SLOVENSKI STANDARD
SIST ETS 300 633 E1:2003

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Prenos in multipleksiranje (TM) ï Digitalni radiorelejni sistemi (DRRS) ï DRRS z nizko in srednjo zmogljivostjo tipa toļ ka-toļ ka, ki deluje v frekvenļ nem obmoļ ju od 2,1 GHz do 2,6 GHz

Transmission and Multiplexing (TM); Digital Radio Relay Systems (DRRS); Low and medium capacity point-to-point DRRS operating in the frequency range 2,1 GHz to 2,6 GHz

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Transmission and Multiplexing (TM); Digital Radio Relay Systems (DRRS); Low and medium capacity point-to-point DRRS operating in the frequency range 2,1 to 2,6 GHz

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Foreword

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

Transposition dates	
Date of adoption:	2 May 1997
Date of latest announcement of this ETS (doa):	30 September 1997
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 March 1998
Date of withdrawal of any conflicting National Standard (dow):	31 March 1998

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1 Scope

This European Telecommunication Standard (ETS) specifies the minimum performance parameters for terrestrial low and medium capacity Point-to-Point (P-P) digital fixed service radio relay equipment operating in the range 2,1 to 2,6 GHz. The requirements and limits given in this ETS are relevant to all environmental conditions for the chosen climatic class. Test methods are under study.

Digital systems are intended to be used for P-P connections in local and regional networks at data rates of $N \times 64$ kbit/s, $N \times 2$ Mbit/s (N = 1, 2, 4, 8, 16), 2×8 Mbit/s and 34 Mbit/s. Other data rates may also be foreseen. Typical applications include:

a) customer connections;
b) Integrated Services Digital Network (ISDN) extension;
c) mobile base station connections;
d) telemetry and telecontrol, including transportable and off-shore use;
e) digital TV application.

The parameters to be specified fall into two categories:

a) Those that are required to provide compatibility between channels from different sources of equipment on the same route, connected either to:

   - separate antennas; or
   - separate polarizations of the same antenna.

b) Parameters defining the transmission quality of the proposed system.

This ETS deals with Intermediate Frequency (IF), Radio Frequency (RF) and baseband characteristics relevant to low and medium capacity Plesiochronous Digital Hierarchy (PDH) transmission. Antenna/feeder system requirements are covered in EN 300 631 [12].

Due to the wide spread of applications and corresponding system rates, parameters such as RF spectrum masks and receiver sensitivity are related to standardized channel spacings rather than to minimum system rates. This allows individual countries to allocate a bandwidth and therefore a standard channel spacing in accordance with the foreseen services and their own frequency management and radio network planning.

As the maximum bit rate in a given bandwidth depends on the system spectral efficiency, different equipment classes are defined:

Class 1: equipment performance based on typically 2-states modulation scheme (e.g. 2-FSK (Frequency-Shift Keying), Gaussian Minimum Shift Keying (GMSK) with discriminator detection, or equivalent);

Class 2: equipment performances based on typically 4-states modulation scheme (e.g. 4-FSK, 4 - QAM (Quadrature Amplitude Modulation), or equivalent);

Class 3: equipment performances based on typically 16-states modulation scheme (e.g. 16-QAM, or equivalent).

Safety aspects are outside the mandate of ETSI and they will not be considered in this ETS.

2 Normative references

This ETS incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate place 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] CEPT Recommendation T/R 13-01: "Preferred channel arrangements for fixed services in the range 1 - 3 GHz".

[2] ETS 300 019, Parts 1 and 2 (1994): "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; subparts 1-1 to 1-7: Classification of environmental conditions; subparts 2-1 to 2-7: Specification of environmental tests".

[3] ITU-T Recommendation G.703 (1991): "Physical/electrical characteristics of hierarchical digital interfaces".

[4] ITU-R Recommendation F.696-1: "Error performance and availability objectives for hypothetical reference digital sections utilizing digital radio-relay systems forming part or all of the medium-grade portion of an ISDN connection".

[5] ITU-R Recommendation F.697-1: "Error performance and availability objectives for the local-grade portion at each end of an ISDN connection utilizing digital radio-relay systems".

[6] ITU-T Recommendation G.773 (1993): "Protocol suites for Q-interfaces for management of transmission systems".

[7] ITU-T Recommendation G.821 (1988): "Error performance of an international digital connection forming part of an integrated services digital network".

[8] ITU-T Recommendation G.826 (1993): "Error performance parameters and objectives for international, constant bit rate digital paths at or above the primary rate".

[9] ETS 300 385: "Radio Equipment and Systems (RES); ElectroMagnetic Compatibility (EMC) standard for digital fixed radio links and ancillary equipment with data rates at around 2 Mbit/s and above".

[10] ITU-T Recommendation V.11 (1993): "Electrical characteristics for balanced double-current interchange circuits operating at data signalling rates up to 10 Mbit/s".

[11] ITU-T Recommendation G.712 (1992): "Transmission performance characteristics of pulse code modulation".

[12] EN 300 631: "Transmission and Multiplexing (TM); Digital Radio Relay Systems (DRRS); Antennas for point-to-point radio links in bands 1 to 3 GHz".

[13] ITU-T Recommendation V.24 (1993): "List of definitions for interchange circuits between terminal equipment (DTE) and data circuit-terminating equipment (DCE)".

[14] ETR 080 (1996): "Transmission and Multiplexing (TM); Integrated Services Digital Network (ISDN) basic rate access; Digital transmission system on metallic local lines".

[15] ITU-R Recommendation F.746: "Radio-frequency channel arrangements for radio-relays systems".

[16] ITU-R Recommendation F.634-3: "Error performance objectives for real digital radio-relay links forming part of a high-grade circuit within an integrated services digital network".

[17] prETS 300 339: "Radio Equipment and Systems (RES); General Electro-Magnetic Compatibility (EMC) for radio equipment".

[18] ETS 300 132: "Equipment Engineering (EE); Power supply interface at the input to telecommunications equipment; Part 1: Operated by alternating current (ac) and Part 2: Operated by direct current (dc)".

3 Abbreviations and symbols

3.1 Abbreviations

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

BB	BaseBand
BER	Bit Error Ratio
CW	Continuous Wave
EMC	ElectroMagnetic Compatibility
FEC	Forward Error Correction
FSK	Frequency Shift Keying
GMSK	Gaussian Minimum Shift Keying
IF	Intermediate Frequency
IF/RF	Intermediate Frequency/Radio Frequency
ISDN	Integrated Services Digital Network
LO	Local Oscillator
NRZ	Non Return to Zero
PDH	Plesiochronous Digital Hierarchy
P-P	Point-to-Point
PRBS	Pseudo Random Binary Sequence
QAM	Quadrature Amplitude Modulation
RF	Radio Frequency
RSL	Receive Signal Level
RX	Receiver
S/I	Signal to Interference ratio
SRL	Spectrum Reference Level
TMN	Telecommunications Management Network
TX	Transmitter
XPD	cross-Polar Discrimination
W/U	Wanted to Unwanted signal ratio

3.2 Symbols

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

dB	deciBel
dBm	deciBel relative to 1 mW
GHz	GigaHertz
kHz	kiloHertz
km	kilometre
kbit/s	kilobits per second
Mbit/s	Megabits per second
MHz	MegaHertz
ppm	parts per million
ns	nanosecond