SLOVENSKI STANDARD

SIST HD 477.3 S1:2002

prva izdaja
oktober 2002

Methods of measurement for equipment used in terrestrial radio-relay systems - Part 3: Simulated systems

ICS 33.060.30

Referenčna številka
SIST HD 477.3 S1:2002(en)

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HD 477.3 S1

ENGLISH VERSION

UDC: 621.396.7:621.317

KEY WORDS: Terrestrial radio-relay system; simulated system; method of measurement

METHODS OF MEASUREMENT FOR EQUIPMENT USED IN TERRESTRIAL RADIO-RELAY SYSTEMS PART 3: SIMULATED SYSTEMS

Méthodes de mesure applicables au matériel utilisé dans les faisceaux hertziens terrestres Troisième partie: liaisons simulées

Meßverfahren für Geräte in terrestrischen Richtfunksystemen Teil 3: Simulierte Systeme

BODY OF THE HD

The Harmonization Document consists of:

- IEC 487-3 (1975) ed 1; IEC/SC 12E, not appended

This Harmonization Document was approved by CENELEC on 1988-09-13.

The English and French versions of this Harmonization Document are provided by the text of the IEC publication and the German version is the official translation of the IEC text.

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to withdraw all conflicting national standards **by or before 1989-10-01.**

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NORME INTERNATIONALE

INTERNATIONAL STANDARD

CEI
IEC
60487-3

Première édition
First edition
1975-01

Méthodes de mesure applicables au matériel utilisé dans les faisceaux hertziens terrestres

Troisième partie: Liaisons simulées

Methods of measurement for equipment used in terrestrial radio-relay systems

Part 3: Simulated systems

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX
PRICE CODE K

Pour prix, voir catalogue en vigueur
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

METHODS OF MEASUREMENT FOR EQUIPMENT USED IN TERRESTRIAL RADIO-RELAY SYSTEMS

PART 3: SIMULATED SYSTEMS

FOREWORD

1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

This publication has been prepared by Sub-Committee 12E, Microwave Systems, of IEC Technical Committee No. 12, Radiocommunications.

A draft was discussed at the meeting held in Budapest in 1972. As a result of this meeting, the draft, document 12E(Central Office)7, was submitted to the National Committees for approval under the Six Months' Rule in January 1973.

The following countries voted explicitly in favour of publication:

Australia	Israel
Belgium	Japan
Canada	South Africa (Republic of)
Czechoslovakia	Sweden
Denmark	Switzerland
France	Turkey
Germany	United Kingdom
Hungary	United States of America

METHODS OF MEASUREMENT FOR EQUIPMENT USED IN TERRESTRIAL RADIO-RELAY SYSTEMS

PART 3: SIMULATED SYSTEMS

SECTION ONE — GENERAL

100. Object

The object of this standard is to define methods for assessing the overall performance of terrestrial radio-relay systems in so far as they can be represented by simulated systems.

101. Scope

The test methods described in this Part 3 are general and are applicable to simulated systems comprising two or more sub-systems. These tests, which are described in subsequent sections, cover the transmission performance of systems used for the transmission of frequency division multiplex (f.d.m.) telephony, monochrome and colour television, sound programme and baseband digital information.

This Part 3 should be used in conjunction with Part 1, Measurements Common to Sub-systems and Simulated Radio-relay Systems.

102. Terms and definitions

The definitions given below supplement those given in Part 1, Section One.

102.1 *Simulated system*

A "simulated system" comprises two or more sub-systems. It represents an actual operational radio-relay system in part, to the extent that the results obtained by measuring the simulated system enable a meaningful assessment of the performance of an actual system to be made (see Sub-clause 103.1).

102.2 *Typical simulated system*

A typical simulated system is one which is sufficiently representative of an actual system to be suitable for system type testing. It comprises sub-systems which have similar design features and manufacturing techniques and which fall within the manufacturer's usual range of ratings for these sub-systems.

Note. — Although there are many different types of radio-relay sub-systems, the configuration of a typical system may be selected from a number of basic arrangements shown as examples in Sub-clause 103.2.

102.3 *System type test*

A system type test is a specified series of tests carried out on a typical simulated system with the object of determining whether a particular manufacturer can be considered capable of integrating the appropriate sub-systems into a complete radio-relay system which will meet the overall system specification.

103. General observations on simulated systems

Methods of measurement which are common to sub-systems and simulated radio-relay systems are given in Part 1. This Part 3 deals with those tests which are applicable only to simulated radio-relay systems.

103.1 *Limitations of tests on simulated systems*

Tests made on simulated systems should approach actual operating conditions as closely as possible. For practical reasons, some sub-systems contained in actual systems have to be excluded from the simulated test arrangement; therefore, the extent to which the results of tests made on simulated systems can be applied to real systems will be subject to limitations as described below.

103.1.1 *Sub-systems not included in simulated radio-relay systems*

The sub-systems listed below are not usually included in a simulated system for practical reasons such as size and cost:

aerials;
feeders;
cross-polarization separators;
long, lossy i.f. cables;
special power supply equipment.

103.1.2 *Significant effects due to the absence of certain sub-systems*

The exclusion of certain of the sub-systems, listed in Sub-clause 103.1.1, from a simulated test arrangement may affect the results of the tests and this fact must be taken into account when assessing the performance of a simulated system.

Some possible effects are given below for guidance:

- absence of echo distortion and "frequency pulling" due to the absence of the feeders and aerials;
- absence of adjacent channel interference. Since adjacent channels are not normally included in a simulated system, an allowance will be required for the interference which they may have caused;
- absence of co-channel interference. Since there are no aerials in a simulated system, co-channel interference caused by back-lobe reception of a signal of the same frequency from another direction (as at a repeater station) cannot, in principle, occur;
- absence of interference from transmitters to receivers in the same station due to:

  a) side-lobe coupling between adjacent aerials, and
  b) the use of a common aerial together with a cross-polarization separator;
- propagation effects other than non-selective fading will not be simulated;
- coupling between transmitters and receivers operating on the same frequency, other than via the intended path, can occur with simulated systems.

Bearing in mind the limitations of comparing simulated systems with actual systems, it will be necessary to assess the effects which are not taken into account by the tests made on a simulated system. Such an assessment may be made by appropriate measurements on sub-systems and by calculation. Suitable methods for measuring sub-systems are described in Part 2, Measurements for Sub-systems (in preparation). The methods of calculation are not within the scope of this publication, but can be found in other technical literature.