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Optical amplifiers - Test methods -- Part 10-4: Multichannel parameters - Interpolated source subtraction method using an optical spectrum analyzer (IEC 61290-10-4:2007 (EQV))

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61290-10-4

July 2007

ICS 33.180.30

English version

Optical amplifiers - Test methods - Part 10-4: Multichannel parameters - Interpolated source subtraction method using an optical spectrum analyzer

(IEC 61290-10-4:2007)

Amplificateurs optiques - Méthodes d'essais - Partie 10-4: Paramètres à canaux multiples - Méthode par soustraction de la source interpolée en utilisant un analyseur de spectre optique (CEI 61290-10-4:2007)

Prüfverfahren für Lichtwellenleiter-Verstärker - Teil 10-4: Mehrkanal-Parameter - Quellen-Interpolations- und Subtraktionsverfahren unter Verwendung eines optischen Spektralanalysators (IEC 61290-10-4:2007)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 86C/724/CDV, future edition 1 of IEC 61290-10-4, prepared by SC 86C, Fibre optic systems and active devices, of IEC TC 86, Fibre optics, was submitted to the IEC-CENELEC parallel Unique Acceptance Procedure and was approved by CENELEC as EN 61290-10-4 on 2007-06-01.

This standard is to be used in conjunction with EN 61291-1:2006.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2008-03-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2010-06-01

Annex ZA has been added by CENELEC.

_____

Endorsement notice

The text of the International Standard IEC 61290-10-4:2007 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61290-1-1	NOTE	Harmonized as EN 61290-1-1:2006 (not modified).
IEC 61290-3	NOTE	Harmonized as EN 61290-3:2000 (not modified).

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 61291-1	2006	Optical amplifiers - Part 1: Generic specification	EN 61291-1	2006
IEC 61291-4	-[1)]	Optical amplifiers - Part 4: Multichannel applications - Performance specification template	EN 61291-4	2003[2)]

[1)] Undated reference.

[2)] Valid edition at date of issue.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPTICAL AMPLIFIERS – TEST METHODS –

Part 10-4: Multichannel parameters – Interpolated source subtraction method using an optical spectrum analyzer

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 61290-10-4 has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics.

This standard shall be used in conjunction with IEC 61291-1. It was established on the basis of the second (2006) edition of that standard.

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

CDV	Report on voting
86C/724/CDV	86C/742/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.

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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*, 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.

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INTRODUCTION

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

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OPTICAL AMPLIFIERS – TEST METHODS –

Part 10-4: Multichannel parameters – Interpolated source subtraction method using an optical spectrum analyzer

1 Scope and object

This part of IEC 61290 applies to all commercially available optical amplifiers (OAs) and optically amplified subsystems. It applies to OAs using optically pumped fibres (OFAs based on either rare-earth doped fibres or on the Raman effect), semiconductor optical amplifiers (SOAs) and waveguides (POWA).

The object of this standard is to establish uniform requirements for accurate and reliable measurements, by means of the interpolated source subtraction method using an optical spectrum analyzer. The following OA parameters, as defined in Clause 3 of IEC 61291-1, are determined:

- channel gain, and
- channel signal-spontaneous noise figure.

This method is called *interpolated source subtraction* (ISS) because the amplified spontaneous emission (ASE) at each channel is obtained by interpolating from measurements at a small wavelength offset around each channel. To minimize the effect of source spontaneous emission, the effect of source noise is subtracted from the measured noise.

The accuracy of the ISS technique degrades at high input power level due to the spontaneous emission from the laser source(s). Annex A provides guidance on the limits of this technique for high input power.

An additional source of inaccuracy is due to interpolation error. Annex A provides guidance on the magnitude of interpolation error for a typical amplifier ASE versus wavelength characteristic.

NOTE 1 All numerical values followed by (‡) are suggested values for which the measurement is assured. Other values may be acceptable but should be verified.

NOTE 2 General aspects of noise figure test methods are reported in IEC 61290-3.

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 61291-1:2006, *Optical amplifiers – Part 1: Generic specification*

IEC 61291-4: *Optical amplifiers – Part 4: Multichannel applications – Performance specification template*

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