Power over Ethernet Consortium
Interoperability Test Suite v2.3 Report

UNH-IOL — 121 Technology Drive, Suite 2 — Durham, NH 03824 — (603) 862-0090
Consortium Manager: Gerard Nadeau — grn@iol.unh.edu — 603.862.0166

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

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Report Rev. 1.0

Enclosed are the results from the PSE interoperability testing performed on:

Device Under Test (DUT):	DC981A/B, LTC4263 Midspan/Endpoint PSE
Ports Tested:	Endpoint Port
Hardware Version:	Not Available
DUT PHY Chip:	Not Applicable
Power Chipset:	Linear LTC4263
Power Supply Voltage:	48 Volts

The test suite referenced in this report is available at the UNH-IOL website:

ftp://ftp.iol.unh.edu/pub/ethernet/test_suites/interop/Interop_Test_Suite_v2.2.pdf

There were no issues uncovered during InterOperability testing.

Testing Completed
08/01/2006

Matthew F Borowski

Matthew Borowski
mfn6@iol.unh.edu

Digitally signed by UNH-IOL
Date: 2006.08.04 14:08:21 -04'00'

Review Completed
08/04/2006

David Schwarzenberg
dws2@iol.unh.edu

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Result Key

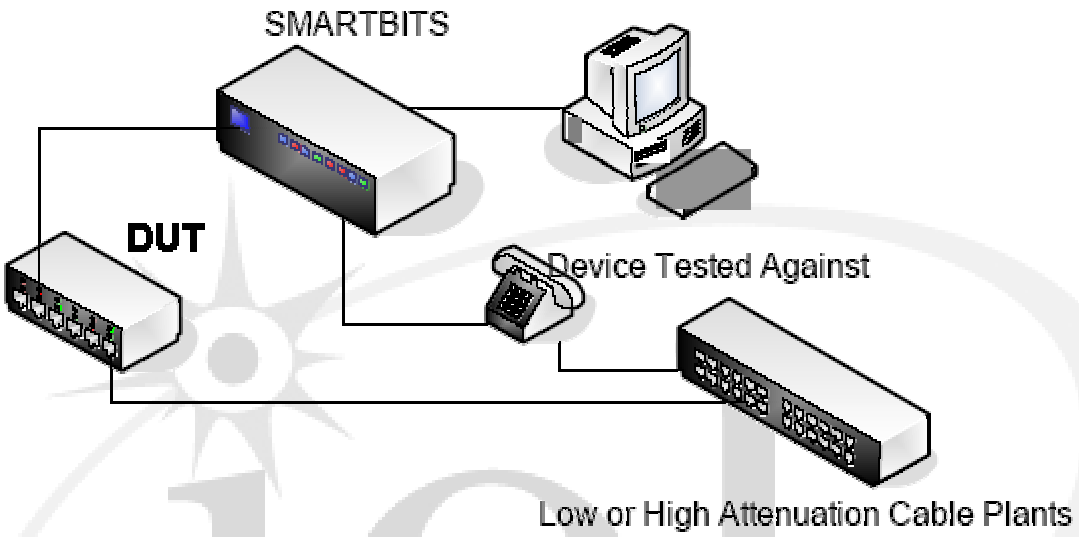
The following table contains possible results and their meanings:

Result	Interpretation
PASS	The Device Under Test (DUT) was observed to exhibit conformant behavior.
PASS with Comments	The DUT was observed to exhibit conformant behavior however an additional explanation of the situation is included, such as due to time limitations only a portion of the testing was performed.
FAIL	The DUT was observed to exhibit non-conformant behavior.
Warning	The DUT was observed to exhibit behavior that is not recommended.
Informative	Results are for informative purposes only and are not judged on a pass of fail basis.
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.
Borderline	The observed values of the specified parameters are valid at one extreme, and invalid at the other.
Not Tested	Not tested due to the time constraints of the test period.

Test Setup

Testing Equipment	
Spirent Smartbits 2000	Used to Source Packet Traffic

Testing Configuration:



Test #1.1.1 Link Speed Detection
Case 1: This test entails powering the DUT with the link partner disconnected until the DUT has fully booted. The link partner is connected via a high attenuation cable plant. Auto-negotiation, if supported, should result in a connection at common optimal values for both the PD and the PSE. The DUT and link partner should be able to send and receive packets. Please refer to the following pages for the results of this test.

Case 2: This test entails powering the DUT with the link partner connected via a high attenuation cable plant. Auto-negotiation, if supported, should result in a connection at common optimal values for both the PD and the PSE. The DUT and link partner should also be able to send and receive packets. Please refer to the following pages for the results of this test.

Test #1.1.3 Packet Error Ratio Estimation
High Attenuation Channel: The two devices are connected to each end of the channel with a 5-meter cable. The high attenuation channel is 125 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. The number of packets lost is noted. Refer to the following tables for further information regarding the results of this test.

Low Attenuation Channel: The two devices are connected to each end of the channel with a short 5-meter cable. The low attenuation channel is 10 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. The number of packets lost is noted. Refer to the following tables for further information regarding the test results.

Test #1.1.4 Endurance Stress Test
This test is designed to verify that no obvious buffer management problems occur when directing a large volume of traffic with minimum IPG at the DUT. This test is informative only and is designed to verify that the DUT has no obvious buffer management problems. The DUT is attached to a sourcing station that is capable of sending an appropriate number of 64-byte ICMP echo requests with a minimum IPG of 96BT (Refer to the Ethernet Physical Layer Interoperability Test Suite Table 1-6). The DUT does not have to respond to all of the requests but the test should not cause any system failures. Refer to the following tables for further information regarding the results of 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.

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 Matrix

The matrices are divided into sections according to the type of device being tested against. The first matrix contains four columns:

- The manufacturer and name of the device being tested against.
- Results of link speed detection testing.
- Results of the packet error ratio test over a high attenuation Category-5 compliant channel at 60°.
- Results of the packet error ratio test over a low attenuation Category-5 compliant channel at 60°.

Test Results:

PD Tested	Test # 1.1.7 Power Request and Application	
	Case 1	Case 2
3COM NJ220	PASS	PASS
3COM NJ200 New	PASS	PASS
3COM NJ200 Old	PASS	PASS
3COM NJ100 New	PASS	PASS
3COM NJ100 Old	PASS	PASS
3COM NJ105	PASS	PASS
3COM 655003403 PD with 3CNJVOIPMOD-NBX	PASS	PASS
3COM 3C10248PE IP Phone	PASS	PASS
3COM 3C10226PE IP Phone	PASS	PASS
Avaya 4602 IP Phone	PASS	PASS
Avaya 4602SW IP Phone	PASS	PASS
Avaya 4610SW IP Phone	PASS	PASS
Avaya 4620 IP Phone	PASS	PASS
Avaya 4620SW IP Phone	PASS	PASS
Avaya 4621SW IP Phone	PASS	PASS
Avaya 4622SW IP Phone	PASS	PASS
Avaya 4625SW IP Phone	PASS	PASS
Avaya 4630SW IP Phone	PASS	PASS
Avaya 9620D01A IP Phone	PASS	PASS
Avaya 9630D01A IP Phone	PASS	PASS
Ault LS15	PASS	PASS
Cisco CP-7911G IP Phone	PASS	PASS
Nortel Networks i2001IP Phone	PASS	PASS
Nortel Networks i2004IP Phone	PASS	PASS
Nortel Networks 1110	PASS	PASS
Nortel Networks 1150E	PASS	PASS

PD Tested	Test # 1.1.7 (Continued) Power Request and Application	
	Case 1	Case 2
Polycom Soundpoint IP 401	PASS	PASS
Polycom Soundpoint 650	PASS	PASS
Linear LTC4257IS8 with 4257 Class 0	PASS	PASS
Linear LTC4257IS8 with 4257 Class 1	PASS	PASS
Linear LTC4257IS8 with 4257 Class 2	PASS	PASS
Linear LTC4257IS8 with 4257 Class 3	PASS	PASS
Linear LTC4257IS8 with 4257 Class 4	PASS	PASS
Linear LTC4257CS8-1 Class 0	PASS	PASS
Linear LTC4257CS8-1 Class 1	PASS	PASS
Linear LTC4257CS8-1 Class 2	PASS	PASS
Linear LTC4257CS8-1 Class 3	PASS	PASS
Linear LTC4257CS8-1 Class 4	PASS	PASS
Linear LTC4267CDHC	PASS	PASS
National Semiconductor LM5070	PASS	PASS
TI TPS2375 Class 0	PASS	PASS
TI TPS2375 Class 1	PASS	PASS
TI TPS2375 Class 2	PASS	PASS
TI TPS2375 Class 3	PASS	PASS
TI TPS2375 Class 4	PASS	PASS

General note: Smartbits SX-7410B cards in a Spirent Smartbits 2000 chassis were used as the sourcing station during test # 1.1.3.

CAT 5 - TSB95 Spec - Maximum Attenuation

Parameter	Pair	Channel-1	Channel-2
Propagation Delay (ns)	(1, 2)	579.00	579.00
	(3, 6)	587.00	583.00
	(4, 5)	597.00	597.00
	(7, 8)	591.00	591.00
Propagation Delay Skew (ns)	(1, 2)	0.00	0.00
	(3, 6)	8.00	4.00
	(4, 5)	18.00	18.00
	(7, 8)	12.00	12.00

Parameter	Pair	Channel-1	Channel-2
Insertion Loss Margin (dB)	(1, 2)	0.50	0.60
	(3, 6)	0.40	0.40
	(4, 5)		
	(7, 8)		
Return Loss Margin (dB)	(1, 2)	6.10	7.00
	(3, 6)	6.30	5.90
	(4, 5)		
	(7, 8)		
Return Loss @ Remote Margin (dB)	(1, 2)	8.12	8.85
	(3, 6)	6.40	5.40
	(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)		

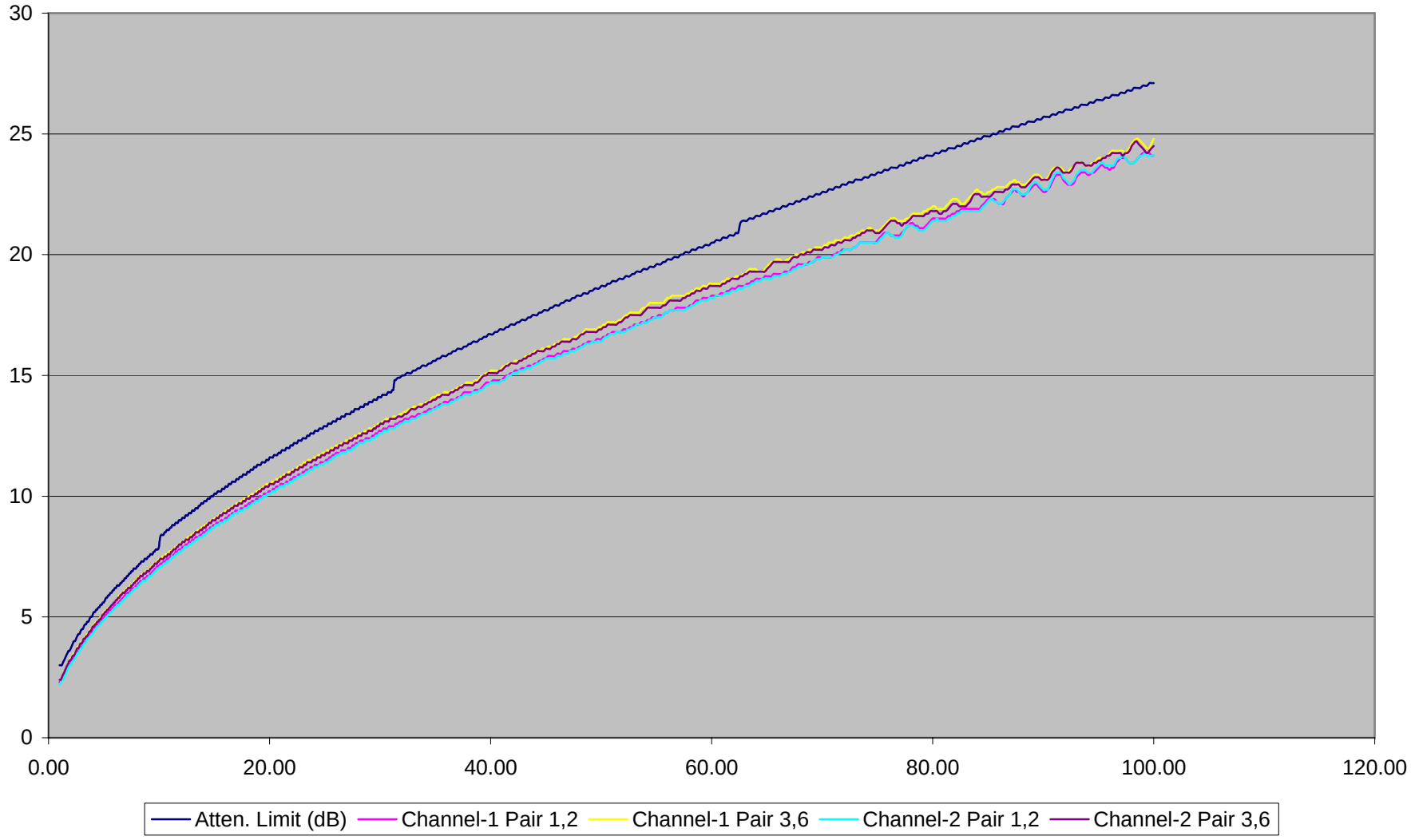
Channel 1 Description: Pass Through

Parameter	Generator-Receptor	Channel-1	Channel-2
NEXT Margin (dB)	(1, 2)-(3, 6)	11.50	11.50
	(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)	8.50	10.20
	(1, 2)-(4, 5)		
	(1, 2)-(7, 8)		
	(3, 6)-(4, 5)		
	(3, 6)-(7, 8)		
	(4, 5)-(7, 8)		

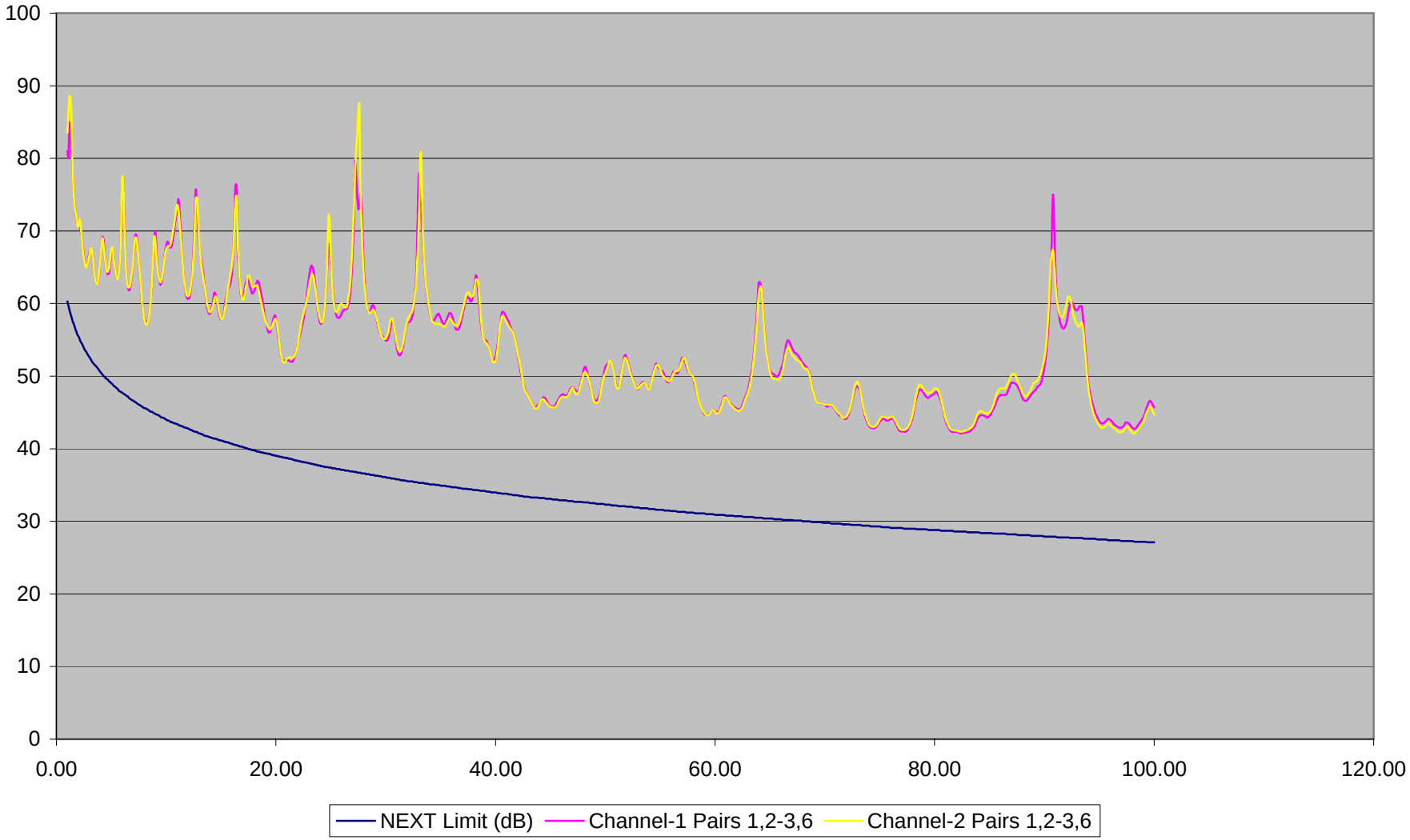
Parameter	Generator-Receptor	Channel-1	Channel-2
ELFEXT Margin (dB)	(1, 2)-(3, 6)		
	(1, 2)-(4, 5)		
	(1, 2)-(7, 8)		
	(3, 6)-(1, 2)		
	(3, 6)-(4, 5)		
	(3, 6)-(7, 8)		
	(4, 5)-(1, 2)		
	(4, 5)-(3, 6)		
	(4, 5)-(7, 8)		
	(7, 8)-(1, 2)		
	(7, 8)-(3, 6)		
	(7, 8)-(4, 5)		
ELFEXT @ Remote Margin (dB)	(1,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

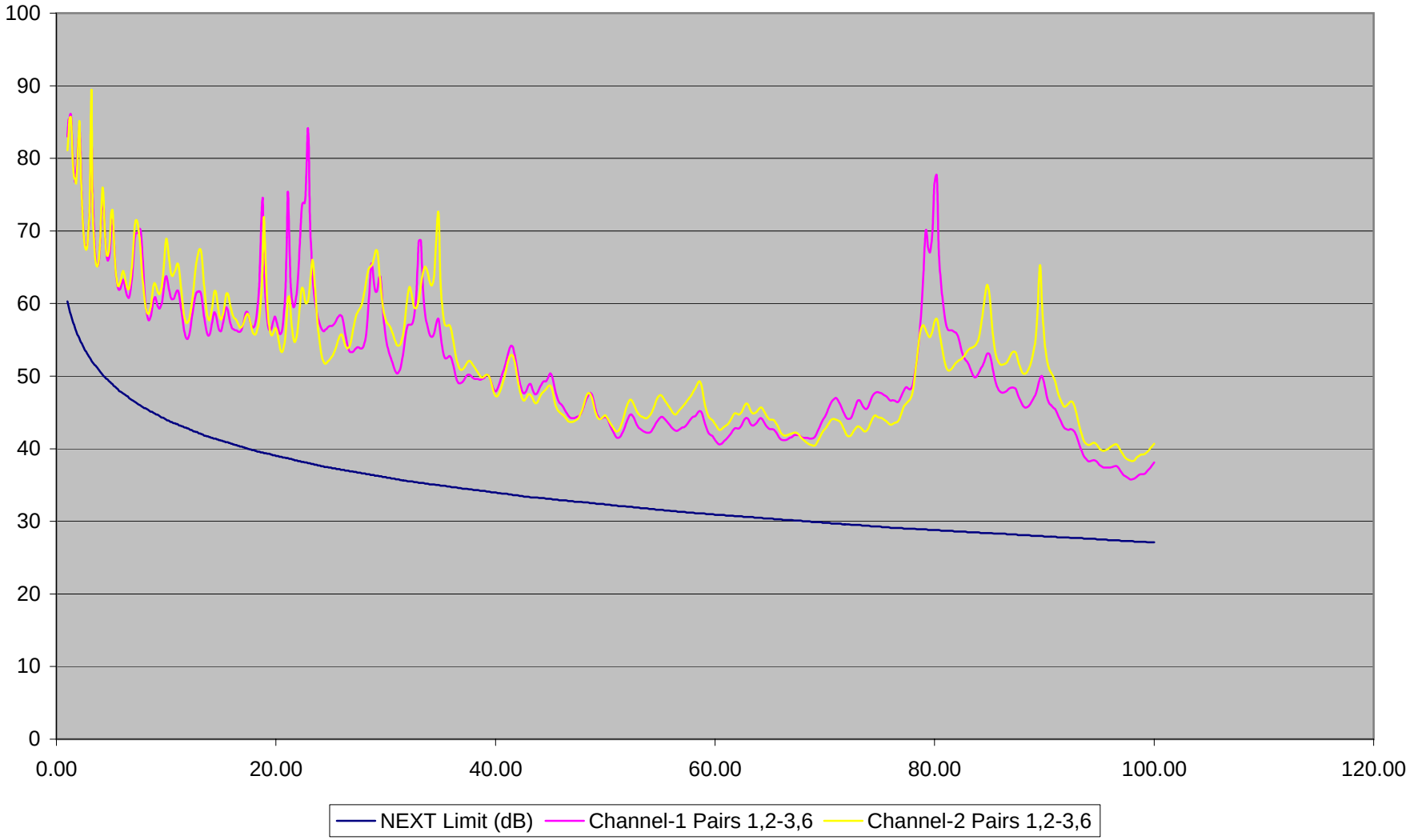
CAT 5 - TSB95 Spec @ Maximum Attenuation - Attenuation Plot
X-Axis Frequency (MHz), Y-Axis Attn (dB)



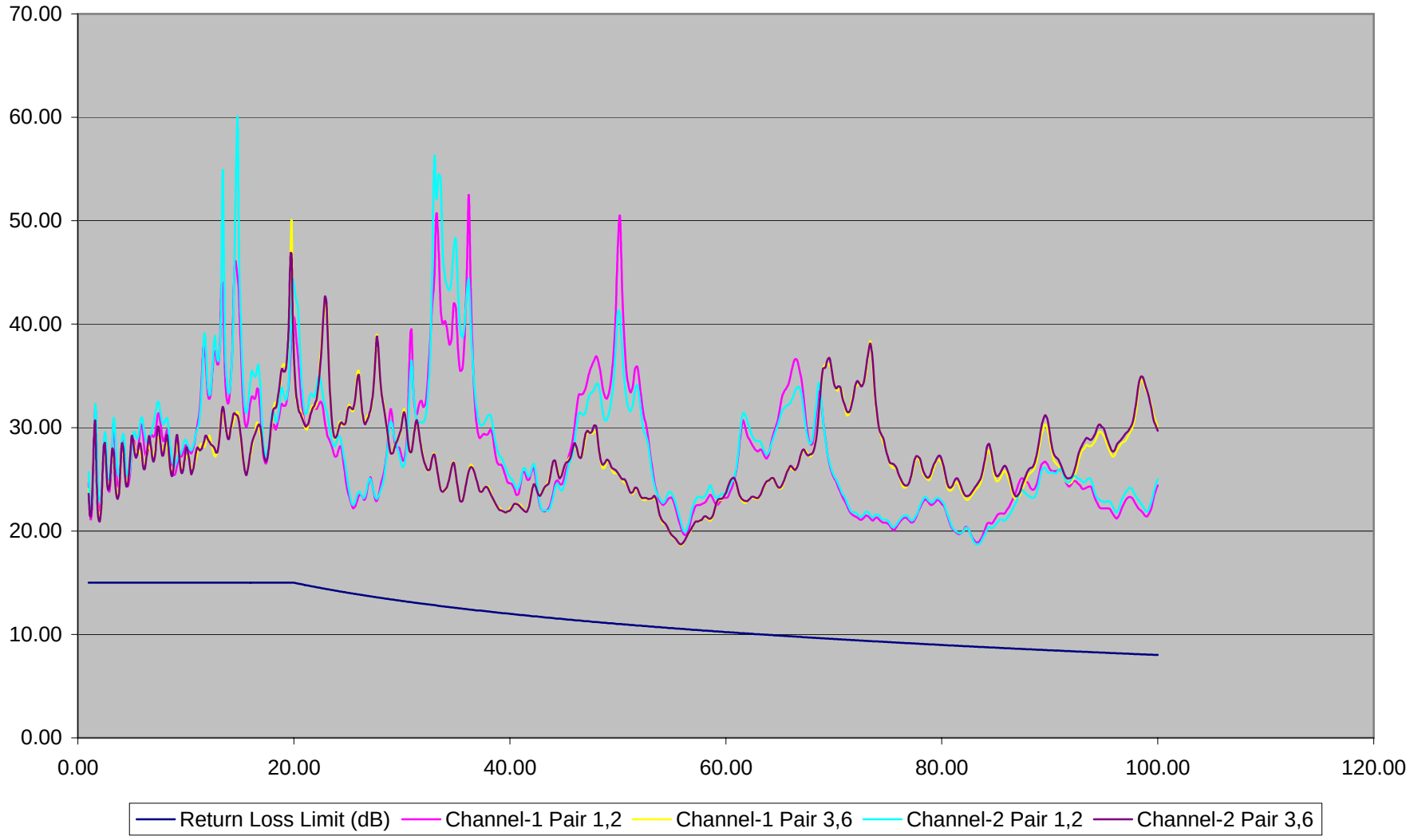
CAT 5 - TSB95 Spec @ Maximum Attenuation - Near End Cross Talk
X-Axis Frequency (MHz), Y-Axis NEXT (dB)



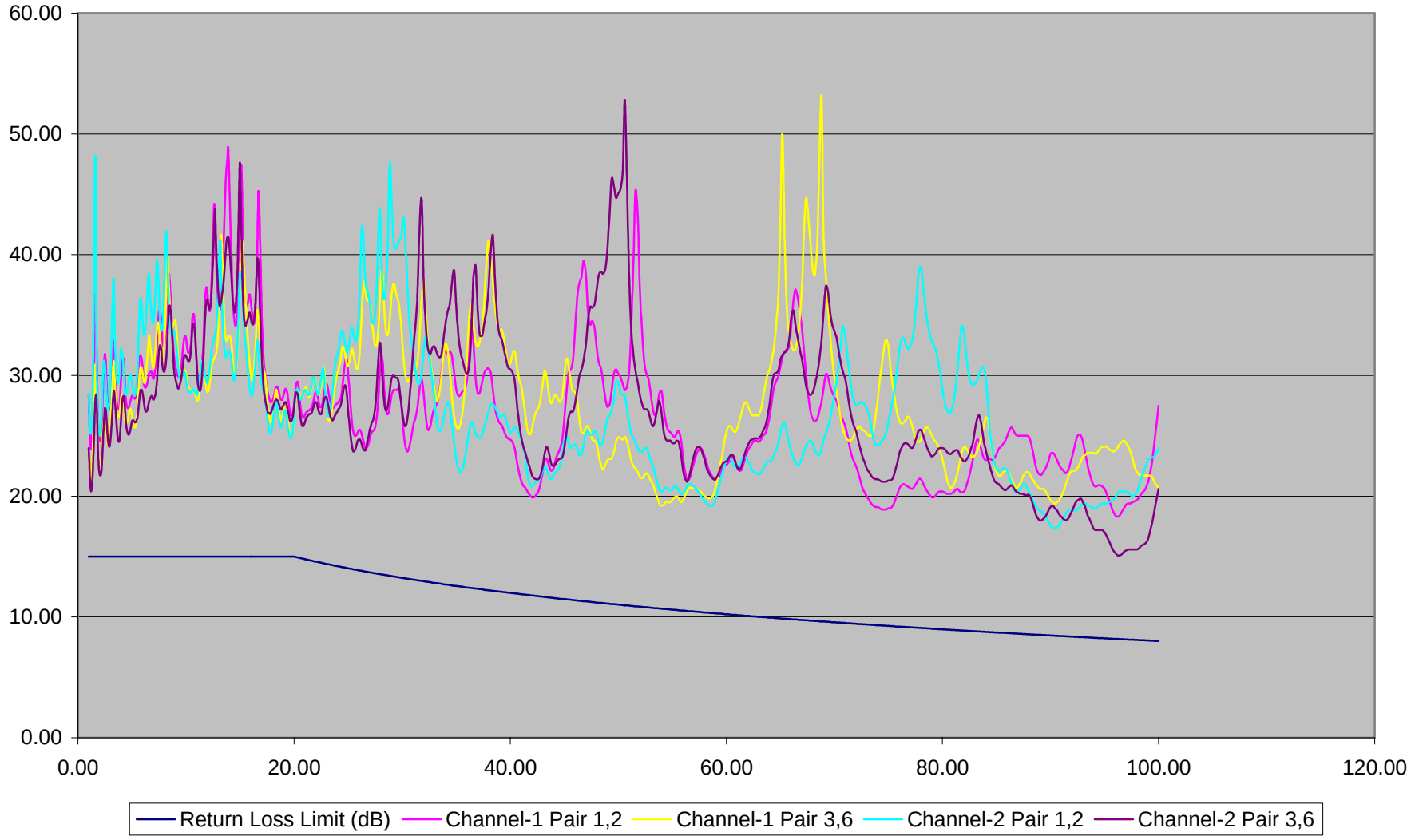
CAT 5 - TSB95 Spec @ Maximum Attenuation - Near End Cross Talk @ Remote
X-Axis Frequency (MHz), Y-Axis NEXT-R (dB)



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)



CAT 5 - TSB95 Spec - Low Attenuation

Parameter	Pair	Channel-1	Channel-2
Propagation Delay (ns)	(1, 2)	57.00	57.00
	(3, 6)	58.00	57.00
	(4, 5)	58.00	57.00
	(7, 8)	57.00	57.00
Propagation Delay Skew (ns)	(1, 2)	0.00	0.00
	(3, 6)	1.00	0.00
	(4, 5)	1.00	0.00
	(7, 8)	0.00	0.00

Parameter	Pair	Channel-1	Channel-2
Insertion Loss Margin (dB)	(1, 2)	2.80	2.80
	(3, 6)	2.80	2.70
	(4, 5)		
	(7, 8)		
Return Loss Margin (dB)	(1, 2)	7.40	8.20
	(3, 6)	6.97	6.50
	(4, 5)		
	(7, 8)		
Return Loss @ Remote Margin (dB)	(1, 2)	8.68	7.15
	(3, 6)	7.43	8.00
	(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)		

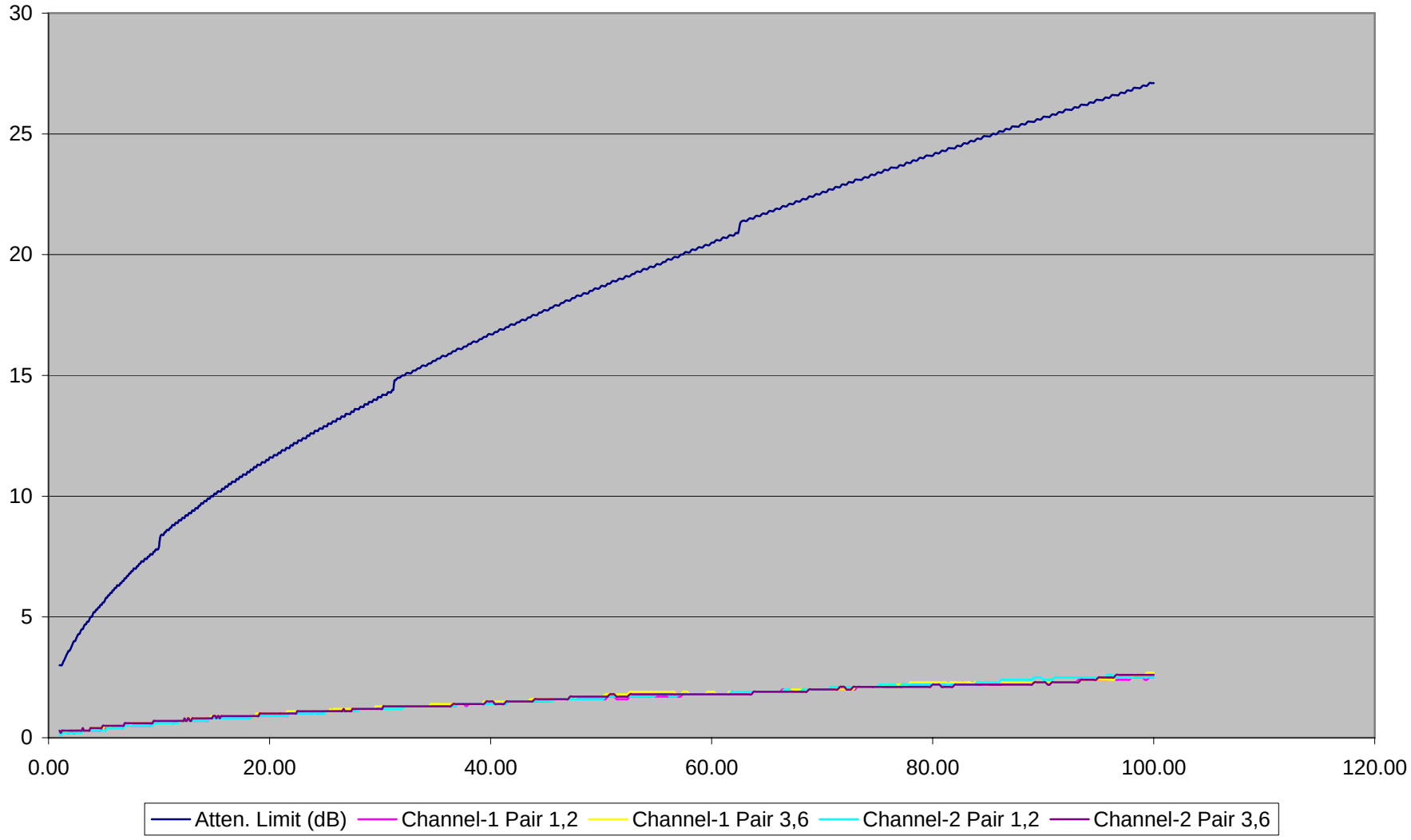
Parameter	Generator-Receptor	Channel-1	Channel-2
NEXT Margin (dB)	(1, 2)-(3, 6)	11.00	10.20
	(1, 2)-(4, 5)		
	(1, 2)-(7, 8)		
	(3, 6)-(4, 5)		
	(3, 6)-(7, 8)		
	(4, 5)-(7, 8)		
NEXT @ Remote Margin (dB)	(1, 2)-(3, 6)	10.30	10.20
	(1, 2)-(4, 5)		
	(1, 2)-(7, 8)		
	(3, 6)-(4, 5)		
	(3, 6)-(7, 8)		
	(4, 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)		

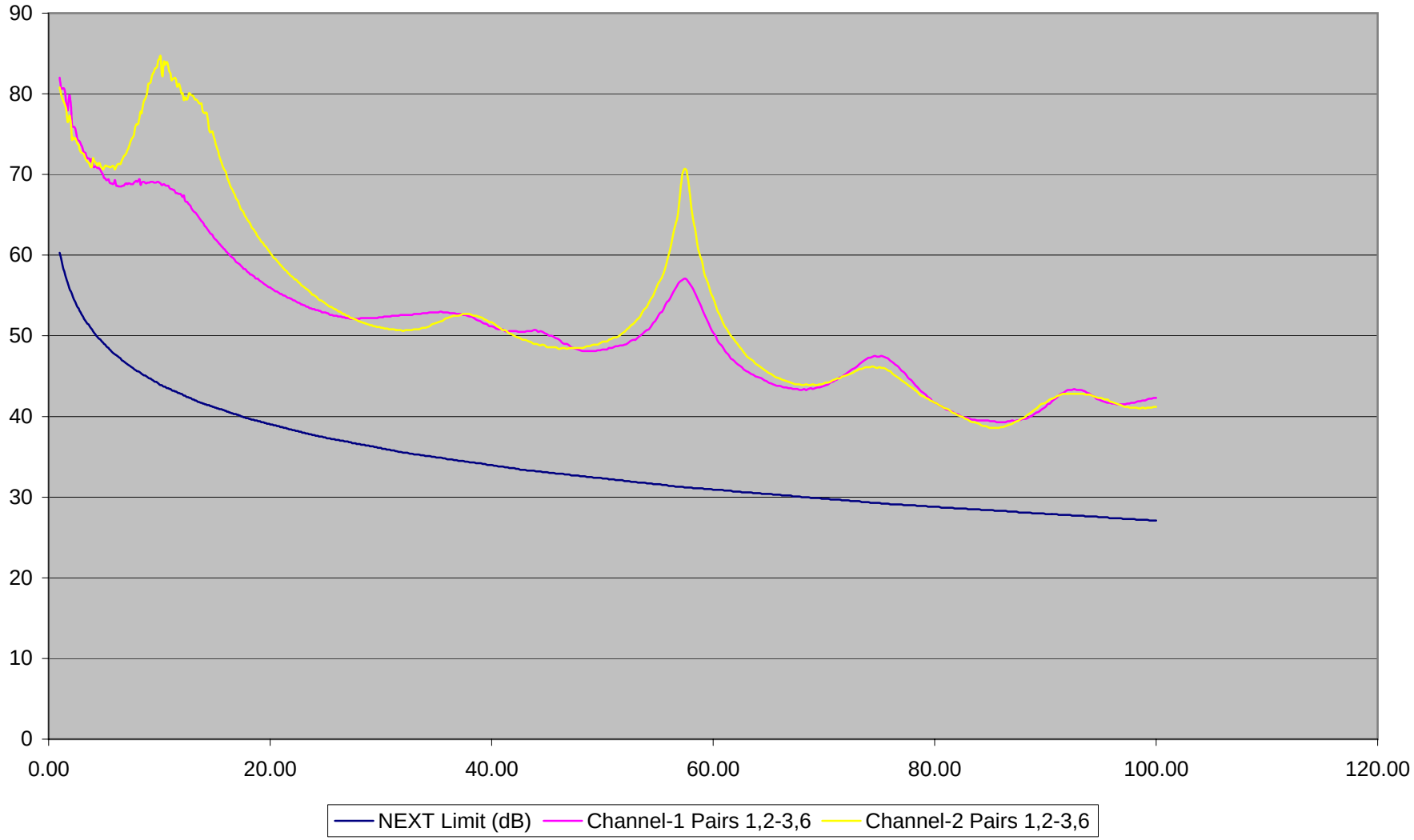
Channel 1 Description: Pass Through

Channel 2 Description: Crossover

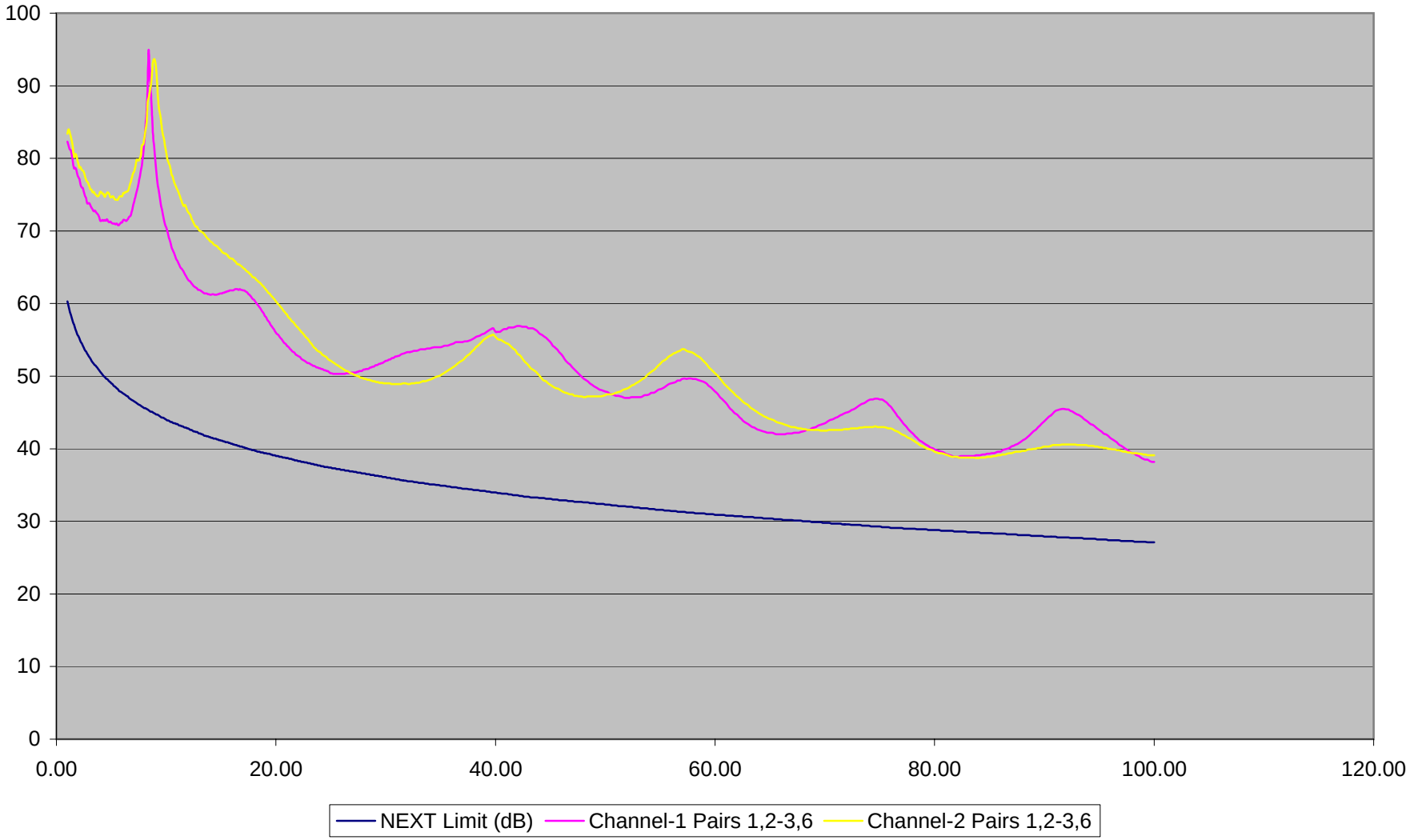
CAT 5 - TSB95 Spec @ Low Attenuation - Attenuation Plot
X-Axis Frequency (MHz), Y-Axis Attn (dB)



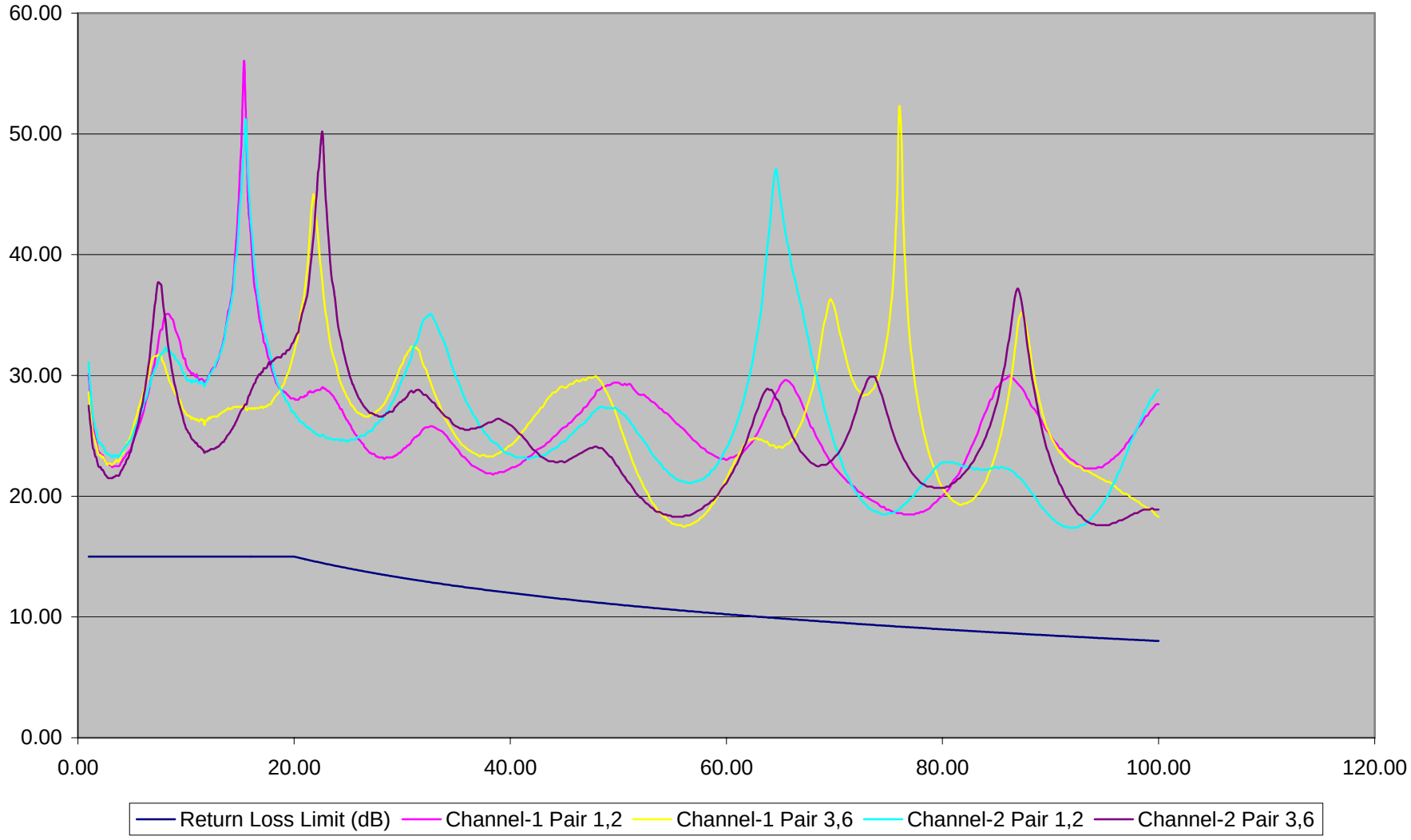
CAT 5 - TSB95 Spec @ Low Attenuation - Near End Cross Talk
X-Axis Frequency (MHz), Y-Axis NEXT (dB)



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



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



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