Commission for
Communications Regulation

Guidelines

GUIDELINES FOR APPLICANTS FOR SATELLITE EARTH STATION LICENCES IN THE FIXED SATELLITE SERVICE IN SPECTRUM ABOVE 3 GHz.

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Contents

1. General

1.1 This document explains the application procedure for licences for fixed satellite earth stations in the Fixed Satellite Service[1] operating above 3 GHz issued by the Commission for Communications Regulation (ComReg). It is in the form of a set of Guidelines and does not purport to be a legal document. It should be read in conjunction with the Wireless Telegraphy (Fixed Satellite Earth Stations) Regulations, 2000, but is not a legal interpretation of those Regulations.

2. The Statutory Regulations

2.1 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 Fixed Satellite Earth Station Licences are contained in the Wireless Telegraphy (Fixed Satellite Earth Stations) Regulations, 2000 (Statutory Instrument No. 261 of 2000). It should be noted that the functions of the Minister specified in these Regulations have been transferred to the Commission in accordance with the Communications Regulation Act, 2002 (No. 20 of 2002)

2.2 Many categories of satellite earth station are exempted from requiring a licence under the Wireless Telegraphy Acts (1926-1988). A listing of classes of equipment that are licence exempt can be found on the ComReg web site[2].

2.3 Other categories of satellite earth stations (e.g. those operating to the Broadcasting Satellite Service, Mobile Satellite Service, etc.) will need to be addressed separately by the Commission.

2.4 The applicant should be aware that any satellite earth station licence in the Fixed Satellite Service granted by the Commission is for the keeping and operating of the apparatus for wireless telegraphy which is specified in the licence. Any licence issued by the Commission does not absolve the licensee from complying with any other statutory obligations.

2.5 A service licence is required where an operator is providing a telecommunications service or network as defined in Section 111 of the Postal and Telecommunications Services Act, 1983, as amended by the European Communities (Telecommunications Licences) Regulations, 1998 (S.I. No. 96 of 1998).

There are two types of service licences: the General Telecommunications Licence and the Basic Telecommunications Licence. A brief description of these licences is given in Annex A.

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[1] As defined in ITU RR Article S1.21

[2] A list of licence exemptions can be found at http://www.comreg.ie/. Current document number 00/67.

3. Frequency Spectrum Information

3.1 The radio frequency spectrum is an important and scarce national resource. It is the policy of the Commission to manage the spectrum in an efficient and orderly manner in Ireland, in order to obtain optimum use from this resource.

3.2 While the Commission will endeavour to minimise the potential for interference between users and services, no liability shall accrue to the Commission arising from interference to licensees of radio systems.

3.3 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.

3.4 The Table of Frequency Allocations - Ireland[3] provides details on spectrum allocations in Ireland. Applicants should be aware that some of the frequency spectrum available for use by satellite services is shared with other services, including fixed radio links.

3.5 In relation to shared bands the Commission takes the view that priority for services of a similar status is based on a first-come-first-served principle. In accordance with ITU procedures, established stations will have priority. Currently in Ireland, generally, most established stations are terrestrial fixed link stations. Further information on the issue of spectrum sharing can be seen in Annex B.

3.6 Coordination is the process by which the requirements of the various users of radio spectrum are balanced against the available resources and the reduction of the probability of interference between the various users to acceptable levels. In some cases it may be necessary for the Commission to undertake international co-ordination procedures, particularly where there is a possibility of interference to/from the terrestrial and/or satellite services of another administration. Successful coordination cannot be guaranteed. Further information on coordination can be found in Annex C.

3.7 The applicant may be required to take site shielding steps in order to minimise or eliminate interference that may occur to, or from, existing terrestrial or other stations (See Annex C for further details on Site Shielding).

3.8 Block allocations of spectrum (band segmentation) will not be made for satellite service purposes. Frequency channels are assigned to individual Earth Stations on a non-exclusive basis. Accordingly, licensees should be aware that the Commission will, where possible, facilitate other users in sharing the same frequency channels.

3.9 In those circumstances where a satellite service user requires a variable bandwidth for day to day operations, the user may lease the maximum required bandwidth from the satellite operator and use smaller segments as needed. For

[3] Updated from time to time. Currently document number 98/03 which is available from this office, or on the web-site www.comreg.ie

spectrum management purposes, the Commission must still consider the full bandwidth as a unit, and a licence is required for the full bandwidth. This applies to services that make use of single-channel per carrier and demand assigned spectrum methods.

3.10 Where an applicant requests channels in a specified band, it should be noted that the Commission cannot guarantee that the spectrum requested can be made available at specific locations. The Commission recognises that specific channels may be required to communicate with individual satellites, for both telecommunications and non-telecommunications applications. Detailed discussions with the Commission may be necessary in such circumstances to facilitate an engineering solution or to seek an alternate location where operation on the requested frequency would be possible.

3.11 In the interest of the efficient use of the radio spectrum, it is the policy of the Commission to review the use of the spectrum on an ongoing basis. Changes in the spectrum allocated for satellite services can arise for the following reasons:

- The requirements of international organisations;
- EU legislation;
- National requirements.

When and if such changes in policy occur, it may be necessary to amend licences that have been issued. (See also Section 14).

3.12 A maximum of 80 MHz of spectrum is available per Licence. Where an applicant requests more than 80 MHz of bandwidth the excess bandwidth must be applied for on a separate application.

4. Wireless Telegraphy Licences

4.1 Licence Categories

The Categories of satellite wireless telegraphy licence are as follows:

- **Non-Transportable Earth Stations**

  This category applies to Large Earth Stations and VSATs.

- **Transportable Earth Stations**

  This category applies to Satellite News Gathering fixed satellite earth stations.

Annual licences can be obtained for both categories of satellite earth station. There is also an option for short-term licences up to a maximum of eleven months in duration (see section 4.2).

Applicants for non-transportable or transportable earth stations will have to comply with the radio equipment requirements outlined in Annex D. Also note that certain categories of receiving earth station in the fixed satellite service are exempted from the requirement to hold a Wireless Telegraphy Licence[4].

4.1.1 Non-Transportable Earth Stations Licence Category (Geostationary Orbit)

Currently there are two types of earth station that can be licensed under this category:

- Large Earth Stations.
- VSAT Earth Stations.

4.1.1.1 Large Earth Stations

The Commission's understanding of a large earth station means an earth station, whose antenna exceeds the maximum size specified for a VSAT in the relevant band (See Table below). Refer to Annex D.

Large earth stations can seek coordination in frequency bands shared with terrestrial fixed service.

Both the transmit and receive segments of a large earth station are required to be licensed with a Wireless Telegraphy Licence.

If it is intended to use occasional-use antennas (an earth station that is normally unused, but may be brought into service occasionally when the facility that it is supporting is not available) a separate Wireless Telegraphy Licence is required, as an earth station of this type must be available for use at all times.

4.1.1.2 VSAT Earth Stations

A VSAT is an earth station, which is defined by the antenna size given in the relevant Technical Basis for Regulation by ETSI (see table below). Refer to Annex D.

ES Type	Frequency (GHz)	Maximum Antenna Size
VSAT	10.7-11.7, 12.5-12.75, 14.0-14.5	3.8 m

[4] See Document No. 00/68 for a list of satellite earth station exemption orders.

VSAT	3.4-4.2, 5.85-6.65	7.3 m
TES	10.7-11.7, 12.5-13.25	5 m
TES	13.75–14.5	4.5m

Maximum Antenna sizes as per ETSI TBR 28, 30, and 43.

In the case of VSATs only the transmit segment will require a Wireless Telegraphy Licence, the receive segment is exempted in accordance with exemption order S.I. No. 273 of 2000. VSATs will only be licensed in un-shared bands (as defined by the Commission [5]) and will therefore not be coordinated.

4.1.2 Transportable Earth Station Licence Category (Geostationary Orbit)

This category provides for the licensing of Satellite News Gathering (SNG) vehicles. As their operating locations are not permanently defined, transportable earth stations cannot be readily coordinated and cannot, therefore, be afforded protection except on a very limited basis. Such limited protection would, inter alia, depend on the frequency band in which the transportable station operates.

The transportable earth station category allows a different regulatory regime to be applied to stations that cannot be co-ordinated due to their short operating time at any one location. Transportable stations may not be used as a long-term alternative to permanent installations. Normally, where a TES is to be at a specific location for a period exceeding one month, within a twelve-month time frame, the TES is regarded as a non-transportable earth station and an appropriate short term or annual licence is required. Please refer to Annex C.3 for site clearance conditions for TES's.

Currently the Commission will not licence TES's in bands below 10 GHz because of the extensive use by the terrestrial services of the shared bands below this frequency.

Operators who wish to use TES's in Ireland on a regular basis should apply for an annual licence. Such licences are only granted in bands currently not shared with the terrestrial fixed service (e.g. 14-14.25, 12.5-12.75 GHz band).

Operators who wish to operate TES's in Ireland on an infrequent basis are also provided for. In such cases, operators can apply on a per event basis for short-term licences and, as part of each application, seek clearance for the operating characteristics of relevant TES.

TES's must follow special procedures if they intend to operate in Airport Exclusion Zones and/or Notification Areas. Please see Section 5 and Annex E for details concerning these areas.

[5] See Annex B

4.2 Duration of Licences

Licenses are generally issued for a period of 1 year as prescribed in legislation. Short term licences are also available for periods of up to eleven months and are mainly applicable to Transportable Earth Stations. One month is the minimum period of a short-term licence.

Valid applications for short-term licences include short-term events, demonstrations, etc. Usually services are too short in duration to permit full coordination, although limited coordination may be required. Short-term licences are usually issued on a non-interference and non-protected basis.

A short-term licence is not convertible to a full license. If a full licence is required, then a new application must be made, as the conditions under which the short-term licence had been granted may no longer apply. For example, frequency assignments may have been made to other stations on the basis of the short-term assignments lapsing.

It is the intention of the Commission to undertake a general review of licence duration for all Wireless Telegraphy Licences.

5. Airport Exclusion Zones and Notification Areas

It is internationally recognised that there is a need to protect aircraft avionics from the possibility of interference arising from earth stations operating in close proximity to airports.

- **Consequently, the deployment of satellite earth stations in areas around certain airports is restricted.**

Regulation 13(f) of the Fixed Satellite Earth Station Regulations, 2000 (S.I No. 261 of 2000) requires that the Licensee must ensure that a fixed satellite earth station shall be operated and used so as not to cause harmful interference with any lawfully operated wireless telegraphy apparatus, and in particular wireless telegraphy apparatus used for any purpose on which the safety of any aircraft may depend.

In order to satisfy this statutory requirement of ensuring that the safety of aircraft is not affected by the satellite earth station, the Licensee must comply with special requirements relating to Airport Exclusion Zones and Airport Notification Areas.

- **Transportable satellite earth stations are required to follow a notification procedure, whereby they must notify the relevant Airport Contact Person of their intention to transmit within a Notification Area.**

- **Satellite earth stations may not operate inside airport Exclusion Zones, except with the prior authorisation of the relevant Airport Contact Person.**

NOTE: *At Cork, Dublin and Shannon airports, for the purpose of TES operations inside the airport perimeter, the Airport Contact Persons will be the Aer Rianta Duty Officer and the duty Systems Manager, Air Navigation Services, I.A.A.. For the purpose of TES operations outside the airport perimeter the Airport Contact Person will be the duty Systems Manager, Air Navigation Services, I.A.A* ***. and*** *the Aer Rianta Duty Officer.*

Notification Areas are applicable to Transportable Satellite Earth Stations. Exclusion Zones are applicable to Transportable Satellite Earth Stations and Non-Transportable Satellite Earth Stations.

Annex E contains details of Airport Exclusion Zones, Notification Areas, Notification procedures and Airport Contact Personnel.

6 Pre-Application Consultation

6.1 As the application process is a single stage process, applicants will need to undertake detailed planning work prior to submitting an application. As this may require significant time and expenditure on the part of applicants, the Commission recommends that applicants undertake pre-application consultation with it, particularly where: -

- the applicant is not familiar with the Commission's application/licensing process;
- the application is not of a routine / repetitive nature;
- there are particular considerations which an applicant wishes to clarify (e.g. possible access to a particular band at a certain location before equipment is ordered).

Pre-consultation is intended to: -

- facilitate an exchange of views,
- facilitate the finding of optimum radio solutions
- help to avoid or reduce the potential for applications being refused.

6.2 The Commission will, where both parties deem it necessary, communicate its understanding in writing of the outcome of any formal pre-application consultation to the prospective applicant. It is expected that an application be submitted within a specified time period thereafter.

7. The Application Process

7.1 Applications in respect of licences for fixed satellite earth stations must be made on the appropriate application form obtainable from the Commission or from the Web Site http://www.comreg.ie/ (Documents 00/65, 00/66, 00/67). The application form (completed and signed) should be submitted to the Commission. The Commission will normally consider applications on a first come – first served basis.

7.2 It should be noted that all applications for licences are evaluated on the basis of the written information provided on the application forms, in addition to any supplementary written information supplied at the request of the Commission, and that all decisions of the Commission are communicated in writing.

7.3 If the application is not in accordance with the Guidelines, the applicant will be notified with reasons as to why the application is being refused.

7.4 If the application is in accordance with the Guidelines the application will be subject to a detailed evaluation of the technical details.

7.5 The application for each proposed satellite earth station may be individually approved or refused or additional information may be requested from the applicant prior to a decision. Where the Commission considers it necessary consultation will take place with the applicant.

8. Evaluation of Applications

8.1 General

Each application is evaluated using the information provided by the applicant on the application form and supplementary written information where applicable to determine the extent to which the following criteria would be satisfied by the grant of the licence:

- the orderly and efficient use of the spectrum;
- fairness in the assignment of spectrum between licensees;
- the promotion of fair competition for the provision of telecommunications services;
- radio equipment requirements (see Annex D);
- compliance with other licensing regimes operated by the Commission;
- compliance with international obligations;

- the effective and efficient delivery of non-telecommunication essential services[6].

8.2 Evaluation

The evaluation of an application will include the following issues:

- Earth Station Matters (Location, Category, etc.);
- Licensing Parameters;
- Coordination/Sharing Matters;
- Earth Station Equipment Matters.

Further explanation in regard to these aspects can be found in Annex F.

9. Notification of Grant of Licence and Payment of Fees

9.1 Upon written notification of the Commission's intention to issue a licence, payment of the relevant licence fee is due within 1 month of the date on the notification. If the licence fee is not paid within 1 month, the application is deemed to have lapsed.

9.2 On being issued with a licence, the licensee is required to bring the satellite earth station into operation in compliance with the terms of the licence, within a stated time (i.e. typically 3 months) failing which the licence may be revoked.

9.3 Except in exceptional circumstances, licences for satellite earth stations will not be renewed if the satellite earth station has not been put into service and the declaration form[7] has not been submitted to the Commission prior to the renewal date of a licence.

9.4 A refusal to grant a licence may occur where the application does not meet the requirements set down by the Commission, or where sufficient spectrum is not available, or where the station cannot be co-ordinated. Where an application is unsuccessful, the applicant will be so notified, reasons will be given for the refusal and the applicant will have an opportunity to appeal such refusal.

[6] Non telecommunication essential services include state/safety services, utilities etc.
[7] See Section 11.

10. Fee Structure

The schedule of fees for a fixed satellite earth station licence is divided into two main categories (see Annex G for a full schedule of fees):

1. fixed satellite earth stations used in one or more of the frequency bands 12.5-12.75 GHz and 14.0-14.25 GHz, or in another frequency band determined from time to time by the Commission to be a low fee paying frequency band[8].

2. fixed satellite earth stations used in any other frequency bands above 3 GHz (i.e. high fee paying)

10.1 Annual Licence Fee (Spectrum Occupancy)

This fee depends on the degree to which the earth station occupies spectrum, either by transmission or by requiring receiver protection. This fee also depends on whether the spectrum applied for is shared or un-shared. For the schedule of fees see Annex G.

Low Fee Paying (Un-coordinated/Un-Shared)

A fee of ε100 is required for one earth station. In the case of VSAT applications additional fees are due if more than one station is being applied for in a single application.

High Fee Paying (Coordinated/Shared)

Additional fees due in shared bands can be determined from Annex G paragraph 2(ii). Fees for the transmit and receive functions of the earth station are calculated separately. The transmit fee is calculated depending on the frequency, bandwidth and transmitted power and the receive fee is dependant on frequency and bandwidth (maximum receiver sensitivity is assumed).

10.2 Short-term Licences.

Where a fixed satellite earth station operates for a period of less than one year at any location, a short-term licence fee may apply. See Annex G paragraph 3 for a schedule of these fees.

[8] See Annex B.

10.3 Review of fees.

It is the intention of the Commission to undertake a general review of current licence fees for Wireless Telegraphy. This review will be the subject of a separate consultation and licensees will be notified prior to the implementation of any such changes.

11. Commissioning/Site Inspections

For the purpose of ensuring that the satellite earth station is installed and operating in accordance with the licence conditions, a completed declaration form, indicating that the satellite earth station has been installed and is conforming with the licence, must be submitted to the Commission within the time limit specified in the licence.

12. Renewal of Licences

12.1 On written application for renewal the Commission will review individual licences in each case. It may not in all cases be possible to effect renewal. In considering renewal the Commission will have regard to:

- whether the fixed satellite earth station is being operated in accordance with the terms of the expiring licence;

- whether changes in radio frequency management requirements, are being implemented at a national or international level for the band in question (see Section 14);

- whether the fixed satellite earth station is subject to a review of spectrum (see Section 14).

12.2 Please note that Regulation 9(4) of the Wireless Telegraphy (Fixed Satellite Earth Stations) Regulations, 2000 requires that an application for a renewal of an annual licence is made within a period of 28 days before expiration of the licence.

Applicants are advised to submit to their applications for renewal at the earliest time within this period to facilitate the timely processing of applications.

12.3 It should be noted that licences issued on a short-term basis (maximum period eleven months) will not be renewed.

13. Modification to licences.

13.1 Modifications to Licences, or to applications for Licences, may be treated by the Commission in the same manner as new applications. Applicants should note that modifications to an application may require re-coordination (See Annex C.1).

13.2 While a licence modification is under consideration, a breach of the conditions of the licence for any reason will not be permitted. If re-coordination of the station under the proposed new conditions cannot be achieved, it may not be possible to accede to the request for modification.

13.3 It is recognised that a request for modification of a licence made by the licensee may be at the behest of the satellite operator and the evaluation of the request will take this into account. The request for modification may alternately originate from the Commission, for example, due to an inability to obtain coordination for the initially assigned spectrum or the necessity of implementing international agreements.

13.4 Modifications are made effective by means of a licence amendment.

14. Review of use of spectrum.

14.1 It is the policy of the Commission to conduct, at regular intervals, reviews of spectrum and as a consequence of these reviews changes to licences may be required. Further information on this issue can be found in Section 3.11.

14.2 In deciding time scales, the Commission will consult with the licensee in any revision of their use of spectrum.

Annex A: Telecommunications Service Licence

There are two categories of Telecommunications Service licence. A licensee cannot hold both types of service licence simultaneously.

A.1 General Telecommunications Licence

A General Telecommunications Licence permits the licensee to provide telecommunications networks and services, including voice telephony, to the general public. Holders of such licences can apply to the Commission for numbers from the national telecommunications numbering resource, for allocation to their customers. General licences are valid for 15 years.

A.2 Basic Telecommunications Licence

A Basic Telecommunications Licence does not cover voice telephony or the provision of services involving the use of numbers from the national telecommunications numbering resource. It is thus tailored to the needs of specialised companies providing, for example, data, Internet and cable-based services. Holders of Basic Licences will be able to apply for a General Telecommunications Licence if, at any stage in the future, they wish to expand the range of services that they provide. Basic Licences are valid for 5 years.

A.3 Fees

0.1.1 The fee for a General Telecommunications Licence is €12,500. For a Basic Telecommunications Licence the fee is €2,500.

A.4 Application Forms

Copies of application forms and further information on telecommunications service licences are available on the ComReg web site (http://www.comreg.ie – documents 98/44, 98/45 and 98/46).

Annex B: Spectrum Sharing Principles

Any sharing restrictions imposed are in line with standard practice. However, it should be borne in mind that due to the high sensitivity of earth station receivers and the high effective radiated power of earth station transmitters, the sharing parameters are different from those used for sharing between terrestrial links.

B.1 Application of ITU principles

In accordance with ITU Regulations[9], some of the frequency spectrum available for use by satellite services is shared with other services – including fixed radio links. Consequently unrestricted access to the full frequency bands shared with terrestrial services is not permitted. A possibility of interference between the different services exists, unless the assignment of frequencies to the different services is implemented on a coordinated basis. The Commission will endeavour to accommodate the needs of applicants, with due regard to the efficient and orderly use of spectrum.

The Commission applies the ITU methodology[10] to all sharing cases (See Section 3.5). Coordination principles are explained further in Annex C. While these procedures may not be optimal in all cases, they are internationally recognised and are transparent and non-discriminatory.

The 4/6 GHz Bands

The sharing policy in the 4/6 GHz bands is particularly significant in view of the extensive geographical coordination areas that occur in this band. The 4/6 GHz band is, therefore, difficult to coordinate due to the necessity of band sharing with terrestrial services and the large, (up to 1200 km), coordination distances that arise in applying the ITU methodology. These long coordination distances result in coordination areas that cover all of Ireland and extend into many other countries in Europe. Full coordination is required in advance of operation in practically all cases. This may not always be successfully achieved.

The use of 4/6 GHz is permitted, though not encouraged, for non-transportable earth stations only. Its use is discouraged for transportable stations due to the coordination difficulties involved. Generally, coordinated operation is only permitted for earth stations with antenna sizes not less than the maximum size specified in the ETSI TBR 43.

[9] Article S5 of the Radio Regulations, made in 1998 under Article 13 of the Constitution and Convention of the International Telecommunications Union.
[10] Article S9 and Appendix S7 of the Radio Regulations.

The 11/12/14 GHz bands

These bands are the principal VSAT bands. In particular, the 11 and 12 GHz bands are extensively used for satellite VSAT downlinks. However, both the fixed service (FS – terrestrial point to point) and fixed satellite service (FSS – point to point via satellite) are allocated the band on a primary basis[11]. In Ireland, the 10.7 to 11.7 GHz band is in use for fixed service high capacity long-haul links.

The 10.7 – 11.7 GHz band can be used in the fixed satellite service for VSAT downlinks (Space to Earth) on a licence exempt and unprotected basis. The preferred band for VSAT downlinks is the 12.5 – 12.75 GHz band as this band is currently exclusively allocated to the fixed satellite service[11].

The 14 GHz band is used extensively for VSAT services. The 14 to 14.25GHz is an un-shared low fee paying band and VSAT users are encouraged to use this band. The 14 – 14.25 GHz band, paired with the 12.5 – 12.75 GHz band, are also the preferred bands for operation of transportable earth station (SNG, etc.) in Ireland.

Bands above 15GHz

Applications for licences in the fixed satellite service in frequency bands above 15GHz are considered. However, in considering such applications, the Commission regards competing requirements for spectrum by other services.

[11] ITU Radio Regulations S5 and 'Table of Frequency Allocations – Ireland'

Annex C: Coordination Issues & Site Clearance

C.1 General Issues

Coordination between a fixed satellite earth station and other fixed satellite earth stations or terrestrial stations applies principally to the site of the station. However, variations in the antenna radiation patterns, emitted power or receiver sensitivity, assigned frequency or bandwidth will have an effect on the coordination distances. If, after an initial successful coordination, a modification to an earth station results in a reduction of coordination distances, re-coordination is not necessary. However, if a modification results in an increase in the coordination area the station will then have to be re-coordinated.

International as well as national coordination may be required; particularly where there is a possibility of interference being caused to the terrestrial and/or satellite services of a neighbouring administration.

Under the Radio Regulations of the ITU[12], Ireland is required to minimise interference to the wireless telegraphy services of other administrations, just as those other administrations are required to minimise interference to Irish services. The Commission may not, therefore, licence wireless telegraphy transmitters, which may cause interference above an internationally agreed level to receivers outside the country. In addition, a level of interference to receivers in Ireland from foreign transmitters may occur and if this level is within the limits set by international agreement then the operator of a receiver located in Ireland must accept it. Sharing parameters are given in Article S21 of the Radio Regulations.

Although international coordination can be a lengthy process to complete (taking up to several years in some cases), most coordination is completed in approximately six months. The response times for administrations are set in the Radio Regulations[13].

C.2 Methodology

Use of ITU Procedures

Where required, coordination is carried out in accordance with the ITU-R regulations and recommendations appropriate to both the fixed satellite earth station and frequency band of operation[14]. In particular, for fixed satellite service earth stations, the coordination area is determined in accordance with Radio Regulation S9, Appendix S7 (Appendix 28) and Recommendations ITU-R IS.847 and ITU-R IS.848.

[12] Articles 196 and 197 of the Constitution of the International Telecommunications Union and S0.3 and S0.4 of the Radio Regulations.
[13] RR-Appendix S7
[14] Regulations and recommendations are subject to change

Interference calculations between stations in Ireland

Interference levels are calculated with respect to other fixed satellite earth stations or terrestrial stations in Ireland using Recommendation ITU-R P.452.

Meeting minimum technical specifications

In order to facilitate the coordination process, stations are required to meet radio equipment requirements as outlined in Annex D.

Requirement for a physical site survey

The applicant is required to supply a physical site survey, showing the horizon elevation angle from the centre of the proposed antenna. This information is required for the coordination process.

Requirement for site shielding

Site shielding is a procedure whereby the earth station is located so that natural or man-made obstructions are positioned between the earth station and potentially interfering, or interfered with, stations. Use may be made of existing obstructions or new shields may be constructed. In the case of shared bands used for satellite downlinks, protection from transmitters in the terrestrial services may be required. Similarly, in the case of shared bands used for satellite uplinks, protection may need to be afforded for terrestrial services' receivers.

C.3 Site Clearance (Transportable Earth Station)

To ensure the safe operation of Transportable Earth Stations and to protect other radio users the operator must comply with the following conditions:

1. The antenna must be directed away from public vantage points by at least 5 degrees.

2. The antenna must be directed away from any radio masts in the near vicinity by 10 degrees.

3. A mechanism must be incorporated which inhibits operation at elevation angles of less than 10 degrees.

4. The earth station must not be sited within 100 metres of a radio installation operating within ± 250Mhz of the earth station carrier frequency. This distance is increased to 200 metres if the radio installation is within ± 45 degrees of the earth station mainbeam.

5. The earth station must not be parked under electricity power lines.

6. Operators must comply to the safety standards mentioned in Annex D.1.

7. Sitting the earth station close to helicopter landing zones must be avoided.

8. For special conditions relating to the operation of earth stations inside Airport Exclusion Zones and Notification Areas please refer to Section 5 and Annex E.

Annex D: Radio Equipment Requirements

D.1 Compliance with Safety Directives

All licensees of satellite earth stations are required to comply with the relevant national and EU legislation. In particular, operators should comply with the EMC (73/23/EEC) and Low Voltage Directives (89/336/EEC) and, in the case of transmitting earth stations, with the radiation limits set down by The International Commission for Non Ionising Radiation Protection (ICNIRP) in their guidelines (Guidelines for Limiting Exposure to Time-varying Electric, Magnetic and Electromagnetic Fields (up to 300 GHz), Health Physics, Volume 74, Number 4, April 1998) published in 1998.

Note: An earth station must not be installed at a location in a manor such as to be the cause of the aggregate non-ionising radiation emissions exceeding the limits specified by the ICNIRP guidelines mentioned above.

D.2 Compliance with Terminal Equipment Directive

Most earth stations (licensed or exempted) need to comply with the requirements, as specified in Directive 98/13/EC[15] of the European Parliament and of the Council of February 12th 1998, relating to telecommunications equipment and satellite earth stations (including the mutual recognition of their conformity). See below for details.

The 'Radio and Telecommunications Terminal Equipment' Directive, 1999/5/EC replaced the previous terminal directive in April 2000 and equipment is now required to conform to the new directive.

Satellite earth stations (licensed or exempted) need to comply with the 'Radio and Telecommunications Terminal Equipment' Directive, 1999/5/EC. Details of any type approval certificates (R&TTE or other relevant equipment directives) should be supplied, along with copies of the certification, in an application for a licence.

D.3 Compliance with Common Technical Regulations

As part of the licence conditions for operating, licensees are also required to comply with the relevant Common Technical Regulation, pursuant to Directive 98/13/EC or, in the absence of such a Common Technical Regulation, are required to comply with: the relevant standard adopted by the European Telecommunications Standards Institute (ETSI); or technical specifications that may be decided periodically by the Commission.

[15] This was replaced by Directive 1999/5/EC by April 2000.

D.4 Antennas

The coordination problems that may arise from the use of antennas with poor side-lobe performance are recognised. Accordingly the minimum acceptable antenna radiation pattern will need to be equivalent to those patterns given in ITU-Recommendations[16]. To avert harmful interference it may be required to use high performance antennas in certain circumstances.

D.5 Compliance with Satellite System Specifications

In the absence of such Common Technical Regulation or relevant ETSI standard, licensees are required to adhere to technical specifications that may be set out by satellite providers.

D.6 Common Technical Regulations

Relevant Common Technical Regulations (CTRs) include:

For VSAT

CTR028 "The European Commission Decision on a Common Technical Regulation for VSAT operating in the 11/12/14 GHz frequency bands."

CTR043 "The European Commission Decision on a Common Technical Regulation for VSAT operating in the 4 GHz and 6 GHz frequency bands."

For SNGs

CTR030 "The European Commission Decision on a Common Technical Regulation for Satellite News Gathering Transportable Earth Stations (SNG TES) operating in the 11-12/13-14 GHz frequency bands."

[16] ITU-R S.465

Annex E: Airport Exclusion Zones and Notification Areas

Exclusion Zones are applicable to Transportable Satellite Earth Stations and Non-Transportable Satellite Earth Stations. Notification Areas are applicable to Transportable Satellite Earth Stations only. Details of Notification Areas and Airport Exclusion Zones are given below.

E.1 Notification Areas

Definition

A notification area is a circle of radius 7 km, which is centred on the airport reference point of an airport equipped with an Instrument Approach Facility.

Notification Procedure

Operators of satellite earth stations must notify the Airport Contact Person of their intention to operate within a notification area.

- This advance notification must include the location, date, time and duration of each transmission.
- In the case of transportable earth stations (TES), an EIRP limit of 70 dBW will apply within the notification area.
- A dedicated (mobile) telephone line, plus a back-up line, must be made available by the TES operator, which directly connects the TES and the Airport Contact Person. The TES must be contactable with this telephone number, 24 hours a day, for the whole period of the operation.

NOTE: The Airport Contact Person at Cork, Dublin and Shannon airports for this purpose will be the duty Systems Manager, Air Navigation Services, I.A.A.

The TES must cease transmitting immediately if requested to do so by the Airport Contact Person.

Where are Notification Areas?

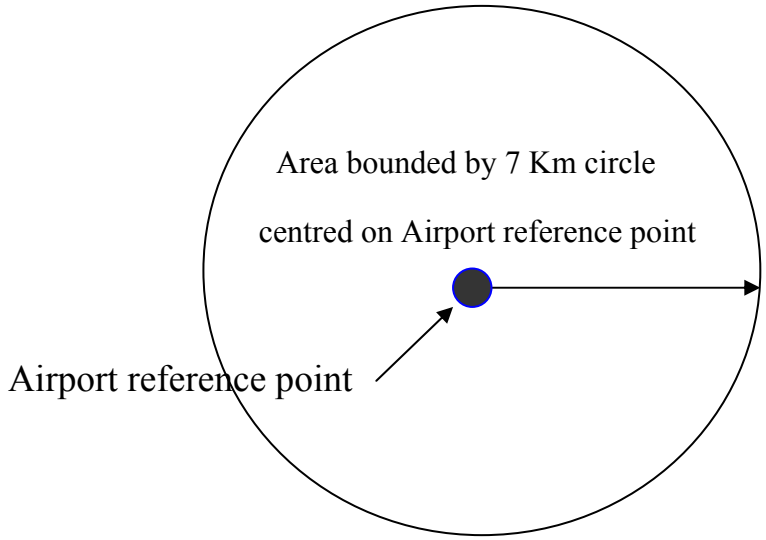
Notification areas exist at the airports listed below that are currently equipped with Instrument Approach Facilities

Table 1 gives details on these airports.

TABLE 1

AIRPORT	Airport Reference Point	Airport Contact Person	PHONE	24-HR	FAX
Cork	Lat 51 50 27 N	Aer Rianta. Duty Officer	021 329659		021 313442
	Long 008 29 20 W	I.A.A Systems Manager	021 329618		021 313029
Donegal	Lat 55 02 55 N	Ops Manager	075 48284	087-2938230	075 48483
	Long 008 21 14 W				
Dublin	Lat 53 25 17 N	Aer Rianta. Duty Officer	01 8144774	01 8144774	01 8145479
	Long 006 16 12	I.A.A Systems Manager	01 8067301	01 8067301	01 8445374
Galway	Lat 53 18 05 N	Ops Manager	091 755569	086-8330525	091 752876
	Long 008 56 21 W				
Kerry	Lat 52 10 52 N	The Manager	066 9764644	087-2544100	066 9764134
	Long 009 31 53 W				
Knock	Lat 53 54 36 N	The Manager	094 67222	094 67222	094 67232
	Long 008 49 04 W				
Shannon	Lat 52 42 07 N	Aer Rianta. Duty Officer	061 712240	061 712240	061 474240
	Long 008 55 29 W	I.A.A Systems Manager	061 363246	061 363246	061 471860
Sligo	Lat 54 16 30 N	The Manager	071 68280	071 67700	071 68396
	Long 008 36 00 W				
Waterford	Lat 52 11 17 N	The Manager	051 875589	087-231574	051 872288
	Long 007 05 13 W				

Airport Notification Area



E.2 Exclusion Zones

Definition:

An exclusion zone is an area 1000 metres wide (centred on the runway centre line) and extending 7 km in the approach direction from the stop end of each Instrument Landing Systems (ILS) equipped airport runway.

Where are Exclusion Zones?

Exclusion zones exist at airports that are currently equipped with Instrument Landing Systems (ILS). Table 2 gives details on the airports that are currently equipped with Instrument Landing Systems:

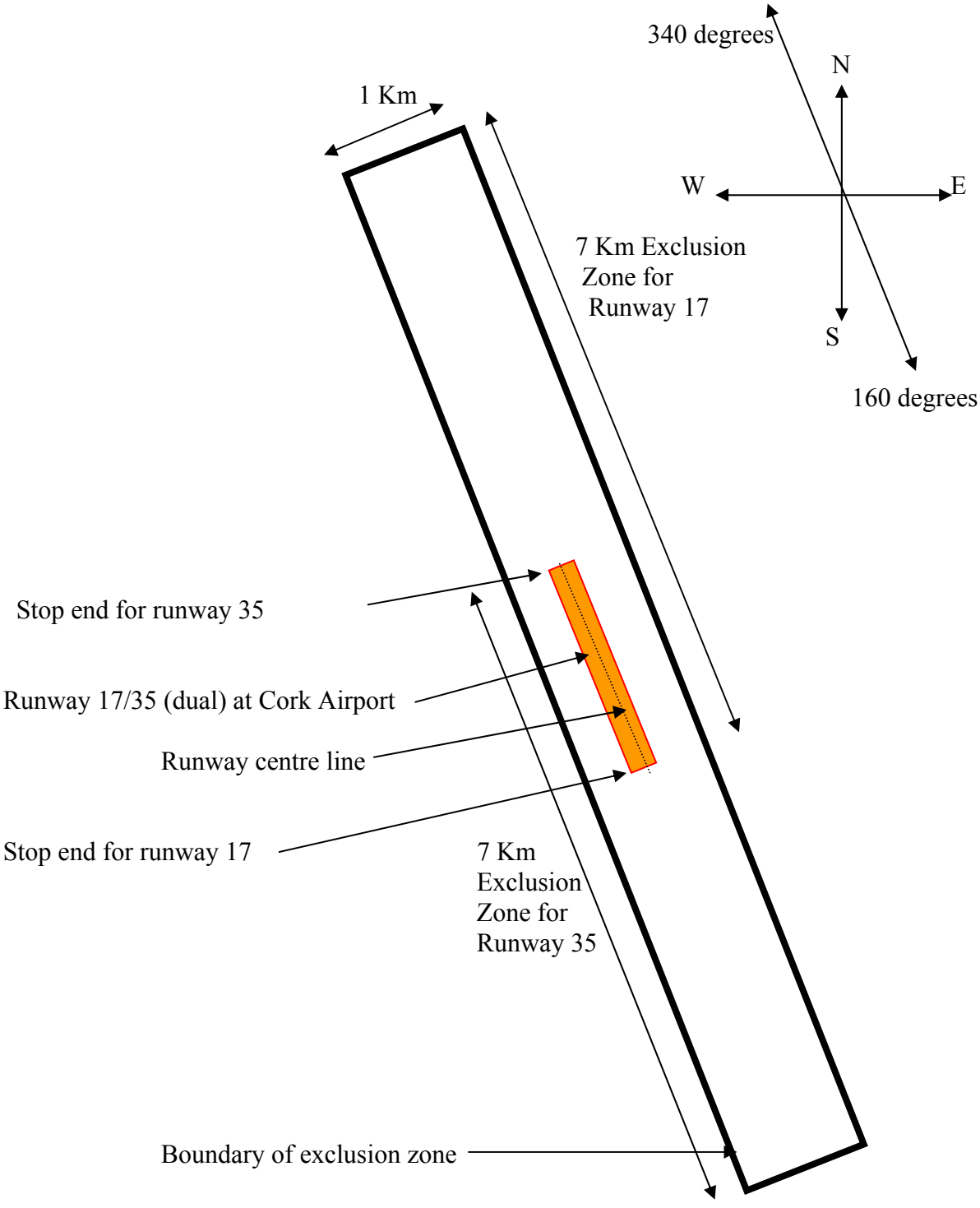
TABLE 2

Airport Name	Runway ILS	Direction of Exclusion Zone (from Runway stop end in degrees East of True North)	Stop end	
Cork	17 (dual)	340 degrees	N 51 49.9	W 008 29.1
	28 (dual)	160 degrees	N 51 51	W 008 29.8
Dublin	28 (dual)	095 degrees	N 53 25 20.75	W 006 17 24.27
	10 (dual)	275 degrees	N 53 25 12.94	W 006 15 02.08
	16	337 degrees	N 53 25 11.66	W 006 14 58.54
Shannon	6 (dual)	232 degrees	N 52 42 36	W 008 54 24
	24 (dual)	052 degrees	N 52 41 36	W 008 56 24
Knock	27	079 degrees	N 53 54 31	W 008 50 09
Kerry	26	071 degrees	N 52 11 40.75	W 009 32 15.46
Waterford	21	021 degrees	N 52 10 53.65	W 007 05 21.87
Donegal	21	023 degrees	N 55 02 22	W 008 20 35

Fixed Satellite Earth Stations may not operate within an exclusion zone, except with the permission of the relevant Airport Contact Person.

Note: If the satellite earth station operator is in any doubt as to the location or extent of an exclusion zone he/she should contact the Irish Aviation Authority at: Tel.: 061 474377 for clarification.

Example: Exclusion Zone at Cork Airport



Note 1 All bearings are given in degrees **east of True North**
Note 2 This diagram is not to scale

Annex F: Application Evaluation Requirements

Applications for satellite earth stations are evaluated using the following criteria:

1. Earth Station

- Purpose of Earth Station
- Location of Earth Station
- Natural Shielding (Site Survey)
- Satellite Orbital Position
- Valid Category (i.e. SNG, VSAT etc.)

2. Licensing Parameters

- Frequency Band
- Bandwidth (i.e. must be less than 80MHz[17])
- Does the entire bandwidth of the signal requested fall within the appropriate frequency bands
- EIRP and Power Density

3. Coordination/Sharing

- Equipment Specifications
- Details for determining spectrum availability
- Compliance of Radio Equipment. (see Annex D)

[17] If the requested bandwidth is greater than 80MHz, a separate application is required for the excessive bandwidth (See Section 3.12)

Annex G: Schedule of Fees Payable

1. Where the Licence concerned relates to a fixed satellite earth station or fixed satellite earth stations for use in one or both of the frequency bands 12.5-12.75 GHz and 14.0-14.25 GHz, or in another frequency band determined from time to time by the Commission to be a frequency band for which the fee structure set out in this paragraph should apply[18], operating to a single space station, the Licensee shall pay:

(i) a Licence fee for each fixed satellite earth station on the issue of and on each renewal of the Licence. The amount payable in relation to the Licence fee shall be;

(a) **ε100** (£78.76) for each fixed satellite earth station, up to ten, and,

(b) **ε25** (£19.69) for each additional fixed satellite earth station, above ten.

2. Where the Licence concerned relates to a fixed satellite earth station or fixed satellite earth stations for use in any other frequency bands than those specified in paragraph 1 above, and is above 3 GHz, operating to a single space station, the Licensee shall pay:

(i) a Licence fee on the issue of and on each renewal of the Licence. The amount payable in relation to the Licence fee will depend on which frequency band the fixed satellite earth station is Licensed to operated in, the bandwidth of the radio spectrum used and the power emitted by the fixed satellite earth station, each of which shall be set out in Part III of the Licence. The amount of the Licence fee is provided for in the numerical tables of this paragraph as set out below:

(a) In relation to a Licence for a fixed satellite earth station for use in the frequency band 3-10 GHz and operating at an equivalent isotropically radiated power less than 50 dBW the following fees will apply:

[18] See Annex B

Bandwidth of Radio Spectrum Used	**Fee Payable ε** (£)
Less than 500 kHz	1000 (787.56)
500 kHz to < 2 MHz	1250 (984.45)
2 MHz to < 11 MHz	1500 (1181.35)
11 MHz to < 40 MHz	1750 (1378.24)
40 MHz to 80 MHz	2000 (1575.13)

In addition to the above, in the case where a fixed satellite earth station is also licensed for use as a receiving fixed satellite earth station, the amount specified in sub-paragraph (c) will be payable.

(b) In relation to a Licence for a fixed satellite earth station for use in the frequency band 3-10 GHz and operating at an equivalent isotropically radiated power between 50 and 75 dBW the following fees will apply:

Bandwidth of Radio Spectrum Used	**Fee Payable ε** (£)
Less than 500 kHz	1250 (984.45)
500 kHz to < 2 MHz	1500 (1181.35)
2 MHz to < 11 MHz	1750 (1378.24)
11 MHz to < 40 MHz	2000 (1575.13)
40 MHz to 80 MHz	2250 (1772.02)

In addition to the above, in the case where a fixed satellite earth station is also licensed for use as a receiving fixed satellite earth station, the amount specified in sub-paragraph (c) will be payable.

(c) In relation to a Licence for a fixed satellite earth station for use in the frequency band 3-10 GHz and operating at an equivalent isotropically radiated power greater than 75 dBW the following fees will apply:

Bandwidth of Radio Spectrum Used	**Fee Payable ε** (£)
Less than 500 kHz	1500 (1181.35)
500 kHz to < 2 MHz	1750 (1378.24)
2 MHz to < 11 MHz	2000 (1575.13)
11 MHz to < 40 MHz	2250 (1772.02)
40 MHz to 80 MHz	2500 (1968.91)

Notwithstanding the above, in the case where a fixed satellite earth station is licensed for use as a receiving fixed satellite earth station or a receive only fixed satellite earth station the fees payable shall be the amount specified in the table contained in this sub-paragraph.

(d) In relation to a Licence for a fixed satellite earth station for use in the frequency band 10-15 GHz and operating at an equivalent isotropically radiated power less than 50 dBW the following fees will apply:

Bandwidth of Radio Spectrum Used	**Fee Payable ε** (£)
Less than 500 kHz	500 (393.78)
500 kHz to < 2 MHz	750 (590.68)
2 MHz to < 11 MHz	1000 (787.56)
11 MHz to < 40 MHz	1250 (984.46)
40 MHz to 80 MHz	1500 (1181.35)

In addition to the above, in the case where a fixed satellite earth station is also licensed for use as a receiving fixed satellite earth station, the amount specified in sub-paragraph (f) will be payable.

(e) In relation to a Licence for a fixed satellite earth station for use in the frequency band 10-15 GHz and operating at an equivalent isotropically radiated power between 50 and 75 dBW the following fees will apply:

Bandwidth of Radio Spectrum Used	**Fee Payable ε** (£)
Less than 500 kHz	750 (590.68)
500 kHz to < 2 MHz	1000 (787.56)
2 MHz to < 11 MHz	1250 (984.46)
11 MHz to < 40 MHz	1500 (1181.35)
40 MHz to 80 MHz	1750 (1378.24)

In addition to the above, in the case where a fixed satellite earth station is also licensed for use as a receiving fixed satellite earth station, the amount specified in sub-paragraph (f) will be payable.

(f) In relation to a Licence for a fixed satellite earth station for use in the frequency band 10-15 GHz and operating at an equivalent isotropically radiated power greater than 75 dBW the following fees will apply:

Bandwidth of Radio Spectrum Used	**Fee Payable ε** (£)
Less than 500 kHz	1000 (787.56)
500 kHz to < 2 MHz	1250 (984.46)
2 MHz to < 11 MHz	1500 (1181.35)
11 MHz to < 40 MHz	1750 (1378.24)
40 MHz to 80 MHz	2000 (1575.13)

Notwithstanding the above, in the case where a fixed satellite earth station is licensed for use as a receiving fixed satellite earth station or a receive only fixed satellite earth station the fees payable shall be the amount specified in the table contained in this sub-paragraph.

(g) In relation to a Licence for a fixed satellite earth station for use in the frequency band above 15 GHz and operating at an equivalent isotropically radiated power less than 50 dBW the following fees will apply:

Bandwidth of Radio Spectrum Used	**Fee Payable ε** (£)
Less than 500 kHz	125 (98.46)
500 kHz to < 2 MHz	250(196.89)
2 MHz to < 11 MHz	500 (393.78)
11 MHz to < 40 MHz	750(590.68)
40 MHz to 80 MHz	1000 (787.56)

In addition to the above, in the case where a fixed satellite earth station is also licensed for use as a receiving fixed satellite earth station, the amount specified in sub-paragraph (i) will be payable.

(h) In relation to a Licence for a fixed satellite earth station for use in the frequency band greater than 15 GHz and operating at an equivalent isotropically radiated power between 50 and 75 dBW the following fees will apply:

Bandwidth of Radio Spectrum	**Fee Payable ε** (£)
Less than 500 kHz	250 (196.89)
500 kHz to < 2 MHz	500 (393.78)
2 MHz to < 11 MHz	750 (590.68)
11 MHz to < 40 MHz	1000 (787.56)
40 MHz to 80 MHz	1250 (984.46)

In addition to the above, in the case where a fixed satellite earth station is also licensed for use as a receiving fixed satellite earth station, the amount specified in sub-paragraph (i) will be payable.

(i) In relation to a Licence for a fixed satellite earth station for use in the frequency band above 15 GHz and operating at an equivalent isotropically radiated power greater than 75 dBW the following fees will apply:

Bandwidth of Radio Spectrum Used	**Fee Payable ε** (£)
Less than 500 kHz	500 (393.78)
500 kHz to < 2 MHz	750 (590.68)
2 MHz to < 11 MHz	1000 (787.56)
11 MHz to < 40 MHz	1250 (984.46)
40 MHz to 80 MHz	1500 (1181.35)

Notwithstanding the above, in the case where a fixed satellite earth station is licensed for use as a receiving fixed satellite earth station or a receive only fixed satellite earth station the fees payable shall be the amount specified in the table contained in this sub-paragraph.

3. Where the Licence concerned relates to a fixed satellite earth station or fixed satellite earth stations for a portion of a year, operating to a single space station, up to eleven months, then the Licensee shall pay:

(i) where a Licence is granted for a portion of a year the Licence fees to be paid by the Licensee shall be calculated as follows:

$$A \times (B / 12) = C$$

where A is the relevant annual Licence fee set out in paragraph 1(ii) or paragraph 2(ii); B is the number of whole months for which the Licence is granted (without prejudice to Part IV of the Licence, 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); and C is the appropriate Licence fee to be paid.

G.2 Examples of Fee Calculations

Example 1

Total fee for a VSAT network of 12 dependant stations, operating in an unshared band.

10 stations at a fee of €100 each. (1000)

2 stations at a fee of €25 each (50)

Total Fee €1050

(Average fee per dependent station per year is €87.50).

An additional annual charge of €100 applies to the hub station (which is not regarded as part of the dependant network), if located in Ireland.

Example 2

Annual fee for one earth station in the 4/6 GHz band using 60 dBW and 6 MHz bandwidth in each direction.

Uplink fee (Table 2b) €1750

Downlink fee (Table 2c) €2000

Total Fee €3750

Example 3

Annual fee for one earth station in the 14/12 GHz band using 45 dBW and < 500 kHz bandwidth up and 10 MHz bandwidth down:

Uplink fee (Table 2d) ε 500

Downlink fee (Table 2f) ε 1500

Total Fee €2000

Example 4

Annual fee for an earth station using 45 dBW with a 1 MHz coordinated uplink and a 10 MHz uncoordinated downlink in the 14/11 GHz band:

Uplink fee (Table 2d) €750

Downlink fee (not coordinated) zero

Total Fee €750

Example 5

Annual fee payable for a TES operating in an unshared band for six months.

Spectrum fee of €100 x 6/12.

Total Annual Fee of €50.

Annex H: Terminology

H.1 Radio Regulations

Unless otherwise specified, terms have the meaning assigned to them in the relevant national legislation or in the Radio Regulations (1998 edition), made under Article 13 of the Constitution and Convention of the International Telecommunications Union.

H.2 Abbreviations

BSS	Broadcasting Satellite Service
CDMA	Code Division Multiple Access
CEPT	Conference of European Postal and Telecommunications Administrations
COMREG	Commission for Communications Regulation
CTR	Common Technical Regulation
DTH	Direct to Home (Satellite)Broadcasting
ECTRA	European Committee for Telecommunications Regulatory Affairs
EMC	Electromagnetic Compatibility
ERC	European Radiocommunications Committee
ERO	European Radiocommunications Office
ETS	European Telecommunications Standard
ETSI	European Telecommunications Standard Institute
EU	European Union
FS	Fixed Service (terrestrial)
FSS	Fixed Satellite Service
GHz	Gigahertz (frequency range)
GPS	Global Positioning System
GSO	Geostationary Orbit (satellite orbit)
ICNIRP	International Commission for Non-Ionising Radiation Protection
ILS	Instrument Landing System
IRPA	International Radiation Protection Association
ISP	Internet Service Provider
ITU	International Telecommunications Union
LEO	Low earth orbit (satellite)

LEOSAT	Low earth orbit satellite
MIFR	ITU Master International Frequency Register
NGSO	Non-geostationary Orbit
OSS	One Stop Shop (licensing process)
RR	Radio Regulations (of the ITU)
SiT	Satellite Interactive Terminal
SNG	Satellite News Gathering
TBR	Technical Basis for Regulation (standard)
TDMA	Time Division Multiple Access
TES	Transportable Earth Station
TVRO	Television Receive Only (station)
UHF	Ultra High Frequency (band)
VHF	Very High Frequency (band)
VSAT	Very Small Aperture Terminals

H.3 General Terminology

"The Act of 1926": the Wireless Telegraphy Act, 1926, as amended (No. 45 of 1926).

"Coordination Area": the area associated with an earth station outside of which a terrestrial station sharing the same frequency band, neither causes, nor is subject to, interfering emissions greater than a permissible level. Note that the size of the coordination area will vary with the coordination method used and the number of satellites with which the earth station may communicate.

"Terrestrial Station": a station effecting terrestrial radiocommunications.

"Terrestrial Radiocommunications": any radiocommunications other than space radiocommunications or space radio astronomy.

"Space Radiocommunications" any radiocommunications involving the use of one or more space stations or the use of one or more reflecting satellites, or other objects, in space.

"Earth Station": means apparatus for wireless telegraphy, located at a fixed point on the surface of the Earth, intended for the transmission of radio signals to, and/or the reception of radio signals from, a station aboard a space vehicle, or from a natural source outside the earth's atmosphere.

"Fixed Service": a radiocommunications service between specified fixed points.

"Fixed Satellite Service": means a radiocommunication service between earth stations at specified fixed points when one or more satellites are used.

"(Dependant) VSAT Earth Station": an earth station, limited in size and operational capability, which operates only under the remote control of another specified earth station with which it communicates via a specified satellite, and which is not normally subject to local control.

"Star Network": A network with one central control hub.

"Mesh Network": A network in which the control function is assumed by different stations at different times.

"VSAT Hub Station": an earth station, which acts as a control station for a VSAT Network.

"VSAT Network": one or more VSAT earth stations communicating with a controlling Earth Station (not necessarily in Ireland), or with other VSAT earth stations under the remote control of the controlling earth station.

"Geostationary Orbit": an orbit that is characterised by the space vehicle remaining in substantially the same position relative the Earth's surface.

"ITU Coordination": the procedure[19] recommended by the International Telecommunications Union, used to determine the potential interference between the Earth Station and other stations (whether located in Ireland or elsewhere).

"National Telecommunications Numbering Resource" is the set of numbers etc., which are used to route telecommunications traffic.

"Licence": a Licence under Section 5 of the Wireless Telegraphy Act. 1926 (No. 45 of 1926), being an annual or a short-term Licence for a fixed satellite earth station or fixed satellite earth stations as defined in the Regulations Wireless Telegraphy (Fixed Satellite Earth Stations), 2000.

"Licensee": the holder of a licence.

"Commission": means the Commission for Communications Regulation.

"Station": means apparatus for wireless telegraphy.

"Wireless telegraphy" and "apparatus for wireless telegraphy": meanings as assigned to them by virtue of the Wireless Telegraphy Act. 1926, as amended.

[19] Radio Regulations S9 and ApS7.