International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.997.1

Amendment 3

(06/2011)

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 3

Recommendation ITU-T G.997.1 (2009) – Amendment 3

ITU International Telecommunication Union

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Recommendation ITU-T G.997.1

Physical layer management for digital subscriber line (DSL) transceivers

Amendment 3

Summary

Amendment 3 to Recommendation ITU-T G.997.1 (2009) contains the following additions:

– Monitoring of interruption for ITU-T G.993.2.

– Management of new retrain criterias for ITU-T G.993.2.

– Management of new electrical loop length estimation for ITU-T G.993.2.

– Change in inhibition rules of LOSS and LOSS-LFE.

– Add modification to the control of the modified ITU-T G.993.2 PSD masks.

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T G.997.1	1999-07-02	15
2.0	ITU-T G.997.1	2003-05-22	15
2.1	ITU-T G.997.1 (2003) Amd. 1	2003-12-14	15
2.2	ITU-T G.997.1 (2003) Amd. 2	2005-01-13	15
3.0	ITU-T G.997.1	2005-09-06	15
4.0	ITU-T G.997.1	2006-06-06	15
4.1	ITU-T G.997.1 (2006) Cor. 1	2006-12-14	15
4.2	ITU-T G.997.1 (2006) Amd. 1	2006-12-14	15
4.3	ITU-T G.997.1 (2006) Amd. 2	2007-11-22	15
4.4	ITU-T G.997.1 (2006) Amd. 3	2008-08-22	15
5.0	ITU-T G.997.1	2009-04-22	15
5.1	ITU-T G.997.1 (2009) Cor. 1	2009-11-13	15
5.2	ITU-T G.997.1 (2009) Amd. 1	2010-06-11	15
5.3	ITU-T G.997.1 (2009) Amd. 2	2010-11-29	15
5.4	ITU-T G.997.1 (2009) Amd. 3	2011-06-22	15

FOREWORD

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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/.

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Recommendation ITU-T G.997.1

Physical layer management for digital subscriber line (DSL) transceivers

Amendment 3

1) Monitoring of short interruptions for ITU-T G.993.2

Add clause 7.2.1.8 as follows:

7.2.1.8 Short interruption performance monitoring parameters

7.2.1.8.1 Loss-of-power interruption count (LPR_INTRPT)

This parameter is a count of the number of *lpr_intrpt* anomalies occurring during the accumulation period. Those anomalies are defined in clause 11.3.1.1 of [ITU-T G.993.2]. Only the counters on the current and previous 24-hours intervals shall be supported. A special value indicates that this counter is not active on the line. Threshold reports for this counter are not specified.

7.2.1.8.2 Host-Reinit interruption count (HRI_INTRPT)

This parameter is a count of the number of *hri_intrpt* anomalies occurring during the accumulation period. Those anomalies are defined in clause 11.3.1.1 of [ITU-T G.993.2]. Only the counters on the current and previous 24-hours intervals shall be supported. A special value indicates that this counter is not active on the line. Threshold reports for this counter are not specified.

7.2.1.8.3 Spontaneous interruption count (SPONT_INTRPT)

This parameter is a count of the number of *spont_intrpt* anomalies occurring during the accumulation period. Those defects are defined in clause 11.3.1.1 of [ITU-T G.993.2]. Only the counters on the current and previous 24-hours intervals shall be supported. A special value indicates that this counter is not active on the line. Threshold reports are specified for the 24-hour interval counter only.

Replace clause 7.2.7.2 with the following:

7.2.7.2 Threshold reports

A threshold report (TR) is an unsolicited error performance report from a ME over the Q-interface and from the xTU-R over the U-interface with respect to either a 15-minute or 24-hour evaluation period. TRs can only occur when the concerned direction is in the available state. At the Q-interface, TRs for near-end and far-end ES, SES and UAS parameters are mandatory and TRs for the other defined parameters are optional except for INM parameters, LPR_INTRPT, HRI_INTRPT, for which TRs are not defined. Threshold reports are not provided at the T-/S-interface.

TR1s shall occur within 10 seconds after the 15-minute threshold is reached or exceeded.

TR2s shall occur within 10 seconds after the 24-hour threshold is reached or exceeded.

Add the following two rows to Table 7-14 before the row "INM configuration parameters":

Table 7-14 – Line configuration profile

Category/Element	Defined in:	Q-Interface	U-C Interface	U-R Interface	T-/S-Interface
…					
Short interruption performance monitoring thresholds (24-hour interval)					
SPONT_INTRPT threshold 24 hours	7.3.1.8	R(O)	R(O)		
INM configuration parameters					

Add the following two rows at the end of Table 7-15:

Table 7-15 – Support of line configuration parameters per Recommendation

Category/Element	G.992.1	G.992.2	G.992.3	G.992.4	G.992.5	G.993.2
…						
Short interruption performance monitoring thresholds (24-hour interval)						
SPONT_INTRPT threshold 24 hours						Y

Add the following four rows at the end of Table 7-22:

Table 7-22 – Line performance monitoring parameters

Category/Element	Defined in:	Q-Interface	U-C Interface	U-R Interface	T-/S-Interface
…					
Short interruption performance monitoring counters (current and previous 24-hour interval)					
LPR_INTRPT counter 24 hours	7.2.1.8.1	R (O)			
HRI_INTRPT counter 24 hours	7.2.1.8.2	R (O)			
SPONT_INTRPT counter 24 hours	7.2.1.8.3	R (O)			

Add the following four rows at the end of Table 7-23:

Table 7-23 – Support of Line performance monitoring parameters per Recommendation

Category/Element	G.992.1	G.992.2	G.992.3	G.992.4	G.992.5	G.993.2	G.998.4
…							
Short interruption performance monitoring counters (current and previous 24-hour interval)							
LPR_INTRPT counter 24 hours						Y	
HRI_INTRPT counter 24 hours						Y	
SPONT_INTRPT counter 24 hours						Y	

2) Management of new retrain criterias for ITU-T G.993.2

Replace clause 7.2.1.1.5 with the following:

7.2.1.1.5 Unavailable Second – Line (UAS-L)

This parameter is a count of 1-second intervals for which the xDSL line is unavailable.

If RIPOLICY is not supported or is not defined for the mode used, or the actual value of RIPOLICY equals 0, ~~The~~ the xDSL line becomes unavailable at the onset of 10 contiguous SES-Ls. These 10 SES-Ls shall be included in unavailable time. Once unavailable, the xDSL line becomes available at the onset of 10 contiguous seconds with no SES-Ls. These 10 seconds with no SES-Ls shall be excluded from unavailable time.

If the actual value of RIPOLICY equals 1, the xDSL line becomes unavailable at the onset of REINIT_TIME_THRESHOLD contiguous SES-Ls. These REINIT_TIME_THRESHOLD SES-Ls shall be included in unavailable time.

Independent of the RIPOLICY, the xDSL line becomes also unavailable when the near-end receiver stops processing showtime symbols, in order to prepare for re-initialization. All contiguous SES-Ls until this moment shall be included in the unavailable time. After initialization or re-initialization, the xDSL line becomes available immediately at the start of showtime.

Some parameter counts are inhibited during unavailability – see clause 7.2.7.13.

Replace clause 7.2.1.2.5 with the following:

7.2.1.2.5 Unavailable Seconds – Line far-end (UAS-LFE)

This parameter is a count of 1-second intervals for which the far-end xDSL line is unavailable.

If the actual value of RIPOLICY equals 0, ~~The~~ the far-end xDSL line becomes unavailable at the onset of 10 contiguous SES-LFEs. These 10 SES-LFEs shall be included in unavailable time. Once unavailable, the far-end xDSL line becomes available at the onset of 10 contiguous seconds with no SES-LFEs. These 10 seconds with no SES-LFEs shall be excluded from unavailable time.

If the actual value of RIPOLICY equals 1, the xDSL line becomes unavailable at the onset of REINIT_TIME_THRESHOLD contiguous SES-LFEs. These REINIT_TIME_THRESHOLD SES-LFEs shall be included in unavailable time.

Independent of the RIPOLICY, the xDSL line becomes also unavailable when the near-end receiver stops processing showtime symbols, in order to prepare for re-initialization. All contiguous SES-LFEs until this moment shall be included in the unavailable time. After initialization or re-initialization, the xDSL line becomes available immediately at the start of showtime.

Some parameter counts are inhibited during unavailability – see clause 7.2.7.13.

Replace Table 7-1 with the following:

Table 7-1 – Line performance monitoring parameter definitions

Name	End	Use at xTU-C	Use at xTU-R	Definition
FECS-L	Near	M	M	FEC ≥ 1 for one or more bearer channels
FECS-LFE	Far	M	O	FFEC ≥ 1 for one or more bearer channels
ES-L	Near	M	M	CRC-8 ≥ 1 for one or more bearer channels **OR** LOS ≥ 1 **OR** SEF ≥ 1 **OR** LPR ≥ 1
ES-LFE	Far	M	O	FEBE ≥ 1 for one or more bearer channels **OR** LOS-FE ≥ 1 **OR** RDI ≥ 1 **OR** LPR-FE ≥ 1

Table 7-1 – Line performance monitoring parameter definitions

Name	End	Use at xTU-C	Use at xTU-R	Definition
SES-L	Near	M	M	CRC-8 ≥ 18 for one or more bearer channels **OR** LOS ≥ 1 **OR** SEF ≥ 1 **OR** LPR ≥ 1 Further conditions see clause 7.2.1.1.3.
SES-LFE	Far	M	O	FEBE ≥ 18 for one or more bearer channels **OR** LOS-FE ≥ 1 **OR** RDI ≥ 1 **OR** LPR-FE ≥ 1 Further condition see clause 7.2.1.2.3
LOSS-L	Near	O	O	LOS ≥ 1
LOSS-LFE	Far	O	O	LOS-FE ≥ 1
UAS-L	Near	M	M	A second of unavailability
UAS-LFE	Far	M	O	A second of unavailability
$INMINPEQ_i$-L	Near	O		Count of $INMAINPEQ_i$-L anomalies on the line
$INMINPEQ_i$-LFE	Far	O		Count of $INMAINPEQ_i$-LFE anomalies on the line
$INMIAT_i$-L	Near	O		Count of $INMAIAT_i$-L anomalies on the line
$INMIAT_i$-LFE	Far	O		Count of $INMAIAT_i$-LFE anomalies on the line
INMME-L	Near	O		Count of INMAME-L anomalies on the line
INMME-LFE	Far	O		Count of INMAME-LFE anomalies on the line

NOTE 1 – Note that **OR** represents a logical OR of two conditions.

NOTE 2 – Unavailability definitions are presented in clauses 7.2.1.1.5 and 7.2.1.2.5~~begins at the onset of 10 contiguous severely errored seconds, and ends at the onset of 10 contiguous seconds with no severely errored seconds~~.

NOTE 3 – If a common CRC or FEC is applied over multiple bearer channels, then each related CRC-8 or FEC anomaly shall be counted only once for the whole set of bearer channels over which the CRC or FEC is applied.

NOTE 4 – If the relevant Recommendation supports one-second normalized CRC counter increments, these increments shall be used instead of an increment of one for each CRC-8 and FEBE anomaly to declare SES.

Add clauses 7.3.1.1.12 and 7.3.1.1.13 as follows:

7.3.1.1.12 Re-Initialization policy selection (RIPOLICY)

7.3.1.1.12.1 Downstream re-initialization policy selection (RIPOLICYds)

The RIPOLICYds parameter indicates which policy shall be applied to determine the triggers for re-initialization in the downstream direction (see clause 12.1.4 of [ITU-T G.993.2] and clauses 7.3.1.1.13 and 7.2.1.1.5 of this Recommendation).

If RIPOLICYds=1 is configured and it is detected during ITU-T G.993.2 initialization that RIPOLICYds=1 is not supported in the downstream direction by either XTU's, the XTU's shall fallback to RIPOLICYds=0.

The valid values for RIPOLICYds are 0 and 1.

7.3.1.1.12.2 Upstream re-initialization policy selection (RIPOLICYus)

The RIPOLICYus parameter indicates which policy shall be applied to determine the triggers for re-initialization in the upstream direction (see clause 12.1.4 of [ITU-T G.993.2] and clauses 7.3.1.1.13 and 7.2.1.1.5 of this Recommendation).

If RIPOLICYus=1 is configured and it is detected during ITU-T G.993.2 initialization that RIPOLICYus=1 is not supported in the upstream direction by either XTU's, the XTU's shall fallback to RIPOLICYus=0.

The valid values for RIPOLICYus are 0 and 1.

7.3.1.1.13 REINIT_TIME_THRESHOLDds

7.3.1.1.13.1 Downstream REINIT_TIME_THRESHOLDds

The parameter REINIT_TIME_THRESHOLDds defines the downstream threshold for re-initialization based on SES, to be used by the VTU receiver when re-initialization policy 1 is used in downstream (see clause 12.1.4 of [ITU-T G.993.2]).

The valid range is from 5 to 31.

7.3.1.1.13.2 Upstream REINIT_TIME_THRESHOLDus

The parameter REINIT_TIME_THRESHOLDus defines the upstream threshold for re-initialization based on SES, to be used by the VTU receiver when re-initialization policy 1 is used in upstream (see clause 12.1.4 of [ITU-T G.993.2]).

The valid range is from 5 to 31.

Renumber clause 7.5.1.38 entitled, Test parameters for [ITU-T G.993.5] as follows:

7.5.1.~~38~~39 Test parameters for Recommendation ITU-T G.993.5

7.5.1.~~38~~39.1 FEXT coupling function downstream (XLOGds)

…

7.5.1.~~38~~39.2 Downstream XLOG subcarrier group size (XLOGGds)

…

Add clause 7.5.1.40 as follows:

7.5.1.40 Actual RIPOLICY (ACT RIPOLICY)

7.5.1.40.1 Actual downstream RIPOLICY (ACTRIPOLICYds)

This parameter indicates the actual re-initialization policy in use in the downstream direction.

A value of 0 indicates the line is operating in RIPOLICYds 0, a value of 1 indicates the line is operating in RIPOLICYds 1.

7.5.1.40.2 Actual upstream RIPOLICY (ACTRIPOLICYus)

This parameter indicates the actual re-initialization policy in use in the upstream direction.

A value of 0 indicates the line is operating in RIPOLICYus 0, a value of 1 indicates the line is operating in RIPOLICYus 1.

Add the following rows to Table 7-14:

Table 7-14 – Line configuration profile

Category/Element	Defined in:	Q-Interface	U-C Interface	U-R Interface	T-/S-Interface
Line/xTU State					
. . .					
VDSL2 Profiles Enabling (PROFILES)	7.3.1.1.11	R/W (M)			R(O)
RIPOLICYds	7.3.1.1.12.1	R/W (O)	R(O)		
RIPOLICYus	7.3.1.1.12.2	R/W (O)			
REINIT_TIME_THRESHOLDds	7.3.1.1.13.1	R/W (O)	R(O)		
REINIT_TIME_THRESHOLDus	7.3.1.1.13.2	R/W (O)			
Power and spectrum usage					

Add the following rows to Table 7-15:

Table 7-15 – Support of line configuration parameters per Recommendation

Category/ Element	G.992.1	G.992.2	G.992.3	G.992.4	G.992.5	G.993.2
Line/xTU State						
. . .						
VDSL2 Profiles Enabling (PROFILES)						Y
RIPOLICYds						Y
RIPOLICYus						Y
REINIT_TIME_THRESHOLDds						Y
REINIT_TIME_THRESHOLDus						Y
Power and spectrum usage						

Modify Table 7-28 as follows:

Table 7-28 – Line test, diagnostic and status parameters

Category/Element	Defined in:	Q-Interface	U-C Interface	U-R Interface	T-/S-Interface	G-Interface
…						
ITU-T G.993.5 Specific (Vectoring)						
FEXT coupling function downstream (XLOGds)	7.5.1.~~38~~39.1	R (M)				
Downstream XLOG subcarrier group size (XLOGGds)	7.5.1.~~38~~39.2	R (M)				
Actual RI_POLICY						
ACTRIPOLICYus	7.5.1.40.1	R(O)				
ACTRIPOLICYds	7.5.1.40.2	R(O)				

Add the following rows to Table 7-29:

Table 7-29 – 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	G.993.5
…							
ITU-T G.993.5 Specific (Vectoring)							
XLOGds							Y
XLOGGds							Y
Actual RI_POLICY							
ACTRIPOLICYus						Y	
ACTRIPOLICYds						Y	

3) Management of new electrical loop length estimation for ITU-T G.993.2

Modify clause 7.3.1.2.14 as follows:

7.3.1.2.14 Upstream power back-off shaped (UPBOSHAPED)

Upstream power back-off (UPBO) is specified in [ITU-T G.993.2] to provide spectral compatibility between loops of different lengths deployed in the same binder. The upstream transmit PSD mask, UPBOMASKus is defined in clause 7.2.1.3.2 of [ITU-T G.993.2].

The ITU-T G.993.2 UPBO configuration parameters *a*, *b*, and the reference electrical lengths kl_{0_REF} shall be set by the NMS in the CO-MIB. The parameter kl_0 may be determined during initialization by the VTUs or forced by the CO-MIB.

a) Upstream power back-off configuration parameters

a.1) Upstream power back-off reference PSD per band (UPBOPSD-pb)

This parameter defines the UPBO reference PSD used to compute the upstream power back-off for each upstream band except US0. A UPBOPSD defined for each band shall consist of two parameters [*a*, *b*]. Parameter *a* ranges from 40 dBm/Hz to 80.95 dBm/Hz in steps of 0.01 dBm/Hz;

and parameter *b* ranges from 0 to 40.95 dBm/Hz in steps of 0.01 dBm/Hz. The UPBO reference PSD at the frequency f expressed in MHz shall be equal to $-a-b\sqrt{f}$. The set of parameter values $a = 40$ dBm/Hz, $b = 0$ dBm/Hz is a special configuration to disable UPBO in the respective upstream band.

a.2) Upstream electrical length (UPBOKL)

This parameter defines the electrical length expressed in dB at 1 MHz, kl_0, configured by the CO-MIB. The value ranges from 0 to 128 dB in steps of 0.1 dB.

a.3) Force CO-MIB electrical length (UPBOKLF)

This parameter is a flag that forces the VTU-R to use the electrical length of the CO-MIB (UPBOKL) to compute the UPBO. The value shall be forced if the flag is set to 1. Otherwise, the VTUs shall determine the electrical length.

a.4) UPBO reference electrical length per band (UPBOKLREF-pb)

This parameter defines the UPBO reference electrical length used to compute the upstream power back-off for each upstream band except US0, for the optional Equalized FEXT UPBO method. The value ranges from 1.8 to 63.5 dB in steps of 0.1 dB with special value 0. The use of the special value 0 is described in clause 7.2.1.3.2 of [ITU-T G.993.2].

a.5) Alternative electrical length estimation mode (AELE-MODE)

This parameter defines the UPBO electrical length estimation mode to be used in the alternative electrical length estimation method (ELE-M1) in clause 7.2.1.3.2.2 of [ITU-T G.993.2]. The value of this parameter is 0, 1, 2 or 3.

a.6) UPBO electrical length threshold percentile (UPBOELMT)

This parameter defines the UPBO electrical length minimum threshold percentile in percent used in the alternative electrical length estimation method (ELE-M1) in clause 7.2.1.3.2.2 of [ITU-T G.993.2]. It is set by network management via the CO-MIB. The parameter ranges from 0 to 15 percent in steps of 1 percent. This value is communicated to the VTU-R in accordance with [ITU-T G.994.1] at start-up.

Add clauses 7.5.1.23.3 to 7.5.1.23.6 as follows:

7.5.1.23.3 VTU-O estimated upstream power back-off electrical length per band (UPBOKLE-pb)

This parameter is a vector of UPBO electrical length per-band estimates for each supported upstream band, expressed in dB at 1 MHz (kl_0) calculated by the VTU-O, based on separate measurements in the supported upstream bands excluding US0. The value ranges from 0 to 128 dB in steps of 0.1 dB, with special value 204.7 which indicates that the estimate is greater than 128 dB. This parameter is required for the alternative electrical length estimation method (ELE-M1).

7.5.1.23.4 VTU-R estimated upstream power back-off electrical length per band (UPBOKLE-R-pb)

This parameter is a vector of UPBO electrical length per-band estimates for each supported downstream band, expressed in dB at 1 MHz (kl_0) calculated by the VTU-R, based on separate measurements in the supported downstream bands. The value ranges from 0 to 128 dB in steps of 0.1 dB, with special value 204.7 which indicates that the estimate is greater than 128 dB. This parameter is required for the alternative electrical length estimation method (ELE-M1).

7.5.1.23.5 UPBO downstream receiver signal level threshold (RXTHRSHds)

This parameter reports the downstream received signal level threshold value used in the alternative electrical length estimation method (ELE-M1) in clause 7.2.1.3.2.2. This parameter represents an offset from –100 dBm/Hz, and ranges from –64 dB to 0 dB in steps of 1 dB.

7.5.1.23.6 UPBO upstream receiver signal level threshold (RXTHRSHus)

This parameter reports the upstream received signal level threshold value used in the alternative electrical length estimation method (ELE-M1) in clause 7.2.1.3.2.2. This parameter represents an offset from –100 dBm/Hz, and ranges from –64 dB to 0 dB in steps of 1 dB.

Modify Table 7-14 as follows:

Table 7-14 – Line configuration profile

Category/Element	Defined in:	Q-Interface	U-C Interface	U-R Interface	T-/S-Interface
…					
UPBOSHAPED (UPBOKLREF-pb)	7.3.1.2.14	R/W (O)	R(O)		
UPBOSHAPED (AELE-MODE, UPBOELMT)	7.3.1.2.14	R/W (O)	R(O)		
…					

Modify Table 7-15 as follows:

Table 7-15 – Support of line configuration parameters per Recommendation

Category/ Element	G.992.1	G.992.2	G.992.3	G.992.4	G.992.5	G.993.2
…						
UPBOSHAPED (UPBOKLREF-pb)						Y
UPBOSHAPED (AELE-MODE, UPBOELMT)						Y
…						

Modify Table 7-28 as follows:

Table 7-28 – Line test, diagnostic and status parameters

Category/Element	Defined in:	Q-Interface	U-C Interface	U-R Interface	T-/S-Interface	G-Interface
…						
Upstream power back-off						
UPBOKLE	7.5.1.23.1	R (M)	R (O)			R (O)
UPBOKLE-R	7.5.1.23.2	R (O)	R (O)			R (O)
UPBOKLE-pb	7.5.1.23.3	R (O)	R (O)			
UPBOKLE-R-pb	7.5.1.23.4	R (O)	R (O)			R (O)

Table 7-28 – Line test, diagnostic and status parameters

Category/Element	Defined in:	Q-Interface	U-C Interface	U-R Interface	T-/S-Interface	G-Interface
RXTHRSHds	7.5.1.23.5	R (O)	R (O)			R (O)
RXTHRSHus	7.5.1.23.6	R (O)	R (O)			
…						

Modify Table 7-29 as follows:

Table 7-29 – 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
…						
Upstream power back-off						
UPBOKLE						Y
UPBOKLE-R						Y
UPBOKLE-pb						Y
UPBOKLE-R-pb						Y
RXTHRSHds						Y
RXTHRSHus						Y
…						

4) Change in inhibition rules of LOSS-L and LOSS-LFE

7.2.7.13 Inhibiting performance monitoring parameters

For a given monitored entity, the accumulation of certain performance parameters is inhibited during periods of unavailability, during SESs or during seconds containing defects on that monitored entity. Inhibiting on a given monitored entity (e.g., ADSL ATM Data Path) is not explicitly affected by conditions on any other monitored entity (xDSL line). The inhibiting rules are as follows:

– UAS and Failure Count parameters shall not be inhibited.

– INM parameters shall be inhibited during a 1-second interval, if it contains one or more LOS defects, or one or more SEF defects, or one or more LPR defects.

– LOSS-L and LOSS-LFE counters shall be inhibited only during unavailable time even if the unavailable time is declared retroactively.

NOTE – An implementation may count the LOSS-L during the contiguous SES-L leading to the declaration of UAS-L and substract them at the onset of the declaration of UAS-L. The same may apply for the LOSS-LFE.

– All other performance parameter counts shall be inhibited during UAS and SES. Inhibiting shall be retroactive to the onset of unavailable time and shall end retroactively to the end of unavailable time.

– SES shall be inhibited during unavailable time even if the unavailable time is declared retroactively.

5) Support of new ITU-T G.993.2 PSD masks

Modify clause 7.3.1.2.15 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 of [ITU-T G.993.2]: D-32, D-48, D-64, D-128.

– Class 997-M1c Annex B of [ITU-T G.993.2]: 997-M1c-A-7.

– Class 997-M1x Annex B of [ITU-T G.993.2]: ~~997-M1x-M-8,~~ 997-M1x-M.

– Class 997-M2x Annex B of [ITU-T G.993.2]: ~~997-M2x-M-8, 997-M2x-A, 997-M2x-M,~~ 997E17-M2x-NUS0, 997E30-M2x-NUS0.

– Class 998-M1x Annex B of [ITU-T G.993.2]: 998-M1x-A, 998-M1x-B, 998-M1x-NUS0.

– Class 998-M2x Annex B of [ITU-T 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 of [ITU-T G.993.2]: 998-M2x-A, 998-M2x-M, 998-M2x-B, 998-M2x-NUS0, 998ADE17-M2x-A, 998ADE17-M2x-B, 998ADE17-M2x-M, 998ADE17-M2x-NUS0-M, 998ADE30-M2x-NUS0-A, 998ADE30-M2x-NUS0-M.

– Class 998-B Annex C of [ITU-T G.993.2]: POTS-138b, POTS-276b (clause C.2.1.1 of [ITU-T G.993.2]), TCM-ISDN (clause C.2.1.2 of [ITU-T G.993.2]).

– Class 998-CO Annex C of [ITU-T G.993.2]: POTS-138co, POTS-276co (clause C.2.1.1 of [ITU-T G.993.2]).

– Class HPE-M1 Annex B of [ITU-T 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 552 kHz.

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

Table 7-6 – Definition of values of CLASSMASK per ITU-T G.993.2 Annex

Parameter value	ITU-T G.993.2 Annex A	ITU-T G.993.2 Annex B	ITU-T 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 ITU-T G.993.2 Annex.			

Change Table 7-7 as follows:

Table 7-7 – 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_138 co
2	8	D-48	M1x-B	M2x-B	M2x-B	~~M1x-M 8~~		~~M2x-M 8~~		TCM-ISDN	POTS_276 co
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 – 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 – 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				ADE17-M2x-M						
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 – 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.											

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Printed in Switzerland
Geneva, 2012