INTERNATIONAL TELECOMMUNICATION UNION

CCITT

THE INTERNATIONAL
TELEGRAPH AND TELEPHONE
CONSULTATIVE COMMITTEE

M.10

(10/92)

MAINTENANCE: INTRODUCTION AND GENERAL PRINCIPLES

SCOPE AND APPLICATION OF RECOMMENDATIONS FOR MAINTENANCE OF TELECOMMUNICATION NETWORKS AND SERVICES

Recommendation M.10

FOREWORD

The CCITT (the International Telegraph and Telephone Consultative Committee) is a permanent organ of the International Telecommunication Union (ITU). CCITT 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 Plenary Assembly of CCITT which meets every four years, establishes the topics for study and approves Recommendations prepared by its Study Groups. The approval of Recommendations by the members of CCITT between Plenary Assemblies is covered by the procedure laid down in CCITT Resolution No. 2 (Melbourne, 1988).

Recommendation M.10 was prepared by Study Group IV and was approved under the Resolution No. 2 procedure on the 5th of October 1992.

CCITT NOTE

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

© ITU 1993

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.

Recommendation M.10

SCOPE AND APPLICATION OF RECOMMENDATIONS FOR MAINTENANCE OF TELECOMMUNICATION NETWORKS AND SERVICES

(1992)

Abstract

The purpose of this Recommendation is to describe, from a maintenance viewpoint, the relationships between the quality level at which telecommunication services are provided and the performance of telecommunication networks that carry them.

This Recommendation also provides general guidance to Administrations on maintenance processes by directing them to the relevant and specific Recommendations dealing with maintenance of network and services.

Keywords

– Maintenance;

– network;

– service.

1 General

The purpose of this Recommendation is to describe, from a maintenance viewpoint, the relationships between the quality level at which telecommunication services are provided and the performance of telecommunication networks that carry them.

This Recommendation should be considered as an introductory Recommendation to the specific Recommendations M.20, "Maintenance philosophy for telecommunication networks", and M.21, "Maintenance philosophy for telecommunication services".

This Recommendation also provides general guidance to Administrations on maintenance processes by directing them to the relevant and specific Recommendations dealing with maintenance of networks and services.

2 Maintenance relationships

Figure 1/M.10 shows the relationships between telecommunication services, the telecommunication networks, and maintenance processes. Networks are made up of two parts, as shown in the figure: physical equipment (e.g. the transmission equipment, switching exchanges, signalling equipment, supporting equipment, etc.) and more abstract or "logical" items (e.g. circuits, paths, links, etc.) that are derived from them. These networks carry the various telecommunication services, including both bearer services and teleservices, to meet the needs of the users.

As shown in Figure 1/M.10, the maintenance processes, as part of the overall OA&M management process, require interactive maintenance information and control flows between them and the networks and services they support. These maintenance processes should be considered from both service and network viewpoints in order to take into account all of the required interactions.

3 Key Recommendations relevant to maintenance

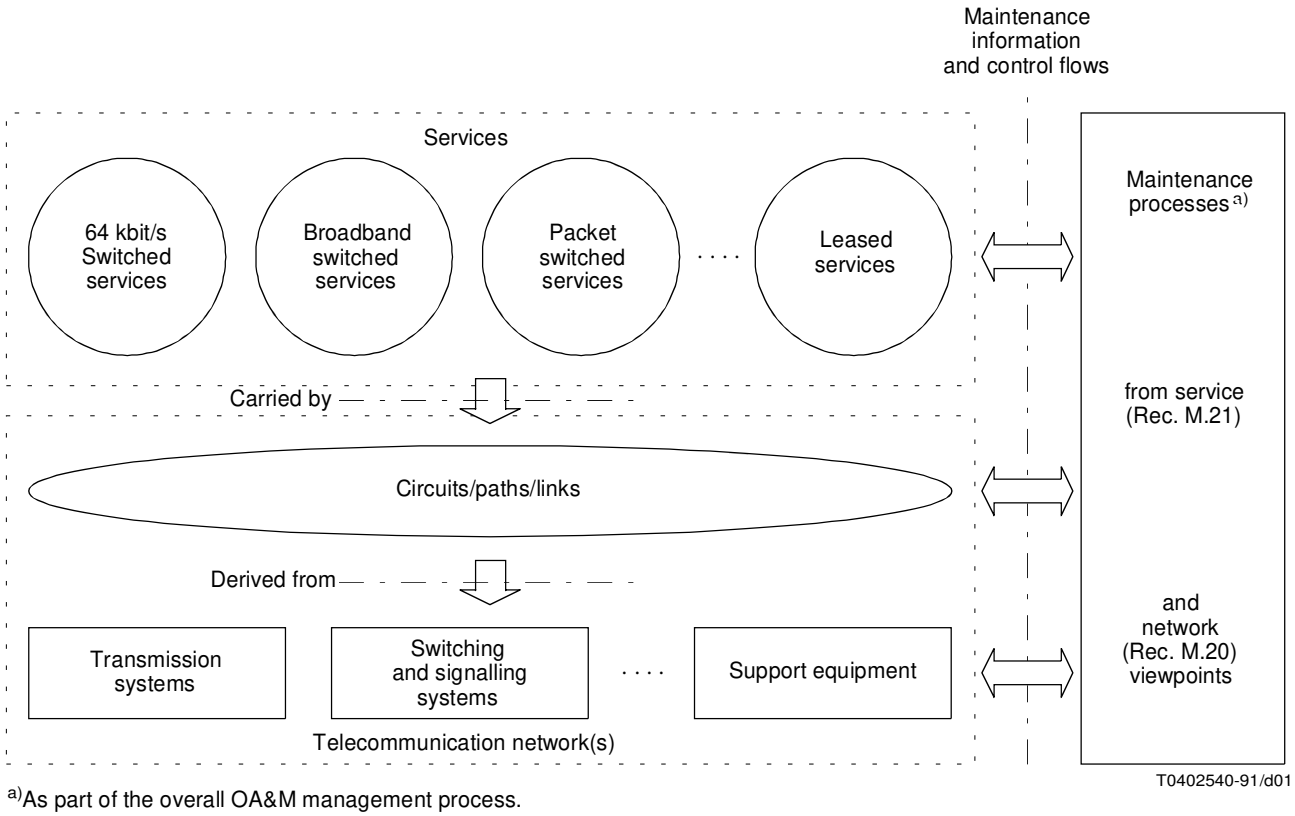
The following list of Recommendations represents the most significant Recommendations to be considered by network operators and service providers when designing their maintenance organization for telecommunication networks and services, are:

– Network maintenance; Recommendation M.20;

– Service maintenance; Recommendation M.21;

– Maintenance organizations; Recommendation M.70;

– Principles of TMN; Recommendation M.3010.



a) As part of the overall OA&M management process.

FIGURE 1/M.10

Service/network relationships for maintenance

4 List of Recommendations relevant to maintenance

This section contains the complete list of M- and N-Series Recommendations. These Recommendations should be considered by Administrations when dealing with maintenance aspects for specific networks, services or maintenance organizations.

4.1 *Recommendations M.10 to M.4110*

Maintenance of telecommunication networks and services

Rec. No.

SECTION 1 *Introduction and general principles of maintenance and maintenance organization*

M.10 Scope and application of Recommendations for maintenance of telecommunication services and networks

M.15 Maintenance considerations for new systems

M.20 Maintenance philosophy for telecommunication networks

M.21 Maintenance philosophy for telecommunication services

M.30 (Renumbered as M.3010)

Rec. No.

M.32 Principles for using alarm information for maintenance of international transmission systems and equipment

M.34 Performance monitoring on international transmission systems and equipment

M.35 Principles concerning line-up and maintenance limits

M.36 (Renumbered as M.3600)

M.40 Abstracts of supplements to the M-, N- and O-Series Recommendations

M.50 Use of telecommunication terms for maintenance

M.60 Maintenance terminology and definitions

M.70 Guiding principles on the general maintenance organization for telephone-type international circuits

M.75 Technical service

M.80 Control stations

M.85 Fault report points

M.90 Sub-control stations

M.93 (Renumbered as M.1510)

M.100 Service circuits

M.110 Circuit testing

M.120 Access points for maintenance

M.125 Digital loopback mechanisms

M.130 (Renumbered as M.2130)

M.140 (Renumbered as M.1400)

M.160 Stability of transmission

M.250 (Replaced by M.3300)

M.251 (Replaced by M.3300)

SECTION 2 *International transmission systems (analogue)* (Recommendations dealing with digital technology will be renumbered into the M.2000-Series when revised)

M.320 Numbering of the channels in a group

M.330 Numbering of groups within a supergroup

M.340 Numbering of supergroups within a mastergroup

M.350 Numbering of mastergroups within a supermastergroup

M.380 Numbering in coaxial systems

M.390 Numbering in systems on symmetric pair cable

M.400 Numbering in radio-relay links or open-wire line systems

M.410 Numbering of digital blocks in transmission systems (will be renumbered into M.2010 when revised)

M.450 Bringing a new international transmission system into service

M.460 Bringing international group, supergroup, etc., links into service

Rec. No.

M.470 Setting up and lining up analogue channels for international telecommunication services

M.475 Setting up and lining up mixed analogue/digital channels for international telecommunication services

M.490 Exchange of information for planned outages of transmission systems (will be renumbered into M.1540 when revised)

M.495 Transmission restoration and transmission route diversity: Terminology and general principles (will be renumbered into M.2310 when revised)

M.496 Functional organization for automatic transmission restoration (will be renumbered into M.2320 when revised[1)])

M.500 Routine maintenance measurements to be made on regulated line sections

M.510 Readjustment to the nominal value of a regulated line section (on a symmetric pair line, a coaxial line or a radio-relay link)

M.520 Routine maintenance on international group, supergroup, etc., links

M.525 Automatic maintenance procedures for international group, supergroup, etc., links

M.530 Readjustment to the nominal value of an international group, supergroup, etc., link

M.535 Special maintenance procedures for multiple destination, unidirectional (MU) group and supergroup links

M.540 Routine maintenance of carrier and pilot generating equipment

M.550 (Renumbered as M.2100)

M.555 (Renumbered as M.2110)

M.556 Setting up and initial testing of digital channels on an international digital path or block

SECTION 3 *International telephone circuits*

M.560 International telephone circuits – Principles, definitions and relative transmission levels

M.562 Types of circuit and circuit section

M.565 Access points for international telephone circuits

M.570 Constitution of the circuit; preliminary exchange of information

M.580 Setting up and lining up an international circuit for public telephony

M.585 Bringing an international digital circuit into service

M.590 Setting up and lining up a circuit fitted with a compandor

M.600 Organization of routine maintenance measurements on circuits

M.605 Routine maintenance schedule for international public telephony circuits

M.610 Periodicity of maintenance measurements on circuits

M.620 Methods for carrying out routine measurements on circuits

M.630 Maintenance of circuits using control chart methods

---

1) When revised, this Recommendation will have a new title to avoid confusion due to the use of the word “organization”

Rec. No.

M.650 Routine line measurements to be made on the line repeaters of audio-frequency sections or circuits

M.660 Periodical in-station tests of echo suppressors complying with Recommendations G.161 and G.164

M.665 Testing of echo cancellers

M.670 Maintenance of a circuit fitted with a compandor

M.675 Lining up and maintaining international demand assignment circuits (SPADE)

M.710 General maintenance organization for the international automatic and semi-automatic telephone service

M.711 (Renumbered as M.1550)

M.715 Fault report point (circuit)

M.716 Fault report point (network)

M.717 Testing point (transmission)

M.718 Testing point (line signalling)

M.719 Testing point (switching and interregister signalling)

M.720 Network analysis point

M.721 System availability information point

M.722 Network management point

M.723 Circuit control station

M.724 Circuit sub-control station

M.725 Restoration control point

M.726 Maintenance organization for the wholly digital international automatic and semi-automatic telephone service

M.729 Organization of the maintenance of international public switched telephone circuits used for data transmission

M.730 Maintenance methods

M.731 Subjective testing

M.732 Signalling and switching routine maintenance tests and measurements

M.733 Transmission routine maintenance measurements on automatic and semi-automatic telephone circuits

M.734 Exchange of information on incoming test facilities at international switching centres

SECTION 4 *International telegraph systems and phototelegraph transmission*

M.800 Use of circuits for voice-frequency telegraphy

M.810 Setting up and lining up an international voice-frequency telegraph link for public telegraph circuits (for 50, 100 and 200 baud modulation rates)

M.820 Periodicity of routine tests on international voice-frequency telegraph links

M.830 Routine measurements to be made on international voice-frequency telegraph links

Rec. No.

M.850 International time division multiplex (TDM) telegraph systems

M.880 International phototelegraph transmission

SECTION 5 *International leased group and supergroup links*

M.900 Use of leased group and supergroup links for wide-spectrum signal transmission (data, facsimile, etc.)

M.910 Setting up and lining up an international leased group link for wide-spectrum signal transmission

SECTION 6 *International leased circuits*

M.1010 Constitution and nomenclature of international leased circuits

M.1012 Circuit control station for leased and special circuits

M.1013 Sub-control station for leased and special circuits

M.1014 Transmission maintenance point (international line) (TMP-IL)

M.1015 Types of transmission on leased circuits

M.1016 Assessment of the service availability performance of international leased circuits

M.1020 Characteristics of special quality international leased circuits with special bandwidth conditioning

M.1025 Characteristics of special quality international leased circuits with basic bandwidth conditioning

M.1030 Characteristics of ordinary quality international leased circuits forming part of private switched telephone networks

M.1040 Characteristics of ordinary quality international leased circuits

M.1045 Preliminary exchange of information for the provision of international leased circuits

M.1050 Lining up an international point-to-point leased circuit

M.1055 Lining up an international multiterminal leased circuit

M.1060 Maintenance of international leased circuits

SECTION 7 *Mobile systems*

M.1130 General definitions and general principles of the operation and maintenance procedures to be used in satellite mobile systems

M.1140 Maritime mobile telecommunication services via satellite
(Blue Book No. M.1100)

M.1150 Maritime mobile telecommunications store-and-forward services (packet Mode) via satellite

M.1160 Aeronautical mobile telecommunication service via satellite

SECTION 8 *International public telephone network maintenance*

M.1220 (Renumbered as M.1530)

M.1230 Assessment of the performance of the international telephone network

M.1235 Use of automatically generated test calls for assessment of network performance

Rec. No.

SECTION 9 *International data transmission systems*

M.1300 International data transmission systems operating in the range 2.4 kbit/s to 2048 kbit/s

M.1320 Numbering of channels in data transmission systems

M.1340 Performance allocations and limits for international data transmission links and systems

M.1350 Setting up, lining up and characteristics of international data transmission systems operating in the range 2.4 kbit/s to 14.4 kbit/s

M.1355 Maintenance of international data transmission systems operating in the range 2.4 to 14.4 kbit/s

M.1370 Bringing-into-service of international data transmission systems

M.1375 Maintenance of international data transmission systems

SECTION 10 *Designations and information exchange*

M.1400 Designations for international network circuits, groups, group and line links, digital blocks, digital paths, data transmission systems, digital blocks created between DCMRs, virtual containers, multiplex sections, and related information
(Blue Book No. M.140)

M.1510 Exchange of contact point information for the maintenance of international services and the international network
(Blue Book No. M.93)

M.1520 Standardized information exchange between administrations

M.1530 Network maintenance information
(Blue Book No. M.1220)

M.1540 See M.490

M.1550 Escalation procedure
(Blue Book No. M.711)

M.1560 Escalation procedure for international leased circuits

SECTION 11 *International transport network*

M.2010 See M.410

M.2100 Performance limits for bringing-into-service and maintenance of international digital paths, sections and transmission systems
(Blue Book No. M.550)

M.2110 Bringing into service international digital paths, sections and transmission systems
(Blue Book No. M.555)

M.2120 Digital path, section and transmission system fault detection and localization procedures

M.2130 Operational procedures in locating and clearing transmission faults
(Blue Book No. M.130)

M.2310 See M.495

M.2320 See M.496

SECTION 12 *Telecommunications management network*

M.3010 Principles for a telecommunication management network
(Blue Book No. M.30)

Rec. No.

M.3020 TMN interface specification methodology

M.3100 Generic network information model

M.3180 Catalogue of TMN management information

M.3200 TMN management service: Overview

M.3300 TMN management facilities presented at the F interface
(Blue Book Nos. M.250 and M.251)

M.3400 TMN management functions

SECTION 13 *Integrated services digital networks*

M.3600 Principles for the maintenance of ISDNs
(Blue Book No. M.36)

M.3602 Application of maintenance principles to ISDN subscriber installations
(Blue Book No. I.602)

M.3603 Application of maintenance principles to ISDN basic rate access
(Blue Book No. I.603)

M.3604 Application of maintenance principles to ISDN primary rate access
(Blue Book No. I.604)

M.3605 Application of maintenance principles to static multiplexed ISDN basic rate access
(Blue Book No. I.605)

M.3620 Principles for the use of ISDN test calls, systems, and responders

M.3640 Management of the D-channel - data link, link and network layer

M.3660 ISDN interface management services

SECTION 14 *Common channel signalling systems*

M.4010 Inter-Administration agreements on Common Channel Signalling System No. 6
(Blue Book No. M.750)

M.4020 Transfer link for Common Channel Signalling System No. 6 (This Recommendation in the Blue Book, Fascicle IV.1 will be renumbered into M.4020 when revised)
(Blue Book No. M.760)

M.4030 Transmission characteristics for setting up and lining up a transfer link for Common Channel Signalling System No. 6 (analogue version)
(Blue Book No. M.761)

M.4040 Maintenance of Common Channel Signalling System No. 6 (This Recommendation in the Blue Book, Fascicle IV.1 will be renumbered into M.4040 when revised)
(Blue Book No. M.762)

M.4100 Maintenance of Common Channel Signalling System No. 7 (This Recommendation in the Blue Book, Fascicle IV.1 will be renumbered into M.4100 when revised)
(Blue Book No. M.782)

M.4110 Inter-Administration agreements on Common Channel Signalling System No. 7
(Blue Book No. M.770)

4.2 *Recommendations N.1 to N.90*

Maintenance of international sound-programme and television transmission circuits

Rec. No.

SECTION 1 *International sound-programme transmission*

1.1 *International sound-programme transmissions – Definitions*

N.1 Definitions for application to international sound-programme transmissions (Rev. 1992)

N.2 Different types of sound-programme circuit

N.3 Control circuits

N.4 Definition and duration of the line-up period and the preparatory period

N.5 Sound-programme control, sub-control and send reference stations

1.2 *Setting-up, lining-up and monitoring the international sound-programme links and connections*

N.10 Limits for the lining-up of international sound-programme links and connections (Rev. 1992)

N.11 Essential transmission performance objectives for international sound-programme centres (ISPC)

N.12 Measurements to be made during the line-up period that precedes a sound-programme transmission

N.13 Measurements to be made by the broadcasting organizations during the preparatory period

N.15 Maximum permissible power during an international sound-programme transmission

N.16 Identification signal

N.17 Monitoring the transmission

N.18 Monitoring for charging purposes, releasing

1.3 *Lining-up and maintenance of international sound-programme circuits*

N.21 Limits and procedures for the lining-up of a sound-programme circuit

N.23 Maintenance measurements to be made on international sound-programme circuits

SECTION 2 *International television transmission*

2.1 *International television transmissions – Definitions and responsibilities*

N.51 Definitions for application to international television transmissions

N.52 Multiple destination television transmissions and coordination centres

N.54 Definition and duration of the line-up period and the preparatory period

N.55 Organization, responsibilities and functions of control and sub-control ITCs and control and sub-control stations for international television connections, links, circuits and circuit sections (Rev. 1992)

2.2 *Lining-up and monitoring of an international television connection*

N.60 Nominal amplitude of video signals at video interconnection points (Rev. 1992)

Rec. No.

N.61 Measurements to be made before the line-up period that precedes a television transmission

N.62 Tests to be made during the line-up period that precedes a television transmission
(Rev. 1992)

N.63 Test signals to be used by the broadcasting organizations during the preparatory period

N.64 Quality and impairment assessment

N.67 Monitoring television transmissions. Use of the field blanking interval
(Rev. 1992)

2.3 *Maintenance of leased circuits for television transmission*

N.73 Maintenance of permanent international television circuits, links and connections

SECTION 3 *International videoconference transmissions*

3.1 *International videoconference transmissions – Definitions*

N.81 Definition for application to international videoconference transmissions

3.2 *Line-up, service commissioning and maintenance of videoconference systems*

N.86 Line-up and service commissioning of international videoconference systems operating at transmission bit rates of 1544 and 2048 kbit/s
(Rev. 1992)

N.90 Maintenance of international videoconference systems operating at transmission bit rates of 1544 and 2048 kbit/s
(Rev. 1992)