Office of the Director of
Telecommunications
Regulation

Licensing Digital Terrestrial Television

Report on the Consultation

Document No. ODTR 01/17 **23 March 2001**

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 Director

I would like to thank all those who responded to the consultation on licensing digital terrestrial television and those who provided additional comments in light of the amended Broadcasting Bill. My Office received a total of fifteen responses to the original consultation and ten submissions to the request for further comments on the amended Broadcasting Bill. There have been many constructive comments from a broad cross-section of industry and commerce that have been taken into account in developing our approach to the licensing of digital terrestrial television in Ireland.

This response document highlights our position based on our analysis of the consultation responses and takes into account our obligations under the Broadcasting Act 2001.

Etain Doyle
Director of Telecommunications Regulation

TABLE OF CONTENTS

0. Executive Summary

0.1 Introduction

The introduction of digital technology in terrestrial television broadcasting offers the consumer a number of benefits, including an increase in the number of TV channels that can be transmitted and the possibility of new interactive multimedia applications. Digital technology, at its current stage of development, makes more efficient use of the available spectrum, by enabling up to five programme services to be compressed into the space currently required to transmit one analogue service, all with the possibility of high quality sound and vision.

Having considered the fifteen written responses to the public consultation and the subsequent ten submissions and taken account of her duties under relevant EU and national legislation and in particular the provisions of the Broadcasting Act, 2001, the Director has reached a number of conclusions on how to proceed with the licensing of digital terrestrial television.

The Director will issue two licences under the Wireless Telegraphy Acts, 1926-1988, a Digital Terrestrial Television (DTT) Licence and a Digital Multiplex Licence to the companies designated by the Minister for Arts, Heritage, Gaeltacht and the Islands under the 2001 Act.

0.2 Regulatory Framework

The licences will contain conditions reflecting the requirements for the multiplex and the transmission companies as provided for in the 2001 Act as well as any additional conditions deemed appropriate by the Director, as discussed and set out in this paper and as may be required under the relevant national and EC law.

The licensing regime for the multiplex operator will provide for the following:

- operation of six multiplexes;
- 15-year licence period;
- licence fee of 3.5 percent of gross revenues arising from licensed services;
- data cap of up to 20 percent of each multiplex at any one time, subject to an aggregate maximum of 15 percent over a 24-hour period;
- no prior approval of retail prices but the Director can investigate and issue binding directions, if necessary;
- a common national price;
- prior approval not required for charges imposed on broadcasters, however if commercial negotiations fail, a dispute resolution procedure will be instigated;
- rollout obligations linked to those in the DTT Licence to meet the universal service obligation set down in the 2001 Act.

The licensing framework for the transmission operator will provide for the following:

- no prior approval of transmission charges, however if commercial negotiations fail, a dispute resolution procedure will be instigated;
- 15-year licence period;
- The target coverage level is 99% of the population no more than ten years after launch.

When the consultation paper was issued in 1999, it was envisaged that one company would undertake both the transmission and multiplex activities. However, following substantial amendments in its passage through the Oireachtas, the 2001 Act allows for the possibility of two separate entities undertaking these activities.

The interrelationship between the transmission and multiplex operators is a key issue in framing the licensing regime for DTT. The parameters within which this relationship will operate are defined in the 2001 Act. This relationship will be reflected in the regulations and licence conditions set down under the Wireless Telegraphy Acts, 1926-1988, and issued by this Office subject to the consent of the Minister for Public Enterprise.

0.3 Legal Notice

This response document does not constitute legal, commercial or technical advice. The Director is not bound by it. The contents herein are without prejudice to the legal position of the Director, or her rights and duties under the legislation.

1. Introduction

1.1 Background

The Director of Telecommunications Regulation ("the Director") and her Office ("the ODTR") are responsible for the regulation of the Irish telecommunications and broadcasting markets in accordance with EU and national legislation.

The introduction of digital technology in terrestrial television broadcasting offers the consumer a number of benefits, including an increase in the number of TV channels that can be transmitted and the possibility of new interactive multimedia applications. Digital terrestrial television (DTT) services, in conjunction with the services provided by cable and MMDS licensees, will help to promote nation-wide competition in the delivery of television programme services.

The Minister for Arts, Heritage, Gaeltacht and the Islands, Ms. Síle de Valera T.D., presented the Broadcasting Bill, 1999 to Dáil Eireann on 27 May 1999. In addition to dealing with other broadcasting issues, the legislation provides for the establishment and operation of DTT on a national basis and requires the Director to issue the necessary licences. The legislation has now passed all stages in the Oireachtas and was enacted on 14th March 2001.

1.2 Consultation

In October 1999, the Director published a consultation document, *Licensing Digital Terrestrial Television* (ODTR 99/57), seeking views on her proposals for the framework within which she intended to license and regulate DTT. Following substantive amendments to the Broadcasting Bill during its passage through the Oireachtas, in January 2001 the Director invited interested parties to submit further comments.

This document summarises the responses to the consultation document and the subsequent submissions following the Broadcasting Bill amendments and outlines the conclusions reached, taking account of the submissions received and other relevant legal and technical considerations.

1.3 List of Respondents

Fifteen responses to the consultation document were received, as listed below:

- AIB Corporate Finance, NERA, Smith Group and Matheson Ormsby Prentice
- Clare FM Radio
- Crown Castle Ireland
- DV4
- Esat Telecom
- Independent Radio and Television Commission
- Irish Multichannel
- Michael J. Barrett

- Norkring-Teracom Consortium
- ntl
- Ocean
- RTE
- Southcoast Community Television
- Thomson-CSF
- TV3

Ten submissions were received following the request for comments in light of the amended Broadcasting Bill:

- AIB Corporate Finance, NERA, Curtis+Cartwright and Matheson Ormsby Prentice
- A&L Goodbody Solicitors
- Chorus (formally Irish Multichannel)
- Esat Telecommunications and Ocean Communications
- Martin Westrap
- Mason Communications
- Michael J. Barrett
- RTE
- Southcoast Community Television
- TV3

The Director wishes to express her thanks to everyone who contributed to the consultation. With the exception of material marked confidential, the written comments of respondents are available for inspection at the ODTR's office in Dublin.

1.4 Legislative Background

The Broadcasting Act, 2001 and the Wireless Telegraphy Acts 1926–1988 form the statutory basis for the licensing of DTT.

The provisions of the 2001 Act provide for the designation by the Minister of Arts, Heritage, Gaeltacht and the Islands of a "Multiplex Company" and a "Transmission Company" for the provision of DTT in Ireland. The manner and method of designation of these companies is not specified in the Act and is a matter for the Minister.

Once the multiplex company and transmission company have been designated by the Minister, the Director is required by the 2001 Act to issue them with licences, under the Wireless Telegraphy Acts, 1926-1988 – the "Digital Multiplex Licence" and the "DTT Licence" respectively. These licences will contain conditions reflecting the requirements for the multiplex and the transmission companies as provided for in the Broadcasting Act, 2001 as well as any additional conditions deemed appropriate by the Director, as discussed and set out in this paper and as may be required under the relevant national and EC law. The form, fee and conditions of these licences will be prescribed by the Director by way of statutory instrument as provided for under the Wireless Telegraphy Acts, 1926- 1988. This statutory instrument will require the consent of the Minister for Public Enterprise.

The 2001 Act provides that the issuing of the Digital Multiplex Licence and the DTT Licence does not prevent the Director from granting further licences – to the existing licensees or to anyone else – under the Wireless Telegraphy Acts, 1926-1988 for the transmission or

multiplexing of programme material or other data in digital form.
In addition, the Digital Multiplex Licensee may require a Telecommunications Licence to be issued in accordance with section 111 of the Postal and Telecommunications Services Act, 1983 (as amended).

1.5 Format of Document

The remainder of this document is split into five sections. Sections 2, 3 and 4 deal with issues raised in the consultation paper. Each sub-section will comprise a brief synopsis of the consultation issue, followed by a summary of the consultation responses and a statement of the Director's position.

Section 5 outlines the regulatory framework within which the transmission and multiplex operators will be licensed. The main conclusions are presented in Section 6.

Appendices II, III and IV outline the draft technical conditions, which will be included in the Digital Multiplex and DTT Licences.

2. Consultation Issues: Digital Multiplex Licence

The consultation paper set out the Director's proposals for the Multiplex Licence, and views were invited on the following specific issues:

- licence duration (Q2.6a/b)
- licence fees (Q2.7)
- technical conditions (Q2.10)
- non-programme services capacity (Q2.12)
- rate regulation (Q2.17)

2.1 Licence Duration

2.1.1 Summary of Consultation Issues

The Director proposed a licence period of fifteen years for the Multiplex Licence.

2.1.2 Views of Respondents

Respondents' views on this issue were mixed with some respondents agreeing with the proposals for a fifteen-year licence period, while one believed it was too long and suggested 12 years would be more appropriate. The majority, however, were of the opinion that a longer licence period was required because of the start-up nature of the business, and the time required to make a return on investment.

Of the respondents in favour of a longer licence period, more than half suggested a fifteen-year licence period with the option to renew for a number of years. These respondents were divided on how long that period should be, one said five years, another, ten years, and yet another twenty years. Other respondents were of the opinion that a twenty-year licence period would be more appropriate.

Finally, one respondent suggested that the licence duration should be the longer of fifteen years or five years after analogue switch-off.

On the question of other factors to be considered in the deciding licence duration, only three respondents provided comments. Among the factors suggested for consideration were the timing of analogue switch-off and the time required to make the investment a viable one.

2.1.3 Position of Director

As outlined in the consultation paper, the Director is of the opinion that the licence period should be set to provide a balance between a return on capital investment and ensuring continuity of service to the consumer.

The Director is not convinced that a licence period in excess of 15 years is warranted. Accordingly, the Digital Multiplex Licence will be granted for a period of fifteen years.

2.2 Licence Fees

2.2.1 Summary of Consultation Issues

The consultation paper proposed a licence fee of 3.5 percent of gross revenues arising from the provision of licensed services. This was to be calculated on the same basis as the cable and MMDS fee thus maintaining fair competition between competing platforms.

2.2.2 Views of Respondents

For the most part, respondents were of the view that the proposed fee was excessive, given the start-up nature of the business. Among the alternatives were a sliding scale fee structure, the telecommunications levy, five percent of net revenue, a maximum of 2.5 percent after analogue switch-off and offsetting the costs of providing services to non-paying customers against gross revenue to calculate the fee level.

On the issue of competition between platforms, a number of respondents questioned the validity of the comparison with cable and MMDS, while another respondent argued that such a fee did not apply to satellite, one of the competing platforms and the only one available on a national basis.

The two cable/MMDS operators were in favour of applying the same fee level to DTT as applied to their services but questioned the validity of the existing cable and MMDS fee level.

2.2.3 Position of Director

The Director acknowledges the views of respondents and is mindful that the multiplex operation is a start-up business, but the fee structure is based on a percentage of gross revenue.

Furthermore the Director believes it is important in order to promote competition in this market to maintain a level playing field between platforms and is thus minded to proceed with her original proposals for a fee level of 3.5 percent of gross revenues arising from licensed services.

Television services delivered by digital satellite do not fall within the scope of the Director's regulatory powers. Such services are provided from another Member State and the provisions of the TV Sans Frontiers Directive[1] apply.

2.3 Technical Conditions

A general question was asked regarding the respondents' views on the Technical Conditions. This section will address individual issues raised by the respondents.

2.3.1 Picture Standards/Minimum Encoded Bit Rate

Views of Respondents

There was a large amount of disagreement regarding picture quality with five out of nine

[1] Directive 89/552/EEC, amendment 97/36/EC.

respondents who expressed a view wanting the technical conditions relaxed so that the current standard would not be maintained. One respondent considered that the ODTR was setting a 'Rolls Royce standard' and that market forces should be allowed to decide the issue.

Three other respondents were of the opinion that the quality standards set were not high enough. One broadcaster stated that setting a minimum bit rate was not an efficient use of the available capacity as some programmes would require a lesser bit rate and others considerably more.

Position of Director

The Director does not agree that the ODTR is setting a 'Rolls Royce standard'. She considers it very important that current standards be maintained and that some improvement in service be gained in the migration to digital. The Director understands that there are alternative means to measure picture quality, such as resolution in terms of the number of lines or PQRs (Picture Quality Ratings) as used by proprietary equipment. Very few multiplexes display these parameters, however, most display the Mega Bits Per Second rate for each encoded programme service and allow an upper and lower limit to be set. This limit can be set remotely and can be linked in the more advanced multiplexes to Metadata embedded in the programme, which in turn can be linked to a scheduling computer, thus allowing flexible management of data rates down to the proscribed limit.

In tests[2] most people (89%) found the picture quality at 4MBps to be equivalent to a good analogue TV picture (ITU-R grade 4). However, the Director is monitoring the development of compression technology and may allow a lower bit rate than the specified minimum to be used, dependent on the Licensee demonstrating objectively that the required picture quality standard can be maintained.

The Minimum Encoded bit rate was set as a compromise between the need to allow for more programme services on each channel, to ensure the service available to the consumer was not downgraded and to promote a level playing field between digital cable, MMDS and DTT.

In the consultation paper, the Director proposed a picture quality standard of ITU-R grade 4.5. The standard for picture quality has been relaxed to ITU-R grade 4 in recognition of the current standard of picture quality produced by the national broadcasters. This relaxation will also apply to the cable and MMDS licensees as they have to distribute the same output.

2.3.2 Picture Standards/HDTV

Views of Respondents

Five respondents stated that the system proposed in the consultation paper (Main Profile @ Main Level) was not the High Definition TV standard, with one respondent asserting that the maximum standard possible is Main Profile @ Main Level.

Position of Director

The assertion that Main Profile @ Main Level is the highest standard possible is not correct - higher standards can be achieved. The Director considers however that this is the minimum acceptable standard. The multiplex operator is free to use a higher standard, such as High profile @ High level at its discretion.

[2] ITC Guidance Note on Picture Quality in Digital Television, 1996.

2.3.3 Programme Specific Information

Views of Respondents

The two respondents who expressed an opinion on this subject addressed the timing of the repetitions within the Event Information Table (EIT). A further point raised was the use of Packet Identifiers (PIDs) for engineering purposes and clarification regarding Network Information Tables (NIT) values.

Position of Director

The information regarding the Programme Specific information and the timing of the refresh rates of the tables are drawn from the relevant European Telecommunication Standards Institute (ETSI) standards. The use of PIDs for engineering purposes was envisaged and is now explicitly mentioned in the technical conditions.

Network IDs have been registered by the ODTR for Ireland and under no circumstances should codes registered elsewhere be used.

2.3.4 Programme Associated Data

Views of Respondents

A number of respondents were unclear as to what data could be carried on a multiplex without being subject to the data cap. There was also concern expressed as to whether Electronic Programme Guide (EPG), System Information (SI) and Conditional Access (CA) data would be included under the cap.

Position of Director

EPG, SI and CA data is not included in the data cap as they are integral parts of the system. Unidirectional data, which provides viewers with additional features within programmes, is also exempt from the data cap. For example educational programmes would be allowed to deliver course notes from tutors, financial programmes could show live market information and sports programmes statistics and profiles on the events featured. Section 2.4.3 gives examples of data that would be subject to the data cap.

2.3.5 Picture Reliability

Views of Respondents

One broadcaster questioned the difference in this figure between the DTT and multiplex licences - 99.99% in the multiplex licence compared to 99% of all locations served in the DTT licence.

Position of Director

The tighter criteria for the multiplex licensee is to ensure that a reliable signal is supplied to the transmission company and that an error by the multiplex operator does not lead to infringement of the transmission company's licence.

2.4 Non-Programme Services Capacity

2.4.1 Summary of Consultation Issues

The consultation paper outlined the Director's view that as Digital Video Broadcasting (DVB) was intended to allow for the transmission of digitised video, priority has to be given to the transmission of programme services. The Director indicated that international spectrum and licensing obligation constraints required her to restrict the percentage of multiplex capacity for non-programme services to 10 percent over a 24-hour period, subject to a maximum of 15 percent at any one time.

2.4.2 Views of Respondents

A number of respondents had concerns over the proposed limit on the percentage of non-programme related data. Some respondents questioned the legal requirement to impose such a restriction. Opinion has been expressed that the Director is under obligation to ensure the efficient and effective use of the radio spectrum, but this does not require her to place restrictions on the use of the multiplex capacity.

Other respondents suggested that the 15 percent maximum limit is too low, as there would be substantial unused capacity overnight. Some respondents suggested that it was unclear what would be exempt from the classification of non-programme related data. There was concern that the limit would be detrimental to the development of DTT. Respondents proposed that a regular review could be made of the limit or that alternative method could be used to achieve the Director's aims.

2.4.3 Position of Director

While DTT is primarily intended as a platform for the delivery of television services, the Director recognises its usefulness as a vehicle for the extension of the information society. Having reviewed the situation internationally, she will allow the DTT platform to utilise up to a maximum of 20 percent of each multiplex at any one time subject to an aggregate maximum of 15 percent over a 24-hour period for the delivery of non-programme services, or additional services as defined in the MMDS licences[3]. It is proposed to amend the MMDS licences to provide for a similar cap.

Examples of these additional services would be email, T-Commerce, Internet services, commercial data transportation such as store and stock records and private data. The licence will therefore include a forward path for these services.

A return path operated by the multiplex operator will require a Telecommunications Licence issued under the Postal and Telecommunications Services Act, 1983 (as amended).

[3] "additional service" means a service that consists of the distribution by the licensee of a service other than programme services or programme associated services by wireless telegraphy by means of the use of spare capacity within the signals carrying any licensed programme service.

2.5 Rate Regulation

2.5.1 Summary of Consultation Issues

The consultation paper outlined the proposals relating to rate regulation. It was proposed that there was no need for detailed price control, that a common price, irrespective of geographic location, would apply and the Director will retain power of investigation.

2.5.2 Views of Respondents

Fourteen of the eighteen respondents addressed this issue, of which more than half were in broad agreement with the proposals outlined in the consultation document.

One respondent who disagreed with the provision that there should be no detailed price control said that the same price control regime should apply to the digital terrestrial service provider as applies to cable and MMDS operators.

The reasons for respondents' opposition to common pricing were varied. One claimed it removed flexibility from the operator, another suggested it was not necessary, as digital satellite services were available nationally at a common price. Yet another respondent likened the proposal to an internal cross-subsidy, which would work to the detriment of competing platforms, that either have no differential between city and rural areas (satellite) or do not have city franchises to finance such a scheme (MMDS).

2.5.3 Position of Director

Services to Retail Customers

Given that the Digital Multiplex licensee will be competing primarily with digital cable and MMDS providers, the Director believes that detailed price control of DTT services is unwarranted. The price control exercised in relation to existing platforms will, in effect, determine the upper limit at which such services may be priced.

The Director will however retain the power to investigate prices charged and may issue binding directions in relation to such prices, if necessary.

The Director has noted respondents' views on common pricing but is of the opinion that common pricing, irrespective of geographical location, is necessary for the development of a competitive television platform that will deliver uniform benefits to all Irish consumers.

Services to Broadcasters

The 2001 Act makes provision for the multiplex operator to charge content providers for digitising the signal. The Director does not consider it necessary to provide prior approval for such charges. However, where parties fail to reach commercial agreements in respect of these charges, she may, at the request of either party, instigate a dispute resolution procedure in accordance with the principles set out in ODTR Decision Note D11/99[4]. In resolving such disputes, the Director intends that regulation of these charges should follow the principles of transparency and cost orientation and represent a fair balance between the legitimate interests of both parties, the user interest, the regulatory obligations or constraints imposed on the parties and the need to provide and maintain a universal service.

[4] Dispute Resolution Procedures (Decision Note D11/99), ODTR 99/53

The Director envisages that the transmission charges will be set by commercial negotiation, followed by dispute resolution, if necessary. She will, however, retain the power to investigate charges and issue binding directions in relation to such charges, if warranted.

3. Digital Terrestrial Television Licence

The consultation paper set out the Director's proposals for the Digital Terrestrial Television Licence, and views were invited on the following specific issues:

- transmission charges (Q3.8)
- licence duration (Q3.9a/b)
- rollout obligations (Q3.9c/d)
- sanctions (Q3.9c/d)

3.1 Transmission Charges

3.1.1 Summary of Consultation Issues

In the consultation paper, the Director was of the view that transmission charges should be regulated on the basis of long run incremental costs (LRIC) plus a reasonable rate of return.

3.1.2 Views of Respondents

Views on this issue were mixed, with only three of the thirteen respondents in agreement with the proposals outlined in the consultation paper. Three more respondents agreed but with some reservations, of which a couple required further details on how LRIC would be defined and one suggested that charges should be scaled to encourage early capital investment.

Of those opposed to the proposals, a few questioned the appropriateness of the LRIC model in determining transmission charges, another suggested that LRIC was not relevant in a convergent market while others were of the belief that regulatory intervention was unnecessary. One respondent suggested that the rate of return should be 17.5%.

3.1.3 Position of Director

Section 7(3) of the Act provides for the Director to specify conditions concerning charges imposed on the multiplex company by the transmission company, however, the Director's powers in this regard are discretionary.

As was the case in section 2.5.3 with regard to the charges to broadcasters by the multiplex operator, the Director does not consider that prior approval of transmission charges is warranted. However, where parties fail to reach commercial agreements in respect of such charges, she may, at the request of either party, instigate a dispute resolution procedure in accordance with the principles set out in ODTR Decision Note D11/99. In resolving such disputes, the Director intends that regulation of these charges should follow the principles of transparency and cost orientation and represent a fair balance between the legitimate interests of both parties, the user interest, the regulatory obligations or constraints imposed on the parties and the need to provide and maintain a universal service.

Notwithstanding the fact that the Director envisages that the transmission charges will be set by commercial negotiation, she will retain the power to investigate charges and issue binding directions in relation to such charges, if warranted.

3.2 Licence Duration

3.2.1 Summary of Consultation Issues

The Director proposed a licence period of fifteen years for the DTT Licence. It was further proposed that the DTT Licence duration would be subject to review from time to time to reflect Ireland's international obligations in relation to spectrum usage.

3.2.2 Views of Respondents

Respondents' views on the licence duration for the Digital Multiplex Licence for the most part also applied to the licence duration for the DTT Licence (See Section 2.1).

A number of respondents expressed concern at the Director's right to amend the licence terms on the grounds that it introduced unnecessary uncertainty for investors.

3.2.3 Position of Director

As outlined in the consultation paper, the Director intends the grant of the Digital Multiplex and DTT Licences to be coterminous.

Therefore, as outlined in Section 2.1, the Director is minded to grant the DTT Licence for a period of fifteen years.

3.3 Rollout Obligations

3.3.1 Summary of Consultation Issues

The proposed rollout obligations required that free-to-air and basic services would be accessible to 65 percent of the population at launch, 85 percent after one year, 95 percent after two years and 99 percent after four years.

3.3.2 Views of Respondents

Of the eight respondents who commented on this issue, only two agreed with the proposed rollout obligations. Most of the remaining respondents were of the view that the obligations were too onerous, with one remarking that RTE's analogue services currently only reached 98 percent of the population.

Alternatives included 95% after five years and 99% after 10 years, a single rollout obligation of 90% after two years and a phased transmission plan rather than percentage population coverage, on the grounds that it would be easier to enforce.

3.3.3 Position of Director

Before specifying the rollout requirements in detail, discussions with the operators will be necessary. The Director remains of the view that speedy rollout will be required to meet the universal service obligation expressed in Section 7 (5) of the 2001 Act.

Accordingly, the Director will set out the detail of the rollout requirements following discussion with the companies designated under the 2001 Act to perform transmission and multiplexing activities. These will be expressed as dates by which various transmission sites

shall be operational (see Section I for the complete list of transmission sites).

The Director will require that all 12 main transmitter sites (Section I, List A) be on air at launch, a further 13 transposer sites (Section I, List B) within 6 months of launch, an additional 15 sites (Section I, List C) within 18 months of launch and 50 further transmission sites (Section I, List D) to be operational within 5 years. This equates to approximately 65 percent population coverage at launch and 95 percent coverage within 5 years of launch.

The target coverage level is 99 percent of the population, to be achieved no later than ten years after launch. The Director intends to review progress after two years to determine if the ten-year timeframe should be shortened, having regard to the availability of multichannel services and technological and commercial developments. It is intended that the review will include a public consultation.

When the consultation paper was published in October 1999, it was envisaged that one company would undertake both the transmission and multiplexing activities. In light of the provisions of the 2001 Act that allow for these activities to be undertaken by two separate entities, rollout obligations will also be included in the Digital Multiplex Licence. These rollout obligations will be linked to those set down in the DTT Licence.

3.4 Breach of licence Terms

3.4.1 Summary of Consultation Issues

In the consultation paper, the Director reserved the right to deal with non-compliance, consistent with the terms of the cable and MMDS licence regulations.

3.4.2 Views of Respondents

Only one respondent commented on this issue and was of the opinion that the Director's powers to deal with non-compliance were not sufficiently flexible to deal with breaches.

3.4.3 Position of Director

The Director considers that any sanctions for breach of licence terms must be proportionate to the breach involved and have as their aim the repair of the breach. Before any sanction will be imposed, the Licensee shall be given the opportunity to make representations and to rectify the breach.

If the Licensee fails to do so, the Director may impose a number of sanctions including suspension of the licence, reduction of the licence terms or revocation of the licence. These are in line with the sanctions that can be applied for breaches of cable or MMDS licence conditions.

3.5 Technical Conditions

A general question was asked regarding the respondents' views on the Technical Conditions. This section will address individual issues raised by the respondents.

3.5.1 Guard Interval

Views of Respondents

Three respondents expressed views on the specification of the Guard Interval. As it would limit the amount of capacity available on each multiplex, two of the respondents wanted it left to the Licensee's discretion.

One respondent took the view that a guard interval of T/4 was appropriate for main stations within a Single Frequency Network (SFN).

Position of Director

As the choice of Guard Interval is directly dependent on the distance between transmitters in the network, the use of inappropriate Guard Intervals can have negative implications for network coverage and reliability.
In the Irish scenario, the majority of the network will operate as a Multi Frequency Network (MFN), therefore a minimum Guard Interval of T/32 is appropriate. For SFNs where the interstation distance exceeds 8.5km, a Guard Interval of T/8 should be used. This accords with the conclusions reached in ODTR 99/30, *Selection of Appropriate Guard Interval for Irish Digital Terrestrial Television - Report on the Consultation*.

3.5.2 Synchronisation

Views of Respondents

One respondent held the view that the benefit of a 6dB power reduction for a station that loses synchronisation within an SFN was not proven.

Position of Director

The Director believes that the 6dB power reduction is an appropriate condition in the unlikely event of a station losing synchronisation within a SFN. However, this condition will be subject to review from time to time.

3.5.3 Planning Parameters and Minimum Field Strengths

Views of Respondents

Some respondents suggested that the proposed Field Strengths in the transmission technical conditions are higher than the Chester Agreement, which leads to higher transmitter powers being required. They believe that the requirement for signal reception by a viewer for 99% locations 99% time is unnecessary.

Position of Director

The fact that digital signals do not need to be as strong as analogue signals to be received would suggest that the transmitter power could be less. However, the signal strength arriving at an aerial varies depending on weather conditions and terrain around a receiving location. In order to guarantee that the digital signal does not disappear for part of the time due to the "cliff edge effect", it is necessary to plan for an average signal strength greater than the minimum and hence use higher than the minimum transmitter power required to serve an area. Moreover these variations in signal strength can be a factor of 10 to 100 times.

The Director believes that planning should be such that viewers within the normal coverage area of a transmitter do not suffer from signal drop-out which disrupts their viewing for

reasons not immediately obvious to them. Thus any reduction in required signal for digital over analogue is substantially eroded due to the requirement to provide the minimum required signal for reception 99% of the time at 99% of locations. The resultant high transmitter powers will not only ensure that the existing coverage areas are maintained but also provide portable indoor reception in areas close to the transmitters.

3.5.4 Spurious Emissions

Views of Respondents

One respondent questioned the limits for in-band and out of band spurious emissions.

Position of Director

The limits presented are the ones used in the spectrum mask contained in ETSI standard EN 300 744.

4. Analogue Switch-Off

4.1.1 Summary of Consultation Issues

The Director requested views on the timing of analogue switch-off, along with the factors to be considered in determining when switch-off should occur. In particular, respondents were asked to comment on the appropriateness of a target coverage level of 95 percent for digital services. This issue, while not directly affecting the manner in which DTT will be regulated by the ODTR, will have a major bearing on the development of DTT.

4.1.2 Views of Respondents

Of the eleven respondents who expressed an opinion on the timing of analogue switch-off, the majority was of the view that a specific date should be set. However, respondents differed on when analogue switch-off should occur.

A number of respondents suggested that analogue switch-off should take place within 10 to15 years of the launch of digital terrestrial television, with one respondent suggesting it should happen as soon as five years after DTT launch. One respondent suggested it should be the earliest of 2008 and two years after penetration levels for digital services reach 90 percent or two years after 90 percent penetration for digital televisions is achieved.

On the factors to be considered in determining the timing of analogue switch-off, there was broad agreement across respondents. Among the factors proposed were coverage, access to digital services (all platforms), equipment availability and affordability, the demand for allocation of the spectrum and the willingness of other parties to subsidise DTT equipment in analogue-only homes. A number of respondents suggested access to digital services on all digital platforms of 85 percent should be achieved before switching off analogue services.

Again, there was broad agreement with the Director's proposal to switch off analogue services once 95 percent of the population was able to receive a digital signal. A number of respondents were of the opinion that coverage should be higher than the proposed level of 95 percent.

One respondent who disagreed with the proposal on coverage levels believed that the key factor was access not coverage.

4.1.3 Position of Director

The decision on when to switch off analogue services is in the first instance an issue for the ODTR. It should be noted that under Section 3 (7) of the Telecommunications (Miscellaneous Provisions) Act, 1996, the Minister for Public Enterprise may issue policy directions in relation to the allocation and use of radio frequency spectrum.

The Director considers that the following trigger criteria are appropriate to determine when analogue switch-off should take place but does not intend to make a decision earlier than three years after the commercial launch of DTT:

- coverage of 98% of population (equivalent to current coverage of free-to-air services;
- 85-90% take-up of digital services across all digital platforms;

5. Summary of Proposed Regulatory Framework

5.1.1 Digital Multiplex Licence

The regulatory framework for the multiplex operator will include the following provisions:

- **Number of Multiplexes**
  The multiplex operator will be authorised to establish and operate six multiplexes.

- **Licence Duration**
  The licence will be granted for a period of 15 years and will run coterminously with the DTT licence.

- **Licence Fee**
  The multiplex operator will pay a licence fee of 3.5 percent of gross revenues arising from licensed services.

- **Non-Programme Services Capacity**
  A data cap of up to 20 percent of each multiplex at any one time, subject to an aggregate maximum of 15 percent over a 24-hour period will apply.

- **Rate Regulation**
  No prior approval of retail prices will be required but the Director can investigate prices and issue binding directions, if necessary. A common national price will apply.

- **Free-to-air Services**
  The multiplex operator cannot charge any customer requiring free-to-air services only.

- **Services to Broadcasters**
  Prior approval will not be required for charges imposed on broadcasters by the multiplex operator. In the event that commercial negotiations fail, a dispute resolution procedure may be instigated at the request of either party.

  Arrangements entered into with broadcasters that have a digital content contract will be non-discriminatory and fair.

- **Universal Service Obligation**
  The 2001 Act requires the multiplex operator to provide universal service as defined in Section 8 (4). Accordingly, its rollout obligations will be linked to those set down in the DTT Licence.

- **Programme Material**
  The multiplex operator is required to use one multiplex for the RTE Authority, half a multiplex each for Teilifis na Gaeilge and the television programme service contractor (Section 9 (3) of 2001 Act). The 2001 Act also provides for a whole or part of a multiplex to be reserved for Northern Ireland broadcast services, as defined in Section 9 (6).

- **Programme Content**
  Where the Commission has terminated a digital content contract or a television programme service contract, or where a contract has expired and has not been renewed, the multiplex operator must discontinue any agreements with such service providers.

  The multiplex operator must ensure that the number of arrangements it enters into with service providers does not result in it having insufficient capacity to carry the required Northern Ireland services, as defined in the 2001 Act.

- **Non-exclusive Licence**
  The Director may issue further licences under the Wireless Telegraphy Acts, 1929-1988 for the multiplexing of programme material or other data in digital form to the existing licensee or to any other person.

- **Provision of Service**
  The multiplex operator shall ensure that its licensed services can be received on an Open Standard Digital Television set.

- **Maintenance of Accounts**
  The multiplex operator will maintain accounts in respect of its operations under the Digital Multiplex Licence.

- **Breach of Licence Terms**
  The Director may impose a number of sanctions including suspension of the licence, reduction of the licence terms or revocation of the licence.

- **Copyright/Legal Right**
  Nothing in the Licence shall authorise the licensee to do any act which is an infringement of any copyright or legal right.

- **Technical Conditions**
  The draft technical conditions are set out in Sections II and III.

- **Variation of Licence**
  The Director reserves the right to vary the licence conditions, or revoke the Licence to comply with any changes in legislation.

- **Provision of Information**
  The Licensee shall keep all records required by the Director, and furnish such information to her as required from time to time.

- **Authorised Officers**
  An authorised officer shall, if so requested, produce a copy of his/her appointment as an authorised officer.

5.1.2 Digital Terrestrial Television Licence

The regulatory framework for the transmission operator will include the following provisions:

- **Transmission charges**
  Prior approval will not be required for charges imposed on the multiplex operator by the transmission operator. In the event that commercial negotiations fail, a dispute resolution procedure may be instigated at the request of either party.

- **Licence Duration**
  The licence will be granted for a period of 15 years and will run coterminously with the Digital Multiplex Licence.

- **Rollout Obligations**
  The 2001 Act makes provision for a universal service obligation on the transmission operator. The target coverage level is 99 percent no later than 10 years after launch. Intermediate rollout requirements are set out in Section 3.3.3.

- **Non-exclusive Licence**
  The Director may issue further licences under the Wireless Telegraphy Acts, 1926-1988 for the transmission of programme material or other data in digital form to the existing licensee or to any other person.

- **Accounting Separation**
  The transmission operator will maintain separate accounts in respect of its operations under the DTT Licence.

- **Breach of Licence Terms**
  The Director may impose a number of sanctions including suspension of the licence, reduction of the licence terms or revocation of the licence.

- **Copyright/Legal Right**
  Nothing in the Licence shall authorise the licensee to do any act which is an infringement of any copyright or legal right.

- **Technical Conditions**
  The draft technical conditions are set out in Sections IV.

- **Variation of Licence**
  The Director reserves the right to vary the licence conditions, or revoke the Licence to comply with any changes in legislation.

- **Provision of Information**
  The Licensee shall keep all records required by Director, and furnish such information to her as required from time to time.

- **Authorised Officers**
  An authorised officer shall, if so requested, produce a copy of his/her appointment as an authorised officer.

- **Other Issues**
  Conditions attaching to the following issues will also be included:
  - Radio and Telecommunications Terminal Equipment (RTTE) Directive requirements;
  - Non-ionising radiation emissions;
  - Interference;
  - Safety of persons and property.

6. Conclusions

When the consultation paper was issued in 1999, it was envisaged that one company would undertake both the transmission and multiplex activities. However, following substantial amendments in its passage through the Oireachtas, the 2001 Act allows for the possibility of two separate entities undertaking these activities.

The interrelationship between the transmission and multiplex operators is a key issue in framing the licensing regime for DTT. The parameters within which this relationship will operate are defined in the 2001 Act and will be reflected in the regulations and licence conditions set down under the Wireless Telegraphy Acts, 1926-1988.

I. List of Transmission Sites

LIST A - Main Transmitters

Cairn Hill
Clermont Carn
Holywell Hill
Kilduff
Kippure
Maghera
Mt Leinster
Mullaghanish
Spur Hill
Three Rock
Truskmore
Woodcock Hill

LIST B – Transposers

Achill
Aranmore
Castlebar
Castletownbere
Clifden
Collins Barracks
Crosshaven
Dungarvan
Fanad
Kilkeeveragh
Knockmoyle
Letterkenny
Suir Valley

LIST C – Transposers

Abbeyfeale
Arklow
Ballybofey
Bantry
Blarney
Casla
Clonmel
Cornamona
Dooncarton
Falcarragh
Ferrypoint
Glencolmkille
Gorey
Greystones
Knockanore

Lehinch
Malin
Mitchelstown
Monaghan
Moville
Mt Gabriel HP
Mt Gabriel VP
Wexford
Wicklow

LIST D – LOW POWER SITES

Ashford
Ashleam
Ballingeary
Ballintrillick
Ballydavid
Ballymacarbry
Ballynakilly
Bandon
Bealanabrack
Broadford
Cahir
Carlingford
Carrickmourne
Clonakilty
Clonmany
Crossbarry
Dingle
Drimoleague
Dromanassig
Dunmanway
Dunmore East
Dunquin
Ennistymon
Failmore
Fermoy
Finvarra
Glanmire
Gleann Na Ngealt
Glenbeigh
Glencar Co Kerry
Glencar Co Leitrim
Glenties
Headfort
Inchigeelagh
Iniscleire
Inistioge
Kells Co Kerry
Kilgarvan
Kilkee
Killaloe
Killeagh
Kilmacomma

Kilmacthomas
Kinsale
Laragh
Lauragh
Listowel
Maam
Macroom
Monasootagh
Mossy Glen
Mt Eagle
Mulrany
Nire Valley
Rosscarbery
Tomriland
West Port
Youghal A

II. Draft Technical Conditions – Digital Multiplex Licence

II.1 Purpose

This document specifies the general conditions attached to a licence for the operation of a Digital Multiplex.

II.2 Summary Information

These conditions detail the characteristics of the equipment that need to be considered for the purposes of the provision of a satisfactory service to the subscriber and safety. They do not include detailed equipment specifications.

The parameters specified in this document are mainly based on those given in IEC, ETSI and CENELEC documents: ISO/IEC 13818-1,2,3, EN 300 468, TR 101 211, ETR 289, EN 301 192, EN 50221 and EN 300 472.

For issues not referred to by this document, the licensee shall comply with standards set out in any relevant ETSI, IEC or CENELEC standard relating to DVB (Digital Video Broadcasting).

The Director of Telecommunications Regulation does not require evidence of type approval of equipment. Instead a procedure of system audits will apply.

The conditions specified in this document may be revised and/or added to from time to time.

Nothing contained in these conditions shall absolve the licensee from any requirement in law to obtain whatever additional consents, permissions, authorisations, or licences, necessary for the exercise of entitlements under the licence.

II.3 Definitions and Glossary of Terms

II.3.1 ODTR

Office of the Director of Telecommunications Regulation.

II.3.2 Director

The Director of Telecommunications Regulation.

II.3.3 Programme Service Provider

A compiler of programme content into a programme service.

II.3.4 Digital Multiplex

A signal (which in its baseband form is a DVB transport stream, but is a signal with a bandwidth of 8MHz when modulated) containing more than one programme service, with associated and other data.

II.3.5 Digital Multiplex Provider

Provider of the above service.

II.3.6 Transport Stream

A data stream corresponding to the relevant ETSI (DVB) standards carrying MPEG2 encoded video and associated or other data.

II.3.7 European Standards Body

A body such as ETSI, the IEC or CENELEC, which sets standards for equipment or services.

II.3.8 EPG

Electronic Programme Guide is the means by which a user can navigate around the supplied services.

II.4 System Transparency

Television

Unless specifically excluded by the licence, the Digital Multiplex shall be implemented in such a manner that it is capable of relaying all components within a Programme Service intended for general reception[5] [6].

Note: - This would include: -
The EPG, TeleText and additional sound channels associated with the vision material. (see section II.6.8.1)

II.5 System Engineering

II.5.1 General

The mechanical and electrical construction of the installation shall be in accordance with best practice.

The practice of good system engineering is a necessary requirement to ensure the provision of a high quality service and the minimising of the potential for interference to, or from, radiocommunication services operating in accordance with the Irish Table of Frequency Allocations.

[5] While not intended for reception by the general public, the broadcast organisations may include Test signals in the Transport Stream. The system must be transparent to these signals, so as to facilitate performance measurements.

[2] While the Multiplexing System shall be designed to relay all the components within a television signal, the actual components relayed shall take account of the copyright arrangements between the licensee and the service provider.

II.5.2 Equipment Construction.

II.5.2.1 General

All controls, meters, indicators and terminals shall be clearly labelled. Details of the main and any auxiliary power supply from which the equipment is intended to operate shall be clearly indicated.

II.5.2.2 Controls

Controls which, when wrongly adjusted, change the system parameters shall be immediately accessible to qualified personnel only.

II.5.2.3 Manufacturer's Identification.

The equipment shall be labelled with the manufacturer's trademark, type designation and serial number.

II.6 System Standards

II.6.1 Frequency Spacing

Nominal radio-frequency channel bandwidth occupied by a modulated Digital Multiplex	8 MHz

II.6.2 Encoding Standards

System	ISO/IEC 13818-1
Video *	MPEG 2 Main Profile, Main Level, ISO/IEC 13818-2
Audio	MPEG 2 layer I and II, ISO/IEC 13818-3
Data (Additional services for general reception)	EN 301 192
Data (Additional services for closed user groups)	EN 301 192
Technical Services (CA Message sections)	ETR 289

**Note: Higher levels and profiles may be used for the provision of HDTV.*

II.6.3 Other Video and Audio Parameters

Video Frame rate	25 or 50Hz
Aspect Ratio	4:3 or 16:9
Resolution	Full

Audio Sampling Frequency	48kHz
Emphasis	None

II.6.4 Minimum Programme Bit rates

Encoded Video	4.5MBps
Encoded Audio, Stereo Channel	256kBps
Encoded Audio, Mono Channel	96kBps

If the original Programme Service has an Encoded Video bit rate of less than 4.5 MBps, then that Programme service must be relayed at the supplied rate.

The Encoded Video bit rate may be reduced:

1 if the operator can objectively show that their system can provide a Video signal with the equivalent resolution, as an ITU-R grade 4 PAL I signal; and/or

2 if the programme falls into one of the following categories for exemption.

a) Archival footage (Black and white).
b) Footage originated on a non-broadcast format.
c) News bulletins.
d) Parliamentary broadcasts.
e) Educational Programmes

No other programme categories may be broadcast at a lower bit rate.

The Director reserves the right to monitor and assess the licensee's picture quality and any abuse of the exemption above will lead to its withdrawal.

II.6.5 Programme Specific Information

All Transport Streams shall provide the tables and descriptors of Programme Specific Information (PSI) as required by the ISO/IEC standard 13818-1, ETS 300 468 and ETR 211. All items should be used in the manner specified in ETR 211.

Each Transport Stream shall carry the following PSI tables: NIT, PAT, and PMT. Where a Conditional Access system is used, the Transport Stream shall carry a CAT.
The PIDs of all Transport Stream packets in the Transport Stream shall be one of the PIDs defined by ISO/IEC 13818-1 or ETS 300 468 or be described in the CAT, PAT or PMT[7].

II.6.6 Service Information

SI tables and descriptors shall be provided in all Transport Streams, as required by ETS 300 468 and ETR 211, in particular the following:

NIT This must be carried by each transport stream and must describe all the Transport Streams from a specified point of emission regardless of whether they are part of the same network.

[7] Ghost PIDs may be used for test purposes.

SDT This must be carried by each transport stream and must describe all the Transport Streams from a specified point of emission, regardless of whether they are part of the same network. The service descriptors shall carry real and unique service names.

EIT Both the Present EIT and the following one, must be carried by all Transport Streams from a specified point of emission. Each EIT shall carry a short event name with a real name of up to 32 characters. Event transitions shall be accurate matching the actual transmission on the Programme Service to within 1 second.

Advertising breaks may not be regarded as events. Only programme material as defined in ETSI EN 300 468 may be regarded as events. The running status codes must be implemented as in the specification EN 300 468 and according to the guidelines laid down in ETR 211.

Event Pause must be implemented during advertising breaks.

If the Licensee is providing schedule information in a proprietary form, such as an EPG on a Transport Stream, then the aforesaid Transport Stream shall carry the EIT schedule information for that Programme Service or Services for a period of at least 24 hours in advance.

TOT All Transport Streams shall carry TOTs with a time offset descriptor for at least Ireland, the country code is specified in ISO 3166. The values of current time offset and next time offset shall reflect the legal requirement in Ireland at the time of broadcast.

TDT All Transport Streams shall carry this table and this shall be transmitted every 30 seconds.

ST All Transport Streams shall carry this table.

II.6.6.1 Service Information Codes

As defined in ETR 162

II.6.7 Software Updates and Encryption

Changes to software and/or services, should be implemented 'over the air' with the data in the form dictated by EN 301 192.

Encryption data may be included in the Digital Multiplex to enable only authorised subscribers to view certain programmes.

II.6.8 Additional Broadcasting Services

II.6.8.1 Permitted Additional Broadcasting Services.

The transmission of a subtitling EPG or teletext service is permitted. The subtitling system used must conform to ETS 300 743 or any future European standard describing the

implementation of such services. 'Over the air' software updates to set top boxes are also permitted.

II.6.8.2 Additional Broadcasting Services Requiring Approval from the Director of Telecommunications Regulation

Prior approval must be obtained from the Director of Telecommunications Regulation for any additional services, other than those indicated in Section II.6.8.1, which are included within a Digital Multiplex.

II.7 System Performance

II.7.1 Impairment Quality

The performance limits set out in this section apply in the presence of all signals for which the Digital Multiplex System was designed.

There are three main forms of visible interference in a digital television signal. These are exhibited by artefacts; such as an absence of picture, freezing of frames and blocking (where the picture turns into course blocks).

The signal should be free from all such interference, and be present for 99.99% of the time, as scheduled. All reasonable efforts should be made to ensure that any signal or signals under the control of the Digital Multiplex Provider are sufficiently reliable to enable the successful demodulation and decoding of Programme Services by authorised subscribers.

II.8 Safety

II.8.1 General Safety.

The installation and its premises must comply with all relevant statutory safety regulations.

II.8.2 Safety Controls

There shall be a single control to isolate power for the entire installation. If a form of auxiliary power (such as diesel generators or an Un-interruptible Power Supply) is provided, then the same control should isolate these. The 'on' position of such a device must be clearly indicated. Guards may be fitted to the device to prevent accidental operation.

II.9 Installation Certification and Maintenance

II.9.1 Access and Personnel

The licensee shall, on a request made by an authorised officer of the Director of Telecommunications Regulation, facilitate that officer in the inspection[8] of any part of the Digital Multiplex System installation.

Only authorised personnel shall have access to the Digital Multiplex System for the purpose of adjustment and/or maintenance of that equipment.

[8] Inspection shall include the undertaking of measurements.

The licensee shall ensure that all authorised personnel are adequately trained for the functions they are to undertake.

II.9.2 Examination and Testing

When the installation of equipment is complete, the licensee shall examine the station and indicate to the Digital Terrestrial Television Operator whether the installation is ready to commence operation in accordance with these conditions. Permission for on-air testing prior to the examination and commencement of regular service can be obtained. On commencement of operation, the licensee shall inform the Director of the date of commencement and provide certification indicating that the station is operating in accordance with the specified conditions and characteristics.

II.9.3 Maintenance

The Digital Multiplex installation shall be so maintained as to always comply with these conditions. The licensee shall ensure that a suitably qualified person has the necessary technical training, knowledge and practical experience so as to be able to certify that the installation and maintenance of the installation complies with these conditions. The licensee shall examine the installation annually to ensure compliance and shall keep a log indicating the dates and results of these examinations.

A copy of any maintenance programme and the log shall be made available to an authorised officer of the Director of Telecommunications Regulation on request.

II.10 Information to be submitted to the Director

II.10.1 Update of System Information

The licensee shall, upon request from the Director of Telecommunications Regulation, submit in a format specified by the Director: -

details of Programme Services, including Programme Service Provider, position and ID in the Digital Multiplex.

the percentage of capacity available on the Digital Multiplex for Core and/or Secondary services.

all relevant information as requested by the Director.

The licensee shall notify the Director immediately any change occurs.

III. Conditions for the Operation of Conditional Access Systems

1. Definition of a Conditional Access System/Service
   A system or service or any part thereof controlling access to digital television services, so that only authorised subscribers receive such services. This includes *Encryption Services*, that is to say, any encryption of signals for digital television services; and the conveyance by such a system of encryption information.

2 Subscriber Authorisation Services, that is to say
   a) the means to actuate or control remotely or otherwise decoders or any other such device; or
   b) the initial transmission of messages connected with the aforesaid.

3. Subscriber Management Services, that is to say
   a) the preparation and/or supply to subscribers of essential components; or
   b) the preparation from subscribers orders of instruction for authorisation signals, for transmission to decoders; or
   c) both.

4. Technical Services, such as
   a) 1,2 and 3 above; or
   b) any part thereof which is of a technical nature, which prevents the digitally transmitted services of the Programme Service provider, or the Programme Service Multiplex provider, being accessed by subscribers.

General Definitions

Programme Service Provider
A compiler of programme content into a programme service.

Programme Service Multiplex
A signal containing more than one Programme Service with associated and other data.

Programme Service Multiplex Provider
Provider of the above service.

Conditional Access Service Provider
A provider of conditional access services or operator of conditional access systems

Set Top Box
A device, which can receive and demodulate fully a scrambled Programme Service, which when a normal television is connected to it enables a subscriber to view such a service.

European Standards Body
A body such as ETSI, the IEC or CENELEC, who set standards for equipment or services.

Programme Redistribution Operator
The operator of a system for the retransmission or relay of programme service multiplexes on a point-to-multipoint basis over-the-air or by cable.

Transcontrol
The means where, upon payment of any relevant charges, a Programme Redistribution Operator may access Programme Services and retransmit them using their own Technical Services.

Encryption
A means of encoding a Programme Service, such that it is only available to subscribers who are authorised to avail of such a service.

Condition 1, Standards

1. Licensees in the State, intending to use the above Conditional Access Systems as defined or part thereof, must use either of the systems referred to in a) or b) below.

    a) Multicrypt technology, as specified in CENELEC standards EN50221 and R 206001.
    b) Simulcrypt technology, as specified in ETSI standards TS 101 197-1, 101 197-2.

2. Licensees must ensure that any Set Top Box offered for sale, lease, rent or otherwise made available by them is fully labelled to indicate the equipment functionality and that user manuals clearly document any limitations of the equipment.

Condition 2, Service Obligations for Conditional Access Service Providers.

1. Any Technical Services, in respect of the licensee's Conditional Access System, offered by the licensee to a programme service provider or a programme service multiplex provider shall be offered on a fair, reasonable and non-discriminatory basis.

2. If any Technical Service is provided under Paragraph 2.1 the licensee shall co-operate with the programme service provider or programme service multiplex provider and do whatever is required, within reason, to ensure the interconnection and or interoperability of the relevant system and all associated apparatus for provision and maintenance of Technical Services.

3. The licensee shall not cause the programme service provider or programme service multiplex provider to incur costs or incremental expenditure in interfacing with the licensee's apparatus or systems greater than the initial charge for the Technical Service or disproportionate to the benefit to be gained from the use of the Technical Services.

Condition 3, Cost Effective Transcontrol

1. Where;

   the licensee provides to a programme service provider or programme service multiplex provider any Technical Service in relation to the provision of digital video services; and the programme service provider's or programme service multiplex provider's digital video services are provided to a programme redistribution operator for the purpose of redistribution:

   The licensee shall co-operate with and assist the programme redistribution operator, providing all information and assistance necessary to facilitate cost effective transcontrol, whereby the programme redistribution operator can transcontrol and redistribute the digital video service using its own Technical Services.

2. Where,

   The licensee does not provide any Technical Services but contracts a conditional access service provider to provide Technical Service in relation to the provision of digital video services, which digital video services are then provided to a programme redistribution operator for the purpose of redistribution:

   The programme service multiplex provider or programme redistribution operator shall make all reasonable efforts to ensure that the Conditional Access Service provider co-operates and assists the programme redistribution operator, providing all information and assistance necessary to facilitate cost-effective transcontrol, whereby the programme redistribution operator can transcontrol and redistribute the digital video service using its own Technical Services.

Condition 4, Prohibition on Linked Sales

1. The licensee shall not attach any condition on the provision of Technical Services where such condition requires the purchase of:

   a) another service from the licensee, except where the service is essential for the operation of the Technical Service requested; or

   b) any apparatus or system, unless the requested Technical Service cannot be provide without such apparatus or system.

2. The licensee may offer bulk discounts on more favourable terms and conditions in respect of a quantity of Technical Services and apparatus it supplies; however, such discount charges (or favourable terms and conditions) should not be more favourable than would have been available for the provision a single Technical Service or apparatus alone.

IV. Draft Technical Conditions – Digital Terrestrial Television Licence

IV.1 Purpose

This document specifies the general conditions attached to a licence for a Digital Terrestrial Television System.

IV.2 Summary Information.

These conditions detail the characteristics of the equipment that need to be considered for the purposes of frequency spectrum management, safety and the provision of a satisfactory service to the subscriber. They do not include detailed equipment specifications.

These conditions also detail those characteristics relevant for ensuring compatibility with other authorised users of the radio frequency spectrum.

The parameters specified in this document are mainly based on those given in ETSI and CENELEC documents: EN 300 744, EN 301 192, TR 101 190 and ETS 300 743

For issues not referred to by this document, the licensee shall comply with standards set out in any relevant ETSI, IEC or CENELEC standard relating to DVB.

The Director of Telecommunications Regulation does not require evidence of type approval of equipment. Instead a procedure of system audits will apply.

The conditions specified in this document may be revised and/or added to from time to time.

Nothing contained in these conditions shall absolve the licensee from any requirement in law to obtain whatever additional consents, permissions, authorisations, or licences necessary for the exercise of entitlements under the licence.

IV.3 Definitions and Glossary of Terms

IV.3.1 Digital Terrestrial Television System

A Digital Terrestrial Television System (DTT) is a system used for the transmission of a modulated data stream containing Digital Multiplexes in the broadcasting bands III, IV and V intended for direct reception by the general public.

IV.3.2 Station

One or more transmitters or receivers, or a combination of transmitters and receivers, including the associated equipment necessary, at one location implementing a digital terrestrial television system.

IV.3.3 Effective Antenna Height (Eff. Ht.)

The height in metres above the average level of the ground between distances of 3 and 15 Km from the transmitter. This is calculated for each of 36 evenly spaced radials (10 degree separation) starting from true North[9].

Note: This takes into account both the height of the site (a.s.l) and the height of the mast (a.g.l).

IV.3.4 Omnidirectional Antenna.

An antenna having a horizontal radiation pattern with variations of 2 dB, or less ,over 360 degrees.

IV.3.5 Effective Radiated Power (e.r.p.) (in a given direction)

The product of the power supplied to the antenna and its gain in a given direction relative to a half-wave dipole. This is usually expressed in decibels relative to one watt (dBW).

IV.3.6 ODTR

Office of the Director of Telecommunications Regulation.

IV.3.7 Director

The Director of Telecommunications Regulation.

IV.3.8 Carrier to Noise ratio

The difference in decibels between the carrier level at a given point in the system and the noise level at that point (measured within a bandwidth appropriate to the television or radio system in use).

IV.3.9 Digital Multiplex

A signal (which in its baseband form is a DVB transport stream, but is a signal with a bandwidth of 8MHz when modulated) containing more than one programme service, with associated and other data.

IV.3.10 European Standards Body

A Body such as ETSI IEC or CENELEC, who specify standards for equipment or services.

[9]This can be calculated by the ODTR using the national grid reference for the transmitting station, consisting of one letter and six digits, provided the site height above sea level and the antenna height above ground level are supplied.

IV.4 System Transparency

Television

Unless specifically excluded by the licence, the Digital Terrestrial Television System shall be designed in such a manner that it is capable of relaying all components within a Programme Service intended for general reception[10] [11].

Note: - This would include EPGs, TeleText and additional sound channels associated with the vision material. (see section IV.6.4.1)

IV.5 System Engineering

IV.5.1 General

The mechanical and electrical construction of the Digital Terrestrial Television System shall be in accordance with best practice.

The practice of good system engineering is a necessary requirement to ensure the provision of a high quality service and the minimising of the potential for interference to, or from, radiocommunication services operating in accordance with the Irish Table of Frequency Allocations.

IV.5.2 Transmitter Construction.

IV.5.2.1 General

All controls, meters, indicators and terminals shall be clearly labelled. Details of the main and any auxiliary power supply from which the equipment is intended to operate shall be clearly indicated. The equipment should be housed in one complete unit.

IV.5.2.2 Controls

Controls which, when wrongly adjusted, increase the risk of causing interference, or of improper functioning of the transmitter, shall be immediately accessible to qualified personnel only.

[10] While not intended for reception by the general public, the broadcast organisations include Test signals in the Transport Stream. The system must be transparent to these signals, so as to facilitate performance measurements.

[11] While the Digital Terrestrial Television System shall be designed to relay all the components within a television signal, the actual components relayed shall take account of the copyright arrangements between the licensee and the service provider.

IV.5.2.3 Manufacturer's Identification.

The transmitter and associated equipment shall be labelled with the manufacturer's trademark, type designation and serial number. The label shall be fitted on the outside of the transmitter and associated equipment, and shall be clearly readable, non-removable and indelible.

IV.5.2.4 Weather Protection.

All apparatus and cables exposed to weather, corrosive atmosphere, or other adverse conditions shall be so constructed, or protected, as may be necessary to prevent danger, or interference, arising from such exposure.

IV.6 System Standards

IV.6.1 Transmission Standard

The Transmission Standard used shall be the DVB-T standard as specified in EN 300 744.

IV.6.2 Summary List of Parameters

IV.6.2.1 Frequency Spacing and Bands of Operation

Nominal radio-frequency channel bandwidth of a Digital Multiplex	8 MHz
Frequency Bands (Broadcasting bands)	III, IV and V

IV.6.2.2 Modulation

Modulation (COFDM)	X7F
Number of carriers	6817
Carrier Modulation	QPSK, 16QAM or 64QAM
Guard Interval (Single Frequency Network)* (Multi Frequency Network or SFN where the interstation distance is less than 8.5km)	 1/8 1/32

**Note: Where a station that is a member of an SFN loses synchronisation, then the output of that station should be reduced by 6dB, or the station should cease transmission, to avoid interference with the remaining synchronised stations.*

IV.6.2.3 Emission Designation

8M00X7FXF

IV.6.3 Software Updates

Changes to software, and/or services, should be implemented 'over the air' with the data in the form dictated by EN 301 192.

Encryption data may be included in the Digital Multiplex to enable only authorised subscribers to view certain programmes.

IV.6.4 Additional Broadcasting Services

IV.6.4.1 Permitted Additional Broadcasting Services.

The transmission of a subtitling EPG or teletext service is permitted. The system used must conform to ETS 300 743, or any future European standard describing the implementation of such services. 'Over the air' software updates to Set Top Boxes are also permitted.

IV.6.4.2 Additional Broadcasting Services Requiring Approval from the Director of Telecommunications Regulation

Prior approval must be obtained from the Director of Telecommunications Regulation for any additional services, other than those indicated in Section IV.6.4.1, included within a Digital Multiplex.

IV.7 System Performance

IV.7.1 Impairment Quality

The performance limits set out in this section apply in the presence of all signals for which the Digital Terrestrial Television System was designed.

There are three main forms of visible interference in a digital television signal. These are exhibited by artefacts; such as an absence of picture, freezing of frames and blocking (where the picture turns into course blocks).

The signal should be free from all such interference for 99% of the time at 99% of locations served.

IV.7.2 Frequency Stability .

The equipment shall be designed to operate on the assigned frequency in the frequency Bands III, IV and V only.

The frequency tolerance shall be

Fs = Bw/100N

Fs	Frequency Stability
Bw	Bandwidth (8 MHz)
N	No of carriers

Or

- ± 250 Hz, for transmitters for which the licence characteristics do not require the use of offset and are part of a Multi Frequency Network.

- ± 1 Hz, for transmitters for which the licence characteristics require the use of offset or are part of a single frequency network

The transmitter frequency adjustment control shall be accessible to qualified personnel only.

IV.7.3 Power

As the total effective radiated power is the sum of the transmitter output power (in dBW) and the gain of the antenna (in dB), the output power of transmitter shall be adjustable so that the value of the effective radiated power permitted for each station is not exceeded.

If the equipment is designed to operate with different levels of power, the rated output power for each power level must be declared by the manufacturer.

IV.7.4 Maximum Permitted Levels of Spurious Emissions

The maximum permitted level of spurious emission for a transmitting station shall be

- at least 40 dB below the transmitter e.r.p. and shall not in any case exceed -46 dBW for a transmitter e.r.p. less than, or equal to, 14dBW.

- at least 60dB below the transmitter e.r.p. and shall not in any case exceed -17 dBW for transmitter e.r.p. above 14 dBW.

IV.8 OVERVIEW OF NATIONAL BAND PLAN.

IV.8.1 Frequency Channels and Standard Groups

The frequency bands for broadcasting are bands III, IV and V.

Due to the phased development of the Digital Terrestrial Television System, a station may initially have coverage in excess of the planned service area. With the introduction of additional stations, it is to be expected that this extended service area will be reduced.

IV.8.2 Assignment List

A list of the Assignments, which constitute the national plan, will be maintained by the Director.

IV.8.3 Planning Parameters

The planning parameters used by the Director correspond to those recommended by the ITU-R. A summary of these parameters is given below.

Parameter	**Description**	**Value used**
Propagation using terrain data	Wanted Signal: Unwanted Signal, Domestic: Unwanted Signal, DVB-T and RBL[12]:	50% location, 50% time 50% location, 5% time 50% location, 1% time
Quality of service	Continuous Interference: Tropospheric Interference:	Grade 4 [13] Grade 3 [14]
Polarisation Discrimination	Domestic: RBL:	15 dB 20 dB

[12]Radio Broadcasting Link
[13]Grade 4: Perceptible, but not annoying
[14]Grade 3: Slightly annoying

Parameter	Description	Value used
Maximum Receive antenna directivity	Domestic: RBL:	16 dB 20 dB
Analogue Protection Ratios	Co-channel, continuous:	52 dB ,no offset 40 dB, 3/12 line offset
	Co-channel, continuous: (PAL I interfered with by DVB-T 8 MHz)	41 dB
	Co-channel, tropospheric:	45 dB, no offset 30 dB, 3/12 line offset
	Co-channel, tropospheric: (PAL I interfered with by DVB-T 8 MHz)	37 dB
	Lower adjacent channel	-9 dB, tropospheric
	Analogue vision signal Interfered with by lower adjacent channel DVB-T 8MHz	-8 dB, tropospheric -4 dB, continuous
	Upper adjacent channel	-12 dB, tropospheric
	Analogue vision signal Interfered with by upper adjacent channel DVB-T 8MHz	-10 dB, tropospheric -6 dB, Continuous
	Image channel Local oscillator channel	-10 dB, tropospheric -10 dB, tropospheric
Analogue Protection Ratios, Precision offset	Continuous, no offset Tropospheric, no offset Continuous, 3/12 line offset Tropospshreric, 3/12 line offset	36 dB 32 dB 27 dB 22 dB
DVB-T Protection Ratios, 64QAM	Co-channel DVB-T Co-Channel analogue Lower adjacent channel analogue Upper adjacent channel analogue	20 dB 4 dB -34 dB -38 dB

IV.8.4 Minimum Field Strength

The minimum field strengths used in planning are:

+55dB(μV/m) for band III
(175 MHz to 230 MHz)
+65dB(μV/m) for band IV
(470 MHz to 582 MHz)
+70dB(μV/m) for band V
(582 MHz to 862 MHz)

The above values are for 10 metres above ground level.
Protection cannot be sought for locations with a field strength below the values mentioned above.

IV.9 SAFETY

IV.9.1 General Safety.

The station and its premises must comply with all relevant statutory safety regulations.

IV.9.2 Safety Controls

There shall be a single control to isolate power for the entire installation. If a form of auxiliary power (such as diesel generators or an Un-interruptible Power Supply) is provided, then the same control should isolate these. The 'on' position of such a device must be clearly indicated. Guards may be fitted to the device to prevent accidental operation.

IV.9.3 Safety Standards

The system must comply with the following requirements:

I.S./EN 60215 : 1990
Safety Requirements for Radio Transmitting Equipment.

ENV50166-2
Human exposure to electromagnetic fields
High frequency (10 kHz to 300GHz)

These standards are available from the National Standards Authority of Ireland[15].

IV.10 STATION CERTIFICATION AND MAINTENANCE

IV.10.1 Access and Personnel

The licensee shall, on a request made by an authorised officer of the Director of Telecommunications Regulation, facilitate that officer in the inspection[16] of any part of the Digital Terrestrial Television System.

Only authorised personnel shall have access to the Transmission Equipment for the purpose of adjustment and/or maintenance of that equipment.

The licensee shall ensure that all authorised personnel are adequately trained for the functions they are to undertake.

[15]Please note that the standard ENV 50166-2 is a European Pre standard and shall be replaced by the respective European Standard when it becomes available.
[16] Inspection shall include the undertaking of measurements

IV.10.2 Examination and Testing

Adequate and accurately calibrated test equipment shall be made available for non-radiative measurements of transmitter power, modulation characteristics and spurious emissions whilst the station is undergoing initial alignment and regular maintenance.

Permission for installation and commissioning transmissions prior to the examination and commencement of regular service can be obtained. On commencement of operation, the licensee shall inform the Director of the date of commencement and provide certification indicating that the station is operating in accordance with the specified conditions and characteristics.

IV.10.3 Maintenance

The transmission installation shall be so maintained as to always comply with these conditions. The licensee shall ensure that a suitably qualified person has the necessary technical training, knowledge and practical experience so as to be able to certify that the installation and maintenance of the station complies with these conditions. The licensee shall examine a station annually to ensure compliance and shall keep a log indicating the dates, and results, of these examinations.

A copy of any maintenance programme and the log shall be made available to an authorised officer of the Director of Telecommunications Regulation on request.

IV.11 Information to be submitted to the Director

IV.11.1 Update of System Information

The licensee shall, upon request from the Director of Telecommunications Regulation, submit:

An up to date frequency plan indicating the Digital Multiplex on any given frequency channel. The licensee shall notify the Director immediately any change occurs.

An updated network diagram/map of their system, clearly indicating the most up to date geographical area of operation of their Digital Terrestrial Television System.

IV.12 Additional and Modified Assignments

IV.12.1 Requisite information

The licensee shall provide the Director with all the necessary details in support of an application for an additional assignment, or a modification of an existing assignment.

IV.12.2 Examination

The licensee shall examine any proposal for an additional, or modified, assignment with regard to other persons having assignments in the same frequency segment.

IV.12.3 Field Strength Measurements

It may be necessary to supply field strength measurements in support of an application or an interference complaint.

IV.12.4 International Agreements

The Director is bound by the provisions of the Radio Regulations and the Final Acts of the European VHF/UHF Broadcasting Conference, Stockholm 1961, in relation to aspects of UHF broadcast television services. These agreements require the Director to undertake certain co-ordination and registration procedures when considering additions / modifications of the assignment plan.

A minimum of three months is allowed for co-ordination. However, co-ordination of additional or modified assignments cannot be guaranteed. The licensee shall allow adequate time in planning, and provide the Director with the relevant information, to ensure compliance with these agreements.