



# Power over Ethernet Consortium Interoperability Test Suite v2.3 Report

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August 03, 2006  
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:	Midspan IN and OUT
Hardware Version:	Not Available
Power Chipset:	Linear LTC4263
Power Supply Voltage:	48 Volts
Magnetics:	Pulse Jack, JK0-0044

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](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

A handwritten signature in black ink that reads "Matthew F Borowski".

Matthew Borowski  
[mfn6@iol.unh.edu](mailto:mfn6@iol.unh.edu)

Review Completed  
08/04/2006

A handwritten signature in black ink that reads "David Schwarzenberg".

David Schwarzenberg  
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## Result Key

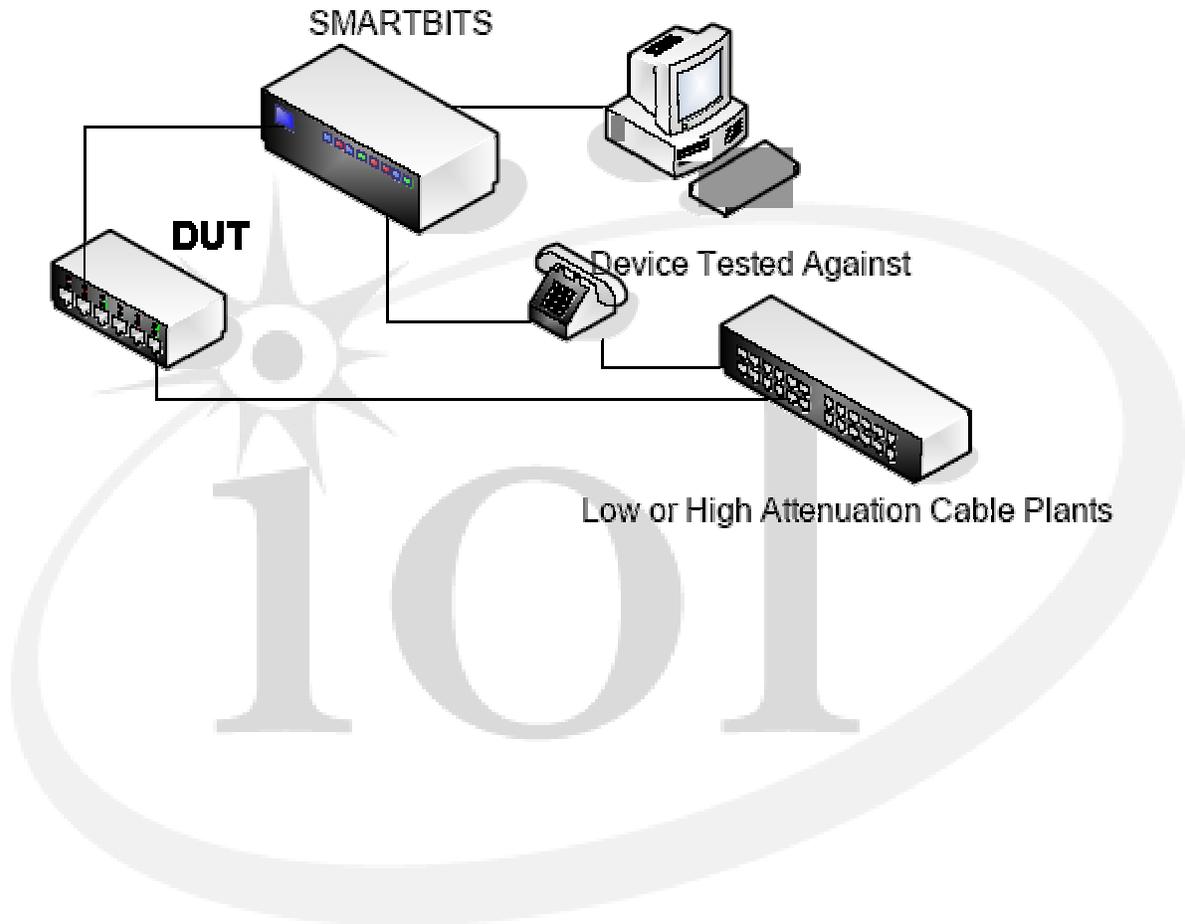
The following table contains possible results and their meanings:

<b>Result</b>	<b>Interpretation</b>
<b>PASS</b>	The Device Under Test (DUT) was observed to exhibit conformant behavior.
<b>PASS with Comments</b>	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.
<b>FAIL</b>	The DUT was observed to exhibit non-conformant behavior.
<b>Warning</b>	The DUT was observed to exhibit behavior that is not recommended.
<b>Informative</b>	Results are for informative purposes only and are not judged on a pass or fail basis.
<b>Refer to Comments</b>	From the observations, a valid pass or fail could not be determined. An additional explanation of the situation is included.
<b>Not Applicable</b>	The DUT does not support the technology required to perform these tests.
<b>Not Available</b>	Due to testing station or time limitations, the tests could not be performed.
<b>Borderline</b>	The observed values of the specified parameters are valid at one extreme, and invalid at the other.
<b>Not Tested</b>	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**

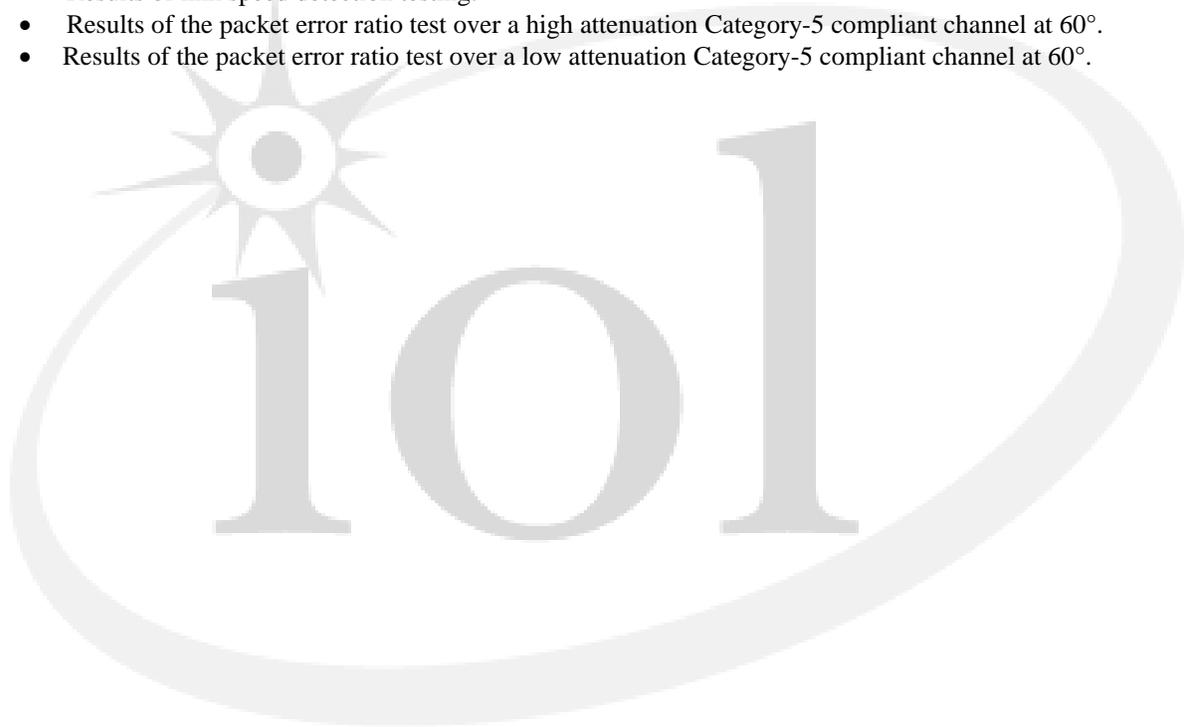
Included with this report is a series of plots that provide a characterization of the channels over which the testing was performed. The plots include the following items.

- 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 # 1.1.1 Link Speed Detection		Test # 1.1.3 High Attenuation Channel		Test # 1.1.3 Low Attenuation Channel	
	Case 1	Case 2	64 Byte	1518 Byte	64 Byte	1518 Byte
3COM NJ220	PASS	PASS	0	0	0	0
3COM NJ200 New	PASS	PASS	0	0	0	0
3COM NJ200 Old	PASS	PASS	0	0	0	0
3COM NJ100 New	PASS	PASS	0	0	0	0
3COM NJ100 Old	PASS	PASS	0	0	0	0
3COM NJ105	PASS	PASS	0	0	0	0
3COM 655003403 PD with 3CNJVOIPMOD-NBX	PASS	PASS	NT*1	NT*1	NT*1	NT*1
3COM 3C10248PE IP Phone	PASS	PASS	0	0	0	0
3COM 3C10226PE IP Phone	PASS	PASS	0	0	0	0
Avaya 4602SW IP Phone	PASS	PASS	0	0	0	0
Avaya 4610SW IP Phone	PASS	PASS	0	0	0	0
Avaya 4620 IP Phone	PASS	PASS	0	0	0	0
Avaya 4620SW IP Phone	PASS	PASS	0	0	0	0
Avaya 4621SW IP Phone	PASS	PASS	0	0	0	0
Avaya 4622SW IP Phone	PASS	PASS	0	0	0	0
Avaya 4625SW IP Phone	PASS	PASS	0	0	0	0
Avaya 4630SW IP Phone	PASS	PASS	0	0	0	0
Avaya 9620D01A IP Phone	PASS	PASS	0	0	0	0
Avaya 9630D01A IP Phone	PASS	PASS	0	0	0	0
Ault LS15	PASS	PASS	0	0	0	0
Cisco CP-7911G IP Phone	PASS	PASS	0	0	0	0
Nortel Networks i2001IP Phone	PASS	PASS	NT*1	NT*1	NT*1	NT*1
Nortel Networks i2004IP Phone	PASS	PASS	0	0	0	0
Nortel Networks 1110	PASS	PASS	0	0	0	0
Nortel Networks 1150E	PASS	PASS	0	0	0	0
Polycom Soundpoint IP 401	PASS	PASS	0	0	0	0
Polycom Soundpoint 650	PASS	PASS	0	0	0	0

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

**Note 1:** These tests were not performed, due to device complexity and excessive time requirements. This does not indicate an interoperability issue.

PD Tested (Without PHY)	Test # 1.1.7 Power Request and Application	
	Case 1	Case 2
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

Test # 1.1.4 Endurance Stress Test	Result
	PASS
<b>Comments on Test Results</b> The DUT dropped 0 packets out of 4,680,000 packets that were sent over a high attenuation channel. With the IPG set at 0.96μs the DUT did not experience any system failures. A Spirent SX-7410B NIC in a Spirent Smartbits 2000 chassis was used as the source station.	

### 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)		

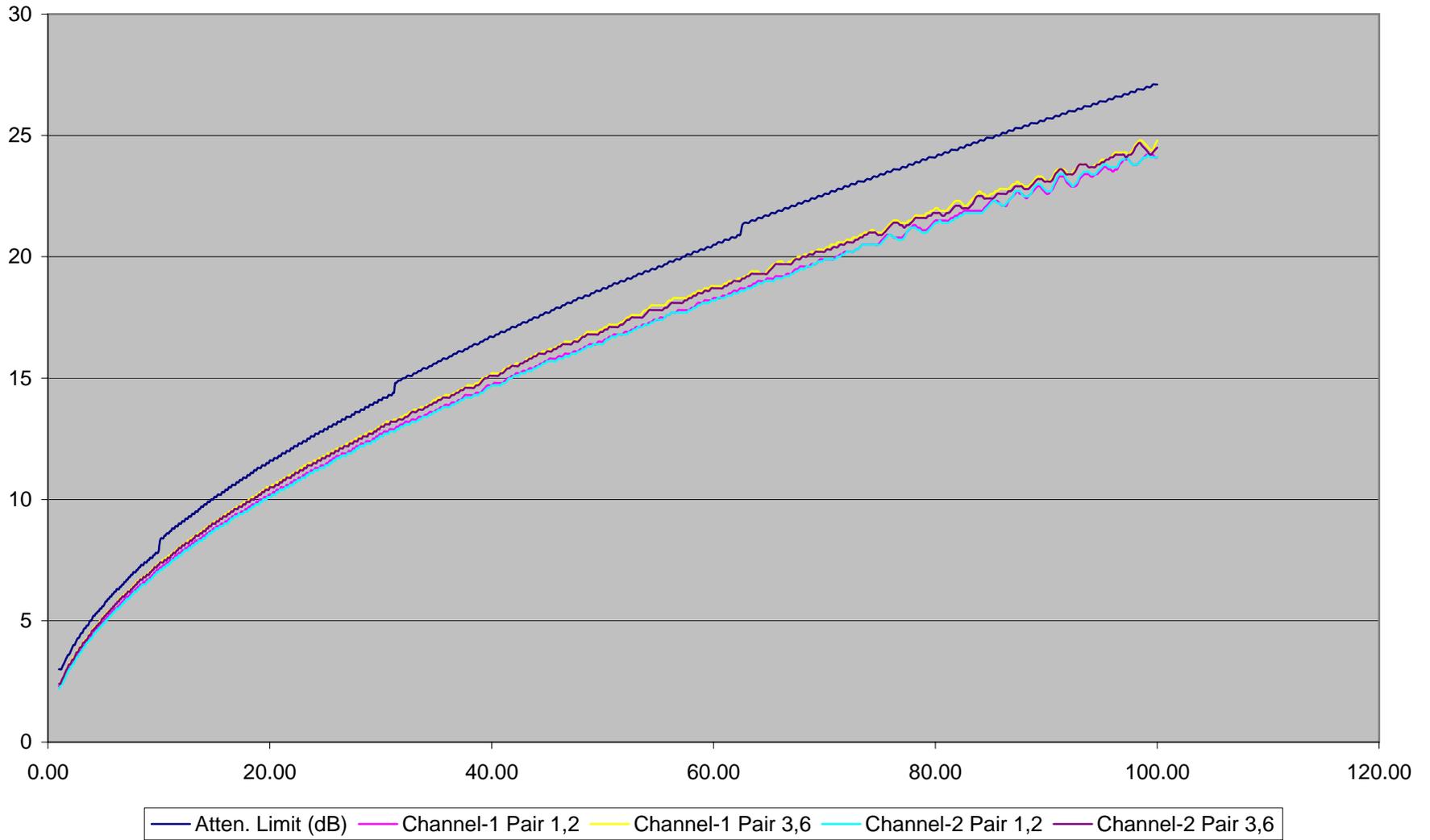
Channel 1 Description: Pass Through

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)		
NEXT @ Remote Margin (dB)	(4, 5)-(7, 8)	8.50	10.20
	(1, 2)-(3, 6)		
	(1, 2)-(4, 5)		
	(1, 2)-(7, 8)		
	(3, 6)-(4, 5)		
	(3, 6)-(7, 8)		
	(4, 5)-(7, 8)		

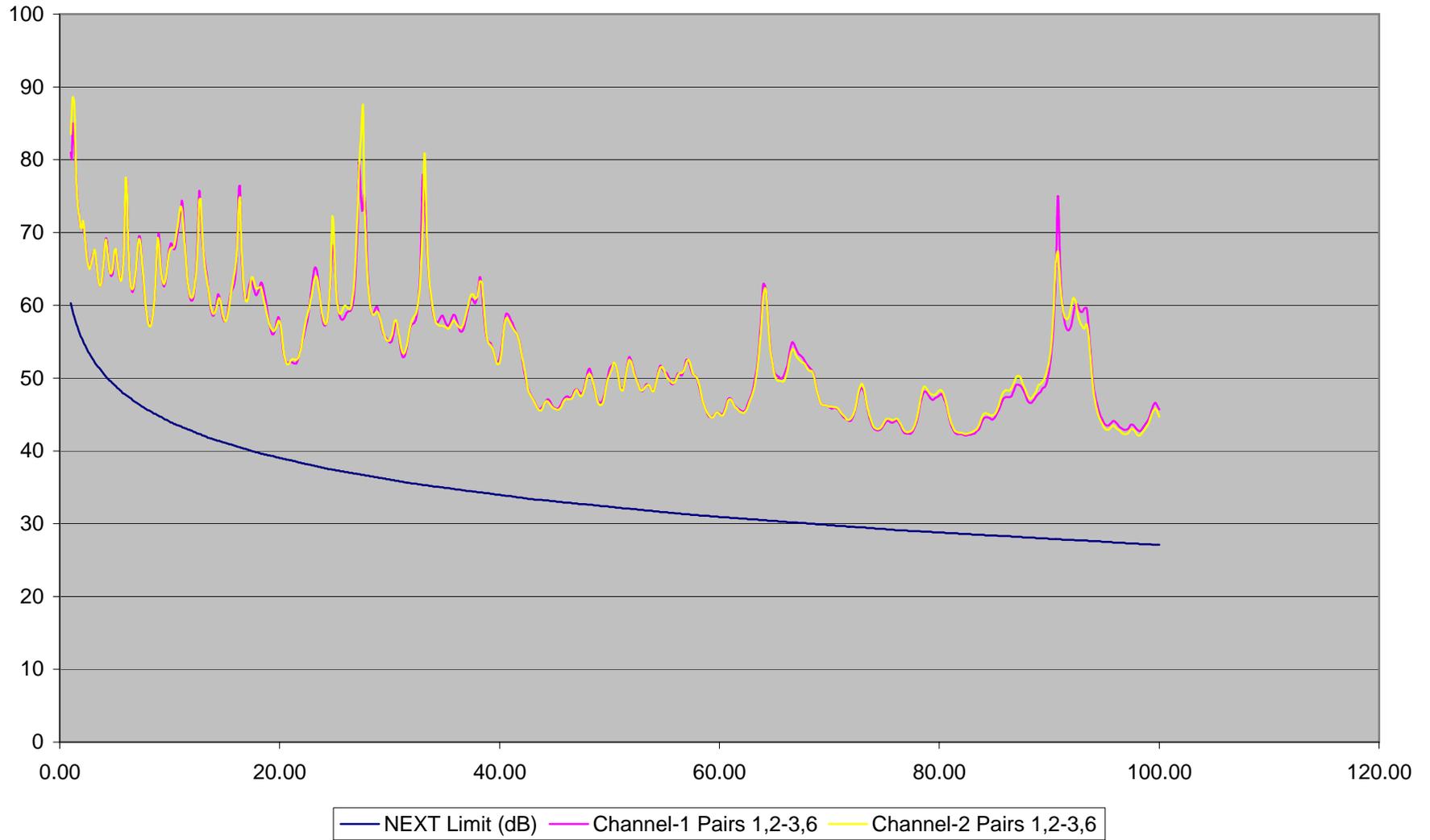
Parameter	Generator-Receptor	Channel-1	Channel-2
ELFEXT Margin (dB)	(1, 2)-(3, 6)		
	(1, 2)-(4, 5)		
	(1, 2)-(7, 8)		
	(3, 6)-(1, 2)		
	(3, 6)-(4, 5)		
	(3, 6)-(7, 8)		
	(4, 5)-(1, 2)		
	(4, 5)-(3, 6)		
	(4, 5)-(7, 8)		
	(7, 8)-(1, 2)		
ELFEXT @ Remote Margin (dB)	(7, 8)-(3, 6)		
	(7, 8)-(4, 5)		
	(1,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

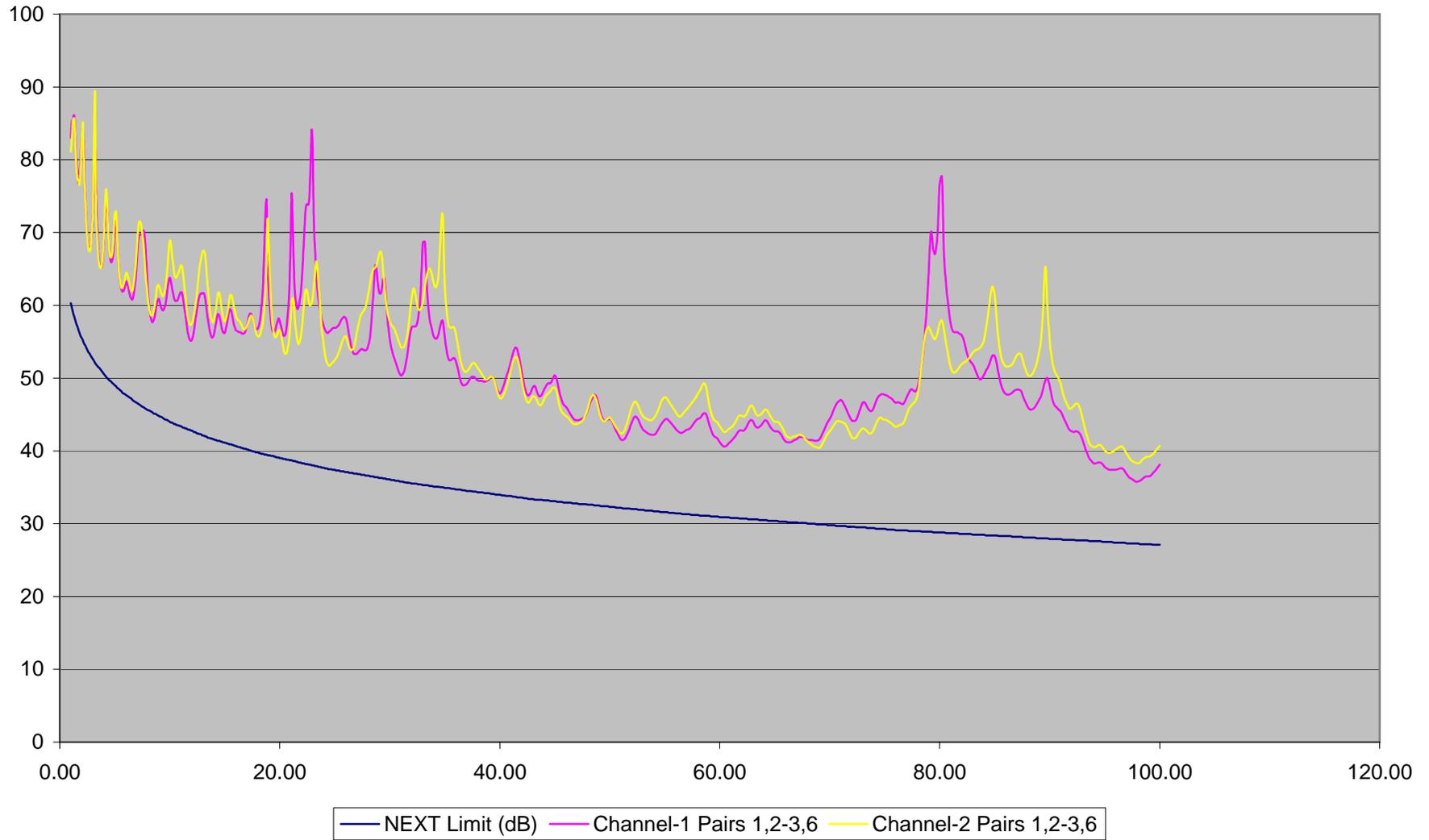
**CAT 5 - TSB95 Spec @ Maximum Attenuation - Attenuation Plot**  
**X-Axis Frequency (MHz), Y-Axis Attn (dB)**



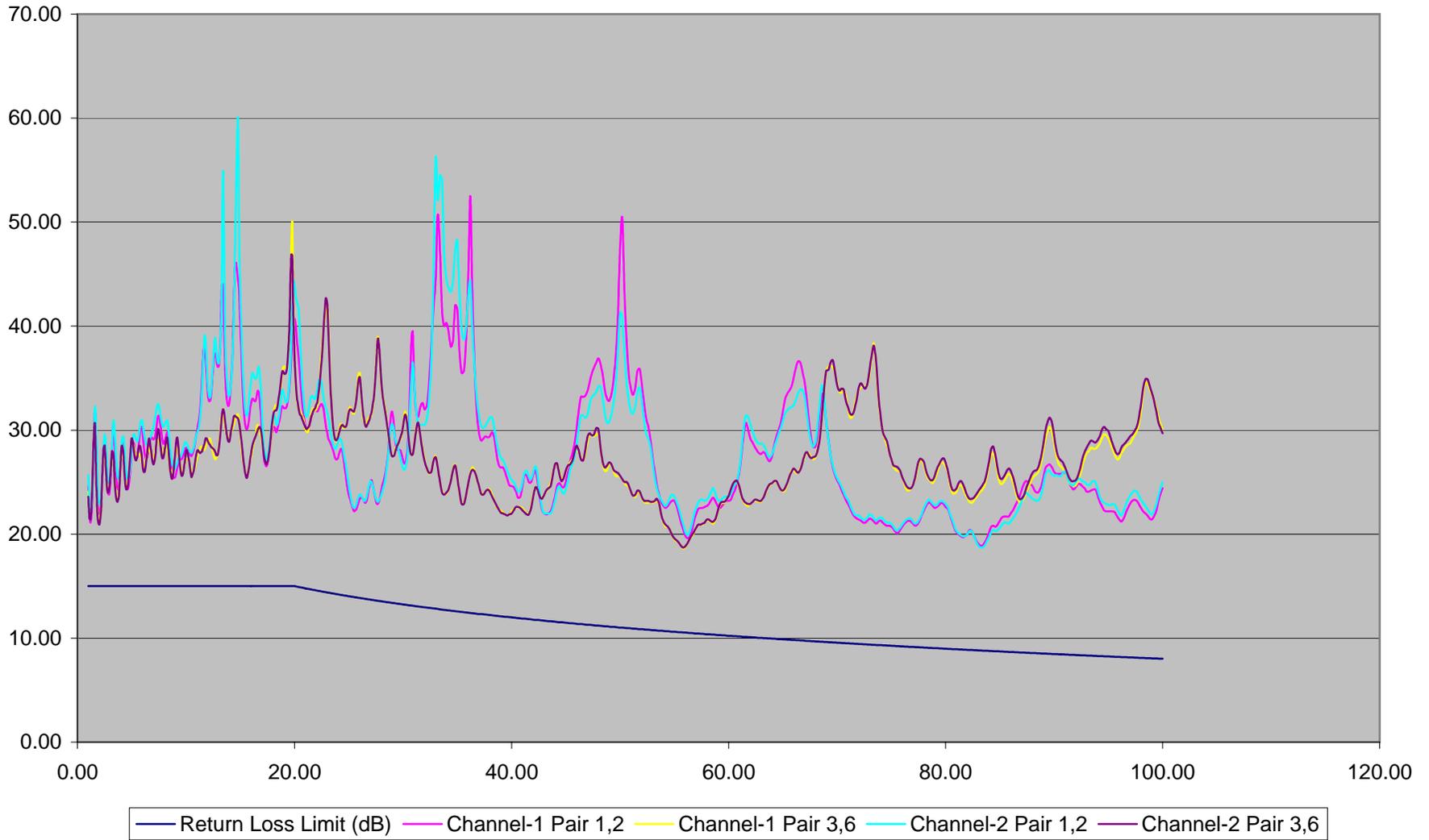
**CAT 5 - TSB95 Spec @ Maximum Attenuation - Near End Cross Talk**  
X-Axis Frequency (MHz), Y-Axis NEXT (dB)



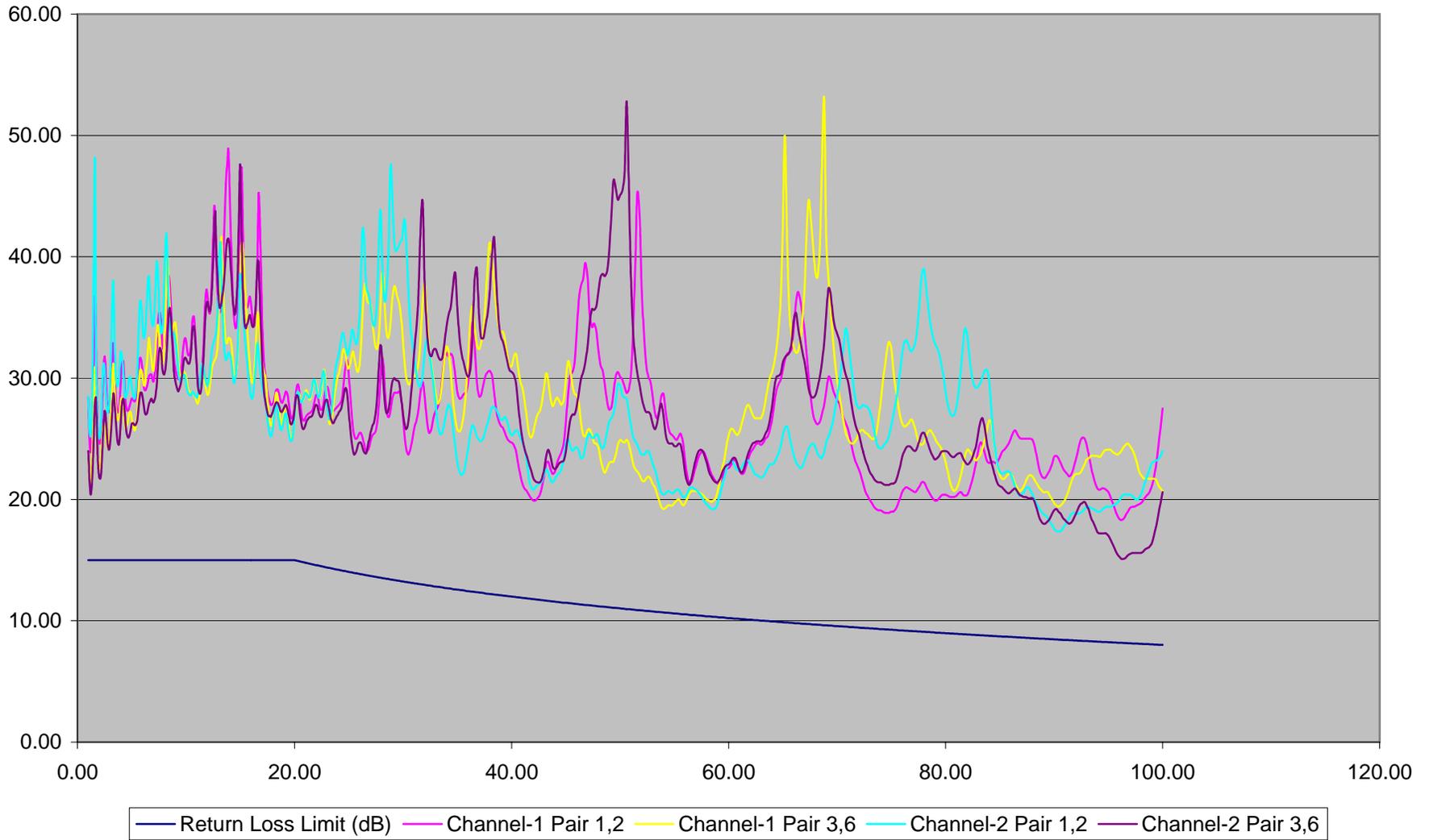
**CAT 5 - TSB95 Spec @ Maximum Attenuation - Near End Cross Talk @ Remote**  
**X-Axis Frequency (MHz), Y-Axis NEXT-R (dB)**



**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)		

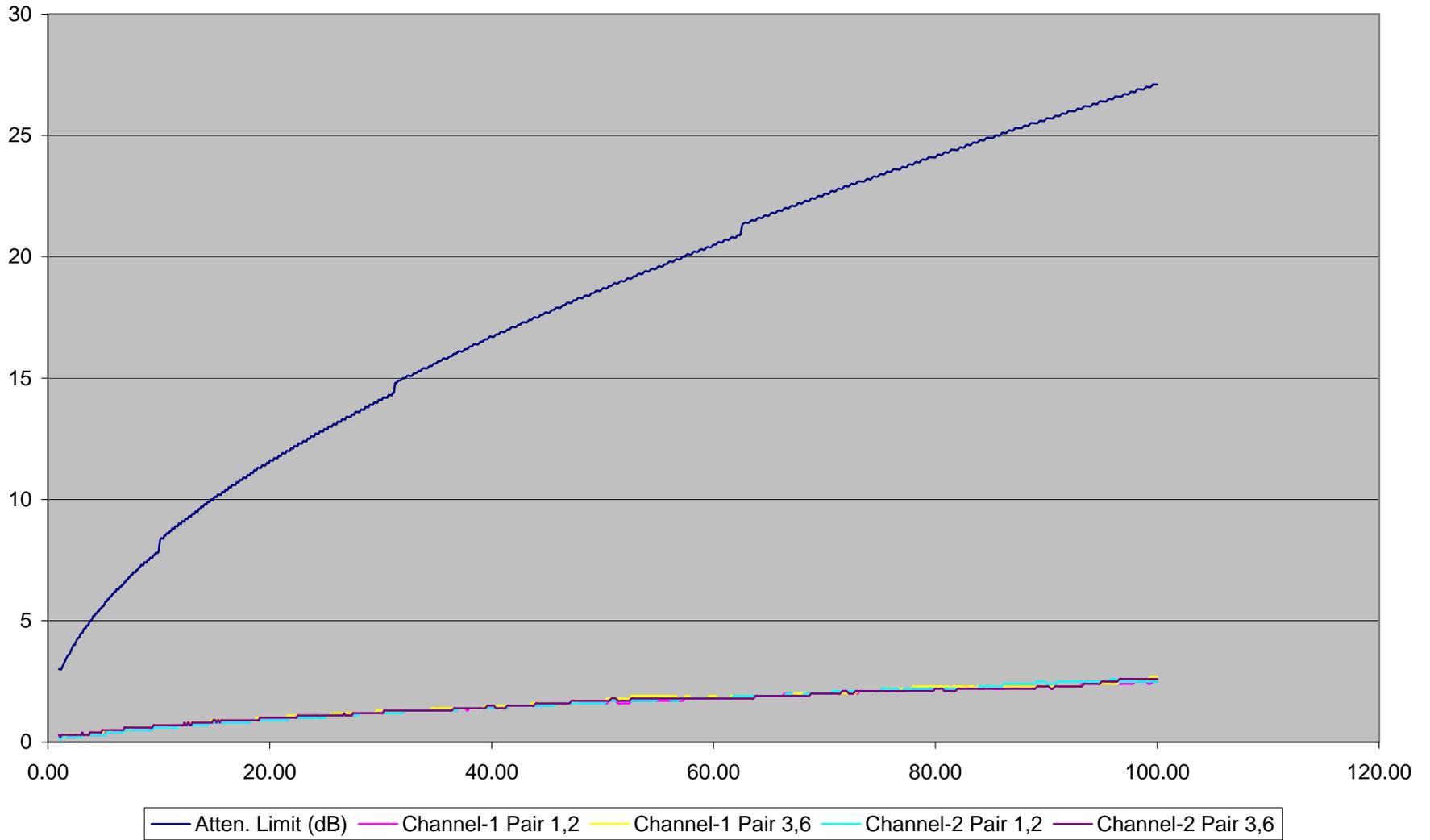
Channel 1 Description: Pass Through

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)		
NEXT @ Remote Margin (dB)	(4, 5)-(7, 8)		
	(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)		

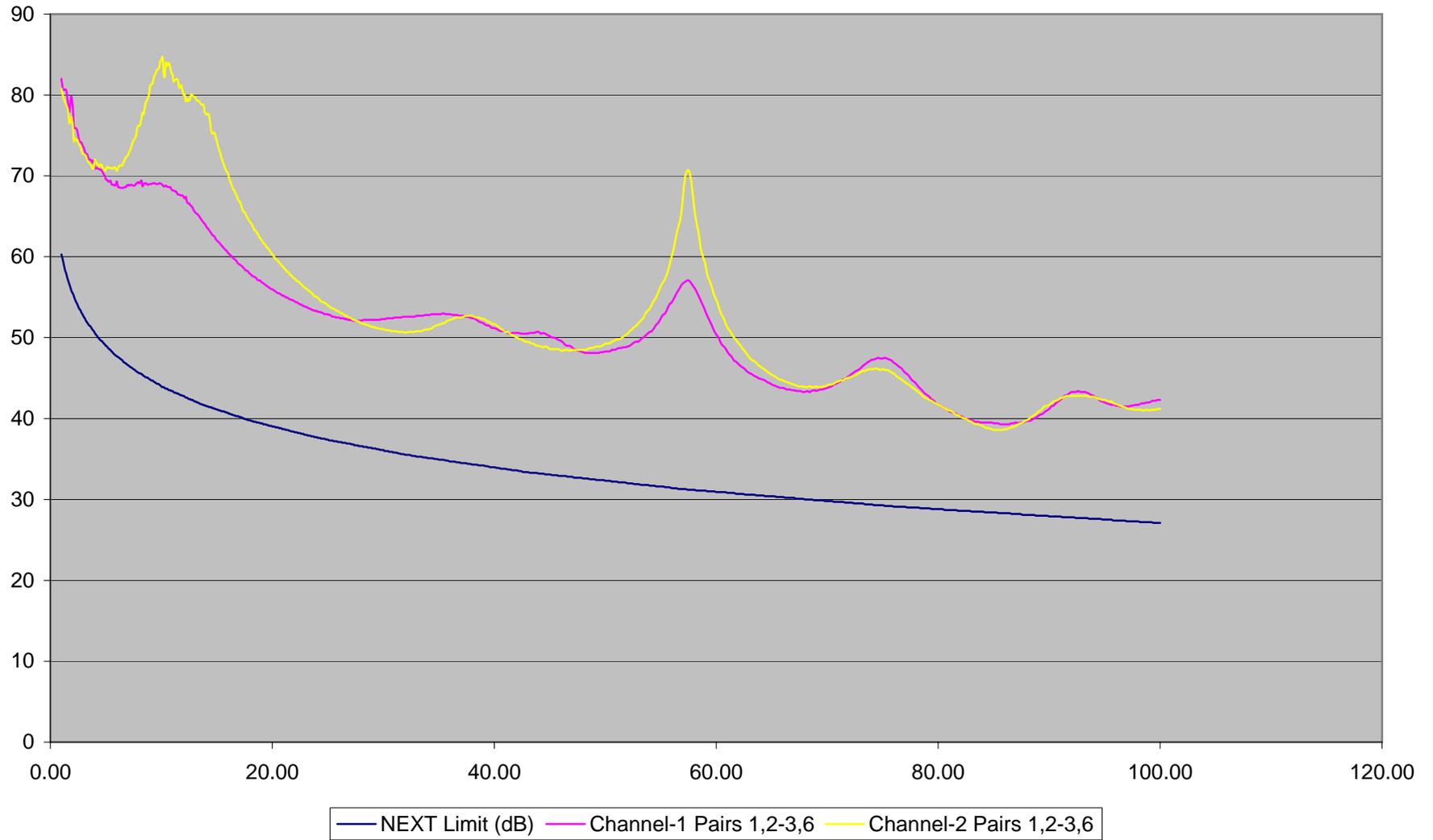
Parameter	Generator-Receptor	Channel-1	Channel-2
ELFEXT Margin (dB)	(1, 2)-(3, 6)		
	(1, 2)-(4, 5)		
	(1, 2)-(7, 8)		
	(3, 6)-(1, 2)		
	(3, 6)-(4, 5)		
	(3, 6)-(7, 8)		
	(4, 5)-(1, 2)		
	(4, 5)-(3, 6)		
	(4, 5)-(7, 8)		
	(7, 8)-(1, 2)		
ELFEXT @ Remote Margin (dB)	(7, 8)-(3, 6)		
	(7, 8)-(4, 5)		
	(1,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

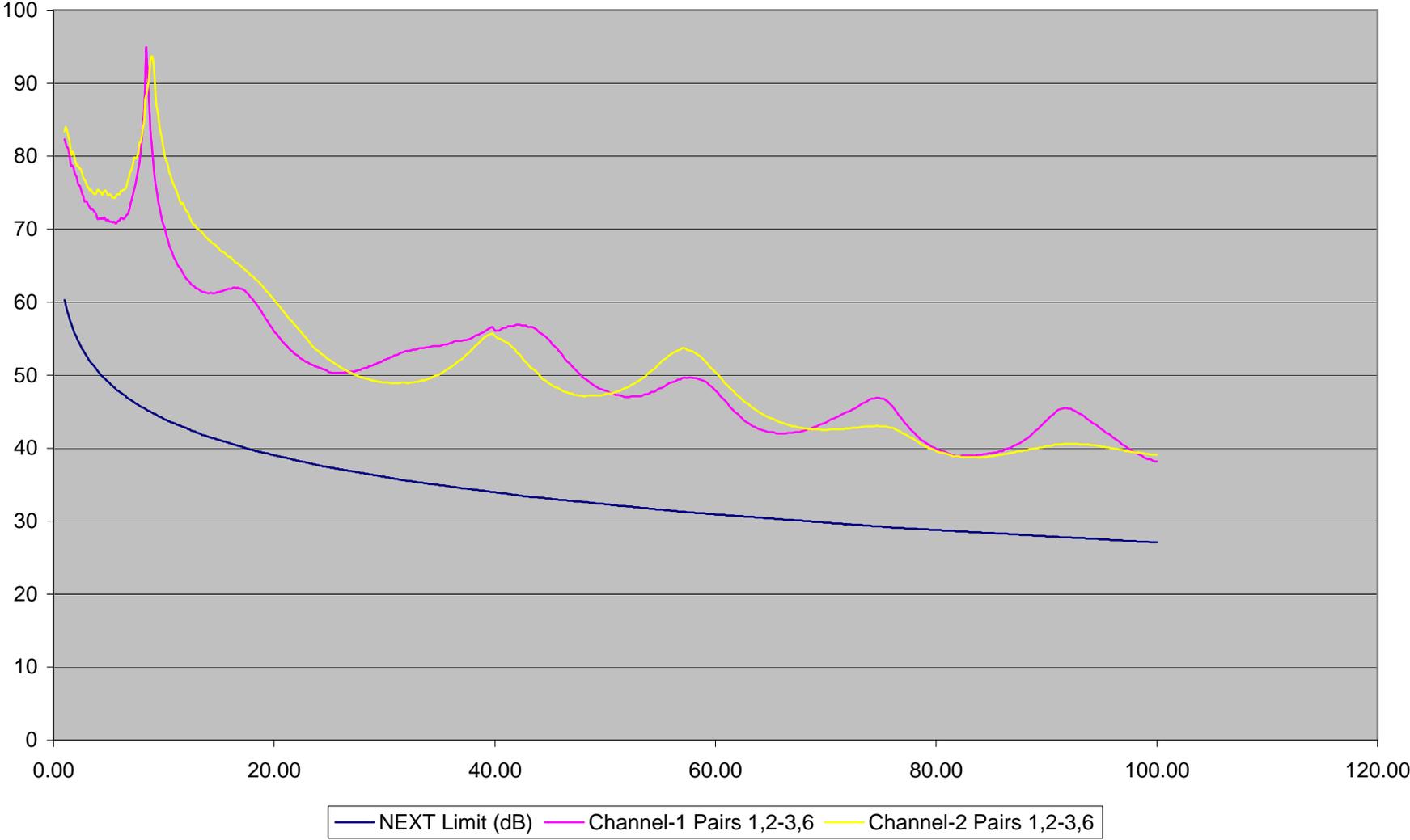
**CAT 5 - TSB95 Spec @ Low Attenuation - Attenuation Plot**  
X-Axis Frequency (MHz), Y-Axis Attn (dB)



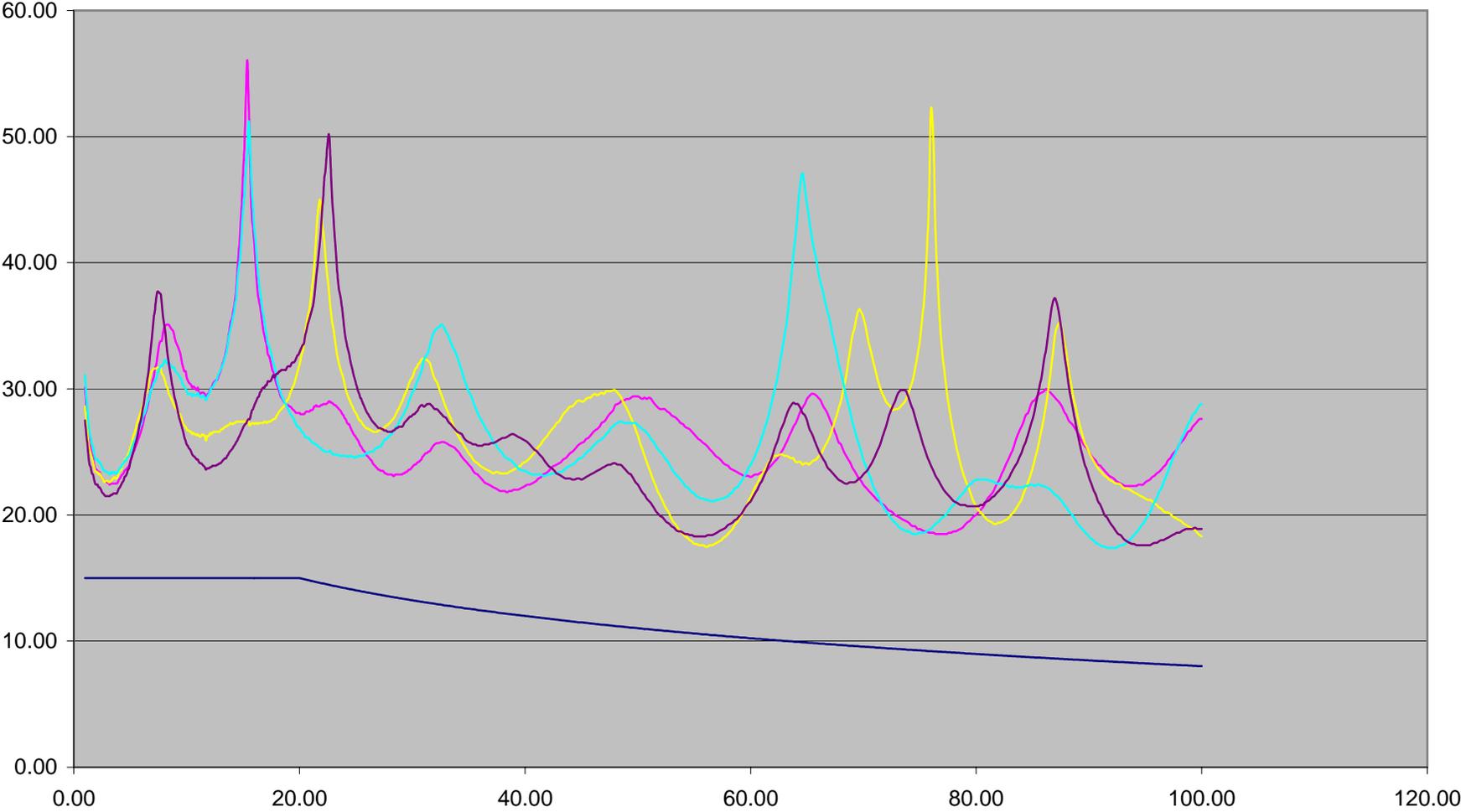
**CAT 5 - TSB95 Spec @ Low Attenuation - Near End Cross Talk**  
X-Axis Frequency (MHz), Y-Axis NEXT (dB)



**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)**



Return Loss Limit (dB) Channel-1 Pair 1,2 Channel-1 Pair 3,6 Channel-2 Pair 1,2 Channel-2 Pair 3,6

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

