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INTERNATIONAL STANDARD

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Optical amplifiers – Test methods – Part 10-1: Multichannel parameters – Pulse method using an optical switch and optical spectrum analyzer

Amplificateurs optiques – Méthodes d'essai Partie 10-1: Paramètres à canaux multiples – Méthode d'impulsion utilisant un interrupteur optique et un analyseur de spectre optique

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OPTICAL AMPLIFIERS – TEST METHODS –

Part 10-1: Multichannel parameters – Pulse method using an optical switch and optical spectrum analyzer

FOREWORD

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International Standard IEC 61290-10-1 has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics.

This second edition cancels and replaces the first edition published in 2003. It is a technical revision with updated references and cautions on proper use of the procedure.

This International Standard is to be read in conjunction with IEC 61291-1.

The text of this standard is based on the following documents:

CDV	Report on voting
86C/778/CDV	86C/809/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 61290 series, published under the general title *Optical amplifiers – Test methods*[1)] can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

1) The first editions of some of these parts were published under the general title *Optical fibre amplifiers – Basic specification* or *Optical amplifier test methods*.

INTRODUCTION

This International Standard is devoted to the subject of optical fibre amplifiers. The technology of optical fibre amplifiers is still rapidly evolving, hence amendments and new editions to this standard can be expected.

OPTICAL AMPLIFIERS – TEST METHODS –

Part 10-1: Multichannel parameters – Pulse method using an optical switch and optical spectrum analyzer

1 Scope and object

This part of IEC 61290 applies to optical amplifiers (OAs) using active fibres and waveguides, containing rare-earth dopants, currently commercially available.

The object of this standard is to establish uniform requirements for accurate and reliable measurements of the signal-spontaneous noise figure as defined in IEC 61291-1.

The test method independently detects amplified signal power and amplified spontaneous emission (ASE) power by launching optical pulses into the OA under test and synchronously detecting "on" and "off" levels of the output pulses by using an optical sampling switch and an optical spectrum analyzer (OSA).

Such measurement is possible because the gain response of the rare-earth doped OA is relatively slow, particularly in Er-doped OAs. However, since the OA gain dynamics vary with amplifier types, operating conditions and control schemes, the gain dynamics should be carefully considered when applying the present test method to various OA. The manufacturer of the OA should present data validating the required modulation frequency to limit the error to <1 dB. The measurements for obtaining this information are described in Annex C.

The test method is described basically for multichannel applications, which includes single channel applications as a special case of multichannel (wavelength-division multiplexed) applications.

NOTE All numerical values followed by (‡) are currently under study.

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.

IEC 61291-1, *Optical amplifiers – Part 1: Generic specification*

3 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply:

AGC	automatic gain control
ALC	automatic level control
AOM	acousto-optic modulator
APC	automatic power control
ASE	amplified spontaneous emission
CW	continuous wave