

Optical amplifiers - Test methods -- Part 3-3: Noise figure parameters - Signal power to total ASE power ratio

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**Optical amplifiers -
Test methods -
Part 3-3: Noise figure parameters -
Signal power to total ASE power ratio
(IEC 61290-3-3:2013)**

Amplificateurs optiques -
Méthodes d'essais -
Partie 3-3: Paramètres du facteur
de bruit -
Rapport puissance du signal sur
puissance totale d'ESA
(CEI 61290-3-3:2013)

Lichtwellenleiter-Verstärker –
Prüfverfahren -
Teil 3-3: Rauschzahlparameter -
Verhältnis der Signalleistung zur Gesamt-
ASE-Leistung
(IEC 61290-3-3:2013)

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 86C/1121/CDV, future edition 1 of IEC 61290-3-3, 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 61290-3-3:2014.

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) 2014-09-12
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2016-12-12

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Endorsement notice

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

- | | | |
|---------------|------|-----------------------------|
| IEC 61290-3-1 | NOTE | Harmonized as EN 61290-3-1. |
| IEC 61290-3-2 | NOTE | Harmonized as EN 61290-3-2. |

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OPTICAL AMPLIFIERS – TEST METHODS –

Part 3-3: Noise figure parameters – Signal power to total ASE power ratio

1 Scope and object

This part of IEC 61290-3 applies to all commercially available single channel optical amplifiers (OAs), including OAs using optically pumped fibres (OFAs) based on either rare-earth doped fibres or on the Raman effect, semiconductor optical amplifier modules (SOA modules) and planar optical waveguide amplifiers (POWAs). More specifically, it applies to single channel OAs placed before optical receivers, where there are no optical bandpass filtering elements placed between the OA and the receiver.

The object of this part of IEC 61290-3 is to establish uniform requirements for accurate and reliable measurement of the ratio of the signal output power to the total ASE power generated by the OA in the optical bandwidth of the receiver. This quantity is a measure of the spontaneous-spontaneous beat noise at the receiver, and is correlated to the spontaneous-spontaneous noise factor of the OA, F_{sp-sp} , as defined in IEC 61290-3 and IEC 61291-1.

IEC 61290-3-1 describes a measurement method, using an optical spectrum analyzer, OSA, for the signal-spontaneous noise factor F_{sig-sp} but does not describe a method for measuring F_{sp-sp} . IEC 61290-3-2 describes a measurement method, using an electrical spectrum analyzer (ESA), for the total noise factor $F_{sp-sp} + F_{sig-sp}$. However, this method does not allow F_{sp-sp} to be measured separately, and therefore does not provide a means of directly quantifying the effect of spontaneous-spontaneous beat noise at the receiver. This part of IEC 61290-3 complements IEC 61290-3-1 and IEC 61290-3-2 in that it provides such a means.

Two measurement methods are provided for the ratio of the signal output power to the total ASE power. The first method uses an OSA, while the second method uses a bandpass filter and an optical power meter.

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 61290-3, *Optical amplifiers – Test methods – Part 3: Noise figure parameters*

IEC 61291-1:2012, *Optical fibre amplifiers – Part 1: Generic specification*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.