
Project: VDSL

Title: VDSL Reaches

Source: FTW

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Abstract:

This paper proposes a new, more complete, set of VDSL reaches.

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Introduction

These are the results from FTW's effort to simulate the performance requirements for ETSI VDSL. We propose these reaches (performance numbers), given in the next section, as an annex to VDSL Part 1. These reaches were generated using the FTW xDSL simulator [2].

The first set of numbers is with UPBO turned off. Then follows the corresponding numbers with UPBO turned on. These numbers are based on the PSD masks given in TS101270-1 V2.0.7 (2003-01) Compared to TD15 in Darmstadt [6] which used those given in Darmstadt-TD03r2.

Appendix A provides the assumptions used (in addition to [1]) when generating the simulation performance numbers. These assumptions are based on recommendations from TD33r1 in Torino [3] and WD14 Praha [4].

Proposed reaches (without PBO)

Main European Plan (997)

	S1	S2	S3	S4	A3	A4
Pcab_M1, Noise A	1026	923	676	119	706	119
Pcab_M2, Noise A	1136	994	754	149	889	149
Pcab_M1 (unnotched), Noise A	1097	970	744	148	859	148
Pex_P2_M1, Noise E	965	868	645	213	1138	338
Pex_P2_M2, Noise E	1075	940	715	265	1233	393
Pex_P2_M1 (unnotched) Noise E	1024	911	702	266	1210	420

Table 1: Performance numbers for main European band plan

	S1	S2	S3	S4	A3	A4
Pcab_M1, Noise B	1026	923	677	143	796	143
Pcab_M2, Noise B	1136	994	754	177	953	177
Pcab_M1 (unnotched), Noise B	1097	969	743	177	922	177
Pex_P2_M1, Noise C	813	742	379	54	379	54
Pex_P2_M2, Noise C	892	823	579	100	579	100
Pex_P2_M1 (unnotched) Noise C	834	771	448	77	448	77

Table 2: Performance numbers for main European band plan

	S1	S2	S3	S4	A3	A4
Pcab_M1, Noise D	906	816	614	197	893	197
Pcab_M2, Noise D	1015	889	677	248	1006	248
Pcab_M1 (unnotched), Noise D	957	857	663	245	959	245
Pex_P2_M1, Noise F	753	702	553	207	720	270
Pex_P2_M2, Noise F	829	767	621	262	834	344
Pex_P2_M1 (unnotched) Noise F	772	721	588	258	744	322

Table 3: Performance numbers for main European band plan

Optional European Plan (998)

	S1	S2	S3	S4	A3	A4
Pcab_M1, Noise A	855	748	286	69	1052	431
Pcab_M2, Noise A	871	763	289	67	1180	581
Pcab_M1 (unnotched), Noise A	856	752	289	68	1126	575
Pex_P2_M1, Noise E	802	703	278	61	1110	801
Pex_P2_M2, Noise E	819	718	284	63	1189	888
Pex_P2_M1 (unnotched) Noise E	804	706	284	62	1110	897

Table 4: Performance numbers for optional European band plan

	S1	S2	S3	S4	A3	A4
Pcab_M1, Noise B	855	748	287	70	1074	483
Pcab_M2, Noise B	871	763	289	67	1200	634
Pcab_M1 (unnotched), Noise B	856	752	289	67	1148	631
Pex_P2_M1, Noise C	726	648	273	56	674	290
Pex_P2_M2, Noise C	757	674	281	58	820	447
Pex_P2_M1 (unnotched) Noise C	728	651	280	58	716	376

Table 5: Performance numbers for optional European band plan

	S1	S2	S3	S4	A3	A4
Pcab_M1, Noise D	755	662	276	58	1047	578
Pcab_M2, Noise D	773	678	283	60	1129	699
Pcab_M1 (unnotched), Noise D	758	666	283	60	1047	701
Pex_P2_M1, Noise F	674	603	270	55	794	557
Pex_P2_M2, Noise F	707	632	280	58	851	667
Pex_P2_M1 (unnotched) Noise F	676	606	277	58	794	606

Table 6: Performance numbers for optional European band plan

Proposed reaches (with PBO)

Main European Plan (997)

	S1	S2	S3	S4	A3	A4
Pcab_M1, Noise A	1026	923	611	98	706	132
Pcab_M2, Noise A	1136	993	750	145	889	159
Pcab_M1 (unnotched), Noise A	1097	970	740	145	859	157
Pex_P2_M1, Noise E	965	868	571	40	1138	338
Pex_P2_M2, Noise E	1075	936	704	76	1233	393
Pex_P2_M1 (unnotched) Noise E	1024	911	693	76	1210	420

Table 7: Performance numbers for main European band plan (with UPBO)

	S1	S2	S3	S4	A3	A4
Pcab_M1, Noise B	1026	923	612	100	796	153
Pcab_M2, Noise B	1136	994	750	145	953	183
Pcab_M1 (unnotched), Noise B	1096	969	739	145	922	183
Pex_P2_M1, Noise C	813	742	379	-	379	60
Pex_P2_M2, Noise C	892	823	579	-	579	103
Pex_P2_M1 (unnotched) Noise C	834	771	448	-	448	81

Table 8: Performance numbers for main European band plan (with UPBO)

	S1	S2	S3	S4	A3	A4
Pcab_M1, Noise D	906	815	502	-	893	198
Pcab_M2, Noise D	1015	885	662	-	1006	249
Pcab_M1 (unnotched), Noise D	957	856	650	-	959	246
Pex_P2_M1, Noise F	753	702	513	-	720	270
Pex_P2_M2, Noise F	829	767	615	-	834	344
Pex_P2_M1 (unnotched Noise F	772	721	588	-	744	322

Table 9: Performance numbers for main European band plan (with UPBO)

Optional European Plan (998)

	S1	S2	S3	S4	A3	A4
Pcab_M1, Noise A	853	744	120	-	1052	431
Pcab_M2, Noise A	868	758	114	-	1180	581
Pcab_M1 (unnotched), Noise A	855	748	114	-	1126	575
Pex_P2_M1, Noise E	797	697	55	-	1110	801
Pex_P2_M2, Noise E	815	712	55	-	1189	888
Pex_P2_M1 (unnotched Noise E	801	700	55	-	1110	897

Table 10: Performance numbers for optional European band plan (with UPBO)

	S1	S2	S3	S4	A3	A4
Pcab_M1, Noise B	853	744	123	-	1074	483
Pcab_M2, Noise B	869	758	114	-	1200	634
Pcab_M1 (unnotched), Noise B	855	748	115	-	1148	631
Pex_P2_M1, Noise C	726	648	-	-	674	290
Pex_P2_M2, Noise C	757	669	-	-	820	447
Pex_P2_M1 (unnotched) Noise C	728	651	-	-	716	376

Table 11: Performance numbers for optional European band plan (with UPBO)

	S1	S2	S3	S4	A3	A4
Pcab_M1, Noise D	752	655	-	-	1047	578
Pcab_M2, Noise D	768	670	-	-	1129	699
Pcab_M1 (unnotched), Noise D	754	658	-	-	1047	701
Pex_P2_M1, Noise F	674	603	-	-	794	557
Pex_P2_M2, Noise F	707	628	-	-	851	667
Pex_P2_M1 (unnotched) Noise F	676	606	-	-	794	606

Table 12: Performance numbers for optional European band plan (with UPBO)

References

- [1] ETSI RTS/TM-06026 (Draft), "Transmission and Multiplexing (TM); Access transmission systems on metallic access cables; Very high speed Digital Subscriber Line (VDSL); Part 1: Functional requirements", ETSI Draft TS 101 270-1, Version 2.0.7, January 2003.
- [2] Nordström T., D. Bengtsson, *FTW xDSL simulation tool*, Version 3.0alpha2, 2002. Version 2.3 is available at <<http://www.xdsl.ftw.at/xdslsimu/>>.
- [3] Nordström T., "Second Proposal for VDSL Simulation Parameters", ETSI TD33r1 Torino (021t33r1), 2002
- [4] Rapporteur, "Report on break-out session to discuss simulation parameters for VDSL", ETSI WD14 Praha (023w14), 2002
- [5] van den Heuvel B., R. Persico, "PSD masks for VDSL, and corresponding templates", ETSI TD03r1 Darmstadt (024t03r1), 2002
- [6] Nordström T., "Proposal for VDSL Performance Requirements", ETSI TD15 Darmstadt (024t15), 2002

Appendix A: Simulation assumption

The simulations to generate the performance numbers are based on the following assumptions:

Shannon gap	9.8 dB
SNR cross-talk margin	6.0 dB
Coding gain	3.8 dB
Implementations losses	2 dB
Time-domain overhead	12%
Maximum useful SNR	57 dB (15 bits)
Power back-off	Assume equal length scenario for the disturbing systems.
Maximum transmit power	+14.5dBm for FTTEEx downstream else +11.5 dBm.
FEXT coupling	–45 dB at 1MHz growing as f^2
NEXT coupling	–50 dB at 1MHz growing as $f^{1.5}$ Crosstalk combination use the FSAN rule
Self FEXT and NEXT from AWGN	20 VDSL (of the same kind, i.e., same PSD) –140 dBm/Hz
Noise model	VDSL Noise A, E
Loops	Loop #2, (cable TP150)
Frequency plans	E1 (997), E2 (998)

Use 125 kHz guard band from each side, except 138 kHz and 12 Mhz.
The optional low frequency band is not to be used.
No transmission (i.e., at –80 dBm/Hz) is assumed in the HAM bands.

Nominal PSD masks specified	Pcab, Pex-P2
Mask variations:	M1 with notching, M2 without notching, and M1 without notching.

Template masks as defined in Part 1 [1] have been use.

Out of band PSD levels as specified in ETSI VDSL specification Part 2.

Only performance numbers with 4-band systems are calculated.

Appendix B: Raw Data

Without PBO

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Loop 2 Noise "A", mask ETSI-VDSL-Template-E1-Pcab-M1 (997)
Actual power DOWN = 4.94 dBm, UP = 7.48 dBm

Service S1 => Len = 1026m, IL = 42.0dB (at 4.0 MHz)
Service S2 => Len = 923m, IL = 43.2dB (at 5.0 MHz)
Service S3 => Len = 676m, IL = 37.3dB (at 6.5 MHz)
Service S4 => Len = 119m, IL = 7.5dB (at 8.0 MHz)
Service A3 => Len = 706m, IL = 31.0dB (at 4.5 MHz)
Service A4 => Len = 119m, IL = 6.2dB (at 6.0 MHz)

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Loop 2 Noise "A", mask ETSI-VDSL-Template-E1-Pcab-M2 UnNotched (997)
Actual power DOWN = 10.75 dBm, UP = 10.32 dBm

Service S1 => Len = 1136m, IL = 46.5dB (at 4.0 MHz)
Service S2 => Len = 994m, IL = 46.6dB (at 5.0 MHz)
Service S3 => Len = 754m, IL = 41.5dB (at 6.5 MHz)
Service S4 => Len = 149m, IL = 9.4dB (at 8.0 MHz)
Service A3 => Len = 889m, IL = 39.1dB (at 4.5 MHz)
Service A4 => Len = 149m, IL = 7.8dB (at 6.0 MHz)

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Loop 2 Noise "A", mask ETSI-VDSL-Template-E1-Pcab-M1 UnNotched (997)
Actual power DOWN = 4.94 dBm, UP = 7.48 dBm

Service S1 => Len = 1097m, IL = 44.9dB (at 4.0 MHz)
Service S2 => Len = 970m, IL = 45.4dB (at 5.0 MHz)
Service S3 => Len = 744m, IL = 41.0dB (at 6.5 MHz)
Service S4 => Len = 148m, IL = 9.3dB (at 8.0 MHz)
Service A3 => Len = 859m, IL = 37.7dB (at 4.5 MHz)
Service A4 => Len = 148m, IL = 7.7dB (at 6.0 MHz)

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Loop 2 Noise "A", mask ETSI-VDSL-Template-E2-Pcab-M1 (998)
Actual power DOWN = 6.80 dBm, UP = 5.95 dBm

Service S1 => Len = 855m, IL = 35.0dB (at 4.0 MHz)
Service S2 => Len = 748m, IL = 35.0dB (at 5.0 MHz)
Service S3 => Len = 286m, IL = 15.7dB (at 6.5 MHz)
Service S4 => Len = 69m, IL = 4.3dB (at 8.0 MHz)
Service A3 => Len = 1052m, IL = 46.2dB (at 4.5 MHz)
Service A4 => Len = 431m, IL = 22.6dB (at 6.0 MHz)

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Loop 2 Noise "A", mask ETSI-VDSL-Template-E2-Pcab-M2 UnNotched (998)
Actual power DOWN = 11.50 dBm, UP = 8.38 dBm

Service S1 => Len = 871m, IL = 35.6dB (at 4.0 MHz)
Service S2 => Len = 763m, IL = 35.7dB (at 5.0 MHz)
Service S3 => Len = 289m, IL = 15.9dB (at 6.5 MHz)
Service S4 => Len = 67m, IL = 4.2dB (at 8.0 MHz)
Service A3 => Len = 1180m, IL = 51.8dB (at 4.5 MHz)
Service A4 => Len = 581m, IL = 30.5dB (at 6.0 MHz)

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Loop 2 Noise "A", mask ETSI-VDSL-Template-E2-Pcab-M1 UnNotched (998)
Actual power DOWN = 6.80 dBm, UP = 5.95 dBm

Service S1 => Len = 856m, IL = 35.0dB (at 4.0 MHz)
Service S2 => Len = 752m, IL = 35.2dB (at 5.0 MHz)
Service S3 => Len = 289m, IL = 15.9dB (at 6.5 MHz)
Service S4 => Len = 68m, IL = 4.2dB (at 8.0 MHz)
Service A3 => Len = 1126m, IL = 49.5dB (at 4.5 MHz)
Service A4 => Len = 575m, IL = 30.1dB (at 6.0 MHz)

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Loop 2 Noise "B", mask ETSI-VDSL-Template-E1-Pcab-M1 (997)
Actual power DOWN = 4.94 dBm, UP = 7.48 dBm

Service S1 => Len = 1026m, IL = 42.0dB (at 4.0 MHz)
Service S2 => Len = 923m, IL = 43.3dB (at 5.0 MHz)
Service S3 => Len = 677m, IL = 37.3dB (at 6.5 MHz)
Service S4 => Len = 143m, IL = 9.0dB (at 8.0 MHz)
Service A3 => Len = 796m, IL = 35.0dB (at 4.5 MHz)
Service A4 => Len = 143m, IL = 7.5dB (at 6.0 MHz)

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Loop 2 Noise "B", mask ETSI-VDSL-Template-E1-Pcab-M2 UnNotched (997)
Actual power DOWN = 10.75 dBm, UP = 10.32 dBm

Service S1 => Len = 1136m, IL = 46.5dB (at 4.0 MHz)
Service S2 => Len = 994m, IL = 46.5dB (at 5.0 MHz)
Service S3 => Len = 754m, IL = 41.5dB (at 6.5 MHz)
Service S4 => Len = 177m, IL = 11.1dB (at 8.0 MHz)
Service A3 => Len = 953m, IL = 41.9dB (at 4.5 MHz)
Service A4 => Len = 177m, IL = 9.3dB (at 6.0 MHz)

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Loop 2 Noise "B", mask ETSI-VDSL-Template-E1-Pcab-M1 UnNotched (997)
Actual power DOWN = 4.94 dBm, UP = 7.48 dBm

Service S1 => Len = 1097m, IL = 44.9dB (at 4.0 MHz)
Service S2 => Len = 969m, IL = 45.4dB (at 5.0 MHz)
Service S3 => Len = 743m, IL = 40.9dB (at 6.5 MHz)
Service S4 => Len = 177m, IL = 11.1dB (at 8.0 MHz)
Service A3 => Len = 922m, IL = 40.5dB (at 4.5 MHz)
Service A4 => Len = 177m, IL = 9.3dB (at 6.0 MHz)

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Loop 2 Noise "B", mask ETSI-VDSL-Template-E2-Pcab-M1 (998)
Actual power DOWN = 6.80 dBm, UP = 5.95 dBm

Service S1 => Len = 855m, IL = 35.0dB (at 4.0 MHz)
Service S2 => Len = 748m, IL = 35.1dB (at 5.0 MHz)
Service S3 => Len = 287m, IL = 15.8dB (at 6.5 MHz)
Service S4 => Len = 70m, IL = 4.4dB (at 8.0 MHz)
Service A3 => Len = 1074m, IL = 47.2dB (at 4.5 MHz)
Service A4 => Len = 483m, IL = 25.3dB (at 6.0 MHz)

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Loop 2 Noise "B", mask ETSI-VDSL-Template-E2-Pcab-M2 UnNotched (998)
Actual power DOWN = 11.50 dBm, UP = 8.38 dBm

Service S1 => Len = 871m, IL = 35.6dB (at 4.0 MHz)
Service S2 => Len = 763m, IL = 35.7dB (at 5.0 MHz)
Service S3 => Len = 289m, IL = 15.9dB (at 6.5 MHz)
Service S4 => Len = 67m, IL = 4.2dB (at 8.0 MHz)
Service A3 => Len = 1200m, IL = 52.7dB (at 4.5 MHz)
Service A4 => Len = 634m, IL = 33.2dB (at 6.0 MHz)

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Loop 2 Noise "B", mask ETSI-VDSL-Template-E2-Pcab-M1 UnNotched (998)
Actual power DOWN = 6.80 dBm, UP = 5.95 dBm

Service S1 => Len = 856m, IL = 35.0dB (at 4.0 MHz)
Service S2 => Len = 752m, IL = 35.2dB (at 5.0 MHz)
Service S3 => Len = 289m, IL = 15.9dB (at 6.5 MHz)
Service S4 => Len = 67m, IL = 4.2dB (at 8.0 MHz)
Service A3 => Len = 1148m, IL = 50.4dB (at 4.5 MHz)
Service A4 => Len = 631m, IL = 33.1dB (at 6.0 MHz)

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Loop 2 Noise "C", mask ETSI-VDSL-Template-E1-Pcab-M1 (997)
Actual power DOWN = 4.94 dBm, UP = 7.48 dBm

Service S1 => Len = 813m, IL = 33.3dB (at 4.0 MHz)
Service S2 => Len = 742m, IL = 34.8dB (at 5.0 MHz)
Service S3 => Len = 379m, IL = 20.9dB (at 6.5 MHz)
Service S4 => Len = 54m, IL = 3.4dB (at 8.0 MHz)
Service A3 => Len = 379m, IL = 16.6dB (at 4.5 MHz)
Service A4 => Len = 54m, IL = 2.8dB (at 6.0 MHz)

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Loop 2 Noise "C", mask ETSI-VDSL-Template-E1-Pcab-M2 UnNotched (997)
Actual power DOWN = 10.75 dBm, UP = 10.32 dBm

Service S1 => Len = 892m, IL = 36.5dB (at 4.0 MHz)
Service S2 => Len = 823m, IL = 38.6dB (at 5.0 MHz)
Service S3 => Len = 579m, IL = 31.9dB (at 6.5 MHz)
Service S4 => Len = 100m, IL = 6.3dB (at 8.0 MHz)
Service A3 => Len = 579m, IL = 25.4dB (at 4.5 MHz)
Service A4 => Len = 100m, IL = 5.2dB (at 6.0 MHz)

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Loop 2 Noise "C", mask ETSI-VDSL-Template-E1-Pcab-M1 UnNotched (997)
Actual power DOWN = 4.94 dBm, UP = 7.48 dBm

Service S1 => Len = 834m, IL = 34.1dB (at 4.0 MHz)
Service S2 => Len = 771m, IL = 36.1dB (at 5.0 MHz)
Service S3 => Len = 448m, IL = 24.7dB (at 6.5 MHz)
Service S4 => Len = 77m, IL = 4.8dB (at 8.0 MHz)
Service A3 => Len = 448m, IL = 19.7dB (at 4.5 MHz)
Service A4 => Len = 77m, IL = 4.0dB (at 6.0 MHz)

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Loop 2 Noise "C", mask ETSI-VDSL-Template-E2-Pcab-M1 (998)
Actual power DOWN = 6.80 dBm, UP = 5.95 dBm

Service S1 => Len = 726m, IL = 29.7dB (at 4.0 MHz)
Service S2 => Len = 648m, IL = 30.4dB (at 5.0 MHz)
Service S3 => Len = 273m, IL = 15.1dB (at 6.5 MHz)
Service S4 => Len = 56m, IL = 3.5dB (at 8.0 MHz)
Service A3 => Len = 674m, IL = 29.6dB (at 4.5 MHz)
Service A4 => Len = 290m, IL = 15.2dB (at 6.0 MHz)

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Loop 2 Noise "C", mask ETSI-VDSL-Template-E2-Pcab-M2 UnNotched (998)
Actual power DOWN = 11.50 dBm, UP = 8.38 dBm

Service S1 => Len = 757m, IL = 31.0dB (at 4.0 MHz)
Service S2 => Len = 674m, IL = 31.6dB (at 5.0 MHz)
Service S3 => Len = 281m, IL = 15.5dB (at 6.5 MHz)
Service S4 => Len = 58m, IL = 3.6dB (at 8.0 MHz)
Service A3 => Len = 820m, IL = 36.0dB (at 4.5 MHz)
Service A4 => Len = 447m, IL = 23.4dB (at 6.0 MHz)

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Loop 2 Noise "C", mask ETSI-VDSL-Template-E2-Pcab-M1 UnNotched (998)
Actual power DOWN = 6.80 dBm, UP = 5.95 dBm

Service S1 => Len = 728m, IL = 29.8dB (at 4.0 MHz)
Service S2 => Len = 651m, IL = 30.5dB (at 5.0 MHz)
Service S3 => Len = 280m, IL = 15.5dB (at 6.5 MHz)
Service S4 => Len = 58m, IL = 3.7dB (at 8.0 MHz)
Service A3 => Len = 716m, IL = 31.4dB (at 4.5 MHz)
Service A4 => Len = 376m, IL = 19.7dB (at 6.0 MHz)

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Loop 2 Noise "D", mask ETSI-VDSL-Template-E1-Pex-P2-M1 (997)
Actual power DOWN = 14.50 dBm, UP = 7.48 dBm

Service S1 => Len = 906m, IL = 37.1dB (at 4.0 MHz)
Service S2 => Len = 816m, IL = 38.2dB (at 5.0 MHz)
Service S3 => Len = 614m, IL = 33.8dB (at 6.5 MHz)
Service S4 => Len = 197m, IL = 12.4dB (at 8.0 MHz)
Service A3 => Len = 893m, IL = 39.2dB (at 4.5 MHz)
Service A4 => Len = 197m, IL = 10.3dB (at 6.0 MHz)

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Loop 2 Noise "D", mask ETSI-VDSL-Template-E1-Pex-P2-M2 UnNotched (997)
Actual power DOWN = 14.50 dBm, UP = 10.32 dBm

Service S1 => Len = 1015m, IL = 41.5dB (at 4.0 MHz)
Service S2 => Len = 889m, IL = 41.6dB (at 5.0 MHz)
Service S3 => Len = 677m, IL = 37.3dB (at 6.5 MHz)
Service S4 => Len = 248m, IL = 15.6dB (at 8.0 MHz)
Service A3 => Len = 1006m, IL = 44.2dB (at 4.5 MHz)
Service A4 => Len = 248m, IL = 13.0dB (at 6.0 MHz)

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Loop 2 Noise "D", mask ETSI-VDSL-Template-E1-Pex-P2-M1 UnNotched (997)
Actual power DOWN = 14.50 dBm, UP = 7.48 dBm

Service S1 => Len = 957m, IL = 39.2dB (at 4.0 MHz)
Service S2 => Len = 857m, IL = 40.1dB (at 5.0 MHz)
Service S3 => Len = 663m, IL = 36.5dB (at 6.5 MHz)
Service S4 => Len = 245m, IL = 15.4dB (at 8.0 MHz)
Service A3 => Len = 959m, IL = 42.1dB (at 4.5 MHz)
Service A4 => Len = 245m, IL = 12.8dB (at 6.0 MHz)

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Loop 2 Noise "D", mask ETSI-VDSL-Template-E2-Pex-P2-M1 (998)
Actual power DOWN = 14.50 dBm, UP = 5.95 dBm

Service S1 => Len = 755m, IL = 30.9dB (at 4.0 MHz)
Service S2 => Len = 662m, IL = 31.0dB (at 5.0 MHz)
Service S3 => Len = 276m, IL = 15.2dB (at 6.5 MHz)
Service S4 => Len = 58m, IL = 3.7dB (at 8.0 MHz)
Service A3 => Len = 1047m, IL = 46.0dB (at 4.5 MHz)
Service A4 => Len = 578m, IL = 30.3dB (at 6.0 MHz)

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Loop 2 Noise "D", mask ETSI-VDSL-Template-E2-Pex-P2-M2 UnNotched (998)
Actual power DOWN = 14.50 dBm, UP = 8.38 dBm

Service S1 => Len = 773m, IL = 31.6dB (at 4.0 MHz)
Service S2 => Len = 678m, IL = 31.7dB (at 5.0 MHz)
Service S3 => Len = 283m, IL = 15.6dB (at 6.5 MHz)
Service S4 => Len = 60m, IL = 3.8dB (at 8.0 MHz)
Service A3 => Len = 1129m, IL = 49.6dB (at 4.5 MHz)
Service A4 => Len = 699m, IL = 36.6dB (at 6.0 MHz)

=====

Loop 2 Noise "D", mask ETSI-VDSL-Template-E2-Pex-P2-M1 UnNotched (998)
Actual power DOWN = 14.50 dBm, UP = 5.95 dBm

Service S1 => Len = 758m, IL = 31.0dB (at 4.0 MHz)
Service S2 => Len = 666m, IL = 31.2dB (at 5.0 MHz)
Service S3 => Len = 283m, IL = 15.6dB (at 6.5 MHz)
Service S4 => Len = 60m, IL = 3.8dB (at 8.0 MHz)
Service A3 => Len = 1047m, IL = 46.0dB (at 4.5 MHz)
Service A4 => Len = 701m, IL = 36.8dB (at 6.0 MHz)

=====

Loop 2 Noise "E", mask ETSI-VDSL-Template-E1-Pex-P2-M1 (997)
Actual power DOWN = 14.50 dBm, UP = 7.48 dBm

Service S1 => Len = 965m, IL = 39.5dB (at 4.0 MHz)
Service S2 => Len = 868m, IL = 40.7dB (at 5.0 MHz)
Service S3 => Len = 645m, IL = 35.6dB (at 6.5 MHz)
Service S4 => Len = 213m, IL = 13.4dB (at 8.0 MHz)
Service A3 => Len = 1138m, IL = 50.0dB (at 4.5 MHz)
Service A4 => Len = 338m, IL = 17.7dB (at 6.0 MHz)

=====

Loop 2 Noise "E", mask ETSI-VDSL-Template-E1-Pex-P2-M2 UnNotched (997)
Actual power DOWN = 14.50 dBm, UP = 10.32 dBm

Service S1 => Len = 1075m, IL = 44.0dB (at 4.0 MHz)
Service S2 => Len = 940m, IL = 44.0dB (at 5.0 MHz)
Service S3 => Len = 715m, IL = 39.4dB (at 6.5 MHz)
Service S4 => Len = 265m, IL = 16.7dB (at 8.0 MHz)
Service A3 => Len = 1233m, IL = 54.2dB (at 4.5 MHz)
Service A4 => Len = 393m, IL = 20.6dB (at 6.0 MHz)

=====

Loop 2 Noise "E", mask ETSI-VDSL-Template-E1-Pex-P2-M1 UnNotched (997)
Actual power DOWN = 14.50 dBm, UP = 7.48 dBm

Service S1 => Len = 1024m, IL = 41.9dB (at 4.0 MHz)
Service S2 => Len = 911m, IL = 42.7dB (at 5.0 MHz)
Service S3 => Len = 702m, IL = 38.7dB (at 6.5 MHz)
Service S4 => Len = 266m, IL = 16.7dB (at 8.0 MHz)
Service A3 => Len = 1210m, IL = 53.2dB (at 4.5 MHz)
Service A4 => Len = 420m, IL = 22.0dB (at 6.0 MHz)

=====

Loop 2 Noise "E", mask ETSI-VDSL-Template-E2-Pex-P2-M1 (998)
Actual power DOWN = 14.50 dBm, UP = 5.95 dBm

Service S1 => Len = 802m, IL = 32.8dB (at 4.0 MHz)
Service S2 => Len = 703m, IL = 32.9dB (at 5.0 MHz)
Service S3 => Len = 278m, IL = 15.3dB (at 6.5 MHz)
Service S4 => Len = 61m, IL = 3.9dB (at 8.0 MHz)
Service A3 => Len = 1110m, IL = 48.8dB (at 4.5 MHz)
Service A4 => Len = 801m, IL = 42.0dB (at 6.0 MHz)

=====

Loop 2 Noise "E", mask ETSI-VDSL-Template-E2-Pex-P2-M2 UnNotched (998)
Actual power DOWN = 14.50 dBm, UP = 8.38 dBm

Service S1 => Len = 819m, IL = 33.5dB (at 4.0 MHz)
Service S2 => Len = 718m, IL = 33.6dB (at 5.0 MHz)
Service S3 => Len = 284m, IL = 15.7dB (at 6.5 MHz)
Service S4 => Len = 63m, IL = 3.9dB (at 8.0 MHz)
Service A3 => Len = 1189m, IL = 52.2dB (at 4.5 MHz)
Service A4 => Len = 888m, IL = 46.5dB (at 6.0 MHz)

=====

Loop 2 Noise "E", mask ETSI-VDSL-Template-E2-Pex-P2-M1 UnNotched (998)
Actual power DOWN = 14.50 dBm, UP = 5.95 dBm

Service S1 => Len = 804m, IL = 32.9dB (at 4.0 MHz)
Service S2 => Len = 706m, IL = 33.1dB (at 5.0 MHz)
Service S3 => Len = 284m, IL = 15.7dB (at 6.5 MHz)
Service S4 => Len = 62m, IL = 3.9dB (at 8.0 MHz)
Service A3 => Len = 1110m, IL = 48.8dB (at 4.5 MHz)
Service A4 => Len = 897m, IL = 47.0dB (at 6.0 MHz)

=====

Loop 2 Noise "F", mask ETSI-VDSL-Template-E1-Pex-P2-M1 (997)
Actual power DOWN = 14.50 dBm, UP = 7.48 dBm

Service S1 => Len = 753m, IL = 30.8dB (at 4.0 MHz)
Service S2 => Len = 702m, IL = 32.9dB (at 5.0 MHz)
Service S3 => Len = 553m, IL = 30.5dB (at 6.5 MHz)
Service S4 => Len = 207m, IL = 13.0dB (at 8.0 MHz)
Service A3 => Len = 720m, IL = 31.6dB (at 4.5 MHz)
Service A4 => Len = 270m, IL = 14.1dB (at 6.0 MHz)

=====

Loop 2 Noise "F", mask ETSI-VDSL-Template-E1-Pex-P2-M2 UnNotched (997)
Actual power DOWN = 14.50 dBm, UP = 10.32 dBm

Service S1 => Len = 829m, IL = 33.9dB (at 4.0 MHz)
Service S2 => Len = 767m, IL = 35.9dB (at 5.0 MHz)
Service S3 => Len = 621m, IL = 34.2dB (at 6.5 MHz)
Service S4 => Len = 262m, IL = 16.5dB (at 8.0 MHz)
Service A3 => Len = 834m, IL = 36.6dB (at 4.5 MHz)
Service A4 => Len = 344m, IL = 18.0dB (at 6.0 MHz)

=====

Loop 2 Noise "F", mask ETSI-VDSL-Template-E1-Pex-P2-M1 UnNotched (997)
Actual power DOWN = 14.50 dBm, UP = 7.48 dBm

Service S1 => Len = 772m, IL = 31.6dB (at 4.0 MHz)
Service S2 => Len = 721m, IL = 33.8dB (at 5.0 MHz)
Service S3 => Len = 588m, IL = 32.4dB (at 6.5 MHz)
Service S4 => Len = 258m, IL = 16.2dB (at 8.0 MHz)
Service A3 => Len = 744m, IL = 32.7dB (at 4.5 MHz)
Service A4 => Len = 322m, IL = 16.9dB (at 6.0 MHz)

=====

Loop 2 Noise "F", mask ETSI-VDSL-Template-E2-Pex-P2-M1 (998)
Actual power DOWN = 14.50 dBm, UP = 5.95 dBm

Service S1 => Len = 674m, IL = 27.6dB (at 4.0 MHz)
Service S2 => Len = 603m, IL = 28.2dB (at 5.0 MHz)
Service S3 => Len = 270m, IL = 14.9dB (at 6.5 MHz)
Service S4 => Len = 55m, IL = 3.5dB (at 8.0 MHz)
Service A3 => Len = 794m, IL = 34.9dB (at 4.5 MHz)
Service A4 => Len = 557m, IL = 29.2dB (at 6.0 MHz)

=====

Loop 2 Noise "F", mask ETSI-VDSL-Template-E2-Pex-P2-M2 UnNotched (998)
Actual power DOWN = 14.50 dBm, UP = 8.38 dBm

Service S1 => Len = 707m, IL = 28.9dB (at 4.0 MHz)
Service S2 => Len = 632m, IL = 29.6dB (at 5.0 MHz)
Service S3 => Len = 280m, IL = 15.4dB (at 6.5 MHz)
Service S4 => Len = 58m, IL = 3.6dB (at 8.0 MHz)
Service A3 => Len = 851m, IL = 37.4dB (at 4.5 MHz)
Service A4 => Len = 667m, IL = 35.0dB (at 6.0 MHz)

=====

Loop 2 Noise "F", mask ETSI-VDSL-Template-E2-Pex-P2-M1 UnNotched (998)
Actual power DOWN = 14.50 dBm, UP = 5.95 dBm

Service S1 => Len = 676m, IL = 27.7dB (at 4.0 MHz)
Service S2 => Len = 606m, IL = 28.4dB (at 5.0 MHz)
Service S3 => Len = 277m, IL = 15.3dB (at 6.5 MHz)
Service S4 => Len = 58m, IL = 3.6dB (at 8.0 MHz)
Service A3 => Len = 794m, IL = 34.9dB (at 4.5 MHz)
Service A4 => Len = 606m, IL = 31.8dB (at 6.0 MHz)

With PBO

=====

Loop 2 Noise "A", mask ETSI-VDSL-Template-E1-Pcab-M1 (997)
Actual power DOWN = 4.94 dBm, UP = 7.48 dBm

Service S1 => Len = 1026m, IL = 42.0dB (at 4.0 MHz)
Service S2 => Len = 923m, IL = 43.2dB (at 5.0 MHz)
Service S3 => Len = 611m, IL = 33.7dB (at 6.5 MHz)
Service S4 => Len = 98m, IL = 6.2dB (at 8.0 MHz)
Service A3 => Len = 706m, IL = 31.0dB (at 4.5 MHz)
Service A4 => Len = 132m, IL = 6.9dB (at 6.0 MHz)

=====

Loop 2 Noise "A", mask ETSI-VDSL-Template-E1-Pcab-M2 UnNotched (997)
Actual power DOWN = 10.75 dBm, UP = 10.32 dBm

Service S1 => Len = 1136m, IL = 46.5dB (at 4.0 MHz)
Service S2 => Len = 993m, IL = 46.5dB (at 5.0 MHz)
Service S3 => Len = 750m, IL = 41.4dB (at 6.5 MHz)
Service S4 => Len = 145m, IL = 9.1dB (at 8.0 MHz)
Service A3 => Len = 889m, IL = 39.1dB (at 4.5 MHz)
Service A4 => Len = 159m, IL = 8.3dB (at 6.0 MHz)

=====

Loop 2 Noise "A", mask ETSI-VDSL-Template-E1-Pcab-M1 UnNotched (997)
Actual power DOWN = 4.94 dBm, UP = 7.48 dBm

Service S1 => Len = 1097m, IL = 44.9dB (at 4.0 MHz)
Service S2 => Len = 970m, IL = 45.4dB (at 5.0 MHz)
Service S3 => Len = 740m, IL = 40.8dB (at 6.5 MHz)
Service S4 => Len = 145m, IL = 9.1dB (at 8.0 MHz)
Service A3 => Len = 859m, IL = 37.7dB (at 4.5 MHz)
Service A4 => Len = 157m, IL = 8.2dB (at 6.0 MHz)

=====

Loop 2 Noise "A", mask ETSI-VDSL-Template-E2-Pcab-M1 (998)
Actual power DOWN = 6.80 dBm, UP = 5.95 dBm

Service S1 => Len = 853m, IL = 34.9dB (at 4.0 MHz)
Service S2 => Len = 744m, IL = 34.8dB (at 5.0 MHz)
Service S3 => Len = 120m, IL = 6.6dB (at 6.5 MHz)
Service S4 => Len = 2m, IL = 0.1dB (at 8.0 MHz)
Service A3 => Len = 1052m, IL = 46.2dB (at 4.5 MHz)
Service A4 => Len = 431m, IL = 22.6dB (at 6.0 MHz)

=====

Loop 2 Noise "A", mask ETSI-VDSL-Template-E2-Pcab-M2 UnNotched (998)
Actual power DOWN = 11.50 dBm, UP = 8.38 dBm

Service S1 => Len = 868m, IL = 35.5dB (at 4.0 MHz)
Service S2 => Len = 758m, IL = 35.5dB (at 5.0 MHz)
Service S3 => Len = 114m, IL = 6.3dB (at 6.5 MHz)
Service S4 => Len = 2m, IL = 0.1dB (at 8.0 MHz)
Service A3 => Len = 1180m, IL = 51.8dB (at 4.5 MHz)
Service A4 => Len = 581m, IL = 30.5dB (at 6.0 MHz)

=====

Loop 2 Noise "A", mask ETSI-VDSL-Template-E2-Pcab-M1 UnNotched (998)
Actual power DOWN = 6.80 dBm, UP = 5.95 dBm

Service S1 => Len = 855m, IL = 35.0dB (at 4.0 MHz)
Service S2 => Len = 748m, IL = 35.0dB (at 5.0 MHz)
Service S3 => Len = 114m, IL = 6.3dB (at 6.5 MHz)
Service S4 => Len = 2m, IL = 0.1dB (at 8.0 MHz)
Service A3 => Len = 1126m, IL = 49.5dB (at 4.5 MHz)
Service A4 => Len = 575m, IL = 30.1dB (at 6.0 MHz)

=====

Loop 2 Noise "B", mask ETSI-VDSL-Template-E1-Pcab-M1 (997)
Actual power DOWN = 4.94 dBm, UP = 7.48 dBm

Service S1 => Len = 1026m, IL = 42.0dB (at 4.0 MHz)
Service S2 => Len = 923m, IL = 43.3dB (at 5.0 MHz)
Service S3 => Len = 612m, IL = 33.7dB (at 6.5 MHz)
Service S4 => Len = 100m, IL = 6.3dB (at 8.0 MHz)
Service A3 => Len = 796m, IL = 35.0dB (at 4.5 MHz)
Service A4 => Len = 153m, IL = 8.0dB (at 6.0 MHz)

=====

Loop 2 Noise "B", mask ETSI-VDSL-Template-E1-Pcab-M2 UnNotched (997)
Actual power DOWN = 10.75 dBm, UP = 10.32 dBm

Service S1 => Len = 1136m, IL = 46.5dB (at 4.0 MHz)
Service S2 => Len = 994m, IL = 46.5dB (at 5.0 MHz)
Service S3 => Len = 750m, IL = 41.3dB (at 6.5 MHz)
Service S4 => Len = 145m, IL = 9.1dB (at 8.0 MHz)
Service A3 => Len = 953m, IL = 41.9dB (at 4.5 MHz)
Service A4 => Len = 183m, IL = 9.6dB (at 6.0 MHz)

=====

Loop 2 Noise "B", mask ETSI-VDSL-Template-E1-Pcab-M1 UnNotched (997)
Actual power DOWN = 4.94 dBm, UP = 7.48 dBm

Service S1 => Len = 1096m, IL = 44.9dB (at 4.0 MHz)
Service S2 => Len = 969m, IL = 45.4dB (at 5.0 MHz)
Service S3 => Len = 739m, IL = 40.7dB (at 6.5 MHz)
Service S4 => Len = 145m, IL = 9.1dB (at 8.0 MHz)
Service A3 => Len = 922m, IL = 40.5dB (at 4.5 MHz)
Service A4 => Len = 183m, IL = 9.6dB (at 6.0 MHz)

=====

Loop 2 Noise "B", mask ETSI-VDSL-Template-E2-Pcab-M1 (998)
Actual power DOWN = 6.80 dBm, UP = 5.95 dBm

Service S1 => Len = 853m, IL = 34.9dB (at 4.0 MHz)
Service S2 => Len = 744m, IL = 34.8dB (at 5.0 MHz)
Service S3 => Len = 123m, IL = 6.8dB (at 6.5 MHz)
Service S4 => Len = 2m, IL = 0.1dB (at 8.0 MHz)
Service A3 => Len = 1074m, IL = 47.2dB (at 4.5 MHz)
Service A4 => Len = 483m, IL = 25.3dB (at 6.0 MHz)

=====

Loop 2 Noise "B", mask ETSI-VDSL-Template-E2-Pcab-M2 UnNotched (998)
Actual power DOWN = 11.50 dBm, UP = 8.38 dBm

Service S1 => Len = 869m, IL = 35.5dB (at 4.0 MHz)
Service S2 => Len = 758m, IL = 35.5dB (at 5.0 MHz)
Service S3 => Len = 114m, IL = 6.3dB (at 6.5 MHz)
Service S4 => Len = 2m, IL = 0.1dB (at 8.0 MHz)
Service A3 => Len = 1200m, IL = 52.7dB (at 4.5 MHz)
Service A4 => Len = 634m, IL = 33.2dB (at 6.0 MHz)

=====

Loop 2 Noise "B", mask ETSI-VDSL-Template-E2-Pcab-M1 UnNotched (998)
Actual power DOWN = 6.80 dBm, UP = 5.95 dBm

Service S1 => Len = 855m, IL = 35.0dB (at 4.0 MHz)
Service S2 => Len = 748m, IL = 35.0dB (at 5.0 MHz)
Service S3 => Len = 115m, IL = 6.3dB (at 6.5 MHz)
Service S4 => Len = 2m, IL = 0.1dB (at 8.0 MHz)
Service A3 => Len = 1148m, IL = 50.4dB (at 4.5 MHz)
Service A4 => Len = 631m, IL = 33.1dB (at 6.0 MHz)

=====

Loop 2 Noise "C", mask ETSI-VDSL-Template-E1-Pcab-M1 (997)
Actual power DOWN = 4.94 dBm, UP = 7.48 dBm

Service S1 => Len = 813m, IL = 33.3dB (at 4.0 MHz)
Service S2 => Len = 742m, IL = 34.8dB (at 5.0 MHz)
Service S3 => Len = 379m, IL = 20.9dB (at 6.5 MHz)
Service S4 => Len = 27m, IL = 1.7dB (at 8.0 MHz)
Service A3 => Len = 379m, IL = 16.6dB (at 4.5 MHz)
Service A4 => Len = 60m, IL = 3.1dB (at 6.0 MHz)

=====

Loop 2 Noise "C", mask ETSI-VDSL-Template-E1-Pcab-M2 UnNotched (997)
Actual power DOWN = 10.75 dBm, UP = 10.32 dBm

Service S1 => Len = 892m, IL = 36.5dB (at 4.0 MHz)
Service S2 => Len = 823m, IL = 38.6dB (at 5.0 MHz)
Service S3 => Len = 579m, IL = 31.9dB (at 6.5 MHz)
Service S4 => Len = 43m, IL = 2.7dB (at 8.0 MHz)
Service A3 => Len = 579m, IL = 25.4dB (at 4.5 MHz)
Service A4 => Len = 103m, IL = 5.4dB (at 6.0 MHz)

=====

Loop 2 Noise "C", mask ETSI-VDSL-Template-E1-Pcab-M1 UnNotched (997)
Actual power DOWN = 4.94 dBm, UP = 7.48 dBm

Service S1 => Len = 834m, IL = 34.1dB (at 4.0 MHz)
Service S2 => Len = 771m, IL = 36.1dB (at 5.0 MHz)
Service S3 => Len = 448m, IL = 24.7dB (at 6.5 MHz)
Service S4 => Len = 44m, IL = 2.7dB (at 8.0 MHz)
Service A3 => Len = 448m, IL = 19.7dB (at 4.5 MHz)
Service A4 => Len = 81m, IL = 4.2dB (at 6.0 MHz)

=====

Loop 2 Noise "C", mask ETSI-VDSL-Template-E2-Pcab-M1 (998)
Actual power DOWN = 6.80 dBm, UP = 5.95 dBm

Service S1 => Len = 726m, IL = 29.7dB (at 4.0 MHz)
Service S2 => Len = 648m, IL = 30.4dB (at 5.0 MHz)
Service S3 => Len = 47m, IL = 2.6dB (at 6.5 MHz)
Service S4 => Len = 3m, IL = 0.2dB (at 8.0 MHz)
Service A3 => Len = 674m, IL = 29.6dB (at 4.5 MHz)
Service A4 => Len = 290m, IL = 15.2dB (at 6.0 MHz)

=====

Loop 2 Noise "C", mask ETSI-VDSL-Template-E2-Pcab-M2 UnNotched (998)
Actual power DOWN = 11.50 dBm, UP = 8.38 dBm

Service S1 => Len = 757m, IL = 31.0dB (at 4.0 MHz)
Service S2 => Len = 669m, IL = 31.4dB (at 5.0 MHz)
Service S3 => Len = 51m, IL = 2.8dB (at 6.5 MHz)
Service S4 => Len = 3m, IL = 0.2dB (at 8.0 MHz)
Service A3 => Len = 820m, IL = 36.0dB (at 4.5 MHz)
Service A4 => Len = 447m, IL = 23.4dB (at 6.0 MHz)

=====

Loop 2 Noise "C", mask ETSI-VDSL-Template-E2-Pcab-M1 UnNotched (998)
Actual power DOWN = 6.80 dBm, UP = 5.95 dBm

Service S1 => Len = 728m, IL = 29.8dB (at 4.0 MHz)
Service S2 => Len = 651m, IL = 30.5dB (at 5.0 MHz)
Service S3 => Len = 51m, IL = 2.8dB (at 6.5 MHz)
Service S4 => Len = 3m, IL = 0.2dB (at 8.0 MHz)
Service A3 => Len = 716m, IL = 31.4dB (at 4.5 MHz)
Service A4 => Len = 376m, IL = 19.7dB (at 6.0 MHz)

=====

Loop 2 Noise "D", mask ETSI-VDSL-Template-E1-Pex-P2-M1 (997)
Actual power DOWN = 14.50 dBm, UP = 7.48 dBm

Service S1 => Len = 906m, IL = 37.1dB (at 4.0 MHz)
Service S2 => Len = 815m, IL = 38.2dB (at 5.0 MHz)
Service S3 => Len = 502m, IL = 27.7dB (at 6.5 MHz)
Service S4 => Len = 19m, IL = 1.2dB (at 8.0 MHz)
Service A3 => Len = 893m, IL = 39.2dB (at 4.5 MHz)
Service A4 => Len = 198m, IL = 10.4dB (at 6.0 MHz)

=====

Loop 2 Noise "D", mask ETSI-VDSL-Template-E1-Pex-P2-M2 UnNotched (997)
Actual power DOWN = 14.50 dBm, UP = 10.32 dBm

Service S1 => Len = 1015m, IL = 41.5dB (at 4.0 MHz)
Service S2 => Len = 885m, IL = 41.5dB (at 5.0 MHz)
Service S3 => Len = 662m, IL = 36.5dB (at 6.5 MHz)
Service S4 => Len = 29m, IL = 1.8dB (at 8.0 MHz)
Service A3 => Len = 1006m, IL = 44.2dB (at 4.5 MHz)
Service A4 => Len = 249m, IL = 13.1dB (at 6.0 MHz)

=====

Loop 2 Noise "D", mask ETSI-VDSL-Template-E1-Pex-P2-M1 UnNotched (997)
Actual power DOWN = 14.50 dBm, UP = 7.48 dBm

Service S1 => Len = 957m, IL = 39.2dB (at 4.0 MHz)
Service S2 => Len = 856m, IL = 40.1dB (at 5.0 MHz)
Service S3 => Len = 650m, IL = 35.8dB (at 6.5 MHz)
Service S4 => Len = 29m, IL = 1.8dB (at 8.0 MHz)
Service A3 => Len = 959m, IL = 42.1dB (at 4.5 MHz)
Service A4 => Len = 246m, IL = 12.9dB (at 6.0 MHz)

=====

Loop 2 Noise "D", mask ETSI-VDSL-Template-E2-Pex-P2-M1 (998)
Actual power DOWN = 14.50 dBm, UP = 5.95 dBm

Service S1 => Len = 752m, IL = 30.8dB (at 4.0 MHz)
Service S2 => Len = 655m, IL = 30.7dB (at 5.0 MHz)
Service S3 => Len = 22m, IL = 1.2dB (at 6.5 MHz)
Service S4 => Len = 2m, IL = 0.1dB (at 8.0 MHz)
Service A3 => Len = 1047m, IL = 46.0dB (at 4.5 MHz)
Service A4 => Len = 578m, IL = 30.3dB (at 6.0 MHz)

=====

Loop 2 Noise "D", mask ETSI-VDSL-Template-E2-Pex-P2-M2 UnNotched (998)
Actual power DOWN = 14.50 dBm, UP = 8.38 dBm

Service S1 => Len = 768m, IL = 31.4dB (at 4.0 MHz)
Service S2 => Len = 670m, IL = 31.4dB (at 5.0 MHz)
Service S3 => Len = 22m, IL = 1.2dB (at 6.5 MHz)
Service S4 => Len = 2m, IL = 0.1dB (at 8.0 MHz)
Service A3 => Len = 1129m, IL = 49.6dB (at 4.5 MHz)
Service A4 => Len = 699m, IL = 36.6dB (at 6.0 MHz)

=====

Loop 2 Noise "D", mask ETSI-VDSL-Template-E2-Pex-P2-M1 UnNotched (998)
Actual power DOWN = 14.50 dBm, UP = 5.95 dBm

Service S1 => Len = 754m, IL = 30.8dB (at 4.0 MHz)
Service S2 => Len = 658m, IL = 30.8dB (at 5.0 MHz)
Service S3 => Len = 22m, IL = 1.2dB (at 6.5 MHz)
Service S4 => Len = 2m, IL = 0.1dB (at 8.0 MHz)
Service A3 => Len = 1047m, IL = 46.0dB (at 4.5 MHz)
Service A4 => Len = 701m, IL = 36.8dB (at 6.0 MHz)

=====

Loop 2 Noise "E", mask ETSI-VDSL-Template-E1-Pex-P2-M1 (997)
Actual power DOWN = 14.50 dBm, UP = 7.48 dBm

Service S1 => Len = 965m, IL = 39.5dB (at 4.0 MHz)
Service S2 => Len = 868m, IL = 40.7dB (at 5.0 MHz)
Service S3 => Len = 571m, IL = 31.5dB (at 6.5 MHz)
Service S4 => Len = 40m, IL = 2.5dB (at 8.0 MHz)
Service A3 => Len = 1138m, IL = 50.0dB (at 4.5 MHz)
Service A4 => Len = 338m, IL = 17.7dB (at 6.0 MHz)

=====

Loop 2 Noise "E", mask ETSI-VDSL-Template-E1-Pex-P2-M2 UnNotched (997)
Actual power DOWN = 14.50 dBm, UP = 10.32 dBm

Service S1 => Len = 1075m, IL = 44.0dB (at 4.0 MHz)
Service S2 => Len = 939m, IL = 44.0dB (at 5.0 MHz)
Service S3 => Len = 704m, IL = 38.8dB (at 6.5 MHz)
Service S4 => Len = 76m, IL = 4.7dB (at 8.0 MHz)
Service A3 => Len = 1233m, IL = 54.2dB (at 4.5 MHz)
Service A4 => Len = 393m, IL = 20.6dB (at 6.0 MHz)

=====

Loop 2 Noise "E", mask ETSI-VDSL-Template-E1-Pex-P2-M1 UnNotched (997)
Actual power DOWN = 14.50 dBm, UP = 7.48 dBm

Service S1 => Len = 1024m, IL = 41.9dB (at 4.0 MHz)
Service S2 => Len = 911m, IL = 42.7dB (at 5.0 MHz)
Service S3 => Len = 693m, IL = 38.2dB (at 6.5 MHz)
Service S4 => Len = 76m, IL = 4.7dB (at 8.0 MHz)
Service A3 => Len = 1210m, IL = 53.2dB (at 4.5 MHz)
Service A4 => Len = 420m, IL = 22.0dB (at 6.0 MHz)

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Loop 2 Noise "E", mask ETSI-VDSL-Template-E2-Pex-P2-M1 (998)
Actual power DOWN = 14.50 dBm, UP = 5.95 dBm

Service S1 => Len = 799m, IL = 32.7dB (at 4.0 MHz)
Service S2 => Len = 697m, IL = 32.6dB (at 5.0 MHz)
Service S3 => Len = 55m, IL = 3.0dB (at 6.5 MHz)
Service S4 => Len = 2m, IL = 0.1dB (at 8.0 MHz)
Service A3 => Len = 1110m, IL = 48.8dB (at 4.5 MHz)
Service A4 => Len = 801m, IL = 42.0dB (at 6.0 MHz)

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Loop 2 Noise "E", mask ETSI-VDSL-Template-E2-Pex-P2-M2 UnNotched (998)
Actual power DOWN = 14.50 dBm, UP = 8.38 dBm

Service S1 => Len = 815m, IL = 33.3dB (at 4.0 MHz)
Service S2 => Len = 712m, IL = 33.3dB (at 5.0 MHz)
Service S3 => Len = 55m, IL = 3.0dB (at 6.5 MHz)
Service S4 => Len = 2m, IL = 0.1dB (at 8.0 MHz)
Service A3 => Len = 1189m, IL = 52.2dB (at 4.5 MHz)
Service A4 => Len = 888m, IL = 46.5dB (at 6.0 MHz)

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Loop 2 Noise "E", mask ETSI-VDSL-Template-E2-Pex-P2-M1 UnNotched (998)
Actual power DOWN = 14.50 dBm, UP = 5.95 dBm

Service S1 => Len = 801m, IL = 32.8dB (at 4.0 MHz)
Service S2 => Len = 700m, IL = 32.8dB (at 5.0 MHz)
Service S3 => Len = 55m, IL = 3.0dB (at 6.5 MHz)
Service S4 => Len = 2m, IL = 0.1dB (at 8.0 MHz)
Service A3 => Len = 1110m, IL = 48.8dB (at 4.5 MHz)
Service A4 => Len = 897m, IL = 47.0dB (at 6.0 MHz)

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Loop 2 Noise "F", mask ETSI-VDSL-Template-E1-Pex-P2-M1 (997)
Actual power DOWN = 14.50 dBm, UP = 7.48 dBm

Service S1 => Len = 753m, IL = 30.8dB (at 4.0 MHz)
Service S2 => Len = 702m, IL = 32.9dB (at 5.0 MHz)
Service S3 => Len = 513m, IL = 28.3dB (at 6.5 MHz)
Service S4 => Len = 15m, IL = 0.9dB (at 8.0 MHz)
Service A3 => Len = 720m, IL = 31.6dB (at 4.5 MHz)
Service A4 => Len = 270m, IL = 14.1dB (at 6.0 MHz)

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Loop 2 Noise "F", mask ETSI-VDSL-Template-E1-Pex-P2-M2 UnNotched (997)
Actual power DOWN = 14.50 dBm, UP = 10.32 dBm

Service S1 => Len = 829m, IL = 33.9dB (at 4.0 MHz)
Service S2 => Len = 767m, IL = 35.9dB (at 5.0 MHz)
Service S3 => Len = 615m, IL = 33.9dB (at 6.5 MHz)
Service S4 => Len = 21m, IL = 1.3dB (at 8.0 MHz)
Service A3 => Len = 834m, IL = 36.6dB (at 4.5 MHz)
Service A4 => Len = 344m, IL = 18.0dB (at 6.0 MHz)

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Loop 2 Noise "F", mask ETSI-VDSL-Template-E1-Pex-P2-M1 UnNotched (997)
Actual power DOWN = 14.50 dBm, UP = 7.48 dBm

Service S1 => Len = 772m, IL = 31.6dB (at 4.0 MHz)
Service S2 => Len = 721m, IL = 33.8dB (at 5.0 MHz)
Service S3 => Len = 588m, IL = 32.4dB (at 6.5 MHz)
Service S4 => Len = 21m, IL = 1.3dB (at 8.0 MHz)
Service A3 => Len = 744m, IL = 32.7dB (at 4.5 MHz)
Service A4 => Len = 322m, IL = 16.9dB (at 6.0 MHz)

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Loop 2 Noise "F", mask ETSI-VDSL-Template-E2-Pex-P2-M1 (998)
Actual power DOWN = 14.50 dBm, UP = 5.95 dBm

Service S1 => Len = 674m, IL = 27.6dB (at 4.0 MHz)
Service S2 => Len = 603m, IL = 28.2dB (at 5.0 MHz)
Service S3 => Len = 22m, IL = 1.2dB (at 6.5 MHz)
Service S4 => Len = 2m, IL = 0.1dB (at 8.0 MHz)
Service A3 => Len = 794m, IL = 34.9dB (at 4.5 MHz)
Service A4 => Len = 557m, IL = 29.2dB (at 6.0 MHz)

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Loop 2 Noise "F", mask ETSI-VDSL-Template-E2-Pex-P2-M2 UnNotched (998)
Actual power DOWN = 14.50 dBm, UP = 8.38 dBm

Service S1 => Len = 707m, IL = 28.9dB (at 4.0 MHz)
Service S2 => Len = 628m, IL = 29.4dB (at 5.0 MHz)
Service S3 => Len = 23m, IL = 1.2dB (at 6.5 MHz)
Service S4 => Len = 2m, IL = 0.1dB (at 8.0 MHz)
Service A3 => Len = 851m, IL = 37.4dB (at 4.5 MHz)
Service A4 => Len = 667m, IL = 35.0dB (at 6.0 MHz)

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Loop 2 Noise "F", mask ETSI-VDSL-Template-E2-Pex-P2-M1 UnNotched (998)
Actual power DOWN = 14.50 dBm, UP = 5.95 dBm

Service S1 => Len = 676m, IL = 27.7dB (at 4.0 MHz)
Service S2 => Len = 606m, IL = 28.4dB (at 5.0 MHz)
Service S3 => Len = 23m, IL = 1.3dB (at 6.5 MHz)
Service S4 => Len = 2m, IL = 0.1dB (at 8.0 MHz)
Service A3 => Len = 794m, IL = 34.9dB (at 4.5 MHz)
Service A4 => Len = 606m, IL = 31.8dB (at 6.0 MHz)