks as set out in Section 3 above. This minimises the possibility of the application proving unsuccessful due to technical issues, such as high/low conflicts, inter-operator interference, etc.

Applications for new or amended radio link licences may be submitted using either of the following methods:

- (a) On-line; using ComReg's web-based radio link application system on www.elicensing.comreg.ie, or
- (b) Application Form 09/89A with text file (XML) containing the technical data.

The on-line option will ensure the optimum turnaround time for processing in that the data goes directly to the ComReg database for immediate processing.

4.2 On-Line Applications:

The online system on www.elicensing.comreg.ie guides applicants through the application process step by step. The information requested online is the same information which is requested in the paper application form.

To make an application on-line:

- The applicant must be an account holder with ComReg.
- if not the applicant may register using the registration facility - also available on www.elicensing.comreg.ie.
- The applicant will be requested to provide a contact email address for correspondence regarding the application.
- The application data must be compiled into a data file (XML) prior to making the application.

- In compiling the data, the applicant should ensure that, among other things:
 - The appropriate ComReg equipment and antenna reference (ARef and ERef) codes are provided.
 - For amended licences; that the licence being amended is identified using the appropriate LPP number.

- Details on the file format and how to compile the.xml file are available on the elicencing website ; www.elicensing@comreg.ie in the area entitled: “*apply for a Fixed Link (PP or PM) Licence*¹²”

- This file is then uploaded during the on-line application process.

- Payment can only be made using either:
 - a. credit card or
 - b. by arranging to have your account with ComReg, in credit to, at least the value of the application being made at the time of application.

- Applications will not be accepted as valid, on-line applications if:
 - The XML data file fails to load or
 - Correct payment is not made or insufficient funds are available in the account to meet the cost of the application.

Where a problem does occur, you will be advised of the nature of the problem via an on-line message.

- You will be given a Transaction Code once your application has been received. This will be followed shortly by an email notification of the ComReg application reference number which has been generated (APP No.).

- The **APP Number** should be used to email additional information such as Path profiles Link Budget etc or for any further correspondence regarding the application.

¹² For further assistance, please contact the licensing operations team in ComReg (tel. 01 8049600), or alternatively you may e-mail to; licensing@comreg.ie

N.B The on-line application facility should not be used for pre-application consultation submissions.

4.3 Application Form with Text File:

To submit a non-electronic application for a new or amended licence, the appropriate application form 09/89 must be completed and the technical details (in XML format) emailed to Licensing@comreg.ie

To submit a valid application:

- The application form must be completed in full, in accordance with the guidelines and the information stipulated in the application form.
- The declaration form in the application form must be signed.
- The *.xml file must be sent electronically to Licensing@comreg.ie using 'LINKXML' as the email subject field.
- The full licence fees must accompany the application form. Alternatively, the applicant may arrange payment of the necessary funds into their ComReg account in advance of submitting their application.

Completed signed application forms must be submitted in writing to ComReg, either via post (at address below), fax or as a scanned copy via e-mail.

Please quote 'LINKXML' in the e-mail subject field.

Licensing Operations
The Commission for Communications Regulation,
Abbey Court,
Irish Life Centre,
Abbey Street,
Dublin 1.
E-mail: Licensing@comreg.ie

4.4 Applications containing Dual Polarity Links:

- For internal processing, dual polarity links are loaded to the ComReg database as 2 links (i.e. V and H), the applicant must therefore identify, at application stage, which links comprise the dual polarity pairing.

- As an amendment will apply to both the H and V sides of the dual polarity link, the applicant must provide details of both the V and H polarities in their amendment request.
- To convert a single polarity link to dual polarity, a new dual polarity link application must be submitted to “replace” the existing link. As full processing of both polarities is required, such applications are not considered as an amendment.

4.5 Link Application File (*.xml)

An .xml file is used to load link application technical data to the ComReg database.

- Where the on-line application facility is used, the XML file must be prepared and available for submission with the on-line application.
- Where a paper application is being submitted the XML file must be sent electronically as a text file to Licensing@comreg.ie using ‘LINKXML’ as the email subject field. and appropriately referenced to the paper application.

For on-line applications; details of the xml file format and how to compile the file, is available on the elicencing website ; www.elicencing@comreg.ie in the area entitled “*apply for a Fixed Link (PP or PM) Licence*”

For paper applications; details of the xml file format and how to compile the file. is available on the ComReg website; www.comreg.ie

4.6 The Evaluation Process

Unless ComReg indicates otherwise, all valid applications for a radio link licence will be evaluated on a “first come, first served” basis.

The applicant should note that while ComReg will endeavour to accommodate their needs, ComReg cannot guarantee that licences will be granted or that licences will be granted with the requested frequency band and channel.

Following conclusion of the evaluation phase, the applicant will be informed of the Commission’s decision to grant or refuse a licence. In the event of refusal, the reasons for refusal will be specified.

4.7 Provision of Further Information

ComReg reserves the right to request an applicant to submit further material and documents in addition to the information already provided within such time and within such format as ComReg may stipulate.

4.8 Publication of Licensee Details

ComReg reserves the right to publish information in relation to the licensee and licence details, subject to its own guidelines on the treatment of confidential information. These guidelines – ComReg publication 05/24 – are available on the ComReg website, www.comreg.ie.

ComReg is subject to Irish and EU rules on treatment and handling of confidential information, is a ‘Public Body’ for the purpose of the Freedom of Information Act, 1997 and is bound by this Act in relation to the release of information. Any personal information which you provide to ComReg will be treated in accordance with the Data Protection Acts, 1988 & 2003.

4.9 Application Conditions

By participating in this process, the applicant undertakes to accept the terms of this application document, will abide by the rules of the process and that its application is an irrevocable and unconditional offer that will remain valid and binding on the applicant for the period of the evaluation or until such time as the applicant has been awarded or declined a licence, or ComReg has otherwise terminated the application. All expenses incurred by the applicant or potential applicants shall be borne by themselves exclusively.

ComReg reserves the right to alter any of conditions of the licensing process. Although every care has been taken in preparing this document and conducting this process, no representation, warranty or undertaking, expressed or implied, in respect of any error or misstatement is or will be made or given, and no responsibility or liability will be accepted by ComReg or by any of its officers, employees, servants, agents or advisers as to the accuracy or completeness of this document or any other written or oral information made available to any interested party or its advisers concerning this document and any liability howsoever arising (including in respect of this licensing process) is expressly disclaimed. No information contained in this document shall form the basis for any warranty or representation by or term of any contract with ComReg.

ComReg makes no representations and warranties in respect of the viability of the market or accuracy of the contents of this document so that the applicant and potential applicants are responsible for their own verification and due diligence. The applicant agrees by accepting any licence which it may be offered that the licensee is responsible for all costs, liabilities and losses derived from the operation or non-operation of the licence or licensed service for whatever cause.

The applicant should note that ComReg is subject to Irish and EU rules on treatment and handling of confidential information, is a ‘Public Body’ for the purpose of the Freedom of Information Act, 1997 and is bound by this Act in relation to the release of information.

While ComReg endeavours to minimise the potential for interference between users and services, no liability shall accrue to ComReg arising from interference to licensees of radio systems. Licence Information

5 Licence Information

A Radio Link licence granted under the Wireless Telegraphy (Radio Link Licence) Regulations 2009 permits the licensee to keep and operate radio apparatus in accordance with these regulations. The licence conditions pertaining to Radio Links licences are contained in the above referenced Regulations and all licensees should familiarise themselves with same. It should be noted that ComReg reserves the right not to grant a licence.

5.1 Licensee

The Radio Link licensee can be an individual, company or firm. It is the responsibility of the licensee to ensure compliance with the Radio Link licence conditions. Additionally, it is the responsibility of the licensee to ensure that their licence details as submitted to ComReg remain valid and updated. The licensee should inform ComReg of any licence amendments (e.g. change of address) as soon as they occur.

5.2 The Licensed Frequency

A Radio Link licence allows the licensee to install and operate a radio link on a specified frequency band and channel spacing at particular sites. Licensees should be aware that ComReg licenses other users on the same frequency channels, provided that there is minimal interference potential.

A licence does not confer any right of ownership of the frequency spectrum. It allows the assigned frequency channel to be used during the term of the licence in accordance with the conditions of the licence.

5.3 Licence Duration and Renewal

The duration of the licence is one year. At the request of the licensee, ComReg may renew a licence subject to the necessary renewal conditions being met.

In considering a renewal request, ComReg will have regard to whether, *inter alia*:

1. The licence renewal fee or any applicable High Usage charges are paid in full;
2. The Radio Link system is being operated in accordance with the terms and conditions of the licence;
3. There are changes being considered or implemented to the Radio Link frequency bands available in Ireland and/or their technical conditions. These changes may be due to national or international considerations.

As a consequence of any such changes, existing licensees may be required to modify or cease their radio link operations in order to comply with the revised frequency bands and technical conditions. ComReg will endeavour to provide as much notice as possible to existing licensees in the event that any such changes are required.

5.4 Temporary Licence Duration

The maximum duration of a temporary radio link licence is six (6) months and is non-renewable. If the licence is granted for a period of less than one month, for the purposes of fee calculation only, the licence shall be considered as a licence granted for a period of one month

5.5 Amendments to a Licence

It is the responsibility of the licensee to inform ComReg of any licence amendments as soon as they occur.

A licence amendment occurs when the details on the licence are no longer correct and therefore need to be updated, for example, when

- The address of the licensee has changed;
- The technical characteristics of the link need to be changed in order to facilitate an upgrade of equipment etc.

It should be noted that a change in the site co-ordinates of the radio link licence is not an amendment. In such cases, the existing licence will be cancelled and the licensee must apply for a new link with the new site co-ordinates.

Where the technical characteristics of a licence are amended, ComReg will issue an amended licence to the licensee, subject to any fees that may arise due to increased bandwidth usage or change in frequency. An amendment fee is due when either/or both the bandwidth or frequency channel on which the link operates has changed such that the annual cost of the link increases. The amendment fee charged is the difference between the old and new fee.

There is no amendment fee where the annual cost of the link decreases on amendment.

Changes to Dual Polarity Links:

A dual polarity link licence may be converted to a standard (single) link licence on written request to remove either the V or H polarisation on the link.

Dual polarity links may be amended (as above) however, as the amendment will apply to both the H and V sides of the link, the applicant must provide details of both the V and H polarities in their amendment request.

In exceptional circumstances and where appropriate, ComReg may need to make modifications to existing licences. Where this is required, ComReg will endeavour to provide as much notice as possible to the affected licensees in advance.

5.6 Cancellation of a Licence

A licence may be cancelled at the written request of the licensee. There shall be no entitlement to any refund of licence fees in the event of any such cancellation.

5.7 Transfer of a Licence

A licensee may request that a radio link licence be transferred to another party. This request must be made in writing and is subject to the approval of ComReg.

5.8 Licence fees

The fee associated for fixed links are set down in Statutory Instrument No. 370 of 2009 Wireless Telegraphy (Radio Link Licence) Regulations 2009. Under these Regulations the €12 processing fee is no longer required. All applications for radio links must be accompanied by the full fee.

The details of the fees applying to radio links are as follows;

Bandwidth (BW) \ Frequency (F)	$BW \leq 3.5$ MHz	$3.5 \text{ MHz} < BW \leq 20$ MHz	$20 \text{ MHz} < BW \leq 40$ MHz	$BW > 40$ MHz
$F < 1$ GHz	€750	N/A	N/A	N/A
$1 \text{ GHz} \leq F < 17$ GHz	€1,000	€1,100	€1,200	€1,500
$17 \text{ GHz} \leq F < 37$ GHz	€750	€825	€900	€1,125
$37 \text{ GHz} \leq F < 39.5$ GHz	€550	€605	€660	€825
$F > 39.5$ GHz	€100	€110	€120	€150

Table 3: Annual Fee (€) for a Point to Point Radio Link which is not on a High Usage Path or in the Congested Frequency Band Area

Bandwidth (BW) \ Frequency (F)	$BW \leq 3.5$ MHz	$3.5 \text{ MHz} < BW \leq 20$ MHz	$20 \text{ MHz} < BW \leq 40$ MHz	$BW > 40$ MHz
$F < 1$ GHz	€900	N/A	N/A	N/A
$1 \text{ GHz} \leq F < 17$ GHz	€1,200	€1,320	€1,440	€1,800

$17 \text{ GHz} \leq F < 37 \text{ GHz}$	€900	€990	€1,080	€1,350
$37 \text{ GHz} \leq F < 39.5 \text{ GHz}$	€660	€726	€792	€990
$F > 39.5 \text{ GHz}$	€120	€132	€144	€180

Table 4: Annual Fee (€) for a Point to Point Radio Link which is on a High Usage Path or in the Congested Frequency Band Area

Where:

- Frequency (F) is the frequency that may be utilised by the radio link as specified in the licence;
- Bandwidth (BW) is the width of the frequency band or channel that may be utilised by the radio link as specified in the licence;
- A High Usage Path is a Radio Link Path upon which the Licensee has five (5) or more Radio Links.
- The Congested Frequency Band and Area is: The 18 GHz Band (17.7 GHz to 18.761 GHz paired with 18.71 GHz to 19.7 GHz) or the 23 GHz Band (22.0 GHz to 22.6 GHz paired with 23.0 GHz to 23.6 GHz) within the range E310000 to E320000 and N220000 to N240000,

For a Point to Multi-Point Radio Link, the annual fee is four (4) times the Annual Fees (€) for a Point to Point Radio Link.

Temporary Licence Fees are applied pro-rata to the relevant annual fee using the number of months for which the licence is granted. (i.e. if a licence is granted for a period of less than one month, then, for the purpose of these calculations only, the licence shall be considered as a licence granted for a period of one month).

An amendment fee is due when either/or both the bandwidth or frequency channel on which the link operates has changed such that the annual cost of the link increases. The amendment fee charged is the difference between the old and new fee.

There is no amendment fee where the annual cost of the link decreases on amendment.

5.9 International Coordination Obligations

In some cases it may be necessary for ComReg to undertake international coordination and registration procedures, particularly where there is a possibility of interference to/from the terrestrial and/or satellite services of another administration. As this may take some time, radio links are licensed subject to a condition that the licence may have to be amended, or withdrawn, if successful coordination is not achieved. Where changes arising from international coordination are required to be made to a licence, the licensee will be advised of the necessary changes. In this event, all expenses must be borne by the licensee.

5.10 Harmful Interference to other licensed users

Licenseses are required to adhere to the guidelines in ETSI Technical Report ETR 053, "Radio Site Engineering for Radio Equipment and Systems in the Mobile Service", to minimise the risk of interference between co-sited/adjacent radio systems.

5.11 Technical Conditions

ComReg issues a radio link licence subject to adherence to a number of technical conditions which specify the operating characteristics of the radio link. These technical conditions vary for each radio link licence. The specified technical conditions include:

Site height above sea level (m) and site co-ordinates;

Maximum transmitter Power (dBW) and emission designation

Antenna gain (dBi), beamwidth, height above ground (m) and Polarisation

Frequency Channel (MHz) & CCIR Rec.

5.12 Commissioning/Site Inspections

ComReg reserves the right to inspect a radio link station at any time to ensure that the system is configured and operating in accordance with the licence conditions. In addition, ComReg may attend the commissioning of sites and may carry out measurements on the system.

5.13 Interference to the radio link

While ComReg endeavours to minimise the potential for interference between users and services, no liability shall accrue to ComReg arising from interference to licensees of radio systems.

Where a licensee experiences interference, it is advisable that they first check that their own equipment is operating to the terms of its licence, i.e. correct output power, frequency etc. and that the interference is not due to its own network.

ComReg deals exclusively with inter-operator interference issues. Users experiencing interference issues caused by their own network must resolve these issue's internally.

In the event that the licensee is satisfied of the above, it is advised to contact the Spectrum Compliance unit within ComReg at compliance@comreg.ie.

Annex 1: Frequency Bands & mandatory technical conditions

Table 5 sets out the necessary technical requirements for submitting a radio link application. Please note that these requirements vary per frequency band.

Table 5: Radio Link Frequency bands, mandatory technical conditions and status

Band	Frequency	Transmit / Receive spacing (duplex direction)	Band Plan	Channel Spacing	Maximum Transmit Power	Minimum path length per Link (km)	Minimum Transmission Capacity	Minimum Antenna Requirement	Mandatory Equipment Class	Notes
1.3 GHz	1370-1375 MHz and 1512-1517 MHz	142MHz	CEPT Recommendation T/R 13-01 E, Annex A	0.25 MHz 0.5 MHz 1 MHz	Minimum required to obtain required availability level	n/a	-	Class 2 EN 300 631	Classes 1, 2, 3 (EN 300 630)	Open and under review Band is subject to review by ComReg in next 2 years. Usage and Frequency allocations may change after review
1.4 GHz	1375-1385MHz and 1427-1437 MHz	52MHz	CEPT Recommendation T/R 13-01 E, Annex B	0.25 MHz 0.5 MHz 1 MHz	Minimum required to obtain required availability level	n/a	-	Class 2 EN 300 631	Classes 1, 2, 3 (EN 300 630)	Open and under review Band is subject to review by ComReg in next 2 years. Usage and Frequency allocations may change after review
2 GHz	2025 - 2110 MHz and 2200 – 2290 MHz	175MHz	CEPT Recommendation T/R 13-01 E, Annex C	3.5 MHz, 7 MHz, 14 MHz	Minimum required to obtain required availability level	25 km	4Mbit/s	Class 3 EN 300 631	Classes 2, 3 applicable (EN 300 633)	Open and under review Band is subject to review by ComReg in next 2 years. Usage and Frequency allocations may change after review
L6 GHz	5.925 - 6.425 GHz	252.04 MHz	CEPT/ERC/REC 14-01 E, Annex 1	29.65 MHz	Minimum required to obtain required availability level	25 km	140 Mbit/s	Class 3 EN 300 833	n/a	Open

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Band	Frequency	Transmit / Receive spacing (duplex direction)	Band Plan	Channel Spacing	Maximum Transmit Power	Minimum path length per Link (km)	Minimum Transmission Capacity	Minimum Antenna Requirement	Mandatory Equipment Class	Notes
U6 GHz	6.425 - 7.125 GHz	340 MHz	CEPT/ERC/REC 14-02 E, Annex 1	20 MHz 40 MHz	Minimum required to obtain required availability level	25 km	140 Mbit/s	Class 3 EN 300 833	n/a	Open
L7	7.125 – 7.425 GHz	154 MHz	CEPT/ECC/REC 02-06 Annex 1	7 MHz, 14 MHz, 28 MHz	Minimum required to obtain required availability level	25 km	140 Mbit/s	Class 3 EN 300 833	n/a	Open Note: Part of the L7 band (7.125 - 7.425 GHz) may be allocated towards unidirectional links such as ENG/OB
U7 GHz	7.425 – 7.725 GHz	154 MHz	CEPT/ECC/REC 02-06 Annex 1	7 MHz, 14 MHz, 28 MHz	Minimum required to obtain required availability level	25 km	140 Mbit/s	Class 3 EN 300 833	n/a	Open
L8 GHz	7.725 – 8.275 GHz	311.32 MHz	ITU-R F. 386-6, Annex 1	29.65 MHz	Minimum required to obtain required availability level	25 km	140 Mbit/s	Class 3 EN 300 833	n/a	Open
U8 GHz	8.275 – 8.5 GHz	126 MHz for 3.5 MHz & 7MHz channel spacing and 119MHz for 14MHz channel spacing	ITU-R F. 386-6, Annex 3	3.5 MHz, 7 MHz, 14 MHz	Minimum required to obtain required availability level	25 km	4 Mbit/s	Class 3 EN 300 833	Classes 1, 2, 3 applicable (EN 301 216)	Open
11 GHz	10.7 - 11.7 GHz	490 MHz	CEPT/ERC/REC 12-06 E	40 MHz	Minimum required to obtain required availability level	10 km	140 Mbit/s	Class 3 EN 300 833	n/a	Open

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Band	Frequency	Transmit / Receive spacing (duplex direction)	Band Plan	Channel Spacing	Maximum Transmit Power	Minimum path length per Link (km)	Minimum Transmission Capacity	Minimum Antenna Requirement	Mandatory Equipment Class	Notes
13 GHz	12.75 - 13.25 GHz	266MHz	CEPT/ERC/REC 12-02 E	3.5MHz, 7MHz, 14MHz, 28MHz	Minimum required to obtain required availability level	9 km	4 Mbit/s	Class 3 EN 300 833	Classes 1, 2 applicable (EN 301 128)	Open
15 GHz	14.5 - 15.35 GHz	420MHz	ITU-R F. 636-3	3.5 MHz, 7 MHz, 14 MHz 28 MHz	Minimum required to obtain required availability level	9 km	4 Mbit/s	Class 3 EN 300 833	Classes 1, 2 applicable (EN 301 128)	Open
18 GHz	17.7 - 19.7 GHz	1010MHz	CEPT/ERC/REC 12-03 E, Annex A	27.5 MHz, 55 MHz,	Minimum required to obtain required availability level	<ul style="list-style-type: none"> 6 km (<=34Mbit/s) 0 km (> 34Mbit/s or 34Mbit/s in 14MHz channel spacing) 	34 Mbit/s	Class 3 EN 300 833	PDH: Classes 1 & 2 applicable (EN 301 128) SDH Classes 4,5 Applicable (EN 300 430)	Open Note: 55 MHz can only be allocated when spectrum efficiency is justified (i.e. 2 x STM-1 Min requirement)
23 GHz	22.0 - 22.6 GHz and 23.0 – 23.6 GHz	1008MHz	CEPT Recommendation T/R 13-02 E, Annex A	3.5 MHz, 7 MHz, 14 MHz, 28 MHz	Minimum required to obtain required availability level	<ul style="list-style-type: none"> 3 km (<=34Mbit/s) 0 km (> 34Mbit/s or 34Mbit/s in 14MHz channel spacing) 	4 Mbit/s	Class 3 EN 300 833	Class 2 applicable to PDH. Class 3 applicable to SDH.	Open

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Band	Frequency	Transmit / Receive spacing (duplex direction)	Band Plan	Channel Spacing	Maximum Transmit Power	Minimum path length per Link (km)	Minimum Transmission Capacity	Minimum Antenna Requirement	Mandatory Equipment Class	Notes
26 GHz	Part of 24.5 - 26.5 GHz band namely: 25.277 – 25.445 GHz and 26.285 – 26.453 GHz	1008MHz	CEPT/ERC/REC 13-02 E, Annex B	3.5 MHz, 7 MHz, 14 MHz, 28 MHz,	Minimum required to obtain required availability level	<ul style="list-style-type: none"> 3 km (<=34Mbit/s) 0 km (> 34Mbit/s or 34Mbit/s in 14MHz channel spacing) 	4 Mbit/s	For Point to Point antennas : EN 302 217-4-2, Class 3 Note for Point to Multipoint antennas: EN 301 215	Class B equipment applicable (PDH and SDH)	Open Note: Other parts of this band may be opened for individual P-P link licensing once the outcome of the 26 GHz Competition is complete.
38 GHz	37 - 39.5 GHz	1260MHz	CEPT Recommendation T/R 12-01 E, Annex	3.5 MHz, 7 MHz, 14 MHz, 28 MHz	Minimum required to obtain required availability level	0 km	4 Mbit/s	Class 3 EN 300 833	Class 2 applicable to PDH. Class 3 applicable to SDH.	Open
58 GHz	57.00 – 59.00	Under Review.	CEPT/ERC/REC 12-09 E, Annex A	50 MHz 100 MHz	Minimum required to obtain required availability level	0 km	Under Review.	Class 3 EN 300 833	Under Review.	Open
80 GHz	71-76 GHz and 81-86 GHz	10 GHz, < 5 GHz.	ECC/REC/(05)07	250 MHz – 4.75 GHz	Minimum required to obtain required availability level	0 km	150 Mbit/s	Minimum Antenna Gain - 43 dBi, as recommended by ETSI Technical Specification TS 102 524	As defined by ETSI technical specification TS 102 524	Open These bands are open for both FDD and TDD systems.

Annex 2: Propagation Availability Requirements

ComReg licenses radio links with different levels of radio propagation availability. There are a number of requirements that must be met in order to be eligible to apply for a particular radio propagation availability category. These are set out in Table 6 below.

The applicant may be able to improve their overall network availability by using network resilience techniques such as hot-standby, space diversity, routing diversity, planned maintenance etc.

Target Radio Outage per year	Required Radio Propagation Availability	Requirements to be met in order to apply for required availability		
		High capacity links in bands > 3 GHz	Low Capacity links in bands > 3 GHz	Bands < 3 GHz
Approx. 263 Minutes	99.95%		Meets minimum technical requirements in these guidelines but antenna is not compliant with class 3 in ETSI standard EN 300 833 at either site	Meets minimum technical requirements in these guidelines but antenna is not compliant with class 3 in ETSI standard EN 300 631 at either site
Approx. 52.6 minutes	99.99%	Meets minimum technical requirements in these guidelines and antenna is compliant with at least class 3 in ETSI standard EN 300 833 at both sites	Meets minimum technical requirements in these guidelines and antenna is compliant with class 3* in ETSI standard EN 300 833 at both sites	Meets minimum technical requirements in these guidelines and antenna is compliant with class 3* in ETSI standard EN 300 631 at both sites
Approx. 26.3 minutes	99.995%	Meets requirements for 99.99% availability and (1 or 2 or 3) 1) including equipment resilience at both sites 2) Routing diversity using for e.g. network meshing, rings etc. on radio, fibre or coax or the use if an alternative infrastructure provider. 3) Is site sharing at either mast with another licensee**		
Approx. 5.3 minutes.	99.999%	Meets requirements for 99.995% availability and (1 or 2) 1) the applicant is allowing other licensees** to share the mast 2) Is site sharing at both masts with another licensee**		
Approx. 26.3 – 5.3 minutes	99.995% - 99.999%	Meets requirements for 99.995% availability and satisfies ComReg that the higher availability of 99.999% is necessary.	Meets requirements for 99.995% availability (or 99.99% in rural areas where there is no shortage of spectrum) and satisfies ComReg that the higher availability is necessary.	

Table 6: Application requirements for required Radio Propagation Availability

* In rare circumstances for example in rural areas where there is no spectrum congestion **and** where there is no alternative means of communication **and** where there is no possibility of providing adequate antenna support **and** where the links are access or low capacity links, the use of Class 2 Antennae may be permitted. However, these may have to be upgraded (at the licensee’s own expense) if spectrum problems arise.

** For the purpose of these guidelines, licensee means a licensee of links above 1GHz, an FWA, FWPMA, WDMDS, WAPECS, 3G or GSM licensee.

