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**Transmission and Multiplexing (TM);
Generic functional requirements for
Synchronous Digital Hierarchy (SDH) equipment;
Part 2-2: Physical section layer functions
Implementation Conformance Statement (ICS)
proforma specification**

ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE

Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE

X.400: c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 92 94 42 00 - Fax: +33 93 65 47 16

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Transmission and Multiplexing (TM) Technical Committee of the European Telecommunications Standards Institute (ETSI), and is now submitted for the Public Enquiry phase of the ETSI standards approval procedure.

This ETS provides the Implementation Conformance Statement (ICS) proforma specification to be used in connection with conformance/approval testing of Synchronous Digital Hierarchy (SDH) equipment. It is one of a family of ETSs covering various aspects of SDH equipment standards.

The ICS proforma specification will ultimately consist of 8 sub-parts of ETS 300 417, numbered 1-2 to 8-2, each of which will correspond to sub-parts 1-1 to 8-1 of ETS 300 417, respectively. The ICS sub-parts are:

- Part 1-2: ETS 300 417-1-2: "General information about Implementation Conformance Statement (ICS) proforma specification";
- Part 2-2: ETS 300 417-2-2: "Physical section layer functions Implementation Conformance Statement (ICS) proforma specification";**
- Part 3-2: ETS 300 417-3-2: "STM-N regenerator and multiplex section layer functions Implementation Conformance Statement (ICS) proforma specification";
- Part 4-2: ETS 300 417-4-2: "SDH path layer functions Implementation Conformance Statement (ICS) proforma specification";
- Part 5-2: ETS 300 417-5-2: "PDH path layer functions Implementation Conformance Statement (ICS) proforma specification";
- Part 6-2: ETS 300 417-6-2: "Synchronisation distribution layer functions Implementation Conformance Statement (ICS) proforma specification";
- Part 7-2: ETS 300 417-7-2: "Auxiliary layer functions Implementation Conformance Statement (ICS) proforma specification";
- Part 8-2: ETS 300 417-8-2: "Major compound functions, Implementation Conformance Statement (ICS) proforma specification".

Proposed transposition dates	
Date of latest announcement of this ETS (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this ETS (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.

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1 Scope

This ETS provides the Implementation Conformance Statement (ICS) proforma specification for the SDH equipment physical section layer functions defined in ETS 300 417-2-1 [2] in compliance with the relevant requirements, and in accordance with the relevant guidance given in ISO/IEC 9646-7 [7] and ETS 300 406 [3].

2 Normative references

This ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] ETS 300 417-1-1 (1996): "Transmission and Multiplexing (TM); Generic functional requirements for SDH equipment; Generic processes and performance".
- [2] prETS 300 417-2-1 (1996): "Transmission and Multiplexing (TM); Generic functional requirements for SDH equipment: Physical section layer functions".
- [3] ETS 300 406 (1995): "Methods for testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".
- [4] ETS 300 232: "Transmission and Multiplexing (TM); Optical interfaces for equipments and systems relating to the Synchronous Digital Hierarchy [ITU-T Recommendation G.957 (1993) modified]".
- [5] ITU-T Recommendation G.957 (1993): "Optical interfaces for equipments and systems relating to the synchronous digital hierarchy".
- [6] ISO/IEC 9646-1 (1994): "Information technology - Open systems interconnection - Conformance testing methodology and framework - Part 1: General concepts".
- [7] ISO/IEC 9646-7 (1995): "Information technology - Open systems interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".
- [8] ETS 300 147 (1993): "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); Multiplexing structure".
- [9] CCITT Recommendation G.703 (1991): "Physical/electrical characteristics of hierarchical digital interfaces".
- [10] CCITT Recommendation G.704 (1991): "Synchronous frame structures used at primary and secondary hierarchical levels".
- [11] CCITT Recommendation G.751 (1988): "Digital multiplex equipments operating at third order bit rate of 34 368 kbit/s and fourth order bit rate of 139 264 kbit/s and using positive justification".
- [12] ITU-T Recommendation G.823 (1993): "The control of jitter and wander within digital networks which are based on the 2 048 kbit/s hierarchy".
- [13] ITU-T Recommendation G.825 (1993): "The control of jitter and wander within digital networks which are based on the synchronous digital hierarchy (SDH)".
- [14] ITU-T Recommendation G.826 (1993): "Error performance parameters and objectives for international, constant bit rate digital paths at or above the primary rate".

- [15] ITU-T Recommendation G.958 (1993): "Digital line systems based on the synchronous digital hierarchy for use on optical fibre cables".
- [16] ETS 300 167 (1993): "Transmission and Multiplexing (TM); Functional characteristics of 2 048 kbit/s interfaces".
- [17] ETS 300 337 (1993): "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 CCITT Recommendation G.702 hierarchical rates of 2 048 kbit/s, 34 368 kbit/s and 139 264 kbit/s".
- [18] ETS 300 166 (1993): "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".
- [19] ETS 300 462: "Transmission and Multiplexing (TM); Generic requirements for synchronization networks".
- [20] prETS 300 417-6-1 (1996): "Transmission and Multiplexing (TM); Generic functional requirements for Synchronous Digital Hierarchy (SDH) equipment; Part 6-1: Synchronisation distribution layer functions".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this ETS, the following definitions apply:

- terms defined in ETS 300 417-2-1 [2];
- terms defined in ISO/IEC 9646-1 [6] and in ISO/IEC 9646-7 [7].

In particular, the following terms defined in ISO/IEC 9646-1 [6] 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 this ETS, the following abbreviations apply:

A	Adaptation function
AI	Adapted Information
AIS	Alarm Indication Signal
C	Connection function
CI	Characteristic Information
CMI	Coded Mark Inversion
CP	Connection Point
D	Data
EMF	Equipment Management Function
EMS	Equipment Management System
E0	Electrical interface signal 64 kbit/s
E12	Electrical interface signal 2 048 kbit/s
E22	Electrical interface signal 8 448 kbit/s
E31	Electrical interface signal 34 368 kbit/s
E4	Electrical interface signal 139 264 kbit/s
ES1	STM-1 electrical interface signal 155 520 kbit/s
EX	Extinction ratio

FAS	Frame Alignment Signal
FS	Frame Start
HDB3	High Density Bipolar of order 3
ICS	Implementation Conformance Statement
ID	IDentifier
IUT	Implementation Under Test
LOF	Loss Of Frame
LOS	Loss Of Signal
MI	Management Information
MON	Monitored
N_B	Near-end Block
NE	Network Element
NMON	Not MONitored
OFS	Out of Frame Second
OOF	Out Of Frame state
OS	Optical Section
OS1	STM-1 Optical Section
OS4	STM-4 Optical Section
OS16	STM-16 Optical Section
P0x	64 kbit/s layer (transparent)
P12s	2 048 kbit/s PDH path layer with synchronous 125 μ s frame structure according to ETS 300 167 [16]
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
P31s	34 368 kbit/s PDH path layer with synchronous 125 μ s frame structure according to ETS 300 337 [20]
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 μ s frame structure according to ETS 300 337 [20]
P4x	139 264 kbit/s layer (transparent)
PDH	Plesiochronous Digital Hierarchy
QL	Quality Level
RS	Regenerator Section
RS1	STM-1 Regenerator Section
RS4	STM-4 Regenerator Section
RS16	STM-16 Regenerator Section
SCS	System Conformance Statement
SD	Synchronisation Distribution layer
SDH	Synchronous Digital Hierarchy
Sk	Sink
So	Source
SQLCH	Squelch
SSD	Server Signal Degrade
SSF	Server Signal Fail
STM	Synchronous Transport Module
STM-N	Synchronous Transport Module, level N
SUT	System Under Test
T12	2 048 kHz signal
TI	Timing Information
TSD	Trail Signal Degrade
TSF	Trail Signal Fail
TT	Trail Termination function
UI	Unit Interval

4 Conformance to this ICS proforma specification

If it claims to conform to this ETS, 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 this ETS, and shall preserve the numbering/naming and ordering of the proforma items.

An ICS which conforms to this ETS shall be a conforming ICS proforma completed in accordance with the instructions for completion given in clause A.1.

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

Annex A (normative): ICS proforma for ETS 300 417-2-1

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 ETS 300 417-2-1 [2] may provide information about the implementation in a standardized manner.

The ICS proformas in the following annexes are subdivided into subclauses each containing the following categories of information:

- identification of the implementation;
- identification of the ETS;
- global statement of conformance.

A.1.2 Abbreviations and conventions

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

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 [7], 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 a 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 a 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 ETS 300 417-2-1 [2], 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 [7], 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 System Conformance Statement (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 subclauses of the ICS proforma.

Annex B (normative): ICS proforma for STM-1 optical section layer

Notwithstanding the provisions of the copyright clause related to the text of this ETS ETSI grants that users of this ETS may freely reproduce the ICS proforma in this annex so that it can be used for its intended purposes and may further publish the completed ICS.

B.1 Identification of the implementation

In this document, an Implementation Under test (IUT), and of course the identification of an IUT refers to an STM-1 Optical Section (OS1) layer instance implemented inside the System Under Test (SUT).

Identification of the IUT and the SUT in which it resides 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 ETS

This ICS proforma applies to the following standard:

ETS 300 417-2-1 [2]: "Transmission and Multiplexing (TM); Generic functional requirements for SDH equipment: physical section layer functions".

B.3 Global statement of conformance of OS1 layer

Are all mandatory capabilities implemented (Yes/No)

NOTE: Answering "No" to this question indicates non-conformance to the ETS specification. Non-supported mandatory capabilities are to be identified in the ICS, with an explanation of why the implementation is non-conforming, on pages attached to the ICS proforma.

Answering "Yes" to this question indicates only that all the capabilities with the explicit status "m" are supported. It is not necessary to fill in the support column of the associated item.

B.4 OS1 optical section layer function

Table B.1: OS1 optical section layer function

Item	OS1 optical section layer function	Reference	Status	Support
1	This OS1 layer is part of an SDH Regenerator equipment.		o	
2	The OS1 Section Layer supports an OS1 Optical Section Connection Function (OS1_C)	4.1	o	
3	The OS1 Section Layer contains an OS1 Trail Termination Source function (OS1_TT_So)	4.2.1	m	
4	The OS1 Section Layer contains an OS1 Trail Termination Sink function (OS1_TT_Sk)	4.2.2	m	
5	The OS1 Section Layer contains an OS1 Section to RS1 (Regenerator Section) Adaptation Source function (OS1/RS1_A_So)	4.3.1	m	
6	The OS1 Section Layer contains an OS1 Section to RS1 Adaptation Sink function (OS1/RS1_A_Sk)	4.3.2	m	

Table B.2: OS1 optical interface classification

Item	OS1 optical interface classification	Reference	Status	Support
1	The Trail Termination Source supports an Intra-office (I1) application (OS1-I1_TT_So)	Table 1/G.957, ETS 300 232	o.201	
2	The Trail Termination Source supports an Inter-office Short-haul with Source nominal wavelength of 1 310 nm (S1.1) application (OS1-S1.1_TT_So)	Table 1/G.957, ETS 300 232	o.201	
3	The Trail Termination Source supports an Inter-office Short-haul with Source nominal wavelength of 1 550 nm (S1.2) application (OS1-S1.2_TT_So)	Table 1/G.957, ETS 300 232	o.201	
4	The Trail Termination Source supports an Inter-office Long-haul with Source nominal wavelength of 1 310 nm (L1.1) application (OS1-L1.1_TT_So)	Table 1/G.957, ETS 300 232	o.201	
5	The Trail Termination Source supports an Inter-office Long-haul with Source nominal wavelength of 1 550 nm on optical fibre complying with Recs. G.652/G.654 (L1.2) application (OS1-L1.2_TT_So)	Table 1/G.957, ETS 300 232	o.201	
6	The Trail Termination Source supports an Inter-office Long-haul with Source nominal wavelength of 1 550 nm on optical fibre complying with Rec. G.653 (L1.3) application (OS1-L1.3_TT_So)	Table 1/G.957, ETS 300 232	o.201	

o.201: It is mandatory to support exactly one of these items

Table B.3: OS1 optical interface source type

Item	OS1 optical interface source type	Reference	Status	Support
1	The source type is a Light Emitting Diode (LED)	Table 4/G.957, ETS 300 232	c301	
2	The source type is a Single-Longitudinal Mode laser (SLM)	Table 4/G.957, ETS 300 232	c302	
3	The source type is a Multi-Longitudinal Mode laser (MLM)	Table 4/G.957, ETS 300 232	c303	

c301: IF B.2/1 THEN o.301 ELSE x

c302: IF B.2/3 OR B.2/4 OR B.2/5 OR B.2/6 THEN o.301 ELSE x

c303: IF B.2/1 OR B.2/2 OR B.2/3 OR B.2/4 OR B.2/6 THEN o.301 ELSE x

o.301: It is mandatory to support exactly one of these items

B.5 OS1 Optical section layer transmission tables

B.5.1 OS1 source operating wavelength range, OS1_TT_So

Table B.4: OS1 source operating wavelength range

Item	OS1 source operating wavelength range	Reference	Status	Support
1	The source wavelength range is within 1 260 and 1 360 nm (OS1-I1_TT_So).	Table 4/G.957, ETS 300 232	c401	
2	The source wavelength range is within 1261 and 1 360 nm (OS1-S1.1_TT_So).	Table 4/G.957, ETS 300 232	c402	
3	The source wavelength range is within 1430 and 1576 nm (OS1-S1.1_TT_So).	Table 4/G.957, ETS 300 232	c403	
4	The source wavelength range is within 1430 and 1580 nm (OS1-S1.2_TT_So).	Table 4/G.957, ETS 300 232	c404	
5	The source wavelength range is within 1280 and 1335 nm (OS1-L1.1_TT_So).	Table 4/G.957, ETS 300 232	c405	
6	The source wavelength range is within 1534 and 1566 nm (OS1-L1.3_TT_So).	Table 4/G.957, ETS 300 232	c406	
7	The source wavelength range is within 1523 and 1577 nm (OS1-L1.3_TT_So).	Table 4/G.957, ETS 300 232	c406	
8	The source wavelength range is within 1480 and 1580 nm (OS1-L1.2_TT_So, OS1-L1.3_TT_So).	Table 4/G.957, ETS 300 232	c407	

c401: IF B.2/3 AND (B.3/1 OR B.3/3) THEN o.401 ELSE x

c402: IF B.2/2 AND B.3/3 THEN o.401 ELSE x

c403: IF B.2/6 AND B.3/3 THEN o.401 ELSE x

c404: IF B.2/3 AND B.3/2 THEN o.401 ELSE x

c405: IF B.2/4 AND (B.3/2 OR B.3/3) THEN o.401 ELSE x

c406: IF B.2/6 AND B.3/2 THEN o.401 ELSE x

c407: IF (B.2/5 OR B.2/6) AND B.3/2 THEN o.401 ELSE x

o.401: It is mandatory to support exactly one of these items

B.5.2 OS1 source spectral characteristics, OS1_TT_So

Table B.5: OS1 source spectral characteristics

Item	OS1 source spectral characteristics	Reference	Status	Support
1	The maximum RMS width under standard operating conditions -measured as the standard deviation of the spectral distribution taking into account all modes that are not more than 20 dB down from the peak mode- is 40 nm (OS1-I1_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c501	
2	The maximum RMS width under standard operating conditions -measured as the standard deviation of the spectral distribution taking into account all modes that are not more than 20 dB down from the peak mode- is 80 nm (OS1-I1_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c502	
3	The maximum RMS width under standard operating conditions -measured as the standard deviation of the spectral distribution taking into account all modes that are not more than 20 dB down from the peak mode- is 7,7 nm (OS1-S1.1_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c503	
4	The maximum RMS width under standard operating conditions -measured as the standard deviation of the spectral distribution taking into account all modes that are not more than 20 dB down from the peak mode- is 2,5 nm (OS1-S1.2_TT_So, OS1-L1.3_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c504	
5	The maximum RMS width under standard operating conditions -measured as the standard deviation of the spectral distribution taking into account all modes that are not more than 20 dB down from the peak mode- is 4 nm (OS1-L1.1_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c505	
6	The maximum RMS width under standard operating conditions -measured as the standard deviation of the spectral distribution taking into account all modes that are not more than 20 dB down from the peak mode- is 3 nm (OS1-L1.3_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c506	
7	The full width of the central wavelength peak, measured under standard operating conditions 20 dB down from the maximum amplitude of the central wavelength, is not more than 1 nm (OS1-L1.2_TT_So, OS1-L1.3_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c507	
8	The side mode suppression ratio -defined as the relative amplitude of the lateral peaks to the central wavelength peak- is at least 30 dB (OS1-L1.2_TT_So, OS1-L1.3_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c507	

c501: IF B.2/1 AND B.3/3 THEN o.501 ELSE x

c502: IF B.2/1 AND B.3/1 THEN o.501 ELSE x

c503: IF B.2/2 AND B.3/3 THEN o.501 ELSE x

c504: IF (B.2/3 AND B.3/3) OR (B.2/6 AND B.3/3 AND B.4/7) THEN o.501 ELSE x

c505: IF B.2/4 AND B.3/3 THEN o.501 ELSE x

c506: IF B.2/6 AND B.3/3 AND B.4/6 THEN o.501 ELSE x

c507: IF (B.2/3 OR B.2/4 OR B.2/5 OR B.2/6) AND B.3/2 THEN o.501 ELSE x

o.501: It is mandatory to support exactly one of these items

B.5.3 OS1 source optical characteristics, OS1_TT_So

Table B.6: OS1 source optical characteristics

Item	OS1 source optical characteristics	Reference	Status	Support
1	The mean launched power level at the reference point S - defined as the average optical power of a pseudo-random data sequence coupled into the fibre by the transmitter- at reference point S is between -8 dBm and -15 dBm (OS1-X1.z_TT_So).	G.957 subclause 6.2.3, Table 4/G.957, ETS 300 232	c601	
2	The mean launched power level at the reference point S - defined as the average optical power of a pseudo-random data sequence coupled into the fibre by the transmitter- at reference point S is between 0 dBm and -5 dBm (OS1-X1.z_TT_So).	G.957 subclause 6.2.3, Table 4/G.957, ETS 300 232	c602	
3	The extinction ratio EX -defined as $EX = 10 \log_{10} (A/B)$, where A is the average optical power level for a logical '1' (emission of light) and B is the average optical power level for a logical '0' (no emission), measured at the reference point S- is not 8,2 dB (OS1-X1.z_TT_So).	G.957 subclause 6.2.4, Table 4/G.957, ETS 300 232	c601	
4	The extinction ratio EX -defined as $EX = 10 \log_{10} (A/B)$, where A is the average optical power level for a logical '1' (emission of light) and B is the average optical power level for a logical '0' (no emission), measured at the reference point S- is not 10 dB (OS1-X1.z_TT_So).	G.957 subclause 6.2.4, Table 4/G.957, ETS 300 232	c602	
5	The pulse shape characteristics -including rise time, fall time, pulse overshoot, pulse undershoot and ringing- is specified in the form of a mask of the transmitter eye diagram at point S. The pulse shape of the signal -coupled to an optical reference receiver whose nominal transfer function is according with the fourth-order Bessel Thompson response described in appendix I/G.957- is within the limits as specified in the mask of figure 2/G.957 (OS1_TT_So).	G.957 subclause 6.2.5 Figure 2/G.957 Appendix I/G.957 ETS 300 232	m	

c601: IF ((B.2/1 AND (B.3/1 OR B.3/3)) OR (B.2/2 AND B.3/3) OR (B.2/3 AND (B.3/2 OR B.3/3))) THEN m ELSE x

c602: IF (B.2/4 AND (B.3/2 OR B.3/3)) OR (B.2/5 AND B.3/2) OR (B.2/6 AND (B.3/2 OR B.3/3)) THEN m ELSE x

B.5.4 OS1 receiver characteristics, OS1_TT_Sk

Table B.7: OS1 receiver characteristics

Item	OS1 receiver characteristics	Reference	Status	Support
1	The receiver sensitivity -defined as the minimum acceptable value of average received power at point R to achieve a BER not worse 10^{-10} - is better than -23 dBm. This value does not include power level associated with dispersion, jitter, or reflection from the optical path (OS1-I1_TT_Sk).	G.957 subclause 6.4.1, Table 4/G.957, ETS 300 232	c701	
2	The receiver sensitivity -defined as the minimum acceptable value of average received power at point R to achieve a BER not worse 10^{-10} - is better than -28 dBm. This value does not include power level associated with dispersion, jitter, or reflection from the optical path (OS1-S1.z_TT_Sk).	G.957 subclause 6.4.1, Table 4/G.957, ETS 300 232	c702	
3	The receiver sensitivity -defined as the minimum acceptable value of average received power at point R to achieve a BER not worse 10^{-10} - is better than -34 dBm. This value does not include power level associated with dispersion, jitter, or reflection from the optical path (OS1-L1.z_TT_Sk).	G.957 subclause 6.4.1, Table 4/G.957, ETS 300 232	c703	
4	The receiver overload -defined as the maximum acceptable value of the received average power at point R to achieve a BER not worse 10^{-10} - is higher than -8 dBm (OS1-I1_TT_Sk, OS1-S1.z_TT_Sk).	G.957 subclause 6.4.2, Table 4/G.957, ETS 300 232	c704	
5	The receiver overload -defined as the maximum acceptable value of the received average power at point R to achieve a BER not worse 10^{-10} - is higher than -10 dBm (OS1-L1.z_TT_Sk).	G.957 subclause 6.4.2, Table 4/G.957, ETS 300 232	c705	
6	The maximum reflectance of the receiver measured at the reference point R is better than -25 dB (OS1-L1.2_TT_Sk).	G.957 subclause 6.4.3, Table 4/G.957, ETS 300 232	c706	
7	The receiver tolerates an optical path penalty not exceeding 1 dB to account for total degradation due to reflections, intersymbol interference, mode partition noise, and laser chirp (OS1_TT_Sk).	G.957 subclause 6.4.4, Table 4/G.957, ETS 300 232	m	

c701: IF B.2/1 AND (B.3/1 OR B.3/3) THEN o.701 ELSE x

c702: IF (B.2/2 AND B.3/3) OR (B.2/3 AND (B.3/2 OR B.3/3)) THEN o.701 ELSE x

c703: IF (B.2/4 AND (B.3/2 OR B.3/3)) OR (B.2/5 AND B.3/2) OR (B.2/6 AND (B.3/2 OR B.3/3)) THEN o.701 ELSE x

c704: IF (B.2/1 AND (B.3/1 OR B.3/3)) OR (B.2/2 AND B.3/3) OR (B.2/3 AND (B.3/2 OR B.3/3)) THEN o.702 ELSE x

c705: IF (B.2/4 AND (B.3/2 OR B.3/3)) OR (B.2/5 AND B.3/2) OR (B.2/6 AND (B.3/2 OR B.3/3)) THEN o.702 ELSE x

c706: IF B.2/5 AND B.3/2 THEN m ELSE x

o.701: It is mandatory to support at least one of these items

o.702: It is mandatory to support at least one of these items

B.5.5 OS1 regeneration characteristics, OS1/RS1_A_So, OS1/RS1_A_Sk

Table B.8: OS1 regeneration output characteristics

Item	OS1 regeneration output characteristics	Reference	Status	Support
1	In the absence of input jitter at the synchronisation interface, the intrinsic jitter at the STM-16 output interface measured over a 60 second interval does not exceed 0,5 Ulpp when measured through a single-pole band pass filter with corner frequencies at 500 Hz and 1,3 MHz.	4.3.1	m	
2	In the absence of input jitter at the synchronisation interface, the intrinsic jitter at the STM-16 output interface measured over a 60 second interval does not exceed 0,1 Ulpp when measured through a single-pole band pass filter with corner frequencies at 65 kHz and 1,3 MHz.	4.3.1	m	
3	Output timing. The bit rate is locked to the synchronisation signal provided by an SSU or SEC via the Synchronisation Distribution Layer.	ETS 300 417-1-1 clause 10 ETS 300 417-6-1	c801	
4	Output timing. The output bit-rate is locked to the frequency of the corresponding input signal.	G.958 subclause 9.2	c802	
5	Output timing. During LOS on the corresponding input port, in free running mode, the bit rate at the STM-1 optical output is 155 ± 20 ppm.	G.958 subclause 9.2	c802	

c801: IF NOT B.1/1 THEN m ELSE n/a

c802: IF B.1/1 THEN m ELSE n/a

Table B.9: OS1 regeneration input characteristics

Item	OS1 regeneration input characteristics	Reference	Status	Support
1	The function supplies the recovered timing signal to the synchronisation distribution layer.	4.3.2	c901	
2	Signal regeneration. The function is able to operate with a maximum BER as specified in ETS 300 417-1-1, subclause 11.3.2.1, when any combination of the following signal conditions exist at its input: <ul style="list-style-type: none"> input optical power level within the range specified in ETS 300 232. jitter modulation applied to the input signal as specified in ETS 300 417-1-1, subclause 11.3.2. input bit rate in the range $155\ 520 \pm 20$ ppm. 	4.3.2	m	
3	The jitter tolerated -defined as the peak-to-peak amplitude of a sinusoidal jitter applied to the signal at reference point R that causes a 1 dB optical power penalty at the optical receiver and lets the system operate without errors- is within the limits specified in the mask of figure 2/G.825.	4.3.2 G.825 subclause 4.1 Figure 2/G.825 Table 2/G.825 Table 2/G.958	m	

c901: IF NOT B.1/1 THEN o ELSE n/a

Table B.10: OS1/RS1 frame alignment characteristics

Item	OS1/RS1 frame alignment characteristics	Reference	Status	Support
1	The frame alignment is found by searching for the A1, A2 bytes contained in the STM-1 signal.	4.3.2	o.1001	
2	The framing pattern searched for is a subset of the A1 and A2 bytes contained on the STM-1 signal.	4.3.2	o.1001	
3	The framing signal is continuously checked with the presumed frame start position for alignment.	4.3.2	m	
4	In the In-Frame (IF) status the maximum Out Of Frame (OOF) detection time is 625 μ s for a random unframed signal.	4.3.2	m	
5	The algorithm used to check the alignment is such that in IF state, under normal condition, a 10^{-3} (Poisson type) error ratio will not cause false OOF more than once per 6 minutes. (Median Value)	4.3.2	m	
6	In the OOF state, the maximum frame alignment time is 250 μ s for an error-free signal with no emulated frame pattern.	4.3.2	m	
7	The Frame Start reference (FS) is maintained during the OOF state and only updated upon successful transition from OOF state to IF state.	4.3.2	m	
8	The algorithm used to recover from the OOF state is such that the probability for false frame recovery with a random unframed signal is not more than 10^{-5} per 250 μ s interval.	4.3.2	m	

o.1001: it is mandatory to support exactly one of these items

B.6 Defect, fault and performance management

B.6.1 Port status management

Table B.11: OS1 port status mode process

Item	OS1 port status mode process	Reference	Status	Support
1	The port status mode supports "not monitored" (NMON) status	ETS 300 417-1-1 subclause 8.5	m	
2	The port status mode supports "monitored" (MON) status	ETS 300 417-1-1 subclause 8.5	m	
3	The port status mode supports "automatic" (AUTO) status	ETS 300 417-1-1 subclause 8.5	o	

B.6.2 Defect detection and clearance criteria

Table B.12: OS1 Loss Of Signal defect (dLOS)

Item	OS1 Loss Of Signal defect (dLOS)	Reference	Status	Support
1	The optical STM-1 Loss Of Signal defect (dLOS) is detected when the received signal has degenerated to a level where SDH frame alignment would be interrupted, and the cause is evidently a drop of incoming power level below operational level.	ETS 300 417-1-1 subclause 8.2.1.6	m	
2	The optical STM-1 Loss Of Signal defect (dLOS) is cleared when the received signal level is greater than or equal to minimum operational level.	ETS 300 417-1-1 subclause 8.2.1.6	m	

Table B.13: OS1 Loss Of Frame defect (dLOF)

Item	OS1 Loss Of Frame defect (dLOF)	Reference	Status	Support
1	If the Out Of Frame (OOF) anomaly persists for more than 3 ms, the function will enter the LOF state and a dLOF defect is declared.	4.3.2	m	
2	To provide for the case of intermittent OOFs, the integrating timer is not reset to zero until an In Frame (IF) condition persists continuously for at least 3 ms.	4.3.2	m	
3	Once in a LOF state, this state is exited when the IF state persists continuously for at least 3 ms.	4.3.2	m	

B.6.3 Consequent action activation and clearance criteria**Table B.14: OS1 Trail Signal Fail action (aTSF)**

Item	OS1 Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The aTSF signal is activated on detection of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	
2	The aTSF signal is deactivated on clearance of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	

Table B.15: OS1 Server Signal Fail action (aSSF)

Item	OS1 Server Signal Fail action (aSSF)	Reference	Status	Support
1	The aSSF is activated on detection of a dLOF defect.	4.3.2	m	
2	The aSSF is activated on detection of a aTSF	4.3.2	m	
3	The aSSF signal is deactivated when the defect(s) which caused the aSSF generation is(are) no longer active and there are no other defects active.	ETS 300 417-1-1 subclause 4.2.2.4	m	

Table B.16: Alarm Indication Signal action (aAIS)

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
1	AIS is applied to the output data within 2 frames (250 μ s) after aTSF detection is adapted (AI_TSF)	4.3.2	m	
2	AIS is removed upon termination of the a TSF condition within 2 frames (250 μ s).	4.3.2	m	
3	AIS is applied to the output data within 2 frames (250 μ s) after dLOF detection-	4.3.2	m	
4	AIS is removed upon termination of the dLOF condition within 2 frames (250 μ s).	4.3.2	m	

B.6.4 Equipment Management System (EMS) fault management

Table B.17: fLOS, fLOF failure report

Item	Failure reports	Reference	Status	Support
1	The fLOS failure is declared when dLOS defect persists continuously for X seconds and the port is the monitoring state (MON).	ETS 300 417-1-1 subclauses 8.2.1.6, 8.3.1, 4.2.2	m	
2	The fLOS failure is cleared if dLOS defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	
3	The fLOF failure is declared if dLOF defect persists continuously for X seconds .	ETS 300 417-1-1 subclause 8.3.1	m	
4	The fLOF failure is cleared if dLOF defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	
5	Any second with at least one Out Of Frame (OOF) event is reported as an Out Of Frame Second.	4.3.2	m	

Table B.18: Programmability of fault management parameters

Item	Programmability of fault management parameters	Reference	Status	Support
1	Programmability of fault declaration time (X parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
2	Programmability of fault clearance time (Y parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
3	Logarithmic values for steps of X and Y values (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
4	The fLOF failure is cleared if dLOF defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	

Table B.19: Fault management parameters value

Item	Fault management parameters value	Reference	Status	Support	Values	
					Allowed	Supported
1	Time for fault declaration (X parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		2,5 ± 0,5 s	
2	Time for fault declaration (X parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		≥ 100 ms	
3	Time for fault declaration (X parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		≤ 30 s	
4	Time for fault clearance (Y parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		10 ± 0,5 s	
5	Time for fault clearance (Y parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		≥ 100 ms	
6	Time for fault clearance (Y parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		≤ 30 s	
7	Logarithmic step for X and/or Y value (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m		—	

Annex C (normative): ICS proforma for STM-4 optical section layer

Notwithstanding the provisions of the copyright clause related to the text of this ETS ETSI grants that users of this ETS may freely reproduce the ICS proforma in this annex so that it can be used for its intended purposes and may further publish the completed ICS.

C.1 Identification of the implementation

In this document, an IUT, and of course the identification of an IUT refers to an OS4 layer instance implemented inside the SUT.

Identification of the IUT and the SUT in which it resides 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

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C.1.2 Implementation Under Test (IUT) identification

IUT name:

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IUT version

Hardware version:

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Software version:

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Firmware version:

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C.1.3 System Under Test (SUT) identification

SUT name:

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Hardware configuration:

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SUT Software version:

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SUT Firmware version:

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Operating system:

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C.1.4 Product supplier

Name:

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Address:

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Telephone number:

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Facsimile number:

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E-mail address:

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Additional information:

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C.1.5 Client

Name:

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Address:

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Telephone number:

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Facsimile number:

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E-mail address:

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Additional information:

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C.1.6 ICS contact person

Name:

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Telephone number:

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Facsimile number:

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E-mail address:

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Additional information:

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C.2 Identification of the ETS

This ICS proforma applies to the following standard:

ETS 300 417-2-1: "Transmission and Multiplexing (TM); Generic functional requirements for SDH equipment: Physical section layer functions".

C.3 Global statement of conformance of OS4 layer

Are all mandatory capabilities implemented (Yes/No)

NOTE: Answering "No" to this question indicates non-conformance to the ETS specification. Non-supported mandatory capabilities are to be identified in the ICS, with an explanation of why the implementation is non-conforming, on pages attached to the ICS proforma.

Answering "Yes" to this question indicates only that all the capabilities with the explicit status "m" are supported. It is not necessary to fill in the support column of the associated item.

C.4 OS4 optical section layer function

Table C.1: OS4 optical section layer function

Item	OS4 optical section layer function	Reference	Status	Support
1	This OS4 layer is part of an SDH Regenerator equipment.		o	
2	The OS4 Section Layer supports an OS4 Optical Section Connection Function (OS4_C)	5.1	o	
3	The OS4 Section Layer contains an OS4 Trail Termination Source function (OS4_TT_So)	5.2.1	m	
4	The OS4 Section Layer contains an OS4 Trail Termination Sink function (OS4_TT_Sk)	5.2.2	m	
5	The OS4 Section Layer contains an OS4 Section to RS4 (Regenerator Section) Adaptation Source function (OS4/RS4_A_So)	5.3.1	m	
6	The OS4 Section Layer contains an OS4 Section to RS4 Adaptation Sink function (OS4/RS4_A_Sk)	5.3.2	m	

Table C.2: OS4 optical interface classification

Item	OS4 optical interface classification	Reference	Status	Support
1	The Trail Termination Source support an Intra-office (I4) application (OS4-I4_TT_So)	Table 1/G.957, ETS 300 232	o.201	
2	The Trail Termination Source support an Inter-office Short-haul with Source nominal wavelength of 1 310 nm (S4.1) application (OS4-S4.1_TT_So)	Table 1/G.957, ETS 300 232	o.201	
3	The Trail Termination Source support an Inter-office Short-haul with Source nominal wavelength of 1 550 nm (S4.2) application (OS4-S4.2_TT_So)	Table 1/G.957, ETS 300 232	o.201	
4	The Trail Termination Source support an Inter-office Long-haul with Source nominal wavelength of 1 310 nm (L4.1) application (OS4-L4.1_TT_So)	Table 1/G.957, ETS 300 232	o.201	
5	The Trail Termination Source support an Inter-office Long-haul with Source nominal wavelength of 1 550 nm on optical fibre complying with Recs. G.652/G.654 (L4.2) application (OS4-L4.2_TT_So)	Table 1/G.957, ETS 300 232	o.201	
6	The Trail Termination Source support an Inter-office Long-haul with Source nominal wavelength of 1 550 nm on optical fibre complying with Rec. G.653 (L4.3) application (OS4-L4.3_TT_So)	Table 1/G.957, ETS 300 232	o.201	

o.201: It is mandatory to support exactly one of these items.

Table C.3: OS4 optical interface source type

Item	OS4 optical interface source type	Reference	Status	Support
1	The source type is a Light Emitting Diode (LED)	Table 4/G.957, ETS 300 232	c301	
2	The source type is a Single-Longitudinal Mode laser (SLM)	Table 4/G.957, ETS 300 232	c302	
3	The source type is a Multi-Longitudinal Mode laser (MLM)	Table 4/G.957, ETS 300 232	c303	

c301: IF C.2/1 THEN o.301 ELSE x

c302: IF C.2/3 OR C.2/4 OR C.2/5 OR C.2/6 THEN o.301 ELSE x

c303: IF C.2/1 OR C.2/2 OR C.2/3 OR C.2/4 OR C.2/6 THEN o.301 ELSE x

o.301: It is mandatory to support exactly one of these items

C.5 OS4 optical section layer transmission tables

C.5.1 OS4 source operating wavelength range, OS4_TT_So

Table C.4: OS4 source operating wavelength range

Item	OS4 source operating wavelength range	Reference	Status	Support
1	The source wavelength range is within 1 260 and 1 360 nm (OS4-I4_TT_So).	Table 4/G.957, ETS 300 232	c401	
2	The source wavelength range is within 1 293 and 1 334 nm (OS4-S4.1_TT_So).	Table 4/G.957, ETS 300 232	c402	
3	The source wavelength range is within 1 274 and 1 356 nm (OS4-S4.1_TT_So).	Table 4/G.957, ETS 300 232	c403	
4	The source wavelength range is within 1 430 and 1 580 nm (OS4-S4.2_TT_So).	Table 4/G.957, ETS 300 232	c404	
5	The source wavelength range is within 1 300 and 1 325 nm (OS4-L4.1_TT_So).	Table 4/G.957, ETS 300 232	c405	
6	The source wavelength range is within 1 280 and 1 335 nm (OS4-L4.1_TT_So).	Table 4/G.957, ETS 300 232	c406	
7	The source wavelength range is within 1 480 and 1 580 nm (OS4-L4.2_TT_So, OS4-L4.3_TT_So).	Table 4/G.957, ETS 300 232	c407	

c401: IF C.2/1 AND (C.3/1 OR C.3/3) THEN o.4 ELSE x

c402: IF C.2/2 AND C.3/3 THEN o.401 ELSE x

c403: IF C.2/2 AND C.3/3 THEN o.401 ELSE x

c404: IF C.2/3 AND C.3/2 THEN o.401 ELSE x

c405: IF C.2/4 AND C.3/3 THEN o.401 ELSE x

c406: IF C.2/4 AND C.3/2 THEN o.401 ELSE x

c407: IF (C.2/5 OR C.2/6) AND C.3/2 THEN o.4 ELSE x

o.401: It is mandatory to support exactly one of these items

C.5.2 OS4 source spectral characteristics, OS4_TT_So

Table C.5: OS4 source spectral characteristics

Item	OS4 source spectral characteristics	Reference	Status	Support
1	The maximum RMS width under standard operating conditions -measured as the standard deviation of the spectral distribution taking into account all modes that are not more than 20 dB down from the peak mode- is 14,5 nm (OS4-I4_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c501	
2	The maximum RMS width under standard operating conditions -measured as the standard deviation of the spectral distribution taking into account all modes that are not more than 20 dB down from the peak mode- is 35 nm (OS4-I4_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c502	
3	The maximum RMS width under standard operating conditions -measured as the standard deviation of the spectral distribution taking into account all modes that are not more than 20 dB down from the peak mode- is 4 nm (OS4-S4.1_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c503	
4	The maximum RMS width under standard operating conditions -measured as the standard deviation of the spectral distribution taking into account all modes that are not more than 20 dB down from the peak mode- is 2,5 nm (OS4-S4.1_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c504	
5	The maximum RMS width under standard operating conditions -measured as the standard deviation of the spectral distribution taking into account all modes that are not more than 20 dB down from the peak mode- is 2 nm (OS4-L4.1_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c505	
6	The maximum RMS width under standard operating conditions -measured as the standard deviation of the spectral distribution taking into account all modes that are not more than 20 dB down from the peak mode- is 1,7 nm (OS4-L4.1_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c506	
7	The full width of the central wavelength peak, measured under standard operating conditions 20 dB down from the maximum amplitude of the central wavelength, is not more than 1 nm (OS4-L4.z_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c507	
8	The side mode suppression ratio -defined as the relative amplitude of the lateral peaks to the central wavelength peak- is at least 30 dB (OS4-S4.2_TT_So, OS4-L4.z_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c508	

c501: IF C.2/1 AND C.3/3 THEN o.501 ELSE x

c502: IF C.2/1 AND C.3/1 THEN o.501 ELSE x

c503: IF C.2/2 AND C.3/3 AND C.4/2 THEN o.501 ELSE x

c504: IF C.2/2 AND C.3/3 AND C.4/3 THEN o.501 ELSE x

c505: IF C.2/4 AND C.3/3 AND C.4/5 THEN o.501 ELSE x

c506: IF C.2/4 AND C.3/3 AND C.4/6 THEN o.501 ELSE x

c507: IF (C.2/4 OR C.2/5 OR C.2/6) AND C.3/2 THEN o.501 ELSE x

c508: IF (C.2/3 OR C.2/4 OR C.2/5 OR C.2/6) AND C.3/2 THEN o.501 ELSE x

o.501: It is mandatory to support exactly one of these items

C.5.3 OS4 source optical characteristics, OS4_TT_So

Table C.6: OS4 source optical characteristics

Item	OS4 source optical characteristics	Reference	Status	Support
1	The mean launched power level at the reference point S - defined as the average optical power of a pseudo-random data sequence coupled into the fibre by the transmitter- at reference point S is between -8 and -15 dBm (OS4-I4_TT_So, OS4-S4.z_TT_So).	G.957 subclause 6.2.3, Table 4/G.957, ETS 300 232	c601	
2	The mean launched power level at the reference point S - defined as the average optical power of a pseudo-random data sequence coupled into the fibre by the transmitter- at reference point S is between +3 and -2 dBm (OS4-L4.z_TT_So).	G.957 subclause 6.2.3, Table 4/G.957, ETS 300 232	c602	
3	The extinction ratio EX -defined as $EX = 10 \log_{10} (A/B)$, where A is the average optical power level for a logical '1' (emission of light) and B is the average optical power level for a logical '0' (no emission), measured at the reference point S- is not 8,2 dB (OS4-I4_TT_So, OS4-S4.z_TT_So).	G.957 subclause 6.2.4, Table 4/G.957, ETS 300 232	c601	
4	The extinction ratio EX -defined as $EX = 10 \log_{10} (A/B)$, where A is the average optical power level for a logical '1' (emission of light) and B is the average optical power level for a logical '0' (no emission), measured at the reference point S- is not 10 dB (OS4-L4.z_TT_So).	G.957 subclause 6.2.4, Table 4/G.957, ETS 300 232	c602	
5	The pulse shape characteristics -including rise time, fall time, pulse overshoot, pulse undershoot and ringing- is specified in the form of a mask of the transmitter eye diagram at point S. The pulse shape of the signal -coupled to an optical reference receiver whose nominal transfer function is according with the fourth-order Bessel Thompson response described in appendix I/G.957- is within the limits as specified in the mask of figure 2/G.957 (OS4_TT_So).	G.957 subclause 6.2.5 Figure 2/G.957 Appendix I/G.957 ETS 300 232	m	

c601: IF ((C.2/1 AND (C.3/1 OR C.3/3)) OR (C.2/2 AND C.3/3) OR (C.2/3 AND C.3/2)) THEN m ELSE x

c602: IF (C.2/4 AND (C.3/2 OR C.3/3)) OR ((C.2/5 OR C.2/6) AND C.3/2) THEN m ELSE x

C.5.4 OS4 receiver characteristics, OS4_TT_Sk

Table C.7: OS4 receiver characteristics

Item	OS4 receiver characteristics	Reference	Status	Support
1	The receiver sensitivity -defined as the minimum acceptable value of average received power at point R to achieve a BER not worse 10^{-10} - is better than -23 dBm. This value does not include power level associated with dispersion, jitter, or reflection from the optical path (OS4-I4_TT_Sk).	G.957 subclause 6.4.1, Table 4/G.957, ETS 300 232	c701	
2	The receiver sensitivity -defined as the minimum acceptable value of average received power at point R to achieve a BER not worse 10^{-10} - is better than -28 dBm. This value does not include power level associated with dispersion, jitter, or reflection from the optical path (OS4-S4.z_TT_Sk, OS4-L4.z_TT_Sk).	G.957 subclause 6.4.1, Table 4/G.957, ETS 300 232	c702	
3	The receiver overload -defined as the maximum acceptable value of the received average power at point R to achieve a BER not worse 10^{-10} - is higher than -8 dBm (OS4_TT_Sk).	G.957 subclause 6.4.2, Table 4/G.957, ETS 300 232	m	
4	The maximum reflectance of the receiver measured at the reference point R is better than [tbd] (OS4-I4_TT_Sk, OS4-S4.1_TT_Sk).	G.957 subclause 6.4.3, Table 4/G.957, ETS 300 232	c703	
5	The maximum reflectance of the receiver measured at the reference point R is better than -27 dB (OS4-S4.2_TT_Sk, OS4-L4.2_TT_Sk).	G.957 subclause 6.4.3, Table 4/G.957, ETS 300 232	c704	
6	The maximum reflectance of the receiver measured at the reference point R is better than -14 dB (OS4-L4.1_TT_Sk, OS4-L4.3_TT_Sk).	G.957 subclause 6.4.3, Table 4/G.957, ETS 300 232	c705	
7	The receiver tolerates an optical path penalty not exceeding 1 dB to account for total degradation due to reflections, intersymbol interference, mode partition noise, and laser chirp (OS4_TT_Sk).	G.957 subclause 6.4.4, Table 4/G.957, ETS 300 232	m	

c701: IF C.2/1 AND (C.3/1 OR C.3/3) THEN o.701 ELSE x

c702: IF (C.2/2 AND C.3/3) OR (C.2/3 AND C.3/2) OR (C.2/4 AND (C.3/2 OR C.3/3)) OR ((C.2/5 OR C.2/6) AND C.3/2) THEN o.701 ELSE x

c703: IF (C.2/1 AND (C.3/1 OR C.3/3)) OR (C.2/2 AND C.3/3) THEN o.702 ELSE x

c704: IF (C.2/3 AND C.3/2) OR (C.2/5 AND C.3/3) THEN o.702 ELSE x

c705: IF (C.2/4 AND (C.3/2 OR C.3/3)) OR (C.2/6 AND C.3/2) THEN o.702 ELSE x

o.701: It is mandatory to support at least one of these items

o.702: It is mandatory to support at least one of these items

C.5.5 OS4 regeneration characteristics, OS4/RS4_A_So, OS4/RS4_A_Sk

Table C.8: OS4 regeneration output characteristics

Item	OS4 regeneration output characteristics	Reference	Status	Support
1	In the absence of input jitter at the synchronisation interface, the intrinsic jitter at the STM-16 output interface measured over a 60 second interval does not exceed 0,5 Ulpp when measured through a single-pole band pass filter with corner frequencies at 1 000 Hz and 5 MHz.	5.3.1	m	
2	In the absence of input jitter at the synchronisation interface, the intrinsic jitter at the STM-16 output interface measured over a 60 second interval does not exceed 0,1 Ulpp when measured through a single-pole band pass filter with corner frequencies at 250 kHz and 5 MHz.	5.3.1	m	
3	Output timing The bit rate is locked to the synchronisation signal provided by an SSU or SEC via the Synchronisation Distribution Layer.	ETS 300 417-1-1 clause 10 DE/TM-01015-6-1	c801	
4	Output timing The output bit-rate is locked to the frequency of the corresponding input signal.	G.958 subclause 9.2	c802	
5	Output timing During LOS on the corresponding input port, in free running mode, the bit rate at the STM-4 optical output is 622 ± 20 ppm.	G.958 subclause 9.2	c802	

c801: IF NOT C.1/1 THEN m ELSE n/a

c802: IF C.1/1 THEN m ELSE n/a

Table C.9: OS4 regeneration input characteristics

Item	OS4 regeneration input characteristics	Reference	Status	Support
1	The function supplies the recovered timing signal to the synchronisation distribution layer.	5.3.2	c901	
2	Signal regeneration. The function is able to operate with a maximum BER as specified in ETS 300 417-1-1, subclause 11.3.2.1, when any combination of the following signal conditions exist at its input: <ul style="list-style-type: none"> input optical power level within the range specified in ETS 300 232. jitter modulation applied to the input signal as specified in ETS 300 417-1-1, subclause 11.3.2. input bit rate in the range $622\ 080 \pm 20$ ppm. 	5.3.2	m	
3	The jitter tolerated -defined as the peak-to-peak amplitude of a sinusoidal jitter applied to the signal at reference point R that causes a 1 dB optical power penalty at the optical receiver and lets the system operate without errors- is within the limits specified in the mask of figure 2/G.825.	5.3.2 G.825 subclause 4.1 Figure 2/G.825 Table 2/G.825 Table 2/G.958	m	

c901: IF NOT C.1/1 THEN o ELSE n/a

Table C.10: OS4/RS4 frame alignment characteristics

Item	OS4/RS4 frame alignment characteristics	Reference	Status	Support
1	The frame alignment is found by searching for the A1, A2 bytes contained in the STM-4 signal.	5.3.2	o.1001	
2	The framing pattern searched for is a subset of the A1 and A2 bytes contained on the STM-4 signal.	5.3.2	o.1001	
3	The framing signal is continuously checked with the presumed frame start position for alignment.	5.3.2	m	
4	In the In-Frame (IF) status the maximum Out Of Frame (OOF) detection time is 625 μ s for a random unframed signal.	5.3.2	m	
5	The algorithm used to check the alignment is such that in IF state, under normal condition, a 10^{-3} (Poisson type) error ratio will not cause false OOF more than once per 6 minutes. (Median Value)	5.3.2	m	
6	In the OOF state, the maximum frame alignment time is 250 μ s for an error-free signal with no emulated frame pattern.	5.3.2	m	
7	The Frame Start reference (FS) is maintained during the OOF state and only updated upon successful transition from OOF state to IF state.	5.3.2	m	
8	The algorithm used to recover from the OOF state is such that the probability for false frame recovery with a random unframed signal is not more than 10^{-5} per 250 μ s interval.	5.3.2	m	

o.1001: it is mandatory to support exactly one of these items

C.6 Defect, fault and performance management

C.6.1 Port status management

Table C.11: OS4 port status mode process

Item	OS4 port status mode process	Reference	Status	Support
1	The port status mode supports "not monitored" (NMON) status	ETS 300 417-1-1 subclause 8.5	m	
2	The port status mode supports "monitored" (MON) status	ETS 300 417-1-1 subclause 8.5	m	
3	The port status mode supports "automatic" (AUTO) status	ETS 300 417-1-1 subclause 8.5	o	

C.6.2 Defect detection and clearance criteria

Table C.12: OS4 Loss Of Signal defect (dLOS)

Item	OS4 Loss Of Signal defect (dLOS)	Reference	Status	Support
1	The optical STM-4 Loss Of Signal defect (dLOS) is detected when the received signal has degenerated to a level where SDH frame alignment would be interrupted, and the cause is evidently a drop of incoming power level below operational level.	ETS 300 417-1-1 subclause 8.2.1.6	m	
2	The optical STM-4 Loss Of Signal defect (dLOS) is cleared when the received signal level is greater than or equal to the minimum operational level.	ETS 300 417-1-1 subclause 8.2.1.6	m	

Table C.13: OS4 Loss Of Frame defect (dLOF)

Item	OS4 Loss Of Frame defect (dLOF)	Reference	Status	Support
1	If the Out Of Frame (OOF) anomaly persists for more than 3 ms, the function will enter the LOF state and a dLOF defect is declared.	5.3.2	m	
2	To provide for the case of intermittent OOFs, the integrating timer is not reset to zero until an In Frame (IF) condition persists continuously for at least 3 ms.	5.3.2	m	
3	Once in a LOF state, this state is exited when the IF state persists continuously for at least 3 ms.	5.3.2	m	

C.6.3 Consequent action activation and clearance criteria**Table C.14: OS4 Trail Signal Fail action (aTSF)**

Item	OS4 Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The aTSF signal is activated on detection of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	
2	The aTSF signal is deactivated on clearance of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	

Table C.15: OS4 Server Signal Fail action (aSSF)

Item	OS4 Server Signal Fail action (aSSF)	Reference	Status	Support
1	The aSSF is activated on detection of a dLOF defect.	5.3.2	m	
2	The aSSF is activated on detection of a aTSF (AI_TSF)	5.3.2	m	
3	The aSSF signal is deactivated when the defect(s) which caused the aSSF generation is(are) no longer active and there are no other defects active.	ETS 300 417-1-1 subclause 8.2.2.4	m	

Table C.16: Alarm Indication Signal action (aAIS)

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
1	AIS is applied to the output data within 2 frames (250 μ s) after aTSF detection is adapted (AI_TSF)	5.3.2	m	
2	AIS is removed upon termination of the a TSF condition within 2 frames (250 μ s).	5.3.2	m	
3	AIS is applied to the output data within 2 frames (250 μ s) after dLOF detection-	5.3.2	m	
4	AIS is removed upon termination of the dLOF condition within 2 frames (250 μ s).	5.3.2	m	

C.6.4 Equipment Management System (EMS) fault management**Table C.17: fLOS, fLOF failure report**

Item	Failure reports	Reference	Status	Support
1	The fLOS failure is declared when dLOS defect persists continuously for X seconds and the port is the monitoring state (MON).	ETS 300 417-1-1 subclauses 8.2.1.6, 8.3.1, 4.2.2	m	
2	The fLOS failure is cleared if dLOS defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	
3	The fLOF failure is declared if dLOF defect persists continuously for X seconds .	ETS 300 417-1-1 subclause 8.3.1	m	
4	The fLOF failure is cleared if dLOF defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	
5	Any second with at least one Out Of Frame (OOF) event is reported as an Out Of Frame Second.	5.3.2	m	

Table C.18: Programmability of fault management parameters

Item	Programmability of fault management parameters	Reference	Status	Support
1	Programmability of fault declaration time (X parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
2	Programmability of fault clearance time (Y parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
3	Logarithmic values for steps of X and Y values (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
4	The fLOF failure is cleared if dLOF defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	

Tabel C.19: Fault management parameters value

Item	Fault management parameters value	Reference	Status	Support	Values	
					Allowed	Supported
1	Time for fault declaration (X parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		2.5 ± 0,5 s	
2	Time for fault declaration (X parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		≥ 100 ms	
3	Time for fault declaration (X parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		≤ 30 s	
4	Time for fault clearance (Y parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		10 ± 0,5 s	
5	Time for fault clearance (Y parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		≥ 100 ms	
6	Time for fault clearance (Y parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		≤ 30 s	
7	Logarithmic step for X and/or Y value (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m		—	

Annex D (normative): ICS proforma for STM-16 optical section layer

Notwithstanding the provisions of the copyright clause related to the text of this ETS ETSI grants that users of this ETS may freely reproduce the ICS proforma in this annex so that it can be used for its intended purposes and may further publish the completed ICS.

D.1 Identification of the implementation

In this document, an IUT, and of course the identification of an IUT refers to an OS16 layer instance implemented inside the SUT.

Identification of the IUT and the SUT in which it resides 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

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D.1.2 Implementation Under Test (IUT) identification

IUT name:

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IUT version

Hardware version:

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Software version:

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Firmware version:

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D.1.3 System Under Test (SUT) identification

SUT name:

.....
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Hardware configuration:

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SUT Software version:

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SUT Firmware version:

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Operating system:

.....

D.1.4 Product supplier

Name:

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Address:

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Telephone number:

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Facsimile number:

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E-mail address:

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Additional information:

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D.1.5 Client

Name:

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Address:

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Telephone number:

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Facsimile number:

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E-mail address:

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Additional information:

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D.1.6 ICS contact person

Name:

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

D.2 Identification of the ETS

This ICS proforma applies to the following standard:

ETS 300 417-2-1 [2]: "Transmission and Multiplexing (TM); Generic functional requirements for SDH equipment: Physical section layer functions".

D.3 Global statement of conformance of OS16 layer

Are all mandatory capabilities implemented (Yes/No)

NOTE: Answering "No" to this question indicates non-conformance to the ETS specification. Non-supported mandatory capabilities are to be identified in the ICS, with an explanation of why the implementation is non-conforming, on pages attached to the ICS proforma.

Answering "Yes" to this question indicates only that all the capabilities with the explicit status "m" are supported. It is not necessary to fill in the support column of the associated item.

D.4 OS16 optical section layer function

Table D.1: OS16 optical section layer function

Item	OS16 optical section layer function	Reference	Status	Support
1	This OS1 layer is part of an SDH Regenerator equipment.		o	
2	The OS16 Section Layer supports an OS16 Optical Section Connection Function (OS16_C)	6.1	o	
3	The OS16 Section Layer contains an OS16 Trail Termination Source function (OS16_TT_So)	6.2.1	m	
4	The OS16 Section Layer contains an OS16 Trail Termination Sink function (OS16_TT_Sk)	6.2.2	m	
5	The OS16 Section Layer contains an OS16 Section to RS16 (Regenerator Section) Adaptation Source function (OS16/RS16_A_So)	6.3.1	m	
6	The OS16 Section Layer contains an OS16 Section to RS16 Adaptation Sink function (OS16/RS16_A_Sk)	6.3.2	m	

Table D.2: OS16 optical interface classification

Item	OS16 optical interface classification	Reference	Status	Support
1	The Trail Termination Source supports an Intra-office (I16) application (OS16-I16_TT_So)	Table 1/G.957, ETS 300 232	o.201	
2	The Trail Termination Source supports an Inter-office Short-haul with Source nominal wavelength of 1 310 nm (S16.1) application (OS16-S16.1_TT_So)	Table 1/G.957, ETS 300 232	o.201	
3	The Trail Termination Source supports an Inter-office Short-haul with Source nominal wavelength of 1 550 nm (S16.2) application (OS16-S16.2_TT_So)	Table 1/G.957, ETS 300 232	o.201	
4	The Trail Termination Source supports an Inter-office Long-haul with Source nominal wavelength of 1 310 nm (L16.1) application (OS16-L16.1_TT_So)	Table 1/G.957, ETS 300 232	o.201	
5	The Trail Termination Source supports an Inter-office Long-haul with Source nominal wavelength of 1 550 nm on optical fibre complying with Recs. G.652/G.654 (L16.2) application (OS16-L16.2_TT_So)	Table 1/G.957, ETS 300 232	o.201	
6	The Trail Termination Source supports an Inter-office Long-haul with Source nominal wavelength of 1 550 nm on optical fibre complying with Rec. G.653 (L16.3) application (OS16-L16.3_TT_So)	Table 1/G.957, ETS 300 232	o.201	

o.201: It is mandatory to support exactly one of these items.

Table D.3: OS16 optical interface source type

Item	OS16 optical interface source type	Reference	Status	Support
1	The source type is a Single-Longitudinal Mode laser (SLM)	Table 4/G.957, ETS 300 232	o.301	
2	The source type is a Multi-Longitudinal Mode laser (MLM)	Table 4/G.957, ETS 300 232	o.301	

c301: IF D.2/3 OR D.2/4 OR D.2/5 OR D.2/6 THEN o.3 ELSE x

c302: IF D.2/1 OR D.2/2 OR D.2/3 OR D.2/4 OR D.2/6 THEN o.3 ELSE x

o.301: It is mandatory to support exactly one of these items

D.5 OS16 Optical section layer transmission tables

D.5.1 OS16 source operating wavelength range, OS16_TT_So

Table D.4: OS16 source operating wavelength range

Item	OS16 source operating wavelength range	Reference	Status	Support
1	The source wavelength range is within 1 266 and 1 360 nm (OS16-I16_TT_So).	Table 4/G.957, ETS 300 232	c401	
2	The source wavelength range is within 1 260 and 1 360 nm (OS16-S16.1_TT_So).	Table 4/G.957, ETS 300 232	c402	
3	The source wavelength range is within 1 430 and 1 580 nm (OS16-S16.2_TT_So).	Table 4/G.957, ETS 300 232	c403	
4	The source wavelength range is within 1 280 and 1 335 nm (OS16-L16.1_TT_So).	Table 4/G.957, ETS 300 232	c404	
5	The source wavelength range is within 1 500 and 1 580 nm (OS16-L16.2_TT_So, OS16-L16.3_TT_So).	Table 4/G.957, ETS 300 232	c405	

c401: IF D.2/1 AND D.3/2 THEN o.401 ELSE x

c402: IF D.2/2 AND D.3/1 THEN o.401 ELSE x

c403: IF D.2/3 AND D.3/1 THEN o.401 ELSE x

c404: IF D.2/4 AND D.3/1 THEN o.401 ELSE x

c405: IF (D.2/5 OR D.2/6) AND D.3/1 THEN o.401 ELSE x

o.401: It is mandatory to support exactly one of these items

D.5.2 OS16 source spectral characteristics, OS16_TT_So

Table D.5: OS16 source spectral characteristics

Item	OS16 source spectral characteristics	Reference	Status	Support
1	The maximum RMS width under standard operating conditions -measured as the standard deviation of the spectral distribution taking into account all modes that are not more than 20 dB down from the peak mode- is 4 nm (OS16-I16_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c501	
2	The full width of the central wavelength peak, measured under standard operating conditions 20 dB down from the maximum amplitude of the central wavelength, is not more than 1 nm (OS16-S16.z_TT_So, OS16-L16.z_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c502	
3	The side mode suppression ratio -defined as the relative amplitude of the lateral peaks to the central wavelength peak- is at least 30 dB (OS16-L16.2_TT_So, OS16-L16.3_TT_So).	G.957 subclause 6.2.2, Table 4/G.957, ETS 300 232	c503	

c501: IF D.2/1 THEN o.501 ELSE x

c502: IF (D.2/2 OR D.2/3 OR D.2/4 OR D.2/5 OR D.2/6) AND D.3/1 THEN o.501 ELSE x

c503: IF (D.2/2 OR D.2/3 OR D.2/4 OR D.2/5 OR D.2/6) AND D.3/1 THEN m ELSE x

o.501: It is mandatory to support exactly one of these items

D.5.3 OS16 source optical characteristics, OS16_TT_So

Table D.6: OS16 source optical characteristics

Item	OS16 source optical characteristics	Reference	Status	Support
1	The mean launched power level at the reference point S - defined as the average optical power of a pseudo-random data sequence coupled into the fibre by the transmitter- at reference point S is between -3 and -10 dBm (OS16-I16_TT_So).	G.957 subclause 6.2.3, Table 4/G.957, ETS 300 232	c601	
2	The mean launched power level at the reference point S - defined as the average optical power of a pseudo-random data sequence coupled into the fibre by the transmitter- at reference point S is between 0 and -5 dBm (OS16-S16.z_TT_So).	G.957 subclause 6.2.3, Table 4/G.957, ETS 300 232	c602	
3	The mean launched power level at the reference point S - defined as the average optical power of a pseudo-random data sequence coupled into the fibre by the transmitter- at reference point S is between +3 and -2 dBm (OS16-L16.z_TT_So).	G.957 subclause 6.2.3, Table 4/G.957, ETS 300 232	c603	
4	The extinction ratio EX -defined as $EX = 10 \log_{10}(A/B)$, where A is the average optical power level for a logical '1' (emission of light) and B is the average optical power level for a logical '0' (no emission), measured at the reference point S- is not 8,2 dB (OS16_TT_So).	G.957 subclause 6.2.4, Table 4/G.957, ETS 300 232	m	
5	The pulse shape characteristics -including rise time, fall time, pulse overshoot, pulse undershoot and ringing- is specified in the form of a mask of the transmitter eye diagram at point S. The pulse shape of the signal -coupled to an optical reference receiver whose nominal transfer function is according with the fourth-order Bessel Thompson response described in appendix I/G.957- is within the limits as specified in the mask of figure 2/G.957 (OS16_TT_So).	G.957 subclause 6.2.5 Figure 2/G.957 Appendix I/G.957 ETS 300 232	m	

c601: IF D.2/1 AND D.3/2 THEN o.601 ELSE x

c602: IF (D.2/2 OR D.2/3) AND D.3/1 THEN o.601 ELSE x

c603: IF (D.2/4 OR D.2/5 OR D.2/6) AND D.3/1 THEN o.601 ELSE x

o.601: It is mandatory to support exactly one of these items

D.5.4 OS16 receiver characteristics, OS16_TT_Sk

Table D.7: OS16 receiver characteristics

Item	OS16 receiver characteristics	Reference	Status	Support
1	The receiver sensitivity -defined as the minimum acceptable value of average received power at point R to achieve a BER not worse 10^{-10} - is better than -18 dBm. This value does not include power level associated with dispersion, jitter, or reflection from the optical path (OS16-I16_TT_Sk, OS16-S16.z_TT_Sk).	G.957 subclause 6.4.1, Table 4/G.957, ETS 300 232	c701	
2	The receiver sensitivity -defined as the minimum acceptable value of average received power at point R to achieve a BER not worse 10^{-10} - is better than -27 dBm. This value does not include power level associated with dispersion, jitter, or reflection from the optical path (OS16-L16.1_TT_Sk, OS16-L16.3_TT_Sk).	G.957 subclause 6.4.1, Table 4/G.957, ETS 300 232	c702	
3	The receiver sensitivity -defined as the minimum acceptable value of average received power at point R to achieve a BER not worse 10^{-10} - is better than -28 dBm. This value does not include power level associated with dispersion, jitter, or reflection from the optical path (OS16-L16.2_TT_Sk).	G.957 subclause 6.4.1, Table 4/G.957, ETS 300 232	c703	
4	The receiver overload -defined as the maximum acceptable value of the received average power at point R to achieve a BER not worse 10^{-10} - is higher than -3 dBm (OS16-I16_TT_Sk).	G.957 subclause 6.4.2, Table 4/G.957, ETS 300 232	c704	
5	The receiver overload -defined as the maximum acceptable value of the received average power at point R to achieve a BER not worse 10^{-10} - is higher than 0 dBm (OS16-S16.z_TT_Sk).	G.957 subclause 6.4.2, Table 4/G.957, ETS 300 232	c705	
6	The receiver overload -defined as the maximum acceptable value of the received average power at point R to achieve a BER not worse 10^{-10} - is higher than -9 dBm (OS16-L16.z_TT_Sk).	G.957 subclause 6.4.2, Table 4/G.957, ETS 300 232	c706	
7	The maximum reflectance of the receiver measured at the reference point R is better than -27 dB (OS16_TT_Sk).	G.957 subclause 6.4.3, Table 4/G.957, ETS 300 232	m	
8	The receiver tolerates an optical path penalty not exceeding 1 dB to account for total degradation due to reflections, intersymbol interference, mode partition noise, and laser chirp (OS16-L16.z_TT_Sk).	G.957 subclause 6.4.4, Table 4/G.957, ETS 300 232	c707	
9	The receiver tolerates an optical path penalty not exceeding 2 dB to account for total degradation due to reflections, intersymbol interference, mode partition noise, and laser chirp (OS16-L16.2_TT_Sk).	G.957 subclause 6.4.4, Table 4/G.957, ETS 300 232	c708	

c701: IF D.2/1 OR D.2/2 OR D.2/3) AND D.3/1 THEN o.701 ELSE x

c702: IF (D.2/4 OR D.2/6) AND D.3/1 THEN o.701 ELSE x

c703: IF D.2/5 AND D.3/1 THEN o.701 ELSE x

c704: IF D.2/1 AND D.3/1 THEN o.702 ELSE x

c705: IF (D.2/2 OR D.2/3) AND D.3/1 THEN o.702 ELSE x

c706: IF (D.2/4 AND D.2/5 OR D.2/6) AND D.3/1 THEN o.702 ELSE x

c707: IF NOT D.2/5 THEN o.703 ELSE x

c708: IF D.2/5 AND D.3/1 THEN o.703 ELSE x

o.701: It is mandatory to support at least one of these items

o.702: It is mandatory to support at least one of these items

o.703: It is mandatory to support at least one of these items

D.5.5 OS16 regeneration characteristics, OS16/RS16_A_So, OS16/RS16_A_Sk

Table D.8: OS16 regeneration output characteristics

Item	OS16 regeneration output characteristics	Reference	Status	Support
1	In the absence of input jitter at the synchronisation interface, the intrinsic jitter at the STM-16 output interface measured over a 60 second interval does not exceed 0,5 Ulpp when measured through a single-pole band pass filter with corner frequencies at 5 kHz and 20 MHz.	6.3.1	m	
2	In the absence of input jitter at the synchronisation interface, the intrinsic jitter at the STM-16 output interface measured over a 60 second interval does not exceed 0,1 Ulpp when measured through a single-pole band pass filter with corner frequencies at 1 MHz and 20 MHz.	6.3.1	m	
3	Output timing The bit rate is locked to the synchronisation signal provided by an SSU or SEC via the Synchronisation Distribution Layer.	ETS 300 417-1-1 clause 10 DE/TM-01015-6-1	c801	
4	Output timing The output bit-rate is locked to the frequency of the corresponding input signal.	G.958 subclause 9.2	c802	
5	Output timing During LOS on the corresponding input port, in free running mode, the bit rate at the STM-16 optical output is 2 ± 20 ppm.	G.958 subclause 9.2	c802	

c801: IF NOT D.1/1 THEN m ELSE n/a

c802: IF D.1/1 THEN m ELSE n/a

Table D.9: OS16 regeneration input characteristics

Item	OS16 regeneration input characteristics	Reference	Status	Support
1	The function supplies the recovered timing signal to the synchronisation distribution layer.	6.3.2	m	
2	Signal regeneration. The function is able to operate with a maximum BER as specified in ETS 300 417-1-1, subclause 11.3.2.1, when any combination of the following signal conditions exist at its input: <ul style="list-style-type: none"> input optical power level within the range specified in ETS 300 232. jitter modulation applied to the input signal as specified in ETS 300 417-1-1, subclause 11.3.2. input bit rate in the range $2\ 488\ 320 \pm 20$ ppm. 	6.3.2	m	
3	The jitter tolerated -defined as the peak-to-peak amplitude of a sinusoidal jitter applied to the signal at reference point R that causes a 1 dB optical power penalty at the optical receiver and lets the system operate without errors- is within the limits specified in the mask of figure 2/G.825.	6.3.2 G.825 subclause 4.1 Figure 2/G.825 Table 2/G.825 Table 2/G.958	m	

Table D.10: OS16/RS16 frame alignment characteristics

Item	OS16/RS16 frame alignment characteristics	Reference	Status	Support
1	The frame alignment is found by searching for the A1, A2 bytes contained in the STM-16 signal.	6.3.2	o.1001	
2	The framing pattern searched for is a subset of the A1 and A2 bytes contained on the STM-16 signal.	6.3.2	o.1001	
3	The framing signal is continuously checked with the presumed frame start position for alignment.	6.3.2	m	
4	In the In-Frame (IF) status the maximum Out Of Frame (OOF) detection time is 625 μ s for a random unframed signal.	6.3.2	m	
5	The algorithm used to check the alignment is such that in IF state, under normal condition, a 10^{-3} (Poisson type) error ratio will not cause false OOF more than once per 6 minutes. (Median Value)	6.3.2	m	
6	In the OOF state, the maximum frame alignment time is 250 μ s for an error-free signal with no emulated frame pattern.	6.3.2	m	
7	The Frame Start reference (FS) is maintained during the OOF state and only updated upon successful transition from OOF state to IF state.	6.3.2	m	
8	The algorithm used to recover from the OOF state is such that the probability for false frame recovery with a random unframed signal is not more than 10^{-5} per 250 μ s interval.	6.3.2	m	

o.1001: it is mandatory to support exactly one of these items

D.6 Defect, fault and performance management

D.6.1 Port status management

Table D.11: OS16 port status mode process

Item	OS16 port status mode process	Reference	Status	Support
1	The port status mode supports "not monitored" (NMON) status	ETS 300 417-1-1 subclause 8.5	m	
2	The port status mode supports "monitored" (MON) status	ETS 300 417-1-1 subclause 8.5	m	
3	The port status mode supports "automatic" (AUTO) status	ETS 300 417-1-1 subclause 8.5	o	

D.6.2 Defect detection and clearance criteria

Table D.12: OS16 Loss Of Signal defect (dLOS)

Item	OS16 Loss Of Signal defect (dLOS)	Reference	Status	Support
1	The optical STM-16 Loss Of Signal defect (dLOS) is detected when the received signal has degenerated to a level where SDH frame alignment would be interrupted, and the cause is evidently a drop of incoming power level below operational level.	ETS 300 417-1-1 subclause 8.2.1.6	m	
2	The optical STM-16 Loss Of Signal defect (dLOS) is cleared when the received signal level is greater than or equal to the minimum operational level.	ETS 300 417-1-1 subclause 8.2.1.6	m	

Table D.13: OS16 Loss Of Frame defect (dLOF)

Item	OS16 Loss Of Frame defect (dLOF)	Reference	Status	Support
1	If the Out Of Frame (OOF) anomaly persists for more than 3 ms, the function will enter the LOF state and a dLOF defect is declared.	6.3.2	m	
2	To provide for the case of intermittent OOFs, the integrating timer is not reset to zero until an In Frame (IF) condition persists continuously for at least 3 ms.	6.3.2	m	
3	Once in a LOF state, this state is exited when the IF state persists continuously for at least 3 ms.	6.3.2	m	

D.6.3 Consequent action activation and clearance criteria

Table D.14: OS16 Trail Signal Fail action (aTSF)

Item	OS16 Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The aTSF signal is activated on detection of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	
2	The aTSF signal is deactivated on clearance of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	

Table D.15: OS16 Server Signal Fail action (aSSF)

Item	OS16 Server Signal Fail action (aSSF)	Reference	Status	Support
1	The aSSF is activated on detection of a dLOF defect.	6.3.2	m	
2	The aSSF is activated on detection of a aTSF	6.3.2	m	
3	The aSSF signal is deactivated when the defect(s) which caused the aSSF generation is(are) no longer active and there are no other defects active.	ETS 300 417-1-1 subclause 8.2.2.4	m	

Table D.16: Alarm Indication Signal action (aAIS)

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
1	AIS is applied to the output data within 2 frames (250 μ s) after aTSF detection is adapted (AI_TSF)	6.3.2	m	
2	AIS is removed upon termination of the a TSF condition within 2 frames (250 μ s).	6.3.2	m	
3	AIS is applied to the output data within 2 frames (250 μ s) after dLOF detection-	6.3.2	m	
4	AIS is removed upon termination of the dLOF condition within 2 frames (250 μ s).	6.3.2	m	

D.6.4 Equipment Management System (EMS) fault management

Table D.17: fLOS, fLOF failure report

Item	fLOS, fLOF failure report	Reference	Status	Support
1	The fLOS failure is declared when the received signal has degenerated to a level where SDH frame alignment would be interrupted, and the cause is evidently a drop of incoming power level below operational level and if dLOS defect persists continuously for X seconds and the port is the monitoring state (MON).	4.2.2, ETS 300 417-1-1 subclauses 8.2.1.6, 8.3.1	m	
2	The fLOS failure is cleared if dLOS defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	
3	The fLOF failure is declared if dLOF defect persists continuously for X seconds .	ETS 300 417-1-1 subclause 8.3.1	m	
4	The LOF failure is cleared if dLOF defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	
5	Any second with at least one Out Of Frame (OOF) event is reported as an Out Of Frame Second.	6.3.2	m	

Table D.18: Programmability of fault management parameters

Item	Programmability of fault management parameters	Reference	Status	Support
1	Programmability of fault declaration time (X parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
2	Programmability of fault clearance time (Y parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
3	Logarithmic values for steps of X and Y values (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
4	The fLOF failure is cleared if dLOF defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	

Tabel D.19: Fault management parameters value

Item	Fault management parameters value	Reference	Status	Support	Values	
					Allowed	Supported
1	Time for fault declaration (X parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		2.5 ± 0,5 s	
2	Time for fault declaration (X parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		≥ 100 ms	
3	Time for fault declaration (X parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		≤ 30 s	
4	Time for fault clearance (Y parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		10 ± 0,5 s	
5	Time for fault clearance (Y parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		≥ 100 ms	
6	Time for fault clearance (Y parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		≤ 30 s	
7	Logarithmic step for X and/or Y value (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m		—	

Annex E (normative): ICS proforma for STM-1 electrical section layer

Notwithstanding the provisions of the copyright clause related to the text of this ETS ETSI grants that users of this ETS may freely reproduce the ICS proforma in this annex so that it can be used for its intended purposes and may further publish the completed ICS.

E.1 Identification of the implementation

In this document, an IUT, and of course the identification of an IUT refers to an ES1 layer instance implemented inside the SUT.

Identification of the IUT and the 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

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E.1.2 Implementation Under Test (IUT) identification

IUT name:

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IUT version

Hardware version:

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Software version:

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Firmware version:

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E.1.3 System Under Test (SUT) identification

SUT name:

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Hardware configuration:

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SUT Software version:

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SUT Firmware version:

.....

Operating system:

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E.1.4 Product supplier

Name:

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Address:

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Telephone number:

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Facsimile number:

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E-mail address:

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Additional information:

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E.1.5 Client

Name:

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Address:

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Telephone number:

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Facsimile number:

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E-mail address:

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Additional information:

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E.1.6 ICS contact person

Name:

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Telephone number:

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Facsimile number:

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E-mail address:

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Additional information:

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E.2 Identification of the ETS

This ICS proforma applies to the following standard:

ETS 300 417-2-1 [2]: "Transmission and Multiplexing (TM); Generic functional requirements for SDH equipment: Physical section layer functions".

E.3 Global statement of conformance of ES1 layer

Are all mandatory capabilities implemented? (Yes/No)

NOTE: Answering "No" to this question indicates non-conformance to the ETS specification. Non-supported mandatory capabilities are to be identified in the ICS, with an explanation of why the implementation is non-conforming, on pages attached to the ICS proforma.

Answering "Yes" to this question indicates only that all the capabilities with the explicit status "m" are supported. It is not necessary to fill in the support column of the associated item.

E.4 STM-1 electrical section layer function

Table E.1: ES1 electrical section layer function

Item	STM-1 electrical section layer function	Reference	Status	Support
1	The STM-1 electrical section layer supports Electrical Section Connection function	8.1	o	
2	The STM-1 electrical section layer contains an ES1 Trail Termination Source function (ES1_TT_So)	8.2.1	m	
3	The STM-1 electrical section layer contains an ES1 Trail Termination Sink function (ES1_TT_Sk)	8.2.2	m	
4	The ES1 Section Layer contains an ES1 Section to RS1 Adaptation Source function (ES1/RS1_A_So)	8.3.1	m	
5	The ES1 Section Layer contains an ES1 Section to RS1 Adaptation Sink function (ES1/RS1_A_Sk)	8.3.2	m	

E.5 STM-1 electrical section layer transmission tables

E.5.1 STM-1 data stream

Table E.2: STM-1 signal

Item	STM-1 signal	Reference	Status	Support
1	The ES1_CI of the intra-station layer CP is an electrical, digital signal of defined amplitude and pulse shape	8	m	

E.5.2 STM-1 electrical section connection function, ES1_C

Table E.3: ES1 connection functionalities

Item	ES1 connection functionalities	Reference	Status	Support
1	no requirement	8.1	n/a	

E.5.3 STM-1 electrical section trail termination functions, ES1_TT_So and ES1_TT_Sk

Table E.4: Electrical characteristics

Item	Electrical characteristics	Reference	Status	Support
1	The pulse shape characteristics - including peak-to-peak voltage, pulse width, "steady state" amplitude, pulse overshoot, rise time, decay time - is specified in the form of a mask. The pulse shape corresponding to a binary 0 is compliant to the mask in figure 24/G.703 and to the relevant values in table 11/G.703.	Figure 24/G.703 Table 11/G.703 ETS 300 166	m	
2	The pulse shape characteristics - including peak-to-peak voltage, pulse width, "steady state" amplitude, pulse overshoot, rise time, decay time - is specified in the form of a mask. The negative pulse shape corresponding to a binary 1 is compliant to the mask in figure 25/G.703 and to the relevant values in table 11/G.703.	Figure 25/G.703 Table 11/G.703 ETS 300 166	m	
3	Each pulse in a coded pulse sequence meets the limit of the relevant mask, irrespectively of the state of the preceding and succeeding pulse	Figure 24-25/G.703 note 3 fig 24-25/ G.703 ETS 300 166	m	
4	The return loss at the output port against 75 ohms is equal or greater than 15 dB in the frequency range from 8 MHz to 240 MHz	ETS 300 166 suclause 5.3	m	
5	One coaxial pair in each direction is used.	Table 11/ G.703	m	
6	The outer conductor of the output port is connected to signal ground.	ETS 300 166 table 1/12	m	
7	The outer conductor of the input port is connected to signal ground.	ETS 300 166 table 1/12	m	
8	The return loss at the input port against 75 ohms is equal or greater than 15 dB in the frequency range from 8 MHz to 240 MHz.	Table 11/G.703	m	

E.5.4 ES1 to RS1 adaptation functions, ES1/RS1_A_So and ES1/RS1_A_Sk

Table E.5: Coding and regeneration of STM-1 signal

Item	Coding and regeneration of STM-1 signal	Reference	Status	Support
1	The function provides CMI encoding of the ES1 signal.	8.3.2	m	
2	The function regenerates the received signal, recovers bit timing and frame start reference from it and provides CMI decoding of the STM-1 signal.	8.3.1	m	
3	The bit rate is locked to the synchronisation signal provided by an SSU or SEC via the Synchronisation Distribution Layer.	ETS 300 417-1-1, subclause 10	m	
4	The function supplies the recovered timing signal to the synchronisation distribution layer.	8.3.2	o	
5	The signal accepted at the input port is as defined for output port but modified by the characteristics of the interconnecting coaxial pair (the attenuation follows a \sqrt{f} law and the loss at 78 MHz is in the range 0 to 12,7 dB).	G.703 , subclause 12.3	m	
6	The port operates without any error when any combination of the following conditions apply to the input signal: <ul style="list-style-type: none"> - an input electrical signal amplitude with any value specified by ETS 300 166 - jitter modulation applied to the input signal with any value defined in figure 2/G.825 and in table 2/G.825. - input bit rate in the range 155 520 kbit/s \pm 20 ppm 	8.3.2 G.823, subclause 3.1.1 Table 2/G.823 Figure 3/G.823 Table 2/G.825 Figure 2/G.825	m	
7	In the absence of input jitter at the synchronization interface, the intrinsic jitter at the STM-1 output interface -measured over a 60 seconds interval- does not exceed 0,05 UI peak-peak when measured through a single pole band-pass filter with corner frequencies at 500 kHz and 1,3 MHz	8.3.1	m	
8	AIS is an all ONE signal .	8.3.2	m	
9	AIS generated by the ES1/RS1_A_Sk function replaces the regular signal when a defect is detected.	8.3.2	m	

Table E.6: STM-1 frame alignment process

Item	STM-1 frame alignment process	Reference	Status	Support
1	The frame alignment is found by searching for the A1, A2 bytes contained in the STM-1 signal.	8.3.2	o.601	
2	The framing pattern searched for is a subset of the A1 and A2 bytes contained on the STM-1 signal.	8.3.2	o.601	
3	The frame signal is continuously checked with the presumed frame start position for the alignment.	8.3.2	m	
4	In the In-Frame (IF) status the maximum Out-Of-Frame (OOF) detection time is 625 μ s for a random unframed signal.	8.3.2	m	
5	The algorithm used to check the alignment is such that in IF state, under normal condition, a 10^{-3} (Poisson type) error ratio will not cause false OOF more than once per 6 minutes. (Medium Value)	8.3.2	m	
6	In the OOF state, the maximum frame alignment time is 250 μ s for an error-free signal with no emulated frame pattern.	8.3.2	m	
7	The frame start reference (FS) is maintained during the OOF state and only updated upon successful transition from OOF to the IF state.	8.3.2	m	
8	The algorithm used to recover from the OOF state is such that the probability for false frame recovery with a random unframed signal is not more than 10^{-5} per 250 μ s interval.	8.3.2	m	

o.601: it is mandatory to support only one of this items

E.6 Defect, fault and performance management

E.6.1 Port status management

Table E.7: STM-1 port status mode process

Item	ES1 port status mode process	Reference	Status	Support
1	The port status mode supports "not monitored" (NMON) status	ETS 300 417-1-1 subclause 8.5	m	
2	The port status mode supports "monitored" (MON) status	ETS 300 417-1-1 subclause 8.5	m	
3	The port status mode supports "automatic" (AUTO) status	ETS 300 417-1-1 subclause 8.5	o	

E.6.2 Defect detection and clearance criteria

Table E.8: Loss Of Signal defect (dLOS)

Item	Loss Of Signal defect (dLOS)	Reference	Status	Support
1	Loss of signal is detected when received amplitudes are less or equal to the level Q, as specified in ETS 300 417-1-1, subclause 8.2.1.6, for a period from 10 to 255 UI	ETS 300 417-1-1, subclause 8.2.1.6	m	
2	Loss of signal is cleared when received amplitudes are greater or equal to the level P, as specified in ETS 300 417-1-1, subclause 8.2.1.6, for a period from 10 to 255 UI	ETS 300 417-1-1, subclause 8.2.1.6	m	
3	Loss of signal is not detected when the received amplitude is between the minimum acceptable amplitude and the level P, as specified in ETS 300 417-1-1, subclause 8.2.1.6.	ETS 300 417-1-1, subclause 8.2.1.6	m	

Table E.9: Loss Of Frame defect (dLOF)

Item	Loss Of Frame defect (dLOF)	Reference	Status	Support
1	If the Out Of Frame (OOF) anomaly persists for more than 3 ms, the function will enter the LOF state and a dLOF defect is declared	8.3.2	m	
2	To provide for the case of intermittent OOFs, the integrating timer is not reset to zero until an In Frame (IF) condition persists continuously for at least 3 ms.	8.3.2	m	
3	Once in a LOF state, this state is exited when the IF state persists continuously for at least 3 ms.	8.3.2	m	

E.6.3 Consequent action activation and clearance criteria**Table E.10: ES1 Trail Signal Fail action (aTSF)**

Item	ES1 Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The aTSF signal is activated on detection of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	
2	The aTSF signal is deactivated on clearance of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	

Table E.11: ES1 Server Signal Fail action (aSSF)

Item	ES1 Server Signal Fail action (aSSF)	Reference	Status	Support
1	The aSSF is activated on detection of a dLOF defect.	8.3.2	m	
2	The aSSF is activated on detection of a aTSF	8.3.2	m	
3	The aSSF signal is deactivated when the defect(s) which caused the aSSF generation is(are) no longer active and there are no other defects active.	ETS 300 417-1-1 subclause 8.2.2.4	m	

Table E.12: Alarm Indication Signal action (aAIS)

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
1	AIS is applied to the output data within 2 frames (250 μ s) after aTSF detection is adapted (AI_TSF)	8.3.2	m	
2	AIS is removed upon termination of the a TSF condition within 2 frames (250 μ s).	8.3.2	m	
3	AIS is applied to the output data within 2 frames (250 μ s) after dLOF detection	8.3.2	m	
4	AIS is removed upon termination of the dLOF condition within 2 frames (250 μ s).	8.3.2	m	

E.6.4 Fault management**Table E.13: Failure reports**

Item	Failure reports	Reference	Status	Support
1	The fLOS failure is declared when dLOS defect persists continuously for X seconds and the port is the monitoring state (MON).	ETS 300 417-1-1 subclauses 8.2.1.6, 8.3.1, 4.2.2	m	
2	The fLOS failure is cleared if dLOS defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	
3	The fLOF failure is declared if dLOF defect persists continuously for X seconds .	ETS 300 417-1-1 subclause 8.3.1	m	
4	The fLOF failure is cleared if dLOF defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	
5	Any second with at least one Out Of Frame (OOF) event is reported as an Out Of Frame Second.	8.3.2	m	

Table E.14: Programmability of fault management parameters

Item	Programmability of fault management parameters	Reference	Status	Support
1	Programmability of fault declaration time (X parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
2	Programmability of fault clearance time (Y parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
3	Logarithmic values for steps of X and Y values (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
4	The fLOF failure is cleared if dLOF defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	

Tabel E.15: Fault management parameters value

Item	Fault management parameters value	Reference	Status	Support	Values	
					Allowed	Supported
1	Time for fault declaration (X parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		2.5 ± 0,5 s	
2	Time for fault declaration (X parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		≥ 100 ms	
3	Time for fault declaration (X parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		≤ 30 s	
4	Time for fault clearance (Y parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		10 ± 0,5 s	
5	Time for fault clearance (Y parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		≥ 100 ms	
6	Time for fault clearance (Y parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		≤ 30 s	
7	Logarithmic step for X and/or Y value (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m		—	

Annex F (normative): ICS proforma for E4 electrical section layer

Notwithstanding the provisions of the copyright clause related to the text of this ETS ETSI grants that users of this ETS may freely reproduce the ICS proforma in this annex so that it can be used for its intended purposes and may further publish the completed ICS.

F.1 Identification of the implementation

In this document, an IUT, and of course the identification of an IUT refers to an E4 layer instance implemented inside the SUT.

Identification of the IUT and the 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.

F.1.1 Date of the statement

.....

F.1.2 Implementation Under Test (IUT) identification

IUT name:

.....
.....

IUT version

Hardware version:

.....

Software version:

.....

Firmware version:

.....

F.1.3 System Under Test (SUT) identification

SUT name:

.....
.....

Hardware configuration:

.....

SUT Software version:

.....

SUT Firmware version:

.....

Operating system:

.....

F.1.4 Product supplier

Name:

.....

Address:

.....
.....
.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....
.....
.....

F.1.5 Client

Name:

.....

Address:

.....

.....

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

.....

F.1.6 ICS contact person

Name:

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

F.2 Identification of the ETS

This ICS proforma applies to the following standard:

ETS 300 417-2-1 [2]: "Transmission and Multiplexing (TM); Generic functional requirements for SDH equipment: Physical section layer functions".

F.3 Global statement of conformance of E4 layer

Are all mandatory capabilities implemented? (Yes/No)

NOTE: Answering "No" to this question indicates non-conformance to the ETS specification. Non-supported mandatory capabilities are to be identified in the ICS, with an explanation of why the implementation is non-conforming, on pages attached to the ICS proforma.

Answering "Yes" to this question indicates only that all the capabilities with the explicit status "m" are supported. It is not necessary to fill in the support column of the associated item.

F.4 E4 electrical section layer function

Table F.1: E4 electrical section layer function

Item	E4 electrical section layer function	Reference	Status	Support
1	The E4 Section Layer supports an E4 Connection function	9.1	o	
2	The E4 Section Layer contains an E4 Trail Termination Source function (E4_TT_So)	9.2.1	m	
3	The E4 Section Layer contains an E4 Trail Termination Sink function (E4_TT_Sk)	9.2.2	m	
4	The E4 Section Layer contains an E4 Section to P4x Adaptation Source function (E4/P4x_A_So)	9.3.1	o.1	
5	The E4 Section Layer contains an E4 Section to P4x Adaptation Sink function (E4/P4x_A_Sk)	9.3.2	c101	
6	The E4 Section Layer contains tain an E4 Section to P4e Adaptation Source function (E4/P4e_A_So)	9.3.3	o.1	
7	The E4 Section Layer contains an E4 Section to P4e Adaptation Sink function (E4/P4e_A_Sk)	9.3.4	c102	
8	The E4 Section Layer contains an E4 Section to P4s Adaptation Source function (E4/P4s_A_So)	9.3.5	o.1	
9	The E4 Section Layer contains an E4 Section to P4s Adaptation Sink function (E4/P4s_A_Sk)	9.3.6	c103	

c101: IF F.1/4 THEN m ELSE x

c102: IF F.1/6 THEN m ELSE x

c103: IF F.1/8 THEN m ELSE x

o.1: It is mandatory to support one or more of these functions

F.5 E4 electrical section layer transmission tables

F.5.1 E4 data stream

Table F.2: E4 signal

Item	E4 signal	Reference	Status	Support
1	The E4_CI of the intra-station layer CP is an electrical, digital signal of defined amplitude and pulse shape	9	m	

F.5.2 E4 electrical section connection function, E4_C

Table F.3: E4 connection functionalities

Item	E4 connection functionalities	Reference	Status	Support
1	no requirement	9.1	n/a	

F.5.3 E4 electrical section trail termination functions, E4_TT_So and E4_TT_Sk

Table F.4: Electrical characteristics

Item	Electrical characteristics	Reference	Status	Support
1	The pulse shape characteristics of a ZERO - including peak-to-peak voltage, pulse width, "steady state" amplitude, pulse overshoot, rise time and decay time complies to the mask in figure 19/G.703.and to the relevant values in table 9/G.703.	Figure 19/G.703 Table 9/G.703	m	
2	The pulse shape characteristics of a ONE - including peak-to-peak voltage, pulse width, "steady state" amplitude, pulse overshoot, rise time and decay time - complies to the mask in Figure 20/G.703 and to the relevant values in table 9/G.703.	Figure 20/G.703 Table 9/G.703	m	
3	Each pulse in a coded pulse sequence meets the limit of the relevant mask, irrespectively of the state of the preceding and succeding pulse	Fig 19/G.703 ETS 300 166, note 3	m	
4	The return loss at the output port against 75 ohms is equal or greater than 15 dB in the frequency range from 7 MHz to 210 MHz	Table 9/G.703	m	
5	One coaxial pair in each direction is used.	Table 9/G.703	m	
6	The outer conductor of the output port is connected to signal ground.	ETS 300 166 table 1/8	m	
7	The outer conductor of the input port is connected to signal ground.	ETS 300 166 table 1/8	m	
8	The return loss at the input port against 75 ohms is equal to or greater than 15 dB in the frequency range from 7 MHz to 210 MHz.	G.703, subclause 9.3	m	

F.5.4 E4 to P4x adaptation functions, E4/P4x_A_So and E4/P4x_A_Sk

Table F.5: Coding and regeneration of P4x signal

Prerequisite: F.1/4 -- E4/P4x adaptation functions are present

Item	Coding and regeneration of P4x signal	Reference	Status	Support
1	The function provides CMI encoding of the E4 signal.	9.3.1	m	
2	The function regenerates the received signal and recovers bit timing from it and CMI decodes the incoming electrical 139 264 kbit/s E4 signal.	9.3.2	m	
3	The bit rate at the output port in free-running mode is 139 264 kbit/s \pm 15 ppm.	G.703, subclause 9.1	m	
4	The bit rate accepted at the input port 139 264 kbit/s \pm 15 ppm.	G.703, subclause 9.1	m	
5	The signal accepted at the input port is as defined for output port but modified by the characteristics of the interconnecting coaxial pair (the attenuation follows a \sqrt{f} law and the loss at 70 MHz is in the range 0 to 12 dB).	G.703, subclause 9.3	m	
6	The port operates without any error when any combination of the following conditions apply to the input signal: <ul style="list-style-type: none"> – an input electrical signal amplitude with any value specified by ETS 300 166 – jitter modulation applied to the input signal with any value defined in figure 3/G.823 and in table 2/G.823. – input bit rate in the range 139 264 kbit/s \pm 15 ppm 	9.3.2 G.823, subclause 3.1.1 Table 2/G.823 Figure 3/G.823	m	
7	The E4/P4x_A_So function does not add any jitter. The output jitter is the combination of the jitter generated and transferred via the client layer	9.3.1	m	
8	AIS is an all ONE signal .	9.3.2	m	
9	AIS generated by the E4/P4x_A_Sk function replaces the regular signal when a defect is detected.	9.3.2	m	

Table F.6: Activation and deactivation of E4/P4x adaptation function

Prerequisite: F.1/4 -- E4/P4x adaptation functions are present

Item	Activation and deactivation	Reference	Status	Support
1	The E4/P4x_A_So function source accesses the access point when it is activated (MI_Active is true); otherwise not.	9.3.1	m	
2	The E4/P4x_A_Sk function can be activated and deactivated	9.3.2	c601	
3	The adaptation sink function performs the operation as specified when it is activated (MI_Active is true). Otherwise, it transmits the all-ONES signal at its output (CI_D) and does not report its status via the management point.	9.3.2	m	

c601:IF

(F.1/5 AND F.1/7) OR (F.1/5 AND F.1/9) OR (F.1/7 AND F.1/9) OR (F.1/5 AND F.1/7 AND F.1/9)
THEN m
ELSE o

NOTE: Activation/deactivation is needed when two or more different types of adaptation functions are present

F.5.5 E4to P4e adaptation functions, E4/P4e_A_So and E4/P4e_A_Sk

Table F.7: Coding and regeneration of P4e signal

Prerequisite: F.1/6 -- E4/P4e adaptation functions are present

Item	Coding and regeneration of P4e signal	Reference	Status	Support
1	The function provides CMI encoding of the E4 signal.	9.3.3	m	
2	The function regenerates the received signal and recovers bit timing from it and CMI decodes the incoming electrical 139 264 kbit/s E4 signal.	9.3.4	m	
3	The bit rate at the output port in free-running mode is 139 264 kbit/s \pm 15 ppm.	G.703, subclause 9.1	m	
4	The bit rate accepted at the input port 139 264 kbit/s \pm 15 ppm.	G.703, subclause 9.1	m	
5	The signal accepted at the input port is as defined for output port but modified by the characteristics of the interconnecting coaxial pair (the attenuation follows a \sqrt{f} law and the loss at 70 MHz is in the range 0 to 12 dB).	G.703, subclause 9.3	m	
6	The port operates without any error when any combination of the following conditions apply to the input signal: <ul style="list-style-type: none"> an input electrical signal amplitude with any value specified by ETS 300 166 jitter modulation applied to the input signal with any value defined in figure 3/G.823 and in table 2/G.823. input bit rate in the range 139 264 kbit/s \pm 15 ppm 	G.703, subclause 9.3	m	
7	The E4/P4e_A_So function does not add any jitter. The output jitter is the combination of the jitter generated and transferred via the client layer	9.3.4, G.823, subclause 3.1.1, Table 2/G.823, Figure 3/G.823	m	
8	AIS is an all ONE signal .	9.3.4	m	
9	AIS generated by the E4/P4e_A_Sk function replaces the regular signal when a defect is detected.	9.3.3	m	

Table F.8: E4/P4e frame alignment process

Prerequisite: F.1/6 -- E4/P4e adaptation functions are present

Item	E4/P4e frame alignment process	Reference	Status	Support
1	The frame alignment signal is inserted into the frame overhead bits 1 to 12	9.3.3, Table 2/G.751	m	
2	The FAS is coded as 1111 1010 0000	9.3.3, Table 2/G.751	m	
3	The frame alignment device should decide that the alignment has been recovered when it detects the presence of three consecutive frame alignment signals	9.3.4, G.751 subclause 1.5.3	m	
4	Loss Of frame alignment should be assumed to have taken place when four consecutive frame alignment signals have been incorrectly received in their predicted positions.	9.3.4, G.751 subclause 1.5.3	m	
5	On detection of a single correct FAS a new search for FAS is started when the absence of the FAS in one of the two following frames is detected	9.3.4, G.751 subclause 1.5.3	m	

Table F.9: Activation and deactivation of E4/P4e adaptation function

Prerequisite: F.1/6 -- E4/P4e adaptation functions are present

Item	Activation and deactivation	Reference	Status	Support
1	The E4/P4e_A_So source function accesses the access point when it is activated (MI_Active is true); otherwise not.	9.3.3	m	
2	The E4/P4e_A_Sk function can be activated and deactivated	9.3.4	c901	
3	The E4/P4e_A_Sk function performs the operation as specified when it is activated (MI_Active is true). Otherwise, it transmits the all-ONEs signal at its output (CI_D) and does not report its status via the management point.	9.3.4	m	

c901:IF

(F.1/5 AND F.1/7) OR (F.1/5 AND F.1/9) OR (F.1/7 AND F.1/9) OR (F.1/5 AND F.1/7 AND F.1/9)
 THEN m
 ELSE o

NOTE: Activation/deactivation is needed when two or more different types of adaptation functions are present

F.5.6 E4 to P4s adaptation functions, E4/P4s_A_So and E4/P4s_A_Sk**Table F.10: Coding and regeneration of P4s signal**

Prerequisite: F.1/8 -- E4/P4s adaptation functions are present

Item	Coding and regeneration of P4s signal	Reference	Status	Support
1	The function provides CMI encoding of the E4 signal.	9.3.5	m	
2	The function regenerates the received signal and recovers bit timing from it and CMI decodes the incoming electrical 139 264 kbit/s E4 signal.	9.3.6	m	
3	The bit rate at the output port in free-running mode is 139 264 kbit/s \pm 15 ppm.	G.703, subclause 9.1	m	
4	The bit rate accepted at the input port 139 264 kbit/s \pm 15 ppm.	G.703, subclause 9.1	m	
5	The signal accepted at the input port is as defined for output port but modified by the characteristics of the interconnecting coaxial pair (the attenuation follows a \sqrt{f} law and the loss at 70 MHz is in the range 0 to 12 dB).	G.703, subclause 9.3	m	
6	The port operates without any error when any combination of the following conditions apply to the input signal: <ul style="list-style-type: none"> – an input electrical signal amplitude with any value specified by ETS 300 166 – jitter modulation applied to the input signal with any value defined in figure 3/G.823 and in table 2/G.823. – input bit rate in the range 139 264 kbit/s \pm 15 ppm 	9.3.2 G.823 subclause 3.1.1 Table 2/G.823 Figure 3/G.823	m	
7	The E4/P4s_A_So function does not add any jitter. The output jitter is the combination of the jitter generated and transferred via the client layer	9.3.5	m	
8	AIS is an all ONE signal .	9.3.6	m	
9	AIS generated by the E4/P4s_A_Sk function replaces the regular signal when a defect is detected.	9.3.6	m	

Table F.11: E4/P4s frame alignment process

Prerequisite: F.1/8 -- E4/P4s adaptation functions are present

Item	E4/P4s frame alignment process	Reference	Status	Support
1	The Frame Alignment signal is allocated to the FA1 and FA2 octets.	ETS 300 337 subclause 6.1.2	m	
2	The FAS is coded as: 11110110 00101000	ETS 300 337 subclause 6.1.2	m	
3	The frame alignment is found by searching for the A1, A2 bytes contained in the 140 Mbit/s signal.	9.3.6	m	
4	The frame signal is continuously checked with the presumed frame start position for alignment.	9.3.6	m	
5	Frame alignment is deemed to have been lost when either: – four consecutive FAS are detected in error or – 986 or more frames with one or more BIP8 violations are detected in a block of 1 000 frames	9.3.6	m	
6	Frame alignment is deemed to have been recovered, when three consecutive non-errored FAS are found.	9.3.6	m	

Table F.12: Activation and deactivation of E4/P4s adaptation function

Prerequisite: F.1/8 -- E4/P4s adaptation functions are present

Item	Activation and deactivation	Reference	Status	Support
1	The E4/P4s_A_Sk function accesses the access point when it is activated (MI_Active is true), otherwise not.	9.3.5	m	
2	The E4/P4s_A_Sk function can be activated and deactivated	9.3.6	c1201	
3	The E4/P4s_A_Sk function performs the operation as specified when it is activated (MI_Active is true). Otherwise, it transmits the all-ONEs signal at its output (CI_D) and does not report its status via the management point.	9.3.6	m	

c1201:IF
 (F.1/5 AND F.1/7) OR (F.1/5 AND F.1/9) OR (F.1/7 AND F.1/9) OR (F.1/5 AND F.1/7 AND F.1/9)
 THEN m
 ELSE o

NOTE: Activation/deactivation is needed when two or more different types of adaptation functions are present

F.6 Defect, fault and performance management

F.6.1 Port status management

Table F.13: E4 port status mode process

Item	E4 port status mode process	Reference	Status	Support
1	The port status mode supports "not monitored" (NMON) status	ETS 300 417-1-1 subclause 8.5	m	
2	The port status mode supports "monitored" (MON) status	ETS 300 417-1-1 subclause 8.5	m	
3	The port status mode supports "automatic" (AUTO) status	ETS 300 417-1-1 subclause 8.5	o	

F.6.2 Defect detection and clearance criteria

Table F.14: E4 Loss Of Signal defect (dLOS)

Item	E4 Loss Of Signal defect (dLOS)	Reference	Status	Support
1	Loss of signal is detected when received amplitudes are less or equal to the level Q, as specified in ETS 300 417-1-1, subclause 8.2.1.6, for a period from 10 to 255 UI	ETS 300 417-1-1 subclause 8.2.1.6	m	
2	Loss of signal is cleared when received amplitudes are greater or equal to the level P, as specified in ETS 300 417-1-1, subclause 8.2.1.6, for a period from 10 to 255 UI	ETS 300 417-1-1 subclause 8.2.1.6	m	
3	Loss of signal is not detected when the received amplitude is between the minimum acceptable amplitude and the level P, as specified in ETS 300 417-1-1, subclause 8.2.1.6.	ETS 300 417-1-1 subclause 8.2.1.6	m	

Table F.15: E4 Loss Of Frame defect (dLOF)

Prerequisite: F.1/6 OR F.1/8 -- E4/P4e or E4/P4s adaptation functions are present

Item	E4 Loss Of Frame defect (dLOF)	Reference	Status	Support
1	Loss Of Frame defect (dLOF) is detected if the frame alignment is deemed to be lost.	9.3.4, 9.3.6	m	
2	The dLOF defect is cleared when the frame alignment is deemed to have been recovered.	9.3.4, 9.3.6	m	

Table F.16: E4 AIS defect

Item	E4 AIS defect	Reference	Status	Support
1	An AIS defect is detected when the received signal has 5 or less ZEROS in each of two consecutive 2 928 bit periods.	9.3.4, ETS 300 417-1-1 subclause 8.2.1.7	c1601	
2	An AIS defect is cleared if each of two consecutive 2 928 bit periods contains 6 or more ZEROS.	9.3.4, ETS 300 417-1-1 subclause 8.2.1.7	c1601	
3	An AIS defect is detected when the received signal has 7 or less ZEROS in each of two consecutive 17 408 bit periods.	9.3.6, ETS 300 417-1-1 subclause 8.2.1.7	c1602	
4	An AIS defect is cleared if each of two consecutive 17 408 bit periods contains 8 or more ZEROS.	9.3.6, ETS 300 417-1-1 subclause 8.2.1.7	c1602	

c1601: IF F.1/7 THEN m ELSE x

c1602: IF F.1/9 THEN m ELSE x

F.6.3 Consequent action activation and clearance criteria

Table F.17: E4 Trail Signal Fail action (aTSF)

Item	E4 Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The aTSF signal is activated on detection of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	
2	The aTSF signal is deactivated on clearance of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	

Table F.18: E4 Server Signal Fail action (aSSF)

Item	E4 Server Signal Fail action (aSSF)	Reference	Status	Support
1	The aSSF is activated on detection of a dLOF defect.	ETS 300 417-1-1 subclause 8.2.2.4	m	
2	The aSSF is activated on detection of a dAIS	ETS 300 417-1-1 subclause 8.2.2.4	m	
3	The aSSF is activated on detection of a aTSF	ETS 300 417-1-1 subclause 8.2.2.4	m	
4	The aSSF signal is deactivated when the defect(s) which caused the aSSF generation is(are) no longer active and there are no other defects active.	ETS 300 417-1-1 subclause 8.2.2.4	m	

Table F.19: Alarm Indication Signal action (aAIS)

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
1	AIS is applied to the output data within 2 frames (250 μ s) after aTSF detection is adapted (AI_TSF)	9.3.2, 9.3.4, 9.3.6	m	
2	AIS is removed upon termination of the aTSF condition within 2 frames (250 μ s).	9.3.2, 9.3.4, 9.3.6	m	
3	AIS is applied to the output data within 2 frames (250 μ s) after dLOF detection-	9.3.2, 9.3.4, 9.3.6	m	
4	AIS is removed upon termination of the dLOF condition within 2 frames (250 μ s).	9.3.2, 9.3.4, 9.3.6	m	
5	AIS is applied to the output data within 2 frames (250 μ s) after dAIS detection	9.3.4, 9.3.6	c1901	
6	AIS is removed upon termination of the dAIS condition within 2 frames (250 μ s).	9.3.4, 9.3.6	c1901	

c1901: IF F.1/7 OR F.1/9 THEN m ELSE x

F.6.4 Fault management**Table F.20: Failure reports**

Item	Failure reports	Reference	Status	Support
1	The fLOS failure is declared when dLOS defect persists continuously for X seconds and the port is the monitoring state (MON).	ETS 300 417-1-1 subclauses 8.3.1, 8.2.1.6, 4.2.2	m	
2	The fLOS failure is cleared if dLOS defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	
3	The dLOF defect detection generates a fLOF failure report when the dLOS has not been detected	ETS 300 417-1-1 subclause 8.2.3	c2001	

c2001: IF F.1/7 OR F.1/9 THEN m ELSE x

Table F.21: Programmability of fault management parameters

Item	Programmability of fault management parameters	Reference	Status	Support
1	Programmability of fault declaration time (X parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
2	Programmability of fault clearance time (Y parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
3	Logarithmic values for steps of X and Y values (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
4	The fLOF failure is cleared if dLOF defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	

Tabel F.22: Fault management parameters value

Item	Fault management parameters value	Reference	Status	Support	Values	
					Allowed	Supported
1	Time for fault declaration (X parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		2.5 ± 0,5 s	
2	Time for fault declaration (X parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		≥ 100 ms	
3	Time for fault declaration (X parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		≤ 30 s	
4	Time for fault clearance (Y parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		10 ± 0,5 s	
5	Time for fault clearance (Y parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		≥ 100 ms	
6	Time for fault clearance (Y parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		≤ 30 s	
7	Logarithmic step for X and/or Y value (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m		—	

Annex G (normative): ICS proforma for E31 electrical section layer

Notwithstanding the provisions of the copyright clause related to the text of this ETS ETSI grants that users of this ETS may freely reproduce the ICS proforma in this annex so that it can be used for its intended purposes and may further publish the completed ICS.

G.1 Identification of the implementation

In this document, an IUT, and of course the identification of an IUT refers to an E31 layer instance implemented inside the SUT.

Identification of the IUT and the 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.

G.1.1 Date of the statement

.....

G.1.2 Implementation Under Test (IUT) identification

IUT name:

.....
.....

IUT version

Hardware version:

.....

Software version:

.....

Firmware version:

.....

G.1.3 System Under Test (SUT) identification

SUT name:

.....
.....

Hardware configuration:

.....

SUT Software version:

.....

SUT Firmware version:

.....

Operating system:

.....

G.1.4 Product supplier

Name:

.....

Address:

.....
.....
.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....
.....
.....

G.1.5 Client

Name:

.....

Address:

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.....

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Telephone number:

.....

Facsimile number:

.....

E-mail address:

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Additional information:

.....

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.....

G.1.6 ICS contact person

Name:

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

G.2 Identification of the ETS

This ICS proforma applies to the following standard:

ETS 300 417-2-1 [2]: "Transmission and Multiplexing (TM); Generic functional requirements for SDH equipment: Physical section layer functions".

G.3 Global statement of conformance of E31 layer

Are all mandatory capabilities implemented? (Yes/No)

NOTE: Answering "No" to this question indicates non-conformance to the ETS specification. Non-supported mandatory capabilities are to be identified in the ICS, with an explanation of why the implementation is non-conforming, on pages attached to the ICS proforma.

Answering "Yes" to this question indicates only that all the capabilities with the explicit status "m" are supported. It is not necessary to fill in the support column of the associated item.

G.4 E31 electrical section layer function

Table G.1: E31 electrical section layer function

Item	E31 electrical section layer function	Reference	Status	Support
1	The E31 Section Layer supports an E31 Connection function	11.1	o	
2	The E31 Section Layer contains an E31 Trail Termination Source function (E31_TT_So)	11.2.1	m	
3	The E31 Section Layer contains an E31 Trail Termination Sink function (E31_TT_Sk)	11.2.2	m	
4	The E31 Section Layer contains an E31 Section to P31x Adaptation Source function (E31/P31x_A_So)	11.3.1	o.1	
5	The E31 Section Layer contains an E31 Section to P31x Adaptation Sink function (E31/P31x_A_Sk)	11.3.2	c101	
6	The E31 Section Layer contains an E31 Section to P31e Adaptation Source function (E31/P31e_A_So)	11.3.3	o.1	
7	The E31 Section Layer contains an E31 Section to P31e Adaptation Sink function (E31/P31e_A_Sk)	11.3.4	c102	
8	The E31 Section Layer contains an E31 Section to P31s Adaptation Source function (E31/P31s_A_So)	11.3.5	o.1	
9	The E31 Section Layer contains an E31 Section to P31s Adaptation Sink function (E31/P31s_A_Sk)	11.3.6	c103	

c101: IF G1/4 THEN m ELSE x

c102: IF G1/6 THEN m ELSE x

c103: IF G1/8 THEN m ELSE x

o.1: It is mandatory to support one or more of these functions

G.5 E31 electrical section layer transmission tables

G.5.1 E31 data stream

Table G.2: E31 signal

Item	E31 signal	Reference	Status	Support
1	The E31_CI of the intra-station layer CP is an electrical, digital signal of defined amplitude and pulse shape	11	m	

G.5.2 E31 electrical section connection function, E31_C

Table G.3: E31 connection functionalities

Item	E31 connection functionalities	Reference	Status	Support
1	no requirement	11.1	n/a	

G.5.3 E31 electrical section trail termination functions, E31_TT_So and E31_TT_Sk

Table G.4: Electrical characteristics

Item	Electrical characteristics	Reference	Status	Support
1	The pulse shape characteristics - including nominal peak voltages, nominal pulse width, ratio of amplitudes at the nominal center width, ratio of widths at the nominal center amplitude - is specified in the form of a mask. The pulse shape is compliant to the mask in figure 17/G.703 and to the relevant values in table 8/G.703.	Figure 17/G.703 Table 8/G.703	m	
2	The impedance at the output port is resistive and equal to 75 ohms.	Table 8/G.703	m	
3	The return loss against 75 ohms of the output port is greater than or equal to the minimum values	ETS 300 166 subclause 5.3	m	
4	One coaxial pair in each direction is used.	Table 8/G.703	m	
5	The outer conductor of the output port is connected to signal ground.	ETS 300 166 table 1/8	m	
6	The outer conductor of the input port is connected to signal ground.	ETS 300 166 table 1/8	m	
7	The impedance at the input port is resistive and equal to 75 ohms.	Table 8/G.703	m	
8	The return loss against 75 ohms of the input port is greater than or equal to the minimum values	G.703, subclause 8.3.3	m	

G.5.4 E31 to P31x adaptation functions, E31/P31x_A_So and E31/P31x_A_Sk**Table G.5: Coding and regeneration of P31x signal**

Prerequisite: G.1/4 -- E31/P31x adaptation functions are present

Item	Coding and regeneration of P31x signal	Reference	Status	Support
1	The E31/P31x_A_So function provides HDB3 encoding of the 34 368 kbit/s signal.	11.3.1	m	
2	The E31/P31x_A_Sk function regenerates the received signal and recovers bit timing from it and HDB3 decodes the incoming electrical 34 368 kbit/s E31 signal.	11.3.2	m	
3	The bit rate at the output port in free-running mode is 34 368 kbit/s \pm 20 ppm.	G.703, subclause 8.1	m	
4	The bit rate accepted at the input port is 34 368 kbit/s \pm 20 ppm.	G.703, subclause 8.1	m	
5	The signal accepted at the input port is as defined for output port but modified by the characteristics of the interconnecting coaxial pair (the attenuation follows a \sqrt{f} law and the loss at 17 184 kHz is in the range 0 to 12 dB).	G.703, subclause 8.3.1	m	
6	Immunity against signal reflection guarantees a no-error condition with a signal-to-interference ratio of 20 dB.	G.703, subclause 8.3.4	m	
7	The port operates without any error when any combination of the following conditions apply to the input signal: <ul style="list-style-type: none"> an input electrical signal amplitude with any value specified by ETS 300 166 jitter modulation applied to the input signal with any value defined in figure 3/G.823 and in table 2/G.823. input bit rate in the range 34 368 kbit/s \pm 20 ppm 	11.3.2, G.823, subclause 3.1.1 Table 2/G.823 Figure 3/G.823	m	
8	The E31/P31x_A_So function does not add any jitter. The output jitter is the combination of the jitter generated and transferred via the client layer	11.3.1	m	
9	AIS is an all ONE signal .	11.3.2	m	
10	AIS generated by the E31/P31x_A_Sk function replaces the regular signal when a defect is detected.	11.3.2	m	

Table G.6: Activation and deactivation of E31/P31x adaptation function

Prerequisite: G.1/4 -- E31/P31x adaptation functions are present

Item	Activation and deactivation	Reference	Status	Support
1	The E31/P31x_A_So function source accesses the access point when it is activated (MI_Active is true); otherwise not.	11.3.1	m	
2	The E31/P31x_A_Sk function can be activated and deactivated	11.3.2	c701	
3	The adaptation sink function performs the operation as specified when it is activated (MI_Active is true). Otherwise, it transmits the all-ONES signal at its output (CI_D) and does not report its status via the management point.	11.3.2	m	

c701:IF (G.1/5 AND G.1/7) OR (G.1/5 AND G.1/9) OR (G.1/7 AND G.1/9) OR (G.1/5 AND G.1/7 AND G.1/9)
THEN m
ELSE o

NOTE: Activation/deactivation is needed when two or more different types of adaptation functions are present

G.5.5 E31to P31e adaptation functions, E31/P31e_A_So and E31/P31e_A_Sk

Table G.7: Coding and regeneration of P31e signal

Prerequisite: G.1/6 -- E31/P31e adaptation functions are present

Item	Coding and regeneration of P31e signal	Reference	Status	Support
1	The E31/P31e_A_So function provides HDB3 encoding of the 34 368 kbit/s signal.	11.3.3	m	
2	The E31/P31e_A_Sk function regenerates the received signal, recovers bit timing and frame start reference from it and HDB3 decodes the incoming electrical 34 368 kbit/s E31 signal.	11.3.4	m	
3	The bit rate at the output port in free-running mode is 34 368 kbit/s \pm 20 ppm.	G.703, subclause 8.1	m	
4	The bit rate accepted at the input port is 34 368 kbit/s \pm 20 ppm.	G.703, subclause 8.1	m	
5	The signal accepted at the input port is as defined for output port but modified by the characteristics of the interconnecting coaxial pair (the attenuation follows a \sqrt{f} law and the loss at 17 184 kHz is in the range 0 to 12 dB).	G.703, subclause 8.3.1	m	
6	Immunity against signal reflection guarantees a no-error condition with a signal-to-interference ratio of 20 dB.	G.703, subclause 8.3.4	m	
7	The port operates without any error when any combination of the following conditions apply to the input signal: <ul style="list-style-type: none"> an input electrical signal amplitude with any value specified by ETS 300 166 jitter modulation applied to the input signal with any value defined in figure 3/G.823 and in table 2/G.823. input bit rate in the range 34 368 kbit/s \pm 20 ppm 	11.3.4, G.823, subclause 3.1.1, Table 2/G.823, Figure 3/G.823	m	
8	The E31/P31e_A_So function does not add any jitter. The output jitter is the combination of the jitter generated and transferred via the client layer	11.3.1	m	
9	AIS is an all ONE signal .	11.3.2	m	
10	AIS generated by the E31/P31e_A_Sk function replaces the regular signal when a defect is detected.	11.3.2	m	

Table G.8: E31/P31e frame alignment process

Prerequisite: G.1/6 -- E31/P31e adaptation functions are present

Item	E31/P31e frame alignment process	Reference	Status	Support
1	The frame alignment signal is inserted into the frame overhead bits 1 to 10	11.3.3, Table 1/G.751	m	
2	The FAS is coded as 1111 0100 00	11.3.3, Table 1/G.751	m	
3	The frame alignment device should decide that the alignment has been recovered when it detects the presence of three consecutive frame alignment signals	11.3.4, G.751 1.4.3	m	
4	Loss of frame alignment should be assumed to have taken place when four consecutive frame alignment signals have been incorrectly received in their predicted positions.	11.3.4, G.751 1.4.3	m	
5	The frame alignment device having detected the appearance of a single correct frame alignment signal should begin 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.	11.3.4, G.751 1.4.3	m	

Table G.9: Activation and deactivation of E31/P31e adaptation function

Prerequisite: G.1/6 -- E31/P31e adaptation functions are present

Item	Activation and deactivation	Reference	Status	Support
1	The E31/P31e_A_So source function accesses the access point when it is activated (MI_Active is true); otherwise not.	11.3.3	m	
2	The E31/P31e_A_Sk function can be activated and deactivated	11.3.4	c901	
3	The E31/P31e_A_Sk function performs the operation as specified when it is activated (MI_Active is true). Otherwise, it transmits the all-ONEs signal at its output (CI_D) and does not report its status via the management point.	11.3.4	m	

c901:IF

(G.1/5 AND G.1/7) OR (G.1/5 AND G.1/9) OR (G.1/7 AND G.1/9) OR (G.1/5 AND G.1/7 AND G.1/9)
 THEN m
 ELSE o

NOTE: Activation/deactivation is needed when two or more different types of adaptation functions are present

G.5.6 E31 to P31s adaptation functions, E31/P31s_A_So and E31/P31s_A_Sk**Table G.10: Coding and regeneration of P31s signal**

Prerequisite: G.1/8 -- E31/P31s adaptation functions are present

Item	Coding and regeneration of P31s signal	Reference	Status	Support
1	The E31/P31s_A_So function provides HDB3 encoding of the 34 368 kbit/s signal.	11.3.5	m	
2	The E31/P31s_A_Sk function regenerates the received signal, recovers bit timing, HDB3 decodes the incoming electrical 34 368 kbit/s E31 signal and recovers frame start reference.	11.3.6	m	
3	The bit rate at the output port in free-running mode is 34 368 kbit/s \pm 20 ppm.	G.703 suclause 8.1	m	
4	The bit rate accepted at the input port is 34 368 kbit/s \pm 20 ppm.	G.703 suclause 8.1	m	
5	The signal accepted at the input port is as defined for output port but modified by the characteristics of the interconnecting coaxial pair (the attenuation follows a \sqrt{f} law and the loss at 17 184 kHz is in the range 0 to 12 dB).	G.703 suclause 8.3.1	m	
6	Immunity against signal reflection guarantees a no-error condition with a signal-to-interference ratio of 20 dB.	G.703 suclause 8.3.4	m	
7	The port operates without any error when any combination of the following conditions apply to the input signal: <ul style="list-style-type: none"> – an input electrical signal amplitude with any value specified by ETS 300 166 – jitter modulation applied to the input signal with any value defined in figure 3/G.823 and in table 2/G.823. – input bit rate in the range 34 368 kbit/s \pm 20 ppm 	G.823 suclause 3.1.1 Table 2/G.823 Figure 3/G.823 11.3.2	m	
8	The E31/P31s_A_So function does not add any jitter. The output jitter is the combination of the jitter generated and transferred via the client layer	11.3.1	m	
9	AIS is an all ONE signal .	11.3.2	m	
10	AIS generated by the E31/P31s_A_Sk function replaces the regular signal when a defect is detected.	11.3.2	m	

Table G.11: E31/P31s frame alignment process

Prerequisite: G.1/8 -- E31/P31s adaptation functions are present

Item	E31/P31s frame alignment process	Reference	Status	Support
1	The Frame Alignment signal is allocated to the FA1 and FA2 octets.	ETS 300 337 subclause 5.1.2	m	
2	The FAS is coded as: 11110110 00101000	ETS 300 337 subclause 5.1.2	m	
3	The frame alignment is found by searching for the A1, A2 bytes contained in the 34 Mbit/s signal.	11.3.6	m	
4	The frame signal is continuously checked with the presumed frame start position for alignment.	11.3.6	m	
5	Frame alignment is deemed to have been lost when either: – four consecutive FAS are detected in error or – 986 or more frames with one or more BIP8 violations are detected in a block of 1 000 frames	11.3.6	m	
6	Frame alignment is deemed to have been recovered, when three consecutive non-errored FAS are found.	11.3.6	m	

Table G.12: Activation and deactivation of E31/P31s adaptation function

Prerequisite: G.1/8 -- E31/P31s adaptation functions are present

Item	Activation and deactivation	Reference	Status	Support
1	The E31/P31s_A_Sk function accesses the access point when it is activated (MI_Active is true), otherwise not.	11.3.5	m	
2	The E31/P31s_A_Sk function can be activated and deactivated	11.3.6	c1201	
3	The E31/P31s_A_Sk function performs the operation as specified when it is activated (MI_Active is true). Otherwise, it transmits the all-ONES signal at its output (CI_D) and does not report its status via the management point.	11.3.6	m	

c1201:IF
 (G.1/5 AND G.1/7) OR (G.1/5 AND G.1/9) OR (G.1/7 AND G.1/9) OR (G.1/5 AND G.1/7 AND G.1/9)
 THEN m
 ELSE o

NOTE: Activation/deactivation is needed when two or more different types of adaptation functions are present

G.6 Defect, fault and performance management

G.6.1 Port status management

Table G.13: E31 port status mode process

Item	E 31 port status mode process	Reference	Status	Support
1	The port status mode supports "not monitored" (NMON) status	ETS 300 417-1-1 subclause 8.5	m	
2	The port status mode supports "monitored" (MON) status	ETS 300 417-1-1 subclause 8.5	m	
3	The port status mode supports "automatic" (AUTO) status	ETS 300 417-1-1 subclause 8.5	o	

G.6.2 Defect detection and clearance criteria**Table G.14: E31 Loss Of Signal defect (dLOS)**

Item	E31 Loss Of Signal defect (dLOS)	Reference	Status	Support
1	Loss of signal is detected when received amplitudes are less than or equal to the level Q, as specified in ETS 300 417-1-1, subclause 8.2.1.6, for a period from 10 to 255 UI	ETS 300 417-1-1 subclause 8.2.1.6	m	
2	Loss of signal is cleared when received amplitudes are greater than or equal to the level P, as specified in ETS 300 417-1-1, subclause 8.2.1.6, for a period from 10 to 255 UI	ETS 300 417-1-1 subclause 8.2.1.6	m	
3	Loss of signal is not detected when the received amplitude is between the minimum acceptable amplitude and the level P, as specified in ETS 300 417-1-1, subclause 8.2.1.6.	ETS 300 417-1-1 subclause 8.2.1.6	m	

Table G.15: E31 Loss Of Frame defect (dLOF)

Prerequisite: G.1/6 OR G.1/8 -- E31/P31e or E31/P31s adaptation functions are present

Item	E31 Loss Of Frame defect (dLOF)	Reference	Status	Support
1	Loss Of Frame defect (dLOF) is detected if the frame alignment is deemed to be lost.	11.3.4, 11.3.6	m	
2	The dLOF defect is cleared when the frame alignment is deemed to have been recovered.	11.3.4, 11.3.6	m	

Table G.16: E31 AIS defect

Item	E31 AIS defect	Reference	Status	Support
1	An AIS defect is detected when the received signal has 4 or less ZEROS in each of two consecutive 1 536 bit periods.	11.3.4, ETS 300 417-1-1 subclause 8.2.1.7	c1501	
2	An AIS defect is cleared if each of two consecutive 1 536 bit periods contains 5 or more ZEROS.	11.3.4, ETS 300 417-1-1 subclause 8.2.1.7	c1501	
3	An AIS defect is detected when the received signal has 7 or less ZEROS in each of two consecutive 4 296 bit periods.	11.3.6, ETS 300 417-1-1 subclause 8.2.1.7	c1502	
4	An AIS defect is cleared if each of two consecutive 4 296 bit periods contains 8 or more ZEROS.	11.3.6, ETS 300 417-1-1 subclause 8.2.1.7	c1502	

C1501: IF G.1/7 THEN m ELSE n/a

C1502: IF G.1/9 THEN m ELSE n/a

G.6.3 Consequent action activation and clearance criteria**Table G.17: E31 Trail Signal Fail action (aTSF)**

Item	E31 Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The aTSF signal is activated on detection of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	
2	The aTSF signal is deactivated on clearance of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	

Table G.18: E 31 Server Signal Fail action (aSSF)

Item	E 31 Server Signal Fail action (aSSF)	Reference	Status	Support
1	The aSSF is activated on detection of a dLOF defect.	ETS 300 417-1-1 subclause 8.2.2.4	m	
2	The aSSF is activated on detection of a dAIS	ETS 300 417-1-1 subclause 8.2.2.4	m	
3	The aSSF is activated on detection of an aTSF	ETS 300 417-1-1 subclause 8.2.2.4	m	
4	The aSSF signal is deactivated when the defect(s) which caused the aSSF generation is(are) no longer active and there are no other defects active.	ETS 300 417-1-1 subclause 8.2.2.4	m	

Table G.19: Alarm Indication Signal action (aAIS)

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
1	AIS is applied to the output data within 2 frames (250 μ s) after aTSF detection is adapted (AI_TSF)	11.3.2, 11.3.4, 11.3.6	m	
2	AIS is removed upon termination of the aTSF condition within 2 frames (250 μ s).	11.3.2, 11.3.4, 11.3.6	m	
3	AIS is applied to the output data within 2 frames (250 μ s) after dLOF detection-	11.3.2, 11.3.4, 11.3.6	m	
4	AIS is removed upon termination of the dLOF condition within 2 frames (250 μ s).	11.3.2, 11.3.4, 11.3.6	m	
5	AIS is applied to the output data within 2 frames (250 μ s) after dAIS detection	11.3.4, 11.3.6	c1801	
6	AIS is removed upon termination of the dAIS condition within 2 frames (250 μ s).	11.3.4, 11.3.6	c1801	

c1801: IF G.1/7 OR G.1/9 THEN m ELSE n/a

G.6.4 Fault management**Table G.20: Failure reports**

Item	Failure reports	Reference	Status	Support
1	The fLOS failure is declared when dLOS defect persists continuously for X seconds and the port is the monitoring state (MON).	ETS 300 417-1-1 subclauses 8.2.1.6, 8.3.1, 4.2.2	m	
2	The fLOS failure is cleared if dLOS defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	
3	The dLOF defect detection generates a fLOF failure report when the dLOS has not been detected	ETS 300 417-1-1 subclause 8.2.3	c1901	

c1901: IF G.1/7 OR G.1/9 THEN m ELSE n/a

Table G.21: Programmability of fault management parameters

Item	Programmability of fault management parameters	Reference	Status	Support
1	Programmability of fault declaration time (X parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
2	Programmability of fault clearance time (Y parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
3	Logarithmic values for steps of X and Y values (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
4	The fLOF failure is cleared if dLOF defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	

Tabel G.22: Fault management parameters value

Item	Fault management parameters value	Reference	Status	Support	Values	
					Allowed	Supported
1	Time for fault declaration (X parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		2.5 ± 0,5 s	
2	Time for fault declaration (X parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		≥ 100 ms	
3	Time for fault declaration (X parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		≤ 30 s	
4	Time for fault clearance (Y parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		10 ± 0,5 s	
5	Time for fault clearance (Y parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		≥ 100 ms	
6	Time for fault clearance (Y parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		≤ 30 s	
7	Logarithmic step for X and/or Y value (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m		—	

Annex H (normative): ICS proforma for E22 electrical section layer

Notwithstanding the provisions of the copyright clause related to the text of this ETS ETSI grants that users of this ETS may freely reproduce the ICS proforma in this annex so that it can be used for its intended purposes and may further publish the completed ICS.

H.1 Identification of the implementation

In this document, an IUT, and of course the identification of an IUT refers to an E22 layer instance implemented inside the SUT.

Identification of the IUT and the 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.

H.1.1 Date of the statement

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H.1.2 Implementation Under Test (IUT) identification

IUT name:

.....
.....

IUT version

Hardware version:

.....

Software version:

.....

Firmware version:

.....

H.1.3 System Under Test (SUT) identification

SUT name:

.....
.....

Hardware configuration:

.....

SUT Software version:

.....

SUT Firmware version:

.....

Operating system:

.....

H.1.4 Product supplier

Name:

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Address:

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Telephone number:

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Facsimile number:

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E-mail address:

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Additional information:

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H.1.5 Client

Name:

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Address:

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Telephone number:

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Facsimile number:

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E-mail address:

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Additional information:

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H.1.6 ICS contact person

Name:

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Telephone number:

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Facsimile number:

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E-mail address:

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Additional information:

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H.2 Identification of the ETS

This ICS proforma applies to the following standard:

ETS 300 417-2-1 [2]: "Transmission and Multiplexing (TM); Generic functional requirements for SDH equipment: Physical section layer functions".

H.3 Global statement of conformance of E22 layer

Are all mandatory capabilities implemented? (Yes/No)

NOTE: Answering "No" to this question indicates non-conformance to the ETS specification. Non-supported mandatory capabilities are to be identified in the ICS, with an explanation of why the implementation is non-conforming, on pages attached to the ICS proforma.

Answering "Yes" to this question indicates only that all the capabilities with the explicit status "m" are supported. It is not necessary to fill in the support column of the associated item.

H.4 E22 electrical section layer function

Table H.1: E22 electrical section layer function

Item	E22 electrical section layer function	Reference	Status	Support
1	The E22 Section Layer supports a E22 Connection function	12.1	o	
2	The E22 Section Layer contains an E22 Trail Termination Source function (E22_TT_So)	12.2.1	m	
3	The E22 Section Layer contains an E22 Trail Termination Sink function (E22_TT_Sk)	12.2.2	m	
4	The E22 Section Layer contains an E22 Section to P22x Adaptation Source function (E22/P22x_A_So)	12.3.1	o.1	
5	The E22 Section Layer contains an E22 Section to P22x Adaptation Sink function (E22/P22x_A_Sk)	12.3.2	c101	
6	The E22 Section Layer contains an E22 Section to P22e Adaptation Source function (E22/P22e_A_So)	12.3.3	o.1	
7	The E22 Section Layer contains an E22 Section to P22e Adaptation Sink function (E22/P22e_A_Sk)	12.3.4	c102	

c101: IF H1/4 THEN m ELSE x

c102: IF H1/6 THEN m ELSE x

o.1: It is mandatory to support one or more of these functions

H.5 E22 Electrical section layer transmission tables

H.5.1 E22 data stream

Table H.2: E22 signal

Item	E22 signal	Reference	Status	Support
1	Is the E22_CI of the intra-station layer CP an electrical, digital signal of defined amplitude and pulse shape	12	m	

H.5.2 E22 electrical section connection function, E22_C

Table H.3: E22 connection functionalities

Item	E22 connection functionalities	Reference	Status	Support
1	no requirement	12.1	n/a	

H.5.3 E22 electrical section trail termination functions, E22_TT_So and E22_TT_Sk

Table H.4: Electrical characteristics

Item	Electrical characteristics	Reference	Status	Support
1	The pulse shape characteristics - including nominal peak voltages, nominal pulse width, ratio of amplitudes at the nominal center width, ratio of widths at the nominal center amplitude - is specified in the form of a mask. The pulse shape is compliant to the mask in figure 16/G.703 and to the relevant values in table 7/G.703.	Figure 16/G.703 Table 7/G.703	m	
2	The impedance at the output port is resistive and equal to 75 ohms.	Table 7/G.703	m	
3	The return loss against 75 ohms of the output port is greater than or equal to the minimum values	ETS 300 166 subclause 5.3	m	
4	One coaxial pair in each direction is used.	Table 7/G.703	m	
5	The outer conductor of the output port is connected to signal ground.	ETS 300 166 table 1/7	m	
6	The outer conductor of the input port is connected to signal ground.	ETS 300 166 table 1/7	m	
7	The impedance at the input port is resistive and equal to 75 ohms.	Table 7/G.703	m	
8	The return loss against 75 ohms of the input port is greater than or equal to the minimum values	G.703, subclause 7.3.3	m	

H.5.4 E22 to P22x adaptation functions, E22/P22x_A_So and E22/P22x_A_Sk

Table H.5: Coding and regeneration of P22x signal

Prerequisite: H.1/4 -- E22/P22x adaptation functions are present

Item	Coding and regeneration of P22x signal	Reference	Status	Support
1	The E22/P22x_A_So function provides HDB3 encoding of the 8 448 kbit/s signal.	12.3.1	m	
2	The E22/P22x_A_Sk function regenerates the received signal and recovers bit timing from it and HDB3 decodes the incoming electrical the 8 448 kbit/s E22 signal.	12.3.2	m	
3	The bit rate at the output port in free-running mode is 8 448 kbit/s \pm 20 ppm.	G.703, subclause 7.1	m	
4	The bit rate accepted at the input port is 8 448 kbit/s \pm 30 ppm.	G.703, subclause 7.1	m	
5	The signal accepted at the input port is as defined for output port but modified by the characteristics of the interconnecting coaxial pair (the attenuation follows a \sqrt{f} law and the loss at 4 224 kHz is in the range 0 to 6 dB).	G.703, subclause 7.3.1	m	
6	Immunity against signal reflection guarantees a no-error condition with a signal-to-interference ratio of 20 dB.	G.703, subclause 7.3.4	m	
7	The port operates without any error when any combination of the following conditions apply to the input signal: <ul style="list-style-type: none"> an input electrical signal amplitude with any value specified by ETS 300 166 jitter modulation applied to the input signal with any value defined in figure 3/G.823 and in table 2/G.823. input bit rate in the range 8 448 kbit/s \pm 30 ppm 	12.3.2 G.823, subclause 3.1.1 Table 2/G.823 Figure 3/G.823	m	
8	The E22/P22x_A_So function does not add any jitter. The output jitter is the combination of the jitter generated and transferred via the client layer	12.3.1	m	
9	AIS is an all ONE signal .	12.3.2	m	
10	AIS generated by the E22/P22x_A_Sk function replaces the regular signal when a defect is detected.	12.3.2	m	

Table H.6: Activation and deactivation of E22/P22x adaptation function

Prerequisite: H.1/4 -- E22/P22x adaptation functions are present

Item	Activation and deactivation	Reference	Status	Support
1	The E22/P22x_A_So function source accesses the access point when it is activated (MI_Active is true); otherwise not..	12.3.1	m	
2	The E22/P22x_A_Sk function can be activated and deactivated	12.3.2	c701	
3	The adaptation sink function performs the operation as specified when it is activated (MI_Active is true). Otherwise, it transmits the all-ONEs signal at its output (CI_D) and does not report its status via the management point.	12.3.2	m	

c701: IF (H.1/5 AND H.1/7) THEN m ELSE n/a

H.5.5 E22to P22e adaptation functions, E22/P22e_A_So and E22/P22e_A_Sk**Table H.7: Coding and regeneration of P22e signal**

Prerequisite: H.1/6 -- E22/P22e adaptation functions are present

Item	Coding and regeneration of P22e signal	Reference	Status	Support
1	The E22/P22e_A_So function provides HDB3 encoding of the 8 448 kbit/s signal.	12.3.3	m	
2	The E22/P22e_A_Sk function regenerates the received signal, recovers bit timing and frame start reference from it and HDB3 decodes the incoming electrical 8 448 bit/s E22 signal.	12.3.4	m	
3	The bit rate at the output port in free-running mode is 8 448 kbit/s \pm 30 ppm.	G.703, subclause 7.1	m	
4	The bit rate accepted at the input port is 8 448 kbit/s \pm 30 ppm.	G.703, subclause 7.1	m	
5	The signal accepted at the input port is as defined for output port but modified by the characteristics of the interconnecting coaxial pair (the attenuation follows a \sqrt{f} law and the loss at 4 224 kHz is in the range 0 to 6 dB).	G.703, subclause 7.3.1	m	
6	Immunity against signal reflection guarantees a no-error condition with a signal-to-interference ratio of 20 dB.	G.703, subclause 7.3.4	m	
7	The port operates without any error when any combination of the following conditions apply to the input signal: <ul style="list-style-type: none"> an input electrical signal amplitude with any value specified by ETS 300 166 jitter modulation applied to the input signal with any value defined in figure 3/G.823 and in table 2/G.823. input bit rate in the range 8 448 kbit/s \pm 30 ppm 	12.3.4, G.823, subclause 3.1.1, Table 2/G.823, Figure 3/G.823	m	
8	The E22/P22e_A_So function does not add any jitter. The output jitter is the combination of the jitter generated and transferred via the client layer	12.3.1	m	
9	AIS is an all ONE signal .	12.3.2	m	
10	AIS generated by the E22/P22e_A_Sk function replaces the regular signal when a defect is detected.	12.3.2	m	

Table H.8: E22/P22e frame alignment process

Prerequisite: H.1/6 -- E22/P22e adaptation functions are present

Item	E22/P22e frame alignment process	Reference	Status	Support
1	The frame alignment signal is inserted into the frame overhead bits 1 to 10	12.3.3, Table 1/G.742	m	
2	The FAS is coded as 1111 0100 00	12.3.3, Table 1/G.742	m	
3	The frame alignment device decides that the alignment has been recovered when it detects the presence of three consecutive frame alignment signals	12.3.4, G.742, clause 4	m	
4	Loss of frame alignment should be assumed to have taken place when four consecutive frame alignment signals have been incorrectly received in their predicted positions.	12.3.4, G.742, clause 4	m	
5	The frame alignment device having detected the appearance of a single correct frame alignment signal should begin 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.	12.3.4 G.742, clause 4	m	

Table H.9: Activation and deactivation of E22/P22e adaptation function

Prerequisite: H.1/6 -- E22/P22e adaptation functions are present

Item	Activation and deactivation	Reference	Status	Support
1	The E22/P22e_A_So source function accesses the access point when it is activated (MI_Active is true); otherwise not.	12.3.3	m	
2	The E22/P22e_A_Sk function can be activated and deactivated	12.3.4	c901	
3	The E22/P22e_A_Sk function performs the operation as specified when it is activated (MI_Active is true). Otherwise, it transmits the all-ONEs signal at its output (CI_D) and does not report its status via the management point.	12.3.4	m	

c901: IF (H.1/5 AND H.1/7) THEN m ELSE o

H.6 Defect, fault and performance management

H.6.1 Port status management

Table H.10: E22 port status mode process

Item	E22 port status mode process	Reference	Status	Support
1	The port status mode supports "not monitored" (NMON) status	ETS 300 417-1-1 subclause 8.5	m	
2	The port status mode supports "monitored" (MON) status	ETS 300 417-1-1 subclause 8.5	m	
3	The port status mode supports "automatic" (AUTO) status	ETS 300 417-1-1 subclause 8.5	o	

H.6.2 Defect detection and clearance criteria

Table H.11: E22 Loss Of Signal defect (dLOS)

Item	E22 Loss Of Signal defect (dLOS)	Reference	Status	Support
1	Loss of signal is detected when received amplitudes are less or equal the level Q for a period from 10 to 255 UI	ETS 300 417-1-1, subclause 8.2.1.6	m	
2	Loss of signal is cleared when received amplitudes are greater or equal the level P for a period from 10 to 255 UI	ETS 300 417-1-1, subclause 8.2.1.6	m	
3	Loss of signal is not detected when the received amplitude is between the minimum acceptable amplitude and the level P, as specified in ETS 300 417-1-1, subclause 8.2.1.6.	ETS 300 417-1-1, subclause 8.2.1.6	m	

Table H.12: E22 Loss Of Frame defect (dLOF)

Prerequisite: H.1/6 -- E22/P22e adaptation functions are present

Item	E22 Loss Of Frame defect (dLOF)	Reference	Status	Support
1	Loss Of Frame defect (dLOF) is detected if the frame alignment is deemed to be lost.	12.3.4	m	
2	The dLOF defect is cleared when the frame alignment is deemed to have been recovered.	12.3.4	m	

Table H.13: E22 AIS defect

Prerequisite: H.1/6 -- E22/P22e adaptation functions are present

Item	E22 AIS defect	Reference	Status	Support
1	An AIS defect is detected when the received signal has 4 or less ZEROs in each of two consecutive 848 bit periods.	12.3.4, ETS 300 417-1-1 subclause 8.2.1.7	m	
2	An AIS defect is cleared if each of two consecutive 848 bit periods contains 5 or more ZEROs.	12.3.4, ETS 300 417-1-1 subclause 8.2.1.7	m	

H.6.3 Consequent action activation and clearance criteria**Table H.14: E22 Trail Signal Fail action (aTSF)**

Item	E22 Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The aTSF signal is activated on detection of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	
2	The aTSF signal is deactivated on clearance of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	

Table H.15: E 22 Server Signal Fail action (aSSF)

Item	E22 Server Signal Fail action (aSSF)	Reference	Status	Support
1	The aSSF is activated on detection of a dLOF defect.	ETS 300 417-1-1 subclause 8.2.2.4	m	
2	The aSSF is activated on detection of a dAIS	ETS 300 417-1-1 subclause 8.2.2.4	m	
3	The aSSF is activated on detection of a aTSF	ETS 300 417-1-1 subclause 8.2.2.4	m	
4	The aSSF signal is deactivated when the defect(s) which caused the aSSF generation is(are) no longer active and there are no other defects active.	ETS 300 417-1-1 subclause 8.2.2.4	m	

Table H.18: Alarm Indication Signal action (aAIS)

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
1	AIS is applied to the output data within 2 frames (250 μ s) after aTSF detection is adapted (AI_TSF)	12.3.2, 12.3.4	m	
2	AIS is removed upon termination of the a TSF condition within 2 frames (250 μ s).	12.3.2, 12.3.4	m	
3	AIS is applied to the output data within 2 frames (250 μ s) after dLOF detection-	12.3.2, 12.3.4	m	
4	AIS is removed upon termination of the dLOF condition within 2 frames (250 μ s).	12.3.2, 12.3.4	m	
5	AIS is applied to the output data within 2 frames (250 μ s) after dAIS detection	12.3.4	c2001	
6	AIS is removed upon termination of the dAIS condition within 2 frames (250 μ s).	12.3.4	c2001	

c2001: IF H.1/7 THEN m ELSE n/a

H.6.4 Fault management

Table H.19: Failure reports

Item	Failure reports	Reference	Status	Support
1	The fLOS failure is declared when dLOS defect persists continuously for X seconds and the port is the monitoring state (MON).	ETS 300 417-1-1 subclauses 8.2.1.6, 8.3.1, 4.2.2	m	
2	The fLOS failure is cleared if dLOS defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	
3	The dLOF defect detection generates a fLOF failure report when the dLOS has not been detected	ETS 300 417-1-1 subclause 8.2.3	c2101	

c2101: IF H.1/7 m ELSE n/a

Table H.20: Programmability of fault management parameters

Item	Programmability of fault management parameters	Reference	Status	Support
1	Programmability of fault declaration time (X parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
2	Programmability of fault clearance time (Y parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
3	Logarithmic values for steps of X and Y values (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
4	The fLOF failure is cleared if dLOF defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	

Table H.21: Fault management parameters value

Item	Fault management parameters value	Reference	Status	Support	Values	
					Allowed	Supported
1	Time for fault declaration (X parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		2.5 ± 0,5 s	
2	Time for fault declaration (X parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		≥ 100 ms	
3	Time for fault declaration (X parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		≤ 30 s	
4	Time for fault clearance (Y parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		10 ± 0,5 s	
5	Time for fault clearance (Y parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		≥ 100 ms	
6	Time for fault clearance (Y parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		≤ 30 s	
7	Logarithmic step for X and/or Y value (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m		—	

Annex I (normative): ICS proforma for E12 electrical section layer

Notwithstanding the provisions of the copyright clause related to the text of this ETS ETSI grants that users of this ETS may freely reproduce the ICS proforma in this annex so that it can be used for its intended purposes and may further publish the completed ICS.

I.1 Identification of the implementation

In this document, an IUT, and of course the identification of an IUT refers to an E12 layer instance implemented inside the SUT.

Identification of the IUT and the 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.

I.1.1 Date of the statement

.....

I.1.2 Implementation Under Test (IUT) identification

IUT name:

.....
.....

IUT version

Hardware version:

.....

Software version:

.....

Firmware version:

.....

I.1.3 System Under Test (SUT) identification

SUT name:

.....
.....

Hardware configuration:

.....

SUT Software version:

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SUT Firmware version:

.....

Operating system:

.....

I.1.4 Product supplier

Name:

.....

Address:

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.....
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Telephone number:

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Facsimile number:

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E-mail address:

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Additional information:

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.....
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I.1.5 Client

Name:

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Address:

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Telephone number:

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Facsimile number:

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E-mail address:

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Additional information:

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I.1.6 ICS contact person

Name:

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Telephone number:

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Facsimile number:

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E-mail address:

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Additional information:

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.....

I.2 Identification of the ETS

This ICS proforma applies to the following standard:

ETS 300 417-2-1 [2]: "Transmission and Multiplexing (TM); Generic functional requirements for SDH equipment: Physical section layer functions".

I.3 Global statement of conformance of E12 layer

Are all mandatory capabilities implemented? (Yes/No)

NOTE: Answering "No" to this question indicates non-conformance to the ETS specification. Non-supported mandatory capabilities are to be identified in the ICS, with an explanation of why the implementation is non-conforming, on pages attached to the ICS proforma.

Answering "Yes" to this question indicates only that all the capabilities with the explicit status "m" are supported. It is not necessary to fill in the support column of the associated item.

I.4 E12 electrical section layer function

Table I.1: E12 electrical section layer function

Item	E12 electrical section layer function	Reference	Status	Support
1	The E12 Section Layer supports a E12 Connection function	13.1	o	
2	The E12 Section Layer contains an E12 Trail Termination Source function (E12_TT_So)	13.2.1	m	
3	The E12 Section Layer contains an E12 Trail Termination Sink function (E12_TT_Sk)	13.2.2	m	
4	The E12 Section Layer contains an E12 Section to P12x Adaptation Source function (E12/P12x_A_So)	13.3.1	o.1	
5	The E12 Section Layer contains an E12 Section to P12x Adaptation Sink function (E12/P12x_A_Sk)	13.3.2	c101	
6	The E12 Section Layer contains an E12 Section to P12s Adaptation Source function (E12/P12s_A_So)	13.3.3	o.1	
7	The E12 Section Layer contains an E12 Section to P12s Adaptation Sink function (E12/P12s_A_Sk)	13.3.4	c102	

c101: IF I.1/4 THEN m ELSE x
 c102: IF I.1/6 THEN m ELSE x
 o.1: It is mandatory to support one or more of these functions

Table I.2: CRC-4 functions

Prerequisite: IF I.1/7 THEN m ELSE n/a

Item	CRC-4 functions	Reference	Status	Support
1	The E12 Section to P12s Adaptation Sink function uses the fixed present CRC-4 mode	13.3.4	o	
2	The E12 Section to P12s Adaptation Sink function uses the automatic interworking mode between CRC-4 and non-CRC-4	13.3.4	c201	

c201: IF I.2/1 THEN x ELSE o

I.5 E12 electrical section layer transmission tables

I.5.1 E12 data stream

Table I.3: E12 signal

Item	E12 signal	Reference	Status	Support
1	The E12_CI of the intra-station layer CP is an electrical, digital signal of defined amplitude and pulse shape	13	m	

I.5.2 E12 electrical section connection function, E12_C

Table I.4: E12 connection functionalities

Item	E12 connection functionalities	Reference	Status	Support
1	no requirement	13.1	n/a	

I.5.3 E12 electrical section trail termination functions, E12_TT_So and E12_TT_Sk

Table I.5: Interface type

Item	Interface type	Reference	Status	Support
1	The interface is balanced with an impedance of 120 ohms	Table 10/G.703	o	

Table I.6: Electrical characteristics for 120 ohms balanced interface

Prerequisite: I.5/1 -- 120 ohms balanced interface

Item	Electrical characteristics	Reference	Status	Support
1	The pulse shape characteristics of a ZERO - including peak-ot-peak voltage, nominal amplitude of 3,0 V, pulse width, "steady state" amplitude, pulse overshoot, rise time and decay time complies to the mask in figure 15/G.703.and to the relevant values in table 6/G.703.	Figure 15/G.703 Table 6/G.703	m	
2	The pulse shape characteristics of a ONE - including peak-ot-peak voltage, nominal amplitude of 0,3 V, pulse width, "steady state" amplitude, pulse overshoot, rise time and decay time - complies to the mask in figure 15/G.703 and to the relevant values in table 6/G.703.	Figure 15/G.703 Table 6/G.703	m	
3	The impedance at the output port is resistive and equal to 120 ohms.	Table 6/G.703	m	
4	The return loss against 120 ohms of the output port is greater than or equal to the minimum values	ETS 300 166 subclause 5.3	m	
5	The output signal balance is greater or equal to to minimum values specified in ETS 300 166, subclause 5.2.	ETS 300 166 subclause 5.2	m	
6	One balanced pair in each direction is used.	Table 6/G.703	m	
7	The output port provides a signal reference point for connecting the screen of the balanced pair.	ETS 300 166 table 1/6	m	
8	The input port provides a signal reference point for connecting the screen of the balanced pair.	ETS 300 166 table 1/6	m	
9	The impedance at the input port is resistive and equal to 120 ohms.	Table 6/G.703	m	
10	The return loss against 120 ohms of the input port is greater than or equal to the minimum values	G.703, subclause 6.3.3	m	

Table I.7: Electrical characteristics for 75 ohms coaxial interface

Prerequisite: (NOT I.5/1): -- 75 ohms coaxial interface

Item	Electrical characteristics	Reference	Status	Support
1	The pulse shape characteristics of a ZERO - including peak-ot-peak voltage, nominal amplitude of 2,37 V, pulse width, "steady state" amplitude, pulse overshoot, rise time and decay time complies to the mask in figure 15/G.703.and to the relevant values in table 6/G.703.	Figure 15/G.703 Table 6/G.703	m	
2	The pulse shape characteristics of a ONE - including peak-ot-peak voltage, nominal amplitude of 0,237 V, pulse width, "steady state" amplitude, pulse overshoot, rise time and decay time - complies to the mask in figure 15/G.703 and to the relevant values in table 6/G.703.	Figure 15/G.703 Table 6/G.703	m	
3	The impedance at the output port is resistive and equal to 75 ohms.	Table 6/G.703	m	
4	The return loss against 75 ohms of the output port is greater than or equal to the minimum values	ETS 300 166 subclause 5.3	m	
5	One coaxial pair in each direction is used.	Table 6/G.703	m	
6	The outer conductor of the output port is connected to signal ground.	ETS 300 166 table 1/6	m	
7	The outer conductor of the input port is connected to signal ground.	ETS 300 166 table 1/6	m	
8	The impedance at the input port is resistive and equal to 75 ohms.	Table 6/G.703	m	
9	The return loss against 75 ohms of the input port is greater than or equal to the minimum values	G.703, subclause 6.3.3	m	

I.5.4 E12 to P12x adaptation functions, E12/P12x_A_So and E12/P12x_A_Sk**Table I.8: Coding and regeneration of P12x signal**

Prerequisite: I.1/4 -- E12/P12x adaptation functions are present

Item	Coding and regeneration of P12x signal	Reference	Status	Support
1	The E12/P12x_A_So function provides HDB3 encoding of the 2 048 kbit/s signal.	13.3.1	m	
2	The E12/P12x_A_Sk function regenerates the received signal and recovers bit timing from it and HDB3 decodes the incoming electrical the 2 048 kbit/s E12 signal.	13.3.2	m	
3	The bit rate at the output port in free-running mode is 2 048 kbit/s \pm 50 ppm.	G.703, subclause 6.1	m	
4	The bit rate accepted at the input port 2 048 kbit/s \pm 50 ppm.	G.703, subclause 6.1	m	
5	The signal accepted at the input port is as defined for output port but modified by the characteristics of the interconnecting coaxial pair (the attenuation follows a \sqrt{f} law and the loss at 1 024 kHz is in the range 0 to 6 dB).	G.703, subclause 6.3	m	
6	The port operates without any error when any combination of the following conditions apply to the input signal: <ul style="list-style-type: none"> – an input electrical signal amplitude with any value specified by ETS 300 166 – jitter modulation applied to the input signal with any value defined in figure 3/G.823 and in table 2/G.823. – input bit rate in the range 2 048 kbit/s \pm 50 ppm – the input signal has an interfering signal specified by ETS 300 166 – the input signal has a longitudinal voltage specified by ETS 300 166 	13.3.2 G.823, subclause 3.1.1 Table 2/G.823 Figure 3/G.823	c701	
7	The port operates without any error when any combination of the following conditions apply to the input signal: <ul style="list-style-type: none"> – an input electrical signal amplitude with any value specified by ETS 300 166 – jitter modulation applied to the input signal with any value defined in figure 3/G.823 and in table 2/G.823. – input bit rate in the range 2 048 kbit/s \pm 50 ppm – the input signal has an interfering signal specified by ETS 300 166 	13.3.2 G.823, subclause 3.1.1 Table 2/G.823 Figure 3/G.823	c702	
8	The E12/P12x_A_So function does not add any jitter. The output jitter is the combination of the jitter generated and transferred via the client layer	13.3.1	m	

c701: IF I.5/1 THEN m ELSE x

c702: IF (NOT I.5/1) THEN m ELSE x

Table I.9: Activation and deactivation of E12/P12x adaptation function

Prerequisite: I.1/4 -- E12/P12x adaptation functions are present

Item	Activation and deactivation	Reference	Status	Support
1	The E12/P12x_A_So function source accesses the access point when it is activated (MI_Active is true); otherwise not.	13.3.1	m	
2	The E12/P12x_A_Sk function can be activated and deactivated	13.3.2	c801	
3	The adaptation sink function performs the operation as specified when it is activated (MI_Active is true). Otherwise, it transmits the all-ONEs signal at its output (CI_D) and does not report its status via the management point.	13.3.2	m	

c801: IF (I.1/5 AND I.1/7) THEN m ELSE o

I.5.5 E12 to P12s adaptation functions, E12/P12s_A_So and E12/P12s_A_Sk

Table I.10: Coding and regeneration of P12s signal

Prerequisite: I.1/6 -- E12/P12s adaptation functions are present

Item	Coding and regeneration of P12s signal	Reference	Status	Support
1	The E12/P12s_A_So function provides HDB3 encoding of the 2 048 kbit/s signal.	13.3.3	m	
2	The E12/P12s_A_Sk function regenerates the received signal and recovers bit timing from it and HDB3 decodes the incoming electrical the 2 048 kbit/s E12 signal.	13.3.4	m	
3	The bit rate at the output port in free-running mode is 2 048 kbit/s \pm 50 ppm.	G.703, subclause 6.1	m	
4	The bit rate accepted at the input port 2 048 kbit/s \pm 50 ppm.	G.703, subclause 6.1	m	
5	The signal accepted at the input port is as defined for output port but modified by the characteristics of the interconnecting coaxial pair (the attenuation follows a \sqrt{f} law and the loss at 1 024 kHz is in the range 0 to 6 dB).	G.703, subclause 6.3	m	
6	The port operates without any error when any combination of the following conditions apply to the input signal: <ul style="list-style-type: none"> – an input electrical signal amplitude with any value specified by ETS 300 166 – jitter modulation applied to the input signal with any value defined in figure 3/G.823 and in table 2/G.823. – input bit rate in the range 2 048 kbit/s \pm 50 ppm – the input signal has an interfering signal specified by ETS 300 166 – the input signal has a longitudinal voltage specified by ETS 300 166 	13.3.4 G.823, subclause 3.1.1 Table 2/G.823 Figure 3/G.823	c901	
7	The port operates without any error when any combination of the following conditions apply to the input signal: <ul style="list-style-type: none"> – an input electrical signal amplitude with any value specified by ETS 300 166 – jitter modulation applied to the input signal with any value defined in figure 3/G.823 and in table 2/G.823. – input bit rate in the range 2 048 kbit/s \pm 50 ppm – the input signal has an interfering signal specified by ETS 300 166 	13.3.4 G.823, subclause 3.1.1 Table 2/G.823 Figure 3/G.823	c902	
8	The E12/P12s_A_So function does not add any jitter. The output jitter is the combination of the jitter generated and transferred via the client layer	13.3.3	m	
9	AIS is an all ONE signal .	13.3.4	m	
10	AIS generated by the E12/P12s_A_Sk function replaces the regular signal when a defect is detected.	13.3.4	m	

c901: IF I.4/1 THEN m ELSE x

c902: IF (NOT I.4/1) THEN m ELSE x

Table I.11: E12/P12s basic frame alignment process

Prerequisite: I.1/6

-- E12/P12s adaptation functions are present

Item	E12/P12s basic frame alignment process	Reference	Status	Support
1	The frame alignment signal is allocated to bits 2-8 of the proper frames.	G.704 subclause 2.3.2 Table 5a/G.704	m	
2	The frame alignment signal is coded as 0011011.	G.704 subclause 2.3.2 Table 5a/G.704	m	
3	Bit 2 of time slot 0 not containing FAS is coded ONE	G.704 subclause 2.3.2 Table 5a/G.704		
4	The frame alignment is found when the following sequence is detected: <ul style="list-style-type: none"> – for the first time, the presence of the correct FAS – the absence of FAS in the following frame by verifying that bit 2 of the basic frame is ONE – for the second time, the presence of correct FAS in the next frame 	G.706 subclause 4.1.2	m	
5	The presence of FAS in frame n+2 and the absence of FAS in frame n+1 is continuously checked.	G.706 subclause 4.1.2	o	
6	Basic frame alignment is deemed to have been lost when three consecutive FAS are detected in error or	G.706 subclause 4.1.1	o.1201	
7	Basic frame alignment is deemed to have been lost when both: <ul style="list-style-type: none"> – three consecutive FAS are detected in error and – three consecutive bit 2 are detected in error 	G.706 subclause 4.1.1	o.1201	
8	Basic frame alignment is deemed to have been lost when 915 or more CRC-4 blocks out of 1 000 CRC-4 blocks are detected in error	G.706 subclause 4.1.1	c.1201	

c1201: IF (I.2/1 OR I.2/2) THEN m ELSE n/a

o.1201: It is mandatory to support exactly one of the detection mechanism

Table I.12: CRC-4 multiframe alignment process

Prerequisite: I.2/1 OR I.2/2 -- CRC-4 functions is present in E12/P12s_A_Sk

Item	CRC-4 multiframe alignment process	Reference	Status	Support
1	The CRC-4 multiframe alignment signal is allocated to bit 1 of time slot 0 not containing the FAS.	G.704 subclause 2.3.3.1	m	
2	The multiframe alignment word is coded	G.704 subclause 2.3.3.1	m	
3	A multiframe is composed of 16 basic frames	G.704 subclause 2.3.3.1	m	
4	A multiframe consist of two SMF each forming a 1 ms CRC block	13, G.704 subclause 2.3.3.1	m	
5	When a condition of assumed frame alignment has been achieved, CRC multiframe alignment is deemed to have occurred if at least two valid CRC multiframe alignment signal can be located within 8 ms and the time seperating the two CRC multiframes is 2 ms or multiple of 2 ms.	G.706 subclause 4.2	m	
6	If the multiframe alignment can not be achieved within 8 ms, it is assumed that basic frame alignment is due to a spurious FAS and a re-search for FAS is initiated.	G.706 subclause 4.2	m	
7	The re-search for FAS is started at a point just after the location of the assumed spurious FAS.	G.706 subclause 4.2	m	
8	Consequent action taken as a result of loss of basic frame alignment are no longer taken when multiframe alignment has been recovered.	G.706 subclause 4.2	m	
9	When multiframe alignment cannot be achieved in the range from 100 ms to 500 ms loss of basic frame alignment is assumed until multiframe alignment is recovered.	G.706 subclause 4.2	c1201	
10	When multiframe alignment is not achieved 400 ms after the detection of basic frame alignment the adaptation sink turns to a non-CRC mode.	G.706 subclause 4.2	c1202	

c1201: IF I.2/1 THEN m ELSE x

c1202: IF I.2/2 THEN m ELSE x

Table I.13: Activation and deactivation of E12/P12s adaptation function

Prerequisite: I.1/6 -- E12/P12s adaptation functions are present

Item	Activation and deactivation	Reference	Status	Support
1	The E12/P12s_A_So function accesses the access point when it is activated (MI_Active is true), otherwise not.	13.3.3	m	
2	The E12/P12s_A_Sk function can be activated and deactivated	13.3.4	c1301	
3	The E12/P12s_A_Sk function performs the operation as specified when it is activated (MI_Active is true). Otherwise, it transmits the all-ONEs signal at its output (CI_D) and does not report its status via the management point.	13.3.4	m	

c1301: IF (I.1/5 AND I.1/7) THEN m ELSE o

I.6 Defect, fault and performance management

I.6.1 Port status management

Table I.14: E12 port status mode process

Item	E12 port status mode process	Reference	Status	Support
1	The port status mode supports "not monitored" (NMON) status	ETS 300 417-1-1 subclause 8.5	m	
2	The port status mode supports "monitored" (MON) status	ETS 300 417-1-1 subclause 8.5	m	
3	The port status mode supports "automatic" (AUTO) status	ETS 300 417-1-1 subclause 8.5	o	

I.6.2 Defect detection and clearance criteria

Table I.15: E12 Loss Of Signal defect (dLOS)

Item	E12 Loss Of Signal defect (dLOS)	Reference	Status	Support
1	Loss of signal is detected when received amplitudes are less than or equal to the level Q as specified by ETS 300 417-1-1, subclause 8.2.1.6 for a period from 10 to 255 UI	ETS 300 417-1-1, subclause 8.2.1.6	m	
2	Loss of signal is not detected when received amplitudes are between the minimum accepted level and the level P for a period from 10 to 255 UI	ETS 300 417-1-1, subclause 8.2.1.6	m	
3	Loss of signal is cleared when the received amplitudes are greater than or equal to the level P, as specified by ETS 300 417-1-1, subclause 8.2.1.6, for a period from 10 to 255 UI	ETS 300 417-1-1, subclause 8.2.1.6	m	

Table I.16: E12 Loss Of Frame defect (dLOF)

Prerequisite: I.1/6 -- E12/P12s adaptation functions is present

Item	E12 Loss Of Frame defect (dLOF)	Reference	Status	Support
1	Loss Of Frame defect (dLOF) is detected if the frame alignment is deemed to be lost.	13.3.4	m	
2	The dLOF defect is cleared when the frame alignment is deemed to have been recovered.	13.3.4	m	

Table I.17: E12 AIS defect

Item	E12 AIS defect	Reference	Status	Support
1	An AIS defect is detected when the received signal has 2 or less ZEROs in each of two consecutive 512 bit periods.	13.3.4 ETS 300 417-1-1 subclause 8.2.1.7	c1701	
2	An AIS defect is cleared if each of two consecutive 512 bit periods contains 3 or more ZEROs.	13.3.4 ETS 300 417-1-1 subclause 8.2.1.7	c1701	

c1701: IF I.1/7 THEN m ELSE x

I.6.3 Consequent action activation and clearance criteria

Table I.18: E12 Trail Signal Fail action (aTSF)

Item	E12 Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The aTSF signal is activated on detection of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	
2	The aTSF signal is deactivated on clearance of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	

Table I.19: E12 Server Signal Fail action (aSSF)

Item	E12 Server Signal Fail action (aSSF)	Reference	Status	Support
1	The aSSF is activated on detection of dLOF defect.	ETS 300 417-1-1 subclause 8.2.2.4	m	
2	The aSSF is activated on detection of dAIS	ETS 300 417-1-1 subclause 8.2.2.4	m	
3	The aSSF is activated on detection of aTSF (AI_TSF)	ETS 300 417-1-1 subclause 8.2.2.4	m	
4	The aSSF signal is deactivated when the defect(s) which caused the aSSF generation is(are) no more active and there are no other defects active.	ETS 300 417-1-1 subclause 8.2.2.4	m	

Table I.20: Alarm Indication Signal action (aAIS)

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
1	AIS is applied to the output data within 2 frames (250 μ s) since a TSF detection is adapted (AI_TSF)	13.3.2, 13.3.4	m	
2	AIS is removed upon termination of the a TSF condition within 2 frames (250 μ s).	13.3.2, 13.3.4	m	
3	AIS is applied to the output data within 2 frames (250 μ s) since dLOF detection-	13.3.2, 13.3.4	m	
4	AIS is removed upon termination of the dLOF condition within 2 frames (250 μ s).	13.3.2, 13.3.4	m	
5	AIS is applied to the output data within 2 frames (250 μ s) since dAIS detection	13.3.4	c2201	
6	AIS is removed upon termination of the dAIS condition within 2 frames (250 μ s).	13.3.4	c2001	

c2001: IF I.1/7 THEN m ELSE n/a

I.6.4 Fault management**Table I.21: Failure reports**

Item	Failure reports	Reference	Status	Support
1	The fLOS failure is declared when dLOS defect persists continuously for X seconds and the port is the monitoring state (MON).	ETS 300 417-1-1 subclauses 8.2.1.6, 8.3.1, 4.2.2	m	
2	The fLOS failure is cleared if dLOS defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	
3	The dLOF defect detection generates a fLOF failure report when the dLOS has not been detected	ETS 300 417-1-1 subclause 8.2.3	c2101	

c2101: IF.1/7 THEN m ELSE n/a

Table I.22: Programmability of fault management parameters

Item	Programmability of fault management parameters	Reference	Status	Support
1	Programmability of fault declaration time (X parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
2	Programmability of fault clearance time (Y parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
3	Logarithmic values for steps of X and Y values (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
4	The fLOF failure is cleared if dLOF defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	

Tabel I.23: Fault management parameters value

Item	Fault management parameters value	Reference	Status	Support	Values	
					Allowed	Supported
1	Time for fault declaration (X parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		2.5 ± 0,5 s	
2	Time for fault declaration (X parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		≥ 100 ms	
3	Time for fault declaration (X parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		≤ 30 s	
4	Time for fault clearance (Y parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		10 ± 0,5 s	
5	Time for fault clearance (Y parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		≥ 100 ms	
6	Time for fault clearance (Y parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		≤ 30 s	
7	Logarithmic step for X and/or Y value (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m		—	

Annex J (normative): ICS proforma for T12 electrical section layer

Notwithstanding the provisions of the copyright clause related to the text of this ETS ETSI grants that users of this ETS may freely reproduce the ICS proforma in this annex so that it can be used for its intended purposes and may further publish the completed ICS.

J.1 Identification of the implementation

In this document, an IUT, and of course the identification of an IUT refers to an T12 layer instance implemented inside the SUT.

Identification of the IUT and the 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.

J.1.1 Date of the statement

.....

J.1.2 Implementation Under Test (IUT) identification

IUT name:

.....
.....

IUT version

Hardware version:

.....

Software version:

.....

Firmware version:

.....

J.1.3 System Under Test (SUT) identification

SUT name:

.....
.....

Hardware configuration:

.....

SUT Software version:

.....

SUT Firmware version:

.....

Operating system:

.....

J.1.4 Product supplier

Name:

.....

Address:

.....
.....
.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....
.....
.....

J.1.5 Client

Name:

.....

Address:

.....

.....

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

.....

J.1.6 ICS contact person

Name:

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

J.2 Identification of the ETS

This ICS proforma applies to the following standard:

ETS 300 417-2-1 [2]: "Transmission and Multiplexing (TM); Generic functional requirements for SDH equipment: Physical section layer functions".

J.3 Global statement of conformance of T12 layer

Are all mandatory capabilities implemented? (Yes/No)

NOTE: Answering "No" to this question indicates non-conformance to the ETS specification. Non-supported mandatory capabilities are to be identified in the ICS, with an explanation of why the implementation is non-conforming, on pages attached to the ICS proforma.

Answering "Yes" to this question indicates only that all the capabilities with the explicit status "m" are supported. It is not necessary to fill in the support column of the associated item.

J.4 T12 electrical section layer function

Table J.1: T12 electrical section layer function

Item	T12 electrical section layer function	Reference	Status	Support
1	The T12 Section Layer supports a T12 Connection function	14.1	o	
2	The T12 Section Layer contains an T12 Trail Termination Source function (T12_TT_So)	14.2.1	m	
3	The T12 Section Layer contains an T12 Trail Termination Sink function (T12_TT_Sk)	14.2.2	m	
4	The T12 Section Layer contains an T12 Section to SD Adaptation Source function (T12/SD_A_So)	14.3.1	m	
5	The T12 Section Layer contains an T12 Section to SD Adaptation Sink function (T12/SD_A_Sk) ?	14.3.2	m	

J.5 T12 Electrical section layer transmission tables

J.5.1 T12 data stream

Table J.2: T12 signal

Item	T12 signal	Reference	Status	Support
1	The T12_CI of the intra-station layer CP is an electrical, digital signal of defined amplitude and pulse shape	14	m	

J.5.2 T12 electrical section connection function, T12_C

Table J.3: T12 connection functionalities

Item	T12 connection functionalities	Reference	Status	Support
1	no requirement	14.1	n/a	

J.5.3 T12 electrical section trail termination functions, T12_TT_So and T12_TT_Sk

Table J.4: Interface type

Item	Interface type	Reference	Status	Support
1	The interface is balanced with an impedance of 120 ohms	Table 10/G.703	o	

Table J.5: Electrical characteristics for 120 ohms balanced interface

Prerequisite J.4/1: -- 120 ohms balanced interface

Item	Electrical characteristics for 120 ohms balanced interface	Reference	Status	Support
1	The pulse shape is specified in the form of a mask. The pulse shape is compliant to the mask in figure 21/G.703 and has a maximum peak voltage of 1,9 V0P and a minimum peak voltage of 1,0 V0P.	Figure 21/G.703 Table 10/G.703	m	
2	One balanced pair is used	Table 10/G.703	m	
3	The impedance at the input port is resistive and equal to 120 ohms.	Table 1/G.703	m	
4	The return loss against 120 ohms of the output port is ≥ 15 dB at 2 048 kHz	G.703, subclause 10.3	m	

Table J.6: Electrical characteristics for coaxial interfaces

Prerequisite: (NOT J.4/1) -- 75 ohms coaxial interface

Item	Electrical characteristics for coaxial interfaces	Reference	Status	Support
1	The pulse shape is specified in the form of a mask. The pulse shape is compliant to the mask in figure 21/G.703 and has a maximum peak voltage of 1,5 V0P and a minimum peak voltage of 0,75 V0P.	Figure 21/G.703 Table 10/G.703	m	
2	One coaxial pair is used	Table 10/G.703	m	
3	The impedance at the input port is resistive and equal to 75 ohms.	Table 1/G.703	m	
4	The return loss against 75 ohms of the output port is ≥ 15 dB at 2 048 kHz	G.703, subclause 10.3	m	

J.5.4 T12 to SD adaptation functions, T12/SD_A_So and T12/SD_A_Sk

Table J.7: Coding and regeneration of the timing signal

Item	Coding and regeneration of the timing signal	Reference	Status	Support
1	The T12/SD_A_So function adapts the equipment internal timing information from the SD layer into a 2 048 kHz timing information to be transmitted to an external equipment and controls the squelching of the output signal.	14.3.1	m	
2	The T12/SD_A_Sk function recovers the electrical 2 048 kHz signal used for transmission of synchronisation signals to external equipment on plesiochronous intra-station section as defined by ETS 300 166.	14.3.2	m	
3	The bit rate accepted at the input port is 2 048 kHz \pm 4,6 ppm.	14.3.2	m	
4	The signal accepted at the input port is as defined for output port but modified by the characteristics of the interconnecting coaxial pair (the attenuation follows a \sqrt{f} law and the loss at 2 048 kHz is in the range 0 to 6 dB).	G.703, subclause 10.3	m	
5	The port operates without any error when any combination of the following conditions apply to the input signal: <ul style="list-style-type: none"> – an input electrical signal amplitude with any value specified by ETS 300 166 – jitter modulation applied to the input signal with any value defined in ETS 300 462. – input bit rate in the range 2 048 kbit/s \pm 4,6 ppm 	14.3.2 G.823, subclause 3.1.1 Table 2/G.823 Figure 3/G.823	m	
6	The T12/SD_A_So function does not add any jitter. The output jitter is the combination of the jitter generated and transferred via the client layer	14.3.1	m	
7	AIS is an all ONE signal .	14.3.2	m	
8	AIS generated by the T12/SD_A_Sk function replaces the regular signal when a defect is detected.	14.3.2	m	

J.6 Defect, fault and performance management

J.6.1 Port status management

Table J.8: T12 port status mode process

Item	T12 port status mode process	Reference	Status	Support
1	The port status mode supports "not monitored" (NMON) status	ETS 300 417-1-1 subclause 8.5	m	
2	The port status mode supports "monitored" (MON) status	ETS 300 417-1-1 subclause 8.5	m	
3	The port status mode supports "automatic" (AUTO) status	ETS 300 417-1-1 subclause 8.5	o	

J.6.2 Defect detection and clearance criteria

Table J.9: T12 Loss Of Signal defect (dLOS)

Item	T12 Loss Of Signal defect (dLOS)	Reference	Status	Support
1	Loss of signal is detected when received amplitudes are less than or equal to the level Q (for E12 layer) as specified by ETS 300 417-1-1, subclause 8.2.1.6 for a period from 10 to 255 UI	14.2.2	m	
2	Loss of signal is not detected when received amplitudes are between the minimum accepted level and the level P (for E12 layer) for a period from 10 to 255 UI	14.2.2	m	
3	Loss of signal is cleared when received amplitudes are greater or equal the level P (for E12 layer) as specified by ETS 300 417-1-1, subclause 8.2.1.6 for a period from 10 to 255 UI	14.2.2	m	

J.6.3 Consequent action activation and clearance criteria

Table J.10: T12 Trail Signal Fail action (aTSF)

Item	T12 Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The aTSF signal is activated on detection of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	
2	The aTSF signal is deactivated on clearance of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	

Table J.11: T12 Server Signal Fail action (aSSF)

Item	T12 Server Signal Fail action (aSSF)	Reference	Status	Support
1	The aSSF is activated under detection of a aTSF (AI_TSF)	ETS 300 417-1-1 subclause 8.2.2.4	m	
2	The aSSF signal is deactivated when the defect(s) which caused the aSSF generation is(are) no longer active and there are no other defects active.	ETS 300 417-1-1 subclause 8.2.2.4	m	

Table J.12: Squelching

Item	Squelching	Reference	Status	Support
1	On activation of the T12_AI_SQLCH the output signal is switched of within 250 μ s	14.2.1	m	
2	On deactivation of the T12_AI_SQLCH the output signal is switched on within 250 μ s	14.2.1	m	
3	The output is switched of when the received timing quality drops below the provisioned MI_QLmin value.	14.3.1	m	
4	The output is switched on when the received timing quality it greater than or equal to the provisioned MI_QLmin value.	14.3.1	m	

J.6.4 Fault management

Table J.13: Failure reports

Item	Failure reports	Reference	Status	Support
1	The fLOS failure is declared when dLOS defect persists continuously for X seconds and the port is the monitoring state (MON).	ETS 300 417-1-1 subclauses 8.3.1, 8.2.1.6, 4.2.2	m	
2	The fLOS failure is cleared if dLOS defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	

Table J.14: Programmability of fault management parameters

Item	Programmability of fault management parameters	Reference	Status	Support
1	Programmability of fault declaration time (X parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
2	Programmability of fault clearance time (Y parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
3	Logarithmic values for steps of X and Y values (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
4	The fLOF failure is cleared if dLOF defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	

Tabel J.15: Fault management parameters value

Item	Fault management parameters value	Reference	Status	Support	Values	
					Allowed	Supported
1	Time for fault declaration (X parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		2.5 \pm 0,5 s	
2	Time for fault declaration (X parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		\geq 100 ms	
3	Time for fault declaration (X parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		\leq 30 s	
4	Time for fault clearance (Y parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		10 \pm 0,5 s	
5	Time for fault clearance (Y parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		\geq 100 ms	
6	Time for fault clearance (Y parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		\leq 30 s	
7	Logarithmic step for X and/or Y value (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m		—	

Annex K (normative): ICS proforma for E0 electrical section layer

Notwithstanding the provisions of the copyright clause related to the text of this ETS ETSI grants that users of this ETS may freely reproduce the ICS proforma in this annex so that it can be used for its intended purposes and may further publish the completed ICS.

K.1 Identification of the implementation

In this document, an IUT, and of course the identification of an IUT refers to an E0 layer instance implemented inside the SUT.

Identification of the IUT and the 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.

K.1.1 Date of the statement

.....

K.1.2 Implementation Under Test (IUT) identification

IUT name:

.....
.....

IUT version

Hardware version:

.....

Software version:

.....

Firmware version:

.....

K.1.3 System Under Test (SUT) identification

SUT name:

.....
.....

Hardware configuration:

.....

SUT Software version:

.....

SUT Firmware version:

.....

Operating system:

.....

K.1.4 Product supplier

Name:

.....

Address:

.....
.....
.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....
.....
.....

K.1.5 Client

Name:

.....

Address:

.....

.....

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

.....

K.1.6 ICS contact person

Name:

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

K.2 Identification of the ETS

This ICS proforma applies to the following standard:

ETS 300 417-2-1 [2]: "Transmission and Multiplexing (TM); Generic functional requirements for SDH equipment: Physical section layer functions".

K.3 Global statement of conformance of E0 layer

Are all mandatory capabilities implemented? (Yes/No)

NOTE: Answering "No" to this question indicates non-conformance to the ETS specification. Non-supported mandatory capabilities are to be identified in the ICS, with an explanation of why the implementation is non-conforming, on pages attached to the ICS proforma.

Answering "Yes" to this question indicates only that all the capabilities with the explicit status "m" are supported. It is not necessary to fill in the support column of the associated item.

K.4 E0 electrical section layer function

Table K.1: E0 electrical section layer function

Item	E0 electrical section layer function	Reference	Status	Support
1	The E0 Section Layer supports a E0 Connection function	16.1	o	
2	The E0 Section Layer contains an E0 Trail Termination Source function (E0_TT_So)	16.2.1	m	
3	The E0 Section Layer contains an E0 Trail Termination Sink function (E0_TT_Sk)	16.2.2	m	
4	The E0 Section Layer contains an E0 Section to P0x Adaptation Source function (E0/P0x_A_So)	16.3.1	m	
5	The E0 Section Layer contains an E0 Section to P0x Adaptation Sink function (E0/P0x_A_Sk)	16.3.2	m	

K.5 E0 electrical section layer transmission tables

K.5.1 E0 data stream

Table K.2: E0 signal

Item	E0 signal	Reference	Status	Support
1	The E0_CI of the intra-station layer CP is an electrical, digital signal of defined amplitude and pulse shape	16	m	

K.5.2 E0 electrical section connection function, E0_C

Table K.3: E0 connection functionalities

Item	E0 connection functionalities	Reference	Status	Support
1	no requirement	16.1	n/a	

K.5.3 E0 electrical section trail termination functions, E0_TT_So and E0_TT_Sk

Table K.4: Electrical characteristics

Item	Electrical characteristics	Reference	Status	Support
1	The pulse shape characteristics - including nominal peak voltages, nominal pulse width, ratio of amplitudes at the nominal center width, ratio of widths at the nominal center amplitude - is specified in the form of a mask. The pulse shape is compliant to the mask in figure 5/G.703. and to the relevant values in table 1/G.703.	Figure 5/G.703 Table 1/G.703	m	
2	The impedance at the output port is resistive and equal to 120 ohms.	Table 1/G.703	m	
3	The return loss against 120 ohms of the output port is greater than or equal to the minimum values	ETS 300 166 subclause 5.3	m	
4	One balanced pair in each direction is used.	G.703, subclause 1.2.1.1.4	m	
5	The output signal balance is greater or equal to to minimum values specified in ETS 300 166, subclause 5.2.	ETS 300 166 subclause 5.2	m	
6	The impedance at the input port is resistive and equal to 120 ohms.	Table 1/G.703	m	
7	The return loss against 120 ohms of the input port is greater than or equal to the minimum values	G.703, subclause 1.2.1.3	m	

K.5.4 E0 to P0x adaptation functions, E0/P0x_A_So and E0/P0x_A_Sk

Table K.5: Coding and regeneration of P0x signal

Item	Coding and regeneration of P0x signal	Reference	Status	Support
1	The E0/P0x_A_So function provides AMI encoding of the 64 kbit/s signal with and generates the octect structure.	G.703, subclause 1.2.1.1.5	m	
2	A 64 kbit/s bit period is divided into four unit intervals	G.703, subclause 1.2.1.1.5	m	
3	A binary one is coded as a block of the following four bits:1100	G.703, subclause 1.2.1.1.5	m	
4	A binary zero is coded as a block of the following four bits:1010	G.703, subclause 1.2.1.1.5	m	
5	The binary signal is converted into a three-level signal by alternating the polarity of consecutive blocks	G.703, subclause 1.2.1.1.5	m	
6	The alternation in polarity of the blocks is violated every 8th block. The violation block marks the last bit in an octet	G.703, subclause 1.2.1.1.5	m	
7	The E0/P0x_A_Sk function regenerates the received signal, recovers bit timing and octect timing from it and decodes the AMI signal of the incoming electrical the 64 kbit/s E0 signal.	12.3.2	m	
8	The bit rate at the output port in free-running mode is 64 kbit/s \pm 100 ppm.	G.703, subclause 12.1.1.1	m	
9	The bit rate accepted at the input port is 64 kbit/s \pm 100 ppm.	G.703, subclause 12.1.1.2	m	
10	The signal accepted at the input port is as defined for output port but modified by the characteristics of the interconnecting coaxial pair (the attenuation follows a \sqrt{f} law and the loss at 128 kHz is in the range 0 to 3 dB).	G.703, subclause 1.2.1.3	m	
11	Immunity against signal reflection guarantees a no-error condition with a signal-to-interference ratio of 20 dB.	G.703, subclause 1.2.1.3	m	
12	The port operates without any error when any combination of the following conditions apply to the input signal: <ul style="list-style-type: none"> – an input electrical signal amplitude with any value specified by ETS 300 166 – jitter modulation applied to the input signal with any value defined in figure 3/G.823 and in table 2/G.823. – input bit rate in the range 64 kbit/s \pm 100 ppm – the input signal has an interfering signal specified by ETS 300 166 – the input signal has a longitudinal voltage specified by ETS 300 166 	16.3.2 G.823, subclause 3.1.1 Table 2/G.823 Figure 3/G.823	m	
13	The E0/P0x_A_So function does not add any jitter. The output jitter is the combination of the jitter generated and transferred via the client layer	16.3.1	m	
14	AIS is an all ONE signal .	16.3.2	m	
15	AIS generated by the E0/P0x_A_Sk function replaces the regular signal when a defect is detected.	16.3.2	m	

K.6 Defect, fault and performance management

K.6.1 Port status management

Table K.6: E0 port status mode process

Item	E0 port status mode process	Reference	Status	Support
1	The port status mode supports "not monitored" (NMON) status	ETS 300 417-1-1 subclause 8.5	m	
2	The port status mode supports "monitored" (MON) status	ETS 300 417-1-1 subclause 8.5	m	
3	The port status mode supports "automatic" (AUTO) status	ETS 300 417-1-1 subclause 8.5	o	

K.6.2 Defect detection and clearance criteria

Table K.7: E0 Loss Of Signal defect (dLOS)

Item	E0 Loss Of Signal defect (dLOS)	Reference	Status	Support
1	Loss of signal is detected when received amplitudes are less than or equal to the level Q as specified by ETS 300 417-1-1, subclause 8.2.1.6 for a period from 10 to 255 UI	ETS 300 417-1-1 subclause 8.2.1.6	m	
2	Loss of signal is not detected when received amplitudes are between the minimum accepted level and the level P for a period from 10 to 255 UI	ETS 300 417-1-1 subclause 8.2.1.6	m	
3	Loss of signal is cleared when received amplitudes are greater or equal the level P as specified by ETS 300 417-1-1, subclause 8.2.1.6 for a period from 10 to 255 UI	ETS 300 417-1-1 subclause 8.2.1.6	m	

K.6.3 Consequent action activation and clearance criteria

Table K.8: E0 Trail Signal Fail action (aTSF)

Item	E0 Trail Signal Fail action (aTSF)	Reference	Status	Support
1	The aTSF signal is activated on detection of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	
2	The aTSF signal is deactivated on clearance of a dLOS defect in the trail termination sink function.	ETS 300 417-1-1 subclause 8.2.2.5	m	

Table K.9: E0 Server Signal Fail action (aSSF)

Item	E0 Server Signal Fail action (aSSF)	Reference	Status	Support
1	The aSSF is activated under detection of a aTSF (AI_TSF)	ETS 300 417-1-1 subclause 8.2.2.4	m	
2	The aSSF signal is deactivated when the defect(s) which caused the aSSF generation is(are) no longer active and there are no other defects active.	ETS 300 417-1-1 subclause 8.2.2.4	m	

Table K.10: Alarm Indication Signal action (aAIS)

Item	Alarm Indication Signal action (aAIS)	Reference	Status	Support
1	AIS is applied to the output data within 250 μ s after a TSF detection is adapted (AI_TSF)	16.3.2	m	
2	AIS is removed upon termination of the a TSF condition within 250 μ s.	16.3.2	m	

K.6.4 Fault management

Table K.11: Failure reports

Item	Failure reports	Reference	Status	Support
1	The fLOS failure is declared when dLOS defect persists continuously for X seconds and the port is the monitoring state (MON).	ETS 300 417-1-1 subclauses 8.3.1, 8.2.1.6, 4.2.2	m	
2	The fLOS failure is cleared if dLOS defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	

Table K.12: Programmability of fault management parameters

Item	Programmability of fault management parameters	Reference	Status	Support
1	Programmability of fault declaration time (X parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
2	Programmability of fault clearance time (Y parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
3	Logarithmic values for steps of X and Y values (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m	
4	The fLOF failure is cleared if dLOF defect is absent continuously for Y seconds.	ETS 300 417-1-1 subclause 8.3.1	m	

Tabel K.13: Fault management parameters value

Item	Fault management parameters value	Reference	Status	Support	Values	
					Allowed	Supported
1	Time for fault declaration (X parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		2.5 ± 0,5 s	
2	Time for fault declaration (X parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		≥ 100 ms	
3	Time for fault declaration (X parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		≤ 30 s	
4	Time for fault clearance (Y parameter default value)	ETS 300 417-1-1 subclause 8.3.1	m		10 ± 0,5 s	
5	Time for fault clearance (Y parameter minimum value)	ETS 300 417-1-1 subclause 8.3.1	m		≥ 100 ms	
6	Time for fault clearance (Y parameter maximum value)	ETS 300 417-1-1 subclause 8.3.1	m		≤ 30 s	
7	Logarithmic step for X and/or Y value (Z parameter)	ETS 300 417-1-1 subclause 8.3.1	m		—	

History

Document history	
August 1996	Public Enquiry PE 112: 1996-08-19 to 1996-12-13