IEC 61300-3-3

Edition 3.0 2009-03

INTERNATIONAL STANDARD

Fibre optic interconnecting devices and passive components – Basic test and measurement procedures –
Part 3-3: Examinations and measurements – Active monitoring of changes in attenuation and return loss

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE R

ICS 33.180.20

ISBN 2-8318-1033-7

CONTENTS

FOREWORD 4
1 Scope 6
2 Normative references 6
3 General description 6
3.1 Test method 6
3.2 Precautions 7
4 Apparatus 7
4.1 Methods 1, 2 and 3 7
4.1.1 General 7
4.1.2 Source (S) 7
4.1.3 Launch condition (E) 8
4.1.4 Monitoring equipment 8
4.1.5 Detector D 9
4.1.6 Stress fixture 9
4.1.7 Branching device BD 9
4.1.8 Temporary joints 9
4.1.9 Data acquisition 9
4.1.10 Monitor sample 9
4.1.11 Reference fibre 10
4.2 Methods 4 and 5 11
4.2.1 General 11
4.2.2 OTDR 11
4.2.3 Buffer fibre 11
4.2.4 Optical switches 11
5 Procedure 13
5.1 Monitoring attenuation and return loss of a single sample – method 1 13
5.1.1 General 13
5.1.2 Attenuation monitoring – method 1 13
5.1.3 Return loss monitoring – method 1 14
5.2 Monitoring attenuation and return loss of multiple samples using a 1 × N branching device – method 2 14
5.2.1 General 14
5.2.2 Attenuation monitoring – method 2 14
5.2.3 Return loss monitoring – method 2 14
5.3 Monitoring attenuation and return loss of multiple samples using two 1 × N optical switches – method 3 14
5.3.1 General 14
5.3.2 Attenuation – method 3 14
5.3.3 Return loss – method 3 15
5.4 Bidirectional OTDR monitoring of attenuation and return loss of multiple samples – method 4 16
5.4.1 General 16
5.4.2 Attenuation – method 4 16
5.4.3 Return loss – method 4 18
5.5 Unidirectional OTDR monitoring of attenuation and return loss of multiple samples – method 5 19
6 Details to be specified 19

6.1 Method 1 19
6.2 Methods 2 and 3 20
6.3 Methods 4 and 5 20

Figure 1 – Method 1 – Monitoring attenuation and return loss of a single sample undergoing stress testing 10
Figure 2 – Method 2 – Monitoring attenuation and return loss of multiple samples using a 1 × N branching device 10
Figure 3 – Method 3 – Monitoring attenuation and return loss of multiple samples using two 1 × N optical switches 11
Figure 4 – Method 4 – Bidirectional OTDR monitoring of attenuation and return loss of multiple samples 12
Figure 5 – Method 5 – Unidirectional OTDR monitoring of attenuation and return loss of multiple samples 13
Figure 6 – Cut-back measurement location (transmission) 15
Figure 7 – Typical OTDR trace caused by the reflection from a DUT 17
Figure 8 – Cut-back measurement location (OTDR) 18

Table 1 – Example values for Rayleigh backscatter coefficient 19

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 3-3: Examinations and measurements – Active monitoring of changes in attenuation and return loss

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

This third edition cancels and replaces the second edition published in 2003. This edition constitutes a minor revision.

The change with respect to the previous edition is the structure of the document.

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

FDIS	Report on voting
86B/2808/FDIS	86B/2830/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 publication may be issued at a later date.

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

Part 3-3: Examinations and measurements – Active monitoring of changes in attenuation and return loss

1 Scope

This part of IEC 61300 describes the procedure to monitor changes in attenuation and/or return loss of a component or an interconnecting device, when subjected to an environmental or mechanical test. Such a procedure is commonly referred to as active monitoring. In many instances, it is more efficient to monitor attenuation and return loss at the same time.

The procedure may be applied to measurements on single samples or to simultaneous measurements on multiple samples, both at single wavelengths and multiple wavelengths, by using branching devices and/or switches as appropriate.

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 61300-1, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 1: General and guidance*

IEC 61300-3-1, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-1: Examinations and measurements – Visual examination*

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 61300-3-35, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-35: Examinations and measurements – Fibre optic cylindrical connector endface visual and automated inspection*[1]

[1] To be published.