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DIGITAL SYSTEMS AND NETWORKS

Digital transmission systems – Digital networks – Quality
and availability targets

**Error performance parameters and objectives
for international, constant bit rate synchronous
digital paths**

ITU-T Recommendation G.828

(Formerly CCITT Recommendation)

INTERNATIONAL TELEPHONE CONNECTIONS AND CIRCUITS	G.100–G.199
GENERAL CHARACTERISTICS COMMON TO ALL ANALOGUE CARRIER-TRANSMISSION SYSTEMS	G.200–G.299
INDIVIDUAL CHARACTERISTICS OF INTERNATIONAL CARRIER TELEPHONE SYSTEMS ON METALLIC LINES	G.300–G.399
GENERAL CHARACTERISTICS OF INTERNATIONAL CARRIER TELEPHONE SYSTEMS ON RADIO-RELAY OR SATELLITE LINKS AND INTERCONNECTION WITH METALLIC LINES	G.400–G.449
COORDINATION OF RADIOTELEPHONY AND LINE TELEPHONY	G.450–G.499
TERMINAL EQUIPMENTS	G.700–G.799
DIGITAL NETWORKS	G.800–G.899
General aspects	G.800–G.809
Design objectives for digital networks	G.810–G.819
Quality and availability targets	G.820–G.829
Network capabilities and functions	G.830–G.839
SDH network characteristics	G.840–G.849
Management of transport network	G.850–G.859
SDH radio and satellite systems integration	G.860–G.869
Optical transport networks	G.870–G.879
DIGITAL SECTIONS AND DIGITAL LINE SYSTEM	G.900–G.999

For further details, please refer to the list of ITU-T Recommendations.

ITU-T Recommendation G.828**Error performance parameters and objectives for international,
constant bit rate synchronous digital paths****Summary**

This Recommendation defines error performance parameters and objectives for international synchronous digital paths. While this Recommendation specifically addresses objectives for international digital paths, the allocation principles can be applied to the design of error performance for national or private synchronous digital paths. The objectives given are independent of the physical network supporting the path. This Recommendation is based upon a block-based measurement concept using error detection codes inherent to the path under test; the block repetition rate being in accordance with SDH technology. This simplifies in-service measurements. The events, parameters and objectives are defined accordingly. In addition to path performance assessment, tandem connection monitoring is covered.

It is not required to apply this Recommendation to SDH paths using equipment designed prior to the date of adoption of this version of ITU-T Recommendation G.828 (March 2000).

Source

ITU-T Recommendation G.828 was prepared by ITU-T Study Group 13 (1997-2000) and approved under the WTSC Resolution 1 procedure on 10 March 2000.

Keywords

Background Block Error (BBE), block-based concept, Error Detection Codes (EDC), error performance objectives, error performance parameters, Errored Second (ES), In-Service Measurements (ISM), Severely Errored Period (SEP), Severely Errored Second (SES), synchronous digital path, Tandem Connection Monitoring (TCM).

FOREWORD

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The World Telecommunication Standardization Conference (WTSC), 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 WTSC 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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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.

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CONTENTS

Page

1	Scope	1
1.1	Application of this Recommendation	1
1.2	Transport network layers	2
1.2.1	SDH transport networks	2
1.2.2	ATM connections	2
1.3	Allocation of end-to-end performance	3
2	References	3
3	Definitions and abbreviations	3
3.1	Abbreviations	3
3.2	Terms and Definitions	5
3.2.4	Error performance events	5
3.2.5	Error performance parameters	5
3.2.6	Additional error performance event / performance parameter	6
4	Measurement of the block	6
4.1	In-service monitoring	6
4.2	Out-of-service measurements	6
5	Performance monitoring at the near end and far end of a path	6
6	Error performance objectives	7
6.1	End-to-end objectives	7
6.2	Apportionment of end-to-end objectives	8
6.2.1	Allocation to the national portion of the end-to-end path	9
6.2.2	Allocation to the international portion of the end-to-end path	9
	Annex A – Criteria for entry to and exit from the unavailable state	10
A.1	Criteria for a single direction	10
A.2	Criterion for a bidirectional path	10
A.3	Criterion for a unidirectional path	11
A.4	Consequences on error performance measurements	11
	Annex B – Relationship between path performance monitoring and the block-based parameters	11
B.1	General	11
B.1.1	Converting BIP measurements into errored blocks	11
B.1.2	Block size for monitoring SDH paths	11
B.1.3	Anomalies	12

	Page
B.1.4 Defects.....	12
B.2 Estimation of the performance parameters.....	13
B.3 Estimation of performance events at the far end of a path.....	14
Appendix I – Flow chart illustrating the recognition of anomalies.....	14
Appendix II – Applicability of ITU-T Recommendation G.828 to non-public networks.....	17



ITU-T Recommendation G.828**Error performance parameters and objectives for international,
constant bit rate synchronous digital paths****1 Scope**

This Recommendation specifies error performance events, parameters and objectives for synchronous digital paths. Subclauses 1.1 to 1.3 give further details.

1.1 Application of this Recommendation

This Recommendation is applicable to international, constant bit rate digital paths based on Synchronous Digital Hierarchies. While this Recommendation specifically addresses objectives for international digital paths, the allocation principles can be applied to the design of error performance for national or private synchronous digital paths. This Recommendation is generic in that it defines the parameters and objectives for paths independent of the physical transport network providing the paths.

Compliance with the performance specification of this Recommendation will, in most cases, also ensure that subtending connections will meet the requirements laid out in ITU-T Recommendations G.821 ($N \times 64$ kbit/s) [5] and G.826 [6]. Therefore, this Recommendation is the only Recommendation required for designing the error performance of synchronous digital paths (see Note). In accordance with the definition of a digital path, path end points may be located at user's premises.

NOTE – It is not required to apply this Recommendation to SDH paths using equipment designed prior to the adoption of this Recommendation in March 2000. Performance events and objectives for paths using equipment designed prior to this date are given in ITU-T G.826.

Paths are used to support services such as circuit switched, packet switched and leased circuit services. The quality of such services, as well as the performance of the network elements belonging to the service layer, is outside of the scope of this Recommendation. However, G.828-based paths can carry ATM traffic. Synchronous digital paths meeting the objectives of this Recommendation will enable the ATM traffic to meet I.356 [9].

The error performance objectives are applicable to each direction of the path independently. The values apply end-to-end over a 27 500 km Hypothetical Reference Path (see Figure 3) which may include optical fibre, digital radio relay, metallic cable and satellite transmission systems. The performance of multiplex and cross-connect functions employing ATM techniques is not included in these values.

The parameter definitions are block-based with the block repetition rate in accordance with SDH technology, making in-service measurement convenient. In addition to in-service measurements, compliance with this Recommendation can be assessed using out-of-service measurements or estimated by measures compatible with this Recommendation as those specified in Annex B.

The objectives given in this Recommendation are long-term objectives to be met over an evaluation period of typically 30 consecutive days (one month). Shorter measurement periods required for maintenance and bringing-into-service are covered in ITU-T Recommendation M.2101 [10].