

Transmitting equipment for radiocommunication -
Frequency response of optical-to-electric conversion
device in high-frequency radio over fibre systems -
Measurement method

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 62803:2016 sisaldab Euroopa standardi EN 62803:2016 ingliskeelset teksti.	This Estonian standard EVS-EN 62803:2016 consists of the English text of the European standard EN 62803:2016.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 14.10.2016.	Date of Availability of the European standard is 14.10.2016.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 33.060.20

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:

Aru 10, 10317 Tallinn, Eesti; koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Aru 10, 10317 Tallinn, Estonia; homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

**Transmitting equipment for radiocommunication - Frequency
response of optical-to-electric conversion device in high-
frequency radio over fibre systems - Measurement method
(IEC 62803:2016)**

Matériels émetteurs pour les radiocommunications -
Réponse en fréquence des dispositifs de conversion
optique-electrique dans des systèmes de transmission radio
sur fibre haute fréquence - Méthode de mesure
(IEC 62803:2016)

Messverfahren einer Frequenzantwort eines optisch-
elektrischen Wandlers in HF-Rundfunk-über-Glasfaser-
Übertragungssystemen
(IEC 62803:2016)

This European Standard was approved by CENELEC on 2016-08-16. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

The text of document 103/147/FDIS, future edition 1 of IEC 62803, prepared by IEC/TC 103 "Transmitting equipment for radiocommunication" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62803:2016.

The following dates are fixed:

- latest date by which the document has to be (dop) 2017-05-16
implemented at national level by
publication of an identical national
standard or by endorsement
- latest date by which the national (dow) 2019-08-16
standards conflicting with the
document have to be withdrawn

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 62803:2016 was approved by CENELEC as a European Standard without any modification.

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references.....	7
3 Terms, definitions and abbreviations	7
3.1 Terms and definitions	7
3.2 Abbreviations	9
4 Optical-to-electrical (O/E) conversion device	9
4.1 Photo diode (PD)	9
4.1.1 General	9
4.1.2 Component parts	9
4.1.3 Structure.....	9
4.1.4 Requirements for PD.....	10
4.2 DFG device.....	10
4.2.1 General	10
4.2.2 Component parts	10
4.2.3 Structure.....	10
4.2.4 Requirements for DFG device.....	10
5 Sampling for quality control.....	11
5.1 Sampling.....	11
5.2 Sampling frequency.....	11
6 Measurement method of frequency response	11
6.1 Circuit diagram.....	11
6.2 Measurement condition	12
6.2.1 Temperature and environment.....	12
6.2.2 Warming up of measurement equipment.....	12
6.3 Principle of measurement method.....	12
6.4 Measurement procedure.....	13
Annex A (normative) Power balanced two-tone signal generation by using a high extinction-ratio MZM [2]	15
Annex B (informative) Requirements for the optical amplifier with automatic level control.....	17
B.1 Introductory remark	17
B.2 Block diagram	17
B.2.1 Optical amplifier.....	17
B.2.2 Automatic level control.....	18
B.3 Function and capabilities.....	18
B.4 Requirements.....	19
B.4.1 Optical amplifier.....	19
B.4.2 Automatic level control (ALC)	20
Annex C (informative) Frequency-response measurement system and automatic level control EDFA.....	21
C.1 Frequency response measurement system for optical-to-electric conversion devices with a two-tone generator	21
C.2 Automatic level control EDFA (ALC-EDFA)	22
Bibliography	24

Figure 1 – Definition of "conversion efficiency "	8
Figure 2 – Optical-to-electrical conversion by photo diode	10
Figure 3 – DFG device	10
Figure 4 – Circuit diagram	11
Figure B.1 – Block diagram of the optical amplifier	17
Figure B.2 – Block diagram of the automatic level control	18
Figure B.3 – Frequency characteristics.....	19
Figure C.1 – System configuration for the frequency response measurement system.....	21
Figure C.2 – ALC-EDFA system configuration.....	22
Figure C.3 – Frequency response measurement examples	23
Table C.1 – Typical specifications of the frequency response measurement system	22
Table C.2 – Typical specifications of the ALC-EDFA system	23

Table C.1 – Typical specifications of the frequency response measurement system	22
Table C.2 – Typical specifications of the ALC-EDFA system	23

INTRODUCTION

A variety of microwave-photonic devices are used in wireless communication and broadcasting systems. A photo-receiver is an interface which converts an optical signal to an electronic signal. This International Standard has been prepared to provide methods for evaluating and calibrating high speed photo-receivers to be used in Radio over Fibre systems.

The method utilizes a Mach-Zehnder modulator for generating two-tone lightwaves as stimulus signals, to provide simpler and easier methods than the conventional method utilizing a complex two-laser system phase-locked with each other.

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent concerning a calibration method and device for light intensity measuring instrument, as it relates to Clause 6.

Related part	Patent holder	Patent number
Clause 6	National Institute of Information and Communications Technology	JP 4753137B EP1956353A US7864330B

IEC takes no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has assured the IEC that he/she is willing to negotiate licences either free of charge or under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with IEC. Information may be obtained from:

National Institute of Information and Communications Technology
4-2-1 Nukui-Kitamachi, Koganei, Tokyo 184-8795, Japan

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified above. IEC shall not be held responsible for identifying any or all such patent rights.

ISO (www.iso.org/patents) and IEC (<http://patents.iec.ch>) maintain on-line data bases of patents relevant to their standards. Users are encouraged to consult the data bases for the most up to date information concerning patents.

TRANSMITTING EQUIPMENT FOR RADIOCOMMUNICATION – FREQUENCY RESPONSE OF OPTICAL-TO-ELECTRIC CONVERSION DEVICE IN HIGH-FREQUENCY RADIO OVER FIBRE SYSTEMS – MEASUREMENT METHOD

1 Scope

This International Standard provides a method for measuring the frequency response of optical-to-electric conversion devices in wireless communication and broadcasting systems.

The frequency range covered by this standard goes up to 100 GHz (practically limited up to 110 GHz by precise RF power measurement) and the wavelength band concerned is 0,8 µm to 2,0 µm.

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.

There are no normative references in this document.

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1

conversion efficiency

ratio of the output current to the input optical power defined by

$$k = \frac{\Delta I_{\text{out}}}{\Delta P_{\text{in}}} \quad (1)$$

Note 1 to entry: See Figure 1.