SLOVENSKI STANDARD
SIST ETS 300 417-2-1 E1:2003

01-december-2003

Prenos in multipleksiranje (TM) ï Generiļ ne zahteve za prenosno funkcionalnost opreme ï 2-1. del: Funkcije plasti fiziļ nega odseka sinhrone digitalne hierarhije (SDH) in pleziohrone digitalne hierarhije (PDH)

Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 2-1: Synchronous Digital Hierarchy (SDH) and Plesiochronous Digital Hierarchy (PDH) physical section layer functions

Ta slovenski standard je istoveten z: **ETS 300 417-2-1 Edition 1**

ICS:

33.040.20	Prenosni sistem	Transmission systems

SIST ETS 300 417-2-1 E1:2003 **en**

EUROPEAN TELECOMMUNICATION STANDARD

ETS 300 417-2-1

April 1997

Source: ETSI TC-TM

Reference: DE/TM-01015-2-1

ICS: 33.020

Key words: Transmission, SDH, interface

Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 2-1: Synchronous Digital Hierarchy (SDH) and Plesiochronous Digital Hierarchy (PDH) physical section layer functions

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Contents

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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).

This ETS has been produced in order to provide inter-vendor and inter-operator compatibility for transport functionality of equipment.

This ETS consists of 8 parts as follows:

Part 1: "Generic processes and performance" (ETS 300 417-1-1);

Part 2: "SDH and PDH physical section layer functions" (ETS 300 417-2-1);

Part 3: "STM-N regenerator and multiplex section layer functions" (ETS 300 417-3-1);

Part 4: "SDH path layer functions" (ETS 300 417-4-1);

Part 5: "PDH path layer functions" (ETS 300 417-5-1);

Part 6: "Synchronization distribution layer functions" (ETS 300 417–6-1);

Part 7: "Auxiliary layer functions" (ETS 300 417-7-1);

Part 8: "Compound and major compound functions" (ETS 300 417-8-1).

Transposition dates	
Date of adoption:	4 April 1997
Date of latest announcement of this ETS (doa):	31 July 1997
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 January 1998
Date of withdrawal of any conflicting National Standard (dow):	31 January 1998

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1 Scope

This European Telecommunication Standard (ETS) specifies a library of basic building blocks and a set of rules by which they are combined in order to describe transport functionality of equipment. The library comprises the functional building blocks needed to completely specify the generic functional structure of the European transmission hierarchies. Equipment which is compliant with this ETS needs to be describable as an interconnection of a subset of these functional blocks contained within this ETS. The interconnections of these blocks need to obey the combination rules given. The generic functionality is described in the ETS 300 417-1-1 [1].

2 Normative references

This ETS incorporates by dated or 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 amendments or revisions. For undated references the latest edition of the publication referred to applies.

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

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

[3] ETS 300 167 (1993): "Transmission and Multiplexing (TM); Functional characteristics of 2 048 kbit/s interfaces".

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

[5] 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".

[6] ETS 300 232 (1993): "Transmission and Multiplexing (TM); Optical interfaces for equipments and systems relating to the Synchronous Digital Hierarchy [ITU-T Recommendation G.957 (1993) modified]".

[7] ITU-T Recommendation G.751 (1988): "Digital multiplex equipments operating at the third order bit rate of 34 368 kbit/s and the fourth order bit rate of 139 264 kbit/s and using positive justification".

[8] ITU-T Recommendation G.742 (1988): "Second order digital multiplex equipment operating at 8 448 kbit/s and using positive justification".

[9] 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".

[10] ITU-T Recommendation G.775 (1994): "Loss of signal (LOS) and alarm indication signal (AIS) defect detection and clearance criteria".

[11] ITU-T Recommendation G.703 (1991): "Physical/electrical characteristics of hierarchical digital interfaces".

[12] ITU-T Recommendation G.958 (1994): "Digital line systems based on the synchronous digital hierarchy for use on optical fibre cables".

[13] ANSI T1.102 (1993): "Telecommunications - Digital Hierarchy - Electrical Interfaces".

[14] ANSI T1.107 (1988): "Telecommunications - Digital Hierarchy - Formats Specifications".

[15] ITU-T Recommendation G.825: "The control of jitter and wander within digital networks which are based on the synchronous digital hierarchy (SDH)".

[16] prETS 300 417–6–1: "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 6-1: Synchronization distribution layer functions".

3 Definitions, abbreviations and symbols

3.1 Definitions

The functional definitions are described in ETS 300 417-1-1 [1].

3.2 Abbreviations

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

A	Adaptation function
AcSL	Accepted Signal Label
AcTI	Accepted Trace Identifier
ADM	Add-Drop Multiplexer
AI	Adapted Information
AIS	Alarm Indication Signal
ALS	Automatic Laser Shutdown
ANSI	American National Standards Institute
AP	Access Point
APId	Access Point Identifier
APS	Automatic Protection Switch
ATM	Asynchronous Transfer Mode
AU	Administrative Unit
AUG	Administrative Unit Group
AU-n	Administrative Unit, level n
BBE	Background Block Error
BBER	Background Block Error Ratio
BER	Bit Error Ratio
BFA	Basic Frame Alignment
BIP	Bit Interleaved Parity
BIP-N	Bit Interleaved Parity, width N
BITS	Building Integrated Timing Supply
BNF	Backus-Naur Form
BSHR	Bi-directional Self Healing Ring
C	Connection function
CH	CHannel
CI	Characteristic Information
CID	Consecutive Identical Digits
CK	ClocK
CM	Connection Matrix
CMI	Coded Mark Inversion
Co	Connection
CP	Connection Point
CRC	Cyclic Redundancy Check
CRC-N	Cyclic Redundancy Check, width N
Cs	supervisory-unequipped Connection function
CSES	Consecutive Severely Errored Seconds
CTF	Compound Timing Function
Ctrl	Control
D	Data
DCC	Data Communications Channel
DEC	DECrement
DEG	DEGraded
DEGTHR	DEGraded THReshold
DL	Data Link
DPRING	Dedicated Protection RING
DROP	Decreased Received Optical Power
DXC	Digital Cross Connect
E0	Electrical interface signal 64 kbit/s
E11	Electrical interface signal 1 544 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

E32	Electrical interface signal 44 736 kbit/s
E4	Electrical interface signal 139 264 kbit/s
EBC	Errored Block Count
ECC	Embedded Communications Channel
ECC(x)	Embedded Communications Channel, layer x
EDC	Error Detection Code
EDCV	Error Detection Code Violation
EFS	Equipment Functional Specification
EMF	Equipment Management Function
EPS	Equipment Protection Switch
EQ	EQuipment
ERS	Elementary Regenerator Section
ES	Electrical Section
ES	Errored Second
ESR	Errored Seconds Ratio
Ex	CCITT Recommendation G.703 [11] type electrical signal, bit rate order x
ExSL	Expected Signal Label
ExTI	Expected Trace Identifier
F_B	Far-end Block
F_BBE	Far-end Background Block Error
F_DS	Far-end Defect Second
F_EBC	Far-end Errored Block Count
F_ES	Far-end Errored Second
F_SES	Far-end Severely Errored Second
F_SESTHR	Far-end Severely Errored Second THReshold
F_UAT_cmd	Far-end UnAvailable Time command
FAS	Frame Alignment Signal
FEBE	Far End Block Error
FERF	Far End Receive Failure
FIFO	First In First Out
FIT	Failure In Time
FO	Frame Offset information
FOP	Failure Of Protocol
FS	Frame Start signal
HDB3	High Density Bipolar of order 3
HDLC	High-level Data Link Control procedure
HO	Higher Order
HOVC	Higher Order Virtual Container
HP	Higher order Path
ID	IDentifier
IF	In Frame state
INC	INCrement
IOS	Intra-Office Section
IS	Intermediate System
ISDN	Integrated Services Digital Network
ISO	International Standardization Organization
ITU-T	International Telecommunications Union - Telecommunications Sector
LAN	Local Area Network
LBC	Laser Bias Current
LC	Link Connection
LLC	Logical Link Control
LMC	Laser Modulation Current
LO	Lower Order
LOA	Loss Of Alignment; generic for LOF, LOM, LOP
LOF	Loss Of Frame
LOM	Loss Of Multiframe
LOP	Loss Of Pointer
LOS	Loss Of Signal
LOT	Loss of Octet Timing
LOVC	Lower Order Virtual Container
LPx	Lower order Path for VC-x (x = 11, 12, 2, 3)
LT	Line Termination
M&CF	Management & Communication Function

MC	Matrix Connection
MCF	Message Communications Function
MDT	Mean Down Time
mei	maintenance event information
MI	Management Information
MO	Managed Object
MON	MONitored
MP	Management Point
MS	Multiplex Section
MS1	STM-1 Multiplex Section
MS16	STM-16 Multiplex Section
MS4	STM-4 Multiplex Section
MSB	Most Significant Bit
MSOH	Multiplex Section OverHead
MSP	Multiplex Section Protection
MSPG	Multiplex Section Protection Group
MTBF	Mean Time Between Failures
MTTR	Mean Time To Repair
N_B	Near-end Block
N_BBE	Near-end Background Block Error
N_DS	Near-end Defect Second
N_EBC	Near-end Errored Block Count
N_ES	Near-end Errored Second
N_SES	Near-end Severely Errored Second
N_SESTHR	Near-end Severely Errored Second THReshold
N_UAT_cmd	Near-end UnAvailable Time command
NC	Network Connection
NCM	No CRC-4 Multiframe alignment signal
NDF	New Data Flag
NE	Network Element
NMON	Not MONitored
NNI	Network Node Interface
NPDU	Network Protocol Data Unit
NRZ	Non-Return to Zero
NRZI	Non-Return to Zero Inverted
NSAP	Network Service Access Point
NU	National Use (bits, bytes)
NUx	National Use, bit rate order x
OAM	Operation, Administration and Management
OFS	Out of Frame Second
OOF	Out Of Frame state
OS	Optical Section
OSC	Oscillator
OSI(x)	Open Systems Interconnection, Layer x
OW	Order Wire
P	Protection
P_A	Protection Adaptation
P_C	Protection Connection
P_TT	Protection Trail Termination
P0_31c	1 984 kbit/s layer
P0s	synchronous 64 kbit/s layer
P11x	1 544 kbit/s layer (transparent)
P12s	2 048 kbit/s PDH path layer with synchronous 125 µs frame structure according to ETS 300 167 [3]
P12x	2 048 kbit/s layer (transparent)
P22e	8 448 kbit/s PDH path layer with 4 plesiochronous 2 048 kbit/s
P22x	8 448 kbit/s layer (transparent)
P31e	34 368 kbit/s PDH path layer with 4 plesiochronous 8 448 kbit/s
P31s	34 368 kbit/s PDH path layer with synchronous 125 µs frame structure according to ETS 300 337 [2]
P31x	34 368 kbit/s layer (transparent)
P32x	44 736 kbit/s layer (transparent)
P4e	139 264 kbit/s PDH path layer with 4 plesiochronous 34 368 kbit/s