



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.821

(12/2002)

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

Digital networks – Quality and availability targets

Error performance of an international digital connection operating at a bit rate below the primary rate and forming part of an Integrated Services Digital Network

ITU-T Recommendation G.821

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ITU-T Recommendation G.821

Error performance of an international digital connection operating at a bit rate below the primary rate and forming part of an Integrated Services Digital Network

Summary

This Recommendation defines error performance parameters and objectives for international digital connections operating below the primary rate of the digital hierarchy, using equipment designed prior to the adoption of revised ITU-T Rec. G.826 on 14 December 2002. The objectives given are independent of the physical network supporting the connection. This Recommendation is based upon bit error and bit error ratio measurements. The events, parameters and objectives are defined accordingly.

Annex A deals with the definition of availability of the connection.

Source

ITU-T Recommendation G.821 was revised by ITU-T Study Group 13 (2001-2004) and approved under the WTSA Resolution 1 procedure on 14 December 2002.

Keywords

Error Performance Objectives, Error Performance Parameters, Errored Second, Severely Errored Second.

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.

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Introduction

This Recommendation takes into account that services are based on the concept of an Integrated Services Digital Network (ISDN).

In digital networks, errors are a major source of degradation in that they affect voice services in terms of distortion of voice, and data type services in terms of lost or inaccurate information or reduced throughput.

In spite of the fact that voice services are likely to predominate the narrow-band ISDN, it is required to transport a wide range of service types and it is therefore desirable to have a unified specification.

An explanation of network performance objectives and their relationship with design objectives is given in ITU-T Rec. G.102. [1]

NOTE – The application of this Recommendation is limited to international digital connections, operating below the primary rate of the digital hierarchy, that use equipment designed prior to the adoption of revised ITU-T Rec. G.826 on 14 December 2002.

Background

This Recommendation was adopted in 1980 and defined error performance parameters and objectives for ISDN connections operating at a bit rate of 64 kbit/s. Because it was the first Recommendation giving error performance objectives, it found wide application even in areas it was not developed for. One of these applications was error performance evaluation at bit rates higher than 64 kbit/s.

In 1988, an Annex D was added to this Recommendation, which indicated how to derive error performance data of 64 kbit/s connections taking into account measurements performed at higher bit rates. Practical experience showed, however, that Annex D/G.821 lead in many cases to doubtful results. It became obvious that a Recommendation was needed which dealt with error performance parameters and objectives for higher bit rates.

To fill this gap, ITU-T Rec. G.826 [3] was developed and was adopted in 1993. It gives error performance parameters and objectives for constant bit rate digital paths operating at bit rates at and above the primary rate. ITU-T Rec. G.826 contains the statement that it "*... is the only Recommendation specifying error performance parameters and objectives at bit rates at or above the primary rate.*" Considering this statement, this Recommendation had to be restricted to bit rates below the primary rate and Annex D/G.821 had to be deleted. On the other hand, the bit rate range between 64 kbit/s and the primary rate was to be covered by this Recommendation.

Another problem discovered in the practical use of this Recommendation was the applicability of the Degraded Minute parameter (DM). In practice, this event was hardly detected and it was therefore decided to delete it from this Recommendation.

In summary, the following modifications are now included in this Recommendation:

- this Recommendation has been restructured in accordance with ITU-T Rec. A.15;
- this Recommendation is applicable to bit rates below the primary rate of the digital hierarchy;
- the Degraded Minute parameter is deleted;
- Annex D/G.821 (1988) is deleted;
- otherwise, there are no technical changes to this Recommendation.

After ITU-T Rec. G.826 [3] was adopted, work on this Recommendation continued and comparisons between the performance objectives for digital connections in this Recommendation and digital paths in ITU-T Rec. G.826 were made. From these comparisons it became apparent that inconsistencies existed between the two Recommendations.