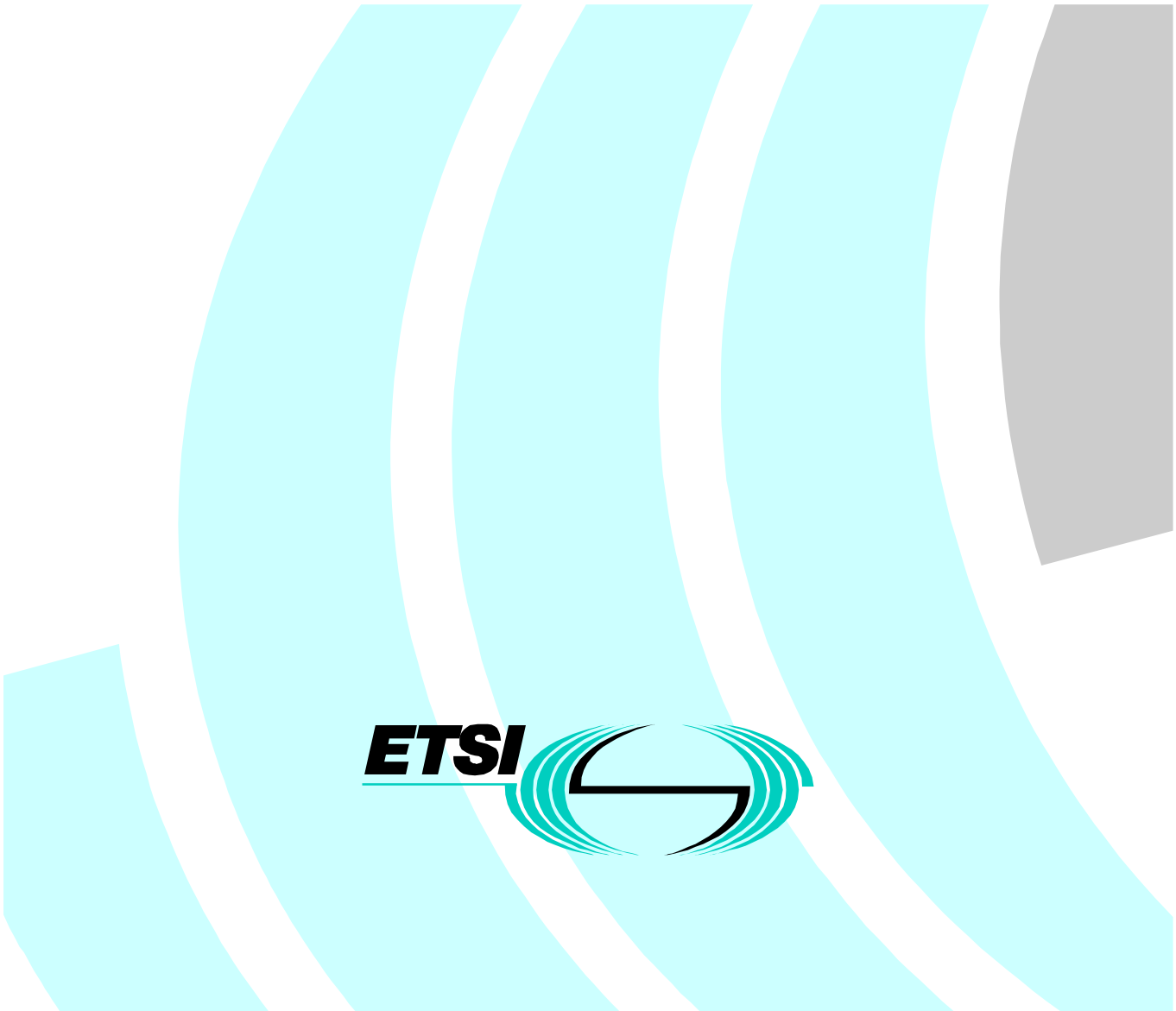
Final draft ETSI EN 300 166 V1.2.1 (2001-05)

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

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Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Transmission and Multiplexing (TM), and is now submitted for the ETSI standards One-step Approval Procedure.

The present document specifies the physical and electrical characteristics of hierarchical interfaces based on IUT-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.

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

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
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
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.		

Clause	Title	Statement
11	Interface at 34 368 kbit/s	N
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.

Annex A (informative): Bibliography

- ITU-T Recommendation K.27 (1996): "Bonding configurations and earthing inside a telecommunication building".
- ITU-T Recommendation K.41 (1998): "Resistibility of internal interfaces of telecommunication centres to surge overvoltages".

History

Document history		
Edition 1	August 1993	Publication
V1.2.1	April 2001	One-step Approval Procedure OAP 20010831: 2001-05-02 to 2001-08-31