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

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**Design and verification requirements for fibre optic
components for space applications**

宇航用纤维光学器件设计与验证要求

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009. Please note that some elements of this document may involve patents. The issuer of this document is not responsible for identifying these patents. This standard is proposed and managed by the National Aerospace Technology and Application Standardization Technical Committee

(SAC/TC425). This standard was drafted. Beijing Aerospace Times Optoelectronics Technology Co., Ltd. The main drafters of this standard. Liu Jianchun, Zhang Zhixin, Shan Lianjie, Ding Dongfa, Zhang Bingxin, Xiang Yanrong, Wang Cun. Design and verification requirements for aerospace fiber optics

1 Scope

China's national design and verification requirements for fibre optic components used in space. It specifies the terms, definitions and abbreviations and the general requirements. Optical fibre has become attractive on spacecraft for the same reasons as on the ground - bandwidth, weight, and complete immunity to the electromagnetic interference that surrounds a spacecraft's power electronics - and it brings its own problems in orbit. Radiation darkens glass: ionising dose creates colour centres that absorb light, and a fibre that was transparent at launch may have lost a significant fraction of its transmission after years in a radiation belt. Temperature cycling stresses the joints between fibre and connector, which are the mechanical weak point. And a fibre cannot be repaired or replaced. So the verification requirements are as much of this standard as the design ones: the component must be shown to survive the dose and the cycling it will see.

This standard specifies the functional parameters, structure, packaging, and other design and verification of functions, parameters, and reliability of fiber optic devices for aerospace Claim. This standard applies to the process control and selection of aerospace fiber optic device design and verification. Applications in other fields can be implemented by reference.

2 Normative references

The following documents are essential for the application of this document. For dated references, only the dated version applies to this article Pieces. For undated references, the latest version (including all amendments) applies to this document.

GB/T 7826-2012 System Reliability Analysis Technology Failure Mode and Impact Analysis (FMEA) Procedure

GB/T 14733.12-2008 telecommunication term fiber optic communication ISO 14621-

1 Space system power, electronics, electromagnetic components-Part 1. Management [Spacesystems-Electrical, elec- tronicandelectromechanical (EEE) parts-Part 1. Partsmanagement] ISO 14621-

2 Space systems, electrical, electronic, and electromagnetic components. Part 2. Requirements for control procedures [Spacesystems-Elec- trical, electronicandelectromechanical (EEE) parts-Part 2. Controlprogramrequirements]

3.1 Terms and definitions The terms and definitions defined in

GB/T 14733.12-2008 and the following apply to this document.

3.1.1 Fiber optic component Components that work based on the characteristics of the optical fiber or work through discrete components coupled with the optical fiber. Output. Including active fiber optics and passive fiber optics.

3.1.2 Passive fiber optics passive fibre optic component Fiber optics capable of performing certain optical functions by themselves without the aid of any external light or electrical energy, including fiber optic connections , Fiber coupler/beam splitter, wavelength division multiplexer, fiber attenuator, fiber filter, fiber isolator, circulator, polarization controller, fiber Delay lines, fiber gratings, etc.

3.1.3 Active fibre optic component Fiber optic devices that need external energy to drive work that can convert electrical signals into optical signals or convert optical signals into electrical signals, Including semiconductor light sources (LD, LED, DFB, QW, SQW, VCSEL), semiconductor light detectors (PD, PIN, APD), fiber laser, Optical amplifier, wavelength converter, optical modulator, optical switch, etc.

3.1.4 Space fibre optics sub-system Space systems equipped with fiber optics can perform certain independent functions, including fiber optic sensing systems and fiber optic communication systems.