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Optical amplifiers - Test methods - Part 10-5: Multichannel parameters - Distributed Raman amplifier gain and noise figure

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EUROPEAN STANDARD

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EUROPÄISCHE NORM

EN 61290-10-5

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English Version

Optical amplifiers - Test methods - Part 10-5: Multichannel parameters - Distributed Raman amplifier gain and noise figure (IEC 61290-10-5:2014)

Amplificateurs optiques - Méthodes d'essai - Partie 10-5: Paramètres à canaux multiples - Gain et facteur de bruit des amplificateurs Raman répartis (CEI 61290-10-5:2014)

Prüfverfahren für Lichtwellenleiter-Verstärker - Teil 10-5: Mehrkanalparameter - Verstärkung und Rauschzahl von verteilten Raman-Verstärkern (IEC 61290-10-5:2014)

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Foreword

The text of document 86C/1142/CDV, future edition 1 of IEC 61290-10-5, prepared by SC 86C "Fibre optic systems and active devices" of IEC/TC 86 "Fibre optics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61290-10-5:2014.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2015-03-27
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2017-06-27

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

IEC 61290-3	NOTE	Harmonized as EN 61290-3.
IEC 61290-10-4	NOTE	Harmonized as EN 61290-10-4.

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu

Publication	Year	Title	EN/HD	Year
IEC 60825-1	-	Safety of laser products -- Part 1: Equipment classification and requirements	EN 60825-1	-
IEC 61291-1	-	Optical amplifiers -- Part 1: Generic specification	EN 61291-1	-
IEC 61291-4	-	Optical amplifiers -- Part 4: Multichannel applications - Performance specification template	EN 61291-4	-
IEC/TR 61292-4	-	Optical amplifiers -- Part 4: Maximum permissible optical power for the damage-free and safe use of optical amplifiers, including Raman amplifiers	-	-

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OPTICAL AMPLIFIERS – TEST METHODS –

Part 10-5: Multichannel parameters – Distributed Raman amplifier gain and noise figure

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1 Scope and object

This part of IEC 61290 applies to distributed Raman amplifiers (DRAs). DRAs are based on the process whereby Raman pump power is introduced into the transmission fibre, leading to signal amplification within the transmission fibre through stimulated Raman scattering. A detailed overview of the technology and applications of DRAs can be found in IEC TR 61292-6.

A fundamental difference between these amplifiers and discrete amplifiers, such as EDFAs, is that the latter can be described using a black box approach with well-defined input and output ports. On the other hand, a DRA is basically a pump module, with the actual amplification process taking place along the transmission fibre. This difference means that standard methods described in other parts of IEC 61290 for measuring amplifier parameters, such as gain and noise figure, cannot be applied without modification.

The object of this standard is to establish uniform requirements for accurate and reliable measurements, using an optical spectrum analyser (OSA), of the following DRA parameters:

a) channel on-off gain;

b) pump unit insertion loss;

c) channel net gain;

d) channel signal-spontaneous noise figure.

The measurement method is largely based on the interpolated source subtraction (ISS) method using an optical spectrum analyser, as described and elaborated in IEC 61290-10-4, with relevant modifications relating to a DRA.

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

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

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60825-1, *Safety of laser products – Part 1: Equipment classification and requirements*

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

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