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

GB/T 16850.1-2022

Replacing GB/T 16850.1-1997, GB/T 16850.2-1999

**Optical amplifier test methods - Part 1: Power and gain
parameters for single-channel optical amplifiers**

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foreword

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

drafting.

This document is part 1 of GB/T 16850 "Test Methods for Optical Amplifiers". GB/T 16850 has issued the following parts.

- Part 1. Single-channel optical amplifier power and gain parameters;
- Part 3. Single-channel optical amplifier noise parameters;
- Part 4. Test method for simulation parameter - gain slope;
- Part 5. Test methods for reflection parameters;
- Part 6. Test methods for pump leakage parameters;
- Part 7. Test method for out-of-band insertion loss.

This document replaces GB/T 16850.1-1997 "Basic Specifications for Test Methods of Optical Fiber Amplifiers - Part 1. Test Methods for Gain Parameters"

"Method" and GB/T 16850.2-1999 "Basic Specifications for Test Methods of Optical Fiber Amplifiers Part 2. Test Methods for Power Parameters", this document

Integrates the duplicate content in the two parts of GB/T 16850.1-1997 and GB/T 16850.2-1999, merges them into one part, and

Compared with GB/T 16850.1-1997 and GB/T 16850.2-1999, except for editorial changes, the main technical changes are as follows.

--- Changed the scope, this document only stipulates the measurement of single-channel optical amplifier gain and power, multi-channel optical amplifier gain and power parameters

The measurement of the number will be specified in Part 10 of GB/T 16850 "Test Methods for Optical Amplifiers"; the scope of application ranges from rare earth element doping

Active fiber optical amplifiers, extended to include Raman fiber amplifiers, semiconductor optical amplifier modules and doped waveguide optical amplifiers

Optical amplifiers including optical amplifiers (see Chapter 1, Chapter 1 of GB/T 16850.1-1997, Chapter 1 of GB/T 16850.2-1999);

- Increased the terms and definitions of "gain bandwidth" (see 3.1);
- Added a brief description of the power and gain parameter measurement methods in the overview (see 5.1);
- Added the requirement that "the ratio of laser source power to total spontaneous emission should be greater than 30dB" for fixed wavelength and tunable light sources (see 6.1);
- Delete the classification description of fixed light source and adjustable wavelength light

source, and no longer specify the type of light source (see 6.1, GB/T 16850.1-

4.1.1 of.1997, 4.1.1 of GB/T 16850.2-1999);

--- Changed the spectrometer resolution requirements in the spectrometer method, from 0.1nm to 1nm (see 6.1, GB/T 16850.1-

4.1.3 of.1997, 4.1.3 of GB/T 16850.2-1997);

--- Changed the requirements for optical connectors in the Spectrum Analyzer Method, and gave the definition of the repeatability of the connection loss (see 6.1,

4.1.8 of GB/T 16850.1-1997, 4.1.8 of GB/T 16850.2-1999);

--- Added the method of measuring the maximum output signal power and the maximum total output power by the spectrum analyzer method (see 6.3);

--- Added the method of measuring the gain change by the spectrum analyzer method (see 7.3);

--- Delete the method of measuring the reverse small signal gain by the spectrum analyzer method (see 4.3.2 of GB/T 16850.1-1997);

--- Changed the formula for calculating the gain in the spectrum analyzer method [see 7.4, formula (3) of GB/T 16850.1-1997];

--- Added the method of measuring the maximum output signal power and the maximum total output power by the optical power meter method (see 8.3).

This document refers to IEC 61290-1.2014 "Optical Amplifier Test Methods Part 1.Power and Gain Parameters", IEC 61290-1-

1.2020 "Optical Amplifier Test Methods Part 1-1.Spectral Analyzer Method for Power and Gain Parameters", IEC 61290-1-2.2005 "Optical

Amplifier test methods Part 1-2.Spectrum analyzer method for power and gain parameters" and IEC 61290-1-3.2021 "Optical amplifiers

Test Method Part 1-3.Power and Gain Parameters Optical Power Meter Method" was drafted, and the degree of consistency with the above standards is non-equivalent.

Please note that some contents of this document may refer to patents. The issuing agency of this document assumes no responsibility for identifying patents.

Introduction

The optical amplifier is the core component in the optical communication network. In order to standardize its test method, on the basis of referring to IEC 61290, successively

formulate

And released 7 parts of GB/T 16850 "Basic Specifications for Test Methods of Optical Fiber Amplifiers". However, since the release of GB/T 16850, optical amplifiers

Significant changes have taken place in the product form and technical requirements of amplifiers, and the relevant IEC 61290 has also been revised several times, and multi-waveforms have been added.

Test methods for channel parameters, gain transient parameters and polarization mode dispersion parameters. As a basic standard for optical amplifiers, it is necessary to gradually develop

Revised to keep up with the trend of new technologies and industrial development, and keep pace with international standards.

The scope of application of the revised GB/T 16850 has been extended to rare earth element doped or Raman fiber amplifiers, semiconductor optical amplifiers

SOA modules and planar optical waveguide amplifiers break through the scope of application of optical fiber amplifiers limited by the original standard, so its subject name

Also changed from "Fiber Amplifier" to "Optical Amplifier". The main formulation and revision work of GB/T 16850 in the future is as follows.

a) Because the test methods for gain and power parameters are basically the same, GB/T 16850.2-1999 "Basic Rules for Test Methods of Optical Fiber Amplifiers"

Part 2. Test methods for power parameters" was merged into GB/T 16850.1;

b) GB/T 16850.1-1997 and GB/T 16850.3-1999 do not distinguish between single-channel optical amplifiers and multi-channel optical amplifiers, but

The test methods for power, gain and noise parameters of single-channel optical amplifiers are not fully applicable to multi-channel optical amplifiers, so this

In the revised version, Parts 1 and 3 are limited to test methods for single-channel optical amplifiers, and relevant parameters for multi-channel amplifiers

The test methods will be specified in Part 10;

c) It is expected to add gain transient parameters (Part 8), multi-channel parameters (Part 10) and polarization mode dispersion parameters (Part 11

points) test method.

According to the original standard structure of GB/T 16850 and the published standard of IEC 61290, GB/T 16850 "Test Methods for Optical Amplifiers" is proposed

Consists of the following parts.