Opening the Market for Satellite Services

Report on Consultation Paper

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Oifig an Stiúrthóra Rialála Teileachumarsáide
Office of the Director of Telecommunications Regulation
Abbey Court, Irish Life Centre, Lower Abbey Street, Dublin 1.
***Telephone* +353-1-804 9600 *Fax* +353-1-804 9680 *Web* www.odtr.ie**

Foreword by the Director

The consultation paper "Opening the Market for Satellite Services" (ODTR Doc. No. 99/09) sought views on a proposed framework for the introduction in Ireland of a regulatory regime for satellite services. I undertook this initiative as I believe that satellite networks can provide a valuable addition to the telecommunications infrastructure in Ireland. Communications via satellite can be cost effective with short set up times providing global access to the remotest of regions with the minimum of infrastructure requirements.

There was a substantial response to the consultation paper from Ireland and abroad, from operators, users and regulators. I would like to thank all those who responded to the consultation paper and availed of this opportunity to influence the development of satellite communications in Ireland. The comments received provided valuable input into the overall process. Indeed, the original proposals have been extensively reviewed and many of those comments have been directly addressed in this document on which the initial satellite earth station licensing regime in Ireland will be based. A number of responses drew attention to the need to consider alternative satellite systems. These comments have been noted and further work will be carried out in the future to extend the regime to other sections of the satellite market.

I am in favour of the development of satellite based telecommunications services and will attempt to facilitate such development, but I am also obliged to consider alternative and competing requests for spectrum. For that reason, the new regulatory framework for satellite services as set out in this document, attempts to strike a reasonable balance between the need to introduce new satellite based services and the competing necessity to protect and expand terrestrial networks. Catering for alternatives is the key to encouraging competition and ultimately providing an effective choice for users.

The regime will be kept under periodic review as the sector develops.

Etain Doyle

Director of Telecommunications Regulation

FOREWORD BY THE DIRECTOR

1 Introduction

1.1 General Background

The Director of Telecommunications Regulation ("the Director") is responsible for the regulation of the Irish telecommunications sector, including the regulation of access to the radio spectrum in accordance with national and EU legislation. A key issue to the sector is that of facilitating and sustaining effective competition.

The Office of the Director of Telecommunications Regulation (ODTR) published a Consultation Document; "Opening the Market for Satellite Services", ODTR 99/09, on the 4th March 1999, inviting submissions on a proposed framework for establishing a licensing regime for satellite services and earth stations[1] in the Fixed Satellite Service at frequencies above 3 GHz. Interested parties were invited to make submissions on the proposed framework. Certain issues were highlighted, but all observations were welcomed and considered.

Responses were received[2] from regulatory agencies, satellite service providers and satellite system users. The replies received from the respondents were wide ranging. Topics covered included the general thrust of the proposed framework, technical definitions and the proposed fee structure. Respondents suggested that the regulatory environment for satellite services should reflect the changing nature of satellite service and licensing regimes, and should evolve to parallel this change.

This paper reports on the consultation process, incorporating revisions made to the original proposals in the light of the responses received. It sets out the Director's current position on the regulatory framework and licensing regime to be adopted with regard to the provision of satellite services.

The next step will be to draft regulations to give effect to these proposals. It should be understood that variations may prove appropriate in the course of drafting the regulations and that this document is without prejudice to the to the legal position or the rights and duties of the Director to regulate the market generally.

This paper is a working document on which the initial licensing regime in Ireland will be based. However, the Director recognises that the development of the satellite radiocommunications sector requires that the regime be kept under periodic review.

1.2 Legislative Background

The structure for the licensing of satellite services will be established by way of introducing regulations pursuant to the Wireless Telegraphy Act 1926, as amended.

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[1] 'Earth Station' includes all wireless telegraphy apparatus, which transmits to or receives from space stations (satellites).

[2] A list of respondents is given in Appendix 1.

Regulations relating to wireless telegraphy apparatus, used for the purposes of providing a telecommunications service, may be made by the Director with the consent of the Minister for Public Enterprise.

A Wireless Telegraphy Licence permits the possession and use of wireless telegraphy apparatus. Unless the use of specific apparatus is exempt, a wireless telegraphy licence is required.

A Telecommunications Service Licence will be required where an applicant intends providing telecommunications services over satellite networks. There are currently two types of service licences, The **Basic Telecommunications Licence** and **the General Telecommunications Licence**. A brief description of service licences is given in Appendix 2.

In European law, the principal applicable legislation is the Licensing Directive (97/13/EC). The **Licensing Directive** has been transposed into Irish law by way of the (European Communities (Telecommunications Licences) Regulations 1998, (SI No. 96 of 1998)). The **Telecommunications Terminal Equipment Directive**, (98/13/EC) also applies. This will be replaced by the 'Radio and Telecommunications Terminal Equipment' Directive, 1999/5/EC in April 2000.

Additional European legislation which may apply is listed in Appendix 3; 'Technical Requirements'. See also Section 3 below on types of licences.

2 Scope of the Licensing Framework

Submissions were invited on a proposed framework for establishing a licensing regime for satellite services and earth stations[3] in the Fixed Satellite Service (FSS) at frequencies above 3 GHz. Interested parties were invited to make submissions on the proposed framework. Certain issues were highlighted, but all observations would be welcomed and considered.

The lower limit of 3 GHz was chosen for this consultation process as satellite services below this frequency are generally restricted to mobile communications services using small terminals, or to space operation services, both of which require special licensing regimes. Licensing regimes for services operating below 3 GHz will be developed independently of this present consultation. (Attention is drawn to Appendix 1, which lists current licence exemption orders for certain classes of mobile earth stations.)

In this paper, the ODTR sets out the report on the consultation process, incorporating revisions made to the original proposals in the light of the responses received.

2.1 Frequency Spectrum Information

The radio frequency spectrum is an important and scarce national resource. In accordance with its statuary obligations, the policy of the Director is to manage the spectrum in an efficient and orderly manner in Ireland, so that optimum use may be obtained from this resource.

The opinion the Satellite Action Plan Regulatory Working Group[4] (SAP-RWG), that the special requirements of the satellite services might not be fully appreciated, has been noted. They considered that the burden of sharing between the terrestrial and satellite services should be effected in a transparent and non-discriminatory manner. Respondents operating terrestrial systems, on the other hand, particularly requested that the development of satellite systems should not be allowed to have a negative impact on their link infrastructure.

While the Director recognises the concerns of SAP-RWG relating to satellite systems, she must also consider the competing requirements of terrestrial system operators sharing the bands. The Director takes the view that a higher priority for satellite services is not provided for in the ITU Radio Regulations[5] relating to shared bands, where priority for services of a similar status[6] is based on a first-come-first-served principle. The Director generally supports the application of ITU principles on this issue. In accordance with ITU procedures, established stations will have priority. In Ireland, generally, all established stations will be terrestrial fixed link stations.

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[3] 'Earth Station' includes all wireless telegraphy apparatus, which transmits to or receives from space stations (satellites).

[4] A consortium of the satellite industry in the EU with some Commission representation.

[5] The Radio Regulations are made under Article 13 of the Constitution and Convention of the International Telecommunications Union, Geneva 1992.

[6] RR S5.23 to S5.32, edition of 1998

However, due to their widespread deployment and consequent difficulty of coordination, Dependant[7] VSAT earth stations will be regarded as having a secondary status[8] in all bands that they share with other services. Coordination of VSAT stations would, additionally, introduce long delays into the granting of licenses for these stations, assuming that coordination could, in each case, be achieved.

2.2 National Spectrum Usage Information

The Table of Frequency Allocations - Ireland[9] provides details on spectrum allocations in Ireland. Spectrum users should be aware that some of the frequency spectrum available for use by satellite services will be shared with other services, including fixed radio links. Appendix 4 contains a table of the common fixed satellite service bands. This Appendix is derived from the 'Table of Frequency Allocations – Ireland', which should be consulted for full details of spectrum allocations.

Respondents suggested that the relevant national radio assignment databases should be made available to facilitate site surveys and coordination. The Director considers that the availability of information about possible coordination conflicts would permit applicants for licences in shared bands to determine, in advance of an application being submitted to the ODTR, the possibility of successful coordination being achieved.

Accordingly, the Director proposes to make available the information on the national frequency assignments in the relevant bands, as it is made available to the ITU Master International Frequency Register. Essentially, this information will cover the location and assigned frequency for each station. Details of the operator or purpose of the station will not be given. Details of the information that will be made available are given in Appendix 5. It is hoped that this information can be made available before the 1st January 2000. It would be helpful to both the applicant and the Director if this information is taken into consideration before applying for a license.

2.3 Spectrum Review

In the interest of the efficient use of the radio spectrum, it is the policy of the Director 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.

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[7] A Dependant VSAT is a VSAT (user) station operating under the remote control of another (Hub) station.

[8] In similar form to the definition of the secondary status of services as given in RR S5.28 to S5.31.

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

2.4 European Spectrum Harmonisation

The need for international harmonisation in the allocation of satellite services spectrum was mentioned by most of the respondents. It was suggested that dedicated spectrum should be provided for satellite services and that the traditional spectrum sharing approach does not work, especially when a high density of users is likely.

As satellites operate on an international basis, the suggested provision of dedicated spectrum for satellite services on a national basis by a country such as Ireland, where any beam footprint is likely to include adjacent countries, is not practical. The harmonisation of spectrum allocation is, therefore, essentially a matter for the ITU or CEPT, as opposed to a national earth station licensing issue.

While the Director generally supports harmonised spectrum allocations at both the ITU and CEPT, there still remains a need to address national requirements.

Many satellite services that operate in the lower part of the spectrum, are presently subject to CEPT consultation processes. Licence exemption regimes have been introduced as a result of these consultations. A number of exemption orders have already been made - please refer to Appendix 6

The Director is also aware of the ongoing development of small, low-cost Satellite Interactive Terminals (SiT), and looks forward to CEPT decisions regarding the regulation of these stations.

2.5 Spectrum Sharing Principles

2.5.1 General Principles

A licence will 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.

Any sharing restrictions imposed will be 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.

In general, the approach adopted by the Director is that priority will be given to existing systems. Where both of the stations have a similar status, for example, where both are primary stations, first come – first served.

2.5.1.1 Application of ITU principles

In accordance with ITU Regulations[10], some of the frequency spectrum available for use by satellite services is shared with other services – including fixed radio links.

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

Consequently it is proposed that unrestricted access to the full frequency bands shared with terrestrial services will not be 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 Director will endeavour to accommodate the needs of applicants, with due regard to the efficient and orderly use of spectrum.

The Director will apply the ITU methodology[11] to all sharing cases. Coordination principles are explained further in Section 2.6 and Appendix 6. While these procedures may not be optimal in all cases, they are internationally recognised and are transparent and non-discriminatory.

2.5.1.2 Band segmentation

Currently, the Director does not intend to make block allocations of spectrum (band segmentation) for satellite service purposes. Rather, frequency channels will be assigned to individual Earth Stations on a non-exclusive basis. Accordingly, licensees should be aware that the Director will, where possible, facilitate other users in sharing the same frequency channels.

Some respondents suggested that band segmentation should be considered. Band segmentation would be difficult to implement in practice, as individual channels may already have been assigned for various purposes within Ireland. Given that satellite services are essentially international in character, a common international solution to satellite service spectrum requirements has to be found. As stated earlier in this report, therefore, the Director will continue her involvement in the CEPT harmonisation process.

2.5.1.3 Satellite operator requests

The Director is aware that satellite operators may try to influence the operating characteristics of earth stations and may request changes to the frequency assignments. This is an issue of interest to many respondents, who pointed out that their requests for access to particular parts of the spectrum may be outside their control. Under both national law and the Radio Regulations, an earth station has to conform to the requirements of the national Administration in whose territory it is located. Therefore, while the Director will consider the requirements of the satellite operators in determining the conditions attached to an earth station frequency assignment, she will also give consideration to the other factors which may influence the assignment of spectrum to earth stations.

2.5.1.4 Variable bandwidth use

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. The Director acknowledges that an operator may not use at any given time the maximum bandwidth available. However, for spectrum management purposes, the Director must still consider the full bandwidth

[11] Article S9 and Appendix S7 of the Radio Regulations.

as a unit. A licence will be required for the full bandwidth. This applies to services that make use of single-channel per carrier and demand assigned spectrum methods.

In an unshared band, a licence for a bandwidth assignment, if a bandwidth is specified, may permit operation anywhere in the band subject to satellite agreement and non-interference.

2.5.1.5 Requests for specific channels

Where an applicant requests channels in a specified band, it should be noted that the Director cannot guarantee that the spectrum requested can be made available at specific locations. The Director recognises that specific channels may be required to communicate with individual satellites, for both telecommunications and non-telecommunications applications. Detailed discussions with the Director 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.

2.5.2 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, expected to be difficult to co-ordinate 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 will be required in advance of operation in practically all cases. This may not always be successfully achieved.

Operation in these bands may be required by some of the respondents for long-haul international traffic. The use of 4/6 GHz will be permitted, though not encouraged, from fixed locations only. Its use will be discouraged for mobile or transportable stations due to the coordination difficulties involved. Generally, coordinated operation will only be permitted for earth stations with antenna sizes not less than the maximum size specified in the ETSI TBR 43. This means that VSAT operation will not, generally, be permitted.

2.5.3 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 and direct to home (DTH) broadcasting. 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[12]. In Ireland, the 10.7 to 11.7 GHz band is in use for fixed service high capacity long-haul links.

Use of the 10.7 to 11.7 GHz band by fixed satellite service downlinks to VSAT earth stations will be permitted on an unprotected basis. However, it will be possible for

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

large[13] earth stations to apply for coordination in this band, although such coordination may be difficult to achieve given the extensive terrestrial use.

The 14 GHz band is used extensively for VSAT services. In Ireland, 14 - 14.25 GHz and 14.25 – 14.5 GHz may be licensed also for use by short-term ENG (terrestrial) links, on a non-interference basis. However, the UK also permits terrestrial link usage from 14.25 to 14.5 GHz. This use creates a coordination difficulty, which is at present subject to discussion with the UK administration.

2.5.3.1 The 14.00-14.25/12.50-12.75 Segment

Applicants should note that the 14.00 to 14.25 GHz uplink and the corresponding 12.5 – 12.75 GHz downlink bands are currently exclusively allotted to satellite operation as in the Irish Table of Frequency Allocations.

The Director will regard these as the preferred VSAT and SNG bands. As coordination will not generally be required for operations in these bands, a light regulatory regime will apply. The schedule of fees should be consulted, see Appendix 9.

2.5.3.2 The 14.25 – 14.50/10.7-11.7 Segment

The downlinks in the 10.7 to 11.7 GHz band (paired with uplinks in the 14.25 – 14.5 GHz band) share spectrum with high capacity terrestrial fixed links. A potential coordination problem will therefore exist in the downlink band.

VSAT receiver operation in the 10.7 – 11.7 GHz band will be permitted on a secondary basis only. This means that VSAT receivers in this band will not be coordinated and protected from interference. Note, however, that uncoordinated receivers will not be required to pay spectrum related annual fees. In the case of large earth stations, with antennas not less than the maximum size specified in the ETSI VSAT TBR28, applications for coordinated operation will be considered.

2.5.3.3 Direct To Home Satellite TV

Direct To Home (DTH) reception will be permitted on an unprotected basis. Interference to DTH-TV should be avoidable in most circumstances, by carefully positioning of the satellite receiver antennas so as to shield the antennas from potential interference sources. This possibility of minimising interference is due to the fact that the 11 GHz band is used for medium to long distance (15+ km) links. Therefore, there is a relatively low concentration of 11 GHz stations in urban or built up areas. Additionally, the minimum permitted length of 11 GHz links and the Irish topography greatly reduces the lookup/down angles of terrestrial fixed link antennas, when compared with the elevation angles of typical satellite earth station antennas.

2.5.4 Bands above 15 GHz.

The possible future use of the 18 GHz band was raised by a respondent in relation to sharing the band between terrestrial fixed links and satellite services.

[13] Stations having antenna sizes larger than that specified as the maximum for VSAT, see Appendix 3.

The segment from 18.8-19.3 GHz has been proposed for use by non-geostationary satellite system downlinks, while the spectrum segment from 28.6 – 29.1 GHz is intended for the corresponding uplinks.

In Ireland, the 18 GHz band is a national infrastructure, terrestrial link band (17.7 – 19.7 GHz) and is already in heavy use. The Director intends to continue to use this band for terrestrial links, but the Director is prepared to consider the use of the band by satellite service receivers on an unprotected basis.

The 28-30 GHz band is not currently used in Ireland. The use of this band is presently under discussion within CEPT and the Director is awaiting the outcome of these discussions before opening the band for either satellite or terrestrial use.

2.6 Coordination

2.6.1 General principles

Coordination is the process by which the requirements of the various users of the radio spectrum are balanced against the available resources and the probability of interference between the various users reduced to acceptable levels. Note that the effective term is 'reduce to an acceptable level' not totally prevent. This process requires consideration of the frequency channels and associated operational characteristics assigned, in conjunction with the geographical locations of the users.

Coordination between an earth station and other 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. Any later variation, following a successful initial coordination, in these parameters will have to be considered in the case of alterations to previously coordinated stations. The station may 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[14], 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.

Ireland 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, in some cases, be a lengthy process, which could take several years to complete, most coordination is completed in approximately

[14] Articles 196 and 197 of the Constitution of the International Telecommunications Union and S0.3 and S0.4 of the Radio Regulations.

six months. The response times for administrations are set in the Radio Regulations[15]. The Licensing Directive makes particular allowance for the potentially extended timeframe required for coordination[16] in setting administrative response time requirements. Satellite systems may, therefore, be licensed subject to the condition that successful coordination is achieved. If not achieved, the licence may be amended or withdrawn and cancelled. Successful coordination cannot be guaranteed.

Coordination will be required for certain classes of earth station, in particular for permanent large earth stations in shared bands. Attention is again drawn to the Director's policy of seeking coordination only for those stations that have sufficiently large antennas. International coordination may be attempted on a full band basis. However, this may not be practical in all circumstances.

2.6.2 Application of ITU principles

The Director will apply ITU procedures where appropriate. ITU procedures are internationally recognised and transparent in their application and methodology. Internationally, the procedures given in Appendix S7 of the Radio Regulations, (RR-APS7) coordination, will generally be used, although this may lead to large coordination distances. Consideration is being given to the use of other ITU recommended procedures, for example ITU-R Recommendation 452, in applicable cases. The Director is aware that RR-Appendix S7 is expected to be reviewed at the World Radio Conference in 2000.

The proposed methodology for coordination is briefly outlined in Appendix 6 to this paper.

Publication of coordination requirement maps may be possible if agreement with other administrations on a bi-lateral coordination procedure can be reached, especially in 14.25 – 14.5 GHz band.

2.6.3 Short –notice coordination for transportable earth stations.

The Director has considered the possibility of introducing a 7x24 hour clearance service for transportable earth stations as suggested by a respondent. There would, however, be a financial impact on the Director and the fee structure, if such a service were established. It is, therefore, unlikely that the Director will provide a service of this type at the present time. Guidelines will be issued for operators at a later date, which will outline policy.

2.7 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,

[15] RR-Appendix S7

[16] Regulation 5 (e) vii of the European Communities (Telecommunications Licences) Regulations, 1998, (S.I 96 of 1998), which transposes the Licensing Directive into Irish law.

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. Where a band used for earth station receive is shared with the terrestrial services, care in site shielding may minimise the potential for interference from the terrestrial services. In the case of shared bands used for satellite uplinks, protection may need to be afforded for terrestrial services' receivers

The cost of interference protection measures, such as site shielding, may have to be borne by the new station in those cases where the existing station is protected and coordinated. Existing protected stations in the shared band will, generally, have priority in accordance with ITU procedure, as outlined in Section 2.5 above. The Director intends to make available relevant information on frequency assignments that have been made in the shared bands in Ireland, see Section 2.2 above. Applicants may use this information to determine whether coordination is possible and whether site shielding may be necessary

If coordination without shielding has been permitted this will, generally, remain valid. However, if the surrounding area becomes populated with new stations it may become desirable that an existing station should install site-shielding measures. Shielding would afford added protection to the station's receivers. In order to facilitate coordination and to minimise present or potential future interference, the Director recommends that all earth stations be sited so as to achieve the maximum possible site shielding at the time of their initial construction. The Director will not be liable for any costs incurred by the operator.

2.8 Licence Exemption

2.8.1 General Principles

In line with the decisions of the European Radiocommunications Committee (ERC), the Director has exempted users from the obligation to hold an individual licence for certain classes of terminal equipment. A list of the current and proposed exemptions is given in Appendix 7. Respondents suggested the inclusion of some of the classes of apparatus, which were not referred to in the original consultation paper.

It is the policy of the Director to consider for exemption from individual licensing all equipment so recommended by CEPT, in so far as this is possible in Ireland while taking into account national requirements. In addition to specified types of terminal equipment, the Director proposes to issue a general exemption for satellite earth station receivers operating in an uncoordinated and unprotected receiving mode. This is clarified further in Section 2.8.2 below.

Exemption from individual licensing will be effected by way of legislation and will, in general, apply to equipment that conforms to specified European standards or to standards set by the Director, if a relevant European standard is not in existence[17].

[17] The ODTR standards would be used, for example, for experimentation and development of apparatus not on the market.

An exemption from a requirement to hold a wireless telegraphy licence under Section 3 of the Act of 1926 will not absolve the user from the requirement to conform to other legislation.

2.8.2 Exemption of Receiving Apparatus

The general exemption of earth station receiving apparatus will include the receiver side of transmit-receive apparatus. While only occasionally used as satellite earth stations, radio astronomy station receivers may be included in the general exemption regulations.

2.8.2.1 Exempt receiver operation

It is proposed that all satellite earth station receiving equipment, regardless of purpose or bandwidth used, will be exempt from licensing unless the user voluntarily requests coordination. This exemption will apply to both receive-only apparatus and transmit/receive apparatus when operating in the receive mode. It will be possible to licence earth station transmitters and operate these in conjunction with wide-band receivers under this general receiver exemption regime.

It is intended that any receivers operated under the exemption regulation will not be co-ordinated and will not be entitled to seek protection from interference. This point should particularly be noted, as some respondents in their submissions to the consultation process requested clarification.

Although exempted receivers will not be coordinated, the use of site shielding measures and the careful positioning of the receiver antenna to obtain the maximum obstruction of potential interference propagation paths will result in the minimisation of interference from surrounding transmitters.

It should be noted that exemption from a requirement to hold a wireless telegraphy licence will not absolve the operator from the need to hold a telecommunications service license, or from the need to obtain permission and/or licences to receive information that may be subject to any legal rights of privacy, copyright or other intellectual property rights[18].

2.8.2.2 Licensed receiver operation

Notwithstanding this proposed general exemption, users requiring their systems to be taken into account and to be protected from interference will have the option of seeking coordination for their system. A receiving earth station requiring coordination will be required to meet specified minimum technical parameters.

The minimum technical specification will include a specification for the antenna size[19] and the antenna pattern, and it may be required to meet site-shielding criteria. Because a receiver that requires protection is occupying spectrum in so far as it prevents the location of transmitters in a surrounding coordination area, a licence will be required, the cost of which will be proportional to the licensed (coordinated) bandwidth.

[18] For example, a Television Broadcast Receiving Licence will still be required for television reception.
[19] The required antenna size will be greater than that specified in the VSAT definitions.

Earth stations that require receiver coordination and protection in the 10.7 to 11.7 GHz band will be required to have an antenna size not less than that specified as the maximum size in the ETSI TBR 28[20].

Earth stations that require receiver coordination and protection in the 4 GHz band will be required to have an antenna size not less than that specified as the maximum size in the ETSI TBR 43[21].

2.9 Teleports

The Director encourages the development of multiple earth stations at one general location – Teleports – in order to minimise the overall impact of satellite earth stations, in terms of their general environmental impact. Infrastructure sharing, effective spectrum management and coordination with radio link networks and other terrestrial services, (and vice versa), are additional advantages.

Coordination applies to the site in addition to the earth station antenna radiation parameters. A coordination area, agreed for a site incorporating a nominal earth station, could facilitate the operation of multiple earth stations on that site. Thus the need for individual coordination for each earth station may be eliminated, except in so far that individual stations may be 'worse' than the nominally coordinated station in terms of radiation and sensitivity patterns.

The idea of Teleports is principally applicable to earth stations operating in those bands that need coordination areas to be established around the station. Teleports may be particularly applicable to telecommunications network earth stations. VSAT hub stations could also be located at Teleports.

2.10 Space and Space Operations Segments

Although the principal demand for space services in Ireland is for access to licences for the establishment of earth stations in the telecommunications ground segment, the Director welcomes the comments on the licensing of the space segment and stations in the space operation service; i.e. the satellite and the associated telecommand and control systems.

The notifying Administration, which advises the ITU of the satellite, regulates the space segment assignment. Satellite telecommand and control earth stations need to be licensed under the national legislation of the country within which they are located.

This aspect was included in the consultation process to cover the possible future establishment in Ireland of various spacecraft command and control and data gathering terminals. Frequency assignments for these services generally fall outside the 'telecommunications link' frequency bands, and may introduce different coordination requirements. No responses were received from commercial service providers on this issue. However, one respondent indicated that it might have a possible future interest in

[20] European Telecommunications Standards Institute, Technical Basis for Regulation 28.
[21] European Telecommunications Standards Institute, Technical Basis for Regulation 43

the space segment and space operation service, for small low-earth-orbit (Little-LEO) satellites.

3 Types of Licences.

3.1 General Principles

3.1.1 Multi-layer licensing

Many respondents suggested that licences for radio frequencies (wireless telegraphy licences) and operation (telecommunications licences) of an earth station should be combined so as to avoid multi-layer licensing.

The Director considers that, while multi-layer licensing may sometimes be undesirable, the particular need to efficiently manage the scarce radio spectrum resource justifies the use of an individual licensing regime. The current policy of the Director is, therefore, to issue a licence for the provision of a telecommunications service in general, without regard to the underlying infrastructure. Where the telecommunications licensee or a non-telecommunications service operator wishes to use radio frequency spectrum, a separate licence will be issued.

3.1.2 Suggestion of system licences

Some respondents to the consultation document indicated a preference for the introduction of system licences. However, this may be precluded by the Act of 1926, which requires the licensing of apparatus. Nevertheless, some form of system licence may be possible in those instances where an applicant can prove to the satisfaction of the Director that the applicant has technical and operational control of all of the wireless telegraphy apparatus in the system for which a licence is sought. The Director undertakes to consider this matter further.

Some respondents felt that the requirement of individual licences was not consistent with the general principle of the Licensing Directive. While the Licensing Directive (97/13/EC) does recommend that general authorisations be given for the provision of telecommunications services, it also recognises in particular, the need to regulate access to the radio frequency spectrum[22] may reasonably require individual licenses.

Section 3 of the Act of 1926, the means by which spectrum usage is regulated, requires the issuing of individual licences for wireless telegraphy apparatus. The Licensing Directive Regulations as transposed into Irish law (European Communities (Telecommunications Licences) Regulations 1998, (SI No. 96 of 1998)) have been made without prejudice to this section.

3.1.3 Service licence suggestions

Telecommunications operators' licences, which authorise the provision of telecommunication services to the public, are issued under different legislation[23].

[22] Licensing Directive, Article 7
[23] The Postal and Telecommunications Services Act, 1983, (No. 24/1983)

Of particular interest was the suggestion by several respondents that third-party satellite-service-provider licences be introduced. It was envisaged that these would replace the Basic Telecommunications Licence for satellite service providers. The Director has considered this suggestion and is currently of the opinion that the present telecommunications licensing regime is appropriate. Please refer to Section 3.2.

3.2 Telecommunications Service Licences.

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 Appendix 2.

Some respondents queried whether particular types of telecommunications services provided using satellite technology are subject to the telecommunications licensing regime. Extensive information regarding the telecommunications licensing regime is contained on the ODTR web-site (www.odtr.ie). Potential applicants who are unsure whether their proposed services are subject to the telecommunications licensing regime should contact the ODTR.

3.3 Wireless Telegraphy Licences.

3.3.1 Spectrum management

The principal function of wireless telegraphy licences is to regulate access to, and manage the use of, the radio spectrum.

Unless otherwise exempted, a wireless telegraphy licence is required under Section 3 of the Act of 1926, as amended, by any person proposing to keep and have possession of apparatus for wireless telegraphy. The licence authorises the use of the apparatus under specific terms and conditions. The issue of a wireless telegraphy licence by the Director of Telecommunications Regulation[24] does not absolve the licensee from complying with any other applicable statutory obligations.

3.3.2 Public health aspects

A provision is included in all relevant wireless telegraphy licences to ensure compliance with the international guidelines for exposure to electromagnetic fields. These international guidelines cover the permissible public exposure limits to electromagnetic fields in the frequency band 100 kHz to 300 GHz. The radio based services, which the Director licence, are within the frequency range of the guidelines.

[24] The Ministers functions under this Act were transferred to the Director, by the Telecommunications (Miscellaneous Provisions) Act, No 34 of 1996, in June 1997.

These international guidelines were developed in 1988 by the International Radiation Protection Association (IRPA) in co-operation with the World Health Organisation. Its successor, the International Commission for Non-Ionising Radiation Protection (ICNIRP), in 1996 issued a position paper on the health and safety aspects of non-ionising radiation. This reviewed both thermal and athermal effects and its conclusion was to endorse the 1988 guidelines.

The current guidelines[25] are those published in 1998.

3.4 Proposed Categories of Wireless Telegraphy Licences

The proposed categories of satellite wireless telegraphy licences are as follows:

- Permanent Earth Stations (Geostationary Orbit)
- Transportable Earth Stations (Geostationary Orbit)
- Exempt Earth Stations

Most permanent, fixed and transportable stations are included in the bands above 3 GHz. Mobile stations usually operate in lower bands and will be subject to exemption or separate regimes. Note that 'fixed' and 'mobile' have specific ITU meanings.

3.4.1 Permanent Earth Station (Geostationary Orbit)

Only permanent earth stations will be permitted in this category. Both large 'telecommunications network' stations and VSAT stations are included, as are coordinated receiving stations.

The term 'permanent' means that the station is operated at a single specified location.

3.4.1.1 Large Earth Stations

The definition of a large earth station means a station, the antenna of which exceeds the maximum size specified for a VSAT in the relevant band. Refer to Appendix 3.

Large earth stations may seek coordination in shared bands.

In the case of large stations, the construction of which may exceed several months, the period within which the applicant must declare the station to be operational may be extended in consultation with the Director.

3.4.1.2 VSAT Earth Stations

A VSAT is an earth station, which is defined by the antenna size given in the ETSI TBR for the relevant band. Refer to Appendix 3.

VSAT earth station receivers will not be eligible to seek coordination in shared bands. VSAT transmitters in certain shared bands may need to achieve coordination.

[25] Guidelines for Limiting Exposure to Time-varying Electric, Magnetic and Electromagnetic Fields (up to 300 GHz), ICNIRP, Health Physics, Vol. 74, No. 4, April 1998.

The Director considers that the potential widespread use of VSAT, in bands shared with the terrestrial fixed services, could, if coordination was permitted, lead to excessive sharing difficulties, which could severely limit her authorising the deployment of fixed service terrestrial links.

3.4.1.3 Receiving Earth Stations (Coordinated)

Receiving earth stations, operating in shared bands and for which the applicant requires earth station co-ordination, will require a licence.

Such a station must be operated at a fixed location, as coordination can only be carried out if the location of the station is known. The station must also have an antenna of a size not less than that defined as the maximum size for a VSAT antenna in the relevant band (refer to Appendix 3).

Earth Stations falling into this category could include, inter alia, earth stations for cable TV and MMDS headends, radio astronomy stations and professional metsat stations. Cable head end stations may also be licensed. One respondent requested that this category should include research and educational sites. There is nothing in the proposed licensing regime to prevent such institutions requesting a co-ordinated status.

3.4.1.4 Special Categories of Earth Station

Special categories of earth station or antenna may exist at large earth stations and Teleports,

The term 'support antenna' is used to mean an antenna at a large earth station which is not normally in use, but which is intended for use during periods when the principal antenna is not available, for example during antenna maintenance. As an unused antenna that is not capable of operating independently of the remainder of the earth station does not contribute to spectrum occupancy, a separate licence will not be required. However, to prevent any misunderstanding arising, the existence of a support antenna will be endorsed on the station license.

The term 'occasional use antenna' is used to mean an earth station that is normally unused, but may be brought into service occasionally when the facility that it is supporting is not available, for example when a submarine cable is out of service and the earth station is used to maintain the international link. As an earth station of this type must be available for use at all times, and is capable of operating independently of the supported facility (unlike the 'support antenna' referred to in the previous paragraph), it may have to be coordinated for use on a full time basis if necessary. A normal licence will, therefore, be required.

3.4.2 Transportable Earth Station (Geostationary Orbit)

This category is intended to provide for the licensing of Satellite News Gathering Vehicles (SNG), and other Transportable Earth Stations (TES). As their operating locations are not strictly 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 is intended to allow 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 used for a period exceeding one month, the TES will be regarded as a permanent station and either a short term or a full licence will be required.

The Director intends that wireless telegraphy apparatus licences for transportable earth stations will be issued for periods of up to one year. However, the duration of continuous use at any one location will be limited to a maximum of one month. In exceptional circumstances and with prior approval from the Director, an additional month of operation at the same location may be authorised. The operation of a TES or SNG (under the terms of the transportable station license) beyond a period of two months at one site will never be permitted.

It may not be possible to licence SNG/TES in bands below 10 GHz because of the extensive use by the terrestrial services of the shared bands below this frequency.

It is envisaged that operators who wish to use SNG TES in Ireland on a regular basis will apply for a one year licence, and arrange for pre-transmission clearance on each occasion of use at any given location. Guidelines will be issued regarding the site clearance procedure.

It is intended that provision will also be made for operators who may wish to operate SNG/TES's in Ireland on an infrequent basis. In such cases, operators will be able to apply on a per event basis for short-term licences and, as part of each application, seek clearance for the operating characteristics of relevant SNG/TES's.

3.4.3 Licence Exempted (Receiving) Earth Station

The term 'receive-only' has been changed to 'receiving'. Two-way earth stations may be operated, licence exempt, in the receive mode on an unprotected basis for wide-band reception. This provision may help satisfy, to some extent, issues raised by respondents relating to the use of asymmetric systems with wide receiver bandwidths and narrow transmitter bandwidths.

As the locations of exempt stations are, in principal, unknown, their position relative to other transmitters is also unknown and, consequently, they cannot be coordinated and provided with protection from interference. Although exempted receivers will not be coordinated, the use of site shielding measures and the careful positioning of the receiver antenna to obtain the maximum obstruction of potential interference propagation paths will result in the minimisation of interference from surrounding transmitters.

The Director is of the opinion that authorising the use of receiving earth station apparatus in this manner will facilitate the use of wide downlink bandwidths, especially in those bands where coordination with other users cannot be achieved.

It is intended that this category will provide for the exemption of all receiving earth stations, unless the operator wishes to have his station licensed under more restrictive conditions. Receiving VSAT and Television Receive-only (TVRO) earth stations, including cable head-end earth stations, will generally fall under this category.

It intended that this exemption will apply to possession and use of the apparatus under the conditions stated in the exemption regulations only. All other relevant regulations will continue to apply.

The station owner/user has an option of seeking a licence for the station provided it meets the necessary technical requirements and if coordination can be achieved.

3.4.4 Short-term licences

The title of this category of licence has been changed from 'temporary' to 'short-term'.

The principal purpose of a short-term licence issued by the Director is to facilitate services that will have an operational duration shorter than one year and usually shorter than six months. The limited duration of the licence is intended to ensure that the short-term licensing procedure is not used to obtain substitute permission for an earth station that should be subject to more rigorous permanent licensing conditions.

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

It should be noted that licences issued on a short-term basis will not be renewed. Short-term licence 'non-renewal' should be interpreted to mean that a new application can be considered, but that the same licensing terms, including frequency assignments, will not necessarily be available for the new period[26].

Short-term licences will not be convertible to a full license[27]. 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.

A short-term licence may be required for system integration trials[28], until full operational clearance is obtained from the satellite operator. Coordination will be required prior to any operation in a shared band.

Short-term licences may be used for the operational evaluation of a system. However, where technical development of apparatus is the objective, a test licence should be sought from the Director.

3.5 Satellite Systems not considered in this document.

This consultation report does not propose to deal with certain categories of satellite systems and earth stations. The Director proposes to address these categories independently of this consultation. Many of the earth station types, which have not been included in the present consultation process, are used for mobile operations. Many of these stations have been exempted from the requirement to have a licence by

[26] Clarification of a point raised by respondents.
[27] Clarification of a point raised by respondents.
[28] This possible use was raised by respondents.

regulations made for each type. A list of exemption orders currently in force is included in Appendix 7.

3.5.1 Non-Geostationary Orbit Systems

Where Non-Geostationary Orbit (NGSO) satellites operate in shared bands, they require special sharing arrangements, due to the movement of the satellites and antenna tracking leading to a large coordination area. These considerations apply particularly to 'feeder' earth stations, which link non-geostationary satellites in the mobile satellite service into terrestrial telecommunication networks. The Director considers that the licensing and coordination of non-geostationary orbit earth stations that work in shared bands requires further study. Licensing regimes for NGSO services will be developed independently of this present consultation and in accordance with European trends.

3.5.2 GPS Augmentation Systems

The Global Positioning System was mentioned by one respondent, as a special case of earth station operation. GPS receivers will be covered by the general licence exempted status, unless special protection is required. Such protection could only be given to GPS receivers at fixed locations such as those used as reference stations in differential systems.

A GPS augmentation service[29] will require transmitters (probably in the GPS band), which will require licenses. These licences might conflict with protection for specialised GPS receiver sites. This is however, a Radio-navigation Services issue essentially outside the scope of the present consultation.

3.5.3 Amateur Satellite Service

Earth stations in the amateur satellite service will be subject to the rules of the amateur service[30].

3.5.4 Non Geostationary Orbit Fixed Earth Stations

Stations in this category will generally be space operations service stations or feeder stations for mobile satellite systems. Feeder stations have not been proposed for location in Ireland at the present time.

3.5.5 Non Geostationary Orbit Mobile Earth Stations

This category is intended for mobile stations including maritime, land and aircraft mobile stations. In many cases, mobile stations may be exempted from the requirement to hold wireless telegraphy licenses, under ERO proposals.

[29] A GPS augmentation service uses local transmitters (pseudolites) to emulate satellites, and thereby provide a more accurate location system in a restricted local area.
[30] Radio Regulations S25 and Resolution 642 of the Radio Regulations.

3.5.6 Earth Station (Non Geostationary Orbit, below 1 GHz)

This category is intended for LEOSAT earth stations in the VHF and UHF bands, used for data relay.

Operation in this band is influenced by the present use of land mobile systems in shared frequency bands.

4 Application Process

Many of the respondents considered that the application process as outlined in the Consultation Paper was appropriate. Some slight modifications have been made to the proposed process to accommodate the changes in the proposed types of licence and the proposed fee structure.

4.1 Guidelines

Respondents requested that procedural and technical guidelines[31] should be issued. The Director will provide procedural and technical guidelines for applicants.

4.2 One Stop Shopping Procedure

While this consultation is focussed on developing a regulatory framework for satellite licensing in Ireland, the Director is aware of the development of the One Stop Shop (OSS) for satellite licences in Europe. This is being brought about through initiatives of the European Radiocommunications Committee, the European Committee for Telecommunications Regulatory Affairs (ECTRA) and the European Commission.

The Director is actively participating in the work of the One Stop Shop Special Investigation Group (OSS SIG) and particularly in the development of a harmonised licensing process for satellite operators across Europe.

The respondents in general, favourably commented upon the participation of the Director in the OSS procedure.

The Director is favourable to the adoption of the One Stop Shop application process when it is finalised.

4.3 National Application Process

Applications in respect of licences for earth stations must be made on ODTR application forms. Application forms for this purpose will be made available from the Director or from the ODTR Site www.odtr.ie. The relevant completed application form(s) must be submitted as a signed hard-copy document, accompanied by the appropriate fee(s).

It is probable that the application forms will be organised into sections, not all of which may be required to be completed in every case.

It is likely that, inter alia, the following details will be requested in the application forms:

[31] Respondents seemed satisfied with the fixed link guidelines and suggested that these be used as a model for satellite service guidelines.

1.Company name and complete address of applicant
2.Contact details including phone and fax numbers
3.Name of contact person, position in company, phone and fax and e-mail details
4.Relevant experience and technical expertise of applicant

5.Category of licence requested
6.Details concerning type of service to be provided – voice, data, video etc
7.Location(s) in Ireland at which it is proposed to deploy satellite earth stations. In the case of dependent VSAT operating in an unshared band, a station address may be considered sufficient as a location detail.

8.Description of earth station type – receive-only, transmit-only or transmit and receive
9.Network details for each earth station – stand alone, point to point, hub or dependant element in network
10.Hub station details (operator, location and contact information etc.), in the case of applications for dependant VSAT
11.Details concerning space station (satellite) with which communication is to be established (including name, orbital type, location, network description)
12.A copy of the approval from the relevant satellite organisation or agent acting for the satellite organisation, for the provision of a particular service to/from the satellite organisation's satellite

13.Earth station details (including earth station code, location details, station make and model, antenna details, frequency and bandwidth details, emission details). In the case of dependant VSAT, one set of details for each earth station type.
14.The applicant must provide evidence that the equipment complies with relevant technical requirements.
15.Coordination details - a horizon profile diagram, electronic site survey if required, site shielding measures.

4.4 Extent of Application Information Required in Certain Cases

It is proposed that separate applications for coordination must be made in respect of each satellite with which an earth station will communicate. Information on different satellites to be accessed will be required principally for the proper evaluation of coordination areas in shared bands at fixed sites. It is also necessary for the Director to ensure that the earth station does not violate the technical requirements of any satellite operator, with whose satellites it intends to communicate or any satellite that may be affected by the earth station beam.

Transportable earth stations will be licensed on an annual basis. The initial licensing will require the completion of an application containing full details. Once a TES is licensed, simplified site clearance procedures will apply. Guidelines will be provided to licensed operators.

A single notification of approval by the satellite operator for a specific earth station or class of earth stations will be sufficient in the application procedure. The approval must indicate that the satellite operator considers that the earth station(s) is capable of operating without causing degradation to the services offered by the satellite. This provision is necessary, as the Director must ensure that the earth station will not cause harmful interference to the target satellite or other satellites.

In cases where the earth station is not coordinated, i.e. operation in unshared bands, some of the details listed above may not be required. For example, a horizon profile is required for coordination only

A short-term licence may be required for system integration trials, until full operational clearance is obtained from the satellite operator. Coordination will be required prior to any operation in a shared band.

4.5 Use of GPS to Determine Application Information

Applicants for licenses, who use GPS to determine the location of the earth station are reminded that it is essential to ensure that the parameters of the GPS receiver, especially if it is a hand-held model, are correctly set before the required location data is determined. It has been the experience of the Director in examining applications for fixed link stations that errors are found in some instances. The Geographical Datum selected should be the Irish National Grid or Lat./Long. The correct selection of either the Irish Grid or Lat./Long. is usually not a problem. However, it is believed from the types of errors that have been found that the underlying spheroid may sometimes be incorrectly chosen. The Modified Airy Spheroid (Ireland 1965) is the basis used for surveying in Ireland. The use of WGS84 or any other spheroid (for example the UK spheroid) will lead to data errors, which may be offset from the Irish survey by up to several kilometres.

4.6 Evaluation of Applications

It is proposed that all applications for licences will be evaluated on the basis of the information provided in the application forms. The Director may request additional information. All decisions of the Director will be communicated in writing.

Each application for a licence will be evaluated to determine the extent to which the following criteria are satisfied:

- 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
- compliance with other licensing regimes operated by the Director
- compliance with international obligations
- measures taken to minimise interference with other users[32]
- the effective and efficient delivery of non-telecommunications essential services.

[32] This provision has been inserted at the suggestion of a respondent.

4.7 Notification of Grant of Licence and Payment of Fees

Upon written notification of the Director's intention to issue a licence, payment of the relevant licence fee will be due within 1 month. If the licence fee is not paid within 1 month, the application will be deemed to have lapsed. A respondent commented that this time scale was not compatible with their accounting system. This procedure is, however, standard for the ODTR and is essential to ensure that the appropriate fees are paid..

The licensee will be required to bring the earth station into operation in compliance with the terms of the licence, within a specified period of time, typically be three months. Failure to do so may result in the licence being revoked.

It is recognised that the proposed time period may be too short for large permanent earth stations[33], which require significant construction work. For such earth stations, the time period will have to be agreed with the Director on the basis of construction plans and project schedules.

For permanent VSAT earth stations, the three-month time period is considered appropriate. For SNG/TES vehicles, the time period will apply to the earth station being initially brought into service, either in Ireland or in another country, that is, the station must be proven to exist and to be capable of operational deployment in Ireland.

4.8 Refusals

The Director may encourage pre-application consultation to help reduce the possibility of applications being refused. Details will be provided in application guidelines.

In particular, when insufficient information has been provided by the applicant, the Director will deem the application to be incomplete and will request additional information be made available.

A refusal to grant a licence may occur where the application does not meet the requirements set down by the Director, 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.

[33] This was pointed out by a respondent.

5 Proposed Conditions that may be incorporated

The conditions described in this section may, inter alia, be incorporated into licences issued for earth stations.

5.1 Duration of Licences

The suggested duration of the licenses provoked much comment.

The relatively short period of the wireless telegraphy licence (one-year) was contrasted by some of the respondents with the duration of the service licences (five or ten years). The one-year wireless telegraphy licence period was unfavourably compared to the ten-year licence proposed for Fixed Wireless Access and Wireless in the Local Loop (FWA/WLL) systems. Most respondents who put forward an opinion on the issue considered that a licence period of 5 – 10 years would be more suitable than the one year period specified, and this would be more in keeping with the trend in Europe.

Licences under the Wireless Telegraphy Acts are generally issued for a period of one year, and are renewable subject to adherence to the conditions of the licence and the payment of fees on an annual basis. The issuing and renewal of licences may also be subject to more general reviews of spectrum use. Upon written application for renewal, the Director will review individual licences on a case by case basis.

It should be noted that the one-year wireless telegraphy licence, which authorises the use of designated spectrum, is different from the telecommunications service licence, which relates to the provision of a service without regard to the means used to provide the service.

A short-period licence facilitates the efficient management of the spectrum, in that the operating conditions can be altered if required, even though a longer-period licence may provide for greater operational security from the licensee's viewpoint.

Wireless telegraphy licences pursuant to the 1926 Act are issued by the Director principally for the purpose of spectrum management. Section 6 of the Act does not prescribe a time limit for the licence.

5.1.1 Extended validity

The Director is supportive of the concept of longer-term wireless telegraphy licences and may consider introducing regulations that authorise the issuing of a wireless telegraphy licence for periods of up to five to seven years. This will be done in conjunction with a review of the general periods of validity of wireless telegraphy licences, as the issue is not confined to satellite services only.

5.1.2 Renewal policy

Respondents considered that the renewal process, stated as being on a case-by-case basis, was unclear and that, in particular, the conditions under which a licence would not be renewed should be clarified and in particular it was felt that it would be unfair to revoke a licence without explanation or warning.

It is not possible to give an exhaustive list of circumstances in which a licence might not be renewed, however the following key points may be noted. The management of the spectrum is a key responsibility of the ODTR. From time to time there may be changes in policy with regard to the assignment of frequencies in a particular part of the spectrum, either due to international or national spectrum allocation policy. A breach of the terms of the licence will normally lead to withdrawal. A licence may also have to be withdrawn if the assignment fails to achieve national or international coordination when this is required. That said, most requests for renewal are granted each year.

5.2 Modification to licences

It is recognised that licensees may, from time to time, wish to request a modification to an existing licence. Where the modification could increase the potential for interference with other users, the licensee will be required to make a new application. A new licence, in those circumstances, would replace the old licence.

While a licence modification is under consideration, a breach of the conditions of coordination 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.

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 Director, for example, due to an inability to obtain coordination for the initially assigned spectrum, the necessity of implementing international agreements, or the need to introduce a new frequency assignment.

5.3 Refarming of Spectrum

The Director seeks to allow licensees undisturbed use of spectrum on an ongoing basis. However, licensees do not acquire rights to continued use of any part of the spectrum. Should it become necessary to move a licensee to a new frequency, no compensation will be payable.

5.4 Commissioning/Site Inspections

The licensee will be required, within a specified period of time, to submit a completed declaration form to the Director. This declaration form will indicate that the system has been installed and conforms to the licence. This is necessary to ensure that spectrum assigned to an earth station has been brought into use and that the station is operating within its licence conditions. The requirement to provide a declaration etc. will always apply to permanent stations and to the initial licensing of transportable stations (but not necessarily to each use or location of transportable stations).

The licensee will be required to allow an officer authorised by the Director entry onto any site that contains apparatus for wireless telegraphy, including satellite transmitting or receiving apparatus. This requirement is made in order to facilitate attendance at commissioning tests, inspection of installations (which in exceptional circumstances may necessitate taking earth stations out of service), and for the monitoring of the use of the radio spectrum. The purpose of this requirement is also intended to allow the Director to ensure the compliance of the apparatus and its operation with the terms of the license.

Attendance at commissioning and inspection will be at the discretion of the Director. The Director may also direct the inspection of licence exempt stations on a random basis to ensure conformance with exemption requirements.

5.5 Exclusion Zones

It is proposed that certain geographical areas, within which satellite earth stations may be permitted to operate, will be restricted. Exclusion zones are likely to include airports.

The principal purpose of establishing an exclusion zone around an airport is to prevent interference with the electronic systems aboard approaching aircraft. Because of this, there can be no discrimination between the different operators of earth stations, though there may reasonably be between different earth station types.

At the present time, the use of earth stations in zones around those airport runways fitted with Instrument Landing Systems (ILS) is prohibited. This provision may be contrasted with other European administrations, which allow operation near airports if clearance is obtained from the airport management.

The Director is aware of work in progress at the European Radiocommunication Office relating to exclusion zones at airports. If a Recommendation or Decision results from this work, the Director will consider it following consultation with the Irish Aviation Authority. In the meantime, the Director considers that the current exclusion zone policy should remain in force.

Appendix 8 details the manner in which exclusion zone boundaries are determined by the Director.

In the case of receive-only terminals, these do not present an EMC hazard and an exclusion zone is not currently deemed necessary.

6 Proposed Fee Structure

6.1 General

A fee will be payable on the issue of a licence whether the applicant intends making immediate use of the assigned frequency spectrum or not. Failure to pay the relevant fee within the prescribed time will result in the application lapsing and cancellation of the frequency assignment. Manufacturing and delivery lead times for equipment, as well as planning permissions lead times, will not considered justifiable circumstances for a delay in payment of the appropriate licence fees.

Fees will be charged both for the initial application process and for the subsequent radio spectrum licence. The radio spectrum fee will reflect the spectrum usage. Fees based on spectrum occupied are levied in the terrestrial fixed links licensing conditions. However, the number of different bandwidth categories is higher in the satellite systems structure. The satellite structure also reflects the possible use of asymmetrical bandwidth occupancy and the possibility of uncoordinated operation in one direction.

Many respondents believed that the Licensing Directive[34] envisaged that fees should cover only the administrative costs of the licensing and enforcement processes. The overriding requirement of European law being that fees should be proportionate and non-discriminatory. Attention is drawn to the fact, however, that the Licensing Directive does acknowledge that fees may be used to influence the utilisation of the spectrum.

Many of the points raised by the respondents in relation to the fee structure originally proposed were considered significant. In particular, the attitude of the respondents towards spectrum reservation fees has been noted.

The proposed fee structure has, therefore, been revised to that outlined below and specified more fully in Appendix 9, to take the comments received into account, and to make the principles behind the fee structure more transparent. Some examples of the calculation of fees based on the new structure are included in Appendix 9.

6.2 Revised Outline Fee Structure

The revised fees will be based on the structure outlined here. Full details are given in Appendix 9.

While the new fee structure results in an increase in the proposed fees for coordinated operation in shared bands, the proposed fees for operation in unshared bands and for uncoordinated operation have been substantially reduced.

[34] S.I No 96 of 1998

6.2.1 Initial Administrative Fees

The administrative fees are required on the initial application for a licence and, if necessary, for each coordination attempt. The application fee is once off, while the coordination fee must be paid for each coordination attempt which is requested.

6.2.1.1 Application Fee

This will be an administrative fee to be paid by all applicants for earth stations, which require a licence, whether transmitting or coordinated receiving stations. The fee will be non-refundable. The fee will consist of a fixed part, applicable to all applications and an additional fee for each additional satellite, after the first, to which the earth station wishes to operate. The additional charge per satellite is made to cover the cost to the Director of processing the application with respect to the technical characteristics of each satellite system.

6.2.1.2 Coordination Fee

This will be an administrative fee to be paid in respect of each station for which coordination is required, i.e. those operating in shared bands. This fee will cover the cost of coordination processing. It will be non-refundable, whether or not coordination is achieved. An additional coordination fee will be required if a subsequent attempt at coordination is requested, following an inability to coordinate the station.

Applicants are advised that they should use all available data to reduce the possibility of the application failing to achieve coordination. There will be no reduction in fees for those applicants who carry out a coordination exercise prior to submitting the application, as the Director must still formally coordinate the station. However, a pre-coordination exercise will greatly reduce the possibility of failure to coordinate and the requirement to pay for subsequent coordination attempts.

6.2.2 Annual Licence Fee

The annual licence fee comprises an administrative (spectrum management) part and an occupancy charge. This fee will depend on the degree to which the earth station occupies spectrum, either by transmission or by requiring receiver protection.

6.2.2.1 Permanent Earth Station Fee

- Scale A: uncoordinated stations (unshared bands)
- Scale B: coordinated stations (shared bands)

Coordinated stations will be required to pay a higher annual fee to reflect the spectrum resource occupied by the licensee and thereby denied to other users.

The fee will consist of:

- a basic charge per licence and an additional fee per earth station in an unshared band;

  or
- the basic fee and an additional bandwidth fee per station in a shared band.

6.2.2.2 Transportable Earth Station Fee

- Scale A: uncoordinated stations (unshared bands)
- Scale B: coordinated stations (shared bands – if permitted)

Coordinated stations will be required to pay a higher annual fee to reflect the spectrum resource occupied by the licensee and thereby denied to other users.

The fee will consist of:

- a basic charge per licence and an additional fee per earth station in an unshared band;

or

- the basic fee and an additional bandwidth fee per station in a shared band.

6.2.2.3 Calculation of Bandwidth

If either the transmitting or the receiving band is shared with other services (nationally or internationally) the fee charged will reflect the bandwidth occupied. Bandwidth will be calculated by adding the coordinated transmit and the coordinated receive bandwidths.

In the case of a coordinated receive-only station, the bandwidth will, therefore, be less than a transmit and receive station. In the case of a station with asymmetrical transmit and receive bandwidths, the overall bandwidth will also reflect the spectrum occupied in a proportionate manner. It is envisaged that a station with a coordinated transmitter and an unprotected receiver (for example transmitting in the 14.25 to 14.50 GHz band and receiving in the 10.7 to 11.7 GHz band) would pay a fee which is proportional to the transmitter bandwidth only.

6.2.2.4 Reflection of the coordination area in the fee

The intention is that the fee charged will also reflect the size of the coordination area surrounding the station. As the geographic area could be difficult to determine exactly, the fee will increase with the effective radiated power. The fee will also increase as the operating frequency band is reduced, because lower frequencies lead to larger coordination areas.

In addition, the fee charged from the tables (Appendix 9) for receive bandwidth will be that fee listed for the highest transmitter power band (i.e. the fee applying to ERP greater than 75 dBW). This reflects the receiver coordination area being generally larger than the transmitter coordination area.

In an effort to avoid excessively complicated fee calculation processes, the fees have been banded. The bands are given in the tables in Appendix 9.

6.3 Short-term Licenses

Where a licence is required for a period of less than one year, either as a short term licence or as a full licence of restricted duration, a reduced fee will be payable. The reduced fee will be charged on a monthly basis. It is intended that the fee per month for the first six months will be slightly less than the fee per month for a second six month period.

6.4 User Categorisation

It was suggested by some respondents that the cost of wireless telegraphy licence fees for non-telecommunication services should be reduced, that user categorisation should be introduced and that educational, scientific, humanitarian and safety services should not be subject to the same rates as commercial and military services.

Due to the difficulty of fairly and transparently categorising earth stations into commercial and non-commercial types, the Director intends to continue her policy of basing the fees for any operational category on the same scale.

6.5 Delay in bringing a station into operation

If the operator is not able to bring an earth station into operation within the permitted time limit, then extra time may be allowed to address the situation. The time extension will be considered on a case by case basis, and additional fees for the extended period may be considered appropriate.

6.6 Bandwidth intensive modes

The particular problems associated with bandwidth rating of CDMA systems, raised by one of the respondents, are recognised. The Director intends to consider this problem in more detail. Many of the CDMA systems are appropriate to mobile operation, such as S-PCS, which may be licence exempt.

7 Transition Arrangements

As there is no satellite earth station licensing regime extant in Ireland at the present time, operators of satellite earth stations currently do so under temporary permits, which have been issued without prejudice to the introduction of a formal licensing structure.

7.1 Implications for existing operators

It is intended that the new licensing framework will replace the existing permit system. The holders of permits will be required to apply for appropriate licences, as these are introduced.

Due regard will be taken of the holders of existing permits in issuing new licenses, provided that applications for licences are received from them within a set time period of the new regulations being made.

New licences may contain different conditions to the old permits. This may be due to inability to achieve co-ordination of the station, or different technical parameters having to be brought into effect.

7.2 Applications for Interim Permits

Pending the introduction of licensing legislation, applications for permits will be considered by the ODTR. Any applications received will be considered in the context of the proposals contained in this document.

8 Notice

The Director is not bound by this document and may amend it from time to time. This document is without prejudice to the legal position or the rights and duties of the Director to regulate the market generally. The principles set out are without prejudice to the final form and content of any licences the Director may issue.

9 Appendix 1: List of Respondents

Enquiries or comments were received from the following organisations:

	Respondent	**Generalised Category**[35]
1	Armstrong	VSAT/SNG Operator
2	BBC	SNG Operator/Broadcaster
3	Cablelink	Cable TV Service Provider
4	Compusal	Private Consultant
5	DCA Intertel	VSAT Service Provider
6	Enterprise Rent-a-Car	VSAT User
7	Esat Digifone	Mobile Telecommunications Operator
8	ESB	Telecommunications User
9	Espirit Telecom	VSAT Service Provider
10	EUTELSAT	Satellite Operator
11	Global VSAT Forum	VSAT Industry Group
12	IDA Ireland	Industrial Development Authority
13	Irish Aviation Authority	Air Navigation Safety Authority
14	Maguire McClafferty	Legal Representatives
15	Met Eireann	State Meteorological Service
16	Mosteshar Mackenzie	Legal Representative
17	National Satellite Services Centre	Academic Research/Consultancy
18	Netherlands Regulator	Regulatory Authority
19	NTL	Radiocommunications Service Provider
20	Ocean	Telecommunications Operator
21	Princes Holdings	Cable TV Service Provider
22	Radiocommunications Agency	Regulatory Authority
23	RTE	SNG Operator/Broadcaster
24	Satellite Action Plan - RWG	VSAT Industry Group
25	SES-ASTRA	DTH Satellite Broadcaster
26	Siemens	Equipment Manufacturer
27	Telecom Eireann	Telecommunications Operator
28	Teledesic	Satellite Operator
29	Telenor	Satellite Service Provider
30	Telespazio	Satellite Service Provider
31	Telia	Satellite Service Provider
32	TV3	SNG Operator/Broadcaster
33	Via Satellite	Industry Journal
34	VSAT Project Management	VSAT System Manager

35 These categories were decided by the Director for the purpose of this document only, on the basis of the principal trust of the responses received.

10 Appendix 2: Telecommunications Service Licences

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

10.1 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 Director for numbers from the national telecommunications numbering resource, for allocation to their customers. General licences are valid for 15 years.

10.2 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.

10.3 Fees

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

10.4 Application Forms

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

11 Appendix 3: Technical Requirements

11.1 Definition of a Large Earth Station

Noting the antenna requirements imposed on terrestrial operators using fixed links in shared bands, the Director is not convinced that VSAT antennas provide a sufficiently rigorous limitation on unwanted off-axis radiation to permit good spectrum management practices in those shared bands.

Therefore, Director intends to introduce a requirement for a higher specification antenna in shared bands to facilitate spectrum re-use.

A large earth station is defined as an earth station that has an antenna size not less than the maximum given in the ETSI VSAT Technical Basis for Regulation for the relevant band.

11.2 Definition of VSAT

The Director notes that there are differing opinions on the definition of Very Small Aperture Terminals (VSAT). All respondents were at variance with the definition of VSAT proposed in the Consultation Paper.

Accordingly, the Director will adopt the definition of VSAT given in the ETSI common 'Technical Basis for Regulation' (TBR); TBR28 for 11/12/14 GHz, and TBR 43 for 4/6 GHz. These are sufficient for general use in unshared bands. However, coordination will not be provided in bands shared with the fixed service terrestrial links.

Receiving VSAT earth stations will be permitted to operate in the shared bands, under general exemption regulations, on an unprotected basis. The fee structure has been designed to recognise that receivers in this band may be unprotected.

11.3 Compliance with Safety Directives.

All licensees of satellite earth stations will be 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.

11.4 Compliance with Terminal Equipment Directive

Most earth stations (licensed or exempted) need to comply with the requirements, as specified in Directive 98/13/EC[36] 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). Please refer to Appendix 7 for a guide to applicable documents.

The Director is aware that the current terminal equipment directive will be replaced by the 'Radio and Telecommunications Terminal Equipment' Directive, 1999/5/EC in April 2000. Equipment will be required to conform to the new directive when it comes into effect in national law.

11.5 Compliance with Common Technical Regulations

Operators will also be required to comply with the relevant Common Technical Regulation, pursuant to Directive 93/97/EEC or, in the absence of such a Common Technical Regulation, will be 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 Director.

11.6 Compliance with ODTR Standards

There remain, however, a number of classes of earth station equipment, which do not need to conform to this Directive. The Director may, where required, set standards for such equipment if common European standards do not already exist.

It is standard practice for the Director to specify particular operational parameters so as to minimise the potential for interference and to facilitate greater frequency reuse. It will, therefore, be necessary for the Director to impose parameters on the earth stations, as the Director is responsible, under Article 21 of the Radio Regulations, for ensuring that earth stations licensed by the Director do not cause harmful interference either to space satellite stations or to terrestrial stations.

11.7 Antennas

The coordination problems that may arise from the use of antennas with poor side-lobe performance are recognised. The designation of an acceptable antenna pattern is under active consideration. The Director is, however, cognisant of the trend towards common 'Technical Basis for Regulation (TBR)' specifications being introduced in Europe.

[36] This will be replaced by Directive 1999/5/EC by April 2000.

11.8 Compliance with Satellite System Specifications

In the absence of such Common Technical Regulation or relevant ETSI standard, operators could be required to adhere to technical specifications that may be set out by satellite providers such as INTELSAT, EUTELSAT etc.

11.9 Common Technical Regulations

Relevant Common Technical Regulations (CTRs) include:

11.9.1 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."

11.9.2 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."

12 Appendix 4: Commonly Used Frequency Bands

12.1 Table of Common Bands

(Refer to the 'Table of Frequency Allocations[37]' for additional details)

Band (GHz)	**Direction**	**Licensing**	**Shared (with)**	**Co-ordination**
3.4 – 3.6	Space - Earth	shared		
3.6 – 4.2	Space - Earth	shared	National Link Infrastructure (4 GHz)	Full Coordination required for large earth stations
5.85 – 6.65	Earth - Space	shared	National Link Infrastructure (L6/U6 GHz)	Full Coordination required for large earth stations
10.7 – 11.7	Space - Earth	shared	National Link Infrastructure (11 GHz)	Only if requested, for large earth stations
12.50 – 12.75	**Space - Earth**	**unshared**		No Coordination
14.00 – 14.25	**Earth - Space**	**unshared**		No Coordination
14.25 – 14.50	Earth - Space	shared	May have fixed terrestrial links (Space-Earth in 10.7-11.7 GHz)	May be required
17.7 – 19.7	Space - Earth	shared	National Link Infrastructure (18 GHz)	Only if requested, for large earth stations
27.5 – 31.00	Earth - Space	shared	Not currently used	

12.2 Notes:

- The bands listed are those commonly used at present for fixed satellite service applications.
- The principal unshared and VSAT bands are in **bold** text.
- The band 3.4 – 3.6 GHz is presently proposed for use for terrestrial fixed wireless access systems. Therefore, the Director does not propose to issue satellite earth station licences in this band until further studies have been completed.
- Bands allotted to the Fixed Satellite Service, under RR-Appendix 30, 30A and 30B plans are not included in the above list as special conditions apply to those bands.

[37] Table of Frequency Allocations – Ireland, Director Document 98/03. Available from the ODTR.

13 Appendix 5: Information on Station Assignments

The following assignment information is typical of that submitted to the ITU MIFR[38], and which the Director will make available for coordination purposes.

Assigned Frequency
Name of Transmitting Station
Location of Transmitting Station (Lat./Long.)
Emission Designation
Transmitter Power
Radiated Power
Hours of Operation
Antenna Characteristics:
- Maximum Gain
- Beamwidth
- Azimuth
- Elevation Angle

Associated Receiving Station, Name and Location.

Information regarding the antenna radiation pattern and the receiver sensitivity may not be directly addressed in the information available. It will be necessary for those carrying out a coordination exercise to use generic, ITU patterns and sensitivities where required.

[38] Master International Frequency Register

14 Appendix 6: Coordination issues

14.1 The ITU

The International Telecommunications Union (ITU), which is a specialised agency of the United Nations, has devised rules and recommendations which constitute international agreements[39]. Subsidiary recommendations have been developed by the European Conference of Postal and Telecommunications Administrations (CEPT)[40] for particular application to the European region. It should be noted that these rules and recommendations are subject to change, as the various authorities update the procedures in order to maintain pace with the developing requirements for radio spectrum and with a view to improving methods of coordination.

14.2 Use of ITU procedures

Where required, coordination will be carried out in accordance with the ITU-R regulations and recommendations appropriate to both the earth station and frequency band of operation. In particular, for fixed satellite service earth stations, the coordination area should be determined in accordance with Radio Regulation S9, Appendix S7 (Appendix 28) and Recommendations ITU-R IS.847, ITU-R IS.848 and ITU-R IS.849.

14.3 Interference calculations between stations in Ireland

Interference levels will be calculated with respect to other earth stations or terrestrial stations in Ireland via Recommendation ITU-R P.452.

14.4 Meeting minimum technical specifications

In order to facilitate the coordination process, stations will be required to meet minimum technical specifications.

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[39] The Radio Regulations, 1998 as amended, made under Article 13 of the Constitution and Convention of the International Telecommunications Union, Geneva 1992.

[40] Including the European Radiocommunications Committee (ERC) and the European Radiocommunications Office (ERO).

14.5 Requirement for a physical site survey

It is intended that the applicant will have to supply a physical site survey, showing the horizon elevation angle from the centre of the proposed antenna. This information will be required for the coordination process.

14.6 Requirement for an RF site survey

A radio frequency interference site survey may be required for the coordination process. It should include measurements at both the centre of the proposed antenna (extending all around the horizon) and at the highest accessible point within one kilometre of the antenna location.

14.7 Requirement for site shielding

It is intended that the applicant will be required to take steps (e.g. site shielding) in order to minimise or eliminate interference that may occur to, or from, existing terrestrial or other stations.

15 Appendix 7: Licence exemption classes

15.1 Licence-exempt (Receiving) Earth Stations.

It is proposed to introduce, by way of a statutory instrument made under the Wireless Telegraphy Act 1926, legislation to exempt earth stations operating in a receiving mode from the requirement to hold a licence under Section 3 of the 1926 Act.

Exempted receiving stations will not be coordinated or protected.

The proposed technical principle for exemption will be:

15.1.1 Title of proposed exemption:

Exemption of: Earth Station Receivers

1. Wireless telegraphy receiving apparatus used,
   i. for the purpose of receiving any signals originating from stations outside the major portion of the Earth's atmosphere,

   is apparatus for which a licence will not be required under Section (3) of the 1926 Act.
2. The working of any apparatus under this order will not be subject to coordination with the working of any other wireless telegraphy apparatus.
3. Apparatus exempt under this order shall not be worked contrary to any other provision of the 1926 Act, or any other applicable legislation.

15.1.2 Explanatory Notes

If this principle is adopted, then Earth Station receiving apparatus will be exempt from a requirement to have a wireless telegraphy license.

Regulations relating to non-disclosure and non-interference will continue to apply. Any requirements to hold licences or authorisation for the use of intellectual property will not be affected by the exemption regulations.

Coordination may be defined as the procedure by which the Director attempts ensure that the possibility of interference between the different apparatus is minimised.

15.2 Licence Exempt Mobile Earth Stations

The following types of earth station equipment are currently license-exempt, Regulations having been made by Statutory Instrument as indicated.

15.2.1 S-PCS (GMPCS) Terminals

Wireless Telegraphy Act, 1926 (Section 3) (Exemption of Satellite Earth Stations for Satellite Personal Communications Services (S-PCS)) Order, 1998

(S.I. No 214 of 1998)

This order exempts earth stations used for personal communications, for example Iridium handsets.

15.2.2 Inmarsat-D Terminals.

Wireless Telegraphy Act, 1926 (Section 3) (Exemption of Inmarsat-D Terminals for Land Mobile Applications) Order, 1999

(S.I. No 100 of 1999)

Inmarsat-D Facility is a global mobile telecommunications system in the Inmarsat satellite network. It supports bi-directional store-and-forward short message data communications.

15.2.3 Inmarsat-C Terminals.

Wireless Telegraphy Act, 1926 (Section 3) (Exemption of Inmarsat-C Terminals for Land Mobile Applications) Order, 1999

(S.I. No 101 of 1999)

Inmarsat-C provides a low bit-rate data service in order to satisfy the need for very small lightweight terminals.

15.2.4 Inmarsat-M Terminals.

Wireless Telegraphy Act, 1926 (Section 3) (Exemption of Inmarsat-M Terminals for Land Mobile Applications) Order, 1999

(S.I. No 102 of 1999)

Inmarsat-M provides portable voice communication, as well as fax/data capabilities.

15.2.5 Omnitrac Terminals (for the Euteltrac system).

Wireless Telegraphy Act, 1926 (Section 3) (Exemption of Omnitracs Terminals for the Euteltracs System) Order, 1999

(S.I. No 103 of 1999)

These terminals allow for the continual tracking of vehicles.

15.2.6 ARCANET Suitcase Terminals

Wireless Telegraphy Act, 1926 (Section 3) (Exemption of (i) ARCANET Suitcase Terminals) Order, 1999

(S.I. No 104 of 1999)

Exempts ARCANET suitcase terminals.

15.2.7 EMS-Prodat Terminals.

Wireless Telegraphy Act, 1926 (Section 3) (Exemption of EMS-PRODAT Terminals for Land Mobile Applications) Order, 1999

(S.I. No 105 of 1999)

The PRODAT system is a low data rate message handling system, designed to serve land, maritime and aeronautical mobile satellite communication.

15.2.8 EMS-MSSAT Terminals

Wireless Telegraphy Act, 1926 (Section 3) (Exemption of EMS-MSSAT Terminals for Land Mobile Applications) Order, 1999

(S.I. No 106 of 1999)

15.2.9 Inmarsat mini-M Terminals.

Wireless Telegraphy Act, 1926 (Section 3) (Exemption of Inmarsat mini-M Terminals for Land Mobile Applications) Order, 1999

(S.I. No 109 of 1999)

Inmarsat mini-M provides portable voice communication, as well as fax/data capability. Its functions are as those of the Inmarsat-M terminal. It differs in that it is more compact.

15.2.10 ARCANET Suitcase Terminals

Wireless Telegraphy Act, 1926 (Section 3) (Exemption of (ii) ARCANET Suitcase Terminals) Order, 1999

(S.I. No 110 of 1999)

Exempts ARCANET suitcase terminals.

16 Appendix 8: Airport Exclusion Zones

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 earth stations in areas around airports will be restricted.

The nature of these restrictions include exclusion zones and notification areas. Exclusion zones and notification areas are particularly important to operators who wish to deploy transportable earth stations.

16.1 Exclusion Zones

An exclusion zone is defined as an area which is 1000 metres wide (centred on the runway centre line) and extending 10 km in the approach direction from the stop end of each Instrument Landing System (ILS) equipped runway.

No earth station transmissions may take place within an exclusion zone.

16.2 Notification Areas

The notification area is defined as a circle of radius 20-km, which is centred on the airport control tower.

For permanent earth stations, the notification procedure will be carried out by the ODTR.

Operation of a TES within the notification area requires that advance notification be forwarded by the operator to the relevant Air Traffic Control (ATC) authority. 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 relevant ATC authority. The TES must be contactable with this telephone number, 24 hours a day, for the whole period of the operation.

The TES must cease transmitting immediately if requested by the ATC authority.

17 Appendix 9: Schedule of Fees

Examples of fee calculations are included later in this appendix.

17.1 Application processing fees

17.1.1 General Application Fee

An initial application fee of ε 100 will be payable for each application.

- This is a once-off fee, paid on submission of the application.
- This fee applies to each application for each earth station, or each set of earth stations with a single common set of parameters, operating to a single satellite.

For each additional satellite to which clearance is required, a fee of ε 25 will be payable in addition to the General Application Fee.

17.1.2 Coordination Fee

- A coordination fee will not be imposed with respect to an application for a licence when coordination is not required in either the transmitter or the receiver band.
- A coordination fee is required when either the transmitter, or receiver, or both must be coordinated.

A coordination fee of ε 300 will be payable for each coordination request.

- A coordination request must be made in respect of:
  each earth station site
  with one set of station parameters
  operating to a single satellite
- This fee will apply to each coordination request, whether successful or not.
- The fee will be non-refundable.
- Coordination cannot be guaranteed.
- Applicants are advised to make use of publicly available information prior to applying for coordination in order to increase the probability of a successful coordination being accomplished.
- Each time the parameters on which the coordination is based are altered and resubmitted, a new coordination fee will be payable.
- The parameters provided to the Director must include the earth station transmitter bandwidth and may include the receiver bandwidth. If a receiving bandwidth is not provided, uncoordinated and non-protected operation of the receiver will be assumed.
- Coordination of receivers with antenna sizes less than the minimum specified will not be possible in shared bands.
- Where receivers are uncoordinated, transmitters will still need to be coordinated if the transmitter band is shared.

17.2 Spectrum Occupancy (annual) Fees

These fees are based on an annual charge for spectrum management and occupancy.

Occupancy charges in shared bands will be based on the sum of the coordinated transmitter bandwidth and the coordinated receiver bandwidth. Uncoordinated operation will be regarded as having zero bandwidth. Using this approach, asymmetric and/or uncoordinated operation in one direction is taken into account in determining the occupancy charge.

The annual fee will be made up of the sum of components.

17.2.1 Basic Fee per licence

Basic Charge **ε 100**

- The basic charge will be payable annually in respect of each license, either for an individual station (or a set of stations on a single license).

17.2.2 Additional Charges for operation in an Unshared Band

17.2.2.1 Permanent Earth Stations

Permanent earth stations are stations located permanently at a specified location.

(i) **For one earth station** **ε 100**

For dependant VSAT earth stations with identical characteristics operating to a single satellite. (VSAT Network)

(ii) **For each earth station up to 10** **ε 100**

(iii) **For each additional earth station, above 10** **ε 25**

17.2.2.2 Transportable Earth Stations

Transportable earth stations are stations, which are movable and are operated at one or more specific locations.

(i) Short-term bandwidth fee exemption

Where the licensed transportable earth station is operational in Ireland for a maximum of 21 days, cumulative, in any calendar year, only the basic charge will apply.

(ii) **For one earth station** **ε 100**

For dependant VSAT earth stations with identical characteristics operating to a single satellite. (VSAT Network)

(iii) **For each earth station up to 10 ε 100**

(iv) **For each additional earth station, above 10, ε 25**

17.2.3 Additional Charges for operation in a shared band.

The shared band may be either the transmitting band or the receiving band or both.

The bandwidth will be determined as the sum of the coordinated transmitting bandwidth and the coordinated receiving bandwidth.

These fees will also apply to VSAT stations for which coordination is required for the transmitter, even under those circumstances where the receiver operates in a shared band on an unprotected basis.

These fees will apply to both permanent and transportable earth stations. Transportable earth stations may only be operated in shared bands at coordinated sites. As the site must remain coordinated whether or not the earth station is present or operating, there will be no reduction in charges for transportable stations. As each earth station and site in a shared band must be coordinated separately, there will be no reductions in charges for multiple stations.

17.2.3.1 Spectrum related charges

The maximum bandwidth, which will be authorised on any one license, will be 80 MHz.

All transmit or receive bandwidth assignments will be contiguous bandwidth in the appropriate band.

(iv)Bands: 3 GHz to 10 GHz

Power (dBW - ERP)	Less than 500 kHz bandwidth	500 kHz to < 2 MHz bandwidth	2 MHz to < 11 MHz bandwidth	11 MHz to < 40 MHz bandwidth	40 MHz to 80 MHz bandwidth
Less than 50	ε 1000	ε 1250	ε 1500	ε 1750	ε 2000
50 to 75	ε 1250	ε 1500	ε 1750	ε 2000	ε 2250
Above 75	ε 1500	ε 1750	ε 2000	ε 2250	ε 2500

(v)Bands: 10 GHz to 15 GHz

Power (dBW - ERP)	Less than 500 kHz bandwidth	500 kHz to < 2 MHz bandwidth	2 MHz to < 11 MHz bandwidth	11 MHz to < 40 MHz bandwidth	40 MHz to 80 MHz bandwidth
Less than 50	ε 500	ε 750	ε 1000	ε 1250	ε 1500
50 to 75	ε 750	ε 1000	ε 1250	ε 1500	ε 1750
Above 75	ε 1000	ε 1250	ε 1500	ε 1750	ε 2000

(vi)Bands: above 15 GHz

Power (dBW - ERP)	Less than 500 kHz bandwidth	500 kHz to < 2 MHz bandwidth	2 MHz to < 11 MHz bandwidth	11 MHz to < 40 MHz bandwidth	40 MHz to 80 MHz bandwidth
Less than 50	ε 125	ε 250	ε 500	ε 750	ε 1000
50 to 75	ε 250	ε 500	ε 750	ε 1000	ε 1250
Above 75	ε 500	ε 750	ε 1000	ε 1250	ε 1500

17.3 Short-term License

Where an earth station, other than a transportable earth station, operates for a period of less than one year at any location, a short-term licence fee will apply.

This fee will be calculated on the basis of:

For each month of operation, from a minimum of one month to a maximum of six months (continuous);

One twelfth of the annual fee.

* For each month of operation, for each month exceeding six months to a maximum of twelve months (continuous);

One tenth of the annual fee.

17.4 Examples of Fee Calculations

Example 1;

Application fee for an earth station operating to two satellites for which two coordination attempts are made.

General Application Fee	ε 100
One Additional Satellite	ε 25
First Coordination Fee	ε 300
Initial Payment	**ε 425**
Subsequent Additional Coordination Fee	ε 300
Total Initial Cost	**ε 725**

Example 2;

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

Basic Charge of ε 100 plus 10 stations at a fee of ε 100 each plus two stations at a fee of ε 25 each. (100+1000+50)

Total Annual Fee of ε 1150 (average fee per dependent station per year is ε 95.83)

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

Example 3;

Annual fee for a VSAT network of 100 dependant stations, operating in an unshared band.

Basic Charge of ε 100 plus 10 stations at a fee of ε 100 each plus ninety stations at a fee of ε 25 each. (100+1000+2250)

Total Annual Fee of ε 3350 (average fee per dependent station per year is ε 33.5)

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

Example 4;

Annual fee payable for a TES operating in an unshared band for more than 21 days (cumulative) in any calendar year.

Basic charge ε 100 plus spectrum fee of ε 100. (100 + 100)

Total Annual Fee of ε 200.

Example 5;

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

Basic fee ε 100 plus + Table (iv) fee. (100 + 1750 + 2000)

Total Annual Fee of ε 3850.

Example 6;

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:

Basic fee ε 100 + Table (v) fee. (100 + 500 + 1500)

Total Annual Fee of ε 2100.

Example 7;

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:

Basic fee of ε 100 + Table (v) fee. (100 + 750 + 0)

Total Annual Fee of ε 850.

18 Appendix 10: Terminology

18.1 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.

18.2 Abbreviations

BSS	Broadcasting Satellite Service
CDMA	Code Division Multiple Access
CEPT	Conference of European Postal and Telecommunications Administrations
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
ODTR	Office of the Director of Telecommunications Regulation
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

18.3 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": a wireless telegraphy link between two or more Earth Stations, each located at a specified fixed point, or points, on the Surface of the Earth, and using a relay station on board a satellite to establish and maintain the link.

"(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[41] 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).

[41] Radio Regulations S9 and ApS7.

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

"Licence": a licence, granted under section 5 of the Wireless Telegraphy Act. 1926, as amended (No. 45 of 1926), to keep, have possession of, install, maintain, work or use apparatus for wireless telegraphy for the purpose of operating a fixed earth station.

"Licensee": the holder of a licence.

"The Director": means the Director of Telecommunications 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.