

This is a preview - click here to buy the full publication



IEC 61300-3-7

Edition 2.0 2009-01

INTERNATIONAL STANDARD

**Fibre optic interconnecting devices and passive components – Basic test and measurement procedures –
Part 3-7: Examinations and measurements – Wavelength dependence of attenuation and return loss of single mode components**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE

U

ICS 33.180.20

ISBN 978-2-88910-498-7

CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references	6
3 Abbreviations and acronyms.....	6
4 General	8
4.1 General description	8
4.2 Spectral conditions.....	9
4.3 Definition.....	9
4.3.1 Attenuation	9
4.3.2 Return loss.....	10
4.4 Device under test	10
4.5 Measurement methods	11
4.5.1 Method A – Broadband light source (BBS).....	11
4.5.2 Method B – Tuneable narrowband light source (TLS).....	12
4.5.3 Method C – Set of multiple fixed narrowband light sources (NLS)	12
4.5.4 Method D – Tuneable OTDR.....	13
4.5.5 Reference method	13
5 Apparatus.....	13
5.1 Wavelength source.....	13
5.1.1 Method A – Broadband light source	13
5.1.2 Method B – Tuneable narrowband light source	13
5.1.3 Method C – Set of N narrowband light sources	14
5.1.4 Method D – Tuneable OTDR.....	14
5.1.5 Depolarizer.....	14
5.2 Detection system.....	15
5.2.1 Method A, Method B.2 and Method C.2 tuneable narrowband detection spectrum	15
5.2.2 Method B.1 and Method C.1 broadband detection spectrum	15
5.3 Branching devices	15
5.4 Termination	16
6 Procedure	16
6.1 Method A – broadband light source	16
6.1.1 Attenuation-only	16
6.1.2 Return-loss-only	17
6.1.3 Attenuation and return loss.....	18
6.2 Method B – Tuneable narrowband light source	19
6.3 Method C – Set of multiple fixed narrowband light sources	20
6.3.1 Attenuation-only	20
6.3.2 Return-loss-only	22
6.3.3 Attenuation and return loss.....	23
6.4 Test results	25
7 Details to be specified	25
7.1 Source	25
7.1.1 Broadband source	25
7.1.2 Tuneable or discrete narrowband light source.....	26
7.1.3 Depolarizer.....	26

7.2	Detection system.....	26
7.2.1	Optical power meter	26
7.2.2	Optical spectrum analyser	26
7.3	Reference branching device	26
7.4	Termination	26
Annex A (informative)	Device under test configurations, terminations and product types	27
Annex B (informative)	Typical light source characteristics	29
Figure 1	– Wavelength dependence of attenuation and return loss	10
Figure 2	– Method A – Attenuation-only measurement	17
Figure 3	– Method A – Return-loss-only measurement	18
Figure 4	– Method A – Attenuation and return loss measurement.....	19
Figure 5	– Method C – Attenuation-only measurement	21
Figure 6	– Method C Return-loss-only measurement.....	22
Figure 7	– Method C – Attenuation and return loss measurement	24
Figure 8	– Wavelength dependent attenuation	25
Table 1	– Test methods and characteristics	11
Table 2	– Wavelength dependent attenuation and return loss	25
Table A.1	– Device under test configurations/terminations	27
Table A.2	– Possible types of passive optical components (POC)	27
Table B.1	– Types of broadband light source (BBS) and main characteristics	29
Table B.2	– Types of tuneable light source (TLS) and main characteristics	30

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 3-7: Examinations and measurements – Wavelength dependence of attenuation and return loss of single mode components

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.
- 2) The formal decisions or agreements of 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61300-3-7 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

This second edition cancels and replaces the first edition published in 2000. It constitutes a technical revision.

Changes from the previous edition of this standard are to reflect changes made to IEC 61300-1 and covers unidirectional and bi-directional methods of measurement.

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

FDIS	Report on voting
86B/2771/FDIS	86B/2803/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.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of IEC 61300 series, published under the general title, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures*, 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.

A bilingual version of this standard may be issued at a later date.

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

Part 3-7: Examinations and measurements – Wavelength dependence of attenuation and return loss of single mode components

1 Scope

This part of IEC 61300-3 describes the various methods available to measure the wavelength dependence of attenuation $A(\lambda)$ and return loss $RL(\lambda)$, of single-mode passive optical components (POC) used in fibre-optic (FO) telecommunications. It is not, however, applicable to dense wavelength division multiplexing (DWDM) devices. Measurement methods of wavelength dependence of attenuation of DWDM devices are described in IEC 61300-3-29. Definition of WDM device types is given in IEC 62074-1.

Three measurement cases are herein considered:

- Measurement of $A(\lambda)$ only;
- Measurement of $RL(\lambda)$ only;
- Measurement of $A(\lambda)$ and $RL(\lambda)$ at the same time.

These measurements may be performed in one direction (unidirectional) or bi-directionally.

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 (including any amendments) applies.

IEC 61300-3-29, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-29: Examinations and measurements – Measurement techniques for characterising the amplitude of the spectral transfer function of DWDM components*

IEC 62074-1, *Fibre optic WDM devices – Part 1: Generic specification*