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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/Z 31477-2015

Replacing GB/Z 31477-2015

**Process management for avionics - Application guide for work
margin and robustness limit stress testing of avionics
equipment**

航空电子过程管理 航空电子产品高加速试验定义和应用指南

(English Translation)

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Foreword

This document is a report-type guidance technical document.

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document replaces GB/Z 31477-2015 "Aviation Electronics Process Management. Definition and Application Guidelines for High-Acceleration Testing of Aviation Electronic Products".

Compared with GB/Z 31477-2015, the main technical changes in "South" are as follows, apart from structural adjustments and editorial modifications.

- a) The scope of application has been changed (see Chapter 1, Chapter 1 of the 2015 edition);
- b) Terms, definitions, and abbreviations have been changed (see Chapter 3, Chapter 2 of the 2015 edition);
- c) The working margin and robustness ultimate stress test methods have been modified (see Chapter 4, Chapter 4 of the 2015 edition);
- d) Added "Delivery Document Requirements" (see 10.1.2);

e) Added a quantitative dimension for cost comparison and a cost balance case (see Chapter 11).

This document is equivalent to IEC TR62500:2024 "Avionics process management. Operating margins and robustness limits of avionics equipment".

The document type of the "Guideline for Application of Stress Testing" has been changed from an IEC technical report to a national standardization guidance technical document in my country.

The following minimal editorial changes have been made to this document;

---The standard name has been changed to "Application of Avionics Process Management in the Testing of Operating Margin and Robust Ultimate Stress of Avionics Equipment". guide";

---The URLs for the ISO and IEC databases have been removed.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed and is under the jurisdiction of the National Technical Committee on Standardization of Avionics Process Management (SAC/TC427).

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1 Scope

This document outlines the objectives, basic principles, application scope, and implementation of operational margin and robustness ultimate stress tests for avionics equipment.

This process is primarily aimed at avionics systems project managers, electronic equipment engineering project managers, design engineers, test supervisors, and reliability assurance personnel.

team.

The guidelines provided in this document are applicable to all types of avionics projects and help responsible original equipment manufacturers (OEMs) realize equipment as early as possible.

Maturity.

Note 1: Ultimate stress testing is often used as an industry strategy for lifecycle cost-benefit management and is not a mandatory requirement for product certification. Furthermore,

customers...

The contract terms may specify equipment availability requirements, such as those starting from the EIS or operational phase. Ultimate stress testing is conducted throughout the aviation electrical system.

The design and development phase of sub-equipment involves stresses in mechanical, climatic, and electrical fields.

Mechanical, electro-hydraulic, and electro-pneumatic types, and regardless of size (from "low-level" sub-components such as CCA, mechanical components, connectors, etc., to systems), Applicable to all types of generator sets (including Class A units).

This document is used in conjunction with IEC 62429, IEC 62506, or both, to test the reliability of hardware devices with embedded software.

Note 3: This document can provide assistance in the equipment definition justification process (see CEN-CENELECprEN 9215), for example.

---Assist in developing definition and justification documents (DJDs) by providing relevant data on equipment operating margins and decision-making basis;

---Provides justification for potential future changes to equipment definitions, such as change management in response to the discontinuation of electronic components.

In this document, "defect" refers to "inherent defect" or "weak link", that is, "defect and its related potential failure or malfunction" (see 3.1.1).

This document applies to the avionics industry; other industrial sectors may refer to it for further information.

2 Normative references

This document has no normative references.

3.1 Terms and Definitions

The following terms and definitions apply to this document.

3.1.1

built-indeficiency

During the product design or manufacturing process, equipment malfunctions or failures may occur, leading to the equipment being unable to function properly or operate.

Defects, shortcomings, flaws, or anomalies (often referred to as weaknesses).

Note 1: Deviations from state-of-the-art design rules or inaccurate manufacturing process control may pose a risk, for example, at the source of built-in defects in the equipment. Such built-in