



SLOVENSKI STANDARD
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**Elektromagnetna združljivost in zadeve v zvezi z radijskim spektrom (ERM) –
Oprema za telekomunikacijsko omrežje – Zahteve za elektromagnetno združljivost
(EMC)**

Electromagnetic compatibility and Radio spectrum Matters (ERM); Telecommunication
network equipment; ElectroMagnetic Compatibility (EMC) requirements

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Candidate Harmonized European Standard (Telecommunications series)

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
Telecommunication network equipment;
ElectroMagnetic Compatibility (EMC) requirements**

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Foreword

This Candidate Harmonized European Standard (Telecommunications series) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC [43] (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

The present document is intended to become a Harmonized Standard, the reference of which will be published in the Official Journal of the European Communities referencing the Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility ("the EMC Directive") (89/336/EEC [41] as amended).

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1 Scope

The present document covers the EMC requirements for equipment intended to be used within a telecommunications network (as defined in clause 3). Examples of such equipment are:

- **Switching equipment.** Such equipment includes:
 - local telephone exchanges;
 - remote switching concentrators;
 - international switches;
 - telex switches;
 - network packet switches.
 - General purpose equipment, which is used as a part of a switching system, may be covered by the scope of other standards. For such equipment, if those other standards fully cover all the requirements of the present document, no further requirements are necessary. Switching equipment can also contain transmission functions, and this has to be recognized during testing.
 - Non-radio transmission equipment and ancillary equipment. Such equipment includes:
 - multiplexers;
 - line equipment and repeaters, e.g. equipment for:
 - Synchronous Digital Hierarchy (SDH);
 - Plesiochronous Digital Hierarchy (PDH);
 - Asynchronous Transfer Mode (ATM);
- such as:
- Digital Cross Connect systems;
 - network terminations;
 - transmission equipment used in the access network like XDSL.
- **Power supply equipment.** Such equipment includes:
 - central power plant;
 - end of suite power supplies;
 - uninterruptible power supplies;
 - stabilized AC power supplies;
 - and other dedicated telecommunication network power supplies;

but excludes equipment which is uniquely associated with or integrated in other equipment.

- **Supervisory equipment.** Such equipment includes:
 - network management equipment;
 - operator access maintenance equipment;
 - traffic measurement systems;
 - line test units;
 - functional test units.

The function of *supervision* may either be performed by independent equipment or form part of other telecommunication equipment. If the function of supervision forms part of a telecommunication equipment, the performance may be evaluated simultaneously with other functions (such as switching and transmission) during EMC testing.

The environmental classification used in the present document refers to TR 101 651 [42].

The requirements of the present document have been selected to ensure an adequate level of immunity for the apparatus covered by the scope of the present document. The levels do not, however, cover extreme cases which may occur at any location but with a low probability of occurrence. In special cases, situations may arise where the levels of disturbance may exceed the immunity test levels specified in the present document. In these instances, special mitigation measures may have to be employed.

Equipment for cabled distribution systems intended only for television and sound signals as defined in EN 50083-2 [3] and optical amplifiers as defined in ITU-T Recommendations G.661 [23] and G.662 [24] are outside the scope of the present document.

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2 References (standards.iteh.ai)

The following documents contain provisions which through reference in this text, constitute provisions of the present document.

<https://standards.iteh.ai/catalog/standards/sist/16d15d4a-a1f1-4e38-a241-643a5b5d5e5c/sist-en-300-386-v1-3-3-2006>

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

- | | |
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3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply. The definitions taken from the IEC 60050-161 [20] have reference in parentheses.

AC secondary interface: output port of an AC power supply

AC secondary voltage: output of the AC power supply at the AC secondary interface

NOTE: The AC secondary voltage may be either:

- a stabilized AC supply derived from a DC primary supply (e.g. where the power supply is an inverter); or
- derived from the AC primary supply (e.g. a stabilized power supply used where the quality of the primary supply is not sufficient to feed telecommunication equipment).

burst (161-02-07): sequence of a limited number of distinct pulses or an oscillation of limited duration

connection: temporary association of transmission channels or telecommunication circuits, switching or other functional units set up to provide for the transfer of information between two or more points in a telecommunication network (IEC 60050-714)

continuous disturbance (161-02-11): electromagnetic disturbance the effects of which on a particular device or equipment cannot be resolved into a succession of distinct effects

DC secondary interface: output port of a DC power supply

DC secondary voltage: output of the DC power supply at the DC secondary interface

The DC secondary voltage may be derived from the AC primary supply with or without a buffer battery.

duration (of a voltage change) (161-08-03): interval of time for the voltage to increase or decrease from the initial value to the final value

duration (of a pulse): interval of time between the instants at which the instantaneous value of a pulse reaches 50 % of the pulse magnitude for the first and last time

enclosure port: physical boundary of the Equipment Under Test (EUT) through which electromagnetic fields may emanate or on which they may impinge

environment, environmental conditions: electromagnetic conditions external to the equipment, to which it is subjected at a certain time

The environmental conditions comprise a combination of single environmental parameters and their severity.

environmental parameters: present one or more properties of the electromagnetic environment

immunity (to a disturbance) (161-01-20): ability of a device, equipment or system to perform without degradation in the presence of an electromagnetic disturbance

impulsive disturbance (161-02-09): electromagnetic disturbance which, when incident on a particular device or equipment, manifests itself as a succession of distinct pulses or transients

interface "A": terminals at which a power supply is connected to the telecommunications equipment

multimedia network equipment: multimedia network equipment containing broadcast and telecommunication functions

nominal voltage: nominal value of voltage that designates the type of supply

normal service: service mode where telecommunications equipment operates within its specification

performance criterion: limits of acceptable behaviour of the equipment during and after the application of the electromagnetic phenomenon

NOTE: Performance criteria A apply for continuous phenomena; performance criteria B and C apply for transient phenomena; and performance criteria R apply for resistibility phenomena.

port: particular interface of the EUT with the external electromagnetic environment

power supply: power source (within the scope of EN 300 386) to which telecommunications equipment is intended to be connected

primary supply: public mains or a locally generated AC or DC supply

pulse (161-02-02): abrupt variation of short duration of a physical quantity followed by a rapid return to the initial value

Radio Frequencies (RF): frequency range above 150 kHz

rise time (of a pulse) (161-02-05): interval of time between the instants at which the instantaneous value of a pulse first reaches a specified lower value and then a specified upper value

NOTE: Unless otherwise specified, the lower and upper values are fixed at 10 % and 90 % of the pulse magnitude.

secondary supply: supply to the telecommunications equipment (e.g. racks or system blocks), derived from the primary supply

surge (voltage) (161-08-11): transient voltage wave propagating along a line or a circuit and characterized by a rapid increase followed by a slower decrease of the voltage

system block: functional group of equipment depending for its operation and performance upon the secondary power supply

telecommunication network: network operated under a licence granted by a national telecommunications authority, which provides telecommunications between Network Termination Points (NTPs) (i.e. excluding terminal equipment beyond the NTPs)

tertiary supply: supply to the telecommunications equipment derived from the secondary supply

transient (adjective or noun) (161-02-01): pertaining to or designating a phenomenon or a quantity which varies between two consecutive steady states during a time interval which is short compared with the timescale of interest

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ADSL	Asymmetric Digital Subscriber Line
AM	Amplitude Modulation
ATM	Asynchronous Transfer Mode
CPU	Central Processing Unit
DC	Direct Current
DLU	Digital Line Unit
DSL	Digital Subscriber Line
EMC	ElectroMagnetic Compatibility
ESD	Electrostatic Discharge
EUT	Equipment Under Test
HDSL	High bit-rate Digital Subscriber Line
LTG	Line Trunk Group
NTPs	Network Termination Points
PDH	Plesiochronous Digital Hierarchy
PRBS	Pseudo Random Bit Sequence
RF	Radio Frequency
rms	root-mean-square
SDH	Synchronous Digital Hierarchy

SDSL	Symmetrical single pair high bit rate Digital Subscriber Line
SN	Switching Network
TLS	Test Load Simulator
T_r/T_h	Rise time (10 % to 90 %) and hold time (50 % to 50 %) of transient signal (see EN 61000-4-4)
TS	Traffic Simulator
U_{ps0}	Voltage measured with a psophometer conforming to ITU-T Recommendation O.41
VDSL	Very high speed Digital Subscriber Line

4 Installation environment

The installation environments for the equipment covered by the present document are defined in TR 101 651 [42]. The environments defined are either:

- the telecommunication centre (major and minor);
- locations other than telecommunication centre e.g. within offices, customers' premises, outdoor locations, etc.

If no restrictions are specified in the product documentation for the installation environment, the equipment shall comply with the requirements of all environments, implying that the more severe test level shall be used when the test is performed.

5 Immunity: test methods

Where reference is made in the present document to specific "test levels" to be used for the tests, it is implicitly required that the EUT shall also fulfil the compliance criteria when tested at "test levels" lower than those specified. This requirement does not apply, however, to tests for immunity to continuous phenomena.

Conducted immunity tests shall be applied to one port at a time.

Conducted immunity test shall not be applied to the signal ports that, according to the product documentation, are not permanently connected.

One signal port of each type found on the equipment shall be tested. If in normal installation practice multi-pair cables (e.g. 64 × balanced pairs) and composite cables (e.g. a combination of fibre and copper) are used, they may be tested as one single cable. Cables bundled for aesthetic or routing purposes are to be tested individually.

It may be determined from consideration of the electrical characteristics and usage of a particular equipment that some of the tests are inappropriate and therefore unnecessary. In such a case, it is required that both the decision and the justification not to apply any particular test to any particular port be recorded in the test report.

5.1 Electrostatic discharge

The immunity test method and laboratory conditions are described in EN 61000-4-2 [7].

ESD shall be applied only to those points and surfaces of the EUT that are expected to be touched during normal operation including users access as specified in the user manual.

The application of discharges to any point of the equipment other than the electrostatic protection point, which is accessible only for maintenance purposes, is not required. The application of ESD to the contacts of open connectors is not required.

5.2 Electrical fast transients/burst

The immunity test method and laboratory conditions are described in EN 61000-4-4 [9].