Licence issued by

Director of Telecommunications Regulation Etain Doyle

To

Radio Telefís Éireann

Document Number: ODTR 00/022 **23 February 2000**

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: http://www.odtr.ie

Licence issued by the Director of Telecommunications Regulation to

Radio Telefís Éireann

WHEREAS Section 3 of the Broadcasting Authority Act, 1960, provided for the establishment of an authority to be known as Radio Éireann ("the Authority");

WHEREAS by Order of the Minister, pursuant to Section 2 of that Act, the Authority was so established on the first day of June, 1960, with the general functions set out in Section 16 of that Act;

WHEREAS by virtue of Section 3 of the Broadcasting Authority (Amendment) Act, 1966, the corporate name of the Authority was changed from Radio Éireann to Radio Telefís Éireann.

AND WHEREAS the Authority is empowered in particular to establish, maintain and operate broadcasting stations and to acquire, install and operate apparatus for wireless telegraphy, which powers may not, however, be exercised save under Licence and in accordance with any conditions attached to such Licence.

NOW I, Etain Doyle, Director of Telecommunications Regulation, in exercise of the powers conferred on me by Section 4 of the Telecommunications (Miscellaneous Provisions) Act, 1996 (No. 34 of 1996), as adapted by the Transport, Energy and Communications (Alteration of Name of Department and Title of Minister) Order, 1997 (S.I. No. 299 of 1997), and in accordance with Section 16(3) of the Broadcasting Authority Act, 1960 hereby grant to the Authority Licence as follows, subject to the conditions set out hereunder*:*

Authorisation

1. For the purpose of carrying out the functions authorised by the Broadcasting Authority Acts, 1960 to 1993, the Licensee is authorised to:

   (a) maintain and operate the broadcasting stations recorded in the Schedule in Part II of this Licence and in accordance with the provisions set out therein and not otherwise, except with the written consent of the Director,

   (b) establish, maintain and operate additional broadcasting stations at such places, and in accordance with such provisions, as the Director may from time to time approve in writing, and any such approved additional broadcasting stations shall thereupon be deemed to be added to the Schedule in Part II of this Licence,

   (c) acquire, install and operate such apparatus for wireless telegraphy as is incidental to the operation of the broadcasting stations mentioned at (a) and (b) as the Director may approve in writing.

2. The Licensee shall not operate any broadcasting station without the Director's specific approval in writing in respect of: -
   (i) characteristic frequency,
   (ii) name and geographical co-ordinates of broadcasting stations,
   (iii) effective radiated power,
   (iv) antenna characteristics, and
   (v) antenna height.

3. The Licensee shall comply with the directions given by the Director in writing in relation to tolerance on characteristic frequency and radiation of spurious emissions or in relation, in any other respect, to the technical operation of the broadcasting stations and apparatus for wireless telegraphy mentioned in the preceding paragraphs.

4. The establishment and operation of radio and television broadcasting stations shall be in accordance with the conditions relating to the establishment and operation of analogue radio and television broadcasting stations set out in Part I of this Licence.

5. The Licensee shall, on being instructed to do so by the Director, inspect and test any broadcasting station and wireless telegraphy apparatus in order to establish that the technical parameters of the installation and its working conforms to the conditions of this Licence. Any such technical audit shall relate to such matters and be in such format as the Director may so direct. When the Director has requested a technical audit, the Licensee shall, within 60 days after the request of the Director, furnish to the Director a full report in writing of the audit. The Licensee shall make available to the Director all relevant documents and records relating to such inspection and test.

6. The broadcasting stations and the apparatus for wireless telegraphy, wherever installed, shall, at all reasonable times, be subject to such inspection and testing by officers authorised in that connection by the Director as is necessary to establish that the technical parameters of the installations and their workings conform to the conditions of this Licence. The Licensee shall make available to the Director's authorised officers all relevant documents and records necessary for such inspection and test.

7. All broadcasting stations and associated apparatus and equipment for wireless telegraphy, wherever established, shall, at the Licensee's expense, be designed, constructed, installed, maintained and used, and, if necessary, altered, so that no avoidable interference with any State or other authorised apparatus for wireless telegraphy and no avoidable injurious affection to any authorised telegraphic line or authorised telecommunication service, wherever placed and by whomsoever used, is caused.

8. If any injurious affection or interference (whether avoidable or not) is caused as aforesaid to any such telegraphic line or telecommunication service, or to any State or other authorised apparatus for wireless telegraphy which was in existence prior to the broadcasting station or apparatus for wireless telegraphy causing the interference, the Licensee shall, if the Director considers it reasonable so to request, pay to the relevant party the amount of the expenses incurred in providing protection for such telegraphic line or telecommunication service against the interference, or in substituting for such line or service a line or service of the same or a different description in another place

and providing for the substituted line or service such protection against the injurious affection as the Director considers necessary or expedient.

9. The Director shall not be liable for any costs incurred by the Licensee in averting any interference with any State or other authorised apparatus for wireless telegraphy, or any injurious affection to any authorised telegraphic line or authorised telecommunication service.

10. If the Director, being satisfied that the use of any broadcasting station, apparatus or equipment of the Licensee, or of wireless telegraphy apparatus made available and worked by any other body on behalf of the Licensee, is causing, or is likely to cause, interference with any wireless telegraphy used for the purposes of any safety of life service, or for any purpose on which the safety of any person or of any vessel, aircraft, or vehicle may depend, gives notice to the Licensee requiring the use of that station, apparatus or equipment to cease forthwith, or on a date and at a time stated in the notice, the use thereof shall cease accordingly and shall not be resumed until such notice has been withdrawn by the Director. The Licensee is required to take whatever such measures as may be specified by the Director in the notice.

11. The broadcasting stations which are the subject of this Licence shall, at all times, be operated by persons properly authorised by the Licensee and all reasonable steps shall be taken to ensure that access to the broadcasting stations cannot be obtained by unauthorised persons at any time.

Other information and inspections

12. (1) The Licensee shall -

(a) from time to time, provide such information as the Director may require by notice in writing served on the Licensee, demonstrating compliance with the Licence terms and providing the Director with information as to the extent of the Licensee's operations;

(b) keep all or any records which the Director, from time to time, informs the Licensee that he or she requires to be kept;

(c) upon becoming aware of the occurrence of any insolvency related event, or of any event likely to materially affect his or her ability to

comply with the conditions set out or referred to in the Licence, notify the Director of that fact;

(d) within 28 days after the occurrence of any of the following events notify the Director of such an occurrence:

(i) any change in the persons having control of the Licensee, or in the directors of the Licensee, or in the directors of any body corporate having control of the Licensee; and

(ii) any change in the persons having any interest in the Licensee, or in a body corporate having direct or indirect control of the Licensee such that a person, or group of persons acting together,

(I) has acquired an interest of more than 20% in aggregate in the Licensee; or

(II) having (or having had) an interest of more than 20% in aggregate in the Licensee, has increased or decreased that interest;

For the purposes of this subparagraph, control means the possession, directly or indirectly, of the power to direct, or cause the direction of, the management policies, whether through ownership of voting rights, by contract, or otherwise;

(e) (i) where the Licensee is incorporated in the State:

(I) within 7 days after the date upon which it is required to be filed with the Registrar of Companies, pursuant to section 127 of the Companies Act, 1963, furnish the Director with a copy of the annual return of the Licensee, or of any person who controls the Licensee;

(II) within 7 days of its circulation to the shareholders of the Licensee, furnish the Director with a copy of the annual report and accounts of the Licensee, or of any person who controls the Licensee;

(ii) where the Licensee is not incorporated in the State, furnish the Director with a copy of any returns, reports, accounts, or other information required to be prepared by the Licensee, or any person who controls the Licensee, in accordance with any laws

under which the Licensee is incorporated or, at the request of the Director, a document to the like effect of any of the documents referred to at subparagraph (i), at such times, and in such forms, as the Director may specify from time to time in a notice served on the Licensee.

(f) on request from an authorised officer, permit the authorised officer, at all reasonable times, to inspect any records which the Director, under the terms of this Licence, requires to be kept.

(2) The Director may arrange for an authorised officer to carry out an audit, or for the carrying out of an independent audit, or may require the Licensee to carry out an audit, or to arrange for an independent audit, to ensure compliance with the Licence; and the Licensee shall allow the authorised officer, or any independent auditor, such access to any premises, equipment or any part of the system, or to inspect, take copies of and acquire such information, as may be required in order to carry out the audit. The cost associated with any independent audit conducted under this paragraph shall be the responsibility of the Licensee. Any information furnished to the Director under and in accordance with the Licence may, if the Director considers it proper so to do, be published by the Director.

Compliance

13. The Licensee shall comply with any direction, requirement, or notice given to him, or her, by the Director in respect of any matter which direction, requirement or notice is, in the opinion of the Director, appropriate, having regard to the functions of the Director, and any other requirements under applicable national and European Community law.

Restrictions on the Licensee

14. The Licensee shall not, without the prior consent in writing of the Director (such consent not to be unreasonably withheld), assign the Licence or any of the powers, duties or functions conferred by it, or lease, or let the Licence or otherwise transfer to another person the benefit, or any benefits, of the Licence. Any consent to transfer

granted by the Director under this paragraph, may be subject to such further conditions as the Director considers appropriate in the circumstances.

Limitations of Licence

15.

Nothing in this Licence shall authorise the Licensee to do anything for which a Licence is otherwise required under the Telegraph Acts, 1863 to 1953, the Wireless Telegraphy Acts, 1926 to 1988, the Postal and Telecommunications Services Act, 1983, any Act amending those Acts or any other Act, Regulation or other measure which may impose a licensing requirement. The Licensee shall be responsible for obtaining such way leave and other approvals, consents, Licences, permissions and authorities as may be necessary.

16. The provisions of the International Telecommunication Convention, and of any international convention or international agreement relating to broadcasting to which the State may be, or may become, a party during the continuance of this Licence, shall be complied with.

Variation of Licence

17. The Director may, following such public consultation (if any) as he or she considers appropriate, by notice in writing served on the licensee, amend or vary the Licence –

(a) with the consent of the Licensee; or

(b) without the consent of the Licensee, provided that the Licensee has been given a reasonable opportunity to make representation to the Director regarding the proposed amendment or variation and that the Director has considered those representation.

Licence Duration

18. This Licence shall operate from 1st March, 2000 and, without prejudice to the right of the Director to terminate or suspend the Licence in the case of non-compliance with the provisions of the Licence by the Licensee, shall be valid and continue in force until 28 February, 2005, and shall then expire.

Sanctions for breach of Licence

19. (1) If the Director has any reason to believe that the Licensee has failed to comply with any provision, or with any condition, set out or referred to in the Licence, the Director may serve a notice on the Licensee-

(a) specifying how, in the opinion of the Director, the Licensee has failed to comply with the relevant provision or condition, and

(b) giving the Licensee, within 14 days of the date of the notice or such further period as the Director considers appropriate, the opportunity to make representations about the alleged failure to comply.

(2) If, after consideration of such representations, if any, the Director is satisfied that the Licensee has failed to comply with the relevant provision or condition then the Director may serve a notice on the Licensee -

(a) specifying how, in the opinion of the Director, the Licensee has failed to comply with the relevant provision or condition, and

(b) stating that unless the licensee takes, within the period specified in the notice, specified steps to remedy the failure, the Director may impose any or any number of the sanctions listed below:

(i) suspend the Licence;

(ii) reduce the Licence term by a period not exceeding 2 years;

(iii) amend the Licence; or

(iv) revoke the Licence;

and may publish the notice.

(3) If at the end of the period specified in any notice under paragraph (2) the Director is satisfied that;

(a) the Licensee has failed to take the steps notified in the notice; and

(b) it would have been reasonably practicable for the Licensee to take those steps,

the Director may, by further notice, impose the relevant sanction specified in the notice under paragraph (2), and may publish such further notice.

(4) Following an application in that behalf by the Licensee, the Director may withdraw any notice given under paragraph (2) or (3) by a further notice, if the Director is satisfied that this is appropriate because of the Licensee's conduct

since the date of the notice given under paragraph (2) or, as the case may be, paragraph (3).

(5) Where the Licence term is reduced pursuant to paragraph (3), the Director may, subject to such conditions as the Director considers appropriate, restore the original Licence term where he or she considers restoration to be appropriate, having regard, inter alia, to the behaviour of the Licensee since the imposition of the sanction of reduction of the Licence term. Any decision of the Director in relation to restoration of the Licence term shall be notified to the Licensee, together with the reasons for such decision, and a notice of the restoration of the Licence term shall be published by the Director.

Licence revocation

20. (1) Without prejudice to the aforementioned sanctions which the Director may impose, the Director may revoke the Licence in any of the following circumstances:

(a) where, in the opinion of the Director, such revocation is required for the purpose of complying with any laws for the time being in force;

(b) if any insolvency related event occurs in respect of the Licensee; or

(c) if the Licensee agrees with the Director in writing that the Licence should be revoked.

(2) Prior to any such revocation, the Director shall serve notice on the Licensee specifying the reason therefor and shall give the Licensee a reasonable opportunity to make representations about the proposed revocation.

21. Any approval, direction or notice of the Director given under this Licence may be under the hand of any officer of the Director authorised in that connection. An authorised officer shall, when exercising any power conferred on him, or her, by this Licence, if so requested, produce to any person affected a copy of his or her appointment as such authorised officer.

22. The Director reserves the right to investigate and regulate charges imposed by the Licensee for services provided pursuant to this Licence, and this Licence shall be construed accordingly.

Force majeure events

23. If a force majeure event occurs which prevents the Licensee from complying with any of the provisions of the Licence, or any of the conditions set out, or referred to, in the Licence:

(a) the Licensee shall, as soon as reasonably practicable, notify the Director of that fact, of the nature of the event and of the manner in which and the extent to which the Licensee is prevented from so complying, and

(b) the obligation to comply with the provisions or conditions shall be suspended for so long as the event continues to occur, but in each case only if and to the extent that the inability to comply could not have been prevented by taking steps specifically required under those provisions or conditions, or by taking other reasonable precautions, and the inability cannot reasonably be overcome by the Licensee.

Definitions

24. In this Licence,

(a) a reference to a Schedule is to a Schedule to this Licence, unless it is indicated that reference to some enactment is intended;

(b) a reference to a paragraph or subparagraph is to the paragraph or subparagraph of the provision in which the reference occurs, unless it is indicated that reference to some other provision is intended

(c) a reference to an enactment shall be construed as a reference to the enactment as amended or extended by or under any subsequent enactment.

25. In this Licence, except where the subject or context requires otherwise, the following expressions have the meanings hereby assigned to them, that is to say: -

"authorised officer" means a person appointed by the Director in writing to be an authorised officer for the purposes of Paragraphs 6,12 and 21 of the Licence;

"broadcasting station" has the same meeting as in the Wireless Telegraphy Acts, 1926-1988;

"Director" means the Director of Telecommunications Regulation appointed under the Telecommunications (Miscellaneous Provisions) Act, 1996 (No. 34 of 1996);

"force majeure event" means any of the following:

(a) fire, flood, earthquake, elements of nature or act of God;

(b) riot, civil disorder or act of war; and

(c) strikes or other industrial action (unless the action affects only the Licensee);

"injurious affection" in relation to a telegraphic line or telecommunication service means any interruption of, interference with, or impairment of communication by means of such line or service;

"insolvency related event" in respect of the Licensee means any of the following:

(a) becoming insolvent, or holding a meeting with or making a composition or arrangement with creditors, or putting a proposal to creditors for a voluntary arrangement for a composition of debts or a scheme of arrangement, or taking any preparatory steps in relation to any of the foregoing;

(b) having a receiver or similar official or other encumbrancer take possession of or be appointed over or having any distress, execution or other process levied or enforced on the whole or any substantial part of the assets of the Licensee (and not discharged within 7 days);

(c) ceasing or threatening to cease to carry on business or becoming unable or being deemed to be unable to pay debts within the meaning of section 214 of the Companies Act, 1963 (No. 33 of 1963);

(d) having a petition presented, or making any other form of application for bankruptcy or winding-up of the Licensee, or the appointment of an examiner or similar official to the Licensee or any preparatory steps being taken in relation to any of them or convening a meeting or taking any preparatory or other steps to convene a meeting for the winding up, bankruptcy or dissolution of the Licensee (other than for the purposes of a solvent amalgamation or reconstruction); and

(e) having any event analogous to any event referred to in paragraphs (a) to (d) occur under the laws under which the Licensee is incorporated;

"interference" means radiated, conducted or induced electromagnetic energy, which militates against the working of apparatus for wireless telegraphy;

"International Telecommunication Convention" means the International Telecommunication Convention signed at Nairobi on the 6th day of November 1982 and the Radio Regulations and additional Radio Regulations in force thereunder, and includes any Convention and Regulations which may from time to time be in force in substitution therefor, or in amendment thereof;

"Licensee" means the holder of the Licence, in this case Radio Telefís Éireann;

"telegraphic line" has the same meaning as in the Telegraph Act, 1878;

"wireless telegraphy" and "apparatus for wireless telegraphy" have the same meaning as in the Wireless Telegraphy Acts, 1926 to 1988.

Etain Doyle,
Director.
Dated this 23rd day of February, 2000

PART II

CONDITIONS RELATING TO THE ESTABLISHMENT AND OPERATION OF ANALOGUE RADIO AND TELEVISION BROADCASTING STATIONS

1. PURPOSE

This document specifies the general conditions attached to a licence for the establishment maintenance and operation of broadcasting stations. These conditions are set out in accordance with Section 16 (3) of the Broadcasting Authority Act, 1960.

2. GENERAL

2.1 These conditions detail the characteristics of the equipment required for the purposes of frequency spectrum management and safety and do not include detailed equipment specifications.

2.2 Evidence of type approval of equipment is not required by the Director[1]. Instead a procedure of station certification by a suitably qualified person, will apply.

2.3 Procedures for the modification of or addition of a station assignment are also specified in this document.

2.4 The technical parameters specified in this document are in accordance with values specified in the Radio Regulations (1998), by ITU-R Study Group 11 (Television), in the Final Acts of the European Broadcasting Conference Stockholm 1961, in the Multilateral Co-ordination Agreement of 1997, in the Final Acts of the Regional Administrative LF/MF Broadcasting Conference (Regions 1 and 3), Geneva 1975, and in the Final Acts of the Regional Administrative Conference for the planning of VHF Sound Broadcasting, Geneva 1984.

2.5 The conditions specified in this document may be varied or added to from time to time by the Director as required.

2.6 In cases of doubt regarding the interpretation of these conditions, the decision of the Director will be final.

3. DEFINITIONS AND GLOSSARY OF TERMS

3.1 Radio Regulations

Radio Regulations, Edition of 1998, as published by the International Telecommunications Union (ITU).

3.2 Assignments

A radio frequency or radio frequency channel for which authorisation by the Office of the Director of Telecommunication Regulation has been granted for its use at a specified station with specified characteristics.

3.3 Station

One or more transmitters or receivers or a combination of transmitters and receivers, including the associated equipment necessary, at one location for the purpose of carrying on a broadcasting service.

3.4 Geneva 1975 Agreement

---

[1] It is recommended that broadcasting transmitters comply with any appropriate European Telecommunications Standard.

The Final Acts of the Regional Administrative LF/MF Broadcasting Conference (Regions 1 and 3), Geneva 1975. An updated plan of assignments constitutes part of this Agreement.

3.5 Geneva 1984 Agreement

The Final Acts of the Regional Administrative Conference for the planning of VHF Sound Broadcasting, Geneva 1984. An updated plan of assignments constitutes part of this Agreement.

3.6 Chester Agreement

The Chester Multilateral Co-ordination Agreement for DVB-T of 1997.

3.7 Stockholm 1961 Agreement

The Final Acts of the European VHF/UHF Broadcasting Conference, Stockholm 1961. An updated plan of assignments constitutes part of this Agreement.

3.8 Effective Radiated Power (ERP) in a given direction.

The product of the power supplied to the antenna and its gain relative to a halfwave dipole in a given direction. This is usually expressed in decibels relative to one watt (dBW). In the case of analogue television broadcasting the ERP of the vision transmissions is the peak envelope power and for sound transmissions it is the unmodulated carrier power.

3.9 Effective Monopole Radiated Power (EMRP) in a given direction.

The product of the power supplied to the antenna and its gain in the horizontal plane relative to a short vertical antenna.

3.10 Maximum Effective Radiated Power.

The maximum value of the effective radiated power in any direction.

3.11 Effective Antenna Height (Eff.Ht.)

The height in meters above the average level of the ground between distances of 3 and 15km from the transmitter. This is calculated for each of 36 evenly spaced radials (10 degree separation) starting from true North[2].

3.12 Maximum Effective Antenna Height

The maximum value in meters for the effective antenna height in any one of the 36 directions referred to in 3.10.

3.13 Omnidirectional Antenna

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

3.14 Service Area

Locations where the field strength available (in the case of VHF and UHF services at the reference receiver height of 10 meters above ground) exceeds both the minimum wanted field strength and the protected field strength (PFS) values as derived from the assignments in the appropriate plans.

3.15 Vertical Aperture

In relation to a VHF or UHF antenna system, the distance in wavelengths between the centres of the outermost radiating elements, plus one half wavelength, in the vertical plane.

3.16 ODTR

Office of the Director of Telecommunications Regulation

3.17 The Director

---

[2] This can be calculated by the ODTR using the National Grid Reference, consisting of one letter and six digits, for the transmitting station, provided the site height above sea level and the antenna height above ground level are supplied

The Director of Telecommunications Regulation

4. TRANSMITTER CONSTRUCTION

4.1. General

The mechanical and electrical construction shall meet such requirements as can be reasonably set, taking the state of the art into account (see also section 6 'Safety and Weather Protection').

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

4.2 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.

4.3 Manufacturer's Identification

The transmitter shall be provided with an indication showing the manufacturer's trademark, type designation and serial number. The indication shall be fitted on the outside of the transmitter, shall be clearly readable, non-removable and indelible.

5. FACILITIES FOR TESTING TRANSMISSION INSTALLATION

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

6. SAFETY AND WEATHER PROTECTION

6.1 General Safety

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

6.2 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 uninterruptable power supply) is provided, then the same control should isolate these. The "on" position of such a devise must be clearly indicated.

6.3 Safety Standards

The system must comply with the following requirements:

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

ENV 50166-2 – Human Exposure to Electromagnetic Fields

High Frequency (10 kHz to 300 GHz)

These standards are available from the National Standards Authority of Ireland[3].

6.4 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 to other services arising from such exposure.

[3] 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.

7. SITE ENGINEERING

7.1 General

The practice of good site engineering is a necessary requirement to ensure good coverage, safety of personnel and minimum interference to other services. This is particularly relevant when considering other services, especially aeronautical systems and private mobile radio networks used by the emergency services, operating in frequency bands adjacent to the VHF-FM radio broadcasting bands. In addition, careful consideration is required for other services when operating from the same site or in close proximity to them.

7.2 Spurious Emissions

Careful consideration should be given to the levels of spurious emissions set out in the relevant subsection of section 8.

7.3 Standard

The European Telecommunications Report ETR132 outlines site engineering practises for VHF-FM systems and is available from the National Standards Authority of Ireland. The licensee shall ensure that all necessary precautions are undertaken to ensure good site engineering practise.

TRANSMISSION CHARACTERISTICS

8.1 Transmission characteristics for LF and MF AM broadcasting stations

8.1.1 Frequency Aspects:

The equipment shall be designed to operate on the assigned frequency in the frequency Band 150 – 285 kHz or 525 – 1605 kHz only.

The frequency tolerance of the main carrier shall be ±10 Hz.

The transmit-frequency shall be derived from a crystal-oscillator. If use is made of a synthesiser and/or a phase locked loop system, the transmitter shall be inhibited when synchronisation is absent. The transmitter frequency adjustment control shall be accessible to qualified personnel only.

8.1.2 Maximum Permitted Levels of Spurious Emissions

The maximum permitted level of spurious emission shall be at least 40dB below t he mean power level of the transmitter and at no time may exceed an absolute power level of 50mW.

8.1.3 Class of Emission, Bandwidth and Modulation Standards:

In accordance with the Geneva 1975 Agreement, the transmission system used shall be double sideband amplitude modulation with full carrier. This is normally specified as 9K00A3EGN.

8.1.4 AF input and RF output Impedance

The nominal A.F. input impedance shall be 600 Ohm balanced to earth within the modulation frequency range 40Hz – 4.5 kHz . The R.F. output impedance of the equipment shall be in the range of 50 - 160 Ohm.

8.15 Transmit Power and Radiated Power:

The transmitter power, stated in the licence, is the carrier power in the absence of modulation.

The radiated power is the sum of the nominal power of the transmitter (in dBW) and the gain of the antenna in dB (relative to a short vertical antenna) without taking any losses into account. It is expressed as the effective monopole radiated power (emrp in kW or in dB relative to 1 kW).

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

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

8.2. Transmission Characteristics for VHF-FM broadcasting stations[4].

8.2.1 Frequency Aspects.

The equipment shall be adjusted to operate on the assigned frequency in the frequency band 87.5 to 108 MHz only.

The frequency tolerance of the main carrier shall be

- 2 kHz, for transmitters of mean power greater than 17 dBW.

- 3 kHz, for transmitters of mean power less than or equal to 17 dBW.

The transmit-frequency shall be derived from a crystal-oscillator. If use is made of a synthesiser and/or a phase locked loop system, the transmitter shall be inhibited when synchronisation is absent. The transmitter frequency adjustment control shall be accessible to qualified personnel only.

8.2.2 Maximum Permitted Levels of Radiated Spurious Emissions.

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

- 40 dB below the licensed e.r.p. a for transmitting station e.r.p. equal to or less than 4 dBW,

- 250 μW e.r.p. for a transmitting station e.r.p. greater than 4 dBW and less than 49 dBW,

- 85 dB below the licensed e.r.p. a for transmitting station e.r.p. equal to or greater than 49 dBW.

These limits must be adhered to for the frequency range 87.5 to 137 MHz.

A band pass filter, which provides a minimum attenuation of 60 dB at frequencies outside the VHF-FM broadcasting band, shall be fitted.

[4] ETS 300 384 is the applicable VHF-FM transmitter standard.from the European Telecommunications Standard Institute.

8.2.3 Class of Emission, Bandwidth, and Modulation Standards.

8.2.3.1 Designation of Emission and Maximum Permitted Bandwidth.

The bandwidth of the radiated signal shall not exceed 270 kHz. The emission shall comply with the following designation :- 270KF9EHW

where,

270K	=	Necessary bandwidth	=	270 kHz
F	=	Type of modulation	=	Frequency modulation
9	=	Modulating signal	=	Composite analogue/digital signal
E	=	Information type	=	Sound broadcasting
H	=	Broadcast quality sound (stereo)		
W	=	Combination of frequency and time division multiplex		

8.2.3.2 Modulation Standards

In accordance with the Geneva 1984 Agreement, the transmission system used shall be either Monophonic or Stereophonic pilot tone system.

i) a Monophonic Transmission

The radio-frequency signal consists of a carrier, frequency modulated by the sound signal, after pre-emphasis, with a maximum frequency deviation of ±75 kHz.

i) b Stereophonic Transmission

The radio-frequency signal consists of a carrier, frequency modulated by a baseband signal according to the specifications of the pilot-tone system. The maximum frequency deviation is ±75kHz.

ii) Pre emphasis and low pass filter

The transmitter must be provided with a pre-emphasis filter with a time-constant of 50 microseconds, combined with a low-pass filter with an attenuation of at least 30 dB at an input modulation frequency of 20 kHz, relative to the level at 1 kHz.

It is possible, even while operating within the specified maximum deviation limit of ±75 kHz, to infringe on the internationally agreed protection ratios used in planning. This is caused by a degree of audio processing resulting in

an increase, beyond a reference level[5], of the average power contained within the multiplexed signal envelope integrated over 60 seconds. Where this occurs, the audio signal level must be adjusted, at the responsible station, so as to eliminate any such infringement. Alternatively, an e.r.p. restriction may be imposed by the Director.

8.2.3.3 Permitted subcarriers for the transmission of supplementary information.

The addition of a sub-carrier on 57 kHz for the transmission of supplementary information using the Radio Data System (RDS), as specified in Irish Standard/EN 50067 : 1993, is considered as being included in the above Designation of Emission and Permitted Bandwidth. The standard is available from the National Standards Authority of Ireland. Only certain features of this system are licensed[6]. The licensee shall provide a completed Certificate of Compliance[7] to the Director within one month of the commencement of transmission of RDS features.

8.2.4 RF Output Impedance

The RF output ports of the transmitter and associated equipment shall be capable of interfacing with equipment whose input impedance is 50 ohms.

8.2.5 Vertically Radiated Power

Due to the proximity of the VHF-FM radio broadcasting band to frequency bands used by aeronautical services, it is important, in the interests of safety, that the power radiated in the vertical direction is restricted. This applies to the entire country due to the nature of the aeronautical services involved. Therefore, the minimum limits, contained in the following table, for the vertical aperture of the transmitting antenna shall be complied with. For an effective radiated power of less than 30 dBW, a correction factor may apply, which allows the use of a single dipole. This will be applied by the Director, and specified on the licence, when appropriate .

[5]The reference level is the power of the multiplex signal containing a single sinusoidal tone which causes a peak deviation of $\pm$ 19 kHz.
[6]An updated list of approved features shall be provided to the licensee by the Director on request.
[7]The Certificate of Compliance form is contained at Annex 4. In some cases only the sections of a certificate relevant to RDS operation may be necessary.

Maximum Total e.r.p.	**Vertical aperture in Wave-lengths**
44 Dbw <= erp	8
37 dBW <= erp < 44 dBW	4
30 dBW <= erp < 37 dBW	2
erp < 30 dBW	1

8.3 Transmission Characteristics for Analogue Television broadcasting stations

8.3.1 Frequency Aspects.

The equipment shall be designed to operate on the assigned frequency in the frequency Bands 174.0 to 222.0 MHz or 470.0 to 862.0 MHz only.

The frequency tolerance shall be

- ± 500 Hz, for transmitters for which the licence characteristics do not require the use of precision offset.

- ± 1 Hz, for transmitters for which the licence characteristics require the use of precision offset.

- ± 10 kHz, for stations of 0 dBW (vision peak envelope power) used to serve small isolated communities (i.e. self-help schemes).

The transmit frequency shall be derived from a crystal oscillator. If use is made of a synthesiser and/or a phase locked loop system, the transmitter shall be inhibited when synchronisation is absent. The transmitter frequency adjustment control shall be accessible to qualified personnel only.

8.3.2 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 14dBW.

- at least 60dB below the transmitter e.r.p. and
  1) in the case of VHF transmitters shall not in any case exceed -30 dBW for transmitter e.r.p. above 14 dBW or
  2) in the case of UHF transmitters shall not in any case exceed -17 dBW for transmitter e.r.p. above 14 dBW.

8.3.3 Class of Emission, Bandwidth, and Modulation Standards.

8.3.3.1 Designation of Emission and Maximum permitted Bandwidth.

The total bandwidth of the radiated signal shall not exceed 8 MHz. The emissions shall comply with the following designations,

A) 7M25C9FNW where,

7M25	=	necessary bandwidth	=	7.25 MHz
C	=	type of modulation	=	Vestigial sideband
9	=	Modulating signal	=	Composite analogue/digital signal
F	=	Information type	=	Television (video)
N	=	Colour		
W	=	Combination of frequency-division and time-division multiplex		

B) 750KF3EGN where,

750K	=	necessary bandwidth	=	750 kHz
F	=	type of modulation	=	Frequency modulation
3	=	modulating signal	=	a single channel containing analogue information
E	=	information type	=	Sound broadcasting
G	=	Sound of broadcasting quality (monophonic)		
N	=	Nature of multiplex	=	None

8.3.3.2 Television Standard

The television standard used shall be PAL system I or the PALPlus system.

Summary list of parameters (for PAL I only):-

Frequency spacing

Nominal radio-frequency channel bandwidth	8 MHz
Vision/Sound Carrier separation	5.9996MHz(±0.0005 MHz)
Nearest edge of channel relative to vision carrier	-1.25MHz
Nominal width of vestigial sideband	1.25 MHz
Nominal width of main sideband	5.5 MHz

Modulation

Type and polarisation of vision modulation	C9F neg.

Type of sound modulation	F3E
Maximum frequency deviation	±50 kHz
Pre-Emphasis for modulation	50 μS

Levels in the radiated signal (% of peak vision carrier)

Synchronising level	100
Blanking level	76 ±2
Difference between black level and blanking level (nominal)	0
Peak white level	20 ±2
Ratio of vision to sound effective radiated powers	10/1 [8]

8.3.3.3 Permitted second sound carrier for the transmission of stereo or bilingual sound.

An additional carrier at 6.552 MHz above the vision carrier for the NICAM 728 multi channel sound system as specified in ITU-R Rec. 707 is permitted.

8.3.4. Additional Broadcasting Services

8.3.4.1. Permitted Additional Broadcasting Services.

The transmission of a teletext service during the field blanking interval is permitted. The system used must conform to Teletext System B parameters described in ITU-R Rec. 653-1. Insertion reference signals may be transmitted on lines 17 and 330 as outlined in ITU-R Rep. 628-4. Insertion test signals for automatic monitoring of the television system may also be transmitted on other blank lines. The transmission of PALPlus signals in lines at the start and end of each frame is permitted.

A widescreen television service may broadcast in the 16:9 aspect ratio using the PALPlus system as described in ITU-R BT 1197-1 ensuring compatibility with the current PAL I system.

8.3.4.2 Additional Broadcasting Services Requiring Approval from the Director

Prior approval must be obtained from the Director for any additional broadcasting services other than those indicated in 8.3.4.1.. For example services, such as data available to a closed circle of paying users, will require a Basic Telecommunications Licence.

[8] In certain cases an alternative vision to sound carrier ratio may be specified by the ODTR

8.3.5 Power and Polarisation.

For a given assignment the radio frequency power and polarisation are specified in the licensed station characteristics. The power is given in terms of the maximum effective radiated power for the vision carrier (peak envelope power) and the sound carrier (unmodulated carrier power). The effective radiated power in a given azimuth is the maximum effective radiated power (in dBW) less the radiation restriction (in dB) at the azimuth due to the antenna radiation pattern.

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

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

9.0 MINIMUM FIELD STRENGTH

The minimum field strengths used in planning are:

1). +73dB(μV/m) for LF
(150 kHz to 285 kHz)
2). +60dB(μV/m) for MF
(525 kHz to 1605 kHz)
3). +54dB(μV/m) for band II
(87.5 MHz to 108 MHz)
4). +55dB(μV/m) for band III
(174 MHz to 223 MHz)
5). +65dB(μV/m) for band IV
(470 MHz to 582 MHz)
6). +70dB(μV/m) for band V
(582 MHz to 862 MHz)

The VHF/UHF values are for 10 metres above ground level.

Protection cannot be sought for locations with a field strength below the above mentioned values.

10 OVERVIEW OF NATIONAL BAND PLAN (Television).

10.1 Frequency Channels and Standard Groups

The VHF frequency band for television broadcasting is 174 to 222 MHz The UHF frequency band for broadcasting is 470 to 862 MHz. The designated television channels for the VHF and UHF bands and the UHF channel grouping adopted by the Director are detailed in Annex 1.

As a general principle and in order to minimise interference between different users the allocation of channels in a group will as far as it is practical to do so, be on the principle of co-programming i.e. the same user will be allocated the same channel in a given channel group wherever it is allocated.

Due to the phased development of UHF television broadcasting 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.

10.2 Assignment List

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

10.3 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, RBL[9]:	50% location, 50% time 50% location, 5% time 50% location, 1% time
Quality of service	Continuous Interference: Tropospheric Interference:	Grade 4 [10] Grade 3 [11]
Polarisation Discrimination	Domestic: RBL:	15 dB 20 dB
Maximum Receive antenna directivity	Domestic: RBL:	16 dB 20 dB

[9]Re-Broadcast Link
[10]Grade 4: Perceptible, but not annoying
[11]Grade 3: Slightly annoying

Protection Ratio		
Co-channel, continuous:		52 dB ,no offset 40 dB, 4/12 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, 4/12 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		-10 dB, tropospheric
Local oscillator channel		-10 dB, tropospheric
Co-Channel Precision offset	continuous, no offset	36 dB
	tropospheric, no offset	32 dB
	continuous, 4/12 line offset	27 dB
	tropospheric, 4/12 line offset	22 dB

Protection ratios for analogue sound broadcasting services are as indicated in the Geneva Agreements 1975 and Geneva Agreements 1984.

11. STATION CERTIFICATION AND MAINTENANCE

11.1 Access and Personnel

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

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

11.2 Examination and Testing

When the installation of equipment is complete the licensee shall inform the Director and seek permission for on-air testing. The licensee shall then examine the station and when ready to commence operations shall provide the Director with certification indicating that the station is operating in accordance with the specified conditions and characteristics and shall inform the Director of the date of commencement of operations.

11.3 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 each station annually to ensure compliance and shall keep a log indicating dates and results of these examinations.

11.4

A Maximum period of one year will be allowed from the date of amendment of a licence for an amended station to come on air and the procedures outlined in this section to be completed. If a certificate of compliance has not been forwarded to the Director within this period the approval for the station in question may be revoked by the Director.

12. ADDITIONAL AND MODIFIED ASSIGNMENTS

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. The standard information required is contained in Annex 2.

12.2 Examination

The licensee shall have regard, in preparation of an application for an additional or modified assignment, to other licensees having assignments in the same frequency segment and make an examination of the compatibility of the assignments. A report of this examination shall be provided to the Director at the time of making an application.

12.3 Field Strength Measurements

It may be necessary to supply field strength measurements in support of an application or an interference complaint. In relation to VHF and UHF, these measurements shall be supplied in accordance with the procedures outlined in Annex 3.

12.4 International Agreements

The Director is bound by the provisions of the Radio Regulations, the Stockholm 1961 Agreement, the Chester Agreement 1997, the Geneva 1975 Agreement, the

Geneva 1984 Agreement and the LEGBAC Memorandum of Understanding [12]. These agreements require the Director to undertake certain co-ordination and registration procedures when considering additions or 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.

[12] Limited Exploratory Group on Broadcasting to Aeronautical Compatibility. Memorandum of Understanding signed at the World Administrative Radio Conference, 1992.

ANNEX 1

TABLE OF CHANNEL FREQUENCIES and CHANNEL GROUPS

NOTE

The carrier frequencies do not include offsets.
The offsets to be used will be specified in the licence.

TABLE 1

BAND III CHANNELS

Frequency Band 174.00 to 222.00 MHz

Channel Number	Channel Frequencies (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
ID	174 - 182	175.25	181.25
IE	182 - 190	183.25	189.25
IF	190 - 198	191.25	197.25
IG	198 - 206	199.25	205.25
IH	206 - 214	207.25	213.25
II	214 - 222	215.25	221.25

TABLE 2

BAND IV CHANNELS

Frequency Band 470.00 to 582.00 MHz

Channel Number	Channel Frequencies (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
21	470 - 478	471.25	477.25
22	478 - 486	479.25	485.25
23	486 - 494	487.25	493.25
24	494 - 502	495.25	501.25
25	502 - 510	503.25	509.25
26	510 - 518	511.25	517.25
27	518 - 526	519.25	525.25
28	526 - 534	527.25	533.25
28	534 - 542	535.25	541.25
30	542 - 550	543.25	549.25
31	550 - 558	551.25	557.25
32	558 - 566	559.25	565.25
33	566 - 574	567.25	573.25
34	574 - 582	575.25	581.25

TABLE 3

BAND V CHANNELS

Frequency Band 582.00 to 862.00

Channel Number	Channel Frequencies (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
35	582 - 590	583.25	589.25
36	590 - 598	591.25	597.25
37	598 - 606	599.25	605.25
38	606 - 614	607.25	613.25
39	614 - 622	615.25	621.25
40	622 - 630	623.25	629.25
41	630 - 638	631.25	637.25
42	638 - 646	639.25	645.25
43	646 - 654	647.25	653.25
44	654 - 662	655.25	661.25
45	662 - 670	663.25	669.25
46	670 - 678	671.25	677.25
47	678 - 686	679.25	685.25
48	686 - 694	687.25	693.25
49	694 - 702	695.25	701.25
50	702 - 710	703.25	709.25
51	710 - 718	711.25	717.25
52	718 - 726	719.25	725.25
53	726 - 734	727.25	733.25
54	734 - 742	735.25	741.25

TABLE 3 (continued)

BAND V CHANNELS

Channel Number	Channel Frequencies (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
55	742 - 750	743.25	749.25
56	750 - 758	751.25	757.25
57	758 - 766	759.25	765.25
58	766 - 774	767.25	773.25
59	774 - 782	775.25	781.25
60	782 - 790	783.25	789.25
61	790 - 798	791.25	797.25
62	798 - 806	799.25	805.25
63	806 - 814	807.25	813.25
64	814 - 822	815.25	821.25
65	822 - 830	823.25	829.25
66	830 - 838	831.25	837.25
67	838 - 846	839.25	845.25
68	846 - 854	847.25	853.25
69	854 - 862	855.25	861.25

TABLE 4

TABLE OF STANDARD UHF CHANNEL GROUPS

Group Number	**Channels**			
1	21	24	27	31
2	22	25	28	32
3	23	26	29	33
4	39	42	45	49
5	40	43	46	50
6	41	44	47	51
7	53	57	60	63
8	54	58	61	64
9	55	59	62	65
10	52	56	66	68
Some of the channels in the above groups together with others not appearing in any group may be formed into alternative groups, for example:				
3A	23	26	30	34

Note : The use of other non-standard groups is considered where necessary.

Annex2a

Information for the Addition / Modification of a sound broadcasting assignment

1 Frequency (MHz/kHz) :

2 Name of Transmitting Station:

3 Geographic Co-ordinates:

4 National Grid Reference:

5 Altitude of Site above Sea Level (m):

6 Height of Antenna above Ground Level (m):

7 Polarisation:

8 Total Effective Radiated Power (dBW):

9 Maximum Horizontal ERP (dBW):

10 Maximum Vertical ERP (dBW):

11 Directivity of Antenna (D or ND):

12 Map, Ordnance Survey Maps such as the “Discovery Series" or equivalent are acceptable, outlining the intended service area. The map shall outline the complete area to be served by the programme service requiring the additional or modified assignment, where appropriate.

ANNEX 2b

Information for the Addition / Modification of a Television Assignment

1	Name of Transmitter Site:	_____		
2	Geographic Coordinates:	Lat: _____	Long: _____	
3	National Grid Reference:	_____		
4	Channel(s):	_____		
5	Offset(s)(twelfth line):	_____		
6	Frequency (MHz)	Programme Services	**Vision**	**Sound**
		_____	_____	_____
		_____	_____	_____
		_____	_____	_____
		_____	_____	_____
7	Altitude of Site above sea level(m):	_____		
8	Height of Antenna above ground level (m):	_____		
9	Polarisation:	_____		
10	Maximum Effective Radiated Power (dBW):	_____		
11	Directivity of Antenna (D or ND):	_____		

12 Map, Ordnance Survey Maps such as the “Discovery Series" or equivalent are acceptable, outlining the intended service area.

13 Radiation Restrictions (dB) if Directional

AZIMUTH	0°	10°	20°	30°	40°	50°	60°	70°	80°
Horizontal Polarisation									
Vertical Polarisation									

AZIMUTH	90°	100°	110°	120°	130°	140°	150°	160°	170°
Horizontal Polarisation									
Vertical Polarisation									

AZIMUTH	180°	190°	200°	210°	220°	230°	240°	250°	260°
Horizontal Polarisation									
Vertical Polarisation									

AZIMUTH	270°	280°	290°	300°	310°	320°	330°	340°	350°
Horizontal Polarisation									
Vertical Polarisation									

Standardised Procedure for Making Field Measurements of Signals Radiated from VHF and UHF Broadcasting Transmitters

Location of Tests

1. The precise location of the selected test point should be noted on a map. The scale of the map should be large enough to allow a national grid reference, accurate to 100m, to be easily read.

2. A general description of the test point vicinity should be noted (i.e. urban, suburban, rural, mountains, flat etc).

3. Particular note should be made of obstructions, if any, in the vicinity that may obscure the line of sight from the selected test point to a particular transmitter.

4. The test point should be selected as far as possible, so as to minimize electrical interference from ESB power lines, heavy traffic or high-power industrial electrical apparatus.

Taking Measurements

1. **Height of Antenna above ground level (agl)**
   The internationally accepted reference height, used in VHF and UHF broadcast planning, for field strength values is 10 metres agl.

2. **Horizontal separation distance of the antenna from the mast**
   The antenna should be separated a suitable distance from the mast. This minimises any distortive effects on the specified antenna gain pattern which may be caused by the proximity of the mast. A separation distance of at least one quarter wavelength between the antenna and the mast is recommended.

3. **Cable Loss**
   Cable loss should be taken into account

4. **Voltage Standing Wave Ratio (VSWR)**
   The VSWR of the antenna should be measured, for the frequency range in question, using a VSWR meter. This is done to verify the antenna impedance is matched to that of the cable. The VSWR should be between 1.0 and 1.5.

   A form to plan and record measurements has been drawn up and is contained below.

5. **Conversion Formulae**

Equations for the conversion of voltage values to electric field strength values are contained in below.

Equations for conversion of voltage values to electric field strength values :

$$E = 4 * (\Pi / \lambda) * \sqrt{((30 * \mathbf{V}^2) / (R * G))}$$

where

E = Electric Field Strength (volts/metre)
Π = 3.14159
λ = Wavelength of transmitted signal (metres)
V = Measured Voltage Reading (volts)
R = Input Impedance (50 ohms)
G = Receiving Antenna Gain (Linear Ratio)

$$E_{dB\mu V/m} = 20 * Log_{10} E_{\mu V/m}$$

Alternatively,

$$E_{dB\mu V/m} = V_{dB\mu V} + 20 * Log_{10}(F_{MHz}) - G_{rx} + L_{dB} - 29.78$$

where

F = Frequency
L = Feeder losses

Date: **Sheet No.**

MEASUREMENTS

Downlead (Uncorrected) Values

Antenna Details:		
Type:	Height (m):	Gain (dB):
	Polarisation:	VSWR:
Cable Loss at 100 Mhz (dB):	Cable Loss at 200 Mhz (dB):	
Cable Loss at 600 Mhz (dB):	Cable Loss at 800 Mhz (dB):	
Measuring Instrument Used:		

Test Point

NGR: Description:	NGR: Description:	NGR: Description:

Transmitter Site□	Description of Terrain in Transmitter Direction			
Station□	Freq (MHz)	Signal Level (dBuV)□		
□	□	□	□	□
□	□	□	□	□
□	□	□	□	□
□	□	□	□	□

Transmitter Site□	Description of Terrain in Transmitter Direction			
Station□	Freq (MHz)	Signal Level (dBuV)□		
□	□	□	□	□
□	□	□	□	□
□	□	□	□	□
□	□	□	□	□

Date: **Sheet No.**

Test Point

NGR: Description:	NGR: Description:	NGR: Description:

Transmitter Site□	Description of Terrain in Transmitter Direction			
Station□	Freq (MHz)	Signal Level (dBuV)□		
□	□	□	□	□
□	□	□	□	□
□	□	□	□	□
□	□	□	□	□

Transmitter Site□	Description of Terrain in Transmitter Direction			
Station□	Freq (MHz)	Signal Level (dBuV)□		
□	□	□	□	□
□	□	□	□	□
□	□	□	□	□
□	□	□	□	□

Transmitter Site□	Description of Terrain in Transmitter Direction			
Station□	Freq (MHz)	Signal Level (dBuV)□		
□	□	□	□	□
□	□	□	□	
□	□	□	□	□
□	□	□	□	□

Annex 4

Certificate of Compliance

Programme Service Name _____

Name of Transmitter site _____

Transmitter Site National Grid Reference _____

Frequency (MHz/kHz) _____

On-Air date _____

Transmitter:

Operating Output RF Power of transmitter
FM sound carrier unmodulated carrier _____
AM sound carrier unmodulated carrier _____
Vision Carrier peak envelope power _____

Measured Frequency of transmitter
AM or FM Sound Carrier _____
Vision Carrier _____

Measured Frequency Deviation at 100 % Modulation _____
(FM sound carrier only)

Measured Maximum Bandwidth of Transmission _____

Measured Maximum Spurious Emission Level _____

Height of Antenna (above ground level) _____

Polarization _____

Aperture of Antenna in Wavelengths _____

Maximum Gain of Antenna _____

Azimuth of preferred Orientation (if N.D.) _____

Azimuth of Maximum Gain (if D) _____

Feeder , Transformer / Harness Loss (dB) _____

Describe any filtering or isolation equipment fitted between the Transmitter output and the Antenna system

_____
_____
_____
_____

I hereby certify that this station complies with the licence characteristics and conditions as issued by the Director of Telecommunications Regulation.

Signed _____ Date _____
on behalf of _____

RDS Features

Programme Identification (PI) Code (Hexadecimal)

Programme Service Name

Basic Features ☐ Group Types OA/OB, 15B, 14A/14B, 1A/1B and 4A including

Traffic Programme	Traffic Announcement,	Clock Time
Program Type	Music/Speech,	Decoder Information
Alternative Frequencies	Programme Item Number	Enhanced Other Networks

Alternative Frequencies	
Transmitter Site	Frequency

Enhanced Other Networks
by Pl Hexadecimal Code

Additional Features

Radio Text	*	Group Type 2A/2B
Transparent Data Channel	*	Group Type 5A//5B
In-House	*	Group Type 6A/6B
Radio Paging	*	Group Type 7A
Traffic Message Channel	*	Group Type 8A

* = authorised / not authorised

I hereby certify that this station complies with the licence characteristics and conditions as issued by the Director of Telecommunications.

Signed _____ Date _____

on behalf of _____