International Telecommunication Union

ITU-T

TELECOMMUNICATION
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G.997.1

Amendment 1

(12/2006)

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

Digital sections and digital line system – Access networks

Physical layer management for digital subscriber line (DSL) transceivers

Amendment 1

ITU-T Recommendation G.997.1 (2006) – Amendment 1

ITU-T

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
Access networks	**G.990–G.999**
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.

ITU-T Recommendation G.997.1

Physical layer management for digital subscriber line (DSL) transceivers

Amendment 1

Summary

This amendment to ITU-T Recommendation G.997.1 contains:

– addition of a new management interface "G" between the ME of the NT and the NMS;

– optional extension of some Channel test, diagnostic and status parameters and Line test, diagnostic and status parameters to G.992.1, G.992.3, G.992.4 and G.992.5;

– addition of a maximum delay variation parameter;

– addition of a channel initialization policy selection parameter;

– support of new PSD masks of G.993.2.

Source

Amendment 1 to ITU-T Recommendation G.997.1 (2006) was approved on 14 December 2006 by ITU-T Study Group 15 (2005-2008) under the ITU-T Recommendation A.8 procedure.

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.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure e.g. interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

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As of the date of approval of this Recommendation, ITU had received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

CONTENTS

ITU-T Recommendation G.997.1

Physical layer management for digital subscriber line (DSL) transceivers

Amendment 1

1) Addition of "G" interface

a) Modify clause 5 as follows:

5 Overview

Figure 5-1 shows the system reference model for this Recommendation.

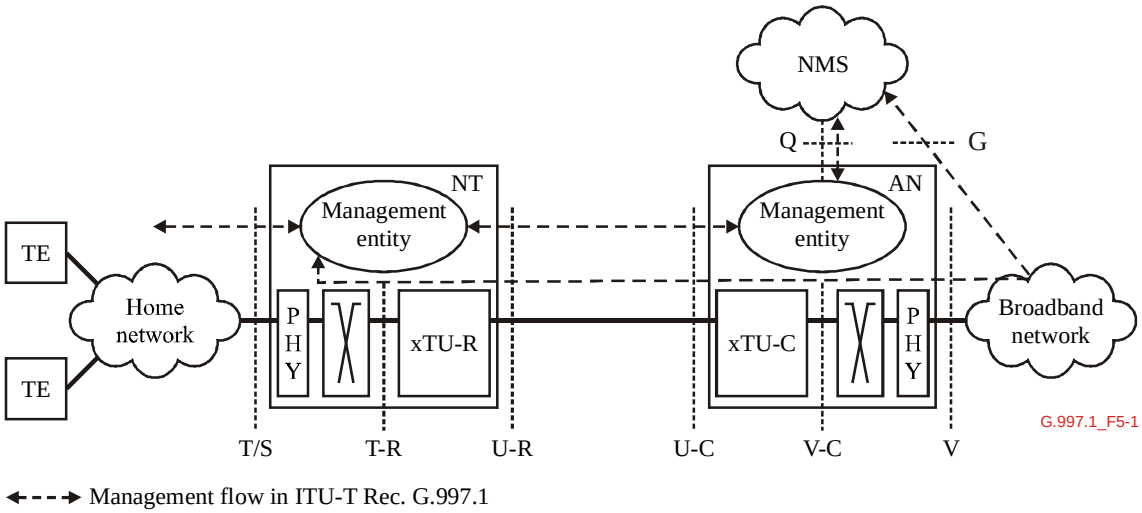

Figure 5-1/G.997.1 – System reference model

There are four management interfaces defined in this Recommendation.

The Q-interface is at the AN for Network Management Systems (NMS). All the parameters specified in this Recommendation apply at the Q-interface. The Q-interface provides the interface between the NMS of the operator and the Management Entity (ME) in the Access Node.

The near-end parameters supported in the ME at the AN are derived from the xTU-C while the far-end parameters (from the xTU-R) can be derived by either of two mechanisms over the U-interface:

- Indicator bits and EOC message can be used to generate the required xTU-R parameters in the ME of the AN.
- The OAM channel and protocol (specified in clause 6) can be used to retrieve the parameters from the xTU-R, when requested by the ME of the AN.

The definition of the transport of the management instrumentation over the Q-interface is outside the scope of this Recommendation. The coding of the management information transferred over the Q-interface is beyond the scope of this Recommendation.

Two management interfaces U-C at the xTU-C and U-R at the xTU-R, are defined. Their main purposes are to provide:

- At the xTU-C: the xTU-C near-end parameters for the xTU-R to retrieve over the U-interface.
- At the xTU-R: the xTU-R near-end parameters for the xTU-C to retrieve over the U-interface.

This Recommendation defines (see clause 6) a method for the communication of the xTU parameters defined in clause 7 over the U-interface.

NOTE 1 – In this Recommendation, U-C and U-R refer to the management interfaces that apply to the respective physical reference points defined in respective Recommendations. In ITU-T Rec. G.993.2, the reference point U-C is referred to as U-O.

At the T-/S-interface a subset of the parameters specified in this Recommendation may apply. The purpose is to indicate the ADSL or VDSL2 link status to the TE. These parameters are maintained by the ME of the NT and are made available over the T-/S-interface.

The G-interface is defined and refers to the management flows from the ME on the NT directly to the NMS when that flow crosses the 'U-C' and 'U-R' interface, but the management flow is not mediated by the ME on the AN. The specification of the protocols to support flows that cross the G-interface is outside the scope of this Recommendation. The parameters supported at the G-interface are a superset of those supported at the S/T interface and they are maintained by the ME of the NT.

The far-end parameters (from the xTU-C) can be derived by either of two mechanisms over the U-interface:

- Indicator bits and EOC message, which are provided at the PMD layer, can be used to generate the required xTU-C parameters in the ME of the NT.
- The OAM channel and protocol (specified in clause 6) can be used to retrieve the parameters from the xTU-C, when requested by the ME of the NT.

The definition of the transport of this management information over the T-/S-interfaces is outside the scope of this Recommendation. The coding of the management information transferred over the T/S-interface is beyond the scope of this Recommendation.

Depending on the transceiver Recommendation (e.g., G.992.1 or G.992.2), some of the parameters may not apply (i.e., fast data stream parameters for ITU-T Rec. G.992.2).

Specific Parameters may be applicable to specific transceiver Recommendations. Tables in clause 7.6 provide the applicability of any specific parameter to any particular Recommendation in the G.992.x series of ITU-T Recommendations and/or to ITU-T Rec. G.993.2.

NOTE 2 – Throughout this Recommendation, the use of the term "xTU-C" refers to both ATU-C and VTU-O, while the term "xTU-R" refers to both ATU-R and VTU-R.

b) *Modify clause 7.6 as follows*:

7.6 Network management elements partitioning

This clause defines the network management elements which correspond to the specific management interfaces:

Q-interface: Management interface towards the xTU-C, from the network side perspective. The xTU-C provides its near-end (at xTU-C) and far-end (at xTU-R) parameters for the system operator to read and write.

U-C interface: Management interface towards the xTU-C, from the xTU-R's perspective. The xTU-C provides its near-end parameters (xTU-R far-end) for the xTU-R to read.

U-R interface: Management interface towards the xTU-R, from the xTU-C's perspective. The xTU-R provides its near-end parameters (xTU-C far-end) for the xTU-C to read.

T-/S-interface: Management interface towards the xTU-R, from the premises side perspective. The xTU-R provides its near-end (at xTU-R) and far-end (at xTU-C) parameters for the subscriber to read and write.

G-interface: Management interface towards the xTU-R, from the NMS perspective. The xTU-R provides its near-end (at xTU-R) and far-end (at xTU-C) parameters for the NMS to read.

The U-C and U-R management interfaces represent the network management elements to be supported through the OAM communications channel specified in this Recommendation (see clause 6). The exchange between the xTU-C and xTU-R of some or all of these network management elements may already be obtained by the EOC commands defined in the respective Recommendations.

The parameters at the management interfaces are described in two categories. Each category is presented by two tables. The first table (e.g., Table 7-10 for "Line failures") indicates the status of the parameter at the corresponding management interface as:

- R are read only.
- W are write only.
- R/W are read and write.
- (M) are mandatory.
- (O) are optional.

If the status of the parameter over the G-interface is not explicitly stated, it is identical to the status of the same parameter over the T-/S-interface.

NOTE – Some management elements are useful only when optional features of the physical layer Recommendation are supported by the xTUs.

The far-end fault and performance monitoring over the Q-interface is equivalent to the near-end fault and performance monitoring over the T-/S-interface. The near-end fault and performance monitoring over the Q-interface is equivalent to the far-end fault and performance monitoring over the T-/S-interface. Over the Q-interface, near-end fault and performance monitoring applies to the upstream direction only and far-end performance monitoring applies to the downstream direction only. Over the T-/S-interface, near-end fault and performance monitoring applies to the downstream direction only and far-end performance monitoring applies to the upstream direction only.

2) Extension to the support and reporting of Channel test, diagnostic and status parameters

a) Modify clause 7.5.2.7 as follows:

7.5.2.7 Actual latency path (LPATH)

This parameter reports the index of the actual latency path in which the bearer is transported. The valid values are 0, ~~and~~ 1, 2, 3. For G.992.1, the FAST path shall be mapped to the latency index 0, and the INTERLEAVED path shall be mapped to the latency index 1.

b) Modify the last paragraph of clause 7.6 as follows:

The second table for each category (e.g., Table 7-11 for "Line failures") indicates for which Recommendations the management element is relevant. A "Y" in a column means that this MIB element is relevant for the specified Recommendation over at least one of the interfaces.

c) Modify Table 7-30 as follows:

Table 7-30/G.997.1 – Channel test, diagnostic and status parameters

Category/Element	Defined in:	Q-Interface	U-C Interface	U-R Interface	T-/S-Interface	G-Interface
Actual Data Rate	7.5.2.1	R (M)			R (O)	R (O)
Previous Data Rate	7.5.2.2	R (M)			R (O)	R (O)
Actual Interleaving Delay	7.5.2.3	R (M)		R (O)	R (O)	R (O)
ACTINP	7.5.2.4	R (M)		R (O)	R (O)	R (O)
INPREPORT	7.5.2.5	R (M)		R (O)	R (O)	R (O)
Actual Framer Setting						
NFEC	7.5.2.6.1	R (M/O) (Note)		R (O)	~~R (O)~~	R (O)
RFEC	7.5.2.6.2	R (M/O) (Note)		R (O)	~~R (O)~~	R (O)
LSYMB	7.5.2.6.3	R (M/O) (Note)		R (O)	~~R (O)~~	R (O)
INTLVDEPTH	7.5.2.6.4	R (M/O) (Note)		R (O)	~~R (O)~~	R (O)
INTLVBLOCK	7.5.2.6.5	R (M)		R (O)	~~R (O)~~	R (O)
Actual Latency Path						
LPATH	7.5.2.7	R (M/O) (Note)		R (O)	~~R (O)~~	R (O)
NOTE – These parameters are R (M) on the Q-interface for G.993.2 and R (O) for all other ITU-T Recommendations, which support them.						

d) *Modify Table 7-31 as follows*:

Table 7-31/G.997.1 – Support of Channel test, diagnostic and status parameters per Recommendation

Category/Element	G.992.1	G.992.2	G.992.3	G.992.4	G.992.5	G.993.2
Actual Data Rate	Y	Y	Y	Y	Y	Y
Previous Data Rate	Y	Y	Y	Y	Y	Y
Actual Interleaving Delay	Y	Y	Y	Y	Y	Y
ACTINP			Y	Y	Y	Y
INPREPORT						Y
Actual Framer Setting						
NFEC	Y	Y	Y	Y	Y	Y
RFEC	Y	Y	Y	Y	Y	Y
LSYMB	Y	Y	Y	Y	Y	Y
INTLVDEPTH	Y	Y	Y	Y	Y	Y
INTLVBLOCK						Y
Actual Latency Path						
LPATH	Y	Y	Y	Y	Y	Y

3) Extension to the support and reporting of Line test, diagnostic and status parameters

a) *Modify Table 7-28 as follows:*

Table 7-28/G.997.1 – Line test, diagnostic and status parameters

Category/Element	Defined in:	Q-Interface	U-C Interface	U-R Interface	T-/S-Interface	G-Interface
xDSL Transmission System	7.5.1.1	R (M)			R (O)	R (O)
VDSL2 Profile	7.5.1.2	R (M)			R (O)	R (O)
VDSL2 Limit PSD Mask and Band plan	7.5.1.3	R (M)			R (O)	R (O)
VDSL2 US0 PSD Mask	7.5.1.4	R (M)			R (O)	R (O)
Power Management State	7.5.1.5	R (M)			R (O)	R (O)
Initialization						
Success/Failure Cause	7.5.1.6	R (M)			R (M)	R (M)
Last State Transmitted Downstream	7.5.1.7	R (M)			R (M)	R (M)
Last State Transmitted Upstream	7.5.1.8	R (M)			R (M)	R (M)
Attenuation						
LATNds	7.5.1.9	R (M)		R (O)	R (M)	R (M)
LATNus	7.5.1.10	R (M)	R (O)		R (M)	R (M)
SATNds	7.5.1.11	R (M)		R (O)	R (M)	R (M)
SATNus	7.5.1.12	R (M)	R (O)		R (M)	R (M)

Table 7-28/G.997.1 – Line test, diagnostic and status parameters

Category/Element	Defined in:	Q-Interface	U-C Interface	U-R Interface	T-/S-Interface	G-Interface
Signal-to-Noise Ratio Margin						
SNRMds	7.5.1.13	R (M)		R (O)	R (M)	R (M)
SNRMpbds	7.5.1.14	R (M)		R (O)	R (M)	R (M)
ACTSNRMODEds	7.5.1.15	R (M)		R (O)	R (M)	R (M)
SNRMus	7.5.1.16	R (M)	R (O)		R (M)	R (M)
SNRMpbus	7.5.1.17	R (M)	R (O)		R (M)	R (M)
ACTSNRMODEus	7.5.1.18	R (M)	R (O)		R (M)	R (M)
Attainable Data rate						
ATTNDRds	7.5.1.19	R (M)	R (O)		R (M)	R (M)
ATTNDRus	7.5.1.20	R (M)		R (O)	R (M)	R (M)
Actual Power Spectral Density						
ACTPSDds	7.5.1.21	R (M)	R (O)			R (O)
ACTPSDus	7.5.1.22	R (M)		R (O)		R (O)
Upstream Power Back-Off						
UPBOKLE	7.5.1.23	R (M)	R (O)			R (O)
Actual Aggregate Transmit Power						
ACTATPds	7.5.1.24	R (M)		R (O)	R (M)	R (M)
ACTATPus	7.5.1.25	R (M)	R (O)		R (M)	R (M)
Channel Characteristics per subcarrier						
HLINSCds	7.5.1.26.1	R (M)	R (O)		R (M)	R (M)
HLINGds	7.5.1.26.2	R (M)	R (O)		R (M)	R (M)
HLINpsds	7.5.1.26.3	R (M)	R (O)		R (M)	R (M)
HLOGMTds	7.5.1.26.4	R (M)	R (O)		R (M)	R (M)
HLOGGds	7.5.1.26.5	R (M)	R (O)		R (M)	R (M)
HLOGpsds	7.5.1.26.6	R (M)	R (O)		R (M)	R (M)
HLINSCus	7.5.1.26.7	R (M)		R (O)	R (M)	R (M)
HLINGus	7.5.1.26.8	R (M)		R (O)	R (M)	R (M)
HLINpsus	7.5.1.26.9	R (M)		R (O)	R (M)	R (M)
HLOGMTus	7.5.1.26.10	R (M)		R (O)	R (M)	R (M)
HLOGGus	7.5.1.26.11	R (M)		R (O)	R (M)	R (M)
HLOGpsus	7.5.1.26.12	R (M)		R (O)	R (M)	R (M)
Quiet Line Noise PSD per subcarrier						
QLNMTds	7.5.1.27.1	R (M)	R (O)		R (M)	R (M)
QLNGds	7.5.1.27.2	R (M)	R (O)		R (M)	R (M)
QLNpsds	7.5.1.27.3	R (M)	R (O)		R (M)	R (M)
QLNMTus	7.5.1.27.4	R (M)		R (O)	R (M)	R (M)
QLNGus	7.5.1.27.5	R (M)		R (O)	R (M)	R (M)

Table 7-28/G.997.1 – Line test, diagnostic and status parameters

Category/Element	Defined in:	Q-Interface	U-C Interface	U-R Interface	T-/S-Interface	G-Interface
QLNpsus	7.5.1.27.6	R (M)		R (O)	R (M)	R (M)
Signal-to-Noise Ratio per subcarrier						
SNRMTds	7.5.1.28.1	R (M)	R (O)		R (M)	R (M)
SNRGds	7.5.1.28.2	R (M)	R (O)		R (M)	R (M)
SNRpsds	7.5.1.28.3	R (M)	R (O)		R (M)	R (M)
SNRMTus	7.5.1.28.4	R (M)		R (O)	R (M)	R (M)
SNRGus	7.5.1.28.5	R (M)		R (O)	R (M)	R (M)
SNRpsus	7.5.1.28.6	R (M)		R (O)	R (M)	R (M)
Bit Allocation per subcarrier						
BITSpsds	7.5.1.29.1	R (M)	R (O)			R (O)
BITSpsus	7.5.1.29.2	R (M)		R (O)		R (O)
Gain Scaling per subcarrier						
GAINSpsds	7.5.1.29.3	R (M)	R (O)			
GAINSpsus	7.5.1.29.4	R (M)		R (O)		
TSSpsds	7.5.1.29.5	R (M)	R (O)			
TSSpsus	7.5.1.29.6	R (M)	R (O)			
MREFPSDds	7.5.1.29.7	R (M)	R (O)			R (O)
MREFPSDus	7.5.1.29.8	R (M)	R (O)			R (O)
Trellis use						
TRELLISds	7.5.1.30	R (M/O) (Note)		R (O)	R (M/O) (Note)	R (M/O) (Note)
TRELLISus	7.5.1.31	R (M/O) (Note)	R (O)		R (M/O) (Note)	R (M/O) (Note)
Cyclic Extension						
ACTUALCE	7.5.1.32	R (M)			R (M)	R (M)
NOTE – These parameters are R (M) on the Q-interface for G.993.2 and R (O) for all other ITU-T Recommendations which support them.						

b) *Modify Table 7-29 as follows*:

Table 7-29/G.997.1 – Support of Line test, diagnostic and status parameters per Recommendation

Category/Element	G.992.1	G.992.2	G.992.3	G.992.4	G.992.5	G.993.2
xDSL Transmission System	Y	Y	Y	Y	Y	Y
VDSL2 Profile						Y
VDSL2 Limit PSD Mask and Band plan						Y
VDSL2 US0 PSD Mask						Y (Annex A)
Power Management State	Y	Y	Y	Y	Y	Y
Initialization						
Success/Failure Cause	Y	Y	Y	Y	Y	Y
Last State Transmitted Downstream			Y	Y	Y	Y
Last State Transmitted Upstream			Y	Y	Y	Y
Attenuation						
LATNds	Y	Y	Y	Y	Y	Y
LATNus	Y	Y	Y	Y	Y	Y
SATNds			Y	Y	Y	Y
SATNus			Y	Y	Y	Y
Signal-to-Noise Ratio Margin						
SNRMds	Y	Y	Y	Y	Y	Y
SNRMpbds						Y
ACTSNRMODEds						Y
SNRMus	Y	Y	Y	Y	Y	Y
SNRMpbus						Y
ACTSNRMODEus						Y
Attainable Data rate						
ATTNDRds	Y	Y	Y	Y	Y	Y
ATTNDRus	Y	Y	Y	Y	Y	Y
Actual Power Spectral Density						
ACTPSDds			Y	Y	Y	
ACTPSDus			Y	Y	Y	
Upstream Power Back-Off						
UPBOKLE						Y

Table 7-29/G.997.1 – Support of Line test, diagnostic and status parameters per Recommendation

Category/Element	G.992.1	G.992.2	G.992.3	G.992.4	G.992.5	G.993.2
Actual Aggregate Transmit Power						
ACTATPds	Y	Y	Y	Y	Y	Y
ACTATPus	Y	Y	Y	Y	Y	Y
Channel Characteristics per subcarrier						
HLINSCds			Y	Y	Y	Y
HLINGds						Y
HLINpsds			Y	Y	Y	Y
HLOGMTds			Y	Y	Y	Y
HLOGGds						Y
HLOGpsds			Y	Y	Y	Y
HLINSCus			Y	Y	Y	Y
HLINGus						Y
HLINpsus			Y	Y	Y	Y
HLOGMTus			Y	Y	Y	Y
HLOGGus						Y
HLOGpsus			Y	Y	Y	Y
Quiet Line Noise PSD per subcarrier						
QLNMTds			Y	Y	Y	Y
QLNGds						Y
QLNpsds			Y	Y	Y	Y
QLNMTus			Y	Y	Y	Y
QLNGus						Y
QLNpsus			Y	Y	Y	Y
Signal-to-Noise Ratio per subcarrier						
SNRMTds			Y	Y	Y	Y
SNRGds						Y
SNRpsds			Y	Y	Y	Y
SNRMTus			Y	Y	Y	Y
SNRGus						Y
SNRpsus			Y	Y	Y	Y
Bit Allocation per subcarrier						
BITSpsds			Y	Y	Y	Y
BITSpsus			Y	Y	Y	Y

Table 7-29/G.997.1 – Support of Line test, diagnostic and status parameters per Recommendation

Category/Element	G.992.1	G.992.2	G.992.3	G.992.4	G.992.5	G.993.2
Gain Scaling per subcarrier						
GAINSpsds			Y	Y	Y	Y
GAINSpsus			Y	Y	Y	Y
TSSpsds			Y	Y	Y	
TSSpsus			Y	Y	Y	
MREFPSDds						Y
MREFPSDus						Y
Trellis Use						
TRELLISds	Y		Y	Y	Y	Y
TRELLISus	Y		Y	Y	Y	Y
Cyclic Extension						
ACTUALCE						Y

4) Maximum delay variation parameter

a) Add new clause 7.3.2.9:

7.3.2.9 Maximum delay variation (DVMAX)

This parameter specifies the maximum value for the delay variation allowed in an OLR procedure.

It ranges from 0.1 to 25.4 in steps of 0.1 ms.

A special value indicates that no delay variation bound is imposed.

b) Add a line in Table 7-16 as follows:

Table 7-16/G.997.1 – Channel configuration profile

Category/Element	Defined in:	Q-Interface	U-C Interface	U-R Interface	T-/S-Interface
• • •					
Data Rate Threshold Downshift	7.3.2.8.2	R/W (M)			
Maximum Delay Variation (DVMAX)	7.3.2.9	R/W (O)			
Near-end (xTU-C) Performance Monitoring Thresholds (15-minute interval)					
• • •					

c) Add a line in Table 7-17 as follows:

Table 7-17/G.997.1 – Support of Channel configuration parameters per Recommendation

Category/Element	G.992.1	G.992.2	G.992.3	G.992.4	G.992.5	G.993.2
• • •						
Data Rate Threshold Downshift	Y	Y	Y	Y	Y	
Maximum Delay Variation (DVMAX)						Y
Near-end Performance Monitoring Thresholds (15-minute interval)						
• • •						

5) Channel Initialization Policy Selection

a) Add new clause 7.3.2.10:

7.3.2.10 Channel Initialization Policy Selection (CIPOLICY)

The channel initialization policy selection is a parameter that indicates which policy shall be applied to determine the transceiver configuration parameters at initialization. The valid values for CIPOLICY are 0 and 1. They are defined in the respective Recommendations.

b) Add a line in Table 7-16 as follows:

Table 7-16/G.997.1 – Channel configuration profile

Category/Element	Defined in:	Q-Interface	U-C Interface	U-R Interface	T-/S-Interface
• • •					
Data Rate Threshold Downshift	7.3.2.8.2	R/W (M)			
Maximum Delay Variation (DVMAX)	7.3.2.9	R/W (O)			
Channel Initialization Policy selection (CIPOLICY)	7.3.2.10	R/W (O)			
Near-end (xTU-C) Performance Monitoring Thresholds (15-minute interval)					
• • •					

c) Add a line in Table 7-17 as follows:

Table 7-17/G.997.1 – Support of Channel configuration parameters per Recommendation

Category/Element	G.992.1	G.992.2	G.992.3	G.992.4	G.992.5	G.993.2
• • •						
Data Rate Threshold Downshift	Y	Y	Y	Y	Y	
Maximum Delay Variation (DVMAX)						Y
Channel Initialization Policy selection (CIPOLICY)			Y		Y	Y
Near-end Performance Monitoring Thresholds (15-minute interval)						
• • •						

6) Add report of far-end INPREPORT

Modify clause 7.5.2.5 as follows:

7.5.2.5 Impulse noise protection reporting mode (INPREPORT)

This parameter reports the method used to compute the ACTINP. If set to 0, the ACTINP is computed according to the INP_no_erasure formula (9.6/G.993.2). If set to 1, the ACTINP is the value estimated by the xTU receiver.

~~In G.993.2, no means are specified to retrieve the impulse noise protection estimated by the far-end VTU receiver. Therefore, the far-end ACTINP shall be computed according to INP_no_erasure formula and the far-end INPREPORT shall be set to 0.~~

7) Support of new PSD masks of G.993.2

Modify clauses 7.3.1.2.15, 7.3.1.2.16 and 7.3.1.2.18 as follows:

7.3.1.2.15 VDSL2 PSD mask class selection (CLASSMASK)

In order to reduce the number of configuration possibilities, the limit Power Spectral Density masks (limit PSD masks) are grouped in the following PSD mask classes:

– Class 998 Annex A/G.993.2: D-32, D-48, D-64, D-128.

– Class 997-M1c Annex B/G.993.2: 997-M1c-A-7.

– Class 997-M1x Annex B/G.993.2: 997-M1x-M-8, 997-M1x-M.

– Class 997-M2x Annex B/G.993.2: 997-M2x-M-8, 997-M2x-A, 997-M2x-M, 997E17-M2x-NUS0, 997E30-M2x-NUS0.

– Class 998-M1x Annex B/G.993.2: 998-M1x-A, 998-M1x-B, 998-M1x-NUS0.

– Class 998-M2x Annex B/G.993.2: 998-M2x-A, 998-M2x-M, 998-M2x-B, 998-M2x-NUS0, 998E17-M2x-NUS0, 998E17-M2x-NUS0-M, 998E30-M2x-NUS0, 998E30-M2x-NUS0-M.

– Class 998ADE-M2x Annex B/G.993.2: 998-M2x-A, 998-M2x-M, 998-M2x-B, 998-M2x-NUS0, 998ADE17-M2x-A, 998ADE17-M2x-B, 998ADE17-M2x-NUS0-M, 998ADE30-M2x-NUS0-A, 998ADE30-M2x-NUS0-M.

– Class 998-B Annex C/G.993.2: POTS-138b, POTS-276b (C.2.1.1/G.993.2), TCM-ISDN (C.2.1.2/G.993.2).

– Class 998-CO Annex C/G.993.2: POTS-138co, POTS-276co (C.2.1.1/G.993.2).

– Class HPE-M1 Annex B/G.993.2: HPE17-M1-NUS0, HPE30-M1-NUS0.

Each class is designed such that the PSD levels of each limit PSD mask of a specific class are equal in their respective passband above ~~276~~ 552 kHz.

One CLASSMASK parameter is defined per G.993.2 Annex enabled in the XTSE. It selects a single PSD mask class per G.993.2 Annex that is activated at the VTU-O. The coding is as indicated in Table 7-6.

Table 7-6/G.997.1 – Definition of values of CLASSMASK per G.993.2 Annex

Parameter value	G.993.2 Annex A	G.993.2 Annex B	G.993.2 Annex C
1	998	997-M1c	998-B
2		997-M1x	998-CO
3		997-M2x	
4		998-M1x	
5		998-M2x	
6		998ADE-M2x	
7		HPE	
NOTE – A single PSD mask class shall be selected per G.993.2 Annex.			

7.3.1.2.16 VDSL2 limit PSD masks and band plans enabling (LIMITMASK)

This configuration parameter contains the G.993.2 limit PSD masks of the selected PSD mask class, enabled by the near-end xTU on this line for each class of profiles. One LIMITMASK parameter is defined per G.993.2 Annex enabled in the XTSE.

The profiles are grouped in following profile classes:

– Class 8: Profiles 8a, 8b, 8c, 8d

– Class 12: Profiles 12a, 12b

– Class 17: Profile 17a

– Class 30: Profile 30a

For each profile class, several limit PSD masks of the selected PSD mask class (CLASSMASK) may be enabled. The enabling parameter is coded in a bit-map representation (0 if the associated mask is not allowed, 1 if it is allowed).

The parameter has the bit definitions for each PSD mask class as indicated in Table 7-7.

Table 7-7/G.997.1 – Definition of bits of LIMITMASK for each CLASSMASK

Bit number	Profile class	PSD mask classes									
		Annex A	Annex B							Annex C	
		998 Annex A	998-M1x Annex B	998-M2x Annex B	998ADE-M2x Annex B	997-M1x Annex B	997-M1c Annex B	997-M2x Annex B	HPE-M1 Annex B	998-B Annex C	998-CO Annex C
Octet 1											
1	8	D-32	M1x-A	M2x-A	M2x-A		M1c-A-7	M2x-A		POTS_138b	POTS_138co
2	8	D-48	M1x-B	M2x-B	M2x-B	M1x-M-8		M2x-M-8		TCM-ISDN	POTS_276co
3	8			M2x-M	M2x-M	M1x-M		M2x-M		POTS_276b	
4	8		M1x-NUS0	M2x-NUS0	M2x-NUS0						
5	8										
6	8										
7	8										
8	8										
Octet 2											
1	8	D-64									
2	8	D-128									
3	8										
4	8										
5	8										
6	8										
7	8										
8	8										

Table 7-7/G.997.1 – Definition of bits of LIMITMASK for each CLASSMASK

Bit number	Profile class	PSD mask classes									
		Annex A	Annex B							Annex C	
		998 Annex A	998-M1x Annex B	998-M2x Annex B	998ADE-M2x Annex B	997-M1x Annex B	997-M1c Annex B	997-M2x Annex B	HPE-M1 Annex B	998-B Annex C	998-CO Annex C
Octet 3											
1	12	D-32	M1x-A	M2x-A	M2x-A			M2x-A		POTS_138b	POTS_138 co
2	12	D-48	M1x-B	M2x-B	M2x-B					TCM-ISDN	POTS_276 co
3	12			M2x-M	M2x-M	M1x-M		M2x-M		POTS_276b	
4	12		M1x-NUS0	M2x-NUS0	M2x-NUS0						
5	12										
6	12										
7	12										
8	12										
Octet 4											
1	12	D-64									
2	12	D-128									
3	12										
4	12										
5	12										
6	12										
7	12										
8	12										

Table 7-7/G.997.1 – Definition of bits of LIMITMASK for each CLASSMASK

Bit number	Profile class	PSD mask classes									
		Annex A	Annex B							Annex C	
		998 Annex A	998-M1x Annex B	998-M2x Annex B	998ADE-M2x Annex B	997-M1x Annex B	997-M1c Annex B	997-M2x Annex B	HPE-M1 Annex B	998-B Annex C	998-CO Annex C
Octet 5											
1	17	D-32		E17-M2x-NUS0	ADE17-M2x-A			E17-M2x-NUS0	17-M1-NUS0	POTS_138b	
2	17	D-48		E17-M2x-NUS0-M	ADE17-M2x-B					TCM-ISDN	
3	17				ADE17-M2x-NUS0-M					POTS_276b	
4	17										
5	17										
6	17										
7	17										
8	17										
Octet 6											
1	17	D-64									
2	17	D-128									
3	17										
4	17										
5	17										
6	17										
7	17										
8	17										

Table 7-7/G.997.1 – Definition of bits of LIMITMASK for each CLASSMASK

Bit number	Profile class	PSD mask classes									
		Annex A	Annex B							Annex C	
		998 Annex A	998-M1x Annex B	998-M2x Annex B	998ADE-M2x Annex B	997-M1x Annex B	997-M1c Annex B	997-M2x Annex B	HPE-M1 Annex B	998-B Annex C	998-CO Annex C
Octet 7											
1	30	D-32		E30-M2x-NUS0	ADE30-M2x-NUS0-A			E30-M2x-NUS0	30-M1-NUS0	POTS_138b	
2	30	D-48		E30-M2x-NUS0-M	ADE30-M2x-NUS0-M					TCM-ISDN	
3	30									POTS_276b	
4	30										
5	30										
6	30										
7	30										
8	30										
Octet 8											
1	30	D-64									
2	30	D-128									
3	30										
4	30										
5	30										
6	30										
7	30										
8	30										
NOTE – All unassigned bits are reserved by ITU.											

7.3.1.2.18 VDSL2 US0 PSD Masks (US0MASK)

This parameter contains the US0 PSD masks to be allowed by the near-end xTU on the line. This parameter is only defined for Annex A/G.993.2. It is represented as a bitmap (0 if not allowed and 1 if allowed) with the definitions of Table 7-8.

Table 7-8/G.997-1 – Definition of bits of US0MASK for Annex A/G.993.2

Bit	Annex A/G.993.2 US0MASK
Octet 1	
1	EU-32
2	EU-36
3	EU-40
4	EU-44
5	EU-48
6	EU-52
7	EU-56
8	EU-60
Octet 2	
1	EU-64
2	~~reserved by ITU~~EU-128
3	reserved by ITU
4	reserved by ITU
5	reserved by ITU
6	reserved by ITU
7	reserved by ITU
8	reserved by ITU
Octet 3	
1	ADLU-32
2	ADLU-36
3	ADLU-40
4	ADLU-44
5	ADLU-48
6	ADLU-52
7	ADLU-56
8	ADLU-60

Table 7-8/G.997-1 – Definition of bits of US0MASK for Annex A/G.993.2

Bit	Annex A/G.993.2 US0MASK
Octet 4	
9	ADLU-64
10	~~reserved by ITU~~ADLU-128
11	reserved by ITU
12	reserved by ITU
13	reserved by ITU
14	reserved by ITU
15	reserved by ITU
16	reserved by ITU
NOTE 1 – Valid combinations of US0MASK and LIMITMASK are described in ITU-T Rec. G.993.2. NOTE 2 – More than one mask may be enabled simultaneously. If no US0 PSD masks are enabled, the line is configured without US0 support.	

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