



# 10 Gigabit Ethernet Consortium

## Optical Interoperability Test Suite version 1.0

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UNH-IOL — 121 Technology Drive, Suite 2 — Durham, NH 03824 — +1-603-862-0090  
10 Gigabit Ethernet Consortium — [10geclab@iol.unh.edu](mailto:10geclab@iol.unh.edu) — +1-603-862-0205

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Guy Ergas  
Mellanox Technologies, Inc.

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Enclosed are the results from the Optical Interoperability testing performed on:

Device Under Test (DUT):	Mellanox SwitchX with MFM1T02A-SR optical module
UNH-IOL Device ID #:	GE-MELLOX-0000017073
Hardware Version:	N/A
Firmware Version:	N/A
Software Version:	N/A
Miscellaneous:	Ports 1 and 2.

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

[ftp://ftp.iol.unh.edu/pub/10gec/10GEC\\_Optical\\_Interop\\_test\\_suite\\_v1.0.pdf](ftp://ftp.iol.unh.edu/pub/10gec/10GEC_Optical_Interop_test_suite_v1.0.pdf)

There were no interoperability issues observed while testing the DUT. For further information please see the detailed test results.

Testing Completed 11/15/2012

Review Completed 12/01/2012

Kyle P. Zarick  
[kzarick@iol.unh.edu](mailto:kzarick@iol.unh.edu)

Jeffrey Lapak  
[jrlapak@iol.unh.edu](mailto:jrlapak@iol.unh.edu)

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## Result Key

The following table contains possible results and their meanings:

Result	Interpretation
<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.

## Revision History

The following table contains a revision history for the report\

Revision	Explanation
<b>1.0</b>	Initial version

### **Comments on Test Procedure:**

In the case of a multiport device, testing is performed on the lowest numbered port that supports the requested technology. Please note that this port may not be an accurate representation of the remaining ports.

### **Test #1 Link Configuration**

*Case 1:* 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. Traffic is then sent from one of the two devices and checked at the other end for correct reception. Additionally, the devices are disconnected and reconnected several times. Refer to the following tables for further information regarding the results of this test.

*Case 2:* This test entails power cycling both the link partner and the DUT with the devices connected during power up; however the DUT is brought to a fully operational state before turning the link partner 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 3:* This test mimics Case 2 except that the link partner is turned on before the DUT. Refer to the following tables for further information regarding the results of this test.

*Case 4:* This test entails power cycling both the link partner and the DUT with the DUT's pluggable transceiver removed during power up. When the DUT and Link Partner are brought to a fully operational state, plug in the DUT's transceiver. Verify that a link has been established between the two devices and that traffic can be transmitted in both directions. Repeat this test with the Link Partner's transceiver if applicable. Refer to the following tables for further information regarding the results of this test.

*Case 5:* This test entails power cycling both the link partner and the DUT. When the DUT and Link Partner are brought to a fully operational state, confirm a valid link and transmit traffic in both directions. Remove the DUT's transceiver and then reinsert the transceiver shortly after. Verify that a link has been established between the two devices and that traffic can be transmitted in both directions. Repeat this test with the Link Partner's transceiver if applicable. Refer to the following tables for further information regarding the results of this test.

### **Test #2 Packet Error Ratio Estimation**

The two devices are connected to each end of a 10km channel with a short fiber optic cable. A number of ICMP echo requests (Refer to the 10 Gigabit Ethernet Optical Interoperability Test Suite: Table 2) 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.

### **Test #3 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 1 billion 1518-byte ICMP echo requests at minimum IPG. 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 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 10km reference channel
- The optical power measured at the receiver of the DUT and link partner after the 10km reference channel.

**Test Results**

Switches/Routers Tested	Test 1 Link Configuration					Test 2: BER Est.		Receiver Power	
	Case 1	Case 2	Case 3	Case 4	Case 5	1518-byte	Length	DUT	Link Partner
Arastra DCS-7124S w/ Fiberxon FTM-811XC-L03DG 10G SFP+	PASS	PASS	PASS	PASS	PASS	0	279m	-6.24	-5.38
Avaya 7024XLS w/ Avaya FNSRMYAJ502BR 10G SFP+	PASS	PASS	PASS	PASS	PASS	0	279m	-6.65	-4.77
Cisco Nexus 5548P w/ Cisco 12344416C 10G SFP+	PASS	PASS	PASS	PASS	PASS	0	279m	-6.54	-5.55
Extreme 10G4Xa w/ Extreme TRF2000EN-LF170 10G XFP	PASS	PASS	PASS	PASS	PASS	0	279m	-6.78	-4.78
Nortel 4526 w/ Intel USC203SU10 10G XFP	PASS	PASS	PASS	PASS	PASS	0	279m	-6.99	-4.88
Nortel 5530-24TFD w/ Intel USC203SU10 10G XFP	PASS	PASS	PASS	PASS	PASS	0	279m	-6.35	-5.45
Procurve 3500 w/ HP ProCurve J9150A 10G SFP+	PASS	PASS	PASS	PASS	PASS	0	279m	-6.55	-4.34
ProCurve 5406 w/ HP ProCurve J9150A 10G SFP+	PASS	PASS	PASS	PASS	PASS	0	279m	-6.31	-5.44

10GBASE NICs Tested	Test 1 Link Configuration					Test 2: BER Est.		Receiver Power	
	Case 1	Case 2	Case 3	Case 4	Case 5	1518-byte	Length	DUT	Link Partner
Sunwave NIC w/ Intel MYBG69N8OU 10G XFP	PASS	PASS	PASS	PASS	PASS	0	279m	-6.87	-7.22
Mellanox NIC w/ Avaya FNSRMYAJ5020E 10G SFP+	PASS	PASS	PASS	PASS	PASS	0	279m	-6.45	-7.45

Test # and Label	Part(s)	Result(s)
<b>Test 3 – Endurance Stress Test</b>	<b>a</b>	<b>Informative</b>
<b>Expected Results and Procedural Comments</b>		
<p>The DUT is attached to a sourcing station that is capable of sending an appropriate number of 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.</p>		
<b>Comments on Test Results</b>		
<p>While passing 1 billion 64-byte frames with a minimum IFG, the DUT did not show any system failures. The DUT responded appropriately to all 64-byte frames.</p> <p>While passing 1 billion 1518-byte frames with a minimum IFG, the DUT did not show any system failures. The DUT responded appropriately to all 1518-byte frames.</p>		



## **ANNEX A: TEST SETUP**

### **Test Equipment**

The following test equipment was used in performing all Interoperability testing:

<b>Testing Equipment</b>	<b>Brand and Version Information</b>
Software	SmartWindows v8.0, UNH-IOL Packet Generator software v3.6a
Traffic Generator	SMB 6000 Chassis 10Gigabit Ethernet Module
Fiber Power Meter	Fluke FM150

### **Test Configuration**

For the possible test configurations, refer to Figures 1-1 through 1-3 in the Interoperability Test Suite.

