

Fibre optic communication subsystem test procedures —

Part 2-9: Digital systems — Optical signal-to-noise ratio measurement for dense wavelength-division multiplexed systems

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British Standard

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National foreword

This British Standard is the official English language version of EN 61280-2-9:2002. It is identical with IEC 61280-2-9:2002.

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**Fibre optic communication subsystem test procedures
Part 2-9: Digital systems –
Optical signal-to-noise ratio measurement
for dense wavelength-division multiplexed systems
(IEC 61280-2-9:2002)**

Procédures d'essai des sous-systèmes
de télécommunications à fibres optiques
Partie 2-9: Systèmes numériques –
Mesure du rapport signal sur bruit optique
pour les systèmes multiplexés
à répartition en longueur d'onde dense
(CEI 61280-2-9:2002)

Prüfverfahren für Lichtwellenleiter-
Kommunikationsuntersysteme
Teil 2-9: Digitale Systeme –
Messung des optischen
Signal-Rausch-Verhältnisses für dichte
Wellenlängen-Multiplex-Systeme
(IEC 61280-2-9:2002)

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

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Endorsement notice

The text of the International Standard IEC 61280-2-9:2002 was approved by CENELEC as a European Standard without any modification.

CONTENTS

INTRODUCTION	4
1 Scope	5
2 Normative references	6
3 Definitions	6
4 Apparatus	7
4.1 Diffraction grating-based OSA	7
4.2 Michelson interferometer-based OSA	8
4.3 Fabry-Perot-based OSA	8
4.4 OSA performance requirements	9
4.4.1 Wavelength range	9
4.4.2 Sensitivity	9
4.4.3 Resolution bandwidth (RBW)	9
4.4.4 Resolution bandwidth accuracy	9
4.4.5 Dynamic range	9
4.4.6 Scale fidelity	10
4.4.7 Polarization dependence	10
4.4.8 Wavelength data points	10
5 Sampling and specimens	11
6 Procedure	11
7 Calculations	11
8 Measurement uncertainty	11
9 Documentation	12
Annex A (informative) Error in measuring signal level due to signal spectral width	13
Bibliography	16

INTRODUCTION

At the optical interfaces within wavelength-division multiplexed (WDM) networks, it is desirable to measure parameters that provide information about the integrity of the physical plant. Such parameters are necessary to *monitor* network performance as an integral part of network management. They are also necessary to assure proper system operation for *installation and maintenance* of the network.

Ideally, such parameters would directly correspond to the bit error ratio (BER) of each channel of a multichannel carrier at the particular optical interface. Related parameters such as Q-factor or those calculated from optical eye patterns would provide similar information, that is, they would correlate to the channel BER. However, it is difficult to obtain access to these parameters at a multichannel interface point. It is necessary to demultiplex the potentially large number of channels and make BER, Q-factor, or eye-diagram measurements on a per-channel basis.

In contrast, useful information about the optical properties of the multichannel carrier is readily obtained by measuring the optical spectrum. Wavelength-resolved signal and noise levels provide information on signal level, signal wavelength, and amplified spontaneous emission (ASE) for each channel. Spectral information, however, does not show signal degradation due to waveshape impairments resulting from polarization-mode dispersion (PMD), and chromatic dispersion. Also, intersymbol interface and time jitter are not revealed from an optical signal to noise ratio (OSNR) measurement. In spite of these limitations, OSNR is listed as an interface parameter in ITU-T Recommendation G.692; "Optical interfaces for multichannel systems with optical amplifiers." [1]¹⁾ OSNR is also listed in ITU-T Recommendation G.959.1, "Optical transport network physical layer interfaces."

1) Figures in brackets refer to the bibliography.