



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

L.51

(04/2003)

SERIES L: CONSTRUCTION, INSTALLATION AND
PROTECTION OF CABLES AND OTHER ELEMENTS OF
OUTSIDE PLANT

Passive node elements for fibre optic networks – General principles and definitions for characterization and performance evaluation

ITU-T Recommendation L.51

Document ID: 123456789

ITU-T Recommendation L.51

Passive node elements for fibre optic networks – General principles and definitions for characterization and performance evaluation

Summary

This Recommendation contains the general principles for generating performance requirements for passive optical nodes. It describes the product and performance parameters necessary to characterize a nodes' capabilities and features. It also summarizes the general requirements that are applicable for all types of passive nodes throughout the entire optical network.

The annex contains a description of the applicable environmental classes, while the appendices contain a description of optical test sample construction, test methods for simulating an intervention at a node and a checklist for facilitating the definition of nodes in optical access networks.

Source

ITU-T Recommendation L.51 was approved by ITU-T Study Group 6 (2001-2004) under the ITU-T Recommendation A.8 procedure on 11 April 2003.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure e.g. interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

© ITU 2003

All rights reserved. No part of this publication may be reproduced, by any means whatsoever, without the prior written permission of ITU.

CONTENTS

Page

1	Scope	1
2	References.....	1
3	Terms and definitions	1
4	Abbreviations and Acronyms	2
5	Performance recommendations for passive optical nodes: general principles	2
5.1	Optical functionality and environmental stability	2
5.2	Consistency for all node types throughout the entire network	2
5.3	Ability to fit all different types of applications	3
5.4	Global applicability of the basic environmental classification, with an option to adjust to specific local conditions	3
6	Parameters concerning functionality of an optical node.....	3
6.1	Node content and interfaces/compatibility	3
6.2	Network adaptability	5
6.3	Wavelength.....	6
7	Environmental conditions for passive optical nodes	6
7.1	Installed product	6
7.2	Transport and storage	7
7.3	Installation or intervention	7
8	General requirements.....	7
8.1	Storage, transport and packaging	7
8.2	Materials	7
Annex A	– Environmental classification	8
A.1	Basic environmental classes	8
A.2	Special conditions.....	9
Appendix I	– Construction of optical test samples	10
I.1	Single fibre splice/connector storage.....	10
I.2	Storage of uncut fibres; addition of a drop cable	11
I.3	Ribbon splice/connector storage.....	12
I.4	Storage of uncut ribbons; addition of a drop cable.....	13
Appendix II	– Intervention at a live node: test methods	13
II.1	Opening and closing covers or drawers to gain access to the organizer system	14
II.2	Movements of organizer elements to gain access to the actual fibre circuits	14
II.3	Addition and connection of extra cables	14
II.4	Rearranging connections (splices).....	15
II.5	Rearranging connectors, jumpers or pigtails	15
II.6	Addition and connection of extra organizer elements	15

	Page
II.7 Installing a node product over a piece of uncut cable slack	15
II.8 Unrolling, cutting and restorage of uncut fibre	16
Appendix III – Additional requirements	16
Appendix IV – Product characterisation checklist.....	17

Introduction

The quality of an optical network will be determined by the performance of each of its individual components. Nodes in this network are one of the key building blocks of the physical network.

A node occurs at each opening or end of a cable jacket. Examples of nodes are optical distribution frames, joint closures for underground and aerial applications, street cabinets etc. Each node shall be capable of performing its expected function in the network, while exposed to the environment that it is intended to reside in. In order to obtain an end-to-end reliable optical network, it is, therefore, necessary to apply a consistent evaluation methodology for all the different types of nodes.

This Recommendation defines the fundamental parameters that are relevant to describe passive optical node products in a systematically way and it is recommended to be used as a basis for generating performance requirements for passive optical nodes. An additional checklist, reflecting the parameters as defined in this Recommendation, in order to facilitate the characterization of a product and to compile the proper set of performance tests, can be created (see Appendix IV).

ITU-T Rec. L.51 (04/2003)

ITU-T Recommendation L.51

Passive node elements for fibre optic networks – General principles and definitions for characterization and performance evaluation

1 Scope

This Recommendation applies to passive nodes for optical networks. It contains the general principles, definitions and requirements to generate consistent performance requirements for each different class of node products.

Annex A and Appendices I to III describe a number of topics applicable to all types of optical nodes: environmental classes, optical test sample layout, simulation methods to evaluate optical stability and a list of additional requirements.

Appendix IV contains a summary checklist of the recommended features and functionalities for passive nodes in the optical network.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- ITU-T Recommendation G.652 (2003), *Characteristics of a single-mode optical fibre cable*.
- IEC 61300-3-28:2002, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-28: Examinations and measurements – Transient loss*.
- IEC 61300-3-3:2003, *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 in return loss (multiple paths)*.
- IEC 60529:2001, *Degrees of protection provided by enclosures (IP Code)*.

3 Terms and definitions

This Recommendation defines the following terms:

3.1 node: A node is defined as a point of intervention in the network e.g., at each opening or at the end of a cable jacket.

"Passive" applies to nodes that do not contain active electronics or other devices that dissipate heat.

"Live" applies to a fibre, an optical circuit or a node at the moment that it carries an optical signal.

3.2 handling versus Access: "Handling" means moving a product between its installed location and the workstand. It also includes the manipulation of the attached cables, the addition of cables, opening or closing covers, drawers or doors.

"Access" includes removing cable sheath; manipulation of uncut/looped fibre; manipulation of elements of the organizer system; manipulation of splices, devices and fibre slack, cutting, cleaving