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SYNCHRONOUS DIGITAL HIERARCHY (SDH) CONFIGURATION OF THE PAYLOAD STRUCTURE FOR THE NETWORK ELEMENT VIEW

ITU-T Recommendation G.774.02

(Previously "CCITT Recommendation")

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (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.

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The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation G.774.02 was prepared by ITU-T Study Group 15 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 1st of November 1994.

NOTE

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

CONTENTS

SUMMARY

This Recommendation provides an information model for the Payload Configuration Management of Synchronous Digital Hierarchy (SDH) Networks. This model describes the managed object classes and their properties for the Payload Configuration function as related to SDH Network Elements. These objects are useful to describe information exchanged across interfaces defined in Recommendation M.3010 Telecommunications Management Network (TMN) architecture for the management of the Payload Configuration function.

KEYWORDS

Action, ASN.1, Attribute, GDMO, Information Model, Managed Object Class, Notification, Synchronous Digital Hierarchy.

Recommendation G.774.02

SYNCHRONOUS DIGITAL HIERARCHY (SDH) CONFIGURATION OF THE PAYLOAD STRUCTURE FOR THE NETWORK ELEMENT VIEW

(Geneva, 1994)

The ITU-T,

considering

(a) that Recommendations G.707, G.708, and G.709 form a coherent set of specifications for the Synchronous Digital Hierarchy (SDH) and the Network Node Interface (NNI);

(b) that Recommendations G.781, G,782, G.783, and G.784 form a coherent set of specifications for SDH multiplex equipment functions and management;

(c) that Recommendation M.3010 defines the principles for a Telecommunications Management Network (TMN);

(d) that Recommendation G.773 defines the protocol suites for Q-interfaces;

(e) that Recommendation M.3100 defines a Generic Network Information Model for the exchange of management information;

(f) that Recommendation G.774 defines an SDH Management Information Model for the Network Element View,

recommends

that the management of SDH payload configuration be carried out by using the information model defined in accordance with the details contained within this Recommendation.

1 Scope

1.1 Scope of this Recommendation

SDH Payload Configuration Functions are used to configure the various SDH adaptation functions.

Modification of the SDH payload structure is done by applying an action on relevant managed objects. These actions are included by subclassing of existing G.774 managed object classes.

1.2 Structure of this Recommendation

Subclause 5.1 provides an overview of the SDH Payload Configuration information model. Clauses 6 to 12 describe the information model using the notation mechanisms defined in Recommendation X.722 Guidelines for the Definition of Managed Objects. Clauses 13 and 14 describe the connectivity pointer constraint rules and the subordination rules applicable to the termination point fragment. Clause 15 contains the syntax definitions of the information carried in the protocol using Abstract Syntax Notation One (ASN.1) defined in Recommendation X.208. Naming and Inheritance are illustrated in informative Annex A. Clauses 5 to 15 are normative; all other text is informative.

2 References

- CCITT Recommendation M.3100 (1992), *Generic network information model*.
- ITU-T Recommendation G.783 (1994), *Characteristics of synchronous digital hierarchy (SDH) equipment functional blocks*.
- ITU-T Recommendation G.784 (1994), *Synchronous Digital Hierarchy (SDH) management*.

– CCITT Recommendation X.722 (1992), *Information technology – OSI – Structure of management information: Guidelines for the definition of managed objects*.

– CCITT Recommendation X.208 (1988), *Specification of Abstract Syntax Notation One (ASN.1)*.

– CCITT Recommendation X.720 (1992), *Information technology – OSI – Structure of management information: Management information model*.

– CCITT Recommendation G.774 (1992), *SDH management information model for the network element view*.

– CCITT Recommendation X.721 (1992), *Definition of management information*.

– CCITT Recommendation X.701 (1992), *Systems management overview*.

– CCITT Recommendation X.730 (1992), *Object management function*.

– ITU-T Recommendation G.803 (1993), *Architectures of transport networks based on the synchronous digital hierarchy (SDH).*

– ITU-T Recommendation G.831 (1993), *Management capabilities of transport networks based on the synchronous digital hierarchy (SDH)*.

– CCITT Recommendation M.3010 (1992), *Principles for a telecommunications management network*.

– ITU-T Recommendation G.707 (1993), *Synchronous digital hierarchy bit rates*.

– ITU-T Recommendation G.708 (1993), *Network-node interface for the synchronous digital hierarchy*.

– ITU-T Recommendation G.709 (1993), *Synchronous multiplexing structure*.

3 Definitions

None.

4 Abbreviations

For the purposes of this Recommendation, the following abbreviations apply:

AU	Administrative Unit
AUG	Administrative Unit Group
Bid	Bidirectional
CTP	Connection Termination Point
GTP	Group Termination Point
Id	Identifier
MS	Multiplexer Section
NE	Network Element
OS	Operation System
OSI	Open system Interconnection
PDH	Plesiochronous Digital Hierarchy
RS	Regenerator Section
SDH	Synchronous Digital Hierarchy
SPI	Synchronous Physical Interface
TMN	Telecommunication Management Network
TP	Termination Point
TTP	Trail Termination Point
TU	Tributary Unit
TUG	Tributary Unit Group
VC-n	Virtual Container n

5 Payload Configuration Information Model

5.1 Overview

Modification of the SDH frame structure is done by applying an action on relevant managed objects. These actions are included by subclassing of Recommendation G.774 managed object classes. Actions are applied on the following classes:

New Managed Object Classes	*Action used*
modifiableAugSink	**defineAUGStructure**
modifiableAugSource	**defineAUGStructure**
modifiableAugBidirectional	**defineAUGStructure**
modifiableTug3Sink	**defineTug3Structure**
modifiableTug3Source	**defineTug3Structure**
modifiableTug3Bidirectional	**defineTug3Structure**
modifiableTug2Sink	**defineTug2Structure**
modifiableTug2Source	**defineTug2Structure**
modifiableTug2Bidirectional	**defineTug2Structure**
modifiableVC4TTPSink	**defineVC4Structure**
modifiableVC4TTPSource	**defineVC4Structure**
modifiableVC4TTPBidirectional	**defineVC4Structure**
modifiableVC3TTPSink	**defineVC3Structure**
modifiableVC3TTPSource	**defineVC3Structure**
modifiableVC3TTPBidirectional	**defineVC3Structure**
modifiableVC2TTPSink	**defineClientType**
modifiableVC2TTPSource	**defineClientType**
modifiableVC2TTPBidirectional	**defineClientType**
modifiableVC12TTPSink	**defineClientType**
modifiableVC12TTPSource	**defineClientType**
modifiableVC12TTPBidirectional	**defineClientType**
modifiableVC11TTPSink	**defineClientType**
modifiableVC11TTPSource	**defineClientType**
modifiableVC11TTPBidirectional	**defineClientType**

Different actions are defined depending on the class of the managed object on which the action is applied.

The behaviour related to the action is specified along with the action definition.

For object classes defined in this Recommendation, the specialization is made from object classes defined in Recommendation G.774 according to the following scheme:

- Sink from Sink;
- Source from Source;
- Bidirectional from Bidirectional.

The **supportableClientList** attribute is used to contain a list of managed object classes. Only instances of classes present in the list may be contained by an instance of the class which contains the **supportableClientList** attribute.

In a case where a TP or **indirectAdaptor** could only contain one type of client the managed object classes from Recommendation G.774 should be used.

5.2 Requirements

The choice between instanciation of modifiable or non-modifiable indirect adaptor object classes is made according to the make up and mode of operation of the network element.

The choice between instanciation of modifiable or non modifiable trail termination point object classes is made according to the make up and mode of operation of the network element or by direct OS operations.

All the structure below any Trail Termination Point (i.e. **vc4TTP**, **vc3TTP**, ...) is completely configured once they are created according to a predefined default configuration.

Reconfiguration of the multiplexing structure should be supported (i.e. changing a **tug3** from a not multiplexed structure into **7 tug2**).

Configuration or reconfiguration defines the complete subtrees between the Trail Termination Point of the server layer (e.g. **vc4TTP**) and the Connection Termination Points of its clients (e.g. **tu3CTP, tu12CTP**, ...).

In a case when a Trail Termination Point can be cross connected, it can exist independently of any existing path that has to be terminated.

The management system may select if the created connection termination point (e.g. **tu3CTP**) can be flexible assigned or not.

The concatenation of **Nxtu2CTP** or **Nxau4CTP** is done by means of GTP objects and by means of the **addTpsToGTP** and **removeTpsFromGTP** actions on the fabric managed object.

The management system should be able to select the type of mapping of the PDH payload inside virtual container.

Change of configuration of already cross-connected CTP which is contained directly or indirectly by the object on which the action is applied is not feasible. The involved connection termination points should be disconnected first using the disconnect action onto the fabric.

6 Object Classes

6.1 Indirect Adaptors

```
modifiableAugBidirectional  MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": augBidirectional;
        CHARACTERIZED BY
        modifiableAugBidPackage  PACKAGE
            BEHAVIOUR
        modifiableAugBidBehaviour  BEHAVIOUR
DEFINED AS
-- This CLASS shall be instantiated when change of the SDH frame structure
-- by management operation is supported --
;;
        ACTIONS
            defineAUGStructure;;;
REGISTERED AS { g774-02MObjectClass 1 };

modifiableAugSink  MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": augSink;
        CHARACTERIZED BY
        modifiableAugSinkPackage  PACKAGE
            BEHAVIOUR
        modifiableAugSinkBehaviour  BEHAVIOUR
DEFINED AS
-- This CLASS shall be instantiated when change of the SDH frame structure
-- by management operation is supported --
;;
        ACTIONS
            defineAUGStructure;;;
REGISTERED AS { g774-02MObjectClass 2 };

modifiableAugSource  MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": augSource;
        CHARACTERIZED BY
        modifiableAugSourcePackage  PACKAGE
            BEHAVIOUR
        modifiableAugSourceBehaviour  BEHAVIOUR
DEFINED AS
-- This CLASS shall be instantiated when change of the SDH frame structure
-- by management operation is supported --
;;
        ACTIONS
            defineAUGStructure;;;
REGISTERED AS { g774-02MObjectClass 3 };
```

```
modifiableTug3Bidirectional  MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": tug3Bidirectional;
        CHARACTERIZED BY
        modifiableTug3BidPackage  PACKAGE
            BEHAVIOUR
        modifiableTug3BidBehaviour  BEHAVIOUR
DEFINED AS
--  This CLASS shall be instantiated when change of the SDH frame structure
--  by management operation is supported  --
;;
        ACTIONS
            defineTug3Structure;;;
REGISTERED AS { g774-02MObjectClass 4 };

modifiableTug3Sink  MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": tug3Sink;
        CHARACTERIZED BY
        modifiableTug3SinkPackage  PACKAGE
            BEHAVIOUR
        modifiableTug3SinkBehaviour  BEHAVIOUR
DEFINED AS
--  This CLASS shall be instantiated when change of the SDH frame structure
--  by management operation is supported  --
;;
        ACTIONS
            defineTug3Structure;;;
REGISTERED AS { g774-02MObjectClass 5 };

modifiableTug3Source  MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": tug3Source;
        CHARACTERIZED BY
        modifiableTug3SourcePackage  PACKAGE
            BEHAVIOUR
        modifiableTug3SourceBehaviour  BEHAVIOUR
DEFINED AS
--  This CLASS shall be instantiated when change of the SDH frame structure
--  by management operation is supported  --
;;
        ACTIONS
            defineTug3Structure;;;
REGISTERED AS { g774-02MObjectClass 6 };

modifiableTug2Bidirectional  MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": tug2Bidirectional;
        CHARACTERIZED BY
        modifiableTug2BidPackage  PACKAGE
            BEHAVIOUR
        modifiableTug2BidBehaviour  BEHAVIOUR
DEFINED AS
--  This CLASS shall be instantiated when change of the SDH frame structure
--  by management operation is supported  --
;;
        ACTIONS
            defineTug2Structure;;;
REGISTERED AS { g774-02MObjectClass 7 };

modifiableTug2Sink  MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": tug2Sink;
        CHARACTERIZED BY
        modifiableTug2SinkPackage  PACKAGE
            BEHAVIOUR
        modifiableTug2SinkBehaviour  BEHAVIOUR
DEFINED AS
--  This CLASS shall be instantiated when change of the SDH frame structure
--  by management operation is supported  --
;;
        ACTIONS
            defineTug2Structure;;;
REGISTERED AS { g774-02MObjectClass 8 };
```

```
modifiableTug2Source  MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": tug2Source;
        CHARACTERIZED BY
        modifiableTug2SourcePackage  PACKAGE
            BEHAVIOUR
        modifiableTug2SourceBehaviour  BEHAVIOUR
DEFINED AS
-- This CLASS shall be instantiated when change of the SDH frame structure
-- by management operation is supported --
;;
        ACTIONS
            defineTug2Structure;;;
REGISTERED AS { g774-02MObjectClass 9 };
```

6.2 High Order Path Layer

```
modifiableVC4TTPBidirectional  MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": vc4TTPBidirectional;
        CHARACTERIZED BY
        "Recommendation M.3100 : 1992": supportableClientListPackage,
        modifiableVC4TTPBidPackage  PACKAGE
            BEHAVIOUR
        modifiableVC4TTPBidBehaviour  BEHAVIOUR
DEFINED AS
-- This CLASS shall be instantiated when change of the SDH frame structure
-- by management operation is supported --
;;
        ACTIONS
            defineVC4Structure;;;
REGISTERED AS { g774-02MObjectClass 10 };

modifiableVC4TTPSink  MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": vc4TTPSink;
        CHARACTERIZED BY
        "Recommendation M.3100 : 1992": supportableClientListPackage,
        modifiableVC4TTPSinkPackage  PACKAGE
            BEHAVIOUR
        modifiableVC4TTPSinkBehaviour  BEHAVIOUR
DEFINED AS
-- This CLASS shall be instantiated when change of the SDH frame structure
-- by management operation is supported --
;;
        ACTIONS
            defineVC4Structure;;;
REGISTERED AS { g774-02MObjectClass 11 };

modifiableVC4TTPSource  MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": vc4TTPSource;
        CHARACTERIZED BY
        "Recommendation M.3100 : 1992": supportableClientListPackage,
        modifiableVC4TTPSourcePackage  PACKAGE
            BEHAVIOUR
        modifiableVC4TTPSourceBehaviour  BEHAVIOUR
DEFINED AS
-- This CLASS shall be instantiated when change of the SDH frame structure
-- by management operation is supported --
;;
        ACTIONS
            defineVC4Structure;;;
REGISTERED AS { g774-02MObjectClass 12 };

modifiableVC3TTPBidirectional  MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": vc3TTPBidirectional;
        CHARACTERIZED BY
        "Recommendation M.3100 : 1992": supportableClientListPackage,
        modifiableVC3TTPBidPackage  PACKAGE
            BEHAVIOUR
        modifiableVC3TTPBidBehaviour  BEHAVIOUR
```

```
DEFINED AS
-- This CLASS shall be instantiated when change of the SDH frame structure
-- by management operation is supported --
;;
        ACTIONS
            defineVC3Structure;;;
REGISTERED AS { g774-02MObjectClass 13 };

modifiableVC3TTPSink MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": vc3TTPSink;
        CHARACTERIZED BY
        "Recommendation M.3100 : 1992": supportableClientListPackage,
        modifiableVC3TTPSinkPackage PACKAGE
            BEHAVIOUR
        modifiableVC3TTPSinkBehaviour BEHAVIOUR
DEFINED AS
-- This CLASS shall be instantiated when change of the SDH frame structure
-- by management operation is supported --
;;
        ACTIONS
            defineVC3Structure;;;
REGISTERED AS { g774-02MObjectClass 14 };

modifiableVC3TTPSource MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": vc3TTPSource;
        CHARACTERIZED BY
        "Recommendation M.3100 : 1992": supportableClientListPackage,
        modifiableVC3TTPSourcePackage PACKAGE
            BEHAVIOUR
        modifiableVC3TTPSourceBehaviour BEHAVIOUR
DEFINED AS
-- This CLASS shall be instantiated when change of the SDH frame structure
-- by management operation is supported --
;;
        ACTIONS
            defineVC3Structure;;;
REGISTERED AS { g774-02MObjectClass 15 };
```

6.3 Low Order Path Layer

```
modifiableVC2TTPBidirectional MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": vc2TTPBidirectional;
        CHARACTERIZED BY
        "Recommendation M.3100 : 1992": supportableClientListPackage,
        modifiableVC2TTPBidPackage PACKAGE
            BEHAVIOUR
        modifiableVC2TTPBidBehaviour BEHAVIOUR
DEFINED AS
-- This CLASS shall be instantiated when change of the SDH frame structure
-- by management operation is supported --
;;
        ACTIONS
            defineClientType;;;
REGISTERED AS { g774-02MObjectClass 16 };

modifiableVC2TTPSink MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": vc2TTPSink;
        CHARACTERIZED BY
        "Recommendation M.3100 : 1992": supportableClientListPackage,
        modifiableVC2TTPSinkPackage PACKAGE
            BEHAVIOUR
        modifiableVC2TTPSinkBehaviour BEHAVIOUR
DEFINED AS
-- This CLASS shall be instantiated when change of the SDH frame structure
-- by management operation is supported --
;;
        ACTIONS
            defineClientType;;;
REGISTERED AS { g774-02MObjectClass 17 };
```

```
modifiableVC2TTPSource  MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": vc2TTPSource;
        CHARACTERIZED BY
        "Recommendation M.3100 : 1992": supportableClientListPackage,
        modifiableVC2TTPSourcePackage  PACKAGE
            BEHAVIOUR
        modifiableVC2TTPSourceBehaviour  BEHAVIOUR
DEFINED AS
-- This CLASS shall be instantiated when change of the SDH frame structure
-- by management operation is supported --
;;
        ACTIONS
            defineClientType;;;
REGISTERED AS { g774-02MObjectClass 18 };

modifiableVC12TTPBidirectional  MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": vc12TTPBidirectional;
        CHARACTERIZED BY
        "Recommendation M.3100 : 1992": supportableClientListPackage,
        modifiableVC12TTPBidPackage  PACKAGE
            BEHAVIOUR
        modifiableVC12TTPBidBehaviour  BEHAVIOUR
DEFINED AS
-- This CLASS shall be instantiated when change of the SDH frame structure
-- by management operation is supported --
;;
        ACTIONS
            defineClientType;;;
REGISTERED AS { g774-02MObjectClass 19 };

modifiableVC12TTPSink  MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": vc12TTPSink;
        CHARACTERIZED BY
        "Recommendation M.3100 : 1992": supportableClientListPackage,
        modifiableVC12TTPSinkPackage  PACKAGE
            BEHAVIOUR
        modifiableVC12TTPSinkBehaviour  BEHAVIOUR
DEFINED AS
-- This CLASS shall be instantiated when change of the SDH frame structure
-- by management operation is supported --
;;
        ACTIONS
            defineClientType;;;
REGISTERED AS { g774-02MObjectClass 20 };

modifiableVC12TTPSource  MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": vc12TTPSource;
        CHARACTERIZED BY
        "Recommendation M.3100 : 1992": supportableClientListPackage,
        modifiableVC12TTPSourcePackage  PACKAGE
            BEHAVIOUR
        modifiableVC12TTPSourceBehaviour  BEHAVIOUR
DEFINED AS
-- This CLASS shall be instantiated when change of the SDH frame structure
-- by management operation is supported --
;;
        ACTIONS
            defineClientType;;;
REGISTERED AS { g774-02MObjectClass 21 };

modifiableVC11TTPBidirectional  MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation G.774 : 1992": vc11TTPBidirectional;
        CHARACTERIZED BY
        "Recommendation M.3100 : 1992": supportableClientListPackage,
        modifiableVC11TTPBidPackage  PACKAGE
            BEHAVIOUR
        modifiableVC11TTPBidBehaviour  BEHAVIOUR
```

DEFINED AS
-- *This CLASS shall be instantiated when change of the SDH frame structure*
-- *by management operation is supported* --
;;
ACTIONS
defineClientType;;;
REGISTERED AS { g774-02MObjectClass 22 };

modifiableVC11TTPSink MANAGED OBJECT CLASS
DERIVED FROM "Recommendation G.774 : 1992": vc11TTPSink;
CHARACTERIZED BY
"Recommendation M.3100 : 1992": supportableClientListPackage,
modifiableVC11TTPSinkPackage PACKAGE
BEHAVIOUR
modifiableVC11TTPSinkBehaviour BEHAVIOUR
DEFINED AS
-- *This CLASS shall be instantiated when change of the SDH frame structure*
-- *by management operation is supported* --
;;
ACTIONS
defineClientType;;;
REGISTERED AS { g774-02MObjectClass 23 };

modifiableVC11TTPSource MANAGED OBJECT CLASS
DERIVED FROM "Recommendation G.774 : 1992": vc11TTPSource;
CHARACTERIZED BY
"Recommendation M.3100 : 1992": supportableClientListPackage,
modifiableVC11TTPSourcePackage PACKAGE
BEHAVIOUR
modifiableVC11TTPSourceBehaviour BEHAVIOUR
DEFINED AS
-- *This CLASS shall be instantiated when change of the SDH frame structure*
-- *by management operation is supported* --
;;
ACTIONS
defineClientType;;;
REGISTERED AS { g774-02MObjectClass 24 };

7 Packages

None.

8 Attributes

None.

9 Actions

9.1 Define AUG Structure

defineAUGStructure ACTION
BEHAVIOUR defineAUGStructureBehaviour;
MODE CONFIRMED;
PARAMETERS defineSDHStructureError;
WITH INFORMATION SYNTAX SDHConfASN1.AUGStructureInfo;
REGISTERED AS { g774-02Action 1 };

defineAUGStructureBehaviour BEHAVIOUR
DEFINED AS

This action is use to select between a one au4 structured aug and a three au3 structured aug.

If the object(s) contained by the aug already matche(s) the "**AUGStructureInfo**" parameter nothing is raised. In all other cases objects contained by the aug are deleted and corresponding to the "**AUGStructureInfo**" parameter one **au4CTP**, or three **au3CTP** are created.

The corresponding connection termination point(s) are created with the **crossConnectionPointerPackage** package according to the "**connectionInfo**" parameter. If the "unknown" choice of the "**connectionInfo**" parameter is selected the choice is left to the network element according to its make-up and mode.

When applied on a sink managed object, sink connection termination points are created.

When applied on a source managed object, source connection termination points are created.

When applied on a bidirectional managed object, bidirectional connection termination points are created.

The action fails if:

- change of configuration applies on an already existing cross-connected connection termination point contained directly or indirectly by the object on which the action is applied;
- the multiplexing structure is not supported by the network element;
- at least one created connection termination point is not cross-connectable and the **crossConnectable** choice of the "**connectionInfo**" parameter is selected.

NOTE – The definition of the connection termination point managed object classes which represent the adaptation function of the characteristic information of the client inside SDH virtual container are not already defined.

;

9.2 Define VC4 Structure

defineVC4Structure ACTION
BEHAVIOUR defineVC4StructureBehaviour,
defineTug3StructureBehaviour,
defineTug2StructureBehaviour;
MODE CONFIRMED;
PARAMETERS defineSDHStructureError;
WITH INFORMATION SYNTAX SDHConfASN1.VC4StructureInfo;
REGISTERED AS { g774-02Action 2 };

defineVC4StructureBehaviour BEHAVIOUR
DEFINED AS

If the action parameter is "**notSubmultiplexed**" and contains "**noClient**" all contained objects are deleted. If the action parameter is "**notSubmultiplexed**" and contains a value different from "**noClient**" a CTP which corresponds to the client of the VC4 is created and the existing contained object(s) are deleted.

If the action parameter is "**threeTUG3**", three tug3 are created if they do not already exist, contained objects are deleted. Each TUG3 are structured according to the "**TUG3StructureInfo**" parameter ranked according to the time sequence of the tug3.

If the action has succeeded then the C2 signal label is updated according to the new frame structure:

- When applied on a sink VC4 the expected signal label is updated.
- When applied on a source VC4 the sent signal label is updated.
- When applied on a bidirectional VC4 both the expected and sent signal label are updated.

NOTE – The definition of the connection termination point managed object classes which represent the adaptation function of the characteristic information of the client inside SDH virtual container are not already defined.

;

9.3 Define VC3 Structure

defineVC3Structure ACTION
BEHAVIOUR defineVC3StructureBehaviour,
defineTug2StructureBehaviour;
MODE CONFIRMED;
PARAMETERS defineSDHStructureError;
WITH INFORMATION SYNTAX SDHConfASN1.VC3StructureInfo;
REGISTERED AS { g774-02Action 3 };

defineVC3StructureBehaviour BEHAVIOUR
DEFINED AS

If the action parameter is "**notSubmultiplexed**" and contains "**noClient**" all contained objects are deleted. If the action parameter is "**notSubmultiplexed**" and contains a value different from "**noClient**" a CTP which corresponds to the client of the VC3 is created and the existing contained objects are deleted.

If the action parameter is "**sevenTUG2**", seven tug2 are created if they do not already exist, contained CTP are deleted. Each TUG2 are structured according to the "**TUG2StructureInfo**" parameter ranked according to the time sequence of the tug2.

If the action has succeeded then the C2 signal label is updated according to the new frame structure:

- When applied on a sink VC3 the expected signal label is updated.
- When applied on a source VC3 the sent signal label is updated.
- When applied on a bidirectional VC3 both the expected and sent signal label are updated.

NOTE – The definition of the connection termination point managed object classes which represent the adaptation function of the characteristic information of the client inside SDH virtual container are not already defined.

;

9.4 Define Tug3 Structure

defineTug3Structure ACTION
BEHAVIOUR defineTug3StructureBehaviour,
defineTug2StructureBehaviour;
MODE CONFIRMED;
PARAMETERS defineSDHStructureError;
WITH INFORMATION SYNTAX SDHConfASN1.TUG3StructureInfo;
REGISTERED AS { g774-02Action 4 };

defineTug3StructureBehaviour BEHAVIOUR
DEFINED AS

If the **tug3StructureInfo** parameter is "**oneTU3**" a tu3CTP is created if it does not already exist and the existing contained object(s) are deleted.

If the **tug3StructureInfo** parameter is "**sevenTUG2**", seven tug2 are created if they do not already exist, contained CTP is deleted. Each TUG2 is structured according to the "**TUG2StructureInfo**" parameter ranked according to the time sequence of the tug2.

NOTE – The definition of the connection termination point managed object classes which represent the adaptation function of the characteristic information of the client inside SDH virtual container are not already defined.

;

9.5 Define Tug2 Structure

defineTug2Structure ACTION
BEHAVIOUR defineTug2StructureBehaviour;
MODE CONFIRMED;
PARAMETERS defineSDHStructureError;
WITH INFORMATION SYNTAX SDHConfASN1.TUG2StructureInfo;
REGISTERED AS { g774-02Action 5 };

defineTug2StructureBehaviour BEHAVIOUR
DEFINED AS

If the object(s) contained by the tug2 already matche(s) the **tug2StructureInfo** parameter nothing is raised. In all other cases objects contained by the tug2 are deleted and corresponding to the "**tug2StructureInfo**" parameter one tu2CTP, three tu12CTP or four tu11CTP are created.

The corresponding connection termination point(s) are created with the **crossConnectionPointerPackage** package according to the "**connectionInfo**" parameter. If the "unknown" choice of the "**connectionInfo**" parameter is selected the choice is left to the network element according to its make-up and mode.

When applied on a sink managed object, sink connection termination points are created.

When applied on a source managed object, source connection termination points are created.

When applied on a bidirectional managed object, bidirectional connection termination points are created.

The action fails if:

- change of configuration applies on an already existing cross-connected connection termination point contained directly or indirectly by the object on which the action is applied;
- the multiplexing structure is not supported by the network element;
- at least one created connection termination point is not cross-connectable and the **crossConnectable** choice of the "**connectionInfo**" parameter is selected.

;

9.6 Definition of the Client type

defineClientType ACTION
BEHAVIOUR defineClientTypeBehaviour;
MODE CONFIRMED;
PARAMETERS defineSDHStructureError;
WITH INFORMATION SYNTAX SDHConfASN1.DefineClientTypeInfo;
REGISTERED AS { g774-02Action 6 };

defineClientTypeBehaviour BEHAVIOUR
DEFINED AS

This action is used to choose the type of the adaptation function of payload inside the SDH low order Virtual Container.

If the action parameter is "**noClient**" the contained object is deleted. If the action parameter is different from "**noClient**" a CTP which corresponds to the client of the TTP is created and the existing contained object is deleted.

When applied on a sink TTP, a sink connection termination point is created.

When applied on a source TTP, a source connection termination point is created.

When applied on a bidirectional TTP, a bidirectional connection termination point is created.

The action fails if:

- the client type is not supported by the network element.

If the action has succeeded then the signal label V5 (bits 5-7) is updated according to the new frame structure:

- When applied on a sink VC the expected signal label is updated.
- When applied on a source VC the sent signal label is updated.
- When applied on a bidirectional VC both the expected and sent signal label are updated.

NOTE – The definition of the connection termination point managed object classes which represent the adaptation function of the characteristic information of the client inside SDH virtual container are not already defined.;

;

10 Notifications

None.

11 Parameters

defineSDHStructureError PARAMETER
CONTEXT SPECIFIC-ERROR;
WITH SYNTAX SDHConfASN1.DefineSDHStructureError;
REGISTERED AS { g774-02Parameter 1 };

12 Name Bindings

This Recommendation extends the Name Bindings currently defined in Recommendation G.774 by adding AND SUBCLASSES.

NOTE – Only the sink – sink and source – source Name Bindings are defined in this Recommendation. The also possible sink – bidirectinal, source – bidirectinal and bidirectinal – bidirectional Name Bindings are used implicitly via Inheritance and the AND SUBCLASSES clauses. For the bidirectional – bidirectional case the sink – sink Name Binding shall be used.

```
au3CTPSink-augSink  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": au3CTPSink  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": augSink  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": au3CTPId;
        BEHAVIOUR
            au3CTPSink-augSinkBehaviour  BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE  --
;;
REGISTERED AS { g774-02NameBinding 1 };

au3CTPSource-augSource  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": au3CTPSource  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": augSource  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": au3CTPId;
        BEHAVIOUR
            au3CTPSource-augSourceBehaviour  BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE  --
;;
REGISTERED AS { g774-02NameBinding 2 };

au4CTPSink-augSink  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": au4CTPSink  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": augSink  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": au4CTPId;
        BEHAVIOUR
            au4CTPSink-augSinkBehaviour  BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE  --
;;
REGISTERED AS { g774-02NameBinding 3 };

au4CTPSource-augSource  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": au4CTPSource  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": augSource  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": au4CTPId;
        BEHAVIOUR
            au4CTPSource-augSourceBehaviour  BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE  --
;;
REGISTERED AS { g774-02NameBinding 4 };
```

```
augSink-msTTPSink  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": augSink  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": msTTPSink  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": augId;
        BEHAVIOUR
            augSink-msTTPSinkBehaviour  BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE  --
;;
REGISTERED AS { g774-02NameBinding 5 };

augSource-msTTPSource  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": augSource  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": msTTPSource  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": augId;
        BEHAVIOUR
            augSource-msTTPSourceBehaviour  BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE  --
;;
REGISTERED AS { g774-02NameBinding 6 };

electricalSPITTPSink-sdhNE  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": electricalSPITTPSink  AND
SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": sdhNE  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": electricalSPITTPId;
        CREATE
            WITH-REFERENCE-OBJECT,
            WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
            DELETES-CONTAINED-OBJECTS;
REGISTERED AS { g774-02NameBinding 7 };

electricalSPITTPSource-sdhNE  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": electricalSPITTPSource  AND
SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": sdhNE  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": electricalSPITTPId;
        CREATE
            WITH-REFERENCE-OBJECT,
            WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
            DELETES-CONTAINED-OBJECTS;
REGISTERED AS { g774-02NameBinding 8 };

msCTPSink-rsTTPSink  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": msCTPSink  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": rsTTPSink  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": msCTPId;
        BEHAVIOUR
            msCTPSink-rsTTPSinkBehaviour  BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE  --
;;
REGISTERED AS { g774-02NameBinding 9 };
```

msCTPSource-rsTTPSource NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": msCTPSource AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": rsTTPSource AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": msCTPId;
BEHAVIOUR
msCTPSource-rsTTPSourceBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 10 };

msDatacomCTPSink-msTTPSink NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": msDatacomCTPSink AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": msTTPSink AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": msDatacomCTPId;
BEHAVIOUR
msDatacomCTPSink-msTTPSinkBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 11 };

msDatacomCTPSource-msTTPSource NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": msDatacomCTPSource AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": msTTPSource AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": msDatacomCTPId;
BEHAVIOUR
msDatacomCTPSource-msTTPSourceBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 12 };

msOrderwireCTPSink-msTTPSink NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": msOrderwireCTPSink AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": msTTPSink AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": msOrderwireCTPId;
BEHAVIOUR
msOrderwireCTPSink-msTTPSinkBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 13 };

msOrderwireCTPSource-msTTPSource NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": msOrderwireCTPSource AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": msTTPSource AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": msOrderwireCTPId;
BEHAVIOUR
msOrderwireCTPSource-msTTPSourceBehaviour BEHAVIOUR

```
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 14 };

msTTPSink-sdhNE NAME BINDING
        SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": msTTPSink AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": sdhNE AND SUBCLASSES;
        WITH ATTRIBUTE "Recommendation G.774 : 1992": msTTPId;
        CREATE
            WITH-REFERENCE-OBJECT,
            WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
            DELETES-CONTAINED-OBJECTS;
REGISTERED AS { g774-02NameBinding 15 };

msTTPSource-sdhNE NAME BINDING
        SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": msTTPSource AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": sdhNE AND SUBCLASSES;
        WITH ATTRIBUTE "Recommendation G.774 : 1992": msTTPId;
        CREATE
            WITH-REFERENCE-OBJECT,
            WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
            DELETES-CONTAINED-OBJECTS;
REGISTERED AS { g774-02NameBinding 16 };

opticalSPITTPSink-sdhNE NAME BINDING
        SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": opticalSPITTPSink AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": sdhNE AND SUBCLASSES;
        WITH ATTRIBUTE "Recommendation G.774 : 1992": opticalSPITTPId;
        CREATE
            WITH-REFERENCE-OBJECT,
            WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
            DELETES-CONTAINED-OBJECTS;
REGISTERED AS { g774-02NameBinding 17 };

opticalSPITTPSource-sdhNE NAME BINDING
        SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": opticalSPITTPSource AND
SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": sdhNE AND SUBCLASSES;
        WITH ATTRIBUTE "Recommendation G.774 : 1992": opticalSPITTPId;
        CREATE
            WITH-REFERENCE-OBJECT,
            WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
            DELETES-CONTAINED-OBJECTS;
REGISTERED AS { g774-02NameBinding 18 };

rsCTPSink-electricalSPITTPSink NAME BINDING
        SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": rsCTPSink AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": electricalSPITTPSink AND SUBCLASSES;
        WITH ATTRIBUTE "Recommendation G.774 : 1992": rsCTPId;
        BEHAVIOUR
            rsCTPSink-electricalSPITTPSinkBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 19 };
```

rsCTPSource-electricalSPITTPSource NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": rsCTPSource AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": electricalSPITTPSource AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": rsCTPId;
BEHAVIOUR
rsCTPSource-electricalSPITTPSourceBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 20 };

rsCTPSink-opticalSPITTPSink NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": rsCTPSink AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": opticalSPITTPSink AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": rsCTPId;
BEHAVIOUR
rsCTPSink-opticalSPITTPSinkBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 21 };

rsCTPSource-opticalSPITTPSource NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": rsCTPSource AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": opticalSPITTPSource AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": rsCTPId;
BEHAVIOUR
rsCTPSource-opticalSPITTPSourceBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 22 };

rsDatacomCTPSink-rsTTPSink NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": rsDatacomCTPSink AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": rsTTPSink AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": rsDatacomCTPId;
BEHAVIOUR
rsDatacomCTPSink-rsTTPSinkBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 23 };

rsDatacomCTPSource-rsTTPSource NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": rsDatacomCTPSource AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": rsTTPSource AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": rsDatacomCTPId;
BEHAVIOUR
rsDatacomCTPSource-rsTTPSourceBehaviour BEHAVIOUR

```
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 24 };

rsOrderwireCTPSink-rsTTPSink NAME BINDING
        SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": rsOrderwireCTPSink AND
SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": rsTTPSink AND SUBCLASSES;
        WITH ATTRIBUTE "Recommendation G.774 : 1992": rsOrderwireCTPId;
        BEHAVIOUR
            rsOrderwireCTPSink-rsTTPSinkBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 25 };

rsOrderwireCTPSource-rsTTPSource NAME BINDING
        SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": rsOrderwireCTPSource AND
SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": rsTTPSource AND SUBCLASSES;
        WITH ATTRIBUTE "Recommendation G.774 : 1992": rsOrderwireCTPId;
        BEHAVIOUR
            rsOrderwireCTPSource-rsTTPSourceBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 26 };

rsTTPSink-sdhNE NAME BINDING
        SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": rsTTPSink AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": sdhNE AND SUBCLASSES;
        WITH ATTRIBUTE "Recommendation G.774 : 1992": rsTTPId;
        CREATE
            WITH-REFERENCE-OBJECT,
            WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
            DELETES-CONTAINED-OBJECTS;
REGISTERED AS { g774-02NameBinding 27 };

rsTTPSource-sdhNE NAME BINDING
        SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": rsTTPSource AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": sdhNE AND SUBCLASSES;
        WITH ATTRIBUTE "Recommendation G.774 : 1992": rsTTPId;
        CREATE
            WITH-REFERENCE-OBJECT,
        WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
            DELETES-CONTAINED-OBJECTS;
REGISTERED AS { g774-02NameBinding 28 };

rsUserChannelCTPSink-rsTTPSink NAME BINDING
        SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": rsUserChannelCTPSink AND
SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": rsTTPSink AND SUBCLASSES;
        WITH ATTRIBUTE "Recommendation G.774 : 1992": rsUserChannelCTPId;
        BEHAVIOUR
            rsUserChannelCTPSink-rsTTPSinkBehaviour BEHAVIOUR
```

DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 29 };

rsUserChannelCTPSource-rsTTPSource NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": rsUserChannelCTPSource AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": rsTTPSource AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": rsUserChannelCTPId;
BEHAVIOUR
rsUserChannelCTPSource-rsTTPSourceBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 30 };

tu11CTPSink-tug2Sink NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": tu11CTPSink AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": tug2Sink AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": tu11CTPId;
BEHAVIOUR
tu11CTPSink-tug2SinkBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 31 };

tu11CTPSource-tug2Source NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": tu11CTPSource AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": tug2Source AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": tu11CTPId;
BEHAVIOUR
tu11CTPSource-tug2SourceBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 32 };

tu12CTPSink-tug2Sink NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": tu12CTPSink AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": tug2Sink AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": tu12CTPId;
BEHAVIOUR
tu12CTPSink-tug2SinkBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 33 };

```
tu12CTPSource-tug2Source  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": tu12CTPSource  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": tug2Source  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": tu12CTPId;
        BEHAVIOUR
            tu12CTPSource-tug2SourceBehaviour  BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE  --
;;
REGISTERED AS { g774-02NameBinding 34 };

tu2CTPSink-tug2Sink  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": tu2CTPSink  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": tug2Sink  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": tu2CTPId;
        BEHAVIOUR
            tu2CTPSink-tug2SinkBehaviour  BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE  --
;;
REGISTERED AS { g774-02NameBinding 35 };

tu2CTPSource-tug2Source  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": tu2CTPSource  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": tug2Source  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": tu2CTPId;
        BEHAVIOUR
            tu2CTPSource-tug2SourceBehaviour  BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE  --
;;
REGISTERED AS { g774-02NameBinding 36 };

tu3CTPSink-tug3Sink  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": tu3CTPSink  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": tug3Sink  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": tu3CTPId;
        BEHAVIOUR
            tu3CTPSink-tug3SinkBehaviour  BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE  --
;;
REGISTERED AS { g774-02NameBinding 37 };

tu3CTPSource-tug3Source NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": tu3CTPSource  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": tug3Source  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": tu3CTPId;
        BEHAVIOUR
            tu3CTPSource-tug3SourceBehaviour  BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE  --
;;
REGISTERED AS { g774-02NameBinding 38 };
```

tug2Sink-tug3Sink NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": tug2Sink AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": tug3Sink AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": tug2Id;
BEHAVIOUR
tug2Sink-tug3SinkBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 39 };

tug2Source-tug3Source NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": tug2Source AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": tug3Source AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": tug2Id;
BEHAVIOUR
tug2Source-tug3SourceBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 40 };

tug2Sink-vc3TTPSink NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": tug2Sink AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": vc3TTPSink AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": tug2Id;
BEHAVIOUR
tug2Sink-vc3TTPSinkBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 41 };

tug2Source-vc3TTPSource NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": tug2Source AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": vc3TTPSource AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": tug2Id;
BEHAVIOUR
tug2Source-vc3TTPSourceBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 42 };

tug3Sink-vc4TTPSink NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": tug3Sink AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": vc4TTPSink AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation G.774 : 1992": tug3Id;
BEHAVIOUR
tug3Sink-vc4TTPSinkBehaviour BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --
;;
REGISTERED AS { g774-02NameBinding 43 };

```
tug3Source-vc4TTPSource  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": tug3Source  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": vc4TTPSource  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": tug3Id;
        BEHAVIOUR
            tug3Source-vc4TTPSourceBehaviour  BEHAVIOUR
DEFINED AS
-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE  --
;;
REGISTERED AS { g774-02NameBinding 44 };

vc11TTPSink-sdhNE  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": vc11TTPSink  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": sdhNE  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": vc11TTPId;
        CREATE
            WITH-REFERENCE-OBJECT,
            WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
            DELETES-CONTAINED-OBJECTS;
REGISTERED AS { g774-02NameBinding 45 };

vc11TTPSource-sdhNE  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": vc11TTPSource  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": sdhNE  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": vc11TTPId;
        CREATE
            WITH-REFERENCE-OBJECT,
            WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
            DELETES-CONTAINED-OBJECTS;
REGISTERED AS { g774-02NameBinding 46 };

vc12TTPSink-sdhNE  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": vc12TTPSink  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": sdhNE  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": vc12TTPId;
        CREATE
            WITH-REFERENCE-OBJECT,
            WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
            DELETES-CONTAINED-OBJECTS;
REGISTERED AS { g774-02NameBinding 47 };

vc12TTPSource-sdhNE  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": vc12TTPSource  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": sdhNE  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": vc12TTPId;
        CREATE
            WITH-REFERENCE-OBJECT,
            WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
            DELETES-CONTAINED-OBJECTS;
REGISTERED AS { g774-02NameBinding 48 };

vc2TTPSink-sdhNE  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": vc2TTPSink  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": sdhNE  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": vc2TTPId;
```

```
        CREATE
            WITH-REFERENCE-OBJECT,
            WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
            DELETES-CONTAINED-OBJECTS;
REGISTERED AS { g774-02NameBinding 49 };

vc2TTPSource-sdhNE  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": vc2TTPSource  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": sdhNE  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": vc2TTPId;
        CREATE
            WITH-REFERENCE-OBJECT,
            WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
            DELETES-CONTAINED-OBJECTS;
REGISTERED AS { g774-02NameBinding 50 };

vc3TTPSink-sdhNE  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": vc3TTPSink  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": sdhNE  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": vc3TTPId;
        CREATE
            WITH-REFERENCE-OBJECT,
            WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
            DELETES-CONTAINED-OBJECTS;
REGISTERED AS { g774-02NameBinding 51 };

vc3TTPSource-sdhNE  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": vc3TTPSource  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": sdhNE  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": vc3TTPId;
        CREATE
            WITH-REFERENCE-OBJECT,
            WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
            DELETES-CONTAINED-OBJECTS;
REGISTERED AS { g774-02NameBinding 52 };

vc4TTPSink-sdhNE  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": vc4TTPSink  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": sdhNE  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": vc4TTPId;
        CREATE
            WITH-REFERENCE-OBJECT,
            WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
            DELETES-CONTAINED-OBJECTS;
REGISTERED AS { g774-02NameBinding 53 };

vc4TTPSource-sdhNE  NAME BINDING
        SUBORDINATE OBJECT CLASS    "Recommendation G.774 : 1992": vc4TTPSource  AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS    "Recommendation G.774 : 1992": sdhNE  AND SUBCLASSES;
        WITH ATTRIBUTE    "Recommendation G.774 : 1992": vc4TTPId;
        CREATE
            WITH-REFERENCE-OBJECT,
            WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE
            DELETES-CONTAINED-OBJECTS;
REGISTERED AS { g774-02NameBinding 54 };
```

vcnUserChannelCTPSink-vc3TTPSink NAME BINDING

SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": vcnUserChannelCTPSink AND SUBCLASSES;

NAMED BY

SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": vc3TTPSink AND SUBCLASSES;

WITH ATTRIBUTE "Recommendation G.774 : 1992": vcnUserChannelCTPId;

BEHAVIOUR

vcnUserChannelCTPSink-vc3TTPSinkBehaviour BEHAVIOUR

DEFINED AS

-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --

;;

REGISTERED AS { g774-02NameBinding 55 };

vcnUserChannelCTPSource-vc3TTPSource NAME BINDING

SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": vcnUserChannelCTPSource AND SUBCLASSES;

NAMED BY

SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": vc3TTPSource AND SUBCLASSES;

WITH ATTRIBUTE "Recommendation G.774 : 1992": vcnUserChannelCTPId;

BEHAVIOUR

vcnUserChannelCTPSource-vc3TTPSourceBehaviour BEHAVIOUR

DEFINED AS

-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --

;;

REGISTERED AS { g774-02NameBinding 56 };

vcnUserChannelCTPSink-vc4TTPSink NAME BINDING

SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": vcnUserChannelCTPSink AND SUBCLASSES;

NAMED BY

SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": vc4TTPSink AND SUBCLASSES;

WITH ATTRIBUTE "Recommendation G.774 : 1992": vcnUserChannelCTPId;

BEHAVIOUR

vcnUserChannelCTPSink-vc4TTPSinkBehaviour BEHAVIOUR

DEFINED AS

-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --

;;

REGISTERED AS { g774-02NameBinding 57 };

vcnUserChannelCTPSource-vc4TTPSource NAME BINDING

SUBORDINATE OBJECT CLASS "Recommendation G.774 : 1992": vcnUserChannelCTPSource AND SUBCLASSES;

NAMED BY

SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": vc4TTPSource AND SUBCLASSES;

WITH ATTRIBUTE "Recommendation G.774 : 1992": vcnUserChannelCTPId;

BEHAVIOUR

vcnUserChannelCTPSource-vc4TTPSourceBehaviour BEHAVIOUR

DEFINED AS

-- The subordinate managed objects are automatically instantiated
-- when the superior managed object is instantiated, according to
-- the make-up and mode of operation of the NE --

;;

REGISTERED AS { g774-02NameBinding 58 };

13 Constraint Rules

13.1 Constraint Rules Extended Syntax

This subclause redefines the grammar of the pointer constraint rules as previously defined in Recommendation G.774. This new grammar should only be appplied to the pointer constraint rules defined in this Recommendation.

13.1.1 Constraint Rules Grammar

<constraint-rule-label> CONSTRAINT RULE
OBJECT CLASS <class-label> [AND SUBCLASSES] ;
IS RELATED TO <class-list> ;
USING ATTRIBUTE <attribute-label> ;
<constraint-rule-set> ;
;

<constraint-rule-set> ::= <single-constraint-rule> | <named-type-constraint-rule>

<single-constraint-rule> ::= ACCORDING TO RULE <constraint-rule>

<named-type-constraint-rule> ::= CASE { <named-type-constraint-rule-list> }

<named-type-constraint-rule-list> ::= <named-type-constraint-rule-item> |
<named-type-constraint-rule-item> , <named-type-constraint-rule-list>

<named-type-constraint-rule-item> ::=
<named-type> ACCORDING TO RULE <constraint-rule>

<class-label> ::= label string as defined in ISO/IEC IS 10165-4

<attribute-label> ::= label string as defined in ISO/IEC IS 10165-4

<class-list> ::= <class-spec> | <class-list> ,<class-spec>

<class-spec> ::= <class-label> | <class-label> AND SUBCLASSES

<constraint-rule> ::= SET { <constraint-members> }
| SEQUENCE { <constraint-members> }
| CHOICE { <constraint-members> }
| SET SIZE (<ordinality>) OF <constraint-term>
| SEQUENCE SIZE (<ordinality>) OF <constraint-term>

<constraint-members> ::= <constraint-term>
| <constraint-term> , <constraint-members>

<constraint-term> ::= <class-spec> | <constraint-rule>

<ordinality> ::= <valueRange> | <valueList>

<valueRange> ::= <lowerValue> .. <upperValue>

<valueList> ::= <itemValue> | <itemValue> , <valueList>

<itemValue> ::= INTEGER

<lowerValue> ::= INTEGER

<upperValue> ::= INTEGER | N

13.1.2 Constraint Rule Templates

OBJECT CLASS <class-label> [AND SUBCLASSES];
indicates the class and optionally the subclasses which are governed by this constraint-rule. A class may be governed by more than one constraint-rule with non-overlapping sets of related classes in the RELATES TO OBJECT CLASSES clause.

IS RELATED TO OBJECT CLASSES <class-list>;
indicates the set of classes of related instances that are governed by this constraint-rule. Any classes that are not in this list are not governed by this constraint-rule.

USING ATTRIBUTE <attribute-label>;
indicates the attribute that represents a relationship by means of a pointer (DN) to the related object instances.

<constraint-rule-set>;

there can be either a single rule, or a set of rules one for each of a set of named choices. In the latter case the CASE { ... } structure is used.

CASE { ... };

provides a distinct constraint-rule for each of the set of named choices in the attribute syntax.

ACCORDING TO RULE <constraint-rule>

provides the rule

SET { <constraint-members> }

indicates that *all* of the constraint-members must be present in any order.

SEQUENCE { <constraint-members> }

indicates that *all* of the constraint-members must be present in sequence.

CHOICE { <constraint-members> }

indicates that *any one* of the constraint-members must be present.

SET SIZE <ordinality> OF <constraint-term>

indicates the number of <constraint-term> that must be present in any order.

SEQUENCE SIZE <ordinality> OF <constraint-term>

indicates the number of <constraint-term> that must be present in sequence.

13.2 Connectivity Pointer Constraints

This subclause defines the allowable values for the downstreamConnectivityPointer and upstreamConnectivityPointer attributes using the object classes defined in this Recommendation. The pointer contraint rules defined in this Recommendation replace those defined in Recommendation G.774 (1992).

```
downstreamConnectivityPointer-au3CTPSink  CONSTRAINT RULE
        OBJECT CLASS
            au3CTPSink AND SUBCLASSES;
        IS RELATED TO
            vc3TTPSink AND SUBCLASSES,
            au3CTPSource AND SUBCLASSES,
            tu3CTPSource AND SUBCLASSES,
            vc4TTPSink  AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": downstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc3TTPSink AND SUBCLASSES,
                    au3CTPSource AND SUBCLASSES,
                    tu3CTPSource AND SUBCLASSES,
                    vc4TTPSink AND SUBCLASSES },
            broadcast ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    SET SIZE(1..N) OF CHOICE {
                      vc3TTPSink AND SUBCLASSES,
                      tu3CTPSource AND SUBCLASSES,
                      au3CTPSource AND SUBCLASSES },
                SET SIZE(1..N) OF CHOICE {
                      vc4TTPSink AND SUBCLASSES }
                }
        };
;

upstreamConnectivityPointer-au3CTPSource  CONSTRAINT RULE
        OBJECT CLASS
            au3CTPSource AND SUBCLASSES;
        IS RELATED TO
            vc3TTPSource AND SUBCLASSES,
            au3CTPSink AND SUBCLASSES,
            tu3CTPSink AND SUBCLASSES,
            vc4TTPSource AND SUBCLASSES;
```

```
        USING ATTRIBUTE
            "Recommendation M.3100": upstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc3TTPSource AND SUBCLASSES,
                    au3CTPSink AND SUBCLASSES,
                    tu3CTPSink AND SUBCLASSES,
                    vc4TTPSource AND SUBCLASSES }
        };
;

downstreamConnectivityPointer-au4CTPSink  CONSTRAINT RULE
        OBJECT CLASS
            au4CTPSink AND SUBCLASSES;
        IS RELATED TO
            au4CTPSource AND SUBCLASSES,
            vc4TTPSink AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": downstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc4TTPSink AND SUBCLASSES,
                    au4CTPSource AND SUBCLASSES, },
            broadcast ACCORDING TO RULE
                SET SIZE(1..N) OF CHOICE {
                    vc4TTPSink AND SUBCLASSES,
                    au4CTPSource AND SUBCLASSES, }
        };
;

upstreamConnectivityPointer-au4CTPSource  CONSTRAINT RULE
        OBJECT CLASS
            au4CTPSource AND SUBCLASSES;
        IS RELATED TO
            au4CTPSink AND SUBCLASSES,
            vc4TTPSource AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": upstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc4TTPSource AND SUBCLASSES,
                    au4CTPSink AND SUBCLASSES }
        };
;

downstreamConnectivityPointer-msCTPSink  CONSTRAINT RULE
        OBJECT CLASS
            msCTPSink AND SUBCLASSES;
        IS RELATED TO
            msTTPSink AND SUBCLASSES,
            msCTPSource AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": downstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    msTTPSink AND SUBCLASSES,
                    msCTPSource AND SUBCLASSES }
        };
;

upstreamConnectivityPointer-msCTPSource CONSTRAINT RULE
        OBJECT CLASS
            msCTPSource AND SUBCLASSES;
        IS RELATED TO
            msTTPSource AND SUBCLASSES,
            msCTPSink AND SUBCLASSES;
```

```
        USING ATTRIBUTE
            "Recommendation M.3100": upstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    msTTPSource AND SUBCLASSES,
                    msCTPSink AND SUBCLASSES }
        };
;

upstreamConnectivityPointer-msTTPSink CONSTRAINT RULE
        OBJECT CLASS
            msTTPSink AND SUBCLASSES;
        IS RELATED TO
            msCTPSink AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": upstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    msCTPSink AND SUBCLASSES }
        };
;

downstreamConnectivityPointer-msTTPSource  CONSTRAINT RULE
        OBJECT CLASS
            msTTPSource AND SUBCLASSES;
        IS RELATED TO
            msCTPSource AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": downstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    msCTPSource AND SUBCLASSES }
        };
;

downstreamConnectivityPointer-rsCTPSink CONSTRAINT RULE
        OBJECT CLASS
            rsCTPSink AND SUBCLASSES;
        IS RELATED TO
            rsTTPSink AND SUBCLASSES,
            rsCTPSource AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": downstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    rsTTPSink AND SUBCLASSES,
                    rsCTPSource AND SUBCLASSES }
        };
;

upstreamConnectivityPointer-rsCTPSource  CONSTRAINT RULE
        OBJECT CLASS
            rsCTPSource AND SUBCLASSES;
        IS RELATED TO
            rsTTPSource AND SUBCLASSES,
            rsCTPSink AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": upstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    rsTTPSource AND SUBCLASSES,
                    rsCTPSink AND SUBCLASSES }
        };
;
```

```
upstreamConnectivityPointer-rsTTPSink  CONSTRAINT RULE
        OBJECT CLASS
            rsCTPSink AND SUBCLASSES;
        IS RELATED TO
            rsCTPSink AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": upstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    rsCTPSink AND SUBCLASSES }
        };
;

downstreamConnectivityPointer-rsTTPSource  CONSTRAINT RULE
        OBJECT CLASS
            rsCTPSource AND SUBCLASSES;
        IS RELATED TO
            rsCTPSource AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": downstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    rsCTPSource AND SUBCLASSES }
        };
;

downstreamConnectivityPointer-tu11CTPSink  CONSTRAINT RULE
        OBJECT CLASS
            tu11CTPSink AND SUBCLASSES;
        IS RELATED TO
            vc11TTPSink AND SUBCLASSES,
            tu11CTPSource AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": downstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc11TTPSink AND SUBCLASSES,
                    tu11CTPSource AND SUBCLASSES },
            broadcast ACCORDING TO RULE
                SET SIZE(1..N) OF CHOICE {
                    vc11TTPSink AND SUBCLASSES,
                    tu11CTPSource AND SUBCLASSES }
        };
;

upstreamConnectivityPointer-tu11CTPSource  CONSTRAINT RULE
        OBJECT CLASS
            tu11CTPSource AND SUBCLASSES;
        IS RELATED TO
            vc11TTPSource AND SUBCLASSES,
            tu11CTPSink AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": upstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc11TTPSource AND SUBCLASSES,
                    tu11CTPSink AND SUBCLASSES }
        };
;

downstreamConnectivityPointer-tu12CTPSink  CONSTRAINT RULE
        OBJECT CLASS
            tu12CTPSink AND SUBCLASSES;
        IS RELATED TO
            vc12TTPSink AND SUBCLASSES,
            tu12CTPSource AND SUBCLASSES;
```

```
        USING ATTRIBUTE
            "Recommendation M.3100": downstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc12TTPSink AND SUBCLASSES,
                    tu12CTPSource AND SUBCLASSES },
            broadcast ACCORDING TO RULE
                SET SIZE(1..N) OF CHOICE {
                    vc12TTPSink AND SUBCLASSES,
                    tu12CTPSource AND SUBCLASSES }
        };
;

upstreamConnectivityPointer-tu12CTPSource  CONSTRAINT RULE
        OBJECT CLASS
            tu12CTPSource AND SUBCLASSES;
        IS RELATED TO
            vc12TTPSource AND SUBCLASSES,
            tu12CTPSink AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": upstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc12TTPSource AND SUBCLASSES,
                    tu12CTPSink AND SUBCLASSES }
        };
;

downstreamConnectivityPointer-tu2CTPSink  CONSTRAINT RULE
        OBJECT CLASS
            tu2CTPSink AND SUBCLASSES;
        IS RELATED TO
            vc2TTPSink AND SUBCLASSES,
            tu2CTPSource AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": downstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc2TTPSink AND SUBCLASSES,
                    tu2CTPSource AND SUBCLASSES },
            broadcast ACCORDING TO RULE
                SET SIZE(1..N) OF CHOICE {
                    vc2TTPSink AND SUBCLASSES,
                    tu2CTPSource AND SUBCLASSES }
        };
;

upstreamConnectivityPointer-tu2CTPSource  CONSTRAINT RULE
        OBJECT CLASS
            tu2CTPSource AND SUBCLASSES;
        IS RELATED TO
            vc2TTPSource AND SUBCLASSES,
            tu2CTPSink AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": upstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc2TTPSource AND SUBCLASSES,
                    tu2CTPSink AND SUBCLASSES }
        };
;
```

```
downstreamConnectivityPointer-tu3CTPSink  CONSTRAINT RULE
        OBJECT CLASS
            tu3CTPSink AND SUBCLASSES;
        IS RELATED TO
            vc3TTPSink AND SUBCLASSES,
            au3CTPSource AND SUBCLASSES,
            tu3CTPSource AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": downstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc3TTPSink AND SUBCLASSES,
                    au3CTPSource AND SUBCLASSES,
                    tu3CTPSource AND SUBCLASSES, },
            broadcast ACCORDING TO RULE
                SET SIZE(1..N) OF CHOICE {
                    vc3TTPSink AND SUBCLASSES,
                    au3CTPSource AND SUBCLASSES,
                    tu3CTPSource AND SUBCLASSES }
        };
;

upstreamConnectivityPointer-tu3CTPSource  CONSTRAINT RULE
        OBJECT CLASS
            tu3CTPSource AND SUBCLASSES;
        IS RELATED TO
            vc3TTPSource AND SUBCLASSES,
            au3CTPSink AND SUBCLASSES,
            tu3CTPSink AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": upstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc3TTPSource AND SUBCLASSES,
                    au3CTPSink AND SUBCLASSES,
                    tu3CTPSink AND SUBCLASSES }
        };
;

upstreamConnectivityPointer-vc11TTPSink  CONSTRAINT RULE
        OBJECT CLASS
            vc11TTPSink AND SUBCLASSES;
        IS RELATED TO
            vc11TTPSource AND SUBCLASSES,
            tu11CTPSink AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": upstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc11TTPSource AND SUBCLASSES,
                    tu11CTPSink AND SUBCLASSES }
        };
;

downstreamConnectivityPointer-vc11TTPSource  CONSTRAINT RULE
        OBJECT CLASS
            vc11TTPSource AND SUBCLASSES;
        IS RELATED TO
            vc11TTPSink AND SUBCLASSES,
            tu11CTPSource AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": downstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc11TTPSink AND SUBCLASSES,
                    tu11CTPSource AND SUBCLASSES, },
```

```
            broadcast ACCORDING TO RULE
                SET SIZE(1..N) OF CHOICE {
                    vc11TTPSink AND SUBCLASSES,
                    tu11CTPSource AND SUBCLASSES }
        };
;

upstreamConnectivityPointer-vc12TTPSink  CONSTRAINT RULE
        OBJECT CLASS
            vc12TTPSink AND SUBCLASSES;
        IS RELATED TO
            vc12TTPSource AND SUBCLASSES,
            tu12CTPSink AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": upstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc12TTPSource AND SUBCLASSES,
                    tu12CTPSink AND SUBCLASSES }
        };
;

downstreamConnectivityPointer-vc12TTPSource  CONSTRAINT RULE
        OBJECT CLASS
            vc12TTPSource AND SUBCLASSES;
        IS RELATED TO
            vc12TTPSink AND SUBCLASSES,
            tu12CTPSource AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": downstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc12TTPSink AND SUBCLASSES,
                    tu12CTPSource AND SUBCLASSES },
            broadcast ACCORDING TO RULE
                SET SIZE(1..N) OF CHOICE {
                    vc12TTPSink AND SUBCLASSES,
                    tu12CTPSource AND SUBCLASSES }
        };
;

upstreamConnectivityPointer-vc2TTPSink  CONSTRAINT RULE
        OBJECT CLASS
            vc2TTPSink AND SUBCLASSES;
        IS RELATED TO
            vc2TTPSource AND SUBCLASSES,
            tu2CTPSink AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": upstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc2TTPSource AND SUBCLASSES,
                    tu2CTPSink AND SUBCLASSES }
        };
;

downstreamConnectivityPointer-vc2TTPSource  CONSTRAINT RULE
        OBJECT CLASS
            vc2TTPSource AND SUBCLASSES;
        IS RELATED TO
            vc2TTPSink AND SUBCLASSES
            tu2CTPSource AND SUBCLASSES;
```

```
        USING ATTRIBUTE
            "Recommendation M.3100": downstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc2TTPSink AND SUBCLASSES,
                    tu2CTPSource AND SUBCLASSES },
            broadcast ACCORDING TO RULE
                SET SIZE(1..N) OF CHOICE {
                    vc2TTPSink AND SUBCLASSES,
                    tu2CTPSource AND SUBCLASSES }
        };
;

upstreamConnectivityPointer-vc3TTPSink  CONSTRAINT RULE
        OBJECT CLASS
            vc3TTPSink AND SUBCLASSES;
        IS RELATED TO
            vc3TTPSource AND SUBCLASSES,
            au3CTPSink AND SUBCLASSES,
            tu3CTPSink AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": upstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc3TTPSource,
                    au3CTPSink,
                    tu3CTPSink }
        };
;

downstreamConnectivityPointer-vc3TTPSource  CONSTRAINT RULE
        OBJECT CLASS
            vc3TTPSource AND SUBCLASSES;
        IS RELATED TO
            vc3TTPSink AND SUBCLASSES,
            au3CTPSource AND SUBCLASSES,
            tu3CTPSource AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": downstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc3TTPSink AND SUBCLASSES,
                    au3CTPSource AND SUBCLASSES,
                    tu3CTPSource AND SUBCLASSES },
            broadcast ACCORDING TO RULE
                SET SIZE(1..N) OF CHOICE {
                    vc3TTPSink AND SUBCLASSES,
                    au3CTPSource AND SUBCLASSES,
                    tu3CTPSource AND SUBCLASSES }
        };
;

upstreamConnectivityPointer-vc4TTPSink  CONSTRAINT RULE
        OBJECT CLASS
            vc4TTPSink AND SUBCLASSES;
        IS RELATED TO
            vc4TTPSource AND SUBCLASSES,
            au4CTPSink AND SUBCLASSES,
            au3CTPSink AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": upstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc4TTPSource AND SUBCLASSES,
                    au4CTPSink AND SUBCLASSES },
```

```
            concatenated ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    SEQUENCE SIZE(3) OF au3CTPSink AND SUBCLASSES }
        };
;

downstreamConnectivityPointer-vc4TTPSource  CONSTRAINT RULE
        OBJECT CLASS
            vc4TTPSource AND SUBCLASSES;
        IS RELATED TO
            vc4TTPSink AND SUBCLASSES,
            au4CTPSource AND SUBCLASSES,
            au3CTPSource AND SUBCLASSES;
        USING ATTRIBUTE
            "Recommendation M.3100": downstreamConnectivityPointer;
        CASE {
            single ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    vc4TTPSink AND SUBCLASSES,
                    au4CTPSource AND SUBCLASSES },
            broadcast ACCORDING TO RULE
                SET SIZE(1..N) OF CHOICE {
                    vc4TTPSink AND SUBCLASSES,
                    au4CTPSource AND SUBCLASSES, },
            concatenated ACCORDING TO RULE
                SET SIZE(1) OF CHOICE {
                    SEQUENCE SIZE(3) OF au3CTPSource AND SUBCLASSES },
            broadcastConcatenated ACCORDING TO RULE
                SET SIZE(1..N) OF CHOICE {
                    SEQUENCE SIZE(3) OF au3CTPSource AND SUBCLASSES }
        };
;
```

14 Subordination Rules

This clause defines the allowable combinations of subordinate object class instances that made be named by a superior object class instance, using the object classes contained in this Recommendation.

```
modifiableAugSinkSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            modifiableAugSink;
        NAMES SUBORDINATES
            au4CTPSink,
            au3CTPSink;
        ACCORDING TO RULE
            CHOICE {
                SET SIZE(1) OF au4CTPSink,
                SET SIZE(3) OF au3CTPSink
            };
;

modifiableAugSourceSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            modifiableAugSource;
        NAMES SUBORDINATES
            au4CTPSource,
            au3CTPSource;
        ACCORDING TO RULE
            CHOICE {
                SET SIZE(1) OF au4CTPSource,
                SET SIZE(3) OF au3CTPSource
            };
;
```

```
modifiableAugBidirectionalSubordination SUBORDINATION  RULE
        SUPERIOR OBJECT CLASS
            modifiableAugBidirectional;
        NAMES SUBORDINATES
            au4CTPSink, au4CTPSource, au4CTPBidirectional,
            au3CTPSink, au3CTPSource, au3CTPBidirectional;
        ACCORDING TO RULE
            CHOICE {
                SET SIZE(1) OF CHOICE {
                    au4CTPSink, au4CTPSource, au4CTPBidirectional },
                SET SIZE(3) OF CHOICE {
                    au3CTPSink, au3CTPSource, au3CTPBidirectional }
            };
;

msTTPSinkSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            msTTPSink;
        NAMES SUBORDINATES
            augSink, modifiableAugSink,
            msDatacomCTPSink,
            msOrderwireCTPSink;
        ACCORDING TO RULE
            SET {
                SET SIZE(1,4,16) OF CHOICE {
                    augSink, modifiableAugSink },
                SET SIZE(0..1) OF msDatacomCTPSink,
                SET SIZE(0..1) OF msOrderwireCTPSink
            };
;

msTTPSourceSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            msTTPSource;
        NAMES SUBORDINATES
            augSource, modifiableAugSource,
            msDatacomCTPSource,
            msOrderwireCTPSource;
        ACCORDING TO RULE
            SET {
                SET SIZE(1,4,16) OF CHOICE {
                    augSource, modifiableAugSource },
                SET SIZE(0..1) OF msDatacomCTPSource,
                SET SIZE(0..1) OF msOrderwireCTPSource
            };
;

msTTPBidirectionalSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            msTTPBidirectional;
        NAMES SUBORDINATES
            augBidirectional, modifiableAugBidirectional,
            msDatacomCTPSink, msDatacomCTPSource, msDatacomCTPBidirectional,
            msOrderwireCTPSink, msOrderwireCTPSource, msOrderwireCTPBidirectional;
        ACCORDING TO RULE
            SET {
                SET SIZE(1,4,16) OF CHOICE {
                    augBidirectional, modifiableAugBidirectional },
                SET SIZE(0..1) OF CHOICE {
                    msDatacomCTPSink, msDatacomCTPSource, msDatacomCTPBidirectional },
                SET SIZE(0..1) OF CHOICE {
                    msOrderwireCTPSink, msOrderwireCTPSource, msOrderwireCTPBidirectional }
            };
;
```

```
modifiableTug2SinkSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            modifiableTug2Sink;
        NAMES SUBORDINATES
            tu11CTPSink,
            tu12CTPSink,
            tu2CTPSink;
        ACCORDING TO RULE
            CHOICE {
                SET SIZE(1) OF tu2CTPSink,
                SET SIZE(3) OF tu12CTPSink,
                SET SIZE(4) OF tu11CTPSink
            };
;

modifiableTug2SourceSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            modifiableTug2Source;
        NAMES SUBORDINATES
            tu11CTPSource,
            tu12CTPSource,
            tu2CTPSource;
        ACCORDING TO RULE
            CHOICE {
                SET SIZE(1) OF tu2CTPSource,
                SET SIZE(3) OF tu12CTPSource,
                SET SIZE(4) OF tu11CTPSource
            };
;

modifiableTug2BidirectionalSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            modifiableTug2Bidirectional;
        NAMES SUBORDINATES
            tu11CTPSink, tu11CTPSource, tu11CTPBidirectional,
            tu12CTPSink, tu12CTPSource, tu12CTPBidirectional,
            tu2CTPSink, tu2CTPSource, tu2CTPBidirectional;
        ACCORDING TO RULE
            CHOICE {
                SET SIZE(1) OF CHOICE {
                    tu2CTPSink, tu2CTPSource, tu2CTPBidirectional },
                SET SIZE(3) OF CHOICE {
                    tu12CTPSink, tu12CTPSource, tu12CTPBidirectional },
                SET SIZE(4) OF CHOICE {
                    tu11CTPSink, tu11CTPSource, tu11CTPBidirectional }
            };
;

modifiableTug3SinkSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            modifiableTug3Sink;
        NAMES SUBORDINATES
            tug2Sink, modifiableTug2Sink,
            tu3CTPSink;
        ACCORDING TO RULE
            CHOICE {
                SET SIZE(1) OF tu3CTPSink,
                SET SIZE(7) OF CHOICE {
                    tug2Sink, modifiableTug2Sink }
            };
;

tug3SourceSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            tug3Source;
        NAMES SUBORDINATES
            tug2Source, modifiableTug2Source,
            tu3CTPSource;
```

```
        ACCORDING TO RULE
            CHOICE {
                SET SIZE(1) OF tu3CTPSource,
                SET SIZE(7) OF CHOICE {
                    tug2Source, modifiableTug2Source }
            };
;

tug3BidirectionalSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            tug3Bidirectional;
        NAMES SUBORDINATES
            tug2Bidirectional, modifiableTug2Bidirectional,
            tu3CTPSink, tu3CTPSource, tu3CTPBidirectional;
        ACCORDING TO RULE
            CHOICE {
                SET SIZE(1) OF CHOICE {
                    tu3CTPSink, tu3CTPSource,tu3CTPBidirectional },
                SET SIZE(7) OF CHOICE {
                    tug2Sink, tug2Source, tug2Bidirectional,
                    modifiableTug2Sink, modifiableTug2Source, modifiableTug2Bidirectional }
            };
;

modifiableVC3TTPSinkSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            modifiableVC3TTPSink;
        NAMES SUBORDINATES
            tug2Sink, modifiableTug2Sink,
            vcnUserChannelCTPSink;
        ACCORDING TO RULE
            SET {
                SET SIZE(7) OF CHOICE {
                    tug2Sink, modifiableTug2Sink },
                SET SIZE(1) OF vcnUserChannelCTPSink
            };
;

vc3TTPSinkSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            vc3TTPSink;
        NAMES SUBORDINATES
            tug2Sink, modifiableTug2Sink,
            vcnUserChannelCTPSink;
        ACCORDING TO RULE
            SET {
                SET SIZE(7) OF CHOICE {
                    tug2Sink, modifiableTug2Sink },
                SET SIZE(1) OF vcnUserChannelCTPSink
            };
;

modifiableVC3TTPSourceSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            modifiableVC3TTPSource;
        NAMES SUBORDINATES
            tug2Source, modifiableTug2source,
            vcnUserChannelCTPSource;
        ACCORDING TO RULE
            SET {
                SET SIZE(7) OF CHOICE {
                    tug2Source, modifiableTug2Source },
                SET SIZE(1) OF vcnUserChannelCTPSource
            };
;
```

```
vc3TTPSourceSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            vc3TTPSource;
        NAMES SUBORDINATES
            tug2Source, modifiableTug2source,
            vcnUserChannelCTPSource;
        ACCORDING TO RULE
            SET {
                SET SIZE(7) OF CHOICE {
                    tug2Source, modifiableTug2Source },
                SET SIZE(1) OF vcnUserChannelCTPSource
            };
;

modifiableVC3TTPBidirectionalSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            modifiableVC3TTPBidirectional;
        NAMES SUBORDINATES
            tug2Bidirectional, modifiableTug2Bidirectional,
            vcnUserChannelCTPSink, vcnUserChannelCTPSource, vcnUserChannelCTPBidirectional;
        ACCORDING TO RULE
            SET {
                SET SIZE(7) OF CHOICE {
                    tug2Bidirectional, modifiableTug2Bidirectional },
                SET SIZE(1) OF CHOICE {
                    vcnUserChannelCTPSink, vcnUserChannelCTPSource,
                    vcnUserChannelCTPBidirectional }
            };
;

vc3TTPBidirectionalSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            vc3TTPBidirectional;
        NAMES SUBORDINATES
            tug2Bidirectional, modifiableTug2Bidirectional,
            vcnUserChannelCTPSink, vcnUserChannelCTPSource, vcnUserChannelCTPBidirectional;
        ACCORDING TO RULE
            SET {
                SET SIZE(7) OF CHOICE {
                    tug2Bidirectional, modifiableTug2Bidirectional },
                SET SIZE(1) OF CHOICE {
                    vcnUserChannelCTPSink, vcnUserChannelCTPSource,
                    vcnUserChannelCTPBidirectional }
            };
;

modifiableVC4TTPSinkSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            modifiableVC4TTPSink;
        NAMES SUBORDINATES
            tug3Sink, modifiableTug3Sink,
            vcnUserChannelCTPSink;
        ACCORDING TO RULE
            SET {
                SET SIZE(3) OF CHOICE {
                    tug3Sink, modifiableTug3Sink },
                SET SIZE(1) OF vcnUserChannelCTPSink
            };
;

vc4TTPSinkSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            vc4TTPSink;
        NAMES SUBORDINATES
            tug3Sink, modifiableTug3Sink,
            vcnUserChannelCTPSink;
```

```
        ACCORDING TO RULE
            SET {
                SET SIZE(3) OF CHOICE {
                    tug3Sink, modifiableTug3Sink },
                SET SIZE(1) OF vcnUserChannelCTPSink
            };
;

modifiableVC4TTPSourceSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            modifiableVC4TTPSource;
        NAMES SUBORDINATES
            tug3Source, modifiableTug3source,
            vcnUserChannelCTPSource;
        ACCORDING TO RULE
            SET {
                SET SIZE(3) OF CHOICE {
                    tug3Source, modifiableTug3Source },
                SET SIZE(1) OF vcnUserChannelCTPSource
            };
;

vc4TTPSourceSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            vc4TTPSource;
        NAMES SUBORDINATES
            tug3Source, modifiableTug3source,
            vcnUserChannelCTPSource;
        ACCORDING TO RULE
            SET {
                SET SIZE(3) OF CHOICE {
                    tug3Source, modifiableTug3Source },
                SET SIZE(1) OF vcnUserChannelCTPSource
            };
;

modifiableVC4TTPBidirectionalSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            modifiableVC4TTPBidirectional;
        NAMES SUBORDINATES
            tug3Bidirectional, modifiableTug3Bidirectional,
            vcnUserChannelCTPSink, vcnUserChannelCTPSource, vcnUserChannelCTPBidirectional;
        ACCORDING TO RULE
            SET {
                SET SIZE(3) OF CHOICE {
                    tug3Bidirectional, modifiableTug3Bidirectional },
                SET SIZE(1) OF CHOICE {
                    vcnUserChannelCTPSink, vcnUserChannelCTPSource,
                    vcnUserChannelCTPBidirectional }
            };
;

vc4TTPBidirectionalSubordination  SUBORDINATION RULE
        SUPERIOR OBJECT CLASS
            vc4TTPBidirectional;
        NAMES SUBORDINATES
            tug3Bidirectional, modifiableTug3Bidirectional,
            vcnUserChannelCTPSink, vcnUserChannelCTPSource, vcnUserChannelCTPBidirectional;
        ACCORDING TO RULE
            SET {
                SET SIZE(3) OF CHOICE {
                    tug3Bidirectional, modifiableTug3Bidirectional },
                SET SIZE(1) OF CHOICE {
                    vcnUserChannelCTPSink, vcnUserChannelCTPSource,
                    vcnUserChannelCTPBidirectional }
            };
;
```

15 Supporting ASN.1 Productions

```
SDHConfASN1 {itu(0) recommendation(0) g(7) g774(774) hyphen(127) conf(02) informationModel(0)
asn1Module(2) sdhconf (0)}

DEFINITIONS IMPLICIT TAGS ::=

BEGIN
-- EXPORTS everything --

sdhConf OBJECT IDENTIFIER ::= { itu(0) recommendation(0) g(7) g774(774) hyphen(127) conf(02)
informationModel(0) }

g774-02MObjectClass OBJECT IDENTIFIER ::= { sdhConf managedObjectClass(3) }

g774-02Action OBJECT IDENTIFIER ::= { sdhConf action(9) }

g774-02NameBinding OBJECT IDENTIFIER ::= { sdhConf nameBinding(6) }

g774-02Parameter OBJECT IDENTIFIER ::= { sdhConf parameter(5) }

ClientType ::= ENUMERATED {
-- For more information refer to G.803 and G.709. --

noClient (0),
c139264AsynchronousMapping ClientType (1),
c44736AsynchronousMapping ClientType (2),
c34AsynchronousMapping ClientType (3),
c6312AsynchronousMapping ClientType (4),
c6312BitSynchronousMapping ClientType (5),
c6312ByteSynchronousMapping ClientType (6),
c2048AsynchronousMapping ClientType (7),
c2048BitSynchronousMapping ClientType (8),
c2048ByteSynchronousMapping ClientType (9),
c1544AsynchronousMapping ClientType (10),
c1544BitSynchronousMapping ClientType (11),
c1544ByteSynchronousMapping ClientType (12),
aTMClientType (13),
fDDIClientType (14),
mANClientType (15)
        }
-- NOTE – The identification of the different type of adaptation functions
-- for a single type of characteristic information is for further study. --

ConnectionInfo ::= ENUMERATED {
        crossConnectable            (1),
        notCrossConnectable         (2),
        unknown                     (3)
            }

AUGStructureInfo ::= CHOICE {
        oneAU4      [0] ConnectionInfo,
        threeAU3    [1] SEQUENCE SIZE (1..3) OF ConnectionInfo
            }

DefineClientTypeInfo ::= ClientType
DefineSDHStructureError ::= ENUMERATED {
        structureNotSupported       (0),
        tpNotCrossConnectable       (1),
        tpAlreadyCrossConnected     (2),
        unknown                     (3)
            }

TUG3StructureInfo ::= CHOICE {
        oneTU3      [0] ConnectionInfo,
        sevenTUG2   [1] SEQUENCE SIZE (1..7) OF TUG2StructureInfo
            } -- ordered according to the time sequence --

TUG2StructureInfo ::= CHOICE {
        oneTU2      [0] ConnectionInfo,
        threeTU12   [1] SEQUENCE SIZE (1..3) OF ConnectionInfo,
        fourTU11    [2] SEQUENCE SIZE (1..4) OF ConnectionInfo
            } -- ordered according to the time sequence --
```

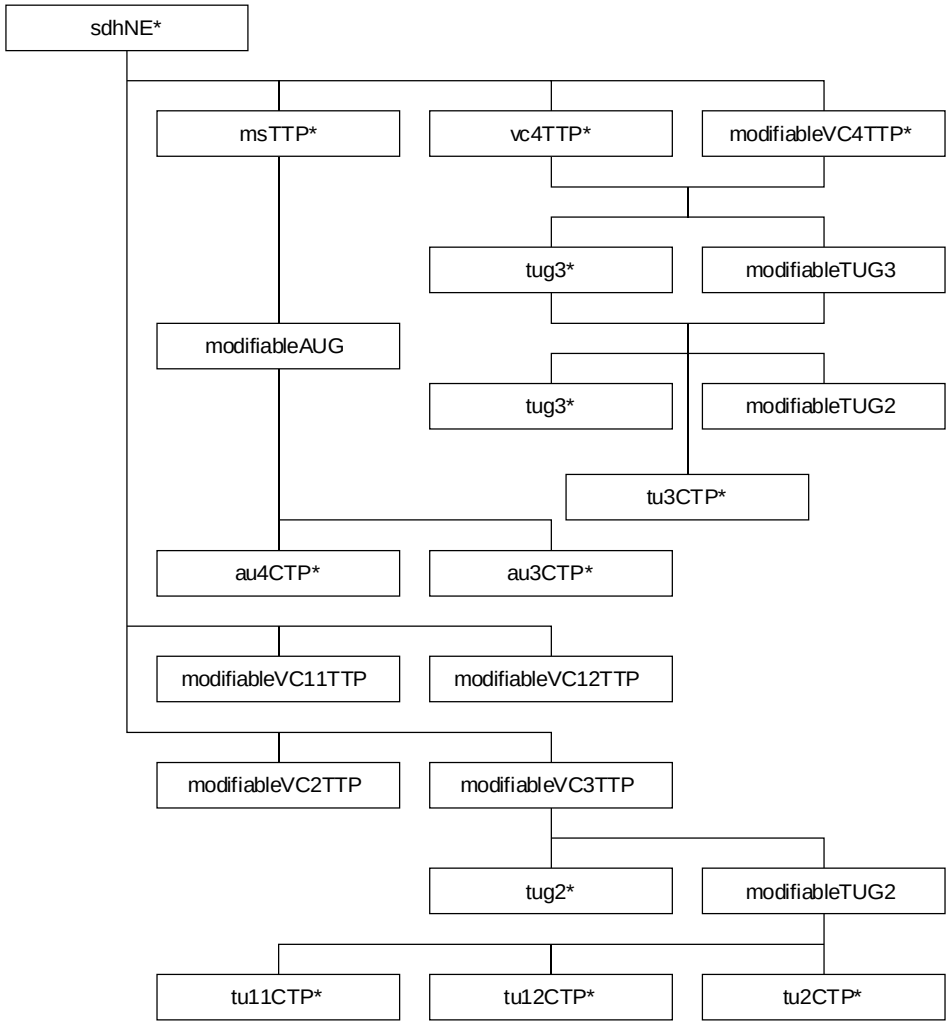
```
VC4StructureInfo ::= CHOICE {
        notSubmultiplexed    [0] ClientType,
        threeTUG3            [1] SEQUENCE SIZE (1..3) OF TUG3StructureInfo
            } -- ordered according to the time sequence --

VC3StructureInfo ::= CHOICE {
        notSubmultiplexed    [0] ClientType,
        sevenTUG2            [1] SEQUENCE SIZE (1..7) OF TUG2StructureInfo
            } -- In case of mapping the VC3 into a VC4 only the notSubmultiplexed choice is permitted. --

END -- end of supporting asn.1 productions --
```

Annex A

Inheritance and Naming Diagrams

(informative)
(This annex does not form an integral part of this Recommendation)

See Figures A.1 and A.2.

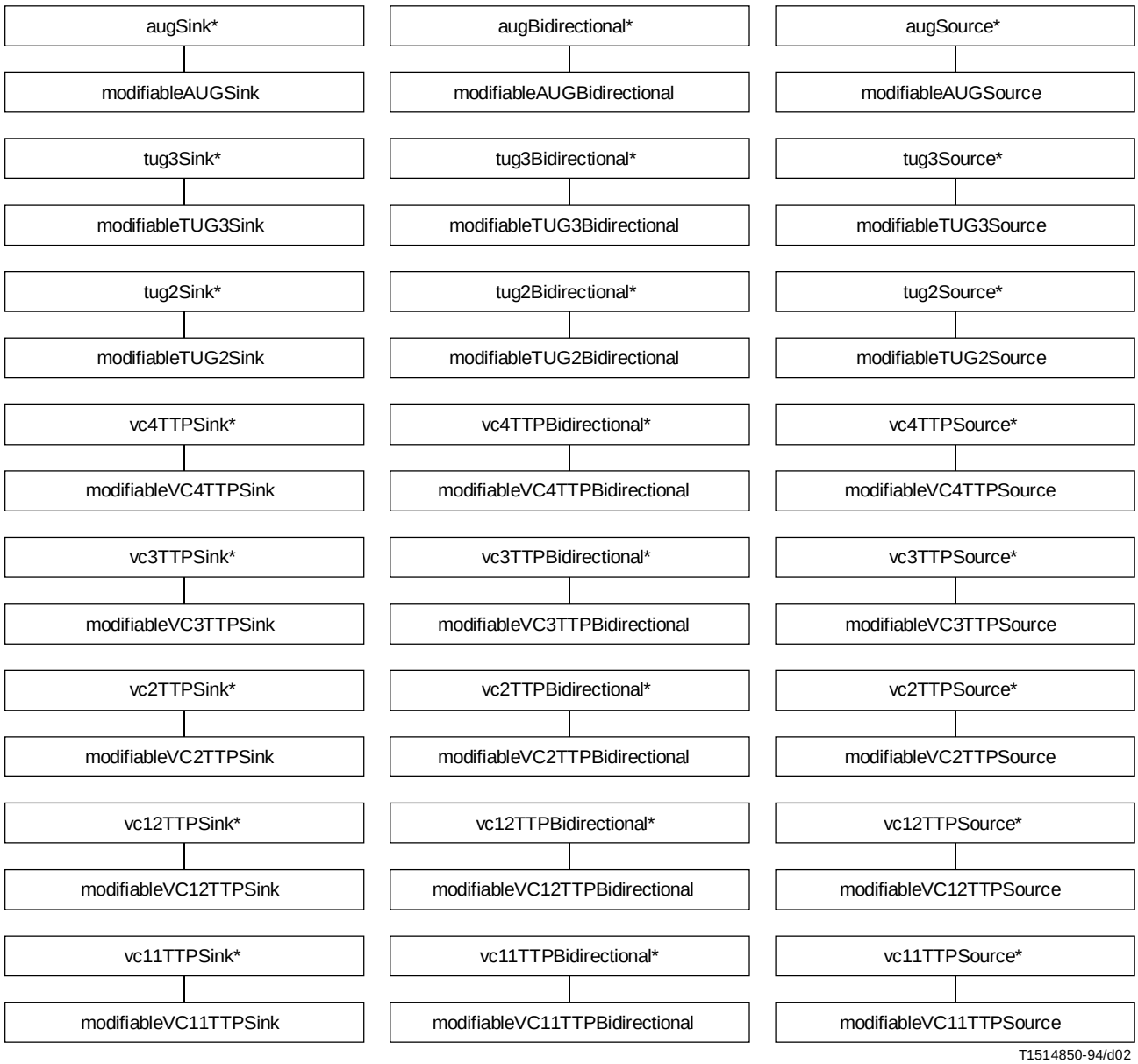


TPs and IAS are sink, source or bidirectional.

* Not defined in this Recommendation.

FIGURE A.1/G.774.02

Naming Tree for Managed Object Classes (defined in this Recommendation)



* Not defined in this Recommendation.

FIGURE A.2/G.774.02

Inheritance Tree for Managed Object Classes (defined in this Recommendation)