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ETHERNET INTEROPERABILITY TEST REPORT

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DEVICE AND TEST PLAN INFORMATION	
Device Under Test (DUT)	Microsemi Polarfire Rev C
Test Plan	Ethernet Interoperability Test Plan, Version 3.0, June 2014
UNH-IOL Test Result ID	28110
This testing pertains to a set of standard requirements, put forth in IEEE 802.3 Standard, 2012	

CONTACT INFORMATION		
Gigabit Ethernet	+1 (603) 862-0203	ethernet@iol.unh.edu
Testing Completed by	Noah Fitter	nfitter@iol.unh.edu
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Digitally signed by UNH-IOL
Date: 2018.02.15 16:39:57 -05'00'

SUMMARY OF RESULTS

The following table contains a summary of results other than PASS. The definition of result types can be found in the RESULT KEY.

TEST NUMBER & LABEL	PARTS	RESULTS
No non-conformant behavior was observed during this testing.		

TESTING NOTES

The following table contains any notes on the testing process or on general DUT behavior.

NOTES
No unusual device activity was observed during this testing

REVISION HISTORY

The following table contains a revision history for this report.

REVISION	DATE	AUTHOR	EXPLANATION
1.0	2/15/2017	Noah Fitter	Initial version

DEVICE UNDER TEST AND INITIALIZATION INFORMATION

The following table contains the state of the DUT during testing.

COMPONENT	DESCRIPTION
UNH-IOL Device Identification Number	24671
Speed and Media Type	1000BASE-T
Hardware Version	DVP-102-000481-001
Firmware Version	N/A
Software Version	Iog_cdr_test_allspeeds.stp
Port Tested	Port 0
MAC Address	N/A
Additional Information	None
Software	None
Initialization Script	None
Additional Commands	None

TEST TOOL AND ENVIRONMENT INFORMATION

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

TOOL	VERSION
UNH-IOL Packet Generator software	3.6a

TOOL	VERSION
Spirent SmartBits 600B	SmartWindow
Module	LAN-3325A TeraMetric XD 4-port Gigabit Ethernet
Version	v7.70.128

INTEROP PARTNER INFORMATION

DEVICE 1 & 2	DESCRIPTIONS	
Company:	3Com Corp.	3Com Corp.
Device Name:	3CR17250	SuperStack II 4900

DEVICE 3 & 4	DESCRIPTIONS	
Company:	Avaya Inc.	Broadcom Corp.
Device Name:	9670G Phone	BCM56218

DEVICE 5 & 6	DESCRIPTIONS	
Company:	Broadcom Corp.	Cisco Systems
Device Name:	BCM5650	7971G Phone

DEVICE 7 & 8	DESCRIPTIONS	
Company:	Cisco Systems	Cisco Systems
Device Name:	C3560G-24TS	CloudCR+ WS-X4648-RJ45V +E

DEVICE 9 & 10	DESCRIPTIONS	
Company:	Cisco Systems	Dell Inc.
Device Name:	Inferno WS-X4548-GB-RJ45V	Power Connect 6224

DEVICE 11 & 12	DESCRIPTIONS	
Company:	Fujitsu Siemens Computers GMbH	Hewlett Packard Enterprise Company
Device Name:	S266361-D2807	ProCurve 100/1000-T xl module J4821A

DEVICE 13 & 14	DESCRIPTIONS	
Company:	Hewlett Packard Corp.	Hewlett Packard Enterprise Company
Device Name:	ProCurve J9033A Blade	ProCurve Switch 2510-48 J9020A

DEVICE 15 & 16	DESCRIPTIONS	
Company:	Marvell Semiconductor Inc.	Nortel Networks
Device Name:	Yukon Supreme 88E8075 B1 NNC200	ERS 4548GT PWR

DEVICE 17 & 18	DESCRIPTIONS	
Company:	Nortel Networks	Panasonic Eco Solutions Networks, Co., Ltd.
Device Name:	IP Phone 1150E (NTYS06)	S16G

DEVICE 19 & 20	DESCRIPTIONS	
Company:	Panasonic Eco Solutions Networks, Co., Ltd.	Realtek Semiconductor Corp.
Device Name:	Panasonic Switch-M16eGPWR+ PN24160	RTL8111E

TEST SETUP

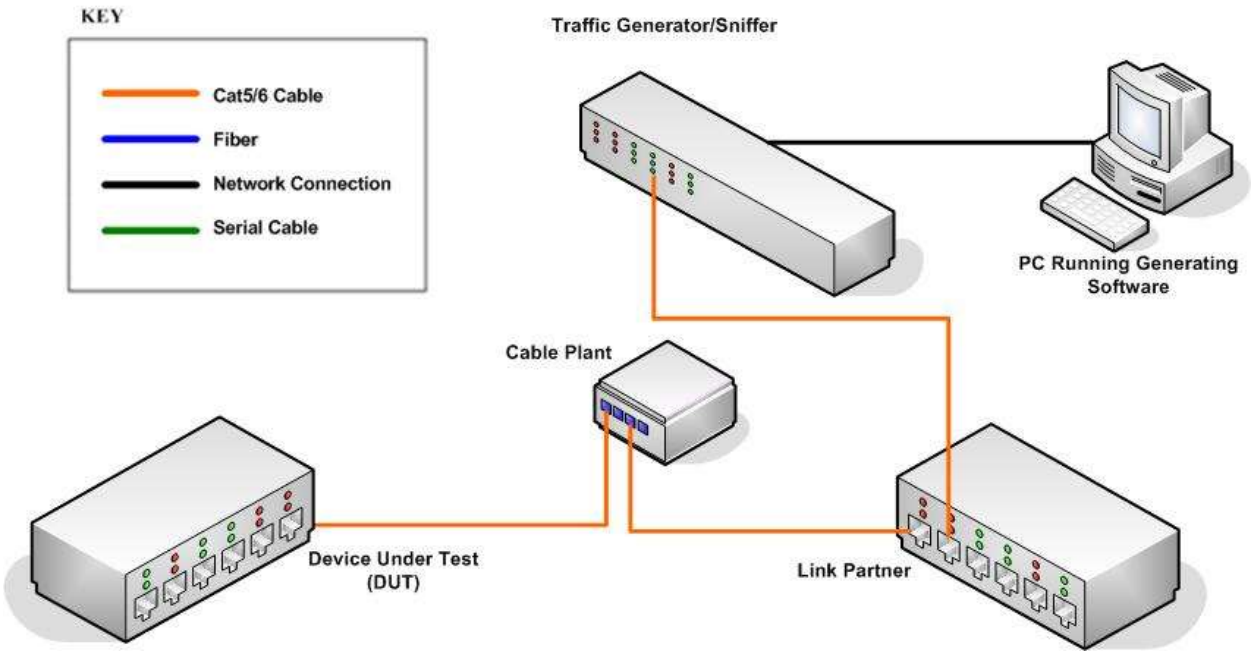


Figure 1 - Test Configuration

RESULTS

The following table contains all results from testing. Detailed test results including observed behaviors can be found in the DETAILED TEST RESULTS.

TEST NUMBER & LABEL	PART A	PART B	PART C
GROUP 1: LINK CONFIGURATION TESTS			
1.1.1 Point to Point Link Configuration	**PASS**	**PASS**	**PASS**
Test #1.1.2: Link Configuration and Powering for PoE	**N/A**	**N/A**	**-**
1.1.3: Direct Attached Cable or Pluggable Module Link Configuration	**N/A**	**N/A**	**-**
1.1.4: 100BASE-FX Link Up – Receiver	**N/A**	**N/A**	**-**
#1.1.5: 100BASE-FX Link Down – Receiver	**N/A**	**-**	**-**
GROUP 2: OPERATIONAL TESTS			
1.2.1: Packet Error Ratio Estimation	**PASS**	**-**	**-**
1.2.2: Endurance Stress Test	**PASS**	**-**	**-**
GROUP 3: EEE-RELATED TESTS			
1.3.1: Low-Power Idle Mode Interoperability	**N/A**	**-**	**-**

DETAILED TEST RESULTS

GROUP 1: Link Configuration Tests

1.1.1 POINT TO POINT LINK CONFIGURATION

Device	Part A1	Part A2	Part A3	Part B1	Part B2	Part C
3Com Corp. 3CR17250	PASS	PASS	PASS	N/A	N/A	PASS
3Com Corp. SuperStack II 4900	PASS	PASS	PASS	N/A	N/A	PASS
Avaya, Inc. 9670G Phone	PASS	PASS	PASS	N/A	N/A	PASS
Broadcom Corp. BCM56218	PASS	PASS	PASS	N/A	N/A	PASS
Broadcom Corp. BCM5650	PASS	PASS	PASS	N/A	N/A	PASS
Cisco Systems 7971G Phone	PASS	PASS	PASS	N/A	N/A	PASS
Cisco Systems C3560G-24TS	PASS	PASS	PASS	N/A	N/A	PASS
Cisco Systems CloudCR+ WS-X4648-RJ45V +E	PASS	PASS	PASS	N/A	N/A	PASS
Cisco Systems Inferno WS-X4548-GB-RJ45V	PASS	PASS	PASS	N/A	N/A	PASS
Dell, Inc. Power Connect 6224	PASS	PASS	PASS	N/A	N/A	PASS
Fujitsu Siemens Computers GmbH S266361-D2807	PASS	PASS	PASS	N/A	N/A	PASS
HP Procurve 100/1000-T xl module J4821A	PASS	PASS	PASS	N/A	N/A	PASS
HP Procurve J9033A Blade	PASS	PASS	PASS	N/A	N/A	PASS
HP ProCurve Switch 2510-48 J9020A	PASS	PASS	PASS	N/A	N/A	PASS
Marvell Semiconductor, Inc. Yukon Supreme 88E8075 B1 NNC200	PASS	PASS	PASS	N/A	N/A	PASS
Nortel Networks ERS 4548GT PWR	PASS	PASS	PASS	N/A	N/A	PASS
Nortel Networks IP Phone 1150E (NTYS06)	PASS	PASS	PASS	N/A	N/A	PASS
Panasonic Eco Solutions Networks, Co., Ltd. S16G	PASS	PASS	PASS	N/A	N/A	PASS
Panasonic Switch-M16eGPWR+ PN24160	PASS	PASS	PASS	N/A	N/A	PASS
Realtek Semiconductor Corp. RTL8111E	PASS	PASS	PASS	N/A	N/A	PASS

PURPOSE

To determine if the DUT establishes the best possible link with a reference set of stations under various startup configurations.

OBSERVED BEHAVIOR & ADDITIONAL COMMENTS

a. The DUT established an HCD link with the link partner and accepted the packets in all cases.
b. The DUT established a link with the link partner and accepted the packets in all cases.
c. The DUT established a link with the link partner and accepted the packets after each break and reconnection.

1.1.2 LINK CONFIGURATION AND POWERING FOR POE
OBSERVED BEHAVIOR & ADDITIONAL COMMENTS
a. This test is not applicable for Gigabit Ethernet Interoperability testing.

1.1.3 DIRECT ATTACHED CABLE OR PLUGGABLE MODULE LINK CONFIGURATION
OBSERVED BEHAVIOR & ADDITIONAL COMMENTS
a. This test is not applicable for Gigabit Ethernet Interoperability testing.

1.1.4 100BASE-FX LINK UP - RECEIVER
OBSERVED BEHAVIOR & ADDITIONAL COMMENTS
a. This test is not applicable for Gigabit Ethernet Interoperability testing.

1.1.5 100BASE-FX LINK DOWN - RECEIVER
OBSERVED BEHAVIOR & ADDITIONAL COMMENTS
a. This test is not applicable for Gigabit Ethernet Interoperability testing.

GROUP 2: Operational Tests

1.2.1 PACKET ERROR RATIO ESTIMATION

Device	High	Low
3Com Corp. 3CR17250	0	0
3Com Corp. SuperStack II 4900	0	0
Avaya, Inc. 9670G Phone	0	0
Broadcom Corp. BCM56218	0	0
Broadcom Corp. BCM5650	0	0
Cisco Systems 7971G Phone	0	0
Cisco Systems C3560G-24TS	0	0
Cisco Systems CloudCR+ WS-X4648-RJ45V +E	0	0
Cisco Systems Inferno WS-X4548-GB-RJ45V	0	0
Dell, Inc. Power Connect 6224	0	0
Fujitsu Siemens Computers GmbH S266361-D2807	0	0
HP Procurve 100/1000-T xl module J4821A	0	0
HP Procurve J9033A Blade	0	0
HP ProCurve Switch 2510-48 J9020A	0	0
Marvell Semiconductor, Inc. Yukon Supreme 88E8075 B1 NNC200	0	0
Nortel Networks ERS 4548GT PWR	0	0
Nortel Networks IP Phone 1150E (NTYS06)	0	0
Panasonic Eco Solutions Networks, Co., Ltd. S16G	0	0
Panasonic Switch-M16eGPWR+ PN24160	0	0
Realtek Semiconductor Corp. RTL8111E	0	0

PURPOSE

To determine if the DUT can exchange packets with a Link Partner such that the exchange of packets produces a packet error ratio that is low enough to meet a desired bit error ratio.

OBSERVED BEHAVIOR & ADDITIONAL COMMENTS

High: The DUT passed traffic with a passing BER.
Low: The DUT passed traffic with a passing BER.

1.2.2 ENDURANCE STRESS TEST	PARTS	RESULTS
64-byte frames	a	**PASS**
1518-byte frames	b	**PASS**

PURPOSE

To verify that no system errors occur when traffic is received at line rate for long periods of time.

OBSERVED BEHAVIOR & ADDITIONAL COMMENTS

a. The DUT forwarded at least one frame of a ten-minute burst of minimum IPG traffic and the additional frame without any system failures and/or errors.
b. The DUT forwarded at least one frame of a ten-minute burst of minimum IPG traffic and the additional frame without any system failures and/or errors.

Group 3: EEE-Related Tests

1.3.1 LOW-POWER IDLE MODE INTEROPERABILITY
OBSERVED BEHAVIOR & ADDITIONAL COMMENTS
a. This test is not applicable for Gigabit Ethernet Interoperability testing.

APPENDICES AND ERRATA

Appendix 1: CABLE PLANT SPECIFICATIONS

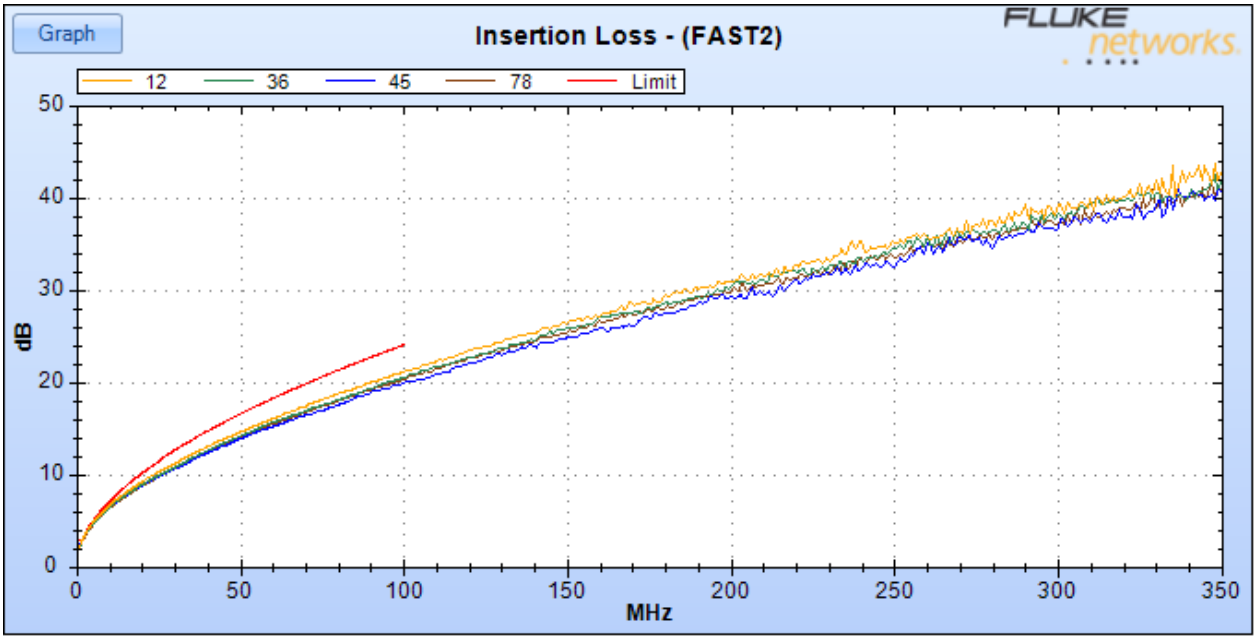
CAT 5 – TIA Cat 5 Ch Spec - Maximum Attenuation

Parameter	Pair	Channel-1
Propagation Delay (ns)	(1,2)	469.00
	(3,6)	468.00
	(4,5)	469.00
	(7,8)	473.00
Propagation Delay Skew (ns)	(1,2)	1.00
	(3,6)	0.00
	(4,5)	1.00
	(7,8)	5.00

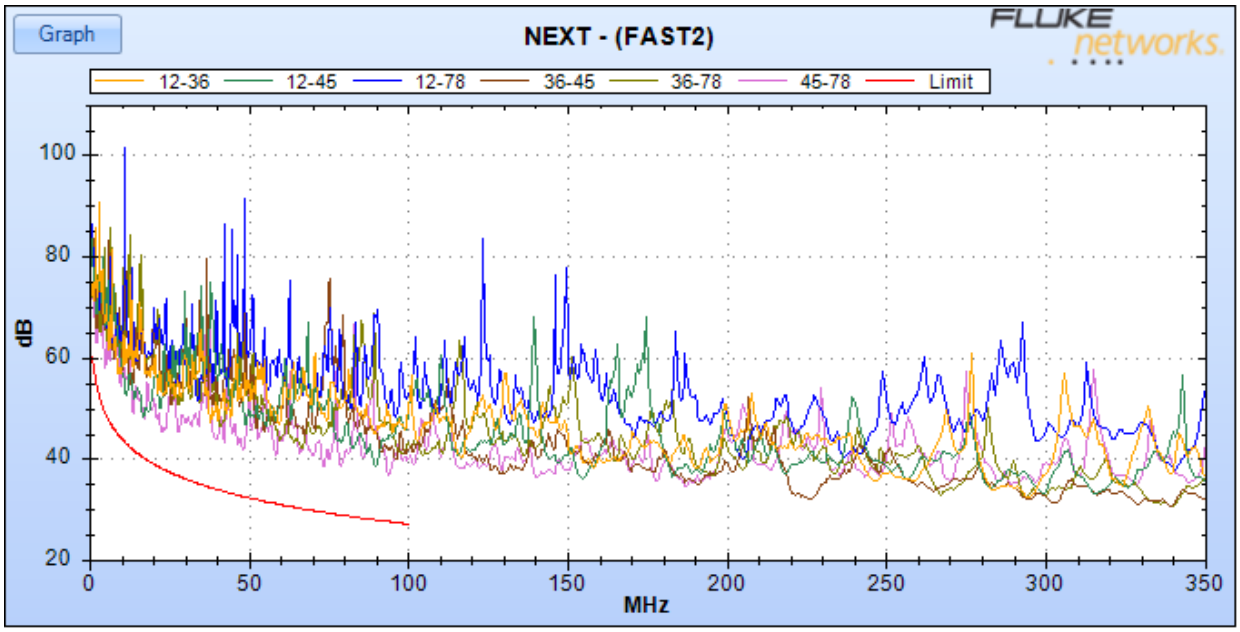
Parameter	Pair	Channel-1
Insertion Loss Margin (dB)	(1,2)	0.00
	(3,6)	0.10
	(4,5)	0.00
	(7,8)	0.10
Return Loss Margin (dB)	(1,2)	5.90
	(3,6)	6.40
	(4,5)	3.70
	(7,8)	4.00
Return Loss @ Remote Margin (dB)	(1,2)	4.00
	(3,6)	5.50
	(4,5)	1.70
	(7,8)	4.50

Parameter	Generator-Receptor	Channel-1
NEXT Margin (dB)	(1, 2)-(3, 6)	11.90
	(1, 2)-(4, 5)	8.20
	(1, 2)-(7, 8)	15.80
	(3, 6)-(4, 5)	11.30
	(3, 6)-(7, 8)	12.10
	(4, 5)-(7, 8)	7.30
NEXT @ Remote Margin (dB)	(1, 2)-(3, 6)	11.70
	(1, 2)-(4, 5)	13.60
	(1, 2)-(7, 8)	15.20
	(3, 6)-(4, 5)	9.10
	(3, 6)-(7, 8)	13.40
	(4, 5)-(7, 8)	9.40

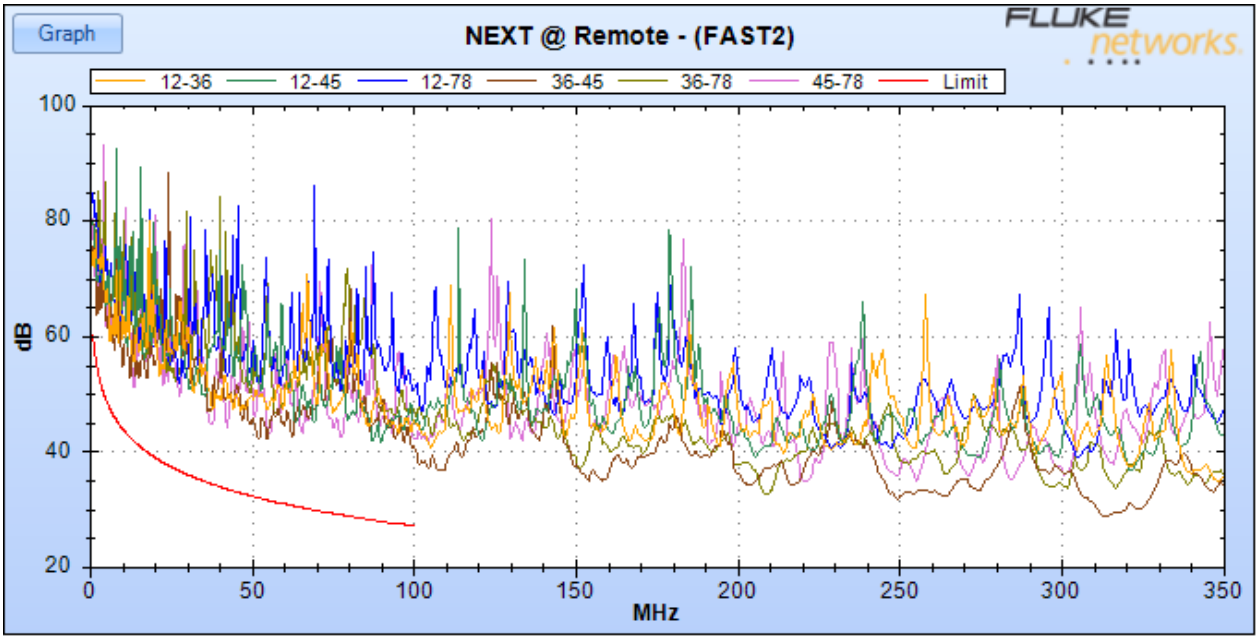
CAT 5 – TIA Cat 5 Ch Spec @ Maximum Attenuation - Attenuation Plot
X-Axis Frequency (MHz), Y-Axis Attn (dB)



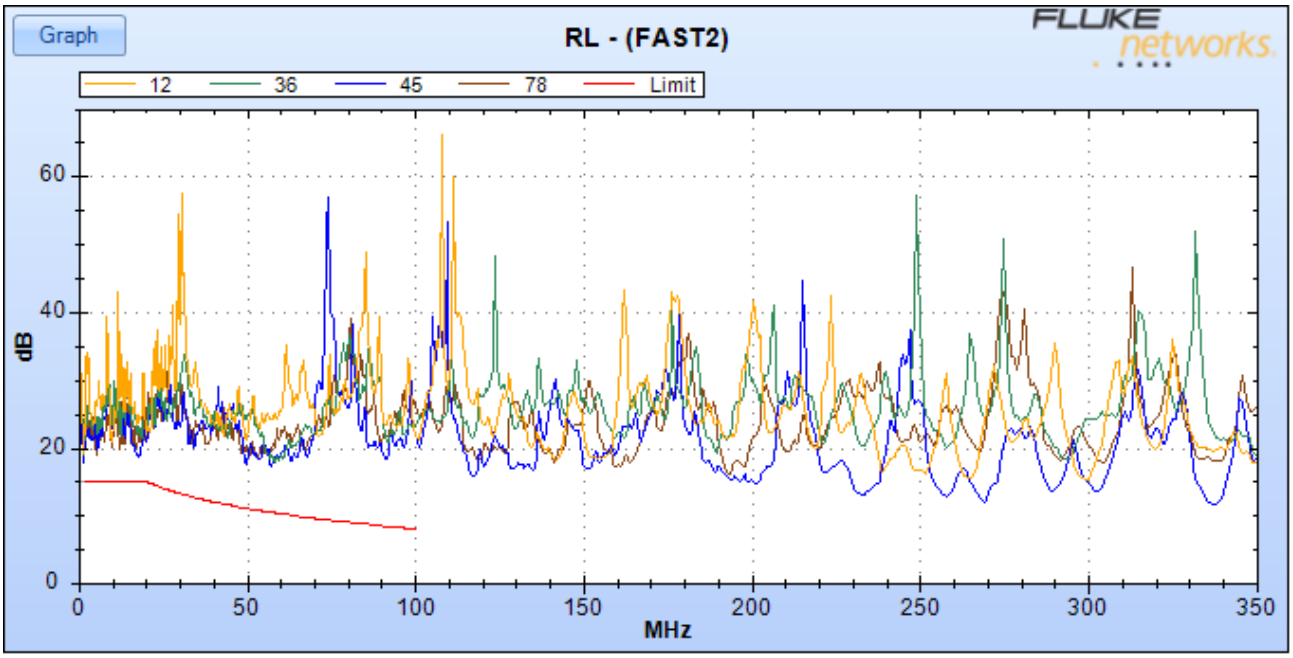
CAT 5 – TIA Cat 5 Ch Spec @ Maximum Attenuation - Near End Cross Talk
X-Axis Frequency (MHz), Y-Axis NEXT (dB)



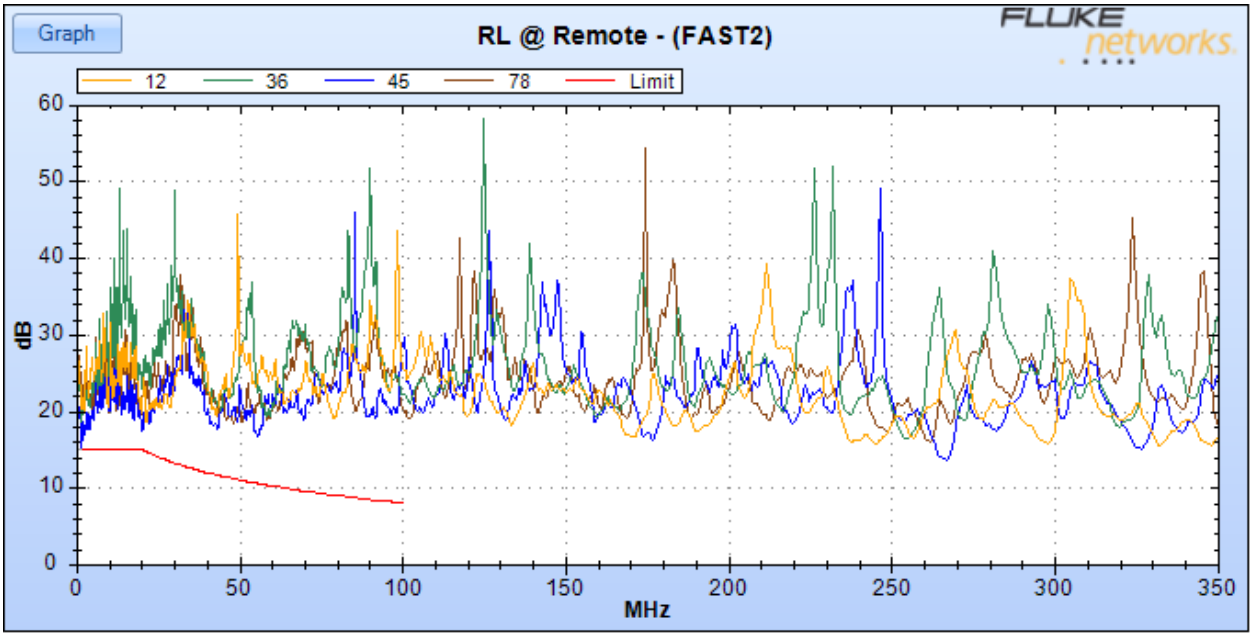
CAT 5 – TIA Cat 5 Ch Spec @ Maximum Attenuation - Near End Cross Talk @ Remote
X-Axis Frequency (MHz), Y-Axis NEXT (dB)



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)



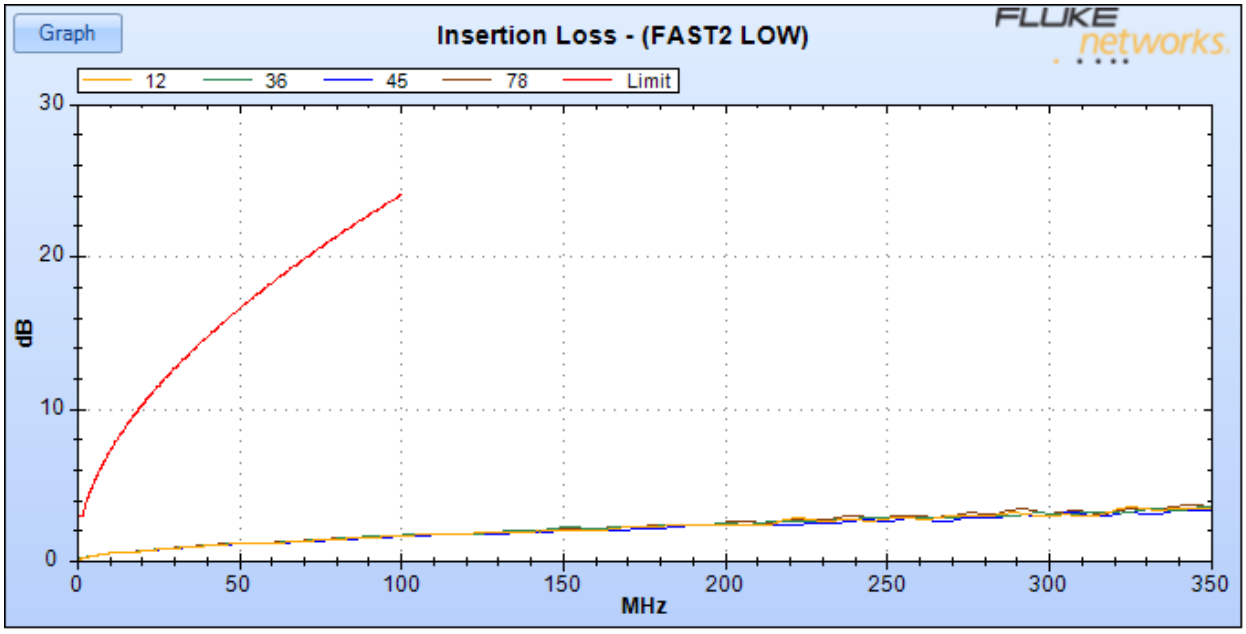
CAT 5 – TIA Cat 5 Ch Spec - Low Attenuation

Parameter	Pair	Channel-1
Propagation Delay (ns)	(1,2)	28.00
	(3,6)	28.00
	(4,5)	29.00
	(7,8)	27.00
Propagation Delay Skew (ns)	(1,2)	1.00
	(3,6)	1.00
	(4,5)	2.00
	(7,8)	0.00

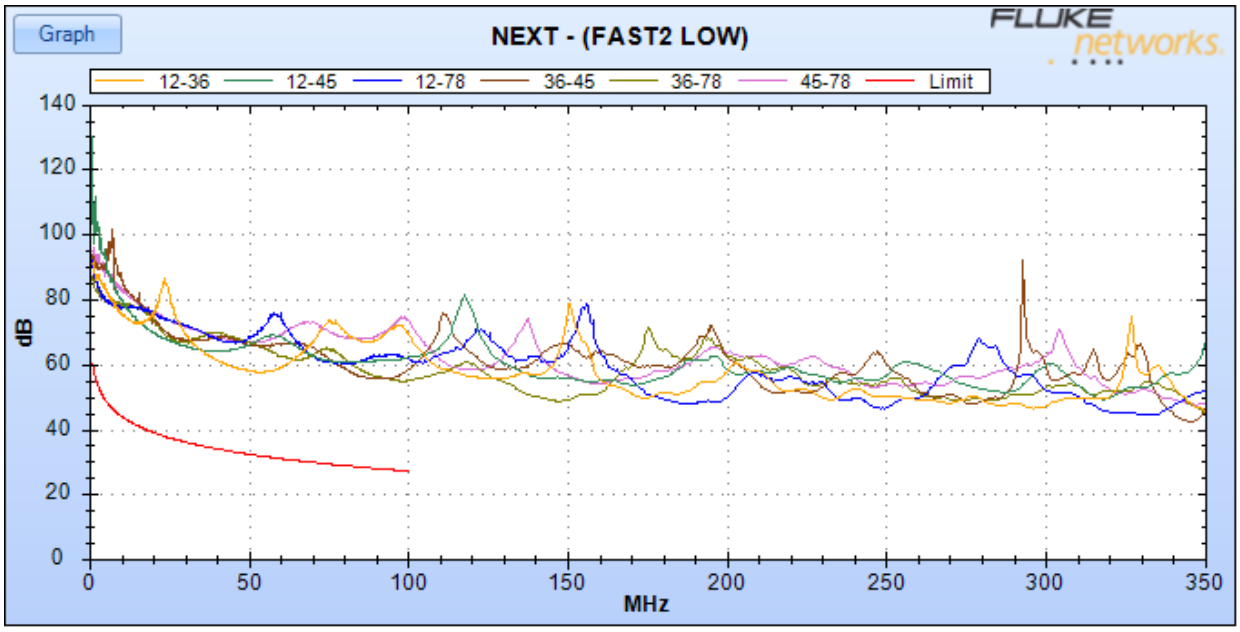
Parameter	Pair	Channel-1
Insertion Loss Margin (dB)	(1,2)	2.80
	(3,6)	2.80
	(4,5)	2.80
	(7,8)	2.80
Return Loss Margin (dB)	(1,2)	11.20
	(3,6)	11.30
	(4,5)	11.40
	(7,8)	11.50
Return Loss @ Remote Margin (dB)	(1,2)	12.30
	(3,6)	11.00
	(4,5)	11.50
	(7,8)	10.80

Parameter	Generator-Receptor	Channel-1
NEXT Margin (dB)	(1, 2)-(3, 6)	25.60
	(1, 2)-(4, 5)	29.30
	(1, 2)-(7, 8)	29.10
	(3, 6)-(4, 5)	27.50
	(3, 6)-(7, 8)	26.40
	(4, 5)-(7, 8)	33.90
NEXT @ Remote Margin (dB)	(1, 2)-(3, 6)	25.90
	(1, 2)-(4, 5)	29.00
	(1, 2)-(7, 8)	29.40
	(3, 6)-(4, 5)	28.30
	(3, 6)-(7, 8)	26.80
	(4, 5)-(7, 8)	32.40

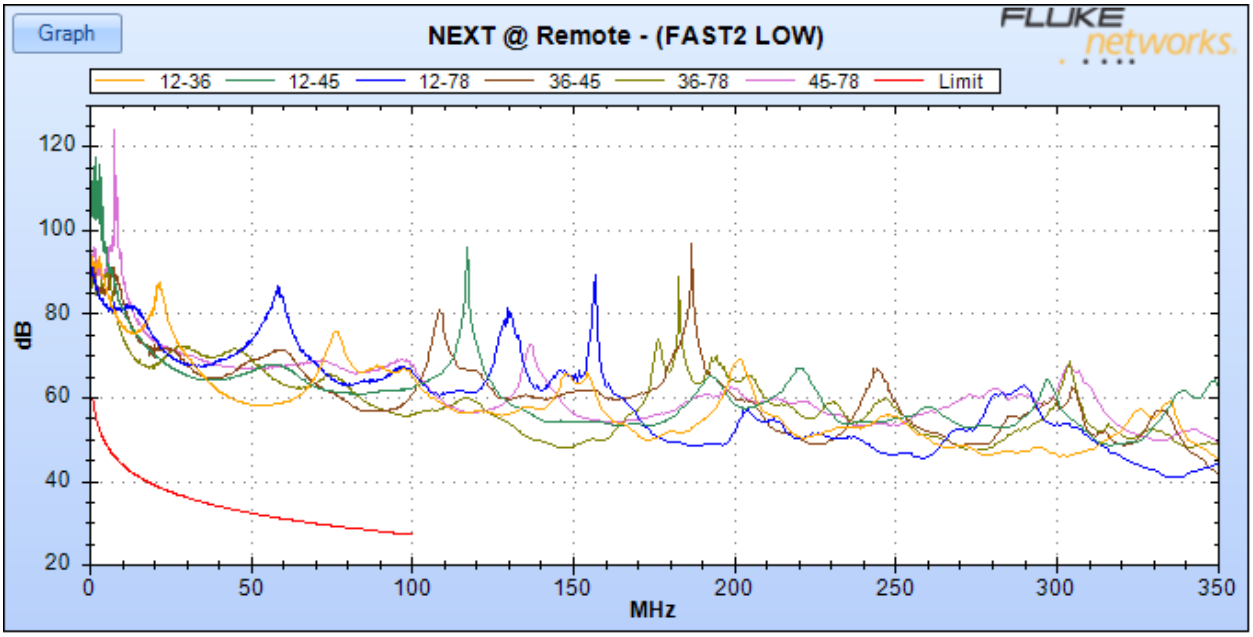
CAT 5 – TIA Cat 5 Ch Spec @ Low Attenuation - Attenuation Plot
X-Axis Frequency (MHz), Y-Axis Attn (dB)



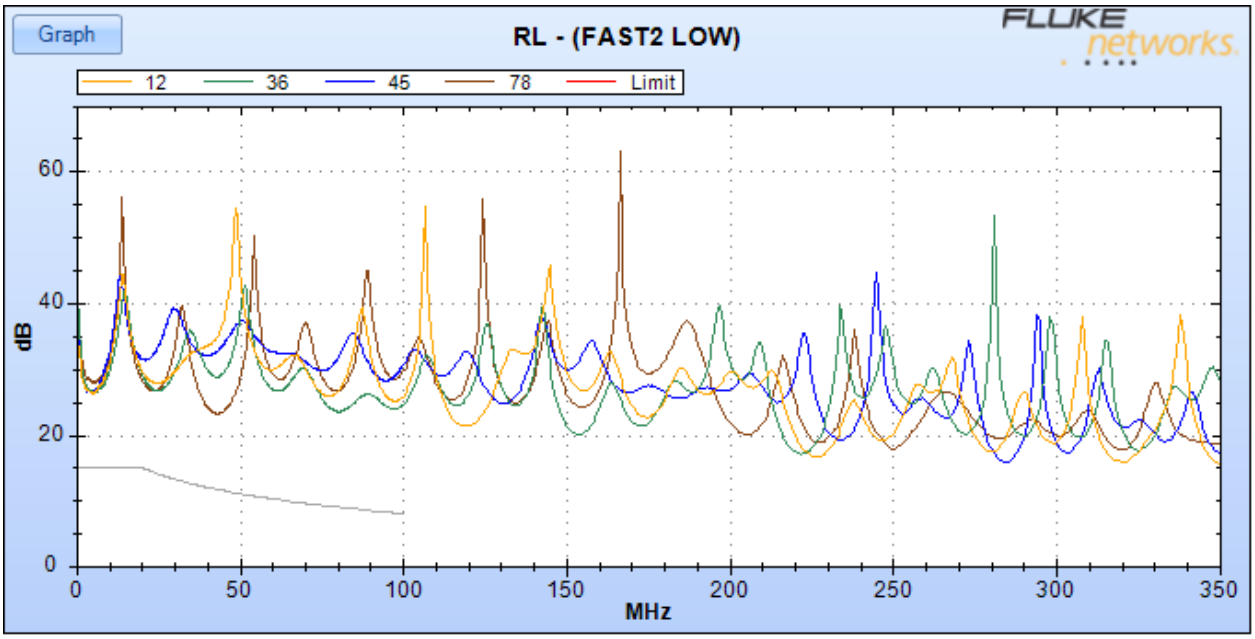
CAT 5 – TIA Cat 5 Ch Spec @ Low Attenuation - Near End Cross Talk
X-Axis Frequency (MHz), Y-Axis NEXT (dB)



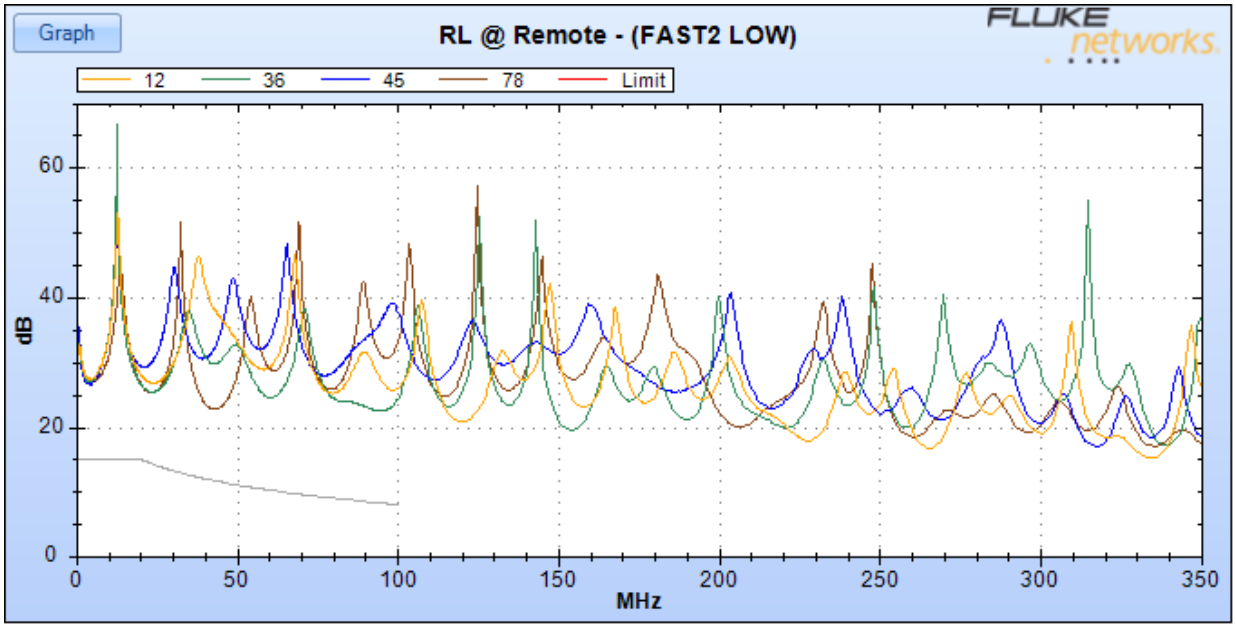
CAT 5 – TIA Cat 5 Ch Spec @ Low Attenuation - Near End Cross Talk @ Remote
X-Axis Frequency (MHz), Y-Axis NEXT (dB)



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)



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 program 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.

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