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MAINTENANCE: TELECOMMUNICATIONS MANAGEMENT NETWORK

CATALOGUE OF TMN MANAGEMENT INFORMATION

Recommendation M.3180

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.3180 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.

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Recommendation M.3180

CATALOGUE OF TMN MANAGEMENT INFORMATION

(1992)

Abstract

This Recommendation is one of a series of Recommendations on the Telecommunications Management Network (TMN). It defines the scope of TMN management information, identifies related specification techniques, describes the relationships among CCITT Recommendations defining management information, and references definitions of currently available management information.

Keywords

– fragment;

– managed object;

– model;

– OSI management;

– resource.

1 Introduction

This Recommendation provides a catalogue of TMN management information involved in communications across the TMN interfaces defined in Recommendation M.3010 [1]. It does not define these management information, but rather identifies each by name and points to the Recommendation which contains its definition. The purpose of the Recommendation is to provide a "roadmap" to assist the reader in identifying the source of TMN management information. It also provides a listing of documents describing techniques and guidelines available to assist in the uniform definition of management information.

For the purposes of this Recommendation, management information includes managed object classes, attributes, name bindings, conditional packages, actions, notifications and behaviours as described in Recommendation X.722 [2], the Guidelines for the Definition of Managed Objects (GDMO). Only managed object classes are identified initially.

2 Definitions

This Recommendation depends on the definitions of the following terms from Recommendations X.701 [3] and X.722 [2]: managed object class, management support object, attributes, name bindings, conditional packages, actions, and notifications.

3 Catalogue overview

This section provides a summary of the information contained in the remaining sections of this Recommendation.

Section 4 contains a list of references to key documents which describe techniques for specifying management information as they apply to the TMN.

Section 5 lists the associated CCITT management information documents and describes the relationships among them.

Section 6 lists management information related to Recommendation M.3100 [4], the Generic Network Information Model (GNIM), and is categorized according to five fragments. GNIM extensions defined in other Recommendations are also included.

Section 7 lists management information associated with protocol machine resources.

Section 8 lists management information required to support common and specific functional areas.

Annex A provides an alphabetical index of management information

Annex B identifies the superclasses of managed object classes in §§ 6, 7, and 8.

4 Techniques for specifying management information

The Recommendations listed in this section describe the techniques which have been used in specifying TMN management information.

The following four CCITT/ISO texts from OSI Management are broad in scope and are provided to encourage consistency between managed object definitions.

Recommendation X.701 [ISO 10040]	Systems Management Overview;
Recommendation X.720 [ISO 10165-1]	Management Information Model;
Recommendation X.721 [ISO 10165-2]	Definition of Management Information;
Recommendation X.722 [ISO 10165-4]	Guidelines for the Definition of Managed Objects.

In addition the following two Recommendations provide guidelines for specifying management information specific to the TMN management area.

Recommendation M.3020	(TMN methodology);
Recommendation Q.8	(Switching and signalling methodology).

5 Relationships among CCITT management information Recommendations

5.1 *Generic Network Information Model*

The Generic Network Information Model (GNIM) defined in Recommendation M.3100 [4] reflects the common elements from the many telecommunication resources within the scope of TMN.

A generic telecommunications network information model is essential to the generation of uniform fault, configuration, performance, security, and accounting management standards. A common network model, identifying the generic resources that exist in a network and their associated attribute types, events, actions, and behaviours, provides a foundation for understanding the interrelationships between these resources and attributes, and may, in turn, promote uniformity in dealing with the various aspects of managing these resources and attributes.

5.2 *Management information for switching and signalling equipment*

The GNIM is expected to be refined by subclassing and extended in a non-generic manner in Recommendation Q.810 [5] to cover specific requirements for switching and signalling equipment. The management information for CCSS No. 7 protocol machine resources *will be* specified in draft Recommendation Q.751. The management information for ISDN is expected to be produced in the near future.

5.3 *Management information for transmission equipment*

The GNIM is refined by subclassing and extended in a non-generic manner in Recommendation G.774 [6] to cover specific requirements for SDH transmission equipment. Plans also exist to cover PDH transmission equipment.

5.4 *Management information for OSI*

The OSI Management Information described in Recommendation X.721 [7] [ISO 10165-2] primarily supports the management of the OSI protocol layers and is also available to complement other management information definitions. The management information for OSI protocol layers are expected to be specified in X-Series Recommendations.

5.5 *Management information for modems*

The management information for V-Series DCEs is under study.

6 Management information supporting telecommunication network resources

The following sections identify and categorize the TNM managed object classes supporting telecom network resources. Unless stated to the contrary, their definitions are found in Recommendation M.3 100 [4].

Note – The need for a Service Fragment is for further study.

6.1 *Network fragment*

Network

6.2 *Managed element fragment*

Equipment

Managed Element

Software

The following managed object class is specified in Recommendation G. 774 [6]:

SDH Network Element

6.3 *Termination point fragment*

Connection Termination Point Bidirectional

Connection Termination Point Sink

Connection Termination Point Source

Termination Point

Trail Termination Point Bidirectional

Trail Termination Point Sink

Trail Termination Point Source

The following managed object classes are specified in Recommendation G. 774 [6]:

Administrative Unit 3 Connection Termination Point Bidirectional

Administrative Unit 3 Connection Termination Point Sink

Administrative Unit 3 Connection Termination Point Source

Administrative Unit 4 Connection Termination Point Bidirectional

Administrative Unit 4 Connection Termination Point Sink

Administrative Unit 4 Connection Termination Point Source

Administrative Unit Group Bidirectional

Administrative Unit Group Sink

Administrative Unit Group Source

Electrical SPI Trail Termination Point Bidirectional

Electrical SPI Trail Termination Point Sink

Electrical SPI Trail Termination Point Source

Indirect Adaptor Bidirectional

Indirect Adaptor Sink

Indirect Adaptor Source

Multiplex Section Connection Termination Point Bidirectional

Multiplex Section Connection Termination Point Sink

Multiplex Section Connection Termination Point Source

Multiplex Section Data Communications Channel Connection Termination Point Bidirectional

Multiplex Section Data Communications Channel Connection Termination Point Sink

Multiplex Section Data Communications Channel Connection Termination Point Source

Multiplex Section Orderwire Connection Termination Point Bidirectional

Multiplex Section Orderwire Connection Termination Point Sink

Multiplex Section Orderwire Connection Termination Point Source

Multiplex Section Trail Termination Point Bidirectional

Multiplex Section Trail Termination Point Sink

Multiplex Section Trail Termination Point Source

Optical SDH Physical Interface Trail Termination Point Bidirectional

Optical SDH Physical Interface Trail Termination Point Sink

Optical SDH Physical Interface Trail Termination Point Source

Regenerator Section Connection Termination Point Bidirectional

Regenerator Section Connection Termination Point Sink

Regenerator Section Connection Termination Point Source

Regenerator Section Data Communications Channel Connection Termination Point Bidirectional

Regenerator Section Data Communications Channel Connection Termination Point Sink

Regenerator Section Data Communications Channel Connection Termination Point Source

Regenerator Section Orderwire Connection Termination Point Bidirectional

Regenerator Section Orderwire Connection Termination Point Sink

Regenerator Section Orderwire Connection Termination Point Source

Regenerator Section Trail Termination Point Bidirectional

Regenerator Section Trail Termination Point Sink

Regenerator Section Trail Termination Point Source

Regenerator Section User Channel Connection Termination Point Bidirectional

Regenerator Section User Channel Connection Termination Point Sink

Regenerator Section User Channel Connection Termination Point Source

Tributary Unit 2 Connection Termination Point Bidirectional

Tributary Unit 2 Connection Termination Point Sink

Tributary Unit 2 Connection Termination Point Source

Tributary Unit 3 Connection Termination Point Bidirectional

Tributary Unit 3 Connection Termination Point Sink

Tributary Unit 3 Connection Termination Point Source

Tributary Unit 11 Connection Termination Point Bidirectional

Tributary Unit 11 Connection Termination Point Sink

Tributary Unit 11 Connection Termination Point Source

Tributary Unit 12 Connection Termination Point Bidirectional

Tributary Unit 12 Connection Termination Point Sink

Tributary Unit 12 Connection Termination Point Source

Tributary Unit Group 2 Bidirectional

Tributary Unit Group 2 Sink

Tributary Unit Group 2 Source

Tributary Unit Group 3 Bidirectional

Tributary Unit Group 3 Sink

Tributary Unit Group 3 Source

VC-n User Channel Connection Termination Point Bidirectional

VC-n User Channel Connection Termination Point Sink

VC-n User Channel Connection Termination Point Source

Virtual Container 2 Trail Termination Point Bidirectional

Virtual Container 2 Trail Termination Point Sink

Virtual Container 2 Trail Termination Point Source

Virtual Container 3 Trail Termination Point Bidirectional

Virtual Container 3 Trail Termination Point Sink

Virtual Container 3 Trail Termination Point Source

Virtual Container 4 Trail Termination Point Bidirectional

Virtual Container 4 Trail Termination Point Sink

Virtual Container 4 Trail Termination Point Source

Virtual Container 11 Trail Termination Point Bidirectional

Virtual Container 11 Trail Termination Point Sink

Virtual Container 11 Trail Termination Point Source

Virtual Container 12 Trail Termination Point Bidirectional

Virtual Container 12 Trail Termination Point Source

Virtual Container 12 Trail Termination Point Sink

6.4 *Transmission fragment*

Connection

Connectivity

Trail

6.5 *Cross-connection fragment*

Cross-connection

Fabric

Group Termination Point

Multipoint Cross-connection

Named Cross-connection

Named Multipoint Cross-connection

Termination Point Pool

7 Management information supporting protocol machine resources

The following sections identify the managed object classes supporting protocol machine resources.

7.1 *OSI Protocols*

7.2 *ISDN Protocols*

7.3 *SS7 Protocols*

8 Management information supporting functional areas

The following sections identify managed object classes supporting the TMN functional areas defined in Recommendation M.3400 [8]. Managed object classes common to these functional areas are also identified. These managed objects are also called management support objects.

8.1 *Common*

The following management support objects are specified in Recommendation X.721 [7]:

Discriminator

Event Forwarding Discriminator

Event Log Record

Log

Log Record

Top

8.2 *Fault management*

8.2.1 *Alarm surveillance*

The following management support object is specified in Recommendation X.721[7]:

Alarm Record

The following management support objects are specified in Recommendation Q.821 [9]:

Current Alarm Summary Control

Management Operations Schedule

8.3 *Performance management*

8.4 *Configuration management*

8.4.1 *Object management*

The following management support objects are specified in Recommendation X.721 [7]:

Attribute Value Change Record

Object Creation Record

Object Deletion Record

State Change Record

8.5 *Accounting management*

8.6 *Security management*

ANNEX A

(to Recommendation M.3180)

Alphabetical Index of Management Information

Managed Object Classes	*Section*
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Administrative Unit 3 Connection Termination Point Sink	6.3
Administrative Unit 3 Connection Termination Point Source	6.3
Administrative Unit 4 Connection Termination Point Bidirectional	6.3
Administrative Unit 4 Connection Termination Point Sink	6.3
Administrative Unit 4 Connection Termination Point Source	6.3

Administrative Unit Group Bidirectional	6.3
Administrative Unit Group Sink	6.3
Administrative Unit Group Source	6.3
Alarm Record	8.2.1
Attribute Value Change Record	8.4.1
Connection	6.4
Connection Termination Point	6.3
Cross-connection	6.5
Current Alarm Summary Control	8.2.1
Discriminator	8.1
Electrical SPI Trail Termination Point Bidirectional	6.3
Electrical SPI Trail Termination Point Sink	6.3
Electrical SPI Trail Termination Point Source	6.3
Equipment	6.2
Event Forwarding Discriminator	8.1
Event Log Record	8.1
Fabric	6.5
Group Termination Point	6.5
Indirect Adaptor Bidirectional	6.3
Indirect Adaptor Sink	6.3
Indirect Adaptor Source	6.3
Log	8.1
Log Record	8.1
Managed Element	6.2
Management Operations Schedule	8.2.1
Multiplex Section Connection Termination Point Bidirectional	6.3
Multiplex Section Connection Termination Point Sink	6.3
Multiplex Section Connection Termination Point Source	6.3
Multiplex Section Data Communications Channel Connection Termination Point Bidirectional	6.3
Multiplex Section Data Communications Channel Connection Termination Point Sink	6.3
Multiplex Section Data Communications Channel Connection Termination Point Source	6.3
Multiplex Section Orderwire Connection Termination Point Bidirectional	6.3
Multiplex Section Orderwire Connection Termination Point Sink	6.3
Multiplex Section Orderwire Connection Termination Point Source	6.3
Multiplex Section Trail Termination Point Bidirectional	6.3

Multiplex Section Trail Termination Point Sink	6.3
Multiplex Section Trail Termination Point Source	6.3
Multipoint Cross-connection	6.5
Named Cross-connection	6.5
Named Multipoint Cross-connection	6.5
Network	6.1
Object Creation Record	8.4.1
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Optical SDH Physical Interface Trail Termination Point Bidirectional	6.3
Optical SDH Physical Interface Trail Termination Point Sink	6.3
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Regenerator Section Connection Termination Point Bidirectional	6.3
Regenerator Section Connection Termination Point Sink	6.3
Regenerator Section Connection Termination Point Source	6.3
Regenerator Section Data Communications Channel Connection Termination Point Bidirectional	6.3
Regenerator Section Data Communications Channel Connection Termination Point Sink	6.3
Regenerator Section Data Communications Channel Connection Termination Point Source	6.3
Regenerator Section Orderwire Connection Termination Point Bidirectional	6.3
Regenerator Section Orderwire Connection Termination Point Sink	6.3
Regenerator Section Orderwire Connection Termination Point Source	6.3
Regenerator Section Trail Termination Point Bidirectional	6.3
Regenerator Section Trail Termination Point Sink	6.3
Regenerator Section Trail Termination Point Source	6.3
Regenerator Section User Channel Connection Termination Point Bidirectional	6.3
Regenerator Section User Channel Connection Termination Point Sink	6.3
Termination Point Source Software	6.2
State Change Record	8.4.1
Termination Point	6.3
Termination Point Pool	6.5
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Trail	6.4
Trail Termination Point	6.3
Tributary Unit 11 Connection Termination Point Bidirectional	6.3
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Tributary Unit 11 Connection Termination Point Source	6.3
Tributary Unit 12 Connection Termination Point Bidirectional	6.3
Tributary Unit 12 Connection Termination Point Sink	6.3
Tributary Unit 12 Connection Termination Point Source	6.3
Tributary Unit 2 Connection Termination Point Bidirectional	6.3
Tributary Unit 2 Connection Termination Point Sink	6.3
Tributary Unit 2 Connection Termination Point Source	6.3
Tributary Unit 3 Connection Termination Point Bidirectional	6.3
Tributary Unit 3 Connection Termination Point Sink	6.3
Tributary Unit 3 Connection Termination Point Source	6.3
Tributary Unit Group 2 Bidirectional	6.3
Tributary Unit Group 2 Sink	6.3
Tributary Unit Group 2 Source	6.3
Tributary Unit Group 3 Bidirectional	6.3
Tributary Unit Group 3 Sink	6.3
Tributary Unit Group 3 Source	6.3
VC-n User Channel Connection Termination Point Bidirectional	6.3
VC-n User Channel Connection Termination Point Sink	6.3
VC-n User Channel Connection Termination Point Source	6.3
Regenerator Section User Channel Connection	6.3
Virtual Container 11 Trail Termination Point Bidirectional	6.3
Virtual Container 11 Trail Termination Point Sink	6.3
Virtual Container 11 Trail Termination Point Source	6.3
Virtual Container 12 Trail Termination Point Bidirectional	6.3
Virtual Container 12 Trail Termination Point Source	6.3
Virtual Container 12 Trail Termination Point Sink	6.3
Virtual Container 2 Trail Termination Point Bidirectional	6.3
Virtual Container 2 Trail Termination Point Sink	6.3
Virtual Container 2 Trail Termination Point Source	6.3
Virtual Container 3 Trail Termination Point Bidirectional	6.3
Virtual Container 3 Trail Termination Point Sink	6.3
Virtual Container 3 Trail Termination Point Source	6.3
Virtual Container 4 Trail Termination Point Bidirectional	6.3
Virtual Container 4 Trail Termination Point Sink	6.3
Virtual Container 4 Trail Termination Point Source	6.3

ANNEX B

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Inheritance Relationships

This annex identifies within brackets [ ] the *immediate* superclasses of the managed object classes identified in §§ 6, 7, and 8. For example, the entry "Trail Termination Point [termination point]" indicates that "Termination Point" is the superclass for the "Trail Termination Point" managed object class. Where more than one superclass is included within the bracket multiple inheritance is indicated. For example, the entry "Administrative Unit 3 Connection Termination Point Bidirectional [connnection termination point bidirectional, administrative unit 3 connection termination point sink, administrative unit 3 connection termination point source]" indicates that "Connnection Termination Point Bidirectional", "Administrative Unit 3 Connection Termination Point Sink", and "Administrative Unit 3 Connection Termination Point Source" are superclasses for the "Administrative Unit 3 Connection Termination Point Bidirectional" managed object class.

Managed Object Class [superclass]

Administrative Unit 3 Connection Termination Point Bidirectional [connnection termination point bidirectional, administrative unit 3 connection termination point sink, *administrative unit 3 connection termination point* source]

Administrative Unit 3 Connection Termination Point Sink [connnection termination point sink]

Administrative Unit 3 Connection Termination Point Source [connnection termination point source]

Administrative Unit 4 Connection Termination Point Bidirectional [connnection termination point bidirectional, administrative unit 3 connection termination point sink, *administrative unit 3 connection termination point* source]

Administrative Unit 4 Connection Termination Point Sink [connnection termination point sink]

Administrative Unit 4 Connection Termination Point Source [connnection termination point source]

Administrative Unit Group Bidirectional [indirect adaptor bidirectional, administrative unit group sink, *administrative unit group* source]

Administrative Unit Group Sink [indirect adaptor sink]

Administrative Unit Group Source [indirect adaptor source]

Alarm Record [event log record]

Attribute Value Change Record [event log record]

Connection [connectivity]

Connection Termination Point Bidirectional [connection termination point source *connection termination point* sink]

Connection Termination Point Sink [termination point]

Connection Termination Point Source [termination point]

Connectivity [top]

Cross-connection [top]

Current Alarm Summary Control [top]

Discriminator [top]

Electrical SPI Trail Termination Point Bidirectional [trail termination point bidirectional, electrical spi trail termination point sink, *electrical spi trail termination point* source]

Electrical SPI Trail Termination Point Sink [trail termination point sink]

Electrical SPI Trail Termination Point Source [trail termination point source]

Equipment [top]

Event Forwarding Discriminator [discriminator]

Event Log Record [log record]

Fabric [top]

Group Termination Point [top]

Indirect Adaptor Bidirectional [indirect adaptor sink, *indirect adaptor* source]

Indirect Adaptor Sink [top]

Indirect Adaptor Source [top]

Log [top]

Log Record [top]

Managed Element [top]

Management Operations Schedule [top]

Multiplex Section Connection Termination Point Bidirectional [connection termination point bidirectional, multiplex section connection termination point sink, multiplex section connection termination point source]

Multiplex Section Connection Termination Point Sink [connection termination point sink]

Multiplex Section Connection Termination Point Source [connection termination point source]

Multiplex Section Data Communications Channel Connection Termination Point Bidirectional [connection termination point bidirectional, multiplex section data communications channel connection termination point sink, *multiplex section data communications channel connection termination point* source]

Multiplex Section Data Communications Channel Connection Termination Point Sink [connection termination point sink]

Multiplex Section Data Communications Channel Connection Termination Point Source [connnection termination point source]

Multiplex Section Orderwire Connection Termination Point Bidirectional [connection termination point bidirectional, multiplex section orderwire connection termination point sink, *multiplex section orderwire connection termination point* source]

Multiplex Section Orderwire Connection Termination Point Sink [connection termination point sink]

Multiplex Section Orderwire Connection Termination Point Source [connection termination point source]

Multiplex Section Trail Termination Point Bidirectional [trail termination point bidirectional, multiplex section trail termination point sink, *multiplex section trail termination point* source]

Multiplex Section Trail Termination Point Sink [trail termination point sink]

Multiplex Section Trail Termination Point Source [trail termination point source]

Multipoint Cross-connection [top]

Named Cross-connection [cross-connection]

Named Multipoint Cross-connection [multipoint cross-connection]

Network [top]

Object Creation Record [event log record]

Object Deletion Record [event log record]

Optical SDH Physical Interface Trail Termination Point Bidirectional [trail termination point bidirectional, optical SDH physical interface trail termination point sink, *optical SDH physical interface trail termination point* source]

Optical SDH Physical Interface Trail Termination Point Sink [trail termination point sink]

Optical SDH Physical Interface Trail Termination Point Source [trail termination point source]

Regenerator Section Connection Termination Point Bidirectional [connection termination point bidirectional, regenerator section connection termination point sink, *regenerator section connection termination point* source]

Regenerator Section Connection Termination Point Sink [connection termination point sink]

Regenerator Section Connection Termination Point Source [connection termination point source]

Regenerator Section Data Communications Channel Connection Termination Point Bidirectional [connection termination point bi*di*rectional, regenerator section data communication channel sink, *regenerator section data communication channel* source]

Regenerator Section Data Communications Channel Connection Termination Point Sink [connection termination point sink]

Regenerator Section Data Communications Channel Connection Termination Point Source [connection termination point source]

Regenerator Section Orderwire Connection Termination Point Bidirectional [connection termination point bi*di*rectional, regenerator section orderwire connection termination point sink, *regenerator section orderwire connection termination point* source]

Regenerator Section Orderwire Connection Termination Point Sink [connection termination point sink]

Regenerator Section Orderwire Connection Termination Point Source [connection termination point source]

Regenerator Section Trail Termination Point Bidirectional [trail termination point bidirectional, regenerator section trail termination point sink, *regenerator section trail termination point* source]

Regenerator Section Trail Termination Point Sink [trail termination point sink]

Regenerator Section Trail Termination Point Source [trail termination point source]

Regenerator Section User Channel Connection Termination Point Bidirectional [connection termination point bidirectional, regenerator section user channel connection termination point sink, *regenerator section user channel connection termination point* source]

Regenerator Section User Channel Connection Termination Point Sink [connection termination point sink]

Regenerator Section User Channel Connection Termination Point Source [connection termination point source]

SDH Network Element [managed element]

Software [top]

State Change Record [event log record]

Termination Point [top]

Termination Point Pool [top]

Top

Trail [connectivity]

Trail Termination Point Bidirectional [trail termination point source, *trail termination point* sink]

Trail Termination Point Sink [termination point]

Trail Termination Point Source [termination point]

Tributary Unit 2 Connection Termination Point Bidirectional [connection termination point bidirectional, Tributary unit 2 connection termination point sink, *tributary unit 2 connection termination point* source]

Tributary Unit 2 Connection Termination Point Sink [connection termination point sink]

Tributary Unit 2 Connection Termination Point Source [connection termination point source]

Tributary Unit 3 Connection Termination Point Bidirectional [connection termination point bidirectional, tributary unit 3 connection termination point sink , *tributary unit 3 connection termination point* source]

Tributary Unit 3 Connection Termination Point Sink [connection termination point sink]

Tributary Unit 3 Connection Termination Point Source [connection termination point source]

Tributary Unit 11 Connection Termination Point Bidirecfional [connection termination point bidirectional, tributary unit 11 connection termination point sink, *tributary unit 11 connection termination point* source]

Tributary Unit 11 Connection Termination Point Sink [connection termination point sink]

Tributary Unit 11 Connection Termination Point Source [connection termination point source]

Tributary Unit 12 Connection Termination Point Bidirectional [connection termination point bidirectional, tributary unit 12 connection termination point sink, *tributary unit 12 connection termination point* source]

Tributary Unit 12 Connection Termination Point Sink [connection termination point sink]

Tributary Unit 12 Connection Termination Point Source [connection termination point source]

Tributary Unit Group 2 Bidirectional [indirect adaptor bidirectional, tributary unit group 2 sink, *tributary unit group 2* source]

Tributary Unit Group 2 Sink [indirect adaptor sink]

Tributary Unit Group 2 Source [indirect adaptor source]

Tributary Unit Group 3 Bidirectional [indirect adaptor bidirectional, tributary unit group 3 sink, *tributary unit group 3* source]

Tributary Unit Group 3 Sink [indirect adaptor sink]

Tributary Unit Group 3 Source [indirect adaptor source]

VC-n User Channel Connection Termination Point Bidirectional [connection termination point bidirectional, vc-n user channel connection termination point sink, *vc-n user channel connection termination point* source]

VC-n User Channel Connection Termination Point Sink [connection termination point sink]

VC-n User Channel Connection Termination Point Source [connection termination point source]

Virtual Container 2 Trail Termination Point Bidirectional [trail termination point bidirectional, virtual container 2 trail termination point sink, *virtual container 2 trail termination point* source]

Virtual Container 2 Trail Termination Point Sink [trail termination point sink]

Virtual Container 2 Trail Termination Point Source [trail termination point source]

Virtual Container 3 Trail Termination Point Bidirectional [trail termination point bidirectional, virtual container 3 trail termination point sink, *virtual container 3 trail termination point* source]

Virtual Container 3 Trail Termination Point Sink [trail termination point sink]

Virtual Container 3 Trail Termination Point Source [trail termination point source]

Virtual Container 4 Trail Termination Point Bidirectional [trail termination point bidirectional, virtual container 4 trail termination point sink, *virtual container 4 trail termination point* source]

Virtual Container 4 Trail Termination Point Sink [trail termination point sink]

Virtual Container 4 Trail Termination Point Source [trail termination point source]

Virtual Container 11 Trail Termination Point Bidirectional [trail termination point bidirectional, virtual container 11 trail termination point sink, *virtual container 11 trail termination point* source]

Virtual Container 11 Trail Termination Point Sink [trail termination point sink]

Virtual Container 11 Trail Termination Point Source [trail termination point source]

Virtual Container 12 Trail Termination Point Bidirectional [trail termination point bidirectional, virtual container 12 trail termination point sink, *virtual container 12 trail termination point* source]

Virtual Container 12 Trail Termination Point Sink [trail termination point sink]

Virtual Container 12 Trail Termination Point Source [trail termination point source]

References

[1] CCITT Recommendation M.3010 *Principles for a telecommunication management network*.

[2] CCITT Recommendation X.722 *Information technology – Open systems interconnection – Structure of management information: guidelines for the definitions of managed objects*.

[3] CCITT Recommendation X.701 *Information technology – Open systems interconnection – Systems management overview*.

[4] CCITT Recommendation M.3100 *Generic network information model*.

[5] CCITT Recommendation Q.810 *Managed Object Library (MOL) for switching and signalling*.

[6] CCITT Recommendation G.774 *SDH management information model*.

[7] CCITT Recommendation X.721 *Information technology – Open systems interconnection – Structure of management information: definition of management information*.

[8] CCITT Recommendation M.3400 *TMN management functions*.

[9] CCITT Recommendation Q.821 *Stage 2 and stage 3 description for the Q3 interface*.