SLOVENSKI STANDARD
SIST EN 300 166 V1.2.1:2003

01-december-2003

Prenos in multipleksiranje (TM) – Fizične in električne karakteristike hierarhičnih digitalnih vmesnikov za opremo, ki uporablja pleziohrone ali sinhrone hierarhije na osnovi hitrosti 2048 kbit/s

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

Ta slovenski standard je istoveten z: **EN 300 166 Version 1.2.1**

ICS:

33.040.20	Prenosni sistem	Transmission systems
35.200	Vmesniška in povezovalna oprema	Interface and interconnection equipment

SIST EN 300 166 V1.2.1:2003 **en**

ETSI EN 300 166 V1.2.1 (2001-09)

European Standard (Telecommunications series)

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

Reference
REN/TM-01061

Keywords
interface, layer 1, NNI, PDH, SDH

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

Individual copies of the present document can be downloaded from:
http://www.etsi.org

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at http://www.etsi.org/tb/status/

If you find errors in the present document, send your comment to:
editor@etsi.fr

Copyright Notification

Contents

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (http://www.etsi.org/ipr).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Transmission and Multiplexing (TM).

The present document specifies the physical and electrical characteristics of hierarchical interfaces based on ITU-T Recommendation G.703 [2] but it does not intend to preclude the use of interfaces covered in other standards.

The aim of the present document is to provide inter-vendor and inter-operator compatibility.

The conformance testing requirements corresponding to the specifications contained in the present document are to be specified in a different EN.

Physical parameters for optical interfaces for the Synchronous Digital Hierarchy (SDH) are to be specified in a different standard which is under development.

National transposition dates	
Date of adoption of this EN:	31 August 2001
Date of latest announcement of this EN (doa):	30 November 2001
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 May 2002
Date of withdrawal of any conflicting National Standard (dow):	31 May 2002

1 Scope

The present document specifies the physical and electrical parameters of interfaces based on ITU-T Recommendations G.702 [1], G.703 [2] and G.707 [3] for interconnection of digital network elements:

- in-station (i.e. for distances below a few hundred metres);
- using metallic (symmetrical or coaxial) pairs;
- at 64, 2 048, 8 448, 34 368 and 139 264 kbit/s hierarchical levels of the Plesiochronous Digital Hierarchy (PDH) and at the first level of the Synchronous Digital Hierarchy (SDH) (STM-1 at 155 520 kbit/s).

The present document also describes the requirements for the physical and electrical parameters of the 2 048 kHz synchronization interface.

2 References

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

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

[1] ITU-T Recommendation G.702 (1988): "Digital hierarchy bit rates".

[2] ITU-T Recommendation G.703 (1998): "Physical/electrical characteristics of hierarchical digital interfaces".

[3] ITU-T Recommendation G.707 (2000): "Network node interface for the synchronous digital hierarchy (SDH)".

[4] ETSI ETS 300 011-2 (1998): "Integrated Services Digital Network (ISDN); Primary rate User-Network Interface (UNI); Part 2: Conformance test specification for interface IA and IB".

[5] ITU-T Recommendation G.704 (1998): "Synchronous frame structures used at 1544, 6312, 2048, 8448 and 44 736 kbit/s hierarchical levels".

3 Definitions and abbreviations

3.1 Definitions

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

N = normative: requirements with which it is necessary to comply in order to be able to claim compliance with the present document

NOTE Therefore, functions and features in clauses of ITU-T Recommendation G. 703 [2], stated as being normative in the present document, shall be implemented and followed even if the text is given as a recommendation or an example.

I = informative: text provided for information only

NOTE Titles for clauses are marked as informative when the requirements are given in further clauses.

N/R = not relevant: clause which is not relevant to the present document

3.2 Abbreviations

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

PDH	Plesiochronous Digital Hierarchy
PRBS	Pseudo-Random Binary Sequence
SDH	Synchronous Digital Hierarchy

4 Requirements

As ITU-T Recommendation G.703 [2] was written as a recommendation, for the purpose of compliance with the present document the statements given in table 1 provide an indication of the status of the requirements (i.e. normative, informative or not relevant).

Table 1: Modifications and statements to ITU-T Recommendation G.703 [2]

Clause	Title	Statement
1	Scope	I
2	References	I
3	Abbreviations	I
4	Interface at 64 kbit/s	I
4.1	Functional requirements	N
4.1.1	Three types of envisaged interfaces	I
4.1.1.1	Co-directional interface	N
4.1.1.2	Centralized clock interface	N/R
4.1.1.3	Contra directional interface	N/R
4.2	Electrical characteristics	I
4.2.1	Electrical characteristics of 64 kbit/s co-directional interface	N
Tolerable longitudinal voltage shall be according to clause 4.1 of the present document.		
Output return loss shall be according to clause 4.2 of the present document.		
4.2.2	Electrical characteristics of 64 kbit/s centralized clock interface	N/R
4.2.3	Electrical characteristics of 64 kbit/s contra directional interface	N/R
5	Interface at 1 544 kbit/s	N/R
6	Interface at 6 312 kbit/s	N/R
7	Interface at 32 064 kbit/s	N/R
8	Interface at 44 736 kbit/s	N/R
9	Interface at 2 048 kbit/s	N
For symmetric interfaces: Tolerable longitudinal voltage shall be according to clause 4.1 of the present document.		
Output return loss shall be according to clause 4.2 of the present document.		
NOTE: For signals with bit rates of n x 64 kbit/s (n = 2 to 31) which are routed through multiplexing equipment specified for the 2 048 kbit/s based hierarchy, the interface shall have the same physical/electrical characteristics as those for the 2 048 kbit/s interface.		
10	Interface at 8 448 kbit/s	N
The output return loss requirement according to clause 4.2 of the present document shall be fulfilled.		
11	Interface at 34 368 kbit/s	N

Clause	Title	Statement
The output return loss requirement according to clause 4.2 of the present document shall be fulfilled.		
12	Interface at 139 264 kbit/s	N
13	2 048 kbit/s synchronization interface	N
14	Interface at 97 728 kbit/s	N/R
15	Interface at 155 520 kbit/s	I
15.1	General characteristics	N
15.2	Specifications at the output ports	N
15.3	Specifications at the input ports	N
15.4	Specifications at the cross-connect points	N/R
15.5	Grounding of outer conductor	N
Annex A	Definition of codes	N
Appendix I	1 544 kbit/s specification in the 1991 version of this Recommendation	N/R
Appendix II	64 and 6 312 kHz synchronization interface specification for use in Japan	N/R

4.1 Tolerable longitudinal voltage

For minimum tolerance to longitudinal voltage at input ports the receiver shall operate without errors with any valid input signal in the presence of a longitudinal voltage V1.

V1 = 2 Vrms over the frequency range 10 Hz to 30 MHz.

The test configuration is given in ETS 300 011-2 [4], clause 5.3.2.3.

4.2 Minimum output return loss

The return loss at the output shall have the following minimum values:

Frequency range	Return loss
0,025 fb to 0,05 fb	6 dB
0,05 fb to 1,5 fb	8 dB

where fb = 256 kHz for 64 kbit/s co-directional interfaces;

2 048 kHz for 2 048 kbit/s interfaces;

8 448 kHz for 8 448 kbit/s interfaces;

34 368 kHz for 34 368 kbit/s interfaces.

The output return loss should be measured under dynamic conditions with PRBS 2^{15}-1 transmitted at the output. For equipment which does not generate an ITU-T Recommendation G.704 [5] framed signal, the PRBS shall be transmitted in the whole bit stream. For equipment which does generate an ITU-T Recommendation G.704 [5] frame, the PRBS shall be transmitted in every traffic channel. The power transmitted into the output of the device under test by the measurement equipment should be less than -10 dBm0. The return loss can be measured with a selective bandwidth analyser with the bandwidth set to 1 kHz or less.

NOTE: The ITU-T Recommendation G.703 [2] interfaces to existing equipment or being under development may not comply with this output return loss requirement.