



UNH-IOL
DSL Consortium
VDSL2 Rate vs. Reach Interoperability
Test Suite (V2RR) Report Revision 1.0

UNH-IOL — 121 Technology Drive, Suite 2 — Durham, NH 03824 — +1-603-862-2911			
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Reviewed by	Jane Tester	jane@iol.unh.edu	+1-603-862-2911

21 March 2008

Mr. Mike Vendor
DSL Consortium
121 Technology Drive, Suite 2
Durham, NH 03824
mike@dsltechnologies.edu
+1-555-555-5555

Mr. Vendor,

Enclosed are the VDSL2 Rate vs. Reach Interoperability Test Suite results for the DSL Consortium Model A CPE and DSL Consortium Model AB DSLAM.. The testing was performed according to Version 1.2.0 of the VDSL2 Rate vs. Reach Interoperability Test Suite for VDSL2 North American Networks, which may be downloaded from the following address:

ftp://ftp.iol.unh.edu/pub/dsl/testsuites/V2RRv120_test_suite.pdf

If you have any questions about the test procedures or results, please contact me via email at joe@iol.unh.edu, or by phone at +1-603-862-2911.

Sincerely,

Joe Tester

Joe Tester

Report reviewed by

Jane Tester

Jane Tester

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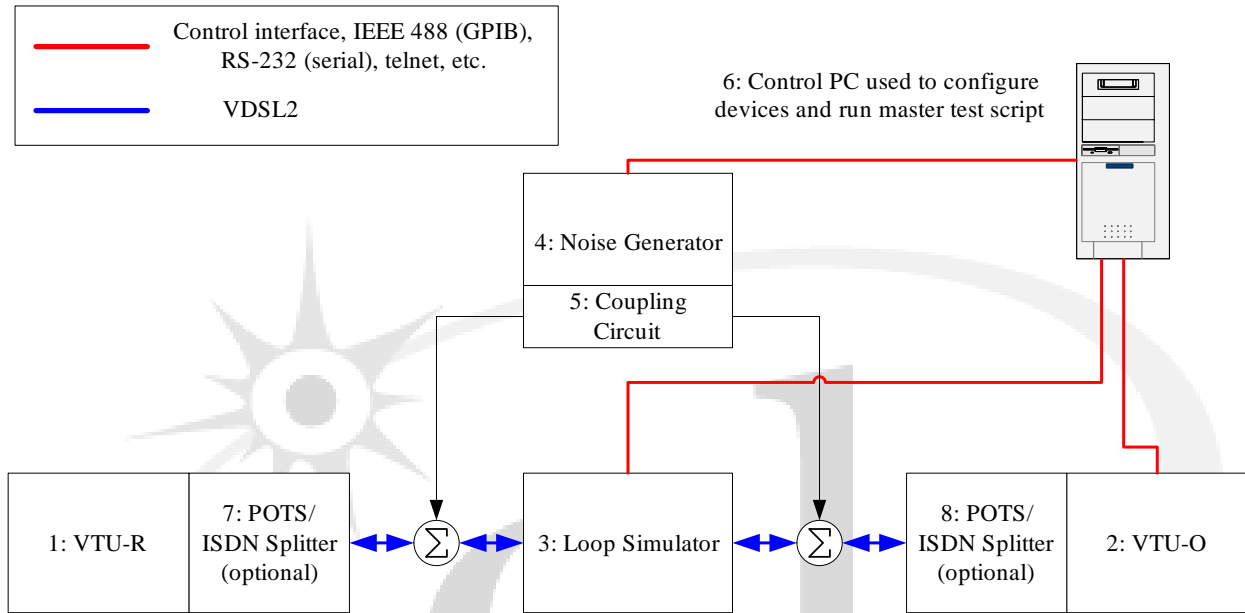
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Test Setups

Test Setup 1: Generic Test Setup



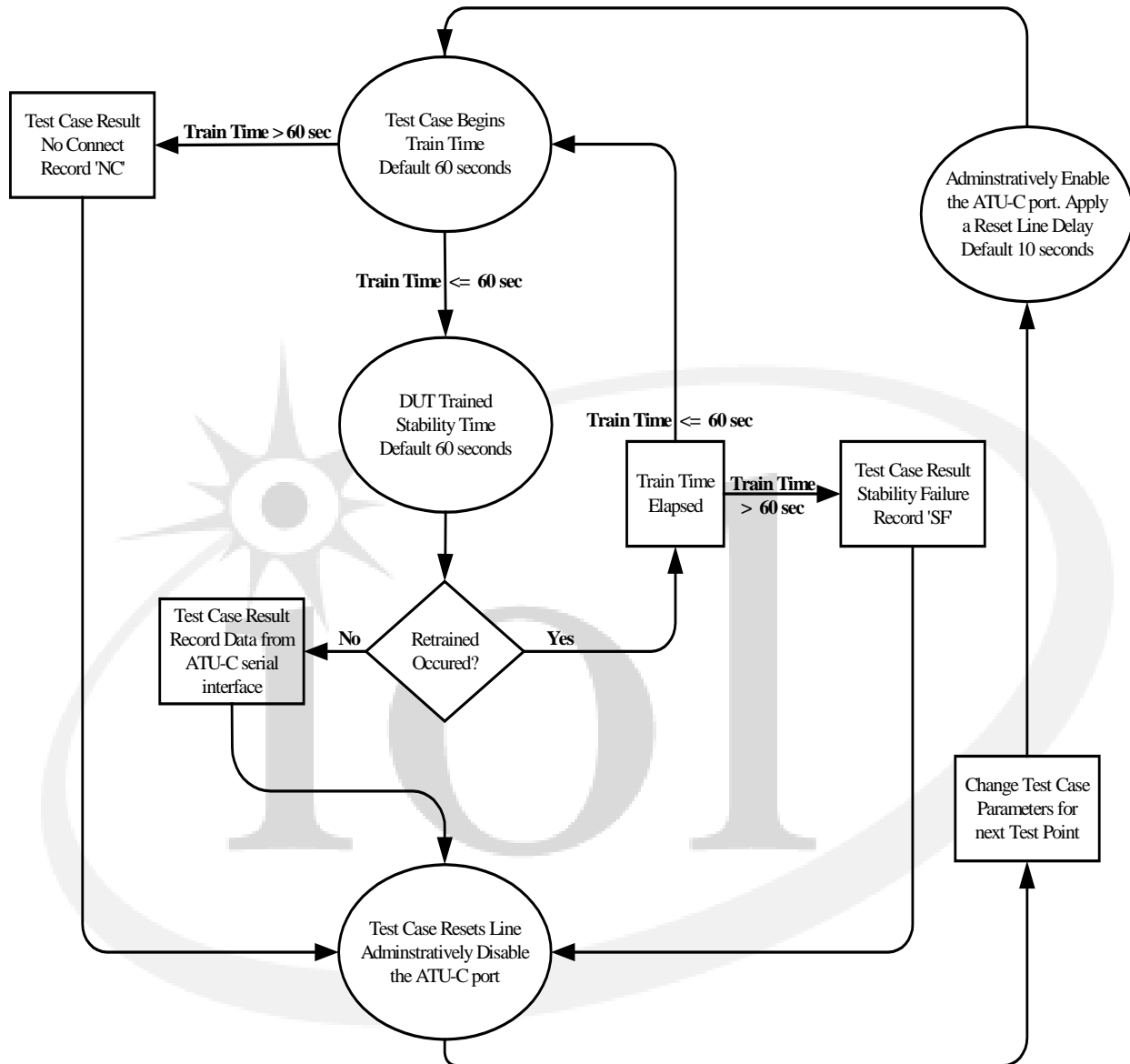
Equipment List

1. DSL Consortium Model A (IOL ID: 9999).
 - Chipset Make: DSL Consortium.
 - Chipset Model: DC1.
 - Chipset Firmware Version: 1.2.3.
 - The Model A was set to train in multimode.
2. Company A Model 10.
 - Line-card: Model 10; port 1 (IOL ID: 4587).
 - Chipset Make: DSL.
 - Chipset Hardware Version: 2.0.
 - Chipset Firmware Version: 2.2.
 - Vendor Firmware Version: 1.2.23.
 - Profile parameters used for each section of this test are displayed in appendix A of this document.
 - Net data rates were taken from the VTU-O configuration interface.
3. Loop simulator: DSL Line Simulator.
 - Loop simulator serial #: 99999
 - Compensated loops were not applied in this test setup.
4. Impairment generator: Company C Noise Generator.
 - DSL noise file package version 1.0.
 - Noise 1.
 - Noise 2.
 - Noise 3.
 - Compensated noise levels were not applied in this test setup.
5. Coupling Circuit: Company C internal coupling circuit.
6. Testing station 3 with LASI (Lasi Automation with Standard Interfaces) version 2008.03.11.
7. Splitter Information: No CPE Splitter Installed
8. Splitter Information: No CO Splitter Installed.

Terminology and Abbreviations

Term	Description
NT	Not Tested (at request of vendor)
NC	No Connection
SF	Stability Failure
NA	Not Available (not supported)
UNDR	Upstream Net Data Rate
UNM	Upstream Noise Margin
UINP	Actual Upstream Impulse Noise Protection
UDLY	Actual Upstream Interleaving Delay
DNDR	Downstream Net Data Rate
DNM	Downstream Noise Margin
DINP	Actual Downstream Impulse Noise Protection in symbols.
DDLY	Actual Downstream Interleaving Delay
Time	Time = Time in seconds required to reach SHOWTIME
Mode	Mode = ANSI (ANSI T1.413-1998), DMT (ITU-T G.992.1 Annex A/B), LITE (ITU-T G.992.2), A2 (ITU-T G.992.3 Annex A/B), A2 L (ITU-T G.992.3 Annex L) A2+ (ITU-T G.992.5), or V2 (ITU G.993.2).

Graphical Representation of the Test Procedure



1. If the VTU-O and the VTU-R do not train within 60 seconds, the trial is considered a failure and “NC” is recorded.
2. After the DUT achieves a connection, the net data rate and noise margin are recorded after a 60 second stability period. During the 60-second stability period, if the DUT re-trains the trial is considered a failure and “SF” is recorded.
3. A line-reset delay of 10 seconds is applied between each test case.

Test Detail

Group 1: Rate vs. Reach Tests for VDSL2 North American Networks

Test V2RR.1.1, -140 dBm/Hz AWGN Noise Impairment, User Specified Profile 1, Loops 300 – 2000 ft, IOL Test ID: 8888																
Length (ft)	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1750	2000	
Iteration 1	UNDR	35840	35840	35840	35840	35840	35840	35840	34232	32104	29416	26496	23352	20104	11440	7648
	DNDR	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	62904	58752	54688
	UNM	16	15.2	14.1	13.1	11.4	9.4	7.3	6.2	6.2	6.1	6.1	6.2	6.4	6.7	6.3
	DNM	10.6	10.4	10.3	10.4	10.2	9.8	9.1	8.7	8.2	7.4	7.3	6.8	6.5	6.6	6.6
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Time	27	28	34	34	27	34	27	35	28	34	34	27	34	27	34
Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 2	UNDR	35840	35840	35840	35840	35840	35840	35840	34712	32136	29384	26552	23328	20128	11464	7680
	DNDR	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	62936	58720	54840
	UNM	15.9	15.1	14.2	12.9	11.5	9.5	7.1	6.1	6.1	6.1	6.2	6.2	6.4	6.7	6.2
	DNM	10.7	10.5	10.3	10.4	10.3	9.9	9.4	8.7	8.3	7.4	7.4	6.7	6.5	6.6	6.6
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Time	34	33	33	34	27	27	34	33	34	28	34	28	27	27	33
Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 3	UNDR	35840	35840	35840	35840	35840	35840	35840	34648	32104	29416	26464	23328	20160	11440	7648
	DNDR	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	62968	58752	54840
	UNM	15.8	15.1	14.3	12.9	11.5	9.5	7.1	6.2	6.2	6.1	6.2	6.2	6.3	6.7	6.2
	DNM	10.7	10.4	10.1	10.2	10.2	9.8	9.3	8.7	8.3	7.4	7.3	6.8	6.5	6.6	6.6
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Time	28	33	34	55	33	33	27	27	28	27	35	27	33	35	33
Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	

VDSL2 Rate vs. Reach Interoperability Test Suite (V2RR) v. 1.2.0
 DSL Consortium Model A (IOL ID: 9999)

Test V2RR.1.1, -140 dBm/Hz AWGN Noise Impairment, User Specified Profile 1, Loops 2250 - 8500 ft, IOL Test ID: 8888																
Length (ft)	2250	2500	2750	3000	3250	3500	3750	4000	4500	5000	5500	6500	7500	8500		
Iteration 1	UNDR	6032	4296	2144	648	1040	1008	1008	976	976	920	920	864	768	680	
	DNDR	49608	43968	39392	35120	28288	26760	24936	23088	19832	17024	14336	9768	6896	4712	
	UNM	6.4	6.6	7.3	8	13	12.2	12.4	12.5	12	13	13.7	12.5	12.6	13.5	
	DNM	6.6	6.4	6.5	6.7	8.9	8.8	8.8	8.8	8.7	8.7	8.7	8.5	8.6	8.6	
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Time	27	33	27	27	30	36	30	30	35	35	36	35	35	29	
	Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 2	UNDR	6032	4264	2168	616	1040	1008	976	976	952	952	920	864	768	680	
	DNDR	49552	44624	39480	34880	28344	26848	24904	22936	19800	16960	14312	9736	6864	4712	
	UNM	6.4	6.5	7.2	8.2	13.2	13	13.3	12.8	13	12.7	12.3	12.4	13	13.1	
	DNM	6.6	6.6	6.6	6.6	8.9	8.8	8.8	8.9	8.8	8.8	8.7	8.5	8.7	8.7	
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Time	34	33	28	27	29	35	35	35	36	34	35	35	35	35	
	Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 3	UNDR	6032	4296	2200	648	1040	1008	976	976	976	952	888	832	768	712	
	DNDR	49488	45304	39576	35120	28344	26760	24904	22936	19776	17048	14336	9824	6896	4744	
	UNM	6.5	6.6	7.2	8.1	12.8	12.7	12.8	12.6	12.7	12.7	12.7	13.1	13.3	12.8	
	DNM	6.6	6.5	6.5	6.6	8.9	8.8	8.8	8.9	8.8	8.7	8.7	8.6	8.6	8.4	
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Time	33	26	33	55	36	36	29	29	36	29	29	29	29	36	29
	Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	

VDSL2 Rate vs. Reach Interoperability Test Suite (V2RR) v. 1.2.0
 DSL Consortium Model A (IOL ID: 9999)

Test V2RR.1.1, -140 dBm/Hz AWGN Noise Impairment, User Specified Profile 2, Loops 300 – 2000 ft, IOL Test ID: 8888																
Length (ft)	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1750	2000	
Iteration 1	UNDR	35840	35840	35840	35840	35840	35840	35840	34232	32104	29416	26496	23352	20104	11440	7648
	DNDR	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	62904	58752	54688
	UNM	16	15.2	14.1	13.1	11.4	9.4	7.3	6.2	6.2	6.1	6.1	6.2	6.4	6.7	6.3
	DNM	10.6	10.4	10.3	10.4	10.2	9.8	9.1	8.7	8.2	7.4	7.3	6.8	6.5	6.6	6.6
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Time	27	28	34	34	27	34	27	35	28	34	34	27	34	27	34
Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 2	UNDR	35840	35840	35840	35840	35840	35840	35840	34712	32136	29384	26552	23328	20128	11464	7680
	DNDR	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	62936	58720	54840
	UNM	15.9	15.1	14.2	12.9	11.5	9.5	7.1	6.1	6.1	6.1	6.2	6.2	6.4	6.7	6.2
	DNM	10.7	10.5	10.3	10.4	10.3	9.9	9.4	8.7	8.3	7.4	7.4	6.7	6.5	6.6	6.6
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Time	34	33	33	34	27	27	34	33	34	28	34	28	27	27	33
Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 3	UNDR	35840	35840	35840	35840	35840	35840	35840	34648	32104	29416	26464	23328	20160	11440	7648
	DNDR	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	62968	58752	54840
	UNM	15.8	15.1	14.3	12.9	11.5	9.5	7.1	6.2	6.2	6.1	6.2	6.2	6.3	6.7	6.2
	DNM	10.7	10.4	10.1	10.2	10.2	9.8	9.3	8.7	8.3	7.4	7.3	6.8	6.5	6.6	6.6
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Time	28	33	34	55	33	33	27	27	28	27	35	27	33	35	33
Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	

VDSL2 Rate vs. Reach Interoperability Test Suite (V2RR) v. 1.2.0
 DSL Consortium Model A (IOL ID: 9999)

Test V2RR.1.1, -140 dBm/Hz AWGN Noise Impairment, User Specified Profile 2, Loops 2250 - 8500 ft, IOL Test ID: 8888																
Length (ft)	2250	2500	2750	3000	3250	3500	3750	4000	4500	5000	5500	6500	7500	8500		
Iteration 1	UNDR	6032	4296	2144	648	1040	1008	1008	976	976	920	920	864	768	680	
	DNDR	49608	43968	39392	35120	28288	26760	24936	23088	19832	17024	14336	9768	6896	4712	
	UNM	6.4	6.6	7.3	8	13	12.2	12.4	12.5	12	13	13.7	12.5	12.6	13.5	
	DNM	6.6	6.4	6.5	6.7	8.9	8.8	8.8	8.8	8.7	8.7	8.7	8.5	8.6	8.6	
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Time	27	33	27	27	30	36	30	30	35	35	36	35	35	29	
	Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 2	UNDR	6032	4264	2168	616	1040	1008	976	976	952	952	920	864	768	680	
	DNDR	49552	44624	39480	34880	28344	26848	24904	22936	19800	16960	14312	9736	6864	4712	
	UNM	6.4	6.5	7.2	8.2	13.2	13	13.3	12.8	13	12.7	12.3	12.4	13	13.1	
	DNM	6.6	6.6	6.6	6.6	8.9	8.8	8.8	8.9	8.8	8.8	8.7	8.5	8.7	8.7	
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Time	34	33	28	27	29	35	35	35	36	34	35	35	35	35	
	Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 3	UNDR	6032	4296	2200	648	1040	1008	976	976	976	952	888	832	768	712	
	DNDR	49488	45304	39576	35120	28344	26760	24904	22936	19776	17048	14336	9824	6896	4744	
	UNM	6.5	6.6	7.2	8.1	12.8	12.7	12.8	12.6	12.7	12.7	12.7	13.1	13.3	12.8	
	DNM	6.6	6.5	6.5	6.6	8.9	8.8	8.8	8.9	8.8	8.7	8.7	8.6	8.6	8.4	
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Time	33	26	33	55	36	36	29	29	36	29	29	29	29	36	29
	Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	

VDSL2 Rate vs. Reach Interoperability Test Suite (V2RR) v. 1.2.0
 DSL Consortium Model A (IOL ID: 9999)

Test V2RR.1. 2, ADSL2+ NEXT/FEXT Noise Impairment, User Specified Profile 1, Loops 300 – 2000 ft, IOL Test ID: 8888																
Length (ft)	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1750	2000	
Iteration 1	UNDR	35840	35840	35840	35840	35840	35840	35840	34232	32104	29416	26496	23352	20104	11440	7648
	DNDR	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	62904	58752	54688
	UNM	16	15.2	14.1	13.1	11.4	9.4	7.3	6.2	6.2	6.1	6.1	6.2	6.4	6.7	6.3
	DNM	10.6	10.4	10.3	10.4	10.2	9.8	9.1	8.7	8.2	7.4	7.3	6.8	6.5	6.6	6.6
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Time	27	28	34	34	27	34	27	35	28	34	34	27	34	27	34
Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 2	UNDR	35840	35840	35840	35840	35840	35840	35840	34712	32136	29384	26552	23328	20128	11464	7680
	DNDR	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	62936	58720	54840
	UNM	15.9	15.1	14.2	12.9	11.5	9.5	7.1	6.1	6.1	6.1	6.2	6.2	6.4	6.7	6.2
	DNM	10.7	10.5	10.3	10.4	10.3	9.9	9.4	8.7	8.3	7.4	7.4	6.7	6.5	6.6	6.6
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Time	34	33	33	34	27	27	34	33	34	28	34	28	27	27	33
Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 3	UNDR	35840	35840	35840	35840	35840	35840	35840	34648	32104	29416	26464	23328	20160	11440	7648
	DNDR	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	62968	58752	54840
	UNM	15.8	15.1	14.3	12.9	11.5	9.5	7.1	6.2	6.2	6.1	6.2	6.2	6.3	6.7	6.2
	DNM	10.7	10.4	10.1	10.2	10.2	9.8	9.3	8.7	8.3	7.4	7.3	6.8	6.5	6.6	6.6
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Time	28	33	34	55	33	33	27	27	28	27	35	27	33	35	33
Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	

VDSL2 Rate vs. Reach Interoperability Test Suite (V2RR) v. 1.2.0
 DSL Consortium Model A (IOL ID: 9999)

Test V2RR.1. 2, ADSL2+ NEXT/FEXT Noise Impairment, User Specified Profile 1, Loops 2250 - 8500 ft, IOL Test ID: 8888																
Length (ft)	2250	2500	2750	3000	3250	3500	3750	4000	4500	5000	5500	6500	7500	8500		
Iteration 1	UNDR	6032	4296	2144	648	1040	1008	1008	976	976	920	920	864	768	680	
	DNDR	49608	43968	39392	35120	28288	26760	24936	23088	19832	17024	14336	9768	6896	4712	
	UNM	6.4	6.6	7.3	8	13	12.2	12.4	12.5	12	13	13.7	12.5	12.6	13.5	
	DNM	6.6	6.4	6.5	6.7	8.9	8.8	8.8	8.8	8.7	8.7	8.7	8.5	8.6	8.6	
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Time	27	33	27	27	30	36	30	30	35	35	36	35	35	29	
	Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 2	UNDR	6032	4264	2168	616	1040	1008	976	976	952	952	920	864	768	680	
	DNDR	49552	44624	39480	34880	28344	26848	24904	22936	19800	16960	14312	9736	6864	4712	
	UNM	6.4	6.5	7.2	8.2	13.2	13	13.3	12.8	13	12.7	12.3	12.4	13	13.1	
	DNM	6.6	6.6	6.6	6.6	8.9	8.8	8.8	8.9	8.8	8.8	8.7	8.5	8.7	8.7	
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Time	34	33	28	27	29	35	35	35	36	34	35	35	35	35	
	Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 3	UNDR	6032	4296	2200	648	1040	1008	976	976	976	952	888	832	768	712	
	DNDR	49488	45304	39576	35120	28344	26760	24904	22936	19776	17048	14336	9824	6896	4744	
	UNM	6.5	6.6	7.2	8.1	12.8	12.7	12.8	12.6	12.7	12.7	12.7	13.1	13.3	12.8	
	DNM	6.6	6.5	6.5	6.6	8.9	8.8	8.8	8.9	8.8	8.7	8.7	8.6	8.6	8.4	
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Time	33	26	33	55	36	36	29	29	36	29	29	29	29	36	29
	Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	

VDSL2 Rate vs. Reach Interoperability Test Suite (V2RR) v. 1.2.0
 DSL Consortium Model A (IOL ID: 9999)

Test V2RR.1. 2, ADSL2+ NEXT/FEXT Noise Impairment, User Specified Profile 2, Loops 300 – 2000 ft, IOL Test ID: 8888																
Length (ft)	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1750	2000	
Iteration 1	UNDR	35840	35840	35840	35840	35840	35840	35840	34232	32104	29416	26496	23352	20104	11440	7648
	DNDR	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	62904	58752	54688
	UNM	16	15.2	14.1	13.1	11.4	9.4	7.3	6.2	6.2	6.1	6.1	6.2	6.4	6.7	6.3
	DNM	10.6	10.4	10.3	10.4	10.2	9.8	9.1	8.7	8.2	7.4	7.3	6.8	6.5	6.6	6.6
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Time	27	28	34	34	27	34	27	35	28	34	34	27	34	27	34
Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 2	UNDR	35840	35840	35840	35840	35840	35840	35840	34712	32136	29384	26552	23328	20128	11464	7680
	DNDR	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	62936	58720	54840
	UNM	15.9	15.1	14.2	12.9	11.5	9.5	7.1	6.1	6.1	6.1	6.2	6.2	6.4	6.7	6.2
	DNM	10.7	10.5	10.3	10.4	10.3	9.9	9.4	8.7	8.3	7.4	7.4	6.7	6.5	6.6	6.6
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Time	34	33	33	34	27	27	34	33	34	28	34	28	27	27	33
Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 3	UNDR	35840	35840	35840	35840	35840	35840	35840	34648	32104	29416	26464	23328	20160	11440	7648
	DNDR	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	62968	58752	54840
	UNM	15.8	15.1	14.3	12.9	11.5	9.5	7.1	6.2	6.2	6.1	6.2	6.2	6.3	6.7	6.2
	DNM	10.7	10.4	10.1	10.2	10.2	9.8	9.3	8.7	8.3	7.4	7.3	6.8	6.5	6.6	6.6
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Time	28	33	34	55	33	33	27	27	28	27	35	27	33	35	33
Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	

VDSL2 Rate vs. Reach Interoperability Test Suite (V2RR) v. 1.2.0
 DSL Consortium Model A (IOL ID: 9999)

Test V2RR.1. 2, ADSL2+ NEXT/FEXT Noise Impairment, User Specified Profile 2, Loops 2250 - 8500 ft, IOL Test ID: 8888																
Length (ft)	2250	2500	2750	3000	3250	3500	3750	4000	4500	5000	5500	6500	7500	8500		
Iteration 1	UNDR	6032	4296	2144	648	1040	1008	1008	976	976	920	920	864	768	680	
	DNDR	49608	43968	39392	35120	28288	26760	24936	23088	19832	17024	14336	9768	6896	4712	
	UNM	6.4	6.6	7.3	8	13	12.2	12.4	12.5	12	13	13.7	12.5	12.6	13.5	
	DNM	6.6	6.4	6.5	6.7	8.9	8.8	8.8	8.8	8.7	8.7	8.7	8.5	8.6	8.6	
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Time	27	33	27	27	30	36	30	30	35	35	36	35	35	29	
	Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 2	UNDR	6032	4264	2168	616	1040	1008	976	976	952	952	920	864	768	680	
	DNDR	49552	44624	39480	34880	28344	26848	24904	22936	19800	16960	14312	9736	6864	4712	
	UNM	6.4	6.5	7.2	8.2	13.2	13	13.3	12.8	13	12.7	12.3	12.4	13	13.1	
	DNM	6.6	6.6	6.6	6.6	8.9	8.8	8.8	8.9	8.8	8.8	8.7	8.5	8.7	8.7	
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Time	34	33	28	27	29	35	35	35	36	34	35	35	35	35	
	Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 3	UNDR	6032	4296	2200	648	1040	1008	976	976	976	952	888	832	768	712	
	DNDR	49488	45304	39576	35120	28344	26760	24904	22936	19776	17048	14336	9824	6896	4744	
	UNM	6.5	6.6	7.2	8.1	12.8	12.7	12.8	12.6	12.7	12.7	12.7	13.1	13.3	12.8	
	DNM	6.6	6.5	6.5	6.6	8.9	8.8	8.8	8.9	8.8	8.7	8.7	8.6	8.6	8.4	
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Time	33	26	33	55	36	36	29	29	36	29	29	29	29	36	29
	Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	

VDSL2 Rate vs. Reach Interoperability Test Suite (V2RR) v. 1.2.0
 DSL Consortium Model A (IOL ID: 9999)

Test V2RR.1. 3, VDSL2 NEXT/FEXT Noise Impairment, User Specified Profile 1, Loops 300 – 2000 ft, IOL Test ID: 8888																
Length (ft)	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1750	2000	
Iteration 1	UNDR	35840	35840	35840	35840	35840	35840	35840	34232	32104	29416	26496	23352	20104	11440	7648
	DNDR	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	62904	58752	54688
	UNM	16	15.2	14.1	13.1	11.4	9.4	7.3	6.2	6.2	6.1	6.1	6.2	6.4	6.7	6.3
	DNM	10.6	10.4	10.3	10.4	10.2	9.8	9.1	8.7	8.2	7.4	7.3	6.8	6.5	6.6	6.6
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Time	27	28	34	34	27	34	27	35	28	34	34	27	34	27	34
Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 2	UNDR	35840	35840	35840	35840	35840	35840	35840	34712	32136	29384	26552	23328	20128	11464	7680
	DNDR	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	62936	58720	54840
	UNM	15.9	15.1	14.2	12.9	11.5	9.5	7.1	6.1	6.1	6.1	6.2	6.2	6.4	6.7	6.2
	DNM	10.7	10.5	10.3	10.4	10.3	9.9	9.4	8.7	8.3	7.4	7.4	6.7	6.5	6.6	6.6
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Time	34	33	33	34	27	27	34	33	34	28	34	28	27	27	33
Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 3	UNDR	35840	35840	35840	35840	35840	35840	35840	34648	32104	29416	26464	23328	20160	11440	7648
	DNDR	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	62968	58752	54840
	UNM	15.8	15.1	14.3	12.9	11.5	9.5	7.1	6.2	6.2	6.1	6.2	6.2	6.3	6.7	6.2
	DNM	10.7	10.4	10.1	10.2	10.2	9.8	9.3	8.7	8.3	7.4	7.3	6.8	6.5	6.6	6.6
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Time	28	33	34	55	33	33	27	27	28	27	35	27	33	35	33
Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	

VDSL2 Rate vs. Reach Interoperability Test Suite (V2RR) v. 1.2.0
 DSL Consortium Model A (IOL ID: 9999)

Test V2RR.1.3, VDSL2 NEXT/FEXT Noise Impairment, User Specified Profile 1, Loops 2250 - 8500 ft, IOL Test ID: 8888																
Length (ft)	2250	2500	2750	3000	3250	3500	3750	4000	4500	5000	5500	6500	7500	8500		
Iteration 1	UNDR	6032	4296	2144	648	1040	1008	1008	976	976	920	920	864	768	680	
	DNDR	49608	43968	39392	35120	28288	26760	24936	23088	19832	17024	14336	9768	6896	4712	
	UNM	6.4	6.6	7.3	8	13	12.2	12.4	12.5	12	13	13.7	12.5	12.6	13.5	
	DNM	6.6	6.4	6.5	6.7	8.9	8.8	8.8	8.8	8.7	8.7	8.7	8.5	8.6	8.6	
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Time	27	33	27	27	30	36	30	30	35	35	36	35	35	29	
	Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 2	UNDR	6032	4264	2168	616	1040	1008	976	976	952	952	920	864	768	680	
	DNDR	49552	44624	39480	34880	28344	26848	24904	22936	19800	16960	14312	9736	6864	4712	
	UNM	6.4	6.5	7.2	8.2	13.2	13	13.3	12.8	13	12.7	12.3	12.4	13	13.1	
	DNM	6.6	6.6	6.6	6.6	8.9	8.8	8.8	8.9	8.8	8.8	8.7	8.5	8.7	8.7	
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Time	34	33	28	27	29	35	35	35	36	34	35	35	35	35	
	Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 3	UNDR	6032	4296	2200	648	1040	1008	976	976	976	952	888	832	768	712	
	DNDR	49488	45304	39576	35120	28344	26760	24904	22936	19776	17048	14336	9824	6896	4744	
	UNM	6.5	6.6	7.2	8.1	12.8	12.7	12.8	12.6	12.7	12.7	12.7	13.1	13.3	12.8	
	DNM	6.6	6.5	6.5	6.6	8.9	8.8	8.8	8.9	8.8	8.7	8.7	8.6	8.6	8.4	
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Time	33	26	33	55	36	36	29	29	36	29	29	29	29	36	29
	Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	

VDSL2 Rate vs. Reach Interoperability Test Suite (V2RR) v. 1.2.0
 DSL Consortium Model A (IOL ID: 9999)

Test V2RR.1. 3, VDSL2 NEXT/FEXT Noise Impairment, User Specified Profile 2, Loops 300 – 2000 ft, IOL Test ID: 8888																
Length (ft)	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1750	2000	
Iteration 1	UNDR	35840	35840	35840	35840	35840	35840	35840	34232	32104	29416	26496	23352	20104	11440	7648
	DNDR	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	62904	58752	54688
	UNM	16	15.2	14.1	13.1	11.4	9.4	7.3	6.2	6.2	6.1	6.1	6.2	6.4	6.7	6.3
	DNM	10.6	10.4	10.3	10.4	10.2	9.8	9.1	8.7	8.2	7.4	7.3	6.8	6.5	6.6	6.6
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Time	27	28	34	34	27	34	27	35	28	34	34	27	34	27	34
Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 2	UNDR	35840	35840	35840	35840	35840	35840	35840	34712	32136	29384	26552	23328	20128	11464	7680
	DNDR	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	62936	58720	54840
	UNM	15.9	15.1	14.2	12.9	11.5	9.5	7.1	6.1	6.1	6.1	6.2	6.2	6.4	6.7	6.2
	DNM	10.7	10.5	10.3	10.4	10.3	9.9	9.4	8.7	8.3	7.4	7.4	6.7	6.5	6.6	6.6
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Time	34	33	33	34	27	27	34	33	34	28	34	28	27	27	33
Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 3	UNDR	35840	35840	35840	35840	35840	35840	35840	34648	32104	29416	26464	23328	20160	11440	7648
	DNDR	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	63736	62968	58752	54840
	UNM	15.8	15.1	14.3	12.9	11.5	9.5	7.1	6.2	6.2	6.1	6.2	6.2	6.3	6.7	6.2
	DNM	10.7	10.4	10.1	10.2	10.2	9.8	9.3	8.7	8.3	7.4	7.3	6.8	6.5	6.6	6.6
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Time	28	33	34	55	33	33	27	27	28	27	35	27	33	35	33
Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	

VDSL2 Rate vs. Reach Interoperability Test Suite (V2RR) v. 1.2.0
 DSL Consortium Model A (IOL ID: 9999)

Test V2RR.1.3, VDSL2 NEXT/FEXT Noise Impairment, User Specified Profile 2, Loops 2250 - 8500 ft, IOL Test ID: 8888																
Length (ft)	2250	2500	2750	3000	3250	3500	3750	4000	4500	5000	5500	6500	7500	8500		
Iteration 1	UNDR	6032	4296	2144	648	1040	1008	1008	976	976	920	920	864	768	680	
	DNDR	49608	43968	39392	35120	28288	26760	24936	23088	19832	17024	14336	9768	6896	4712	
	UNM	6.4	6.6	7.3	8	13	12.2	12.4	12.5	12	13	13.7	12.5	12.6	13.5	
	DNM	6.6	6.4	6.5	6.7	8.9	8.8	8.8	8.8	8.7	8.7	8.7	8.5	8.6	8.6	
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Time	27	33	27	27	30	36	30	30	35	35	36	35	35	29	
	Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 2	UNDR	6032	4264	2168	616	1040	1008	976	976	952	952	920	864	768	680	
	DNDR	49552	44624	39480	34880	28344	26848	24904	22936	19800	16960	14312	9736	6864	4712	
	UNM	6.4	6.5	7.2	8.2	13.2	13	13.3	12.8	13	12.7	12.3	12.4	13	13.1	
	DNM	6.6	6.6	6.6	6.6	8.9	8.8	8.8	8.9	8.8	8.8	8.7	8.5	8.7	8.7	
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Time	34	33	28	27	29	35	35	35	36	34	35	35	35	35	
	Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	
Iteration 3	UNDR	6032	4296	2200	648	1040	1008	976	976	976	952	888	832	768	712	
	DNDR	49488	45304	39576	35120	28344	26760	24904	22936	19776	17048	14336	9824	6896	4744	
	UNM	6.5	6.6	7.2	8.1	12.8	12.7	12.8	12.6	12.7	12.7	12.7	13.1	13.3	12.8	
	DNM	6.6	6.5	6.5	6.6	8.9	8.8	8.8	8.9	8.8	8.7	8.7	8.6	8.6	8.4	
	UINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DINP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DDLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Time	33	26	33	55	36	36	29	29	36	29	29	29	29	36	29
	Mode	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	V2	

Appendix A: Profile Parameters

User Specified Profile Parameters		User Specified Profile 1	User Specified Profile 2
Line Configuration Parameters	Annex	A	A
	Band Plan	998	998
	Profile	8a	8d
	VTU-R Limit PSD Mask	EU-32	EU-32
	VTU-O Limit PSD Mask	D-32	D-32
	Max SNRM Up (dB)	31	31
	Target SNRM Up (dB)	6.0	6.0
	Min SNRM Up (dB)	0	0
	Max SNRM Down (dB)	31	31
	Target SNRM Down (dB)	6	6
Min SNRM Down (dB)	0	0	
Channel Configuration Parameters	Min Rate Up (kbps)	64	64
	Max Rate Up (kbps)	100000	100000
	Min Rate Down (kbps)	64	64
	Max Rate Down (kbps)	100000	100000
	Max Interleaving Delay Up (ms)	1	1
	Max Interleaving Delay Down (ms)	1	1
	Min INP Up (symbols)	0	0
Min INP Down (symbols)	0	0	
Legacy Parameters	Legacy Modes of Operation for ITU-T G.993.2 [1] (VDSL2) Automode	NA	NA