

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.983.3

Amendment 2

(07/2005)

SERIES G: TRANSMISSION SYSTEMS AND MEDIA,
DIGITAL SYSTEMS AND NETWORKS

Digital sections and digital line system – Optical line
systems for local and access networks

A broadband optical access system with increased
service capability by wavelength allocation

Amendment 2

ITU-T Recommendation G.983.3 (2001) – Amendment 2

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ITU-T Recommendation G.983.3

A broadband optical access system with increased service capability by wavelength allocation

Amendment 2

Summary

This amendment adds a new appendix to ITU-T Rec. G.983.3 that establishes the industry best practice optical budgets for the B-PON system operating at 622 Mbit/s downstream and 155 Mbit/s upstream.

Source

Amendment 2 to ITU-T Recommendation G.983.3 (2001) was approved on 14 July 2005 by ITU-T Study Group 15 (2005-2008) under the ITU-T Recommendation A.8 procedure.

Keywords

B-PON, optical.

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.

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

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ITU-T Recommendation G.983.3

A broadband optical access system with increased service capability by wavelength allocation

Amendment 2

1) Introduction

This amendment describes the recommended practical power budgets for systems described in the G.983.x series that operate at the downstream rate of 622 Mbit/s and upstream rate of 155 Mbit/s. These budgets are optional extensions of the Recommendation, and reflect the observed practical optimum values for this particular system.

2) Modifications to ITU-T Rec. G.983.3

In III.2.1, replace the second to last paragraph with the following:

The isolation required at WF1 is driven by the reflections in the PON, which can be either –32 dB or –20 dB. Using existing techniques, the enhancement band signal maximum launch power can be +20 dBm or higher. For the following example, we assume a launch power of +20 dBm. With a reflection loss of –20 dB, the reflection can be as high as 0 dBm. If the signal must be 13 dB higher than the interference, then the combined isolation of the WF1 and diplexer must be 43 dB. If we assume a PON reflectance of –32 dB, then the isolation of WF1 and diplexer must be 31 dB.

3) Additions to ITU-T Rec. G.983.3

Add the following new Appendix VI:

Appendix VI

Industry best practice for 622 Mbit/s downstream, 155 Mbit/s upstream B-PON

VI.1 Introduction

The widespread deployment of 622 Mbit/s downstream, 155 Mbit/s upstream B-PON systems have provided increased visibility into the feasibility of loss budgets for this system. This appendix captures the industry best practices for this rate combination.

The notable variations from the loss budgets found elsewhere in this Recommendation include:

- Reduced OLT transmitter power tolerance;
- Overall loss budgets midway between class B and C;
- Loss budget asymmetry.

These variations can provide increased capabilities for operation and testing of B-PON systems. Therefore, the budgets contained in this appendix are recommended over and above all others in this Recommendation for the 622/155 Mbit/s rate PON.

VI.2 System applications

There are currently two major applications for the B-PON system. The first is a full-service system with a video overlay. The second is a digital-only system without a video overlay. These two applications are diagrammed in Figure VI.1. The two applications lead to slightly differing loss budget requirements. To meet these two sets of requirements, it is necessary to define two OLT optic types, and one ONT optic type. The OLT optic type then determines which application and loss budget will be obtained. The single ONT optic type allows for commonality over both applications, and increases volumes.

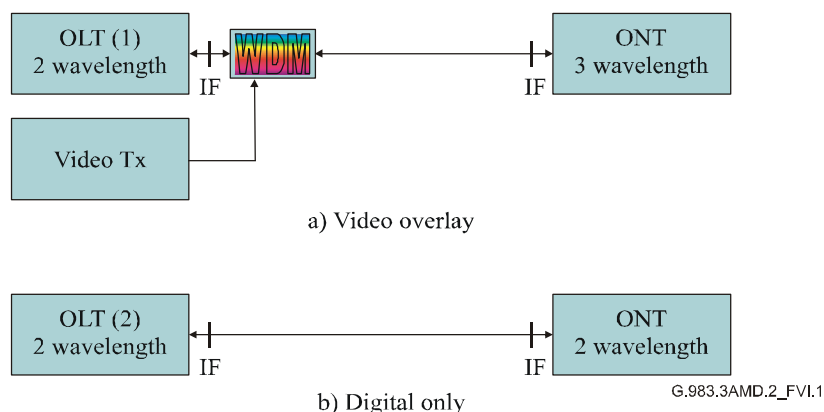


Figure VI.1/G.983.3 – B-PON applications

VI.3 Optical specifications

The optical specifications for the OLT1, OLT2, and ONT optics are given in Table VI.1. This table refers to power levels measured at the interface points shown in Figure VI.1; specifically, any WDM filters external to the OLT or ONT equipment are considered part of the ODN. These specifications are meant to augment similar specifications found in Table 4 in the main body of the Recommendation. All other specifications found elsewhere in the Recommendation still apply.

Table VI.1/G.983.3 – Optical power levels for the 622 Mbit/s downstream, 155 Mbit/s upstream systems

Items	Unit	Single fibre
OLT1: 622 Mbit/s Tx, 155 Mbit/s Rx		OLT1
Mean launched power MIN	dBm	+0
Mean launched power MAX	dBm	+3
Minimum sensitivity	dBm	–32
Minimum overload	dBm	–9
OLT2: 622 Mbit/s Tx, 155 Mbit/s Rx		OLT2
Mean launched power MIN	dBm	+1
Mean launched power MAX	dBm	+4
Minimum sensitivity	dBm	–31
Minimum overload	dBm	–6

**Table VI.1/G.983.3 – Optical power levels for the 622 Mbit/s downstream,
155 Mbit/s upstream systems**

Items	Unit	Single fibre
ONT: 155 Mbit/s Tx, 622 Mbit/s Rx		ONT
Mean launched power MIN	dBm	–2
Mean launched power MAX	dBm	+4
Minimum sensitivity	dBm	–28
Minimum overload	dBm	–6

VI.4 Link budgets

The link budgets for the two applications are given in Table VI.2. These budgets cover all optical components between the OLT and ONT, including non-integrated WDM filters for the multiplex of video overlays and other enhancement band services.

**Table VI.2/G.983.3 – Loss budgets for the 622 Mbit/s downstream,
155 Mbit/s upstream systems**

Items	Unit	Single fibre
Video overlay system (OLT1-ONT)		
Minimum optical loss at 1490 nm	dB	9
Minimum optical loss at 1310 nm	dB	13
Maximum optical loss at 1490 nm	dB	27
Maximum optical loss at 1310 nm	dB	29
Digital-only system (OLT2-ONT)		
Minimum optical loss at 1490 nm	dB	10
Minimum optical loss at 1310 nm	dB	10
Maximum optical loss at 1490 nm	dB	28
Maximum optical loss at 1310 nm	dB	28

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