

TECHNICAL REPORT

Guidance for the interpretation of OTDR backscattering traces for single-mode fibres

(<https://standards.iteh.ai>)
Document Preview

IEC TR 62316:2026

<https://standards.iteh.ai/catalog/standards/iec/1d4b41b8-34ee-477e-bff5-d5f7b65537e7/iec-tr-62316-2026>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2026 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search -

webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

[IEC TR 62316:2026](https://standards.iteh.ai/catalog/standards/iec/1d4b41b8-34ec-477e-bff5-d5f7b65537e7/iec-tr-62316-2026)

<https://standards.iteh.ai/catalog/standards/iec/1d4b41b8-34ec-477e-bff5-d5f7b65537e7/iec-tr-62316-2026>

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD	3
INTRODUCTION	5
1 Scope	6
2 Normative references	6
3 Terms, definitions and abbreviated terms	6
3.1 Terms and definitions	6
3.2 Abbreviated terms	6
4 Backscattering phenomenon	6
4.1 Rayleigh scattering	6
4.2 Fresnel reflections and dead zone fibres	7
5 Measurement of the backscattered power (OTDR)	7
5.1 General	7
5.2 Representation of the backscattered power	8
5.3 Noise and perturbations	8
6 Interpretation of a backscattering trace	9
6.1 General	9
6.2 Launch cord	9
6.3 Tail cord	9
6.4 Unidirectional trace	10
6.4.1 General	10
6.4.2 Slope as the attenuation coefficient of a fibre	10
6.4.3 Impurity and discontinuity	11
6.4.4 Pulse width	11
6.4.5 Polarization effects	11
6.5 Bi-directional trace	12
6.5.1 General	12
6.5.2 Attenuation uniformity	14
6.5.3 MFD uniformity	15
6.6 Splice loss evaluation	16
6.6.1 General	16
6.6.2 Event measurement methods	16
6.6.3 Apparent losers and gainers	18
6.6.4 Example of apparent splice loss evaluation for uni-directional OTDR measurements	21
7 Uncertainties, deviation and resolution	23
7.1 General	23
7.2 Attenuation coefficient measurements	23
7.3 Fault locations	23
Bibliography	26
Figure 1 – Unidirectional OTDR trace showing splice and/or macrobend loss	9
Figure 2 – Idealized unidirectional OTDR traces corresponding to a non-reflective splice between two fibres	16
Figure 3 – OTDR traces for similar or different fibre types with either different MFD or different backscatter properties, or both	18

Figure 4 – Loss in unidirectional OTDR measurements as function of the MFD difference between two spliced fibres	19
Figure 5 – Theoretical power through splice loss due to MFD difference (with $\Omega_1 = 9 \mu\text{m}$)	20
Figure 6 – Apparent cumulative unidirectional backscattering mismatch distribution for six splice combinations of B-652 and B-657 reported in Table 1.....	22
Figure 7 – Schematic drawing of a fibre with two consecutive defects 1 and 2	24
Table 1 – Summary for six fibre splice combinations of B-652 and B-657 based on popular 1 310 nm MFD fibre distributions.....	21

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[IEC TR 62316:2026](#)

<https://standards.iteh.ai/catalog/standards/iec/1d4b41b8-34ee-477e-bff5-d5f7b65537e7/iec-tr-62316-2026>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

Guidance for the interpretation of OTDR backscattering traces for single-mode fibres

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 itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC TR 62316 has been prepared by subcommittee 86A: Fibres and cables, of IEC technical committee 86: Fibre optics. It is a Technical Report.

This fourth edition cancels and replaces the third edition published in 2017. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) update of the fibre types;
- b) addition of information as regards attenuation uniformity.