

2.3 Specification

2.3.1 Feature licences

Part of the MileGate functionality is subject to feature licences. For more information on feature licences please refer to [\[012\] Release Note "MileGate R5B"](#) and to [\[915\] Technical Bulletin "Feature Licences for MileGate"](#).

2.3.2 Function and feature overview

2.3.2.1 SUAD1 specific functions and features

Table 3: SUAD1 specific functions and features

Function	Standard	ESW release
32 ADSL interfaces, supporting...		
- ADSL with non-overlapped spectrum	ITU-T G.992.1 (06/99), Asymmetric digital subscriber line (ADSL) transceivers, Annex A	r1
- ADSL2 with non-overlapped spectrum	ITU-T G.992.3 (01/05), Asymmetric digital subscriber line transceivers 2 (ADSL2), Annex A	r1
- ADSL2+ with non-overlapped spectrum	ITU-T G.992.5 (01/05), Asymmetric Digital Subscriber Line (ADSL) transceivers - Extended bandwidth ADSL2 (ADSL2+), Annex A	r1
Support of reach-extended ADSL2 (READSL2) for POTS lines	ITU-T G.992.3 Annex L	r3e
Support of ADSL2 extended upstream bandwidth for POTS lines	ITU-T G.992.3 Annex M	r2
Support of ADSL2+ extended upstream bandwidth for POTS lines	ITU-T G.992.5 Annex M	r2

2.3.2.2 SUAD2 specific functions and features

Table 4: SUAD2 specific functions and features

Function	Standard	ESW release
32 ADSL interfaces, supporting...		
- ADSL with non-overlapped spectrum	ITU-T G.992.1 (06/99), Asymmetric digital subscriber line (ADSL) transceivers, Annex B	r1
- ADSL2 with non-overlapped spectrum	ITU-T G.992.3 (01/05), Asymmetric digital subscriber line transceivers 2 (ADSL2), Annex B	r1
- ADSL2+ with non-overlapped spectrum	ITU-T G.992.5 (01/05), Asymmetric Digital Subscriber Line (ADSL) transceivers - Extended bandwidth ADSL2 (ADSL2+), Annex B	r1

2.3.2.3 Functions and features common to SUAD1, SUAD2

Table 5: Functions and features common to SUAD1, SUAD2

Function	Rating or standard	ESW release
Maximum number of units per subrack - in a MileGate 25x0 - in a MileGate 23x0	20 ^a 7 ^a	
Support of Single Ended Line Test (SELT)	ITU-T G.996.2 (05/09), Single-ended line testing for digital subscriber lines (DSL)	r2
Support of Double Ended Line Testing (DELT)	ITU-T G.996.2 (05/09)	r1
Allows up to 640 ADSL2+ ports per MileGate 25x0 subrack		r1
Interworking performance: packet rate of up to 700 k packets/s (up to 700 k packets/s per direction with unsymmetrical rates) at a packet size of 64 ... 1526 bytes		r2
Support of MAC address translation (SUAD1)		r3g
Support of MAC address translation (SUAD2)		r3f
Handshaking procedures	ITU-T G.994.1 (05/03), Handshake procedures for digital subscriber line (DSL) transceivers	r1
Support of L2 (low power) and L0 (Full On)	ITU-T G.992.3, ITU-T G.996.1 (02/01), Test procedures for digital subscriber line (DSL) transceivers	r1
ADSL2 / ADSL2+ performance according to	DSL Forum WT-100, ADSL2 / ADSL2+ Performance Test Plan	r1
Support of single latency mode (fast and interleaved with selectable latency)	ITU-T G.992.1, ITU-T G.992.3	r1
Up to 8 VCCs per port	DSL Forum TR-101, ITU-T I.361 (02/99) B-ISDN ATM layer specification	r1
PPPoE on ADSL lines	DSL Forum TR-101	r1
IPoE on ADSL lines	DSL Forum TR-101	r1
VLAN support	IEEE 802.1Q, Virtual Bridged Local Area Networks, 1998	r1
Support of 1:1 VLAN mode, single and double tagged	DSL Forum TR-101	r1
Support of N:1 single VLAN mode	DSL Forum TR-101	r1
Support of N:1 double tagged services		r5a
VLAN tagging in upstream direction and VLAN filtering in downstream direction (frames from subscribers are not tagged or priority tagged, except for Transparent LAN services)	DSL Forum TR-101, IEEE 802.1D, Part 3: Media Access Control (MAC) Bridges, 1998	r1
Support of VLAN QoS with Class of Service (CoS) handling: 8 CoS by four priority queues, with selectable scheduler per queue: - strict priority - weighted fair queuing (WFQ)	IEEE 802.1p, Traffic Class Expediting and Dynamic Multicast Filtering (in 802.1D-1998), DSL Forum TR-101	r1 r3d
Interface (VCC) rate limiter (upstream, downstream)		r5a
IGMP snooping with IPoE, IGMP proxy with report message suppression	IETF RFC 2236, Internet Group Management Protocol, Version 2, November 1997; IETF RFC 3376, Internet Group Management Protocol, Version 3, October 2002	r1

Table 5: Functions and features common to SUAD1, SUAD2 (continued)

Function	Rating or standard	ESW release
Multicast stream preview		r3g
Multicast pre-join and post-leave - pre-join intervals - post-leave intervals	1 ... 5 min 10 ... 180 sec	r3g
Multicast bandwidth allocation per port and per stream		r3g
Support of static multicast		r4a
IGMP query padding		r5a
Support of subscriber logon methods	nto1 service: - PPPoE - DHCP - None - PPPoE / DHCP combined (SUAD2) - PPPoE / DHCP combined (SUAD1) 1to1 service: - DHCP - PPPoE	r1 r1 r3e r3h r4a r5a r5c
DHCP relay option 82	IETF RFC 2131, IETF RFC 951, IETF RFC 3046, DHCP Relay Agent Information Option, January 2001	r1
DHCP option 82 for 1to1 services		r5a
PPPoE intermediate agent	DSL Forum TR-101, IETF RFC 2516, A Method for Transmitting PPP Over Ethernet (PPPoE), February 1999	r1
Enhanced DHCP logon options	DSL Forum TR-101	r3b
Enhanced PPPoE tag options	DSL Forum TR-101	r3b
1to1 service traceability option "DHCP tag encoding"		r5a
1to1 service traceability option "PPPoE tag encoding"		r5c
Support of Ethernet private line services (PLS)	BroadBand Forum TR-101, "Migration to Ethernet Based DSL Aggregation, April 2006"	r4a
Support of transparent LAN services (TLS)	BroadBand Forum TR-101, "Migration to Ethernet Based DSL Aggregation, April 2006"	r4a
Tunnelling of L2CP messages for private line services		r3e
Support of ARPs within the NE (details see security features below)		r5a

Table 5: Functions and features common to SUAD1, SUAD2 (continued)

Function	Rating or standard	ESW release
Emission	refer to [201] System Description "MileGate R5B"	
Immunity	refer to [201] System Description "MileGate R5B"	
Safety	refer to [201] System Description "MileGate R5B"	
Ambient conditions	refer to [201] System Description "MileGate R5B"	

a. See possible limitations in the ESW release note of the embedded software.

For additional information and functional contents or limitations, refer to the refer to [012] Release Note "MileGate R5B".

2.3.3 ADSL line interface characteristics

2.3.3.1 Transmission medium

Minimum requirements	Twisted copper pair no loading coils no open wires
Bridged taps	
- Maximum number	2
- Maximum length	500 m

2.3.3.2 Transmission parameters

Number of ADSL interfaces	32
Line rates	
- Downstream range	32 ... 26'000 kbit/s
- Upstream range with Annex M	32 ... 1'536 kbit/s 32 ... 3'520 kbit/s
Line code	DMT (ITU-T G.992.1, 992.3, 992.5)
Reach extended ADSL2	ITU-T G.992.3 (Annex L)
One way transfer delay	
- Channel type «Interleaved»	Configurable maximum, current value from status
- Channel type «Fast»	According to ADSL / ADSL2 / ADSL2+ standards
Output power	
- Maximum output power	20.4 dBm

2.3.3.3 Transmission performance

ADSL according to	DSL Forum TR 067 ETSI TS 101 388
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ADSL2 and ADSL2+ according to DSL Forum TR-100

The following diagrams show the rate & reach behaviour of the SUAD1, SUAD2 ports in the case of 0.4 mm cable and white noise (-140 dBm/Hz) applied to ATU-R and ATU-C.

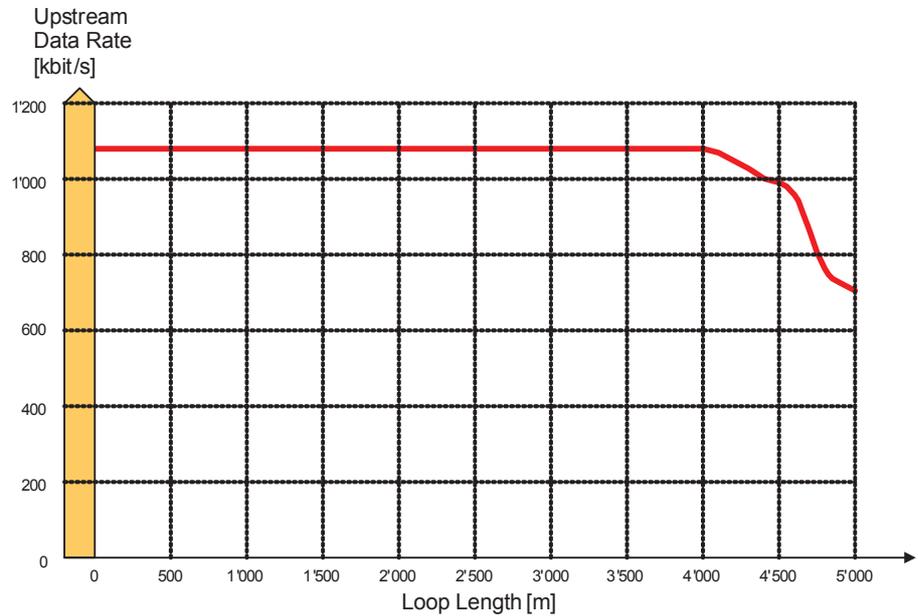


Figure 1: SUAD1 upstream rate and reach over 0.4 mm with white noise (-140 dBm/Hz), interleaved channel mode (Annex A)

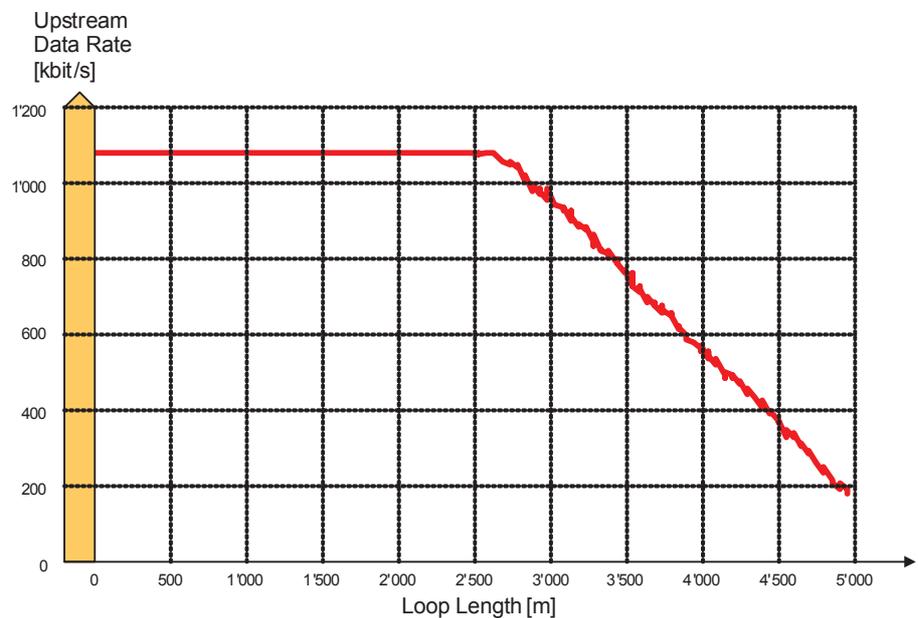


Figure 2: SUAD2 upstream rate and reach over 0.4 mm with white noise (-140 dBm/Hz), interleaved channel mode (Annex B)

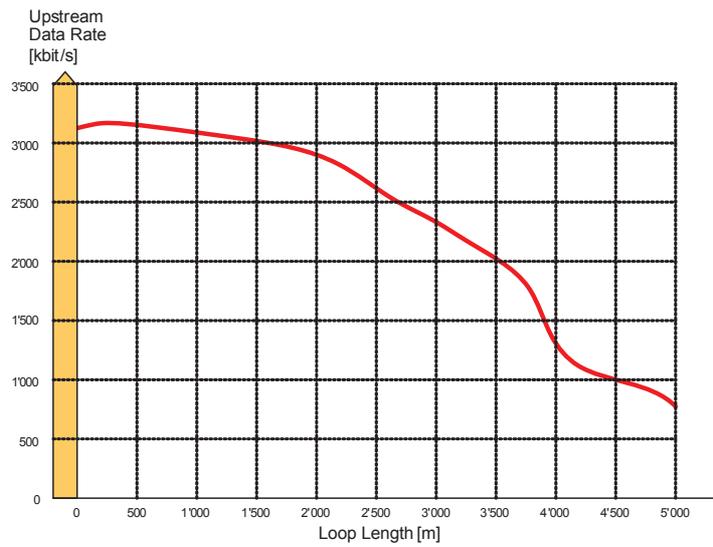


Figure 3: SUAD1 upstream rate and reach over 0.4 mm with white noise (-140 dBm/Hz), interleaved channel mode (Annex M)

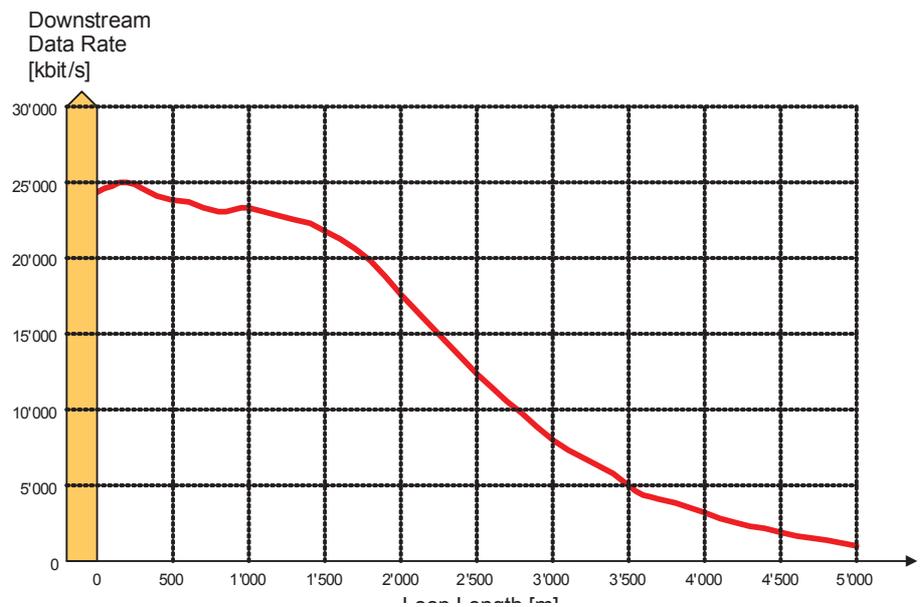


Figure 4: SUAD1 downstream rate and reach over 0.4 mm with white noise (-140 dBm/Hz), interleaved channel mode (Annex A)

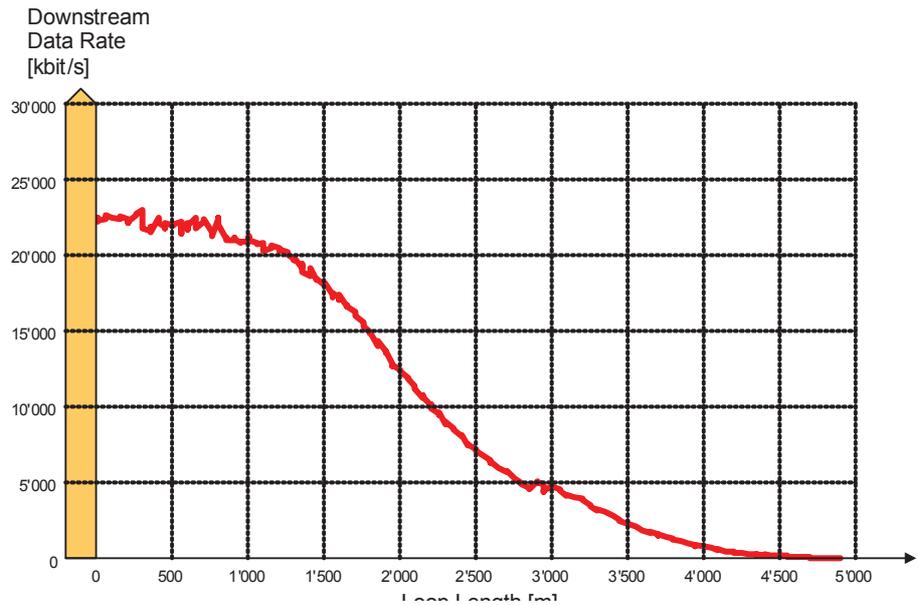


Figure 5: SUAD2 downstream rate and reach over 0.4 mm with white noise (-140 dBm/Hz), interleaved channel mode (Annex B)

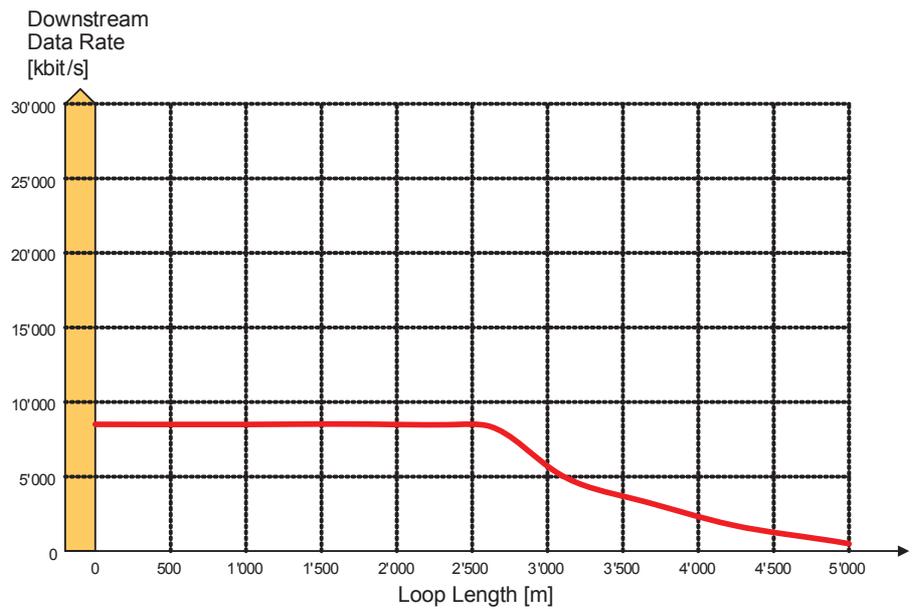


Figure 6: SUAD1 downstream rate and reach over 0.4 mm with white noise (-140 dBm/Hz), interleaved channel mode, impulse noise protection = 2 (Annex M)

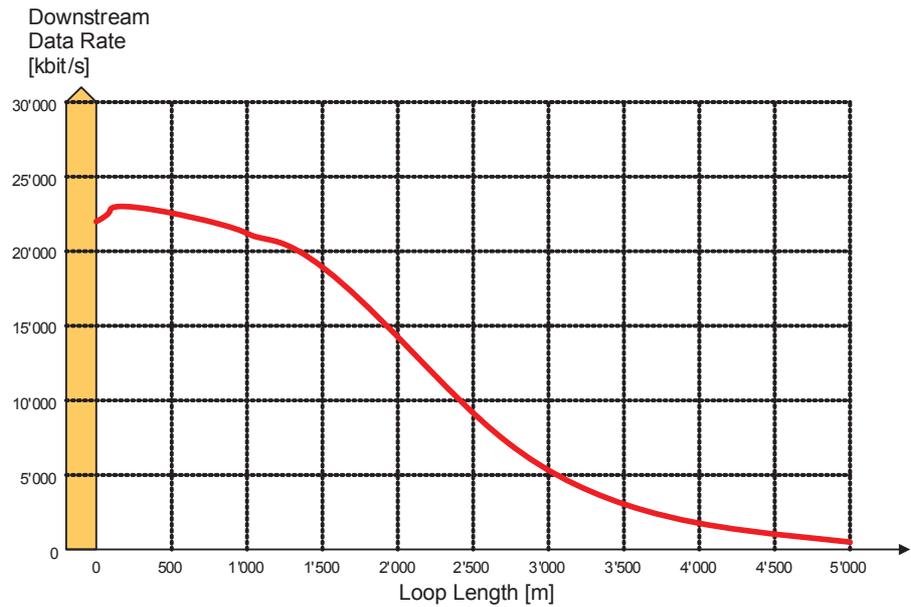


Figure 7: SUAD1 downstream rate and reach over 0.4 mm with white noise (-140 dBm/Hz), fast channel mode, impulse noise protection = 0.5 (Annex M)

2.3.3.4 Power Spectral Density (PSD)

The following four diagrams show the PSDs of the ADSL2 and the ADSL2+ transmission signals on the SUAD1, SUAD2 units. Please note that the PSD requirements are identical for ADSL and ADSL2. Accordingly, the measurement results of ADSL2 and ADSL2+ are presented here only.

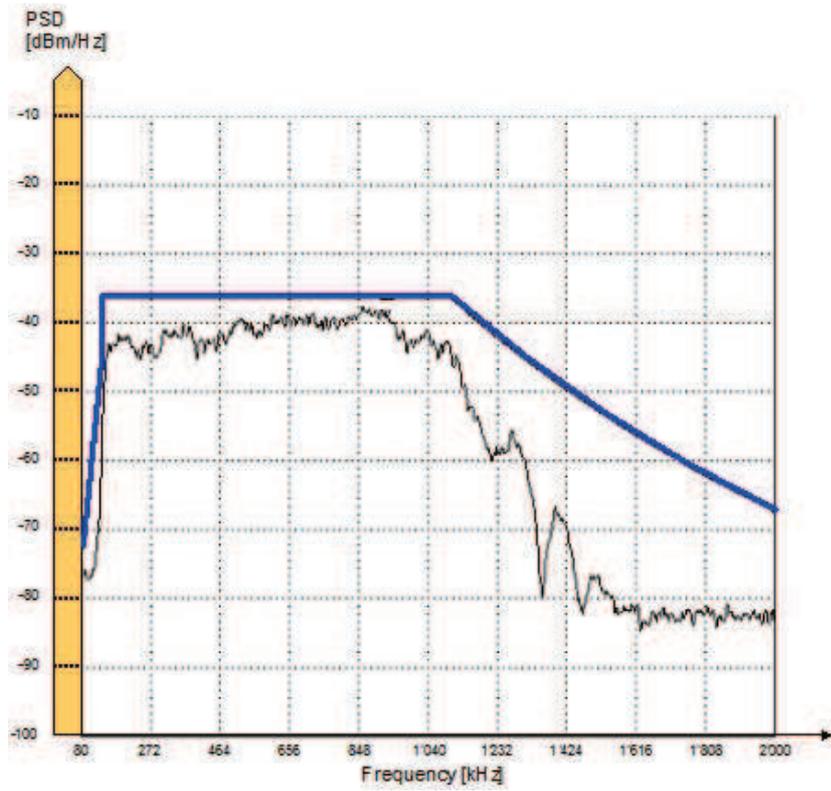


Figure 8: SUAD1 ADSL2 Power Spectral Density for non-overlapped spectrum operation (Annex A, identical requirement for ADSL)

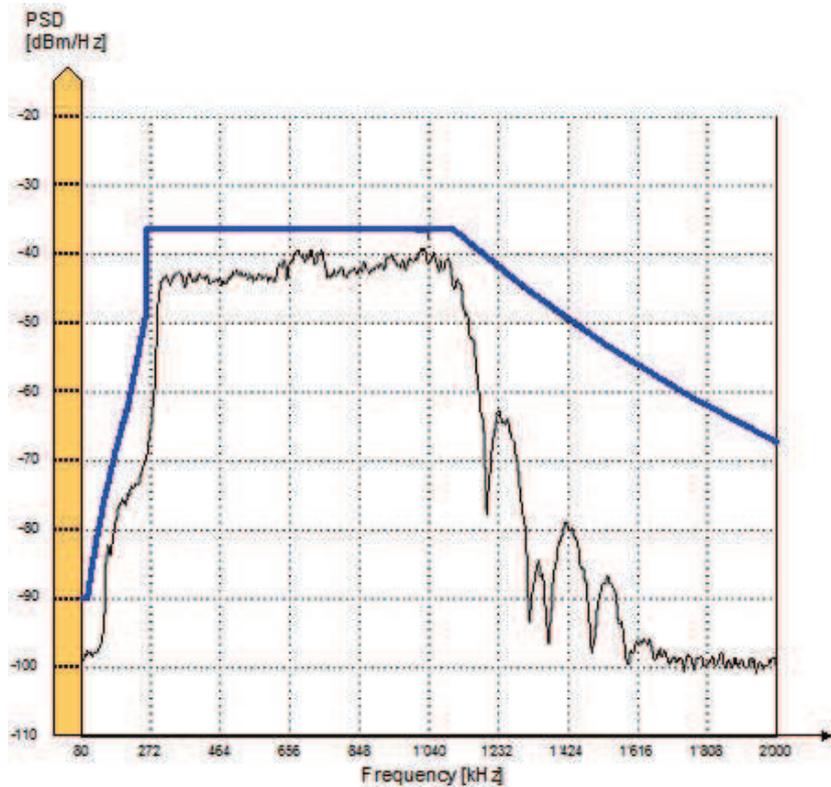


Figure 9: SUAD2 ADSL2 Power Spectral Density for non-overlapped spectrum operation (Annex B, identical requirement for ADSL)

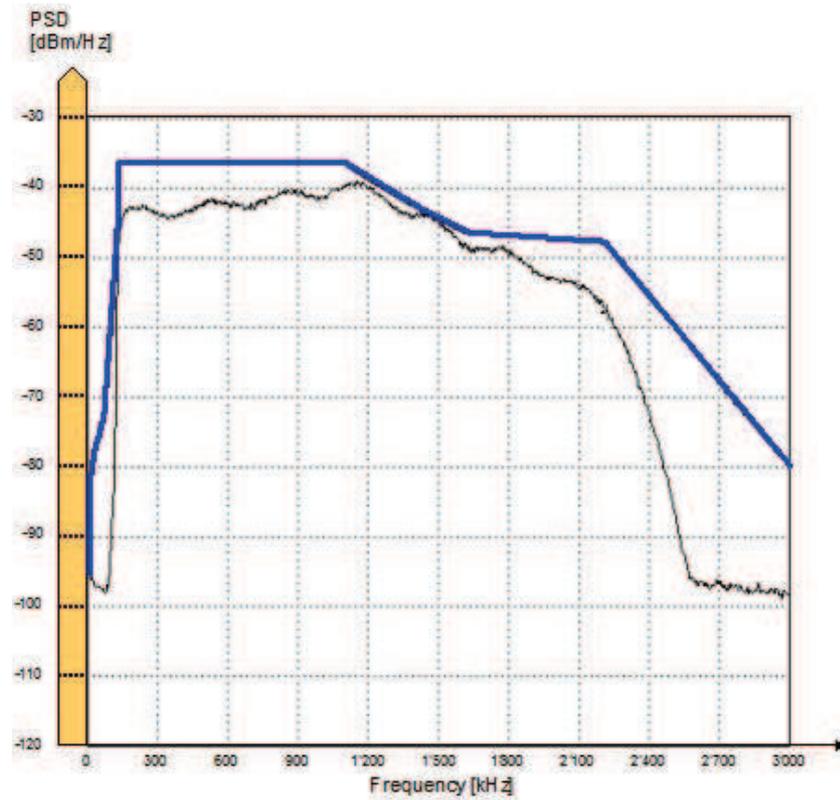


Figure 10: SUAD1 ADSL2+ Power Spectral Density for non-overlapped spectrum operation (Annex A)

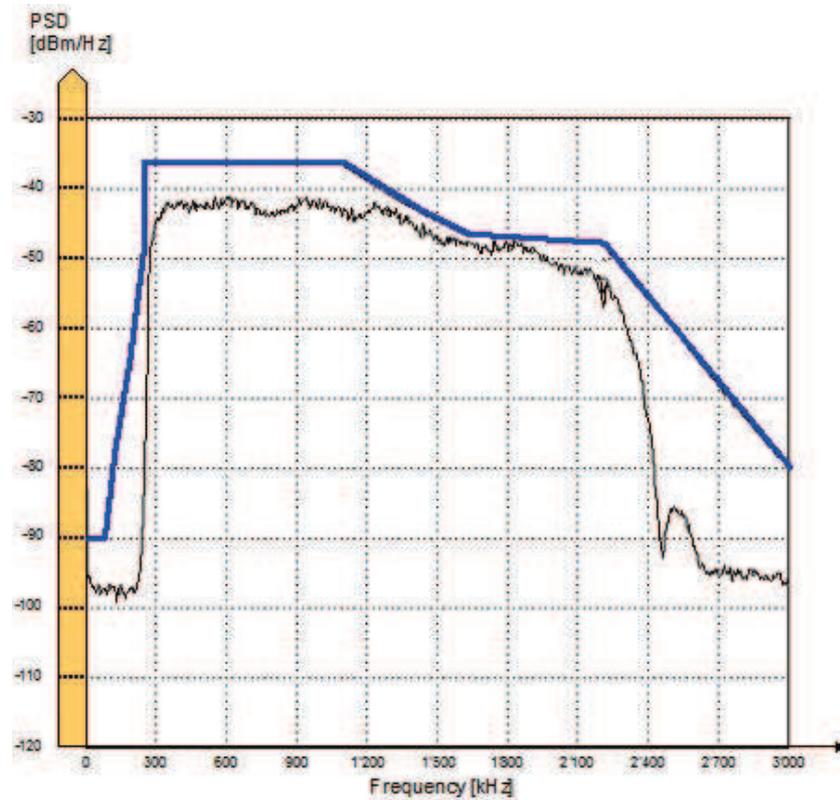


Figure 11: SUAD2 ADSL2+ Power Spectral Density for non-overlapped spectrum operation (Annex B)

The SUAD1 ADSL2+ power spectral density for non-overlapped spectrum operation with Annex M is the same as for Annex B with SUAD2.