



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.996.1

Amendment 1
(03/2003)

SERIES G: TRANSMISSION SYSTEMS AND MEDIA,
DIGITAL SYSTEMS AND NETWORKS

Digital sections and digital line system – Access networks

Test procedures for digital subscriber line (DSL)
transceivers

Amendment 1: New Annex B

ITU-T Recommendation G.996.1 (2001) – Amendment 1

ITU-T G-SERIES RECOMMENDATIONS
TRANSMISSION SYSTEMS AND MEDIA, DIGITAL SYSTEMS AND NETWORKS

INTERNATIONAL TELEPHONE CONNECTIONS AND CIRCUITS	G.100–G.199
GENERAL CHARACTERISTICS COMMON TO ALL ANALOGUE CARRIER-TRANSMISSION SYSTEMS	G.200–G.299
INDIVIDUAL CHARACTERISTICS OF INTERNATIONAL CARRIER TELEPHONE SYSTEMS ON METALLIC LINES	G.300–G.399
GENERAL CHARACTERISTICS OF INTERNATIONAL CARRIER TELEPHONE SYSTEMS ON RADIO-RELAY OR SATELLITE LINKS AND INTERCONNECTION WITH METALLIC LINES	G.400–G.449
COORDINATION OF RADIOTELEPHONY AND LINE TELEPHONY	G.450–G.499
TESTING EQUIPMENTS	G.500–G.599
TRANSMISSION MEDIA CHARACTERISTICS	G.600–G.699
DIGITAL TERMINAL EQUIPMENTS	G.700–G.799
DIGITAL NETWORKS	G.800–G.899
DIGITAL SECTIONS AND DIGITAL LINE SYSTEM	G.900–G.999
General	G.900–G.909
Parameters for optical fibre cable systems	G.910–G.919
Digital sections at hierarchical bit rates based on a bit rate of 2048 kbit/s	G.920–G.929
Digital line transmission systems on cable at non-hierarchical bit rates	G.930–G.939
Digital line systems provided by FDM transmission bearers	G.940–G.949
Digital line systems	G.950–G.959
Digital section and digital transmission systems for customer access to ISDN	G.960–G.969
Optical fibre submarine cable systems	G.970–G.979
Optical line systems for local and access networks	G.980–G.989
Access networks	G.990–G.999
QUALITY OF SERVICE AND PERFORMANCE	G.1000–G.1999
TRANSMISSION MEDIA CHARACTERISTICS	G.6000–G.6999
DIGITAL TERMINAL EQUIPMENTS	G.7000–G.7999
DIGITAL NETWORKS	G.8000–G.8999

For further details, please refer to the list of ITU-T Recommendations.

ITU-T Recommendation G.996.1

Test procedures for digital subscriber line (DSL) transceivers

Amendment 1

New Annex B

Summary

The amendment adds a new Annex B to ITU-T Rec. G.996.1 that contains primary constants and disturbers for test loops for use in ADSL+ in an environment coexisting with TCM-ISDN DSL.

Source

Amendment 1 to ITU-T Recommendation G.996.1 (2001) was prepared by ITU-T Study Group 15 (2001-2004) and approved under the WTSA Resolution 1 procedure on 16 March 2003.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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ITU-T Recommendation G.996.1

Test procedures for digital subscriber line (DSL) transceivers

Amendment 1

New Annex B

1) New Annex B

Add the following Annex B to ITU-T Rec. G.996.1:

Annex B

Test loops and crosstalk disturbers of ADSL transceivers with extended bandwidth for environment coexisting with TCM-ISDN DSL as defined in ITU-T Rec. G.961 Appendix III

B.1 Test loops

B.1.1 Loop configurations

To test the performance of ADSL transceivers with extended bandwidth, the test loops in Figure 11 and the associate loop lengths in Table 10 shall be used.

B.1.2 Primary line constants

The primary line constants are R, L, C, and G. The equations below give the values of R in ohm/m, L in H/m, G in mho/m, C in F/m, and f (frequency) in Hz. The equation of G only is modified to that defined in 6.1.3. The coefficient values are shown in Table B.1. The values of the exponent "ge" contained in the equation of G are added in Table B.1, and the other coefficient values are the same as those shown in Table 11.

$$R = 2(R_i + R_n + R_{ns}) \quad [\text{ohm/m}]$$

$$L = 2(L_a + L_i + L_n + L_{ns}) \quad [\text{H/m}]$$

$$C = C_i \quad [\text{F/m}]$$

$$G = 2\pi f^{ge} C \tan \delta \quad [\text{mho/m}]$$

$$R_i = \frac{1}{\pi r_i^2 \sigma_i} \operatorname{Re} \left[\frac{\lambda}{2} \frac{J_0(\lambda)}{J_1(\lambda)} \right]; \quad \text{skin effect}$$

$$R_n = \frac{1}{\pi d_i^2 \sigma_i} \operatorname{Re} \left[-\lambda \frac{J_1(\lambda)}{J_0(\lambda)} \right]; \quad \text{intra-pair eddy current effect}$$

$$R_{ns} = \frac{1}{\pi d_i^2 \sigma_i} 4 \operatorname{Re} \left[-\lambda \frac{J_1(\lambda)}{J_0(\lambda)} \right]; \quad \text{intra-quad eddy current effect}$$

$$L_a = \frac{\mu_0}{2\pi} \ln \left(\frac{d_i}{r_i} \right); \quad \text{external inductance}$$