

### SLOVENSKI STANDARD SIST ETS 300 635 E1:2003

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

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### **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 4 92 94 42 00 - Fax: +33 4 93 65 47 16

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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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### 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

### 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; PV
- the protocol stack to be used for message communication;
- the network level management processes; sitch ai) 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]. 9c25ac938bb4/sist-ets-300-635-e1-2003

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)".

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[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". PREVIEW
[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". SIST ETS 300 635 E1:2003 https://standards.iteh.ai/catalog/standards/sist/590c1981-24fe-401d-a24c-
[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

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O&M Operations and Maintenance

OS **Operation System** 

OSI Open System Interconnection PDH Plesiochronous Digital Hierarchy

Pkg **Packages** ы Physical Interface

**RAPS** Radio Automatic Protection Switch

Radio Frequency RF

Radio Frame Complementary OverHead RFCOH

**ROHA** Radio OverHead Access

RPI Radio (generic) Physical Interface **RPPI** Radio Plesiochronous Physical Interface **RSPI** Radio Synchronous Physical Interface

**RPS** Radio Protection Switching Relative Distinguished Name **RDN RRR** Radio Relay Regenerator **RRT** Radio Relay Terminal RS Regenerator Section

Regenerator Section OverHead **RSOH** Regenerator Section Termination **RST** SDH Synchronous Digital Hierarchy

Synchronous Equipment Management Function **SEMF** 

Synchronous Equipment Timing Source **SETS** 

SF Switch Failure

Snk Sink

SOH Section OverHead SPI SDH Physical Interface

Src Source

Synchronous Transport Module (level) N STM-N

STM-RR Synchronous Transport Module for Sub-STM-1 Radio Relay

TMN Telecommunication Management Network

TP **Termination Point** 

Trail Termination Point 635 E1:2003 TTP

VC-n

https://standards/sist/590c1981-24fe-401d-a24c-Cross Polar Interference Canceller **XPIC** 

#### 4 Generalized functional block diagram

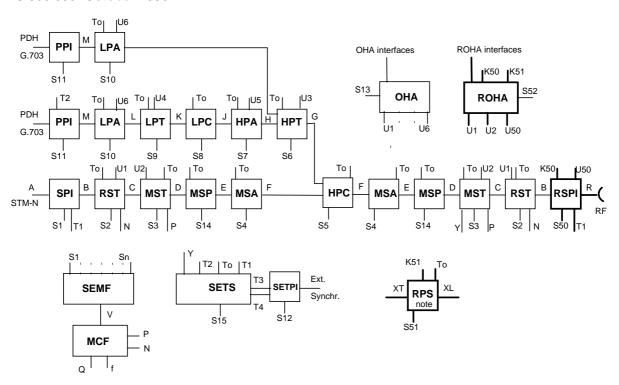
Figure 1 is taken as a generalized block diagram for STM-N systems (in this figure Ux. Kx and Sx interface numbering for radio specific blocks has been taken starting from 50 onward).

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.

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U50: Reference point for Radio Frame Complementary OverHead (RFCOH) bytes access

(insertion/extraction);

Media specific or RFCOH bytes (whichever is applicable) interface for Radio K50:

Synchronous Physical Interface (RSPI) usage; Media specific or RFCOH bytes (whichever is applicable) interface for Radio Protection K51:

Switching (RPS) usage;

RPS Reference point (Tributary side) S. iteh. ai) XT:

RPS Reference point (Line side); XI ·

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.