Power Over Ethernet Consortium
Interoperability Test Suite version 0.1

InterOperability Lab — 121 Technology Drive, Suite 2
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December 10, 2003

Dilian Reyes
Linear Technology
1630 McCarthy Blvd.
Milpitas, CA 95035

Mr. Reyes:

Enclosed are the results from the Power over Ethernet GTP Interoperability testing performed on:

Linear Technology DC671

This testing pertains to the Power over Ethernet testing that was performed during the week of November 17, 2003.

There were no interoperability issues uncovered, during the testing process. If you have any questions about the test procedures or results, please contact us via e-mail at (alosee@iol.unh.edu), (srlp2@iol.unh.edu) or by phone at (603) 862-0239.

Sincerely,

Andrew Losee

Sean LaPierre

The following table contains possible results and their meanings:

Result	Interpretation
PASS	The DUT was observed to exhibit conformant behavior.
FAIL	The DUT was observed to exhibit non-compliant behavior.
PASS with Comments	The DUT was observed to exhibit conformant behavior, however this behavior deviated from previous compliant results. An additional explanation of the situation is included.
Warning	The DUT was observed to exhibit behavior that is not recommended.
Refer to Comments	From the observations, a valid pass or fail could not be determined. An additional explanation of the situation is included.
Not Applicable	The DUT does not support the technology required to perform these tests.
Not Available	Due to testing station or time limitations, the tests could not be performed, or were performed in a limited capacity.
Not Tested	Not tested due to time constraint of the test period.
Borderline	The observed values of the specified parameter are valid at one extreme, and invalid at the other extreme.
Informative	Results are for informative purposes only and are not judged on a pass or fail basis.

POINT-TO-POINT (PTP) INTEROPERABILITY TESTS:

Comments on Test Procedures:

Test #1.1.1 Link Speed Detection

Case 1: This test entails powering on the PSE separately and then connecting the link partner. The Power Sourcing Equipment should be able to provide power to the Powered Device. A link should be established between the two devices and traffic should be able to be transmitted between them. Refer to the following tables for further information regarding the results from this test

Test #1.1.7 Power Request and Application

These Cases are designed specifically for devices that only support power.

Case 1: This test entails powering on the DUT separately and then connecting the link partner. The Power Sourcing Equipment should be able to provide power to the Powered Device. Refer to the following tables for further information regarding the results from this test.

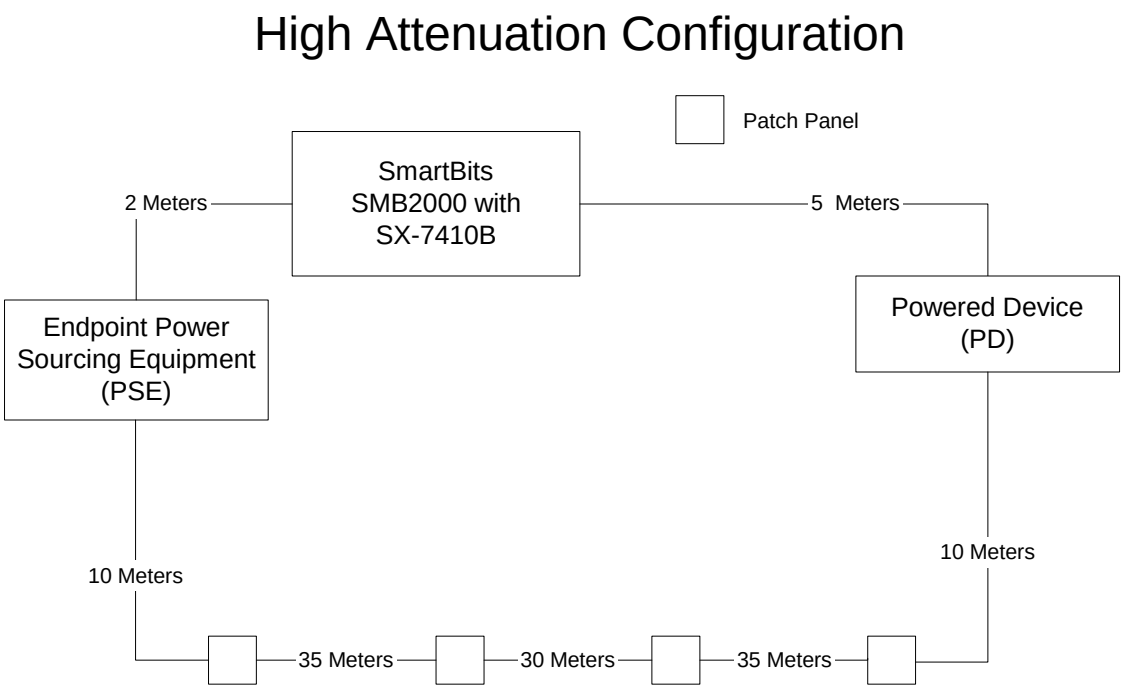
Case 2: This test entails power cycling the Power Sourcing Equipment while the Powered Device is connected. The Power Sourcing Equipment should provide power to the Powered Device. Refer to the following tables for further information regarding the results from this test.

Packet Error Ratio Estimation

High Attenuation Channel: The two devices are connected to each end of the channel with a 10-meter cable. The high attenuation channel is approximately 120 meters long. A number of ICMP echo requests (Refer to the Ethernet Physical Layer Interoperability Test Suite: Appendix A Table A-1) are sent to verify that traffic can successfully be sent between the link partners. For this test event 4,680,000 64byte packets and 197,000 1518byte packets were transmitted between the link partners. The number of packets lost is noted. Refer to the following tables for further information regarding the results of this test.

Endpoint PSE Channel Configuration

The following cable configurations were used for Endpoint PSE and PD interoperability testing.



Channel Plots

Included with this report is a series of plots that provide a characterization of the channels over which the testing was performed. The plots include the following items:

- Attenuation plots taken for each channel.
- Near end cross talk (NEXT) plots taken from both ends of each channel (Both the DUT and the testing station). The DUT end is labeled as “Near End Crosstalk" and the testing station end is labeled as “Near End Crosstalk @ Remote”.
- Return Loss plots taken for each channel, at the DUT and at the testing station. The DUT is labeled as “Return Loss” and the testing station end is labeled as “Return Loss @ Remote”.

Test Results:

PSEs Tested	Test 1.1.1 Case 1	64 Byte	1518 Byte
PowerDsine 30012/3006	**PASS**	**0**	**0**
PowerDsine 6001	**PASS**	**0**	**0**
PowerDsine 64012	**PASS**	**0**	**0**
Extreme Summit 300-48	**PASS**	**0**	**0**
Extreme Summit 300-48 Helium Rev A	**PASS**	**0**	**0**
Nortel Baystack 460-24T	**PASS**	**0**	**0**
Red Hawk BL-8520	**PASS**	**0**	**0**
Red Hawk BL-6524	**PASS**	**0**	**0**
3COM NJ105	**PASS**	**0**	**0**
3COM NJ220	**PASS**	**0**	**0**
3COM NJ200 Old	**PASS**	**0**	**0**
3COM NJ200 New	**PASS**	**0**	**0**
3COM NJ100	**PASS**	**0**	**0**
Cisco WS-X4248-RJ21V	**PASS**	**0**	**0**
Cisco WS-X4548-GB-RJ45V	**PASS**	**0**	**0**

CAT 5 - TSB95 Spec - Maximum Attenuation

Parameter	Pair	Channel-1	Channel-2
Propagation Delay (ns)	(1, 2)	551.00	503.00
	(3, 6)	555.00	508.00
	(4, 5)	542.00	495.00
	(7, 8)	558.00	511.00
Propagation Delay Skew (ns)	(1, 2)	9.00	8.00
	(3, 6)	13.00	13.00
	(4, 5)	0.00	0.00
	(7, 8)	16.00	16.00

Parameter	Pair	Channel-1	Channel-2
Insertion Loss Margin (dB)	(1, 2)	0.40	0.70
	(3, 6)	0.30	0.60
	(4, 5)		
	(7, 8)		
Return Loss Margin (dB)	(1, 2)	10.80	11.50
	(3, 6)	8.40	8.95
	(4, 5)		
	(7, 8)		
Return Loss @ Remote Margin (dB)	(1, 2)	10.33	9.30
	(3, 6)	6.70	9.20
	(4, 5)		
	(7, 8)		
PSNEXT Margin (dB)	(1, 2)		
	(3, 6)		
	(4, 5)		
	(7, 8)		
PSNEXT @ Remote Margin (dB)	(1, 2)		
	(3, 6)		
	(4, 5)		
	(7, 8)		
PSELFEXT Margin (dB)	(1, 2)		
	(3, 6)		
	(4, 5)		
	(7, 8)		
PSELFEXT @ Remote Margin (dB)	(1, 2)		
	(3, 6)		
	(4, 5)		
	(7, 8)		

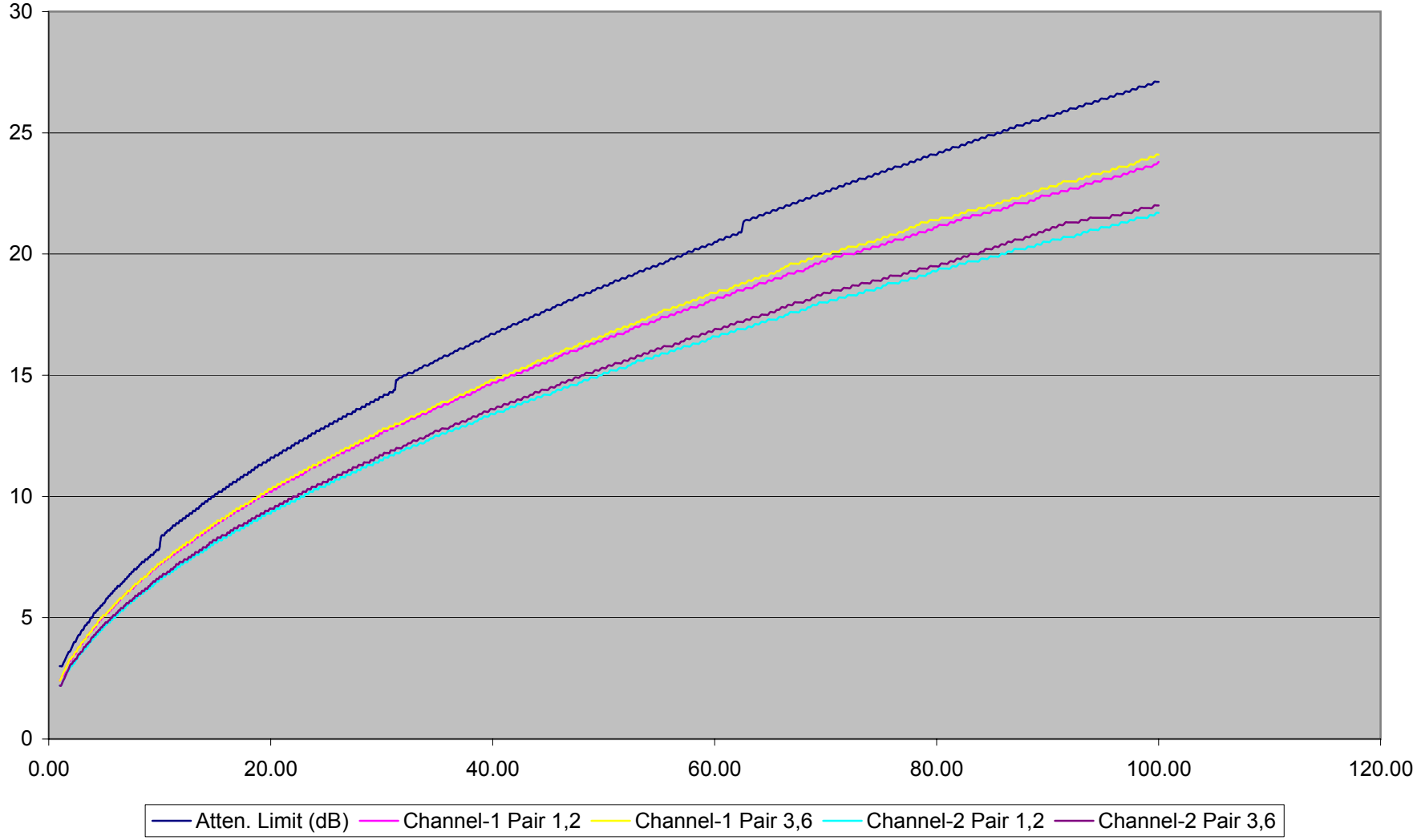
Parameter	Generator-Receptor	Channel-1	Channel-2
NEXT Margin (dB)	(1, 2)-(3, 6)	17.80	14.90
	(1, 2)-(4, 5)		
	(1, 2)-(7, 8)		
	(3, 6)-(4, 5)		
	(3, 6)-(7, 8)		
	(4, 5)-(7, 8)		
NEXT @ Remote Margin (dB)	(1, 2)-(3, 6)	14.30	11.90
	(1, 2)-(4, 5)		
	(1, 2)-(7, 8)		
	(3, 6)-(4, 5)		
	(3, 6)-(7, 8)		
	(4, 5)-(7, 8)		

Parameter	Generator-Receptor	Channel-1	Channel-2
ELFEXT Margin (dB)	(1, 2)-(3, 6)		
	(1, 2)-(4, 5)		
	(1, 2)-(7, 8)		
	(3, 6)-(1, 2)		
	(3, 6)-(4, 5)		
	(3, 6)-(7, 8)		
	(4, 5)-(1, 2)		
	(4, 5)-(3, 6)		
	(4, 5)-(7, 8)		
	(7, 8)-(1, 2)		
	(7, 8)-(3, 6)		
	(7, 8)-(4, 5)		
ELFEXT @ Remote Margin (dB)	(1, 2)-(3, 6)		
	(1, 2)-(4, 5)		
	(1, 2)-(7, 8)		
	(3, 6)-(1, 2)		
	(3, 6)-(4, 5)		
	(3, 6)-(7, 8)		
	(4, 5)-(1, 2)		
	(4, 5)-(3, 6)		
	(4, 5)-(7, 8)		
	(7, 8)-(1, 2)		
	(7, 8)-(3, 6)		
	(7, 8)-(4, 5)		

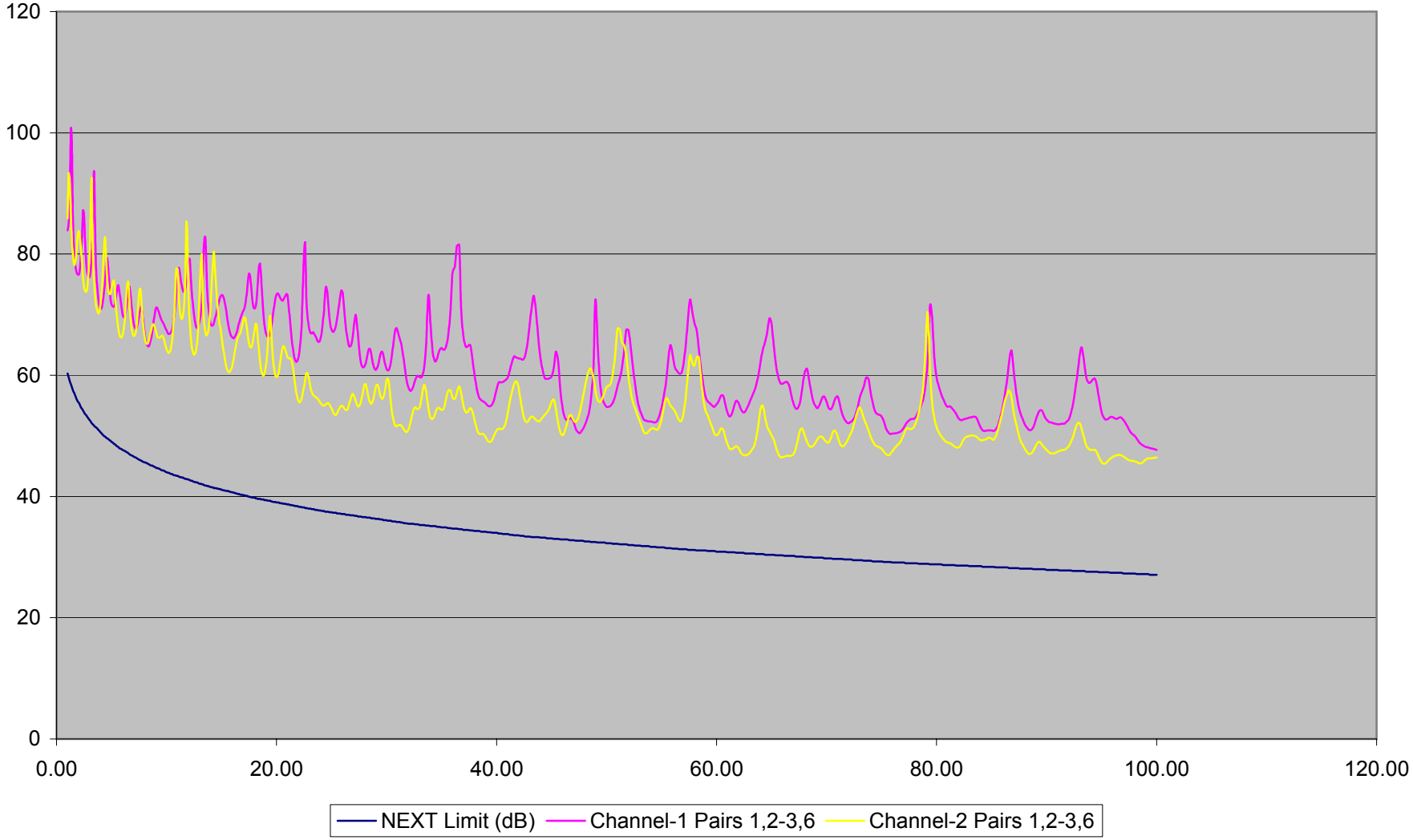
Channel 1 Description: GTP Cable Plant #1

Channel 2 Description: GTP Cable Plant #2

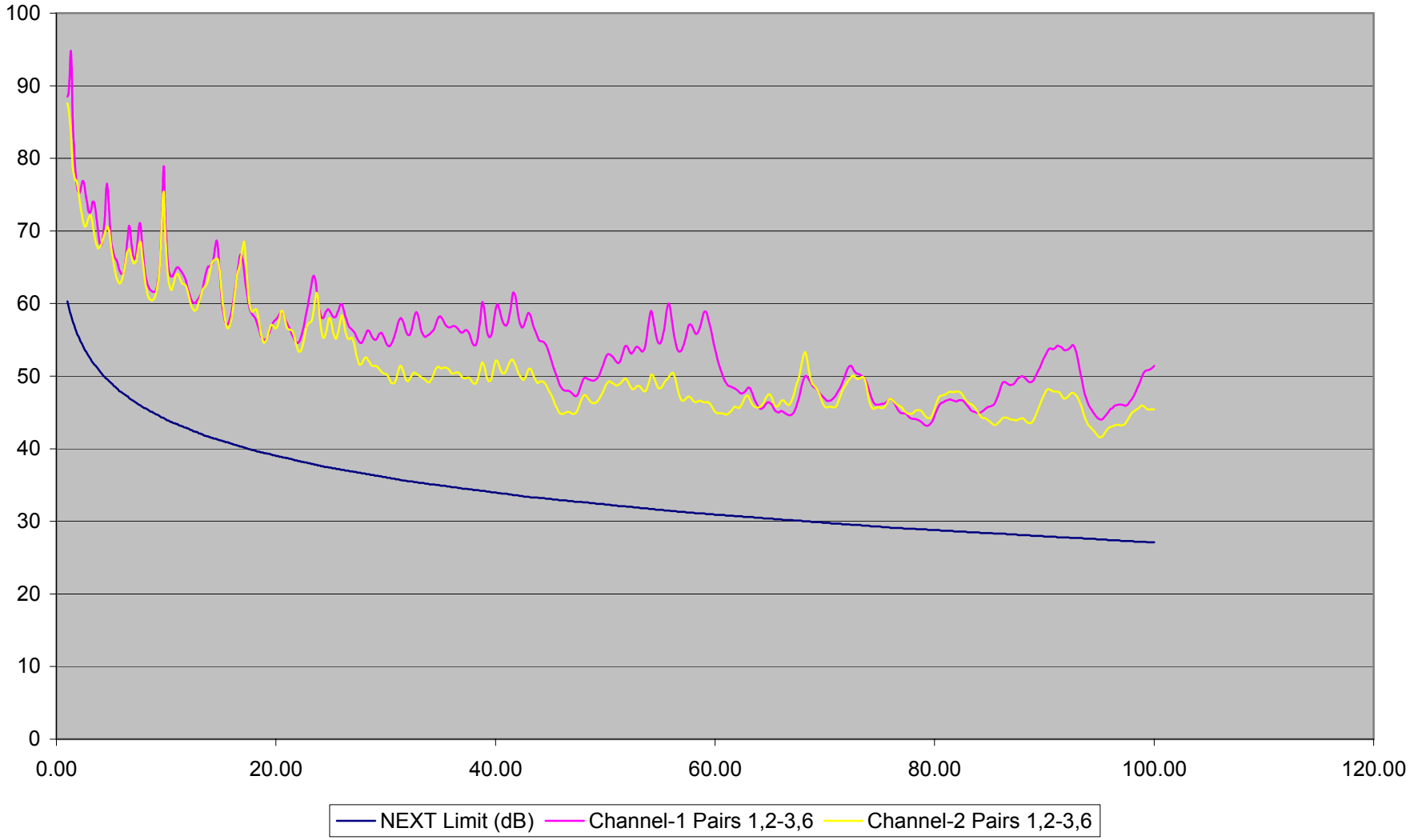
CAT 5 - TSB95 Spec @ Maximum Attenuation - Attenuation Plot
X-Axis Frequency (MHz), Y-Axis Attn (dB)



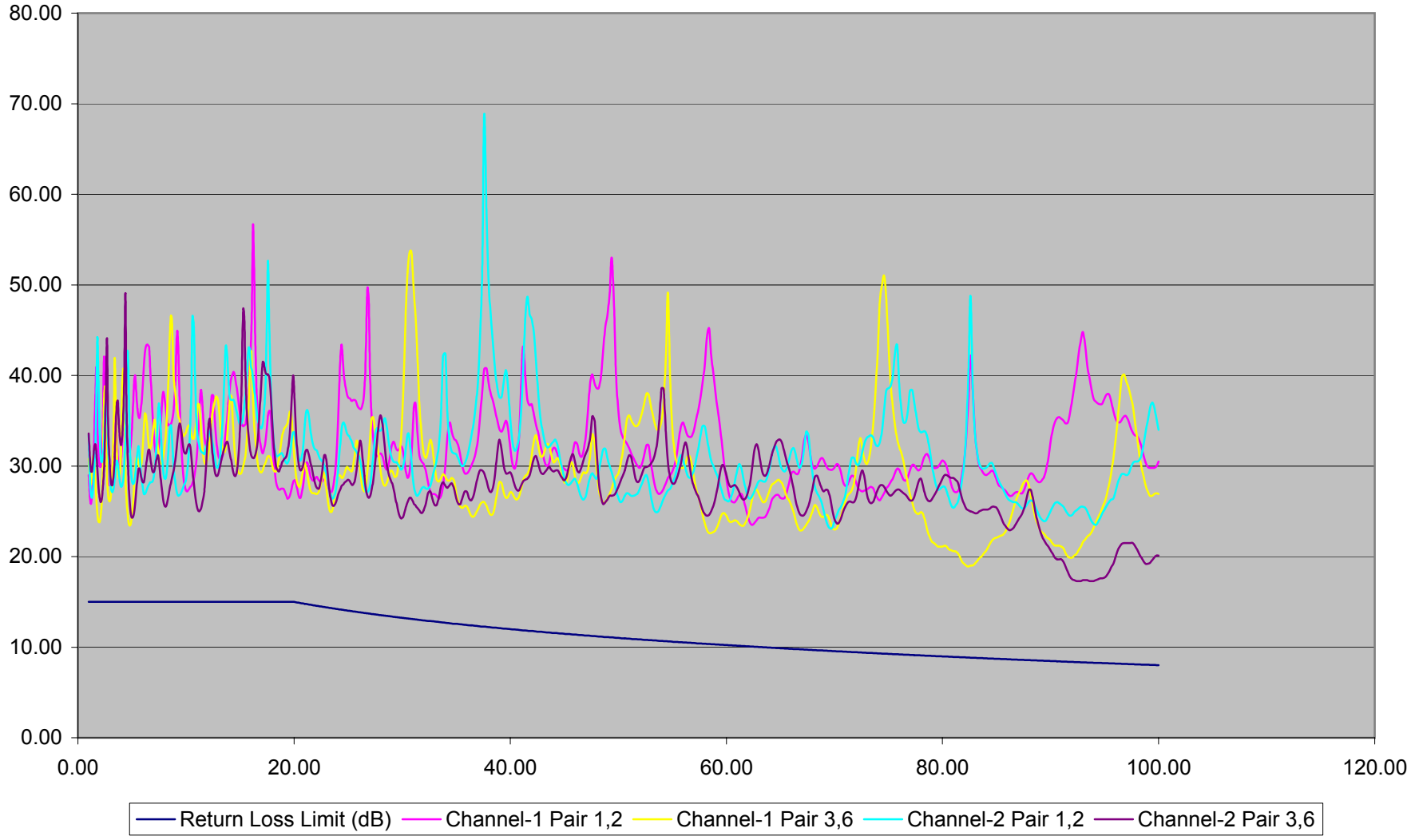
CAT 5 - TSB95 Spec @ Maximum Attenuation - Near End Cross Talk
X-Axis Frequency (MHz), Y-Axis NEXT (dB)



CAT 5 - TSB95 Spec @ Maximum Attenuation - Near End Cross Talk @ Remote
X-Axis Frequency (MHz), Y-Axis NEXT-R (dB)



CAT 5 - TSB95 Spec @ Maximum Attenuation - Return Loss
X-Axis Frequency (MHz), Y-Axis RL (dB)



CAT 5 - TSB95 Spec @ Maximum Attenuation - Return Loss @ Remote
X-Axis Frequency (MHz), Y-Axis RL-R (dB)