SLOVENSKI STANDARD
SIST EN 61300-3-3:1997

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Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-3: Examinations and measurements - Monitoring change in attenuation and in return loss (multiple paths) (IEC 61300-3-3:1997)

Fibre optic interconnecting devices and passive components - Basic test and measurement procedures -- Part 3-3: Examinations and measurements - Monitoring change in attenuation and in return loss (multiple paths)

Lichtwellenleiter - Verbindungselemente und passive Bauteile - Grundlegende Prüf- und Meßverfahren -- Teil 3-3: Untersuchungen und Messungen - Aufzeichnung der Änderung von Dämpfung und Rückflußdämpfung (Mehrkanal-Verfahren)

Dispositifs d'interconnexion et composants passifs à fibres optiques - Méthodes fondamentales d'essais et de mesures -- Partie 3-3: Examens et mesures - Contrôle de la variation de l'affaiblissement et de la puissance réfléchie (voies multiples)

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EUROPEAN STANDARD

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English version

Fibre optic interconnecting devices and passive components Basic test and measurement procedures Part 3-3: Examinations and measurements - Monitoring change in attenuation and in return loss (multiple paths) (IEC 61300-3-3:1997)

Dispositifs d'interconnexion et composants passifs à fibres optiques Méthodes fondamentales d'essais et de mesures Partie 3-3: Examens et mesures Contrôle de la variation de l'affaiblissement et de la puissance réfléchie (voies multiples) (CEI 61300-3-3:1997)

Lichtwellenleiter - Verbindungselemente und passive Bauteile - Grundlegende Prüf- und Meßverfahren Teil 3-3: Untersuchungen und Messungen - Aufzeichnung der Änderung von Dämpfung und Rückflußdämpfung (Mehrkanal-Verfahren) (IEC 61300-3-3:1997)

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CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 86B/852/FDIS, future edition 1 of IEC 61300-3-3, prepared by SC 86B, Fibre optic interconnecting devices and passive components, of IEC TC 86, Fibre optics, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61300-3-3 on 1997-03-11.

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) 1997-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1997-12-01

Annexes designated "normative" are part of the body of the standard.
In this standard, annex ZA is normative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61300-3-3:1997 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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 61300-3-6	1997	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures Part 3-6: Examinations and measurements Return loss	EN 61300-3-6	1997

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Fibre optic interconnecting devices and passive components – Basic test and measurement procedures –

Part 3-3: Examinations and measurements – Monitoring change in attenuation and in return loss (multiple paths)

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FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – BASIC TEST AND MEASUREMENT PROCEDURES –

Part 3-3: Examinations and measurements – Monitoring change in attenuation and in return loss (multiple paths)

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.

3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.

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

International Standard IEC 61300-3-3 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

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

FDIS	Report on voting
86B/852/FDIS	86B/951/RVD

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

IEC 1300 consists of the following parts, under the general title *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures*:

– Part 1: General and guidance

– Part 2: Tests

– Part 3: Examinations and measurements

FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – BASIC TEST AND MEASUREMENT PROCEDURES –

Part 3-3: Examinations and measurements – Monitoring change in attenuation and in return loss (multiple paths)

1 General

1.1 *Scope and object*

This part of IEC 1300 describes the procedure to measure the change in attenuation and in return loss of a component as it is subjected to an environmental test (primary test). Since it is customary to test a group of components in this type of test over periods of time, this measurement procedure and associated equipment are designed to monitor many components in the same procedure and to employ automated data acquisition. Furthermore, since the level changes in attenuation and return loss in components that is significant for their performance in systems can be very small, this measurement procedure emphasizes maintenance of high measurement stability over time.

1.2 *Normative reference*

The following normative document contains provisions which, through reference in this text, constitute provisions of this part of IEC 1300. At the time of publication, the edition indicated was valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 1300 are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 1300-3-6:1996, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-6: Examinations and measurements – Return loss*

2 General description

Four methods of monitoring change in attenuation and in return loss are described in this procedure. Methods 1 and 2 measure these parameters by measuring changes in power levels of light passing through the component or reflected by the component. Methods 3 and 4 measure attenuation and return loss by using the OTDR. Therefore, the associated apparatus is described separately. These two methods may be used only when the OTDR average time is much less than the variation time of the test environmental conditions. These four methods are used in measuring return loss on DUTs for singlemode fibres. Method 1 shall be considered as the reference method.

3 Apparatus

3.1 *Methods 1 and 2*

The apparatus for this procedure and the layout to carry out measurements on the components under test (DUT) are shown in figures 1 and 2. The apparatus consists of:

3.1.1 *Source/excitation S/E*

A multiple light source (and excitation unit where applicable) capable of separately launching into the test fibres light of the wavelengths at which the measurements are specified. A method of achieving this multiple source is independent light sources joined by an optical switch SW3 as shown in figure 2. The multiple light source can also be achieved by several other means such as independent sources connected by a star branching device and individually switched off and on, or a single white light source coupled to the fibre through switchable bandpass filters. Light source parameters which must be considered for this test include the following elements:

a) stability over time. Although this test method includes a reference light level measurement for each set of measurements, a high level of absolute light output stability is required since each set of measurements can occur over several minutes. This stability is generally considered in conjunction with measurement averaging techniques in the optical detectors.

b) polarization independence. It is common to be monitoring changes in attenuation that are small in comparison with the polarization dependence of insertion loss of the components under test and of parts of the apparatus such as branching device, switches and detectors. Therefore, it is usually necessary to specify light sources with a low degree of polarization such as incandescent elements (white light source) or LEDs which are coupled to the fibre using low polarization inducing optics. Alternatively, a sufficiently stable test set-up using lasers either depolarized or with stabilized polarization can be used.

c) spectral purity and stability of spectrum versus time. Particularly when measuring wavelength dependent components such as multiplexers or attenuators, it is necessary to use a light source that does not emit light at extraneous wavelengths at levels that can affect the measurement accuracy.

d) output power level. Since return loss measurements usually involve highly attenuated signals, a light source with an output of at least –3 dBm is required for the measured signal to remain within the range of the power meter.

3.1.2 *Monitoring equipment*

An assembly to permit monitoring of the light through the multiple paths corresponding to the DUTs and reference channels.

In method 1, the light is divided into N paths by a 1×N branching device, and individual monitoring channels are established. The apparatus for this assembly is shown schematically in figure 1. In the figure, S is the multiple light source, BD is the directional branching device and D_1, D_2 and D_3 are light detectors. In the apparatus, the component assembly shown leading from channel 1 to the 1×N branching device is repeated on each of the N channels. This method is practical up to a small number of DUT channels since it will require multiplicity of branching devices and detectors.

In method 2, active switching of the light paths through the DUTs is used. The apparatus, as shown in figure 2 consists of a directional branching device and two 1×N computer-controlled optical switches. The channel number of these switches is sufficiently large to interconnect the component channels under test, one or more reference lines, and a reference reflectance channel.