Commission for
Communications Regulation

Guidelines

Conditions for the operation of an Analogue Cable Relay Network, Issued under an Authorisation

Document No:	**ComReg98/64R2**
Date:	**3rd September, 2003**

An Coimisiún um Rialáil Cumarsáide
Commission for Communications Regulation
Abbey Court Irish Life Centre Lower Abbey Street Dublin 1 Ireland
Telephone +353 1 804 9600 *Fax* +353 1 804 9680 *Email* info@comreg.ie *Web* www.comreg.ie

Conditions for the operation of an analogue cable relay network, issued under an authorisation.

Contents

1 Introduction 3

1.1 Purpose 3
1.2 Summary Information 3

2 Definitions and Glossary of Terms 4

3 System Transparency 6

3.1 Television 6
3.2 FM Sound Radio 6

4 System Engineering 7

4.1 General 7
4.1.1 Headend output 7
4.2 Weather Protection 7
4.3 Use of Earth 7

5 System Standards 8

5.1 Television Standard 8
5.1.1 Summary list of parameters:- 8
5.1.2 Permitted second sound carrier for the transmission of stereo or bilingual sound 9
5.1.3 Additional Broadcasting Services 9
5.2 FM Sound Radio 10
5.2.1 Modulation Standards 10
5.2.2 Permitted sub carriers for the transmission of supplementary information 10
5.3 Leakage reference signals 11

6 Network Performance 12

6.1 General 12
6.1.1 Impedance 12
6.1.2 Measurement point 12
6.2 Network Performance for Television. 12
6.2.1 Carrier levels at system outlets. 12
6.2.2 Mutual isolation between system outlets 13
6.2.3 Amplitude response within a television channel at any system outlet 14
6.2.4 Frequency stability of relayed carrier signals at any system outlet 14
6.2.5 Random Noise 14
6.2.6 Interference to Television channels 15
6.2.7 Differential gain and phase in a television channel 16
6.2.8 Echoes in television channels 16
6.2.9 Hum modulation of carriers in television channels 16
6.3 System Performance for FM Sound Radio 17
6.3.1 Carrier levels at system outlets. 17
6.3.2 Mutual isolation between system outlets 18
6.3.3 Amplitude Response within an FM sound radio channel 18
6.3.4 Frequency stability of relayed carrier signals at any system outlet 18
6.3.5 Adjacent channel spacing 18
6.3.6 Interference 18
6.3.7 Random Noise 19

6.3.8 Hum modulation 19

7 Leakage and Immunity 20

7.1 General 20
7.1.1 Network Information to be Provided 20
7.2 Signal Leakage 21
7.2.1 Correction factors that can be applied for various measurement distances 22
7.3 General Immunity 22

8 Access to Equipment, System Testing and Maintenance 24

8.1 Access and Personnel 24
8.2 Test equipment 24
8.3 Measurement of performance parameters 24
8.4 Measurement of signal leakage 24
8.5 Signal Leakage Audits 25
8.6 Maintenance 25

1 Introduction

1.1 Purpose

This document specifies the conditions attached to an authorisation pursuant to Regulation 3 of the Authorisation Regulations for analogue cable relay networks. It details the basic characteristics of the network that need to be considered to allow the conditions of an authorisation to be met. They also detail the characteristics relevant for ensuring compatibility with authorised users of the radio frequency spectrum.

1.2 Summary Information

The parameters specified in this document are based on those given in CENELEC document EN 50083 parts 1, 2, 3, 5, 7 and 8 entitled "Cable Distribution Systems for Television and Sound Signals". The parameters only relate to analogue transmissions.

For issues not referred to by this document the authorised person shall comply with standards set out in CENELEC document EN 50083 parts 1 to 8 or any other relevant CENELEC or ETSI document.

Evidence of type approval of cable relay equipment is not required by the Commission for Communications Regulation. Instead a procedure of system audits will apply to assess compliance with the relevant European Standards.

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

2 Definitions and Glossary of Terms

"Authorisation": means an authorisation pursuant to Regulation 3 of the Authorisation Regulations to provide Authorised Services;

"Authorisation Regulations": means the European Communities (Electronic Communications) (Authorisation) Regulations, 2003 (S.I. No. – of 2003);

"Authorised Person": means the person who is deemed to be authorised to provide Authorised Services under Regulation 3 of the Authorisation Regulations;

"Cable Relay Network": means the network authorised under Regulation 3 of the Authorisation Regulations for the distribution of analogue

"Headend": means equipment which is connected to receiving antennas or other signal sources and also connected to the remainder of the cable relay system, to process the signal to be relayed.

"Feeder": means a transmission path forming part of a cable relay system. Such a path may consist of a metallic cable, optic fibre or any combination of them.

"Trunk_Feeder": means a feeder used for the transmission of signals between a head end and a distribution point or between distribution points.

"Distribution Point": means a point where signals are taken from the trunk feeder to energise spur feeders. In some cases a distribution point may be directly connected to the headend.

"Spur Feeder": means a feeder to which subscriber taps are connected.

"Subscriber's Tap": means a device for connecting a subscriber's feeder to a spur feeder.

"Subscriber Feeder": means a feeder connecting a Subscriber's tap to a system outlet or, where the latter is not used, directly to the subscriber's equipment.

"System Outlet": means a device for connecting a subscriber's feeder to a receiver lead and hence to a users equipment.

"Transfer Point": means an interface between the cable relay network and a building's internal network, each of which may be separately owned.

"Immunity": means the ability of a device, equipment or system to perform without degradation in the presence of an electromagnetic disturbance.

"Screening Effectiveness"; means the ability of equipment or a system to attenuate the influence of electromagnetic fields from outside the equipment or system or to suppress the leakage of electromagnetic fields from inside the equipment or system.

"Intermodulation"; means the process whereby non-linearity in equipment in a system produces a spurious output signal (called Intermodulation products) at frequencies which are a linear combination of those of the input signals.

"Carrier to Intermodulation Ratio": means the difference in decibels between the carrier level at a specified point in a system and the level of a specified Intermodulation product or combination of products.

"Carrier to Noise Ratio": means the difference in decibels between the vision or sound 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).

"Mutual Isolation": means the attenuation between one system outlet and another at any frequency within the range of the system under investigation. It is always specified, for any particular installation, as the minimum value obtained within specified frequency limits.

"Echo Rating": means the result of a system test with a 2 T sine-squared pulse (as determined in ITU-R Recommendations 473 and 567) using the boundary line on a specified graticule within which all parts of the received pulse fall.

3 System Transparency

3.1 Television

The cable relay network shall be designed in such a manner that it is capable of relaying all components within a television signal, intended for general reception[1].

Note: - This would include Teletext and additional sound channels associated with the vision material (See section 5.1.3) and that this provision does not relate to: -

- additional sound channels associated with satellite television transmissions carrying material not associated with the vision material;

- additional multilingual sound channels associated with satellite television transmissions, carrying material associated with the vision material.

3.2 FM Sound Radio

The cable relay network shall be designed in such a manner that it is capable of relaying all components transmitted within a sound broadcast signal and intended for general reception.

Note: - This would include radio data systems (RDS) and other permitted sub carriers for the transmission of supplementary information. (See Section 5.2.2).

[1]While not intended for reception by the general public, broadcast organisation include Test insertion signal in the vertical blanking interval (VBI). The system must be transparent to these signals so as to facilitate performance measurements.

4 System Engineering

4.1 General

The mechanical and electrical construction of the cable relay network shall accord with best practice in order to minimise the potential for harmful interference to radiocommunication services operating in accordance with the Irish Table of Frequency Allocations. This is particularly relevant when considering:

- leakage from the cable relay network which could interfere with radiocommunication services, especially aeronautical systems, private mobile radio networks used by the emergency services, stations of the amateur service and other radiocommunication stations operating in the same environment as the cable relay network.

4.1.1 Headend output

The signal parameters at the headend output should be such as to permit the cable relay network to operate in accordance with the system standard and performance set out in Sections 5 and 6 respectively.

4.2 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 harmful interference to radiocommunication services operating in accordance with the Irish Table of Frequency Allocations arising from such exposure.

4.3 Use of Earth

The use of an earth return circuit for programme transmission is prohibited. This does not preclude the earthing of the sheath of a cable.

5 System Standards

5.1 Television Standard

The television standard used shall be PAL system I.

5.1.1 Summary list of parameters:-

5.1.1.1 Frequency spacing

Nominal radio-frequency channel bandwidth	8 MHz
Vision/Sound Carrier separation	5.9996 MHz (±0.0005 MHz)
Nearest edge of channel relative to vision carrier	-1.25 MHz (see note 1)
Nominal width of vestigial sideband	1.25 MHz
Nominal width of main sideband	5.5 MHz

Note 1:- Where NICAM sound is used on the lower adjacent channel and a "harmonically related carrier" arrangement is used for the carrier frequencies, this figure may have to be reduced to -0.75 MHz.

5.1.1.2 Modulation

Type and polarity of vision modulation	C9F neg.
Type of sound modulation	F3E
- Maximum frequency deviation	±50 kHz
- Pre-Emphasis for modulation	50 µS

5.1.1.3 Levels in the distributed signal (% of peak vision carrier)

Synchronising level	100
Blanking level	76 ±2
Difference between black level and blanking level	0 (nominal)
Peak white level	20 ±2
Ratio of vision to sound carrier powers[2]	between 10 dB and 13 dB

5.1.2 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.

5.1.3 Additional Broadcasting Services

5.1.3.1 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.

[2] In certain circumstances an alternative vision to sound carrier ratio may be specified by the Commission for Communications Regulation

5.2 FM Sound Radio

5.2.1 Modulation Standards

The transmission system used shall be either Monophonic or Stereophonic pilot tone system as specified in ITU-R Rec. 450-1 The main parameters for these systems are:-

5.2.1.1 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.

5.2.1.2 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 ±75 kHz.

5.2.1.3 Pre emphasis and low pass filter

The headend 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.

5.2.2 Permitted sub carriers 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[3], is permitted. Only certain features of this system are licensed[4] to Irish broadcast stations.

[3] Available from the National Standards Authority of Ireland.

[4] An updated list of approved features shall be provided to the licensee by the Commission for Communications Regulation on request.

5.3 Leakage reference signals

Any cable relay network is likely to be spread over a wide area and its quality as regards screening effectiveness may vary from part to part. To obtain a complete picture of leakage characteristics measurements have to be made over its entire area and on a regular basis. This also helps to locate all the strong leakage points caused by major faults in screening effectiveness.

In order that the measurements are not confused by off-air signals, a leakage reference signal, also referred to as a "tagged carrier", which can positively identified as emanating from the cable relay system must be used.

For spectrum management reasons the modulation, frequency and level of the leakage reference signal shall be specified by the Commission for Communications Regulation following consultation with the authorised person. As there will be ongoing developments in the use of the radio spectrum, it may be necessary to change the frequency used from time to time.

6 Network Performance

6.1 General

6.1.1 Impedance

The nominal impedance of the system shall be 75 ohms. It should be noted that this value applies to all coaxial feeder cable and system outlets and shall be used as the reference impedance in level measurements on the cable relay system.

6.1.2 Measurement point

The parameters specified in Section 7 relate to performance only at the system outlet installed by the authorised person.

Where an authorised person installs a transfer point then they must install a system outlet specifically to be the reference outlet for all network measurements. The signal provided to the transfer point should be above the minimum specified so that measurements at the reference outlet will be in accordance with those specified in Section 7.

6.2 Network Performance for Television.

6.2.1 Carrier levels at system outlets.

6.2.1.1 Minimum and maximum carrier levels

The minimum and maximum carrier levels are expressed as the r.m.s. voltage of each vision carrier at the peak of the modulation envelope measured at the system television outlet across an external 75 ohm termination or referred to 75 ohms. These values are given in table 1.

Table 1 Minimum and maximum carrier levels at system outlets

Type of Service	Minimum carrier level (dBµV)	Maximum Carrier level (dBµV)	Conditions
AM VSB Television (PAL System I)	57	80 77**	** for systems over 20 channels
Note: - In order not to overload the receivers, the figures quoted above for the maximum level might have to be reduced.			

6.2.1.2 Maximum Carrier level differences between relayed television channels

The difference in carrier levels shall not exceed the values given in table 2. It should be noted that the differences given in table 2 apply to signals having the same type of modulation.

Table 2 Maximum Carrier level differences at system outlets between distributed television channels

Frequency Range	Maximum level difference (dB)
30.0 MHz to 862 .0 MHz	12
Any 60.0 MHz range	6
Adjacent channel	3

6.2.2 Mutual isolation between system outlets

The minimum isolation at any frequency between any two subscriber system outlets connected separately to a spur feeder of the cable relay network shall be as in table 3.

Table 3 Mutual isolation between system outlets.

Frequency Range in MHz.	Mutual Isolation (dB)	Condition
TV/TV 30.0 to 862.0	42 36*	* For systems having 8 and 12 MHz spacing

6.2.3 Amplitude response within a television channel at any system outlet

The amplitude response as a function of frequency for the entire network shall be such that the variation in gain over any A.M. television channel of 8 MHz bandwidth is not more than ±2 dB relative to that at the vision carrier frequency and the gain shall not vary by more than ±0.5 dB within any frequency range of 0.5 MHz.

6.2.4 Frequency stability of relayed carrier signals at any system outlet

When a signal is not relayed at the received frequency or is locally generated, the variation in frequency from the declared nominal value shall not exceed ±30 kHz for a television signal and the difference between vision and sound carriers for any one channel shall be maintained within ±15 kHz.

6.2.5 Random Noise

At any system outlet, the level of noise voltage generated in the system in any channel shall be such that the carrier to noise ratio shall not be less than the value given in table 4.

Table 4. Carrier to noise ratio at system outlet

Type of service	**Minimum carrier to noise ratio (dB)**	**Equivalent noise bandwidth (MHz)**
AM VSB Television (PAL System I)	44	5.08

6.2.6 Interference to Television channels

6.2.6.1 Single frequency interference

This clause refers to single-frequency interference which may result from intermodulation or the presence of other interfering signals (local oscillators, ingress signals etc.)

At any system outlet the level of any unwanted signal generated within the network shall be such that the lowest carrier to interference ratio within a wanted television channel shall not be less than 57dB.

6.2.6.2 Single channel Intermodulation interference

In this special case of single frequency interference the ratio of the reference level relative to the interference signal shall be not less than 54 dB.

6.2.6.3 Multiple frequency Intermodulation interference

At any system outlet the level of multiple frequency Intermodulation interference in any wanted television channel shall be such that the carrier to interference ratio shall not be less than

57dB	For each cluster of composite beats in negative modulation;
52 dB	For each cluster of composite beats in positive modulation;
52 dB	For the summation of the clusters falling into that channel.

Note: - Where “Harmonically related carriers” are used a relaxation of 10 dB can be considered.

6.2.7 Differential gain and phase in a television channel

The differential gain and phase in any television channel at any system outlet shall not exceed the figures given in table 5.

Table 5 Differential gain and phase in a television channel

Type of service	Maximum differential gain (%)	Maximum differential phase (degrees)
AM VSB Television (PAL System I)	14	12

6.2.8 Echoes in television channels

The echo rating in any television channel at any system outlet shall not exceed 6%.

6.2.9 Hum modulation of carriers in television channels

At any system outlet the spurious modulation of any vision carrier at the frequency of the supply mains and harmonics thereof shall be such that the reference modulation to the hum modulation ratio is not less than 46 dB.

6.3 System Performance for FM Sound Radio

6.3.1 Carrier levels at system outlets.

6.3.1.1 Minimum and maximum carrier levels

The minimum and maximum carrier levels are expressed as the r.m.s voltage of each carrier measured at the system outlet connection for FM sound radio across an external 75 ohm termination or referred to 75 ohms. Values are given in table 6.

Table 6 Minimum and maximum carrier levels at system outlets.

Type of Service	Minimum carrier level (dBµV)	Maximum Carrier level (dBµV)
FM sound mono Stereo	 40 50	 70 70
NOTE: - In order not to overload certain receivers, the figures quoted above for the maximum levels may have to be reduced.		

6.3.1.2 Carrier level differences

FM sound radio signals shall be at the same level at the headend before transmission through the cable relay network. The difference in FM sound radio carrier levels at the system outlet shall not exceed the values given in table 7.

Table 7. Maximum level difference at any system outlet

Frequency Range	Maximum level difference (dB)
87.5 to 107.9 MHz	6
NOTE: - If FM sound signals are present at the system outlet intended for AM-VSB television signals, the level of any FM. carrier shall be at least 3 dB lower than the lowest television signal at the outlet.	

6.3.2 Mutual isolation between system outlets

The minimum isolation at any frequency between any two subscribers' system outlets connected separately to a spur feeder of the relay system shall be as in table 8.

Table 8 Mutual isolation

Frequency Range in MHz.	Minimum Mutual Isolation (dB)
FM sound radio/FM sound radio	42

6.3.3 Amplitude Response within an FM sound radio channel

The amplitude response as a function of frequency for the entire system shall be such that the maximum amplitude variation over any FM channel of 270 kHz is not more than 3 dB with the slope not exceeding 0.3 dB per 10 kHz within 75 kHz of the carrier.

6.3.4 Frequency stability of relayed carrier signals at any system outlet

When a signal is not relayed at the received frequency or is locally generated, the variation in frequency from the declared nominal value shall not exceed $\pm$12 kHz for an FM sound radio signal.

6.3.5 Adjacent channel spacing

When individual channel processing is applied the minimum spacing between unmodulated carriers shall be not less than 300 kHz. The increment of channel spacing shall be an integer multiple of 100 kHz.

6.3.6 Interference

At any system outlet the level of any unwanted signal within the system shall be such that the lowest carrier to interference ratio between a wanted and unwanted FM sound radio signal is as shown in table 9.

Table 9. Minimum Carrier to Interference Ratio between wanted and unwanted FM sound signals

Type of Service	Minimum Carrier to interference Ratio (dB)
FM Sound Radio (mono)	36
FM Sound Radio (stereo)	51

6.3.7 Random Noise

At any system outlet, the level of noise voltage generated in the system in any channel shall be such that the carrier to noise ratio shall be no less than the value given in table 10.

Table 10. Carrier to noise ratio at system outlet

Type of service	Minimum carrier to noise ratio (dB)	Equivalent noise bandwidth (MHz)
FM sound mono	38	0.2
FM sound stereo	48	0.2

6.3.8 Hum modulation

Hum modulation sidebands must be at least 46 dB below the carrier level.

7 Leakage and Immunity

7.1 General

In general, a cable relay network can cover a wide geographic area. The quality as regards screening effectiveness can vary from location to location. The licensee shall ensure that the cable relay network or any apparatus connected to it shall not cause interference to:-

- reception of programme services
- communication circuits of authorised telecommunication service providers
- radiocommunication services operating in accordance with the Irish Table of Frequency Allocations.

The authorised person shall be responsible for checking the level of signal leakage, on a regular basis, throughout the area served by the cable relay network and maintain it in accordance with the levels indicated in Table 11 (section 9.2).

Where signal leakage is detected and is deemed by the Commission to be causing interference to any service contained in the categories listed in points 9.1 (a) to (d), the authorised person shall take whatever steps are necessary at their own expense to immediately eliminate the interference. If they are unable to eliminate the interference the offending channel, including all carriers shall be removed from the cable relay network, until the matter is resolved to the satisfaction of the Commission for Communications Regulation.

In certain cases it may be necessary for the Commission to specify lower limits for signal leakage or amend the licence to resolve any interference problems that arise.

7.1.1 Network Information to be Provided

Upon request from the Commission, the authorised person shall submit:

- an up to date frequency plan indicating the programme name of each television channel and its vision carrier frequency. The authorised person shall notify the Commission immediately any change occurs.

- an up to date list of all the programme names of the FM sound radio channels and their respective carrier frequencies. The authorised person shall notify the Commission 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 cable distribution system and the location of the headend and feeder cables including amplifiers.

7.2 Signal Leakage

The limits for leakage from a cable distribution network using analogue technology are given in table 11. The maximum[5] field strength values are for a distance of 3 metres from the cable system.

Table 11 Signal Leakage Limits for Cable Distribution Networks

Frequency f (MHz) in the Range	Interfering Field Strength Limit dBµV/m	Measurement distance	Measurement Bandwidth
1 – 30 MHz	20 – 7.7·log10(f/MHz)	3m	9kHz
30 – 1000 MHz	27dBµV/m	3m	9kHz

Table of Use Restrictions/Prohibitions

Frequency Range MHz	Restrictions/Prohibitions
74.8 - 75.2	Use restricted (Note 2)
108 – 138	Use prohibited (Note 3)
144 – 146	Use prohibited
156.6 - 157.0	Use restricted (Note 2)
242.8 - 243.2	Use prohibited
281 – 282	Use restricted (Note 2)

[5] Notwithstanding the signal leakage limits set out in table 11 the authorised person may be required to adhere to stricter limits in the event of interference being caused by the cable relay network to other authorised radio users. This is particularly relevant if interference is being caused to an aeronautical or emergency service. Any costs incurred shall be borne by the authorised person.

318.5 - 319.5	Use restricted (Note 2)
328.6 - 335.4	Use prohibited
405.85 - 406.25	Use prohibited
430 – 440	Use prohibited

Note 2: The use of vision/sound/pilot carriers and colour sub-carriers is prohibited in this range.

Note 3: Except for the leakage reference signal, provided it is specifically authorised in the licence by the Commission.

7.2.1 Correction factors that can be applied for various measurement distances

Table 12. Distance correction factor

Distance (m)	Correction factor (dB)
3	0
5	-6
10	-10
15	-13.5
20	-16
25	-18
30	-19.5

Note: intermediate values of reduction factor should be obtained by interpolation.

7.3 General Immunity

Interference can enter a cable relay system (sometimes referred to as ingress) by the following means:

- poor screening of passive equipment (plugs, etc.),
- poor screening of active equipment (amplifiers, converters etc.),
- poor screening of the cable against induced voltages,
- poor screening of the cable against induced currents,

- excessive impedance in the ground connection of the input terminals of active equipment,

- insufficient rejection of power supply borne interference on mains powered equipment.

The authorised person shall ensure that the immunity of the cable relay network shall be such that at any system outlet on any relayed channel the carrier to interference ratio (caused by an external field) shall be not less than the limit given for single frequency interference to television signals given in Section 6.2.6.1 and the values of carrier to interference ratios for FM sound radio signals given in Section 6.3.6.

8 Access to Equipment, System Testing and Maintenance

8.1 Access and Personnel

The licensee shall on request made by an authorised officer of the Commission for Communications Regulation, facilitate that officer in the inspection[6] of any part of the cable relay network.

8.2 Test equipment

Adequate test equipment shall be held by the authorised person for the accurate measurement of the system performance parameters specified in Section 7 and to ensure that the system signal leakage limits as specified in section 9 are complied with.

8.3 Measurement of performance parameters

Unless otherwise specified by the Commission, the procedure for measuring performance parameters shall be in accordance with those specified in CENELEC document EN50083 part 7.

Note: - As some of these procedures involve the removal of the programme signal and replacing it by a test signal, for the duration of the measurement period, alternative measurement procedures may be considered by the Commission so as to minimise disruption to the viewers. However where the Commission is not satisfied with results obtained using alternative measurement procedures then the measurements shall be repeated using the procedures in the CENELEC document.

8.4 Measurement of signal leakage

Unless otherwise specified by the Commission, the measurement procedure for signal leakage reference signal shall be in accordance with the "mobile method" - section 4.2- in CENELEC document EN50083 part 8.

[6] Inspection shall include the undertaking of measurements.

8.5 Signal Leakage Audits

For the prevention of harmful interference an authorised person may be required to carry out signal leakage audits on their cable network and submit the results to the Commission for consideration. These audits must be carried out in compliance with any methodology, time periods or requirements specified by the Commission.

8.6 Maintenance

The licensee shall ensure that the network is audited and maintained on a regular basis so as to ensure compliance with these conditions and in particular with all of the relevant European Standards.