



Power over Ethernet Consortium Interoperability Test Suite v2.3 Report

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Report Rev. 1.0

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

Device Under Test (DUT):	National Semiconductor LM5072 PD
Hardware Version:	Not Available
DUT PHY Chip:	Not Applicable
Power Chipset:	National Semiconductor
Magnetics:	Coilcraft DA2257-AL

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_v2.3.pdf

There were no issues uncovered during interoperability testing.

Testing Completed
03/14/2006

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

Matthew F. Borowski
mfn6@iol.unh.edu

Review Completed
03/16/2006

A handwritten signature in black ink that reads "Zachary Clifton".

Zachary Clifton
zclifton@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 or 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.

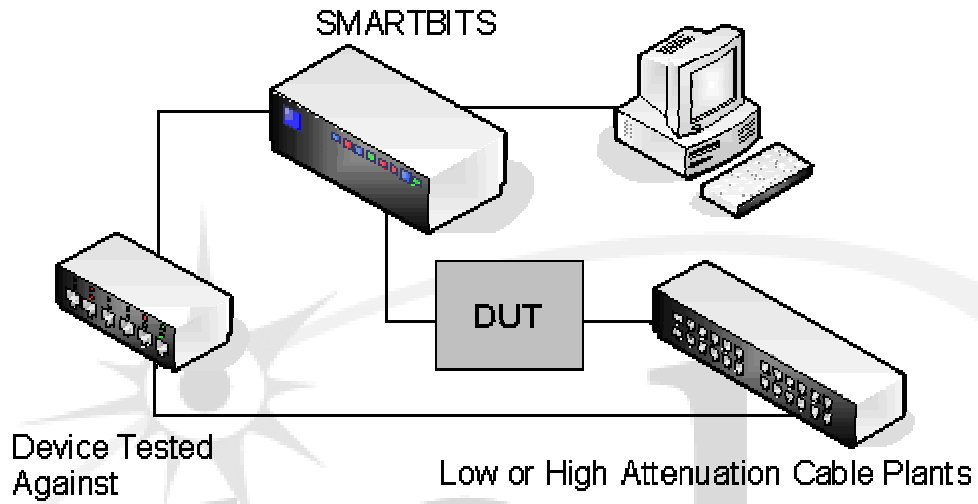
Test Setup

Testing Equipment

Spirent Smartbits 2000

Used to Source Packet Traffic

Testing Configuration:



Test #1.1.1 Link Speed Detection

Case 1: This test entails connecting the DUT to the link partner while it is on and performing detection. The link partner should be able to provide power to the DUT. Refer to the following tables for further information regarding the results from this test.

Case 2: This test entails power cycling the Link Partner (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.

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 powered devices that only support power.

Case 1: This test entails connecting the DUT to the link partner while it is on and performing detection. The link partner should be able to provide power to the DUT. 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

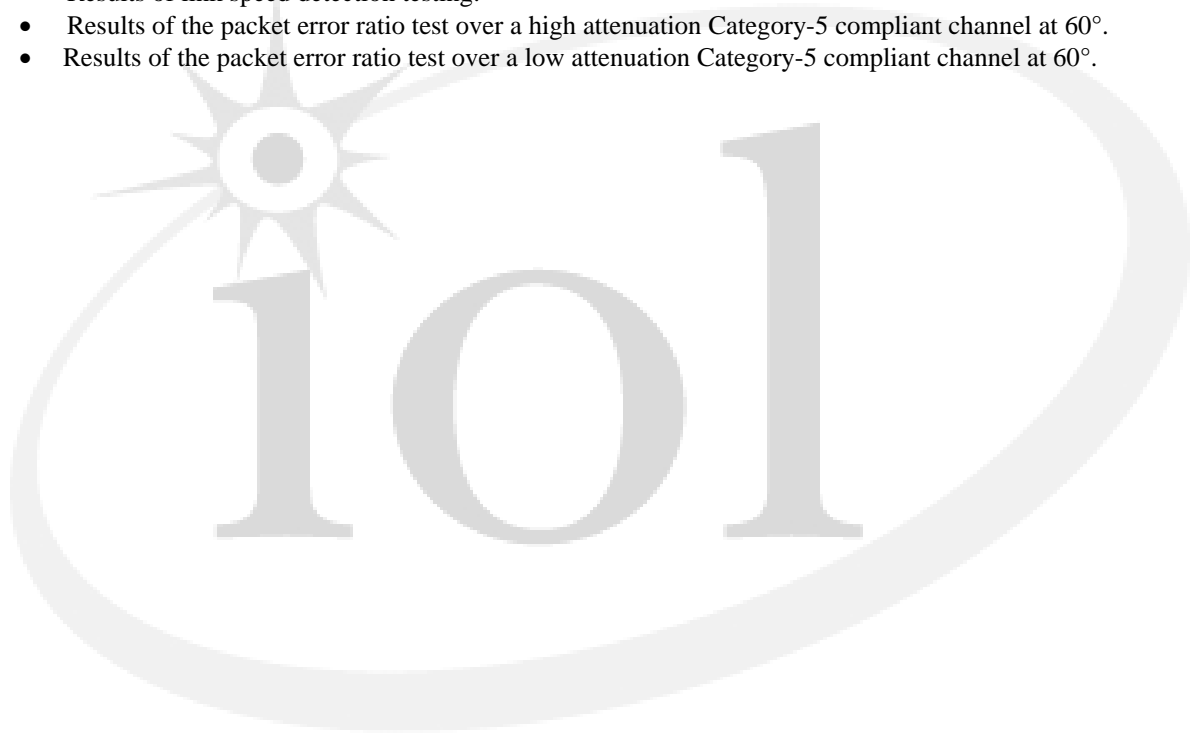
Included with this report is a series of plots that provide a characterization of the channels over which the testing was performed. The plots include the following items.

- 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:

PSE Tested	Test # 1.1.7 Power Request and Application	
	Case 1	Case 2
3Com 4400 PSE Switch	PASS	PASS
3Com NetJack 220	PASS	PASS
3Com NetJack 200 New	PASS	PASS
3Com NetJack 200 Old	PASS	PASS
3Com NetJack 100 Old	PASS	PASS
3Com NetJack 105	PASS	PASS
Avaya P333T-PWR	PASS	PASS
Broadcom XGS2 24-port	PASS	PASS
Broadcom XGS3 48-port	PASS	PASS
Cisco Veo2-WS-X4248-RJ45V	PASS	PASS
Cisco Inferno-WS-X4548-GB-RJ45V	PASS	PASS
Dell PowerConnect 3424P	PASS	PASS
HP Procurve J8161A	PASS	PASS
HP Procurve 2650 PWR	PASS	PASS
Matsushita Switch-M12PWR	PASS	PASS
Matsushita Switch-S12PWR	PASS	PASS
Nortel Networks Baystack 460-24T PWR Switch	PASS	PASS
Nortel Networks Baystack 470-24T PWR Switch	PASS	PASS
Panduit DPoE24U1X	PASS	PASS
Phihong PSA16U-480	PASS	PASS
PowerDsine 3001	PASS	PASS
PowerDsine 6001	PASS	PASS
PowerDsine 6024	PASS	PASS
PowerDsine 3012	PASS	PASS

CAT 5 - TSB95 Spec - Maximum Attenuation

Parameter	Pair	Channel-1	Channel-2
Propagation Delay (ns)	(1, 2)	579.00	585.00
	(3, 6)	587.00	579.00
	(4, 5)	599.00	597.00
	(7, 8)	593.00	593.00
Propagation Delay Skew (ns)	(1, 2)	0.00	6.00
	(3, 6)	8.00	0.00
	(4, 5)	20.00	18.00
	(7, 8)	14.00	14.00

Parameter	Pair	Channel-1	Channel-2
Insertion Loss Margin (dB)	(1, 2)	0.60	0.30
	(3, 6)	0.40	0.40
	(4, 5)		
	(7, 8)		
Return Loss Margin (dB)	(1, 2)	3.32	5.20
	(3, 6)	5.50	6.02
	(4, 5)		
	(7, 8)		
Return Loss @ Remote Margin (dB)	(1, 2)	7.10	6.80
	(3, 6)	5.40	5.20
	(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)		

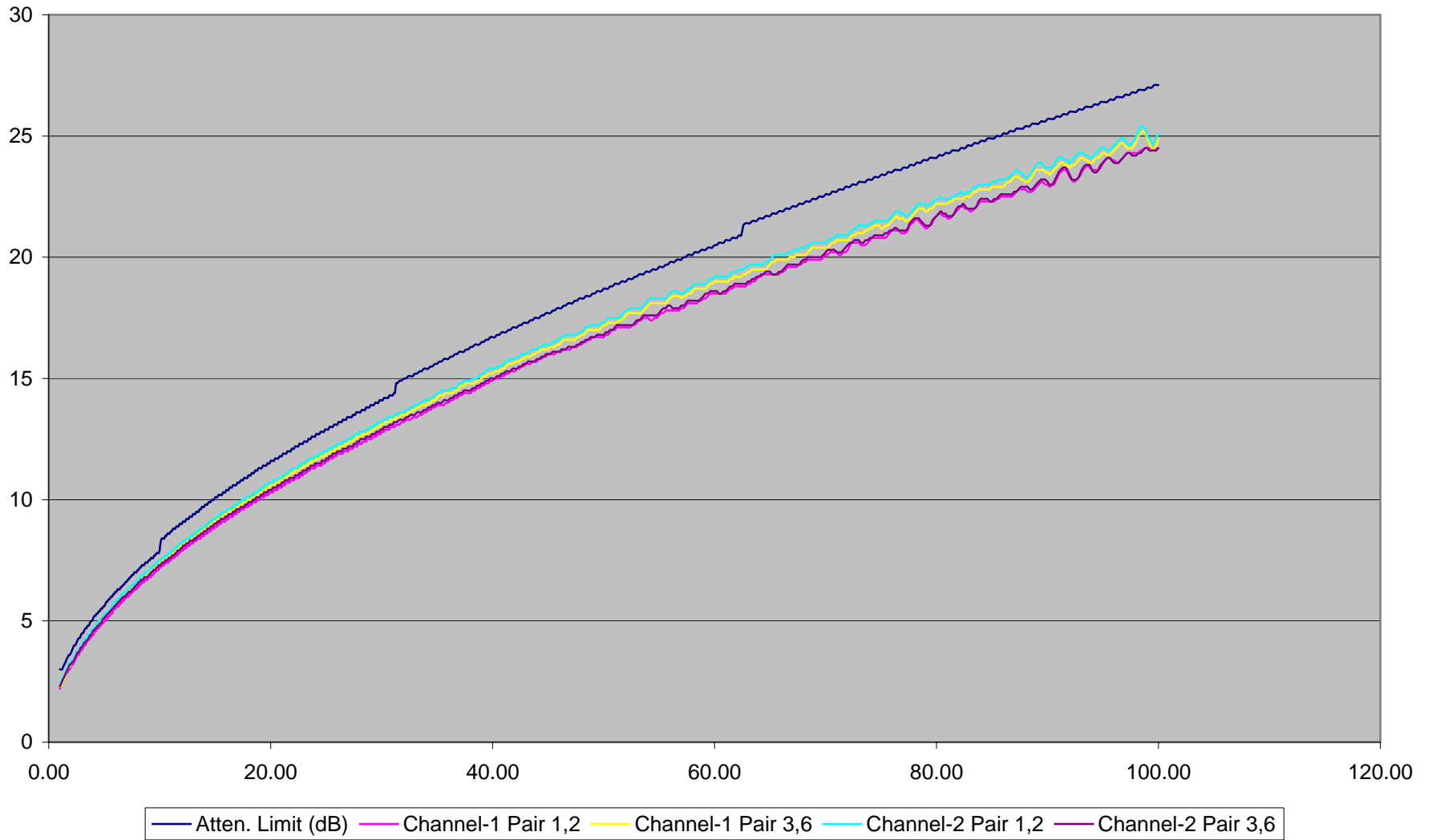
Channel 1 Description: Pass Through

Parameter	Generator-Receptor	Channel-1	Channel-2
NEXT Margin (dB)	(1, 2)-(3, 6)	9.40	8.40
	(1, 2)-(4, 5)		
	(1, 2)-(7, 8)		
	(3, 6)-(4, 5)		
	(3, 6)-(7, 8)		
NEXT @ Remote Margin (dB)	(4, 5)-(7, 8)	10.00	9.40
	(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

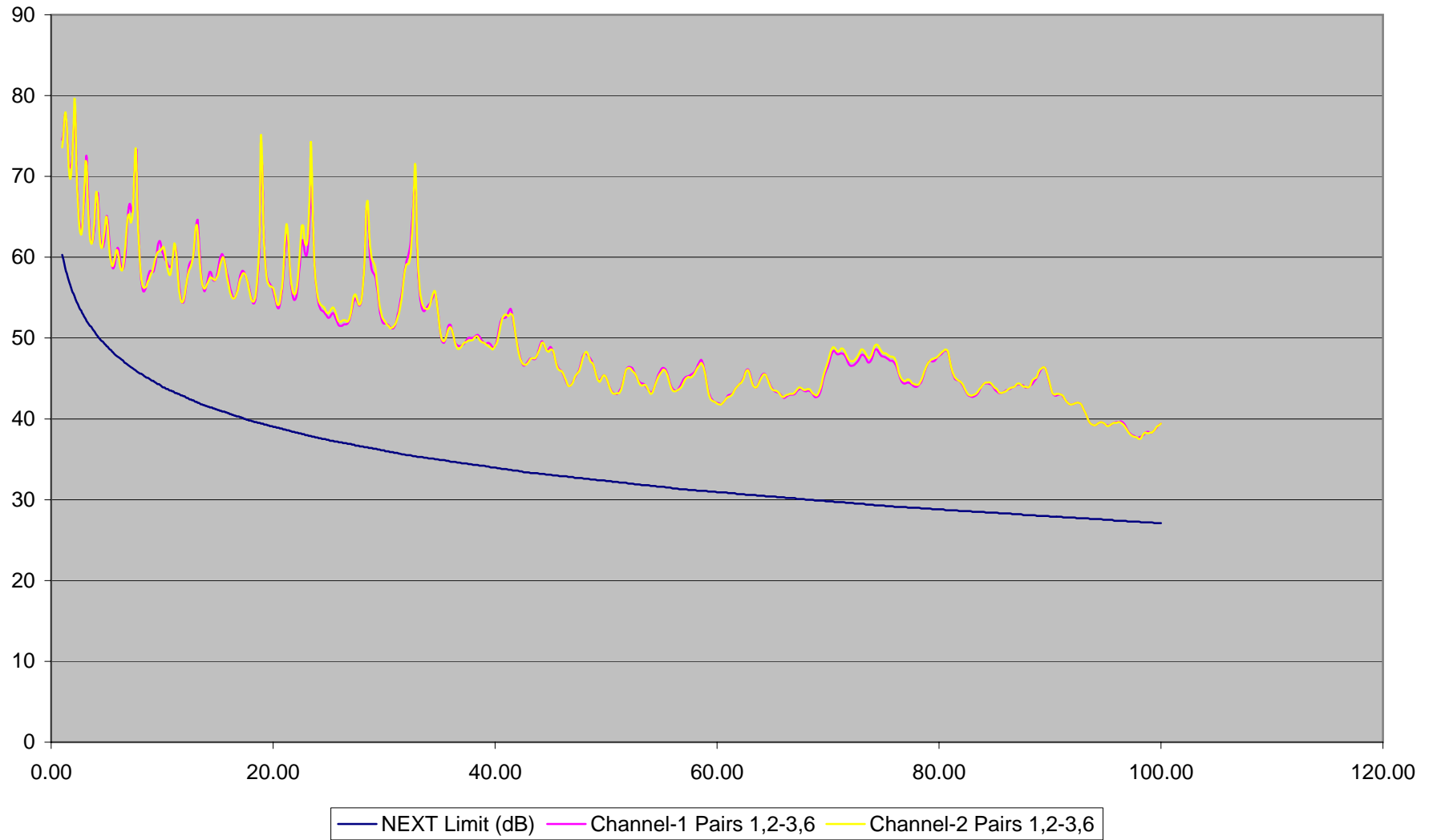
CAT 5 - TSB95 Spec @ Maximum Attenuation - Attenuation Plot
X-Axis Frequency (MHz), Y-Axis Attn (dB)



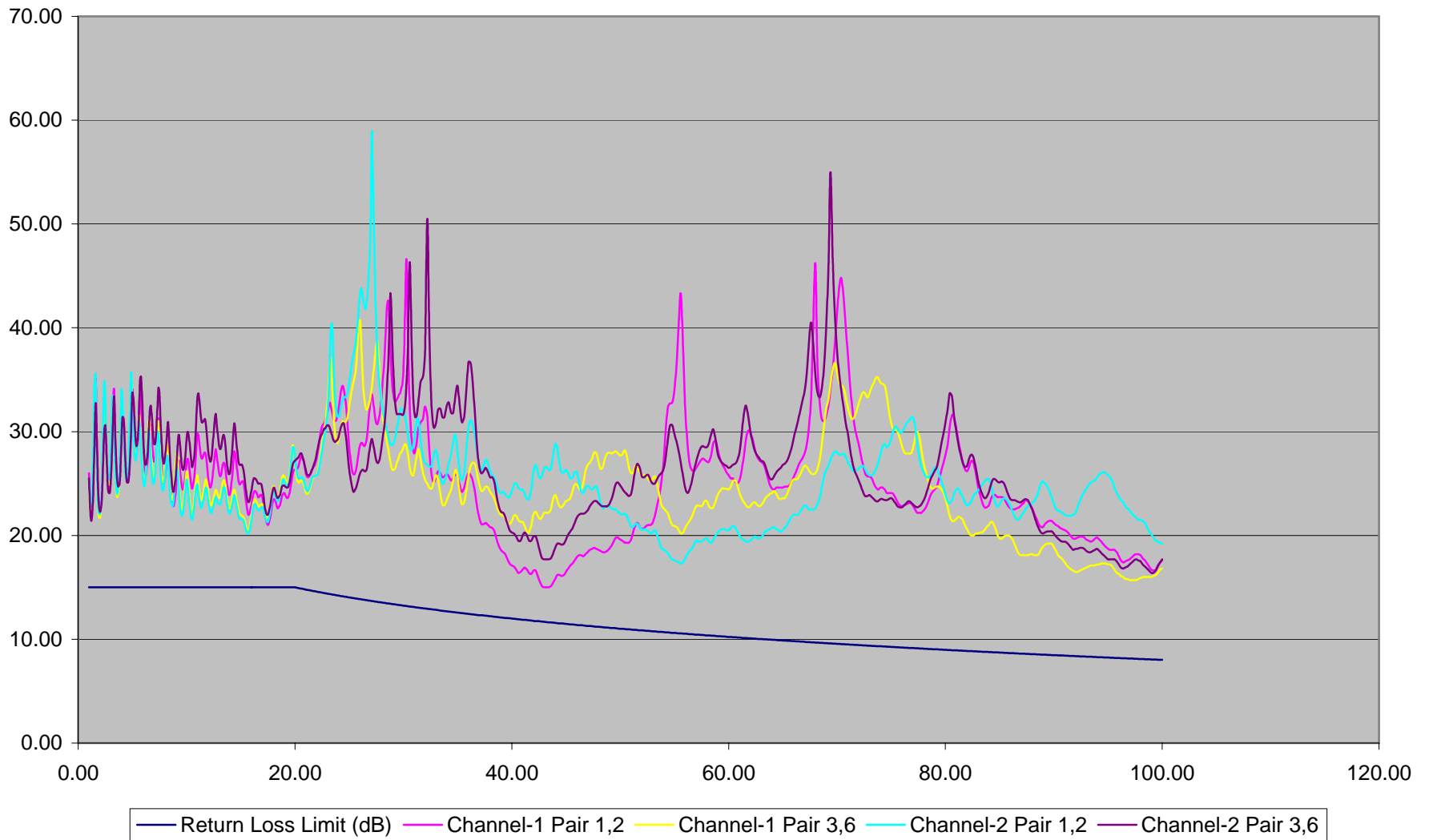
CAT 5 - TSB95 Spec @ Maximum Attenuation - Near End Cross Talk
X-Axis Frequency (MHz), Y-Axis NEXT (dB)



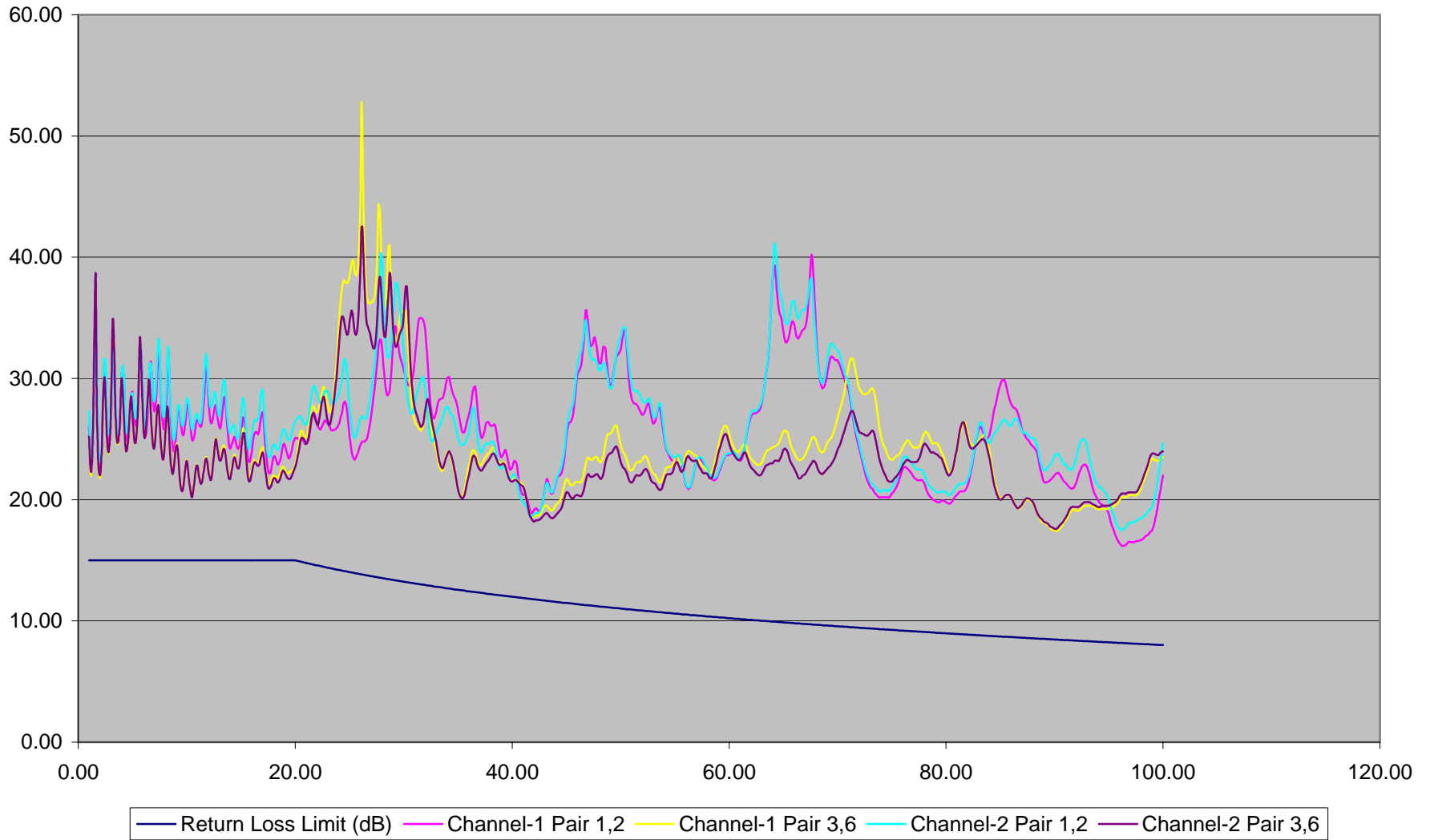
CAT 5 - TSB95 Spec @ Maximum Attenuation - Near End Cross Talk @ Remote
X-Axis Frequency (MHz), Y-Axis NEXT-R (dB)



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

Parameter	Pair	Channel-1	Channel-2
Insertion Loss Margin (dB)	(1, 2)	2.80	2.80
	(3, 6)	2.80	2.80
	(4, 5)		
	(7, 8)		
Return Loss Margin (dB)	(1, 2)	3.40	3.50
	(3, 6)	3.70	6.10
	(4, 5)		
	(7, 8)		
Return Loss @ Remote Margin (dB)	(1, 2)	4.47	7.10
	(3, 6)	3.00	3.20
	(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)		

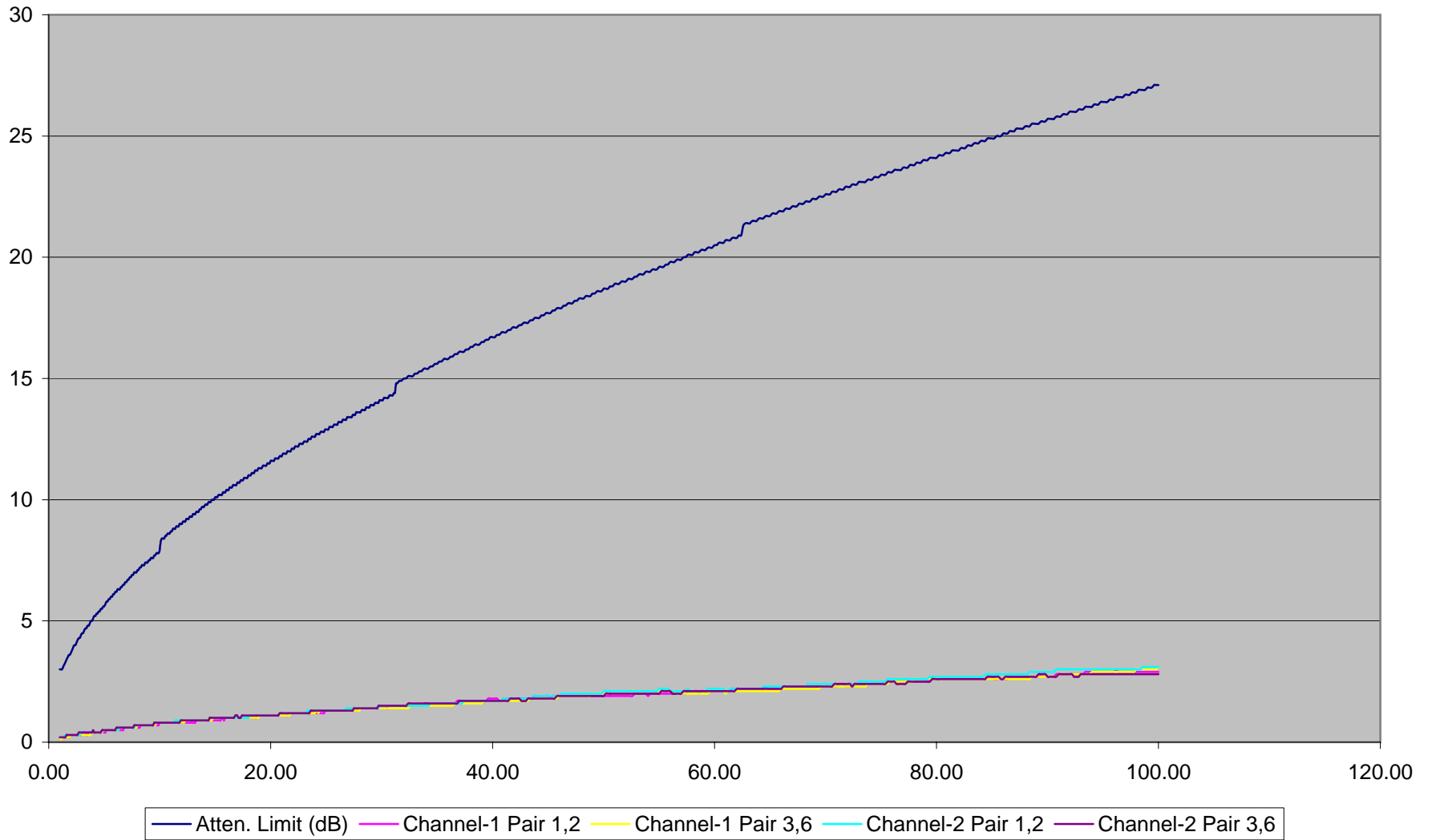
Channel 1 Description: Pass Through

Parameter	Generator-Receptor	Channel-1	Channel-2
NEXT Margin (dB)	(1, 2)-(3, 6)	9.30	9.20
	(1, 2)-(4, 5)		
	(1, 2)-(7, 8)		
	(3, 6)-(4, 5)		
	(3, 6)-(7, 8)		
NEXT @ Remote Margin (dB)	(4, 5)-(7, 8)	10.10	10.60
	(1, 2)-(3, 6)		
	(1, 2)-(4, 5)		
	(1, 2)-(7, 8)		
	(3, 6)-(4, 5)		
	(3, 6)-(7, 8)		
	(4, 5)-(7, 8)		

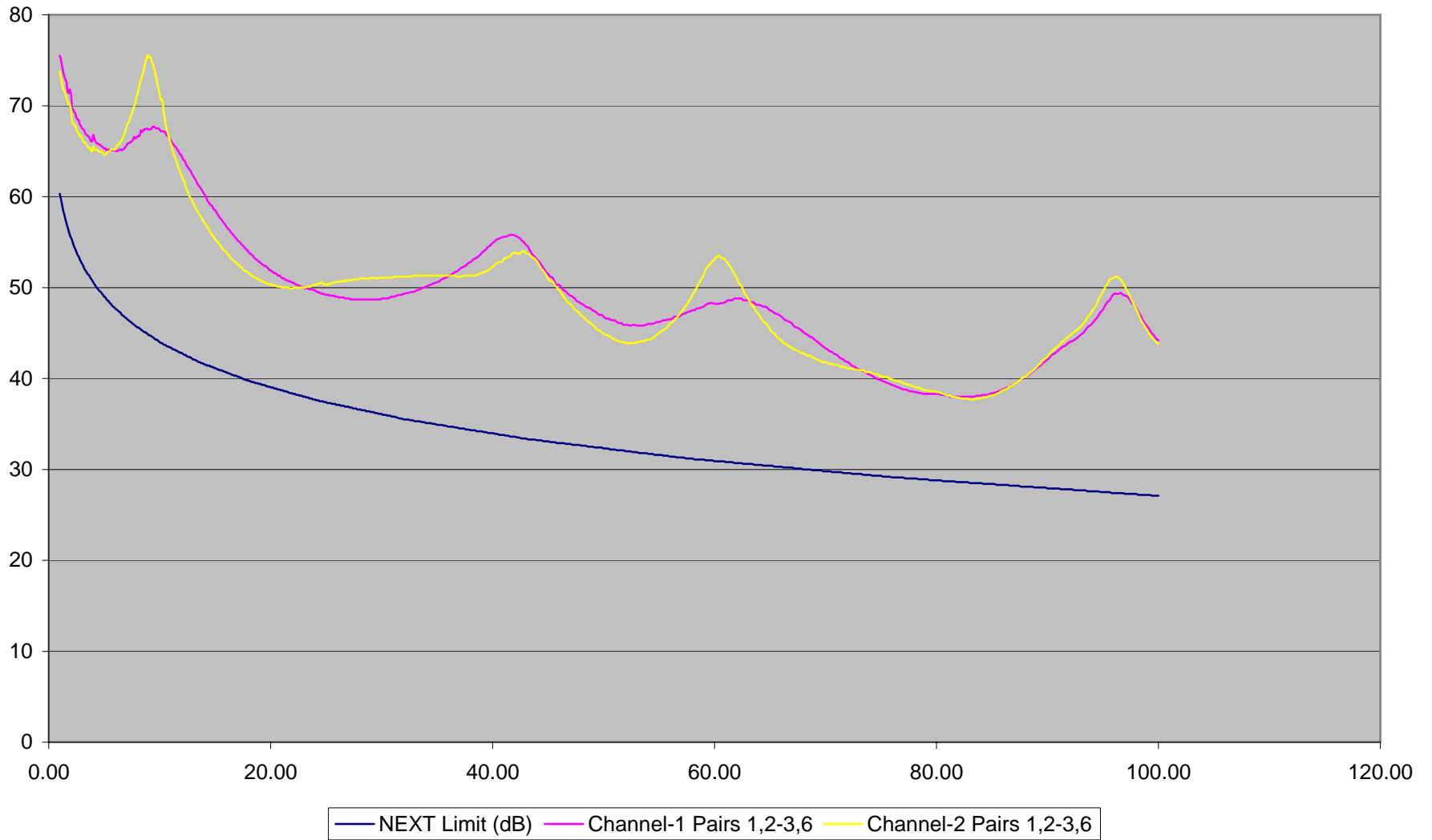
Parameter	Generator-Receptor	Channel-1	Channel-2
ELFEXT Margin (dB)	(1, 2)-(3, 6)		
	(1, 2)-(4, 5)		
	(1, 2)-(7, 8)		
	(3, 6)-(1, 2)		
	(3, 6)-(4, 5)		
	(3, 6)-(7, 8)		
	(4, 5)-(1, 2)		
	(4, 5)-(3, 6)		
	(4, 5)-(7, 8)		
	(7, 8)-(1, 2)		
ELFEXT @ Remote Margin (dB)	(7, 8)-(3, 6)		
	(7, 8)-(4, 5)		
	(1,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

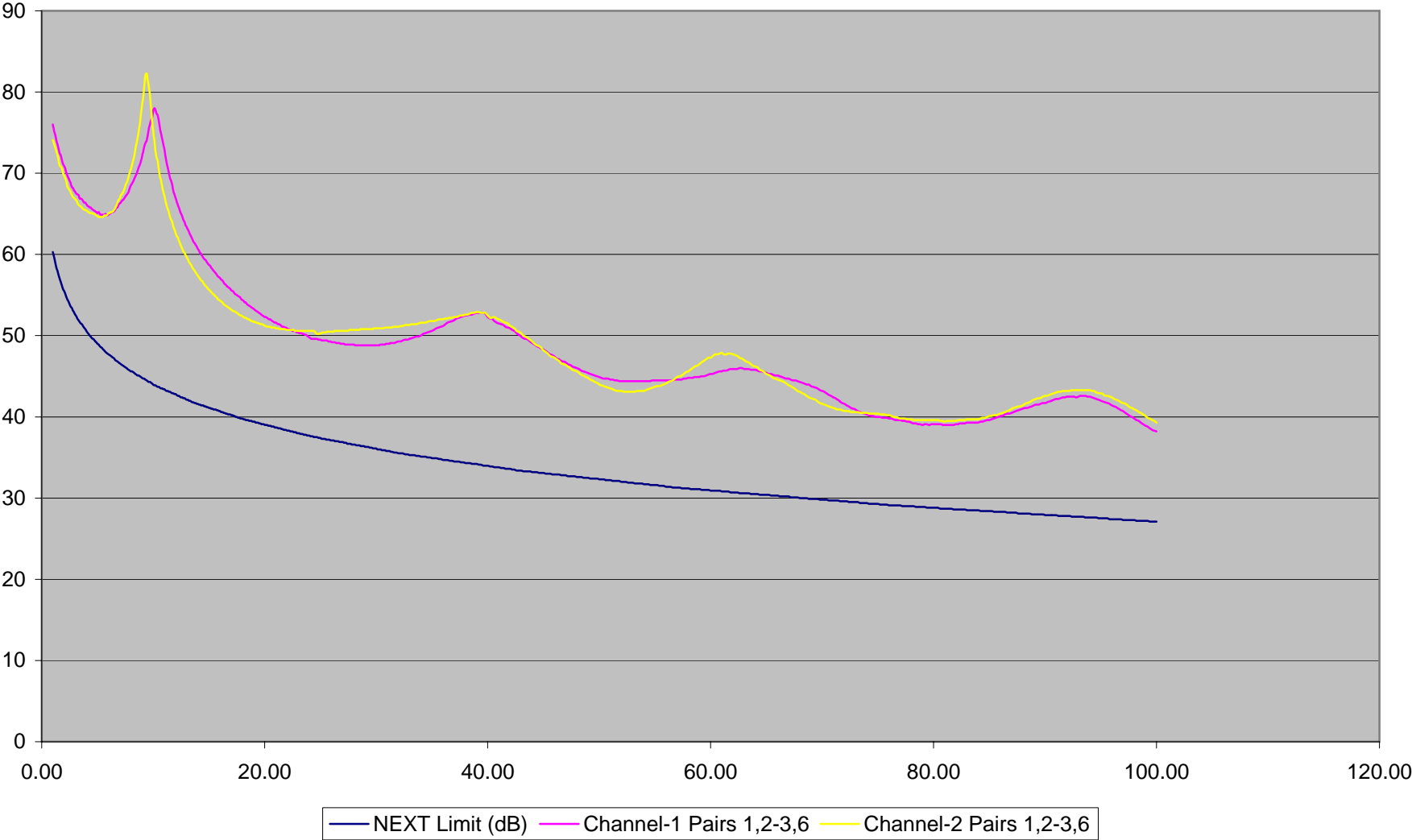
CAT 5 - TSB95 Spec @ Low Attenuation - Attenuation Plot
X-Axis Frequency (MHz), Y-Axis Attn (dB)



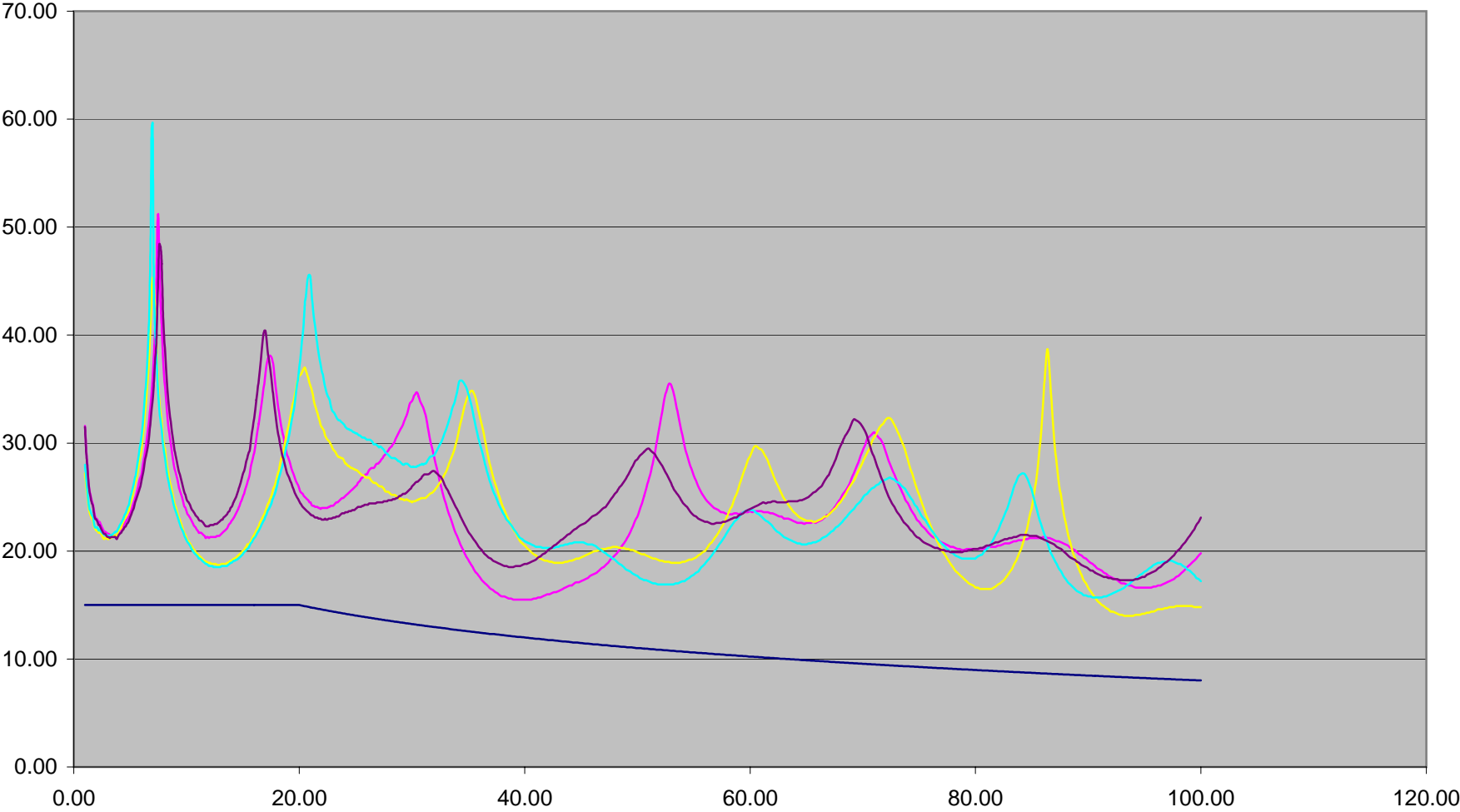
CAT 5 - TSB95 Spec @ Low Attenuation - Near End Cross Talk
X-Axis Frequency (MHz), Y-Axis NEXT (dB)



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)

