



SLOVENSKI STANDARD
SIST ETS 300 198 E1:2005

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Transmission and Multiplexing (TM); Parameters for radio relay systems for the transmission of digital signals and analogue video signals operating at 23 GHz

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**Parameters for radio relay systems for the transmission of
digital signals and analogue video signals operating at 23 GHz**

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Transmission and Multiplexing (TM) Technical Committee of the European Telecommunications Standards Institute (ETSI).

This ETS specifies the minimum performance parameters for radio equipment operating in the frequency range 21,2 GHz to 23,6 GHz as specified in Clause 1.

Annex A provides details of documents which are informative references to this ETS.

Other standards cover radio communications equipment not listed in the scope.

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1 Scope

This European Telecommunication Standard (ETS) covers the minimum performance parameters for terrestrial fixed services radio communications equipment as given below, in the frequency band 21,2 GHz to 23,6 GHz.

This ETS specifies the performance criteria for the different equipment groups.

The equipment groups are:

- digital signals;
- analogue video signals.

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] CCIR Recommendation 637 (1991): "Radio-frequency channel arrangements for analogue and digital radio-relay systems in the 21,1 to 23,6 GHz frequency band".
- [2] ETS 300 019: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment Part 1-1: Classification of environmental conditions - Storage".
- [3] prETS 300 132-1: "Equipment Engineering (EE); Power supply interface at the input to telecommunications equipments Part 1: Interfaces operated by alternating current "AC" (DE/EE-02001.1)
 <https://standards.iteh.ai/SIST-ETS-300-198-E1-2005/9f25d9d0ca93/sist-ets-300-198-e1-2005>
- [4] prETS 300 132-2: "Equipment Engineering (EE); Power supply interface at the input to telecommunications equipments Part 2: Interfaces operated by direct current "DC" (DE/EE-02001.2)
- [5] CCITT Recommendation G.703 (1991): "Physical/electrical characteristics of hierarchical digital interfaces".
- [6] CCITT Recommendation G.707 (1991): "Synchronous digital hierarchy bit rates".
- [7] CCITT Recommendation G.708 (1991): "Network node interface for the synchronous digital hierarchy".
- [8] CCITT Recommendation G.709 (1991): "Synchronous multiplexing structure".
- [9] CCITT Recommendation G.781 (1990): "Structure of Recommendations on multiplexing equipment for synchronous digital hierarchy (SDH)".
- [10] CCITT Recommendation G.782 (1990): "Types and general characteristics of synchronous digital hierarchy (SDH) multiplexing equipment".
- [11] CCITT Recommendation G.783 (1990): "Characteristics of synchronous digital hierarchy (SDH) multiplexing equipment functional blocks".
- [12] CCITT Recommendation G.784 (1990): "Synchronous digital hierarchy (SDH) management".

- [13] CCIR Recommendation 403: "Intermediate-frequency characteristics for the interconnection of analogue radio-relay systems".
- [14] CCIR Recommendation 696: "Error performance and availability objectives for hypothetical reference digital sections utilising digital radio-relay systems forming part or all of the medium grade portion of an ISDN connection".
- [15] CCIR Recommendation 697: "Error performance and availability objectives for the local grade portion at each end of an ISDN utilising digital radio-relay systems".

3 Abbreviations

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

AC	Alternating Current
BER	Bit Error Ratio
C/I	Carrier/Interference
DC	Direct Current
RF	Radio Frequency
RSL	Receive Signal Level
SDH	Synchronous Digital Hierarchy
TMN	Telecommunications Management Network

4 General characteristics (digital and analogue)

4.1 Frequency bands and channel arrangements

4.1.1 Frequency band

- a) Frequency band shall be 21,2 GHz to 23,6 GHz.
- b) Channel plan: the channel plan shall be in accordance with CCIR Recommendation 637 [1] with a basic raster of 3,5 MHz.

4.1.2 Co-polar channel spacing for systems operating on different antennas

For systems operating on the same antenna, see subclause 4.3, a).

Table 1: Digital systems

Minimum bit rate (Mbit/s)	2	2	2 x 2	8	8	34	34	140/155
Channel spacing (MHz)	3,5	7	3,5	7	14	28	56	112

NOTE: 34 Mbit/s bit rate in 56 MHz channel spacing is used for transportable, temporary and emergency links.

Table 2: Analogue systems

Video baseband (MHz)	<3,5	<6	<10	<14
Channel spacing (MHz)	28	56	56	56

4.1.3 Transmit/receive centre gap

The centre gap shall be taken as a multiple of the basic raster distance of 3,5 MHz, and shall not be less than 56 MHz.

4.1.4 Transmit/receive duplex frequency separation

The transmitter receiver duplex frequency separation shall not be less than 252 MHz and should be in accordance with local administrations frequency planning rules.

4.2 Performance prediction and objectives (for reference only)

Systems considered in this ETS should be able to meet CCIR medium grade performance objectives given in CCIR Recommendation 696 [14] Class 4 and local grade performance objectives of CCIR Recommendation 697 [15].

The dominant fading mechanism is rain attenuation; performance prediction methods should be based on the latest issue of the following CCIR Recommendations:

Recommendation 453: "The formula for the radio refractive index";

Recommendation 530: "Propagation data and prediction methods required for the design of terrestrial line-of-sight systems";

Recommendation 837: "Characteristics of precipitation for propagation modelling";

Recommendation 838: "Specific attenuation model for rain for use in prediction methods";

Recommendation 840: "Attenuation due to clouds and fog".

4.3 Compatibility requirements between systems

- a) It is envisaged that systems will normally be required to operate on common hops using either separate antennas or on separate polarisations on the same antenna.
- b) There should be no requirement to operate transmitting equipment from one manufacturer with receiving equipment from another, or to multiplex different manufacturers equipment on the same polarisation of the same antenna.

4.4 Types of installation

The equipment may comprise both radio relay units in weather protected locations and outdoor units with the Radio Frequency (RF) assemblies likely to be located close to the antenna in order to minimise feeder losses.

4.4.1 Environmental conditions

The equipment shall be required to meet either the environmental conditions set out in ETS 300 019 [2], which defines weather protected and non-weather protected locations, classes and test severities, or one of the conditions listed in subclause 4.4.1.2.

4.4.1.1 Equipment within weather protected locations

The most important climatic parameters for the five classes are given in table 3.

Table 3

Climatic class	3.1	3.2	3.3	3.4	3.5
High air temperature (°C)	+ 40	+ 45	+ 55	+ 70	+ 40
Low air temperature (°C)	+ 5	- 5	- 25	- 40	- 40
High relative humidity (%)	85	95	100	100	100
Low relative humidity (%)	5	5	10	10	10
Air movement (m/s)	5	5	5	5	5
Solar radiation (W/m ²)	700	700	1 120	1 120	-

Climatic classes 3.1 and 3.2 apply to equipment designed for temperature controlled locations or partially temperature controlled locations respectively. This type of equipment is generally described as "indoor" equipment.

The use of radio-relay equipment covering climatic classes 3.3 (non-temperature controlled locations), 3.4 (sites with heat trap) and 3.5 (sheltered locations) is not mandatory.

4.4.1.2 Equipment for non-weather protected locations

This type of equipment is generally described as "outdoor" equipment. Class 4.1 or extended class 4.1 E parameters should be applied. Class 4.1 applies to many of the ETSI countries and class 4.1 E applies to them all. The most important parameter values are given in table 4.

Table 4

Climatic class	4.1	4.1E
High air temperature (°C)	+ 40	+ 45
Low air temperature (°C)	- 33	- 45
High relative humidity (%)	100	100
Low relative humidity (%)	15	8
Air movement (m/s)	50	50
Solar radiation (W/m ²)	1 120	1 120

It should be noted that radio cabinets supplied with a system will give their own "weather protection" including full protection against precipitation and wind. Climatic classes 3.3, 3.4 and 3.5 (subclause 4.4.1.1) may, therefore, also be applicable for "outdoor" locations.

Some ETSI members may also decide to apply one of the non-standard specifications given in table 5.

Table 5

High air temperature (°C)	+ 40	+ 50
Low air temperature (°C)	- 20	- 30
High relative humidity (%)	90	90
Low relative humidity (%)	5	5
Air movement (m/s)	50	50
Solar radiation (W/m ²)	1 120	1 120

4.4.2 Electromagnetic compatibility

Under study.