SVENSK STANDARD SS-EN 62150-4

| Fastställd | Utgåva | Sida | Ansvarig kommitté |
|---|---|---|---|
| 2010-06-21 | 1 | 1 (1+14) | SEK TK 86 |



# Fiberoptik – Aktiva komponenter – Mätning och provning – Del 4: Relativt intensitetsbrus mätt med optisk tidsdomänmetod

*Fibre optic active components and devices – Test and measurement procedures – Part 4: Relative intensity noise using a time-domain optical detection system*

Som svensk standard gäller europastandarden EN 62150-4:2010. Den svenska standarden innehåller den officiella engelska språkversionen av EN 62150-4:2010.

**Nationellt förord**

Europastandarden EN 62150-4:2010

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC

– **IEC 62150-4, First edition, 2009 - Fibre optic active components and devices - Test and measurement procedures - Part 4: Relative intensity noise using a time-domain optical detection system**

utarbetad inom International Electrotechnical Commission, IEC.

ICS 33.180.20

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 62150-4

January 2010

ICS 33.180.20

English version

# Fibre optic active components and devices - Test and measurement procedures - Part 4: Relative intensity noise using a time-domain optical detection system

(IEC 62150-4:2009)

Composants et dispositifs actifs à fibres optiques - Procédures d'essais et de mesures - Partie 4: Intensité relative du bruit en utilisant un système de détection optique dans le domaine temporel (CEI 62150-4:2009)

Aktive Lichtwellenleiter-Bauteile und -Bauelemente - Grundlegende Prüf- und Messverfahren - Teil 4: Messung des relativen Intensitätsrauschens unter Anwendung eines optischen Zeitbereichs-Empfangssystems (IEC 62150-4:2009)



CENELEC

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

**Central Secretariat: Avenue Marnix 17, B - 1000 Brussels**



Ref. No. EN 62150-4:2010 E

SEK Svensk Elstandard

## Foreword

The text of document 86C/918/FDIS, future edition 1 of IEC 62150-4, 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 was approved by CENELEC as EN 62150-4 on 2009-12-01.

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) | 2010-09-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2012-12-01 |

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 62150-4:2009 was approved by CENELEC as a European Standard without any modification.

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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 61280-2-2 | - | Fibre optic communication subsystem test procedures -<br>Part 2-2: Digital systems - Optical eye pattern, waveform and extinction ratio measurement | EN 61280-2-2 | - |
| IEC 61300-3-6 | - | Fibre optic interconnecting devices and passive components - Basic test and measurement procedures -<br>Part 3-6: Examinations and measurements - Return loss | EN 61300-3-6 | - |
| IEC 62007-2 | - | Semiconductor optoelectronic devices for fibre optic system applications -<br>Part 2: Measuring methods | EN 62007-2 | - |
| IEEE 802.3 | 2005 | IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks -<br>Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications | - | - |
| ITU-T Recommendation G.957 | - | Optical interfaces for equipments and systems relating to the synchronous digital hierarchy | - | - |

# CONTENTS

# INTRODUCTION

Laser intensity noise can be one of the limiting factors in the transmission of analogue or digital signals. It can reduce the signal-to-noise ratio and increase the bit error rate, therefore degrading system performance. Laser intensity noise can vary significantly depending on the properties of the laser and back reflections. In order to optimize communication links, it is essential to accurately characterize the laser intensity noise, compare it with the signal strength, and if necessary allow an appropriate power budget.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent concerning the FFT method for separating noise and deterministic signals given in 5.4.2.

IEC takes no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has assured the IEC that he/she is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with IEC. Information may be obtained from:

Agilent Technologies
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Santa Rosa, CA 95404

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# FIBRE OPTIC ACTIVE COMPONENTS AND DEVICES – TEST AND MEASUREMENT PROCEDURES –

## Part 4: Relative intensity noise using a time-domain optical detection system

## 1 Scope

This part of IEC 62150 specifies test and measurement procedures for relative intensity noise ($RIN$). It applies to lasers, laser transmitters, and the transmitter portion of transceivers. This procedure examines whether the device or module satisfies the appropriate performance specification. The procedure is applicable to single longitudinal mode (SLM). An optional section of the procedure presents a controlled return loss to the device-under-test, but is only applicable to devices coupled to SMF.

The method described in this standard, using a time-domain detection system, provides a single value for $RIN$ that averages the noise over the transmission bandwidth. The measurement is made on a modulated laser capturing the $RIN$ value under normal operating conditions. It also measures $RIN_{\mathrm{OMA}}$, an alternative definition, as described in IEEE 802.3-2005.

An alternative $RIN$ measurement method uses a photoreceiver and electrical spectrum analyzer and provides $RIN$ vs. electrical frequency. This method provides a $RIN$ value averaged over particular electrical band determined by a filter. For a filter bandwidth and characteristic that duplicates the filtering in a transmission system, this technique provides a result that is appropriate to determine the noise for such a system.

This method is based on the measurement of total intensity noise including and does attempt to subtract the effects of thermal and shot noise.

Background on laser intensity noise is given in Annex A.

## 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 61280-2-2, *Fibre optic communication subsystem test procedures – Part 2-2: Digital systems – Optical eye pattern, waveform and extinction ratio measurement*

IEC 61300-3-6, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-6: Examinations and measurements – Return loss*

IEC 62007-2*, Semiconductor optoelectronic devices for fibre optic system applications – Part 2: Measuring methods*

IEEE 802.3™-2005, *Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications*

ITU-T Recommendation G.957, *Optical interfaces for equipments and systems relating to the synchronous digital hierarchy*