



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

M.1340

(02/2000)

SERIES M: TMN AND NETWORK MAINTENANCE:
INTERNATIONAL TRANSMISSION SYSTEMS,
TELEPHONE CIRCUITS, TELEGRAPHY, FACSIMILE
AND LEASED CIRCUITS

International data transmission systems

**Performance objectives, allocations and limits
for international PDH leased circuits and
supporting data transmission links and systems**

ITU-T Recommendation M.1340

(Formerly CCITT Recommendation)

ITU-T M-SERIES RECOMMENDATIONS

TMN AND NETWORK MAINTENANCE: INTERNATIONAL TRANSMISSION SYSTEMS, TELEPHONE CIRCUITS, TELEGRAPHY, FACSIMILE AND LEASED CIRCUITS

Introduction and general principles of maintenance and maintenance organization	M.10–M.299
International transmission systems	M.300–M.559
International telephone circuits	M.560–M.759
Common channel signalling systems	M.760–M.799
International telegraph systems and phototelegraph transmission	M.800–M.899
International leased group and supergroup links	M.900–M.999
International leased circuits	M.1000–M.1099
Mobile telecommunication systems and services	M.1100–M.1199
International public telephone network	M.1200–M.1299
International data transmission systems	M.1300–M.1399
Designations and information exchange	M.1400–M.1999
International transport network	M.2000–M.2999
Telecommunications management network	M.3000–M.3599
Integrated services digital networks	M.3600–M.3999
Common channel signalling systems	M.4000–M.4999

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

ITU-T RECOMMENDATION M.1340

PERFORMANCE OBJECTIVES, ALLOCATIONS AND LIMITS FOR INTERNATIONAL PDH LEASED CIRCUITS AND SUPPORTING DATA TRANSMISSION LINKS AND SYSTEMS

Summary

This Recommendation is only applicable to international data transmission links and systems for PDH applications. The requirements described in this Recommendation should form the basis for all digital test measurements associated with these types of applications. The performance limits are also applicable to the international portions of international leased circuits that are supported by an international data transmission system and that have a PDH digital interface at the Customer's premises. Allocations of performance between international and national portions are covered, but those between Network Operators within the national portion require further study.

Recommendations M.1370 and M.1375 describe the Bringing-Into-Service and Maintenance procedures respectively for international data transmission links and systems, while Recommendations M.1380 and M.1385 describe similar procedures for international PDH leased circuits supported by those systems. These Recommendations are to be applied in conjunction with the performance objectives, allocations and limits described in this Recommendation.

This Recommendation addresses the performance of leased circuits with a PDH digital presentation at the Customer's premises. Another Recommendation is being developed for performance of SDH leased circuits. For leased circuits with an analogue presentation, the performance limits of Recommendations M.1020, M.1025 or M.1040 are applied as appropriate.

Source

ITU-T Recommendation M.1340 was revised by ITU-T Study Group 4 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on 4 February 2000.

Keywords

In-service monitoring, international data transmission system, international leased circuit, international section, national section, performance objective, performance allocation, performance limits, performance parameters, test duration.

FOREWORD

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the ITU. The 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 Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 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.

INTELLECTUAL PROPERTY RIGHTS

The ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. The 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, the 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 2000

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the ITU.

CONTENTS

Page

1	Scope.....	1
2	References.....	1
3	Terms and definitions	3
4	Abbreviations.....	3
5	Basic principles.....	4
5.1	Operational procedures	4
5.2	Performance events and parameters.....	4
5.3	Derivation of performance objectives, allocation and limits	4
5.3.1	Data rates below primary rate.....	5
5.3.2	Data rates at primary rate and above.....	5
5.4	Test duration and error phenomena	5
5.5	Action on test failure.....	5
6	Error performance allocation principles and test limits	6
6.1	Overall performance allocation (link terminating point-to-link terminating point) ...	6
6.2	Calculation of overall performance limits	7
6.3	Portion performance allocation (between MPs)	8
6.4	Calculation of portion performance limits.....	8
7	Short duration test objectives.....	8
7.1	Maintenance test limits	9
7.2	BIS test limits.....	9
8	In-Service Monitoring (ISM) of performance.....	9
9	Tables under study	17
Appendix I – Guidelines for performance allocations of the national circuit portions of an international leased circuit		18
I.1	Scope.....	18
I.2	Basic principles.....	18
I.2.1	Data rates below primary rate.....	18
I.2.2	Data rate at the primary rate and higher rates	18
I.3	Error performance allocation principles	20
I.3.1	Performance allocation	20
I.3.2	Portion performance allocation.....	20
I.4	Short duration test objectives.....	22
I.5	In-service performance monitoring.....	22



Documents

Document Sharing Hub

Recommendation M.1340 (02/2000)

iii

Recommendation M.1340

PERFORMANCE OBJECTIVES, ALLOCATIONS AND LIMITS FOR INTERNATIONAL PDH LEASED CIRCUITS AND SUPPORTING DATA TRANSMISSION LINKS AND SYSTEMS

(Published 1993, revised in 1996 and 2000)

1 Scope

This Recommendation is only applicable to international data transmission links and systems for PDH applications. The requirements described in this Recommendation should form the basis for all digital test measurements associated with these types of applications. The performance limits are also applicable to the international portions of international leased circuits that are supported by an international data transmission system and that have a PDH digital interface at the Customer's premises. Allocations of performance between international and national portions are covered, but those between Network Operators/Service Providers within the national portion require further study.

This Recommendation addresses the performance of leased circuits with a PDH digital presentation at the Customer's premises. Another Recommendation is being developed for performance of SDH leased circuits. For leased circuits with an analogue presentation, the procedures described in Recommendation M.1060 [11] and performance limits of Recommendations M.1020 [7], M.1025 [8] or M.1040 [9] are applied as appropriate.

The limits described in this Recommendation represent a typical minimum level of performance and Network Operators/Service Providers should apply practical experience and negotiation to mutually agree more stringent limits whenever feasible. However, it should be recognized that the performance limits described may not be achieved by certain existing transmission equipment technologies.

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; all 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.

- [1] ITU-T Recommendation G.701 (1993), *Vocabulary of digital transmission and multiplexing, and pulse code modulation (PCM) terms.*
- [2] ITU-T Recommendation G.821 (1996), *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.*
- [3] ITU-T Recommendation G.826 (1999) *Error performance parameters and objectives for international, constant bit rate digital paths at or above the primary rate.*
- [4] CCITT Recommendation M.20 (1992), *Maintenance philosophy for telecommunication networks.*
- [5] CCITT Recommendation M.34 (1988), *Performance monitoring on international transmission systems and equipment.*



Documents

Document Sharing Hub

Recommendation M.1340 (02/2000)

1

- [6] ITU-T Recommendation M.60 (1993), *Maintenance terminology and definitions.*
- [7] ITU-T Recommendation M.1020 (1993), *Characteristics of special quality international leased circuits with special bandwidth conditioning.*
- [8] ITU-T Recommendation M.1025 (1993), *Characteristics of special quality international leased circuits with basic bandwidth conditioning.*
- [9] CCITT Recommendation M.1040 (1988), *Characteristics of ordinary quality international leased circuits.*
- [10] ITU-T Recommendation M.1045 (1996), *Preliminary exchange of information for the provision of international leased circuits and international data transmission systems.*
- [11] CCITT Recommendation M.1060 (1988), *Maintenance of international leased circuits.*
- [12] ITU-T Recommendation M.1300 (1997), *Maintenance of international data transmission systems operating in the range 2.4 kbit/s to 140 Mbit/s.*
- [13] ITU-T Recommendation M.1370 (1998), *Bringing-into-service of international data transmission systems.*
- [14] ITU-T Recommendation M.1375 (1998), *Maintenance of international data transmission systems.*
- [15] ITU-T Recommendation M.1380 (2000), *Bringing-into-service of international leased circuits that are supported by international data transmission systems.*
- [16] ITU-T Recommendation M.1385 (2000), *Maintenance of international leased circuits that are supported by international data transmission systems.*
- [17] ITU-T Recommendation M.1400 (2000), *Designations for inter operator networks.*
- [18] CCITT Recommendation M.1510 (1992), *Exchange of contact point information for the maintenance of international services and the international network.*
- [19] ITU-T Recommendation M.1530 (1999), *Network maintenance information.*
- [20] ITU-T Recommendation M.1535 (1996), *Principles for maintenance information to be exchanged at the customer contact point (MICC).*
- [21] ITU-T Recommendation M.1537 (1997), *Definition of maintenance information to be exchanged at customer contact point (MICC).*
- [22] ITU-T Recommendation M.1539 (1999), *Management of the grade of network maintenance services at the maintenance service customer contact point (MSCC).*
- [23] ITU-T Recommendation M.1540 (1994), *Exchange of information for planned outages of transmission systems.*
- [24] CCITT Recommendation M.1560 (1992), *Escalation procedure for international leased circuits.*
- [25] ITU-T Recommendation M.2100 (1995), *Performance limits for bringing-into-service and maintenance of international PDH paths, sections and transmission systems.*

3 Terms and definitions

Recommendation M.1300 [12] provides general descriptions of international data transmission systems. Terminology and definitions relating to this Recommendation are provided in Recommendations G.701 [1] and M.60 [6]. For the purposes of this Recommendation, the following definitions of an international digital leased circuit and Service Level Agreement (SLA)/Contract apply:

3.1 international digital leased circuit: The digital path between two Network Terminating Equipments (NTEs). The digital leased circuit may be bidirectional or unidirectional and its end points are at the boundaries between the Network Operator/Service Provider and the Customer. The NTEs may be owned by the Network Operator/Service Provider or owned by the Customer.

3.2 SLA/Contract: A set of appropriate procedures and targets formally or informally agreed between Network Operators/Service Providers or between Network Operators/Service Providers and Customers, in order to achieve and maintain specified Quality of Service (QoS) in accordance with ITU (ITU-T and ITU-R) Recommendations. The SLA may be an integral part of the Contract. These procedures and targets are related to specific circuit/service availability, error performance, Ready For Service (RFS) date, Mean Time Between Failures (MTBF), Mean Time to Restore Service (MTRS), Mean Time To Repair (MTTR).

4 Abbreviations

This Recommendation uses the following abbreviations:

BIS	Bringing-Into-Service
CSES	Consecutive Severely Errored Second
ES	Errored Second
FS	Frontier Station
HRX	Hypothetical Reference Connection
ISM	In-Service Monitoring
LTP	Link Terminating Point
MP	Measurement Point
MTBF	Mean Time Between Failures
MTRS	Mean Time to Restore Service
MTTR	Mean Time To Repair
NTE	Network Terminating Equipment
OOS	Out-Of-Service
PCM	Pulse Code Modulation
PDH	Plesiochronous Digital Hierarchy
QoS	Quality of Service
RFS	Ready For Service
RPO	Reference Performance Objective
SDH	Synchronous Digital Hierarchy
SEP	Severely Errored Period
SES	Severely Errored Second