



# SLOVENSKI STANDARD SIST ETS 300 750 E1:2003

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G]ghYa ]'fUX]cX]Z n]Ÿ'Ë'NY'c'j ]gc\_cZY\_j Yb b]'fU<: tZY\_j Yb bc'a cXi `]fUb]ž  
nj c\_cj b]'fUX]cX]Z nb]'cXXU'b\_]']j 'ZY\_j Yb bYa 'dUgi 'cX'\*'A<n'Xc'+' A<n

Radio broadcasting systems; Very High Frequency (VHF), frequency modulated, sound  
broadcasting transmitters in the 66 to 73 MHz band

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**ICS:**

33.170

Televizijska in radijska  
difuzija

Television and radio  
broadcasting

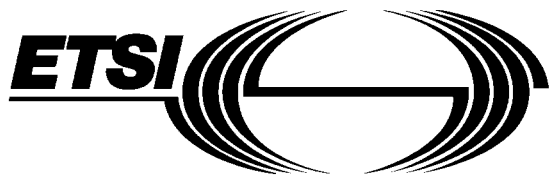
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# EUROPEAN TELECOMMUNICATION STANDARD

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**Radio broadcasting systems;**

**Very High Frequency (VHF), frequency modulated,**

**sound broadcasting transmitters**

**in the 66 to 73 MHz band**

## ETSI

European Telecommunications Standards Institute

**ETSI Secretariat**

**Postal address:** F-06921 Sophia Antipolis CEDEX - FRANCE

**Office address:** 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE

**X.400:** c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 4 92 94 42 00 - Fax: +33 4 93 65 47 16

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## Contents

Foreword .....	5
1 Scope .....	7
2 Normative references .....	7
3 Definitions and abbreviations .....	8
3.1 Definitions .....	8
3.2 Abbreviations .....	8
4 Technical requirements .....	9
4.1 Characteristics of RF interface ports .....	9
4.2 Transmitter input configuration .....	9
4.3 Transmitter output characteristics .....	9
4.4 Frequency range .....	9
4.5 Frequency stability .....	10
4.5.1 Frequency error .....	10
4.5.2 Frequency drift .....	10
4.6 Frequency adjustment .....	10
4.7 Unwanted frequency shift .....	10
4.8 Frequency deviation .....	10
4.9 Overdeviation .....	10
4.10 Deviation sensitivity stability .....	11
4.11 Unwanted emissions .....	11
4.11.1 Spurious emissions .....	11
4.11.2 Out-of-band emissions - stereophonic transmitters .....	11
4.11.3 Out-of-band emissions - monophonic transmitters .....	11
4.12 Amplitude Modulation (AM) .....	11
4.12.1 Synchronous AM (AM due to FM) .....	11
4.12.2 Hum and noise (residual AM) .....	11
4.13 Test load characteristics .....	11
5 Operating and test conditions .....	12
5.1 Normal operating and test conditions .....	12
5.2 Extreme operating and test conditions .....	12
Annex A (normative): Stereo test encoder for pilot tone system, audio and multiplex parameters .....	17
A.1 Introduction .....	17
A.2 Input parameters .....	17
A.2.1 Audio inputs .....	17
A.2.2 Auxiliary inputs .....	17
A.2.2.1 Impedance .....	17
A.2.2.2 Gain .....	17
A.3 Pilot signal .....	17
A.3.1 Pilot tone .....	17
A.3.2 Pilot tone output .....	17
A.3.3 External pilot synchronizing .....	17
A.4 Output .....	18
A.4.1 MPX coded signal .....	18
A.4.2 Level of the MPX coded signal .....	18
A.4.3 Spurious frequencies .....	18

A.5	Non-linear distortion.....	18
A.5.1	Harmonic distortion of the encoder .....	18
A.5.2	Base-band frequency intermodulation products of the encoder.....	18
A.5.3	Distortion products of the decoder .....	19
A.6	Signal-to-Noise ratio (S/N).....	19
A.6.1	Unweighted S/N .....	19
A.6.2	Weighted S/N.....	19
A.7	Linear distortion .....	19
A.7.1	AF channel amplitude difference.....	19
A.7.2	Auxiliary input.....	19
A.8	Linear crosstalk .....	19
A.8.1	Crosstalk attenuation between the M and S channels .....	19
A.8.2	Crosstalk attenuation between the two AF channels .....	19
Annex B (normative):	RF Spectrum measurements to detect excessive spectrum pollution due to abnormal AF - input levels .....	20
B.1	Measuring arrangement .....	20
B.2	Measuring procedure.....	20
B.3	Presentation of the results .....	20
Annex C (informative):	General conditions of operation.....	21
C.1	Temperature in the operating room .....	21
C.2	Relative humidity in the operating room .....	21
C.3	Cooling air temperature .....	21
C.4	Relative humidity of the air entering the cooling system up to 25°C.....	21
C.5	Air pressure .....	21
C.6	Immunity against mechanical vibrations airborne or air pressure .....	21
C.7	Immunity against electric field strength within the broadcasting bands.....	21
C.8	Immunity against magnetic field strength .....	21
C.9	Mains voltage.....	21
C.10	Mains frequency .....	21
Annex D (normative):	Reverse intermodulation measurements.....	22
D.1	Scope of annex.....	22
D.2	Measurement arrangement .....	22
D.3	Principle of measurement.....	22
D.4	Measurement routine.....	23
Annex E (informative):	Bibliography .....	24
History	.....	25

## Foreword

This European Telecommunication Standard (ETS) has been produced by the Joint Technical Committee (JTC) of the European Broadcasting Union (EBU), Comité Européen de Normalisation ELECtrotechnique (CENELEC) and the European Telecommunications Standards Institute (ETSI).

This ETS defines the performance characteristics of Very High Frequency (VHF), frequency modulated, monophonic and stereophonic sound broadcasting transmitters operating in the frequency band 66 MHz to 73 MHz needed in Eastern Europe as requested by Hungary and supported by Romania. This ETS is based upon and complements ETS 300 384, which covers the frequency band 87,5 MHz to 108 MHz.

**NOTE:** The EBU/ETSI JTC was established in 1990 to co-ordinate the drafting of ETSs in the specific field of broadcasting and related fields. Since 1995 the JTC became a tripartite body by including in the Memorandum of Understanding also CENELEC, which is responsible for the standardization of radio and television receivers. The EBU is a professional association of broadcasting organizations whose work includes the co-ordination of its Members' activities in the technical, legal, programme-making and programme-exchange domains. The EBU has Active Members in about 60 countries in the European Broadcasting Area; its headquarters is in Geneva \*.

\* European Broadcasting Union  
Case Postale 67  
CH-1218 GRAND SACONNEX (Geneva)  
Switzerland

Tel: +41 22 717 21 11

Fax: +41 22 717 24 81

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## 1 Scope

This European Telecommunication Standard (ETS) covers those performance requirements for Very High Frequency (VHF) Frequency Modulation (FM) sound broadcasting transmitters operating in the frequency band 66 MHz to 73 MHz, and modulated in accordance with ITU-R Recommendation 450-2 [1], which has some bearing on the Radio Frequency (RF) spectrum. Monophonic signals are transmitted in accordance with section 1, and stereophonic signals in accordance with section 2.2 (pilot tone system) of ITU-R Recommendation 450-2 [1]. This ETS also covers the transmission of supplementary signals as described in ITU-R Recommendation 450-2 [1] and EN 50067 [2]. The RDS (EN 50067 [2]) has been defined in band 87,5 to 108 MHz. The view of RDS Forum held in Budapest during November 1994 is that the 66 to 73 MHz band is not suitable for the transmission of RDS on networked transmissions.

This ETS considers only those technical characteristics that relate to the radiated signal and hence directly affect the efficient use of RF spectrum.

The use of ITU-R Recommendation 412-7 [3] for planning sound broadcasting services is assumed.

Spurious and out-of-band emission limits specified in figures 1 and 3 respectively are incorporated to protect both aeronautical navigation and communication services operating in the frequency band 108 MHz to 137 MHz and rebroadcast reception in the frequency band 66 MHz to 73 MHz.

In those areas where reliance on a transmitter specification alone cannot guarantee protection of the RF spectrum (e.g. reverse intermodulation), recommendations appropriate to installed systems are described in ETR 132 [8].

Electro-Magnetic Compatibility (EMC) aspects for equipment covered by this ETS are given in ETS 300 447 (see annex E, Bibliography).

## 2 Normative references

This ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

- [1] ITU-R Recommendation 450-2 (1982): "Transmission standards for FM sound broadcasting at VHF".
- [2] EN 50067: "Specification of the Radio Data System (RDS)".
- [3] ITU-R Recommendation 412-7 (1990): "Planning standards for FM sound broadcasting at VHF".
- [4] IEC 244-1: "General conditions of measurements, frequency, output power".
- [5] IEC 244-2: "Bandwidth, out of band power and power of non-essential oscillations".
- [6] EN 60244-13: "Methods of measurements for radio transmitters, Performance characteristics for FM sound broadcasting".
- [7] CCIR Recommendation 468-4 (1986): "Measurement of audio frequency noise voltage levels in sound broadcasting".
- [8] ETR 132: "Radio broadcasting systems; Code of practice for site engineering Very High Frequency (VHF), frequency modulated, sound broadcasting transmitters".
- [9] ITU-R Recommendation IS.851-1: "Sharing between the broadcasting service and the fixed and/or mobile services in the VHF and UHF band (Question ITU-R 2/12)".

### 3 Definitions and abbreviations

#### 3.1 Definitions

For the purposes of this ETS the following definitions apply:

**difference signal S:**  $S = (L-R)/2$ ; this information allows the stereo-receiver to regain signals L and R in conjunction with the M signal.

**Multiplex (MPX) signal:** This signal contains all information, including the pilot tone and any supplementary signal which is used to frequency modulate the VHF FM transmitter.

**out-of-band emissions:** Emission on a frequency or frequencies immediately outside the necessary bandwidth which results from the modulation process, but excluding spurious emissions.

**pilot tone:** The pilot tone (19 kHz) is used to regain the stereo subcarrier in the stereo-receiver.

**Radio Data System (RDS):** RDS is a signal containing information on programmes and broadcasting network as defined in EN 50067 [2]. This signal is carried by a subcarrier at 57 kHz, amplitude modulated by the encoded data with suppressed carrier in a frequency band of  $\pm 2,4$  kHz.

**signal L:** Signal L corresponds to the information in the left channel.

**signal R:** Signal R corresponds to the information in the right channel.

**spurious emissions:** Emission on a frequency or frequencies which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products but exclude out of band emissions.

**stereo subcarrier:** The subcarrier (38 kHz) converts the S signal to the carrier-frequency position (23 kHz to 53 kHz).

**sum signal M:**  $M = (L + R)/2$ ; this information is also the signal for the monophonic receiver.

**supplementary signal:** This signal can operate in the range between 53 kHz and 76 kHz, according to ITU-R Recommendation 450-2 [1].

**unwanted emissions:** Consist of spurious emissions and out of band emissions.

#### 3.2 Abbreviations

For the purposes of this ETS, the following abbreviations apply:

AC	Alternating Current
AF	Audio Frequency
AM	Amplitude Modulation
DC	Direct Current
EMC	Electro Magnetic Compatibility
FM	Frequency Modulation
ISS	Interfering Signal Source
MPX	Multiplex
RDS	Radio Data System
RF	Radio Frequency
rms	root mean square
S/N	Signal-to-Noise ratio
TUT	Transmitter Under Test
VHF	Very High Frequency

## 4 Technical requirements

The transmitter shall be tested:

- at its rated output power, as declared by the manufacturer;
- into a load as defined in subclause 4.13 a), unless otherwise stated.

The transmitter operating at any frequency in the range 66 MHz to 73 MHz shall comply with the requirements of this clause.

If the transmitter incorporates RDS, then the transmission shall be in accordance with ITU-R Recommendation 450-2 [1] and EN 50067 [2]. The RDS can only be implemented without the Alternative Frequency feature. If the transmitter incorporates any other form of supplementary signal(s), then the transmission shall be in accordance with ITU-R Recommendation 450-2 [1].

The method of measurement for the parameters listed in the following subclauses shall be in accordance with EN 60244-13 [6], IEC 244-1 [4] and IEC 244-2 [5], unless otherwise stated.

### 4.1 Characteristics of RF interface ports

All RF output ports designated to interface with other equipment shall operate into a nominal impedance of 50  $\Omega$ .

All RF input ports designated to interface with other equipment shall have a nominal impedance of 50  $\Omega$  when driven in accordance with the manufacturers specifications.

### 4.2 Transmitter input configuration

If the transmitter does not incorporate a stereo encoder and is intended for stereo operation then a test encoder to the specification given in annex A shall be used.

If the transmitter is designed only for monophonic transmissions (i.e. without an MPX input) out-of-band emissions shall be tested in accordance with subclause 4.11.3.

### 4.3 Transmitter output characteristics

The carrier output power shall be within  $\pm 1,0$  dB of the rated output power under normal operating conditions as defined in subclause 5.1. The carrier output power under extreme conditions, as defined in subclause 5.2, shall be within  $+2,0$  dB and  $-3,0$  dB of the rated output power.

The transmitter shall be capable of delivering its rated RF output power into an antenna with an input return loss of  $\geq 16$  dB at all phase angles.

The transmitter shall be capable of operating without damage into loads including open and short circuits, and may shut down or operate at reduced RF output power level to meet this requirement.

The reverse intermodulation performance at the operating frequency or frequencies of the transmitter shall be measured according to the method described in annex D. The frequency offset of the interfering source shall be varied over the range 300 kHz to 7 MHz maximum on both sides of the carrier, but shall remain within the range 66 MHz to 73 MHz.

The reverse intermodulation shall not exceed -10 dB at all frequency offsets within the above range.

### 4.4 Frequency range

The transmitter shall operate within the range 66 MHz to 73 MHz. The preferred operating frequencies shall be multiples of 10 kHz. If 10 kHz channel spacing is not used the actual channel spacing shall be declared by the manufacturer.