Final draft EN 300 417-4-2 V1.1.1 (1999-03)

European Standard (Telecommunications series)

**Transmission and Multiplexing (TM);
Generic requirements of transport functionality of equipment;
Part 4-2: Synchronous Digital Hierarchy (SDH)
path layer functions;
Implementation Conformance Statement (ICS)
proforma specification**

Reference
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Contents

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Transmission and Multiplexing (TM), and is now submitted for the Voting phase of the ETSI standards Two-step Approval Procedure.

The present document is one of a family of documents that has been produced in order to provide inter-vendor and inter-operator compatibility of Synchronous Digital Hierarchy (SDH) equipment.

The present document is part 4-2 of a multi-part EN covering the Generic requirements of transport functionality of equipment, as identified below:

Part 1-1: "Generic processes and performance".

Part 1-2: "General information about Implementation Conformance Statement (ICS) proforma".

Part 1-3 "Generic processes and performance; Abstract Test Suite (ATS)".

Part 2-1: "Synchronous Digital Hierarchy (SDH) and Plesiochronous Digital Hierarchy (PDH) physical section layer functions".

Part 2-2: "Synchronous Digital Hierarchy (SDH) and Plesiochronous Digital Hierarchy (PDH) physical section layer functions; Implementation Conformance Statement (ICS) proforma specification".

Part 2-3: "Synchronous Digital Hierarchy (SDH) and Plesiochronous Digital Hierarchy (PDH) physical section layer functions; Abstract Test Suite (ATS)".

Part 3-1: "Synchronous Transport Module-N (STM-N) regenerator and multiplex section layer functions".

Part 3-2: "Synchronous Transport Module-N (STM-N) regenerator and multiplex section layer functions; Implementation Conformance Statement (ICS) proforma specification".

Part 3-3: "Synchronous Transport Module-N (STM-N) regenerator and multiplex section layer functions; Abstract Test Suite (ATS)".

Part 4-1: "Synchronous Digital Hierarchy (SDH) path layer functions".

Part 4-2: "Synchronous Digital Hierarchy (SDH) path layer functions; Implementation Conformance Statement (ICS) proforma specification".

Part 4-3: "Synchronous Digital Hierarchy (SDH) path layer functions; Abstract Test Suite (ATS)".

Part 5-1: "Plesiochronous Digital Hierarchy (PDH) path layer functions".

Part 5-2: "Plesiochronous Digital Hierarchy (PDH) path layer functions; Implementation Conformance Statement (ICS) proforma specification".

Part 5-3: "Plesiochronous Digital Hierarchy (PDH) path layer functions; Abstract Test Suite (ATS)".

Part 6-1: "Synchronization layer functions".

Part 6-2: "Synchronization layer functions; Implementation Conformance Statement (ICS) proforma specification".

Part 6-3: "Synchronization layer functions; Abstract Test Suite (ATS)".

Part 7-1: "Auxiliary layer functions".

Part 7-2: "Auxiliary layer functions; Implementation Conformance Statement (ICS) proforma specification".

Part 7-3: "Auxiliary layer functions; Abstract Test Suite (ATS)".

Parts 2 to 7 specify the layers and their atomic functions.

NOTE 1: The present document does not currently address configuration management.

NOTE 2: The SDH radio equipment functional blocks are addressed by ETSI WG TM4.

Various of the above parts have previously been published as parts of EN 300 417.

They have been converted to parts of EN 300 417 without technical changes, but some editorial changes have been necessary (e.g. references). In particular:

- Parts 2-1 and 3-2 have been modified to take account of editorial errors present in edition 1.
- Part 1-1 has had its title change of to align with other parts published at a later date.

Also note that in the meantime parts 8-1, 8-2 and 8-3 have been stopped.

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

Introduction

To evaluate conformance of a particular implementation, it is necessary to have a statement of which capabilities and options have been implemented for a telecommunication specification. Such a statement is called an Implementation Conformance Statement (ICS).

A client of a test laboratory who requests a conformance/approval test shall provide to the test laboratory a completed ICS proforma for each layer to be tested and a detailed system description of the implementation.

The ICS proforma is not another complete description of the related specification, but rather a compact form of its static conformance requirements, to be used by the test laboratory to identify which test shall be performed on a given implementation. Not every feature of a profile specification is contained in the related ICS proforma. For particular cases requiring specific information the ICS can refer to the appropriate clause of the related specification by means of references, notes and or comments.

The ICS proforma captures the implementation flexibility allowed by the related specification and details which option are left to the implementor, which are conditionally dependent on other option taken by the implementor.

1 Scope

The present document provides the Implementation Conformance Statement (ICS) proforma for the Synchronous Digital Hierarchy (SDH) path layer functions defined in EN 300 417-4-1 [8] in compliance with the relevant requirements, and in accordance with the relevant guidance given in ISO/IEC 9646-7 [13] and ETS 300 406 [5].

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] ETS 300 147 (1997): "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); Multiplexing structure".

[2] ETS 300 166: "Transmission and Multiplexing (TM); Physical and electrical characteristics of hierarchical digital interfaces for equipment using the 2 048 kbit/s - based plesiochronous or synchronous digital hierarchies".

[3] ETS 300 167: "Transmission and Multiplexing (TM); Functional characteristics of 2 048 kbit/s interfaces".

[4] ETS 300 216: "Network Aspects (NA); Metropolitan Area Network (MAN); Physical layer convergence procedure for 155,520 Mbit/s".

[5] ETS 300 406 (1995): "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

[6] EN 300 417-1-1: "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) equipment; Part 1-1: Generic processes and performance".

[7] EN 300 417-3-1: "Transmission and Multiplexing (TM); Generic requirement of transport functionality of equipment; Part 3-1: Synchronous Transport Module-N (STM-N) regenerator and multiplex section layer functions".

[8] EN 300 417-4-1: "Transmission and Multiplexing (TM); Generic requirement of transport functionality of equipment; Part 4-1: Synchronous Digital Hierarchy (SDH) path layer functions".

[9] EN 300 417-6-1: "Transmission and Multiplexing (TM); Generic requirement of transport functionality of equipment; Part 6-1: Synchronization layer functions".

[10] ETS 300 746 (1997): "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); Network protection schemes; Automatic Protection Switch (APS) protocols and operation".

[11] ISO/IEC 8802-6: "Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 6: Distributed Queue Dual Bus (DQDB) access method and physical layer specifications".

[12] ISO/IEC 9646-1 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".

[13] ISO/IEC 9646-7 (1995): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".

[14] ITU-T Recommendation G.707 (1996): "Network node interface for the synchronous digital hierarchy (SDH)".

[15] ITU-T Recommendation G.823 (1993): "The control of jitter and wander within digital networks which are based on the 2048 kbit/s hierarchy".

[16] ITU-T Recommendation O.151: "Error performance measuring equipment operating at the primary rate and above".

[17] ITU-T Recommendation O.181: "Equipment to assess error performance on STM-N interfaces".

[18] ETS 300 337: "Transmission and Multiplexing (TM); Generic frame structures for the transport of various signals (including Asynchronous Transfer Mode (ATM) cells and Synchronous Digital Hierarchy (SDH) elements) at the ITU-T Recommendation G.702 hierarchical rates of 2 048 kbit/s, 34 368 kbit/s and 139 264 kbit/s".

[19] ITU-T Recommendation G.706: "Frame alignment and cyclic redundancy check (CGC) procedures relating to basic frame structures defined in Recommendation G.704".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

- terms defined in EN 300 417-4-1 [8];
- terms defined in ISO/IEC 9646-1 [12] and in ISO/IEC 9646-7 [13].

In particular, the following terms defined in ISO/IEC 9646-1 [12] apply:

Implementation Conformance Statement (ICS): a statement made by the supplier of an implementation or system claimed to conform to a given specification, stating which capabilities have been implemented. The ICS can take several forms: protocol ICS, profile ICS, profile specific ICS, information object ICS, etc.

ICS proforma: a document, in the form of a questionnaire, which when completed for an implementation or system becomes an ICS

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

A	Adaptation function
AcSL	Accepted Signal Label
AcTI	Accepted Trace identifier
AI	Adapted Information
AIS	Alarm Indication Signal
AP	Access Point
APId	Access Point Identifier
APS	Automatic Protection Switch
ATM	Asynchronous Transfer Mode
ATS	Abstract Test Suite
Avp	ATM virtual path
BIP	Bit Interleaved Parity
BIP-N	Bit Interleaved Parity, width N
C	Connection function

CI	Characteristic Information
CK	Clock
CLR	Clear
CRC	Cyclic Redundancy Check
D	Data
DEC	Decrement
DEG	Degraded
DEGM	Degraded Monitor period
DEGTHR	Degraded Threshold
dPLM	Payload Mismatch defect
DQDB	Distributed Queue Dual Bus
DS	Defect Second
DSTATUS	Data Status
DTYPE	Data Type
EB	Errored Block
EBC	Errored Block Count
EDC	Error Detection Code
EDCV	Error Detection Code Violation
EMF	Equipment Management Function
EQ	Equipment
ERSN	External Request Signal Number
ERT	External Request Type
ES	Errored Second
EXER	Exercise
ExSL	Expected Signal Label
EXTCMD	External command
ExTI	Expected Trace Identifier
F_B	Far-end Block
FAS	Frame Alignment Signal
FS	Frame Start signal
FSw	Forced Switch
GRSN	Global Request Signal Number
GRT	Global Request Type
HO	Hold Off (used in HOTime)
ICS	Implementation Conformance Statement
IEC	Incoming Error Count
IF	In Frame state
IM	In Multiframe state
IUT	Implementation Under Test
LC	Link Connection, Layer Clock
LO	Lower Order
LO	Lockout of protection
LOF	Loss Of Frame
LOM	Loss Of Multiframe
LOP	Loss Of Path
LOVC	Lower Order Virtual Container
LRT	Local RequesT
LSS	Loss of Sequence Structure
LSTATUS	Link Status
LTC	Loss of Tandem Connection
MFAS	Multi Frame Alignment Signal
MFS	Multi-Frame Start
MI	Management Information
MO	Managed Object
MON	Monitored
MP	Management Point
MS	Multiplex Section
MS1	STM-1 Multiplex Section
MS16	STM-16 Multiplex Section
MS4	STM-4 Multiplex Section

MSB	Most Significant Bit
MSw	Manual Switch
N1[x][y]	bit x (x = 7,8) of byte N1 in frame y (y = 1..76)
N2[x][y]	bit x (x = 7,8) of byte N2 in frame y (y = 1..76)
N_B	Near-end Block
NCI	No CRC-4 multiframe Indication
NDF	New Data Flag
NE	Network Element
NMON	Not Monitored
NUx	National Use, bit rate order x
ODI	Outgoing Defect Indication
OEI	Outgoing Error Indication
OF	Outgoing Far-end
OF_B	Outgoing VC Block
OFS	Out of Frame Second
OOM	Out Of Multiframe
OSF	Outgoing Signal Fail
P0s	synchronous 64 kbit/s layer
P12s	2 048 kbit/s PDH path layer with synchronous 125 μs frame structure according to ETS 300 167 [3]
P12x	2 048 kbit/s layer (transparent)
P22e	8 448 kbit/s PDH path layer with 4 plesiochronous 2 048 kbit/s
P22x	8 448 kbit/s layer (transparent)
P31e	34 368 kbit/s PDH path layer with 4 plesiochronous 8 448 kbit/s
P31x	34 368 kbit/s layer (transparent)
P4e	139 264 kbit/s PDH path layer with 4 plesiochronous 34 368 kbit/s
P4s	139 264 kbit/s PDH path layer with synchronous 125 μs frame structure according to ETS 300 337 [18]
P4x	139 264 kbit/s layer (transparent)
P_A	Protection Adaptation
P_C	Protection Connection
P_TT	Protection Trail Termination
PDH	Plesiochronous Digital Hierarchy
PLCSM	Physical Layer Communication State Machine
PLM	Payload Mismatch
Pn	Plesiochronous signal, Level n
POH	Path Overhead
ppm	part per million
PRBS	Pseudo Random Binary Sequence
QOS	Quality Of Service
RD	Read
RDI	Remote Defect Indicator
REI	Remote Error Indicator
RI	Remote Information
RRT	Remore RequesT
RxSL	Received Signal Label
RxTI	Received Trace identifier
S11*	TU-12 carrying a VC-11 path layer
S12	VC-12 path layer
S12D	VC-12 tandem connection sublayer
S12P	VC-12 protection sublayer
S2	VC-2 path layer
S2D	VC-2 tandem connection sublayer
S2P	VC-2 protection sublayer
S3	VC-3 path layer
S3D	VC-3 tandem connection sublayer
S3P	VC-3 protection sublayer
S4	VC-4 path layer
S4D	VC-4 tandem connection sublayer
S4P	VC-4 protection sublayer

S4-4c	contiguous concatenated VC-4-4c path layer
SD	Synchronization Distribution layer, Signal Degrade
SDH	Synchronous Digital Hierarchy
SF	Signal Fail
Sk	Sink
SNC	Sub-Network Connection
SNC/I	Inherently monitored Sub-Network Connection protection
SNC/N	Non-intrusively monitored Sub-Network Connection protection
SNC/S	Sublayer monitored Sub-Network Connection protection
So	Source
SRSN	Signal Request Signal Number
SRT	Signal Request Type
SSD	Server Signal Degrade
SSF	Server Signal Fail
STM	Synchronous Transport Module
STM-N	Synchronous Transport Module, level N
SUT	System Under Test
TC	Tandem Connection
TCn	Tandem Connection level n
TCP	Termination Connection Point
TI	Timing Information
TI	Trace Identifier
TIM	Trace Identifier Mismatch
TIMdis	Trace Identifier Mismatch disable
TM	Transmission_Medium
TMN	Telecommunications Management Network
TP	Timing Point
TS	Time Slot
TSD	Trail Signal Degrade
TSE	Test Signal Error
TSF	Trail Signal Fail
TSS	Test Signal Structure
TT	Trail Termination function
TTI	Trail Trace Identifier
TU	Tributary Unit
TUG	Tributary Unit Group
TxTI	Transmitted Trace Identifier
UNEQ	Unequipped
VC	Virtual Container
VC-n	Virtual Container, level n
WTR	Wait to Restore

4 Conformance to this ICS proforma specification

If it claims to conform to the present document, the actual ICS proforma to be filled in by a supplier shall be technically equivalent to the text of the ICS proforma given in the annexes of the present document, and shall preserve the numbering/naming and ordering of the proforma items.

An ICS which conforms to the present document shall be a conforming ICS proforma completed in accordance with the instructions for completion given in annex A.

For each layer instance, it is needed to fill a separate ICS Proforma depending on the layer instance.

Annex A (normative): ICS proforma for EN 300 417-4-1

A.1 Guidance for completing the ICS proforma

A.1.1 Purposes and structure

The purpose of this ICS proforma is to provide a mechanism whereby a supplier of an implementation of the requirements defined in EN 300 417-4-1 [8] may provide information about the implementation in a standardized manner.

The ICS proforma is subdivided into subclause for the following categories of information:

- instructions for completing the ICS proforma;
- identification of the implementation;
- identification of the EN;
- global statement of conformance.

A.1.2 Abbreviations and conventions

The ICS proforma contained in this annex is comprised of information in tabular form in accordance with the guidelines presented in ISO/IEC 9646-7 [13].

Item column

The item column contains a number which identifies the item in the table.

Item description column

The item description column describes in free text each respective item (e.g. parameters, timers, etc.). It implicitly means "is <item description> supported by the implementation?".

Status column

The following notations, defined in ISO/IEC 9646-7 [13], are used for the status column:

m mandatory - the capability is required to be supported.

o optional - the capability may be supported or not.

n/a not applicable - in the given context, it is impossible to use the capability.

x prohibited (excluded) - there is a requirement not to use this capability in the given context.

o.i qualified optional - for mutually exclusive or selectable options from a set. "i" is an integer which identifies an unique group of related optional items and the logic of their selection which is defined immediately following the table.

ci conditional - the requirement on the capability ("m", "o", "x" or "n/a") depends on the support of other optional or conditional items. "i" is an integer identifying an unique conditional status expression which is defined immediately following the table. For nested conditional expressions, the syntax "IF ... THEN (IF ... THEN ... ELSE...) ELSE ..." shall be used to avoid ambiguities.

Reference column

The reference column gives reference to EN 300 417-4-1 [8], except where explicitly stated otherwise.

Support column

The support column shall be filled in by the supplier of the implementation. The following common notations, defined in ISO/IEC 9646-7 [13], are used for the support column:

Y or y supported by the implementation.

N or n not supported by the implementation.

N/A, n/a or - no answer required (allowed only if the status is n/a, directly or after evaluation of a conditional status).

If this ICS proforma is completed in order to describe a multiple-profile support in a system, it is necessary to be able to answer that a capability is supported for one profile and not supported for another. In that case, the supplier shall enter the unique reference to a conditional expression, preceded by "?" (e.g. ?3). This expression shall be given in the cell provided at the bottom of the table. It uses predicates defined in the SCS, each of which refers to a single profile and which takes the value TRUE if and only if that profile is to be used.

EXAMPLE: ?3: IF prof1 THEN Y ELSE N.

It is also possible to provide a comment to an answer in the space provided at the bottom of the table.

Values allowed column

The values allowed column contains the values or the ranges of values allowed.

Values supported column

The values supported column shall be filled in by the supplier of the implementation. In this column, the values or the ranges of values supported by the implementation shall be indicated.

Mnemonic column

The Mnemonic column contains mnemonic identifiers for each item.

References to items

For each possible item answer (answer in the support column) within the ICS proforma exists a unique reference, used, for example, in the conditional expressions. It is defined as the table identifier, followed by a solidus character "/", followed by the item number in the table. If there is more than one support column in a table, the columns shall be discriminated by letters (a, b, etc.), respectively.

EXAMPLE 1: C.5/4 is the reference to the answer of item 4 in table 5 of annex C.

EXAMPLE 2: C.6/3b is the reference to the second answer (i.e. in the second support column) of item 3b in table 6 of annex C.

Prerequisite line

A prerequisite line takes the form: Prerequisite: <predicate>.

A prerequisite line after a clause or table title indicates that the whole clause or the whole table is not required to be completed if the predicate is FALSE.

A.1.3 Instructions for completing the ICS proforma

The supplier of the implementation shall complete the ICS proforma in each of the spaces provided. However, the tables containing in "user role" subclause shall only be completed for user implementations, and the tables containing in "network role" subclause shall only be completed for network implementations. If necessary, the supplier may provide additional comments separately.

More detailed instructions are given at the beginning of the different subclause of the ICS proforma.

Annex B (normative): ICS proforma for S4 Path Layer

B.1 Identification of the implementation

In the present document, an Implementation Under Test (IUT), and of course the identification of an IUT refers to a S4 Path Layer instance implemented inside the System Under Test (SUT).

Identification of the IUT and the system in which it resides SUT should be filled in so as to provide as much detail as possible regarding version numbers and configuration options.

The product supplier information and client information should both be filled in if they are different.

A person who can answer queries regarding information supplied in the ICS should be named as the contact person.

B.1.1 Date of the statement

....

B.1.2 Implementation Under Test (IUT) identification

IUT name:

....

....

IUT version

Hardware version:

....

....

Software version:

....

....

Firmware version:

....

....

B.1.3 System Under Test (SUT) identification

SUT name:

....

....

Hardware configuration:

....

....

SUT Software version:

....

....

SUT Firmware version:

....

Operating system:

....

....

B.1.4 Product supplier

Name:

....

Address:

....

....

....

Telephone number:

....

Facsimile number:

....

E-mail address:

....

Additional information:

....

....

....

B.1.5 Client

Name:

....

Address:

....

....

....

Telephone number:

....

Facsimile number:

....

E-mail address:

....

Additional information:

....

....

....

B.1.6 ICS contact person

Name:

....

Telephone number:

....

Facsimile number:

....

E-mail address:

....

Additional information:

....

....

B.2 Identification of the EN

This ICS proforma applies to the following standard:

EN 300 417-4-1 (V1.1): "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 4-1: Synchronous Digital Hierarchy (SDH) path layer functions".

B.3 Global statement of conformance of S4 Path Layer

Due to the model used for this layer the "Global statement of conformance" sentence used in ETSI ICS is not applicable to this layer.

B.4 S4 Path Layer functions

B.4.1 S4 Path Layer Description

Table B.1: S4 Path Layer functions

Item	S4 Path Layer functions	Reference	Status	Support
1	VC-4 Layer Connection function (S4_C)	4, figure 1	o.101	
2	VC-4 Layer Trail Termination Source function (S4_TT_So)	4, figure 1	o.101	
3	Trail Termination Sink function (S4_TT_Sk)	4, figure 1	o.101	
4	VC-4 Layer to P4x Layer Adaptation Source function (S4/P4x_A_So)	4, figure 1	c101	
5	VC-4 Layer to P4x Layer Adaptation Sink function (S4/P4x_A_Sk)	4, figure 1	c102	
6	VC-4 Layer to P4e Layer Adaptation Source function (S4/P4e_A_So)	4, figure 1	c101	
7	VC-4 Layer to P4e Layer Adaptation Sink function (S4/P4e_A_Sk)	4, figure 1	c102	
8	VC-4 Layer to VC-3, VC-2, VC-12 and VC-11 Layer Compound Adaptation Source function (S4/SX_A_So)	4, figure 1	c101	
9	VC-4 Layer to VC-3, VC-2, VC-12 and VC-11 Layer Compound Adaptation Sink function (S4/SX_A_Sk)	4, figure 1	c102	
10	VC-4 Layer to DQDB Layer Adaptation Source function (S4/DQDB_A_So)	4, figure 1	c101	
11	VC-4 Layer to DQDB Layer Adaptation Sink function (S4/DQDB_A_Sk)	4, figure 1	c102	
12	VC-4 Layer to ATM Layer (ATM) Compound Adaptation Source function (S4/Avp_A_So)	4, figure 1	c101	
13	VC-4 Layer to ATM Layer (ATM) Compound Adaptation Sink function (S4/Avp_A_Sk)	4, figure 1	c102	
14	VC-4 Layer to TUG Adaptation Source function (S4/TUG_A_So)	4, figure 1, figure 18	c103	
15	VC-4 Layer to TUG Adaptation Sink function (S4/TUG_A_Sk)	4, figure 1, figure 32	c104	
16	TUG Termination Source function (TUG_T_So)	4, figure 1, figure 18	c103	

Item	S4 Path Layer functions	Reference	Status	Support
17	TUG Termination Sink function (TUG_T_Sk)	4, figure 1, figure 32	c104	
18	TUG to VC-3 Layer Adaptation Source function (TUG/S3_A_So/K.0.0)	4, figure 1, figure 18	c105	
19	TUG to VC-3 Layer Adaptation Sink function (TUG/S3_A_Sk/K.0.0)	4, figure 1, figure 32	c106	
20	TUG to VC-2 Layer Adaptation Source function (TUG/S2_A_So/K.L.0)	4, figure 1, figure 18	c105	
21	TUG to VC-2 Layer Adaptation Sink function (TUG/S2_A_Sk/K.L.0)	4, figure 1, figure 32	c106	
22	TUG to VC-12 Layer Adaptation Source function (TUG/S12_A_So/K.L.M)	4, figure 1, figure 18	c105	
23	TUG to VC-12 Layer Adaptation Sink function (TUG/S12_A_Sk/K.L.M)	4, figure 1, figure 32	c106	
24	TUG to VC-11 Layer Adaptation Source function (TUG/S11*_A_So/K.L.M)	4, figure 1, figure 18	c105	
25	TUG to VC-11 Layer Adaptation Sink function (TUG/S11*_A_Sk/K.L.M)	4, figure 1, figure 32	c106	
26	VC-4 Layer to P0s Layer Adaptation Source function (S4/P0s_A_So)	4, figure 1	c107	
27	VC-4 Layer to P0s Layer Adaptation Sink function (S4/P0s_A_Sk)	4, figure 1	c108	
28	VC-4 Layer to TSS1 Layer Adaptation Source function (S4/TSS1_A_So)	4, figure 1	c107	
29	VC-4 Layer to TSS1 Layer Adaptation Sink function (S4/TSS1_A_Sk)	4, figure 1	c108	
30	VC-4 Layer Non-intrusive Monitoring function (S4m_TT_Sk)	4, figure 1	c109	
31	VC-4 Layer Supervisory Unequipped function (S4s_TT_So)	4, figure 1	c109	
32	VC-4 Layer Supervisory Unequipped Termination Sink function (S4s_TT_Sk)	4, figure 1	c109	
33	VC-4 Tandem Connection Trail Termination Source function (S4D_TT_So)	4, figure 1	c109	
34	VC-4 Tandem Connection Trail Termination Sink function (S4D_TT_Sk)	4, figure 1	c109	
35	VC-4 Tandem Connection to VC-4 Adaptation Source function (S4D/S4_A_So)	4, figure 1	c110	
36	VC-4 Tandem Connection to VC-4 Adaptation Sink function (S4D/S4_A_Sk)	4, figure 1	c111	
37	VC-4 Tandem Connection non-intrusive Trail Termination Sink function (S4Dm_TT_Sk)	4, figure 1	c109	
38	VC-4 Layer Linear Trail Protection	4, figure 4	c112	
39	VC-4 Layer Sub-Network Connection (SNC) Protection	4, annex D figure 1 to figure 6	c109	
40	VC-4 Layer to LC Layer Adaptation Source function (S4/LC_A_So)	4, figure 1	c113	
41	VC-4 Layer to Xxx Layer Adaptation Source function (S4/Xxx_A_So)	n/a	c101	
42	VC-4 Layer to Xxx Layer Adaptation Sink function (S4/Xxx_A_Sk)	n/a	c102	

o.101: It is mandatory to support at least one of these items-- connection function and/or trail termination source and/or trail termination sink present

o.102: It is mandatory to support at least one of these items-- at least one Payload Adaptation Source present
o.103: It is mandatory to support at least one of these items-- at least one Payload Adaptation Sink present
o.104: It is mandatory to support at least one of these items-- at least one Low Order VC Adaptation Source present
o.105: It is mandatory to support at least one of these items-- at least one Low Order Adaptation Sink present
c101: IF B.1/2 THEN o.102 ELSE x -- a TT_So function should exist for A_So function
c102: IF B.1/3 THEN o.103 ELSE x -- a TT_Sk function should exist for A_Sk function
c103: IF B.1/8 THEN m ELSE x -- S4/SX_A_So function should exist
c104: IF B.1/9 THEN m ELSE x -- S4/SX_A_Sk function should exist
c105: IF B.1/8 THEN o.104 ELSE x -- S4/SX_A_So function should exist
c106: IF B.1/9 THEN o.105 ELSE x -- S4/SX_A_Sk function should exist
c107: IF B.1/2 THEN o ELSE x -- a TT_So function should exist for A_So function
c108: IF B.1/3 THEN o ELSE x -- a TT_Sk function should exist for A_Sk function
c109: IF B.1/1 THEN o ELSE n/a -- a connection function should exist
c110: IF B.1/33 THEN m ELSE x -- a Tandem Connection TT_So function should exist for Tandem Connection A_So function
c111: IF B.1/34 THEN m ELSE x -- a Tandem Connection TT_Sk function should exist for Tandem Connection A_Sk function
c112: IF B.1/3 THEN o ELSE n/a -- S4_TT_Sk function should exist for S4 Linear Trail Protection
c113: IF (B.1/2 OR B.1/31) THEN o ELSE n/a -- S4_TT_So and/or S4s_TT_So function should exist

Comment: In items from B.1/18 to B.1/25 the value of K is an integer number in the range from 1 to 3, the value of L is an integer number in the range from 1 to 7, the value of M is an integer number in the range from 1 to 3.

Items dealing with S4/Xxx_A functions take into account the implementation of adaptation functions not specified or referenced in EN 300 417-x-1 standards.

Table B.2: Supported VC-4 Layer payload Adaptation functions

Prerequisite: B.1/2 OR B.1/3 -- implies that at least one VC-4 Layer payload Adaptation function is present

Item	S4 Path Layer functions	Reference	Status	Support
1	More than one VC-4 Layer payload Adaptation source function is supported	4, figure 1	c201	
2	More than one VC-4 Layer payload Adaptation sink function is supported	4, figure 1	c202	

c201: IF B.1/2 THEN o ELSE x -- implies that at least one VC-4 Layer payload Adaptation Source function is present
c202: IF B.1/3 THEN o ELSE x -- implies that at least one VC-4 Layer payload Adaptation Sink function is present

Table B.3: Number of adaptation functions to lower order VC layers

Prerequisite: B.1/8 OR B. 1/9 -- S4/SX_A_So and/or S4/SX_A_Sk functions present

Item	Number of adaptation functions to lower order VC layers	Reference	Status	Support	Values	
					Allowed	Supported
1	Number of supported TUG/S3_A_So: j1	4.3.5, figure 18	c301		$1 \le j1 \le 3$	
2	Number of supported TUG/S3_A_Sk: j2	4.3.6, figure 32	c302		$1 \le j2 \le 3$	
3	Number of supported TUG/S2_A_So: j3	4.3.5, figure 18	c303		$1 \le j3 \le 21$	
4	Number of supported TUG/S2_A_Sk: j4	4.3.6, figure 32	c304		$1 \le j4 \le 21$	
5	Number of supported TUG/S12_A_So: j5	4.3.5, figure 18	c305		$1 \le j5 \le 63$	
6	Number of supported TUG/S12_A_Sk: j6	4.3.6, figure 32	c306		$1 \le j6 \le 63$	
7	Number of supported TUG/S11*_A_So: j7	4.3.5, figure 18	c307		$1 \le j7 \le 63$	
8	Number of supported TUG/S11*_A_Sk: j8	4.3.6, figure 32	c308		$1 \le j8 \le 63$	
9	"Equivalent TU-12s" supported in the source direction: $21 \times j1 + 3 \times j3 + j5 + j7$	4.3.5, figure 18	c309		$21 \times j1 + 3 \times j3 + j5 + j7 \ge 63$	
10	"Equivalent TU-12s" supported in the sink direction: $21 \times j2 + 3 \times j4 + j6 + j8$	4.3.6, figure 32	c310		$21 \times j2 + 3 \times j4 + j6 + j8 \ge 63$	

Comment to B.3/9 and B.3/10: if the one among the values of j1, j2,j3, j4, j5, j6, j7 and j8 is not given in the proper item (i.e. respectively B.3/1, B.3/2, B.3/3, B.3/4, B.3/5, B.3/6, B.3/7, B.3/8), in items B.3/9 and B.3/10 its value is assumed to be zero.

c301: IF B.1/18 THEN m ELSE n/a -- TUG/S3_A_So function supported
c302: IF B.1/19 THEN m ELSE n/a -- TUG/S3_A_Sk function supported
c303: IF B.1/20 THEN m ELSE n/a -- TUG/S2_A_So function supported
c304: IF B.1/21 THEN m ELSE n/a -- TUG/S2_A_So function supported
c305: IF B.1/22 THEN m ELSE n/a -- TUG/S12_A_So function supported
c306: IF B.1/23 THEN m ELSE n/a -- TUG/S12_A_So function supported
c307: IF B.1/24 THEN m ELSE n/a -- TUG/S11_A_So function supported
c308: IF B.1/25 THEN m ELSE n/a -- TUG/S11_A_So function supported
c309: IF B.1/8 THEN m ELSE n/a -- S4/SX_A_So function supported
c310: IF B.1/9 THEN m ELSE n/a -- S4/SX_A_Sk function supported

Table B.4: VC-4 Layer Protection schemes

Prerequisite: B.1/38 OR B.1/39 -- VC-4 Layer Linear Trail or SNC Protection supported

Item	VC-4 Layer Protection schemes	Reference	Status	Support
1	VC-4 Layer 1+1 Linear Trail Protection with unidirectional switching and revertive operation	4.5.1.1	c401	
2	VC-4 Layer 1+1 Linear Trail Protection with unidirectional switching and non-revertive operation	4.5.1.1	c401	
3	VC-4 Layer 1+1 Inherently Monitored SNC (SNC/I) Protection with unidirectional switching and revertive operation	4.1	c403	
4	VC-4 Layer 1+1 Inherently Monitored SNC (SNC/I) Protection with unidirectional switching and non-revertive operation	4.1	c403	
5	VC-4 Layer 1+1 Non-intrusively Monitored SNC (SNC/N) Protection with unidirectional switching and revertive operation	4.1	c404	
6	VC-4 Layer 1+1 Non-intrusively Monitored SNC (SNC/N) Protection with unidirectional switching and non-revertive operation	4.1	c404	
7	VC-4 Layer 1+1 Sub-layer Monitored SNC (SNC/S) Protection with unidirectional switching and revertive operation	4.1	c405	
8	VC-4 Layer 1+1 Sub-layer Monitored SNC (SNC/S) Protection with unidirectional switching and non-revertive operation	4.1	c405	

Comment to B.4/3 and B.4/4: The APS protocol for bidirectional VC-4 linear trail protection is not defined.

o.401: It is mandatory to support at least one of these items -- at least one 1+1 linear trail protection scheme
o.402: It is mandatory to support at least one of these items -- at least one 1+1 SNC protection scheme
c401: IF B.1/38 THEN o.401 ELSE x -- 1+1 linear trail protection supported
c402: IF (B.1/38 AND (B.1/2 AND B.1/3))
THEN o.401 ELSE x -- 1+1 linear trail protection and bidirectional layer supported
c403: IF B.1/39 THEN o.402 ELSE x -- 1+1 SNC protection supported
c404: IF (B.1/39 AND (B.1/30 OR B.1/32))
THEN o.402 ELSE x -- 1+1 SNC protection and S4m_TT_Sk and/or S4s_TT_Sk supported
c405: IF (B.1/39 AND (B.1/34 OR B.1/37))
THEN o.402 ELSE x -- 1+1 SNC protection and S4D_TT_Sk and/or S4Dm_TT_Sk supported (according to ETS 300 746 [10])

Table B.5: VC-4 Layer Linear Trail Protection functions

Prerequisite: B.1/38 -- VC-4 Layer Linear Trail Protection scheme supported

Item	VC-4 Layer Linear Trail Protection functions	Reference	Status	Support
1	VC-4 Layer Linear Trail Protection Connection function (S4P_C)	4, figure 4	m	
2	VC-4 Protection Trail Termination Source function (S4P_TT_So)	4, figure 4	c501	
3	VC-4 Protection Trail Termination Sink function (S4P_TT_Sk)	4, figure 4	m	
4	VC-4 trail to VC-4 Linear Trail Protection Layer Adaptation Source function (S4/S4P_A_So)	4, figure 4	c501	
5	VC-4 trail to VC-4 Linear Trail Protection Layer Adaptation Sink function (S4/S4P_A_Sk)	4, figure 4	m	

c501: IF B.1/2 THEN m ELSE x -- a TT_So function should exist for protection Source functions

Table B.6: Supervision processes

Item	Supervision process	Reference	Status	Support
1	Near-end Performance monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c601	
2	Far-end Performance monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c602	
3	Protection Performance monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	n/a	
4	Defect correlation process	EN 300 417-1-1 [6] subclause 8.2-8.3	c603	
5	Tandem Connection Near-end Performance monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c604	
6	Tandem Connection Far-end Performance monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c605	
7	Tandem Connection Outgoing VC Performance monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c605	
8	Tandem Connection Defect correlation process Equipment Management Function	EN 300 417-1-1 [6] subclause 8.2-8.3	c604	

c601: IF (B.1/3 OR B.1/30 OR B.1/32) THEN m ELSE n/a -- S4_TT_Sk and/or S4m_TT_Sk and/or S4s_TT_Sk present

c602: IF (B.1/2 AND B.1/3) OR (B.1/31 AND B.1/32) OR B.1/30 THEN m ELSE n/a -- bidirectional S4 layer or both Supervisory-unequipped or non-intrusive monitoring source Trail Termination functions present

c603: IF (B.1/3 OR B.1/5 OR B.1/7 OR B.1/11 OR B.1/13 OR B.1/15 OR B.1/19 OR B.1/23 OR B.1/25 OR B.1/29 OR B.1/30 OR B.1/32) THEN m ELSE n/a -- at least one of the Sink functions with defect correlation capabilities present

c604: IF (B.1/34 OR B.1/37) THEN o ELSE n/a -- S4D_TT_Sk and/or S4Dm_TT_Sk present

c605: IF (B.1/33 AND B.1/34) OR B.1/37THEN m ELSE n/a -- both Tandem Connection Trail Termination functions present

B.4.2 VC-4 Layer Transmission Tables

Table B.7: Data stream structure

Item	Data stream structure	Reference	Status	Support
1	The CI at the S4 connection point is octet structured with a 125 microsecond frame.	4	m	
2	The S4_CI is 261x9 bytes data stream composed of one column of 9 bytes of VC-4 overhead and 260 columns of 9 bytes of VC-4 payload.	4, figure 2	m	

B.4.2.1 VC-4 Layer Connection Function: S4_C

Prerequisite B.1/1 -- Connection function exist

B.4.2.1.1 Routing process

Table B.8: Connectivity functionalities: generalities

Item	Connectivity functionalities: generalities	Reference	Status	Support
1	The S4_C function is able to connect a specific input ((termination) connection point) with a specific output input ((termination) connection point) by means of establishing a matrix connection between the specified input and output.	4.1	m	
2	The S4_C function is able to remove an established matrix connection.	4.1	m	

Table B.9: Connectivity functionalities: connection characterization

Item	Connectivity functionalities: connection characterization	Reference	Status	Support
1	Each connection in the S4_C function is characterized by the type of connection: unprotected, 1+1 protected (SNC/I, SNC/N or SNC/S protection)	4.1	c901	
2	Each connection in the S4_C function is characterized by the traffic direction: unidirectional, bidirectional	4.1	m	
3	Each connection in the S4_C function is characterized by the input and output connection points: set of connection point identifiers	4.1	m	

c901: IF B.1/39 THEN m ELSE n/a -- 1+1 SNC protection supported

B.4.2.1.2 Unequipped VC generation

Table B.10: Unequipped VC generation

Item	Connectivity functionalities: connection characterization	Reference	Status	Support
1	The function generates an unequipped VC signal, as specified in EN 300 417-1-1 [6], subclause 7.2.	4.1, EN 300 417-1-1 [6], subclause 7.2.	m	

B.4.2.1.3 SNC protection process

Prerequisite: B.1/39 -- 1+1 SNC protection supported (if the given condition is not true then skip the whole subclause "SNC protection process")

Table B.11: SNC protection connectivity functionalities: generalities

Item	SNC protection connectivity functionalities: generalities	Reference	Status	Support
1	The S4_C is able to establish protection groups between a number of (T)CPs to perform the 1+1 VC-4 linear (sub)network connection protection process.	4.1, EN 300 417-1-1 [6], subclause 9.4.1, subclause 9.4.2, subclause 9.4.3	m	
2	The S4_C performs the bridge and selector functionality as presented in figure 48 of EN 300 417-1-1 [6]	4.1	m	

Table B.12: SNC protection connectivity functionalities: source direction

Item	SNC protection connectivity functionalities: source direction	Reference	Status	Support
1	The working output is connected to the associated normal input.	4.1	m	
2	The protection output is connected to the associated normal input.	4.1	m	

Table B.13: SNC protection connectivity functionalities: sink direction

Item	SNC protection connectivity functionalities: sink direction	Reference	Status	Support
1	The signal output at the normal reference point can be the signal received via either the working connection or the protection connection	4.1	m	

Comment: In the sink case of a protection connection the source of the connection is determined by the SF (and SD) signals associated with each of the two inputs to the connection and the possible external switch requests. The set of SF and SD signals used, is controlled by the protection type setting.

Table B.14: SNC protection operation

Item	SNC protection operation	Reference	Status	Support
1	The signal switching procedure is started under a Signal Fail condition. This depends on the protection type: SF = SSF for SNC/I and SF = TSF for SNC/N or SNC/S.	4.1, EN 300 417-3-1 [7] A.1	m	
2	The signal switching procedure is started under a Signal Degrade condition. This depends on the protection type: SD = TSD for SNC/N or SNC/S.	4.1, EN 300 417-3-1 [7] A.1	c1401	
3	For revertive operation the available external commands are LO, FSw-#1, MSw-#1, CLR	4.1, EN 300 417-3-1 [7] A.1	c1402	
4	For non-revertive operation the available external commands are LO or FSw, FSw-#i, MSw-#i, CLR (i = 0, 1)	4.1, EN 300 417-3-1 [7] A.1	c1403	
5	The Wait-To-Restore (WTR) time is provisionable	4.1, EN 300 417-3-1 [7] A.1	c1402	
6	The Hold-off (HO) time is provisionable in steps of the order of 100 ms	4.1, EN 300 417-3-1 [7] A.1	m	

c1401: IF (B.4/7 OR B.4/8 OR B.4/9 OR B.4/10)
THEN m ELSE n/a -- SNC/N and/or SNC/S protection supported
c1402: IF (B.4/5 OR B.4/7 OR B.4/9)
THEN m ELSE n/a -- revertive SNC protection scheme supported
c1403: IF (B.4/6 OR B.4/8 OR B.4/10)
THEN m ELSE n/a -- non-revertive SNC protection scheme supported

Table B.15: Protection architecture characteristic parameters

Item	Protection architecture characteristic parameters	Reference	Status	Support	Values	
					Allowed	Supported
1	Wait-To-Restore (WTR) time: X value	4.1, EN 300 417-3-1 [7] A.1	c1501		0 ≤ X ≤ 12 minutes	
2	Hold-off (HO) time: Z value	4.1, EN 300 417-3-1 [7] A.1	m		0 ≤ Z ≤ 10 s	
3	Switching time (Y) is less than or equal to 50 ms	4.1, EN 300 417-3-1 [7] A.1	m		___	___

c1501: IF (B.4/5 OR B.4/7 OR B.4/9)
THEN m ELSE n/a -- revertive SNC protection scheme supported

Table B.16: SNC protection dynamic configuration

Item	SNC protection dynamic configuration	Reference	Status	Support
1	It is possible to add/remove connections to/from a broadcast connection without disturbing the CI passing the connection unless any protection switching action is activated/required	4.1	m	
2	It is possible to add/remove the protection status to the configuration of a connection without disturbing the CI passing the connection unless any protection switching action is activated/required	4.1	m	
3	It is possible to change between the operation type of a connection without disturbing the CI passing the connection unless any protection switching action is activated/required	4.1	c1601	
4	It is possible to change the WTR time of a connection without disturbing the CI passing the connection unless any protection switching action is activated/required	4.1	c1602	
5	It is possible to change the Hold-off time of a connection without disturbing the CI passing the connection unless any protection switching action is activated/required.	4.1	m	
6	The operation type can be changed via S4_C_MI_OPERtype	4.1	c1601	

c1601: IF (B.4/5 OR B.4/7 OR B.4/9) AND (B.4/6 OR B.4/8 OR B.4/10)
THEN m ELSE n/a -- at least one revertive and one non-revertive SNC protection scheme supported
c1602: IF B.15/1 THEN m ELSE n/a -- Wait-To-Restore (WTR) time supported

B.4.2.2 VC-4 Layer Trail Termination Functions: S4_TT_So, S4_TT_Sk, S4m_TT_Sk, S4s_TT_So and S4s_TT_Sk

Prerequisite: B.1/2 OR B.1/3 OR B.1/30 OR
B.1/31 OR B.1/32 -- at least one VC-4 trail termination function present

B.4.2.2.1 In service error monitoring process

Table B.17: In service error monitoring: principles

Item	In service error monitoring: principles	Reference	Status	Support
1	An Error Detection Code (EDC) is part of the characteristic information for in service monitoring purposes.	EN 300 417-1-1 [6] subclause 7.3	m	
2	In service error monitoring parameter definition is block-based.	ITU-T Rec.G.707 [14] subclause 9.2.2.4 note	m	
3	The block length is 2 349 bytes (the entire VC-4).	ITU-T Rec.G.707 [14] subclause 9.2.2.4	m	
4	The error monitoring is performed using Bit Interleaved Parity 8 (BIP-8).	4.2.1,4.4.2 , ITU-T Rec.G.707 [14] subclause 9.2.2.4 note	m	
5	The BIP-8 is calculated using even parity in such a manner that the bit in position x provides even parity over the x-bits of all the 8-bits sequences within the specified block.	ITU-T Rec.G.707 [14] subclause 9.2.2.4 note	m	

Comments: The BIP-n is interpreted as checking 'n' separate interleaved parity check blocks. If any of the 'n' parity check fails (Error Detection Code Violation), the block is assumed to be in error.

Table B.18: Error Detection Code location

Item	Error Detection Code location	Reference	Status	Support
1	VC-4 Layer Error Detection Code (EDC) is located in byte B3 of the VC-4 overhead.	4, figure 2	m	

Table B.19: Error Detection Code processing: source direction

Prerequisite: B.1/2 OR B.1/31 -- S4_TT_So and/or S4s_TT_So present

Item	Error Detection Code processing: source direction	Reference	Status	Support
1	The BIP-8 is calculated over all bits of the entire previous VC-4.	4.2.1, 4.4.2	m	
2	BIP-8 code is inserted in the B3 byte of the current VC-4.	4.2.1, 4.4.2	m	

Table B.20: Error Detection Code processing: sink direction

Prerequisite: B.1/3 OR B.1/30 OR B.1/32 -- S4_TT_Sk, S4m_TT_Sk, and/or S4s_TT_Sk present

Item	Error Detection Code processing: sink direction	Reference	Status	Support
1	The incoming error monitoring byte B3 is recovered from the VC-4 overhead.	4.2.2, 4.4.1, 4.4.3	m	
2	The BIP-8 is calculated over all bits of the entire previous VC-4.	4.2.2, 4.4.1, 4.4.3	m	
3	Recovered B3 byte is compared with the calculated BIP-8.	4.2.2, 4.4.1, 4.4.3	m	
4	A difference between the computed and recovered B3 values is taken as evidence of one or more errors (nN_B) in the computation block.	4.2.2, 4.4.1, 4.4.3	m	

B.4.2.2.2 Remote indicator monitoring process

B.4.2.2.2.1 VC-4 Remote Defect Indication (VC-4 RDI)

Table B.21: Remote Defect Indication location

Item	Remote Defect Indication location	Reference	Status	Support
1	The VC-4 RDI is located in bit 5 of byte G1 of the VC-4 overhead.	4.2.2, 4.4.1, 4.4.3	m	

Table B.22: Remote Defect Indication processing: source direction

Prerequisite: (B.1/2 AND B.1/3) OR
(B.1/31 AND B.1/32) -- bidirectional S4 layer and/or both Supervisory- unequipped Trail Termination functions

Item	Remote Defect Indication processing: source direction	Reference	Status	Support
1	VC-4 RDI is set upon activation of S4_RI_RDI determined by the associated S4_TT_Sk.	4.2.1	c2201	
2	VC-4 RDI is cleared upon deactivation of S4_RI_RDI determined by the associated S4_TT_Sk.	4.2.1	c2201	
3	VC-4 RDI is set upon activation of S4s_RI_RDI determined by the associated S4s_TT_Sk.	4.4.2	c2202	
4	VC-4 RDI is cleared upon deactivation of S4s_RI_RDI determined by the associated S4s_TT_Sk.	4.4.2	c2202	
5	VC-4 RDI signal is coded as a '1' bit value.	4.2.1, 4.4.2	m	
6	The '0' bit value is inserted if no S4_RI_RDI signal is active.	4.2.1, 4.4.2	m	

c2201: IF (B.1/2 AND B.1/3)
THEN m ELSE n/a -- bidirectional S4 layer supported
c2202: IF (B.1/31 AND B.1/32)
THEN m ELSE n/a -- Supervisory-unequipped Trail Termination functions supported

Table B.23: Remote Defect Indication processing: sink direction

Prerequisite: B.1/3 OR B.1/30 OR B.1/32 -- S4_TT_Sk and/or S4m_TT_Sk and/or S4s_TT_Sk present

Item	Remote Defect Indication processing: sink direction	Reference	Status	Support
1	The VC-4 layer Trail Termination Sink functions (S4_TT_Sk, S4m_TT_Sk, S4s_TT_Sk) extract and monitor bit 5 of G1 byte in order to detect the '1' bit code as evidence of VC-4 RDI condition.	4.2.2, 4.4.1, 4.4.3	m	

B.4.2.2.2.2 VC-4 Remote Error Indication (S4 REI)

Table B.24: Remote Error Indication: principles

Item	Remote Error Indication: principles	Reference	Status	Support
1	The REI signal contains the exact number of Errored Block (EB) detected in the trail signal at the far-end trail termination	ITU-T Rec.G.707 [14] subclause 9.3.1.4	m	
2	The block length is 18 792 bits (one VC-4). The Error Detection Code (EDC) is BIP-8.	ITU-T Rec.G.707 [14] subclause 9.3.1.4	m	

Table B.25: Remote Error Indication location

Item	Remote Error Indication location	Reference	Status	Support
1	The VC-4 overhead REI is located in bits 1 to 4 of G1 byte of the VC-4 overhead.	ITU-T Rec.G.707 [14] subclause 9.3.1.4	m	

Table B.26: Remote Error Indication processing: source direction

Item	Remote Error Indication processing: source direction	Reference	Status	Support
1	The S4_TT_So sets REI to the equivalent binary value of the number of EDCV detected by the monitoring process following the coding given in table 4 of subclause 4.2.1 in EN 300 417-4-1 [8].	4.2.1, table 4	c2601	
2	The S4s_TT_So sets REI to the equivalent binary value of the number of EDCV detected by the monitoring process following the coding given in table 38 of subclause 4.4.2 in EN 300 417-4-1 [8].	4.4.2, table 38	c2602	

c2601: IF (B.1/2 AND B.1/3)
THEN m ELSE n/a -- bidirectional S4 layer supported
c2602: IF (B.1/31 AND B.1/32)
THEN m ELSE n/a -- Supervisory-unequipped Trail Termination functions supported

Table B.27: Remote Error Indication processing: sink direction

Prerequisite: B.1/3 OR B.1/30 OR B.1/32 -- S4_TT_Sk and/or S4m_TT_Sk and/or S4s_TT_Sk present

Item	Remote Error Indication processing: sink direction	Reference	Status	Support
1	The VC-4 layer Trail Termination Sink functions (S4_TT_Sk, S4m_TT_Sk, S4s_TT_Sk) extract the VC-4 REI from the incoming VC-4 overhead.	4.2.2, 4.4.1, 4.4.3	m	
2	The VC-4 layer Trail Termination Sink functions (S4_TT_Sk, S4m_TT_Sk, S4s_TT_Sk) interpret the VC-4 REI as given in table 6 of subclause 4.2.2 in EN 300 417-4-1 [8].	4.2.2, 4.4.1, 4.4.3, table 6	m	

B.4.2.2.3 Trail Trace Identifier

Table B.28: Trail Trace Identifier: principles

Item	Trail Trace Identifier: principles	Reference	Status	Support
1	A Trail Trace Identifier (TTI) is inserted by the termination source containing the local Access Point Identifier (APId) and TTI header (TxTI).	4.2.1, 4.4.2, EN 300 417-1-1 [6] subclause 7.1	c2801	
2	The content of the accepted TTI (AcTI) is compared by the trail termination sink function with the provisioned "expected TTI" (ExTI), identifying the expected remote AP.	4.2.2, 4.4.1, 4.4.3, EN 300 417-1-1 [6] subclause 7.1, EN 300 417-1-1 [6] subclause 8.2.1.3	c2802	

c2801: IF (B.1/2 OR B.1/31)
THEN m ELSE n/a -- S4_TT_So and/or S4s_TT_So present
c2802: IF (B.1/3 OR B.1/30 OR B.1/32)
THEN m ELSE n/a -- S4_TT_Sk and/or S4m_TT_Sk and/or S4s_TT_Sk present

Table B.29: Trail Trace Identifier byte location

Item	Trail Trace Identifier byte location	Reference	Status	Support
1	The VC-4 Layer Trail Trace Identifier (TTI) is located in byte J1 of the VC-4 overhead.	4.2.1	m	

Table B.30: Trail Trace Identifier byte structure

Item	Trail Trace Identifier byte structure	Reference	Status	Support
1	The VC-4 TTI is a 16 byte string containing the 15 byte APId and a 1 byte header. The MSB of the header is a "1", the remaining 7 bits contain the CRC-7 value of the VC-4 TTI. The MSB of the 15 APId bytes is "0".	EN 300 417-1-1 [6] subclause 7.1	m	
2	The CRC-7 word is the remainder after multiplication by x7 and then division (modulo 2) by the generator polynomial x7 + x3 + 1, of the polynomial representation of the VC-4 TTI with the CRC bits set to binary zeroes.	EN 300 417-1-1 [6] subclause 7.1	m	
3	The 16 byte VC-4 TxTI, 16 byte VC-4 ExTI and 16 byte VC-4 AcTI are transferred via the Management Point to and from the trail termination function and the trail termination non-intrusive monitor function.	EN 300 417-1-1 [6] subclause 8.2.1.3	m	

Table B.31: Trail Trace identification: source direction

Prerequisite: B.1/2 OR B.1/31 -- at least one VC-4 layer Trail Termination source function present

Item	Trail Trace identification: source direction	Reference	Status	Support
1	The 16 byte VC-4 TTI is transmitted continuously.	EN 300 417-1-1 [6] subclause 7.1	m	

Table B.32: Trail Trace identification: sink direction

Prerequisite: B.1/3 OR B.1/30 OR B.1/32 -- at least one VC-4 layer Termination sink function present

Item	Trail Trace identification: sink direction	Reference	Status	Support
1	The VC-4 Layer Trail Termination Sink functions (S4_TT_Sk, S4s_TT_Sk, S4m_TT_Sk) support mode 1.	EN 300 417-1-1 [6] subclause 7.1	m	
2	The VC-4 Layer Trail Termination Sink functions (S4_TT_Sk, S4s_TT_Sk, S4m_TT_Sk) support mode 2.	EN 300 417-1-1 [6] subclause 7.1	m	
3	The VC-4 Layer Trail Termination Sink functions (S4_TT_Sk, S4s_TT_Sk, S4m_TT_Sk) recover the 16 byte multiframe carried in byte J1 and assume it as Received Trail Trace Identifier (RxTI). The RxTI is made available as AcTI for network management purposes	4.2.2, 4.4.1, 4.4.3	m	
4	The expected TTI mode is provisionable via S4-_TT_Sk_MI_ExTImode	4.2.2, 4.4.1, 4.4.3	m	

B.4.2.2.4 Supervisory Unequipped indication

Table B.33: Supervisory Unequipped indication

Prerequisite: B.1/31 -- S4s_TT_So function present

Item	Supervisory Unequipped indication	Reference	Status	Support
1	The S4s_TT_So function inserts code "0000 0000" in bytes C2 and N1, as defined in EN 300 417-1-1 subclause 7.2.	4.4.2, EN 300 417-1-1 [6] subclause 7.2	m	

B.4.2.3 Activation/deactivation of VC-4 Layer payload Adaptation Functions (S4/P4x_A, S4/P4e_A, S4/TUG_A, S4/DQDB_A, S4/Avp_A and S4/TSS1_A)

Table B.34: Activation/deactivation of VC-4 Layer payload Adaptation Functions

Prerequisite: B.2/1 OR B.2/2 -- more than one VC-4 Layer payload Adaptation function present

Item	Activation/deactivation of VC-4 Layer payload Adaptation Functions	Reference	Status	Support
1	Only one of the supported adaptation source functions, as taken from the set composed of S4/P4x_A_So, S4/P4e_A_So, S4/TUG_A_So, S4/DQDB_A_So, S4/Avp_A_So and S4/TSS1_A_So, can access the VC-4 access point at a time. Access to the access point by other adaptation source functions is denied.	4, 4.3.1, 4.3.3, 4.3.5.1, 4.3.9, 4.3.13, 4.3.11	c3401	
2	Each of the supported VC-4 Layer payload adaptation source functions accesses the VC-4 access point when it is activated (MI_Active is true). Otherwise, it does not access the access point.	4.3.1, 4.3.3, 4.3.5.1, 4.3.9, 4.3.13, 4.3.11	c3401	
3	The supported adaptation sink functions, as taken from the set composed of S4/P4x_A_Sk, S4/P4e_A_Sk, S4/TUG_A_Sk, S4/DQDB_A_Sk, S4/Avp_A_Sk and S4/TSS1_A_Sk, can be activated/deactivated.	4, 4.3.2, 4.3.4, 4.3.6.1, 4.3.10, 4.3.14, 4.3.12	c3402	
4	Each of the supported VC-4 Layer payload adaptation sink functions performs its operation specified above when it is activated (MI_Active is true). Otherwise, it does not report its status via the management point.	4.3.2, 4.3.4, 4.3.6.1, 4.3.10, 4.3.14, 4.3.12	c3402	
5	If the S4/P4x_A_Sk and/or S4/P4e_A_Sk is not activated it transmits the all-ONEs signal at its output (CI_D).	4.3.3, 4.3.4	c3403	
6	If the S4/TUG_A_Sk is not activated it activates the SSF signal at its output.	4.3.6.1	c3404	

c3401: IF B.2/1 THEN m ELSE x -- more than one VC-4 Layer payload adaptation source function supported
c3402: IF B.2/2 THEN o ELSE x -- more than one VC-4 Layer payload adaptation sink function supported
c3403: IF B.34/3 AND (B.1/5 OR B.1/7) THEN m ELSE n/a -- S4/P4x_A_Sk and/or S4/P4e_A_Sk function supported
c3404: IF B.34/3 AND B.1/15 THEN m ELSE n/a -- S4/TUG_A_Sk function supported

B.4.2.4 VC-4 Layer to P4x Layer Adaptation Functions: S4/P4x_A_So and S4/P4x_A_Sk

Prerequisite: B.1/4 OR B.1/5 -- S4/P4x_A_So and/or S4/P4x_A_Sk present

Table B.35: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The S4/P4x_A_So maps a 139 264 kbit/s ±15 ppm information stream into a VC-4 payload (2 340 bytes) using bit stuffing and adds bytes C2 and H4.	4.3.1, ETS 300 147 [1]	c3501	
2	The mapping of the 139 264 kbit/s ±15 ppm information stream into the VC-4 payload is performed as depicted in figure 12 of subclause 4.3.1 in EN 300 417-4-1 [8]	4.3.1, figure 12, ETS 300 147 [1]	c3501	
3	The S4/P4x_A_So generates the S4 fixed Frame Start (FS)	4.3.1	c3501	
4	The S4/P4x_A_Sk function recovers plesiochronous P4x Characteristic Information (139 264 kbit/s ±15 ppm) from the synchronous container-4 and checks the reception of the correct payload signal type.	4.3.2, ETS 300 147 [1]	c3502	

c3501: IF B.1/4 THEN m ELSE n/a -- S4/P4x_A_So present
c3502: IF B.1/5 THEN m ELSE n/a -- S4/P4x_A_Sk present.

B.4.2.4.1 VC-4 Layer to P4x Layer frequency justification and bitrate adaptation processes

Table B.36: Frequency justification and bitrate adaptation: principles

Prerequisite: B.1/4 -- S4/P4x_A_So present

Item	Frequency justification and bitrate adaptation: principles	Reference	Status	Support
1	Frequency justification is performed by bit stuffing.	4.3.1	m	

Table B.37: Frequency justification and bitrate adaptation: source direction

Prerequisite: B.1/4 -- S4/P4x_A_So present

Item	Frequency justification and bitrate adaptation: source direction	Reference	Status	Support
1	The S4/P4x_A_So function provides for an elastic store (buffer) process. The data signal is written into the buffer under control of the associated input clock. The data are read out of the buffer and written onto the D and S bits under control of the VC-4 clock, frame position (S4_TI), and justification decisions.	4.3.1, figure 12	m	
2	Each justification decision results in a corresponding positive justification action. Upon a positive justification action, the reading of 1 data bit is cancelled once and no data are written at the justification opportunity bit S. If no justification action is to be performed, data are written onto S.	4.3.1, figure 12	m	
3	The buffer size is such that in the presence of jitter as specified by ITU-T Recommendation G.823 [15] and a frequency within the range 139 264 kbit/s ±15 ppm, this justification process does not introduce any errors. Any step in frequency within this range does not cause any errors.	4.3.1, ITU-T Rec.G.823 [15]	m	

B.4.2.4.2 Justification control

Table B.38: Justification control generation and interpretation

Item	Justification control generation and interpretation	Reference	Status	Support
1	The S4/P4x_A_So function generates the justification control (C) bits according to the specification in ETS 300 147 [1]. It inserts the justification control bits in the appropriate C bit positions.	4.3.1, figure 12, ETS 300 147 [1]	c3801	
2	The S4/P4x_A_Sk function performs justification control interpretation specified by ETS 300 147 [1] to recover the 139 264 kbit/s signal from the VC-4. If the majority of the C bits is "0", the S bit is taken as a data bit, otherwise (majority of C bits is "1") S bit is taken as a justification bit and consequently ignored.	4.3.2, ETS 300 147 [1]	c3802	

c3801: IF B.1/4 THEN m ELSE n/a -- S4/P4x_A_So present
c3802: IF B.1/5 THEN m ELSE n/a -- S4/P4x_A_Sk present

B.4.2.4.3 Smoothing and jitter limiting process

Table B.39: Smoothing and jitter limiting process

Prerequisite: B.1/5 -- S4/P4x_A_Sk present

Item	Smoothing and jitter limiting process	Reference	Status	Support
1	The S4/P4x_A_Sk function provides for a clock smoothing and elastic store (buffer) process. The 139 264 kbit/s data signal is written into the buffer under control of the associated (gapped) input clock. The data signal is read out of the buffer under control of a smoothed (equally spaced) 139 264 kHz ±15 ppm clock.	4.3.2	m	
2	The residual jitter caused by pointer adjustments and bit justifications (measured at the 139 264 kbit/s interface) is within the limits specified in EN 300 417-1-1 [6] subclause 11.3.1.2.	4.3.2, EN 300 417-1-1 [6] subclause 11.3.1.2	m	
3	In the presence of jitter as specified in EN 300 417-1-1 [6] subclause 11.3.1.2 and a frequency within the range 139 264 kbit/s ±15 ppm, this justification process does not introduce any errors.	4.3.2, EN 300 417-1-1 [6] subclause 11.3.1.2	m	
4	Following a step in frequency of the P4x signal there will be a maximum recovery time of TBD seconds after which this process will not generate any bit errors.	4.3.2	n/a	

B.4.2.4.4 Payload type processing

Table B.40: Payload type generation

Prerequisite: B.1/4 -- S4/P4x_A_So present

Item	Payload type generation	Reference	Status	Support
1	The S4/P4x_A_So function inserts code "0001 0010" (Asynchronous mapping of 139 264 kbit/s into the Container-4) in byte C2 of the VC-4 overhead as defined in ETS 300 147 [1].	4.3.1, figure 13, ETS 300 147 [1]	m	

Table B.41: Payload type recovery

Prerequisite: B.1/5 -- S4/P4x_A_Sk present

Item	Payload type recovery	Reference	Status	Support
1	The S4/P4x_A_Sk function compares the content of the accepted C2 byte with the expected value code "0001 0010" (Asynchronous mapping of 139 264 kbit/s into the Container-4).	4.3.2	m	
2	The application and acceptance and mismatch detection process are as specified in EN 300 417-1-1 [6], subclauses 7.2 and 8.2.1.2.	4.3.2, EN 300 417-1-1 [6] subclause 7.2, subclause 8.2.1.2	m	

B.4.2.4.5 H4 byte processing

Table B.42: H4 byte recovery

Prerequisite: B.1/5 -- S4/P4x_A_Sk present

Item	H4 byte recovery	Reference	Status	Support
1	The value in the H4 byte is ignored	4.3.2	m	

B.4.2.5 VC-4 Layer to P4e Layer Adaptation Functions: S4/P4e_A_So and S4/P4e_A_Sk

Prerequisite: B.1/6 OR B.1/7 -- S4/P4e_A_So and/or S4/P4e_A_Sk present

Table B.43: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The S4/P4e_A_So function maps a 139 264 kbit/s ±15 ppm information stream into a VC-4 payload (2 340 bytes) using bit stuffing and adds bytes C2 and H4.	4.3.3, ETS 300 147 [1]	c4301	
2	The mapping of the 139 264 kbit/s ±15 ppm information stream into the VC-4 payload is performed as depicted in figure 12 of subclause 4.3.3 in EN 300 417-4-1 [8]	4.3.3, figure 12 ETS 300 147 [1]	c4301	
3	The S4/P4e_A_So generates the S4 fixed Frame Start (FS)	4.3.3	c4301	
4	The S4/P4e_A_Sk function recovers plesiochronous P4e Characteristic Information (139 264 kbit/s ±15 ppm) from the synchronous container-4, checks the reception of the correct payload signal type and recovers P4e frame start reference (FS) from the received signal.	4.3.4, ETS 300 147 [1]	c4302	

c4301: IF B.1/6 THEN m ELSE n/a -- S4/P4e_A_So present
c4302: IF B.1/7 THEN m ELSE n/a -- S4/P4e_A_Sk present

B.4.2.5.1 VC-4 Layer to P4e Layer frequency justification and bitrate adaptation processes

Table B.44: Frequency justification and bitrate adaptation: principles

Prerequisite: B.1/6 -- S4/P4e_A_So present

Item	Frequency justification and bitrate adaptation: principles	Reference	Status	Support
1	Frequency justification is performed by bit stuffing.	4.3.3	m	

Table B.45: Frequency justification and bitrate adaptation: source direction

Prerequisite: B.1/6 -- S4/P4e_A_So present

Item	Frequency justification and bitrate adaptation: source direction	Reference	Status	Support
1	The S4/P4e_A_So function provides for an elastic store (buffer) process. The data signal is written into the buffer under control of the associated input clock. The data are read out of the buffer and written onto the D and S bits under control of the VC-4 clock, frame position (S4_TI), and justification decisions.	4.3.3, figure 12	m	
2	Each justification decision results in a corresponding positive justification action. Upon a positive justification action, the reading of 1 data bit is cancelled once and no data are written at the justification opportunity bit S. If no justification action is to be performed, data are written onto S.	4.3.3, figure 12	m	
3	The buffer size is such that in the presence of jitter as specified by ITU-T Recommendation G.823 [15] and a frequency within the range 139 264 kbit/s ± 15 ppm, this justification process does not introduce any errors. Any step in frequency within this range does not cause any errors.	4.3.3, ITU-T Rec.G.823 [15]	m	

B.4.2.5.2 Justification control

Table B.46: Justification control generation and interpretation

Item	Justification control generation and interpretation	Reference	Status	Support
1	The S4/P4e_A_So function generates the justification control (C) bits according to the specification in ETS 300 147 [1]. It inserts the justification control bits in the appropriate C bit positions.	4.3.3, figure 12, ETS 300 147 [1]	c4601	
2	The S4/P4e_A_Sk function performs justification control interpretation specified by ETS 300 147 to recover the 139 264 kbit/s signal from the VC-4. If the majority of the C bits is "0", the S bit is taken as a data bit, otherwise (majority of C bits is "1") S bit is taken as a justification bit and consequently ignored.	4.3.4, ETS 300 147 [1]	c4602	

c4601: IF B.1/6 THEN m ELSE n/a -- S4/P4e_A_So present
c4602: IF B.1/7 THEN m ELSE n/a -- S4/P4e_A_Sk present

B.4.2.5.3 Smoothing and jitter limiting process

Table B.47: Smoothing and jitter limiting process

Prerequisite: B.1/7 -- S4/P4e_A_Sk present

Item	Smoothing and jitter limiting process	Reference	Status	Support
1	The S4/P4e_A_Sk function provides for a clock smoothing and elastic store (buffer) process. The 139 264 kbit/s data signal is written into the buffer under control of the associated (gapped) input clock. The data signal is read out of the buffer under control of a smoothed (equally spaced) 139 264 kHz ±15 ppm clock.	4.3.4	m	
2	The residual jitter caused by pointer adjustments and bit justifications (measured at the 139 264 kbit/s interface) is within the limits specified in EN 300 417-1-1 [6] subclause 11.3.1.2.	4.3.4, EN 300 417-1-1 [6] subclause 11.3.1.2	m	
3	In the presence of jitter as specified in EN 300 417-1-1 [6] subclause 11.3.1.2 and a frequency within the range 139 264 kbit/s ±15 ppm, this justification process does not introduce any errors.	4.3.4, EN 300 417-1-1 [6] subclause 11.3.1.2	m	
4	Following a step in frequency of the P4e signal there will be a maximum recovery time of TBD seconds after which this process will not generate any bit errors.	4.3.4	n/a	

B.4.2.5.4 Frame Alignment process

Table B.48: Frame Alignment process

Prerequisite: B.1/7 -- S4/P4e_A_Sk present

Item	Frame Alignment process	Reference	Status	Support
1	The S4/P4e_A_Sk function performs the frame alignment of the 139 264 kbit/s signal to recover the frame start information FS.	4.3.4	m	
2	Loss of frame alignment is assumed to have taken place when four consecutive frame alignment signals have been incorrectly received in their predicted positions.	4.3.4	m	
3	When frame alignment is assumed to be lost, the frame alignment device decides that such alignment has effectively been recovered when it detects the presence of three consecutive frame alignment signals.	4.3.4	m	
4	The frame alignment device having detected the appearance of a single correct frame alignment signal, begins a new search for the frame alignment signal when it detects the absence of the frame alignment signal in one of the two following frames.	4.3.4	m	

B.4.2.5.5 Payload type processing

Table B.49: Payload type generation

Prerequisite: B.1/6 -- S4/P4e_A_So present

Item	Payload type generation	Reference	Status	Support
1	The S4/P4e_A_So function inserts code "0001 0010" (Asynchronous mapping of 139 264 kbit/s into the Container-4) in byte C2 of the VC-4 overhead as defined in ETS 300 147 [1].	4.3.3, figure 13, ETS 300 147 [1]	m	

Table B.50: Payload type recovery

Prerequisite: B.1/7 -- S4/P4e_A_Sk present

Item	Payload type recovery	Reference	Status	Support
1	The S4/P4e_A_Sk function compares the content of the accepted C2 byte with the expected value code "0001 0010" (Asynchronous mapping of 139 264 kbit/s into the Container-4).	4.3.4	m	
2	The application and acceptance and mismatch detection process are as specified in EN 300 417-1-1 [6], subclauses 7.2 and 8.2.1.2.	4.3.4, EN 300 417-1-1 [6] subclause 7.2, subclause 8.2.1.2	m	

B.4.2.5.6 H4 byte processing

Table B.51: H4 byte recovery

Prerequisite: B.1/7 -- S4/P4e_A_Sk present

Item	H4 byte recovery	Reference	Status	Support
1	The value in the H4 byte is ignored	4.3.4	m	

B.4.2.6 VC-4 Layer to VC-3, VC-2, VC-12 and VC-11 Layer Compound Adaptation Functions: S4/SX_A_So and S4/SX_A_Sk

Prerequisite: B.1/8 OR B.1/9 -- S4/SX_A_So and/or S4/SX_A_Sk present

Table B.52: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The S4/SX_A_So compound function provides adaptation from the VC-3/2/12/11 layers to VC-4 layer. This process is performed by a combination of several atomic functions as shown in figure 18.	4.3.5, figure 18	c5201	
2	The S4/SX_A_Sk compound function provides adaptation from the VC-4 layer to the VC-3/2/12/11 layers. This process is performed by a combination of several atomic functions as shown in figure 32.	4.3.6, figure 32	c5202	
3	Each of the TUG/Sm_A (m = 3,2,12,11*) functions is characterized by the K.L.M parameters, which define the number of the TU within the VC-4 the function has access to (TU numbering scheme according to EN 300 417-1-1 [6], subclause 3.3.5).	4.3.5, figure 18, 4.3.6, figure 32 EN 300 417-1-1 [6], subclause. 3.3.5	m	

c5201: IF B.1/8 THEN m ELSE n/a -- S4/SX_A_So present
c5202: IF B.1/9 THEN m ELSE n/a -- S4/SX_A_Sk present

Comment: In item B.52/3 the value of K is an integer number in the range from 1 to 3, the value of L is an integer number in the range from 1 to 7, the value of M is an integer number in the range from 1 to 3.

B.4.2.6.1 VC-4 Layer to TUG Adaptation Functions: S4/TUG_A_So and S4/TUG_A_Sk

Table B.53: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The S4/TUG_A_So function adds two payload specific bytes C2 and H4 to the VC-4 POH and fixed stuff (R0) bytes to the VC-4 payload.	4.3.5.1, figure 21	c5301	
2	The S4/TUG_A_Sk function monitors two payload specific bytes C2 and H4 of the VC-4 POH.	4.3.6.1	c5302	

c5301: IF B.1/14 THEN m ELSE n/a -- S4/TUG_A_So present
c5302: IF B.1/15 THEN m ELSE n/a -- S4/TUG_A_Sk present

B.4.2.6.1.1 Payload type processing

Table B.54: Payload type generation

Prerequisite: B.1/14 -- S4/TUG_A_So present

Item	Payload type generation	Reference	Status	Support
1	The S4/TUG_A_So function inserts code "0000 0010" (TUG structure) in byte C2 of the VC-4 overhead as defined in ETS 300 147 [1].	4.3.5.1, ETS 300 147 [1]	m	

Table B.55: Payload type recovery

Prerequisite: B.1/15 -- S4/TUG_A_Sk present

Item	Payload type recovery	Reference	Status	Support
1	The function S4/TUG_A_Sk compares the content of the accepted C2 byte with the expected value code "0000 0010" (TUG structure).	4.3.6.1	m	
2	The application and acceptance and mismatch detection process are as specified in EN 300 417-1-1 [6], subclauses 7.2 and 8.2.1.2.	4.3.6.1, EN 300 417-1-1 [6] subclause 7.2, subclause 8.2.1.2	m	

B.4.2.6.1.2 Multiframe Indicator processing

Table B.56: Multiframe Indicator generation

Prerequisite: B.1/20 OR B.1/22 OR B.1/24 -- S4/S2_A_So and/or S4/S12_A_So and/or S4/S11*_A_So present

Item	Multiframe Indicator generation	Reference	Status	Support
1	The value of the multiframe indicator byte H4 is set as specified by ETS 300 147 [1]:500 µs-TU multiframe sequence, and aligned with the TUG MultiFrame Start (TUG_CI_MFS).	4.3.5.1, figure 20, figure 21, ETS 300 147 [1]	m	

Table B.57: Multiframe Indicator recovery

Prerequisite: B.1/15 -- S4/TUG_A_Sk present

Item	Multiframe Indicator recovery	Reference	Status	Support
1	The function recovers the 500 µs (multi)frame start phase performing multi-frame alignment on bits 7 and 8 of byte H4.	4.3.6.1	c5701	
2	If the TUG structure consists of TU-3s only, the value of H4 byte is ignored.	4.3.6.1	c5702	
3	Out-of-multiframe (OOM) is assumed once when an error is detected in the H4 bit 7 and 8 sequence. Multiframe alignment is assumed to be recovered, and the in-multiframe (IM) state is entered, when in four consecutive VC-4 frames an error free H4 sequence is found.	4.3.6.1	c5701	

c5701: IF (B.1/21 OR B.1/23 OR B.1/25)
THEN m ELSE x -- S4/S2_A_Sk and/or S4/S12_A_Sk and/or S4/S11*_A_Sk present

c5702: IF B.1/19 AND NOT(B.1/21 OR
B.1/23 OR B.1/25) THEN m ELSE x -- S4/S3_A_Sk present only

B.4.2.6.1.3 Fixed Stuff insertion

Table B.58: Fixed Stuff insertion

Prerequisite: B.1/14 -- S4/TUG_A_So present

Item	Fixed Stuff insertion	Reference	Status	Support
1	The R0 bytes are always added.	4.3.5.1, figure 21, ETS 300 147 [1]	m	
2	The Rj (j = 1,2,3) bytes are added if the TUG-3-j contains TUG-2s.	4.3.5.1, figure 21, ETS 300 147 [1]	c5801	

c5801: IF B.1/20 OR B.1/22 OR B.1/24
THEN m ELSE x -- S4/S2_A_So and/or S4/S12_A_So and/or S4/S11*_A_So present

B.4.2.6.2 TUG to VC-3/2/12/11 Layer Adaptation Functions: TUG/S3_A_So, TUG/S3_A_Sk, TUG/S2_A_So, TUG/S2_A_Sk, TUG/S12_A_So, TUG/S12_A_Sk, TUG/S11*_A_So and TUG/S11*_A_Sk

Table B.59: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The TUG/S3_A_So function provides frequency justification and bitrate adaptation for a VC-3 signal, represented by a nominally 48 960 kbit/s information stream (having a frequency accuracy within ±4,6 ppm) and the related frame phase.	4.3.5.3	c5901	
2	The TUG/S2_A_So function provides frequency justification and bitrate adaptation for a VC-2 signal, represented by a nominally 6 848 kbit/s information stream (having a frequency accuracy within ±4,6 ppm) and the related frame phase.	4.3.5.4	c5902	
3	The TUG/S12_A_So function provides frequency justification and bitrate adaptation for a VC-12 signal, represented by a nominally 2 240 kbit/s information stream (having a frequency accuracy within ±4,6 ppm) and the related frame phase.	4.3.5.5	c5903	
4	The TUG/S11*_A_So function provides frequency justification and bitrate adaptation for a VC-11 signal, represented by a nominally 1 664 kbit/s information stream (having a frequency accuracy within ±4,6 ppm) and the related frame phase.	4.3.5.6	c5904	
5	The TUG/S3_A_Sk function recovers the VC-3 data with frame phase information from a TU-3.	4.3.6.3	c5905	
6	The TUG/S2_A_Sk function recovers VC-2 data with frame phase information from a TU-2.	4.3.6.4	c5906	
7	The TUG/S12_A_Sk function recovers VC-12 data with frame phase information from a TU-12.	4.3.6.5	c5907	

Item	Adaptation process	Reference	Status	Support
8	The TUG/S11*_A_Sk function recovers VC-11 data with frame phase information from a TU-12.	4.3.6.6	c5908	
9	The TUG/S3_A_So function has access to a specific TU-3 of the TUG access point. The TU-3 is defined by the parameter K (K = 1..3).	.3	c5909	
10	The TUG/S2_A_So function has access to a specific TU-2 of the TUG access point. The TU-2 is defined by the K and L (K = 1..3, L = 1..7).	4.3.5.4, 4.3.6.4	c5910	
11	The TUG/S12_A_So function has access to a specific TU-12 of the TUG access point. The TU-12 is defined by the parameters K, L and M (K = 1..3, L = 1..7, M = 1..3).	4.3.5.5, 4.3.6.5	c5911	
12	The TUG/S11*_A_So function has access to a specific TU-12 of the TUG access point. The TU-12 is defined by the parameters K, L and M (K = 1..3, L = 1..7, M = 1..3).	4.3.5.6, 4.3.6.6	c5912	

c5901: IF B.1/18 THEN m ELSE n/a -- TUG/S3_A_So present
c5902: IF B.1/20 THEN m ELSE n/a -- TUG/S2_A_So present
c5903: IF B.1/22 THEN m ELSE n/a -- TUG/S12_A_So present
c5904: IF B.1/24 THEN m ELSE n/a -- TUG/S11*_A_So present
c5905: IF B.1/19 THEN m ELSE n/a -- TUG/S3_A_Sk present
c5906: IF B.1/21 THEN m ELSE n/a -- TUG/S2_A_Sk present
c5907: IF B.1/23 THEN m ELSE n/a -- TUG/S12_A_Sk present
c5908: IF B.1/25 THEN m ELSE n/a -- TUG/S11*_A_Sk present
c5909: IF (B.1/18 OR B.1/19)
THEN m ELSE n/a -- TUG/S3_A_So and/or TUG/S3_A_Sk present
c5910: IF (B.1/20 OR B.1/21)
THEN m ELSE n/a -- TUG/S2_A_So and/or TUG/S2_A_Sk present
c5911: IF (B.1/22 OR B.1/23)
THEN m ELSE n/a -- TUG/S12_A_So and/or TUG/S12_A_Sk present
c5912: IF (B.1/24 OR B.1/25)
THEN m ELSE n/a -- TUG/S11*_A_So and/or TUG/S11*_A_Sk present

Table B.60: Activation/deactivation of TUG/Sm_A functions (m = 3,2,12,11*)

Item	Activation/deactivation of TUG/Sm_A functions (m = 3,2,12,11*)	Reference	Status	Support
1	The equivalent capacity of TUG/Sm_A_So (m = 3,2,12,11*) functions exceeds the 63 TU-12 timeslots available in a VC-4 (21 × j1 + 3 × j3 + j5 + j7 > 63)		c6001	
2	The equivalent capacity of TUG/Sm_A_Sk (m = 3,2,12,11*) functions exceeds the 63 TU-12 timeslots available in a VC-4 (21 × j2 + 3 × j4 + j6 + j8) > 63)		c6002	
3	Several TUG/Sm_A_So (m = 3,2,12,11*) functions may have access to the same TU, but only one is allowed to be activated.	4.3.5	c6003	

Item	Activation/deactivation of TUG/Sm_A functions (m = 3,2,12,11*)	Reference	Status	Support
4	Several TUG/Sm_A_Sk functions may have access to the same TU timeslot. In contradiction with the source direction, adaptation sink functions may be activated all together. This will presumably cause faults (e.g. cLOP) to be detected and reported. To prevent this an adaptation sink function can be deactivated.	4.3.6	c6004	
5	This is controlled by the equipment management function by activating/deactivating the functions according to the configured TUG multiplex structure.	4.3.5, 4.3.6	c6005	
6	The TUG/Sm_A_So (m = 3,2,12,11*) functions access the TUG access point when they are activated (MI_Active is true). Otherwise, they do not access the TUG access point.	4.3.5.3-4-5-6	c6006	
7	The TUG/Sm_A_Sk functions perform their processes when they are activated (MI_Active is true). Otherwise, they transmit the all-ONEs signal at their output (CI_D) and do not report their status via their management point.	4.3.6.3-4-5-6	c6007	

Comment to B.60/01 and B.60/02: in B.60/01 and B.60/02 the values of j1, j2, j3, j4, j5, j6, j7, j8 if supported, are those given respectively in B.3/1 and B.3/3.

c6001: IF B.3/9 THEN o ELSE n/a -- the equivalent capacity of TUG/Sm_A_So (m = 3,2,12,11*) functions is equal or exceeds the 63 TU-12 timeslots available in a VC-4
c6002: IF B.3/10 THEN o ELSE n/a -- the equivalent capacity of TUG/Sm_A_Sk (m = 3,2,12,11*) functions is equal or exceeds the 63 TU-12 timeslots available in a VC-4
c6003: IF B.60/1 THEN m ELSE x -- the equivalent capacity of TUG/Sm_A_So (m = 3,2,12,11*) functions exceeds the 63 TU-12 timeslots available in a VC-4
c6004: IF B.60/2 THEN m ELSE x -- the equivalent capacity of TUG/Sm_A_Sk (m = 3,2,12,11*) functions exceeds the 63 TU-12 timeslots available in a VC-4
c6005: IF (B.60/3 OR B.60/4) THEN m ELSE x -- activation/deactivation of TUG/Sm_A functions supported
c6006: IF B.60/3 THEN m ELSE x -- activation/deactivation of TUG/Sm_A_So functions supported
c6007: IF B.60/4 THEN m ELSE x -- activation/deactivation of TUG/Sm_A_Sk functions supported

Comment: The number of TUG/Sm_A (m = 3,2,12,11*) functions that is active must completely fill the VC-4 payload.

B.4.2.6.2.1 TUG to VC-3/2/12/11 Layer frequency justification and bitrate adaptation processes

Table B.61: Frequency justification and bitrate adaptation: principles

Item	Frequency justification and bitrate adaptation: principles	Reference	Status	Support
1	Frequency justification is performed by pointer adjustments.	4.3.5.3 to 4.3.5.6, 4.3.6.3 to 4.3.6.6	m	

Table B.62: Frequency justification and bitrate adaptation: source direction

Prerequisite: B.1/8 -- implies that at least one TUG/Sm_A_So (m = 3,2,12,11*) function is present

Item	Frequency justification and bitrate adaptation: source direction	Reference	Status	Support
1	The TUG/Sm_A_So function provides for an elastic store (buffer) process. The data and frame start signals are written into the store under control of the associated input clock. The data and frame start signals are read out of the store under control of the VC-4 clock, frame position and justification decision.	4.3.5.3 to 4.3.5.6	m	
2	Each justification decision results in a corresponding negative/positive justification action. Upon a positive justification action, the reading of 8 data bits are cancelled once and no data are written at the justification opportunity position H3+1. Upon a negative justification action, an extra 8 data bits are read out once into the justification opportunity position H3.	4.3.5.3	c6201	
3	Each justification decision results in a corresponding negative/positive justification action. Upon a positive justification action, the reading of 8 data bits are cancelled once and no data are written at the justification opportunity position V3+1. Upon a negative justification action, an extra 8 data bits are read out once into the justification opportunity position V3.	4.3.5.4 to 4.3.5.6	c6202	
4	Consecutive pointer operations must be separated by at least three frames (i.e. every fourth frame) in which the pointer value remains constant.	4.3.5.3 to 4.3.5.6	m	
5	The size of the buffer for the elastic store process is [for further study]	4.3.5.3 to 4.3.5.6	n/a	

c6201: IF B.1/18 THEN m ELSE n/a -- TUG/S3_A_So present
c6202: IF (B.1/20 OR B.1/22 OR B.1/24)
THEN m ELSE n/a -- TUG/S2_A_So and/or TUG/S12_A_So and/or TUG/S11*_A_So present

B.4.2.6.2.2 TUG to VC-3/2/12/11 Layer alignment process

Table B.63: VC-3/2/12/11 Alignment process: principles

Item	VC-3/2/12/11 Alignment process: principles	Reference	Status	Support
1	The TU-3 alignment process is carried out by the processing of the TU-3 pointer which is aligned in the VC-4 payload in fixed position relative to the VC-4 frame.	ITU-T Rec.G.707 [14] subclause 8.2	c6301	
2	The TU-3 pointer value indicates the offset between the pointer and the first byte of the VC-3 as shown in ITU-T Rec.G.707 [14] figures 8 to 9.	ITU-T Rec.G.707 [14] subclause 8.2.2, figure 8-9/ ITU-T Rec.G.707 [14]	c6301	
3	The TU-2/TU-12 alignment process is carried out by the processing of the TU-2/TU-12 pointer which is aligned in the VC-4 payload in fixed position relative to the VC-4 frame and multiframe.	ITU-T Rec.G.707 [14] subclause 8.3	c6302	
4	The TU-2/TU-12 pointer indicates the offset from byte V2 of the TU-2/TU-12 multiframe to the first byte of the VC-2/12/11.	ITU-T Rec.G.707 [14] subclause 8.3.2	c6302	

c6301: IF (B.1/18 OR B.1/19)
THEN m ELSE n/a -- TUG/S3_A_So and/or TUG/S3_A_Sk present
c6302: IF (B.1/20 OR B.1/21 OR B.1/22 OR B.1/23 OR B.1/24 OR B.1/25) THEN m ELSE n/a -- TUG/S2_A_So and/or TUG/S2_A_Sk and/or TUG/S12_A_So and/or TUG/S12_A_Sk and/or TUG/S11*_A_Sk and/or TUG/S11*_A_Sk present

Table B.64: TU-n Pointer and alignment: byte location

Item	TU-n Pointer and alignment: byte location	Reference	Status	Support
1	The first 3 bytes (H1, H2, H3) of column j + 3 (j = 1,2,3) in the VC-4 frame are allocated to the alignment process of TU-3(j,0,0).	4.3.5.3, figure 24, ITU-T Rec.G.707 [14] subclause 8.2-8.2.2	c6401	
2	The TU-3(j,0,0) (j = 1,2,3) pointer is located into H1 (j + 1,1) and H2 (j + 1,2) of the VC-4 frame.	4.3.5.3, figure 24, ITU-T Rec.G.707 [14] subclause 8.2-8.2.2	c6401	
3	The justification opportunity byte for TU-3(j,0,0) (j = 1,2,3) is located into H3 + 1(6 + j,3) of the VC-4 frame.	4.3.5.3, figure 24, ITU-T Rec.G.707 [14] subclause 8.2-8.2.2	c6401	
4	Bytes V1, V2, V3 of the TU-2/TU-12 multiframe are allocated to the alignment process.	4.3.5.4 figure 26, 4.3.5.5 figure 28, 4.3.5.6 figure 30, ITU-T Rec.G.707 [14] subclause 8.3-8.3.2	c6402	
5	The TU-2/TU-12 pointer is located into bytes V1 and V2 of the TU-2/TU-12 multiframe.	4.3.5.4 figure 26, 4.3.5.5 figure 28, 4.3.5.6 figure 30, ITU-T Rec.G.707 [14] subclause 8.3-8.3.2	c6402	
6	The justification opportunity byte for TU-2/TU-12 is located into byte V3+1 which, within the TU-2/TU-12 multiframe, immediately follows byte V3.	4.3.5.4 figure 26, 4.3.5.5 figure 28, 4.3.5.6 figure 30, ITU-T Rec.G.707 [14] subclause 8.3-8.3.2	c6402	

c6401: IF (B.1/18 OR B.1/19)
THEN m ELSE n/a -- TUG/S3_A_So and/or TUG/S3_A_Sk present
c6402: IF (B.1/20 OR B.1/21 OR B.1/22 OR B.1/23 OR B.1/24 OR B.1/25) THEN m ELSE n/a -- TUG/S2_A_So and/or TUG/S2_A_Sk and/or TUG/S12_A_So and/or TUG/S12_A_Sk and/or TUG/S11*_A_So and/or TUG/S11*_A_Sk present

Table B.65: TU-3/2/12 Pointer and alignment: byte structure

Item	TU-3/2/12 Pointer and alignment: byte structure	Reference	Status	Support
1	The content of H1 (j + 1,1) (j = 1,2,3) and H2 (j + 1,2) bytes of the VC-4 frame is viewed as one pointer word.	ITU-T Rec.G.707 [14] subclause 8.2.2	c6501	
2	The content of V1 and V2 bytes of the TU-2/TU-12 multiframe is viewed as one pointer word.	ITU-T Rec.G.707 [14] subclause 8.3.2	c6502	
3	Bits 1 through 4 of the pointer word carry the New Data Flag (NDF).	ITU-T Rec.G.707 [14] subclause 8.2.2-8.3.2	m	
4	Bits 5 and 6 of the TU-3 pointer word, named ss bits, are set to '10', to indicate TU-3.	4.3.5.3, ITU-T Rec.G.707 [14] subclause 8.2.2	c6501	
5	Bits 5 and 6 of the TU-2 pointer word, named ss bits, are set to '00', to indicate TU-2.	4.3.5.4, ITU-T Rec.G.707 [14] subclause 8.3.2	c6503	
6	Bits 5 and 6 of the TU-12 pointer word, named ss bits, are set to '10', to indicate TU-12.	4.3.5.5, 4.3.5.6, ITU-T Rec.G.707 [14] subclause 8.3.2	c6504	
7	Bits 7 through 16 (last ten bits) of the pointer word carry the pointer value.	ITU-T Rec.G.707 [14] subclause 8.2.2-8.3.2	m	
8	The TU-3 pointer value is a binary number with a range of 0 to 764.	ITU-T Rec.G.707 [14] subclause 8.2.2	c6501	
9	The TU-2 pointer value is a binary number with a range of 0 to 427.	ITU-T Rec.G.707 [14] subclause 8.3.2	c6503	
10	The TU-12 pointer value is a binary number with a range of 0 to 139.	ITU-T Rec.G.707 [14] subclause 8.3.2	c6504	
11	The H3 (j + 1,3) (j = 1,2,3) byte is the negative justification opportunity byte.	ITU-T Rec.G.707 [14] subclause 8.2.2	c6501	
12	The V3 byte of the TU-2/TU-12 multiframe is the negative justification opportunity byte.	ITU-T Rec.G.707 [14] subclause 8.3.2	c6502	
13	Bits 7, 9, 11, 13, 15 of the pointer word (I bits) are the pointer incrementation indication bits.	ITU-T Rec.G.707 [14] subclause 8.2.2-8.3.2	m	
14	Bits 8, 10, 12, 14, 16 of the pointer word (D bits) are the pointer decrementation indication bits.	ITU-T Rec.G.707 [14] subclause 8.2.2-8.3.2	m	

c6501: IF (B.1/18 OR B.1/19)
THEN m ELSE n/a -- TUG/S3_A_So and/or TUG/S3_A_Sk present
c6502: IF (B.1/20 OR B.1/21 OR B.1/22 OR B.1/23 OR B.1/24 OR B.1/25) THEN m ELSE n/a -- TUG/S2_A_So and/or TUG/S2_A_Sk and/or TUG/S12_A_So and/or TUG/S12_A_Sk and/or TUG/S11*_A_So and/or TUG/S11*_A_Sk present
c6503: IF (B.1/20 OR B.1/21)
THEN m ELSE n/a -- TUG/S2_A_So and/or TUG/S2_A_Sk present
c6504: IF (B.1/22 OR B.1/23 OR
B.1/24 OR B.1/25) THEN m ELSE n/a -- TUG/S12_A_So and/or TUG/S12_A_Sk and/or TUG/S11*_A_So and/or TUG/S11*_A_Sk present

B.4.2.6.2.2.1 TU-3/2/12 Pointer generation

Prerequisite: B.1/8 -- implies that at least one TUG/Sm_A_So (m = 3,2,12,11*) function is present

Table B.66: Pointer generation principles

Item	Pointer generation principles	Reference	Status	Support
1	The pointer is generated according to the pointer generation algorithm.	4.3.5.3-4-5-6, EN 300 417-1-1 [6] annex A	m	
2	The pointer generation algorithm can be modelled by a finite state machine as shown in EN 300 417-1-1 [6] figure A.1. Four states can be identified: • NORM_state • NDF_state • INC_state • DEC_state	EN 300 417-1-1 [6] annex A	m	
3	The transitions from the NORM state to the INC, DEC and NDF states are initiated by Elastic Store process events.	EN 300 417-1-1 [6] annex A	m	
4	The transitions from INC, DEC and NDF states to the NORM state occur autonomously under the generation of special pointer patterns.	EN 300 417-1-1 [6] annex A	m	

Table B.67: Pointer generation events

Item	Pointer generation events	Reference	Status	Support
1	thr_exc: elastic store filling exceeds an upper threshold	EN 300 417-1-1 [6] annex A	m	
2	thr_und: elastic store filling falls below a lower threshold	EN 300 417-1-1 [6] annex A	m	
3	FO_normal: normal frame offset	EN 300 417-1-1 [6] annex A	m	
4	FO_discont: frame offset discontinuity	EN 300 417-1-1 [6] annex A	m	
5	A frame offset discontinuity occurs if an incoming NDF_enable or 3*new_point is received by the pointer interpreter controlling the process of writing into the elastic store.	EN 300 417-1-1 [6] annex A	m	
6	A frame offset discontinuity occurs if the Elastic Store overflow/underflow condition is detected.	EN 300 417-1-1 [6] annex A	m	
7	The active offset is defined as the phase between the VC-4 and the VC-3/2/12/11.	EN 300 417-1-1 [6] annex A	m	
8	The active offset is undefined during a signal fail condition.	EN 300 417-1-1 [6] annex A	m	

Table B.68: Pointer generation actions

Item	Pointer generation actions	Reference	Status	Support
1	The norm_point action generates a transmitted pointer word with: NDF disabled (NDF bytes set to 0110), pointer value set to active offset.	EN 300 417-1-1 [6] annex A	m	
2	The inc_ind action generates a transmitted pointer word with: NDF disabled (NDF bytes set to 0110), pointer value set to the active offset and D-bits inverted. After this action 1 stuffing byte is transmitted in the H3+1(or V3+1) byte and the active offset is incremented by one unit. If the previous pointer value is set to its maximum value, the subsequent pointer is set to zero.	EN 300 417-1-1 [6] annex A, ITU-T Rec.G.707 [14] subclause 8.1.5	m	
3	The dec_ind action generates a transmitted pointer word with: NDF disabled (NDF bytes set to 0110), pointer value set to the active offset and D-bits inverted. After this action 1 data byte is transmitted in the H3 (or V3) byte and the active offset is decremented by one. If the previous pointer value is zero, the subsequent pointer is set to its maximum value.	EN 300 417-1-1 [6] annex A, ITU-T Rec.G.707 [14] subclause 8.1.5	m	
4	The NDF_enable action generates a pointer word with: NDF enabled (NDF bytes set to 1001), pointer value set to the new offset. After this action the active offset is updated to the new offset value.	EN 300 417-1-1 [6] annex A	m	

Comments: I bits and D bits are, respectively, bits 7, 9, 11, 13, 15 and 8, 10, 12, 14, 16 of the pointer word.

Table B.69: Pointer generation: operation in NORM state

Item	Pointer generation: operation in NORM state	Reference	Status	Support
1	Reception: FO_normal Transition to state: NORM Action: norm_point	EN 300 417-1-1 [6] annex A	m	
2	Reception: thr_exc Transition to state: DEC Action: dec_ind	EN 300 417-1-1 [6] annex A	m	
3	Reception: thr_und Transition to state: INC Action: inc_ind	EN 300 417-1-1 [6] annex A	m	
4	Reception: FO_discont Transition to state: NDF Action: NDF_enable	EN 300 417-1-1 [6] annex A	m	

Table B.70: Pointer generation: operation in INC state

Item	Pointer generation: operation in INC state	Reference	Status	Support
1	Reception: FO_normal Transition to state: INC Action: norm_point	EN 300 417-1-1 [6] annex A	m	
2	Reception: 3*FO_normal Transition to state: NORM Action: norm_point	EN 300 417-1-1 [6] annex A	m	
3	Reception: FO_discont Transition to state: NDF Action: NDF_enable	EN 300 417-1-1 [6] annex A	m	

Table B.71: Pointer generation: operation in DEC state

Item	Pointer generation: operation in DEC state	Reference	Status	Support
1	Reception: FO_normal Transition to state: DEC Action: norm_point	EN 300 417-1-1 [6] annex A	m	
2	Reception: 3*FO_normal Transition to state: NORM Action: norm_point	EN 300 417-1-1 [6] annex A	m	
3	Reception: FO_discont Transition to state: NDF Action: NDF_enable	EN 300 417-1-1 [6] annex A	m	

Table B.72: Pointer generation: operation in NDF state

Item	Pointer generation: operation in NDF state	Reference	Status	Support
1	Reception: FO_normal Transition to state: NDF Action: norm_point	EN 300 417-1-1 [6] annex A	m	
2	Reception: FO_discont Transition to state: NDF Action: NDF_enable	EN 300 417-1-1 [6] annex A	m	
3	Reception: 3*FO_normal Transition to state: NORM Action: norm_point	EN 300 417-1-1 [6] annex A	m	

B.4.2.6.2.2.2 TU-3/2/12 pointer interpretation

Prerequisite: B.1/9 -- implies that at least one TUG/Sm_A_Sk (m = 3,2,12,11*) function is present

Table B.73: Pointer interpretation principles

Item	Pointer interpretation principles	Reference	Status	Support
1	The pointer is interpreted according to the pointer interpretation algorithm.	4.3.6.3-4-5-6, EN 300 417-1-1 [6] annex B	m	
2	The pointer interpretation algorithm can be globally described by a state diagram as shown in EN 300 417-1-1 figure B.1. Six states are defined: • NORMal_state (NORM) • AIS_state (AIS) • LOP_state (LOP) • INCrement_state (INC) • DECrement_state (DEC) • NDF_state (NDF)	EN 300 417-1-1 [6] annex B	m	
3	The transitions between the states will be initiated either by single or consecutive events.	EN 300 417-1-1 [6] annex B	m	

Table B.74: Pointer interpretation events

Item	Pointer interpretation events	Reference	Status	Support
1	NDF Enabled occurs when any of the following bit patterns is received: "1001", "0001", "1101", "1011", "1000"	EN 300 417-1-1 [6] annex B	m	
2	NDF Disabled occurs when any of the following bit patterns is received: "0110", "1110", "0010", "0100", "0111"	EN 300 417-1-1 [6] annex B	m	
3	The norm_point event corresponds to a received pointer word with: NDF disabled AND match of ss-bits AND received pointer offset value equal to active offset value	EN 300 417-1-1 [6] annex B	m	
4	The NDF_enable event corresponds to a received pointer word with: NDF enabled AND match of ss-bits AND received pointer offset value in range	EN 300 417-1-1 [6] annex B	m	
5	The AIS_ind event corresponds to a received pointer word set to 11111111 11111111 (FF FF Hex)	EN 300 417-1-1 [6] annex B	m	
6	The inc_ind event corresponds to a received pointer word with: NDF disabled AND match of ss-bits AND majority of D-bits inverted AND no majority of D-bits inverted	EN 300 417-1-1 [6] annex B	m	
7	The inv_point event corresponds to any other received pointer word: NOT norm_point AND NOT NDF_enable AND NOT AIS_ind AND NOT [(inc_ind OR dec_ind) AND NORM_state]	EN 300 417-1-1 [6] annex B	m	
8	The new_point event corresponds to a received pointer word with: NDF disabled AND match of ss-bits AND received pointer offset value in range but not equal to active offset value	EN 300 417-1-1 [6] annex B	m	
9	The remaining six NDF codes ("0000", "0011", "0101", "1010", "1100", "1111") result in an inv_pointer indication.	EN 300 417-1-1 [6] annex B	m	
10	The 8*NDF_enable event corresponds to 8 consecutive NDF_enable events.	EN 300 417-1-1 [6] annex B	m	
11	The 3*AIS_ind corresponds to three consecutive AIS_ind events.	EN 300 417-1-1 [6] annex B	m	
12	The 8* inv_point event corresponds to 8 consecutive inv_point events.	EN 300 417-1-1 [6] annex B	m	
13	The 3*any_point corresponds to the following combination of events: 3*NOT NDF_enable AND NOT 3*AIS_ind AND NOT 3*new_point	EN 300 417-1-1 [6] annex B	m	
14	The 3*new_point corresponds to three consecutive equal new_point events.	EN 300 417-1-1 [6] annex B	m	

Table B.75: Operation in NORM state

Item	Operation in NORM state	Reference	Status	Support
1	Reception: inc_ind Transition to state: INC Action: increment active offset	EN 300 417-1-1 [6] annex B	m	
2	Reception: dec_ind Transition to state: DEC Action: decrement active offset	EN 300 417-1-1 [6] annex B	m	
3	Reception: NDF_enable Transition to state: NDF Action: accept new offset	EN 300 417-1-1 [6] annex B	m	
4	Reception: 3*new_point Transition to state: NORM Action: accept new offset	EN 300 417-1-1 [6] annex B	m	
5	Reception: 8*inv_point Transition to state: LOP Action: offset undefined	EN 300 417-1-1 [6] annex B	m	
6	Reception: 3*AIS_ind Transition to state: AIS Action: offset undefined	EN 300 417-1-1 [6] annex B	m	

Table B.76: Operation in INC state

Item	Operation in INC state	Reference	Status	Support
1	Reception: 3*new_point Transition to state: NORM Action: accept new offset	EN 300 417-1-1 [6] annex B	m	
2	Reception: 3*AIS_ind Transition to state: AIS Action: offset undefined	EN 300 417-1-1 [6] annex B	m	
3	Reception: 3*any_point Transition to state: NORM Action: none	EN 300 417-1-1 [6] annex B	m	
4	Reception: NDF_enable Transition to state: NDF Action: accept new offset	EN 300 417-1-1 [6] annex B	m	

Table B.77: Operation in DEC state

Item	Operation in DEC state	Reference	Status	Support
1	Reception: 3*new_point Transition to state: NORM Action: accept new offset	EN 300 417-1-1 [6] annex B	m	
2	Reception: 3*AIS_ind Transition to state: AIS Action: offset undefined	EN 300 417-1-1 [6] annex B	m	
3	Reception: 3*any_point Transition to state: NORM Action: none	EN 300 417-1-1 [6] annex B	m	
4	Reception: NDF_enable Transition to state: NDF Action: accept new offset	EN 300 417-1-1 [6] annex B	m	

Table B.78: Operation in NDF state

Item	Operation in NDF state	Reference	Status	Support
1	Reception: 3*new_point Transition to state: NORM Action: accept new offset	EN 300 417-1-1 [6] annex B	m	
2	Reception: 3*AIS_ind Transition to state: AIS Action: offset undefined	EN 300 417-1-1 [6] annex B	m	
3	Reception: 3*any_point Transition to state: NORM Action: none	EN 300 417-1-1 [6] annex B	m	
4	Reception: NDF_enable Transition to state: NDF Action: accept new offset	EN 300 417-1-1 [6] annex B	m	
5	Reception: 8*NDF_enable Transition to state: LOP Action: offset undefined	EN 300 417-1-1 [6] annex B	m	

Table B.79: Operation in LOP state

Item	Operation in LOP state	Reference	Status	Support
1	Reception: 3*new_point Transition to state: NORM Action: accept new offset	EN 300 417-1-1 [6] annex B	m	
2	Reception: 3*AIS_ind Transition to state: AIS Action: offset undefined	EN 300 417-1-1 [6] annex B	m	

Table B.80: Operation in AIS state

Item	Operation in AIS state	Reference	Status	Support
1	Reception: 3*new_point Transition to state: NORM Action: accept new offset	EN 300 417-1-1 [6] annex B	m	
2	Reception: 3*AIS_ind Transition to state: AIS Action: offset undefined	EN 300 417-1-1 [6] annex B	m	
3	Reception: 8*inv_point Transition to state: LOP Action: offset undefined	EN 300 417-1-1 [6] annex B	m	
4	Reception: NDF_enable Transition to state: NDF Action: accept new offset	EN 300 417-1-1 [6] annex B	m	

Table B.81: Pointer interpretation: complements

Item	Pointer interpretation: complements	Reference	Status	Support
1	Non-consecutive invalid indications do not activate the transition to the LOP_state.	EN 300 417-1-1 [6] annex B	m	
2	The pointer processor maintains its current phase on detection of an invalid pointer and searches in parallel for a new phase.	4.3.6.3-4-5-6	m	
3	The reception of 3*new_point takes precedence over any other events.	EN 300 417-1-1 [6] annex B	m	
4	The 2nd and 3rd offset value received in 3*new_point needs to be identical with the 1st.	EN 300 417-1-1 [6] annex B	m	
5	The "consecutive new_point" counter is reset to zero on a change of state, except for transitions occurring among INC, DEC, NDF states and the NORM state.	EN 300 417-1-1 [6] annex B	m	
6	The "consecutive inv_point counter" can be incremented in all states. The "consecutive inv_point" counter is not reset on a change of state.	EN 300 417-1-1 [6] annex B	m	
7	The "consecutive AIS_ind" counter is not reset on a change of state.	EN 300 417-1-1 [6] annex B	m	
8	The "consecutive NDF_enable" counter is reset to zero on a change of AIS to NDF state; otherwise the counter is not reset.	EN 300 417-1-1 [6] annex B	m	

B.4.2.6.2.3 VC-4 Layer to VC-3/2/12/11 Layer multiplexing and demultiplexing processes

Table B.82: Multiplexing

Prerequisite: B.1/8 -- implies that at least one TUG/Sm_A_So (m = 3,2,12,11*) function is present

Item	Multiplexing	Reference	Status	Support
1	The VC-3 is multiplexed into the TUG_AI_D/K.0.0 (K = 1..3) via a TU-3, according to the pointer generation algorithm	4.3.5.3	c8201	
2	The VC-2 is multiplexed into the TUG_AI_D/K.L.0 (K = 1..3; L = 1,..,7) via a TU-2, according to the pointer generation algorithm	4.3.5.4	c8202	
3	The VC-12 is multiplexed into the TUG_AI_D/K.L.M (K = 1..3; L = 1..7; M = 1..3) via a TU-12, according to the pointer generation algorithm	4.3.5.5	c8203	
4	The VC-11 is multiplexed into the TUG_AI_D/K.L.M (K = 1..3; L = 1..7; M = 1..3) via a TU-12, according to the pointer generation algorithm	4.3.5.6	c8204	
5	The VC-11 is transported within a TU-12; 9 bytes of fixed stuff (figure 30) are added per 125 µs to the VC-11 as specified by ETS 300 147 [1] to map the VC-11 into the TU-12 payload.	4.3.5.6, figure 30	c8204	
6	Bytes allocated to the TU-3 pointer are multiplexed into the TUG_AI_D/K.0.0 (K = 1,2,3).	4.3.5.3	c8201	
7	Bytes allocated to the TU-2 pointer are multiplexed into the TUG_AI_D/K.L.0 (K = 1,2,3; L = 1..7).	4.3.5.4	c8202	
8	Bytes allocated to the TU-12 pointer are multiplexed into the TUG_AI_D/K.L.M (K = 1..3; L = 1..7; M = 1..3).	4.3.5.5-6	c8205	

c8201: IF B.1/18 THEN m ELSE n/a -- TUG/S3_A_So present
c8202: IF B.1/20 THEN m ELSE n/a -- TUG/S2_A_So present
c8203: IF B.1/22 THEN m ELSE n/a -- TUG/S12_A_So present
c8204: IF B.1/24 THEN m ELSE n/a -- TUG/S11*_A_So present
c8205: IF (B.1/22 OR B.1/24)
THEN m ELSE n/a -- TUG/S12_A_So and/or TUG/S11*_A_So present

Table B.83: Demultiplexing

Prerequisite: B.1/9 -- implies that at least one TUG/Sm_A_Sk = 3,2,12,11* function is present

Item	Demultiplexing	Reference	Status	Support
1	The VC-3 pointer is recovered from the TUG_AI_D/K.0.0 (K = 1,2,3).	4.3.6.3	c8301	
2	The VC-3 is recovered from TUG_AI_D/K.0.0 (K = 1,2,3) according to the pointer interpretation algorithm.	4.3.6.3	c8301	
3	The VC-2 pointer is recovered from the TUG_AI_D/K.L.0 (K = 1,2,3; L = 1..7).	4.3.6.4	c8302	
4	The VC-2 is recovered from TUG_AI_D/K.L.0 (K = 1,2,3; L = 1..7) according to the pointer interpretation algorithm.	4.3.6.4	c8302	
5	The VC-12 pointer is recovered from the TUG_AI_D/K.L.M (K = 1..3; L = 1..7; M = 1..3)..	4.3.5.5-6	c8303	
6	The VC-12/11* is recovered from TUG_AI_D/K.L.M (K = 1..3; L = 1..7; M = 1..3) according to the pointer interpretation algorithm.	4.3.6.5-6	c8303	

c8301: IF B.1/19 THEN m ELSE n/a -- TUG/S3_A_Sk present
c8302: IF B.1/21 THEN m ELSE n/a -- TUG/S2_A_Sk present
c8303: IF (B.1/23 OR B.1/25)
THEN m ELSE n/a -- TUG/S12_A_Sk and/or TUG/S11*_A_Sk present

B.4.2.7 VC-4 Layer to DQDB Layer Adaptation Functions: S4/DQDB_A_So and S4/DQDB_A_Sk

Prerequisite: B.1/10 OR B.1/11 -- S4/DQDB_A_So and/or S4/DQDB_A_Sk present

Table B.84: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The S4/DQDB_A_So function provides the mapping of a DQDB slots (whose frequency accuracy is within ±4,6 ppm) into VC-4 and it also adds the bytes F2, F3,C2 and H4 of specific client information.	4.3.9, figure 45, ETS 300 216 [4]	c8401	
2	The DQDB slots are located horizontally (by row) in the VC-4 payload capacity with the slot boundaries aligned with the VC-4 octet boundaries. Because the VC-4 payload capacity is not an integer multiple of the DQDB slot length (53 octets), a slot is allowed to cross the VC-4 boundary.	4.3.9, figure 44	c8401	
3	The S4/DQDB_A_So generates a fixed Frame Start (FS)	4.3.9	c8401	
4	The S4/DQDB_A_Sk function recovers DQDB Characteristic Information from the synchronous container-4 as specified in the ETS 300 216 [4], bytes F2, F3,C2 and H4 of the VC-4 overhead.	4.3.10, ETS 300 216 [4]	c8402	

c8401: IF B.1/10 THEN m ELSE n/a -- S4/DQDB_A_So present
c8402: IF B.1/11 THEN m ELSE n/a -- S4/DQDB_A_Sk present

Table B.85: DQDB dedicated signals

Item	Adaptation process	Reference	Status	Support
1	The signal DQDB_CI_DSTATUS provides an indication to the S4/DQDB_A_So function that the DQDB_CI_D is either VALID or INVALID	4.3.9, IEEE Standard 802.6 [11] subclause 4	c8501	
2	The signal DQDB_CI_DSTATUS provides an indication to the DQDB layer that the DQDB_CI_D is either VALID or INVALID.	4.3.10, IEEE Standard 802.6 [11] subclause 4	c8502	
3	The S4/DQDB_A_Sk function provides to the DQDB layer a 125 µs timing information (DQDB_CI_TMARK).	4.3.10, IEEE Standard 802.6 [11] subclause 4	c8502	
4	The S4/DQDB_A_Sk function provides to the DQDB layer the operational state of the transmission link (DQDB_CI_LSTATUS) between two adjacent DQDB nodes.	4.3.10, IEEE Standard 802.6 [11] subclause 4	c8502	

c8501: IF B.1/10 THEN m ELSE n/a -- S4/DQDB_A_So present
c8502: IF B.1/11 THEN m ELSE n/a -- S4/DQDB_A_Sk present

Comment: The signals DQDB_CI_DTYPE, DQDB_CI_DSTATUS, DQDB_CI_TMARK and DQDB_CI_LSTATUS represent the services provided by the Physical Layer at Each Service Access point to the DQDB layer defined in IEEE Standard 802.6 [11] part 4.

B.4.2.7.1 DQDB slot payload scrambling/descrambling

Table B.86: Scrambling/descrambling: principles

Item	Scrambling/descrambling: principles	Reference	Status	Support
1	The scrambler/descrambler operates for a duration of the 48 octet slot payload. Operation is suspended and the scrambler/descrambler state is retained at all other times.	4.3.9, 4.3.10	m	
2	A self-synchronous scrambler/descrambler with generator polynomial $x^{43} + 1$ is used.	4.3.9, 4.3.10	m	

Table B.87: Scrambling

Prerequisite: B.1/10 -- S4/DQDB_A_So present

Item	Scrambling	Reference	Status	Support
1	The slot payload of 48 octets is scrambled before mapping in the VC-4 frame.	4.3.9	m	

Table B.88: Descrambling

Prerequisite: B.1/11 -- S4/DQDB_A_Sk present

Item	Descrambling	Reference	Status	Support
1	The descrambler operates for the duration of the assumed slot payload according to the derived slot delineation.	4.3.10	m	

B.4.2.7.2 DQDB slot boundary indication/delineation process

Table B.89: DQDB slot boundary indication/delineation: principles

Item	DQDB slot boundary indication/delineation: principles	Reference	Status	Support
1	The S4/DQDB_A_So function makes use of a dedicated input signal, DQDB_CI_DTYPE to identify the boundary of the slot (first octet), the M1 and M2 management octets in the incoming DQDB_CI_D stream.	4.3.9, IEEE Standard 802.6 [11] subclause 4	c8901	
2	The S4/DQDB_A_Sk function make use of a dedicated output signal, DQDB_CI_DTYPE to indicate the boundary of the slot (first octets), the M1 and M2 management octets in DQDB_CI_D stream sent to the DQDB layer	4.3.10, IEEE Standard 802.6 [11] subclause 4	c8902	

c8901: IF B.1/10 THEN m ELSE n/a -- S4/DQDB_A_So present
c8902: IF B.1/11 THEN m ELSE n/a -- S4/DQDB_A_Sk present

Comment: The signal DQDB_CI_DTYPE represents a service provided by the Physical Layer at Each Service Access point to the DQDB layer defined in IEEE Standard 802.6 [11] part 4.

Table B.90: DQDB slot boundary indication/delineation improvement

Item	DQDB slot boundary indication/delineation improvement	Reference	Status	Support
1	An eight bit pattern is added (module 2) to the HCS field of the slot header in order to improve slot delineation procedure in the sink direction. The added bit pattern is "01010101".	4.3.9	c9001	
2	Following slot delineation, the bit pattern "0101 0101" is subtracted (equal to add modulo 2) from the HCS field of the slot headers and then descrambled	4.3.10	c9002	

c9001: IF B.1/10 THEN m ELSE n/a -- S4/DQDB_A_So present
c9002: IF B.1/11 THEN m ELSE n/a -- S4/DQDB_A_Sk present

Table B.91: DQDB slot boundary indication

Prerequisite: B.1/10 -- S4/DQDB_A_So present

Item	DQDB slot boundary indication	Reference	Status	Support
1	Bit 3 to 8 of the H4 octet form the slot offset indicator.	4.3.9, figure 46	m	
2	Slot boundary indication is provided on a 125 µs basis by use of six bit field in the H4 octet.	4.3.9	m	
3	The slot offset indicator contains a binary number indicating the offset in octets between the H4 octet and the first slot boundary following the H4 octet.	4.3.9	m	
4	The valid range of the slot offset indicator value is 0 to 52.	4.3.9	m	

Table B.92: DQDB slot boundary delineation

Prerequisite: B.1/11 -- S4/DQDB_A_Sk present

Item	DQDB slot boundary delineation	Reference	Status	Support
1	Slot delineation is achieved using the H4 octet slot offset indicator method.	4.3.10	o.9201	
2	Slot delineation is achieved using the HCS method.	4.3.10	o.9201	
3	When using the H4 octet slot offset indicator method, the H4 slot offset indicator value provides slot boundary indication.	4.3.10, ETS 300 216 [4] subclause 5.6.1.1.1.	c9201	
4	A H4 slot offset indicator value out of range is regarded as an unexpected slot offset indicator value.	4.3.10, ETS 300 216 [4] subclause 5.6.1.1.1.	c9201	
5	When using the HCS method, slot boundaries are derived within the VC-4 payload using the correlation between the 3 slot header octets that are protected by the HCS, and the slot header HCS octet itself.	4.3.10, ETS 300 216 [4] subclause 5.6.1.1.2.	c9202	

o.9201: It is mandatory to support exactly one of these items -- only one method of slot delineation supported
c9201: IF B.92/1 THEN m ELSE n/a -- H4 octet slot offset indicator method supported for slot delineation
c9202: IF B.92/2 THEN m ELSE n/a -- HCS method supported for slot delineation

B.4.2.7.3 Link Status Signal processing

Table B.93: Link Status Signal insertion

Prerequisite: B.1/10 -- S4/DQDB_A_So present

Item	Link Status Signal insertion	Reference	Status	Support
1	The bits 1 and 2 of the H4 octet are used for the LSS code.	4.3.9, figure 46, IEEE Standard 802.6 [11] subclause 11.3.2.	m	
2	The Link Status Signal is used to communicate information about the status of the transmission link between two adjacent DQDB nodes.	4.3.9	m	
3	The LSS codes conform to table 30 in EN 300 417-4-1 [8] subclause 4.3.9.	4.3.9, table 30	m	

Table B.94: Link Status Signal recovery

Prerequisite: B.1/11 -- S4/DQDB_A_Sk present

Item	Link Status Signal recovery	Reference	Status	Support
1	The bits 1 and 2 of the H4 octet are recovered and processed to generate the outgoing LSS.	4.3.10	m	
2	The outgoing LSS is generated from the LSS code in bits 1 and 2 of the H4 octet in accordance to table 30 in EN 300 417-4-1 [8] subclause 4.3.9.	4.3.10, table 30	m	

B.4.2.7.4 Payload type processing

Table B.95: Payload type generation

Prerequisite: B.1/10 -- S4/DQDB_A_So present

Item	Payload type generation	Reference	Status	Support
1	The S4/DQDB_A_So function inserts in byte C2 code "0001 0100" (which indicates an IEEE Standard 802.6 [11] payload as defined in ETS 300 147 [1]).	4.3.9, figure 46, IEEE Standard 802.6 [11] subclause 11.3.2, ETS 300 147	m	

Table B.96: Payload type recovery

Prerequisite: B.1/11 -- S4/DQDB_A_Sk present

Item	Payload type recovery	Reference	Status	Support
1	The 4/DQDB_A_Sk function compares the content of the accepted C2 byte with the expected value code "0001 0100" (Man (DQDB) mapping, IEEE Standard 802.6 [11]) as a check on consistency between the provisioning operation at each end.	4.3.10	m	
2	The application and acceptance and mismatch process conform to EN 300 417-1-1 [6], subclause 7.2 and 8.2.1.2.	4.3.10, EN 300 417-1-1 [6] subclause 7.2, subclause 8.2.1.2	m	

B.4.2.7.5 DQDB Layer management information transport

Table B.97: DQDB Layer management information transport

Item	DQDB Layer management information transport	Reference	Status	Support
1	DQDB Layer management information octets (M1 and M2) are inserted in bytes F2 and F3 of the VC-4 overhead.	4.3.9	c9701	
2	Bytes F2 and F3 of the VC-4 overhead are sent to the DQDB layer without any processing in the atomic function.	4.3.10	c9702	

c9701: IF B.1/10 THEN m ELSE n/a -- S4/DQDB_A_So present
c9702: IF B.1/11 THEN m ELSE n/a -- S4/DQDB_A_Sk present

B.4.2.8 VC-4 Layer to ATM Layer Compound Adaptation Functions: S4/Avp_A_So and S4/Avp_A_Sk

The specification of this function is under study.

B.4.2.9 VC-4 Layer to LC Layer Adaptation Function: S4/LC_A_So

The specification of this function is in EN 300 417-6-1 [9].

B.4.2.10 VC-4 Layer to TSS1 Layer Adaptation Functions: S4/TSS1_A_So and S4/TSS1_A_Sk

Prerequisite: B.1/28 OR B.1/29 -- S4/TSS1_A_So and/or S4/TSS1_A_Sk present

Table B.98: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The S4/TSS1_A_So function maps a VC-4 synchronous Test Signal Structure TSS1 PRBS stream into a VC-4 payload and adds the C2 and H4 bytes.	4.3.11, ITU-T Rec.O.181 [17]	c9801	
2	The S4/TSS1_A_So function creates a 2^{23}-1 PRBS with timing derived from the S4_TI_Ck and maps it without justification bits into the whole of the synchronous container-4.	4.3.11, figure 49, ITU-T Rec.O.181 [17]	c9801	
3	The S4/TSS1_A_Sk function recovers a TSS1 2^{23}-1 PRBS test sequence from the synchronous container-4 (having a frequency accuracy within ±4,6 ppm) and monitors the reception of the correct payload signal type and for the presence of test sequence bit errors (TSE) in the PRBS sequence.	4.3.12	c9802	

c9801: IF B.1/28 THEN m ELSE n/a -- S4/TSS1_A_So present
c9802: IF B.1/29 THEN m ELSE n/a -- S4/TSS1_A_Sk present

B.4.2.10.1 Payload type processing

Table B.99: Payload type generation

Prerequisite: B.1/28 -- S4/TSS1_A_So present

Item	Payload type generation	Reference	Status	Support
1	The function S4/TSS1_A_So inserts code "1111 1110" (TSS1 in the Container-4) into byte C2 of the VC-4 overhead.	4.3.11, figure 49, ETS 300 147 [1], ITU-T Rec.G.707 [14]	m	

Table B.100: Payload type recovery

Prerequisite: B.1/29 -- S4/TSS1_A_Sk present

Item	Payload type recovery	Reference	Status	Support
1	The S4/TSS1_A_Sk function compares the content of the recovered C2 byte (RxSL) with the expected value code "1111 1110" (TSS1 into the Container-4).	4.3.12	m	
2	The application and acceptance and mismatch process are as specified in EN 300 417-1-1 [6], subclauses 7.2 and 8.2.1.2.	4.3.12, EN 300 417-1-1 [6] subclause 7.2, subclause 8.1.2	m	

B.4.2.10.2 H4 byte processing

Table B.101: H4 byte recovery

Prerequisite: B.1/29 -- S4/TSS1_A_Sk present

Item	H4 byte recovery	Reference	Status	Support
1	The value of H4 is ignored	4.3.12	m	

B.4.2.11 VC-4 Layer to P0s Layer Adaptation Functions: S4/P0s_A_So and S4/P0s_A_Sk

Prerequisite: B.1/10 OR B.1/11 -- S4/P0s_A_So and/or S4/P0s_A_Sk present

Table B.102: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The S4/P0s_A_So function provides the multiplexing of a 64 kbit/s information stream into the S4_AI using slip buffering. It takes P0s_CI, defined in ETS 300 166 [2] as an octet structured bit-stream with a synchronous bit rate of 64 kbit/s , present at its input and inserts it into the VC-4 POH byte F2 as defined in ETS 300 147 [1] and depicted in figure 2.	4.3.7, figure 2, figure 40 ETS 300 166 [2], ETS 300 147 [1]	c10201	
2	The S4/P0s_A_Sk function extracts the path user channel byte F2 from the VC-4 layer Characteristic Information.	4.3.8, figure 2, figure 40	c10202	

c10201: IF B.1/26 THEN m ELSE n/a -- S4/P0s_A_So present
c10202: IF B.1/27 THEN m ELSE n/a -- S4/P0s_A_Sk present

B.4.2.11.1 VC-4 Layer to P0s Layer frequency justification and bitrate adaptation processes

Table B.103: Frequency justification and bitrate adaptation: principles

Prerequisite: B.1/10 -- S4/P0s_A_So present

Item	Frequency justification and bitrate adaptation: principles	Reference	Status	Support
1	Frequency justification is performed by slip buffering.	4.3.7	m	

Table B.104: Frequency justification and bitrate adaptation: source direction

Prerequisite: B.1/10 -- S4/P0s_A_So present

Item	Frequency justification and bitrate adaptation: source direction	Reference	Status	Support
1	The S4/P0s_A_So function provides for an elastic store (slip buffer) process. The data signal is written into the buffer under control of the associated input clock. The data are read out of the buffer under control of the VC-4 clock, frame position (S4_TI), and justification decisions.	4.3.7	m	
2	Each justification decision results in a corresponding negative/positive justification (slip) action. Upon a positive justification (slip) action, the reading of one 64 kbit/s octet (8 bits) are cancelled once. Upon a negative justification (slip) action, the same 64 kbit/s octet (8 bits) are read out a second time.	4.3.7	m	
3	The elastic store (slip buffer) accommodates at least 18 μs of wander without introducing errors.	4.3.7, ITU-T Rec.G.823 [15]	m	

B.4.2.11.2 Data latching and smoothing process

Table B.105: Data latching and smoothing process

Prerequisite: B.1/11 -- S4/P0s_A_Sk present

Item	Data latching and smoothing process	Reference	Status	Support
1	The S4/P0s_A_Sk function provides a data latching and smoothing function. Each 8-bit octet received is written and latched into a data store under the control of the VC-4 signal clock. The eight data bits are read out of the store using a nominal 64 kHz clock which may be derived directly from the incoming STM-N signal clock (e.g. 155 520 kHz divided by a factor of 2 430 × N).	4.3.8	m	

B.4.3 VC-4 Layer Linear Trail Protection Transmission Tables

Prerequisite: B.1/38 -- VC-4 Layer Linear Trail Protection supported

Table B.106: Protection operation

Item	Protection operation	Reference	Status	Support
1	The APS channel is a 4 bits channel carried into bits 1-4 of byte K3 (formerly byte Z4).	4.5.1.1, EN 300 417-3-1 [7] A.1	c10601	
2	The signal switching procedure is started under Signal Fail (SF = SSF, originated as AI_TSF) or Signal Degrade (SD = SSD originated as AI_TSD) conditions.	4.5.1.1-2, EN 300 417-3-1 [7] A.1	m	
3	For unidirectional switching and revertive operation the available external commands are LO, FSw-#1, MSw-#1, CLR.	4.5.1.1, EN 300 417-3-1 [7] A.1	c10602	
4	For unidirectional switching and non-revertive operation the available external commands are LO or FSw, FSw-#i, MSw-#i, CLR (i = 0, 1).	4.5.1.1, EN 300 417-3-1 [7] A.1	c10603	
5	For bidirectional switching and revertive operation the available external commands are LO, FSw-#1, MSw-#1, CLR.	4.5.1.2, EN 300 417-3-1 [7] A.1	c10604	
6	For bidirectional switching and non-revertive operation the available external commands are LO or FSw, FSw-#i, MSw-#i, CLR (i = 0, 1).	4.5.1.2, EN 300 417-3-1 [7] A.1	c10605	
7	The Wait-To-Restore (WTR) time is provisionable	4.5.1.1-2, EN 300 417-3-1 [7] A.1	c10606	
8	The Hold-off (HO) time is provisionable in steps of the order of 100 ms	4.5.1.1-2, EN 300 417-3-1 [7] A.1	m	

c10601: IF (B.4/3 OR B.4/4) THEN m ELSE o -- Linear Trail Protection bidirectional switching supported
c10602: IF B.4/1 THEN m ELSE n/a -- Linear Trail Protection unidirectional switching and revertive operation supported
c10603: IF B.4/2 THEN m ELSE n/a -- Linear Trail Protection unidirectional switching and non-revertive operation supported
c10604: IF B.4/3 THEN m ELSE n/a -- Linear Trail Protection bidirectional switching and revertive operation supported
c10605: IF B.4/4 THEN m ELSE n/a -- Linear Trail Protection bidirectional switching and non-revertive operation supported
c10606: IF (B.4/1 OR B.4/3) THEN m ELSE n/a -- Linear Trail Protection revertive operation supported

Comments: The Linear Protection Switching Operation is generically described in annex A of EN 300 417-3-1 [7].

Table B.107: Protection architecture characteristic parameters

Item	Protection architecture characteristic parameters	Reference	Status	Support	Values	
					Allowed	Supported
1	Wait-To-Restore (WTR) time: X value	4.5.1.1-2, EN 300 417-3-1 [7] A.1	c10701		$0 \leq X \leq 12$ minutes	
2	Hold-off (HO) time: Z value	4.5.1.1-2, EN 300 417-3-1 [7] A.1	m		$0 \leq Z \leq 10$ s	
3	Switching time (Y) is less than or equal to 50 ms	4.5.1.1-2, EN 300 417-3-1 [7] A.1	m		___	___

c10701: IF (B.4/1 OR B.4/3) THEN m ELSE n/a -- Linear Trail Protection revertive operation supported

B.4.3.1 VC-4 Layer Linear Trail Protection Connection Function: S4P_C

Table B.108: Connectivity functionalities: generalities

Item	Connectivity functionalities: generalities	Reference	Status	Support
1	The VC-4 Protection Connection function performs the VC-4 linear trail protection process for 1+1 protection architectures.	4.5.1.1, 4.5.1.2	m	
2	The VC-4 Protection Connection function performs the bridge and selector functionality.	4.5.1.1, 4.5.1.2	m	
3	It is possible to change between operation types without disturbing the CI passing the connection unless any protection switching action is activated/required.	4.5.1.1, 4.5.1.2	c10801	
4	It is possible to change the WTR time without disturbing the CI passing the connection any protection switching action is activated/required.	4.5.1.1, 4.5.1.2	c10802	
5	It is possible to change the Hold-off time of a connection without disturbing the CI passing the connection any protection switching action is activated/required.	4.5.1.1, 4.5.1.2	c10803	
6	The protection type can be changed via S4_C_MI_PROTtype	4.5.1.2	c10804	
7	The operation type can be changed via S4_C_MI_OPERtype	4.5.1.1, 4.5.1.2	c10801	

c10801: IF (B.4/1 OR B.4/3) AND (B.4/2 OR B.4/4)
THEN m ELSE n/a -- at least one revertive and one non-revertive Trail protection scheme supported
c10802: IF B.107/1 THEN m ELSE n/a -- Wait-To-Restore (WTR) time supported
c10803: IF B.107/2 THEN m ELSE n/a -- Hold-off (HO) time supported
c10804: IF (B.4/1 OR B.4/2) AND (B.4/3 OR B.4/4)
THEN m ELSE n/a -- both unidirectional and bidirectional Trail protection scheme supported

Table B.109: Connectivity functionalities: source direction

Item	Connectivity functionalities: source direction	Reference	Status	Support
1	The working output is connected to the associated normal input. The protection output is also connected to the normal input.	4.5.1.1, 4.5.1.2	m	
2	The working outputs are connected to the associated normal inputs for 1+1 protection.	4.5.1.1, 4.5.1.2	m	

Table B.110: Connectivity functionalities: sink direction

Item	Connectivity functionalities: sink direction	Reference	Status	Support
1	The signal output at the normal reference point can be the signal received via either the associated working path or the protection path.	4.5.1.1, 4.5.1.2	m	

B.4.3.2 VC-4 Layer Linear Trail Protection Trail Termination Functions: S4P_TT_So and S4P_TT_Sk

Table B.111: Trail termination process

Item	Trail termination process	Reference	Status	Support
1	The S4_AI at the output of the S4P_TT_So is identical to the S4P_CI at its input.	4.5.2.1	c11101	
2	The S4P_TT_Sk function reports the state of the protected VC-4 trail.	4.5.2.2	m	
3	In case all connections are unavailable the S4P_TT_Sk reports the signal fail condition of the protected trail.	4.5.2.2	m	

c11101: IF B.5/2 THEN m ELSE n/a -- S4P_TT_So function supported

B.4.3.3 VC-4 Layer Linear Trail Protection Adaptation Functions:S4/S4P_A_So and S4/S4P_A_Sk

B.4.3.3.1 VC-4 Layer to VC-4 Protection Layer multiplexing and demultiplexing processes

Table B.112: Multiplexing

Prerequisite: B.5/4 -- S4/S4P_A_So present

Item	Multiplexing	Reference	Status	Support
1	The S4/S4P_A_So inserts the S4P_CI_D signal into the S4P_AI_D signal	4.5.3.1	m	
2	The S4/S4P_A_So inserts the S4 APS signal into S4_AI	4.5.3.1	c11201	

c11201: IF (B.4/3 OR B.4/4) THEN m ELSE o -- Linear Trail Protection bidirectional switching supported

Comment: S4 APS signal insertion is required only for the protection path.

Table B.113: Demultiplexing

Item	Demultiplexing	Reference	Status	Support
1	The S4/S4P_A_Sk extracts the S4P_CI_D signal from the S4_AI_D signal.	4.5.3.2	m	
2	The S4/S4P_A_Sk extracts the S4 APS signal from the S4_AI.	4.5.3.2	c11301	

c11301: IF (B.4/3 OR B.4/4) THEN m ELSE o -- Linear Trail Protection bidirectional switching supported

Comment: The extraction and persistency processing of the S4 APS signal is required only for the protection path.

B.4.4 VC-4 Layer Linear Trail Protection and Sub-Network Connection (SNC) Protection processes

Prerequisite: B.1/38 OR B.1/39 -- VC-4 Layer Linear Trail Protection and/or SNC Protection supported

B.4.4.1 APS externally initiated commands

Table B.114: Issuing of External Switching Commands

Item	Issuing of External Switching Commands	Reference	Status	Support
1	The external commands are received from the EMF.	ETS 300 746 [10] subclauses 6.1, 6.2	m	

Table B.115: Transmission of External Switching Requests

Prerequisite: B.114/1 -- External Switching Command issuing is supported

Item	Transmission of External Switching Requests	Reference	Status	Support
1	The external requests are issued via the APS bytes.	ETS 300 746 [10] subclause 6.1	n/a	
2	The external requests are issued via the EMF.	ETS 300 746 [10] subclause 6.1	m	

Table B.116: External Switching Commands

Prerequisite: B.114/1 -- External Switching Command issuing is supported

Item	External Switching Commands	Reference	Status	Support
1	The external command Clear (CLR) conforms to the definition given in the whole point 1) clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
2	The external command Lockout of Protection (LO) conforms to the definition given in the whole point 2) clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
3	The external command Forced Switch #i (FSw-#i) conforms to the definition given in the whole point 3) of clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
4	The external command Manual Switch #i (MSw-#i) conforms to the definition given in the whole point 4) clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
5	The external command Exercise #i (EXER #i) conforms to the definition given in the whole point 5) clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
6	The descending order of priority for external switching commands is: CLR, LO, FSw-#i, MSw-#i, EXER #i.	EN 300 417-3-1 [7] A.2	m	

B.4.4.2 APS automatically initiated commands

Table B.117: Automatic Generation of Requests

Item	Automatic Generation of Requests	Reference	Status	Support
1	The NE initiates the following automatic requests: Signal Failure (SF), Signal Degrade (SD).	ETS 300 746 [10] subclauses 6.1, 6.2	m	
2	The NE initiates the automatic request Wait To Restore (WTR).	ETS 300 746 [10] subclauses 6.1, 6.2	c11701	

c11701: IF (B.4/1 OR B.4/3 OR B.4/5 OR B.4/7 OR B.4/9) THEN m ELSE n/a -- revertive operation supported

Table B.118: Transmission of Automatically Generated Requests

Prerequisite: B.4/3 OR B.4/4 -- VC-4 Layer Linear Trail Protection bidirectional switching supported

Item	Transmission of Automatically Generated Requests	Reference	Status	Support
1	The automatically generated requests are issued via the APS bytes.	ETS 300 746 [10] subclause 6.1	m	

Table B.119: Automatically Generated Requests

Item	Automatically Generated Requests	Reference	Status	Support
1	In the Wait to restore (WTR) state the operation is such that in the revertive mode of operation, the normal signal will be restored when the working trail has recovered from the fault.	EN 300 417-3-1 [7] A.4	c11901	
2	An SF or SD condition will override the WTR.	EN 300 417-3-1 [7] A.4	c11901	
3	After the WTR period is completed, a No Request state will be entered.	EN 300 417-3-1 [7] A.4	c11901	
4	In the Reverse Request state the operation is such that for the case of bidirectional switching, a reverse request is returned for exerciser and for all other requests of higher priority.	EN 300 417-3-1 [7] A.4	n/a	
5	In unidirectional switching, Reverse Request is never indicated.	EN 300 417-3-1 [7] A.4	c11902	
6	In the Do not Revert state the operation is such that in the non-revertive mode of operation, assuming the normal signal is on protection when the working trail is repaired or a switch command is released, the tail end maintains the selection and issues Do not Revert for normal signal 1.	EN 300 417-3-1 [7] A.4	c11903	
7	For the case of bidirectional switching, the head end also maintains the selection and continues indicating reverse request.	EN 300 417-3-1 [7] A.4	c11904	
8	The Do not Revert is removed when pre-empted by a defect condition or an external request.	EN 300 417-3-1 [7] A.4	c11903	
9	In the No Request state none of the trail signal conditions is active, none of the external commands is active, and none of the states described above is active.	EN 300 417-3-1 [7] A.4	m	

c11901: IF (B.4/1 OR B.4/3 OR B.4/5 OR B.4/7 OR B.4/9) THEN m ELSE n/a -- revertive operation supported
c11902: IF (B.4/1 OR B.4/2 OR B.4/5 OR B.4/6 OR B.4/7 OR B.4/8 OR B.4/9)
THEN m ELSE n/a -- unidirectional operation supported

c11903: IF (B.4/2 OR B.4/4 OR B.4/6 OR B.4/8 OR B.4/10) THEN m ELSE n/a -- non-revertive operation supported
c11904: IF B.4/4 THEN m ELSE n/a -- non-revertive and bidirectional operation supported

B.4.4.3 APS generalities

Table B.120: Priority of request types

Item	Priority of request types	Reference	Status	Support
1	The priority of request types conforms to the priority order given in table A.2 (clause A.6) of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.6, table A.2	m	

B.4.4.4 APS sub-processes

Table B.121: Signal request process

Item	Signal request processes	Reference	Status	Support
1	The SRSN is "0" (zero) for the protection trail and "1" for working trail #1.	EN 300 417-3-1 [7] A.9	m	
2	The SRT is generated based on the inputs SF, SD, SFpriority, SDpriority, as specified in the clause "Signal request (type & signal number) processes" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

Comments: The signal request process transfers the input SF and SD signals from a trail into a Signal Request Type (SRT) and Signal Request Signal Number (SRSN).

Table B.122: External request process

Item	External request processes	Reference	Status	Support
1	The ERSN is "0" (zero) if no normal signal is indicated, "1" for normal signal #1.	EN 300 417-3-1 [7] A.9	m	
2	The ERT/ERN is generated as specified in the clause "External request (type & signal number) processes" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

Comments: The external request process transfers the external commands (EXTCMD) into an External Request Type (ERT) and External Request Signal Number (ERSN).

Table B.123: Local request priority process

Item	Local request priority processes	Reference	Status	Support
1	The status of the protection and working input signals (SRT/SRSN #0 to SRT/SRSN #1), the external command (ERT/ERSN), and protection parameters OPERtype and EXTRAtraffic is evaluated by a three step priority logic as specified in the clause "Local request (type & signal number) priority processes" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

Comments: The local request priority process determines the highest priority local request.

Table B.124: Global request priority process

Item	Global request priority processes	Reference	Status	Support
1	The local request (LRT) and the remote request (RRT) are compared to decide which has priority, according to the descending order of priorities in table A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	n/a	
2	A received reverse request is not considered in the comparison.	EN 300 417-3-1 [7] A.9	n/a	
3	The Global Request Type (GRT) and Global Request Signal Number (GRSN) is determined as specified in the clause "Global request (type & signal number) priority processes" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

NOTE: Currently no bidirectional APS signalling protocol is defined EN 300 417-3-1 Annex A for linear VC trail 1+1 SNC Protection schemes.

Table B.125: Control of the selector

Item	Control of the selector	Reference	Status	Support
1	The control of the selector is performed as specified in the clause "Control of the selector" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

Comments: The control of the selector controls which of the normal signals is connected to/extracted from the protection trail.

B.4.4.5 APS status report

Table B.126: APS reporting process

Item	APS reporting process	Reference	Status	Support
1	The active external request are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	m	
2	The active local request are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	m	
3	The active remote request are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	n/a	
4	The reason of denial of an external command are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	m	
5	The condition (SF, SD) of the working and protection trails are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	m	

B.4.5 VC-4 Tandem Connection Sub-layer Transmission Tables

Prerequisite: B.1/33 OR B.1/34 OR B.1/37 -- S4D_TT_So, S4D_TT_Sk and/or S4Dm_TT_Sk present

B.4.5.1 VC-4 Tandem Connection Sub-layer Trail Termination Functions: S4D_TT_So, S4D_TT_Sk and S4Dm_TT_Sk

Table B.127: VC-4 Tandem Connection Termination process

Item	VC-4 Tandem Connection Termination process	Reference	Status	Support
1	The S4D_TT_So compensates VC-4 BIP-8 (in byte B3 of the VC-4 overhead) and generates byte N1 of the VC-4 overhead according to a 76 frame multiframe.	4.6.1	c12701	
2	The S4D_TT_So inserts all-0s in the six reserved bits in frames 73 to 76 of the 76 frame multiframe.	4.6.1	c12701	
3	The S4D_TT_Sk processes byte B3 of the VC-4 overhead, and recovers byte N1 of the VC-4 overhead according to a 76 frame multiframe.	4.6.2	c12702	
4	The S4D_TT_Sk terminates byte N1 of the VC-4 overhead by inserting an all-ZERO pattern, after it has recovered the content of this byte.	4.6.2	c12702	
5	The S4Dm_TT_Sk recovers byte N1 of the VC-4 overhead according to a 76 frame multiframe.	4.6.5	c12703	

c12701: IF B.1/33 THEN m ELSE n/a -- S4D_TT_So present
c12702: IF B.1/34 THEN m ELSE n/a -- S4D_TT_Sk present
c12703: IF B.1/37 THEN m ELSE n/a -- S4Dm_TT_Sk present

B.4.5.1.1 In service error monitoring process

Table B.128: VC-4 BIP-8 compensation: source direction

Prerequisite: B.1/33 -- S4D_TT_So present

Item	VC-4 BIP-8 compensation: source direction	Reference	Status	Support
1	The S4D_TT_So function compensates the VC-4 BIP-8 (in byte B3) according the logical equation given in subclause 4.6.1 of EN 300 417-4-1 [8].	4.6.1	m	

Table B.129: VC-4 BIP-8 compensation: sink direction

Prerequisite: B.1/34 -- S4D_TT_Sk present

Item	VC-4 BIP-8 compensation: sink direction	Reference	Status	Support
1	The S4D_TT_Sk function compensates the VC-4 BIP-8 (in byte B3) according the logical equation given in subclause 4.6.1 of EN 300 417-4-1 [8].	4.6.1, 4.6.2	m	

B.4.5.1.2 Tandem Connection Error Count processes

Table B.130: Incoming Error Count (IEC)

Prerequisite: B.1/33 -- S4D_TT_So present

Item	Incoming Error Count (IEC)	Reference	Status	Support
1	The S4D_TT_So computes even BIP-8 for each bit n of every byte of the preceding VC-4 including B3 and compares it with byte B3 recovered from the current frame.	4.6.1	m	
2	A difference between the computed and recovered BIP-8 values is taken as evidence of one or more errors in the computation block (TC IEC) and is inserted in bits 1 to 4 of byte N1, in accordance to EN 300 417-4-1 [8] subclause 4.6.1, figure 61 and table 50.	4.6.1, figure 61, table 50	m	
3	If AI_SF is true, code "1110" is inserted in bits 1 to 4 of byte N1 instead of the number of incoming BIP-8 violations.	4.6.1	m	

Table B.131: Tandem Connection Error Count

Prerequisite: B.1/34 OR B.1/37 -- S4D_TT_Sk and/or S4Dm_TT_Sk present

Item	Tandem Connection Error Count	Reference	Status	Support
1	The VC-4 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) compute even bit parity for each bit n of every byte of the preceding VC-4 and compares it with bit n of B3 recovered from the current frame (n = 1 to 8 inclusive).	4.6.2, 4.6.5	m	
2	A difference between the computed and recovered B3 values is taken as evidence of one or more errors in the computation block (nON_B).	4.6.2, 4.6.5	m	
3	The magnitude (absolute value) of the difference between this calculated number of errors and the number of errors derived from bits N1[1-4], according to EN 300 417-4-1 [8] subclause 4.6.2 table 52. If this magnitude of the difference is one or more, an errored TC block is detected (nN_B).	4.6.2, figure 64, table 52, 4.6.5	m	

B.4.5.1.3 Tandem Connection Multiframe Alignment process

Table B.132: Multiframe Alignment process: source direction

Prerequisite: B.1/33 -- S4D_TT_So present

Item	Multiframe Alignment process: source direction	Reference	Status	Support
1	The function inserts the Frame Alignment Signal (FAS) "1111 1111 1111 1110" in FAS bits N1[7-8] in frames 1 to 8 of the multiframed N1[7-8] channel.	4.6.1	m	

Table B.133: Multiframe Alignment process: sink direction

Prerequisite: B.1/34 OR B.1/37 -- S4D_TT_Sk and/or S4Dm_TT_Sk present

Item	Multiframe Alignment process: sink direction	Reference	Status	Support
1	The VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) perform a multiframe alignment on bits 7 and 8 of byte N1.	4.6.2, 4.6.5	m	
2	The multiframe alignment is found by searching for the pattern "1111 1111 1111 1110" within the bits 7 and 8 of byte N1.	4.6.2, 4.6.5	m	
3	The multiframe alignment signal is continuously checked with the presumed multiframe start position for the alignment.	4.6.2, 4.6.5	m	

B.4.5.1.4 VC-4 Tandem Connection Remote indicator monitoring process

B.4.5.1.4.1 VC-4 Tandem Connection Remote Defect Indication (TC RDI)

Table B.134: Remote Defect Indication location

Prerequisite: (B.1/33 AND B.1/34) OR B.1/37 -- bidirectional S4D layer and/or S4Dm_TT_Sk present

Item	Remote Defect Indication location	Reference	Status	Support
1	The TC RDI is located in bit 8 of byte N1 in frame 73 of the 76 frame multiframe. This location is expressed with the notation: N1[8][73].	4.6.1, 4.6.2, 4.6.5	m	

Comment: N1[x][y] refers to bit x (x = 7,8) of byte N1 in frame y (y = 1..76) of the 76 frame multiframe.

Table B.135: Remote Defect Indication processing: source direction

Prerequisite: (B.1/33 AND B.1/34) -- bidirectional S4D layer present

Item	Remote Defect Indication processing: source direction	Reference	Status	Support
1	TC RDI code is set upon activation of S4D_RI_RDI determined by the associated S4D_TT_Sk.	4.6.1	m	
2	TC RDI is cleared upon deactivation of S4D_RI_RDI determined by the associated S4D_TT_Sk.	4.6.1	m	
3	TC RDI signal is coded as a '1' bit value.	4.6.1	m	
4	The '0' bit value is inserted if no S4D_RI_RDI signal is active.	4.6.1	m	

Table B.136: Remote Defect Indication processing: sink direction

Prerequisite: B.1/34 OR B.1/37 -- S4D_TT_Sk and/or S4Dm_TT_Sk present

Item	Remote Defect Indication processing: sink direction	Reference	Status	Support
1	The VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) extract and monitor bit location N1[8][73]. A "1" indicates a Remote Defect Indication state, while a "0" indicates the normal, working state.	4.6.2, 4.6.5	m	

Comment: N1[x][y] refers to bit x (x = 7,8) of byte N1 in frame y (y = 1..76) of the 76 frame multiframe.

B.4.5.1.4.2 VC-4 Tandem Connection Remote Error Indication (TC REI)

Table B.137: Remote Error Indication: principles

Prerequisite: (B.1/33 AND B.1/34) OR B.1/37 -- bidirectional S4D layer and/or S4Dm_TT_Sk present

Item	Remote Error Indication: principles	Reference	Status	Support
1	The REI signal indicates if Errored Block (EB) were detected in the trail signal at the far-end trail termination	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	
2	The block length is 18 792 bits (one VC-4). The Error Detection Code (EDC) is BIP-8 in the B3 byte.	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	

Table B.138: Remote Error Indication location

Prerequisite: (B.1/33 AND B.1/34) OR B.1/37 -- bidirectional S4D layer and/or S4Dm_TT_Sk present

Item	Remote Error Indication location	Reference	Status	Support
1	The TC REI is located in bit 5 of byte N1 of the VC-4 overhead.	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	

Table B.139: Remote Error Indication processing: source direction

Prerequisite: (B.1/33 AND B.1/34) -- bidirectional S4D layer present

Item	Remote Error Indication processing: source direction	Reference	Status	Support
1	The S4D_TT_So inserts the RI_REI value in the REI bit in the following frame.	4.6.1	m	

Table B.140: Remote Error Indication processing: sink direction

Prerequisite: B.1/34 OR B.1/37 -- S4D_TT_Sk and/or S4Dm_TT_Sk present

Item	Remote Error Indication processing: sink direction	Reference	Status	Support
1	The VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) extract and monitor bit location N1[5] to recover the TC REI value (nF_B).	4.6.2, 4.6.5	m	

B.4.5.1.5 VC-4 Tandem Connection Outgoing indicator monitoring process

B.4.5.1.5.1 VC-4 Tandem Connection Outgoing Defect Indication (TC ODI)

Table B.141: Outgoing Defect Indication location

Prerequisite: (B.1/33 AND B.1/34) OR B.1/37 -- bidirectional S4D layer and/or S4Dm_TT_Sk present

Item	Outgoing Defect Indication location	Reference	Status	Support
1	The TC ODI is located in bit 7 of byte N1 in frame 74 of the 76 frame multiframe. This location is expressed with the notation: N1[7][74].	4.6.1, 4.6.2, 4.6.5	m	

Comment: N1[x][y] refers to bit x (x = 7,8) of byte N1 in frame y (y = 1..76) of the 76 frame multiframe.

Table B.142: Outgoing Defect Indication processing: source direction

Prerequisite: (B.1/33 AND B.1/34) -- bidirectional S4D layer present

Item	Outgoing Defect Indication processing: source direction	Reference	Status	Support
1	TC ODI code is inserted after the ODI request generation in the S4D_TT_Sk.	4.6.1	m	
2	TC ODI is cleared at the first opportunity after the ODI request has cleared in the associated S4D_TT_Sk.	4.6.1	m	
3	TC ODI signal is coded as a '1' bit value.	4.6.1	m	
4	The '0' bit value is inserted if no S4D_RI_ODI signal is active.	4.6.1	m	

Table B.143: Outgoing Defect Indication processing: sink direction

Prerequisite: B.1/34 OR B.1/37 -- S4D_TT_Sk and/or S4Dm_TT_Sk present

Item	Outgoing Defect Indication processing: sink direction	Reference	Status	Support
1	The VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) extract and monitor bit location N1[7][74]. A "1" indicates a Outgoing Defect Indication state, while a "0" indicates the normal, working state.	4.6.2, 4.6.5	m	

Comment: N1[x][y] refers to bit x (x = 7,8) of byte N1 in frame y (y = 1..76) of the 76 frame multiframe.

B.4.5.1.5.2 VC-4 Tandem Connection Outgoing Error Indication (TC OEI)

Table B.144: Outgoing Error Indication: principles

Prerequisite: (B.1/33 AND B.1/34) OR B.1/37 -- bidirectional S4D layer and/or S4Dm_TT_Sk present

Item	Outgoing Error Indication: principles	Reference	Status	Support
1	The OEI signal contains the exact number of Errored Block (EB) detected in the trail signal at the far-end trail termination	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	
2	The block length is 18 792 bits (one VC-4). The Error Detection Code (EDC) is BIP-8 in the B3 byte.	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	

Table B.145: Outgoing Error Indication location

Prerequisite: (B.1/33 AND B.1/34) OR B.1/37 -- bidirectional S4D layer and/or S4Dm_TT_Sk present

Item	Outgoing Error Indication location	Reference	Status	Support
1	The TC OEI is located in bit 6 of byte N1 of the VC-4 overhead.	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	

Table B.146: Outgoing Error Indication processing: source direction

Prerequisite: (B.1/33 AND B.1/34) -- bidirectional S4D layer present

Item	Outgoing Error Indication processing: source direction	Reference	Status	Support
1	The S4D_TT_So inserts the RI_OEI value in the OEI bit in the following frame.	4.6.1	m	

Table B.147: Outgoing Error Indication processing: sink direction

Prerequisite: B.1/34 OR B.1/37 -- S4D_TT_Sk and/or S4Dm_TT_Sk present

Item	Outgoing Error Indication processing: sink direction	Reference	Status	Support
1	The VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) extract bit location N1[5] to recover the TC OEI value (nOF_B).	4.6.2, 4.6.5	m	

B.4.5.1.6 Tandem Connection Trace Identifier

Table B.148: Tandem Connection Trace Identifier: principles

Item	Tandem Connection Trace Identifier: principles	Reference	Status	Support
1	A Tandem Connection Trace Identifier (TC TI) is inserted by the S4D_TT_So function containing the local Access Point Identifier (APId) and TI header (TxTI).	4.6.1, EN 300 417-1-1 [6] subclause 7.1	c14801	
2	The content of the accepted TI (AcTI) is compared by the S4D_TT_Sk function with the provisioned "expected TI" (ExTI), identifying the expected remote AP.	4.6.2, 4.6.5, EN 300 417-1-1 [6] subclause 7.1, EN 300 417-1-1 [6] subclause 8.2.1.3	c14802	

c14801: IF B.1/33 THEN m ELSE n/a -- S4D_TT_So present
c14802: IF (B.1/34 OR B.1/37)
THEN m ELSE n/a -- S4D_TT_Sk and/or S4Dm_TT_Sk present

Table B.149: Tandem Connection Trace Identifier byte location

Item	Tandem Connection Trace Identifier byte location	Reference	Status	Support
1	The Tandem Connection Trace Identifier (TC TI) is located in bits N1[7-8] in frames 9 to 72.	4.6.1, 4.6.2, 4.6.5	m	

Table B.150: Tandem Connection Trace Identifier byte structure

Item	Tandem Connection Trace Identifier byte structure	Reference	Status	Support
1	The Tandem Connection Trace Identifier (TC TI) is a 16 byte string containing the 15 byte APId and a 1 byte header. The MSB of the header is a "1", the remaining 7 bits contain the CRC-7 value of the VC-4 TTI. The MSB of the 15 APId bytes is "0".	EN 300 417-1-1 [6] subclause 7.1	m	
2	The CRC-7 word is the remainder after multiplication by x^7 and then division (modulo 2) by the generator polynomial $x^7 + x^3 + 1$, of the polynomial representation of the VC-4 TTI with the CRC bits set to binary zeroes.	EN 300 417-1-1 [6] subclause 7.1	m	
3	The 16 byte VC-4 TxTI, 16 byte VC-4 ExTI and 16 byte VC-4 AcTI are transferred via the Management Point to and from the trail termination function.	EN 300 417-1-1 [6] subclause 8.2.1.3	m	

Table B.151: Tandem Connection Trace identification: source direction

Prerequisite: B.1/33 -- S4D_TT_So present

Item	Tandem Connection Trace identification: source direction	Reference	Status	Support
1	The function inserts the TC trace identifier, received via MI_TxTI, in the TC-TI bits N1[7-8] in frames 9 to 72 of the multiframed N1[7-8] channel.	4.6.1	m	

Table B.152: Tandem Connection Trace identification: sink direction

Prerequisite: B.1/34 OR B.1/37 -- S4D_TT_Sk and/or S4Dm_TT_Sk present

Item	Tandem Connection Trace identification: sink direction	Reference	Status	Support
1	The VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) support mode 1	EN 300 417-1-1 [6] subclause 7.1	m	
2	The VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) do not support mode 2	EN 300 417-1-1 [6] subclause 7.1	m	
3	The VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) recover the 16 byte multiframe carried in bits N1[7-8] in frames 9 to 72 and assume it as Received Trail Trace Identifier (RxTI). The RxTI is made available as AcTI for network management purposes.	4.6.2, 4.6.5	m	

B.4.5.2 VC-4 Tandem Connection to VC-4 Layer Adaptation Functions: S4D/S4_TT_So and S4D/S4_A_Sk

Table B.153: Adaptation process

Prerequisite: B.1/35 OR B.1/36 -- S4D/S4_A_So and/or S4D/S4_A_Sk present

Item	Adaptation process	Reference	Status	Support
1	The S4D/S4_A_So replaces the incoming Frame Start (CI_FS) signal by a local generated one, if an all-ONEs (AIS) VC is received (i.e. if CI_SSF is TRUE).	4.6.3	c15301	
2	The S4D/S4_A_Sk restore the invalid frame start condition (i.e. output aSSF = true) if that existed at the ingress of the tandem connection.	4.6.4	c15302	

c15301: IF B.1/35 THEN m ELSE n/a -- S4D/S4_A_So present
c15302: IF B.1/36 THEN m ELSE n/a -- S4D/S4_A_Sk present

B.4.6 VC-4 Layer Defect, Consequent Action, Defect Correlation and Performance Monitoring Tables

B.4.6.1 Port Status Management

Table B.154: Trail Termination Point Mode Process

Prerequisite: B.1/3 OR B.1/30 OR B.1/32 -- S4_TT_Sk and/or S4m_TT_Sk and/or S4s_TT_Sk present

Item	Trail Termination Point Mode Process	Reference	Status	Support
1	The Trail Termination Point Mode supports "not monitored" (NMON) status.	EN 300 417-1-1 [6] subclause 8.5	m	
2	The Trail Termination Point Mode supports "monitored" (MON) status.	EN 300 417-1-1 [6] subclause 8.5	m	
3	The Trail Termination Point Mode status is provisionable by the EMF	4.2.2, 4.4.1, 4.4.3	m	

B.4.6.2 Defect detection and clearance criteria

Table B.155: VC-4 Layer Alarm Indication Signal defect (VC dAIS)

Prerequisite: B.1/30 -- S4m_TT_Sk present

Item	VC-4 Layer Alarm Indication Signal defect (VC dAIS)	Reference	Status	Support
1	The S4m_TT_Sk function detects a VC AIS defect (dAIS) if 5 consecutive frames contain the '1111 1111' pattern in byte C2.	4.4.1	m	
2	The S4m_TT_Sk function clears the VC AIS defect if in 5 consecutive frames any pattern other than the '1111 1111' is detected in byte C2.	4.4.1	m	

Table B.156: Remote Defect Indication defect (dRDI)

Prerequisite: B.1/3 OR B.1/30 OR B.1/32 -- S4_TT_Sk and/or S4m_TT_Sk and/or S4s_TT_Sk present

Item	Remote Defect Indication defect (dRDI)	Reference	Status	Support
1	The S4 RDI defect (dRDI) is detected if 5 consecutive frames contain the '1' value in bit 5 of the G1 byte.	4.2.2, 4.4.1, 4.4.3, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
2	The S4 RDI defect (dRDI) is cleared if in 5 consecutive frames contain the '0' value in bit 5 of the G1 byte.	4.2.2, 4.4.1, 4.4.3, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
3	The S4 RDI defect (dRDI) is cleared during reception of an aSSF.	4.2.2, 4.4.1, 4.4.3, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
4	The S4 RDI defect (dRDI) is cleared during reception of a VC AIS.	4.4.1	c15601	

c15601: IF B.1/30 THEN m ELSE x -- S4m_TT_Sk present

Table B.157: Degraded defect (dDEG)

Prerequisite: B.1/3 OR B.1/30 OR B.1/32 -- S4_TT_Sk and/or S4m_TT_Sk and/or S4s_TT_Sk present

Item	Degraded defect (dDEG)	Reference	Status	Support
1	Once every second, S4 pNEBC is compared with DEGTHR	4.2.2, 4.4.1, 4.4.3, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
2	If S4 pNEBC ≥ DEGTHR the corresponding second is declared BAD, otherwise it is declared GOOD	4.2.2, 4.4.1, 4.4.3, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
3	The S4 dDEG defect (dDEG) is detected if M consecutive BAD seconds have occurred.	4.2.2, 4.4.1, 4.4.3, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
4	The S4 dDEG defect (dDEG) is cleared if M consecutive GOOD seconds have occurred.	4.2.2, 4.4.1, 4.4.3, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
5	The S4 dDEG defect (dDEG) is cleared during reception of SSF	4.4.1, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
6	The S4 dDEG defect (dDEG) is cleared during reception of a VC AIS	4.4.1, EN 300 417-1-1 [6] subclause 8.2.1.4	c15701	
7	The DEGTHR parameter is provisionable by the EMF	4.2.2, 4.4.1, 4.4.3,	m	
8	The DEGM parameter is provisionable by the EMF	4.2.2, 4.4.1, 4.4.3,	m	

c15701: IF B.1/30 THEN m ELSE x -- S4m_TT_Sk present

Table B.158: DEG defect parameters value

Prerequisite: B.1/3 OR B.1/30 OR B.1/32 -- S4_TT_Sk and/or S4m_TT_Sk and/or S4s_TT_Sk present

Item	DEG defect parameters	Reference	Status	Support	Values	
					Allowed	Supported
1	S4 dDEG DEGTHR parameter	4.2.2, 4.4.1, 4.4.3	m		0 < DEGTHR ≤ 8 000	
2	S4 dDEG M parameter	4.2.2, 4.4.1, 4.4.3	m		2 ≤ M ≤ 10	

Table B.159: Trace Identifier Mismatch defect (dTIM)

Prerequisite: B.1/3 OR B.1/30 OR B.1/32 -- S4_TT_Sk and/or S4m_TT_Sk and/or S4s_TT_Sk present

Item	Trace Identifier Mismatch defect (dTIM)	Reference	Status	Support
1	The S4 TIM defect (dTIM) is detected, within a maximum period of 100 ms in the absence of bit errors, when the Accepted Trace Identifier (AcTI) does not match the Expected Trace Identifier (ExTI).	4.2.2, 4.4.1, 4.4.3, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
2	The S4 TIM defect (dTIM) is cleared, within a maximum period of 100 ms, after the Accepted Trace Identifier (AcTI) matches the Expected Trace Identifier (ExTI) in the absence of bit errors.	4.2.2, 4.4.1, 4.4.3, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
3	The S4 TIM defect (dTIM) is suppressed during reception of an aSSF.	4.2.2, 4.4.1, 4.4.3, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
4	The S4 TIM defect (dTIM) is cleared during reception of a VC AIS.	4.4.1	c15901	
5	It is possible to disable the trace identifier mismatch defect detection (TIMdis).	4.2.2, 4.4.1, 4.4.3	m	

c15901: IF B.1/30 THEN m ELSE x -- S4m_TT_Sk present

Table B.160: Unequipped defect (dUNEQ)

Prerequisite: B.1/3 OR B.1/30 OR B.1/32 -- S4_TT_Sk and/or S4m_TT_Sk and/or S4s_TT_Sk present

Item	Unequipped defect (dUNEQ)	Reference	Status	Support
1	The S4 UNEQ defect (dUNEQ) is detected, within a maximum period of 100 ms in the absence of bit errors, if the "accepted TSL" is the unequipped indication (TSL code = 0) within a maximum period of 100 ms in the absence of bit errors.	4.2.2, 4.4.1, 4.4.3, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
2	The S4 UNEQ defect (dUNEQ) is cleared, within a maximum period of 100 ms in the absence of bit errors, if the "accepted TSL" contains a non "unequipped" signal label (TSL code ≥ 1).	4.2.2, 4.4.1, 4.4.3, EN 300 417-1-1 [6] subclause 8.2.1.2	m	

Table B.161: P4e Alarm Indication Signal defect (P4e dAIS)

Prerequisite: B.1/7 -- S4/P4e_A_Sk present

Item	P4e Alarm Indication Signal defect (P4e dAIS)	Reference	Status	Support
1	The S4/P4e_Sk detects a VC AIS defect (dAIS) if the incoming signal has X or less ZEROs in each of two consecutive Y bit periods, with X = 5, Y = 2 928.	4.3.4, EN 300 417-1-1 [6] subclause 8.2.1.7	m	
2	The S4/P4e_Sk clears a VC AIS defect (dAIS) if each of two consecutive Y bit periods contains Z or more ZEROs (with X = 5, Y = 2 928, Z = 6) or the Frame Alignment Signal (FAS) has been found.	4.3.4, EN 300 417-1-1 [6] subclause 8.2.1.7	m	

Table B.162: TU-3/2/12 Alarm Indication Signal defect (TU-3/2/12 dAIS)

Prerequisite: B.1/9 -- implies that at least one TUG/Sm_A_Sk (m = 3,2,12,11*) function is present

Item	TU-3/2/12 Alarm Indication Signal defect (TU-3/2/12 dAIS)	Reference	Status	Support
1	The TU-3/2/12 dAIS is detected if the pointer interpreter enters the AIS_state.	4.3.6.3 to 4.3.6.6	m	
2	The TU-3/2/12 dAIS is cleared if the pointer interpreter exits the AIS_state.	4.3.6.3 to 4.3.6.6	m	

Table B.163: Loss of TU-3/2/12 Pointer defect (TU-3/2/12 dLOP)

Prerequisite: B.1/9 -- implies that at least one TUG/Sm_A_Sk (m = 3,2,12,11*) function is present

Item	Loss of TU-3/2/12 Pointer defect (TU-3/2/12 dLOP)	Reference	Status	Support
1	The Low Order Path dLOP (related to an TU-3/2/12 pointer) is detected if the pointer interpreter enters the LOP_state.	4.3.6.3 to 4.3.6.6	m	
2	The Low Order Path dLOP (related to an TU-3/2/12 pointer) is cleared if the pointer interpreter exits the LOP_state.	4.3.6.3 to 4.3.6.6	m	

Table B.164: Payload Mismatch defect (dPLM)

Prerequisite: B.1/3 -- implies that at least one VC-4 Layer payload Adaptation Sink function is present

Item	Payload Mismatch defect (dPLM)	Reference	Status	Support
1	The S4 PLM defect (dPLM) is detected, within a maximum period of 100 ms in the absence of bit errors, when the Accepted Signal Label (AcSL) does not match the Expected Signal Label (ExSL).	4.3.2, 4.3.4, 4.3.6.1, 4.3.10, 4.3.12, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
2	The S4 PLM defect (dPLM) is cleared, within a maximum period of 100 ms, after the Accepted Signal Label (AcSL) matches the Expected Signal Label (ExSL) in the absence of bit errors.	4.3.2, 4.3.4, 4.3.6.1, 4.3.10, 4.3.12, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
3	The S4 PLM defect (dPLM) is suppressed during reception of an aTSF.	4.3.2, 4.3.4, 4.3.6.1, 4.3.10, 4.3.12, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
4	The S4 PLM defect (dPLM) is suppressed if the incoming TSL code is "1" (equipped non-specific).	4.3.2, 4.3.4, 4.3.6.1, 4.3.10, 4.3.12, EN 300 417-1-1 [6] subclause 8.2.1.2	m	

Table B.165: Loss of Frame defect (dLOF)

Prerequisite: B.1/7 -- S4/P4e_A_Sk function present

Item	Loss of Frame defect (dLOF)	Reference	Status	Support
1	The P4e LOF defect (dLOF) is detected when four consecutive frame alignment signals have been incorrectly received in their predicted positions.	4.3.4	m	
2	The P4e LOF defect (dLOF) is cleared when three consecutive frame alignment signals are detected.	4.3.4	m	

Table B.166: Loss of Multiframe defect (dLOM)

Prerequisite: B.1/21 OR B.1/23 OR B.1/25 -- TUG/S2_A_Sk and/or TUG/S12_A_Sk and/or TUG/S11*_A_Sk function present

Item	Loss of Multiframe defect (dLOM)	Reference	Status	Support
1	The TU-2/12 LOM defect (dLOM) is detected if the multiframe alignment process is in the OOM state and the H4 multiframe is not recovered within X ms.	4.3.6.1	m	
2	The TU-2/12 LOM defect (dLOM) is cleared when, once in a dLOM state, the multiframe is recovered (multiframe alignment process enter the In-Multiframe state).	4.3.6.1	m	
3	X is not configurable	4.3.6.1	m	

Table B.167: LOM defect parameters value

Prerequisite: B.1/21 OR B.1/23 OR B.1/25 -- TUG/S2_A_Sk and/or TUG/S12_A_Sk and/or TUG/S11*_A_Sk function present

Item	LOM defect parameters	Reference	Status	Support	Values	
					Allowed	Supported
1	TU-2/12 dLOM entry: X value.	4.3.6.1	m		1 < X ≤ 5 ms	

Table B.168: Loss of Slot Delineation defect (dLSD)

Prerequisite: B.1/11 -- S4/DQDB_A_Sk function present

Item	Loss of Slot Delineation defect (dLSD)	Reference	Status	Support
1	The S4/DQDB_A_Sk function detects a Loss of Slot Delineation defect (dLSD) according to ETS 300 216 [4] subclause 5.6.1.2.	4.3.10, ETS 300 216 [4] subclause 5.6.1.2	m	

Table B.169: Loss of Sequence Synchronization defect (dLSS)

Prerequisite: B.1/29 -- S4/TSS1_A_Sk function present

Item	Loss of Sequence Synchronization defect (dLSS)	Reference	Status	Support
1	The S4/TSS1_A_Sk function detects a Loss of PRBS lock (dLSS) according to the criteria defined in ITU-T Recommendation O.151 [16] subclause 2.6.	4.3.12, ITU-T Rec.O.151 [16] subclause 2.6	m	

B.4.6.3 Consequent action activation and clearance criteria

Table B.170: Alarm Indication Signal action (aAIS)

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
1	The S4_TT_Sk outputs an all "1"s signal within 250 µs upon S4 dUNEQ detection.	4.2.2	c17001	
2	The S4_TT_Sk outputs an all "1"s signal within 250 µs upon S4 dTIM detection.	4.2.2	c17001	
3	The S4_TT_Sk outputs normal data within 250 µs when there is (are) no more defect(s) active.	4.2.2	c17001	
4	The S4/P4x_A_Sk outputs an all "1"s signal within 250 µs upon AI_TSF reception.	4.3.2	c17002	
5	The S4/P4x_A_Sk outputs an all "1"s signal within 250 µs upon S4 dPLM reception.	4.3.2	c17002	
6	The S4/P4x_A_Sk outputs normal data within 250 µs when there is (are) no more defect(s) active.	4.3.2	c17002	
7	The S4/P4e_A_Sk outputs an all "1"s signal within 250 µs upon AI_TSF reception.	4.3.4	c17003	
8	The S4/P4e_A_Sk outputs an all "1"s signal within 250 µs upon S4 dPLM reception.	4.3.4	c17003	
9	The S4/P4e_A_Sk outputs an all "1"s signal within 250 µs upon P4e dLOF reception.	4.3.4	c17003	
10	The S4/P4e_A_Sk outputs an all "1"s signal within 250 µs upon P4e dAIS reception.	4.3.4	c17003	
11	The S4/P4e_A_Sk outputs normal data within 250 µs when there is (are) no more defect(s) active.	4.3.4	c17003	
12	The TUG/Sm_A_So (m = 3,2,12,11*) functions output an all "1"s signal within 250 µs upon CI_SSF reception.	4.3.5.3-4-5-6	c17004	
13	The TUG/Sm_A_So (m = 3,2,12,11*) functions output normal data within 250 µs when there is (are) no more defect(s) active.	4.3.5.3-4-5-6	c17004	
14	The TUG/Sm_A_Sk (m = 3,2,12,11*) functions output an all "1"s signal within 250 µs upon AI_TSF reception.	4.3.6.3-4-5-6	c17005	
15	The TUG/Sm_A_Sk (m = 3,2,12,11*) functions output an all "1"s signal within 250 µs upon TU-3/2/12 dLOP reception.	4.3.6.3-4-5-6	c17005	
16	The TUG/Sm_A_Sk (m = 3,2,12,11*) functions output an all "1"s signal within 250 µs upon TU-3/2/12 dAIS reception.	4.3.6.3-4-5-6	c17005	
17	The TUG/Sm_A_Sk (m = 3,2,12,11*) functions output normal data within 250 µs when there is (are) no more defect(s) active.	4.3.6.3-4-5-6	c17005	
18	The S4/P0s_A_Sk outputs an all "1"s signal within 1 ms upon AI_TSF reception.	4.3.8	c17006	

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
19	The S4/P0s_A_Sk outputs normal data within 1 ms when there is (are) no more defect(s) active.	4.3.8	c17006	

c17001: IF B.1/3 THEN m ELSE n/a -- S4_TT_Sk present
c17002: IF B.1/5 THEN m ELSE n/a -- S4/P4x_A_Sk present
c17003: IF B.1/7 THEN m ELSE n/a -- S4/P4e_A_Sk present
c17004: IF (B.1/18 OR B.1/20 OR B.1/22 OR B.1/24) THEN m ELSE n/a -- TUG/Sm_A_So (m = 3,2,12,11*) functions present
c17005: IF (B.1/19 OR B.1/21 OR B.1/23 OR B.1/25) THEN m ELSE n/a -- TUG/Sm_A_Sk (m = 3,2,12,11*) functions present
c17006: IF B.1/27 THEN m ELSE n/a -- S4/P0s_A_Sk present

Table B.171: Remote Defect Indication defect action (aRDI)

Prerequisite: (B.1/2 AND B.1/3) OR (B.1/31 AND B.1/32) -- S4_TT_So and S4_TT_Sk and/or S4s_TT_So and S4s_TT_Sk functions present

Item	Remote Defect Indication defect action (aRDI)	Reference	Status	Support
1	The S4_TT_Sk outputs an RDI request generation (RI_RDI) on CI_SSF detection.	4.2.2	c17101	
2	The S4_TT_Sk outputs an RDI request generation (RI_RDI) on S4 dUNEQ detection.	4.2.2	c17101	
3	The S4_TT_Sk outputs an RDI request generation (RI_RDI) on S4 dTIM detection.	4.2.2	c17101	
4	The S4_TT_Sk clears the RDI request when there is (are) no more defect(s) active.	4.2.2	c17101	
5	The S4_TT_So inserts the RDI code within 250 µs upon RI_RDI reception.	4.2.1	c17101	
6	The S4_TT_So outputs normal data within 250 µs upon RI_RDI clearing.	4.2.1	c17101	
7	The S4s_TT_Sk outputs an RDI request generation (RI_RDI) on CI_SSF detection.	4.4.3	c17102	
8	The S4s_TT_Sk outputs an RDI request generation (RI_RDI) on S4 dTIM detection.	4.4.3	c17102	
9	The S4s_TT_Sk clears the RDI request when there is (are) no more defect(s) active.	4.4.3	c17102	
10	The S4s_TT_So inserts the RDI code within 250 µs upon RI_RDI reception.	4.4.2	c17102	
11	The S4s_TT_So outputs normal data within 250 µs upon RI_RDI clearing.	4.4.2	c17102	

c17101: IF (B.1/2 AND B.1/3)
THEN m ELSE n/a -- S4_TT_So and S4_TT_Sk functions present
c17102: IF (B.1/31 AND B.1/32)
THEN m ELSE n/a -- S4s_TT_So and S4s_TT_Sk functions present

Table B.172: Remote Error Indication action (aREI)

Prerequisite: (B.1/2 AND B.1/3) OR (B.1/31 AND B.1/32)-- S4_TT_So and S4_TT_Sk and/or S4s_TT_So and S4s_TT_Sk functions present

Item	Remote Error Indication action (aREI)	Reference	Status	Support
1	The S4_TT_So inserts the REI value in the next REI bits.	4.2.1	c17201	
2	The S4s_TT_So inserts the REI value in the next REI bits.	4.4.2	c17202	

c17201: IF (B.1/2 AND B.1/3)
THEN m ELSE n/a -- S4_TT_So and S4_TT_Sk functions present
c17202: IF (B.1/31 AND B.1/32)
THEN m ELSE n/a -- S4s_TT_So and S4s_TT_Sk functions present

Table B.173: Server Signal Fail action (aSSF)

Prerequisite: B.1/3 -- implies that at least one VC-4 Layer payload Adaptation Sink function is present.

Item	Server Signal Fail action (aSSF)	Reference	Status	Support
1	The S4/P4e_A_Sk sets CI_SSF to TRUE on S4 dPLM detection.	4.3.4	c17301	
2	The S4/P4e_A_Sk sets CI_SSF to TRUE on P4e dLOF detection.	4.3.4	c17301	
3	The S4/P4e_A_Sk sets CI_SSF to TRUE on P4e dAIS detection.	4.3.4	c17301	
4	The S4/P4e_A_Sk sets CI_SSF to TRUE on AI_TSF reception.	4.3.4	c17301	
5	The S4/P4e_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	4.3.4	c17301	
6	The S4/TUG_A_Sk sets TUG_CI_SSF_TU3 to TRUE on S4 dPLM detection.	4.3.6.1	c17302	
7	The S4/TUG_A_Sk sets TUG_CI_SSF_TU3 to FALSE when there is (are) no more defect(s) active.	4.3.6.1	c17302	
8	The S4/TUG_A_Sk sets TUG_CI_SSF_TUG2 to TRUE on S4 dPLM detection.	4.3.6.1	c17302	
9	The S4/TUG_A_Sk sets TUG_CI_SSF_TUG2 to TRUE on dLOM detection.	4.3.6.1	c17302	
10	The S4/TUG_A_Sk sets TUG_CI_SSF_TUG2 to FALSE when there is (are) no more defect(s) active.	4.3.6.1	c17302	
11	The TUG/S3_A_Sk sets CI_SSF to TRUE on TU-3 dAIS detection.	4.3.6.3	c17303	
12	The TUG/S3_A_Sk sets CI_SSF to TRUE on TU-3 dLOP detection.	4.3.6.3	c17303	
13	The TUG/S3_A_Sk sets CI_SSF to TRUE on AI_TSF_TU3 reception.	4.3.6.3	c17303	
14	The TUG/S3_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	4.3.6.3	c17303	
15	The TUG/S2_A_Sk sets CI_SSF to TRUE on TU-2 dAIS detection.	4.3.6.4	c17303	
16	The TUG/S2_A_Sk sets CI_SSF to TRUE on TU-2 dLOP detection.	4.3.6.4	c17303	
17	The TUG/S2_A_Sk sets CI_SSF to TRUE on AI_TSF_TUG2 reception.	4.3.6.4	c17303	

Item	Server Signal Fail action (aSSF)	Reference	Status	Support
18	The TUG/S2_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	4.3.6.4	c17303	
19	The TUG/S12_A_Sk sets CI_SSF to TRUE on TU-12 dAIS detection.	4.3.6.5	c17303	
20	The TUG/S12_A_Sk sets CI_SSF to TRUE on TU-12 dLOP detection.	4.3.6.5	c17303	
21	The TUG/S12_A_Sk sets CI_SSF to TRUE on AI_TSF_TUG2 reception.	4.3.6.5	c17303	
22	The TUG/S12_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	4.3.6.5	c17303	
23	The TUG/S11*_A_Sk sets CI_SSF to TRUE on TU-12 dAIS detection.	4.3.6.6	c17303	
24	The TUG/S11*_A_Sk sets CI_SSF to TRUE on TU-12 dLOP detection.	4.3.6.6	c17303	
25	The TUG/S11*_A_Sk sets CI_SSF to TRUE on AI_TSF_TUG2 reception.	4.3.6.6	c17303	
26	The TUG/S11*_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	4.3.6.6	c17303	
27	The S4/P0s_A_Sk sets CI_SSF to TRUE on AI_TSF reception.	4.3.8	c17304	
28	The S4/P0s_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	4.3.8	c17304	
29	The S4/DQDB_A_Sk sets CI_SSF to TRUE on S4 dPLM detection.	4.3.10	c17305	
30	The S4/DQDB_A_Sk sets CI_SSF to TRUE on dLSD detection.	4.3.10	c17305	
31	The S4/DQDB_A_Sk sets CI_SSF to TRUE on AI_TSF reception.	4.3.10	c17305	
32	The S4/DQDB_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	4.3.10	c17305	

c17301: IF B.1/7 THEN m ELSE n/a -- S4/P4e_A_Sk present
c17302: IF B.1/15 THEN m ELSE n/a -- S4/TUG_A_Sk present
c17303: IF (B.1/19 OR B.1/21 OR B.1/23 OR B.1/25) THEN m ELSE n/a -- TUG/Sm_A_Sk (m = 3,2,12,11*) functions present
c17304: IF B.1/27 THEN m ELSE n/a -- S4/P0s_A_Sk present
c17305: IF B.1/11 THEN m ELSE n/a -- S4/DQDB_A_Sk present

Table B.174: Trail Signal Fail action (aTSF)

Prerequisite: B.1/3 OR B.1/17 OR B.1/30 OR B.1/32 -- S4_TT_Sk and/or TUG_T_Sk and/or S4m_TT_Sk and/orS4s_TT_Sk functions present.

Item	Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The S4_TT_Sk sets AI_TSF to TRUE on S4 dUNEQ detection.	4.2.2	c17401	
2	The S4_TT_Sk sets AI_TSF to TRUE on S4 dTIM detection.	4.2.2	c17401	
3	The S4_TT_Sk sets AI_TSF to TRUE on CI_SSF reception.	4.2.2	c17401	
4	The S4_TT_Sk sets AI_TSF to FALSE when there is (are) no more defect(s) active.	4.2.2	c17401	
5	The TUG_T_Sk sets TUG_AI_TSF_TU3 to TRUE on TUG_CI_SSF_TU3 reception.	4.3.6.2	c17402	
6	The TUG_T_Sk sets TUG_AI_TSF_TU3 to FALSE when there is (are) no more defect(s) active.	4.3.6.2	c17402	
7	The TUG_T_Sk sets TUG_AI_TSF_TUG2 to TRUE on TUG_CI_SSF_TUG2 reception.	4.3.6.2	c17402	
8	The TUG_T_Sk sets TUG_AI_TSF_TUG2 to FALSE when there is (are) no more defect(s) active.	4.3.6.2	c17402	
9	The S4m_TT_Sk sets AI_TSF to TRUE on S4 dAIS detection.	4.4.1	c17403	
10	The S4m_TT_Sk sets AI_TSF to TRUE on S4 dUNEQ detection.	4.4.1	c17403	
11	The S4m_TT_Sk sets AI_TSF to TRUE on S4 dTIM detection.	4.4.1	c17403	
12	The S4m_TT_Sk sets AI_TSF to TRUE on CI_SSF reception.	4.4.1	c17403	
13	The S4m_TT_Sk sets AI_TSF to FALSE when there is (are) no more defect(s) active.	4.4.1	c17403	
14	The S4s_TT_Sk sets AI_TSF to TRUE on S4 dTIM detection.	4.4.3	c17404	
15	The S4s_TT_Sk sets AI_TSF to TRUE on CI_SSF reception.	4.4.3	c17404	
16	The S4s_TT_Sk sets AI_TSF to FALSE when there is (are) no more defect(s) active.	4.4.3	c17404	

c17401: IF B.1/3 THEN m ELSE n/a -- S4_TT_Sk present
c17402: IF B.1/17 THEN m ELSE n/a -- TUG_T_Sk present
c17403: IF B.1/30 THEN m ELSE n/a -- S4m_TT_Sk present
c17404: IF B.1/32 THEN m ELSE n/a -- S4s_TT_Sk present

Table B.175: Trail Signal Degrade action (aTSD)

Prerequisite: B.1/3 OR B.1/30 OR B.1/32 -- S4_TT_Sk and/or S4m_TT_Sk and/or S4s_TT_Sk functions present

Item	Trail Signal Degrade action (aTSD)	Reference	Status	Support
1	If the dDEG is detected in the trail termination sink the aTSD is performed.	EN 300 417-1-1 [6] subclause 8.2.2.6	m	
2	It ceases aTSD insertion after the dDEG defect is cleared.	EN 300 417-1-1 [6] subclause 8.2.2.6	m	
3	The aTSD is equivalent to send the Signal Degrade (SD) signal as defined in the Automatic Protection Switching (APS).	EN 300 417-1-1 [6] subclause 8.2.2.6	m	

Table B.176: Void Slot generation

Prerequisite: B.1/10 -- S4/DQDB_A_So present.

Item	Void Slot generation	Reference	Status	Support
1	The S4/DQDB_A_So function generates void slots and maps them into the VC-4 payload if continuous octets marked as INVALID (DQDB_CI_DSTATUS = INVALID) or no octet are received from the DQDB layer.	4.3.9	m	
2	A void slot is defined as a 53 octets each with default code of "0000 0000".	4.3.9	m	

Table B.177: Link Status Signal processing

Prerequisite: B.1/11 -- S4/DQDB_A_Sk present.

Item	Link Status Signal processing	Reference	Status	Support
1	The S4/DQDB_A_Sk function generates the outgoing LSS (DQDB_RI_LSS) and the Link Status indication (DQDB_CI_LSTATUS) according to the Link Status Signal Operation table defined in EN 300 417-4-1 [8], subclause 4.3.10 table 32	4.3.10	m	
2	The operation table determines the status of the transmission link according to the VC-4 layer state (SSF), the incoming LSS and the Physical Layer Connection State Machine (PLCSM) control.	4.3.10	m	
3	If aSSF it is not declared, the S4/DQDB_A_Sk function sends to the DQDB layer the DQDB slots and DQDB Management octet marked as VALID.	4.3.10	m	
4	If aSSF is declared, the S4/DQDB_A_Sk function sends to the DQDB layer a DQDB_CI_LSTATUS indication with the value DOWN.	4.3.10	m	

Item	Link Status Signal processing	Reference	Status	Support
5	If the DQDB node is capable to perform Head Of Bus operation (DQDB_MI_HOB = true), the S4/DQDB_A_Sk function sends to the DQDB layer EMPTY slot and EMPTY DQDB management octet (M1 and M2).	4.3.10	m	
6	If it is not capable to perform Head Of Bus operation (DQDB_MI_HOB = false), the S4/DQDB_A_Sk function sends to the DQDB layer octets marked as INVALID and the outgoing LSS code equal to hob_incapable irrespective of the incoming LSS code.	4.3.10	m	

B.4.6.4 Defect correlation

Prerequisite: B.6/4 -- Defect correlation process supported.

Table B.178: Defect correlation

Item	Defect correlation	Reference	Status	Support
1	Under S4 dUNEQ detection the S4_TT_Sk and S4m_TT_Sk functions generate a S4 cUNEQ report if the port is in the monitoring state (MON).	4.2.2, 4.4.1	c17801	
2	Under S4 dTIM detection the S4_TT_Sk and S4m_TT_Sk functions generate a S4 cTIM report if the port is in the monitoring state (MON) and no dUNEQ defect has been detected.	4.2.2, 4.4.1	c17801	
3	Under detection of both S4 dUNEQ and S4 dTIM and reception of "AcTI = all 0s" the S4s_TT_Sk function generates a S4 cUNEQ report if the port is in the monitoring state (MON).	4.4.3, EN 300 417-1-1 [6] subclause.8.2.3.2	c17802	
4	Under S4 dTIM detection the S4s_TT_Sk function generates a S4 cTIM report if the port is in the monitoring state (MON) and no dUNEQ defect nor "AcTI = all 0s" have been declared.	4.4.3, EN 300 417-1-1 [6] subclause.8.2.3.2	c17802	
5	Under S4 dDEG detection the VC-4 Layer Trail Termination Sink functions (S4_TT_Sk, S4m_TT_Sk, S4s_TT_Sk) generate a S4 cDEG report if the port is in the monitoring state (MON) and no dTIM defect has been detected.	4.2.2, 4.4.1, 4.4.3	c17803	
6	Under S4 dRDI detection the VC-4 Layer Trail Termination Sink functions (S4_TT_Sk, S4m_TT_Sk, S4s_TT_Sk) generate a S4 cRDI report if the port is in the monitoring state (MON) and no dUNEQ nor dTIM defects have been detected.	4.2.2, 4.4.1, 4.4.3	c17803	
7	The S4 cRDI is reported only if S4 RDI_reported is set to TRUE by the EMF. By default S4 RDI_reported is set to FALSE.	4.2.2, 4.4.1, 4.4.3	c17803	
8	Under CI_SSF reception the VC-4 Layer Trail Termination Sink functions (S4_TT_Sk, S4m_TT_Sk, S4s_TT_Sk) generate a S4 cSSF report if the port is in the monitoring state (MON).	4.2.2, 4.4.1, 4.4.3	c17803	

Item	Defect correlation	Reference	Status	Support
9	The S4 cSSF is reported only if selected S4 SSF_reported is set to TRUE by the EMF. By default S4 SSF_reported is set to FALSE.	4.2.2, 4.4.1, 4.4.3	c17803	
10	Under S4 dPLM detection the S4/P4x_A_Sk generates a S4 cPLM report if no AI_TSF is received from the S4_TT_Sk.	4.3.2	c17804	
11	Under S4 dPLM detection the S4/P4e_A_Sk generates a S4 cPLM report if no AI_TSF is received from the S4_TT_Sk.	4.3.4	c17805	
12	Under P4e dAIS detection the S4/P4e_A_Sk generates a P4e cAIS report if no dPLM defect has been detected and no AI_TSF is received from the S4_TT_Sk.	4.3.4	c17805	
13	The P4e cAIS is reported only if selected P4e AIS_reported is set to TRUE by the EMF. By default S4 AIS_reported is set to FALSE.	4.3.4	c17805	
14	Under P4e dLOF detection the S4/P4e_A_Sk generates a P4e cLOF report if no dAIS nor dPLM defects have been detected.	4.3.4	c17805	
15	Under S4 dPLM detection the S4/TUG_A_Sk generates a S4 cPLM report if no AI_TSF is received from the S4_TT_Sk.	4.3.6.1	c17806	
16	Under TU-2/12 dLOM detection the S4/TUG_A_Sk generates a TU-2/12 cLOM report if no dPLM defect has been detected and no AI_TSF is received from the S4_TT_Sk.	4.3.6.1	c17806	
17	Under TU-3/2/12 dAIS detection the TUG/Sm_A_Sk (m = 3,2,12,11*) functions generate TU-3/2/12 cAIS report if no AI_TSF is received from the TUG_T_Sk.	4.3.6.3 to 4.3.6.6	c17807	
18	The TU-3/2/12 cAIS is reported only if selected TU-3/2/12 AIS_reported is set to TRUE by the EMF. By default S4 AIS_reported is set to FALSE.	4.3.6.3 to 4.3.6.6	c17807	
19	Under S4 dPLM detection the S4/DQDB_A_Sk generates a S4 cPLM report if no AI_TSF is received from the S4_TT_Sk.	4.3.10	c17808	
20	Under dLSD detection the S4/DQDB_A_Sk generates a cLSD report if no dPLM defect has been detected and no AI_TSF is received from the S4_TT_Sk.	4.3.10	c17808	
21	Under S4 dPLM detection the S4/TSS1_A_Sk generates a S4 cPLM report if no AI_TSF is received from the S4_TT_Sk.	4.3.12	c17809	
22	Under dLSS detection the S4/TSS1_A_Sk generates a cLSS report if no AI_TSF is received from the S4_TT_Sk.	4.3.12	c17809	
23	All the generated fault causes (cXXX) are reported to the EMF.	EN 300 417-1-1 [6] subclause 8.1, figure 36	m	

c17801: IF (B.1/3 OR B.1/30)
THEN m ELSE n/a -- S4_TT_Sk and/or S4m_TT_Sk present
c17802: IF B.1/32 THEN m ELSE n/a -- S4s_TT_Sk present
c17803: IF (B.1/3 OR B.1/30 OR B.1/32)

THEN m ELSE n/a -- S4_TT_Sk and/or S4m_TT_Sk and/or S4s_TT_Sk present
c17804: IF B.1/5 THEN m ELSE n/a -- S4/P4x_A_Sk present
c17805: IF B.1/7 THEN m ELSE n/a -- S4/P4e_A_Sk present
c17806: IF (B.1/21 OR B.1/23 OR B.1/25)
THEN m ELSE n/a -- TUG/Sm_A_Sk (m = 2,12,11*) functions present
c17807: IF B.1/9 THEN m ELSE n/a -- implies that at least one TUG/Sm_A_Sk (m = 3,2,12,11*) function is present
c17808: IF B.1/11 THEN m ELSE n/a -- S4/DQDB_A_Sk present
c17809: IF B.1/29 THEN m ELSE n/a -- S4/TSS1_A_Sk present

B.4.6.5 Performance monitoring

B.4.6.5.1 Near End Performance monitoring

Table B.179: pN_DS performance parameter

Prerequisite: B.6/1 -- Near-end performance monitoring process supported.

Item	pN_DS performance parameter	Reference	Status	Support
1	The VC-4 Layer Trail Termination Sink functions (S4_TT_Sk, S4m_TT_Sk, S4s_TT_Sk) indicate a S4 pN_DS every second with at least one occurrence of S4 aTSF or an equipment defect (dEQ).	4.2.2, 4.4.1, 4.4.3	m	

Table B.180: pN_EBC performance parameter

Prerequisite: B.6/1 -- Near-end performance monitoring process supported.

Item	pN_EBC performance parameter	Reference	Status	Support
1	Every second the VC-4 Layer Trail Termination Sink functions (S4_TT_Sk, S4m_TT_Sk, S4s_TT_Sk) count the number of S4 Near-end Errored Block (S4 N_Bs) within that second as the S4 pN_EBC (S4 Near-end Error Block Count).	4.2.2, 4.4.1, 4.4.3	m	

Comments: A "Near-end Block" (N_B) is errored if one or more BIP-8 violations are detected.

Table B.181: pN_TSE performance parameter

Prerequisite: B.6/1 AND B.1/29 -- Near-end performance monitoring process supported and S4/TSS1_A_Sk present

Item	pN_TSE performance parameter	Reference	Status	Support
1	Every second the S4/TSS1_A_Sk gives sum of Test Sequence Errors (TSE) within one second period as the S4 pN_TSE (S4 Near-end Test Sequence Errors).	4.2.2, 4.4.1, 4.4.3	m	

Comments: The TSE error block size is equal to the B3 BIP-8 error block size with the exception of the VC-4 POH.

B.4.6.5.2 Far End Performance monitoring

Prerequisite: B.6/2 -- Far-end performance monitoring process supported.

Table B.182: pF_DS performance parameter

Item	pF_DS performance parameter	Reference	Status	Support
1	The VC-4 Layer Trail Termination Sink functions (S4_TT_Sk, S4m_TT_Sk, S4s_TT_Sk) indicate a S4 pF_DS every second with at least one occurrence of S4 dRDI.	4.2.2, 4.4.1, 4.4.3	m	

Table B.183: pF_EBC performance parameter

Item	pF_EBC performance parameter	Reference	Status	Support
1	Every second VC-4 Layer Trail Termination Sink functions (S4_TT_Sk, S4m_TT_Sk, S4s_TT_Sk) count the number of S4 Far-end Errored Block (S4 F_Bs) within that second as the S4 pF_EBC (S4 Far-end Error Block Count).	4.2.2, 4.4.1, 4.4.3	m	

Comments: A "Far-end Block" (F_B) is errored if the REI count indicates one or more errors.

B.4.7 VC-4 Layer Linear Trail Protection Defect, Consequent Action, Defect Correlation and Performance Monitoring Tables

Prerequisite: B.1/38 -- VC-4 Layer Linear Trail Protection scheme supported

B.4.7.1 Consequent action activation and clearance criteria

Table B.184: Server Signal Fail action (aSSF)

Item	Server Signal Fail action (aSSF)	Reference	Status	Support
1	The S4/S4P_A_Sk sets CI_SSF to TRUE on AI_TSF reception.	4.5.3.2	m	
2	The S4/S4P_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	4.5.3.2	m	

Table B.185: Trail Signal Fail action (aTSF)

Prerequisite: B.5/3 -- S4P_TT_Sk present

Item	Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The S4P_TT_Sk sets AI_TSF to TRUE on CI_SSF reception.	4.5.2.2	m	
2	The S4P_TT_Sk sets AI_TSF to FALSE when there is (are) no more defect(s) active.	4.5.2.2	m	

Table B.186: Server Signal Degrade action (aSSD)

Item	Server Signal Degrade action (aSSD)	Reference	Status	Support
1	The S4/S4P_A_Sk sets CI_SSD to TRUE on AI_TSD reception.	4.5.3.2	m	
2	The S4/S4P_A_Sk sets CI_SSD to FALSE when there is (are) no more defect(s) active.	4.5.3.2	m	

B.4.7.2 Defect correlation

Table B.187: Defect correlation

Item	Defect correlation	Reference	Status	Support
1	Under S4P CI_SSF reception the S4P_TT_Sk generates an S4P cSSF report.	4.5.2.2	c18701	
2	The S4P cSSF is reported only if selected S4P SSF_reported is set to TRUE by the EMF. By default S4P SSF_reported is set to FALSE.	4.5.2.2	c18701	
3	All the generated fault cause (cXXX) are reported to the EMF	EN 300 417-1-1 [6] subclause 8.1 figure 36	c18701	

c18701: IF B.5/3 THEN m ELSE n/a -- S4P_TT_Sk present

B.4.8 VC-4 Tandem Connection Sub-layer Defect, Consequent Action, Defect Correlation and Performance Monitoring Tables

Prerequisite: B.1/33 OR B.1/34 OR B.1/37 -- S4D_TT_So and/or S4D_TT_Sk and/or S4Dm_TT_Sk present

B.4.8.1 Port Status Management

Table B.188: Trail Termination Point Mode Process

Prerequisite: B.1/34 OR B.1/37 -- S4D_TT_Sk and/or S4Dm_TT_Sk present

Item	Trail Termination Point Mode Process	Reference	Status	Support
1	The Trail Termination Point Mode supports "not monitored" (NMON) status.	EN 300 417-1-1 [6] subclause 8.5	m	
2	The Trail Termination Point Mode supports "monitored" (MON) status.	EN 300 417-1-1 [6] subclause 8.5	m	
3	The Trail Termination Point Mode status is provisionable by the EMF	4.6.2, 4.6.5	m	

B.4.8.2 Defect detection and clearance criteria

Prerequisite: B.1/34 OR B.1/37 -- S4D_TT_Sk and/or S4Dm_TT_Sk present

Table B.189: VC-4 Tandem Connection Incoming Alarm Indication Signal defect (TC dIncAIS)

Prerequisite: B.1/34 -- S4D_TT_Sk present

Item	VC-4 Tandem Connection Incoming Alarm Indication Signal defect (TC dIncAIS)	Reference	Status	Support
1	The S4D_TT_Sk function detects a TC Incoming AIS defect (dIncAIS) if 5 consecutive frames contain the '1110' pattern in the IEC bits (N1[1-4]).	4.6.2	m	
2	The S4D_TT_Sk function clears the TC Incoming AIS defect (dIncAIS) if in 5 consecutive frames any pattern other than the '1110' is detected in the IEC bits (N1[1-4]).	4.6.2	m	

Table B.190: VC-4 Tandem Connection Remote Defect Indication defect (dRDI)

Item	VC-4 Tandem Connection Remote Defect Indication defect (dRDI)	Reference	Status	Support
1	The TC RDI defect (dRDI) is detected if 5 consecutive frames contain the '1' value in bit N1[8][73] of the 76 frame multiframe.	4.6.2, 4.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
2	The TC RDI defect (dRDI) is cleared if in 5 consecutive frames contain the '0' value in bit N1[8][73] of the 76 frame multiframe.	4.6.2, 4.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
3	The TC RDI defect (dRDI) is cleared during reception of an aSSF.	4.6.2, 4.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	

Comment: N1[x][y] refers to bit x (x = 7,8) of byte N1 in frame y (y = 1..76) of the 76 frame multiframe.

Table B.191: VC-4 Tandem Connection Degraded defect (dDEG)

Item	VC-4 Tandem Connection Degraded defect (dDEG)	Reference	Status	Support
1	Once every second, S4D pNEBC is compared with DEGTHR	4.6.2, 4.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
2	If S4D pNEBC ≥ DEGTHR the corresponding second is declared BAD, otherwise it is declared GOOD	4.6.2, 4.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
3	The S4D dDEG defect (dDEG) is detected if M consecutive BAD seconds have occurred.	4.6.2, 4.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
4	The S4D dDEG defect (dDEG) is cleared if M consecutive GOOD seconds have occurred.	4.6.2, 4.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
5	The S4D dDEG defect (dDEG) is cleared during reception of an aSSF	4.6.2, 4.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
6	The DEGTHR parameter is provisionable by the EMF	4.6.2, 4.6.5	m	
7	The DEGM parameter is provisionable by the EMF	4.6.2, 4.6.5	m	

Table B.192: VC-4 Tandem Connection DEG defect parameters value

Item	VC-4 Tandem Connection DEG defect parameters	Reference	Status	Support	Values	
					Allowed	Supported
1	S4D dDEG DEGTHR parameter	4.6.2, 4.6.5	m		0 < DEGTHR ≤ 8 000	
2	S4D dDEG M parameter	4.6.2, 4.6.5	m		2 ≤ M ≤ 10	

Table B.193: VC-4 Tandem Connection Trace Identifier Mismatch defect (dTIM)

Item	VC-4 Tandem Connection Trace Identifier Mismatch defect (dTIM)	Reference	Status	Support
1	The S4D TIM defect (dTIM) is detected, within a maximum period of 1 s in the absence of bit errors, when the Accepted Trace Identifier (AcTI) does not match the Expected Trace Identifier (ExTI).	4.6.2, 4.6.5, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
2	The S4D TIM defect (dTIM) is cleared, within a maximum period of 1 s, after the Accepted Trace Identifier (AcTI) matches the Expected Trace Identifier (ExTI) in the absence of bit errors.	4.6.2, 4.6.5, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
3	The S4D TIM defect (dTIM) is suppressed during reception of an aSSF.	4.6.2, 4.6.5, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
4	It is possible to disable the TC trace identifier mismatch defect detection (TIMdis).	4.6.2, 4.6.5	m	

Table B.194: VC-4 Tandem Connection Unequipped defect (dUNEQ)

Item	VC-4 Tandem Connection Unequipped defect (dUNEQ)	Reference	Status	Support
1	The S4D UNEQ defect (dUNEQ) is detected if five consecutive VC-4 frames contain the "0000 0000" pattern in byte N1.	4.6.2, 4.6.5, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
2	The S4D UNEQ defect (dUNEQ) is cleared if in five consecutive VC-4 frames any pattern other than the "0000 0000" is detected in byte N1.	4.6.2, 4.6.5, EN 300 417-1-1 [6] subclause 8.2.1.2	m	

Table B.195: Loss of Tandem Connection defect (dLTC)

Item	Loss of Tandem defect (dLTC)	Reference	Status	Support
1	The S4D LTC defect (dLTC) is detected if the multiframe alignment process is in the OOM state.	4.6.2, 4.6.5	m	
2	The S4D LTC defect (dLTC) is cleared if the multiframe alignment process is in the IM state.	4.6.2, 4.6.5	m	

Table B.196: VC-4 Tandem Connection Remote Outgoing VC defect (dODI)

Item	VC-4 Tandem Connection Remote Outgoing VC defect (dODI)	Reference	Status	Support
1	The TC ODI defect (dODI) is detected if 5 consecutive frames contain the '1' value in bit N1[7][74] of the 76 frame multiframe.	4.6.2, 4.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
2	The TC ODI defect (dODI) is cleared if in 5 consecutive frames contain the '0' value in bit N1[7][74] of the 76 frame multiframe.	4.6.2, 4.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
3	The TC RDI defect (dRDI) is cleared during reception of an aSSF.	4.6.2, 4.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	

B.4.8.3 Consequent action activation and clearance criteria

Table B.197: Alarm Indication Signal action (aAIS)

Prerequisite: B.1/34 OR B.1/36 -- S4D_TT_Sk and/or S4D/S4_A_Sk present

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
1	The S4D_TT_Sk outputs an all "1"s signal within 250 µs upon S4D dUNEQ detection.	4.6.2	c19701	
2	The S4D_TT_Sk outputs an all "1"s signal within 250 µs upon S4D dTIM detection.	4.6.2	c19701	
3	The S4D_TT_Sk outputs an all "1"s signal within 250 µs upon S4D dLTC detection.	4.6.2	c19701	
4	The S4D_TT_Sk outputs normal data within 250 µs when there is (are) no more defect(s) active.	4.6.2	c19701	
5	The S4D/S4_A_Sk outputs an all "1"s signal within 1 ms upon AI_OSF reception.	4.6.4	c19702	
6	The S4D/S4_A_Sk outputs normal data within 1 ms when there is (are) no more defect(s) active.	4.6.4	c19702	

c19701: IF B.1/34 THEN m ELSE n/a -- S4D_TT_Sk present
c19702: IF B.1/36 THEN m ELSE n/a -- S4D/S4_A_Sk present

Table B.198: Remote Defect Indication defect action (aRDI)

Prerequisite: B.1/33 AND B.1/34 -- S4D_TT_So and S4D_TT_Sk functions present

Item	Remote Defect Indication defect action (aRDI)	Reference	Status	Support
1	The S4D_TT_Sk outputs an RDI request generation (RI_RDI) on CI_SSF detection.	4.6.2	m	
2	The S4D_TT_Sk outputs an RDI request generation (RI_RDI) on S4D dUNEQ detection.	4.6.2	m	
3	The S4D_TT_Sk outputs an RDI request generation (RI_RDI) on S4D dTIM detection.	4.6.2	m	
4	The S4D_TT_Sk outputs an RDI request generation (RI_RDI) on S4D dLTC detection.	4.6.2	m	
5	The S4D_TT_Sk clears the RDI request when there is (are) no more defect(s) active.	4.6.2	m	
6	The S4D_TT_So inserts the RDI code within the TC RDI code within 1 multiframe (9,5 ms) upon RI_RDI reception.	4.6.1	m	
7	The S4D_TT_So outputs normal data within the TC RDI code within 1 multiframe (9,5 ms) upon RI_RDI clearing.	4.6.1	m	

Table B.199: Remote Error Indication action (aREI)

Prerequisite: B.1/33 AND B.1/34 -- S4D_TT_So and S4D_TT_Sk functions present

Item	Remote Error Indication action (aREI)	Reference	Status	Support
1	The S4D_TT_So inserts the RI_REI value in the REI bit in the following frame.	4.6.1	m	

Table B.200: Outgoing Defect Indication defect action (aODI)

Prerequisite: B.1/33 AND B.1/34 -- S4D_TT_So and S4D_TT_Sk functions present

Item	Outgoing Defect Indication defect action (aODI)	Reference	Status	Support
1	The S4D_TT_Sk outputs an ODI request generation (RI_ODI) on CI_SSF detection.	4.6.2	m	
2	The S4D_TT_Sk outputs an ODI request generation (RI_ODI) on S4D dUNEQ detection.	4.6.2	m	
3	The S4D_TT_Sk outputs an ODI request generation (RI_ODI) on S4D dTIM detection.	4.6.2	m	
4	The S4D_TT_Sk outputs an ODI request generation (RI_ODI) on S4D dLTC detection.	4.6.2	m	
5	The S4D_TT_Sk outputs an ODI request generation (RI_ODI) on S4D dIncAIS detection.	4.6.2	m	
6	The S4D_TT_Sk clears the ODI request when there is (are) no more defect(s) active.	4.6.2	m	
7	The S4D_TT_So inserts the ODI code within the TC ODI code within 1 multiframe (9,5 ms) upon RI_ODI reception.	4.6.1	m	
8	The S4D_TT_So outputs normal data within the TC ODI code at the first opportunity after the RI_ODI request has been cleared	4.6.1	m	

Table B.201: Outgoing Error Indication action (aOEI)

Prerequisite: B.1/33 AND B.1/34 -- S4D_TT_So and S4D_TT_Sk functions present

Item	Outgoing Error Indication action (aOEI)	Reference	Status	Support
1	The S4D_TT_So inserts the RI_OEI value in the OEI bit in following frame.	4.6.1	m	

Table B.202: Server Signal Fail action (aSSF)

Prerequisite: B.1/35 -- S4D/S4_A_Sk present

Item	Server Signal Fail action (aSSF)	Reference	Status	Support
1	The S4D/S4_A_Sk sets CI_SSF to TRUE on AI_OSF reception.	4.6.4	m	
2	The S4D/S4_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	4.6.4	m	

Table B.203: Trail Signal Fail action (aTSF)

Prerequisite: B.1/34 OR B.1/37 -- S4D_TT_Sk and/or S4Dm_TT_Sk present

Item	Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) set AI_TSF to TRUE on S4D dUNEQ detection.	4.6.2, 4.6.5	m	
2	The Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) set AI_TSF to TRUE on S4D dTIM detection.	4.6.2, 4.6.5	m	
3	The Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) set AI_TSF to TRUE on S4D dLTC detection.	4.6.2, 4.6.5	m	
4	The Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) set AI_TSF to TRUE on CI_SSF reception.	4.6.2, 4.6.5	m	
5	The Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) set AI_TSF to FALSE when there is (are) no more defect(s) active.	4.6.2, 4.6.5	m	

Table B.204: Outgoing Signal Fail action (aOSF)

Prerequisite: B.1/34 OR B.1/37 -- S4D_TT_Sk and/or S4Dm_TT_Sk present.

Item	Outgoing Signal Fail action (aOSF)	Reference	Status	Support
1	The Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) set AI_OSF to TRUE on S4D dUNEQ detection.	4.6.2, 4.6.5	m	
2	The Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) set AI_OSF to TRUE on S4D dTIM detection.	4.6.2, 4.6.5	m	
3	The Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) set AI_OSF to TRUE on S4D dLTC detection.	4.6.2, 4.6.5	m	
4	The Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) set AI_OSF to TRUE on S4D dIncAIS detection.	4.6.2, 4.6.5	m	

Item	Outgoing Signal Fail action (aOSF)	Reference	Status	Support
5	The Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) set AI_OSF to TRUE on CI_SSF reception.	4.6.2, 4.6.5	m	
6	The Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) set AI_OSF to FALSE when there is (are) no more defect(s) active.	4.6.2, 4.6.5	m	

Table B.205: AI_SF signal generation (AI_SF)

Prerequisite: B.1/35 -- S4D/S4_A_So present

Item	AI_SF signal generation (AI_SF)	Reference	Status	Support
1	The S4D/S4_A_So sets AI_SF to TRUE on CI_SSF reception.	4.6.3	m	
2	The S4D/S4_A_So sets AI_SF to FALSE when no CI_SSF is received.	4.6.3	m	

Table B.206: Trail Signal Degrade action (aTSD)

Prerequisite: B.1/34 OR B.1/37 -- S4D_TT_Sk and/or S4Dm_TT_Sk present

Item	Trail Signal Degrade action (aTSD)	Reference	Status	Support
1	If the dDEG is detected in the trail termination sink the aTSD is performed.	EN 300 417-1-1 [6] subclause 8.2.2.6	m	
2	It ceases aTSD insertion after the dDEG defect is cleared.	EN 300 417-1-1 [6] subclause 8.2.2.6	m	

B.4.8.4 Defect correlation

Prerequisite: B.6/8 -- Tandem Connection defect correlation process supported.

Table B.207: Tandem Connection Defect Correlation

Item	Tandem Connection Defect correlation	Reference	Status	Support
1	Under S4D dUNEQ detection the VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) generate a S4D cUNEQ report if the port is in the monitoring state (MON).	4.6.2, 4.6.5	m	
2	Under S4D dLTC detection the VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) generate a S4D cLTC report if the port is in the monitoring state (MON) and no dUNEQ defect has been detected.	4.6.2, 4.6.5	m	
3	Under S4D dTIM detection the VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) generate a S4D cTIM report if the port is in the monitoring state (MON) and no dUNEQ nor dLTC defects have been detected.	4.6.2, 4.6.5	m	
4	Under S4D dDEG detection the VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) generate a S4D cDEG report if the port is in the monitoring state (MON) and no dTIM nor dLTC defects have been detected.	4.6.2, 4.6.5	m	
5	Under S4D dRDI detection the VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) generate a S4D cRDI report if the port is in the monitoring state (MON) and no dUNEQ nor dTIM nor dLTC defects have been detected.	4.6.2, 4.6.5	m	
6	The S4D cRDI is reported only if S4D RDI_reported is set to TRUE by the EMF. By default S4D RDI_reported is set to FALSE.	4.6.2, 4.6.5	m	
7	Under S4D dODI detection the VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) generate a S4D cODI report if the port is in the monitoring state (MON) and no dUNEQ nor dTIM nor dLTC defects have been detected.	4.6.2, 4.6.5	m	
8	The S4D cODI is reported only if S4D ODI_reported is set to TRUE by the EMF. By default S4D ODI_reported is set to FALSE.	4.6.2, 4.6.5	m	
9	Under CI_SSF the VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) generate a S4D cSSF report if the port is in the monitoring state (MON).	4.6.2, 4.6.5	m	
10	The S4D cSSF is reported only if selected S4D SSF_reported is set to TRUE by the EMF. By default S4D SSF_reported is set to FALSE.	4.6.2, 4.6.5	m	
11	All the generated fault causes (cXXX) are reported to the EMF	EN 300 417-1-1 [6] subclause 8.1, figure 36	m	

B.4.8.5 Performance monitoring

B.4.8.5.1 Near End Performance monitoring

Prerequisite: B.6/5 -- Tandem Connection Near-end performance monitoring process supported.

Table B.208: pN_DS performance parameter

Item	pN_DS performance parameter	Reference	Status	Support
1	The VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) indicate a S4D pN_DS every second with at least one occurrence of S4D aTSF or an equipment defect (dEQ).	4.6.2, 4.6.5	m	

Table B.209: pN_EBC performance parameter

Item	pN_EBC performance parameter	Reference	Status	Support
1	Every second the VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) count the number of S4D Near-end Errored Block (S4D N_Bs) within that second as the S4D pN_EBC (S4D Near-end Error Block Count).	4.6.2, 4.6.5	m	

Comments: A "Near-end Block" (N_B) is errored if one or more BIP-8 violations are detected.

B.4.8.5.2 Far End Performance Monitoring

Prerequisite: B.6/6 -- Tandem Connection Far-end performance monitoring process supported

Table B.210: pF_DS performance parameter

Item	pF_DS performance parameter	Reference	Status	Support
1	The VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) indicate a S4D pF_DS every second with at least one occurrence of S4D dRDI.	4.6.2, 4.6.5	m	

Table B.211: pF_EBC performance parameter

Item	pF_EBC performance parameter	Reference	Status	Support
1	Every second VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) count the number of S4D Far-end Errored Block (S4D F_Bs) within that second as the S4D pF_EBC (S4D Far-end Error Block Count).	4.6.2, 4.6.5	m	

Comments: A "Far-end Block" (F_B) is errored if the REI count indicates one or more errors.

B.4.8.5.3 Tandem Connection Outgoing VC Performance Monitoring

Prerequisite: B.6/7 -- Tandem Connection Outgoing VC performance monitoring process supported

Table B.212: pOF_DS performance parameter

Item	pOF_DS performance parameter	Reference	Status	Support
1	The VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) indicate a S4D pOF_DS every second with at least one occurrence of S4D dODI	4.6.2, 4.6.5	m	

Table B.213: pOF_EBC performance parameter

Item	pOF_EBC performance parameter	Reference	Status	Support
1	Every second VC-4 Tandem Connection Trail Termination Sink functions (S4D_TT_Sk, S4Dm_TT_Sk) count the number of S4D Outgoing VC Errored Block (S4D OF_Bs) within that second as the S4D pOF_EBC (S4D Outgoing VC Error Block Count).	4.6.2, 4.6.5	m	

Comments: An "Outgoing VC Block" (OF_B) is errored if the OEI count indicates one or more errors.

Table B.214: pON_EBC performance parameter

Item	pON_EBC performance parameter	Reference	Status	Support
1	Every second the VC-4 Tandem Connection Trail Termination Sink function (S4D_TT_Sk) counts the number of S4D Outgoing Near-end Errored Block (S4D ON_Bs) within that second as the S4D pON_EBC (S4D Outgoing Near-end Error Block Count).	4.6.2	m	

Table B.215: pON_DS performance parameter

Item	pON_DS performance parameter	Reference	Status	Support
1	The VC-4 Tandem Connection Trail Termination Sink function (S4D_TT_Sk) indicates a S4D pON_DS every second with at least one occurrence of S4D aODI or an equipment defect (dEQ).	4.6.2	m	

Annex C (normative): ICS proforma for S3 Path Layer

C.1 Identification of the implementation

In the present document, an IUT, and of course the identification of an IUT refers to a S3 Path Layer instance implemented inside the SUT.

Identification of the Implementation Under Test (IUT) and the system in which it resides (the System Under Test (SUT)) should be filled in so as to provide as much detail as possible regarding version numbers and configuration options.

The product supplier information and client information should both be filled in if they are different.

A person who can answer queries regarding information supplied in the ICS should be named as the contact person.

C.1.1 Date of the statement

....

C.1.2 Implementation Under Test (IUT) identification

IUT name:

....

....

IUT version

Hardware version:

....

....

Software version:

....

....

Firmware version:

....

....

C.1.3 System Under Test (SUT) identification

SUT name:

....

....

Hardware configuration:

....

....

SUT Software version:

....

....

SUT Firmware version:

....

Operating system:

....

....

C.1.4 Product supplier

Name:

....

Address:

....

....

....

Telephone number:

....

Facsimile number:

....

E-mail address:

....

Additional information:

....

....

....

C.1.5 Client

Name:

....

Address:

....

....

....

Telephone number:

....

Facsimile number:

....

E-mail address:

....

Additional information:

....

....

....

C.1.6 ICS contact person

Name:

....

Telephone number:

....

Facsimile number:

....

E-mail address:

....

Additional information:

....

....

C.2 Identification of the EN

This ICS proforma applies to the following standard:

EN 300 417-4-1 (V1.1): "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 4-1: Synchronous Digital Hierarchy (SDH) path layer functions".

C.3 Global statement of conformance of S3 Path Layer

Due to the model used for this layer the "Global statement of conformance" sentence used in ETSI ICS is not applicable to this layer.

C.4 S3 Path Layer functions

C.4.1 S3 Path Layer Description

Table C.1: S3 Path Layer functions

Item	S3 Path Layer functions	Reference	Status	Support
1	VC-3 Layer Connection function (S3_C)	5, figure 68	o.101	
2	VC-3 Layer Trail Termination Source function (S3_TT_So)	5, figure 68	o.101	
3	Trail Termination Sink function (S3_TT_Sk)	5, figure 68	o.101	
4	VC-3 Layer to P31x Layer Adaptation Source function (S3/P31x_A_So)	5, figure 68	c101	
5	VC-3 Layer to P31x Layer Adaptation Sink function (S3/P31x_A_Sk)	5, figure 68	c102	
6	VC-3 Layer to P31e Layer Adaptation Source function (S3/P31e_A_So)	5, figure 68	c101	
7	VC-3 Layer to P31e Layer Adaptation Sink function (S3/P31e_A_Sk)	5, figure 68	c102	
8	VC-3 Layer to ATM Layer (ATM) Compound Adaptation Source function (S3/Avp_A_So)	5, figure 68	c101	
9	VC-3 Layer to ATM Layer (ATM) Compound Adaptation Sink function (S3/Avp_A_Sk)	5, figure 68	c102	
10	VC-3 Layer to P0s Layer Adaptation Source function (S3/P0s_A_So)	5, figure 68	c103	
11	VC-3 Layer to P0s Layer Adaptation Sink function (S3/P0s_A_Sk)	5, figure 68	c104	
12	VC-3 Layer to TSS3 Layer Adaptation Source function (S3/TSS3_A_So)	5, figure 68	c103	
13	VC-3 Layer to TSS3 Layer Adaptation Sink function (S3/TSS3_A_Sk)	5, figure 68	c104	
14	VC-3 Layer Non-intrusive Monitoring function (S3m_TT_Sk)	5, figure 68	c105	
15	VC-3 Layer Supervisory Unequipped function (S3s_TT_So)	5, figure 68	c105	

Item	S3 Path Layer functions	Reference	Status	Support
16	VC-3 Layer Supervisory Unequipped Termination Sink function (S3s_TT_Sk)	5, figure 68	c105	
17	VC-3 Tandem Connection Trail Termination Source function (S3D_TT_So)	5, figure 68	c105	
18	VC-3 Tandem Connection Trail Termination Sink function (S3D_TT_Sk)	5, figure 68	c105	
19	VC-3 Tandem Connection to VC-3 Adaptation Source function (S3D/S3_A_So)	5, figure 68	c106	
20	VC-3 Tandem Connection to VC-3 Adaptation Sink function (S3D/S3_A_Sk)	5, figure 68	c107	
21	VC-3 Tandem Connection non-intrusive Trail Termination Sink function (S3Dm_TT_Sk)	5, figure 68	c105	
22	VC-3 Layer Linear Trail Protection	5, figure 71	c108	
23	VC-3 Layer Sub-Network Connection (SNC) Protection	5	c105	
24	VC-3 Layer to LC Layer Adaptation Source function (S3/LC_A_So)	5, figure 68	c109	
25	VC-3 Layer to Xxx Layer Adaptation Source function (S3/Xxx_A_So)	n/a	c101	
26	VC-3 Layer to Xxx Layer Adaptation Sink function (S3/Xxx_A_Sk)	n/a	c102	

o.101:	It is mandatory to support at least one of these items	-- connection function and/or trail termination source and/or trail termination sink present
o.102:	It is mandatory to support at least one of these items	-- at least one Payload Adaptation Source present
o.103:	It is mandatory to support at least one of these items	-- at least one Payload Adaptation Sink present
c101:	IF C.1/2 THEN o.102 ELSE x	-- a TT_So function should exist for A_So function
c102:	IF C.1/3 THEN o.103 ELSE x	-- a TT_Sk function should exist for A_Sk function
c103:	IF C.1/2 THEN o ELSE x	-- a TT_So function should exist for A_So function
c104:	IF C.1/3 THEN o ELSE x	-- a TT_Sk function should exist for A_Sk function
c105:	IF C.1/1 THEN o ELSE n/a	-- a connection function should exist
c106:	IF C.1/17 THEN m ELSE x	-- a Tandem Connection TT_So function should exist for Tandem Connection A_So function
c107:	IF C.1/18 THEN m ELSE x	-- a Tandem Connection TT_Sk function should exist for Tandem Connection A_Sk function
c108:	IF C.1/3 THEN o ELSE n/a	-- S3_TT_Sk function should exist for S3 Linear Trail Protection
c109:	IF C.1/2 OR C.1/15 THEN m ELSE n/a	-- S3_TT_So and/or S3s_TT_So function should exist

Comment: If the S3_C is not supported it is assumed that the TT_So (TT_Sk) functions are hard-wired all together to the S3_CI source direction (S3_CI sink direction). That could be the case of an ATM equipment.

Items dealing with S3/Xxx_A functions take into account the implementation of adaptation functions not specified or referenced in EN 300 417-x-1 standards.

NOTE: S3 to P32x adaptation functions do not appear in the present document as their specification is given as informative in an annex in EN 300 417-4-1 [8].

Table C.2: Supported VC-3 Layer payload Adaptation functions

Prerequisite: C.1/2 OR C.1/3 -- implies that at least one VC-3 Layer payload Adaptation function is present

Item	S3 Path Layer functions	Reference	Status	Support
1	More than one VC-3 Layer payload Adaptation source function is supported	5, figure 68	c201	
2	More than one VC-3 Layer payload Adaptation sink function is supported	5, figure 68	c202	

c201: IF C.1/2 THEN o ELSE x -- implies that at least one VC-3 Layer payload Adaptation Source function is present

c202: IF C.1/3 THEN o ELSE x -- implies that at least one VC-3 Layer payload Adaptation Sink function is present

Table C.3: VC-3 Layer Protection schemes

Prerequisite: C.1/22 OR C.1/23 -- VC-3 Layer Linear Trail or SNC Protection supported

Item	VC-3 Layer Linear Trail Protection schemes	Reference	Status	Support
1	VC-3 Layer 1+1 Linear Trail Protection with unidirectional switching and revertive operation	5.5.1.1	c301	
2	VC-3 Layer 1+1 Linear Trail Protection with unidirectional switching and non-revertive operation	5.5.1.1	c301	
3	VC-3 Layer 1+1 Linear Trail Protection with bidirectional switching and revertive operation	5.5.1.2	c302	
4	VC-3 Layer 1+1 Linear Trail Protection with bidirectional switching and non-revertive operation	5.5.1.2	c302	
5	VC-3 Layer 1+1 Inherently Monitored SNC (SNC/I) Protection with unidirectional switching and revertive operation	5.1	c303	
6	VC-3 Layer 1+1 Inherently Monitored SNC (SNC/I) Protection with unidirectional switching and non-revertive operation	5.1	c303	
7	VC-3 Layer 1+1 Non-intrusively Monitored SNC (SNC/N) Protection with unidirectional switching and revertive operation	5.1	c304	
8	VC-3 Layer 1+1 Non-intrusively Monitored SNC (SNC/N) Protection with unidirectional switching and non-revertive operation	5.1	c304	
9	VC-3 Layer 1+1 Sub-layer Monitored SNC (SNC/S) Protection with unidirectional switching and revertive operation	5.1	c305	
10	VC-3 Layer 1+1 Sub-layer Monitored SNC (SNC/S) Protection with unidirectional switching and non-revertive operation	5.1	c305	

Comment to C.3/3 and C.3/4: The APS protocol for bidirectional VC-3 linear trail protection is not defined.

o.301: It is mandatory to support at least one of these items -- at least one 1+1 linear trail protection scheme

o.302: It is mandatory to support at least one of these items -- at least one 1+1 SNC protection scheme

c301: IF C.1/22 THEN o.301 ELSE x -- 1+1 linear trail protection supported

c302: IF (C.1/22 ANDOR (C.1/2 AND C.1/3))

	THEN o.301 ELSE x	-- 1+1 linear trail protection and bidirectional layer supported
c303:	IF C.1/23 THEN o.302 ELSE x	-- 1+1 SNC protection supported
c304:	IF (C.1/23 AND (C.1/14 OR C.1/16)) THEN o.302 ELSE x	-- 1+1 SNC protection and S3m_TT_Sk and/or S3s_TT_Sk supported
c305:	IF (C.1/23 AND (C.1/18 OR C.1/21)) THEN o.302 ELSE x	-- 1+1 SNC protection and S3D_TT_Sk and/or S3Dm_TT_Sk supported

Table C.4: VC-3 Layer Linear Trail Protection functions

Prerequisite: C.1/22 -- VC-3 Layer Linear Trail Protection scheme supported

Item	VC-3 Layer Linear Trail Protection functions	Reference	Status	Support
1	VC-3 Layer Linear Trail Protection Connection function (S3P_C)	5, figure 71	m	
2	VC-3 Protection Trail Termination Source function (S3P_TT_So)	5, figure 71	c401	
3	VC-3 Protection Trail Termination Sink function (S3P_TT_Sk)	5, figure 71	m	
4	VC-3 trail to VC-3 Linear Trail Protection Layer Adaptation Source function (S3/S3P_A_So)	5, figure 71	c401	
5	VC-3 trail to VC-3 Linear Trail Protection Layer Adaptation Sink function (S3/S3P_A_Sk)	5, figure 71	m	

c401: IF C.1/2 THEN m ELSE x -- a TT_So function should exist for protection Source functions

Table C.5: Supervision processes

Item	Supervision process	Reference	Status	Support
1	Near-end Performance Monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c501	
2	Far-end Performance Monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c502	
3	Protection Performance Monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c503	
4	Defect correlation process	EN 300 417-1-1 [6] subclause 8.2-8.3	c504	
5	Tandem Connection Near-end Performance Monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c505	
6	Tandem Connection Far-end Performance Monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c506	
7	Tandem Connection Outgoing VC Performance Monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c506	
8	Tandem Connection Defect correlation process	EN 300 417-1-1 [6] subclause 8.2-8.3	c505	

c501:	IF (C.1/3 OR C.1/14 OR C.1/16) THEN m ELSE n/a	-- S3_TT_Sk and/or S3m_TT_Sk and/or S3s_TT_Sk present
c502:	IF (C.1/2 AND C.1/3) OR (C.1/15 AND C.1/16) THEN m ELSE n/a	-- bidirectional S3 layer or both Supervisory-unequipped Trail Termination functions present
c503:	IF C.1/22 THEN m ELSE n/a	-- VC-3 Layer Linear Trail Protection scheme supported
c504:	IF (C.1/3 OR C.1/5 OR C.1/7 OR C.1/9 OR C.1/9 OR C.1/13 OR C.1/14 OR C.1/16) THEN m ELSE n/a	-- at least one of the Sink functions defect correlation capabilities present
c505:	IF (C.1/18 OR C.1/21) THEN m ELSE n/a	-- S3D_TT_Sk and/or S3Dm_TT_Sk present
c506:	IF (C.1/18 AND C.1/19) THEN m ELSE n/a	-- both Tandem Connection Trail Termination functions present

C.4.2 VC-3 Layer Transmission Tables

Table C.6: Data stream structure

Item	Data stream structure	Reference	Status	Support
1	The CI at the S3 connection point is octet structured with a 125 microsecond frame.	5	m	
2	The S3_CI is 85 x 9 bytes data stream composed of one column of 9 bytes of VC-3 overhead and 84 columns of 9 bytes of VC-3 payload.	5, figure 2	m	

C.4.2.1 VC-3 Layer Connection Function: S3_C

Prerequisite: C.1/1 -- S3_C present

C.4.2.1.1 Routing process

Table C.7: Connectivity functionalities: generalities

Prerequisite: C.1/1 -- S3_C present

Item	Connectivity functionalities: generalities	Reference	Status	Support
1	The S3_C function is able to connect a specific input ((termination) connection point) with a specific output input ((termination) connection point) by means of establishing a matrix connection between the specified input and output.	5.1	m	
2	The S3_C function is able to remove an established matrix connection.	5.1	m	

Comment: Not supporting C.7/1 and C.7/2 means that only hard-wired connections are supported

Table C.8: Connectivity functionalities: connection characterization

Item	Connectivity functionalities: connection characterization	Reference	Status	Support
1	Each connection in the S3_C function is characterized by the type of connection: unprotected, 1+1 protected (SNC/I, SNC/N or SNC/S protection)	5.1	c801	
2	Each connection in the S3_C function is characterized by the traffic direction: unidirectional, bidirectional	5.1	m	
3	Each connection in the S3_C function is characterized by the input and output connection points: set of connection point identifiers	5.1	m	

c801: IF C.1/2339 THEN m ELSE n/a -- 1+1 SNC protection supported

C.4.2.1.2 Unequipped VC generation

Table C.9: Unequipped VC generation

Item	Connectivity functionalities: connection characterization	Reference	Status	Support
1	The function generates an unequipped VC signal, as specified in EN 300 417-1-1 [6], subclause 7.2.	5.1, EN 300 417-1-1 [6], subclause 7.2.	m	

C.4.2.1.3 SNC protection process

Prerequisite: C.1/23 -- 1+1 SNC protection supported (if the given condition is not true then skip the whole subclause "SNC protection process")

Table C.10: SNC protection connectivity functionalities: generalities

Item	SNC protection connectivity functionalities: generalities	Reference	Status	Support
1	The S3_C is able to establish protection groups between a number of (T)CPs to perform the 1+1 VC-3 linear (sub)network connection protection process.	5.1, EN 300 417-1-1 [6] subclause 9.4.1, subclause 9.4.2, subclause 9.4.3	m	
2	The S3_C performs the bridge and selector functionality as presented in figure 49 of EN 300 417-1-1 [6]	5.1	m	

Table C.11: SNC protection connectivity functionalities: source direction

Item	SNC protection connectivity functionalities: source direction	Reference	Status	Support
1	The working output is connected to the associated normal input.	5.1	m	
2	The protection output is connected to the associated normal input.	5.1	m	

Table C.12: SNC protection connectivity functionalities: sink direction

Item	SNC protection connectivity functionalities: sink direction	Reference	Status	Support
1	The signal output at the normal reference point can be the signal received via either the working connection or the protection connection	5.1	m	

Comment: In the sink case of a protection connection the source of the connection is determined by the SF (and SD) signals associated with each of the two inputs to the connection and the possible external switch requests. The set of SF and SD signals used, is controlled by the protection type setting.

Table C.13: SNC protection operation

Item	SNC protection operation	Reference	Status	Support
1	No APS channel is supported for SNC protection applications	5.1, EN 300 417-3-1 [7] A.1	m	
2	The signal switching procedure is started under a Signal Fail condition. This depends on the protection type: SF = SSF for SNC/I and SF = TSF for SNC/N or SNC/S.	5.1, EN 300 417-3-1 [7] A.1	m	
3	The signal switching procedure is started under a Signal Degrade condition. This depends on the protection type: SD = TSD for SNC/N or SNC/S.	5.1, EN 300 417-3-1 [7] A.1	c1301	
4	For revertive operation the available external commands are LO, FSw-#1, MSw-#1, CLR	5.1, EN 300 417-3-1 [7] A.1	c1302	
5	For non-revertive operation the available external commands are LO or FSw, FSw-#i, MSw-#i, CLR (i = 0, 1)	5.1, EN 300 417-3-1 [7] A.1	c1303	
6	Extra Traffic cannot be supported	5.1, EN 300 417-3-1 [7] A.1	m	
7	The Wait-To-Restore (WTR) time is provisionable	5.1, EN 300 417-3-1 [7] A.1	c1302	
8	The Hold-off (HO) time is provisionable in steps of the order of 100 ms	5.1, EN 300 417-3-1 [7] A.1	m	

c1301: IF (C.4/7 OR C.4/8 OR C.4/9 OR C.4/8)
THEN m ELSE n/a -- SNC/N and/or SNC/S protection supported

c1302: IF (C.4/5 OR C.4/7 OR C.4/9)
THEN m ELSE n/a -- revertive SNC protection scheme supported

c1303: IF (C.4/6 OR C.4/8 OR C.4/8)
THEN m ELSE n/a -- non-revertive SNC protection scheme supported

Table C.14: Protection architecture characteristic parameters

Item	Protection architecture characteristic parameters	Reference	Status	Support	Values	
					Allowed	Supported
1	Wait-To-Restore (WTR) time: X value	5.1, EN 300 417-3-1 [7] A.1	c1401		05 ≤ X ≤ 12 minutes	
2	Hold-off (HO) time: Z value	5.1, EN 300 417-3-1 [7] A.1	m		0 ≤ Z ≤ 10 s	
3	Switching time (Y) is less than or equal to 50 ms	5.1, EN 300 417-3-1 [7] A.1	m		___	___

c1401: IF (C.4/5 OR C.4/7 OR C.4/9)
THEN m ELSE n/a -- revertive SNC protection scheme supported

Table C.15: SNC protection dynamic configuration

Item	SNC protection dynamic configuration	Reference	Status	Support
1	It is possible to add/remove connections to/from a broadcast connection without disturbing the CI passing the connection unless any protection switching action is activated/required	5.1	m	
2	It is possible to add/remove the protection status to the configuration of a connection without disturbing the CI passing the connection unless any protection switching action is activated/required	5.1	m	
3	It is possible to change between the operation type of a connection without disturbing the CI passing the connection unless any protection switching action is activated/required	5.1	c1501	
4	It is possible to change the WTR time of a connection without disturbing the CI passing the connection unless any protection switching action is activated/required	5.1	c1502	
5	It is possible to change the Hold-off time of a connection without disturbing the CI passing the connection unless any protection switching action is activated/required.	5.1	m	
6	The operation type can be changed via S3_C_MI_OPERtype	5.1	c1501	

c1501: IF (C.4/5 OR C.4/7 OR C.4/9) AND (C.4/6 OR C.4/8 OR C.4/10) THEN m ELSE n/a -- at least one revertive and one non-revertive SNC protection scheme supported

c1502: IF C.15/1 THEN m ELSE n/a -- Wait-To-Restore (WTR) time supported

C.4.2.2 VC-3 Layer Trail Termination Functions: S3_TT_So, S3_TT_Sk, S3m_TT_Sk, S3s_TT_So and S3s_TT_Sk

Prerequisite: C.1/2 OR C.1/3 OR C.1/14 OR C.1/15 OR C.1/16 -- at least one VC-3 layer Trail Termination function present

C.4.2.2.1 In service error monitoring process

Table C.16: In service error monitoring: principles

Item	In service error monitoring: principles	Reference	Status	Support
1	An Error Detection Code (EDC) is part of the characteristic information for in service monitoring purposes.	EN 300 417-1-1 [6] subclause 7.3	m	
2	In service error monitoring parameter definition is block-based.	ITU-T Rec.G.707 [14] subclause 9.2.2.4 note	m	
3	The block length is 765 bytes (the entire VC-3).	ITU-T Rec.G.707 [14] subclause 9.2.2.4	m	
4	The error monitoring is performed using Bit Interleaved Parity 8 (BIP-8).	4.2.1,4.4.2 , ITU-T Rec.G.707 [14] subclause 9.2.2.4 note	m	
5	The BIP-8 is calculated using even parity in such a manner that the bit in position x provides even parity over the x-bits of all the 8-bits sequences within the specified block.	ITU-T Rec.G.707 [14] subclause 9.2.2.4 note	m	

Comments: The BIP-n is interpreted as checking 'n' separate interleaved parity check blocks. If any of the 'n' parity check fails (Error Detection Code Violation), the block is assumed to be in error.

Table C.17: Error Detection Code location

Item	Error Detection Code location	Reference	Status	Support
1	VC-3 Layer Error Detection Code (EDC) is located in byte B3 of the VC-3 overhead.	5, figure 69	m	

Table C.18: Error Detection Code processing: source direction

Prerequisite: C.1/2 OR C.1/15 -- S3_TT_So and/or S3s_TT_So present

Item	Error Detection Code processing: source direction	Reference	Status	Support
1	The BIP-8 is calculated over all bits of the entire previous VC-3.	5.2.1,5.4.2	m	
2	BIP-8 code is inserted in the B3 byte of the current VC-3.	5.2.1,5.4.2	m	

Table C.19: Error Detection Code processing: sink direction

Prerequisite: C.1/3 OR C.1/14 OR C.1/16 --S3_TT_Sk, S3m_TT_Sk and/or S3s_TT_Sk present

Item	Error Detection Code processing: sink direction	Reference	Status	Support
1	The incoming error monitoring byte B3 is recovered from the VC-3 overhead.	5.2.2,5.4.1, 5.4.3	m	
2	The BIP-8 is calculated over all bits of the entire previous VC-3.	5.2.2,5.4.1, 5.4.3	m	
3	Recovered B3 byte is compared with the calculated BIP-8.	5.2.2,5.4.1, 5.4.3	m	
4	A difference between the computed and recovered B3 values is taken as evidence of one or more errors (nN_B) in the computation block.	5.2.2,5.4.1, 5.4.3	m	

C.4.2.2.2 Remote indicator monitoring process

C.4.2.2.2.1 VC-3 Remote Defect Indication (VC-3 RDI)

Table C.20: Remote Defect Indication location

Item	Remote Defect Indication location	Reference	Status	Support
1	The VC-3 RDI is located in bit 5 of byte G1 of the VC-3 overhead.	5.2.2, 5.4.1, 5.4.3	m	

Table C.21: Remote Defect Indication processing: source direction

Prerequisite: (C.1/2 AND C.1/3) OR
(C.1/15 AND C.1/16) -- bidirectional S3 layer and/or both Supervisory- unequipped Trail Termination functions

Item	Remote Defect Indication processing: source direction	Reference	Status	Support
1	VC-3 RDI is set upon activation of S3_RI_RDI determined by the associated S3_TT_Sk.	5.2.1	c2101	
2	VC-3 RDI is cleared upon deactivation of S3_RI_RDI determined by the associated S3_TT_Sk.	5.2.1	c2101	
3	VC-3 RDI is set upon activation of S3s_RI_RDI determined by the associated S3s_TT_Sk.	5.4.2	c2102	
4	VC-3 RDI is cleared upon deactivation of S3s_RI_RDI determined by the associated S3s_TT_Sk.	5.4.2	c2102	
5	VC-3 RDI signal is coded as a '1' bit value.	5.2.1, 5.4.2	m	
6	The '0' bit value is inserted if no S3_RI_RDI signal is active.	5.2.1, 5.4.2	m	

c2101: IF (C.1/2 AND C.1/3)
THEN m ELSE n/a -- bidirectional S3 layer supported
c2102: IF (C.1/15 AND C.1/16)
THEN m ELSE n/a -- Supervisory-unequipped Trail Termination functions supported

Table C.22: Remote Defect Indication processing: sink direction

Prerequisite: C.1/3 OR C.1/14 OR C.1/16 -- S3_TT_Sk and/or S3m_TT_Sk and/or S3s_TT_Sk present

Item	Remote Defect Indication processing: sink direction	Reference	Status	Support
1	The VC-3 layer Trail Termination Sink functions (S3_TT_Sk, S3m_TT_Sk, S3s_TT_Sk) extract and monitor bit 5 of G1 byte in order to detect the '1' bit code as evidence of VC-3 RDI condition.	5.2.2, 5.4.1, 5.4.3	m	

C.4.2.2.2.2 VC-3 Remote Error Indication (S3 REI)

Table C.23: Remote Error Indication: principles

Item	Remote Error Indication: principles	Reference	Status	Support
1	The REI signal contains the exact number of Errored Block (EB) detected in the trail signal at the far-end trail termination	ITU-T Rec.G.707 [14] subclause 9.3.1.4	m	
2	The block length is 6 120 bits (one VC-3). The Error Detection Code (EDC) is BIP-8.	ITU-T Rec.G.707 [14] subclause 9.3.1.4	m	

Table C.24: Remote Error Indication location

Item	Remote Error Indication location	Reference	Status	Support
1	The VC-3 overhead REI is located in bits 1 to 4 of G1 byte of the VC-3 overhead.	ITU-T Rec.G.707 [14] subclause 9.3.1.4	m	

Table C.25: Remote Error Indication processing: source direction

Prerequisite: (C.1/2 AND C.1/3) OR
(C.1/15 AND C.1/16) -- bidirectional S3 layer and/or both Supervisory-unequipped Trail Termination functions

Item	Remote Error Indication processing: source direction	Reference	Status	Support
1	The S3_TT_So sets REI to the equivalent binary value of the number of EDCV detected by the monitoring process following the coding given in table 59 of subclause 5.2.1 in EN 300 417-4-1 [8].	5.2.1, table 59	c2501	
2	The S3s_TT_So sets REI to the equivalent binary value of the number of EDCV detected by the monitoring process following the coding given in table 75 of subclause 5.4.3 in EN 300 417-4-1 [8].	5.4.3, table 75	c2502	

c2501: IF (C.1/2 AND C.1/3)
THEN m ELSE n/a -- bidirectional S3 layer supported

c2502: IF (C.1/15 AND C.1/16)
THEN m ELSE n/a -- Supervisory-unequipped Trail Termination functions supported

Table C.26: Remote Error Indication processing: sink direction

Prerequisite: C.1/3 OR C.1/14 OR C.1/15 -- S3_TT_Sk and/or S3m_TT_Sk and/or S3s_TT_Sk present

Item	Remote Error Indication processing: sink direction	Reference	Status	Support
1	The VC-3 layer Trail Termination Sink functions (S3_TT_Sk, S3m_TT_Sk, S3s_TT_Sk) extract the VC-3 REI from the incoming VC-3 overhead.	5.2.2, 5.4.1, 5.4.3	m	
2	The VC-3 layer Trail Termination Sink functions (S3_TT_Sk, S3m_TT_Sk, S3s_TT_Sk) interpret the VC-3 REI as given in table 61 of subclause 5.2.2 in EN 300 417-4-1 [8].	5.2.2, 5.4.1, 5.4.3, table 61	m	

C.4.2.2.3 Trail Trace Identifier

Prerequisite: C.1/2 OR C.1/3 OR
C.1/14 OR C.1/15 OR C.1/16 -- at least one VC-3 layer Trail Termination function present

Table C.27: Trail Trace Identifier: principles

Item	Trail Trace Identifier: principles	Reference	Status	Support
1	A Trail Trace Identifier (TTI) is inserted by the termination source containing the local Access Point Identifier (APId) and TTI header (TxTI).	5.2.1, 5.4.2, EN 300 417-1-1 [6] subclause 7.1	c2701	
2	The content of the accepted TTI (AcTI) is compared by the trail termination sink function with the provisioned "expected TTI" (ExTI), identifying the expected remote AP.	5.2.2, 5.4.1, 5.4.3, EN 300 417-1-1 [6] subclause 7.1, EN 300 417-1-1 [6] subclause 8.2.1.3	c2702	

c2701: IF (C.1/2 OR C.1/15) THEN m ELSE n/a -- S3_TT_So and/or S3s_TT_So present
c2702: IF (C.1/3 OR C.1/14 OR C.1/16)
THEN m ELSE n/a -- S3_TT_Sk and/or S3m_TT_Sk and/or S3s_TT_Sk present

Table C.28: Trail Trace Identifier byte location

Item	Trail Trace Identifier byte location	Reference	Status	Support
1	The VC-3 Layer Trail Trace Identifier (TTI) is located in byte J1 of the VC-3 overhead.	5.2.1	m	

Table C.29: Trail Trace Identifier byte structure

Item	Trail Trace Identifier byte structure	Reference	Status	Support
1	The VC-3 TTI is a 16 byte string containing the 15 byte APId and a 1 byte header. The MSB of the header is a "1", the remaining 7 bits contain the CRC-7 value of the VC-3 TTI. The MSB of the 15 APId bytes is "0".	EN 300 417-1-1 [6] subclause 7.1	m	
2	The CRC-7 word is the remainder after multiplication by x^7 and then division (modulo 2) by the generator polynomial $x^7 + x^3 + 1$, of the polynomial representation of the VC-3 TTI with the CRC bits set to binary zeroes.	EN 300 417-1-1 [6] subclause 7.1	m	
3	The 16 byte VC-3 TxTI, 16 byte VC-3 ExTI and 16 byte VC-3 AcTI are transferred via the Management Point to and from the trail termination function.	EN 300 417-1-1 [6] subclause 8.2.1.3	m	

Table C.30: Trail Trace identification: source direction

Prerequisite: C.1/2 OR C.1/15 -- at least one VC-3 layer Trail Termination source function present

Item	Trail Trace identification: source direction	Reference	Status	Support
1	The 16 byte VC-3 TTI is transmitted continuously.	EN 300 417-1-1 [6] subclause 7.1	m	

Table C.31: Trail Trace identification: sink direction

Prerequisite: C.1/3 OR C.1/14 OR C.1/16 -- at least one VC-3 layer Trail Termination sink function present

Item	Trail Trace identification: sink direction	Reference	Status	Support
1	The VC-3 Layer Trail Termination Sink functions (S3_TT_Sk, S3s_TT_Sk, S3m_TT_Sk) support mode 1.	EN 300 417-1-1 [6] subclause 7.1	m	
2	The VC-3 Layer Trail Termination Sink functions (S3_TT_Sk, S3s_TT_Sk, S3m_TT_Sk) support mode 2.	EN 300 417-1-1 [6] subclause 7.1	m	
3	The VC-3 Layer Trail Termination Sink functions (S3_TT_Sk, S3s_TT_Sk, S3m_TT_Sk) recover the 16 byte multiframe carried in byte J1 and assume it as Received Trail Trace Identifier (RxTI). The RxTI is made available as AcTI for network management purposes	5.2.2, 5.4.1, 5.4.3	m	
4	The expected TTI mode is provisionable via S3-_TT_Sk_MI_ExTImode	5.2.2, 5.4.1, 5.4.3	m	

C.4.2.2.4 Supervisory Unequipped indication

Table C.32: Supervisory Unequipped indication

Prerequisite: C.1/15 -- S3s_TT_So function present

Item	Supervisory Unequipped indication	Reference	Status	Support
1	The S3s_TT_So function inserts code "0000 0000" (unequipped tandem connection) in byte N1, as defined in EN 300 417-1-1 [6] subclause 7.2.	5.4.2, EN 300 417-1-1 [6] subclause 7.2	m	

C.4.2.3 Activation/deactivation of VC-3 Layer payload Adaptation Functions (S3/P31x_A, S3/P31e_A, S3/Avp_A and S3/TSS3_A)

Table C.33: Activation/deactivation of VC-3 Layer payload Adaptation Functions

Prerequisite: C.2/1 OR C.2/2 -- more than one VC-3 Layer payload Adaptation function present

Item	Activation/deactivation of VC-3 Layer payload Adaptation Functions	Reference	Status	Support
1	Only one of the supported adaptation source functions, as taken from the set composed of S3/P31x_A_So, S3/P31e_A_So, S3/Avp_A_So and S3/TSS3_A_So, can access the VC-3 access point at a time. Access to the access point by other adaptation source functions is denied.	5, 5.3.1, 5.3.3, 5.3.9, 5.3.7	c3301	
2	Each of the supported VC-3 Layer payload adaptation source functions accesses the VC-3 access point when it is activated (MI_Active is true). Otherwise, it does not access the access point.	5, 5.3.1, 5.3.3, 5.3.9, 5.3.7	c3301	
3	The supported adaptation sink functions, as taken from the set composed of S3/P31x_A_Sk, S3/P31e_A_Sk, S3/Avp_A_Sk and S3/TSS3_A_Sk, can be activated/deactivated.	5, 5.3.2, 5.3.4, 5.3.10, 5.3.8	c3302	
4	Each of the supported VC-3 Layer payload adaptation sink functions performs its operation specified above when it is activated (MI_Active is true). Otherwise, it does not report its status via the management point.	5, 5.3.2, 5.3.4, 5.3.10, 5.3.8	c3302	
5	If the S3/P31x_A_Sk and/or S3/P31e_A_Sk is not activated it transmits the all-ONEs signal at its output (CI_D).	5, 5.3.2, 5.3.4	c3303	

c3301: IF C.2/1 THEN m ELSE x -- more than one VC-3 Layer payload adaptation source function supported

c3302: IF C.2/2 THEN o ELSE x -- more than one VC-3 Layer payload adaptation sink function supported

c3303: IF C.33/3 AND (C.1/5 OR C.1/7) THEN m ELSE n/a -- S3/P31x_A_Sk and/or S3/P31e_A_Sk function supported

C.4.2.4 VC-3 Layer to P31x Layer Adaptation Functions: S3/P31x_A_So and S3/P31x_A_Sk

Prerequisite: C.1/4 OR C.1/5 -- S3/P31x_A_So and/or S3/P31x_A_Sk present

Table C.34: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The S3/P31x_A_So maps a 34 368 kbit/s ±20 pm information stream into a VC-3 payload (756 bytes) using bit stuffing and adds bytes C2 and H4.	5.3.1, ETS 300 147 [1]	c3401	
2	The mapping of the 34 368 kbit/s ±20 ppm information stream into the VC-3 payload is performed as depicted in figures 79 and 80 of subclause 4.3.1 in EN 300 417-4-1 [8]	5.3.1, figure 79, figure 80, ETS 300 147 [1]	c3401	
3	The S3/P31x_A_So generates the S3 fixed Frame Start (FS)	5.3.1	c3401	
4	The S3/P31x_A_Sk function recovers plesiochronous P31x Characteristic Information (34 368 kbit/s ±20 ppm) from the synchronous container-3 and checks the reception of the correct payload signal type.	5.3.2, ETS 300 147 [1]	c3402	

c3401: IF C.1/4 THEN m ELSE n/a -- S3/P31x_A_So present
c3402: IF C.1/5 THEN m ELSE n/a -- S3/P31x_A_Sk present

C.4.2.4.1 VC-3 Layer to P31x Layer frequency justification and bitrate adaptation processes

Table C.35: Frequency justification and bitrate adaptation: principles

Prerequisite: C.1/4 -- S3/P31x_A_So present

Item	Frequency justification and bitrate adaptation: principles	Reference	Status	Support
1	Frequency justification is performed by bit stuffing.	5.3.1	m	

Table C.36: Frequency justification and bitrate adaptation: source direction

Prerequisite: C.1/4 -- S3/P31x_A_So present

Item	Frequency justification and bitrate adaptation: source direction	Reference	Status	Support
1	The S3/P31x_A_So function provides for an elastic store (buffer) process. The data signal is written into the buffer under control of the associated input clock. The data are read out of the buffer and written onto the I, S1, S2 bits under control of the VC-3 clock, frame position (S3_TI), and justification decisions.	5.3.1, figure 79, figure 80	m	
2	Each justification decision results in a corresponding positive justification action. Upon a positive justification action, the reading of 1 data bit is cancelled once and no data are written at the justification opportunity bit S2 and no data are written onto S1. Upon a negative justification action, 1 extra data bit is read once and written onto the justification opportunity bit S1 and data are written onto S2. If neither a positive nor a negative justification action is to be performed, either no data are written onto S1 and data are written onto S2, or vice versa.	5.3.1, figure 79, figure 80	m	
3	The buffer size is such that in the presence of jitter as specified by ITU-T Recommendation G.823 [15] and a frequency within the range 34 368 kbit/s ±20 ppm, this justification process does not introduce any errors. Any step in frequency within this range does not cause any errors.	5.3.1, ITU-T Rec.G.823 [15]	m	

C.4.2.4.2 Justification control

Table C.37: Justification control generation and interpretation

Item	Justification control generation and interpretation	Reference	Status	Support
1	The S3/P31x_A_So function generates the justification control (C1C2) bits according to the specification in ETS 300 147 [1]. It inserts the justification control bits in the appropriate C1C2 bit positions.	5.3.1, figure 80, ETS 300 147	c3701	
2	The S3/P31x_A_Sk function performs justification control interpretation specified by ETS 300 147 [1] to recover the 34 368 kbit/s signal from the VC-3. If the majority of the C1 bits is "0", the S1 bit is taken as a data bit, otherwise (majority of C1 bits is "1") S1 bit is taken as a justification bit and consequently ignored. If the majority of the C2 bits is "0", the S2 bit is taken as a data bit, otherwise (majority of C2 bits is "1") S2 bit is taken as a justification bit and consequently ignored.	5.3.2, ETS 300 147 [1]	c3702	

c3701: IF C.1/4 THEN m ELSE n/a -- S3/P31x_A_So present
c3702: IF C.1/5 THEN m ELSE n/a -- S3/P31x_A_Sk present

C.4.2.4.3 Smoothing and jitter limiting process

Table C.38: Smoothing and jitter limiting process

Prerequisite: C.1/5 -- S3/P31x_A_Sk present

Item	Smoothing and jitter limiting process	Reference	Status	Support
1	The S3/P31x_A_Sk function provides for a clock smoothing and elastic store (buffer) process. The 34 368 kbit/s data signal is written into the buffer under control of the associated (gapped) input clock. The data signal is read out of the buffer under control of a smoothed (equally spaced) 34 368 kHz ±20 ppm clock.	5.3.2	m	
2	The residual jitter caused by pointer adjustments and bit justifications (measured at the 34 368 kbit/s interface) is within the limits specified in EN 300 417-1-1 [6] subclause 11.3.1.2.	5.3.2, EN 300 417-1-1 [6] subclause 11.3.1.2	m	
3	In the presence of jitter as specified in EN 300 417-1-1 [6] subclause 11.3.1.2 and a frequency within the range 34 368 kbit/s ±15 ppm, this justification process does not introduce any errors.	5.3.2, EN 300 417-1-1 [6] subclause 11.3.1.2	m	
4	Following a step in frequency of the P31x signal there will be a maximum recovery time of TBDrecovery time of X seconds after which this process will not generate any bit errors.	5.3.2	n/a	

C.4.2.4.4 Payload typeSignal Label processing

Table C.39: Payload typeSignal Label generation

Prerequisite: C.1/4 -- S3/P31x_A_So present

Item	Payload typeSignal Label generation	Reference	Status	Support
1	The S3/P31x_A_So function inserts code "0000 0100" (Asynchronous mapping of 34 368 kbit/s into the Container-3) in byte C2 of the VC-3 overhead as defined in ETS 300 147 [1].	5.3.1, figure 19, ETS 300 147 [1]	m	

Table C.40: Payload typeSignal Label recovery

Prerequisite: C.1/5 -- S3/P31x_A_Sk present

Item	Payload typeSignal Label recovery	Reference	Status	Support
1	The S3/P31x_A_Sk function compares the content of the accepted C2 byte with the expected value code "0000 0100" (Asynchronous mapping of 34 368 kbit/s into the Container-3).	5.3.2	m	
2	The application and acceptance and mismatch detection process are as specified in EN 300 417-1-1 [6], subclauses 7.2 and 8.2.1.2.	5.3.2, EN 300 417-1-1 [6] subclause 7.2, subclause 8.2.1.2	m	

C.4.2.4.5 H4 byte processing

Table C.41: H4 byte recovery

Prerequisite: C.1/5 -- S3/P31x_A_Sk present

Item	H4 byte recovery	Reference	Status	Support
1	The value in the H4 byte is ignored	5.3.1	m	

C.4.2.5 VC-3 Layer to P31e Layer Adaptation Functions: S3/P31e_A_So and S3/P31e_A_Sk

Prerequisite: C.1/6 OR C.1/7 -- S3/P31e_A_So and/or S3/P31e_A_Sk present

Table C.42: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The S3/P31e_A_So function maps a 34 368 kbit/s ±20 ppm information stream into a VC-3 payload (2 340 bytes) using bit stuffing and adds bytes C2 and H4.	5.3.3, ETS 300 147 [1]	c4201	
2	The mapping of the 34 368 kbit/s ±20 ppm information stream into the VC-3 payload is performed as depicted in figures 23 and 24 of subclause 5.3.3 in EN 300 417-4-1 [8]	5.3.3, figure 79, figure 24 ETS 300 147 [1]	c4201	
3	The S3/P31e_A_So generates a fixed Frame Start (FS)	5.3.3	c4201	
4	The S3/P31e_A_Sk function recovers plesiochronous P31e Characteristic Information (34 368 kbit/s ±20 ppm) from the synchronous container-3, monitors the reception of the correct payload signal type and recovers P31e frame start reference (FS) from the received signal.	5.3.4, ETS 300 147 [1]	c4202	

c4201: IF C.1/6 THEN m ELSE n/a -- S3/P31e_A_So present
c4202: IF C.1/7 THEN m ELSE n/a -- S3/P31e_A_Sk present

C.4.2.5.1 VC-3 Layer to P31e Layer frequency justification and bitrate adaptation processes

Table C.43: Frequency justification and bitrate adaptation: principles

Prerequisite: C.1/6 -- S3/P31e_A_So present

Item	Frequency justification and bitrate adaptation: principles	Reference	Status	Support
1	Frequency justification is performed by bit stuffing.	5.3.3	m	

Table C.44: Frequency justification and bitrate adaptation: source direction

Prerequisite: C.1/6 -- S3/P31e_A_So present

Item	Frequency justification and bitrate adaptation: source direction	Reference	Status	Support
1	The S3/P31e_A_So function provides for an elastic store (buffer) process. The data signal is written into the buffer under control of the associated input clock. The data are read out of the buffer and written onto the D and S bits under control of the VC-3 clock, frame position (S3_TI), and justification decisions.	5.3.3, figure 80	m	
2	Each justification decision results in a corresponding positive or negative justification action. Upon a positive justification action, the reading of 1 data bit is cancelled once and no data are written at the justification opportunity bit S2 and no data are written onto S1. Upon a negative justification action, 1 extra data bit is read once and written onto the justification opportunity bit S1 and data are written onto S2. If neither a positive nor a negative justification action is to be performed, either no data are written onto S1 and data are written onto S2, or vice versa.	5.3.3, figure 80	m	
3	The buffer size is such that in the presence of jitter as specified by ITU-T Recommendation G.823 [15] and a frequency within the range 34 368 kbit/s $\pm$20 ppm, this justification process does not introduce any errors. Any step in frequency within this range does not cause any errors.	5.3.3, ITU-T Rec.G.823 [15]	m	

C.4.2.5.2 Justification control

Table C.45: Justification control generation and interpretation

Item	Justification control generation and interpretation	Reference	Status	Support
1	The S3/P31e_A_So function generates the justification control (C1C2) bits according to the specification in ETS 300 147 [1]. It inserts the justification control bits in the appropriate C1C2 bit positions.	5.3.3, figure 80, ETS 300 147 [1]	c4501	
2	The S3/P31e_A_Sk function performs justification control interpretation specified by ETS 300 147 to recover the 34 368 kbit/s signal from the VC-3. If the majority of the C1 bits is "0", the S1 bit is taken as a data bit, otherwise (majority of C1 bits is "1") S1 bit is taken as a justification bit and consequently ignored. If the majority of the C2 bits is "0", the S2 bit is taken as a data bit, otherwise (majority of C2 bits is "1") S2 bit is taken as a justification bit and consequently ignored.	5.3.4, ETS 300 147 [1]	c4502	

c4501: IF C.1/6 THEN m ELSE n/a -- S3/P31e_A_So present
c4502: IF C.1/7 THEN m ELSE n/a -- S3/P31e_A_Sk present

C.4.2.5.3 Smoothing and jitter limiting process

Table C.46: Smoothing and jitter limiting process

Prerequisite: C.1/7 -- S3/P31e_A_Sk present

Item	Smoothing and jitter limiting process	Reference	Status	Support
1	The S3/P31e_A_Sk function provides for a clock smoothing and elastic store (buffer) process. The 34 368 kbit/s data signal is written into the buffer under control of the associated (gapped) input clock. The data signal is read out of the buffer under control of a smoothed (equally spaced) 34 368 kHz ±20 ppm clock.	5.3.4	m	
2	The residual jitter caused by pointer adjustments and bit justifications (measured at the 34 368 kbit/s interface) is within the limits specified in EN 300 417-1-1 [6] subclause 11.3.1.2 .	5.3.4, EN 300 417-1-1 [6] subclause 11.3.1.2	m	
3	In the presence of jitter as specified in EN 300 417-1-1 [6] subclause 11.3.1.2 and a frequency within the range 34 368 kbit/s ±20 ppm, this justification process does not introduce any errors.	5.3.4, EN 300 417-1-1 [6] subclause 11.3.1.2	m	
4	Following a step in frequency of the P31e signal there will be a maximum recovery time of TBDrecovery time of X seconds after which this process will not generate any bit errors.	5.3.4	n/a	

C.4.2.5.4 Frame Alignment process

Table C.47: Frame Alignment process

Prerequisite: C.1/7 -- S3/P31e_A_Sk present

Item	Frame Alignment process	Reference	Status	Support
1	The S3/P31e_A_Sk function performs the frame alignment of the 34 368 kbit/s signal to recover the frame start information FS.	5.3.4	m	
2	Loss of frame alignment is assumed to have taken place when four consecutive frame alignment signals have been incorrectly received in their predicted positions.	5.3.4	m	
3	When frame alignment is assumed to be lost, the frame alignment device decides that such alignment has effectively been recovered when it detects the presence of three consecutive frame alignment signals.	5.3.4	m	
4	The frame alignment device having detected the appearance of a single correct frame alignment signal, begins a new search for the frame alignment signal when it detects the absence of the frame alignment signal in one of the two following frames.	5.3.4	m	

C.4.2.5.5 Payload typeSignal Label processing

Table C.48: Payload typeSignal Label generation

Prerequisite: C.1/6 -- S3/P31e_A_So present

Item	Payload typeSignal Label generation	Reference	Status	Support
1	The S3/P31e_A_So function inserts code "0000 0010" (Asynchronous mapping of 34 368 kbit/s into the Container-3) in byte C2 of the VC-3 overhead as defined in ETS 300 147 [1].	5.3.3, figure 19, ETS 300 147 [1]	m	

Table C.49: Payload typeSignal Label recovery

Prerequisite: C.1/7 -- S3/P31e_A_Sk present

Item	Payload typeSignal Label recovery	Reference	Status	Support
1	The S3/P31e_A_Sk function compares the content of the accepted C2 byte with the expected value code "0000 0010" (Asynchronous mapping of 34 368 kbit/s into the Container-3).	5.3.4	m	
2	The application and acceptance and mismatch detection process are as specified in EN 300 417-1-1 [6], subclauses 7.2 and 8.2.1.2.	5.3.4, EN 300 417-1-1 [6] subclause 7.2, subclause 8.2.1.2	m	

C.4.2.5.6 H4 byte processing

Table C.50: H4 byte recovery

Prerequisite: C.1/7 -- S3/P31e_A_Sk present

Item	H4 byte recovery	Reference	Status	Support
1	The value in the H4 byte is ignored	5.3.4	m	

C.4.2.6 VC-3 Layer to ATM Layer Compound Adaptation Functions: S3/Avp_A_So and S3/Avp_A_Sk

The specification of this function is under study.

C.4.2.7 VC-4 Layer to LC Layer Adaptation Function: S3/LC_A_So

The specification of this function is addressed EN 300 417-6-1 [9].

C.4.2.8 VC-3 Layer to TSS3 Layer Adaptation Functions: S3/TSS3_A_So and S3/TSS3_A_Sk

Prerequisite: C.1/12 OR C.1/13 -- S3/TSS3_A_So and/or S3/TSS3_A_Sk present

Table C.51: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The S3/TSS3_A_So function maps a VC-3 synchronous Test Signal Structure TSS3 PRBS stream into a VC-3 payload and adds the C2 and H4 bytes.	5.3.7, ITU-T Rec.O.181 [17]	c5101	
2	The S3/TSS3_A_So function creates a 2^{23} -1 PRBS with timing derived from the S3_TI_Ck and maps it without justification bits into the whole of the synchronous container-3.	5.3.7, ITU-T Rec.O.181 [17], figure 88	c5101	
3	The S3/TSS3_A_Sk function recovers a TSS3 2^{23} -1 PRBS test sequence from the synchronous container-3 (having a frequency accuracy within ±4,6 ppm) and monitors the reception of the correct payload signal type and for the presence of test sequence error blocks (TSE) in the PRBS sequence.	5.3.8	c5102	

c5101: IF C.1/12 THEN m ELSE n/a -- S3/TSS3_A_So present
c5102: IF C.1/13 THEN m ELSE n/a -- S3/TSS3_A_Sk present

C.4.2.8.1 Payload typeSignal Label processing

Table C.52: Payload typeSignal Label generation

Prerequisite: C.1/12 -- S3/TSS3_A_So present

Item	Payload typeSignal Label generation	Reference	Status	Support
1	The function S3/TSS3_A_So inserts code "1111 1110" (TSS3 in the Container-3) in byte C2 of the VC-3 overhead.	5.3.7, figure 88, ETS 300 147 [1], ITU-T Rec.G.707 [14]	m	

Table C.53: Payload typeSignal Label recovery

Prerequisite: C.1/13 -- S3/TSS3_A_Sk present

Item	Payload typeSignal Label recovery	Reference	Status	Support
1	The S3/TSS3_A_Sk function compares the content of the recovered C2 byte (RxSL) with the expected value code "1111 1110" (TSS3 into the Container-3).	5.3.8	m	
2	The application and acceptance and mismatch process are as specified in EN 300 417-1-1 [6], subclauses 7.2 and 8.2.1.2.	5.3.8, EN 300 417-1-1 [6] subclause 7.2, subclause 8.2.1.2	m	

C.4.2.8.2 H4 byte processing

Table C.54: H4 byte recovery

Prerequisite: C.1/13 -- S3/TSS3_A_Sk present

Item	H4 byte recovery	Reference	Status	Support
1	The value of H4 is ignored	5.3.8	m	

C.4.2.9 VC-3 Layer to P0s Layer Adaptation Functions: S3/P0s_A_So and S3/P0s_A_Sk

Prerequisite: C.1/10 OR C.1/11 -- S3/P0s_A_So and/or S3/P0s_A_Sk present

Table C.55: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The S3/P0s_A_So function provides the multiplexing of a 64 kbit/s information stream into the S3_AI using slip buffering. It takes P0s_CI, defined in ETS 300 166 [2] as an octet structured bit-stream with a synchronous bit rate of 64 kbit/s , present at its input and inserts it into the VC-3 POH byte F2 as defined in ETS 300 147 [1] and depicted in figure 69.	5.3.5, figure 69, figure 85 ETS 300 166 [2], ETS 300 147 [1]	c5501	
2	The S3/P0s_A_Sk function extracts the path user channel byte F2 from the VC-3 layer Characteristic Information.	5.3.6, figure 69, figure 85	c5502	

c5501: IF C.1/10 THEN m ELSE n/a -- S3/P0s_A_So present

c5502: IF C.1/11 THEN m ELSE n/a -- S3/P0s_A_Sk present

C.4.2.9.1 VC-3 Layer to P0s Layer frequency justification and bitrate adaptation processes

Table C.56: Frequency justification and bitrate adaptation: principles

Prerequisite: C.1/10 -- S3/P0s_A_So present

Item	Frequency justification and bitrate adaptation: principles	Reference	Status	Support
1	Frequency justification is performed by slip buffering.	5.3.5	m	

Table C.57: Frequency justification and bitrate adaptation: source direction

Prerequisite: C.1/10 -- S3/P0s_A_So present

Item	Frequency justification and bitrate adaptation: source direction	Reference	Status	Support
1	This S3/P0s_A_So function provides the multiplexing of a 64 kbit/s information stream into the S3_AI using slip buffering. It takes P0s_CI, defined in ETS 300 166 [2] as an octet structured bit-stream with a synchronous bit rate of 64 kbit/s , present at its input and inserts it into the VC-3 POH byte F2 as defined in ETS 300 147 [1] and depicted in figure 69.	5.3.5	m	
2	Each justification decision results in a corresponding negative/positive justification (slip) action. Upon a positive justification (slip) action, the reading of one 64 kbit/s octet (8 bits) are cancelled once. Upon a negative justification (slip) action, the same 64 kbit/s octet (8 bits) are read out a second time.	5.3.5	m	
3	The elastic store (slip buffer) accommodates at least 18 µs of wander without introducing errors.	5.3.5, ITU-T Rec.G.823 [15]	m	

C.4.2.9.2 Data latching and smoothing process

Table C.58: Data latching and smoothing process

Prerequisite: C.1/11 -- S3/P0s_A_Sk present

Item	Data latching and smoothing process	Reference	Status	Support
1	The S3/P0s_A_Sk function provides a data latching and smoothing function. Each 8-bit octet received is written and latched into a data store under the control of the VC-3 signal clock. The eight data bits are read out of the store using a nominal 64 kHz clock which may be derived directly from the incoming STM-N signal clock (e.g. 155 520 kHz divided by a factor of 2 430 × N).	5.3.6	m	

C.4.3 VC-3 Layer Linear Trail Protection Transmission Tables

Prerequisite: C.1/22 -- VC-3 Layer Linear Trail Protection supported

Table C.59: Protection operation

Prerequisite: C.1/22 -- VC-3 Layer Linear Trail Protection supported

Item	Protection operation	Reference	Status	Support
1	The APS channel is a 4 bits channel carried into bits 1-4 of byte K3 (formerly byte Z4).	5.5.1.1, EN 300 417-3-1 [7] A.1	c5901	
2	The signal switching procedure is started under Signal Fail (SF = SSF, originated as AI_TSF) or Signal Degrade (SD = SSD originated as AI_TSD) conditions.	5.5.1.1 to 5.5.1.2, EN 300 417-3-1 [7] A.1	m	
3	For unidirectional switching and revertive operation the available external commands are LO, FSw-#1, MSw-#1, CLR.	5.5.1.1, EN 300 417-3-1 [7] A.1	c5902	
4	For unidirectional switching and non-revertive operation the available external commands are LO or FSw, FSw-#i, MSw-#i, CLR (i = 0, 1).	5.5.1.1, EN 300 417-3-1 [7] A.1	c5903	
5	For bidirectional switching and revertive operation the available external commands are LO, FSw-#1, MSw-#1, CLR.	5.5.1.2, EN 300 417-3-1 [7] A.1	c5904	
6	For bidirectional switching and non-revertive operation the available external commands are LO or FSw, FSw-#i, MSw-#i, CLR (i = 0, 1).	5.5.1.2, EN 300 417-3-1 [7] A.1	c5905	
7	The Wait-To-Restore (WTR) time is provisionable	5.5.1.1 to 5.5.1.2, EN 300 417-3-1 [7] A.1	c5906	
8	The Hold-off (HO) time is provisionable in steps of the order of 100 ms	5.5.1.1 to 5.5.1.2, EN 300 417-3-1 [7] A.1	m	

c5901: IF (C.4/3 OR C.4/4) THEN m ELSE o -- Linear Trail Protection bidirectional switching supported

c5902: IF C.B.4/1 THEN m ELSE n/a -- Linear Trail Protection unidirectional switching and revertive operation supported

c5903: IF C.B.4/2 THEN m ELSE n/a -- Linear Trail Protection unidirectional switching and non-revertive operation supported

c5904: IF C.B.4/3 THEN m ELSE n/a -- Linear Trail Protection bidirectional switching and revertive operation supported
c5905: IF C.B.4/4 THEN m ELSE n/a -- Linear Trail Protection bidirectional switching and non-revertive operation supported
c5906: IF (C.B.4/1 OR C.B.4/3) THEN m ELSE n/a -- Linear Trail Protection revertive operation supported

Comments: The Linear Protection Switching Operation is generically described in annex A of EN 300 417-3-1 [7].

Table C.60: Protection architecture characteristic parameters

Prerequisite: C.1/22 -- VC-3 Layer Linear Trail Protection supported

Item	Protection architecture characteristic parameters	Reference	Status	Support	Values	
					Allowed	Supported
1	Wait-To-Restore (WTR) time: X value	5.5.1.1 to 5.5.1.2, EN 300 417-3-1 [7] A.1	c6001		$0 \le X \le 12$ minutes	
2	Hold-off (HO) time: Z value	5.5.1.1 to 5.5.1.2, EN 300 417-3-1 [7] A.1	m		$0 \le Z \le 10$ s	
3	Switching time (Y) is less than or equal to 50 ms	5.1, EN 300 417-3-1 [7] A.1	m		___	___

c6001: IF (C.4/1 OR C.4/3) THEN m ELSE n/a -- Linear Trail Protection revertive operation supported

C.4.3.1 VC-3 Layer Linear Trail Protection Connection Function: S3P_C

Table C.61: Connectivity functionalities: generalities

Item	Connectivity functionalities: generalities	Reference	Status	Support
1	The VC-3 Protection Connection function performs the VC-3 linear trail protection process for 1+1 protection architectures.	5.5.1.1, 5.5.1.2	m	
2	The VC-3 Protection Connection function performs the bridge and selector functionality.	5.5.1.1, 5.5.1.2	m	
3	It is possible to change between operation types without disturbing the CI passing the connection unless any protection switching action is activated/required.	5.5.1.1, 5.5.1.2	c6101	
4	It is possible to change the WTR time without disturbing the CI passing the connection any protection switching action is activated/required.	5.5.1.1, 5.5.1.2	c6102	
5	It is possible to change the Hold-off time of a connection without disturbing the CI passing the connection any protection switching action is activated/required.	5.5.1.1, 5.5.1.2	c6103	
6	The protection type can be changed via S3_C_MI_PROTtype	5.5.1.2	c6104	
7	The operation type can be changed via S3_C_MI_OPERtype	5.5.1.1, 5.5.1.2	c6101	

c6101: IF (C.4/1 OR C.4/3) AND (C.4/2 OR C.4/4) THEN m ELSE n/a -- at least one revertive and one non-revertive Trail protection scheme supported
c6102: IF C.107/1 THEN m ELSE n/a -- Wait-To-Restore (WTR) time supported
c6103: IF C.107/2 THEN m ELSE n/a -- Hold-off (HO) time supported
c6104: IF (C.4/1 OR C.4/2) AND (C.4/3 OR C.4/4) THEN m ELSE n/a -- both unidirectional and bidirectional Trail protection scheme supported

Table C.62: Connectivity functionalities: source direction

Item	Connectivity functionalities: source direction	Reference	Status	Support
1	The working output is connected to the associated normal input. The protection output is also connected to the normal input.	5.5.1.1, 5.5.1.2	m	
2	The working outputs are connected to the associated normal inputs for 1+1 protection.	5.5.1.1, 5.5.1.2	m	

Table C.63: Connectivity functionalities: sink direction

Item	Connectivity functionalities: sink direction	Reference	Status	Support
1	The signal output at the normal reference point can be the signal received via either the associated working path or the protection path.	5.5.1.1, 5.5.1.2	m	

C.4.3.2 VC-3 Layer Linear Trail Protection Trail Termination Functions: S3P_TT_So and S3P_TT_Sk

Table C.64: Trail termination process

Item	Trail termination process	Reference	Status	Support
1	The S3_AI at the output of the S3P_TT_So is identical to the S3P_CI at its input.	5.5.2.1	c6401	
2	The S3P_TT_Sk function reports the state of the protected VC-3 trail.	5.5.2.2	c6402	
3	In case all connections are unavailable the S3P_TT_Sk reports the signal fail condition of the protected trail.	5.5.2.2	c6402	

c6401: IF C.5/2 THEN m ELSE n/a -- S3P_TT_So function supported
c6402: IF C.5/3 THEN m ELSE n/a -- S3P_TT_Sk function supported

C.4.3.3 VC-3 Layer Linear Trail Protection Adaptation Functions:S3/S3P_A_So and S3/S3P_A_Sk

C.4.3.3.1 VC-3 Layer to VC-3 Protection Layer multiplexing and demultiplexing processes

Table C.65: Multiplexing

Prerequisite: C.5/4 -- S3/S3P_A_So present

Item	Multiplexing	Reference	Status	Support
1	The S3/S3P_A_So inserts the S3P_CI_D signal into the S3P_AI_D signal	5.5.3.1	m	
2	The S3/S3P_A_So inserts the S3 APS signal into S3_AI	5.5.3.1	c6501	

c6501: IF (C.4/3 OR C.4/4) THEN m ELSE o -- Linear Trail Protection bidirectional switching supported

Comment: S3 APS signal insertion is required only for the protection path.

Table C.66: Demultiplexing

Prerequisite: C.5/5 -- S3/S3P_A_Sk present

Item	Demultiplexing	Reference	Status	Support
1	The S3/S3P_A_Sk extracts the S3P_CI_D signal from the S3_AI_D signal.	5.5.3.2	m	
2	The S3/S3P_A_Sk extracts the S3 APS signal from the S3_AI.	5.5.3.2	m	

Comment: The extraction and persistency processing of the S3 APS signal is required only for the protection path.

C.4.4 VC-3 Layer Linear Trail Protection and Sub-Network Connection (SNC) Protection processes

C.4.4.1 APS externally initiated commands

Prerequisite: C.1/22 OR C.1/23 -- VC-3 Layer Linear Trail Protection and/or SNC Protection supported

Table C.67: Issuing of External Switching Commands

Item	Issuing of External Switching Commands	Reference	Status	Support
1	The external commands are received from the EMF.	ETS 300 746 [10] subclauses 6.1, 6.2	m	

Table C.68: Transmission of External Switching Requests

Prerequisite: C.114/1 -- External Switching Command issuing is supported

Item	Transmission of External Switching Requests	Reference	Status	Support
1	The external requests are issued via the APS bytes.	ETS 300 746 [10] subclause 6.1	n/a	
2	The external requests are issued via the EMF.	ETS 300 746 [10] subclause 6.1	m	

Table C.69: External Switching Commands

Prerequisite: C.114/1 -- External Switching Command issuing is supported

Item	External Switching Commands	Reference	Status	Support
1	The external command Clear (CLR) conforms to the definition given in the whole point 1) clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
2	The external command Lockout of Protection (LO) conforms to the definition given in the whole point 2) clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
3	The external command Forced Switch #i (FSw-#i) conforms to the definition given in the whole point 3) of clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
4	The external command Manual Switch #i (MSw-#i) conforms to the definition given in the whole point 4) clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
5	The external command Exercise #i (EXER #i) conforms to the definition given in the whole point 5) clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
6	The descending order of priority for external switching commands is: CLR, LO, FSw-#i, MSw-#i, EXER #i.	EN 300 417-3-1 [7] A.2	m	

C.4.4.2 APS automatically initiated commands

Table C.70: Automatic Generation of Requests

Item	Automatic Generation of Requests	Reference	Status	Support
1	The NE initiates the following automatic requests: Signal Failure (SF), Signal Degrade (SD).	ETS 300 746 [10] subclauses 6.1, 6.2	m	
2	The NE initiates the automatic request Wait To Restore (WTR).	ETS 300 746 [10] subclauses 6.1, 6.2	c7001	

c7001: IF (C.4/1 OR C.4/3 OR C.4/5 OR C.4/7 OR C.4/9) THEN m ELSE n/a -- revertive operation supported

Table C.71: Automatically Generated Requests

Item	Automatically Generated Requests	Reference	Status	Support
1	In the Wait to restore (WTR) state the operation is such that in the revertive mode of operation, the normal signal will be restored when the working trail has recovered from the fault.	EN 300 417-3-1 [7] A.4	c7101	
2	An SF or SD condition will override the WTR.	EN 300 417-3-1 [7] A.4	c7101	
3	After the WTR period is completed, a No Request state will be entered.	EN 300 417-3-1 [7] A.4	c7101	
4	In the Reverse Request state the operation is such that for the case of bidirectional switching, a reverse request is returned for exerciser and for all other requests of higher priority.	EN 300 417-3-1 [7] A.4	c7102	
5	In unidirectional switching, Reverse Request is never indicated.	EN 300 417-3-1 [7] A.4	C7103	
6	In the Do not Revert state the operation is such that in the non-revertive mode of operation, assuming the normal signal is on protection when the working trail is repaired or a switch command is released, the tail end maintains the selection and issues Do not Revert for normal signal 1.	EN 300 417-3-1 [7] A.4	C7104	
7	For the case of bidirectional switching, the head end also maintains the selection and continues indicating reverse request.	EN 300 417-3-1 [7] A.4	c7105	
8	The Do not Revert is removed when pre-empted by a defect condition or an external request.	EN 300 417-3-1 [7] A.4	c7104	
9	In the No Request state none of the trail signal conditions is active, none of the external commands is active, and none of the states described above is active.	EN 300 417-3-1 [7] A.4	m	

NOTE: Currently no bidirectional APS signalling protocol is defined EN 300 417-3-1, Annex A, for linear VC trail 1+1 SNC Protection schemes.

c7101: IF (C.4/1 OR C.4/3 OR C.4/5 OR C.4/7 OR C.4/9) THEN m ELSE n/a -- revertive operation supported
c7102: IF (C.4/3 OR C.4/4) THEN m ELSE n/a -- bidirectional operation supported
c7103: IF (C.4/1 OR C.4/2 OR C.4/5 OR C.4/6 OR C.4/7 OR C.4/8 OR C.4/9) THEN m ELSE n/a -- unidirectional operation supported
c7104: IF (C.4/2 OR C.4/4 OR C.4/6 OR C.4/8 OR C.4/8) THEN m ELSE n/a -- non-revertive operation supported
c7105: IF C.4/4 THEN m ELSE n/a -- non-revertive and bidirectional operation supported

C.4.4.3 APS generalities

Table C.72: Priority of request types

Item	Priority of request types	Reference	Status	Support
1	The priority of request types conforms to the priority order given in table A.2 (clause A.6) of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.6, table A.2	m	

C.4.4.4 APS switch performance

Table C.73: Switch completion time

Item	Switch completion time	Reference	Status	Support
1	The switch completion time is less than X ms (TBD).	EN 300 417-3-1 [7] A.8	m	

C.4.4.5 APS sub-processes

Table C.74: Signal request process

Item	Signal request processes	Reference	Status	Support
1	The SRSN is "0" (zero) for the protection trail and "1" for working trail #1.	EN 300 417-3-1 [7] A.9	m	
2	The SRT is generated based on the inputs SF, SD, SFpriority, SDpriority, as specified in the clause "Signal request (type & signal number) processes" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

Comments: The signal request process transfers the input SF and SD signals from a trail into a Signal Request Type (SRT) and Signal Request Signal Number (SRSN).

Table C.75: External request process

Item	External request processes	Reference	Status	Support
1	The ERSN is "0" (zero) if no normal signal is indicated, "i" ($1 \leq i \leq nmax$) for normal signal #i, and "nmax+1" for the extra traffic signal.	EN 300 417-3-1 [7] A.9	m	
2	The ERT/ERN is generated as specified in the clause "External request (type & signal number) processes" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

Comments: The external request process transfers the external commands (EXTCMD) into an External Request Type (ERT) and External Request Signal Number (ERSN).

Table C.76: Local request priority process

Item	Local request priority processes	Reference	Status	Support
1	The status of the protection and working input signals (SRT/SRSN #0 to SRT/SRSN #n), the external command (ERT/ERSN), and protection parameters OPERtype and EXTRAtraffic is evaluated by a three step priority logic as specified in the clause "Local request (type & signal number) priority processes" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

Comments: The local request priority process determines the highest priority local request.

Table C.77: Global request priority process

Item	Global request priority processes	Reference	Status	Support
1	The local request (LRT) and the remote request (RRT) are compared to decide which has priority, according to the descending order of priorities in table A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	c7701	
2	A received reverse request is not considered in the comparison.	EN 300 417-3-1 [7] A.9	c7701	
3	The Global Request Type (GRT) and Global Request Signal Number (GRSN) is determined as specified in the clause "Global request (type & signal number) priority processes" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

NOTE: Currently no bidirectional APS signalling protocol is defined EN 300 417-3-1 Annex A for linear VC trail 1+1 SNC Protection schemes.

c7701: IF (C.4/3 OR C.4/4 OR C.4/5)
THEN m ELSE x -- bidirectional switching supported

Comments: The global request priority process determines the Global Request Type (GRT) and Global Request Signal Number (GRSN).

Table C.78: Control of the selector

Item	Control of the selector	Reference	Status	Support
1	The control of the selector is performed as specified in the clause "Control of the selector" in paragraph A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

Comments: The control of the selector controls which of the normal signals is connected to/extracted from the protection trail.

C.4.4.6 APS signal interpretation

C.4.4.7 APS status report

Table C.79: APS reporting process

Item	APS reporting process	Reference	Status	Support
1	The active external request are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	m	
2	The active local request are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	m	
3	The active remote request are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	c7901	
4	The reason of denial of an external command are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	m	
5	The condition (SF, SD) of the working and protection trails are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	m	

c7901: IF (C.4/3 OR C.4/4 OR C.4/5)
THEN m ELSE o -- bidirectional switching supported

C.4.5 VC-3 Tandem Connection Sub-layer Transmission Tables

C.4.5.1 VC-3 Tandem Connection Sub-layer Trail Termination Functions: S3D_TT_So, S3D_TT_Sk and S3Dm_TT_Sk

Prerequisite: C.1/17 OR C.1/18 OR C.1/21 -- S3D_TT_So, S3D_TT_Sk and/or S3Dm_TT_Sk present

Table C.80: VC-3 Tandem Connection Termination process

Item	VC-3 Tandem Connection Termination process	Reference	Status	Support
1	The S3D_TT_So compensates VC-3 BIP-8 (in byte B3 of the VC-3 overhead) and generates byte N1 of the VC-3 overhead according to a 76 frame multiframe.	5.6.1	c8001	
2	The S3D_TT_So inserts all-0s in the six reserved bits in frames 73 to 76 of the 76 frame multiframe.	5.6.1	c8001	
3	The S3D_TT_Sk processes byte B3 of the VC-3 overhead, and recovers byte N1 of the VC-3 overhead according to a 76 frame multiframe.	5.6.2	c8002	
4	The S3D_TT_Sk terminates byte N1 of the VC-3 overhead by inserting an all-ZERO pattern, after it has recovered the content of this byte.	5.6.2	c8002	
5	The S3Dm_TT_Sk recovers byte N1 of the VC-3 overhead according to a 76 frame multiframe.	5.6.5	c8003	

c8001: IF C.1/17 THEN m ELSE n/a -- S3D_TT_So present
c8002: IF C.1/18 THEN m ELSE n/a -- S3D_TT_Sk present
c8003: IF C.1/21 THEN m ELSE n/a -- S3Dm_TT_Sk present

C.4.5.1.1 In service error monitoring process

Table C.81: VC-3 BIP-8 compensation: source direction

Prerequisite: C.1/17 -- S3D_TT_So present

Item	VC-3 BIP-8 compensation: source direction	Reference	Status	Support
1	The S3D_TT_So function compensates the VC-3 BIP-8 (in byte B3) according the logical equation given in subclause 5.6.1 of EN 300 417-4-1 [8].	5.6.1	m	

Table C.82: VC-3 BIP-8 compensation: sink direction

Prerequisite: C.1/18 -- S3D_TT_Sk present

Item	VC-3 BIP-8 compensation: sink direction	Reference	Status	Support
1	The S3D_TT_Sk function compensates the VC-3 BIP-8 (in byte B3) according the logical equation given in subclause 5.6.1 of EN 300 417-4-1 [8].	5.6.1, 5.6.2	m	

C.4.5.1.2 Tandem Connection Error Count process

Table C.83: Incoming Error Count (IEC)

Prerequisite: C.1/17 -- S3D_TT_So present

Item	Incoming Error Count (IEC)	Reference	Status	Support
1	The S3D_TT_So computes even BIP-8 for each bit n of every byte of the preceding VC-3 including B3 and compares it with byte B3 recovered from the current frame.	5.6.1	m	
2	A difference between the computed and recovered BIP-8 values is taken as evidence of one or more errors in the computation block (TC IEC) and is inserted in bits 1 to 4 of byte N1, in accordance to EN 300 417-4-1 [8] subclause 5.6.1, figure 100 and table 85.	5.6.1, figure100, table 85	m	
3	If AI_SF is true, code "1110" is inserted in bits 1 to 4 of byte N1 instead of the number of incoming BIP-8 violations.	5.6.1	m	

Table C.84: Tandem Connection Error Count

Prerequisite: C.1/18 OR C.1/21 -- S3D_TT_Sk and/or S3Dm_TT_Sk present

Item	Tandem Connection Error Count	Reference	Status	Support
1	The VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) compute even bit parity for each bit n of every byte of the preceding VC-3 and compares it with bit n of B3 recovered from the current frame (n = 1 to 8 inclusive).	5.6.2, 5.6.5	m	
2	A difference between the computed and recovered B3 values is taken as evidence of one or more errors in the computation block (nON_B).	5.6.2, 5.6.5	m	
3	The magnitude (absolute value) of the difference between this calculated number of errors and the number of errors derived from bits N1[1-4], according to EN 300 417-4-1 [8] subclause 5.6.2 table 87. If this magnitude of the difference is one or more, an errored TC block is detected (nN_B).	5.6.2, figure 103, table 87, 5.6.5	m	

C.4.5.1.3 Tandem Connection Multiframe Alignment process

Table C.85: Multiframe Alignment process: source direction

Prerequisite: C.1/17 -- S3D_TT_So present

Item	Multiframe Alignment process: source direction	Reference	Status	Support
1	The function inserts the Frame Alignment Signal (FAS) "1111 1111 1111 1110" in FAS bits N1[7-8] in frames 1 to 8 of the multiframed N1[7-8] channel.	5.6.1	m	

Table C.86: Multiframe Alignment process: sink direction

Prerequisite: C.1/18 OR C.1/21 -- S3D_TT_Sk and/or S3Dm_TT_Sk present

Item	Multiframe Alignment process: sink direction	Reference	Status	Support
1	The VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) perform a multiframe alignment on bits 7 and 8 of byte N1.	5.6.2, 5.6.5	m	
2	The multiframe alignment is found by searching for the pattern "1111 1111 1111 1110" within the bits 7 and 8 of byte N1.	5.6.2, 5.6.5	m	
3	The multiframe alignment signal is continuously checked with the presumed multiframe start position for the alignment.	5.6.2, 5.6.5	m	

C.4.5.1.4 VC-3 Tandem Connection Remote indicator monitoring process

C.4.5.1.4.1 VC-3 Tandem Connection Remote Defect Indication (TC RDI)

Table C.87: Remote Defect Indication location

Prerequisite: (C.1/17 AND C.1/18) OR C.1/21 -- bidirectional S3D layer and/or S3Dm_TT_Sk present

Item	Remote Defect Indication location	Reference	Status	Support
1	The TC RDI is located in bit 8 of byte N1 in frame 73 of the 76 frame multiframe. This location is expressed with the notation: N1[8][73].	5.6.1, 5.6.2, 5.6.5	m	

Comment: N1[x][y] refers to bit x (x = 7,8) of byte N1 in frame y (y = 1..76) of the 76 frame multiframe.

Table C.88: Remote Defect Indication processing: source direction

Prerequisite: (C.1/17 AND C.1/18) -- bidirectional S3D layer present

Item	Remote Defect Indication processing: source direction	Reference	Status	Support
1	TC RDI code is set upon activation of S3D_RI_RDI determined by the associated S3D_TT_Sk.	5.6.1	m	
2	TC RDI is cleared upon deactivation of S3D_RI_RDI determined by the associated S3D_TT_Sk.	5.6.1	m	
3	TC RDI signal is coded as a '1' bit value.	5.6.1	m	
4	The '0' bit value is inserted if no S3D_RI_RDI signal is active.	5.6.1	m	

Table C.89: Remote Defect Indication processing: sink direction

Prerequisite: C.1/18 OR C.1/21 -- S3D_TT_Sk and/or S3Dm_TT_Sk present

Item	Remote Defect Indication processing: sink direction	Reference	Status	Support
1	The VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) extract and monitor bit location N1[8][73]. A "1" indicates a Remote Defect Indication state, while a "0" indicates the normal, working state.	5.6.2, 5.6.5	m	

Comment: N1[x][y] refers to bit x (x = 7,8) of byte N1 in frame y (y = 1..76) of the 76 frame multiframe.

C.4.5.1.4.2 VC-3 Tandem Connection Remote Error Indication (TC REI)

Table C.90: Remote Error Indication: principles

Prerequisite: (C.1/17 AND C.1/18) OR C.1/21 -- bidirectional S3D layer and/or S3Dm_TT_Sk present

Item	Remote Error Indication: principles	Reference	Status	Support
1	The REI signal indicates if Errored Block (EB) were detected in the trail signal at the far-end trail termination	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	
2	The block length is 6 120 bits (one VC-3). The Error Detection Code (EDC) is BIP-8 in the B3 byte.	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	

Table C.91: Remote Error Indication location

Prerequisite: (C.1/17 AND C.1/18) OR C.1/21 -- bidirectional S3D layer and/or S3Dm_TT_Sk present

Item	Remote Error Indication location	Reference	Status	Support
1	The TC REI is located in bit 5 of byte N1 of the VC-3 overhead.	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	

Table C.92: Remote Error Indication processing: source direction

Prerequisite: (C.1/17 AND C.1/18) -- bidirectional S3D layer present

Item	Remote Error Indication processing: source direction	Reference	Status	Support
1	The S3D_TT_So inserts the RI_REI value in the REI bit in the following frame.	5.6.1	m	

Table C.93: Remote Error Indication processing: sink direction

Prerequisite: C.1/18 OR C.1/21 -- S3D_TT_Sk and/or S3Dm_TT_Sk present

Item	Remote Error Indication processing: sink direction	Reference	Status	Support
1	The VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) extract and monitor bit location N1[5] to recover the TC REI value (nF_B).	5.6.2, 5.6.5	m	

C.4.5.1.5 VC-3 Tandem Connection Outgoing indicator monitoring process

C.4.5.1.5.1 VC-3 Tandem Connection Outgoing Defect Indication (TC ODI)

Table C.94: Outgoing Defect Indication location

Prerequisite: (C.1/17 AND C.1/18) OR C.1/21 -- bidirectional S3D layer and/or S3Dm_TT_Sk present

Item	Outgoing Defect Indication location	Reference	Status	Support
1	The TC ODI is located in bit 7 of byte N1 in frame 74 of the 76 frame multiframe. This location is expressed with the notation: N1[7][74].	5.6.1, 5.6.2, 5.6.5	m	

Comment: N1[x][y] refers to bit x (x = 7,8) of byte N1 in frame y (y = 1..76) of the 76 frame multiframe.

Table C.95: Outgoing Defect Indication processing: source direction

Prerequisite: (C.1/17 AND C.1/18) -- bidirectional S3D layer present

Item	Outgoing Defect Indication processing: source direction	Reference	Status	Support
1	TC ODI code is inserted after the ODI request generation in the S3D_TT_Sk.	5.6.1	m	
2	TC ODI is cleared at the first opportunity after the ODI request has cleared in the associated S3D_TT_Sk.	5.6.1	m	
3	TC ODI signal is coded as a '1' bit value.	5.6.1	m	
4	The '0' bit value is inserted if no S3D_RI_ODI signal is active.	5.6.1	m	

Table C.96: Outgoing Defect Indication processing: sink direction

Prerequisite: C.1/18 OR C.1/21 -- S3D_TT_Sk and/or S3Dm_TT_Sk present

Item	Outgoing Defect Indication processing: sink direction	Reference	Status	Support
1	The VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) extract and monitor bit location N1[7][74]. A "1" indicates a Outgoing Defect Indication state, while a "0" indicates the normal, working state.	5.6.2, 5.6.5	m	

Comment: N1[x][y] refers to bit x (x = 7,8) of byte N1 in frame y (y = 1..76) of the 76 frame multiframe.

C.4.5.1.5.2 VC-3 Tandem Connection Outgoing Error Indication (TC OEI)

Table C.97: Outgoing Error Indication: principles

Prerequisite: (C.1/17 AND C.1/18) OR C.1/21 -- bidirectional S3D layer and/or S3Dm_TT_Sk present

Item	Outgoing Error Indication: principles	Reference	Status	Support
1	The OEI signal contains the exact number of Errored Block (EB) detected in the trail signal at the far-end trail termination	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	
2	The block length is 18 792 bits (one VC-3). The Error Detection Code (EDC) is BIP-8 in the B3 byte.	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	

Table C.98: Outgoing Error Indication location

Prerequisite: (C.1/17 AND C.1/18) OR C.1/21 -- bidirectional S3D layer and/or S3Dm_TT_Sk present

Item	Outgoing Error Indication location	Reference	Status	Support
1	The TC OEI is located in bit 6 of byte N1 of the VC-3 overhead.	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	

Table C.99: Outgoing Error Indication processing: source direction

Prerequisite: (C.1/17 AND C.1/18) -- bidirectional S3D layer present

Item	Outgoing Error Indication processing: source direction	Reference	Status	Support
1	The S3D_TT_So inserts the RI_OEI value in the OEI bit in the following frame.	5.6.1	m	

Table C.100: Outgoing Error Indication processing: sink direction

Prerequisite: C.1/18 OR C.1/21 -- S3D_TT_Sk and/or S3Dm_TT_Sk present

Item	Outgoing Error Indication processing: sink direction	Reference	Status	Support
1	The VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) extract and monitor bit location N1[5] to recover the TC OEI value (nOF_B).	5.6.2, 5.6.5	m	

C.4.5.1.6 Tandem Connection Trace Identifier

Table C.101: Tandem Connection Trace Identifier: principles

Item	Tandem Connection Trace Identifier: principles	Reference	Status	Support
1	A Tandem Connection Trace Identifier (TC TI) is inserted by the S3D_TT_So function containing the local Access Point Identifier (APId) and TI header (TxTI).	5.6.1, EN 300 417-1-1 [6] subclause 7.1	c10101	
2	The content of the accepted TI (AcTI) is compared by the S3D_TT_Sk function with the provisioned "expected TI" (ExTI), identifying the expected remote AP.	5.6.2, 5.6.5, EN 300 417-1-1 [6] subclause 7.1, EN 300 417-1-1 [6] subclause 8.2.1.3	c10102	

c10101: IF C.1/17 THEN m ELSE n/a -- S3D_TT_So present
c10102: IF (C.1/18 OR C.1/21) THEN m ELSE n/a -- S3D_TT_Sk and/or S3Dm_TT_Sk present

Table C.102: Tandem Connection Trace Identifier byte location

Item	Tandem Connection Trace Identifier byte location	Reference	Status	Support
1	The Tandem Connection Trace Identifier (TC TI) is located in bits N1[7-8] in frames 9 to 72.	5.6.1, 5.6.2, 5.6.5	m	

Table C.103: Tandem Connection Trace Identifier byte structure

Item	Tandem Connection Trace Identifier byte structure	Reference	Status	Support
1	The Tandem Connection Trace Identifier (TC TI) is a 16 byte string containing the 15 byte APId and a 1 byte header. The MSB of the header is a "1", the remaining 7 bits contain the CRC-7 value of the VC-3 TTI. The MSB of the 15 APId bytes is "0".	EN 300 417-1-1 [6] subclause 7.1	m	
2	The CRC-7 word is the remainder after multiplication by x^7 and then division (modulo 2) by the generator polynomial $x^7 + x^3 + 1$, of the polynomial representation of the VC-3 TTI with the CRC bits set to binary zeroes.	EN 300 417-1-1 [6] subclause 7.1	m	
3	The 16 byte VC-3 TxTI, 16 byte VC-3 ExTI and 16 byte VC-3 AcTI are transferred via the Management Point to and from the trail termination function.	EN 300 417-1-1 [6] subclause 8.2.1.3	m	

Table C.104: Tandem Connection Trace identification: source direction

Prerequisite: C.1/17 -- S3D_TT_So present

Item	Tandem Connection Trace identification: source direction	Reference	Status	Support
1	The function inserts the TC trace identifier, received via MI_TxTI, in the TC-TI bits N1[7-8] in frames 9 to 72 of the multiframed N1[7-8] channel.	5.6.1	m	

Table C.105: Tandem Connection Trace identification: sink direction

Prerequisite: C.1/18 OR C.1/21 -- S3D_TT_Sk and/or S3Dm_TT_Sk present

Item	Tandem Connection Trace identification: sink direction	Reference	Status	Support
1	The VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) support mode 1	EN 300 417-1-1 [6] subclause 7.1	m	
2	The VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) do not support mode 2	EN 300 417-1-1 [6] subclause 7.1	m	
3	The VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) recover the 16 byte multiframe carried in bits N1[7-8] in frames 9 to 72 and assume it as Received Trail Trace Identifier (RxTI). The RxTI is made available as AcTI for network management purposes.	5.6.2, 5.6.5	m	

C.4.5.2 VC-3 Tandem Connection to VC-3 Layer Adaptation Functions: S3D/S3_TT_So and S3D/S3_A_Sk

Table C.106: Adaptation process

Prerequisite: C.1/19 OR C.1/20 -- S3D/S3_A_So and/or S3D/S3_A_Sk present

Item	Adaptation process	Reference	Status	Support
1	The S3D/S3_A_So replaces the incoming Frame Start (CI_FS) signal by a local generated one, if an all-ONEs (AIS) VC is received (i.e. if CI_SSF is TRUE).	5.6.3	c10601	
2	The S3D/S3_A_Sk restore the invalid frame start condition (i.e. output aSSF = true) if that existed at the ingress of the tandem connection.	5.6.4	c10602	

c10601: IF C.1/19 THEN m ELSE n/a -- S3D/S3_A_So present
c10602: IF C.1/20 THEN m ELSE n/a -- S3D/S3_A_Sk present

C.4.6 VC-3 Layer Defect, Consequent Action, Defect correlation and Performance Monitoring Tables

C.4.6.1 Port Status Management

Table C.107: Trail Termination Point Mode Process

Prerequisite: C.1/3 OR C.1/14 OR C.1/16 -- S3_TT_Sk and/or S3m_TT_Sk and/or S3s_TT_Sk present.

Item	Trail Termination Point Mode Process	Reference	Status	Support
1	The Trail Termination Point Mode supports "not monitored" (NMON) status.	EN 300 417-1-1 [6] subclause 8.5	m	
2	The Trail Termination Point Mode supports "monitored" (MON) status.	EN 300 417-1-1 [6] subclause 8.5	m	
3	The Trail Termination Point Mode status is provisionable by the EMF	5.2.2, 5.4.1, 5.4.3	m	

C.4.6.2 Defect detection and clearance criteria

Table C.108: VC-3 Layer Alarm Indication Signal defect (VC dAIS)

Prerequisite: C.1/14 -- S3m_TT_Sk present

Item	VC-3 Layer Alarm Indication Signal defect (VC dAIS)	Reference	Status	Support
1	The S3m_TT_Sk function detects a VC AIS defect (dAIS) if 5 consecutive frames contain the '1111 1111' pattern in byte C2.	5.4.1	m	
2	The S3m_TT_Sk function clears the VC AIS defect if in 5 consecutive frames any pattern other than the '1111 1111' is detected in byte C2.	5.4.1	m	

Table C.109: Remote Defect Indication defect (dRDI)

Prerequisite: C.1/3 OR C.1/14 OR C.1/16 -- S3_TT_Sk and/or S3m_TT_Sk and/or S3s_TT_Sk present

Item	Remote Defect Indication defect (dRDI)	Reference	Status	Support
1	The S3 RDI defect (dRDI) is detected if 5 consecutive frames contain the '1' value in bit 5 of the G1 byte.	5.2.2, 5.4.1, 5.4.3, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
2	The S3 RDI defect (dRDI) is cleared if in 5 consecutive frames contain the '0' value in bit 5 of the G1 byte.	5.2.2, 5.4.1, 5.4.3, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
3	The S3 RDI defect (dRDI) is cleared during reception of an aSSF.	5.2.2, 5.4.1, 5.4.3, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
4	The S3 RDI defect (dRDI) is cleared during reception of a VC AIS.	5.4.1	c10901	

c10901: IF C.1/14 THEN m ELSE x -- S3m_TT_Sk present

Table C.110: Degraded defect (dDEG)

Prerequisite: C.1/3 OR C.1/14 OR C.1/16 -- S3_TT_Sk and/or S3m_TT_Sk and/or S3s_TT_Sk present

Item	Degraded defect (dDEG)	Reference	Status	Support
1	Once every second, S3 pNEBC is compared with DEGTHR	5.2.2, 5.4.1, 5.4.3, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
2	If S3 pNEBC ≥ DEGTHR the corresponding second is declared BAD, otherwise it is declared GOOD	5.2.2, 5.4.1, 5.4.3, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
3	The S3 dDEG defect (dDEG) is detected if M consecutive BAD seconds have occurred.	5.2.2, 5.4.1, 5.4.3, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
4	The S3 dDEG defect (dDEG) is cleared if M consecutive GOOD seconds have occurred.	5.2.2, 5.4.1, 5.4.3, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
5	The S3 dDEG defect (dDEG) is cleared during reception of an aSSF	5.4.1, EN 300 417-1-1 [6] subclause 8.2.1.4	c11001	
6	The S3 dDEG defect (dDEG) is cleared during reception of an VC AIS	5.4.1, EN 300 417-1-1 [6] subclause 8.2.1.4	c11001	
7	The DEGTHR parameter is provisionable by the EMF	5.2.2, 5.4.1, 5.4.3	m	
8	The DEGM parameter is provisionable by the EMF	5.2.2, 5.4.1, 5.4.3	m	

c11001: IF C.1/14 THEN m ELSE x -- – S3m_TT_Sk present

Table C.111: DEG defect parameters value

Prerequisite: C.1/3 OR C.1/14 OR C.1/16 -- S3_TT_Sk and/or S3m_TT_Sk and/or S3s_TT_Sk present

Item	DEG defect parameters	Reference	Status	Support	Values	
					Allowed	Supported
1	S3 dDEG DEGTHR parameter	5.2.2, 5.4.1, 5.4.3	m		0 < DEGTHR ≤ 8 000	
2	S3 dDEG M parameter	5.2.2, 5.4.1, 5.4.3	m		2 ≤ M ≤ 10	

Table C.112: Trace Identifier Mismatch defect (dTIM)

Prerequisite: C.1/3 OR C.1/14 OR C.1/16 -- S3_TT_Sk and/or S3m_TT_Sk and/or S3s_TT_Sk present

Item	Trace Identifier Mismatch defect (dTIM)	Reference	Status	Support
1	The S3 TIM defect (dTIM) is detected, within a maximum period of 100 ms in the absence of bit errors, when the Accepted Trace Identifier (AcTI) does not match the Expected Trace Identifier (ExTI).	5.2.2, 5.4.1, 5.4.3, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
2	The S3 TIM defect (dTIM) is cleared, within a maximum period of 100 ms, after the Accepted Trace Identifier (AcTI) matches the Expected Trace Identifier (ExTI) in the absence of bit errors.	5.2.2, 5.4.1, 5.4.3, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
3	The S3 TIM defect (dTIM) is suppressed during reception of an aSSF.	5.2.2, 5.4.1, 5.4.3, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
4	The S3 TIM defect (dTIM) is cleared during reception of a VC AIS.	5.4.1	c11201	
5	It is possible to disable the trace identifier mismatch defect detection (TIMdis).	5.2.2, 5.4.1, 5.4.3	m	

c11201: IF C.1/14 THEN m ELSE x -- S3m_TT_Sk present

Table C.113: Unequipped defect (dUNEQ)

Prerequisite: C.1/3 OR C.1/14 OR C.1/16 -- S3_TT_Sk and/or S3m_TT_Sk and/or S3s_TT_Sk present

Item	Unequipped defect (dUNEQ)	Reference	Status	Support
1	The S3 UNEQ defect (dUNEQ) is detected, within a maximum period of 100 ms in the absence of bit errors, if the "accepted TSL" is the unequipped indication (TSL code = 0) within a maximum period of 100 ms in the absence of bit errors.	5.2.2, 5.4.1, 5.4.3, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
2	The S3 UNEQ defect (dUNEQ) is cleared, within a maximum period of 100 ms in the absence of bit errors, if the "accepted TSL" contains a non "unequipped" signal label (TSL code ≥ 1).	5.2.2, 5.4.1, 5.4.3, EN 300 417-1-1 [6] subclause 8.2.1.2	m	

Table C.114: P31e Alarm Indication Signal defect (P31e dAIS)

Prerequisite: C.1/7 -–- S3/P31e_A_Sk present

Item	P31e Alarm Indication Signal defect (P31e dAIS)	Reference	Status	Support
1	The S3/P31e_Sk detects a VC AIS defect (dAIS) if the incoming signal has X or less ZEROs in each of two consecutive Y bit periods, with X = 4, Y = 1 536.	5.3.4, EN 300 417-1-1 [6] subclause 8.2.1.7	m	
2	The S3/P31e_Sk clears a VC AIS defect (dAIS) if each of two consecutive Y bit periods contains Z or more ZEROs (with X = 4, Y = 1 536, Z = 5) or the Frame Alignment Signal (FAS) has been found.	5.3.4, EN 300 417-1-1 [6] subclause 8.2.1.7	m	

Table C.115: Payload Mismatch defect (dPLM)

Prerequisite: C.1/3 -- implies that at least one VC-3 Layer payload Adaptation Sink function is present

Item	Payload Mismatch defect (dPLM)	Reference	Status	Support
1	The S3 PLM defect (dPLM) is detected, within a maximum period of 100 ms in the absence of bit errors, when the Accepted Signal Label (AcSL) does not match the Expected Signal Label (ExSL).	5.3.2, 5.3.4, 5.3.8, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
2	The S3 PLM defect (dPLM) is cleared, within a maximum period of 100 ms, after the Accepted Signal Label (AcSL) matches the Expected Signal Label (ExSL) in the absence of bit errors.	5.3.2, 5.3.4, 5.3.8, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
3	The S3 PLM defect (dPLM) is suppressed during reception of an aTSF.	5.3.2, 5.3.4, 5.3.8, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
4	The S3 PLM defect (dPLM) is suppressed if the incoming TSL code is "1" (equipped non-specific).	5.3.2, 5.3.4, 5.3.8, EN 300 417-1-1 [6] subclause 8.2.1.2	m	

Table C.116: Loss of Frame defect (dLOF)

Prerequisite: C.1/7 -- S3/P31e_A_Sk function present

Item	Loss of Frame defect (dLOF)	Reference	Status	Support
1	The P31e LOF defect (dLOF) is detected when four consecutive frame alignment signals have been incorrectly received in their predicted positions.	5.3.4	m	
2	The P31e LOF defect (dLOF) is cleared when three consecutive frame alignment signals are detected.	5.3.4	m	

Table C.117: Loss of Sequence Synchronization defect (dLSS)

Prerequisite: C.1/13 -- S3/TSS3_A_Sk function present

Item	Loss of Sequence Synchronization defect (dLSS)	Reference	Status	Support
1	The S3/TSS3_A_Sk function detects a Loss of PRBS lock (dLSS) according to the criteria defined in ITU-T Recommendation O.151 [16] subclause 2.6.	5.3.8, ITU-T Rec O.151 [16] subclause 2.6	m	

C.4.6.3 Consequent action activation and clearance criteria

Table C.118: Alarm Indication Signal action (aAIS)

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
1	The S3_TT_Sk outputs an all "1"s signal within 250 µs upon S3 dUNEQ detection.	5.2.2	c11801	
2	The S3_TT_Sk outputs an all "1"s signal within 250 µs upon S3 dTIM detection.	5.2.2	c11801	
3	The S3_TT_Sk outputs normal data within 250 µs when there is (are) no more defect(s) active.	5.2.2	c11801	
4	The S3/P31x_A_Sk outputs an all "1"s signal within 250 µs upon AI_TSF reception.	5.3.2	c11802	
5	The S3/P31x_A_Sk outputs an all "1"s signal within 250 µs upon S3 dPLM reception.	5.3.2	c11802	
6	The S3/P31x_A_Sk outputs normal data within 250 µs when there is (are) no more defect(s) active.	5.3.2	c11802	
7	The S3/P31e_A_Sk outputs an all "1"s signal within 250 µs upon AI_TSF reception.	5.3.4	c11803	
8	The S3/P31e_A_Sk outputs an all "1"s signal within 250 µs upon S3 dPLM reception.	5.3.4	c11803	
9	The S3/P31e_A_Sk outputs an all "1"s signal within 250 µs upon PS31e dLOF reception.	5.3.4	c11803	
10	The S3/P31e_A_Sk outputs an all "1"s signal within 250 µs upon PS31e dAIS reception.	5.3.4	c11803	
11	The S3/P31e_A_Sk outputs normal data within 250 µs when there is (are) no more defect(s) active.	5.3.4	c11803	
12	The S3/P0s_A_Sk outputs an all "1"s signal within 1 ms upon AI_TSF reception.	5.3.5	c11804	
13	The S3/P0s_A_Sk outputs normal data within 1 ms when there is (are) no more defect(s) active.	5.3.5	c11804	

c11801: IF C.1/3 THEN m ELSE n/a -- S3_TT_Sk present
c11802: IF C.1/5 THEN m ELSE n/a -- S3/P31x_A_Sk present
c11803: IF C.1/7 THEN m ELSE n/a -- S3/P31e_A_Sk present
c11804: IF C.1/11 THEN m ELSE n/a -- S3/P0s_A_Sk present

Table C.119: Remote Defect Indication defect action (aRDI)

Prerequisite: (C.1/2 AND C.1/3) OR
(C.1/15 AND C.1/16) -- S3_TT_So and S3_TT_Sk and/or S3s_TT_So and S3s_TT_Sk functions present

Item	Remote Defect Indication defect action (aRDI)	Reference	Status	Support
1	The S3_TT_Sk outputs an RDI request generation (RI_RDI) on CI_SSF detection.	5.2.2	c11901	
2	The S3_TT_Sk outputs an RDI request generation (RI_RDI) on S3 dUNEQ detection.	5.2.2	c11901	
3	The S3_TT_Sk outputs an RDI request generation (RI_RDI) on S3 dTIM detection.	5.2.2	c11901	
4	The S3_TT_Sk clears the RDI request when there is (are) no more defect(s) active.	5.2.2	c11901	
5	The S3_TT_So inserts the RDI code within 250 µs upon RI_RDI reception.	5.2.1	c11901	
6	The S3_TT_So outputs normal data within 250 µs upon RI_RDI clearing.	5.2.1	c11901	
7	The S3s_TT_Sk outputs an RDI request generation (RI_RDI) on CI_SSF detection.	5.4.3	c11902	
8	The S3s_TT_Sk outputs an RDI request generation (RI_RDI) on S3 dTIM detection.	5.4.3	c11902	
9	The S3s_TT_Sk clears the RDI request when there is (are) no more defect(s) active.	5.4.3	c11902	
10	The S3s_TT_So inserts the RDI code within 250 µs upon RI_RDI reception.	5.4.2	c11902	
11	The S3s_TT_So outputs normal data within 250 µs upon RI_RDI clearing.	5.4.2	c11902	

c11901: IF (C.1/2 AND C.1/3)
THEN m ELSE n/a -- S3_TT_So and S3_TT_Sk functions present
c11902: IF (C.1/15 AND C.1/16)
THEN m ELSE n/a -- S3s_TT_So and S3s_TT_Sk functions present

Table C.120: Remote Error Indication action (aREI)

Prerequisite: C.1/2 AND C.1/3) OR
C.1/15 AND C.1/16) - S3_TT_So and S3_TT_Sk and/or S3s_TT_So and s_TT_Sk functions present

Item	Remote Error Indication action (aREI)	Reference	Status	Support
1	The S3_TT_So inserts the REI value in the next REI bits.	5.2.1	c12001	
2	The S3s_TT_So inserts the REI value in the next REI bits.	5.4.2	c12002	

c12001: IF (C.1/2 AND C.1/3)
THEN m ELSE n/a -- S3_TT_So and S3_TT_Sk functions present
c12002: IF (C.1/15 AND C.1/16)
THEN m ELSE n/a -- S3s_TT_So and S3s_TT_Sk functions present

Table C.121: Server Signal Fail action (aSSF)

Prerequisite: C.1/3 -- implies that at least one VC-3 Layer payload Adaptation k function is present

Item	Server Signal Fail action (aSSF)	Reference	Status	Support
1	The S3/P31x_A_Sk sets CI_SSF to TRUE on S3 dPLM detection.	5.3.4	c12101	
2	The S3/P31x_A_Sk sets CI_SSF to TRUE on P31e dLOF detection.	5.3.4	c12101	
3	The S3/P31x_A_Sk sets CI_SSF to TRUE on P31e dAIS detection.	5.3.4	c12101	
4	The S3/P31x_A_Sk sets CI_SSF to TRUE on AI_TSF reception.	5.3.4	c12101	
5	The S3/P31x_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	5.3.4	c12101	
6	The S3/P31e_A_Sk sets CI_SSF to TRUE on S3 dPLM detection.	5.3.4	c12102	
7	The S3/P31e_A_Sk sets CI_SSF to TRUE on S3 dLOF detection.	5.3.4	c12102	
8	The S3/P31e_A_Sk sets CI_SSF to TRUE on S3 dAIS detection.	5.3.4	c12102	
9	The S3/P31e_A_Sk sets CI_SSF to TRUE on AI_TSF reception.	5.3.4	c12102	
10	The S3/P31e_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	5.3.4	c12102	
11	The S3/P0s_A_Sk sets CI_SSF to TRUE on AI_TSF reception.	5.3.8	c12103	
12	The S3/P0s_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	5.3.8	c12103	

c12101: IF C.1/5 THEN m ELSE n/a -- S3/P31x_A_Sk present
c12102: IF C.1/7 THEN m ELSE n/a -- S3/P31e_A_Sk present
c12103: IF C.1/11 THEN m ELSE n/a -- S3/P0s_A_Sk present

Table C.122: Trail Signal Fail action (aTSF)

Prerequisite: C.1/3 OR C.1/14 OR C.1/16 -- S3_TT_Sk and/or S3m_TT_Sk and/orS3s_TT_Sk functions present

Item	Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The S3_TT_Sk sets AI_TSF to TRUE on S3 dUNEQ detection.	5.2.2	c12201	
2	The S3_TT_Sk sets AI_TSF to TRUE on S3 dTIM detection.	5.2.2	c12201	
3	The S3_TT_Sk sets AI_TSF to TRUE on CI_SSF reception.	5.2.2	c12201	
4	The S3_TT_Sk sets AI_TSF to FALSE when there is (are) no more defect(s) active.	5.2.2	c12201	
5	The S3m_TT_Sk sets AI_TSF to TRUE on S3 dAIS detection.	5.4.1	c12202	
6	The S3m_TT_Sk sets AI_TSF to TRUE on S3 dUNEQ detection.	5.4.1	c12202	
7	The S3m_TT_Sk sets AI_TSF to TRUE on S3 dTIM detection.	5.4.1	c12202	
8	The S3m_TT_Sk sets AI_TSF to TRUE on CI_SSF reception.	5.4.1	c12202	
9	The S3m_TT_Sk sets AI_TSF to FALSE when there is (are) no more defect(s) active.	5.4.1	c12202	
10	The S3s_TT_Sk sets AI_TSF to TRUE on S3 dTIM detection.	5.4.3	c12203	
11	The S3s_TT_Sk sets AI_TSF to TRUE on CI_SSF reception.	5.4.3	c12203	
12	The S3s_TT_Sk sets AI_TSF to FALSE when there is (are) no more defect(s) active.	5.4.3	c12203	

c12201: IF C.1/3 THEN m ELSE n/a -- S3_TT_Sk present
c12202: IF C.1/14 THEN m ELSE n/a -- S3m_TT_Sk present
c12203: IF C.1/16 THEN m ELSE n/a -- S3s_TT_Sk present

Table C.123: Trail Signal Degrade action (aTSD)

Prerequisite: C.1/3 OR C.1/14 OR C.1/16 -- S3_TT_Sk and/or S3m_TT_Sk and/or S3s_TT_Sk functions present

Item	Trail Signal Degrade action (aTSD)	Reference	Status	Support
1	If the dDEG is detected in the trail termination sink the aTSD is performed.	EN 300 417-1-1 [6] subclause 8.2.2.6	m	
2	It ceases aTSD insertion after the dDEG defect is cleared.	EN 300 417-1-1 [6] subclause 8.2.2.6	m	
3	The aTSD is equivalent to send the Signal Degrade (SD) signal as defined in the Automatic Protection Switching (APS).	EN 300 417-1-1 [6] subclause 8.2.2.6	m	

C.4.6.4 Defect Correlation

Prerequisite: C.6/4 -- Defect correlation process supported

Table C.124: Defect correlation

Item	Defect correlation	Reference	Status	Support
1	Under S3 dUNEQ detection the S3_TT_Sk and S3m_TT_Sk functions generate a S3 cUNEQ report if the port is in the monitoring state (MON).	5.2.2, 5.4.1	c12401	
2	Under S3 dTIM detection the S3_TT_Sk and S3m_TT_Sk functions generate a S3 cTIM report if the port is in the monitoring state (MON) and no dUNEQ defect has been detected.	5.2.2, 5.4.1	c12401	
3	Under detection of both S3 dUNEQ and S3 dTIM and reception of "AcTI = all 0s" the S3s_TT_Sk function generates a S3 cUNEQ report if the port is in the monitoring state (MON).	5.4.3, EN 300 417-1-1 [6] subclause.8.2.3.2	c12402	
4	Under S3 dTIM detection the S3s_TT_Sk function generates a S3 cTIM report if the port is in the monitoring state (MON) and no dUNEQ defect nor "AcTI = all 0s" have been declared.	5.4.3, EN 300 417-1-1 [6] subclause.8.2.3.2	c12402	
5	Under S3 dDEG detection the VC-3 Layer Trail Termination Sink functions (S3_TT_Sk, S3m_TT_Sk, S3s_TT_Sk) generate a S3 cDEG report if the port is in the monitoring state (MON) and no dTIM defect has been detected.	5.2.2, 5.4.1, 5.4.3	c12403	
6	Under S3 dRDI detection the VC-3 Layer Trail Termination Sink functions (S3_TT_Sk, S3m_TT_Sk, S3s_TT_Sk) generate a S3 cRDI report if the port is in the monitoring state (MON) and no dUNEQ nor dTIM defects have been detected.	5.2.2, 5.4.1, 5.4.3	c12403	
7	The S3 cRDI is reported only if S3 RDI_reported is set to TRUE by the EMF. By default S3 RDI_reported is set to FALSE.	5.2.2, 5.4.1, 5.4.3	c12403	
8	Under CI_SSF reception the VC-3 Layer Trail Termination Sink functions (S3_TT_Sk, S3m_TT_Sk, S3s_TT_Sk) generate a S3 cSSF report if the port is in the monitoring state (MON).	5.2.2, 5.4.1, 5.4.3	c12403	
9	The S3 cSSF is reported only if selected S3 SSF_reported is set to TRUE by the EMF. By default S3 SSF_reported is set to FALSE.	5.2.2, 5.4.1, 5.4.3	c12403	
10	Under S3 dPLM detection the S3/P31x_A_Sk generates a S3 cPLM report if no AI_TSF is received from the S3_TT_Sk.	5.3.2	c12404	
11	Under S3 dPLM detection the S3/P31e_A_Sk generates a S3 cPLM report if no AI_TSF is received from the S3_TT_Sk.	5.3.4	c12405	

Item	Defect correlation	Reference	Status	Support
12	Under P31e dAIS detection the S3/P31e_A_Sk generates a P31e cAIS report if no dPLM defect has been detected and no AI_TSF is received from the S3_TT_Sk.	5.3.4	c12405	
13	The P31e cAIS is reported only if selected P31e AIS_reported is set to TRUE by the EMF. By default P31e AIS_reported is set to FALSE.	5.3.4	c12405	
14	Under P31e dLOF detection the S3/P31e_A_Sk generates a P31e cLOF report if no dAIS nor dPLM defects have been detected.	5.3.4	c12405	
15	Under S3 dPLM detection the S3/TSS3_A_Sk generates a S3 cPLM report if no AI_TSF is received from the S3_TT_Sk.	5.3.8	c12406	
16	Under dLSS detection the S3/TSS3_A_Sk generates a cLSS report if no AI_TSF is received from the S3_TT_Sk.	5.3.8	c12406	
17	All the generated fault causes (cXXX) are reported to the EMF.	EN 300 417-1-1 [6] subclause 8.1 figure 36	m	

c12401: IF (C.1/3 OR C.1/14) THEN m ELSE n/a -- S3_TT_Sk and/or S3m_TT_Sk present
c12402: IF C.1/16 THEN m ELSE n/a -- S3s_TT_Sk present
c12403: IF (C.1/3 OR C.1/14 OR C.1/16) THEN m ELSE n/a -- S3_TT_Sk and/or S3m_TT_Sk and/or S3s_TT_Sk present
c12404: IF C.1/5 THEN m ELSE n/a -- S3/P31x_A_Sk present
c12405: IF C.1/7 THEN m ELSE n/a -- S3/P31e_A_Sk present
c12406: IF C.1/13 THEN m ELSE n/a -- S3/TSS3_A_Sk present

C.4.6.5 Performance monitoring

C.4.6.5.1 Near End Performance monitoring

Prerequisite: C.6/1 -- Near-end performance monitoring process supported

Table C.125: pN_DS performance parameter

Prerequisite: C.6/1 -- Near-end performance monitoring process supported

Item	pN_DS performance parameter	Reference	Status	Support
1	The VC-3 Layer Trail Termination Sink functions (S3_TT_Sk, S3m_TT_Sk, S3s_TT_Sk) indicate a S3 pN_DS every second with at least one occurrence of S3 aTSF or an equipment defect (dEQ).	5.2.2, 5.4.1, 5.4.3	m	

Table C.126: pN_EBC performance parameter

Prerequisite: C.6/1 -- Near-end performance monitoring process supported

Item	pN_EBC performance parameter	Reference	Status	Support
1	Every second the VC-3 Layer Trail Termination Sink functions (S3_TT_Sk, S3m_TT_Sk, S3s_TT_Sk) count the number of S3 Near-end Errored Block (S3 N_Bs) within that second as the S3 pN_EBC (S3 Near-end Error Block Count).	5.2.2, 5.4.1, 5.4.3	m	

Comments: A "Near-end Block" (N_B) is errored if one or more BIP-8 violations are detected.

Table C.127: pN_TSE performance parameter

Prerequisite: C.6/1 AND C.1/13 -- Near-end performance monitoring process supported and S3/TSS3_A_Sk present

Item	pN_TSE performance parameter	Reference	Status	Support
1	Every second the S3/TSS3_A_Sk gives sum of Test Sequence Errors (TSE) within one second period as the S3 pN_TSE (S3 Near-end Test Sequence Errors).	5.2.2, 5.4.1, 5.4.3	m	

Comments: The TSE error block size is equal to the B3 BIP-8 error block size with the exception of the VC-3 POH.

C.4.6.5.2 Far End Performance Monitoring

Prerequisite: C.6/2 -- Far-end performance monitoring process supported

Table C.128: pF_DS performance parameter

Item	pF_DS performance parameter	Reference	Status	Support
1	The VC-3 Layer Trail Termination Sink functions (S3_TT_Sk, S3m_TT_Sk, S3s_TT_Sk) indicate a S3 pF_DS every second with at least one occurrence of S3 dRDI.	5.2.2, 5.4.1, 5.4.3	m	

Table C.129: pF_EBC performance parameter

Item	pF_EBC performance parameter	Reference	Status	Support
1	Every second VC-3 Layer Trail Termination Sink functions (S3_TT_Sk, S3m_TT_Sk, S3s_TT_Sk) count the number of S3 Far-end Errored Block (S3 F_Bs) within that second as the S3 pF_EBC (S3 Far-end Error Block Count).	5.2.2, 5.4.1, 5.4.3	m	

Comments: A "Far-end Block" (F_B) is errored if the REI count indicates one or more errors.

C.4.7 VC-3 Layer Linear Trail Protection Defect, Defect, Consequent Action, Defect Correlation and Performance Monitoring Tables

Prerequisite: C.1/22 -- VC-3 Layer Linear Trail Protection scheme supported

C.4.7.1 Consequent action activation and clearance criteria

Table C.130: Server Signal Fail action (aSSF)

Item	Server Signal Fail action (aSSF)	Reference	Status	Support
1	The S3/S3P_A_Sk sets CI_SSF to TRUE on AI_TSF reception.	5.5.3.2	m	
2	The S3/S3P_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	5.5.3.2	m	

Table C.131: Trail Signal Fail action (aTSF)

Prerequisite: C.5/3 -- S3P_TT_Sk present

Item	Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The S3P_TT_Sk sets AI_TSF to TRUE on CI_SSF reception.	5.5.2.2	m	
2	The S3P_TT_Sk sets AI_TSF to FALSE when there is (are) no more defect(s) active.	5.5.2.2	m	

Table C.132: Server Signal Degrade action (aSSD)

Prerequisite: C.5/5 -- S3/S3P_A_Sk present

Item	Server Signal Degrade action (aSSD)	Reference	Status	Support
1	The S3/S3P_A_Sk sets CI_SSD to TRUE on AI_TSD reception.	5.5.3.2	m	
2	The S3/S3P_A_Sk sets CI_SSD to FALSE when there is (are) no more defect(s) active.	5.5.3.2	m	

C.4.7.2 Defect correlation

Table C.133: Defect correlation

Item	Defect correlation	Reference	Status	Support
1	Under S3P CI_SSF reception the S3P_TT_Sk generates an S3P cSSF report.	5.5.2.2	c13301	
2	The S3P cSSF is reported only if selected S3P SSF_reported is set to TRUE by the EMF. By default S3P SSF_reported is set to FALSE.	5.5.2.2	c13301	
3	All the generated fault causes (cXXX) are reported to the EMF		c13301	

c13301: IF C.5/3 THEN m ELSE n/a -- S3P_TT_Sk present

C.4.8 VC-3 Tandem Connection Sub-layer Defect, Consequent Action, Defect Correlation and Performance Monitoring Tables

Prerequisite: C.1/17 OR C.1/18 OR C.1/21 -–- S3D_TT_So and/or S3D_TT_Sk and/or S3Dm_TT_Sk present

C.4.8.1 Port Status Management

Table C.134: Trail Termination Point Mode Process

Prerequisite: C.1/18 OR C.1/21 -- S3D_TT_Sk and/or S3Dm_TT_Sk present

Item	Trail Termination Point Mode Process	Reference	Status	Support
1	The Trail Termination Point Mode supports "not monitored" (NMON) status.	EN 300 417-1-1 [6] subclause 8.5	m	
2	The Trail Termination Point Mode supports "monitored" (MON) status.	EN 300 417-1-1 [6] subclause 8.5	m	
3	The Trail Termination Point Mode status is provisionable by the EMF.	5.6.2, 5.6.5	m	

C.4.8.2 Defect detection and clearance criteria

Prerequisite: C.1/18 OR C.1/21 -- S3D_TT_Sk and/or S3Dm_TT_Sk present

Table C.135: VC-3 Tandem Connection Incoming Alarm Indication Signal defect (TC dIncAIS)

Prerequisite: C.1/18 -- S3D_TT_Sk present

Item	VC-3 Tandem Connection Incoming Alarm Indication Signal defect (TC dIncAIS)	Reference	Status	Support
1	The S3D_TT_Sk function detects a TC Incoming AIS defect (dIncAIS) if 5 consecutive frames contain the '1110' pattern in the IEC bits (N1[1-4]).	5.6.2	m	
2	The S3D_TT_Sk function clears the TC Incoming AIS defect (dIncAIS) if in 5 consecutive frames any pattern other than the '1110' is detected in the IEC bits (N1[1-4]).	5.6.2	m	

Table C.136: VC-3 Tandem Connection Remote Defect Indication defect (dRDI)

Item	VC-3 Tandem Connection Remote Defect Indication defect (dRDI)	Reference	Status	Support
1	The TC RDI defect (dRDI) is detected if 5 consecutive frames contain the '1' value in bit N1[8][73] of the 76 frame multiframe.	5.6.2, 5.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
2	The TC RDI defect (dRDI) is cleared if in 5 consecutive frames contain the '0' value in bit N1[8][73] of the 76 frame multiframe.	5.6.2, 5.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
3	The TC RDI defect (dRDI) is cleared during reception of an aSSF.	5.6.2, 5.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	

Comment: N1[x][y] refers to bit x (x = 7,8) of byte N1 in frame y (y = 1..76) of the 76 frame multiframe.

Table C.137: VC-3 Tandem Connection Degraded defect (dDEG)

Item	VC-3 Tandem Connection Degraded defect (dDEG)	Reference	Status	Support
1	Once every second, S3D pNEBC is compared with DEGTHR	5.6.2, 5.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
2	If S3D pNEBC ≥ DEGTHR the corresponding second is declared BAD, otherwise it is declared GOOD	5.6.2, 5.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
3	The S3D dDEG defect (dDEG) is detected if M consecutive BAD seconds have occurred.	5.6.2, 5.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
4	The S3D dDEG defect (dDEG) is cleared if M consecutive GOOD seconds have occurred.	5.6.2, 5.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
5	The S3D dDEG defect (dDEG) is cleared during reception of an aSSF	5.6.2, 5.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
6	The DEGTHR parameter is provisionable by the EMF	5.6.2, 5.6.5	m	
7	The DEGM parameter is provisionable by the EMF	5.6.2, 5.6.5	m	

Table C.138: VC-3 Tandem Connection DEG defect parameters value

Item	VC-3 Tandem Connection DEG defect parameters	Reference	Status	Support	Values	
					Allowed	Supported
1	S3D dDEG DEGTHR parameter	5.6.2, 5.6.5	m		0 < DEGTHR ≤ 8 000	
2	S3D dDEG M parameter	5.6.2, 5.6.5	m		2 ≤ M ≤ 10	

Table C.139: VC-3 Tandem Connection Trace Identifier Mismatch defect (dTIM)

Item	VC-3 Tandem Connection Trace Identifier Mismatch defect (dTIM)	Reference	Status	Support
1	The S3D TIM defect (dTIM) is detected, within a maximum period of 1 s in the absence of bit errors, when the Accepted Trace Identifier (AcTI) does not match the Expected Trace Identifier (ExTI).	5.6.2, 5.6.5, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
2	The S3D TIM defect (dTIM) is cleared, within a maximum period of 1 s, after the Accepted Trace Identifier (AcTI) matches the Expected Trace Identifier (ExTI) in the absence of bit errors.	5.6.2, 5.6.5, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
3	The S3D TIM defect (dTIM) is suppressed during reception of an aSSF.	5.6.2, 5.6.5, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
4	It is possible to disable the TC trace identifier mismatch defect detection (TIMdis).	5.6.2, 5.6.5	m	

Table C.140: VC-3 Tandem Connection Unequipped defect (dUNEQ)

Item	VC-3 Tandem Connection Unequipped defect (dUNEQ)	Reference	Status	Support
1	The S3D UNEQ defect (dUNEQ) is detected if five consecutive VC-3 frames contain the "0000 0000" pattern in byte N1.	5.6.2, 5.6.5, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
2	The S3D UNEQ defect (dUNEQ) is cleared if in five consecutive VC-3 frames any pattern other than the "0000 0000" is detected in byte N1.	5.6.2, 5.6.5, EN 300 417-1-1 [6] subclause 8.2.1.2	m	

Table C.141: Loss of Tandem Connection defect (dLTC)

Item	Loss of Tandem defect (dLTC)	Reference	Status	Support
1	The S3D LTC defect (dLTC) is detected if the multiframe alignment process is in the OOM state.	5.6.2, 5.6.5	m	
2	The S3D LTC defect (dLTC) is cleared if the multiframe alignment process is in the IM state.	5.6.2, 5.6.5	m	

Table C.142: VC-3 Tandem Connection Remote Outgoing VC defect (dODI)

Item	VC-3 Tandem Connection Remote Outgoing VC defect (dODI)	Reference	Status	Support
1	The TC ODI defect (dODI) is detected if 5 consecutive frames contain the '1' value in bit N1[7][74] of the 76 frame multiframe.	5.6.2, 5.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
2	The TC ODI defect (dODI) is cleared if in 5 consecutive frames contain the '0' value in bit N1[7][74] of the 76 frame multiframe.	5.6.2, 5.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
3	The TC RDI defect (dRDI) is cleared during reception of an aSSF.	5.6.2, 5.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	

C.4.8.3 Consequent action activation and clearance criteria

Table C.143: Alarm Indication Signal action (aAIS)

Prerequisite: C.1/18 OR C.1/20 -- S3D_TT_Sk and/or S3D/S3_A_Sk present.

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
1	The S3D_TT_Sk outputs an all "1"s signal within 250 µs upon S3D dUNEQ detection.	5.6.2	c14301	
2	The S3D_TT_Sk outputs an all "1"s signal within 250 µs upon S3D dTIM detection.	5.6.2	c14301	
3	The S3D_TT_Sk outputs an all "1"s signal within 250 µs upon S3D dLTC detection.	5.6.2	c14301	
4	The S3D_TT_Sk outputs normal data within 250 µs when there is (are) no more defect(s) active.	5.6.2	c14301	
5	The S3D/S3_A_Sk outputs an all "1"s signal within 1 ms upon AI_OSF reception.	5.6.4	c14302	
6	The S3D/S3_A_Sk outputs normal data within 1 ms when there is (are) no more defect(s) active.	5.6.4	c14302	

c14301: IF C.1/18 THEN m ELSE n/a -- S3D_TT_Sk present
c14302: IF C.1/20 THEN m ELSE n/a -- S3D/S3_A_Sk present

Table C.144: Remote Defect Indication defect action (aRDI)

Prerequisite: C.1/17 AND C.1/18 -- S3D_TT_So and S3D_TT_Sk functions present.

Item	Remote Defect Indication defect action (aRDI)	Reference	Status	Support
1	The S3D_TT_Sk outputs an RDI request generation (RI_RDI) on CI_SSF detection.	5.6.2	m	
2	The S3D_TT_Sk outputs an RDI request generation (RI_RDI) on S3D dUNEQ detection.	5.6.2	m	
3	The S3D_TT_Sk outputs an RDI request generation (RI_RDI) on S3D dTIM detection.	5.6.2	m	
4	The S3D_TT_Sk outputs an RDI request generation (RI_RDI) on S3D dLTC detection.	5.6.2	m	
5	The S3D_TT_Sk clears the RDI request when there is (are) no more defect(s) active.	5.6.2	m	
6	The S3D_TT_So inserts the RDI code within the TC RDI code within 1 multiframe (9,5 ms) upon RI_RDI reception.	5.6.1	m	
7	The S3D_TT_So outputs normal data within the TC RDI code within 1 multiframe (9,5 ms) upon RI_RDI clearing.	5.6.1	m	

Table C.145: Remote Error Indication action (aREI)

Prerequisite: C.1/17 AND C.1/18 -- S3D_TT_So and S3D_TT_Sk functions present.

Item	Remote Error Indication action (aREI)	Reference	Status	Support
1	The S3D_TT_So inserts the RI_REI value in the REI bit in the following frame.	5.6.1	m	

Table C.146: Outgoing Defect Indication defect action (aODI)

Prerequisite: C.1/17 AND C.1/18 -- S3D_TT_So and S3D_TT_Sk functions present.

Item	Outgoing Defect Indication defect action (aODI)	Reference	Status	Support
1	The S3D_TT_Sk outputs an ODI request generation (RI_ODI) on CI_SSF detection.	5.6.2	m	
2	The S3D_TT_Sk outputs an ODI request generation (RI_ODI) on S3D dUNEQ detection.	5.6.2	m	
3	The S3D_TT_Sk outputs an ODI request generation (RI_ODI) on S3D dTIM detection.	5.6.2	m	
4	The S3D_TT_Sk outputs an ODI request generation (RI_ODI) on S3D dLTC detection.	5.6.2	m	
5	The S3D_TT_Sk outputs an ODI request generation (RI_ODI) on S3D dIncAIS detection.	5.6.2	m	
6	The S3D_TT_Sk clears the ODI request when there is (are) no more defect(s) active.	5.6.2	m	
7	The S3D_TT_So inserts the ODI code within the TC ODI code within 1 multiframe (9,5 ms) upon RI_ODI reception.	5.6.1	m	
8	The S3D_TT_So outputs normal data within the TC ODI code at the first opportunity after the RI_ODI request has been cleared	5.6.1	m	

Table C.147: Outgoing Error Indication action (aOEI)

Prerequisite: C.1/17 AND C.1/18 -- S3D_TT_So and S3D_TT_Sk functions present

Item	Outgoing Error Indication action (aOEI)	Reference	Status	Support
1	The S3D_TT_So inserts the RI_OEI value in the OEI bit in following frame.	5.6.1	m	

Table C.148: Server Signal Fail action (aSSF)

Prerequisite: C.1/20 -- S3D/S3_A_Sk present.

Item	Server Signal Fail action (aSSF)	Reference	Status	Support
1	The S3D/S3_A_Sk sets CI_SSF to TRUE on AI_OSF reception.	5.6.4	m	
2	The S3D/S3_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	5.6.4	m	

Table C.149: Trail Signal Fail action (aTSF)

Prerequisite: C.1/18 OR C.1/21 -- S3D_TT_Sk and/or S3Dm_TT_Sk present.

Item	Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) set AI_TSF to TRUE on S3D dUNEQ detection.	5.6.2, 5.6.5	m	
2	The Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) set AI_TSF to TRUE on S3D dTIM detection.	5.6.2, 5.6.5	m	
3	The Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) set AI_TSF to TRUE on S3D dLTC detection.	5.6.2, 5.6.5	m	
4	The Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) set AI_TSF to TRUE on CI_SSF reception.	5.6.2, 5.6.5	m	
5	The Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) set AI_TSF to FALSE when there is (are) no more defect(s) active.	5.6.2, 5.6.5	m	

Table C.150: Outgoing Signal Fail action (aOSF)

Prerequisite: C.1/18 OR C.1/21 -- S3D_TT_Sk and/or S3Dm_TT_Sk present

Item	Outgoing Signal Fail action (aOSF)	Reference	Status	Support
1	The Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) set AI_OSF to TRUE on S3D dUNEQ detection.	5.6.2, 5.6.5	m	
2	The Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) set AI_OSF to TRUE on S3D dTIM detection.	5.6.2, 5.6.5	m	
3	The Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) set AI_OSF to TRUE on S3D dLTC detection.	5.6.2, 5.6.5	m	
4	The Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) set AI_OSF to TRUE on S3D dIncAIS detection.	5.6.2, 5.6.5	m	
5	The Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) set AI_OSF to TRUE on CI_SSF reception.	5.6.2, 5.6.5	m	
6	The Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) set AI_OSF to FALSE when there is (are) no more defect(s) active.	5.6.2, 5.6.5	m	

Table C.151: AI_SF signal generation (AI_SF)

Prerequisite: C.1/19 -- S3D/S3_A_So present

Item	AI_SF signal generation (AI_SF)	Reference	Status	Support
1	The S3D/S3_A_So sets AI_SF to TRUE on CI_SSF reception.	5.6.3	m	
2	The S3D/S3_A_So sets AI_SF to FALSE when no CI_SSF is received.	5.6.3	m	

Prerequisite: C.1/18 OR C.1/21 -- S3D_TT_Sk and/or S3Dm_TT_Sk present.

Table C.152: Trail Signal Degrade action (aTSD)

Item	Trail Signal Degrade action (aTSD)	Reference	Status	Support
1	If the dDEG is detected in the trail termination sink the aTSD is performed.	EN 300 417-1-1 [6] subclause 8.2.2.6	m	
2	It ceases aTSD insertion after the dDEG defect is cleared.	EN 300 417-1-1 [6] subclause 8.2.2.6	m	

C.4.8.4 Defect correlation

Prerequisite: C.5/8 -- Tandem Connection defect correlation process supported

Table C.153: Tandem Connection Defect Correlation

Item	Tandem Connection Failure report	Reference	Status	Support
1	Under S3D dUNEQ detection the VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) generate a S3D cUNEQ report if the port is in the monitoring state (MON).	5.6.2, 5.6.5	m	
2	Under S3D dLTC detection the VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) generate a S3D cLTC report if the port is in the monitoring state (MON) and no dUNEQ defect has been detected.	5.6.2, 5.6.5	m	
3	Under S3D dTIM detection the VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) generate a S3D cTIM report if the port is in the monitoring state (MON) and no dUNEQ nor dLTC defects have been detected.	5.6.2, 5.6.5	m	
4	Under S3D dDEG detection the VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) generate a S3D cDEG report if the port is in the monitoring state (MON) and no dTIM nor dLTC defects have been detected.	5.6.2, 5.6.5	m	
5	Under S3D dRDI detection the VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) generate a S3D cRDI report if the port is in the monitoring state (MON) and no dUNEQ nor dTIM nor dLTC defects have been detected.	5.6.2, 5.6.5	m	

Item	Tandem Connection Failure report	Reference	Status	Support
6	The S3D cRDI is reported only if S3D RDI_reported is set to TRUE by the EMF. By default S3D RDI_reported is set to FALSE.	5.6.2, 5.6.5	m	
7	Under S3D dODI detection the VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) generate a S3D cODI report if the port is in the monitoring state (MON) and no dUNEQ nor dTIM nor dLTC defects have been detected.	5.6.2, 5.6.5	m	
8	The S3D cODI is reported only if S3D ODI_reported is set to TRUE by the EMF. By default S3D ODI_reported is set to FALSE.	5.6.2, 5.6.5	m	
9	Under CI_SSF the VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) generate a S3D cSSF report if the port is in the monitoring state (MON).	5.6.2, 5.6.5	m	
10	The S3D cSSF is reported only if selected S3D SSF_reported is set to TRUE by the EMF. By default S3D SSF_reported is set to FALSE.	5.6.2, 5.6.5	m	
11	All the generated fault causes (cXXX) are reported to the EMF	EN 300 417-1-1 [6] subclause 8.1, figure 36	m	

C.4.8.5 Performance Monitoring

C.4.8.5.1 Near End Performance Monitoring

Prerequisite: C.5/5 -- Tandem Connection Near-end performance monitoring process supported

Table C.154: pN_DS performance parameter

Item	pN_DS performance parameter	Reference	Status	Support
1	The VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) indicate a S3D pN_DS every second with at least one occurrence of S3D aTSF or an equipment defect (dEQ).	5.6.2, 5.6.5	m	

Table C.155: pN_EBC performance parameter

Item	pN_EBC performance parameter	Reference	Status	Support
1	Every second the VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) count the number of S3D Near-end Errored Block (S3D N_Bs) within that second as the S3D pN_EBC (S3D Near-end Error Block Count).	5.6.2, 5.6.5	m	

Comments: A "Near-end Block" (N_B) is errored if one or more BIP-8 violations are detected.

C.4.8.5.2 Far End Performance Monitoring

Prerequisite: C.5/6 -- Tandem Connection Far-end performance monitoring process supported

Table C.156: pF_DS performance parameter

Item	pF_DS performance parameter	Reference	Status	Support
1	The VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) indicate a S3D pF_DS every second with at least one occurrence of S3D dRDI.	5.6.2, 5.6.5	m	

Table C.157: pF_EBC performance parameter

Item	pF_EBC performance parameter	Reference	Status	Support
1	Every second VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) count the number of S3D Far-end Errored Block (S3D F_Bs) within that second as the S3D pF_EBC (S3D Far-end Error Block Count).	5.6.2, 5.6.5	m	

Comments: A "Far-end Block" (F_B) is errored if the REI count indicates one or more errors.

C.4.8.5.3 Tandem Connection Outgoing VC Performance Monitoring

Prerequisite: C.5/7 -- Tandem Connection Outgoing VC performance monitoring process supported

Table C.158: pOF_DS performance parameter

Item	pOF_DS performance parameter	Reference	Status	Support
1	The VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) indicate a S3D pOF_DS every second with at least one occurrence of S3D dODI	5.6.2, 5.6.5	m	

Table C.159: pOF_EBC performance parameter

Item	pOF_EBC performance parameter	Reference	Status	Support
1	Every second VC-3 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) count the number of S3D Outgoing VC Errored Block (S3D OF_Bs) within that second as the S3D pOF_EBC (S3D Outgoing VC Error Block Count).	5.6.2, 5.6.5	m	

Comments: An "Outgoing VC Block" (OF_B) is errored if the OEI count indicates one or more errors.

Table C.160: pON_EBC performance parameter

Item	pON_EBC performance parameter	Reference	Status	Support
1	Every second the VC-3 Tandem Connection Trail Termination Sink function (S3D_TT_Sk) counts the number of S3D Outgoing Near-end Errored Block (S3D ON_Bs) within that second as the S3D pON_EBC (S3D Outgoing Near-end Error Block Count).	5.6.2	m	

Table C.161: pON_DS performance parameter

Item	pON_DS performance parameter	Reference	Status	Support
1	The VC-3 Tandem Connection Trail Termination Sink function (S3D_TT_Sk) indicates a S3D pON_DS every second with at least one occurrence of S3D aODI or an equipment defect (dEQ).	5.6.2	m	

Annex D (normative): ICS proforma for S2 Path Layer

D.1 Identification of the implementation

In the present document, an IUT, and of course the identification of an IUT refers to a S2 Path Layer instance implemented inside the SUT.

Identification of the Implementation Under Test (IUT) and the system in which it resides (the System Under Test (SUT)) should be filled in so as to provide as much detail as possible regarding version numbers and configuration options.

The product supplier information and client information should both be filled in if they are different.

A person who can answer queries regarding information supplied in the ICS should be named as the contact person.

D.1.1 Date of the statement

....

D.1.2 Implementation Under Test (IUT) identification

IUT name:

....

....

IUT version

Hardware version:

....

....

Software version:

....

....

Firmware version:

....

....

D.1.3 System Under Test (SUT) identification

SUT name:

....

....

Hardware configuration:

....

....

SUT Software version:

....

....

SUT Firmware version:

....

Operating system:

....

....

D.1.4 Product supplier

Name:

....

Address:

....

....

....

Telephone number:

....

Facsimile number:

....

E-mail address:

....

Additional information:

....

....

....

D.1.5 Client

Name:

....

Address:

....

....

....

Telephone number:

....

Facsimile number:

....

E-mail address:

....

Additional information:

....

....

....

D.1.6 ICS contact person

Name:

....

Telephone number:

....

Facsimile number:

....

E-mail address:

....

Additional information:

....

....

D.2 Identification of the EN

This ICS proforma applies to the following standard:

EN 300 417-4-1 (V1.1): "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 4-1: Synchronous Digital Hierarchy (SDH) path layer functions".

D.3 Global statement of conformance of S2 Path Layer

Due to the model used for this layer the "Global statement of conformance" sentence used in ETSI ICS is not applicable to this layer.

D.4 S2 Path Layer functions

D.4.1 S2 Path Layer Description

Table D.1: S2 Path Layer functions

Item	S2 Path Layer functions	Reference	Status	Support
1	VC-2 Layer Connection function (S2_C)	6, figure 107	o.101	
2	VC-2 Layer Trail Termination Source function (S2_TT_So)	6, figure 107	o.101	
3	Trail Termination Sink function (S2_TT_Sk)	6, figure 107	o.101	
4	VC-2 Layer to ATM Layer (ATM) Compound Adaptation Source function (S2/Avp_A_So)	6, figure 107	c101	
5	VC-2 Layer to ATM Layer (ATM) Compound Adaptation Sink function (S2/Avp_A_Sk)	6, figure 107	c102	
6	VC-2 Layer to TSS4 Layer Adaptation Source function (S2/TSS4_A_So)	6, figure 107	c103	
7	VC-2 Layer to TSS4 Layer Adaptation Sink function (S2/TSS4_A_Sk)	6, figure 107	c104	
8	VC-2 Layer Non-intrusive Monitoring function (S2m_TT_Sk)	6, figure 107	c105	
9	VC-2 Layer Supervisory Unequipped function (S2s_TT_So)	6, figure 107	c105	
10	VC-2 Layer Supervisory Unequipped Termination Sink function (S2s_TT_Sk)	6, figure 107	c105	
11	VC-2 Tandem Connection Trail Termination Source function (S2D_TT_So)	6, figure 107	c105	
12	VC-2 Tandem Connection Trail Termination Sink function (S2D_TT_Sk)	6, figure 107	c105	
13	VC-2 Tandem Connection to VC-2 Adaptation Source function (S2D/S2_A_So)	6, figure 107	c106	
14	VC-2 Tandem Connection to VC-2 Adaptation Sink function (S2D/S2_A_Sk)	6, figure 107	c107	

Item	S2 Path Layer functions	Reference	Status	Support
15	VC-2 Tandem Connection non-intrusive Trail Termination Sink function (S2Dm_TT_Sk)	6, figure 107	c105	
16	VC-2 Layer Linear Trail Protection	6, figure 110	c108	
17	VC-2 Layer Sub-Network Connection (SNC) Protection	6	c105	
18	VC-2 Layer to LC Layer Adaptation Source function (S2/LC_A_So)	6, figure 107	c109	
19	VC-2 Layer to Xxx Layer Adaptation Source function (S2/Xxx_A_So)	n/a	c101	
20	VC-2 Layer to Xxx Layer Adaptation Sink function (S2/Xxx_A_Sk)	n/a	c102	

o.101: It is mandatory to support at least one of these items -- connection function and/or trail termination source and/or trail termination sink present

o.102: It is mandatory to support at least one of these items -- at least one Payload Adaptation Source present

o.103: It is mandatory to support at least one of these items -- at least one Payload Adaptation Sink present

c101: IF D.1/2 THEN o.102 ELSE x -- a TT_So function should exist for A_So function
c102: IF D.1/3 THEN o.103 ELSE x -- a TT_Sk function should exist for A_Sk function
c103: IF D.1/2 THEN o ELSE x -- a TT_So function should exist for A_So function
c104: IF D.1/3 THEN o ELSE x -- a TT_Sk function should exist for A_Sk function
c105: IF D.1/1 THEN o ELSE n/a -- a connection function should exist
c106: IF D.1/11 THEN m ELSE x -- a Tandem Connection TT_So function should exist for Tandem Connection A_So function
c107: IF D.1/12 THEN m ELSE x -- a Tandem Connection TT_Sk function should exist for Tandem Connection A_Sk function
c108: IF D.1/3 THEN o ELSE n/a -- S2_TT_Sk function should exist for S2 Linear Trail Protection
c109: IF D.1/2 OR D.1/9 THEN m ELSE n/a -- S2_TT_So and/or S2s_TT_So function should exist

Comment: If the S2_C is not supported it is assumed that the TT_So (TT_Sk) functions are hard-wired all together to the S2_CI source direction (S2_CI sink direction). That could be the case of an ATM equipment.

Items dealing with S2/Xxx_A functions take into account the implementation of adaptation functions not specified or referenced in EN 300 417-x-1 standards.

Table D.2: Supported VC-2 Layer payload Adaptation functions

Prerequisite: D.1/2 OR D.1/3 -- implies that at least one VC-2 Layer payload Adaptation function is present

Item	S2 Path Layer functions	Reference	Status	Support
1	More than one VC-2 Layer payload Adaptation source function is supported	6, figure 107	c201	
2	More than one VC-2 Layer payload Adaptation sink function is supported	6, figure 107	c202	

c201: IF D.1/2 THEN o ELSE x -- implies that at least one VC-2 Layer payload Adaptation Source function is present
c202: IF D.1/3 THEN o ELSE x -- implies that at least one VC-2 Layer payload Adaptation Sink function is present

Table D.3: VC-2 Layer Protection schemes

Prerequisite: D.1/16 OR D.1/17 -- VC-2 Layer Linear Trail or SNC Protection supported

Item	VC-2 Layer Linear Trail Protection schemes	Reference	Status	Support
1	VC-2 Layer 1+1 Linear Trail Protection with unidirectional switching and revertive operation	6.5.1.1	c301	
2	VC-2 Layer 1+1 Linear Trail Protection with unidirectional switching and non-revertive operation	6.5.1.1	c301	
3	VC-2 Layer 1+1 Linear Trail Protection with bidirectional switching and revertive operation	6.5.1.2	c302	
4	VC-2 Layer 1+1 Linear Trail Protection with bidirectional switching and non-revertive operation	6.5.1.2	c302	
5	VC-2 Layer 1+1 Inherently Monitored SNC (SNC/I) Protection with unidirectional switching and revertive operation	6.1	c303	
6	VC-2 Layer 1+1 Inherently Monitored SNC (SNC/I) Protection with unidirectional switching and non-revertive operation	6.1	c303	
7	VC-2 Layer 1+1 Non-intrusively Monitored SNC (SNC/N) Protection with unidirectional switching and revertive operation	6.1	c304	
8	VC-2 Layer 1+1 Non-intrusively Monitored SNC (SNC/N) Protection with unidirectional switching and non-revertive operation	6.1	c304	
9	VC-2 Layer 1+1 Sub-layer Monitored SNC (SNC/S) Protection with unidirectional switching and revertive operation	6.1	c305	
10	VC-2 Layer 1+1 Sub-layer Monitored SNC (SNC/S) Protection with unidirectional switching and non-revertive operation	6.1	c305	

Comment to D.3/3 and D.3/4: The APS protocol for bidirectional VC-2 linear trail protection is not defined.

o.301: It is mandatory to support at least one of these items -- at least one 1+1 linear trail protection scheme

o.302: It is mandatory to support at least one of these items -- at least one 1+1 SNC protection scheme

c301: IF D.1/16 THEN o.301 ELSE x -- 1+1 linear trail protection supported

c302: IF (D.1/16 ANDOR (D.1/2 AND D.1/3)) THEN o.301 ELSE x -- 1+1 linear trail protection and bidirectional layer supported

c303: IF D.1/17 THEN o.302 ELSE x -- 1+1 SNC protection supported

c304: IF (D.1/17 AND (D.1/8 OR D.1/10)) THEN o.302 ELSE x -- 1+1 SNC protection and S2m_TT_Sk and/or S2s_TT_Sk supported

c305: IF (D.1/17 AND (D.1/12 OR D.1/15)) THEN o.302 ELSE x -- 1+1 SNC protection and S2D_TT_Sk and/or S2Dm_TT_Sk supported

Table D.4: VC-2 Layer Linear Trail Protection functions

Prerequisite: D.1/16 -- VC-2 Layer Linear Trail Protection scheme supported

Item	VC-2 Layer Linear Trail Protection functions	Reference	Status	Support
1	VC-2 Layer Linear Trail Protection Connection function (S2P_C)	6, figure 110	m	
2	VC-2 Protection Trail Termination Source function (S2P_TT_So)	6, figure 110	c401	
3	VC-2 Protection Trail Termination Sink function (S2P_TT_Sk)	6, figure 110	m	
4	VC-2 trail to VC-2 Linear Trail Protection Layer Adaptation Source function (S2/S2P_A_So)	6, figure 110	c401	
5	VC-2 trail to VC-2 Linear Trail Protection Layer Adaptation Sink function (S2/S2P_A_Sk)	6, figure 110	m	

c401: IF D.1/2 THEN m ELSE x -- a TT_So function should exist for protection Source functions

Table D.5: Supervision processes

Item	Supervision process	Reference	Status	Support
1	Near-end Performance Monitoring process	.	c501	
2	Far-end Performance Monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c502	
3	Protection Performance Monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c503	
4	Defect correlation process	EN 300 417-1-1 [6] subclause 8.2-8.3	c504	
5	Tandem Connection Near-end Performance Monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c505	
6	Tandem Connection Far-end Performance Monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c506	
7	Tandem Connection Outgoing VC Performance Monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c506	
8	Tandem Connection Defect correlation process	EN 300 417-1-1 [6] subclause 8.2-8.3	c505	

c501: IF (D.1/3 OR D.1/8 OR D.1/10) THEN m ELSE n/a -- S2_TT_Sk and/or S2m_TT_Sk and/or S2s_TT_Sk present

c502: IF (D.1/2 AND D.1/3) OR (D.1/9 AND D.1/10) THEN m ELSE n/a -- bidirectional S2 layer or both Supervisory-unequipped Trail Termination functions present

c503: IF D.1/16 THEN m ELSE n/a -- VC-2 Layer Linear Trail Protection scheme supported

c504: IF (D.1/3 OR D.1/5 OR D.1/7 OR D.1/8 OR D.1/10 OR D.1/12 OR D.1/15) THEN m ELSE n/a -- at least one of the Sink functions with defect correlation capabilities present

c505: IF (D.1/12 OR D.1/15) THEN m ELSE n/a -- S2D_TT_Sk and/or S2Dm_TT_Sk present

c506: IF (D.1/11 AND D.1/12) THEN m ELSE n/a -- both Tandem Connection Trail Termination functions present

D.4.2 VC-2 Layer Transmission Tables

Table D.6: Data stream structure

Item	Data stream structure	Reference	Status	Support
1	The CI at the S2 connection point is octet structured with a 500 microsecond frame.	4	m	
2	The S2_CI is 428 bytes data stream composed of 4 bytes of VC-2 overhead and 424 bytes of VC-2 payload.	6, figure 108	m	

D.4.2.1 VC-2 Layer Connection Function: S2_C

D.4.2.1.1 Routing process

Prerequisite: D.1/1 -- S2_C present

Table D.7: Connectivity functionalities: generalities

Prerequisite: D.1/1 -- S2_C present

Item	Connectivity functionalities: generalities	Reference	Status	Support
1	The S2_C function is able to connect a specific input ((termination) connection point) with a specific output input ((termination) connection point) by means of establishing a matrix connection between the specified input and output.	6.1	m	
2	The S2_C function is able to remove an established matrix connection.	6.1	m	

Comment: Not supporting D.7/1 and D.7/2 means that only hard-wired connections are supported

Table D.8: Connectivity functionalities: connection characterization

Item	Connectivity functionalities: connection characterization	Reference	Status	Support
1	Each connection in the S2_C function is characterized by the type of connection: unprotected, 1+1 protected (SNC/I, SNC/N or SNC/S protection)	6.1	c801	
2	Each connection in the S2_C function is characterized by the traffic direction: unidirectional, bidirectional	6.1	m	
3	Each connection in the S2_C function is characterized by the input and output connection points: set of connection point identifiers	6.1	m	

c801: IF D.1/17 THEN m ELSE n/a -- 1+1 SNC protection supported.

D.4.2.1.2 Unequipped VC generation

Table D.9: Unequipped VC generation

Item	Connectivity functionalities: connection characterization	Reference	Status	Support
1	The function generates an unequipped VC signal, as specified in EN 300 417-1-1 [6], subclause 7.2.	6.1, EN 300 417-1-1 [6], subclause 7.2.	m	

D.4.2.1.3 SNC protection process

Prerequisite: D.1/17 -- 1+1 SNC protection supported (if the given condition is not true then skip the whole subclause "SNC protection process")

Table D.10: SNC protection connectivity functionalities: generalities

Item	SNC protection connectivity functionalities: generalities	Reference	Status	Support
1	The S2_C is able to establish protection groups between a number of (T)CPs to perform the 1+1 VC-2 linear (sub)network connection protection process.	6.1, EN 300 417-1-1 [6] subclause 9.6.1, subclause 9.6.2, subclause 9.6.3	m	
2	The S2_C performs the bridge and selector functionality as presented in figure 49 of EN 300 417-1-1 [6]	6.1	m	

Table D.11: SNC protection connectivity functionalities: source direction

Item	SNC protection connectivity functionalities: source direction	Reference	Status	Support
1	The working output is connected to the associated normal input.	6.1	m	
2	The protection output is connected to the associated normal input.	6.1	m	

Table D.12: SNC protection connectivity functionalities: sink direction

Item	SNC protection connectivity functionalities: sink direction	Reference	Status	Support
1	The signal output at the normal reference point can be the signal received via either the working connection or the protection connection	6.1	m	

Comment: In the sink case of a protection connection the source of the connection is determined by the SF (and SD) signals associated with each of the two inputs to the connection and the possible external switch requests. The set of SF and SD signals used, is controlled by the protection type setting.

Table D.13: SNC protection operation

Item	SNC protection operation	Reference	Status	Support
1	No APS channel is supported for SNC protection applications	6.1, EN 300 417-3-1 [7] A.1	m	
2	The signal switching procedure is started under a Signal Fail condition. This depends on the protection type: SF = SSF for SNC/I and SF = TSF for SNC/N or SNC/S.	6.1, EN 300 417-3-1 [7] A.1	m	
3	The signal switching procedure is started under a Signal Degrade condition. This depends on the protection type: SD = TSD for SNC/N or SNC/S.	6.1, EN 300 417-3-1 [7] A.1	c1301	
4	For revertive operation the available external commands are LO, FSw-#1, MSw-#1, CLR	6.1, EN 300 417-3-1 [7] A.1	c1302	
5	For non-revertive operation the available external commands are LO or FSw, FSw-#i, MSw-#i, CLR (i = 0, 1)	6.1, EN 300 417-3-1 [7] A.1	c1303	
6	Extra Traffic cannot be supported	6.1, EN 300 417-3-1 [7] A.1	m	
7	The Wait-To-Restore (WTR) time is provisionable	6.1, EN 300 417-3-1 [7] A.1	c1302	
8	The Hold-off (HO) time is provisionable in steps of the order of 100 ms	6.1, EN 300 417-3-1 [7] A.1	m	

c1301: IF (D.4/7 OR D.4/8 OR D.4/9 OR D.4/10)
THEN m ELSE n/a -- SNC/N and/or SNC/S protection supported

c1302: IF (D.4/5 OR D.4/7 OR D.4/9)
THEN m ELSE n/a -- revertive SNC protection scheme supported

c1303: IF (D.4/6 OR D.4/8 OR D.4/10)
THEN m ELSE n/a -- non-revertive SNC protection scheme supported

Table D.14: Protection architecture characteristic parameters

Item	Protection architecture characteristic parameters	Reference	Status	Support	Values	
					Allowed	Supported
1	Wait-To-Restore (WTR) time: X value	6.1, EN 300 417-3-1 [7] A.1	c1401		$05 \leq X \leq 12$ minutes	
2	Hold-off (HO) time: Z value	6.1, EN 300 417-3-1 [7] A.1	m		$0 \leq Z \leq 10$ s	
3	Switching time (Y) is less than or equal to 50 ms	6.1, EN 300 417-3-1 [7] A.1	m		___	___

c1401: IF (D.4/5 OR D.4/7 OR D.4/9)
THEN m ELSE n/a -- revertive SNC protection scheme supported

Table D.15: SNC protection dynamic configuration

Item	SNC protection dynamic configuration	Reference	Status	Support
1	It is possible to add/remove connections to/from a broadcast connection without disturbing the CI passing the connection unless any protection switching action is activated/required	6.1	m	
2	It is possible to add/remove the protection status to the configuration of a connection without disturbing the CI passing the connection unless any protection switching action is activated/required	6.1	m	
3	It is possible to change between the operation type of a connection without disturbing the CI passing the connection unless any protection switching action is activated/required	6.1	c1501	
4	It is possible to change the WTR time of a connection without disturbing the CI passing the connection unless any protection switching action is activated/required	6.1	c1502	
5	It is possible to change the Hold-off time of a connection without disturbing the CI passing the connection unless any protection switching action is activated/required.	6.1	m	
6	The operation type can be changed via S2_C_MI_OPERtype	6.1	c1501	

c1501: IF (D.4/5 OR D.4/7 OR D.4/9) AND (D.4/6 OR D.4/8 OR D.4/10) THEN m ELSE n/a -- at least one revertive and one non-revertive SNC protection scheme supported

c1502: IF D.15/1 THEN m ELSE n/a -- Wait-To-Restore (WTR) time supported

D.4.2.2 VC-2 Layer Trail Termination Functions: S2_TT_So, S2_TT_Sk, S2m_TT_Sk, S2s_TT_So and S2s_TT_Sk

Prerequisite: D.1/2 OR D.1/3 OR D.1/8 OR D.1/9 OR D.1/10 -- at least one VC-3 layer Trail Termination function present

D.4.2.2.1 In service error monitoring process

Table D.16: In service error monitoring: principles

Item	In service error monitoring: principles	Reference	Status	Support
1	An Error Detection Code (EDC) is part of the characteristic information for in service monitoring purposes.	EN 300 417-1-1 [6] subclause 7.3	m	
2	In service error monitoring parameter definition is block-based.	ITU-T Rec.G.707 [14] subclause 9.2.2.4 note	m	
3	The block length is 428 bytes (the entire VC-2).	ITU-T Rec.G.707 [14] subclause 9.2.2.4	m	
4	The error monitoring is performed using Bit Interleaved Parity 2 (BIP-2).	6.2.1,6.6.2 , ITU-T Rec.G.707 [14] subclause 9.2.2.4 note	m	
5	The BIP-2 is calculated using even parity in such a manner that the bit in position x provides even parity over the x-bits of all the 2-bits sequences within the specified block.	ITU-T Rec.G.707 [14] subclause 9.2.2.4 note	m	

Comments: The BIP-n is interpreted as checking 'n' separate interleaved parity check blocks. If any of the 'n' parity check fails (Error Detection Code Violation), the block is assumed to be in error.

Table D.17: Error Detection Code location

Item	Error Detection Code location	Reference	Status	Support
	VC-2 Layer Error Detection Code (EDC) is located in byte V5 bits 1-2 of the VC-2 overhead.	6, figure 108	m	

Table D.18: Error Detection Code processing: source direction

Prerequisite: D.1/2 OR D.1/9 -- S2_TT_So and/or S2s_TT_So present

Item	Error Detection Code processing: source direction	Reference	Status	Support
1	The BIP-2 is calculated over all bits of the entire previous VC-2.	6.2.1,6.6.2	m	
2	BIP-2 code is inserted in byte V5 bits 1-2 of the current VC-2.	6.2.1,6.6.2	m	

Table D.19: Error Detection Code processing: sink direction

Prerequisite: D.1/3 OR D.1/8 OR D.1/10 -- S2_TT_Sk, S2m_TT_Sk, and/or S2s_TT_Sk present

Item	Error Detection Code processing: sink direction	Reference	Status	Support
1	The incoming error monitoring byte V5 is recovered from the VC-2 overhead.	6.2.2,6.6.1, 6.6.3	m	
2	The BIP-2 is calculated over all bits of the entire previous VC-2.	6.2.2,6.6.1, 6.6.3	m	
3	Recovered byte V5 bits 1-2 of byte V5 are compared with the calculated BIP-2.	6.2.2,6.6.1, 6.6.3	m	
4	A difference between the computed and recovered bits 1-2 of byte V5 values is taken as evidence of one or more errors (nN_B) in the computation block.	6.2.2,6.6.1, 6.6.3	m	

D.4.2.2.2 Remote indicator monitoring process

D.4.2.2.2.1 VC-2 Remote Defect Indication (VC-2 RDI)

Table D.20: Remote Defect Indication location

Item	Remote Defect Indication location	Reference	Status	Support
1	The VC-2 RDI is located in bit 8 of byte V5 of the VC-2 overhead.	6.2.2, 6.6.1, 6.6.3	m	

Table D.21: Remote Defect Indication processing: source direction

Prerequisite: (D.1/2 AND D.1/3) OR
(D.1/9 AND D.1/10) -- bidirectional S2 layer and/or both Supervisory- unequipped Trail Termination functions

Item	Remote Defect Indication processing: source direction	Reference	Status	Support
1	VC-2 RDI is set upon activation of S2_RI_RDI determined by the associated S2_TT_Sk.	6.2.1	c2101	
2	VC-2 RDI is cleared upon deactivation of S2_RI_RDI determined by the associated S2_TT_Sk.	6.2.1	c2101	
3	VC-2 RDI is set upon activation of S2s_RI_RDI determined by the associated S2s_TT_Sk.	6.6.2	c2102	
4	VC-2 RDI is cleared upon deactivation of S2s_RI_RDI determined by the associated S2s_TT_Sk.	6.6.2	c2102	
5	VC-2 RDI signal is coded as a '1' bit value.	6.2.1, 6.6.2	m	
6	The '0' bit value is inserted if no S2_RI_RDI signal is active.	6.2.1, 6.6.2	m	

c2101: IF (D.1/2 AND D.1/3) THEN m ELSE n/a -- bidirectional S2 layer supported
c2102: IF (D.1/9 AND D.1/10) THEN m ELSE n/a -- Supervisory-unequipped Trail Termination functions supported

Table D.22: Remote Defect Indication processing: sink direction

Prerequisite: D.1/3 OR D.1/8 OR D.1/10 -- S2_TT_Sk and/or S2m_TT_Sk and/or S2s_TT_Sk present

Item	Remote Defect Indication processing: sink direction	Reference	Status	Support
1	The VC-2 layer Trail Termination Sink functions (S2_TT_Sk, S2m_TT_Sk, S2s_TT_Sk) extract and monitor bit 8 of V5 byte in order to detect the '1' bit code as evidence of VC-2 RDI condition.	6.2.2, 6.6.1, 6.6.3	m	

D.4.2.2.2.2 VC-2 Remote Error Indication (S2 REI)

Table D.23: Remote Error Indication: principles

Item	Remote Error Indication: principles	Reference	Status	Support
1	The REI signal indicates if Errored Block (EB) were detected in the trail signal at the far-end trail termination	ITU-T Rec.G.707 [14] subclause 9.3.1.4	m	
2	The block length is 3 424 bits (one VC-2). The Error Detection Code (EDC) is BIP-2.	ITU-T Rec.G.707 [14] subclause 9.3.1.4	m	

Table D.24: Remote Error Indication location

Item	Remote Error Indication location	Reference	Status	Support
1	The VC-2 overhead REI is located in bit 3 of V5 byte of the VC-2 overhead.	ITU-T Rec.G.707 [14] subclause 9.3.1.4	m	

Table D.25: Remote Error Indication processing: source direction

Prerequisite: (D.1/2 AND D.1/3) OR
(D.1/9 AND D.1/10) -- bidirectional S2 layer and/or both Supervisory- unequipped Trail Termination functions

Item	Remote Error Indication processing: source direction	Reference	Status	Support
1	The S2_TT_So sets REI to the equivalent binary value of the number of EDCV detected by the monitoring process following the coding given in table 94 of subclause 6.2.1 in EN 300 417-4-1 [8].	6.2.1, table 94	c2501	
2	The S2s_TT_So sets REI to the equivalent binary value of the number of EDCV detected by the monitoring process following the coding given in table 102 of subclause 6.4.2 in EN 300 417-4-1 [8].	6.6.2, table 102	c2502	

c2501: IF (D.1/2 AND D.1/3)
THEN m ELSE n/a -- bidirectional S2 layer supported
c2502: IF (D.1/9 AND D.1/10)
THEN m ELSE n/a -- Supervisory-unequipped Trail Termination functions supported

Table D.26: Remote Error Indication processing: sink direction

Prerequisite: D.1/3 OR D.1/8 OR D.1/10 -- S2_TT_Sk and/or S2m_TT_Sk and/or S2s_TT_Sk present

Item	Remote Error Indication processing: sink direction	Reference	Status	Support
1	The VC-2 layer Trail Termination Sink functions (S2_TT_Sk, S2m_TT_Sk, S2s_TT_Sk) extract the VC-2 REI from the incoming VC-2 overhead.	6.2.2, 6.6.1, 6.6.3	m	
2	The VC-2 layer Trail Termination Sink functions (S2_TT_Sk, S2m_TT_Sk, S2s_TT_Sk) interpret the VC-2 REI as given in table 6 of subclause 4.2.2 in EN 300 417-4-1 [8].	6.2.2, 6.6.1, 6.6.3, table 6	m	

D.4.2.2.3 Trail Trace Identifier

Prerequisite: D.1/2 OR D.1/3 OR D.1/8 OR D.1/9 OR D.1/10 -- at least one VC-2 layer Trail Termination function present

Table D.27: Trail Trace Identifier: principles

Item	Trail Trace Identifier: principles	Reference	Status	Support
1	A Trail Trace Identifier (TTI) is inserted by the termination source containing the local Access Point Identifier (APId) and TTI header (TxTI).	6.2.1, 4.4.2, EN 300 417-1-1 [6] subclause 7.1	c2701	
2	The content of the accepted TTI (AcTI) is compared by the trail termination sink function with the provisioned "expected TTI" (ExTI), identifying the expected remote AP.	6.2.2, 4.4.1, 4.4.3, EN 300 417-1-1 [6] subclause 7.1, EN 300 417-1-1 [6] subclause 8.2.1.3	c2702	

c2701: IF (D.1/2 OR D.1/9) THEN m ELSE n/a -- S2_TT_So and/or S2s_TT_So present
c2702: IF (D.1/3 OR D.1/8 OR D.1/10) THEN m ELSE n/a -- S2_TT_Sk and/or S2m_TT_Sk and/or S2s_TT_Sk present

Table D.28: Trail Trace Identifier byte location

Item	Trail Trace Identifier byte location	Reference	Status	Support
1	The VC-2 Layer Trail Trace Identifier (TTI) is located in byte J2 of the VC-2 overhead.	6.2.1	m	

Table D.29: Trail Trace Identifier byte structure

Item	Trail Trace Identifier byte structure	Reference	Status	Support
1	The VC-2 TTI is a 16 byte string containing the 15 byte APId and a 1 byte header. The MSB of the header is a "1", the remaining 7 bits contain the CRC-7 value of the VC-2 TTI. The MSB of the 15 APId bytes is "0".	EN 300 417-1-1 [6] subclause 7.1	m	
2	The CRC-7 word is the remainder after multiplication by x^7 and then division (modulo 2) by the generator polynomial $x^7 + x^3 + 1$, of the polynomial representation of the VC-2 TTI with the CRC bits set to binary zeroes.	EN 300 417-1-1 [6] subclause 7.1	m	
3	The 16 byte VC-2 TxTI, 16 byte VC-2 ExTI and 16 byte VC-2 AcTI are transferred via the Management Point to and from the trail termination function.	EN 300 417-1-1 [6] subclause 8.2.1.3	m	

Table D.30: Trail Trace identification: source direction

Prerequisite: D.1/2 OR D.1/9 -- at least one VC-2 layer Trail Termination source function present

Item	Trail Trace identification: source direction	Reference	Status	Support
1	The 16 byte VC-2 TTI is transmitted continuously.	EN 300 417-1-1 [6] subclause 7.1	m	

Table D.31: Trail Trace identification: sink direction

Prerequisite: D.1/3 OR D.1/8 OR D.1/10 -- at least one VC-2 layer Trail Termination sink function present

Item	Trail Trace identification: sink direction	Reference	Status	Support
1	The VC-2 Layer Trail Termination Sink functions (S2_TT_Sk, S2s_TT_Sk, S2m_TT_Sk) support mode 1.	EN 300 417-1-1 [6] subclause 7.1	m	
2	The VC-2 Layer Trail Termination Sink functions (S2_TT_Sk, S2s_TT_Sk, S2m_TT_Sk) support mode 2.	EN 300 417-1-1 [6] subclause 7.1	m	
3	The VC-2 Layer Trail Termination Sink functions (S2_TT_Sk, S2s_TT_Sk, S2m_TT_Sk) recover the 16 byte multiframe carried in byte J2 and assume it as Received Trail Trace Identifier (RxTI). The RxTI is made available as AcTI for network management purposes.	6.2.2, 6.4.1, 6.4.3	m	
4	The expected TTI mode is provisionable via S32_TT_Sk_MI_ExTImode.	6.2.2, 6.4.1, 6.4.3	m	

D.4.2.2.4 Supervisory Unequipped indication

Table D.32: Supervisory Unequipped indication

Prerequisite: D.1/9 -- S2s_TT_So function present

Item	Supervisory Unequipped indication	Reference	Status	Support
1	The S2s_TT_So function inserts code "0000 0000" (unequipped tandem connection) in byte N2, as defined in EN 300 417-1-1 [6] subclause 7.2.	6.4.2, EN 300 417-1-1 [6] subclause 7.2	m	

D.4.2.3 Activation/deactivation of VC-2 Layer payload Adaptation Functions (S2/Avp_A and S2/TSS4_A)

Table D.33: Activation/deactivation of VC-2 Layer payload Adaptation Functions

Prerequisite: D.2/1 OR D.2/2 -- more than one VC-2 Layer payload Adaptation function present.

Item	Activation/deactivation of VC-2 Layer payload Adaptation Functions	Reference	Status	Support
1	Only one of the supported adaptation source functions, as taken from the set composed of S2/Avp_A_So and S2/TSS4_A_So, can access the VC-2 access point at a time. Access to the access point by other adaptation source functions is denied.	6, 6.3.1, 6.3.3	c3301	
2	Each of the supported VC-2 Layer payload adaptation source functions accesses the VC-2 access point when it is activated (MI_Active is true). Otherwise, it does not access the access point.	6, 6.3.1, 6.3.3	c3301	
3	The supported adaptation sink functions, as taken from the set composed of S2/Avp_A_Sk and S2/TSS4_A_Sk, can be activated/deactivated.	6, 6.3.2, 6.3.4	c3302	
4	Each of the supported VC-2 Layer payload adaptation sink functions performs its operation specified above when it is activated (MI_Active is true). Otherwise, it does not report its status via the management point.	6, 6.3.2, 6.3.4	c3302	

c3301: IF D.2/1 T5HEN m ELSE x -- more than one VC-2 Layer payload adaptation source function supported

c3302: IF D.2/2 THEN o ELSE x -- more than one VC-2 Layer payload adaptation sink function supported

D.4.2.4 VC-2 Layer to ATM Layer Compound Adaptation Functions: S2/Avp_A_So and S2/Avp_A_Sk

The specification of this function is under study.

D.4.2.5 VC-2 Layer to LC Layer Adaptation Function: S2/LC_A_So

The specification of this function is addressed EN 300 417-6-1 [9].

D.4.2.6 VC-2 Layer to TSS4 Layer Adaptation Functions: S2/TSS4_A_So and S2/TSS4_A_Sk

Prerequisite: D.1/6 OR D.1/7 -- S2/TSS4_A_So and/or S2/TSS4_A_Sk present

Table D.34: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The S2/TSS4_A_So function maps a VC-2 synchronous Test Signal Structure TSS4 PRBS stream into a VC-2 payload and adds the bits V5[5-7] bytes.	6.3.1, ITU-T Rec.O.181 [17]	c3401	
2	The S2/TSS4_A_So function creates a 2^{15} -1 PRBS with timing derived from the S2_TI_Ck and maps it without justification bits into the whole of the synchronous container-2 having a capacity of 424 bytes.	6.3.1	c3401	
3	The function S2/TSS4_A_Sk recovers a TSS4 2^{15} -1 PRBS test sequence from the synchronous container-2 (having a frequency accuracy within ±4,6 ppm) and monitors the reception of the correct payload signal type and the presence of test sequence bit errors (TSE) in the PRBS sequence.	6.3.2, ITU-T Rec.O.181 [17]	c3402	

c3401: IF D.1/6 THEN m ELSE n/a -- S2/TSS4_A_So present
c3402: IF D.1/7 THEN m ELSE n/a -- S2/TSS4_A_Sk present

D.4.2.6.1 Payload typeSignal Label processing

Table D.35: Payload typeSignal Label generation

Prerequisite: D.1/6 -- S2/TSS4_A_So present

Item	Payload typeSignal Label generation	Reference	Status	Support
1	The function S2/TSS4_A_So inserts code "110" (TSS4 in the Container-2) into bits 5-7 of byte V5 of the VC-2 overhead.	6.3.1, figure 49, ETS 300 147 [1], ITU-T Rec.G.707 [14]	m	

Table D.36: Payload typeSignal Label recovery

Prerequisite: D.1/7 -- S2/TSS4_A_Sk present

Item	Payload typeSignal Label recovery	Reference	Status	Support
1	The S2/TSS4_A_Sk function compares the content of the recovered bits 5 to 7 of byte V5 (RxSL) with the expected value code "110" (TSS4 into the Container-2).	6.3.2	m	
2	The application and acceptance and mismatch process are as specified in EN 300 417-1-1 [6], subclauses 7.2 and 8.2.1.2.	6.3.2, EN 300 417-1-1 [6] subclause 7.2, subclause 8.2.1.2	m	

D.4.3 VC-2 Layer Linear Trail Protection Transmission Tables

Prerequisite: D.1/16 -- VC-2 Layer Linear Trail Protection supported

Table D.37: Protection operation

Prerequisite: D.1/16 -- VC-2 Layer Linear Trail Protection supported

Item	Protection operation	Reference	Status	Support
1	The APS channel is a 4 bits channel carried into bits 1-4 of byte K4.	6.5.1.1, EN 300 417-3-1 [7] A.1	c3701	
2	The signal switching procedure is started under Signal Fail (SF = SSF, originated as AI_TSF) or Signal Degrade (SD = SSD originated as AI_TSD) conditions.	6.5.1.1-2, EN 300 417-3-1 [7] A.1	m	
3	For unidirectional switching and revertive operation the available external commands are LO, FSw-#1, MSw-#1, CLR.	6.5.1.1, EN 300 417-3-1 [7] A.1	c3702	
4	For unidirectional switching and non-revertive operation the available external commands are LO or FSw, FSw-#i, MSw-#i, CLR (i = 0, 1).	6.5.1.1, EN 300 417-3-1 [7] A.1	c3703	
5	For bidirectional switching and revertive operation the available external commands are LO, FSw-#1, MSw-#1, CLR.	6.5.1.2, EN 300 417-3-1 [7] A.1	c3704	
6	For bidirectional switching and non-revertive operation the available external commands are LO or FSw, FSw-#i, MSw-#i, CLR (i = 0, 1).	6.5.1.2, EN 300 417-3-1 [7] A.1	c3705	
7	The Wait-To-Restore (WTR) time is provisionable	6.5.1.1-2, EN 300 417-3-1 [7] A.1	c3706	
8	The Hold-off (HO) time is provisionable in steps of the order of 100 ms	6.5.1.1-2, EN 300 417-3-1 [7] A.1	m	

c3701: IF (D.4/3 OR D.4/4) THEN m ELSE o -- Linear Trail Protection bidirectional switching supported
c3702: IF D.4/1 THEN m ELSE n/a -- Linear Trail Protection unidirectional switching and revertive operation supported
c3703: IF D.4/2 THEN m ELSE n/a -- Linear Trail Protection unidirectional switching and non-revertive operation supported
c3704: IF D.4/3 THEN m ELSE n/a -- Linear Trail Protection bidirectional switching and revertive operation supported
c3705: IF D.4/4 THEN m ELSE n/a -- Linear Trail Protection bidirectional switching and non-revertive operation supported
c3706: IF (D.4/1 OR D.4/3) THEN m ELSE n/a -- Linear Trail Protection revertive operation supported

Comments: The Linear Protection Switching Operation is generically described in annex A of EN 300 417-3-1 [7].

Table D.38: Protection architecture characteristic parameters

Prerequisite: D.1/16 -- VC-2 Layer Linear Trail Protection supported

Item	Protection architecture characteristic parameters	Reference	Status	Support	Values	
					Allowed	Supported
1	Wait-To-Restore (WTR) time: X value	6.5.1.1-2, EN 300 417-3-1 [7] A.1	c3801		5 ≤ X ≤ 12 minutes	
2	Hold-off (HO) time: Z value	6.5.1.1-2, EN 300 417-3-1 [7] A.1	m		0 ≤ Z ≤ 10 s	
3	Switching time (Y) is less than or equal to 50 ms	6.1, EN 300 417-3-1 [7] A.1	m		___	___

c3801: IF (D.4/1 OR D.4/3) THEN m ELSE n/a -- Linear Trail Protection revertive operation supported

D.4.3.1 VC-2 Layer Linear Trail Protection Connection Function: S2P_C

Table D.39: Connectivity functionalities: generalities

Item	Connectivity functionalities: generalities	Reference	Status	Support
1	The VC-2 Protection Connection function performs the VC-2 linear trail protection process for 1+1 protection architectures.	6.5.1.1, 6.5.1.2	m	
2	The VC-2 Protection Connection function performs the bridge and selector functionality.	6.5.1.1, 6.5.1.2	m	
3	It is possible to change between operation types without disturbing the CI passing the connection unless any protection switching action is activated/required.	6.5.1.1, 6.5.1.2	c3901	
4	It is possible to change the WTR time without disturbing the CI passing the connection any protection switching action is activated/required.	6.5.1.1, 6.5.1.2	c3902	
5	It is possible to change the Hold-off time of a connection without disturbing the CI passing the connection any protection switching action is activated/required.	6.5.1.1, 6.5.1.2	c3903	
6	The protection type can be changed via S2_C_MI_PROTtype	6.5.1.2	c3904	
7	The operation type can be changed via S2_C_MI_OPERtype	6.5.1.1, 6.5.1.2	c3901	

c3901: IF (D.4/1 OR D.4/3) AND (D.4/2 OR D.4/4)
THEN m ELSE n/a -- at least one revertive and one non-revertive Trail protection scheme supported

c3902: IF D.107/1 THEN m ELSE n/a -- Wait-To-Restore (WTR) time supported

c3903: IF D.107/2 THEN m ELSE n/a -- Hold-off (HO) time supported

c3904: IF (D.4/1 OR D.4/2) AND (D.4/3 OR D.4/4)
THEN m ELSE n/a -- both unidirectional and bidirectional Trail protection scheme supported

Table D.40: Connectivity functionalities: source direction

Item	Connectivity functionalities: source direction	Reference	Status	Support
1	The working output is connected to the associated normal input. The protection output is also connected to the normal input.	6.5.1.1, 6.5.1.2	m	
2	The working outputs are connected to the associated normal inputs for 1+1 protection.	6.5.1.1, 6.5.1.2	m	

Table D.41: Connectivity functionalities: sink direction

Item	Connectivity functionalities: sink direction	Reference	Status	Support
1	The signal output at the normal reference point can be the signal received via either the associated working path or the protection path.	6.5.1.1, 6.5.1.2	m	

D.4.3.2 VC-2 Layer Linear Trail Protection Trail Termination Functions: S2P_TT_So and S2P_TT_Sk

Table D.42: Trail termination process

Item	Trail termination process	Reference	Status	Support
1	The S2_AI at the output of the S2P_TT_So is identical to the S2P_CI at its input.	6.5.2.1	c4201	
2	The S2P_TT_Sk function reports the state of the protected VC-2 trail.	4.5.2.2	c4202	
3	In case all connections are unavailable the S2P_TT_Sk reports the signal fail condition of the protected trail.	4.5.2.2	c4202	

c4201: IF D.5/2 THEN m ELSE n/a -- S2P_TT_So function supported
c4202: IF D.5/3 THEN m ELSE n/a -- S2P_TT_Sk function supported

D.4.3.3 VC-2 Layer Linear Trail Protection Adaptation Functions:S2/S2P_A_So and S2/S2P_A_Sk

D.4.3.3.1 VC-2 Layer to VC-2 Protection Layer multiplexing and demultiplexing processes

Table D.43: Multiplexing

Prerequisite: D.5/4 -- S2/S2P_A_So present

Item	Multiplexing	Reference	Status	Support
1	The S2/S2P_A_So inserts the S2P_CI_D signal into the S2P_AI_D signal	6.5.3.1	m	
2	The S2/S2P_A_So inserts the S2 APS signal into S2_AI	6.5.3.1	c4301	

c4301: IF (D.4/3 OR D.4/4) THEN m ELSE o -- Linear Trail Protection bidirectional switching supported

Comment: S2 APS signal insertion is required only for the protection path.

Table D.44: Demultiplexing

Prerequisite: D.5/5 -- S2/S2P_A_Sk present

Item	Demultiplexing	Reference	Status	Support
1	The S2/S2P_A_Sk extracts the S2P_CI_D signal from the S2_AI_D signal.	6.5.3.2	m	
2	The S2/S2P_A_Sk extracts the S2 APS signal from the S2_AI.	6.5.3.2	m	

Comment: The extraction and persistency processing of the S2 APS signal is required only for the protection path.

D.4.4 VC-2 Layer Linear Trail Protection and Sub-Network Connection (SNC) Protection processes

D.4.4.1 APS externally initiated commands

Prerequisite: D.1/16 OR D.1/17 -- VC-2 Layer Linear Trail Protection and/or SNC Protection supported

Table D.45: Issuing of External Switching Commands

Item	Issuing of External Switching Commands	Reference	Status	Support
1	The external commands are received from the EMF.	ETS 300 746 [10] subclauses 6.1, 6.2	m	

Table D.46: Transmission of External Switching Requests

Prerequisite: D.114/1 -- External Switching Command issuing is supported

Item	Transmission of External Switching Requests	Reference	Status	Support
1	The external requests are issued via the APS bytes.	ETS 300 746 [10] subclause 6.1	n/a	
2	The external requests are issued via the EMF.	ETS 300 746 [10] subclause 6.1	m	

Table D.47: External Switching Commands

Prerequisite: D.114/1 -- External Switching Command issuing is supported

Item	External Switching Commands	Reference	Status	Support
1	The external command Clear (CLR) conforms to the definition given in the whole point 1) paragraph A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
2	The external command Lockout of Protection (LO) conforms to the definition given in the whole point 2) clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
3	The external command Forced Switch #i (FSw-#i) conforms to the definition given in the whole point 3) of clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
4	The external command Manual Switch #i (MSw-#i) conforms to the definition given in the whole point 4) clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
5	The external command Exercise #i (EXER #i) conforms to the definition given in the whole point 5) clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] 2	m	
6	The descending order of priority for external switching commands is: CLR, LO, FSw-#i, MSw-#i, EXER #i.	EN 300 417-3-1 [7] A.2	m	

D.4.4.1.1 APS automatically initiated commands

Table D.48: Automatic Generation of Requests

Item	Automatic Generation of Requests	Reference	Status	Support
1	The NE initiates the following automatic requests: Signal Failure (SF), Signal Degrade (SD).	ETS 300 746 [10] subclauses 6.1, 6.2	m	
2	The NE initiates the automatic request Wait To Restore (WTR).	ETS 300 746 [10] subclauses 6.1, 6.2	c4801	

c4801: IF (D.4/1 OR D.4/3 OR D.4/5 OR D.4/7 OR D.4/9) THEN m ELSE n/a -- revertive operation supported

Table D.49: Automatically Generated Requests

Item	Automatically Generated Requests	Reference	Status	Support
1	In the Wait to restore (WTR) state the operation is such that in the revertive mode of operation, the normal signal will be restored when the working trail has recovered from the fault.	EN 300 417-3-1 [7] A.4	c4901	
2	An SF or SD condition will override the WTR.	EN 300 417-3-1 [7] A.4	c4901	
3	After the WTR period is completed, a No Request state will be entered.	EN 300 417-3-1 [7] A.4	c4901	
4	In the Reverse Request state the operation is such that for the case of bidirectional switching, a reverse request is returned for exerciser and for all other requests of higher priority.	EN 300 417-3-1 [7] A.4	c4902	
5	In unidirectional switching, Reverse Request is never indicated.	EN 300 417-3-1 [7] A.4	c49023	
6	In the Do not Revert state the operation is such that in the non-revertive mode of operation, assuming the normal signal is on protection when the working trail is repaired or a switch command is released, the tail end maintains the selection and issues Do not Revert for normal signal 1.	EN 300 417-3-1 [7] A.4	c49034	
7	For the case of bidirectional switching, the head end also maintains the selection and continues indicating reverse request.	EN 300 417-3-1 [7] A.4	c4905	
8	The Do not Revert is removed when pre-empted by a defect condition or an external request.	EN 300 417-3-1 [7] A.4	c4904	
9	In the No Request state none of the trail signal conditions is active, none of the external commands is active, and none of the states described above is active.	EN 300 417-3-1 [7] A.4	m	

NOTE: Currently no bidirectional APS signalling protocol is defined EN 300 417-3-1 Annex A for linear VC trail 1+1 SNC Protection schemes.

c4901: IF (D.4/1 OR D.4/3 OR D.4/5 OR D.4/7 OR D.4/9) THEN m ELSE n/a -- revertive operation supported
c4902: IF (D.4/3 OR D.4/4) THEN m ELSE n/a -- bidirectional operation supported
c4903: IF (D.4/1 OR D.4/2 OR D.4/5 OR D.4/6 OR D.4/7 OR D.4/8 OR D.4/9) THEN m ELSE n/a -- unidirectional operation supported
c4904: IF (D.4/2 OR D.4/4 OR D.4/6 OR D.4/8 OR D.4/10) THEN m ELSE n/a -- non-revertive operation supported
c4905: IF D.4/4 THEN m ELSE n/a -- non-revertive and bidirectional operation supported

D.4.4.1.2 APS generalities

Table D.50: Priority of request types

Item	Priority of request types	Reference	Status	Support
1	The priority of request types conforms to the priority order given in table A.2 (clause A.6) of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.6, table A.2	m	

D.4.4.1.3 APS switch performance

Table D.51: Switch completion time

Item	Switch completion time	Reference	Status	Support
1	The switch completion time is less than X ms (TBD).	EN 300 417-3-1 [7] A.8	m	

D.4.4.1.4 APS sub-processes

Table D.52: Signal request process

Item	Signal request processes	Reference	Status	Support
1	The SRSN is "0" (zero) for the protection trail and "1" for working trail #1.	EN 300 417-3-1 [7] A.9	m	
2	The SRT is generated based on the inputs SF, SD, SFpriority, SDpriority, as specified in the clause "Signal request (type & signal number) processes" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

Comments: The signal request process transfers the input SF and SD signals from a trail into a Signal Request Type (SRT) and Signal Request Signal Number (SRSN).

Table D.53: External request process

Item	External request processes	Reference	Status	Support
1	The ERSN is "0" (zero) if no normal signal is indicated, "i" ($1 \le i \le nmax$) for normal signal #i, and "nmax+1" for the extra traffic signal.	EN 300 417-3-1 [7] A.9	m	
2	The ERT/ERN is generated as specified in the clause "External request (type & signal number) processes" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

Comments: The external request process transfers the external commands (EXTCMD) into an External Request Type (ERT) and External Request Signal Number (ERSN).

Table D.54: Local request priority process

Item	Local request priority processes	Reference	Status	Support
1	The status of the protection and working input signals (SRT/SRSN #0 to SRT/SRSN #n), the external command (ERT/ERSN), and protection parameters OPERtype and EXTRAtraffic is evaluated by a three step priority logic as specified in the clause "Local request (type & signal number) priority processes" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

Comments: The local request priority process determines the highest priority local request.

Table D.55: Global request priority process

Item	Global request priority processes	Reference	Status	Support
1	The local request (LRT) and the remote request (RRT) are compared to decide which has priority, according to the descending order of priorities in table A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	c5501	
2	A received reverse request is not considered in the comparison.	EN 300 417-3-1 [7] A.9	c5501	
3	The Global Request Type (GRT) and Global Request Signal Number (GRSN) is determined as specified in the clause "Global request (type & signal number) priority processes" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

NOTE: Currently no bidirectional APS signalling protocol is defined EN 300 417-3-1 Annex A for linear VC trail 1+1 SNC Protection schemes.

c5501: IF (D.4/3 OR D.4/4 OR D.4/5)
THEN m ELSE x -- bidirectional switching supported

Comments: The global request priority process determines the Global Request Type (GRT) and Global Request Signal Number (GRSN).

Table D.56: Control of the selector

Item	Control of the selector	Reference	Status	Support
1	The control of the selector is performed as specified in the clause "Control of the selector" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

Comments: The control of the selector controls which of the normal signals is connected to/extracted from the protection trail.

D.4.4.1.5 APS status report

Table D.57: APS reporting process

Item	APS reporting process	Reference	Status	Support
1	The active external request are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	m	
2	The active local request are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	m	
3	The active remote request are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	n/ac5701	
4	The reason of denial of an external command are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	m	
5	The condition (SF,SD) of the working and protection trails are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	m	

c5701: IF6 (D.4/3 OR D.4/4 OR D.4/5)
THEN m ELSE o -- bidirectional switching supported

D.4.5 VC-2 Tandem Connection Sub-layer Transmission Tables

D.4.5.1 VC-2 Tandem Connection Sub-layer Trail Termination Functions: S2D_TT_So, S2D_TT_Sk and S2Dm_TT_Sk

Prerequisite: D.1/11 OR D.1/12 OR D.1/15 -- S2D_TT_So, S2D_TT_Sk and/or S2Dm_TT_Sk present

Table D.58: VC-2 Tandem Connection Termination process

Item	VC-2 Tandem Connection Termination process	Reference	Status	Support
1	The S2D_TT_So compensates VC-2 BIP-2 (in bits 1-2 of byte V5 of the VC-2 overhead) and generates byte N2 of the VC-2 overhead according to a 76 frame multiframe.	6.6.1	c5801	
2	The S2D_TT_So inserts all-0s in the six reserved bits in frames 73 to 76 of the a 76 frame multiframe (38 ms).	6.6.1	c5801	
3	The S2D_TT_So inserts the value '1' in bit N2[3].	6.6.1	c5801	
4	The S2D_TT_Sk processes bits 1-2 of byte V5 of the VC-2 overhead, and recovers byte N2 of the VC-2 overhead according to a 76 frame multiframe (38 ms).	6.6.2	c5802	
5	The S2D_TT_Sk terminates byte N2 of the VC-2 overhead by inserting an all-ZERO pattern, after it has recovered the content of this byte.	6.6.2	c5802	
6	The S2Dm_TT_Sk recovers byte N2 of the VC-2 overhead according to a 76 frame multiframe (38 ms).	6.6.5	c5803	

c5801: IF D.1/11 THEN m ELSE n/a -- S2D_TT_So present
c5802: IF D.1/12 THEN m ELSE n/a -- S2D_TT_Sk present
c5803: IF D.1/15 THEN m ELSE n/a -- S2Dm_TT_Sk present

D.4.5.1.1 VC-2 in service error monitoring process

Table D.59: VC-2 BIP-2 compensation: source direction

Prerequisite: D.1/11 -- S2D_TT_So present

Item	VC-2 BIP-2 compensation: source direction	Reference	Status	Support
1	The S2D_TT_So function compensates the VC-2 BIP-2 (in bits 1-2 of byte V5) according the logical equation given in subclause 6.6.1 of EN 300 417-4-1 [8].	6.6.1	m	

Table D.60: VC BIP-2 process: sink direction

Prerequisite: D.1/12 OR D.1/15 -- S2D_TT_Sk and/or S2Dm_TT_Sk present

Item	TC BIP-2 process: sink direction	Reference	Status	Support
1	The VC-2 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) compute even BIP-2 for each bit pair of every byte of the preceding VC-2 including V5 and N2 and compare it with bit 1 and 2 of V5 recovered from the current frame.	6.6.2, 6.6.5, figure 131	m	
2	A difference between the computed and recovered VC-2 BIP-2 values (in byte V5) is taken as evidence of an errored block (nON_B) present in the outgoing VC.	6.6.2, 6.6.5, figure 131	m	

Table D.61: VC-2 BIP-2 compensation: sink direction

Prerequisite: D.1/12 -- S2D_TT_Sk present

Item	VC-2 BIP-2 compensation: sink direction	Reference	Status	Support
1	The S2D_TT_Sk function compensates the VC-2 BIP-2 (in bits 1-2 of byte V5) according the logical equation given in subclause 6.6.1 of EN 300 417-4-1 [8].	6.6.1, 6.6.2	m	

D.4.5.1.2 Tandem Connection in service error monitoring process

NOTE: This process has the same objective of the Incoming Error Count (IEC) process in the S4 and S3 layers

Table D.62: TC BIP-2 process: source direction

Prerequisite: D.1/11 -- S2D_TT_So present

Item	TC BIP-2 process: source direction	Reference	Status	Support
1	The S2D_TT_So function calculates a BIP-2 over the VC-2, and inserts this value in TC BIP-2 (bits 1-2 of byte N2) in the next frame.	6.6.1, figure 128	m	

Table D.63: TC BIP-2 process: sink direction

Prerequisite: D.1/12 OR D.1/15 -- S2D_TT_Sk and/or S2Dm_TT_Sk present

Item	TC BIP-2 process: sink direction	Reference	Status	Support
1	The VC-2 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) compute even BIP-2 for each bit pair of every byte of the preceding VC-2 including V5 and N2 and compare it with bit 1 and 2 of N2 recovered from the current frame.	6.6.2, 6.6.5, figure 131	m	
2	A difference between the computed and recovered VC-2 BIP-2 values (in byte N2) is taken as evidence of an errored block (nN_B) generated within the Tandem Connection domain.	6.6.2, 6.6.5, figure 131	m	

D.4.5.1.3 Tandem Connection Multiframe Alignment process

Table D.64: Multiframe Alignment process: source direction

Prerequisite: D.1/11 -- S2D_TT_So present

Item	Multiframe Alignment process: source direction	Reference	Status	Support
1	The function inserts the Frame Alignment Signal (FAS) "1111 1111 1111 1110" in FAS bits N2[7-8] in frames 1 to 8 of the multiframed N2[7-8] channel.	6.6.1	m	

Table D.65: Multiframe Alignment process: sink direction

Prerequisite: D.1/12 OR D.1/15 -- S2D_TT_Sk and/or S2Dm_TT_Sk present

Item	Multiframe Alignment process: sink direction	Reference	Status	Support
1	The VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) perform a multiframe alignment on bits 7 and 8 of byte N2.	6.6.2, 4.6.5	m	
2	The multiframe alignment is found by searching for the pattern "1111 1111 1111 1110" within the bits 7 and 8 of byte N2.	6.6.2, 4.6.5	m	
3	The multiframe alignment signal is continuously checked with the presumed multiframe start position for the alignment.	6.6.2, 4.6.5	m	

D.4.5.1.4 VC-2 Tandem Connection Remote indicator monitoring process

D.4.5.1.4.1 VC-2 Tandem Connection Remote Defect Indication (TC RDI)

Table D.66: Remote Defect Indication location

Prerequisite: (D.1/11 AND D.1/12) OR D.1/15 -- bidirectional S2D layer and/or S2Dm_TT_Sk present

Item	Remote Defect Indication location	Reference	Status	Support
1	The TC RDI is located in bit 8 of byte N2 in frame 73 of the 76 frame multiframe (38 ms). This location is expressed with the notation: N2[8][73].	6.6.1, 6.6.2, 4.6.5	m	

Comment: N2[x][y] refers to bit x (x = 7,8) of byte N2 in frame y (y = 1..76) of the 76 frame multiframe (38 ms).

Table D.67: Remote Defect Indication processing: source direction

Prerequisite: (D.1/11 AND D.1/12) -- bidirectional S2D layer present

Item	Remote Defect Indication processing: source direction	Reference	Status	Support
1	TC RDI code is set upon activation of S2D_RI_RDI determined by the associated S2D_TT_Sk.	6.6.1	m	
2	TC RDI is cleared upon deactivation of S2D_RI_RDI determined by the associated S2D_TT_Sk.	6.6.1	m	
3	TC RDI signal is coded as a '1' bit value.	6.6.1	m	
4	The '0' bit value is inserted if no S2D_RI_RDI signal is active.	6.6.1	m	

Table D.68: Remote Defect Indication processing: sink direction

Prerequisite: D.1/12 OR D.1/15 -- S2D_TT_Sk and/or S2Dm_TT_Sk present

Item	Remote Defect Indication processing: sink direction	Reference	Status	Support
1	The VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) extract and monitor bit location N2[8][73]. A "1" indicates a Remote Defect Indication state, while a "0" indicates the normal, working state.	6.6.2, 4.6.5	m	

Comment: N2[x][y] refers to bit x (x = 7,8) of byte N2 in frame y (y = 1..76) of the 76 frame multiframe (38 ms).

D.4.5.1.4.2 VC-2 Tandem Connection Remote Error Indication (TC REI)

Table D.69: Remote Error Indication: principles

Prerequisite: (D.1/11 AND D.1/12) OR D.1/15 -- bidirectional S2D layer and/or S2Dm_TT_Sk present

Item	Remote Error Indication: principles	Reference	Status	Support
1	The REI signal indicates if Errored Block (EB) were detected in the trail signal at the far-end trail termination	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	
2	The block length is 3 424 (one VC-2). The Error Detection Code (EDC) is BIP-2 in bits 1-2 of N2 byte.	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	

Table D.70: Remote Error Indication location

Prerequisite: (D.1/11 AND D.1/12) OR D.1/15 -- bidirectional S2D layer and/or S2Dm_TT_Sk present

Item	Remote Error Indication location	Reference	Status	Support
1	The TC REI is located in bit 5 of byte N2 of the VC-2 overhead.	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	

Table D.71: Remote Error Indication processing: source direction

Prerequisite: (D.1/11 AND D.1/12) -- bidirectional S2D layer present

Item	Remote Error Indication processing: source direction	Reference	Status	Support
1	The S2D_TT_So inserts the RI_REI value in the REI bit in the following frame.	6.6.1	m	

Table D.72: Remote Error Indication processing: sink direction

Prerequisite: D.1/12 OR D.1/15 -- S2D_TT_Sk and/or S2Dm_TT_Sk present

Item	Remote Error Indication processing: sink direction	Reference	Status	Support
1	The VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) extract and monitor bit location N2[5] to recover the TC REI value (nF_B).	6.6.2, 4.6.5	m	

D.4.5.1.5 VC-2 Tandem Connection Outgoing indicator monitoring process

D.4.5.1.5.1 VC-2 Tandem Connection Outgoing Defect Indication (TC ODI)

Table D.73: Outgoing Defect Indication location

Prerequisite: (D.1/11 AND D.1/12) OR D.1/15 -- bidirectional S2D layer and/or S2Dm_TT_Sk present

Item	Outgoing Defect Indication location	Reference	Status	Support
1	The TC ODI is located in bit 7 of byte N2 in frame 74 of the 76 frame multiframe (38 ms). This location is expressed with the notation: N2[7][74].	6.6.1, 6.6.2, 4.6.5	m	

Comment: N2[x][y] refers to bit x (x = 7,8) of byte N2 in frame y (y = 1..76) of the 76 frame multiframe (38 ms).

Table D.74: Outgoing Defect Indication processing: source direction

Prerequisite: (D.1/11 AND D.1/12) -- bidirectional S2D layer present

Item	Outgoing Defect Indication processing: source direction	Reference	Status	Support
1	TC ODI code is inserted after the ODI request generation in the S2D_TT_Sk.	6.6.1	m	
2	TC ODI is cleared at the first opportunity after the ODI request has cleared in the associated S2D_TT_Sk.	6.6.1	m	
3	TC ODI signal is coded as a '1' bit value.	6.6.1	m	
4	The '0' bit value is inserted if no S2D_RI_ODI signal is active.	6.6.1	m	

Table D.75: Outgoing Defect Indication processing: sink direction

Prerequisite: D.1/12 OR D.1/15 -- S2D_TT_Sk and/or S2Dm_TT_Sk present

Item	Outgoing Defect Indication processing: sink direction	Reference	Status	Support
1	The VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) extract and monitor bit location N2[7][74]. A "1" indicates a Outgoing Defect Indication state, while a "0" indicates the normal, working state.	6.6.2, 4.6.5	m	

Comment: N2[x][y] refers to bit x (x = 7,8) of byte N2 in frame y (y = 1..76) of the 76 frame multiframe (38 ms).

D.4.5.1.5.2 VC-2 Tandem Connection Outgoing Error Indication (TC OEI)

Table D.76: Outgoing Error Indication: principles

Prerequisite: (D.1/11 AND D.1/12) OR D.1/15 -- bidirectional S2D layer and/or S2Dm_TT_Sk present

Item	Outgoing Error Indication: principles	Reference	Status	Support
1	The REI signal indicates if Errored Block (EB) were detected in the trail signal at the far-end trail termination	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	
2	The block length is 3 424 (one VC-2). The Error Detection Code (EDC) is BIP-2 in bits 1-2 of V5 byte.	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	

Table D.77: Outgoing Error Indication location

Prerequisite: (D.1/11 AND D.1/12) OR D.1/15 -- bidirectional S2D layer and/or S2Dm_TT_Sk present

Item	Outgoing Error Indication location	Reference	Status	Support
1	The TC OEI is located in bit 6 of byte N2 of the VC-2 overhead.	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	

Table D.78: Outgoing Error Indication processing: source direction

Prerequisite: (D.1/11 AND D.1/12) -- bidirectional S2D layer present

Item	Outgoing Error Indication processing: source direction	Reference	Status	Support
1	The S2D_TT_So inserts the RI_OEI value in the OEI bit in the following frame.	6.6.1	m	

Table D.79: Outgoing Error Indication processing: sink direction

Prerequisite: D.1/12 OR D.1/15 -- S2D_TT_Sk and/or S2Dm_TT_Sk present

Item	Outgoing Error Indication processing: sink direction	Reference	Status	Support
1	The VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) extract and monitor bit location N2[5] to recover the TC OEI value (nOF_B).	6.6.2, 4.6.5	m	

D.4.5.1.6 Tandem Connection Trace Identifier

Table D.80: Tandem Connection Trace Identifier: principles

Item	Tandem Connection Trace Identifier: principles	Reference	Status	Support
1	A Tandem Connection Trace Identifier (TC TI) is inserted by the S2D_TT_So function containing the local Access Point Identifier (APId) and TI header (TxTI).	6.6.1, EN 300 417-1-1 [6] subclause 7.1	c8001	
2	The content of the accepted TI (AcTI) is compared by the S2D_TT_Sk function with the provisioned "expected TI" (ExTI), identifying the expected remote AP.	6.6.2, 4.6.5, EN 300 417-1-1 [6] subclause 7.1, EN 300 417-1-1 [6] subclause 8.2.1.3	c8002	

c8001: IF D.1/11 THEN m ELSE n/a -- S2D_TT_So present
c8002: IF (D.1/12 OR D.1/15) THEN m ELSE n/a -- S2D_TT_Sk and/or S2Dm_TT_Sk present

Table D.81: Tandem Connection Trace Identifier byte location

Item	Tandem Connection Trace Identifier byte location	Reference	Status	Support
1	The Tandem Connection Trace Identifier (TC TI) is located in bits N2[7-8] in frames 9 to 72.	6.6.1, 6.6.2, 4.6.5	m	

Table D.82: Tandem Connection Trace Identifier byte structure

Item	Tandem Connection Trace Identifier byte structure	Reference	Status	Support
1	The Tandem Connection Trace Identifier (TC TI) is a 16 byte string containing the 15 byte APId and a 1 byte header. The MSB of the header is a "1", the remaining 7 bits contain the CRC-7 value of the VC-2 TTI. The MSB of the 15 APId bytes is "0".	EN 300 417-1-1 [6] subclause 7.1	m	
2	The CRC-7 word is the remainder after multiplication by x^7 and then division (modulo 2) by the generator polynomial $x^7 + x^3 + 1$, of the polynomial representation of the VC-2 TTI with the CRC bits set to binary zeroes.	EN 300 417-1-1 [6] subclause 7.1	m	
3	The 16 byte VC-2 TxTI, 16 byte VC-2 ExTI and 16 byte VC-2 AcTI are transferred via the Management Point to and from the trail termination function.	EN 300 417-1-1 [6] subclause 8.2.1.3	m	

Table D.83: Tandem Connection Trace identification: source direction

Prerequisite: D.1/11 -- S2D_TT_So present

Item	Tandem Connection Trace identification: source direction	Reference	Status	Support
1	The function inserts the TC trace identifier, received via MI_TxTI, in the TC-TI bits N2[7-8] in frames 9 to 72 of the multiframed N2[7-8] channel.	6.6.1	m	

Table D.84: Tandem Connection Trace identification: sink direction

Prerequisite: D.1/12 OR D.1/15 -- S2D_TT_Sk and/or S2Dm_TT_Sk present

Item	Tandem Connection Trace identification: sink direction	Reference	Status	Support
1	The VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) support mode 1	EN 300 417-1-1 [6] subclause 7.1	m	
2	The VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) do not support mode 2	EN 300 417-1-1 [6] subclause 7.1	m	
3	The VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) recover the 16 byte multiframe carried in bits N2[7-8] in frames 9 to 72 and assume it as Received Trail Trace Identifier (RxTI). The RxTI is made available as AcTI for network management purposes.	6.6.2, 6.6.5	m	

D.4.5.1.7 Incoming AIS code process

Table D.85: Incoming AIS code process: source direction

Prerequisite: D.1/11 -- S2D_TT_So present

Item	Incoming AIS code process: source direction	Reference	Status	Support
1	If AI_SF is true bit N2[4] is set to the value "1", otherwise value "0" is inserted.	6.6.1	m	

D.4.5.2 VC-2 Tandem Connection to VC-2 Layer Adaptation Functions: S2D/S2_TT_So and S2D/S2_A_Sk

Table D.86: Adaptation process

Prerequisite: D.1/11 OR D.1/12 -- S2D/S2_A_So and/or S2D/S2_A_Sk present

Item	Adaptation process	Reference	Status	Support
1	The S2D/S2_A_So replaces the incoming Frame Start (CI_FS) signal by a local generated one, if an all-ONEs (AIS) VC is received (i.e. if CI_SSF is TRUE).	6.6.3	c8601	
2	The S2D/S2_A_Sk restore the invalid frame start condition (i.e. output aSSF = true) if that existed at the ingress of the tandem connection.	6.6.4	c8602	

c8601: IF D.1/11 THEN m ELSE n/a -- S2D/S2_A_So present
c8602: IF D.1/12 THEN m ELSE n/a -- S2D/S2_A_Sk present

D.4.6 VC-2 Layer Defect, Consequent Action, Defect Correlation and Performance Monitoring Tables

D.4.6.1 Port Status Management

Table D.87: Trail Termination Point Mode Process

Prerequisite: D.1/3 OR D.1/8 OR D.1/10 -- S2_TT_Sk and/or S2m_TT_Sk and/or S2s_TT_Sk present

Item	Trail Termination Point Mode Process	Reference	Status	Support
1	The Trail Termination Point Mode supports "not monitored" (NMON) status.	EN 300 417-1-1 [6] subclause 8.5	m	
2	The Trail Termination Point Mode supports "monitored" (MON) status.	EN 300 417-1-1 [6] subclause 8.5	m	
3	The Trail Termination Point Mode status is provisionable by the EMF.	6.2.2, 6.4.1, 6.4.3	m	

D.4.6.2 Defect detection and clearance criteria

Table D.88: VC-2 Layer Alarm Indication Signal defect (VC dAIS)

Prerequisite: D.1/8 -- S2m_TT_Sk present

Item	VC-2 Layer Alarm Indication Signal defect (VC dAIS)	Reference	Status	Support
1	The S2m_TT_Sk function detects a VC AIS defect (dAIS) if 5 consecutive frames contain the '111' pattern in bit 5-7 of byte V5.	6.4.1	m	
2	The S2m_TT_Sk function clears the VC AIS defect if in 5 consecutive frames any pattern other than the '111' pattern in bit 5-7 of byte V5.	6.4.1	m	

Table D.89: Remote Defect Indication defect (dRDI)

Prerequisite: D.1/3 OR D.1/8 OR D.1/10 -- S2_TT_Sk and/or S2m_TT_Sk and/or S2s_TT_Sk present

Item	Remote Defect Indication defect (dRDI)	Reference	Status	Support
1	The S2 RDI defect (dRDI) is detected if 5 consecutive frames contain the '1' value in bit 8 of the V5 byte.	6.2.2, 6.4.1, 6.4.3, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
2	The S2 RDI defect (dRDI) is cleared if in 5 consecutive frames contain the '0' value in bit 8 of the V5 byte.	6.2.2, 6.4.1, 6.4.3, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
3	The S2 RDI defect (dRDI) is cleared during reception of an aSSF.	6.2.2, 6.4.1, 6.4.3, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
4	The S2 RDI defect (dRDI) is cleared during reception of a VC AIS.	6.4.1	c8901	

c8901: IF D.1/8 THEN m ELSE x -- S2m_TT_Sk present

Table D.90: Degraded defect (dDEG)

Prerequisite: D.1/3 OR D.1/8 OR D.1/10 -- S2_TT_Sk and/or S2m_TT_Sk and/or S2s_TT_Sk present

Item	Degraded defect (dDEG)	Reference	Status	Support
1	Once every second, S2 pNEBC is compared with DEGTHR	6.2.2, 6.4.1, 6.4.3, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
2	If S2 pNEBC ≥ DEGTHR the corresponding second is declared BAD, otherwise it is declared GOOD	6.2.2, 6.4.1, 6.4.3, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
3	The S2 dDEG defect (dDEG) is detected if M consecutive BAD seconds have occurred.	6.2.2, 6.4.1, 6.4.3, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
4	The S2 dDEG defect (dDEG) is cleared if M consecutive GOOD seconds have occurred.	6.2.2, 6.4.1, 6.4.3, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
5	The S2 dDEG defect (dDEG) is cleared during reception of an aSSF	6.4.1, EN 300 417-1-1 [6] subclause 8.2.1.4	c9001	
6	The S2 dDEG defect (dDEG) is cleared during reception of an VC AIS	6.4.1, EN 300 417-1-1 [6] subclause 8.2.1.4	c9001	
7	The DEGTHR parameter is provisionable by the EMF	6.2.2, 6.4.1, 6.4.3	m	
8	The DEGM parameter is provisionable by the EMF	6.2.2, 6.4.1, 6.4.3	m	

c9001: IF D.1/8 THEN m ELSE x -- – S12m_TT_Sk present

Table D.91: DEG defect parameters value

Prerequisite: D.1/3 OR D.1/8 OR D.1/10 -- S2_TT_Sk and/or S2m_TT_Sk and/or S2s_TT_Sk present

Item	DEG defect parameters	Reference	Status	Support	Values	
					Allowed	Supported
1	S2 dDEG DEGTHR parameter	6.2.2, 6.4.1, 6.4.3	m		0 < DEGTHR ≤ 2 000	
2	S2 dDEG M parameter	6.2.2, 6.4.1, 6.4.3	m		2 ≤ M ≤ 10	

Table D.92: Trace Identifier Mismatch defect (dTIM)

Prerequisite: D.1/3 OR D.1/8 OR D.1/10 -- S2_TT_Sk and/or S2m_TT_Sk and/or S2s_TT_Sk present

Item	Trace Identifier Mismatch defect (dTIM)	Reference	Status	Support
1	The S2 TIM defect (dTIM) is detected, within a maximum period of 100 ms in the absence of bit errors, when the Accepted Trace Identifier (AcTI) does not match the Expected Trace Identifier (ExTI).	6.2.2, 6.4.1, 6.4.3, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
2	The S2 TIM defect (dTIM) is cleared, within a maximum period of 100 ms, after the Accepted Trace Identifier (AcTI) matches the Expected Trace Identifier (ExTI) in the absence of bit errors.	6.2.2, 6.4.1, 6.4.3, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
3	The S2 TIM defect (dTIM) is suppressed during reception of an aSSF.	6.2.2, 6.4.1, 6.4.3, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
4	The S2 TIM defect (dTIM) is cleared during reception of a VC AIS.	6.4.1	c9201	
5	It is possible to disable the trace identifier mismatch defect detection (TIMdis).	6.2.2, 6.4.1, 6.4.3	m	

c9201: IF D.1/8 THEN m ELSE x -- S2m_TT_Sk present

Table D.93: Unequipped defect (dUNEQ)

Prerequisite: D.1/3 OR D.1/8 OR D.1/10 -- S2_TT_Sk and/or S2m_TT_Sk and/or S2s_TT_Sk present

Item	Unequipped defect (dUNEQ)	Reference	Status	Support
1	The S2 UNEQ defect (dUNEQ) is detected, within a maximum period of 100 ms in the absence of bit errors, if the "accepted TSL" is the unequipped indication (TSL code = 0) within a maximum period of 100 ms in the absence of bit errors.	6.2.2, 6.4.1, 6.4.3, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
2	The S2 UNEQ defect (dUNEQ) is cleared, within a maximum period of 100 ms in the absence of bit errors, if the "accepted TSL" contains a non "unequipped" signal label (TSL code ≥ 1).	6.2.2, 6.4.1, 6.4.3, EN 300 417-1-1 [6] subclause 8.2.1.2	m	

Table D.94: Payload Mismatch defect (dPLM)

Prerequisite: D.1/7 -- S2/TSS4_A_Sk function present

Item	Payload Mismatch defect (dPLM)	Reference	Status	Support
1	The S2 PLM defect (dPLM) is detected, within a maximum period of 100 ms in the absence of bit errors, when the Accepted Signal Label (AcSL) does not match the Expected Signal Label (ExSL).	6.3.2, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
2	The S2 PLM defect (dPLM) is cleared, within a maximum period of 100 ms, after the Accepted Signal Label (AcSL) matches the Expected Signal Label (ExSL) in the absence of bit errors.	6.3.2, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
3	The S2 PLM defect (dPLM) is suppressed during reception of an aTSF.	6.3.2, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
4	The S2 PLM defect (dPLM) is suppressed if the incoming TSL code is "1" (equipped non-specific).	6.3.2, EN 300 417-1-1 [6] subclause 8.2.1.2	m	

Table D.95: Loss of Sequence Synchronization defect (dLSS)

Prerequisite: D.1/7 -- S2/TSS4_A_Sk function present

Item	Loss of Sequence Synchronization defect (dLSS)	Reference	Status	Support
1	The S2/TSS4_A_Sk function detects a Loss of PRBS lock (dLSS) according to the criteria defined in ITU-T Recommendation O.151 [16] subclause 2.6.	6.3.2, ITU-T Rec O.151 [16] subclause 2.6	m	

D.4.6.3 Consequent action activation and clearance criteria

Table D.96: Alarm Indication Signal action (aAIS)

Prerequisite: D.1/3 -- S2_TT_Sk present

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
1	The S2_TT_Sk outputs an all "1"s signal within 250 µs upon S2 dUNEQ detection.	6.2.2	m	
2	The S2_TT_Sk outputs an all "1"s signal within 250 µs upon S2 dTIM detection.	6.2.2	m	
3	The S2_TT_Sk outputs normal data within 250 µs when there is (are) no more defect(s) active.	6.2.2	m	

Table D.97: Remote Defect Indication defect action (aRDI)

Prerequisite: (D.1/2 AND D.1/3) OR
(D.1/9 AND D.1/10) -- S2_TT_So and S2_TT_Sk and/or S2s_TT_So and S2s_TT_Sk functions present

Item	Remote Defect Indication defect action (aRDI)	Reference	Status	Support
1	The S2_TT_Sk outputs an RDI request generation (RI_RDI) on CI_SSF detection.	6.2.2	c9701	
2	The S2_TT_Sk outputs an RDI request generation (RI_RDI) on S2 dUNEQ detection.	6.2.2	c9701	
3	The S2_TT_Sk outputs an RDI request generation (RI_RDI) on S2 dTIM detection.	6.2.2	c9701	
4	The S2_TT_Sk clears the RDI request when there is (are) no more defect(s) active.	6.2.2	c9701	
5	The S2_TT_So inserts the RDI code within 250 µs upon RI_RDI reception.	6.2.1	c9701	
6	The S2_TT_So outputs normal data within 250 µs upon RI_RDI clearing.	6.2.1	c9701	
7	The S2s_TT_Sk outputs an RDI request generation (RI_RDI) on CI_SSF detection.	6.4.3	c9702	
8	The S2s_TT_Sk outputs an RDI request generation (RI_RDI) on S2 dTIM detection.	6.4.3	c9702	
9	The S2s_TT_Sk clears the RDI request when there is (are) no more defect(s) active.	6.4.3	c9702	
10	The S2s_TT_So inserts the RDI code within 250 µs upon RI_RDI reception.	6.6.2	c9702	
11	The S2s_TT_So outputs normal data within 250 µs upon RI_RDI clearing.	6.6.2	c9702	

c9701: IF (D.1/2 AND D.1/3) THEN m ELSE n/a -- S2_TT_So and S2_TT_Sk functions present
c9702: IF (D.1/9 AND D.1/10) THEN m ELSE n/a -- S2s_TT_So and S2s_TT_Sk functions present

Table D.98: Remote Error Indication action (aREI)

Prerequisite: (D.1/2 AND D.1/3) OR
(D.1/9 AND D.1/10) -- S2_TT_So and S2_TT_Sk and/or S2s_TT_So and S2s_TT_Sk functions present

Item	Remote Error Indication action (aREI)	Reference	Status	Support
1	The S2_TT_So inserts the REI value in the next REI bits.	6.2.1	c9801	
2	The S2s_TT_So inserts the REI value in the next REI bits.	6.6.2	c9802	

c9801: IF (D.1/2 AND D.1/3) THEN m ELSE n/a -- S2_TT_So and S2_TT_Sk functions present
c9802: IF (D.1/9 AND D.1/10) THEN m ELSE n/a -- S2s_TT_So and S2s_TT_Sk functions present

Table D.99: Trail Signal Fail action (aTSF)

Prerequisite: D.1/3 OR D.1/8 OR D.1/10 -- S2_TT_Sk and/or S2m_TT_Sk and/or S2s_TT_Sk functions present

Item	Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The S2_TT_Sk sets AI_TSF to TRUE on S2 dUNEQ detection.	6.2.2	c9901	
2	The S2_TT_Sk sets AI_TSF to TRUE on S2 dTIM detection.	6.2.2	c9901	
3	The S2_TT_Sk sets AI_TSF to TRUE on CI_SSF reception.	6.2.2	c9901	
4	The S2_TT_Sk sets AI_TSF to FALSE when there is (are) no more defect(s) active.	6.2.2	c9901	
5	The S2m_TT_Sk sets AI_TSF to TRUE on S2 dAIS detection.	6.4.1	c9902	
6	The S2m_TT_Sk sets AI_TSF to TRUE on S2 dUNEQ detection.	6.4.1	c9902	
7	The S2m_TT_Sk sets AI_TSF to TRUE on S2 dTIM detection.	6.4.1	c9902	
8	The S2m_TT_Sk sets AI_TSF to TRUE on CI_SSF reception.	6.4.1	c9902	
9	The S2m_TT_Sk sets AI_TSF to FALSE when there is (are) no more defect(s) active.	6.4.1	c9902	
10	The S2s_TT_Sk sets AI_TSF to TRUE on S2 dTIM detection.	6.4.3	c9903	
11	The S2s_TT_Sk sets AI_TSF to TRUE on CI_SSF reception.	6.4.3	c9903	
12	The S2s_TT_Sk sets AI_TSF to FALSE when there is (are) no more defect(s) active.	6.4.3	c9903	

c9901: IF D.1/3 THEN m ELSE n/a -- S2_TT_Sk present
c9902: IF D.1/8 THEN m ELSE n/a -- S2m_TT_Sk present
c9903: IF D.1/10 THEN m ELSE n/a -- S2s_TT_Sk present

Table D.100: Trail Signal Degrade action (aTSD)

Prerequisite: D.1/3 OR D.1/8 OR D.1/10 -- S2_TT_Sk and/or S2m_TT_Sk and/or S2s_TT_Sk functions present

Item	Trail Signal Degrade action (aTSD)	Reference	Status	Support
1	If the dDEG is detected in the trail termination sink the aTSD is performed.	EN 300 417-1-1 [6] subclause 8.2.2.6	m	
2	It ceases aTSD insertion after the dDEG defect is cleared.	EN 300 417-1-1 [6] subclause 8.2.2.6	m	
3	The aTSD is equivalent to send the Signal Degrade (SD) signal as defined in the Automatic Protection Switching (APS).	EN 300 417-1-1 [6] subclause 8.2.2.6	m	

D.4.6.4 Defect correlation

Prerequisite: D.6/4 -- Defect correlation process supported

Table D.101: Defect correlation

Item	Defect correlation	Reference	Status	Support
1	Under S2 dUNEQ detection the S2_TT_Sk and S2m_TT_Sk functions generate a S2 cUNEQ report if the port is in the monitoring state (MON).	6.2.2, 6.4.1	c10101	
2	Under S2 dTIM detection the S2_TT_Sk and S2m_TT_Sk functions generate a S2 cTIM report if the port is in the monitoring state (MON) and no dUNEQ defect has been detected.	6.2.2, 6.4.1	c10101	
3	Under detection of both S2 dUNEQ and S2 dTIM and reception of "AcTI = all 0s" the S2s_TT_Sk function generates a S2 cUNEQ report if the port is in the monitoring state (MON).	6.4.3, EN 300 417-1-1 [6] subclause.8.2.3.2	c10102	
4	Under S2 dTIM detection the S2s_TT_Sk function generates a S2 cTIM report if the port is in the monitoring state (MON) and no dUNEQ defect nor "AcTI = all 0s" have been declared.	6.4.3, EN 300 417-1-1 [6] subclause.8.2.3.2	c10102	
5	Under S2 dDEG detection the VC-2 Layer Trail Termination Sink functions (S2_TT_Sk, S2m_TT_Sk, S2s_TT_Sk) generate a S2 cDEG report if the port is in the monitoring state (MON) and no dTIM defect has been detected.	6.2.2, 6.4.1, 6.4.3	c10103	
6	Under S2 dRDI detection the VC-2 Layer Trail Termination Sink functions (S2_TT_Sk, S2m_TT_Sk, S2s_TT_Sk) generate a S2 cRDI report if the port is in the monitoring state (MON) and no dUNEQ nor dTIM defects have been detected.	6.2.2, 6.4.1, 6.4.3	c10103	
7	The S2 cRDI is reported only if S2 RDI_reported is set to TRUE by the EMF. By default S2 RDI_reported is set to FALSE.	6.2.2, 6.4.1, 6.4.3	c10103	
8	Under CI_SSF reception the VC-2 Layer Trail Termination Sink functions (S2_TT_Sk, S2m_TT_Sk, S2s_TT_Sk) generate a S2 cSSF report if the port is in the monitoring state (MON).	6.2.2, 6.4.1, 6.4.3	c10103	
9	The S2 cSSF is reported only if selected S2 SSF_reported is set to TRUE by the EMF. By default S2 SSF_reported is set to FALSE.	6.2.2, 6.4.1, 6.4.3	c10103	
10	Under S2 dPLM detection the S2/TSS4_A_Sk generates a S2 cPLM report if no AI_TSF is received from the S2_TT_Sk.	6.3.2	c10104	
11	Under dLSS detection the S2/TSS4_A_Sk generates a cLSS report if no AI_TSF is received from the S2_TT_Sk.	6.3.2	c10104	
12	All the generated fault causes (cXXX) are reported to the EMF	EN 300 417-1-1 [6] subclause 8.1, figure 36	m	

c10101: IF (D.1/3 OR D.1/8) THEN m ELSE n/a -- S2_TT_Sk and/or S2m_TT_Sk present

c10102: IF D.1/10 THEN m ELSE n/a -- S2s_TT_Sk present
c10103: IF (D.1/3 OR D.1/8 OR D.1/10) THEN m ELSE n/a -- S2_TT_Sk and/or S2m_TT_Sk and/or S2s_TT_Sk present
c10104: IF D.1/7 THEN m ELSE n/a -- S2/TSS4_A_Sk present

D.4.6.5 Performance monitoring

D.4.6.5.1 Near End Performance monitoring

Prerequisite: D.6/1 -- Near-end performance monitoring process supported

Table D.102: pN_DS performance parameter

Prerequisite: D.6/1 -- Near-end performance monitoring process supported

Item	pN_DS performance parameter	Reference	Status	Support
1	The VC-2 Layer Trail Termination Sink functions (S2_TT_Sk, S2m_TT_Sk, S2s_TT_Sk) indicate a S2 pN_DS every second with at least one occurrence of S2 aTSF or an equipment defect (dEQ).	6.2.2, 6.4.1, 6.4.3	m	

Table D.103: pN_EBC performance parameter

Prerequisite: D.6/1 -- Near-end performance monitoring process supported

Item	pN_EBC performance parameter	Reference	Status	Support
1	Every second the VC-2 Layer Trail Termination Sink functions (S2_TT_Sk, S2m_TT_Sk, S2s_TT_Sk) count the number of S2 Near-end Errored Block (S2 N_Bs) within that second as the S2 pN_EBC (S2 Near-end Error Block Count).	6.2.2, 6.4.1, 6.4.3	m	

Comments: A "Near-end Block" (N_B) is errored if one or more BIP-2 violations are detected.

Table D.104: pN_TSE performance parameter

Prerequisite: D.6/1 AND D.1/6 -- Near-end performance monitoring process supported and S2/TSS4_A_Sk present

Item	pN_TSE performance parameter	Reference	Status	Support
1	Every second the S2/TSS4_A_Sk gives sum of Test Sequence Errors (TSE) within one second period as the S2 pN_TSE (S2 Near-end Test Sequence Errors).	6.2.2, 6.4.1, 6.4.3	m	

Comments: The TSE error block size is equal to the V5 BIP-2 error block size with the exception of the VC-2 POH.

D.4.6.5.2 Far End Performance monitoring

Prerequisite: D.6/2 -- Far-end performance monitoring process supported

Table D.105: pF_DS performance parameter

Item	pF_DS performance parameter	Reference	Status	Support
1	The VC-2 Layer Trail Termination Sink functions (S2_TT_Sk, S2m_TT_Sk, S2s_TT_Sk) indicate a S2 pF_DS every second with at least one occurrence of S2 dRDI.	6.2.2, 6.4.1, 6.4.3	m	

Table D.106: pF_EBC performance parameter

Item	pF_EBC performance parameter	Reference	Status	Support
1	Every second VC-2 Layer Trail Termination Sink functions (S2_TT_Sk, S2m_TT_Sk, S2s_TT_Sk) count the number of S2 Far-end Errored Block (S2 F_Bs) within that second as the S2 pF_EBC (S2 Far-end Error Block Count).	6.2.2, 6.4.1, 6.4.3	m	

Comments: A "Far-end Block" (F_B) is errored if the REI count indicates one or more errors.

D.4.7 VC-2 Layer Linear Trail Protection Defect, Consequent Action, Defect Correlation and Performance Monitoring Tables

Prerequisite: D.1/16 -- VC-2 Layer Linear Trail Protection scheme supported

D.4.7.1 Consequent action activation and clearance criteria

Table D.107: Server Signal Fail action (aSSF)

Prerequisite: D.5/5 -- S2/S2P_A_Sk present

Item	Server Signal Fail action (aSSF)	Reference	Status	Support
1	The S2/S2P_A_Sk sets CI_SSF to TRUE on AI_TSF reception.	6.5.3.2	m	
2	The S2/S2P_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	6.5.3.2	m	

Table D.108: Trail Signal Fail action (aTSF)

Prerequisite: D.5/3 -- S2P_TT_Sk present

Item	Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The S2P_TT_Sk sets AI_TSF to TRUE on CI_SSF reception.	6.5.2.2	m	
2	The S2P_TT_Sk sets AI_TSF to FALSE when there is (are) no more defect(s) active.	6.5.2.2	m	

Table D.109: Server Signal Degrade action (aSSD)

Prerequisite: D.5/5 -- S2/S2P_A_Sk present

Item	Server Signal Degrade action (aSSD)	Reference	Status	Support
1	The S2/S2P_A_Sk sets CI_SSD to TRUE on AI_TSD reception.	6.5.3.2	m	
2	The S2/S2P_A_Sk sets CI_SSD to FALSE when there is (are) no more defect(s) active.	6.5.3.2	m	

D.4.7.2 Defect correlation

Table D.110: Defect correlation

Item	Defect correlation	Reference	Status	Support
1	Under S2P CI_SSF reception the S2P_TT_Sk generates an S2P cSSF report.	6.5.2.2	c11001	
2	The S2P cSSF is reported only if selected S2P SSF_reported is set to TRUE by the EMF. By default S2P SSF_reported is set to FALSE.	6.5.2.2	c11001	
3	All the generated fault causes (cXXX) are reported to the EMF	EN 300 417-1-1 [6] subclause 8.1 figure 36	m	

c11001: IF D.5/3 THEN m ELSE n/a -- S2P_TT_Sk present

D.4.8 VC-2 Tandem Connection Sub-layer Defect, Consequent Action, Defect correlation and Performance Monitoring Tables

Prerequisite: D.1/11 OR D.1/12 OR D.1/15 -- S2D_TT_So and/or S2D_TT_Sk and/or S2Dm_TT_Sk present

D.4.8.1 Port Status Management

Table D.111: Trail Termination Point Mode Process

Prerequisite: D.1/12 OR D.1/15 -- S2D_TT_Sk and/or S2Dm_TT_Sk present

Item	Trail Termination Point Mode Process	Reference	Status	Support
1	The Trail Termination Point Mode supports "not monitored" (NMON) status.	EN 300 417-1-1 [6] subclause 8.5	m	
2	The Trail Termination Point Mode supports "monitored" (MON) status.	EN 300 417-1-1 [6] subclause 8.5	m	
3	The Trail Termination Point Mode status is provisionable by the EMF	6.6.2, 6.6.5	m	

D.4.8.2 Defect detection and clearance criteria

Prerequisite: D.1/12 OR D.1/15 -- S2D_TT_Sk and/or S2Dm_TT_Sk present

Table D.112: VC-2 Tandem Connection Incoming Alarm Indication Signal defect (TC dIncAIS)

Prerequisite: D.1/12 -- S2D_TT_Sk present

Item	VC-2 Tandem Connection Incoming Alarm Indication Signal defect (TC dIncAIS)	Reference	Status	Support
1	The S2D_TT_Sk function detects a TC Incoming AIS defect (dIncAIS) if 5 consecutive frames contain the '1' value in bit N2[4].	6.6.2	m	
2	The S2D_TT_Sk function clears the TC Incoming AIS defect (dIncAIS) if 5 consecutive frames contain the '0' value in bit N2[4].	6.6.2	m	

Table D.113: VC-2 Tandem Connection Remote Defect Indication defect (dRDI)

Item	VC-2 Tandem Connection Remote Defect Indication defect (dRDI)	Reference	Status	Support
1	The TC RDI defect (dRDI) is detected if 5 consecutive frames contain the '1' value in bit N2[8][73] of the 76 frame multiframe (38 ms).	6.6.2, 6.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
2	The TC RDI defect (dRDI) is cleared if in 5 consecutive frames contain the '0' value in bit N2[8][73] of the 76 frame multiframe (38 ms).	6.6.2, 6.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
3	The TC RDI defect (dRDI) is cleared during reception of an aSSF.	6.6.2, 6.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	

Comment: N2[x][y] refers to bit x (x = 7,8) of byte N2 in frame y (y = 1..76) of the 76 frame multiframe (38 ms).

Table D.114: VC-2 Tandem Connection Degraded defect (dDEG)

Item	VC-2 Tandem Connection Degraded defect (dDEG)	Reference	Status	Support
1	Once every second, S2D pNEBC is compared with DEGTHR	6.6.2, 6.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
2	If S2D pNEBC ≥ DEGTHR the corresponding second is declared BAD, otherwise it is declared GOOD	6.6.2, 6.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
3	The S2D dDEG defect (dDEG) is detected if M consecutive BAD seconds have occurred.	6.6.2, 6.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
4	The S2D dDEG defect (dDEG) is cleared if M consecutive GOOD seconds have occurred.	6.6.2, 6.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
5	The S2D dDEG defect (dDEG) is cleared during reception of an aSSF	6.6.2, 6.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
6	The DEGTHR parameter is provisionable by the EMF	5.6.2, 6.6.5	m	
7	The DEGM parameter is provisionable by the EMF	6.6.2, 6.6.5	m	

Table D.115: VC-2 Tandem Connection DEG defect parameters value

Item	VC-2 Tandem Connection DEG defect parameters	Reference	Status	Support	Values	
					Allowed	Supported
1	S2D dDEG DEGTHR parameter	6.6.2, 6.6.5	m		0 < DEGTHR ≤ 28 000	
2	S2D dDEG M parameter	6.6.2, 6.6.5	m		2 ≤ M ≤ 10	

Table D.116: VC-2 Tandem Connection Trace Identifier Mismatch defect (dTIM)

Item	VC-2 Tandem Connection Trace Identifier Mismatch defect (dTIM)	Reference	Status	Support
1	The S2D TIM defect (dTIM) is detected, within a maximum period of 1 s in the absence of bit errors, when the Accepted Trace Identifier (AcTI) does not match the Expected Trace Identifier (ExTI).	6.6.2, 6.6.5, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
2	The S2D TIM defect (dTIM) is cleared, within a maximum period of 1 s, after the Accepted Trace Identifier (AcTI) matches the Expected Trace Identifier (ExTI) in the absence of bit errors.	6.6.2, 6.6.5, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
3	The S2D TIM defect (dTIM) is suppressed during reception of an aSSF.	6.6.2, 6.6.5, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
4	It is possible to disable the TC trace identifier mismatch defect detection (TIMdis).	6.6.2, 6.6.5	m	

Table D.117: VC-2 Tandem Connection Unequipped defect (dUNEQ)

Item	VC-2 Tandem Connection Unequipped defect (dUNEQ)	Reference	Status	Support
1	The S2D UNEQ defect (dUNEQ) is detected if five consecutive VC-2 frames contain the "0000 0000" pattern in byte N2.	6.6.2, 6.6.5, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
2	The S2D UNEQ defect (dUNEQ) is cleared if in five consecutive VC-2 frames any pattern other than the "0000 0000" is detected in byte N2.	6.6.2, 6.6.5, EN 300 417-1-1 [6] subclause 8.2.1.2	m	

Table D.118: Loss of Tandem Connection defect (dLTC)

Item	Loss of Tandem defect (dLTC)	Reference	Status	Support
1	The S2D LTC defect (dLTC) is detected if the multiframe alignment process is in the OOM state.	6.6.2, 6.6.5	m	
2	The S2D LTC defect (dLTC) is cleared if the multiframe alignment process is in the IM state.	6.6.2, 6.6.5	m	

Table D.119: VC-2 Tandem Connection Remote Outgoing VC defect (dODI)

Item	VC-2 Tandem Connection Remote Outgoing VC defect (dODI)	Reference	Status	Support
1	The TC ODI defect (dODI) is detected if 5 consecutive frames contain the '1' value in bit N2[7][74] of the 76 frame multiframe (38 ms).	6.6.2, 6.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
2	The TC ODI defect (dODI) is cleared if in 5 consecutive frames contain the '0' value in bit N2[7][74] of the 76 frame multiframe (38 ms).	6.6.2, 6.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
3	The TC RDI defect (dRDI) is cleared during reception of an aSSF.	6.6.2, 6.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	

D.4.8.3 Consequent action activation and clearance criteria

Table D.120: Alarm Indication Signal action (aAIS)

Prerequisite: D.1/12 OR D.1/12 -- S2D_TT_Sk and/or S2D/S2_A_Sk present

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
1	The S2D_TT_Sk outputs an all "1"s signal within 250 µs upon S2D dUNEQ detection.	6.6.2	c12001	
2	The S2D_TT_Sk outputs an all "1"s signal within 250 µs upon S2D dTIM detection.	6.6.2	c12001	
3	The S2D_TT_Sk outputs an all "1"s signal within 250 µs upon S2D dLTC detection.	6.6.2	c12001	
4	The S2D_TT_Sk outputs normal data within 250 µs when there is (are) no more defect(s) active.	6.6.2	c12001	
5	The S2D/S2_A_Sk outputs an all "1"s signal within 1 ms upon AI_OSF reception.	6.6.4	c12002	
6	The S2D/S2_A_Sk outputs normal data within 1 ms when there is (are) no more defect(s) active.	6.6.4	c12002	

c12001: IF D.1/12 THEN m ELSE n/a -- S2D_TT_Sk present
c12002: IF D.1/12 THEN m ELSE n/a -- S2D/S2_A_Sk present

Table D.121: Remote Defect Indication defect action (aRDI)

Prerequisite: D.1/11 AND D.1/12 -- S2D_TT_So and S2D_TT_Sk functions present

Item	Remote Defect Indication defect action (aRDI)	Reference	Status	Support
1	The S2D_TT_Sk outputs an RDI request generation (RI_RDI) on CI_SSF detection.	6.6.2	m	
2	The S2D_TT_Sk outputs an RDI request generation (RI_RDI) on S2D dUNEQ detection.	6.6.2	m	
3	The S2D_TT_Sk outputs an RDI request generation (RI_RDI) on S2D dTIM detection.	6.6.2	m	
4	The S2D_TT_Sk outputs an RDI request generation (RI_RDI) on S2D dLTC detection.	6.6.2	m	
5	The S2D_TT_Sk clears the RDI request when there is (are) no more defect(s) active.	6.6.2	m	
6	The S2D_TT_So inserts the RDI code within the TC RDI code within 1 multiframe (9,5 ms) upon RI_RDI reception.	6.6.1	m	
7	The S2D_TT_So outputs normal data within the TC RDI code within 1 multiframe (9,5 ms) upon RI_RDI clearing.	6.6.1	m	

Table D.122: Remote Error Indication action (aREI)

Prerequisite: D.1/11 AND D.1/12 -- S2D_TT_So and S2D_TT_Sk functions present

Item	Remote Error Indication action (aREI)	Reference	Status	Support
1	The S2D_TT_So inserts the RI_REI value in the REI bit in the following frame.	6.6.1	m	

Table D.123: Outgoing Defect Indication defect action (aODI)

Prerequisite: D.1/11 AND D.1/12 -- S2D_TT_So and S2D_TT_Sk functions present

Item	Outgoing Defect Indication defect action (aODI)	Reference	Status	Support
1	The S2D_TT_Sk outputs an ODI request generation (RI_ODI) on CI_SSF detection.	6.6.2	m	
2	The S2D_TT_Sk outputs an ODI request generation (RI_ODI) on S2D dUNEQ detection.	6.6.2	m	
3	The S2D_TT_Sk outputs an ODI request generation (RI_ODI) on S2D dTIM detection.	6.6.2	m	
4	The S2D_TT_Sk outputs an ODI request generation (RI_ODI) on S2D dLTC detection.	6.6.2	m	
5	The S2D_TT_Sk outputs an ODI request generation (RI_ODI) on S2D dIncAIS detection.	6.6.2	m	
6	The S2D_TT_Sk clears the ODI request when there is (are) no more defect(s) active.	6.6.2	m	
7	The S2D_TT_So inserts the ODI code within the TC ODI code within 1 multiframe (9,5 ms) upon RI_ODI reception.	6.6.1	m	
8	The S2D_TT_So outputs normal data within the TC ODI code at the first opportunity after the RI_ODI request has been cleared	6.6.1	m	

Table D.124: Outgoing Error Indication action (aOEI)

Prerequisite: D.1/11 AND D.1/12 -- S2D_TT_So and S2D_TT_Sk functions present

Item	Outgoing Error Indication action (aOEI)	Reference	Status	Support
1	The S2D_TT_So inserts the RI_OEI value in the OEI bit in following frame.	6.6.1	m	

Table D.125: Server Signal Fail action (aSSF)

Prerequisite: D.1/11 -- S2D/S2_A_Sk present

Item	Server Signal Fail action (aSSF)	Reference	Status	Support
1	The S2D/S2_A_Sk sets CI_SSF to TRUE on AI_OSF reception.	6.6.4	m	
2	The S2D/S2_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	6.6.4	m	

Table D.126: Trail Signal Fail action (aTSF)

Prerequisite: D.1/12 OR D.1/15 -- S2D_TT_Sk and/or S2Dm_TT_Sk present

Item	Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) set AI_TSF to TRUE on S2D dUNEQ detection.	6.6.2, 6.6.5	m	
2	The Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) set AI_TSF to TRUE on S2D dTIM detection.	6.6.2, 6.6.5	m	
3	The Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) set AI_TSF to TRUE on S2D dLTC detection.	6.6.2, 6.6.5	m	
4	The Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) set AI_TSF to TRUE on CI_SSF reception.	6.6.2, 6.6.5	m	
5	The Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) set AI_TSF to FALSE when there is (are) no more defect(s) active.	6.6.2, 6.6.5	m	

Table D.127: Outgoing Signal Fail action (aOSF)

Prerequisite: D.1/12 OR D.1/15 -- S2D_TT_Sk and/or S2Dm_TT_Sk present

Item	Outgoing Signal Fail action (aOSF)	Reference	Status	Support
1	The Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) set AI_OSF to TRUE on S2D dUNEQ detection.	6.6.2, 6.6.5	m	
2	The Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) set AI_OSF to TRUE on S2D dTIM detection.	6.6.2, 6.6.5	m	
3	The Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) set AI_OSF to TRUE on S2D dLTC detection.	6.6.2, 6.6.5	m	
4	The Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) set AI_OSF to TRUE on S2D dIncAIS detection.	6.6.2, 6.6.5	m	
5	The Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) set AI_OSF to TRUE on CI_SSF reception.	6.6.2, 6.6.5	m	
6	The Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) set AI_OSF to FALSE when there is (are) no more defect(s) active.	6.6.2, 6.6.5	m	

Table D.128: AI_SF signal generation (AI_SF)

Prerequisite: D.1/11 -- S2D/S2_A_So present

Item	AI_SF signal generation (AI_SF)	Reference	Status	Support
1	The S2D/S2_A_So sets AI_SF to TRUE on CI_SSF reception.	6.6.3	m	
2	The S2D/S2_A_So sets AI_SF to FALSE when no CI_SSF is received.	6.6.3	m	

Table D.129: Trail Signal Degrade action (aTSD)

Prerequisite: D.1/12 OR D.1/15 -- S2D_TT_Sk and/or S2Dm_TT_Sk present

Item	Trail Signal Degrade action (aTSD)	Reference	Status	Support
1	If the dDEG is detected in the trail termination sink the aTSD is performed.	EN 300 417-1-1 [6] subclause 8.2.2.6	m	
2	It ceases aTSD insertion after the dDEG defect is cleared.	EN 300 417-1-1 [6] subclause 8.2.2.6	m	

D.4.8.4 Defect correlation

Prerequisite: D.5/8 -- Tandem Connection defect correlation process supported

Table D.130: Tandem Connection defect correlation

Item	Tandem Connection defect correlation	Reference	Status	Support
1	Under S2D dUNEQ detection the VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) generate a S2D cUNEQ report if the port is in the monitoring state (MON).	6.6.2, 6.6.5	m	
2	Under S2D dLTC detection the VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) generate a S2D cLTC report if the port is in the monitoring state (MON) and no dUNEQ defect has been detected.	6.6.2, 6.6.5	m	
3	Under S2D dTIM detection the VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) generate a S2D cTIM report if the port is in the monitoring state (MON) and no dUNEQ nor dLTC defects have been detected.	6.6.2, 6.6.5	m	
4	Under S2D dDEG detection the VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) generate a S2D cDEG report if the port is in the monitoring state (MON) and no dTIM nor dLTC defects have been detected.	6.6.2, 6.6.5	m	
5	Under S2D dRDI detection the VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) generate a S2D cRDI report if the port is in the monitoring state (MON) and no dUNEQ nor dTIM nor dLTC defects have been detected.	6.6.2, 6.6.5	m	

Item	Tandem Connection defect correlation	Reference	Status	Support
6	The S2D cRDI is reported only if S2D RDI_reported is set to TRUE by the EMF. By default S2D RDI_reported is set to FALSE.	6.6.2, 6.6.5	m	
7	Under S2D dODI detection the VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) generate a S2D cODI report if the port is in the monitoring state (MON) and no dUNEQ nor dTIM nor dLTC defects have been detected.	6.6.2, 6.6.5	m	
8	The S2D cODI is reported only if S2D ODI_reported is set to TRUE by the EMF. By default S2D ODI_reported is set to FALSE.	6.6.2, 6.6.5	m	
9	Under CI_SSF the VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) generate a S2D cSSF report if the port is in the monitoring state (MON).	6.6.2, 6.6.5	m	
10	The S2D cSSF is reported only if selected S2D SSF_reported is set to TRUE by the EMF. By default S2D SSF_reported is set to FALSE.	6.6.2, 6.6.5	m	
11	All the generated fault causes (cXXX) are reported to the EMF	EN 300 417-1-1 [6] subclause 8.1 figure 36	m	

D.4.8.5 Performance monitoring

D.4.8.5.1 Near End Performance monitoring

Prerequisite: D.5/5 -- Tandem Connection Near-end performance monitoring process supported

Table D.131: pN_DS performance parameter

Item	pN_DS performance parameter	Reference	Status	Support
1	The VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) indicate a S2D pN_DS every second with at least one occurrence of S2D aTSF or an equipment defect (dEQ).	6.6.2, 6.6.5	m	

Table D.132: pN_EBC performance parameter

Item	pN_EBC performance parameter	Reference	Status	Support
1	Every second the VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) count the number of S2D Near-end Errored Block (S2D N_Bs) within that second as the S2D pN_EBC (S2D Near-end Error Block Count).	6.6.2, 6.6.5	m	

Comments: A "Near-end Block" (N_B) is errored if one or more BIP-2 violations are detected.

D.4.8.5.2 Far End Performance Monitoring

Prerequisite: D.5/6 -- Tandem Connection Far-end performance monitoring process supported

Table D.133: pF_DS performance parameter

Item	pF_DS performance parameter	Reference	Status	Support
1	The VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) indicate a S2D pF_DS every second with at least one occurrence of S2D dRDI.	6.6.2, 6.6.5	m	

Table D.134: pF_EBC performance parameter

Item	pF_EBC performance parameter	Reference	Status	Support
1	Every second VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) count the number of S2D Far-end Errored Block (S2D F_Bs) within that second as the S2D pF_EBC (S2D Far-end Error Block Count).	6.6.2, 6.6.5	m	

Comments: A "Far-end Block" (F_B) is errored if the REI count indicates one or more errors.

D.4.8.5.3 Tandem Connection Outgoing VC Performance Monitoring

Prerequisite: D.5/7 -- Tandem Connection Outgoing VC performance monitoring process supported

Table D.135: pOF_DS performance parameter

Item	pOF_DS performance parameter	Reference	Status	Support
1	The VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) indicate a S2D pOF_DS every second with at least one occurrence of S2D dODI	6.6.2, 6.6.5	m	

Table D.136: pOF_EBC performance parameter

Item	pOF_EBC performance parameter	Reference	Status	Support
1	Every second VC-2 Tandem Connection Trail Termination Sink functions (S2D_TT_Sk, S2Dm_TT_Sk) count the number of S2D Outgoing VC Errored Block (S2D OF_Bs) within that second as the S2D pOF_EBC (S2D Outgoing VC Error Block Count).	6.6.2, 6.6.5	m	

Comments: An "Outgoing VC Block" (OF_B) is errored if the OEI count indicates one or more errors.

Table D.137: pON_EBC performance parameter

Item	pON_EBC performance parameter	Reference	Status	Support
1	Every second the VC-2 Tandem Connection Trail Termination Sink function (S2D_TT_Sk) counts the number of S2D Outgoing Near-end Errored Block (S2D ON_Bs) within that second as the S2D pON_EBC (S2D Outgoing Near-end Error Block Count).	6.6.2	m	

Table D.138: pON_DS performance parameter

Item	pON_DS performance parameter	Reference	Status	Support
1	The VC-2 Tandem Connection Trail Termination Sink function (S2D_TT_Sk) indicates a S2D pON_DS every second with at least one occurrence of S2D aODI or an equipment defect (dEQ).	6.6.2	m	

Annex E (normative): ICS proforma for S12 Path Layer

E.1 Identification of the implementation

In the present document, an IUT, and of course the identification of an IUT refers to a S12 Path Layer instance implemented inside the SUT.

Identification of the Implementation Under Test (IUT) and the system in which it resides (the System Under Test (SUT)) should be filled in so as to provide as much detail as possible regarding version numbers and configuration options.

The product supplier information and client information should both be filled in if they are different.

A person who can answer queries regarding information supplied in the ICS should be named as the contact person.

E.1.1 Date of the statement

....

E.1.2 Implementation Under Test (IUT) identification

IUT name:

....

....

IUT version

Hardware version:

....

....

Software version:

....

....

Firmware version:

....

....

E.1.3 System Under Test (SUT) identification

SUT name:

....

....

Hardware configuration:

....

....

SUT Software version:

....

....

SUT Firmware version:

....

Operating system:

....

....

E.1.4 Product supplier

Name:

....

Address:

....

....

....

Telephone number:

....

Facsimile number:

....

E-mail address:

....

Additional information:

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....

....

E.1.5 Client

Name:

....

Address:

....

....

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Telephone number:

....

Facsimile number:

....

E-mail address:

....

Additional information:

....

....

....

E.1.6 ICS contact person

Name:

....

Telephone number:

....

Facsimile number:

....

E-mail address:

....

Additional information:

....

....

E.2 Identification of the EN

This ICS proforma applies to the following standard:

EN 300 417-4-1 (V1.1): "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 4-1: Synchronous Digital Hierarchy (SDH) path layer functions".

E.3 Global statement of conformance of S12 Path Layer

Due to the model used for this layer the "Global statement of conformance" sentence used in ETSI ICS is not applicable to this layer.

E.4 S12 Path Layer functions

E.4.1 S12 Path Layer Description

Table E.1: S12 Path Layer functions

Item	S12 Path Layer functions	Reference	Status	Support
1	VC-12 Layer Connection function (S12_C)	7, figure 135	o.101m	
2	VC-12 Layer Trail Termination Source function (S12_TT_So)	7, figure 135	o.101	
3	Trail Termination Sink function (S12_TT_Sk)	7, figure 135	o.101	
4	VC-12 Layer to P12x Layer Adaptation Source function (S12/P12x_A_So)	7, figure 135	c101	
5	VC-12 Layer to P12x Layer Adaptation Sink function (S12/P12x_A_Sk)	7, figure 135	c102	
6	VC-12 Layer to P12s-x Layer Adaptation Sink function (S12/P12s-x_A_Sk)	7, figure 135	c102	
7	VC-12 Layer to P12s-b Layer Adaptation Source function (S12/P12s-b_A_So)	7, figure 135	c101	
8	VC-12 Layer to P12s-b Layer Adaptation Sink function (S12/P12s-b_A_Sk)	7, figure 135	c102	
9	VC-12 Layer to P12s-a Layer Adaptation Source function (S12/P12s-a_A_So)	7, figure 135	c101	
10	VC-12 Layer to P12s-a Layer Adaptation Sink function (S12/P12s-a_A_Sk)	7, figure 135	c102	
11	VC-12 Layer to P0-31c Layer Adaptation Source function (S12/P0-31c_A_So)	7, figure 135	c101	
12	VC-12 Layer to P0-31c Layer Adaptation Sink function (S12/P0-31c_A_Sk)	7, figure 135	c102	
13	VC-12 Layer to ATM Layer (ATM) Compound Adaptation Source function (S12/Avp_A_So)	7, figure 135	c101	

Item	S12 Path Layer functions	Reference	Status	Support
14	VC-12 Layer to ATM Layer (ATM) Compound Adaptation Sink function (S12/Avp_A_Sk)	7, figure 135	c102	
15	VC-12 Layer to TSS4 Layer Adaptation Source function (S12/TSS4_A_So)	7, figure 135	c103	
16	VC-12 Layer to TSS4 Layer Adaptation Sink function (S12/TSS4_A_Sk)	7, figure 135	c104	
17	VC-12 Layer Non-intrusive Monitoring function (S12m_TT_Sk)	7, figure 135	c105	
18	VC-12 Layer Supervisory Unequipped function (S12s_TT_So)	7, figure 135	c105	
19	VC-12 Layer Supervisory Unequipped Termination Sink function (S12s_TT_Sk)	7, figure 135	c105	
20	VC-12 Tandem Connection Trail Termination Source function (S12D_TT_So)	7, figure 135	c105	
21	VC-12 Tandem Connection Trail Termination Sink function (S12D_TT_Sk)	7, figure 135	c105	
22	VC-12 Tandem Connection to VC-12 Adaptation Source function (S12D/S12_A_So)	7, figure 135	c106	
23	VC-12 Tandem Connection to VC-12 Adaptation Sink function (S12D/S12_A_Sk)	7, figure 135	c107	
24	VC-12 Tandem Connection non-intrusive Trail Termination Sink function (S12Dm_TT_Sk)	7, figure 135	c105	
25	VC-12 Layer Linear Trail Protection	7, figure 138	c108	
26	VC-12 Layer Sub-Network Connection (SNC) Protection	7	c105	
27	VC-12 Layer to LC Layer Adaptation Source function (S12/LC_A_So)	7, figure 135	c109	
28	VC-12 Layer to Xxx Layer Adaptation Source function (S12/Xxx_A_So)	n/a	c101	
29	VC-12 Layer to Xxx Layer Adaptation Sink function (S12/Xxx_A_Sk)	n/a	c102	

o.101: It is mandatory to support at least one of these items -- connection function and/or trail termination source and/or trail termination sink present

o.102: It is mandatory to support at least one of these items -- at least one Payload Adaptation Source present

o.103: It is mandatory to support at least one of these items -- at least one Payload Adaptation Sink present

c101: IF E.1/2 THEN o.102 ELSE x -- a TT_So function should exist for A_So function
c102: IF E.1/3 THEN o.103 ELSE x -- a TT_Sk function should exist for A_Sk function
c103: IF E.1/2 THEN o ELSE x -- a TT_So function should exist for A_So function
c104: IF E.1/3 THEN o ELSE x -- a TT_Sk function should exist for A_Sk function
c105: IF E.1/20 THEN m ELSE x -- a connection function should exist
c106: IF E.1/20 THEN m ELSE x -- a Tandem Connection TT_So function should exist for Tandem Connection A_So function
c107: IF E.1/21 THEN m ELSE x -- a Tandem Connection TT_Sk function should exist for Tandem Connection A_Sk function
c108: IF E.1/3 THEN o ELSE n/a -- S12_TT_Sk function should exist for S12 Linear Trail Protection
c109: IF E.D.1/2 OR E.D.1/18 THEN m ELSE n/a -- -- S12_TT_So and/or S12s_TT_So function should exist

Comment: If the S12_C is not supported it is assumed that the TT_So (TT_Sk) functions are hard-wired all together to the S12_CI source direction (S12_CI sink direction). That could be the case of an ATM equipment.

Items dealing with S12/Xxx_A functions take into account the implementation of adaptation functions not specified or referenced in EN 300 417-x-1 standards.

Table E.2: Supported VC-12 Layer payload Adaptation functions

Prerequisite: E.1/2 OR E.1/3 -- implies that at least one VC-12 Layer payload Adaptation function is present

Item	S12 Path Layer functions	Reference	Status	Support
1	More than one VC-12 Layer payload Adaptation source function is supported	7, figure 135	c201	
2	More than one VC-12 Layer payload Adaptation sink function is supported	7, figure 135	c202	

c201: IF E.1/2 THEN o ELSE x -- implies that at least one VC-12 Layer payload Adaptation Source function is present

c202: IF E.1/3 THEN o ELSE x -- implies that at least one VC-12 Layer payload Adaptation

Table E.3: VC-12 Layer Protection schemes

Prerequisite: E.1/25 OR E.1/26 -- VC-12 Layer Linear Trail or SNC Protection supported

Item	VC-12 Layer Linear Trail Protection schemes	Reference	Status	Support
1	VC-12 Layer 1+1 Linear Trail Protection with unidirectional switching and revertive operation	7.5.1.1	c301	
2	VC-12 Layer 1+1 Linear Trail Protection with unidirectional switching and non-revertive operation	7.5.1.1	c301	
3	VC-12 Layer 1+1 Linear Trail Protection with bidirectional switching and revertive operation	7.5.1.2	c302	
4	VC-12 Layer 1+1 Linear Trail Protection with bidirectional switching and non-revertive operation	7.5.1.2	c302	
5	VC-12 Layer 1+1 Inherently Monitored SNC (SNC/I) Protection with unidirectional switching and revertive operation	7.1	c303	
6	VC-12 Layer 1+1 Inherently Monitored SNC (SNC/I) Protection with unidirectional switching and non-revertive operation	7.1	c303	
7	VC-12 Layer 1+1 Non-intrusively Monitored SNC (SNC/N) Protection with unidirectional switching and revertive operation	7.1	c304	
8	VC-12 Layer 1+1 Non-intrusively Monitored SNC (SNC/N) Protection with unidirectional switching and non-revertive operation	7.1	c304	
9	VC-12 Layer 1+1 Sub-layer Monitored SNC (SNC/S) Protection with unidirectional switching and revertive operation	7.1	c305	
10	VC-12 Layer 1+1 Sub-layer Monitored SNC (SNC/S) Protection with unidirectional switching and non-revertive operation	7.1	c305	

Comment to E.3/3 and E.3/4: The APS protocol for bidirectional VC-3 linear trail protection is not defined.

o.301:	It is mandatory to support at least one of these items	-- at least one 1+1 linear trail protection scheme
o.302:	It is mandatory to support at least one of these items	-- at least one 1+1 SNC protection scheme
c301:	IF E.1/25 THEN o.301 ELSE x	-- 1+1 linear trail protection supported
c302:	IF (E.1/25 ANDOR (E.1/2 AND E.1/3)) THEN o.301 ELSE x	-- 1+1 linear trail protection and bidirectional layer supported
c303:	IF E.1/26 THEN o.302 ELSE x	-- 1+1 SNC protection supported
c304:	IF (E.1/26 AND (E.1/17 OR E.1/19)) THEN o.302 ELSE x	-- 1+1 SNC protection and S12m_TT_Sk and/or S12s_TT_Sk supported
c305:	IF (E.1/26 AND (E.1/21 OR E.1/24)) THEN o.302 ELSE x	-- 1+1 SNC protection and S12D_TT_Sk and/or S12Dm_TT_Sk supported

Table E.4: VC-12 Layer Linear Trail Protection functions

Prerequisite: E.1/25 -- VC-12 Layer Linear Trail Protection scheme supported

Item	VC-12 Layer Linear Trail Protection functions	Reference	Status	Support
1	VC-12 Layer Linear Trail Protection Connection function (S12P_C)	7, figure 135	m	
2	VC-12 Protection Trail Termination Source function (S12P_TT_So)	7, figure 135	c401	
3	VC-12 Protection Trail Termination Sink function (S12P_TT_Sk)	7, figure 135	m	
4	VC-12 trail to VC-12 Linear Trail Protection Layer Adaptation Source function (S12/S12P_A_So)	7, figure 135	c401	
5	VC-12 trail to VC-12 Linear Trail Protection Layer Adaptation Sink function (S12/S12P_A_Sk)	7, figure 135	m	

c401:	IF E.1/2 THEN m ELSE x	-- a TT_So function should exist for protection Source functions

Table E.5: Supervision processes

Item	Supervision process	Reference	Status	Support
1	Near-end Performance monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c501	
2	Far-end Performance monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c502	
3	Protection Performance monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c503	
4	Defect correlation process	EN 300 417-1-1 [6] subclause 8.2-8.3	c504	
5	Tandem Connection Near-end Performance monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c505	
6	Tandem Connection Far-end Performance monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c506	
7	Tandem Connection Outgoing VC Performance monitoring process	EN 300 417-1-1 [6] subclause 8.2-8.4	c506	
8	Tandem Connection defect correlation process	EN 300 417-1-1 [6] subclause 8.2-8.3	c505	

c501:	IF (E.1/3 OR E.1/17 OR E.1/19) THEN m ELSE n/a	-- S12_TT_Sk and/or S12m_TT_Sk and/or S12s_TT_Sk present
c502:	IF (E.1/2 AND E.1/3) OR (E.1/18 AND E.1/19) THEN m ELSE n/a	-- bidirectional S12 layer or both Supervisory-unequipped Trail Termination functions present
c503:	IF E.1/25 THEN m ELSE n/a	-- VC-12 Layer Linear Trail Protection scheme supported
c504:	IF (E.1/3 OR E.1/5 OR E.1/6 OR E.1/8 OR E.1/10 OR E.1/12 OR	

E.1/14 OR E.1/16 OR E.1/17 OR E.1/19 OR
E.1/21 OR E.1/24) THEN m ELSE n/a -- at least one of the Sink functions with defect correlation capabilities present

c505: IF (E.1/21 OR E.1/24)
THEN m ELSE n/a -- S12D_TT_Sk and/or S12Dm_TT_Sk present

c506: IF (E.1/20 AND E.1/21)
THEN m ELSE n/a -- both Tandem Connection Trail Termination functions present

E.4.2 VC-12 Layer Transmission Tables

Table E.6: Data stream structure

Item	Data stream structure	Reference	Status	Support
1	The CI at the S12 connection point is octet structured with a 500 microsecond frame.	7	m	
2	The S12_CI is 140 bytes data stream composed of 4 bytes of VC-12 overhead and 136 bytes of VC-12 payload.	7, figure 136	m	

E.4.2.1 VC-12 Layer Connection Function: S12_C

Prerequisite: E.1/1 -- S12_C present

E.4.2.1.1 Routing process

Table E.7: Connectivity functionalities: generalities

Prerequisite: E.1/1 -- S12_C present

Item	Connectivity functionalities: generalities	Reference	Status	Support
1	The S12_C function is able to connect a specific input ((termination) connection point) with a specific output input ((termination) connection point) by means of establishing a matrix connection between the specified input and output.	7.1	m	
2	The S12_C function is able to remove an established matrix connection.	7.1	m	

Comment: Not supporting E.7/1 and E.7/2 means that only hard-wired connections are supported.

Table E.8: Connectivity functionalities: connection characterization

Item	Connectivity functionalities: connection characterization	Reference	Status	Support
1	Each connection in the S12_C function is characterized by the type of connection: unprotected, 1+1 protected (SNC/I, SNC/N or SNC/S protection)	7.1	c801	
2	Each connection in the S12_C function is characterized by the traffic direction: unidirectional, bidirectional	7.1	m	
3	Each connection in the S12_C function is characterized by the input and output connection points: set of connection point identifiers	7.1	m	

c801: IF E.1/26 THEN m ELSE n/a -- 1+1 SNC protection supported

E.4.2.1.2 Unequipped VC generation

Table E.9: Unequipped VC generation

Item	Connectivity functionalities: connection characterization	Reference	Status	Support
1	The function generates an unequipped VC signal, as specified in EN 300 417-1-1 [6], subclause 7.2.	7.1, EN 300 417-1-1 [6], subclause 7.2.	m	

E.4.2.1.3 SNC protection process

Prerequisite: E.1/26 -- 1+1 SNC protection supported (if the given condition is not true then skip the whole subclause "SNC protection process")

Table E.10: SNC protection connectivity functionalities: generalities

Item	SNC protection connectivity functionalities: generalities	Reference	Status	Support
1	The S12_C is able to establish protection groups between a number of (T)CPs to perform the 1+1 VC-12 linear (sub)network connection protection process.	7.1, EN 300 417-1-1 [6] subclause 9.7.1, subclause 9.7.2, subclause 9.6.3	m	
2	The S12_C performs the bridge and selector functionality as presented in figure 49 of EN 300 417-1-1 [6]	7.1	m	

Table E.11: SNC protection connectivity functionalities: source direction

Item	SNC protection connectivity functionalities: source direction	Reference	Status	Support
1	The working output is connected to the associated normal input.	7.1	m	
2	The protection output is connected to the associated normal input.	7.1	m	

Table E.12: SNC protection connectivity functionalities: sink direction

Item	SNC protection connectivity functionalities: sink direction	Reference	Status	Support
1	The signal output at the normal reference point can be the signal received via either the working connection or the protection connection	7.1	m	

Comment: In the sink case of a protection connection the source of the connection is determined by the SF (and SD) signals associated with each of the two inputs to the connection and the possible external switch requests. The set of SF and SD signals used, is controlled by the protection type setting.

Table E.13: SNC protection operation

Item	SNC protection operation	Reference	Status	Support
1	The signal switching procedure is started under a Signal Fail condition. This depends on the protection type: SF = SSF for SNC/I and SF = TSF for SNC/N or SNC/S.	7.1, EN 300 417-3-1 [7] A.1	m	
2	The signal switching procedure is started under a Signal Degrade condition. This depends on the protection type: SD = TSD for SNC/N or SNC/S.	7.1, EN 300 417-3-1 [7] A.1	c1301	
3	For revertive operation the available external commands are LO, FSw-#1, MSw-#1, CLR	7.1, EN 300 417-3-1 [7] A.1	c1302	
4	For non-revertive operation the available external commands are LO or FSw, FSw-#i, MSw-#i, CLR (i = 0, 1)	7.1, EN 300 417-3-1 [7] A.1	c1303	
5	The Wait-To-Restore (WTR) time is provisionable	7.1, EN 300 417-3-1 [7] A.1	c1302	
6	The Hold-off (HO) time is provisionable in steps of the order of 100 ms	7.1, EN 300 417-3-1 [7] A.1	m	

c1301: IF (E.4/6 OR E.4/7 OR E.4/8 OR E.4/9)
THEN m ELSE n/a -- SNC/N and/or SNC/S protection supported

c1302: IF (E.4/5 OR E.4/6 OR E.4/8)
THEN m ELSE n/a -- revertive SNC protection scheme supported

c1303: IF (E.4/6 OR E.4/7 OR E.4/9)
THEN m ELSE n/a -- non-revertive SNC protection scheme supported

Table E.14: Protection architecture characteristic parameters

Item	Protection architecture characteristic parameters	Reference	Status	Support	Values	
					Allowed	Supported
1	Wait-To-Restore (WTR) time: X value	7.1, EN 300 417-3-1 [7] A.1	c1401		$0 \leq X \leq 12$ minutes	
2	Hold-off (HO) time: Z value	7.1, EN 300 417-3-1 [7] A.1	m		$0 \leq Z \leq 10$ s	
3	Switching time (Y) is less than or equal to 50 ms	7.1, EN 300 417-3-1 [7] A.1	m		___	___

c1401: IF (E.4/5 OR E.4/6 OR E.4/8)
THEN m ELSE n/a -- revertive SNC protection scheme supported

Table E.15: SNC protection dynamic configuration

Item	SNC protection dynamic configuration	Reference	Status	Support
1	It is possible to add/remove connections to/from a broadcast connection without disturbing the CI passing the connection unless any protection switching action is activated/required	7.1	m	
2	It is possible to add/remove the protection status to the configuration of a connection without disturbing the CI passing the connection unless any protection switching action is activated/required	7.1	m	
3	It is possible to change between the operation type of a connection without disturbing the CI passing the connection unless any protection switching action is activated/required	7.1	c1501	
4	It is possible to change the WTR time of a connection without disturbing the CI passing the connection unless any protection switching action is activated/required	7.1	c1502	
5	It is possible to change the Hold-off time of a connection without disturbing the CI passing the connection unless any protection switching action is activated/required.	7.1	m	
6	The operation type can be changed via S12S13_C_MI_OPERtype	7.1	c1501	

c1501: IF (E.4/5 OR E.4/7 OR E.4/9) AND
(E.4/6 OR E.4/8 OR E.4/10)
THEN m ELSE n/a -- at least one revertive and one non-revertive SNC protection scheme supported

c1502: IF E.15/1 THEN m ELSE n/a -- Wait-To-Restore (WTR) time supported

E.4.2.2 VC-12 Layer Trail Termination Functions: S12_TT_So, S12_TT_Sk, S12m_TT_Sk, S12s_TT_So and S12s_TT_Sk

Prerequisite: E.1/2 OR E.1/3 OR E.1/17 OR
E.1/18 OR E.1/19 -- at least one VC-12 layer Trail Termination function present

E.4.2.2.1 In service error monitoring process

Table E.16: In service error monitoring: principles

Item	In service error monitoring: principles	Reference	Status	Support
1	An Error Detection Code (EDC) is part of the characteristic information for in service monitoring purposes.	EN 300 417-1-1 [6] subclause 7.3	m	
2	In service error monitoring parameter definition is block-based.	ITU-T Rec.G.707 [14] subclause 9.2.2.4 note	m	
3	The block length is 140 bytes (the entire VC-12).	ITU-T Rec.G.707 [14] subclause 9.2.2.4	m	
4	The error monitoring is performed using Bit Interleaved Parity 2 (BIP-2).	7.2.1,7.7.2 , ITU-T Rec.G.707 [14] subclause 9.2.2.4 note	m	
5	The BIP-2 is calculated using even parity in such a manner that the bit in position x provides even parity over the x-bits of all the 2-bits sequences within the specified block.	ITU-T Rec.G.707 [14] subclause 9.2.2.4 note	m	

Comments: The BIP-n is interpreted as checking 'n' separate interleaved parity check blocks. If any of the 'n' parity check fails (Error Detection Code Violation), the block is assumed to be in error.

Table E.17: Error Detection Code location

Item	Error Detection Code location	Reference	Status	Support
1	VC-12 Layer Error Detection Code (EDC) is located in byte V5 bits 1-2 of the VC-12 overhead.	7, figure 108	m	

Table E.18: Error Detection Code processing: source direction

Prerequisite: E.1/2 OR E.1/18 -- S12_TT_So and/or S12s_TT_So present

Item	Error Detection Code processing: source direction	Reference	Status	Support
1	The BIP-2 is calculated over all bits of the entire previous VC-12.	7.2.1,7.6.2	m	
2	BIP-2 code is inserted in byte V5 bits 1-2 of the current VC-12.	7.2.1,7.6.2	m	

Table E.19: Error Detection Code processing: sink direction

Prerequisite: E.1/3 OR E.1/17 OR E.1/19 -- S12_TT_Sk, S12m_TT_Sk, and/or S12s_TT_Sk present

Item	Error Detection Code processing: sink direction	Reference	Status	Support
1	The incoming error monitoring byte V5 is recovered from the VC-12 overhead.	7.2.2,7.6.1, 7.6.3	m	
2	The BIP-2 is calculated over all bits of the entire previous VC-12.	7.2.2,7.6.1, 7.6.3	m	
3	Recovered byte V5 bits 1-2 of byte V5 are compared with the calculated BIP-2.	7.2.2,7.6.1, 7.6.3	m	
4	A difference between the computed and recovered bits 1-2 of byte V5 values is taken as evidence of one or more errors (nN_B) in the computation block.	7.2.2,7.6.1, 7.6.3	m	

E.4.2.2.2 Remote indicator monitoring process

E.4.2.2.2.1 VC-12 Remote Defect Indication (VC-12 RDI)

Table E.20: Remote Defect Indication location

Item	Remote Defect Indication location	Reference	Status	Support
1	The VC-12 RDI is located in bit 8 of byte V5 of the VC-12 overhead.	7.2.2, 7.6.1, 7.6.3	m	

Table E.21: Remote Defect Indication processing: source direction

Prerequisite: (E.1/2 AND E.1/3) OR
(E.1/18 AND E.1/19) -- bidirectional S12 layer and/or both Supervisory- unequipped Trail Termination functions

Item	Remote Defect Indication processing: source direction	Reference	Status	Support
1	VC-12 RDI is set upon activation of S12_RI_RDI determined by the associated S12_TT_Sk.	7.2.1	c2101	
2	VC-12 RDI is cleared upon deactivation of S12_RI_RDI determined by the associated S12_TT_Sk.	7.2.1	c2101	
3	VC-12 RDI is set upon activation of S12s_RI_RDI determined by the associated S12s_TT_Sk.	7.6.2	c2102	
4	VC-12 RDI is cleared upon deactivation of S12s_RI_RDI determined by the associated S12s_TT_Sk.	7.6.2	c2102	
5	VC-12 RDI signal is coded as a '1' bit value.	7.2.1, 7.6.2	m	
6	The '0' bit value is inserted if no S12_RI_RDI signal is active.	7.2.1, 7.6.2	m	

c2101: IF (E.1/2 AND E.1/3)
THEN m ELSE n/a -- bidirectional S12 layer supported
c2102: IF (E.1/18 AND E.1/19)
THEN m ELSE n/a -- Supervisory-unequipped Trail Termination functions supported

Table E.22: Remote Defect Indication processing: sink direction

Prerequisite: E.1/3 OR E.1/17 OR E.1/19 -- S12_TT_Sk and/or S12m_TT_Sk and/or S12s_TT_Sk present

Item	Remote Defect Indication processing: sink direction	Reference	Status	Support
1	The VC-12 layer Trail Termination Sink functions (S12_TT_Sk, S12m_TT_Sk, S12s_TT_Sk) extract and monitor bit 8 of V5 byte in order to detect the '1' bit code as evidence of VC-12 RDI condition.	7.2.2, 7.6.1, 7.6.3	m	

E.4.2.2.2.2 VC-12 Remote Error Indication (S12 REI)

Table E.23: Remote Error Indication: principles

Item	Remote Error Indication: principles	Reference	Status	Support
1	The REI signal indicates if Errored Block (EB) were detected in the trail signal at the far-end trail termination	ITU-T Rec.G.707 [14] subclause 9.3.1.4	m	
2	The block length is 3 424 bits (one VC-12). The Error Detection Code (EDC) is BIP-2.	ITU-T Rec.G.707 [14] subclause 9.3.1.4	m	

Table E.24: Remote Error Indication location

Item	Remote Error Indication location	Reference	Status	Support
1	The VC-12 overhead REI is located in bit 3 of V5 byte of the VC-12 overhead.	ITU-T Rec.G.707 [14] subclause 9.3.1.4	m	

Table E.25: Remote Error Indication processing: source direction

Prerequisite: (E.1/2 AND E.1/3) OR
(E.1/18 AND E.1/19) -- bidirectional S12 layer and/or both Supervisory- unequipped Trail Termination functions

Item	Remote Error Indication processing: source direction	Reference	Status	Support
1	The S12_TT_So sets REI to the equivalent binary value of the number of EDCV detected by the monitoring process following the coding given in table 121 of subclause 7.2.1 in EN 300 417-4-1 [8].	7.2.1, table 121	c2501	
2	The S12s_TT_So sets REI to the equivalent binary value of the number of EDCV detected by the monitoring process following the coding given in table 138 of subclause 7.4.2 in EN 300 417-4-1 [8].	7.6.2, table 138	c2502	

c2501: IF (E.1/2 AND E.1/3)
THEN m ELSE n/a -- bidirectional S12 layer supported
c2502: IF (E.1/18 AND E.1/19)
THEN m ELSE n/a -- Supervisory-unequipped Trail Termination functions supported

Table E.26: Remote Error Indication processing: sink direction

Prerequisite: E.1/3 OR E.1/17 OR E.1/19 -- S12_TT_Sk and/or S12m_TT_Sk and/or S12s_TT_Sk present

Item	Remote Error Indication processing: sink direction	Reference	Status	Support
1	The VC-12 layer Trail Termination Sink functions (S12_TT_Sk, S12m_TT_Sk, S12s_TT_Sk) extract the VC-12 REI from the incoming VC-12 overhead.	7.2.2, 7.6.1, 7.6.3	m	
2	The VC-12 layer Trail Termination Sink functions (S12_TT_Sk, S12m_TT_Sk, S12s_TT_Sk) interpret the VC-12 REI as given in table 6 of subclause 4.2.2 in EN 300 417-4-1 [8].	7.2.2, 7.6.1, 7.6.3, table 6	m	

E.4.2.2.3 Trail Trace Identifier

Prerequisite: E.1/2 OR E.1/3 OR E.1/17 OR E.1/18 OR E.1/19 -- at least one VC-12 layer Trail Termination function present

Table E.27: Trail Trace Identifier: principles

Item	Trail Trace Identifier: principles	Reference	Status	Support
1	A Trail Trace Identifier (TTI) is inserted by the termination source containing the local Access Point Identifier (APId) and TTI header (TxTI).	7.2.1, 4.4.2, EN 300 417-1-1 [6] subclause 7.1	c2701	
2	The content of the accepted TTI (AcTI) is compared by the trail termination sink function with the provisioned "expected TTI" (ExTI), identifying the expected remote AP.	7.2.2, 4.4.1, 4.4.3, EN 300 417-1-1 [6] subclause 7.1, EN 300 417-1-1 [6] subclause 8.2.1.3	c2702	

c2701: IF (E.1/2 OR E.1/18) THEN m ELSE n/a -- S12_TT_So and/or S12s_TT_So present
c2702: IF (E.1/3 OR E.1/17 OR E.1/19) THEN m ELSE n/a -- S12_TT_Sk and/or S12m_TT_Sk and/or S12s_TT_Sk present

Table E.28: Trail Trace Identifier byte location

Item	Trail Trace Identifier byte location	Reference	Status	Support
1	The VC-12 Layer Trail Trace Identifier (TTI) is located in byte J2 of the VC-12 overhead.	7.2.1	m	

Table E.29: Trail Trace Identifier byte structure

Item	Trail Trace Identifier byte structure	Reference	Status	Support
1	The VC-12 TTI is a 16 byte string containing the 15 byte APId and a 1 byte header. The MSB of the header is a "1", the remaining 7 bits contain the CRC-7 value of the VC-12 TTI. The MSB of the 15 APId bytes is "0".	EN 300 417-1-1 [6] subclause 7.1	m	
2	The CRC-7 word is the remainder after multiplication by x^7 and then division (modulo 2) by the generator polynomial $x^7 + x^3 + 1$, of the polynomial representation of the VC-12 TTI with the CRC bits set to binary zeroes.	EN 300 417-1-1 [6] subclause 7.1	m	
3	The 16 byte VC-12 TxTI, 16 byte VC-12 ExTI and 16 byte VC-12 AcTI are transferred via the Management Point to and from the trail termination function.	EN 300 417-1-1 [6] subclause 8.2.1.3	m	

Table E.30: Trail Trace identification: source direction

Prerequisite: E.1/2 OR E.1/18 -- at least one VC-12 layer Trail Termination source function present

Item	Trail Trace identification: source direction	Reference	Status	Support
1	The 16 byte VC-12 TTI is transmitted continuously.	EN 300 417-1-1 [6] subclause 7.1	m	

Table E.31: Trail Trace identification: sink direction

Prerequisite: E.1/3 OR E.1/17 OR E.1/19 -- at least one VC-12 layer Trail Termination sink function present

Item	Trail Trace identification: sink direction	Reference	Status	Support
1	The VC-12 Layer Trail Termination Sink functions (S12_TT_Sk, S12s_TT_Sk, S12m_TT_Sk) support mode 1.	EN 300 417-1-1 [6] subclause 7.1	m	
2	The VC-12 Layer Trail Termination Sink functions (S12_TT_Sk, S12s_TT_Sk, S12m_TT_Sk) support mode 2.	EN 300 417-1-1 [6] subclause 7.1	m	
3	The VC-12 Layer Trail Termination Sink functions (S12_TT_Sk, S12s_TT_Sk, S12m_TT_Sk) recover the 16 byte multiframe carried in byte J2 and assume it as Received Trail Trace Identifier (RxTI). The RxTI is made available as AcTI for network management purposes	7.2.2, 7.4.1, 7.4.3	m	
4	The expected TTI mode is provisionable via S12-_TT_Sk_MI_ExTImode	7.2.2, 7.4.1, 7.4.3	m	

E.4.2.2.4 Supervisory Unequipped indication

Table E.32: Supervisory Unequipped indication

Prerequisite: E.1/18 -- S12s_TT_So function present

Item	Supervisory Unequipped indication	Reference	Status	Support
1	The S12s_TT_So function inserts code "0000 0000" (unequipped tandem connection) in byte N2, as defined in EN 300 417-1-1 [6] subclause 7.2.	7.4.2, EN 300 417-1-1 [6] subclause 7.2	m	

E.4.2.3 Activation/deactivation of VC-12 Layer payload Adaptation Functions (S12/P12x_A, S12/P12s-b_A, S12/P12s-a_A, S12/P12s-x_A, S12/P0-31c_A, S12/Avp_A and S12/TSS4_A)

Table E.33: Activation/deactivation of VC-12 Layer payload Adaptation Functions

Prerequisite: E.2/1 OR E.2/2 -- more than one VC-12 Layer payload Adaptation function present

Item	Activation/deactivation of VC-12 Layer payload Adaptation Functions	Reference	Status	Support
1	Only one of the supported adaptation source functions, as taken from the set composed of S12/P12x_A_So, S12/P12s-b_A_So, S12/P12s-a_A_So, S12/P0-31c_A_So, S12/Avp_A_So and S12/TSS4_A_So, can access the VC-12 access point at a time. Access to the access point by other adaptation source functions is denied.	7.3.1, 7.3.3.1, 7.3.3.2, 7.3.5, 7.3.7, 7.3.9	c3301	
2	Each of the supported VC-12 Layer payload adaptation source functions accesses the VC-12 access point when it is activated (MI_Active is true). Otherwise, it does not access the access point.	7.3.1, 7.3.3.1, 7.3.3.2, 7.3.5, 7.3.7, 7.3.9	c3301	

Item	Activation/deactivation of VC-12 Layer payload Adaptation Functions	Reference	Status	Support
3	The supported adaptation sink functions, as taken from the set composed of S12/P12x_A_Sk, S12/P12s-b_A_Sk, S12/P12s-a_A_Sk, S12/P12s-x_A_Sk, S12/P0-31c_A_Sk, S12/Avp_A_Sk and S12/TSS4_A_Sk, can be activated/deactivated.	7.3.2, 7.3.4.1, 7.3.4.2, 7.3.4.3, 7.3.6, 7.3.8, 7.3.10	c3302	
4	Each of the supported VC-12 Layer payload adaptation sink functions performs its operation specified above when it is activated (MI_Active is true). Otherwise, it does not report its status via the management point.	7.3.2, 7.3.4.1, 7.3.4.2, 7.3.4.3, 7.3.6, 7.3.8, 7.3.10	c3302	
5	If the S12/P12x_A_Sk and/or S12/P12s-x_A_Sk and/or S12/P12s-b_A_Sk and/or S12/P12s-a_A_Sk and/or S12/P0-31c_A_Sk and/or is not activated it transmits the all-ONEs signal at its output (CI_D).	7.3.2, 7.3.4.1, 7.3.4.2, 7.3.4.3, 7.3.6	c3303	

c3301: IF E.2/1 THEN m ELSE x -- more than one VC-12 Layer payload adaptation source function supported

c3302: IF E.2/2 THEN o ELSE x -- more than one VC-12 Layer payload adaptation sink function supported

c3303: IF E.33/3 AND (E.1/5 OR E.1/6 OR E.1/8 OR E.1/10 OR E.1/12) THEN m ELSE n/a -- S12/P12x_A_So and/or S12/P12s-b_A_So and/or S12/P12s-a_A_So and/or S12/P12s-x_A_So and/or S12/P0-31c_A_ So function supported

E.4.2.4 VC-12 Layer to P12x Layer Adaptation Functions: S12/P12x_A_So and S12/P12x_A_Sk

Prerequisite: E.1/4 OR E.1/5 -- S12/P12x_A_So and/or S12/P12x_A_Sk present

Table E.34: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The S12/P12x_A_So maps a 2 048 kbit/s ±50 ppm information stream into a VC-12 payload (140 bytes) using bit stuffing and adds bits 5 and 7 of byte V5.	7.3.1, ETS 300 147 [1]	c3401	
2	The mapping of the 2 048 kbit/s ±50 ppm information stream into the VC-12 payload is performed as depicted in figure 145 of subclause 7.3.1 in EN 300 417-4-1 [8]	7.3.1, figure 145, ETS 300 147 [1]	c3401	
3	The S12/P12x_A_So generates the S12 fixed Frame Start (FS)	7.3.1	c3401	
4	The S12/P12x_A_Sk function recovers plesiochronous P12x Characteristic Information (2 048 kbit/s ±50 ppm) from the synchronous container-12 and checks the reception of the correct payload signal type.	7.3.2, ETS 300 147 [1]	c3402	

c3401: IF E.1/4 THEN m ELSE n/a -- S12/P12x_A_So present
c3402: IF E.1/5 THEN m ELSE n/a -- S12/P12x_A_Sk present

E.4.2.4.1 VC-12 Layer to P12x Layer frequency justification and bitrate adaptation processes

Table E.35: Frequency justification and bitrate adaptation: principles

Prerequisite: E.1/4 -- S12/P12x_A_So present

Item	Frequency justification and bitrate adaptation: principles	Reference	Status	Support
1	Frequency justification is performed by bit stuffing.	7.3.1	m	

Table E.36: Frequency justification and bitrate adaptation: source direction

Prerequisite: E.1/4 -- S12/P12x_A_So present

Item	Frequency justification and bitrate adaptation: source direction	Reference	Status	Support
1	The S12/P12x_A_So function provides for an elastic store (buffer) process. The data signal is written into the buffer under control of the associated input clock. The data are read out of the buffer and written onto the D, S1 and S2 bits under control of the VC-12 clock, frame position (S12_TI), and justification decisions.	7.3.1, figure 12	m	
2	Each justification decision results in a corresponding positive or negative justification action. Upon a positive justification action, the reading of 1 data bit is cancelled once and no data are written at the justification opportunity bit S2 and no data are written onto S1. Upon a negative justification action, 1 extra data bit is read once and written onto the justification opportunity bit S1 and data are written onto S2. If neither a positive nor a negative justification action is to be performed, either no data are written onto S1 and data are written onto S2, or vice versa.	7.3.1, figure 12	m	
3	The buffer size is such that in the presence of jitter as specified by ITU-T Recommendation G.823 [15] and a frequency within the range 2 048 kbit/s ±50 ppm, this justification process does not introduce any errors. Any step in frequency within this range does not cause any errors.	7.3.1, ITU-T Rec.G.823 [15]	m	

E.4.2.4.2 Justification control

Table E.37: Justification control generation and interpretation

Item	Justification control generation and interpretation	Reference	Status	Support
1	The S12/P12x_A_So function generates the justification control (C1,C2) bits according to the specification in ETS 300 147 [1]. It inserts the justification control bits in the appropriate C1C2 bit positions.	7.3.1, figure 145, ETS 300 147 [1]	c3701	
2	The S12/P12x_A_Sk function performs justification control interpretation according ETS 300 147 [1] to recover the 2 048 kbit/s signal from the VC-12. If the majority of the C1 bits is "0" the S1 bit is taken as a data bit, otherwise (majority of C1 bits is "1") S1 bit is taken as a justification bit and consequently ignored. If the majority of the C2 bits is "0" S2 bit is taken as a data bit, otherwise (majority of C2 bits is "1") S2 bit is taken as a justification bit and consequently ignored.	7.3.2, ETS 300 147 [1]	c3702	

c3701: IF E.1/4 THEN m ELSE n/a -- S12/P12x_A_So present
c3702: IF E.1/5 THEN m ELSE n/a -- S12/P12x_A_Sk present

E.4.2.4.3 Smoothing and jitter limiting process

Table E.38: Smoothing and jitter limiting process

Prerequisite: E.1/5 -- S12/P12x_A_Sk present

Item	Smoothing and jitter limiting process	Reference	Status	Support
1	The S12/P12x_A_Sk function provides for a clock smoothing and elastic store (buffer) process. The 2 048 kbit/s data signal is written into the buffer under control of the associated (gapped) input clock. The data signal is read out of the buffer under control of a smoothed (equally spaced) 2 048 kHz ±50 ppm clock.	7.3.2	m	
2	The residual jitter caused by pointer adjustments and bit justifications (measured at the 2 048 kbit/s interface) is within the limits specified in EN 300 417-1-1 [6] subclause 11.3.1.2.	7.3.2, EN 300 417-1-1 [6] subclause 11.3.1.2	m	
3	In the presence of jitter as specified in EN 300 417-1-1 [6] subclause 11.3.1.2 and a frequency within the range 2 048 kbit/s ±50 ppm, this justification process does not introduce any errors.	7.3.2, EN 300 417-1-1 [6] subclause 11.3.1.2	m	
4	Following a step in frequency of the P12x signal there will be a maximum recovery time of TBDrecovery time of X seconds after which this process will not generate any bit errors.	7.3.2	m	

E.4.2.4.4 Payload typeSignal Label processing

Table E.39: Payload typeSignal Label generation

Prerequisite: E.1/4 -- S12/P12x_A_So present

Item	Payload typeSignal Label generation	Reference	Status	Support
1	The S12/P12x_A_So function inserts code "010" (Asynchronous mapping of 2 048 kbit/s into the Container-12) in bits 5 to 7 of byte V5 of the VC-12 overhead as defined in ETS 300 147 [1].	7.3.1, figure 13, ETS 300 147 [1]	m	

Table E.40: Payload typeSignal Label recovery

Prerequisite: E.1/5 -- S12/P12x_A_Sk present

Item	Payload typeSignal Label recovery	Reference	Status	Support
1	The S12/P12x_A_Sk function compares the content of the accepted bits 5 to 7 of byte V5 with the expected value code "010" (Asynchronous mapping of 2 048 kbit/s into the Container-12).	7.3.2	m	
2	The application and acceptance and mismatch detection process are as specified in EN 300 417-1-1 [6], subclauses 7.2 and 8.2.1.2.	7.3.2, EN 300 417-1-1 [6] subclause 7.2, subclause 8.2.1.2	m	

E.4.2.5 VC-12 Layer to P12s-b Layer Adaptation Functions: S12/P12s-b_A_So and S12/P12s-b_A_Sk

Prerequisite: E.1/7 OR E.1/8 -- S12/P12s-b_A_So and/or S12/P12s-b_A_Sk present

Table E.41: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The S12/P12s-b_A_So function byte-synchronously maps a synchronous octet structured 2 048 kbit/s information stream into a VC-12 payload and adds bits 5 to 7 of byte V5.	7.3.3.1, ETS 300 147 [1]	c4101	
2	The mapping of the 2 048 kbit/s ±4.6 ppm information stream into the VC-12 payload is performed as depicted in figure 149 of subclause 7.3.3.1.1 in EN 300 417-4-1 [8]	7.3.3.1, figure 149 ETS 300 147 [1]	c4101	
3	The S12/P12s-b_A_So generates a fixed Frame Start (FS)	7.3.3.1	c4101	
4	The S12/P12s-b_A_Sk function recovers byte-synchronous mapped P12s Characteristic Information (2 048 kbit/s ±4,6 ppm) from the synchronous container-12 and monitors the reception of the correct payload signal type. It recovers the frame (and CRC4 multiframe) phase of the 2 048 kbit/s signal.	7.3.4.2, ETS 300 147 [1]	c4102	

c4101: IF E.1/7 THEN m ELSE n/a -- S12/P12s-b_A_So present
c4102: IF E.1/8 THEN m ELSE n/a -- S12/P12s-b_A_Sk present

E.4.2.5.1 VC-12 Layer to P12s-b Layer frequency justification and bitrate adaptation processes

Table E.42: Frequency justification and bitrate adaptation: source direction

Prerequisite: E.1/7 -- S12/P12s-b_A_So present

Item	Frequency justification and bitrate adaptation: source direction	Reference	Status	Support
1	The S12/P12s-b_A_So function provides for a (35/32) clock multiplier process taking P12s_CI_CK as input to generate the VC-12 clock signal S12_AI_CK.	7.3.3.1, figure 150	m	
2	The S12/P12s-b_A_So function provides for a buffer process. The data and frame start signals are written into the buffer under control of the associated input clock. The data and frame start signals are read out of the buffer under control of the VC-12 clock. No data are read out of the buffer at the VC-12 POH byte positions and fixed stuff "R" byte positions.	7.3.3.1, figure 149	m	
3	The S12/P12s-b_A_So converts the P12s frame start signal (P12s_CI_FS) identifying TS0 position into a VC-12 frame start signal (S12_AI_FS) identifying V5 byte position.	7.3.3.1	m	
4	The buffer size is such that the above process does not introduce errors.	7.3.3.1, ITU-T Rec.G.823 [15]	m	

E.4.2.5.2 Smoothing and jitter limiting process

Table E.43: Smoothing and jitter limiting process

Prerequisite: E.1/8 -- S12/P12s-b_A_Sk present

Item	Smoothing and jitter limiting process	Reference	Status	Support
1	The S12/P12s-b_A_Sk function provides for a clock smoothing and elastic store (buffer) process. The 2 048 kbit/s data signal is written into the buffer under control of the associated (gapped) input clock with a frequency accuracy within ±4,6 ppm. The data signal is read out of the buffer under control of a smoothed (equally spaced) 2 048 kHz ±4,6 ppm clock.	7.3.4.2	m	
2	The residual jitter caused by pointer adjustments and bit justifications (measured at the 2 048 kbit/s interface) is within the limits specified in EN 300 417-1-1 [6] subclause 11.3.1.2.	7.3.4.2, EN 300 417-1-1 [6] subclause 11.3.1.2	m	

Item	Smoothing and jitter limiting process	Reference	Status	Support
3	In the presence of jitter as specified in EN 300 417-1-1 [6] subclause 11.3.1.2 and a frequency within the range 2 048 kbit/s ±4,6 ppm, this justification process does not introduce any errors.	7.3.4.2, EN 300 417-1-1 [6] subclause 11.3.1.2	m	
4	Following a step in frequency of the P12s signal there will be a maximum recovery time of TBDrecovery time of X seconds after which this process will not generate any bit errors.	7.3.4.2	m	

E.4.2.5.3 Frame and Multiframe Alignment process

Table E.44: Frame and Multiframe Alignment process

Prerequisite: E.1/8 -- S12/P12s-b_A_Sk present

Item	Frame and Multiframe Alignment process	Reference	Status	Support
1	The S12/P12s-b_A_Sk function recovers the (250 µs) basic frame and (2 ms) CRC-4 multiframe phase evaluating the timeslots in the VC-12). The process operates as specified in ETS 300 167 [3].	7.3.4.2, figure 149	m	
2	The S12/P12s-b_A_Sk function supports either the manual, or the automatic, or both manual and automatic interworking modes.	7.3.4.2	m	

E.4.2.5.4 Payload typeSignal Label processing

Table E.45: Payload typeSignal Label generation

Prerequisite: E.1/7 -- S12/P12s-b_A_So present

Item	Payload typeSignal Label generation	Reference	Status	Support
1	The S12/P12s-b_A_So function inserts code "100" (byte-synchronous mapping of 2 048 kbit/s into the Container-12) in bits 5 to 7 of byte V5 of the VC-12 overhead as defined in ETS 300 147 [1].	7.3.3.1, ETS 300 147 [1]	m	

Table E.46: Payload typeSignal Label recovery

Prerequisite: E.1/8 -- S12/P12s-b_A_Sk present

Item	Payload typeSignal Label recovery	Reference	Status	Support
1	The S12/P12s-b_A_Sk function compares the content of the accepted bits 5 to 7 of byte V5 with the expected value code "100" (byte-synchronous mapping of 2 048 kbit/s into the Container-12).	7.3.4.2	m	
2	The application and acceptance and mismatch detection process are as specified in EN 300 417-1-1 [6], subclauses 7.2 and 8.2.1.2.	7.3.4.2, EN 300 417-1-1 [6] subclause 7.2, subclause 8.2.1.2	m	

E.4.2.6 VC-4 Layer to P12s-a Layer Adaptation Functions: S12/P12s-a_A_So and S12/P12s-a_A_Sk

Prerequisite: E.1/9 OR E.1/10 -- S12/P12s-a_A_So and/or S12/P12s-a_A_Sk present

Table E.47: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The S12/P12s-a_A_So function maps a 2 048 kbit/s ±50 ppm information stream into a VC-12 payload (140 bytes) using bit stuffing and adds bits 5 to 7 of byte V5.	7.3.3.2, ETS 300 147 [1]	c4701	
2	The mapping of the 2 048 kbit/s ±50 ppm kbit/s ±15 ppm information stream into the VC-12 payload is performed as depicted in figure 145 of subclause 4.3.3 in EN 300 417-4-1 [8]	7.3.3.2, figure 145 ETS 300 147 [1]	c4701	
3	The S12/P12s-a_A_So generates a fixed Frame Start (FS)	7.3.3.2	c4701	
4	The S12/P12s-a_A_Sk function recovers asynchronous mapped P12s Characteristic Information from the synchronous container-12 according to ETS 300 147 [1], and monitors the reception of the correct payload signal type. It recovers the frame (and CRC4 multiframe) phase of the 2 048 kbit/s signal.	7.3.4.3, ETS 300 147 [1]	c4702	

c4701: IF E.1/9 THEN m ELSE n/a -- S12/P12s-a_A_So present
c4702: IF E.1/10 THEN m ELSE n/a -- S12/P12s-a_A_Sk present

E.4.2.6.1 VC-12 Layer to P12s-a Layer frequency justification and bitrate adaptation processes

Table E.48: Frequency justification and bitrate adaptation: principles

Prerequisite: E.1/9 -- S12/P12s-a_A_So present

Item	Frequency justification and bitrate adaptation: principles	Reference	Status	Support
1	Frequency justification is performed by bit stuffing.	7.3.3.2	m	

Table E.49: Frequency justification and bitrate adaptation: source direction

Prerequisite: E.1/9 -- S12/P12s-a_A_So present

Item	Frequency justification and bitrate adaptation: source direction	Reference	Status	Support
1	The S12/P12s-a_A_So function provides for an elastic store (buffer) process. The data signal is written into the buffer under control of the associated input clock. The data are read out of the buffer and written onto the D, S1 and S2 bits under control of the VC-12 clock, frame position (S12_TI), and justification decisions.	7.3.3.2, figure 145	m	
2	Each justification decision results in a corresponding positive or negative justification action. Upon a positive justification action, the reading of 1 data bit is cancelled once and no data are written at the justification opportunity bit S2 and no data are written onto S1. Upon a negative justification action, 1 extra data bit is read once and written onto the justification opportunity bit S1 and data are written onto S2. If neither a positive nor a negative justification action is to be performed, either no data are written onto S1 and data are written onto S2, or vice versa.	7.3.3.2, figure 145	m	
3	The buffer size is such that in the presence of jitter as specified by ITU-T Recommendation G.823 and a frequency within the range 2 048 kbit/s ±50 ppm, this justification process does not introduce any errors. Any step in frequency within this range does not cause any errors.	7.3.3.2, ITU-T Rec.G.823 [15]	m	

E.4.2.6.2 Justification control

Table E.50: Justification control generation and interpretation

Item	Justification control generation and interpretation	Reference	Status	Support
1	The S12/P12s-a_A_So function generates the justification control (C1,C2) bits according to the specification in ETS 300 147 [1]. It inserts the justification control bits in the appropriate C1C2 bit positions.	7.3.3.2, figure 145, ETS 300 147 [1]	c5001	
2	The S12/P12s-a_A_Sk function performs justification control interpretation according ETS 300 147 [1] to recover the 2 048 kbit/s signal from the VC-12. If the majority of the C1 bits is "0" the S1 bit is taken as a data bit, otherwise (majority of C1 bits is "1") S1 bit is taken as a justification bit and consequently ignored. If the majority of the C2 bits is "0" S2 bit is taken as a data bit, otherwise (majority of C2 bits is "1") S2 bit is taken as a justification bit and consequently ignored.	7.3.4.3, ETS 300 147 [1]	c5002	

c5001: IF E.1/9 THEN m ELSE n/a -- S12/P12s-a_A_So present
c5002: IF E.1/10 THEN m ELSE n/a -- S12/P12s-a_A_Sk present

E.4.2.6.3 Smoothing and jitter limiting process

Table E.51: Smoothing and jitter limiting process

Prerequisite: E.1/10 -- S12/P12s-a_A_Sk present

Item	Smoothing and jitter limiting process	Reference	Status	Support
1	The S12/P12s-a_A_Sk function provides for a clock smoothing and elastic store (buffer) process. The 2 048 kbit/s data signal is written into the buffer under control of the associated (gapped) input clock. The data signal is read out of the buffer under control of a smoothed (equally spaced) 2 048 kHz ±50 ppm clock.	7.3.4.3	m	
2	The residual jitter caused by pointer adjustments and bit justifications (measured at the 2 048 kbit/s interface) is within the limits specified in EN 300 417-1-1 [6] subclause 11.3.1.2.	7.3.4.3, EN 300 417-1-1 [6] subclause 11.3.1.2	m	
3	In the presence of jitter as specified in EN 300 417-1-1 [6] subclause 11.3.1.2 and a frequency within the range 2 048 kbit/s ±50 ppm, this justification process does not introduce any errors.	7.3.4.3, EN 300 417-1-1 [6] subclause 11.3.1.2	m	
4	Following a step in frequency of the P12s signal there will be a maximum recovery time of TBDrecovery time of X seconds after which this process will not generate any bit errors.	7.3.4.3	m	

E.4.2.6.4 Frame and Multiframe Alignment process

Table E.52: Frame and Multiframe Alignment process

Prerequisite: E.1/10 -- S12/P12s-a_A_Sk present

Item	Frame and Multiframe Alignment process	Reference	Status	Support
1	The S12/P12s-a_A_Sk function recovers the (250 μs) basic frame and (2 ms) CRC-4 multiframe phase evaluating the D-bits and S1, S2 bits according to the justification control interpretation process in the VC-12.	7.3.4.3, figure 145	m	
2	The S12/P12s-a_A_Sk function supports either the manual, or the automatic, or both manual and automatic interworking modes.	7.3.4.3	m	

E.4.2.6.5 Payload typeSignal Label processing

Table E.53: Payload typeSignal Label generation

Prerequisite: E.1/9 -- S12/P12s-a_A_So present

Item	Payload typeSignal Label generation	Reference	Status	Support
1	The S12/P12s-a_A_So function inserts code "010" (Asynchronous mapping of 2 048 kbit/s into the Container-12) in bits 5 to 7 of byte V5 of the VC-12 overhead as defined in ETS 300 147 [1].	7.3.3.2, figure 136, ETS 300 147 [1]	m	

Table E.54: Payload typeSignal Label recovery

Prerequisite: E.1/10 -- S12/P12s-a_A_Sk present

Item	Payload typeSignal Label recovery	Reference	Status	Support
1	The S12/P12s-a_A_Sk function compares the content of the accepted bits 5 to 7 of byte V5 with the expected value code "010" (Asynchronous mapping of 2 048 kbit/s into the Container-12).	7.3.4.3	m	
2	The application and acceptance and mismatch detection process are as specified in EN 300 417-1-1 [6], subclause 7.2 and 8.2.1.2.	7.3.4.3, EN 300 417-1-1 [6] subclause 7.2, subclause 8.2.1.2	m	

E.4.2.7 VC-12 Layer to P12s-x Layer Adaptation Source Function: S12/P12s-x_A_So

Prerequisite: E.1/6 -- S12/P12s-x_A_Sk present

Table E.55: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The S12/P12s-x_A_Sk function recovers byte-synchronous mapped P12s Characteristic Information (2 048 kbit/s ±4,6 ppm) from the synchronous container-12 and monitors the reception of the correct payload signal type. It recovers the frame (and CRC4 multiframe) phase of the 2 048 kbit/s signal.	7.3.4.1, ETS 300 147 [1]	m	

E.4.2.7.1 Smoothing and jitter limiting process

Table E.56: Smoothing and jitter limiting process

Item	Smoothing and jitter limiting process	Reference	Status	Support
1	The S12/P12s-x_A_Sk function provides for a clock smoothing and elastic store (buffer) process. The 2 048 kbit/s data signal is written into the buffer under control of the associated (gapped) input clock with a frequency accuracy within ±4,6 ppm. The data signal is read out of the buffer under control of a smoothed (equally spaced) 2 048 kHz ±4,6 ppm clock.	7.3.4.1	m	
2	The residual jitter caused by pointer adjustments and bit justifications (measured at the 2 048 kbit/s interface) is within the limits specified in EN 300 417-1-1 [6] subclause 11.3.1.2.	7.3.4.1, EN 300 417-1-1 [6] subclause 11.3.1.2	m	
3	In the presence of jitter as specified in EN 300 417-1-1 [6] subclause 11.3.1.2 and a frequency within the range 2 048 kbit/s ±4,6 ppm, this justification process does not introduce any errors.	7.3.4.1, EN 300 417-1-1 [6] subclause 11.3.1.2	m	
4	Following a step in frequency of the P12s signal there will be a maximum recovery time of TBDrecovery time of X seconds after which this process will not generate any bit errors.	7.3.4.1	n/am	

E.4.2.7.2 Payload typeSignal Label processing

Table E.57: Payload typeSignal Label recovery

Item	Payload typeSignal Label recovery	Reference	Status	Support
1	The S12/P12s-x_A_Sk function compares the content of the accepted bits 5 to 7 of byte V5 with the expected value code "100" (byte-synchronous mapping of 2 048 kbit/s into the Container-12).	7.3.4.1	m	
2	The application and acceptance and mismatch detection process are as specified in EN 300 417-1-1 [6], subclauses 7.2 and 8.2.1.2.	7.3.4.1, EN 300 417-1-1 [6] subclause 7.2, subclause 8.2.1.2	m	

E.4.2.8 VC-12 Layer to P0-31c Layer Adaptation Functions: S12/P0-31c_A_So and S12/P0-31c_A_Sk

Prerequisite: E.1/11 OR E.1/12 -- S12/P0-31c_A_So and/or S12/P0-31c_A_Sk present

Table E.58: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The S12/P0-31c_A_So function byte-synchronously maps a synchronous octet structured 1 984 kbit/s information stream into a VC-12 payload and adds bits 5 to 7 of byte V5.	7.3.5, ETS 300 147 [1]	c5801	
2	The mapping of the 1 984 kbit/s ±50 ppm information stream into the VC-12 payload is performed as depicted in figure 158 of subclause 7.3.5.1 in EN 300 417-4-1 [8]	7.3.5, figure 158 ETS 300 147 [1]	c5801	
3	The S12/P0-31c_A_So generates a fixed Frame Start (FS)	7.3.5	c5801	
4	The S12/P0-31c_A_Sk function recovers 31 bytes representing any combination of 64 kbit/s channels as a 31 bytes per frame structured synchronous bit-stream with a rate of 1 984 kbit/s from byte synchronous mapping in VC-12 as specified by ETS 300 147 [1], and monitors the reception of the correct payload signal type.	7.3.6, ETS 300 147	c5802	

c5801: IF E.1/11 THEN m ELSE n/a -- S12/P0-31c_A_So present
c5802: IF E.1/12 THEN m ELSE n/a -- S12/P0-31c_A_Sk present

E.4.2.8.1 VC-12 Layer to P0-31c Layer frequency justification and bitrate adaptation processes

Table E.59: Frequency justification and bitrate adaptation: principles

Prerequisite: E.1/11 -- S12/P0-31c_A_So present

Item	Frequency justification and bitrate adaptation: principles	Reference	Status	Support
1	Frequency justification is performed by bit stuffing.	7.3.5	m	

Table E.60: Frequency justification and bitrate adaptation: source direction

Prerequisite: E.1/11 -- S12/P0-31c_A_So present

Item	Frequency justification and bitrate adaptation: source direction	Reference	Status	Support
1	The S12/P0-31c_A_So function provides for a (35/31) clock multiplier process taking P0-31c_CI_CK as input to generate the VC-12 clock signal S12_AI_CK.	7.3.5	m	
2	The S12/P0-31c_A_So function provides for a buffer process. The data and frame start signals are written into the buffer under control of the associated input clock. The data and frame start signals are read out of the buffer under control of the VC-12 clock. No data are read out of the buffer at the VC-12 POH byte positions and fixed stuff "R" byte positions.	7.3.5, figure 158	m	
3	The S12/P0-31c_A_So converts the P0-31c frame start signal (P0-31c_CI_FS) identifying TS0 position into a VC-12 frame start signal (S12_AI_FS) identifying V5 byte position.	7.3.5	m	
4	The buffer size is such that the above process does not introduce errors.	7.3.5, ITU-T Rec.G.823 [15]	m	

E.4.2.8.2 Smoothing and jitter limiting process

Table E.61: Smoothing and jitter limiting process

Prerequisite: E.1/12 -- S12/P0-31c_A_Sk present

Item	Smoothing and jitter limiting process	Reference	Status	Support
1	The S12/P0-31c_A_Sk function provides for a clock smoothing and elastic store (buffer) process. The 1 984 kbit/s data signal is written into the buffer under control of the associated (gapped) input clock with a frequency accuracy within ±4,6 ppm. The data signal is read out of the buffer under control of a smoothed (equally spaced) 1 984 kHz ±4,6 ppm clock.	7.3.6	m	
2	The residual jitter caused by pointer adjustments and bit justifications is within the limits specified in EN 300 417-1-1 [6] subclause 11.3.1.2.	7.3.6, EN 300 417-1-1 [6] subclause 11.3.1.2	m	
3	In the presence of jitter as specified in EN 300 417-1-1 [6] subclause 11.3.1.2 and a frequency within the range 1 984 kbit/s ±4,6 ppm, this justification process does not introduce any errors.	7.3.6, EN 300 417-1-1 [6] subclause 11.3.1.2	m	
4	Following a step in frequency of the P0-31c signal there will be a maximum recovery time of TBDrecovery time of X seconds after which this process will not generate any bit errors.	7.3.6	m	

E.4.2.8.3 Frame and Multiframe Alignment process

Table E.62: Frame and Multiframe Alignment process

Prerequisite: E.1/12 -- S12/P0-31c_A_Sk present

Item	Frame and Multiframe Alignment process	Reference	Status	Support
1	The S12/P0-31c_A_Sk function The function shall extract from the VC-12 frame phase the 1 984 kbit/s signal (8 kHz) frame phase.	7.3.6, figure 158	m	

E.4.2.8.4 Payload typeSignal Label processing

Table E.63: Payload typeSignal Label generation

Prerequisite: E.1/11 -- S12/P0-31c_A_So present

Item	Payload typeSignal Label generation	Reference	Status	Support
1	The S12/P0-31c_A_So function inserts code "100" (byte-synchronous mapping of 2 048 kbit/s into the Container-12) in bits 5 to 7 of byte V5 of the VC-12 overhead as defined in ETS 300 147 [1].	7.3.5, ETS 300 147 [1]	m	

Table E.64: Payload typeSignal Label recovery

Prerequisite: E.1/12 -- S12/P0-31c_A_Sk present

Item	Payload typeSignal Label recovery	Reference	Status	Support
1	The S12/P0-31c_A_Sk function compares the content of the accepted bits 5 to 7 of byte V5 with the expected value code "100" (byte-synchronous mapping of 2 048 kbit/s into the Container-12).	7.3.6	m	
2	The application and acceptance and mismatch detection process are as specified in EN 300 417-1-1 [6], subclause 7.2 and 8.2.1.2.	7.3.6, EN 300 417-1-1 [6] subclause 7.2, subclause 8.2.1.2	m	

E.4.2.9 VC-12 Layer to ATM Layer Compound Adaptation Functions: S12/Avp_A_So and S12/Avp_A_Sk

The specification of this function is under study.

E.4.2.10 VC-12 Layer to LC Layer Adaptation Function: S12/LC_A_So

The specification of this function is EN 300 417-6-1 [9].

E.4.2.11 VC-12 Layer to TSS4 Layer Adaptation Functions: S12/TSS4_A_So and S12/TSS4_A_Sk

Prerequisite: E.1/15 OR E.1/16 -- S12/TSS4_A_So and/or S12/TSS4_A_Sk present

Table E.65: Adaptation process

Item	Adaptation process	Reference	Status	Support
1	The S12/TSS4_A_So function maps a VC-12 synchronous Test Signal Structure TSS4 PRBS stream into a VC-12 payload and adds the bits V5[5-7] bytes.	6.3.1, ITU-T Rec.O.181 [17]	c6501	
2	The S12/TSS4_A_So function creates a 2^{15} -1 PRBS with timing derived from the S12_TI_Ck and maps it without justification bits into the whole of the synchronous container-12 having a capacity of 136 bytes.	6.3.1	c6501	
3	The function S12/TSS4_A_Sk recovers a TSS4 2^{15} -1 PRBS test sequence from the synchronous container-12 (having a frequency accuracy within ±4,6 ppm) and monitors the reception of the correct payload signal type and the presence of test sequence bit errors (TSE) in the PRBS sequence.	6.3.2, ITU-T Rec.O.181 [17]	c6502	

c6501: IF E.1/15 THEN m ELSE n/a -- S12/TSS4_A_So present
c6502: IF E.1/16 THEN m ELSE n/a -- S12/TSS4_A_Sk present

E.4.2.11.1 Payload typeSignal Label processing

Table E.66: Payload typeSignal Label generation

Prerequisite: E.1/15 -- S12/TSS4_A_So present

Item	Payload typeSignal Label generation	Reference	Status	Support
1	The function S12/TSS4_A_So inserts code "110" (TSS4 in the Container-12) into bits 5-7 of byte V5 of the VC-12 overhead.	7.3.1, figure 49, ETS 300 147 [1], ITU-T Rec.G.707 [14]	m	

Table E.67: Payload typeSignal Label recovery

Prerequisite: E.1/16 -- S12/TSS4_A_Sk present

Item	Payload typeSignal Label recovery	Reference	Status	Support
1	The S12/TSS4_A_Sk function compares the content of the recovered bits 5 to 7 of byte V5 (RxSL) with the expected value code "110" (TSS4 into the Container-12).	7.3.2	m	
2	The application and acceptance and mismatch process are as specified in EN 300 417-1-1 [6], subclause 7.2 and 8.2.1.2.	7.3.2, EN 300 417-1-1 [6] subclause 7.2, subclause 8.2.1.2	m	

E.4.3 VC-12 Layer Linear Trail Protection Transmission Tables

Prerequisite: E.1/25 -- VC-12 Layer Linear Trail Protection supported

Table E.68: Protection operation

Prerequisite: E.1/25 -- VC-12 Layer Linear Trail Protection supported

Item	Protection operation	Reference	Status	Support
1	The APS channel is a 4 bits channel carried into bits 1-4 of byte K4.	7.5.1.1, EN 300 417-3-1 [7] A.1	c6801	
2	The signal switching procedure is started under Signal Fail (SF = SSF, originated as AI_TSF) or Signal Degrade (SD = SSD originated as AI_TSD) conditions.	7.5.1.1-2, EN 300 417-3-1 [7] A.1	m	
3	For unidirectional switching and revertive operation the available external commands are LO, FSw-#1, MSw-#1, CLR.	7.5.1.1, EN 300 417-3-1 [7] A.1	c6802	
4	For unidirectional switching and non-revertive operation the available external commands are LO or FSw, FSw-#i, MSw-#i, CLR (i = 0, 1).	7.5.1.1, EN 300 417-3-1 [7] A.1	c6803	
5	For bidirectional switching and revertive operation the available external commands are LO, FSw-#1, MSw-#1, CLR.	7.5.1.2, EN 300 417-3-1 [7] A.1	c6804	
6	For bidirectional switching and non-revertive operation the available external commands are LO or FSw, FSw-#i, MSw-#i, CLR (i = 0, 1).	7.5.1.2, EN 300 417-3-1 [7] A.1	c6805	
7	The Wait-To-Restore (WTR) time is provisionable.	7.5.1.1-2, EN 300 417-3-1 [7] A.1	c6806	
8	The Hold-off (HO) time is provisionable in steps of the order of 100 ms.	7.5.1.1-2, EN 300 417-3-1 [7] A.1	m	

c6801: IF (E.4/3 OR E.4/4) THEN m ELSE o -- Linear Trail Protection bidirectional switching supported
c6802: IF E.4/1 THEN m ELSE n/a -- Linear Trail Protection unidirectional switching and revertive operation supported
c6803: IF E.4/2 THEN m ELSE n/a -- Linear Trail Protection unidirectional switching and non-revertive operation supported
c6804: IF E.4/3 THEN m ELSE n/a -- Linear Trail Protection bidirectional switching and revertive operation supported
c6805: IF E.4/4 THEN m ELSE n/a -- Linear Trail Protection bidirectional switching and non-revertive operation supported
c6806: IF (E.4/1 OR E.4/3) THEN m ELSE n/a -- Linear Trail Protection revertive operation supported

Comments: The Linear Protection Switching Operation is generically described in annex A of EN 300 417-3-1 [7].

Table E.69: Protection architecture characteristic parameters

Prerequisite: E.1/25 -- VC-12 Layer Linear Trail Protection supported

Item	Protection architecture characteristic parameters	Reference	Status	Support	Values	
					Allowed	Supported
1	Wait-To-Restore (WTR) time: X value	7.5.1.1-2, EN 300 417-3-1 [7] A.1	c6901		0 ≤ X ≤ 12 minutes	
2	Hold-off (HO) time: Z value	7.5.1.1-2, EN 300 417-3-1 [7] A.1	m		0 ≤ Z ≤ 10 s	
3	Switching time (Y) is less than or equal to 50 ms	7.1, EN 300 417-3-1 [7] A.1	m		___	___

c6901: IF (E.4/1 OR E.4/3) THEN m ELSE n/a -- Linear Trail Protection revertive operation supported

E.4.3.1 VC-12 Layer Linear Trail Protection Connection Function: S12P_C

Table E.70: Connectivity functionalities: generalities

Item	Connectivity functionalities: generalities	Reference	Status	Support
1	The VC-12 Protection Connection function performs the VC-12 linear trail protection process for 1+1 protection architectures.	7.5.1.1, 7.5.1.2	m	
2	The VC-12 Protection Connection function performs the bridge and selector functionality.	7.5.1.1, 7.5.1.2	m	
3	It is possible to change between operation types without disturbing the CI passing the connection unless any protection switching action is activated/required.	7.5.1.1, 7.5.1.2	c7001	
4	It is possible to change the WTR time without disturbing the CI passing the connection any protection switching action is activated/required.	7.5.1.1, 7.5.1.2	c7002	
5	It is possible to change the Hold-off time of a connection without disturbing the CI passing the connection any protection switching action is activated/required.	7.5.1.1, 7.5.1.2	c7003	
6	The protection type can be changed via S3_C_MI_PROTtype.	7.5.1.2	c7004	
7	The operation type can be changed via S3_C_MI_OPERtype.	7.5.1.1, 7.5.1.2	c7001	

c7001: IF (E.4/1 OR E.4/3) AND (E.4/2 OR E.4/4) THEN m ELSE n/a -- at least one revertive and one non-revertive Trail protection scheme supported

c7002: IF E.107/1 THEN m ELSE n/a -- Wait-To-Restore (WTR) time supported

c7003: IF E.107/2 THEN m ELSE n/a -- Hold-off (HO) time supported

c7004: IF (E.4/1 OR E.4/2) AND (E.4/3 OR E.4/4) THEN m ELSE n/a -- both unidirectional and bidirectional Trail protection scheme supported

Table E.71: Connectivity functionalities: source direction

Item	Connectivity functionalities: source direction	Reference	Status	Support
1	The working output is connected to the associated normal input. The protection output is also connected to the normal input.	7.5.1.1, 7.5.1.2	m	
2	The working outputs are connected to the associated normal inputs for 1+1 protection.	7.5.1.1, 7.5.1.2	m	

Table E.72: Connectivity functionalities: sink direction

Item	Connectivity functionalities: sink direction	Reference	Status	Support
1	The signal output at the normal reference point can be the signal received via either the associated working path or the protection path.	7.5.1.1, 7.5.1.2	m	

E.4.3.2 VC-12 Layer Linear Trail Protection Trail Termination Functions: S12P_TT_So and S12P_TT_Sk

Table E.73: Trail termination process

Item	Trail termination process	Reference	Status	Support
1	The S12_AI at the output of the S12P_TT_So is identical to the S12P_CI at its input.	7.5.2.1	c7301	
2	The S12P_TT_Sk function reports the state of the protected VC-12 trail.	4.5.2.2	c7302	
3	In case all connections are unavailable the S12P_TT_Sk reports the signal fail condition of the protected trail.	4.5.2.2	c7302	

c7301: IF E.5/2 THEN m ELSE n/a -- S12P_TT_So function supported
c7302: IF E.5/3 THEN m ELSE n/a -- S12P_TT_Sk function supported

E.4.3.3 VC-12 Layer Linear Trail Protection Adaptation Functions:S12/S12P_A_So and S12/S12P_A_Sk

E.4.3.3.1 VC-12 Layer to VC-12 Protection Layer multiplexing and demultiplexing processes

Table E.74: Multiplexing

Prerequisite: E.5/4 -- S12/S12P_A_So present

Item	Multiplexing	Reference	Status	Support
1	The S12/S12P_A_So inserts the S12P_CI_D signal into the S12P_AI_D signal	7.5.3.1	m	
2	The S12/S12P_A_So inserts the S12 APS signal into S12_AI	7.5.3.1	c7401	

c7401: IF (E.4/3 OR E.4/4) THEN m ELSE o -- Linear Trail Protection bidirectional switching supported

Comment: S12 APS signal insertion is required only for the protection path.

Table E.75: Demultiplexing

Prerequisite: E.5/5 -- S12/S12P_A_Sk present

Item	Demultiplexing	Reference	Status	Support
1	The S12/S12P_A_Sk extracts the S12P_CI_D signal from the S12_AI_D signal.	7.5.3.2	m	
2	The S12/S12P_A_Sk extracts the S12 APS signal from the S12_AI.	7.5.3.2	m	

Comment: The extraction and persistency processing of the S12 APS signal is required only for the protection path.

E.4.4 VC-12 Layer Linear Trail Protection and Sub-Network Connection (SNC) Protection processes

E.4.4.1 APS externally initiated commands

Prerequisite: E.1/25 OR E.1/26 -- VC-12 Layer Linear Trail Protection and/or SNC Protection supported

Table E.76: Issuing of External Switching Commands

Item	Issuing of External Switching Commands	Reference	Status	Support
1	The external commands are received from the EMF.	ETS 300 746 [10] subclauses 6.1, 6.2	m	

Table E.77: Transmission of External Switching Requests

Prerequisite: E.114/1 -- External Switching Command issuing is supported

Item	Transmission of External Switching Requests	Reference	Status	Support
1	The external requests are issued via the APS bytes.	ETS 300 746 [10] subclause 6.1	n/a	
2	The external requests are issued via the EMF.	ETS 300 746 [10] subclause 6.1	m	

Table E.78: External Switching Commands

Prerequisite: E.114/1 -- External Switching Command issuing is supported

Item	External Switching Commands	Reference	Status	Support
1	The external command Clear (CLR) conforms to the definition given in the whole point 1) clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
2	The external command Lockout of Protection (LO) conforms to the definition given in the whole point 2) clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
3	The external command Forced Switch #i (FSw-#i) conforms to the definition given in the whole point 3) of clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
4	The external command Manual Switch #i (MSw-#i) conforms to the definition given in the whole point 4) clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
5	The external command Exercise #i (EXER #i) conforms to the definition given in the whole point 5) clause A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.2	m	
6	The descending order of priority for external switching commands is: CLR, LO, FSw-#i, MSw-#i, EXER #i.	EN 300 417-3-1 [7] A.2	m	

E.4.4.2 APS automatically initiated commands

Table E.79: Automatic Generation of Requests

Item	Automatic Generation of Requests	Reference	Status	Support
1	The NE initiates the following automatic requests: Signal Failure (SF), Signal Degrade (SD).	ETS 300 746 [10] subclauses6.1, 6.2	m	
2	The NE initiates the automatic request Wait To Restore (WTR).	ETS 300 746 [10] subclauses 6.1, 6.2	c7901	

c7901: IF (E.4/1 OR E.4/3 OR E.4/5 OR E.4/67 OR E.4/918) THEN m ELSE n/a -- revertive operation supported

Table E.80: Automatically Generated Requests

Item	Automatically Generated Requests	Reference	Status	Support
1	In the Wait to restore (WTR) state the operation is such that in the revertive mode of operation, the normal signal will be restored when the working trail has recovered from the fault.	EN 300 417-3-1 [7] A.4	c8001	
2	An SF or SD condition will override the WTR.	EN 300 417-3-1 [7] A.4	c8001	
3	After the WTR period is completed, a No Request state will be entered.	EN 300 417-3-1 [7] A.4	c8001	
4	In the Reverse Request state the operation is such that for the case of bidirectional switching, a reverse request is returned for exerciser and for all other requests of higher priority.	EN 300 417-3-1 [7] A.4	c8002	
5	In unidirectional switching, Reverse Request is never indicated.	EN 300 417-3-1 [7] A.4	c8003	
6	In the Do not Revert state the operation is such that in the non-revertive mode of operation, assuming the normal signal is on protection when the working trail is repaired or a switch command is released, the tail end maintains the selection and issues Do not Revert for normal signal 1.	EN 300 417-3-1 [7] A.4	c8004	
7	For the case of bidirectional switching, the head end also maintains the selection and continues indicating reverse request.	EN 300 417-3-1 [7] A.4	c8005	
8	The Do not Revert is removed when pre-empted by a defect condition or an external request.	EN 300 417-3-1 [7] A.4	c8004	
9	In the No Request state none of the trail signal conditions is active, none of the external commands is active, and none of the states described above is active.	EN 300 417-3-1 [7] A.4	m	

NOTE: Currently no bidirectional APS signalling protocol is defined EN 300 417-3-1 Annex A for linear VC trail 1+1 SNC Protection schemes.

c8001: IF (E.4/1 OR E.4/3 OR E.4/5 OR E.4/67 OR E.4/918) THEN m ELSE n/a -- revertive operation supported
c8002: IF (E.4/3 OR E.4/4) THEN m ELSE n/a -- bidirectional operation supported
c8003: IF (E.4/1 OR E.4/2 OR E.4/5 OR E.4/6 OR E.4/7 OR E.4/817 OR E.4/198) THEN m ELSE n/a -- unidirectional operation supported
c8004: IF (E.4/2 OR E.4/4 OR E.4/6 OR E.4/817 OR E.4/109) THEN m ELSE n/a -- non-revertive operation supported
c8005: IF E.4/4 THEN m ELSE n/a -- non-revertive and bidirectional operation supported

E.4.4.3 APS generalities

Table E.81: Priority of request types

Item	Priority of request types	Reference	Status	Support
1	The priority of request types conforms to the priority order given in table A.2 (clause A.6) of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.6, table A.2	m	

E.4.4.4 APS switch performance

Table E.82: Switch completion time

Item	Switch completion time	Reference	Status	Support
1	The switch completion time is less than X ms (TBD).	EN 300 417-3-1 [7] A.8	m	

E.4.4.5 APS sub-processes

Table E.83: Signal request process

Item	Signal request processes	Reference	Status	Support
1	The SRSN is "0" (zero) for the protection trail and "1" for working trail #1.	EN 300 417-3-1 [7] A.9	m	
2	The SRT is generated based on the inputs SF, SD, SFpriority, SDpriority, as specified in the clause "Signal request (type & signal number) processes" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

Comments: The signal request process transfers the input SF and SD signals from a trail into a Signal Request Type (SRT) and Signal Request Signal Number (SRSN).

Table E.84: External request process

Item	External request processes	Reference	Status	Support
1	The ERSN is "0" (zero) if no normal signal is indicated, "i" (1 ≤ i ≤ nmax) for normal signal #i, and "nmax+1" for the extra traffic signal.	EN 300 417-3-1 [7] A.9	m	
2	The ERT/ERN is generated as specified in the clause "External request (type & signal number) processes" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

Comments: The external request process transfers the external commands (EXTCMD) into an External Request Type (ERT) and External Request Signal Number (ERSN).

Table E.85: Local request priority process

Item	Local request priority processes	Reference	Status	Support
1	The status of the protection and working input signals (SRT/SRSN #0 to SRT/SRSN #n), the external command (ERT/ERSN), and protection parameters OPERtype and EXTRAtraffic is evaluated by a three step priority logic as specified in the clause "Local request (type & signal number) priority processes" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

Comments: The local request priority process determines the highest priority local request.

Table E.86: Global request priority process

Item	Global request priority processes	Reference	Status	Support
1	The local request (LRT) and the remote request (RRT) are compared to decide which has priority, according to the descending order of priorities in table A.2 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	c8601	
2	A received reverse request is not considered in the comparison.	EN 300 417-3-1 [7] A.9	c8601	
3	The Global Request Type (GRT) and Global Request Signal Number (GRSN) is determined as specified in the clause "Global request (type & signal number) priority processes" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

NOTE: Currently no bidirectional APS signalling protocol is defined EN 300 417-3-1 Annex A for linear VC trail 1+1 SNC Protection schemes.

c8601: IF (E.4/3 OR E.4/4 OR E.4/5)
THEN m ELSE x -- bidirectional switching supported

Comments: The global request priority process determines the Global Request Type (GRT) and Global Request Signal Number (GRSN).

Table E.87: Control of the selector

Item	Control of the selector	Reference	Status	Support
1	The control of the selector is performed as specified in the clause "Control of the selector" in clause A.9 of annex A in EN 300 417-3-1 [7].	EN 300 417-3-1 [7] A.9	m	

Comments: The control of the selector controls which of the normal signals is connected to/extracted from the protection trail.

E.4.4.6 APS status report

Table E.88: APS reporting process

Item	APS reporting process	Reference	Status	Support
1	The active external request are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	m	
2	The active local request are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	m	
3	The active remote request are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	c8801	
4	The reason of denial of an external command are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	m	
5	The condition (SF,SD) of the working and protection trails are reported to the Equipment Management Function.	EN 300 417-3-1 [7] A.9	m	

c8801: IF (E.4/3 OR E.4/4 OR E.4/5)
THEN m ELSE o -- bidirectional switching supported

E.4.5 VC-12 Tandem Connection Sub-layer Transmission Tables

E.4.5.1 VC-12 Tandem Connection Sub-layer Trail Termination Functions: S12D_TT_So, S12D_TT_Sk and S12Dm_TT_Sk

Prerequisite: E.1/20 OR E.1/21 OR E.1/24 -- S12D_TT_So, S12D_TT_Sk and/or S12Dm_TT_Sk present

Table E.89: VC-12 Tandem Connection Termination process

Item	VC-12 Tandem Connection Termination process	Reference	Status	Support
1	The S12D_TT_So compensates VC-12 BIP-2 (in bits 1-2 of byte V5 of the VC-12 overhead) and generates byte N2 of the VC-12 overhead according to a 76 frame multiframe.	7.6.1	c8901	
2	The S12D_TT_So inserts all-0s in the six reserved bits in frames 73 to 76 of the a 76 frame multiframe (38 ms).	7.6.1	c8901	
3	The S12D_TT_So inserts the value '1' in bit N2[3].	7.6.1	c8901	
4	The S12D_TT_Sk processes bits 1-2 of byte V5 of the VC-12 overhead, and recovers byte N2 of the VC-12 overhead according to a 76 frame multiframe (38 ms).	7.6.2	c8902	
5	The S12D_TT_Sk terminates byte N2 of the VC-12 overhead by inserting an all-ZERO pattern, after it has recovered the content of this byte.	7.6.2	c8902	
6	The S12Dm_TT_Sk recovers byte N2 of the VC-12 overhead according to a 76 frame multiframe (38 ms).	7.6.5	c8903	

c8901: IF E.1/20 THEN m ELSE n/a -- S12D_TT_So present
c8902: IF E.1/21 THEN m ELSE n/a -- S12D_TT_Sk present
c8903: IF E.1/24 THEN m ELSE n/a -- S12Dm_TT_Sk present

E.4.5.1.1 VC-12 in service error monitoring process

Table E.90: VC-12 BIP-2 compensation: source direction

Prerequisite: E.1/20 -- S12D_TT_So present

Item	VC-12 BIP-2 compensation: source direction	Reference	Status	Support
1	The S12D_TT_So function compensates the VC-12 BIP-2 (in bits 1-2 of byte V5) according the logical equation given in subclause 7.6.1 of EN 300 417-4-1 [8].	7.6.1	m	

Table E.91: VC BIP-2 process: sink direction

Prerequisite: E.1/21 OR E.1/24 -- S12D_TT_Sk and/or S12Dm_TT_Sk present

Item	TC BIP-2 process: sink direction	Reference	Status	Support
1	The VC-12 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) compute even BIP-2 for each bit pair of every byte of the preceding VC-12 including V5 and N2 and compare it with bit 1 and 2 of V5 recovered from the current frame.	7.6.2, 7.6.5, figure 175	m	
2	A difference between the computed and recovered VC-12 BIP-2 values (in byte V5) is taken as evidence of an errored block (nON_B) present in the outgoing VC.	7.6.2, 7.6.5, figure 175	m	

Table E.92: VC-12 BIP-2 compensation: sink direction

Prerequisite: E.1/21 -- S12D_TT_Sk present

Item	VC-12 BIP-2 compensation: sink direction	Reference	Status	Support
1	The S12D_TT_Sk function compensates the VC-12 BIP-2 (in bits 1-2 of byte V5) according the logical equation given in subclause 7.6.1 of EN 300 417-4-1 [8].	7.6.1, 7.6.2	m	

E.4.5.1.2 Tandem Connection in service error monitoring process

NOTE: This process has the same objective of the Incoming Error Count (IEC) process in the S12 and S3 layers

Table E.93: TC BIP-2 process: source direction

Prerequisite: E.1/20 -- S12D_TT_So present

Item	TC BIP-2 process: source direction	Reference	Status	Support
1	The S12D_TT_So function calculates a BIP-2 over the VC-12, and inserts this value in TC BIP-2 (bits 1-2 of byte N2) in the next frame.	7.6.1, figure 128	m	

Table E.94: TC BIP-2 process: sink direction

Prerequisite: E.1/21 OR E.1/24 -- S12D_TT_Sk and/or S12Dm_TT_Sk present

Item	TC BIP-2 process: sink direction	Reference	Status	Support
1	The VC-12 Tandem Connection Trail Termination Sink functions (S3D_TT_Sk, S3Dm_TT_Sk) compute even BIP-2 for each bit pair of every byte of the preceding VC-12 including V5 and N2 and compare it with bit 1 and 2 of N2 recovered from the current frame.	7.6.2, 7.6.5, figure 175	m	
2	A difference between the computed and recovered VC-12 BIP-2 values (in byte N2) is taken as evidence of an errored block (nN_B) generated within the Tandem Connection domain.	7.6.2, 7.6.5, figure 175	m	

E.4.5.1.3 Tandem Connection Multiframe Alignment process

Table E.95: Multiframe Alignment process: source direction

Prerequisite: E.1/20 -- S12D_TT_So present

Item	Multiframe Alignment process: source direction	Reference	Status	Support
1	The function inserts the Frame Alignment Signal (FAS) "1111 1111 1111 1110" in FAS bits N2[7-8] in frames 1 to 8 of the multiframed N2[7-8] channel.	7.6.1	m	

Table E.96: Multiframe Alignment process: sink direction

Prerequisite: E.1/21 OR E.1/24 -- S12D_TT_Sk and/or S12Dm_TT_Sk present

Item	Multiframe Alignment process: sink direction	Reference	Status	Support
1	The VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) perform a multiframe alignment on bits 7 and 8 of byte N2.	7.6.2, 7.6.5	m	
2	The multiframe alignment is found by searching for the pattern "1111 1111 1111 1110" within the bits 7 and 8 of byte N2.	7.6.2, 7.6.5	m	
3	The multiframe alignment signal is continuously checked with the presumed multiframe start position for the alignment.	7.6.2, 7.6.5	m	

E.4.5.1.4 VC-12 Tandem Connection Remote indicator monitoring process

E.4.5.1.4.1 VC-12 Tandem Connection Remote Defect Indication (TC RDI)

Table E.97: Remote Defect Indication location

Prerequisite: (E.1/20 AND E.1/21) OR E.1/24 -- bidirectional S12D layer and/or S12Dm_TT_Sk present

Item	Remote Defect Indication location	Reference	Status	Support
1	The TC RDI is located in bit 8 of byte N2 in frame 73 of the 76 frame multiframe (38 ms). This location is expressed with the notation: N2[8][73].	7.6.1, 7.6.2, 7.6.5	m	

Comment: N2[x][y] refers to bit x (x = 7,8) of byte N2 in frame y (y = 1..76) of the 76 frame multiframe (38 ms).

Table E.98: Remote Defect Indication processing: source direction

Prerequisite: (E.1/20 AND E.1/21) -- bidirectional S12D layer present

Item	Remote Defect Indication processing: source direction	Reference	Status	Support
1	TC RDI code is set upon activation of S12D_RI_RDI determined by the associated S12D_TT_Sk.	7.6.1	m	
2	TC RDI is cleared upon deactivation of S12D_RI_RDI determined by the associated S12D_TT_Sk.	7.6.1	m	
3	TC RDI signal is coded as a '1' bit value.	7.6.1	m	
4	The '0' bit value is inserted if no S12D_RI_RDI signal is active.	7.6.1	m	

Table E.99: Remote Defect Indication processing: sink direction

Prerequisite: E.1/21 OR E.1/24 -- S12D_TT_Sk and/or S12Dm_TT_Sk present

Item	Remote Defect Indication processing: sink direction	Reference	Status	Support
1	The VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) extract and monitor bit location N2[8][73]. A "1" indicates a Remote Defect Indication state, while a "0" indicates the normal, working state.	7.6.2, 7.6.5	m	

Comment: N2[x][y] refers to bit x (x = 7,8) of byte N2 in frame y (y = 1..76) of the 76 frame multiframe (38 ms).

E.4.5.1.4.2 VC-12 Tandem Connection Remote Error Indication (TC REI)

Table E.100: Remote Error Indication: principles

Prerequisite: (E.1/20 AND E.1/21) OR E.1/24 -- bidirectional S12D layer and/or S12Dm_TT_Sk present

Item	Remote Error Indication: principles	Reference	Status	Support
1	The REI signal indicates if Errored Block (EB) were detected in the trail signal at the far-end trail termination	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	
2	The block length is 3 424 (one VC-12). The Error Detection Code (EDC) is BIP-2 in bits 1-2 of N2 byte.	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	

Table E.101: Remote Error Indication location

Prerequisite: (E.1/20 AND E.1/21) OR E.1/24 -- bidirectional S12D layer and/or S12Dm_TT_Sk present

Item	Remote Error Indication location	Reference	Status	Support
1	The TC REI is located in bit 5 of byte N2 of the VC-12 overhead.	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	

Table E.102: Remote Error Indication processing: source direction

Prerequisite: (E.1/20 AND E.1/21) -- bidirectional S12D layer present

Item	Remote Error Indication processing: source direction	Reference	Status	Support
1	The S12D_TT_So inserts the RI_REI value in the REI bit in the following frame.	7.6.1	m	

Table E.103: Remote Error Indication processing: sink direction

Prerequisite: E.1/21 OR E.1/24 -- S12D_TT_Sk and/or S12Dm_TT_Sk present

Item	Remote Error Indication processing: sink direction	Reference	Status	Support
1	The VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) extract and monitor bit location N2[5] to recover the TC REI value (nF_B).	7.6.2, 7.6.5	m	

E.4.5.1.5 VC-12 Tandem Connection Outgoing indicator monitoring process

E.4.5.1.5.1 VC-12 Tandem Connection Outgoing Defect Indication (TC ODI)

Table E.104: Outgoing Defect Indication location

Prerequisite: (E.1/20 AND E.1/21) OR E.1/24 -- bidirectional S12D layer and/or S12Dm_TT_Sk present

Item	Outgoing Defect Indication location	Reference	Status	Support
1	The TC ODI is located in bit 7 of byte N2 in frame 74 of the 76 frame multiframe (38 ms). This location is expressed with the notation: N2[7][74].	7.6.1, 7.6.2, 7.6.5	m	

Comment: N2[x][y] refers to bit x (x = 7,8) of byte N2 in frame y (y = 1..76) of the 76 frame multiframe (38 ms).

Table E.105: Outgoing Defect Indication processing: source direction

Prerequisite: (E.1/20 AND E.1/21) -- bidirectional S12D layer present

Item	Outgoing Defect Indication processing: source direction	Reference	Status	Support
1	TC ODI code is inserted after the ODI request generation in the S12D_TT_Sk.	7.6.1	m	
2	TC ODI is cleared at the first opportunity after the ODI request has cleared in the associated S12D_TT_Sk.	7.6.1	m	
3	TC ODI signal is coded as a '1' bit value.	7.6.1	m	
4	The '0' bit value is inserted if no S12D_RI_ODI signal is active.	7.6.1	m	

Table E.106: Outgoing Defect Indication processing: sink direction

Prerequisite: E.1/21 OR E.1/24 -- S12D_TT_Sk and/or S12Dm_TT_Sk present

Item	Outgoing Defect Indication processing: sink direction	Reference	Status	Support
1	The VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) extract and monitor bit location N2[7][74]. A "1" indicates a Outgoing Defect Indication state, while a "0" indicates the normal, working state.	7.6.2, 7.6.5	m	

Comment: N2[x][y] refers to bit x (x = 7,8) of byte N2 in frame y (y = 1..76) of the 76 frame multiframe (38 ms).

E.4.5.1.5.2 VC-12 Tandem Connection Outgoing Error Indication (TC OEI)

Table E.107: Outgoing Error Indication: principles

Prerequisite: (E.1/20 AND E.1/21) OR E.1/24 -- bidirectional S12D layer and/or S12Dm_TT_Sk present

Item	Outgoing Error Indication: principles	Reference	Status	Support
1	The REI signal indicates if Errored Block (EB) were detected in the trail signal at the far-end trail termination	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	
2	The block length is 3 424 (one VC-12). The Error Detection Code (EDC) is BIP-2 in bits 1-2 of V5 byte.	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	

Table E.108: Outgoing Error Indication location

Prerequisite: (E.1/20 AND E.1/21) OR E.1/24 -- bidirectional S12D layer and/or S12Dm_TT_Sk present

Item	Outgoing Error Indication location	Reference	Status	Support
1	The TC OEI is located in bit 6 of byte N2 of the VC-12 overhead.	ITU-T Rec.G.707 [14] subclause 9.3.1.8	m	

Table E.109: Outgoing Error Indication processing: source direction

Prerequisite: (E.1/20 AND E.1/21) -- bidirectional S12D layer present

Item	Outgoing Error Indication processing: source direction	Reference	Status	Support
1	The S12D_TT_So inserts the RI_OEI value in the OEI bit in the following frame.	7.6.1	m	

Table E.110: Outgoing Error Indication processing: sink direction

Prerequisite: E.1/21 OR E.1/24 -- S12D_TT_Sk and/or S12Dm_TT_Sk present

Item	Outgoing Error Indication processing: sink direction	Reference	Status	Support
1	The VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) extract and monitor bit location N2[5] to recover the TC OEI value (nOF_B).	7.6.2, 7.6.5	m	

E.4.5.1.6 Tandem Connection Trace Identifier

Table E.111: Tandem Connection Trace Identifier: principles

Item	Tandem Connection Trace Identifier: principles	Reference	Status	Support
1	A Tandem Connection Trace Identifier (TC TI) is inserted by the S12D_TT_So function containing the local Access Point Identifier (APId) and TI header (TxTI).	7.6.1, EN 300 417-1-1 [6] subclause 7.1	c11101	
2	The content of the accepted TI (AcTI) is compared by the S12D_TT_Sk function with the provisioned "expected TI" (ExTI), identifying the expected remote AP.	7.6.2, 7.6.5, EN 300 417-1-1 [6] subclause 7.1, EN 300 417-1-1 [6] subclause 8.2.1.3	c11102	

c11101: IF E.1/20 THEN m ELSE n/a -- S12D_TT_So present
c11102: IF (E.1/21 OR E.1/24) THEN m ELSE n/a -- S12D_TT_Sk and/or S12Dm_TT_Sk present

Table E.112: Tandem Connection Trace Identifier byte location

Item	Tandem Connection Trace Identifier byte location	Reference	Status	Support
1	The Tandem Connection Trace Identifier (TC TI) is located in bits N2[7-8] in frames 9 to 72.	7.6.1, 7.6.2, 7.6.5	m	

Table E.113: Tandem Connection Trace Identifier byte structure

Item	Tandem Connection Trace Identifier byte structure	Reference	Status	Support
1	The Tandem Connection Trace Identifier (TC TI) is a 16 byte string containing the 15 byte APId and a 1 byte header. The MSB of the header is a "1", the remaining 7 bits contain the CRC-7 value of the VC-12 TTI. The MSB of the 15 APId bytes is "0".	EN 300 417-1-1 [6] subclause 7.1	m	
2	The CRC-7 word is the remainder after multiplication by x^7 and then division (modulo 2) by the generator polynomial $x^7 + x^3 + 1$, of the polynomial representation of the VC-12 TTI with the CRC bits set to binary zeroes.	EN 300 417-1-1 [6] subclause 7.1	m	
3	The 16 byte VC-12 TxTI, 16 byte VC-12 ExTI and 16 byte VC-12 AcTI are transferred via the Management Point to and from the trail termination function.	EN 300 417-1-1 [6] subclause 8.2.1.3	m	

Table E.114: Tandem Connection Trace identification: source direction

Prerequisite: E.1/20 -- S12D_TT_So present

Item	Tandem Connection Trace identification: source direction	Reference	Status	Support
1	The function inserts the TC trace identifier, received via MI_TxTI, in the TC-TI bits N2[7-8] in frames 9 to 72 of the multiframed N2[7-8] channel.	7.6.1	m	

Table E.115: Tandem Connection Trace identification: sink direction

Prerequisite: E.1/21 OR E.1/24 -- S12D_TT_Sk and/or S12Dm_TT_Sk present

Item	Tandem Connection Trace identification: sink direction	Reference	Status	Support
1	The VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) support mode 1.	EN 300 417-1-1 [6] subclause 7.1	m	
2	The VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) do not support mode 2.	EN 300 417-1-1 [6] subclause 7.1	m	
3	The VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) recover the 16 byte multiframe carried in bits N2[7-8] in frames 9 to 72 and assume it as Received Trail Trace Identifier (RxTI). The RxTI is made available as AcTI for network management purposes.	7.6.2, 7.6.5	m	

E.4.5.1.7 Incoming AIS code process

Table E.116: Incoming AIS code process: source direction

Prerequisite: E.1/20 -- S12D_TT_So present

Item	Incoming AIS code process: source direction	Reference	Status	Support
1	If AI_SF is true bit N2[4] is set to the value "1", otherwise value "0" is inserted.	7.6.1	m	

E.4.5.2 VC-12 Tandem Connection to VC-12 Layer Adaptation Functions: S12D/S12_TT_So and S12D/S12_A_Sk

Table E.117: Adaptation process

Prerequisite: E.1/20 OR E.1/21 -- S12D/S12_A_So and/or S12D/S12_A_Sk present

Item	Adaptation process	Reference	Status	Support
1	The S12D/S12_A_So replaces the incoming Frame Start (CI_FS) signal by a local generated one, if an all-ONEs (AIS) VC is received (i.e. if CI_SSF is TRUE).	7.6.3	c11701	
2	The S12D/S12_A_Sk restore the invalid frame start condition (i.e. output aSSF = true) if that existed at the ingress of the tandem connection.	7.6.4	c11702	

c11701: IF E.1/20 THEN m ELSE n/a -- S12D/S12_A_So present
c11702: IF E.1/21 THEN m ELSE n/a -- S12D/S12_A_Sk present

E.4.6 VC-12 Layer Defect, Consequent Action, Defect Correlation and Performance Monitoring Tables

E.4.6.1 Port Status Management

Table E.118: Trail Termination Point Mode Process

Prerequisite: E.1/3 OR E.1/17 OR E.1/19 -- S12_TT_Sk and/or S12m_TT_Sk and/or S12s_TT_Sk present

Item	Trail Termination Point Mode Process	Reference	Status	Support
1	The Trail Termination Point Mode supports "not monitored" (NMON) status.	EN 300 417-1-1 [6] subclause 8.5	m	
2	The Trail Termination Point Mode supports "monitored" (MON) status.	EN 300 417-1-1 [6] subclause 8.5	m	
3	The Trail Termination Point Mode status is provisionable by the EMF	7.2.2, 7.4.1, 7.4.3		

E.4.6.2 Defect detection and clearance criteria

Table E.119: VC-12 Layer Alarm Indication Signal defect (VC dAIS)

Prerequisite: E.1/17 -- S12m_TT_Sk present

Item	VC-12 Layer Alarm Indication Signal defect (VC dAIS)	Reference	Status	Support
1	The S12m_TT_Sk function detects a VC AIS defect (dAIS) if 5 consecutive frames contain the '111' pattern in bit 5-7 of byte V5.	7.4.1	m	
2	For equipment designed prior to EN 300 417-1-1 [6], the S12m_TT_Sk function clears the VC AIS defect if the accepted signal label is not equal to all-ONEs.	7.4.1	m	

Table E.120: Remote Defect Indication defect (dRDI)

Prerequisite: E.1/3 OR E.1/17 OR E.1/19 -- S12_TT_Sk and/or S12m_TT_Sk and/or S12s_TT_Sk present

Item	Remote Defect Indication defect (dRDI)	Reference	Status	Support
1	The S12 RDI defect (dRDI) is detected if 5 consecutive frames contain the '1' value in bit 8 of the V5 byte.	7.2.2, 7.4.1, 7.4.3, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
2	The S12 RDI defect (dRDI) is cleared if in 5 consecutive frames contain the '0' value in bit 8 of the V5 byte.	7.2.2, 7.4.1, 7.4.3, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
3	The S12 RDI defect (dRDI) is cleared during reception of an aSSF.	7.2.2, 7.4.1, 7.4.3, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
4	The S12 RDI defect (dRDI) is cleared during reception of a VC AIS.	7.4.1	c12001	

c12001: IF E.1/17 THEN m ELSE x -- S12m_TT_Sk present

Table E.121: Degraded defect (dDEG)

Prerequisite: E.1/3 OR E.1/17 OR E.1/19 -- S12_TT_Sk and/or S12m_TT_Sk and/or S12s_TT_Sk present

Item	Degraded defect (dDEG)	Reference	Status	Support
1	Once every second, S12 pNEBC is compared with DEGTHR.	7.2.2, 7.4.1, 7.4.3, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
2	If S12 pNEBC ≥ DEGTHR the corresponding second is declared BAD, otherwise it is declared GOOD.	7.2.2, 7.4.1, 7.4.3, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
3	The S12 dDEG defect (dDEG) is detected if M consecutive BAD seconds have occurred.	7.2.2, 7.4.1, 7.4.3, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
4	The S12 dDEG defect (dDEG) is cleared if M consecutive GOOD seconds have occurred.	7.2.2, 7.4.1, 7.4.3, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
5	The S12 dDEG defect (dDEG) is cleared during reception of an aSSF.	7.4.1, EN 300 417-1-1 [6] subclause 8.2.1.4	c12101	
6	The S12 dDEG defect (dDEG) is cleared during reception of a VC AIS.	7.4.1, EN 300 417-1-1 [6] subclause 8.2.1.4	c12101	
7	The DEGTHR parameter is provisionable by the EMF.	7.2.2, 7.4.1, 7.4.3	m	
8	The DEGM parameter is provisionable by the EMF.	7.2.2, 7.4.1, 7.4.3	m	

c12101: IF E.1/17 THEN m ELSE x -- – S12m_TT_Sk present

Table E.122: DEG defect parameters value

Prerequisite: E.1/3 OR E.1/17 OR E.1/19 -- S12_TT_Sk and/or S12m_TT_Sk and/or S12s_TT_Sk present

Item	DEG defect parameters	Reference	Status	Support	Values	
					Allowed	Supported
1	S12 dDEG DEGTHR parameter	7.2.2, 7.4.1, 7.4.3	m		0 < DEGTHR ≤ 2 000	
2	S12 dDEG M parameter	7.2.2, 7.4.1, 7.4.3	m		2 ≤ M ≤ 10	

Table E.123: Trace Identifier Mismatch defect (dTIM)

Prerequisite: E.1/3 OR E.1/17 OR E.1/19 -- S12_TT_Sk and/or S12m_TT_Sk and/or S12s_TT_Sk present

Item	Trace Identifier Mismatch defect (dTIM)	Reference	Status	Support
1	The S12 TIM defect (dTIM) is detected, within a maximum period of 100 ms in the absence of bit errors, when the Accepted Trace Identifier (AcTI) does not match the Expected Trace Identifier (ExTI).	7.2.2, 7.4.1, 7.4.3, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
2	The S12 TIM defect (dTIM) is cleared, within a maximum period of 100 ms, after the Accepted Trace Identifier (AcTI) matches the Expected Trace Identifier (ExTI) in the absence of bit errors.	7.2.2, 7.4.1, 7.4.3, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
3	The S12 TIM defect (dTIM) is suppressed during reception of an aSSF.	7.2.2, 7.4.1, 7.4.3, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
4	The S12 TIM defect (dTIM) is cleared during reception of a VC AIS.	7.4.1	c12301	
5	It is possible to disable the trace identifier mismatch defect detection (TIMdis).	7.2.2, 7.4.1, 7.4.3	m	

c12301: IF E.1/17 THEN m ELSE x -- S12m_TT_Sk present

Table E.124: Unequipped defect (dUNEQ)

Prerequisite: E.1/3 OR E.1/17 OR E.1/19 -- S12_TT_Sk and/or S12m_TT_Sk and/or S12s_TT_Sk present

Item	Unequipped defect (dUNEQ)	Reference	Status	Support
1	The S12 UNEQ defect (dUNEQ) is detected, within a maximum period of 100 ms in the absence of bit errors, if the "accepted TSL" is the unequipped indication (TSL code = 0) within a maximum period of 100 ms in the absence of bit errors.	7.2.2, 7.4.1, 7.4.3, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
2	The S12 UNEQ defect (dUNEQ) is cleared, within a maximum period of 100 ms in the absence of bit errors, if the "accepted TSL" contains a non "unequipped" signal label (TSL code ≥ 1).	7.2.2, 7.4.1, 7.4.3, EN 300 417-1-1 [6] subclause 8.2.1.2	m	

Table E.125: P12s-b/P12s-a Layer Alarm Indication Signal defect (P12s-b/P12s-a dAIS)

Prerequisite: E.1/8 OR E.1/10 -- S12/P12s-b_Sk and/or S12/P12s-a_Sk

Item	P12s-b/P12s-a Layer Alarm Indication Signal defect (P12s-b/P12s-a dAIS)	Reference	Status	Support
1	The S12/P12s-b_Sk and S12/P12s-a_Sk functions detect a VC AIS defect (dAIS) if the incoming signal has X or less ZEROs in each of two consecutive Y bit periods, with X = 2, Y = 512.	7.3.4.2, 7.3.4.3, EN 300 417-1-1 [6] subclause 8.2.1.7	m	
2	The S12/P12s-b_Sk and S12/P12s-a_Sk functions clear a VC AIS defect (dAIS) if each of two consecutive Y bit periods contains Z or more ZEROs (with X = 2, Y = 512, Z = 3) or the Frame Alignment Signal (FAS) has been found.	7.3.4.2, 7.3.4.3, EN 300 417-1-1 [6] subclause 8.2.1.7	m	

Table E.126: Payload Mismatch defect (dPLM)

Prerequisite: E.1/3 -- implies that at least one VC-12 Layer payload Adaptation Sink function is present

Item	Payload Mismatch defect (dPLM)	Reference	Status	Support
1	The S12 PLM defect (dPLM) is detected, within a maximum period of 100 ms in the absence of bit errors, when the Accepted Signal Label (AcSL) does not match the Expected Signal Label (ExSL).	7.3.2, 7.3.4.1, 7.3.4.2, 7.3.4.3, 7.3.6, 7.3.8, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
2	The S12 PLM defect (dPLM) is cleared, within a maximum period of 100 ms, after the Accepted Signal Label (AcSL) matches the Expected Signal Label (ExSL) in the absence of bit errors.	7.3.2, 7.3.4.1, 7.3.4.2, 7.3.4.3, 7.3.6, 7.3.8, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
3	The S12 PLM defect (dPLM) is suppressed during reception of an aTSF.	7.3.2, 7.3.4.1, 7.3.4.2, 7.3.4.3, 7.3.6, 7.3.8, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
4	The S12 PLM defect (dPLM) is suppressed if the incoming TSL code is "1" (equipped non-specific).	7.3.2, 7.3.4.1, 7.3.4.2, 7.3.4.3, 7.3.6, 7.3.8, EN 300 417-1-1 [6] subclause 8.2.1.2	m	

Table E.127: Loss of Frame defect (dLOF)

Prerequisite: E.1/8 OR E.1/10 -- S12/P12s-b_A_Sk and/or S12/P12s-a_A_Sk function present

Item	Loss of Frame defect (dLOF)	Reference	Status	Support
1	The P12s-b/P12s-a LOF defect (dLOF) is detected in accordance to ETS 300 167 [3].	7.3.4.2, 7.3.4.3, ETS 300 167 [3], ITU-T Rec. G.706 [19] subclause 4	m	
2	The P12s-b/P12s-a LOF defect (dLOF) is cleared in accordance to ETS 300 167 [3].	7.3.4.2, 7.3.4.3, ETS 300 167 [3], ITU-T Rec. G.706 [19] subclause 4	m	

Table E.128: Loss of Sequence Synchronization defect (dLSS)

Prerequisite: E.1/16 -- S12/TSS4_A_Sk function present

Item	Loss of Sequence Synchronization defect (dLSS)	Reference	Status	Support
1	The S12/TSS4_A_Sk function detects a Loss of PRBS lock (dLSS) according to the criteria defined in ITU-T Recommendation O.151 [16] subclause 2.6.	7.3.8, ITU-T Rec O.151 [16] subclause 2.6	m	

Table E.129: Non CRC-4 Interworking (NCI) report

Prerequisite: E.1/8 OR E.1/10 -- S12/P12s-b_Sk and/or S12/P12s-a_Sk present

Item	Non CRC-4 Interworking (NCI) report	Reference	Status	Support
1	In the automatic CRC-4 interworking mode, the NCI status is reported as specified in ETS 300 167 [3].	7.3.4.2, 7.3.4.3, ETS 300 167 [3]	m	

E.4.6.3 Consequent action activation and clearance criteria

Table E.130: Alarm Indication Signal action (aAIS)

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
1	The S12_TT_Sk outputs an all "1"s signal within 250 µs upon S12 dUNEQ detection.	7.2.2	c13001	
2	The S12_TT_Sk outputs an all "1"s signal within 250 µs upon S12 dTIM detection.	7.2.2	c13001	
3	The S12_TT_Sk outputs normal data within 250 µs when there is (are) no more defect(s) active.	7.2.2	c13001	
4	The S12/P12x_A_Sk function outputs an all "1"s signal within 250 µs upon dPLM reception.	7.3.2	c13002	
5	The S12/P12x_A_Sk function outputs an all "1"s signal within 250 µs upon AI_TSF reception.	7.3.2	c13002	
6	The S12/P12x_A_Sk function outputs normal data within 250 µs when there is (are) no more defect(s) active.	7.3.2	c13002	
7	The S12/P12s-b_A_So function outputs an all "1"s signal within 250 µs upon CI_SSF reception.	7.3.4.2, 7.3.4.3	c13003	
8	The S12/P12s-b_A_So function outputs normal data within 250 µs when there is (are) no more defect(s) active.	7.3.4.2, 7.3.4.3	c13003	
9	The S12/P12s-x_A_Sk function outputs an all "1"s signal within 250 µs upon dPLM reception.	7.3.4.1	c13004	
10	The S12/P12s-x_A_Sk function outputs an all "1"s signal within 250 µs upon AI_TSF reception.	7.3.4.1	c13004	
11	The S12/P12s-x_A_Sk function outputs normal data within 250 µs when there is (are) no more defect(s) active.	7.3.4.1	c13004	
12	The S12/P12s-b_A_Sk function outputs an all "1"s signal within 250 µs upon dPLM reception.	7.3.4.2	c13005	
13	The S12/P12s-b_A_Sk function outputs an all "1"s signal within 250 µs upon dAIS reception.	7.3.4.2	c13005	
14	The S12/P12s-b_A_Sk function outputs an all "1"s signal within 250 µs upon dLOF reception.	7.3.4.2	c13005	
15	The S12/P12s-b_A_Sk function outputs normal data within 250 µs when there is (are) no more defect(s) active.	7.3.4.2	c13005	
16	The S12/P12s-a_A_Sk function outputs an all "1"s signal within 250 µs upon dPLM reception.	7.3.4.3	c13006	
17	The S12/P12s-a_A_Sk function outputs an all "1"s signal within 250 µs upon dAIS reception.	7.3.4.3	c13006	
18	The S12/P12s-a_A_Sk function outputs an all "1"s signal within 250 µs upon dLOF reception.	7.3.4.3	c13006	

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
19	The S12/P12s-a_A_Sk function outputs normal data within 250 µs when there is (are) no more defect(s) active.	7.3.4.3	c13006	
20	The S12/P0-31c_A_So function outputs an all "1"s signal within 250 µs upon CI_SSF reception.	7.3.5	c13007	
21	The S12_TT_Sk outputs an all "1"s signal within 250 µs upon S12 dUNEQ detection.	7.2.2	c13001	
22	The S12/P0-31c_A_So function outputs normal data within 250 µs when there is (are) no more defect(s) active.	7.3.5	c13007	
23	The S12/P0-31c_A_Sk function outputs an all "1"s signal within 250 µs upon dPLM reception.	7.3.6	c13008	
24	The S12/P0-31c_A_Sk function outputs an all "1"s signal within 250 µs upon AI_TSF reception.	7.3.6	c13008	
25	The S12/P0-31c_A_Sk function outputs normal data within 250 µs when there is (are) no more defect(s) active.	7.3.6	c13008	

c13001: IF E.1/3 THEN m ELSE n/a -- S12_TT_Sk present
c13002: IF E.1/5 THEN m ELSE n/a -- S12/P12x present
c13003: IF E.1/7 THEN m ELSE n/a -- S12/P12s-b_So present
c13004: IF E.1/6 THEN m ELSE n/a -- S12/P12s-x_Sk present
c13005: IF E.1/8 THEN m ELSE n/a -- S12/P12s-b_Sk present
c13006: IF E.1/10 THEN m ELSE n/a -- S12/P12s-a_Sk present
c13007: IF E.1/11 THEN m ELSE n/a -- S12/P0-31c_A_So present
c13008: IF E.1/12 THEN m ELSE n/a -- S12/P0-31c_A_Sk present

Table E.131: Remote Defect Indication defect action (aRDI)

Prerequisite: (E.1/2 AND E.1/3) OR
(E.1/18 AND E.1/19) -- S12_TT_So and S12_TT_Sk and/or S12s_TT_So and S12s_TT_Sk functions present

Item	Remote Defect Indication defect action (aRDI)	Reference	Status	Support
1	The S12_TT_Sk outputs an RDI request generation (RI_RDI) on CI_SSF detection.	7.2.2	c13101	
2	The S12_TT_Sk outputs an RDI request generation (RI_RDI) on S12 dUNEQ detection.	7.2.2	c13101	
3	The S12_TT_Sk outputs an RDI request generation (RI_RDI) on S12 dTIM detection.	7.2.2	c13101	
4	The S12_TT_Sk clears the RDI request when there is (are) no more defect(s) active.	7.2.2	c13101	
5	The S12_TT_So inserts the RDI code within 250 µs upon RI_RDI reception.	7.2.1	c13101	
6	The S12_TT_So outputs normal data within 250 µs upon RI_RDI clearing.	7.2.1	c13101	
7	The S12s_TT_Sk outputs an RDI request generation (RI_RDI) on CI_SSF detection.	7.4.3	c13102	
8	The S12s_TT_Sk outputs an RDI request generation (RI_RDI) on S12 dTIM detection.	7.4.3	c13102	
9	The S12s_TT_Sk clears the RDI request when there is (are) no more defect(s) active.	7.4.3	c13102	
10	The S12s_TT_So inserts the RDI code within 250 µs upon RI_RDI reception.	7.4.2	c13102	
11	The S12s_TT_So outputs normal data within 250 µs upon RI_RDI clearing.	7.4.2	c13102	

c13101: IF (E.1/2 AND E.1/3) THEN m ELSE n/a -- S12_TT_So and S12_TT_Sk functions present
c13102: IF (E.1/18 AND E.1/19) THEN m ELSE n/a -- S12s_TT_So and S12s_TT_Sk functions present

Table E.132: Remote Error Indication action (aREI)

Prerequisite: (E.1/2 AND E.1/3) OR
(E.1/18 AND E.1/19) -- S12_TT_So and S12_TT_Sk and/or S12s_TT_So and S12s_TT_Sk functions present

Item	Remote Error Indication action (aREI)	Reference	Status	Support
1	The S12_TT_So inserts the REI value in the next REI bits.	7.2.1	c13201	
2	The S12s_TT_So inserts the REI value in the next REI bits.	7.6.2	c13202	

c13201: IF (E.1/2 AND E.1/3) THEN m ELSE n/a -- S12_TT_So and S12_TT_Sk functions present
c13202: IF (E.1/18 AND E.1/19) THEN m ELSE n/a -- S12s_TT_So and S12s_TT_Sk functions present

Table E.133: Server Signal Fail action (aSSF)

Prerequisite: E.1/3 -- implies that at least one VC-12 Layer payload Adaptation Sink function is present.

Item	Server Signal Fail action (aSSF)	Reference	Status	Support
1	The S12/P12x_A_Sk sets CI_SSF to TRUE on S12 dPLM detection.	7.3.2	c13301	
2	The S12/P12x_A_Sk sets CI_SSF to TRUE on AI_TSF reception.	7.3.2	c13301	
3	The S12/P12x_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	7.3.2	c13301	
4	The S12/P12s-x_A_Sk sets CI_SSF to TRUE on S12 dPLM detection.	7.3.4.1	c13302	
5	The S12/P12s-x_A_Sk sets CI_SSF to TRUE on AI_TSF reception.	7.3.4.1	c13302	
6	The S12/P12s-x_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	7.3.4.1	c13302	
7	The S12/P12s-b_A_Sk sets CI_SSF to TRUE on S12 dPLM detection.	7.3.4.2	c13303	
8	The S12/P12s-b_A_Sk sets CI_SSF to TRUE on P12s-b dAIS detection.	7.3.4.2	c13303	
9	The S12/P12s-b_A_Sk sets CI_SSF to TRUE on P12s-b dLOF reception.	7.3.4.2	c13303	
10	The S12/P12s-b_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	7.3.4.2	c13303	
11	The S12/P12s-a_A_Sk sets CI_SSF to TRUE on S12 dPLM detection.	7.3.4.3	c13304	
12	The S12/P12s-a_A_Sk sets CI_SSF to TRUE on P12s-a dAIS detection.	7.3.4.3	c13304	
13	The S12/P12s-a_A_Sk sets CI_SSF to TRUE P12s-a dLOF reception.	7.3.4.3	c13304	
14	The S12/P12s-a_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	7.3.4.3	c13304	
15	The S12/P0-31c_A_Sk sets CI_SSF to TRUE on S12 dPLM detection.	7.3.6	c13305	
16	The S12/P0-31c_A_Sk sets CI_SSF to TRUE on AI_TSF reception.	7.3.6	c13305	
17	The S12/P0-31c_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	7.3.6	c13305	

c13301: IF E.1/5 THEN m ELSE n/a -- S12/P12x_A_Sk present
c13302: IF E.1/6 THEN m ELSE n/a -- S12/P12s-x_A_Sk present
c13303: IF E.1/8 THEN m ELSE n/a -- S12/P12s-b_A_Sk present
c13304: IF E.1/10 THEN m ELSE n/a -- S12/P12s-a_A_Sk present
c13305: IF E.1/12 THEN m ELSE n/a -- S12/P0-31c_A_Sk present

Table E.134: Trail Signal Fail action (aTSF)

Prerequisite: E.1/3 OR E.1/17 OR E.1/19 -- S12_TT_Sk and/or S12m_TT_Sk and/or S12s_TT_Sk functions present

Item	Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The S12_TT_Sk sets AI_TSF to TRUE on S12 dUNEQ detection.	7.2.2	c13401	
2	The S12_TT_Sk sets AI_TSF to TRUE on S12 dTIM detection.	7.2.2	c13401	
3	The S12_TT_Sk sets AI_TSF to TRUE on CI_SSF reception.	7.2.2	c13401	
4	The S12_TT_Sk sets AI_TSF to FALSE when there is (are) no more defect(s) active.	7.2.2	c13401	
5	The S12m_TT_Sk sets AI_TSF to TRUE on S12 dAIS detection.	7.4.1	c13402	
6	The S12m_TT_Sk sets AI_TSF to TRUE on S12 dUNEQ detection.	7.4.1	c13402	
7	The S12m_TT_Sk sets AI_TSF to TRUE on S12 dTIM detection.	7.4.1	c13402	
8	The S12m_TT_Sk sets AI_TSF to TRUE on CI_SSF reception.	7.4.1	c13402	
9	The S12m_TT_Sk sets AI_TSF to FALSE when there is (are) no more defect(s) active.	7.4.1	c13402	
10	The S12s_TT_Sk sets AI_TSF to TRUE on S12 dTIM detection.	7.4.3	c13403	
11	The S12s_TT_Sk sets AI_TSF to TRUE on CI_SSF reception.	7.4.3	c13403	
12	The S12s_TT_Sk sets AI_TSF to FALSE when there is (are) no more defect(s) active.	7.4.3	c13403	

c13401: IF E.1/3 THEN m ELSE n/a -- S12_TT_Sk present
c13402: IF E.1/17 THEN m ELSE n/a -- S12m_TT_Sk present
c13403: IF E.1/19 THEN m ELSE n/a -- S12s_TT_Sk present

Table E.135: Trail Signal Degrade action (aTSD)

Prerequisite: E.1/3 OR E.1/17 OR E.1/19 -- S12_TT_Sk and/or S12m_TT_Sk and/or S12s_TT_Sk functions present

Item	Trail Signal Degrade action (aTSD)	Reference	Status	Support
1	If the dDEG is detected in the trail termination sink the aTSD is performed.	EN 300 417-1-1 [6] subclause 8.2.2.6	m	
2	It ceases aTSD insertion after the dDEG defect is cleared.	EN 300 417-1-1 [6] subclause 8.2.2.6	m	
3	The aTSD is equivalent to send the Signal Degrade (SD) signal as defined in the Automatic Protection Switching (APS).	EN 300 417-1-1 [6] subclause 8.2.2.6	m	

E.4.6.4 Defect correlation

Prerequisite: E.6/4 -- Defect correlation process supported

Table E.136: Defect correlation

Item	Defect correlation	Reference	Status	Support
1	Under S12 dUNEQ detection the S12_TT_Sk and S12m_TT_Sk functions generate a S12 cUNEQ report if the port is in the monitoring state (MON).	7.2.2, 7.4.1	c13601	
2	Under S12 dTIM detection the S12_TT_Sk and S12m_TT_Sk functions generate a S12 cTIM report if the port is in the monitoring state (MON) and no dUNEQ defect has been detected.	7.2.2, 7.4.1	c13601	
3	Under detection of both S12 dUNEQ and S12 dTIM and reception of "AcTI = all 0s" the S12s_TT_Sk function generates a S12 cUNEQ report if the port is in the monitoring state (MON).	7.4.3, EN 300 417-1-1 [6] subclause.8.2.3.2	c13602	
4	Under S12 dTIM detection the S12s_TT_Sk function generates a S12 cTIM report if the port is in the monitoring state (MON) and no dUNEQ defect nor "AcTI = all 0s" have been declared.	7.4.3, EN 300 417-1-1 [6] subclause.8.2.3.2	c13602	
5	Under S12 dDEG detection the VC-12 Layer Trail Termination Sink functions (S12_TT_Sk, S12m_TT_Sk, S12s_TT_Sk) generate a S12 cDEG report if the port is in the monitoring state (MON) and no dTIM defect has been detected.	7.2.2, 7.4.1, 7.4.3	c13603	
6	Under S12 dRDI detection the VC-12 Layer Trail Termination Sink functions (S12_TT_Sk, S12m_TT_Sk, S12s_TT_Sk) generate a S12 cRDI report if the port is in the monitoring state (MON) and no dUNEQ nor dTIM defects have been detected.	7.2.2, 7.4.1, 7.4.3	c13603	
7	The S12 cRDI is reported only if S12 RDI_reported is set to TRUE by the EMF. By default S12 RDI_reported is set to FALSE.	7.2.2, 7.4.1, 7.4.3	c13603	
8	Under CI_SSF reception the VC-12 Layer Trail Termination Sink functions (S12_TT_Sk, S12m_TT_Sk, S12s_TT_Sk) generate a S12 cSSF report if the port is in the monitoring state (MON).	7.2.2, 7.4.1, 7.4.3	c13603	
9	The S12 cSSF is reported only if selected S12 SSF_reported is set to TRUE by the EMF. By default S12 SSF_reported is set to FALSE.	7.2.2, 7.4.1, 7.4.3	c13603	
10	Under S12 dPLM detection the S12/P12x_A_Sk generates a S12 cPLM report if no AI_TSF is received from the S12_TT_Sk.	7.3.2	c13604	
11	Under S12 dPLM detection the S12/P12s-x_A_Sk generates a S12 cPLM report if no AI_TSF is received from the S12_TT_Sk.	7.3.4.1	c13605	

Item	Defect correlation	Reference	Status	Support
12	Under S12 dPLM detection the S12/P12s-b_A_Sk generates a S12 fPLM report if no AI_TSF is received from the S12_TT_Sk.	7.3.4.2	c13606	
13	Under S12 dPLM detection the S12/P12s-a_A_Sk generates a S12 cPLM report if no AI_TSF is received from the S12_TT_Sk.	7.3.4.3	c13607	
14	Under S12 dPLM detection the S12/P0-31c_A_Sk generates a S12 cPLM report if no AI_TSF is received from the S12_TT_Sk.	7.3.6	c13608	
15	Under S12 dPLM detection the S12/TSS4_A_Sk generates a S12 cPLM report if no AI_TSF is received from the S12_TT_Sk.	7.3.8	c13609	
16	Under dLSS detection the S12/TSS4_A_Sk generates a cLSS report if no AI_TSF is received from the S12_TT_Sk.	7.3.8	c13609	
17	All the generated fault causes (cXXX) are reported to the EMF	EN 300 417-1-1 [6] subclause 8.1 figure 36	m	

c13601: IF (E.1/3 OR E.1/17) THEN m ELSE n/a -- S12_TT_Sk and/or S12m_TT_Sk present
c13602: IF E.1/19 THEN m ELSE n/a -- S12s_TT_Sk present
c13603: IF (E.1/3 OR E.1/17 OR E.1/19) THEN m ELSE n/a -- S12_TT_Sk and/or S12m_TT_Sk and/or S12s_TT_Sk present
c13604: IF E.1/5 THEN m ELSE n/a -- S12/P12x_A_Sk present
c13605: IF E.1/6 THEN m ELSE n/a -- S12/P12s-x_A_Sk present
c13606: IF E.1/8 THEN m ELSE n/a -- S12/P12s-b_A_Sk present
c13607: IF E.1/10 THEN m ELSE n/a -- S12/P12s-a_A_Sk present
c13608: IF E.1/12 THEN m ELSE n/a -- S12/P0-31c_A_Sk present
c13609: IF E.1/16 THEN m ELSE n/a -- S12/TSS4_A_Sk present

E.4.6.5 Performance monitoring

E.4.6.5.1 Near End Performance monitoring

Prerequisite: E.6/1 -- Near-end performance monitoring process supported

Table E.137: pN_DS performance parameter

Prerequisite: E.6/1 -- Near-end performance monitoring process supported

Item	pN_DS performance parameter	Reference	Status	Support
1	The VC-12 Layer Trail Termination Sink functions (S12_TT_Sk, S12m_TT_Sk, S12s_TT_Sk) indicate a S12 pN_DS every second with at least one occurrence of S12 aTSF or an equipment defect (dEQ).	7.2.2, 7.4.1, 7.4.3	m	

Table E.138: pN_EBC performance parameter

Prerequisite: E.6/1 -- Near-end performance monitoring process supported

Item	pN_EBC performance parameter	Reference	Status	Support
1	Every second the VC-12 Layer Trail Termination Sink functions (S12_TT_Sk, S12m_TT_Sk, S12s_TT_Sk) count the number of S12 Near-end Errored Block (S12 N_Bs) within that second as the S12 pN_EBC (S12 Near-end Error Block Count).	7.2.2, 7.4.1, 7.4.3	m	

Comments: A "Near-end Block" (N_B) is errored if one or more BIP-2 violations are detected.

Table E.139: pN_TSE performance parameter

Prerequisite: E.6/1 AND E.16/16 -- Near-end performance monitoring process supported and S12/TSS4_A_Sk present

Item	pN_TSE performance parameter	Reference	Status	Support
1	Every second the S12/TSS4_A_Sk gives sum of Test Sequence Errors (TSE) within one second period as the S12 pN_TSE (S12 Near-end Test Sequence Errors).	7.2.2, 7.4.1, 7.4.3	m	

Comments: The TSE error block size is equal to the V5 BIP-2 error block size with the exception of the VC-12 POH.

E.4.6.5.2 Far End Performance Monitoring

Prerequisite: E.6/2 -- Far-end performance monitoring process supported

Table E.140: pF_DS performance parameter

Item	pF_DS performance parameter	Reference	Status	Support
1	The VC-12 Layer Trail Termination Sink functions (S12_TT_Sk, S12m_TT_Sk, S12s_TT_Sk) indicate a S12 pF_DS every second with at least one occurrence of S12 dRDI.	7.2.2, 7.4.1, 7.4.3	m	

Table E.141: pF_EBC performance parameter

Item	pF_EBC performance parameter	Reference	Status	Support
1	Every second VC-12 Layer Trail Termination Sink functions (S12_TT_Sk, S12m_TT_Sk, S12s_TT_Sk) count the number of S12 Far-end Errored Block (S12 F_Bs) within that second as the S12 pF_EBC (S12 Far-end Error Block Count).	7.2.2, 7.4.1, 7.4.3	m	

Comments: A "Far-end Block" (F_B) is errored if the REI count indicates one or more errors.

E.4.7 VC-12 Layer Linear Trail Protection Defect, Consequent Action, Defect Correlation and Performance Monitoring Tables

Prerequisite: E.B.1/25 -- VC-12 Layer Linear Trail Protection scheme supported

E.4.7.1 Consequent action activation and clearance criteria

Table E.142: Server Signal Fail action (aSSF)

Prerequisite: E.5/5 -- S12/S12P_A_Sk present

Item	Server Signal Fail action (aSSF)	Reference	Status	Support
1	The S12/S12P_A_Sk sets CI_SSF to TRUE on AI_TSF reception.	7.5.3.2	m	
2	The S12/S12P_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	7.5.3.2	m	

Table E.143: Trail Signal Fail action (aTSF)

Prerequisite: E.5/3 -- S12P_TT_Sk present

Item	Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The S12P_TT_Sk sets AI_TSF to TRUE on CI_SSF reception.	7.5.2.2	m	
2	The S12P_TT_Sk sets AI_TSF to FALSE when there is (are) no more defect(s) active.	7.5.2.2	m	

Prerequisite: E.5/5 -- S12/S12P_A_Sk present

Table E.144: Server Signal Degrade action (aSSD)

Item	Server Signal Degrade action (aSSD)	Reference	Status	Support
1	The S12/S12P_A_Sk sets CI_SSD to TRUE on AI_TSD reception.	7.5.3.2	m	
2	The S12/S12P_A_Sk sets CI_SSD to FALSE when there is (are) no more defect(s) active.	7.5.3.2	m	

E.4.7.2 Defect correlation

Table E.145: Defect correlation

Item	Defect correlation	Reference	Status	Support
1	Under S12P CI_SSF reception the S12P_TT_Sk generates an S12P fSSF report.	7.5.2.2	c14501	
2	The S12P fSSF is reported only if selected S12P SSF_reported is set to TRUE by the EMF. By default S12P SSF_reported is set to FALSE.	7.5.2.2	c14501	
3	All the generated fault causes (cXXX) are reported to the EMF	EN 300 417-1-1 [6] subclause 8.1 figure 36	m	

c14501: IF E.5/3 THEN m ELSE n/a -- S12P_TT_Sk present

E.4.8 VC-12 Tandem Connection Sub-layer Defect, Consequent Action, Defect Correlation and Performance Monitoring Tables

Prerequisite: E.1/20 OR E.1/21 OR E.1/24 -- S12D_TT_So and/or S12D_TT_Sk and/or S12Dm_TT_Sk present

E.4.8.1 Port Status Management

Table E.146: Trail Termination Point Mode Process

Prerequisite: E.1/21 OR E.1/24 -- S12D_TT_Sk and/or S12Dm_TT_Sk present

Item	Trail Termination Point Mode Process	Reference	Status	Support
1	The Trail Termination Point Mode supports "not monitored" (NMON) status.	EN 300 417-1-1 [6] subclause 8.5	m	
2	The Trail Termination Point Mode supports "monitored" (MON) status.	EN 300 417-1-1 [6] subclause 8.5	m	
3	The Trail Termination Point Mode status is provisionable by the EMF.	7.6.2, 7.6.5	m	

E.4.8.2 Defect detection and clearance criteria

Prerequisite: E.1/21 OR E.1/24 -- S12D_TT_Sk and/or S12Dm_TT_Sk present

Table E.147: VC-12 Tandem Connection Incoming Alarm Indication Signal defect (TC dIncAIS)

Prerequisite: E.1/21 -- S12D_TT_Sk present

Item	VC-12 Tandem Connection Incoming Alarm Indication Signal defect (TC dIncAIS)	Reference	Status	Support
1	The S12D_TT_Sk function detects a TC Incoming AIS defect (dIncAIS) if 5 consecutive frames contain the '1' value in bit N2[4].	7.6.2	m	
2	The S12D_TT_Sk function clears the TC Incoming AIS defect (dIncAIS) if 5 consecutive frames contain the '0' value in bit N2[4].	7.6.2	m	

Table E.148: VC-12 Tandem Connection Remote Defect Indication defect (dRDI)

Item	VC-12 Tandem Connection Remote Defect Indication defect (dRDI)	Reference	Status	Support
1	The TC RDI defect (dRDI) is detected if 5 consecutive frames contain the '1' value in bit N2[8][73] of the 76 frame multiframe (38 ms).	7.6.2, 7.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
2	The TC RDI defect (dRDI) is cleared if in 5 consecutive frames contain the '0' value in bit N2[8][73] of the 76 frame multiframe (38 ms).	7.6.2, 7.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
3	The TC RDI defect (dRDI) is cleared during reception of an aSSF.	7.6.2, 7.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	

Comment: N2[x][y] refers to bit x (x = 7,8) of byte N2 in frame y (y = 1..76) of the 76 frame multiframe (38 ms).

Table E.149: VC-12 Tandem Connection Degraded defect (dDEG)

Item	VC-12 Tandem Connection Degraded defect (dDEG)	Reference	Status	Support
1	Once every second, S12D pNEBC is compared with DEGTHR	7.6.2, 7.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
2	If S12D pNEBC ≥ DEGTHR the corresponding second is declared BAD, otherwise it is declared GOOD	7.6.2, 7.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
3	The S12D dDEG defect (dDEG) is detected if M consecutive BAD seconds have occurred.	7.6.2, 7.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
4	The S12D dDEG defect (dDEG) is cleared if M consecutive GOOD seconds have occurred.	7.6.2, 7.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
5	The S12D dDEG defect (dDEG) is cleared during reception of an aSSF	7.6.2, 7.6.5, EN 300 417-1-1 [6] subclause 8.2.1.4	m	
6	The DEGTHR parameter is provisionable by the EMF	7.6.2, 7.6.5	m	
7	The DEGM parameter is provisionable by the EMF	7.6.2, 7.6.5	m	

Table E.150: VC-12 Tandem Connection DEG defect parameters value

Item	VC-12 Tandem Connection DEG defect parameters	Reference	Status	Support	Values	
					Allowed	Supported
1	S12D dDEG DEGTHR parameter	7.6.2, 7.6.5	m		0 < DEGTHR ≤ 28 000	
2	S12D dDEG M parameter	7.6.2, 7.6.5	m		2 ≤ M ≤ 10	

Table E.151: VC-12 Tandem Connection Trace Identifier Mismatch defect (dTIM)

Item	VC-12 Tandem Connection Trace Identifier Mismatch defect (dTIM)	Reference	Status	Support
1	The S12D TIM defect (dTIM) is detected, within a maximum period of 1 s in the absence of bit errors, when the Accepted Trace Identifier (AcTI) does not match the Expected Trace Identifier (ExTI).	7.6.2, 7.6.5, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
2	The S12D TIM defect (dTIM) is cleared, within a maximum period of 1 s, after the Accepted Trace Identifier (AcTI) matches the Expected Trace Identifier (ExTI) in the absence of bit errors.	7.6.2, 7.6.5, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
3	The S12D TIM defect (dTIM) is suppressed during reception of an aSSF.	7.6.2, 7.6.5, EN 300 417-1-1 [6] subclause 8.2.1.3	m	
4	It is possible to disable the TC trace identifier mismatch defect detection (TIMdis).	7.6.2, 7.6.5	m	

Table E.152: VC-12 Tandem Connection Unequipped defect (dUNEQ)

Item	VC-12 Tandem Connection Unequipped defect (dUNEQ)	Reference	Status	Support
1	The S12D UNEQ defect (dUNEQ) is detected, within a maximum period of 100 ms in the absence of bit errors, if the "received bit locations N2[7-8][9-72]" contain the unequipped indication (TSL code = "0000 0000") within a maximum period of 100 ms in the absence of bit errors. New text: The S12D UNEQ defect (dUNEQ) is detected if five consecutive VC-12 frames contain the "0000 0000" pattern in byte N2.	7.6.2, 7.6.5, EN 300 417-1-1 [6] subclause 8.2.1.2	m	
2	The S12D UNEQ defect (dUNEQ) is cleared, within a maximum period of 100 ms in the absence of bit errors, if the "received bit locations N2[7-8][9-72]" contain a non "unequipped" signal label (TSL code ≠ "0000 0000"). New text: The S12D UNEQ defect (dUNEQ) is cleared if in five consecutive VC-12 frames any pattern other than the "0000 0000" is detected in byte N2.	7.6.2, 7.6.5, EN 300 417-1-1 [6] subclause 8.2.1.2	m	

Table E.153: Loss of Tandem Connection defect (dLTC)

Item	Loss of Tandem defect (dLTC)	Reference	Status	Support
1	The S12D LTC defect (dLTC) is detected if the multiframe alignment process is in the OOM state.	7.6.2, 7.6.5	m	
2	The S12D LTC defect (dLTC) is cleared if the multiframe alignment process is in the IM state.	7.6.2, 7.6.5	m	

Table E.154: VC-12 Tandem Connection Remote Outgoing VC defect (dODI)

Item	VC-12 Tandem Connection Remote Outgoing VC defect (dODI)	Reference	Status	Support
1	The TC ODI defect (dODI) is detected if 5 consecutive frames contain the '1' value in bit N2[7][74] of the 76 frame multiframe (38 ms).	7.6.2, 7.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
2	The TC ODI defect (dODI) is cleared if in 5 consecutive frames contain the '0' value in bit N2[7][74] of the 76 frame multiframe (38 ms).	7.6.2, 7.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	
3	The TC RDI defect (dRDI) is cleared during reception of an aSSF.	7.6.2, 7.6.5, EN 300 417-1-1 [6] subclause 8.2.1.5	m	

E.4.8.3 Consequent action activation and clearance criteria

Table E.155: Alarm Indication Signal action (aAIS)

Prerequisite: E.1/21 OR E.1/21 -- S12D_TT_Sk and/or S12D/S12_A_Sk present

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
1	The S12D_TT_Sk outputs an all "1"s signal within 250 µs upon S12D dUNEQ detection.	7.6.2	c15501	
2	The S12D_TT_Sk outputs an all "1"s signal within 250 µs upon S12D dTIM detection.	7.6.2	c15501	
3	The S12D_TT_Sk outputs an all "1"s signal within 250 µs upon S12D dLTC detection.	7.6.2	c15501	
4	The S12D_TT_Sk outputs normal data within 250 µs when there is (are) no more defect(s) active.	7.6.2	c15501	
5	The S12D/S12_A_Sk outputs an all "1"s signal within 1 ms upon AI_OSF reception.	7.6.4	c15502	
6	The S12D/S12_A_Sk outputs normal data within 1 ms when there is (are) no more defect(s) active.	7.6.4	c15502	

c15501: IF E.1/21 THEN m ELSE n/a -- S12D_TT_Sk present
c15502: IF E.1/21 THEN m ELSE n/a -- S12D/S12_A_Sk present

Table E.156: Remote Defect Indication defect action (aRDI)

Prerequisite: E.1/20 AND E.1/21 -- S12D_TT_So and S12D_TT_Sk functions present

Item	Remote Defect Indication defect action (aRDI)	Reference	Status	Support
1	The S12D_TT_Sk outputs an RDI request generation (RI_RDI) on CI_SSF detection.	7.6.2	m	
2	The S12D_TT_Sk outputs an RDI request generation (RI_RDI) on S12D dUNEQ detection.	7.6.2	m	
3	The S12D_TT_Sk outputs an RDI request generation (RI_RDI) on S12D dTIM detection.	7.6.2	m	
4	The S12D_TT_Sk outputs an RDI request generation (RI_RDI) on S12D dLTC detection.	7.6.2	m	
5	The S12D_TT_Sk clears the RDI request when there is (are) no more defect(s) active.	7.6.2	m	
6	The S12D_TT_So inserts the RDI code within the TC RDI code within 1 multiframe (9,5 ms) upon RI_RDI reception.	7.6.1	m	
7	The S12D_TT_So outputs normal data within the TC RDI code within 1 multiframe (9,5 ms) upon RI_RDI clearing.	7.6.1	m	

Table E.157: Remote Error Indication action (aREI)

Prerequisite: E.1/20 AND E.1/21 -- S12D_TT_So and S12D_TT_Sk functions present

Item	Remote Error Indication action (aREI)	Reference	Status	Support
1	The S12D_TT_So inserts the RI_REI value in the REI bit in the following frame.	7.6.1	m	

Table E.158: Outgoing Defect Indication defect action (aODI)

Prerequisite: E.1/20 AND E.1/21 -- S12D_TT_So and S12D_TT_Sk functions present

Item	Outgoing Defect Indication defect action (aODI)	Reference	Status	Support
1	The S12D_TT_Sk outputs an ODI request generation (RI_ODI) on CI_SSF detection.	7.6.2	m	
2	The S12D_TT_Sk outputs an ODI request generation (RI_ODI) on S12D dUNEQ detection.	7.6.2	m	
3	The S12D_TT_Sk outputs an ODI request generation (RI_ODI) on S12D dTIM detection.	7.6.2	m	
4	The S12D_TT_Sk outputs an ODI request generation (RI_ODI) on S12D dLTC detection.	7.6.2	m	
5	The S12D_TT_Sk outputs an ODI request generation (RI_ODI) on S12D dIncAIS detection.	7.6.2	m	
6	The S12D_TT_Sk clears the ODI request when there is (are) no more defect(s) active.	7.6.2	m	
7	The S12D_TT_So inserts the ODI code within the TC ODI code within 1 multiframe (9,5 ms) upon RI_ODI reception.	7.6.1	m	
8	The S12D_TT_So outputs normal data within the TC ODI code at the first opportunity after the RI_ODI request has been cleared.	7.6.1	m	

Table E.159: Outgoing Error Indication action (aOEI)

Prerequisite: E.1/20 AND E.1/21 -- S12D_TT_So and S12D_TT_Sk functions present

Item	Outgoing Error Indication action (aOEI)	Reference	Status	Support
1	The S12D_TT_So inserts the RI_OEI value in the OEI bit in following frame.	7.6.1	m	

Table E.160: Server Signal Fail action (aSSF)

Prerequisite: E.1/20 -- S12D/S12_A_Sk present

Item	Server Signal Fail action (aSSF)	Reference	Status	Support
1	The S12D/S12_A_Sk sets CI_SSF to TRUE on AI_OSF reception.	7.6.4	m	
2	The S12D/S12_A_Sk sets CI_SSF to FALSE when there is (are) no more defect(s) active.	7.6.4	m	

Table E.161: Trail Signal Fail action (aTSF)

Prerequisite: E.1/21 OR E.1/24 -- S12D_TT_Sk and/or S12Dm_TT_Sk present

Item	Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) set AI_TSF to TRUE on S12D dUNEQ detection.	7.6.2, 7.6.5	m	
2	The Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) set AI_TSF to TRUE on S12D dTIM detection.	7.6.2, 7.6.5	m	
3	The Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) set AI_TSF to TRUE on S12D dLTC detection.	7.6.2, 7.6.5	m	
4	The Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) set AI_TSF to TRUE on CI_SSF reception.	7.6.2, 7.6.5	m	
5	The Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) set AI_TSF to FALSE when there is (are) no more defect(s) active.	7.6.2, 7.6.5	m	

Table E.162: Outgoing Signal Fail action (aOSF)

Prerequisite: E.1/21 OR E.1/24 - S12D_TT_Sk and/or S12Dm_TT_Sk present

Item	Outgoing Signal Fail action (aOSF)	Reference	Status	Support
1	The Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) set AI_OSF to TRUE on S12D dUNEQ detection.	7.6.2, 7.6.5	m	
2	The Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) set AI_OSF to TRUE on S12D dTIM detection.	7.6.2, 7.6.5	m	
3	The Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) set AI_OSF to TRUE on S12D dLTC detection.	7.6.2, 7.6.5	m	
4	The Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) set AI_OSF to TRUE on S12D dIncAIS detection.	7.6.2, 7.6.5	m	
5	The Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) set AI_OSF to TRUE on CI_SSF reception.	7.6.2, 7.6.5	m	
6	The Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) set AI_OSF to FALSE when there is (are) no more defect(s) active.	7.6.2, 7.6.5	m	

Table E.163: AI_SF signal generation (AI_SF)

Prerequisite: E.1/20 - S12D/S12_A_So present

Item	AI_SF signal generation (AI_SF)	Reference	Status	Support
1	The S12D/S12_A_So sets AI_SF to TRUE on CI_SSF reception.	7.6.3	m	
2	The S12D/S12_A_So sets AI_SF to FALSE when no CI_SSF is received.	7.6.3	m	

Table E.164: Trail Signal Degrade action (aTSD)

Prerequisite: E.1/21 OR E.1/24 - S12D_TT_Sk and/or S12Dm_TT_Sk present

Item	Trail Signal Degrade action (aTSD)	Reference	Status	Support
1	If the dDEG is detected in the trail termination sink the aTSD is performed.	EN 300 417-1-1 [6] subclause 8.2.2.6	m	
2	It ceases aTSD insertion after the dDEG defect is cleared.	EN 300 417-1-1 [6] subclause 8.2.2.6	m	

E.4.8.4 Defect correlation

Prerequisite: E.5/8 - Tandem Connection defect correlation process supported

Table E.165: Tandem Connection defect correlation

Item	Tandem Connection defect correlation	Reference	Status	Support
1	Under S12D dUNEQ detection the VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) generate a S12D cUNEQ report if the port is in the monitoring state (MON).	7.6.2, 7.6.5	m	
2	Under S12D dLTC detection the VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) generate a S12D cLTC report if the port is in the monitoring state (MON) and no dUNEQ defect has been detected.	7.6.2, 7.6.5	m	
3	Under S12D dTIM detection the VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) generate a S12D cTIM report if the port is in the monitoring state (MON) and no dUNEQ nor dLTC defects have been detected.	7.6.2, 7.6.5	m	
4	Under S12D dDEG detection the VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) generate a S12D cDEG report if the port is in the monitoring state (MON) and no dTIM nor dLTC defects have been detected.	7.6.2, 7.6.5	m	
5	Under S12D dRDI detection the VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) generate a S12D cRDI report if the port is in the monitoring state (MON) and no dUNEQ nor dTIM nor dLTC defects have been detected.	7.6.2, 7.6.5	m	
6	The S12D cRDI is reported only if S12D RDI_reported is set to TRUE by the EMF. By default S12D RDI_reported is set to FALSE.	7.6.2, 7.6.5	m	
7	Under S12D dODI detection the VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) generate a S12D cODI report if the port is in the monitoring state (MON) and no dUNEQ nor dTIM nor dLTC defects have been detected.	7.6.2, 7.6.5	m	

Item	Tandem Connection defect correlation	Reference	Status	Support
8	The S12D cODI is reported only if S12D ODI_reported is set to TRUE by the EMF. By default S12D ODI_reported is set to FALSE.	7.6.2, 7.6.5	m	
9	Under CI_SSF the VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) generate a S12D cSSF report if the port is in the monitoring state (MON).	7.6.2, 7.6.5	m	
10	The S12D cSSF is reported only if selected S12D SSF_reported is set to TRUE by the EMF. By default S12D SSF_reported is set to FALSE.	7.6.2, 7.6.5	m	
11	All the generated fault causes (cXXX) are reported to the EMF	EN 300 417-1-1 [6] subclause 8.1 figure 36	m	

E.4.8.5 Performance monitoring

E.4.8.5.1 Near End Performance monitoring

Prerequisite: E.5/5 - Tandem Connection Near-end performance monitoring process supported

Table E.166: pN_DS performance parameter

Item	pN_DS performance parameter	Reference	Status	Support
1	The VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) indicate a S12D pN_DS every second with at least one occurrence of S12D aTSF or an equipment defect (dEQ).	7.6.2, 7.6.5	m	

Table E.167: pN_EBC performance parameter

Item	pN_EBC performance parameter	Reference	Status	Support
1	Every second the VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) count the number of S12D Near-end Errored Block (S12D N_Bs) within that second as the S12D pN_EBC (S12D Near-end Error Block Count).	7.6.2, 7.6.5	m	

Comments: A "Near-end Block" (N_B) is errored if one or more BIP-2 violations are detected.

E.4.8.5.2 Far End Performance Monitoring

Prerequisite: E.5/6 -- Tandem Connection Far-end performance monitoring process supported

Table E.168: pF_DS performance parameter

Item	pF_DS performance parameter	Reference	Status	Support
1	The VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) indicate a S12D pF_DS every second with at least one occurrence of S12D dRDI.	7.6.2, 7.6.5	m	

Table E.169: pF_EBC performance parameter

Item	pF_EBC performance parameter	Reference	Status	Support
1	Every second VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) count the number of S12D Far-end Errored Block (S12D F_Bs) within that second as the S12D pF_EBC (S12D Far-end Error Block Count).	7.6.2, 7.6.5	m	

Comments: A "Far-end Block" (F_B) is errored if the REI count indicates one or more errors.

E.4.8.5.3 Tandem Connection Outgoing VC Performance Monitoring

Prerequisite: E.5/7 -- Tandem Connection Outgoing VC performance monitoring process supported

Table E.170: pOF_DS performance parameter

Item	pOF_DS performance parameter	Reference	Status	Support
1	The VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) indicate a S12D pOF_DS every second with at least one occurrence of S12D dODI	7.6.2, 7.6.5	m	

Table E.171: pOF_EBC performance parameter

Item	pOF_EBC performance parameter	Reference	Status	Support
1	Every second VC-12 Tandem Connection Trail Termination Sink functions (S12D_TT_Sk, S12Dm_TT_Sk) count the number of S12D Outgoing VC Errored Block (S12D OF_Bs) within that second as the S12D pOF_EBC (S12D Outgoing VC Error Block Count).	7.6.2, 7.6.5	m	

Comments: An "Outgoing VC Block" (OF_B) is errored if the OEI count indicates one or more errors.

Table E.172: pON_EBC performance parameter

Item	pON_EBC performance parameter	Reference	Status	Support
1	Every second the VC-12 Tandem Connection Trail Termination Sink function (S12D_TT_Sk) counts the number of S12D Outgoing Near-end Errored Block (S12D ON_Bs) within that second as the S12D pON_EBC (S12D Outgoing Near-end Error Block Count).	7.6.2	m	

Table E.173: pON_DS performance parameter

Item	pON_DS performance parameter	Reference	Status	Support
1	The VC-12 Tandem Connection Trail Termination Sink function (S12D_TT_Sk) indicates a S12D pON_DS every second with at least one occurrence of S12D aODI or an equipment defect (dEQ).	7.6.2	m	

Annex F (informative): Bibliography

- TS 101 009 (1997): "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); Network protection schemes; Types and characteristics".

History

Document history				
V1.1.1	April 1998	Public Enquiry	PE 9831:	1998-04-03 to 1998-07-31
V1.1.1	March 1999	Vote	V 9918:	1999-03-02 to 1999-04-30