International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.996.2

Amendment 4

(08/2013)

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

Digital sections and digital line system – Metallic access networks

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Single-ended line testing for digital subscriber lines (DSL)

Amendment 4: Updates to Annex E

Recommendation ITU-T G.996.2 (2009) – Amendment 4

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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
TRANSMISSION MEDIA AND OPTICAL SYSTEMS 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
Metallic access networks	**G.990–G.999**
MULTIMEDIA QUALITY OF SERVICE AND PERFORMANCE – GENERIC AND USER-RELATED ASPECTS	G.1000–G.1999
TRANSMISSION MEDIA CHARACTERISTICS	G.6000–G.6999
DATA OVER TRANSPORT – GENERIC ASPECTS	G.7000–G.7999
PACKET OVER TRANSPORT ASPECTS	G.8000–G.8999
ACCESS NETWORKS	G.9000–G.9999

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

Recommendation ITU-T G.996.2

Single-ended line testing for digital subscriber lines (DSL)

Amendment 4:

Updates to Annex E

Summary

Amendment 4 to Recommendation ITU-T G.996.2 (2009) provides the following updates to Annex E:

- accuracy values for multi-component 4-element resistance and 3-element capacitance parameters in MELT-PMD
- a definition on dealing with the xDSL input capacitance during measurements.

History

Edition	Recommendation	Approval	Study Group	Unique ID[1]
1.0	ITU-T G.996.2	2009-05-22	15	11.1002/1000/9666-en
1.1	ITU-T G.996.2 (2009) Amd. 1	2009-10-09	15	11.1002/1000/9892-en
1.2	ITU-T G.996.2 (2009) Amd. 2	2012-04-06	15	11.1002/1000/11503-en
1.3	ITU-T G.996.2 (2009) Amd. 3	2013-03-16	15	11.1002/1000/11892-en
1.4	ITU-T G.996.2 (2009) Amd. 4	2013-08-29	15	11.1002/1000/11995-en

[1] To access the Recommendation, type the URL http://handle.itu.int/ in the address field of your web browser, followed by the Recommendation's unique ID. For example, http://handle.itu.int/11.1002/1000/11830-en.

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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.

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Recommendation ITU-T G.996.2

Single-ended line testing for digital subscriber lines (DSL)

Amendment 4:

Updates to Annex E

1) Update to Annex E – Specific requirements for a MELT-PMD

Add the following new paragraph to the end of clause E.1:

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The accuracy values provided in this annex are based on an assumption that the MELT functionality has, or obtains, the value of the input capacitance looking into the xTU-C and subtracts it from the raw results to report the measurement of the external capacitance. The method to obtain the input capacitance of the xTU-C is vendor discretionary and is beyond the scope of this Recommendation. No part of the overall accuracy budget has been allocated to account for a possible change in the input capacitance of the xTU-C.

Add a new clause E.1.1.12 as follows:

E.1.1.12 Combined measurement of 4-element resistance and 3-element capacitance

The accuracy numbers defined in clauses E.1.1.1.1 and E.1.1.2 apply to a 4-element DC resistance and a 3-element capacitance measurement performed on a single component. This clause defines the accuracy numbers for a combined measurement performed on a multiple component network as shown in Figure E.3. The network consists of six components located tip-to-ring, tip-to-ground and ring-to-ground, with neither foreign voltages nor a signature network connected to it.

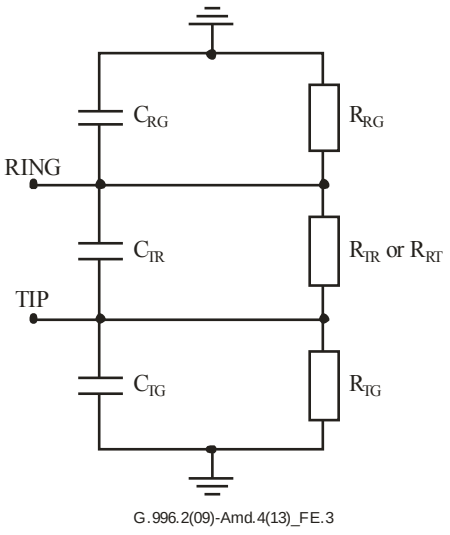

Figure E.3 – Multiple component network

The accuracy numbers included in Tables E.11.8 to E.11.12 are applicable to a combined measurement of 4-element DC resistance and 3-element capacitance when using any combination of external components selected within the range of values defined in Table E.11.6 or in Table E.11.7. Tables E.11.8 to E.11.12, indicating the accuracy of individual components when

measured within a multi-component network, shall not be used for components outside of the range covered by Tables E.11.6 and E.11.7.

Table E.11.6 – Range of external components for MELT measurements on ADSLplus or VSDL equipment

Resistance range:	1 MΩ to 6.8 MΩ
C_{TG} and C_{RG} capacitance range:	22 nF to 470 nF
C_{TR} capacitance range:	10 nF to 100 nF

Table E.11.7 – Range of external components for MELT measurements on SHDSL equipment

Resistance range:	1 MΩ to 6.8 MΩ
C_{TG} and C_{RG} capacitance range:	22 nF to 470 nF
C_{TR} capacitance range:	100 nF to 1 µF

Tables E.11.8 to E.11.12 provide the accuracy of individual components when measured within a multi-component network. Those accuracy figures are applicable when all components have values selected within the ranges specified in Table E.11.6 for ADSL2plus or VDSL applications, or specified in Table E.11.7 for SHDSL applications. The accuracies are cumulative when both an absolute and a relative figure are provided. The 7-element parameter set, that is the four DC resistances (R_{TR}, R_{RT}, R_{TG} and R_{RG}) and the three capacitances (C_{TR}, C_{TG} and C_{RG}), shall be measured and reported.

Table E.11.8 – Resistance accuracy R_{TR}, R_{TG}, R_{RG}

Resistance range	Accuracy
1 MΩ-4 MΩ	±15%
4 MΩ-5 MΩ	±20%
5 MΩ-6.8 MΩ	±25%

Table E.11.9 – Capacitance accuracy C_{TR} for MELT measurements on ADSLplus or VSDL equipment

Capacitance range	Accuracy
10 nF-60 nF	±7 nF
60 nF-100 nF	±(4 nF + 5%)

Table E.11.10 – Capacitance accuracy C_{TG}, C_{RG} for MELT measurements on ADSLplus or VSDL equipment

Capacitance range	Accuracy
22 nF-60 nF	±6 nF
60 nF-300 nF	±(3 nF + 5%)
300 nF-470 nF	±6%

Table E.11.11 – Capacitance accuracy C_{TR} for MELT measurements on SHDSL equipment

Capacitance range	Accuracy
100 nF-700 nF	±55 nF
700 nF-1 µF	±(20 nF + 5%)

Table E.11.12 – Capacitance accuracy C_{TG}, C_{RG} for MELT measurements on SHDSL equipment

Capacitance range	Accuracy
22 nF-250 nF	±25 nF
250 nF-470 nF	±(15 nF + 4%)

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Series E	Overall network operation, telephone service, service operation and human factors
Series F	Non-telephone telecommunication services
Series G	**Transmission systems and media, digital systems and networks**
Series H	Audiovisual and multimedia systems
Series I	Integrated services digital network
Series J	Cable networks and transmission of television, sound programme and other multimedia signals
Series K	Protection against interference
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