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Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-38:Examinations and measurements - Group delay, chromatic dispersion and phase ripple (IEC 61300-3-38:2012)

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Lichtwellenleiter - Verbindungselemente und passive Bauteile - Grundlegende Prüf- und Messverfahren -- Teil 3-38: Untersuchungen und Messungen - Gruppenlaufzeit, chromatische Dispersion und Phasenwelligkeit (IEC 61300-3-38:2012)

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Dispositifs d'interconnexion et composants passifs à fibres optiques - Procédures fondamentales d'essais et de mesures - Partie 3-38: Examens et mesures - Retard de groupe, dispersion chromatique et fluctuation de phase (CEI 61300-3-38:2012)

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**Fibre optic interconnecting devices and passive components -
Basic test and measurement procedures -
Part 3-38:Examinations and measurements -
Group delay, chromatic dispersion and phase ripple
(IEC 61300-3-38:2012)**

Dispositifs d'interconnexion et
composants passifs à fibres optiques -
Procédures fondamentales d'essais
et de mesures -
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Retard de groupe, dispersion chromatique
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Foreword

The text of document 86B/3394/FDIS, future edition 1 of IEC 61300-3-38, 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 approved by CENELEC as EN 61300-3-38:2012.

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IEC 60793-1-42	NOTE	Harmonised as EN 60793-1-42.
IEC 61300-1	NOTE	Harmonised as EN 61300-1.12
IEC 61300-3-1	NOTE	Harmonised as EN 61300-3-1.
IEC 61300-3-32	NOTE	Harmonised as EN 61300-3-32.

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Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-731	-	International Electrotechnical Vocabulary (IEV) - Chapter 731: Optical fibre communication	-	-
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	EN 61300-3-29	-

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**Fibre optic interconnecting devices and passive components – Basic test and measurement procedures –
Part 3-38: Examinations and measurements – Group delay, chromatic dispersion and phase ripple**

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**Dispositifs d'interconnexion et composants passifs à fibres optiques –
Procédures fondamentales d'essais et de mesures –
Partie 3-38: Examens et mesures – Retard de groupe, dispersion chromatique et fluctuation de phase**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

**Part 3-38: Examinations and measurements –
Group delay, chromatic dispersion and phase ripple**

FOREWORD

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International Standard IEC 61300-3-38 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

This first edition cancels and replaces the IEC/PAS 61300-3-38 published in 2007. This edition constitutes a technical revision.

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

FDIS	Report on voting
86B/3394/FDIS	86B/3438/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.

The 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 stability 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

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

Part 3-38: Examinations and measurements – Group delay, chromatic dispersion and phase ripple

1 Scope

This part of IEC 61300 describes the measurement methods necessary to characterise the group delay properties of passive devices and dynamic modules. From these measurements further parameters like group delay ripple, linear phase deviation, chromatic dispersion, dispersion slope, and phase ripple can be derived. In addition, when these measurements are made with resolved polarization, the differential group delay can also be determined as an alternative to separate measurement with the dedicated methods of IEC 61300-3-32.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-731, *International Electrotechnical Vocabulary – Chapter 731: Optical fibre communication* <https://standards.iteh.ai/catalog/standards/sist/16c92fb0-70ff-4b1e-b097-b95d028533b2/sist-en-61300-3-38-2012>

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 characterizing the amplitude of the spectral transfer function of DWDM components*

3 Terms and abbreviations

For the purposes of this document, the terms and definitions given in IEC 60050-731 and IEC 61300-3-29 apply, together with the following.

BW	Bandwidth: the spectral width of a signal or filter.
CD	Chromatic dispersion (in ps/nm): change of group delay over wavelength: $CD=d(GD)/d\lambda$
D	Detector
DGD	Differential group delay (in ps): difference in propagation time between two orthogonal polarization modes
DUT	Device under test
DWDM	Dense wavelength division multiplexing
δ	Step size of the VWS during a wavelength swept measurement
f_{RF}	Modulation frequency
GD	Group delay (in ps): time required for a signal to propagate through a device
GDR	Group delay ripple (in ps): the amplitude of ripple of GD
LN	LiNbO ₃