



Gigabit Ethernet Consortium

Ethernet Interoperability Test Suite v3.0 Report

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Microsemi

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Report Rev. 1.0

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

Device Information	
Device Under Test (DUT):	Microsemi Polarfire
UNH-IOL Device Identification #:	23941
Hardware Version:	DVP-102-000481-001
Port Tested:	Port 0

Results Overview

No interoperability issues were discovered during the testing process.

Test Tool and Test Suite Information

The following table contains the test tool and test suite versions used during testing:

Test Tool	Version
Traffic Generator	Spirent SmartBits 2000: SX-7410B, SX-7210, SmartWindow v9.50.159
Test Suite	Ethernet Interoperability v3.0 June 11 th , 2014
UNH-IOL Test Results ID:	26892

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Initialization Information

The following table contains the steps taken to initialize the DUT prior to testing:

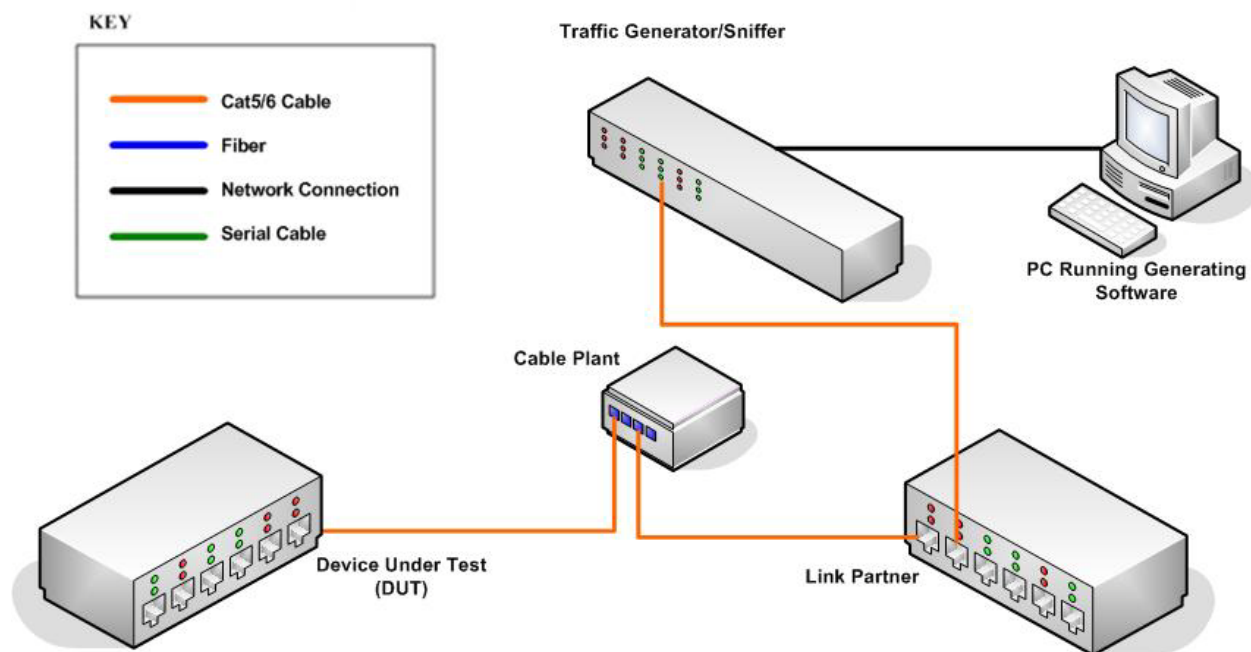
Component	Description
Software	Microsemi SoftConsole v5.1
Initialization Script	N/A
Additional Commands	Debug Skip All Breakpoints Resume

Revision History

The following table contains a revision history for this report:

Revision	Explanation
1.0	Initial version.

Test Setup





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MD5 Fingerprint: 7B 9B 0C 40 55 27 86 C0 F7 4A A3 45 DB F9 40 6E
SHA-1 Fingerprint: 03 59 97 71 28 ED 17 7F 1A 83 C5 D0 1D A8 2B 98 3E 2F 0F E7

Result Key

The following table contains possible results and their meanings:

Result	Meaning	Interpretation
PASS	Pass	The Device Under Test (DUT) was observed to exhibit conformant behavior.
PWC	Pass With Comments	The Device Under Test (DUT) was observed to exhibit conformant behavior, however changes were made to the normal test procedure or the behavior observed requires additional comments.
FAIL	Fail	The Device Under Test (DUT) was observed to exhibit non-conformant behavior.
RTC	Refer to Comments	From the observations, a valid pass or fail was not determined. An additional explanation of the situation is included.
Info	Informative	Test is designed for informational purposes only. The results may help ensure the interoperability of the DUT, but are not standards requirements.
Warn	Warning	The DUT was observed to exhibit behavior that is not recommended.
N/A	Not Applicable	This test does not apply to the device type or is not applicable to the testing programs selected.
N/S	Not Supported	The Device Under Test (DUT) was not observed to support the necessary functionality required to perform these tests or the requirement is optional and not supported by this device.
N/T	Not Tested	This test was not performed and therefore this is not a complete test report. Please see the comments for additional reasons.
UA	Unavailable	The test was not performed due to limitation of the test tool(s) or interoperable systems, or the test methodology is still under development.



GROUP 1 – POINT-TO-POINT (PTP) INTEROPERABILITY TESTS

Comments on Test Procedure

Test#1.1.1 Point to Point Link Configuration – Part A

Case 1: This test entails powering off the link partner and DUT, connecting a compliant high attenuation line between them and then powering on the DUT. After the DUT has completed the booting process, the link partner is powered on. Once the link partner has booted up, 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 of this test.

Case 2: This test mimics Case 1 except that the link partner is powered on prior to the DUT. Refer to the following tables for further information regarding the results of this test.

Case 3: This test entails powering on the DUT and the link partner separately and then connecting them together once they have booted up and have been configured such that each device is auto-negotiating. Traffic is then sent from one of the two devices and checked at the other end for correct reception. Refer to the following tables for further information regarding the results of this test.

Test#1.1.1 Point to Point Link Configuration – Part C

A valid highest common denominator connection between the DUT and a testing station is established over a high attenuation cable plant. The link is then broken and established with another device configured to send link signaling at a speed other than the HCD. The link is broken once again, and an HCD link is re-established with the testing station. For all compatible speeds, the DUT should detect and link at the appropriate link speed and duplex. Refer to the following tables for further information regarding the results of this test.

Test#1.2.1 Packet Error Ratio Estimation

High Attenuation Channel: The two devices are connected with a high attenuation line. A number of ICMP echo requests (Refer to the Ethernet Interoperability Test Suite: Appendix B Table B1) 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 with an approximately 5-meter cable. A number of ICMP echo requests (Refer to the Ethernet Interoperability Test Suite: Appendix B Table B1) 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#1.2.2 Endurance Stress Test – Part A

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 continuously sending 64-byte echo requests with a minimum IPG of 96BT for ten minutes. Additionally, a single 64-byte frame will be sent following the ten-minute burst to verify that the DUT is still capable of frame reception and transmission. 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#1.2.2 Endurance Stress Test – Part B

This test mimics Part A except that 1518-byte echo requests are utilized. Refer to the following tables for further information regarding the results of 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. Each 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 channel. This channel is designed to not exceed the attenuation of a worst case Category-5 channel at 60°C.
- Results of the packet error ratio test over a low attenuation Category-5 compliant channel.

Test Results

(Refer to Annex A for test setup)

Switches Tested	Test#1.1.1 Point to Point Link Configuration					Test#1.2.1 High Attenuation Channel	Test#1.2.1 Low Attenuation Channel
	Part A Case 1	Part A Case 2	Part A Case 3	Part B	Part C	1518-byte	1518-byte
3Com Corp. 3CR17250	PASS	PASS	PASS	N/A	N/A	0	0
Avaya, Inc. 96710G Phone	PASS	PASS	PASS	N/A	N/A	0	0
Broadcom Corp. BCM56224	PASS	PASS	PASS	N/A	N/A	1	0
Broadcom Corp. BCM56620	PASS	PASS	PASS	N/A	N/A	1	0
Cisco Systems CloudCR	PASS	PASS	PASS	N/A	N/A	0	0
Cisco Systems CP-7917G-GE Phone	PASS	PASS	PASS	N/A	N/A	0	0
Coyote Point Systems, Inc. E650gx	PASS	PASS	PASS	N/A	N/A	0	0
D-Link Systems, Inc. NetStructure 480T Routing Switch	PASS	PASS	PASS	N/A	N/A	0	0
Dell, Inc. Power Connect 6224	PASS	PASS	PASS	N/A	N/A	0	0
Extreme Networks Summit 1i	PASS	PASS	PASS	N/A	N/A	0	0
HP ProCurve 100/1000-T xl module J4821A	PASS	PASS	PASS	N/A	N/A	0	0
HP ProCurve J9033A	PASS	PASS	PASS	N/A	N/A	0	0
LVL7 Systems, Inc. GSM7238S	PASS	PASS	PASS	N/A	N/A	0	0
Matsushita Electric Works, Ltd. M-24 Management Switch	PASS	PASS	PASS	N/A	N/A	3	0
Panasonic Eco Solutions Networks, Co., Ltd. S16G	PASS	PASS	PASS	N/A	N/A	1	0
Panasonic Eco Solutions Networks, Co., Ltd. Switch-M12eGPWR+	PASS	PASS	PASS	N/A	N/A	0	0
Realtek Semiconductor Corp. RTL8367	PASS	PASS	PASS	N/A	N/A	1	0

Adapters Tested	Test#1.1.1 Point to Point Link Configuration					Test#1.2.1 High Attenuation Channel	Test#1.2.1 Low Attenuation Channel
	Part A Case 1	Part A Case 2	Part A Case 3	Part B	Part C	1518-byte	1518-byte
Fujitsu Siemens Computers GmbH S266361-D2807	PASS	PASS	PASS	N/A	PASS	0	0
Realtek Semiconductor Corp. RTL8169SB	PASS	PASS	PASS	N/A	PASS	0	0
Silicom, Ltd. PEG4BP	PASS	PASS	PASS	N/A	PASS	0	0

Test# and Label	Part(s)	Result(s)
1.2.2 – Endurance Stress Test	A	PASS
Expected Results and Procedural Comments		
The DUT is attached to a sourcing station that is capable of sending an appropriate number of 64-byte and 1518-byte ICMP echo requests with minimum IPG. The DUT does not have to respond to all of the requests but the test should not cause any system failures.		
Comments on Test Results		
While passing 64-byte frames with a minimum IFG for 10 minutes, the DUT did not show any system failures. The DUT responded appropriately to all 64-byte frames. While passing 1518-byte frames with a minimum IFG for 10 minutes, the DUT did not show any system failures. The DUT responded appropriately to all 1518-byte frames.		

ANNEX A – TEST SETUP

Test Equipment

The following test equipment was used in performing interoperability testing when the Link Partner was a switch:

Testing Equipment	Brand and Version Information
PC Requirements	64-bit Microsoft Windows OS
Software	SmartWindow v7.70.128, UNH-IOL Packet Generator software v3.6a
Traffic Generator/ Monitor	SMB 600 Chassis with one LAN3325A 1000BASE-X module

The following test equipment was used in performing interoperability testing when the Link Partner was a NIC:

Testing Equipment	Brand and Version Information
PC Requirements	Microsoft Windows 10
Software	SmartWindow v7.70.128, UNH-IOL Packet Generator software v3.6a
Configuration	SMB 600 Chassis with one LAN3325A 1000BASE-X module connected to a NIC, which was bridged with a link partner (using Windows 10).
Traffic Generator/ Monitor	SMB 2000 Chassis with two SX-7410B 100BASE-TX modules

The following test equipment was used when performing test #1.2.2, *Endurance Stress Test*:

Testing Equipment	Brand and Version Information
PC Requirements	64-bit Microsoft Windows OS
Software	SmartWindow v7.70.128, UNH-IOL Packet Generator software v3.6a
Traffic Generator/ Monitor	SMB 600 Chassis with one LAN3325A 1000BASE-X module



Test Configuration

For the possible test configurations, refer to Figures 1-1 through 1-4 in the Interoperability Test Suite.

ANNEX B – CABLE PLANT SPECIFICATIONS

Refer to the following pages.

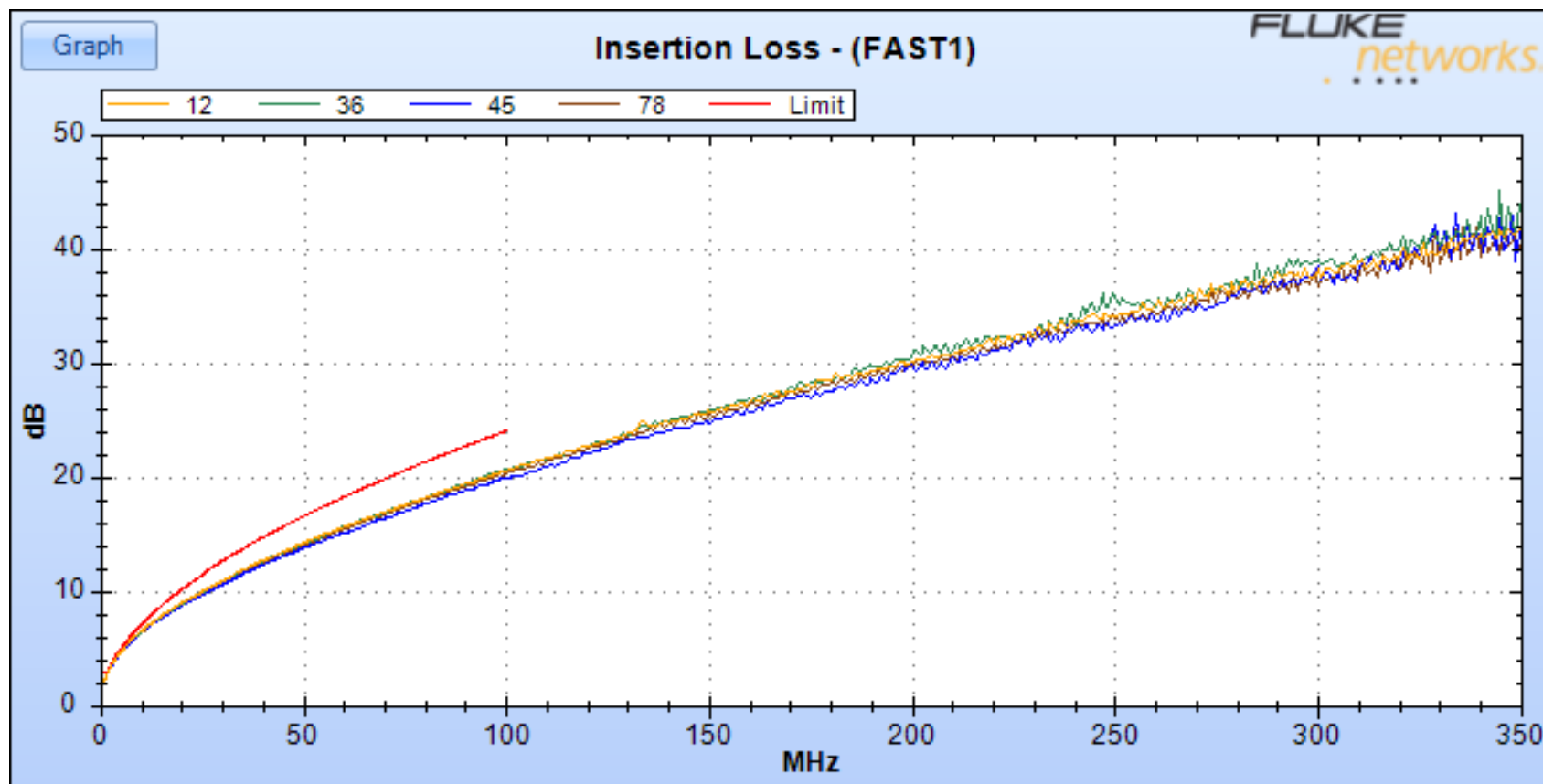
CAT 5 – TIA Cat 5 Ch Spec - Maximum Attenuation

Parameter	Pair	Channel-1
Propagation Delay (ns)	(1,2)	481.00
	(3,6)	475.00
	(4,5)	476.00
	(7,8)	483.00
Propagation Delay Skew (ns)	(1,2)	6.00
	(3,6)	0.00
	(4,5)	1.00
	(7,8)	8.00

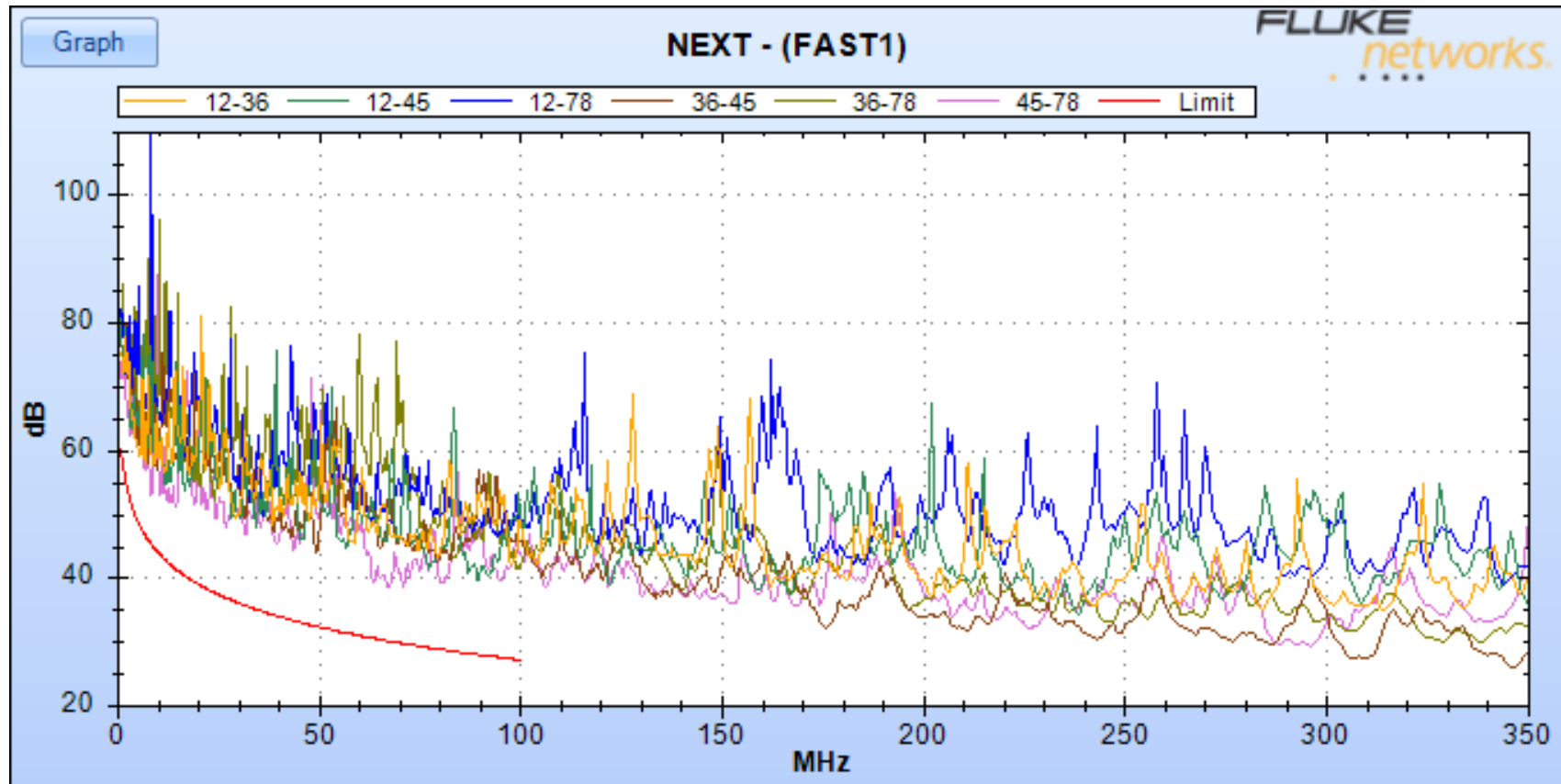
Parameter	Pair	Channel-1
Insertion Loss Margin (dB)	(1,2)	0.10
	(3,6)	0.10
	(4,5)	0.10
	(7,8)	0.10
Return Loss Margin (dB)	(1,2)	6.40
	(3,6)	6.40
	(4,5)	2.60
	(7,8)	5.50
Return Loss @ Remote Margin (dB)	(1,2)	6.80
	(3,6)	7.60
	(4,5)	4.20
	(7,8)	5.70

Parameter	Generator-Receptor	Channel-1
NEXT Margin (dB)	(1, 2)-(3, 6)	11.50
	(1, 2)-(4, 5)	11.50
	(1, 2)-(7, 8)	15.10
	(3, 6)-(4, 5)	11.70
	(3, 6)-(7, 8)	14.10
	(4, 5)-(7, 8)	7.60
NEXT @ Remote Margin (dB)	(1, 2)-(3, 6)	11.90
	(1, 2)-(4, 5)	9.40
	(1, 2)-(7, 8)	16.20
	(3, 6)-(4, 5)	10.70
	(3, 6)-(7, 8)	11.60
	(4, 5)-(7, 8)	7.50

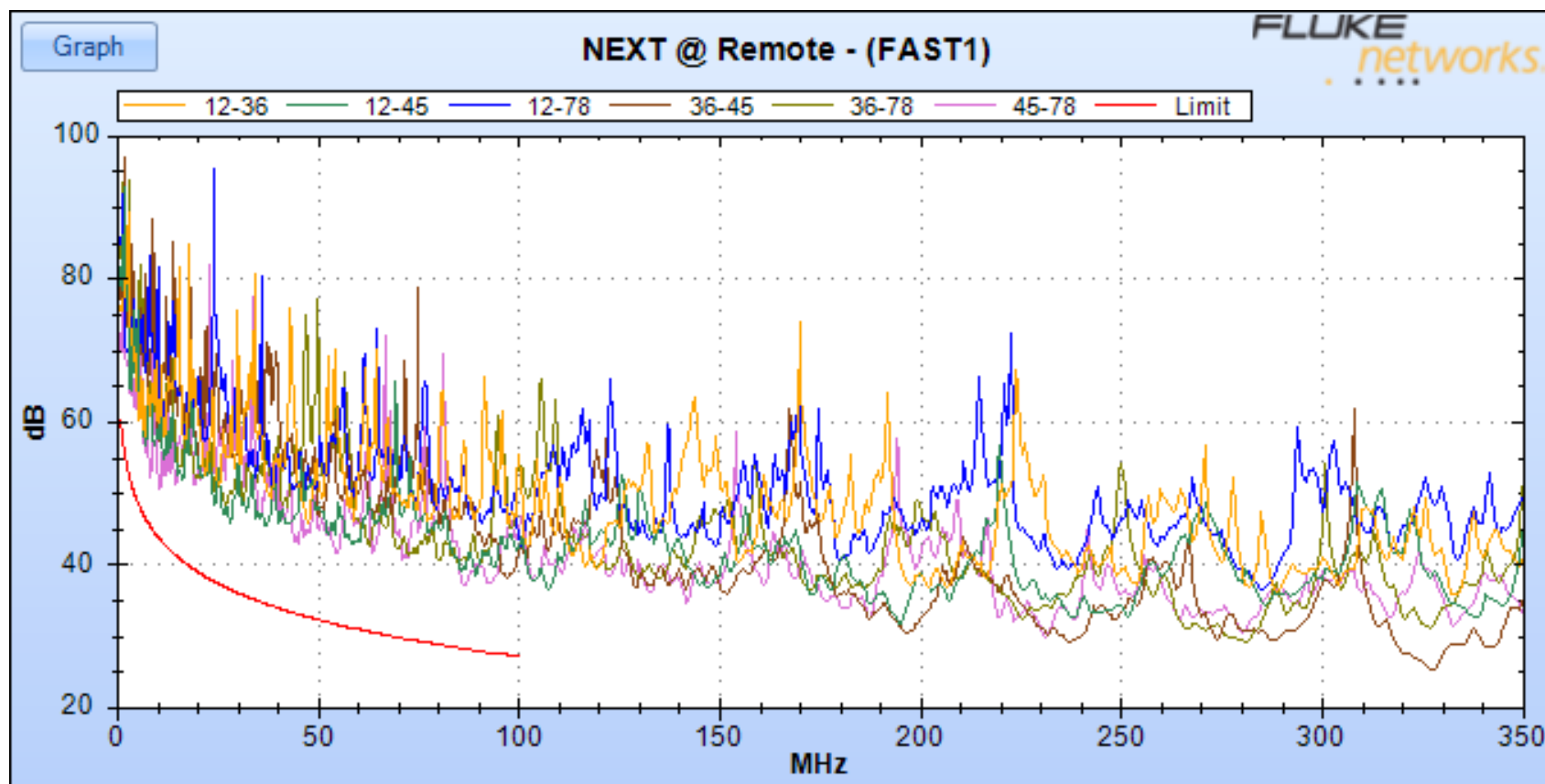
CAT 5 – TIA Cat 5 Ch Spec @ Maximum Attenuation - Attenuation Plot
X-Axis Frequency (MHz), Y-Axis Attn (dB)



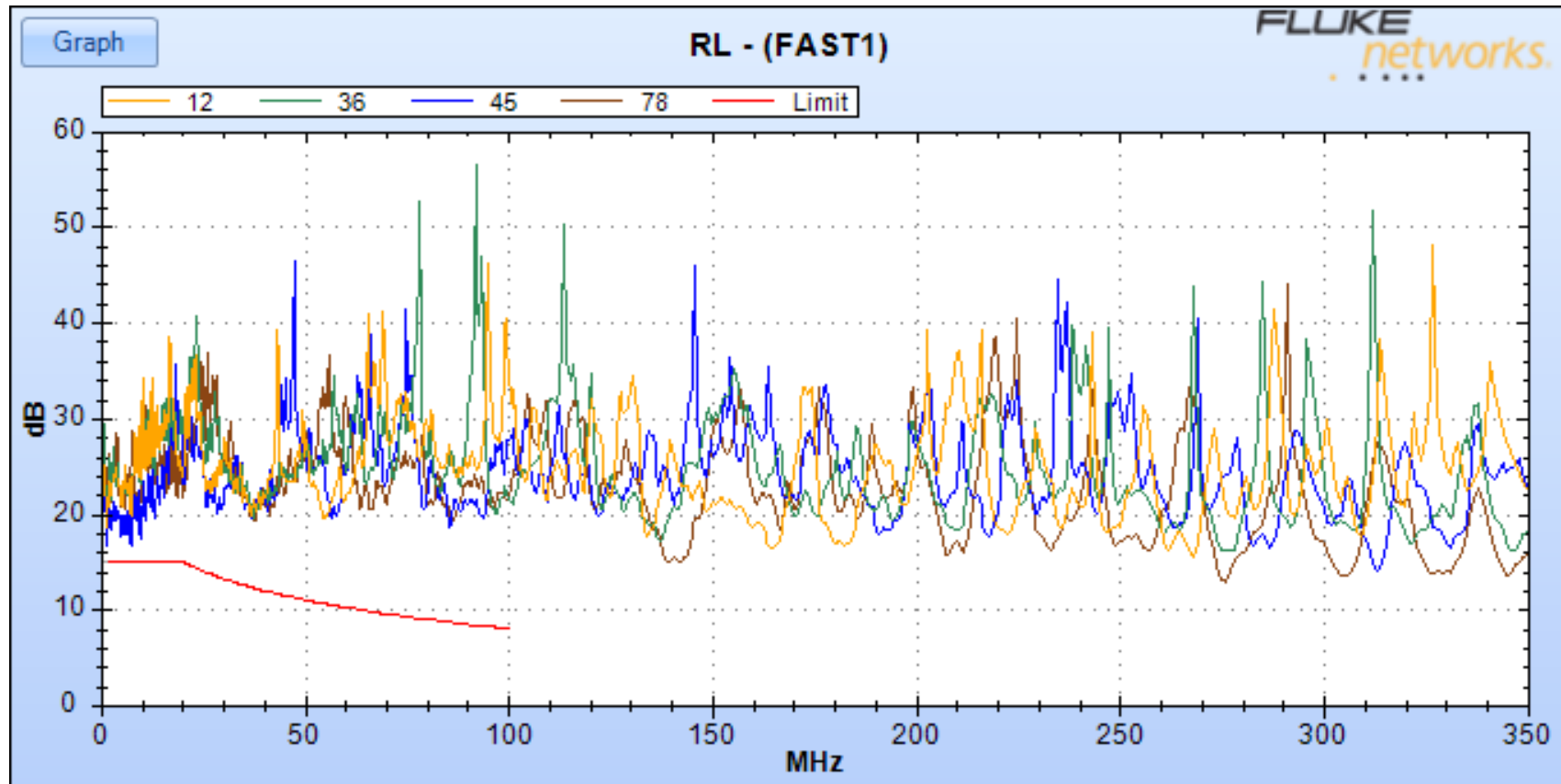
CAT 5 – TIA Cat 5 Ch Spec @ Maximum Attenuation - Near End Cross Talk
X-Axis Frequency (MHz), Y-Axis NEXT (dB)



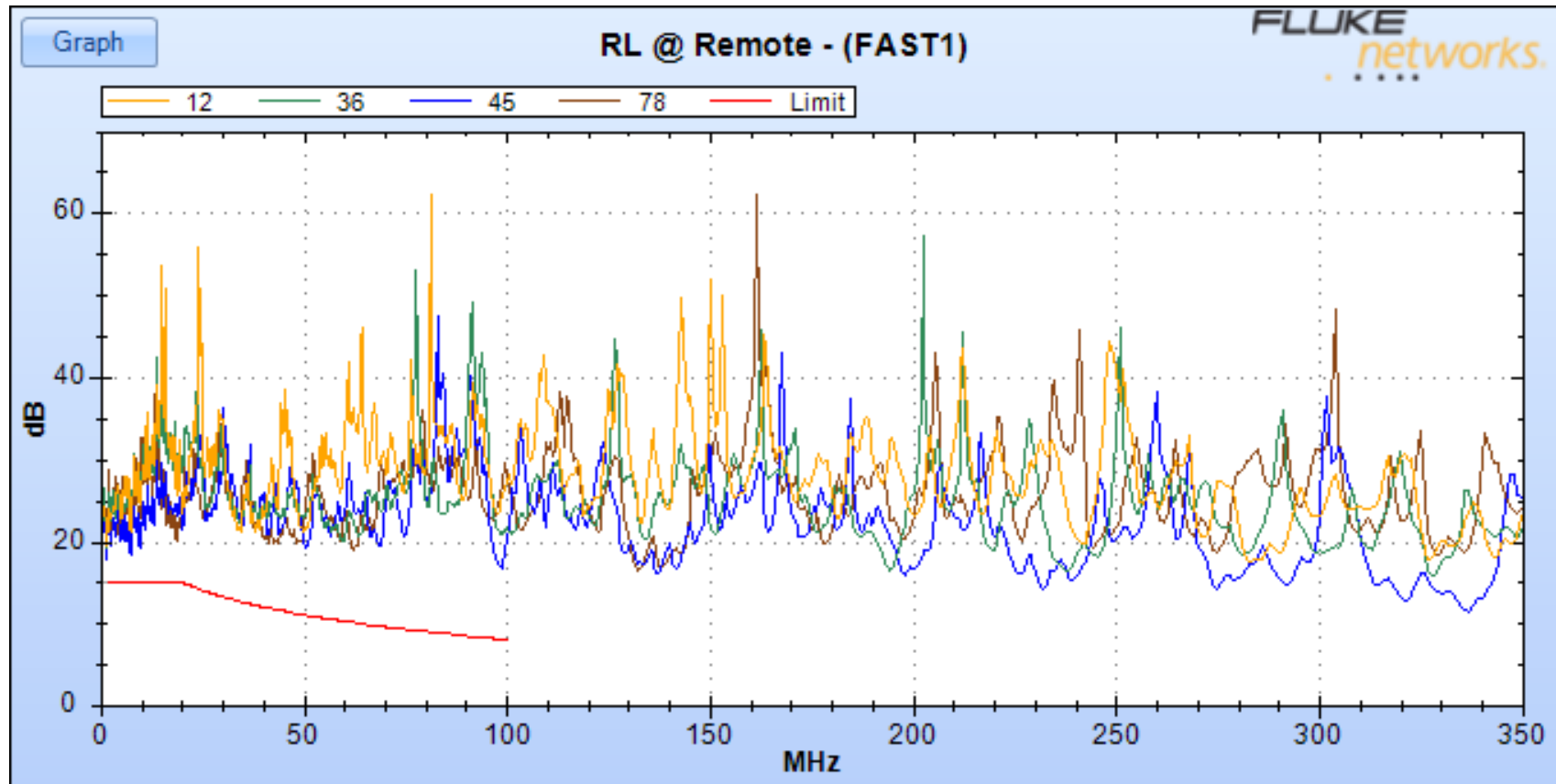
CAT 5 – TIA Cat 5 Ch Spec @ Maximum Attenuation - Near End Cross Talk @ Remote
X-Axis Frequency (MHz), Y-Axis NEXT (dB)



CAT 5 – TIA Cat 5 Ch Spec @ Maximum Attenuation - Return Loss
X-Axis Frequency (MHz), Y-Axis RL (dB)



CAT 5 – TIA Cat 5 Ch Spec @ Maximum Attenuation - Return Loss @ Remote
X-Axis Frequency (MHz), Y-Axis RL (dB)



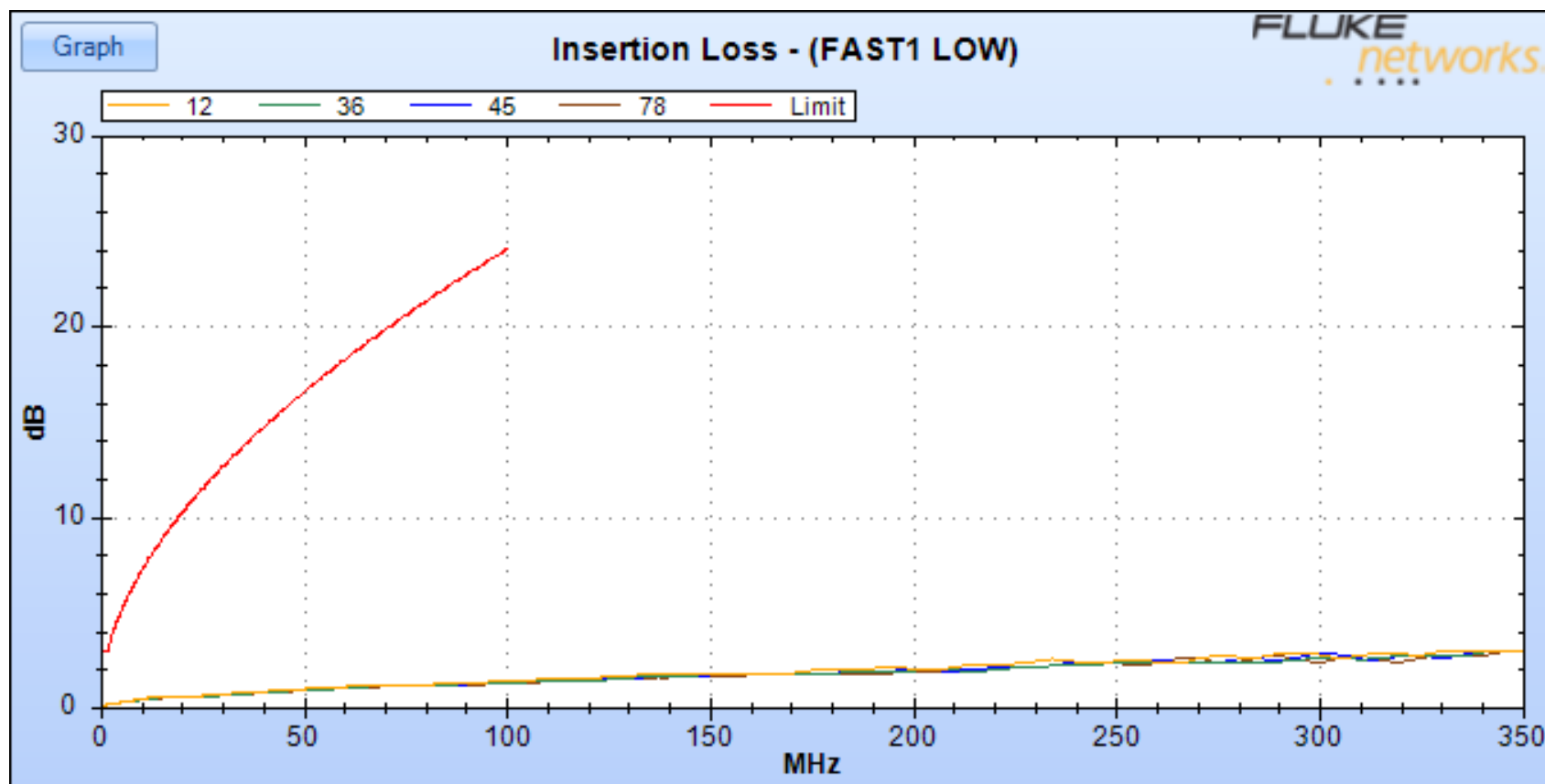
CAT 5 – TIA Cat 5 Ch Spec - Low Attenuation

Parameter	Pair	Channel-1
Propagation Delay (ns)	(1,2)	24.00
	(3,6)	23.00
	(4,5)	23.00
	(7,8)	22.00
Propagation Delay Skew (ns)	(1,2)	2.00
	(3,6)	1.00
	(4,5)	1.00
	(7,8)	0.00

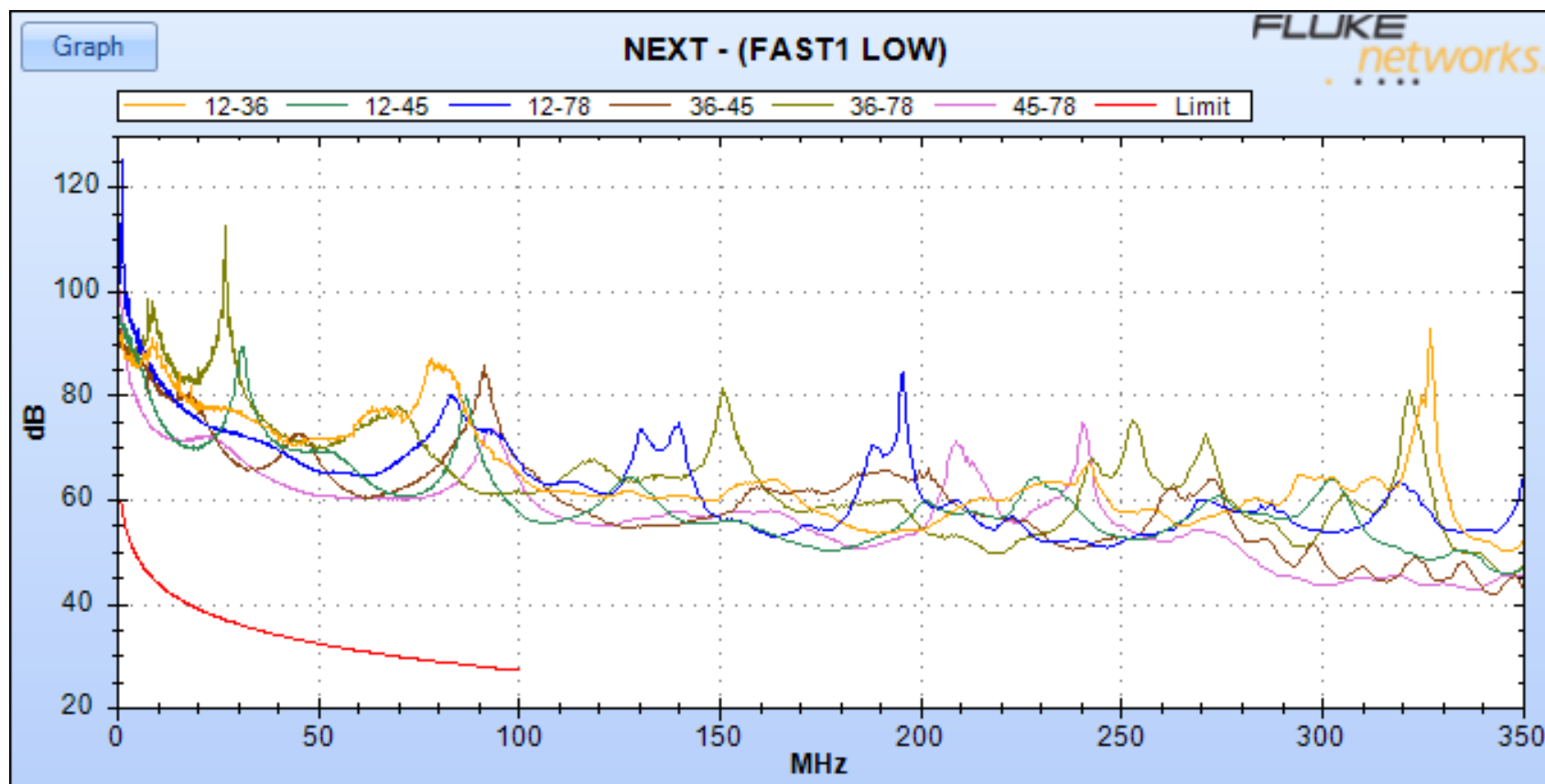
Parameter	Pair	Channel-1
Insertion Loss Margin (dB)	(1,2)	2.80
	(3,6)	2.80
	(4,5)	2.80
	(7,8)	2.80
Return Loss Margin (dB)	(1,2)	10.40
	(3,6)	12.10
	(4,5)	11.00
	(7,8)	13.10
Return Loss @ Remote Margin (dB)	(1,2)	11.00
	(3,6)	12.40
	(4,5)	11.90
	(7,8)	12.30

Parameter	Generator-Receptor	Channel-1
NEXT Margin (dB)	(1, 2)-(3, 6)	31.20
	(1, 2)-(4, 5)	29.70
	(1, 2)-(7, 8)	33.00
	(3, 6)-(4, 5)	29.60
	(3, 6)-(7, 8)	31.10
	(4, 5)-(7, 8)	28.30
NEXT @ Remote Margin (dB)	(1, 2)-(3, 6)	27.60
	(1, 2)-(4, 5)	26.70
	(1, 2)-(7, 8)	32.50
	(3, 6)-(4, 5)	27.20
	(3, 6)-(7, 8)	29.80
	(4, 5)-(7, 8)	28.00

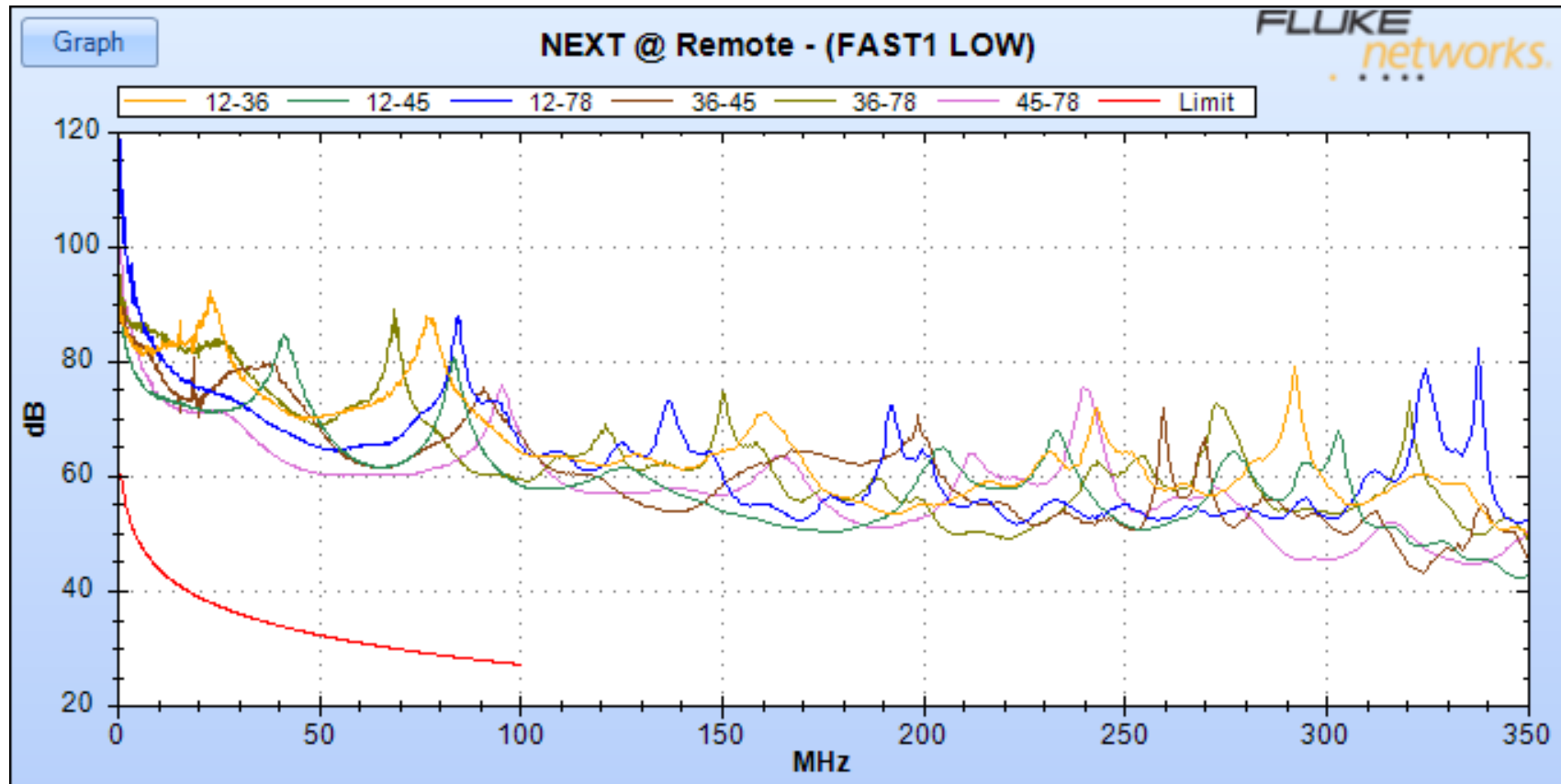
CAT 5 – TIA Cat 5 Ch Spec @ Low Attenuation - Attenuation Plot
X-Axis Frequency (MHz), Y-Axis Attn (dB)



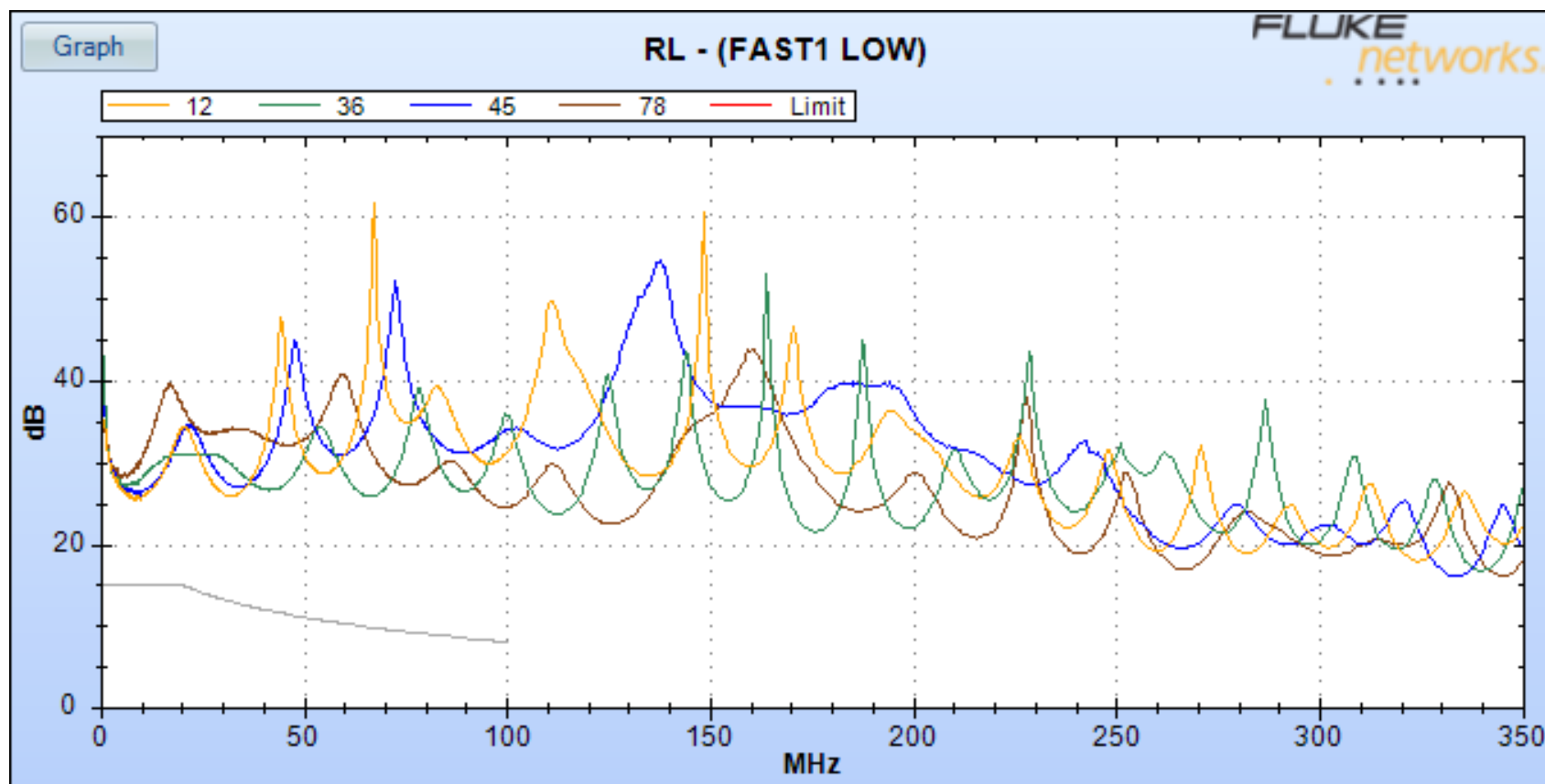
CAT 5 – TIA Cat 5 Ch Spec @ Low Attenuation - Near End Cross Talk
X-Axis Frequency (MHz), Y-Axis NEXT (dB)



CAT 5 – TIA Cat 5 Ch Spec @ Low Attenuation - Near End Cross Talk @ Remote
X-Axis Frequency (MHz), Y-Axis NEXT (dB)



CAT 5 – TIA Cat 5 Ch Spec @ Low Attenuation - Return Loss
X-Axis Frequency (MHz), Y-Axis RL (dB)



CAT 5 – TIA Cat 5 Ch Spec @ Low Attenuation - Return Loss @ Remote
X-Axis Frequency (MHz), Y-Axis RL (dB)

