ILNAS

Institut luxembourgeois de la normalisation
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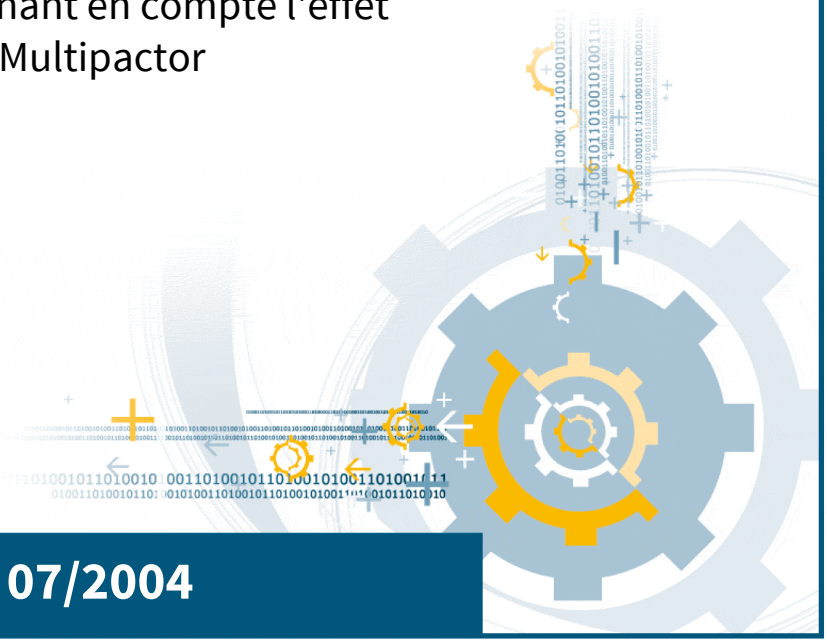
des produits et services

ILNAS-EN 14777:2004

Space engineering - Multipaction design and test

Raumfahrttechnik - Multiplication
Konzeption und Test

Systèmes sol et opérations - Conception
et test prenant en compte l'effet
Multipactor



07/2004

National Foreword

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EUROPEAN STANDARD
NORME EUROPÉENNE
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EN 14777

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English version

Space engineering - Multipaction design and test

Systèmes sol et opérations - Conception et test prenant en compte l'effet Multipactor

Raumfahrttechnik (Engeneering) - Multipaction Konzenption und Test

This European Standard was approved by CEN on 29 April 2004.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Foreword

This document (EN 14777:2004) has been prepared by CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2005, and conflicting national standards shall be withdrawn at the latest by January 2005.

It is based on a previous version[1)] originally prepared by the ECSS E-20-01 Working Group, reviewed by the ECSS Engineering Panel and approved by the ECSS Steering Board. The European Cooperation for Space Standardization (ECSS) is a cooperative effort of the European Space Agency, National Space Agencies and European industry associations for the purpose of developing and maintaining common standards.

This European Standard is one of the series of space standards intended to be applied together for the management, engineering and product assurance in space projects and applications.

Requirements in this European Standard are defined in terms of what shall be accomplished, rather than in terms of how to organize and perform the necessary work. This allows existing organizational structures and methods to be applied where they are effective, and for the structures and methods to evolve as necessary without rewriting the standards.

The formulation of this European Standard takes into account the existing EN ISO 9000 family of documents.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1) ECSS-E-20-01

Introduction

Single carrier multipaction has well-established theoretical and testing procedures, and the heritage from proven components enables to define testing margin values as requirements for European space missions. Applying the single carrier margin to peak in-phase multi-carrier signals is recognized as excessively onerous in many cases, but the present understanding of multipaction for multicarrier signals is not well enough established for a reduced limit to be specified. For this reason, the margins for the multi-carrier case are stated as recommendations, with a view to their evolving to requirements in the longer term.

1 Scope

This document specifies the requirements and recommendations for the design and test of RF components and equipment to achieve acceptable performance with respect to multipaction-free operation in service in space. The document includes:

— verification planning requirements;

— definition of a route to conform to the requirements;

— design and test margin requirements;

— design and test requirements; and

— informative annexes that provide guidelines on the design and test processes.

This document is intended to result in the effective design and verification of the multipaction performance of the equipment and consequently in a high confidence in achieving successful product operation.

This document covers multipaction events occurring in all classes of RF satellite components and equipment at all frequency bands of interest. Operation in single carrier CW and pulse modulated mode are included, as well as multi-carrier operations. This document does not include breakdown processes caused by collisional processes, such as plasma formation.

This document is applicable to all space missions.

When viewed in a specific project context, the requirements defined in this document should be tailored to match the genuine requirements of a particular profile and circumstances of a project.

NOTE Tailoring is a process by which individual requirements of specifications, standards and related documents are evaluated and made applicable to a specific project, by selection and in some exceptional cases, modification of existing or addition of new requirements.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13701:2001, *Space systems — Glossary of terms.*

EN 14725, *Space engineering — Verification.*

EN ISO 14644–1, *Cleanrooms and associated controlled environments — Part 1: Classification of air cleanliness (ISO 14644-1:1999).*

ESCC Basic Specification No. 24900*, Issue 1, October 2002, Minimum requirements for controlling environmental contamination of components.*

ESCC Basic Specification No. 20600*, Issue 1, February 2003, Preservation, packaging and despatch of ESCC electronic components.*