SLOVENSKI STANDARD
SIST ETS 300 635 E1:2003

01-december-2003

Prenos in multipleksiranje (TM) ï Sinhrona digitalna hierarhija (SDH) ï Radijsko specifiļ ni funkcijski bloki za prenos pri Mx STM-N

Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); Radio specific functional blocks for transmission of M x STM-N

Ta slovenski standard je istoveten z: ETS 300 635 Edition 1

ICS:

33.040.20 Prenosni sistem Transmission systems

SIST ETS 300 635 E1:2003 **en**

EUROPEAN TELECOMMUNICATION STANDARD

ETS 300 635

October 1996

Source: ETSI TC-TM

Reference: DE/TM-04028

ICS: 33.040.20

Key words: SDH, radio, transmission

Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); Radio specific functional blocks for transmission of Mx STM-N

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Foreword

This European Telecommunication Standard (ETS) was produced by the Transmission and Multiplexing (TM) Technical Committee of the European Telecommunications Standards Institute (ETSI).

Transposition dates	
Date of adoption of this ETS:	4 October 1996
Date of latest announcement of this ETS (doa):	31 January 1997
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 July 1997
Date of withdrawal of any conflicting National Standard (dow):	31 July 1997

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1 Scope

This European Telecommunication Standard (ETS) defines functional blocks specific to the Digital Radio Relay System (DRRS) which uses the Synchronous Digital Hierarchy (SDH) for transmitting Mx STM-N signals (where STM-N is Synchronous Transport Module-(level) N).

Considering that:

- ITU-T Recommendation G.783 [7] describes the characteristics of SDH equipment functional blocks;

and that:

- ETS 300 417 [1] defines a library of basic building blocks and a set of rules, by which they may be combined to describe an SDH equipment;

this ETS uses the methodology specified in ITU-T Recommendation G.783 [7], in order to give a generic description of a SDH DRRS. However in informative annex C some functional description in ETS 300 417 [1] style has been included in order to facilitate a future enhancement of radio specific functionality description with this methodology.

This ETS defines:

- the functional blocks specific to SDH DRRS.

This ETS does not define:

- the information model for radio relay network elements;
- the protocol stack to be used for message communication;
- the network level management processes;
- the functional block already defined by ITU-T Recommendation G.783 [7] and ETS 300 417 [1];
- the radio specific management of performance monitoring requirements.

The equipment functionality is consistent with SDH multiplexing structure given in ETS 300 147 [15].

Equipment developed prior to this ETS may not comply in all details with this ETS.

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 amendment or revision. For undated references, the latest edition of the publication referred to applies.

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

[2] ETS 300 304 (1994): "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH) information model for the Network Element (NE) view".

[3] ITU-R Recommendation F.750: "Architectures and functional aspects of radio-relay systems for SDH based networks".

[4] ITU-T Recommendation G.773: "Protocols suites for Q-interfaces for management of transmission systems".

[5] ITU-T Recommendation G.781: "Structure of Recommendations on equipment for the Synchronous Digital Hierarchy (SDH)".

[6] ITU-T Recommendation G.782: "Types and general characteristics of Synchronous Digital Hierarchy (SDH) equipment".

[7] ITU-T Recommendation G.783: "Characteristics of Synchronous Digital Hierarchy (SDH) equipment functional blocks".

[8] ITU-T Recommendation G.784: "Synchronous Digital Hierarchy (SDH) management".

[9] ITU-T Recommendation G.803: "Architectures of transport networks based on the Synchronous Digital Hierarchy (SDH)".

[10] ITU-T Recommendation G.831: "Management capabilities of transport networks based on the Synchronous Digital Hierarchy (SDH)".

[11] ITU-T Recommendation M.3010: "Principles for a telecommunications management network".

[12] ITU-T Recommendation M.60: "Maintenance Terminology and definitions".

[13] ITU-T Recommendation Q.811: "Lower layer Protocol profiles for the Q3 interface".

[14] ITU-T Recommendation Q.812: "Upper layer Protocols profile for the Q3 interface".

[15] ETS 300 147 (1995): "Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH) Multiplexing structure".

[16] ITU-T Recommendation G.707: "Synchronous Digital Hierarchy bit rates".

[17] ITU-T Recommendation G.708: "Network node interface for the Synchronous Digital Hierarchy".

[18] ITU-T Recommendation G.709: "Synchronous multiplexing structure".

3 Abbreviations

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

AIS	Alarm Indication Signal
AP	Access Point
ATPC	Automatic Transmit Power Control
BER	Bit Error Rate
CMIP	Common Management Information Protocol
CMIS	Common Management Information Service
CP	Connection Point
CTP	Connection Termination Point
DRRS	Digital Radio Relay System
EW	Early Warning
GTP	Group Termination Point
HPA	Higher order Path Adaptation
IF	Intermediate Frequency: frequency(s) other than RF used for the purpose of implementation depending functions (e.g. easier filtering)
IA	Indirect Adapter
IOS	Intra-Office Section
LOF	Loss Of Frame
LPA	Lower order Path Adaptation
MOC	Managed Object Class
MSP	Multiplex Section Protection
MSOH	Multiplex Section OverHead
NE	Network Element

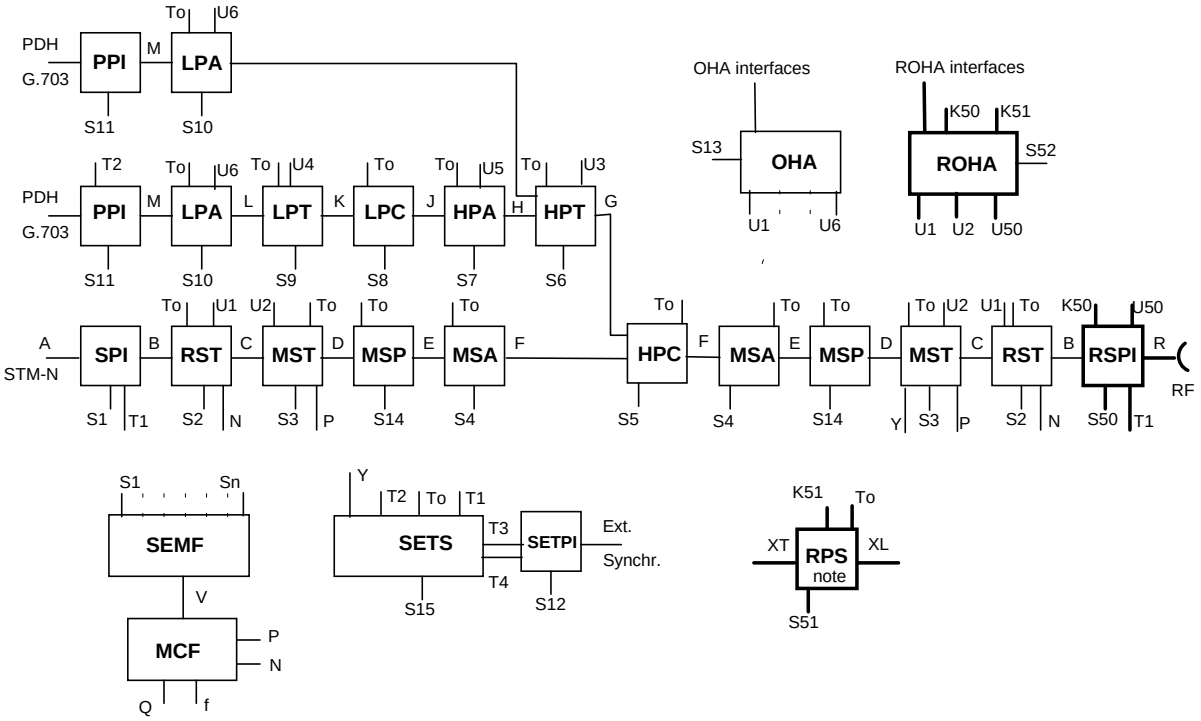
O&M	Operations and Maintenance
OS	Operation System
OSI	Open System Interconnection
PDH	Plesiochronous Digital Hierarchy
Pkg	Packages
PI	Physical Interface
RAPS	Radio Automatic Protection Switch
RF	Radio Frequency
RFCOH	Radio Frame Complementary OverHead
ROHA	Radio OverHead Access
RPI	Radio (generic) Physical Interface
RPPI	Radio Plesiochronous Physical Interface
RSPI	Radio Synchronous Physical Interface
RPS	Radio Protection Switching
RDN	Relative Distinguished Name
RRR	Radio Relay Regenerator
RRT	Radio Relay Terminal
RS	Regenerator Section
RSOH	Regenerator Section OverHead
RST	Regenerator Section Termination
SDH	Synchronous Digital Hierarchy
SEMF	Synchronous Equipment Management Function
SETS	Synchronous Equipment Timing Source
SF	Switch Failure
Snk	Sink
SOH	Section OverHead
SPI	SDH Physical Interface
Src	Source
STM-N	Synchronous Transport Module (level) N
STM-RR	Synchronous Transport Module for Sub-STM-1 Radio Relay
TMN	Telecommunication Management Network
TP	Termination Point
TTP	Trail Termination Point
VC-n	Virtual Container n
XPIC	Cross Polar Interference Canceller

4 Generalized functional block diagram

Figure 1 is taken as a generalized block diagram for STM-N systems (in this figure Ux, Kx and Sx interface numbering for radio specific blocks has been taken starting from 50 onward).

In figure 1 only the most common ITU-T Recommendation G.783 [7] defined functional blocks are reported, together with the radio specific ones. Nevertheless other present or future defined functional blocks may be implemented, if applicable, into SDH DRRS.

Additional description using ITU-T Recommendation G.803 [9] and ETS 300 417 [1] methodology is not in the scope of this ETS, however some basic related concept may be found in annex C.



U50: Reference point for Radio Frame Complementary OverHead (RFCOH) bytes access (insertion/extraction);

K50: Media specific or RFCOH bytes (whichever is applicable) interface for Radio Synchronous Physical Interface (RSPI) usage;

K51: Media specific or RFCOH bytes (whichever is applicable) interface for Radio Protection Switching (RPS) usage;

XT: RPS Reference point (Tributary side);

XL: RPS Reference point (Line side);

Other references: see ITU-T Recommendations G.782 [6] and G.783 [7].

NOTE: The RPS functional block comprises a connection type function which, for an implementation dependent purpose, can be inserted in between any other functional block to perform specific (n + m) line protection for the radio section. It has the same "X" input/output interfaces which are always compatible with any interface where it may be inserted, namely reference points B, C, D, E or F, however it should be noted that, when looked from the point of view of ETS 300 417 [1] methodology, RPS placed in different network layer will result in different functionality (see informative annex A for details).

Figure 1: Generalized SDH-DRRS logical and functional block diagram

4.1 SDH Radio Synchronous Physical Interface function (RSPI)

The RSPI function provides the interface between the radio physical medium at reference point R and the Regenerator Section Termination (RST) function at reference point B.

Data at R is a Radio Frequency (RF) signal containing an STM-N signal with non-standardized use of Section Overhead (SOH) media dependent bytes (provided by ITU-T Recommendations G.707 [16] and G.708 [17]) and (if used) an additional arbitrary RFCOH. Therefore, in accordance with ITU-R Recommendation F.750 [3], mid-air interconnectivity between transmitter and receiver of different vendors is not required.

The information flows associated with the RSPI function are described with reference to figure 2. This functional block is, therefore, expanded in figure 3.