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SERIES K: PROTECTION AGAINST INTERFERENCE

Risk assessment of damages to telecommunication sites due to lightning discharges

ITU-T Recommendation K.39

(Previously CCITT Recommendation)

ITU-T K-SERIES RECOMMENDATIONS
PROTECTION AGAINST INTERFERENCE

For further details, please refer to ITU-T List of Recommendations.

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (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 (Helsinki, March 1-12, 1993).

ITU-T Recommendation K.39 was prepared by ITU-T Study Group 5 (1993-1996) and was approved by the WTSC (Geneva, 9-18 October 1996).

NOTES

1. In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.
2. The status of annexes and appendices attached to the Series K Recommendations should be interpreted as follows:
 - an *annex* to a Recommendation forms an integral part of the Recommendation;
 - an *appendix* to a Recommendation does not form part of the Recommendation and only provides some complementary explanation or information specific to that Recommendation.

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SUMMARY

This Recommendation gives support to protection engineers in evaluating the risk for severe damages caused by lightning. It comprises a risk analysis that includes the effect from direct and nearby lightning strikes as well as overvoltages originating from incoming services, mainly power and communication networks. The analysis also indicates the most efficient additional protective measures for sites with insufficient basic protection.

Part of this Recommendation deals with the risk of injuries to people being present at the site during thunderstorms.

This Recommendation is based on a concept from IEC TC 81 and modified to be applicable to practical cases in telecommunication systems.

The example in Appendix I applies to a telecommunication site with an adjacent antenna mast.

Recommendation K.39

RISK ASSESSMENT OF DAMAGES TO TELECOMMUNICATION SITES DUE TO LIGHTNING DISCHARGES

(Geneva, 1996)

1 Introduction

Protective measures against a randomly occurring overvoltage phenomenon like lightning discharges have to a great extent been empirically based. Modern equipment has shown to be more prone to damages compared with older ones. Serious consequences in complexed communication systems may also occur in built-up areas, earlier classified as unexposed. The widespread use of radio stations with high antenna masts for wireless telecommunication has significantly increased the risk for damages due to direct lightning strikes to the site.

The need for protection should be based on a risk assessment considering the cost and importance of the system, the electromagnetic environment at the particular site and the probability of damages. The protection levels and the type of protective methods should also be chosen regarding the costs of installation and maintenance of protective devices.

An assessment of the probability of overvoltage occurrences and the sensitivity of the existing telecommunication installation shall give a possibility to attain a well-balanced protection of the whole system.

Protective measures to eliminate severe injuries to people during thunderstorms are especially important at exposed sites that are permanently or temporarily manned.

2 Scope

This Recommendation comprises a method for the risk assessment of damages to equipment at telecommunication sites and personnel safety due to overvoltages and overcurrents caused by lightning discharges.

3 List of 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] IEC 1662:1995, *Assessment of the risk of damage due to lightning*.
- [2] IEC 1024-1:1990, *Protection of structures against lightning, Part 1: General principles*.
- [3] IEC 1024-1-1:1993, *Protection of structures against lightning, Part 1: General principles – Section 1: Guide A – Selection of protection levels for lightning protection systems*.
- [4] IEC 1312-1:1995, *Protection against lightning electromagnetic impulse, Part 1: General principles*.
- [5] ITU-T Recommendation K.20 (1996), *Resistibility of telecommunication switching equipment to overvoltages and overcurrents*.
- [6] ITU-T Recommendation K.21 (1996), *Resistibility of subscriber's terminal to overvoltages and overcurrents*.
- [7] ITU-T Recommendation K.22 (1995), *Overvoltage resistibility of equipment connected to an ISDN T/S bus*.
- [8] ITU-T Recommendation K.27 (1996), *Bonding configurations and earthing inside a telecommunication building*.
- [9] ITU-T Recommendation K.40 (1996), *Protection against LEMP in telecommunications centres*.



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