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SERIES K: PROTECTION AGAINST INTERFERENCE

Safety criteria for telecommunication equipment

ITU-T Recommendation K.51

(Formerly CCITT Recommendation)

ITU-T RECOMMENDATION K.51

SAFETY CRITERIA FOR TELECOMMUNICATION EQUIPMENT

Summary

This Recommendation provides guidance on safety criteria for telecommunication network infrastructure equipment. It specifies requirements intended to reduce risks of fire, electric shock or injury for the operator, layman and service personnel who may come into contact with the equipment. This Recommendation refers to IEC 60950 and provides additional requirements when these are not covered by IEC 60950. Equipment complying with the relevant requirements in this Recommendation is considered suitable for use in a telecommunication network. However, this Recommendation does not include requirements for performance or functional characteristics of equipment.

Source

ITU-T Recommendation K.51 was prepared by ITU-T Study Group 5 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on 25 February 2000.

Keywords

Remote power feeding, safety, telecommunication equipment.

FOREWORD

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the ITU. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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As of the date of approval of this Recommendation, the ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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Introduction

This Recommendation provides guidance on safety criteria for telecommunication network infrastructure equipment. The requirements of this Recommendation have been developed in cooperation with IEC TC74. This Recommendation should be read together with IEC 60950 [2].

Recommendation K.51

SAFETY CRITERIA FOR TELECOMMUNICATION EQUIPMENT

(Geneva, 2000)

1 Scope

1.1 Equipment covered by this Recommendation

This Recommendation is applicable to mains-powered, battery-powered or remotely-powered telecommunication network infrastructure equipment.

This Recommendation specifies requirements intended to reduce risks of fire, electric shock or injury for the operator and layman who may come into contact with the equipment and, where specifically stated, for service personnel.

This Recommendation is intended to reduce such risks with respect to installed equipment, whether it consists of a system of interconnected units or independent units, subject to installing, operating and maintaining the equipment in the manner prescribed by the manufacturer.

Equipment complying with the relevant requirements in this Recommendation is considered suitable for use in a telecommunication network. However, this Recommendation does not include requirements for performance or functional characteristics of equipment.

1.2 Additional requirements

Requirements additional to those specified in this Recommendation may be necessary for:

- equipment intended for operation in special environments, for example, extremes of temperature; excessive dust, moisture or vibration; flammable gases; and corrosive or explosive atmospheres;
- equipment intended to be used in vehicles, on board ships or aircraft, in tropical countries, or at altitudes greater than 2000 m;
- equipment intended for use where ingress of water is possible.

NOTE – Attention is drawn to the fact that authorities of some countries impose additional requirements.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

[1] ITU-T Recommendation K.50 (2000), *Safe limits of operating voltages and currents for telecommunication systems powered over the network.*

[2] IEC 60950 (1999), *Safety of Information Technology Equipment, Ed. 3*.

3 Definitions

In this Recommendation, the definitions introduced by ITU-T Recommendation K.50 [1] and IEC 60950 [2] are used. As it is recommended to read these documents together, the definitions are not reproduced here.

4 Abbreviations

This Recommendation uses the following abbreviation:

RFT Remote Feeding Telecommunication circuit

5 Safety criteria for telecommunication network infrastructure equipment

5.1 General requirements

Telecommunication network infrastructure equipment shall comply with all the relevant requirements of IEC 60950 [2].

5.2 Special requirements

Remote Feeding Telecommunication circuits (RFT circuits) are defined in K.50. These circuits are not yet standardized by IEC. For these circuits the following requirements apply. For the reader's convenience, a cross-reference between the requirements of this Recommendation and similar paragraphs of IEC 60950 is provided in Appendix I.

5.2.1 Protection from electric shock and energy hazards

5.2.1.1 Access to energized parts

The equipment shall be so constructed that in user access areas there is adequate protection against contact with bare parts of RFT circuits.

5.2.1.2 Protection in service access areas

Bare parts at hazardous voltages, except for RFT circuits, shall be located or guarded so that unintentional contact with such parts is unlikely during service operations involving other parts of the equipment.

Bare parts at hazardous voltage, including RFT circuits, shall be located or guarded so that accidental shorting to SELV circuits or to TNV circuits, for example by tools or test probes used by service personnel, is unlikely.

5.2.1.3 Protection in restricted access locations

For equipment to be installed in a restricted access location, contact is permitted with the bare parts of RFT circuits by the test finger as defined in Figure 2A of [2]. However, such parts shall be so located or guarded that unintentional contact is unlikely.

5.2.2 Interconnection of equipment

5.2.2.1 General requirements

Where equipment is intended to be electrically connected to other equipment, interconnection circuits shall be selected to provide continued conformance to the requirements of K.50 for RFT circuits, after making the connections.

NOTE 1 – This is normally achieved by connecting RFT-C circuits to RFT-C circuits and RFT-V circuits to RFT-V circuits.

NOTE 2 – It is permitted for an interconnecting cable to contain more than one type of circuit (e.g. SELV, limited current, TNV, ELV, RFT, or hazardous voltage) provided that they are separated as required by this Recommendation and IEC 60950 [2].

5.2.2.2 Types of interconnecting circuits

An RFT circuit can be an interconnection circuit.

5.2.2.3 Interconnection between RFT circuits

The interconnection of one RFT-V circuit to another RFT-V circuit shall not result in exceeding the limits specified in Annex A/K.50. The interconnection of one RFT-C circuit to another RFT-C circuit shall not result in exceeding the limits specified in Annex B/K.50.

5.2.3 Protection of telecommunication network service personnel, and users of other equipment connected to the network, from hazards in the equipment

5.2.3.1 Protection from hazardous voltages

Circuitry intended to be directly connected to a telecommunication network shall comply with the requirements of an SELV circuit, an TNV circuit or an RFT circuit.

5.2.4 Separation from other circuits and parts

An RFT circuit shall be separated from:

- other RFT circuits by functional isolation; provided that neither circuit exceeds the limits of K.50 if this isolation is short-circuited. Otherwise, the circuits shall be separated as if one were at a hazardous voltage;
- ELV circuits by supplementary insulation;
- earthed accessible parts, earthed SELV circuits and earthed TNV circuits by basic insulation;
- unearthed accessible parts, unearthed SELV circuits, unearthed TNV circuits and circuits at hazardous voltages by one or both of the following:
  - double or reinforced insulation;
  - basic insulation, together with protective screening connected to the main protective earthing terminal.

Compliance is checked by inspection and measurement.

5.2.5 Installation instructions

For equipment using an RFT circuit intended for interconnection with other equipment, the installation instructions shall specify all of the following:

- the effective capacitance of the equipment:
  - between the connection points for the conductors of the telecommunication network; and
  - between the connection point for one conductor of the telecommunication network and earth;
- that a system assessment shall be carried out to ensure that the effective capacitance of the total system, including the capacitance of the equipment, does not exceed the values specified in Figure 1;
- that the voltage rating of the telecommunication network must be adequate for the normal RFT circuit voltage, together with any superimposed transient;
- RFT circuit voltage.

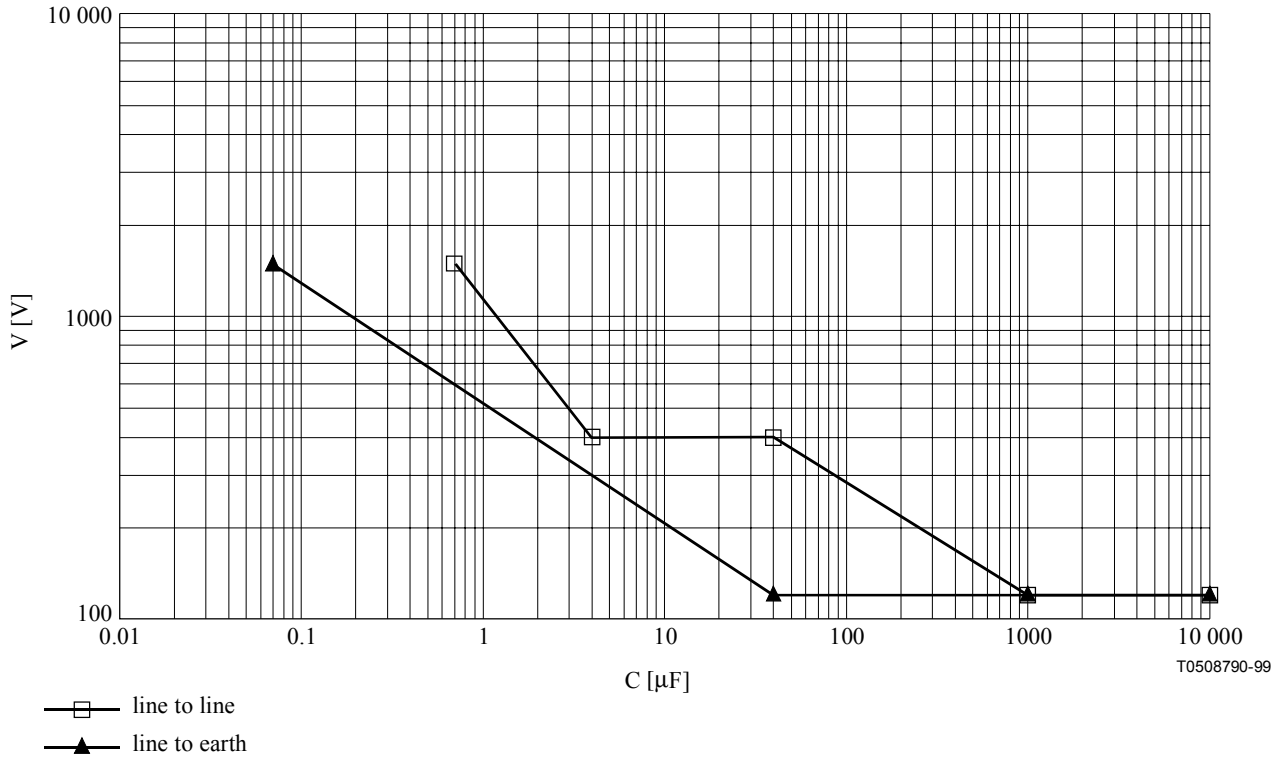

Figure 1/K.51 – Limits for capacitance values of RFT circuits or of the total system

APPENDIX I

Cross-reference between K.51 and IEC 60950

For the reader's convenience, this appendix provides a cross-reference between the requirements of this Recommendation and paragraphs of IEC 60950 where similar requirements for other circuits are given (Table I.1).

Table I.1/K.51

K.51 clause number	IEC 60950 paragraph number
5.2.1.1	2.1.1
5.2.1.2	2.1.2
5.2.1.3	2.1.3
5.2.2	3.5
5.2.2.1	3.5.1
5.2.2.2	3.5.2
5.2.2.3	3.5.4
5.2.3	6.1
5.2.3.1	6.1.1

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