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

GB/T 34956-2017

**Atmospheric radiation effects -- Accommodation of
atmospheric radiation effects via single event effects within
avionics electronic equipment**

大气辐射影响 航空电子设备单粒子效应防护设计指南

(English Translation)

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard uses the translation method is equivalent to using IEC 62396-1:2016 "Avionics process management atmospheric radiation effects Part 1. Air Airborne electronic equipment single particle effect protection design guide. " this standard compared with IEC 62396-1:2016, mainly made the following editorial changes.

--- The standard name changed to "Atmospheric radiation affect avionics single particle effect protection design guide";

--- Increased information appendix NA, NB.

This standard is proposed by China Aviation Industry Corporation.

This standard by the National Avionics Process Management Standardization Technical Committee (SAC/TC427) centralized.

This standard was drafted unit. China Aviation Institute of Integrated Technology, Beijing Shengtao Ping Experimental Engineering Technology Co., Ltd., China Aviation Industry First Aircraft Design and Research Institute.

Introduction

Aircrew and passengers are exposed to atmospheric radiation (neutrons and protons) during flight, which also affects avionics Prepared and induced single particle effect (SEE). In the past few years, domestic and international air crews affected the crew and passengers A great deal of research has been carried out and great achievements have been made. The standardization of atmospheric neutron radiation effects for avionics has

been it has received great attention from the aviation manufacturing industry and is a further extension of ongoing work related to atmospheric radiation by aircraft crews and passengers.

Atmospheric radiation effect is one of the influencing factors of the avionics soft and hard failure rate. From the system security point of view, in use when calculating the failure rate, the method described in the ARP4754A (Common Method for Calculating Hard Failure Rates and Soft Failure Rates) also applies to atmospheric radiation Shot failure rate.

In addition, the standard reference JEDEC (Joint Electron Device Engineering Council) standard JESD89A, the standard is Electronic equipment suffers from ground-level (below 3040m) atmospheric emissions that produce soft errors in the reference standard.

This standard determines the potential impact of the aircraft on its electronic products exposed to atmospheric ionizing radiation and the disposal of these effects the general method of sound, adapted to avionics system designers, electronic equipment or components of the development and production and application of units can also refer to use.

Atmospheric radiation effects Avionics single particle effect protection design guide

1 Scope

This standard mainly for 18.3km flight aircraft in the airborne electronic equipment to provide protection against atmospheric radiation design guidance, but also it provides a reference for the design of atmospheric radiation effect protection of avionics in aircraft flying above 18.3km.

This standard defines the radiation environment and its radiation in the avionics environment effects, proposed in the avionics system defense Control the design requirements of these effects.

This standard is intended to guide the development of avionics equipment manufacturers and designers in the avionics single-particle effect to form a standard design Process and method.

This standard provides a detailed radiation environment to identify the avionics radiation problems required to provide electronic devices single-particle effect rate Quantitative calculation method. A comprehensive system safety analysis approach should consider the single-particle effect rate and consider both device-level and system-level proofs After the particle effect rate avionics meet the application requirements.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version applies to this article Pieces. For undated references, the

latest edition (including all amendments) applies to this document.

GB/T 34955-2017 atmospheric radiation effects avionics single particle effect test guide (IEC 62396-2:2012, IDT) IEC 62239-1-2015 Avionics process management - Part 1.

Preparation and maintenance of electronic component management plans
management of avionics management plan-Part 1:

Preparation and maintenance of an electronic components management plan) IEC 62396-3, Avionics process management, effects of atmospheric radiation - Part 3. Single-particle effects of atmospheric radiation in avionics systems Prevention and control optimization system design [Process management for avionics-Atmospheric radiation effects-Part 3: Opti-mising system design to accommodate the single event effects (SEE) of atmospheric radiation] IEC 62396-4-2013, Avionics process management, effects of atmospheric radiation - Part 4. High-voltage avionics and its potential Process design guidelines for single-particle effects (Process management for avionics-Atmospheric radiation effects-Part 4.

Guidelines for designing with high voltage electrical products and potential single effect) IEC 62396-5 Avionics Process Management Atmospheric Radiation Effects Part 5. Thermal Neutron Fluence Rates and Their Applications in Avionics Systems Process evaluation guideline (Process management for avionics-Atmospheric radiation effects-Part 5: Guide-lines for assessing the neutron fluxes and effects in avionics systems) EIA4899 electronic device management plan preparation standards (Standard for preparing an electronic components management plan

3 Terms and definitions

The following terms and definitions apply to this document.

Note: Users of this standard may adopt additional definitions of terms that are consistent with the customary practices within their organization.