


TEST REPORT IEC 60950-1: 2005 (2nd Edition) Information technology equipment – Safety – Part 1: General requirements	
Report Reference No.	30880025.007
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CB Testing Laboratory	TUV Rheinland of North America, Inc.
Address	1279 Quarry Lane, Ste. A, Pleasanton, CA 94566
Applicant's name	Myricom, Inc.
Address	325 N. Santa Anita Ave., Arcadia CA 91006
Manufacturer's name	Myricom, Inc.
Address	Myricom, Inc., 325 N. Santa Anita Ave., Arcadia CA 91006
Factory's name	Myricom, Inc.
Address	Myricom, Inc., 325 N. Santa Anita Ave., Arcadia CA 91006
Test specification:	
Standard	<input checked="" type="checkbox"/> IEC 60950-1:2005 (2nd Edition) (Information technology equipment – Safety –Part1: General requirements)
Test procedure	CB
Non-standard test method	N/A
Test Report Form No.	IECEN60950_1C
Test Report Form(s) Originator	SGS Fimko Ltd
Master TRF	Dated 2007-06
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Test item description	LAN Switch
Trade Mark	
Manufacturer	Myricom, Inc., 325 N. Santa Anita Ave., Arcadia CA 91006
Model/Type reference	10G-21U-CLOS-ENCL, 10G-21U-EDGE-ENCL, 10G-12U-CLOS-ENCL,

Ratings.....:	Input: 100-240V, 50/60 Hz, 10A-5A (rating per input, up to 4 inputs)
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General remarks:

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

"(See Enclosure #)" refers to additional information appended to the report.

"(See appended table)" refers to a table appended to the report.

Note: This TRF includes EN Group Differences together with National Differences and Special National Conditions, if any. All Differences are located in the Appendix to the main body of this TRF.

Throughout this report a comma (point) is used as the decimal separator.

General product information:

This test report is Amendment 2 to the original CB-report with document number 30880025.001 and the first amendment CB report 30880025.004 and covers the addition of new line cards 10G-THRU-16Q, 10G-THRU-8M8ER, 10G-THRU-16WQP, 10G-SW32LC-16QP, 10G-S SW32LC-16ES, 10G-SW32LC-16EM. Each line card uses less power than line cards that have already been evaluated for the original report and subsequent amendment so no testing was performed as part of this investigation and the new line cards have been evaluated on a constructional basis only. Critical components within the line cards being added include Certified Class 1 lasers only.

The product covered in this test report are LAN Switches with the model numbers: 10G-21U-CLOS-ENCL, 10G-21U-EDGE-ENCL, 10G-12U-CLOS-ENCL, 10G-12U-SPINE-ENCL, 10G-7U-CLOS-ENCL and 10G-7U-SPINE-ENCL. The LAN Switch product comes with six different configuration codes: 10G-21U-CLOS-ENCL has the CLOS backplane boards, which accept eight 10G-2SW32LC line cards in the middle, one 10G-MONITOR-B in the top, and nearly any combination of the other line cards in the other slots. The 10G-21U-EDGE-ENCL has one 10G-MONITOR-B in the top, and the other slots accepts nearly any combination of the other line cards, excluding the 10G-2SW32LC line card (For details of line cards, see critical components list table 1.5.1). The 12U and 7U configurations are similar in functional configuration with the differences being the 12U is a smaller chassis intended for use with 2-4 power supplies and the 7U is a still smaller chassis intended for use with 1-2 power supplies. The 12U configuration was tested per this investigation and it was determined via the test results and inspection that the data taken for the 21U is representative of the 12U and 7U and as such the previously-measured 21 test results are applied to this report amendment.

The enclosures contain a metal chassis, up four approved power supplies (different for each model), approved DC fans, a backplane, AC-Inlet/Filter and interface cards, which are all interchangeable. Model No. 10G-21U-CLOS-ENCL is a '21U high, 41-slot enclosure for switch networks up to 512 ports' located on the rear panel of the unit. These ports are connected to copper and fiber cables and there is no power available on these ports. All signals are AC coupled through 470pF capacitors

During the testing the maximum power was generated by using resistive loads. Due to the expenses of each individual card, a low-cost test configuration with these resistive loads cards generating 200W of power was used for the temperature rise measurement and abnormal fault conditions.

It should be noted that for the final configuration of the LAN Switches each individual card has two redundant temperature sensors which control the power to a card (thermal cut-out / power off at 60°C). Also, the four DC fans at the back-side of the products are speed-adjustable depending on the temperature inside the LAN Switch enclosure. Individual temperature sensors are located on each line card and each fan controller PCB

Model 10G-21U-CLOS-ENCL is intended to be fully operational with a minimum of three power supplies only. However, the four power supply configuration is intended for triple-AC systems(where there are three different sources of AC

power), and the enclosure will continue to run will continue to run with one AC off and one power supply down. The unit contains; four fans, four power supplies and thirty cards – mixed.

There are no connections to a Telecommunication Network (TNV).

CDRH-Report for Optical Transceiver has to be provided by customer for US Approval.

During the testing the maximum power was generated by using resistive loads. Due to the expenses of each individual card a low-cost test configuration with these resistive load cards, generating 200W of power, was used for the temperature rise measurements and abnormal fault conditions.

Conditions of Acceptability:

1. This unit is considered to operate under the conditions of:
 - Pollution Degree 2: Not sealed, not subjected to dust, dirt, and condensation
 - Equipment mobility: Rack mounted / fixed
2. Rated ambient of 40°C at maximum rated load

Testing procedure and testing location:	
<input checked="" type="checkbox"/> CB/CCA Testing Laboratory:	Testing location/ address.....: TUV Rheinland of North America, Inc. 1279 Quarry Lane, Ste. A, Pleasanton, CA 94566
<input type="checkbox"/> Associated CB Laboratory:	N/A Testing location/ address.....:
Tested by (name + signature)..... : Stephen Ross	
Approved by (+ signature) : Uwe Meyer	
<input type="checkbox"/> Testing procedure: TMP	N/A Tested by (name + signature)..... : Approved by (+ signature) : Testing location/ address.....:
<input type="checkbox"/> Testing procedure: WMT	N/A Tested by (name + signature)..... : Witnessed by (+ signature) : Approved by (+ signature) : Testing location/ address.....:
<input type="checkbox"/> Testing procedure: SMT	N/A Tested by (name + signature)..... : Approved by (+ signature) : Supervised by (+ signature)..... : Testing location/ address..... :
<input type="checkbox"/> Testing procedure: RMT	N/A Tested by (name + signature)..... : Approved by (+ signature) : Supervised by (+ signature)..... : Testing location/ address.....:

Summary of testing:	
Tests performed (name of test and test clause): = no testing performed for this amendment =	Testing location: TÜV Rheinland of North America, Inc. 1279 Quarry Lane, Ste. A, Pleasanton, CA 94566
Summary of compliance with National Differences: Comments: <u>Summary of compliance with National Differences (for explanation of codes see below):</u> AT, CA (temporary differences), DE, DK, FI, FR, GB, IT, JP, KR, NL, NO, PL, SE, SI, US (temporary differences). <u>and Group Differences as listed at the end of this test report</u> <u>Explanation of Codes:</u> <i>AT=Austria, CA-Canada, DE=Germany, DK=Denmark, FI=Finland, FR=France, GB=United Kingdom, IT=Italy, JP=Japan, KR=Korea, NL=The Netherlands, NO=Norway, PL=Poland, SE=Sweden, SI=Slovenia, US=United States</i>	
The following Attachments are integral part of this test report: = no attachments for this amendment =	

Test item particulars	
Equipment mobility	<input type="checkbox"/> movable <input type="checkbox"/> hand-held <input type="checkbox"/> transportable <input checked="" type="checkbox"/> stationary <input type="checkbox"/> for building-in <input type="checkbox"/> direct plug-in
Connection to the mains.....	<input type="checkbox"/> pluggable equipment <input type="checkbox"/> type A <input type="checkbox"/> type B <input type="checkbox"/> permanent connection <input checked="" type="checkbox"/> detachable power supply cord <input type="checkbox"/> non-detachable power supply cord <input type="checkbox"/> not directly connected to the mains
Operating condition	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> rated operating / resting time:
Access location	<input checked="" type="checkbox"/> operator accessible <input type="checkbox"/> restricted access location
Over voltage category (OVC)	<input type="checkbox"/> OVC I <input checked="" type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input type="checkbox"/> other:
Mains supply tolerance (%) or absolute mains supply values	
Tested for IT power systems	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
IT testing, phase-phase voltage (V)	230V
Class of equipment	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III <input type="checkbox"/> Not classified
Considered current rating (A)	
Pollution degree (PD)	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
IP protection class	IPX0
Altitude during operation (m)	2000 m
Altitude of test laboratory (m)	2000 m
Mass of equipment (kg)	98kg
Possible test case verdicts:	
- test case does not apply to the test object.....	N/A
- test object does meet the requirement.....	P (Pass)
- test object does not meet the requirement.....	F (Fail)
Testing	
Date of receipt of test item	N/A
Date(s) of performance of tests	N/A <i>[constructional check only, all test data is based on previously issued reports 30880025.001 and 30880025.004, all changes per this amendment are either non-safety critical or editorial in nature only]</i>

1	GENERAL	P
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1.5	Components		P
1.5.1	General	Complies	P
	Comply with IEC 60950-1 or relevant component standard	Refer to appended table 1.5.1 (list of critical components)	P
1.5.2	Evaluation and testing of components	All safety critical components are certified. All components are used within their specified ratings, plastic materials, PCBs and wiring materials are UL listed, non-certified components were tested according to this standard.	P

1.5.1	TABLE: List of critical components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity ¹	
1.) Power Supply (up to 4 each)	Astec	DS850-3	Input: 100-240, 50/60Hz, 10A; Output: +12V/70A, +3.3V/6A	IEC/EN/UL60950-1 UL 1449 (VDR's)	CSA, cULus, TUV	
2.) DC Fan (up to 8 each)	Delta	FFB1212EHE-F00	12VDC 3.0A – 5.38 m ³ /min	IEC/EN/UL 60950-1	VDE, CE, UL, CSA	
3.) DC Fan Controller board	Myricom	05-2896	Minimum flammability rating: V-0,	UL94	UL	

4.) Internal wiring	Various	Various	Rated 600V, 105°C, flammability rating minimum VW-1 4 wire gage type 10070 from output power distribution board to the power back plane bus bars (2 cables;3 feet long) +/-12V. Wire gages for line/neutral/safety ground: type "1015" wire , 18ga for +12/- Back plane to signal/power/fans to backplane 18 ga to 24 ga .	--	UL
5.) Cards	Myricom	10G-Monitor –B	Minimum flammability rating:V-0	UL94	UL
6.) Cards	Myricom	10G-SW32LC-16M	Minimum flammability rating:V-0	UL94	UL
7.) Cards	Myricom	10G-THRU-16M	Minimum flammability rating:V-0	UL94	UL
8.) Cards	Myricom	10G-SW32LC-16Q	Minimum flammability rating:V-0	UL94	UL
9.) Cards	Myricom	10G-THRU-16Q	Minimum flammability rating:V-0	UL94	UL
10.) Cards	Myricom	10G-SW32LC-8Q8ER	Minimum flammability rating:V-0	UL94	UL
11.) Cards	Myricom	10G-THRU-8Q8ER	Minimum flammability rating:V-0	UL94	UL
12.) Cards	Myricom	10G-SW32LC-8M8ER	Minimum flammability rating:V-0	UL94	UL
13.) Cards	Myricom	10G-THRU-8M8ER	Minimum flammability rating:V-0	UL94	UL
14.) Cards	Myricom	10G-SW32LC-8M8EM	Minimum flammability rating:V-0	UL94	UL
15.) Cards	Myricom	10G-THRU-8M8EM	Minimum flammability rating:V-0	UL94	UL
16.) Cards	Myricom	10G-SW32LC-16QP	Minimum flammability rating:V-0	UL94	UL

17.) Cards	Myricom	10G-THRU-16QP	Minimum flammability rating:V-0	UL94	UL
18.) Cards	Myricom	10G-SW32LC-8QP8ER	Minimum flammability rating:V-0	UL94	UL
19.) Cards	Myricom	10G-SW32LC-16ES	Minimum flammability rating:V-0	UL94	UL
20.) Cards	Myricom	10G-SW32LC-16EM	Minimum flammability rating:V-0	UL94	UL
21.) Cards	Myricom	10G-2SW32LC	Minimum flammability rating:V-0	UL94	UL
22.) Cards	Myricom	10G-FAN v1.0	Minimum flammability rating:V-0	UL94	UL
23.) Backplane left	Myricom	10G-21U-CLOS	Minimum flammability rating:V-0	UL94	UL
24.) Backplane right	Myricom	10G-21U-CLOS	Minimum flammability rating:V-0	UL94	UL
25.) Backplane left	Myricom	10G-21U-EDGE	Minimum flammability rating:V-0	UL94	UL
26.) Backplane right	Myricom	10G-21U-EDGE	Minimum flammability rating:V-0	UL94	UL
27.) Backplane left	Myricom	10G-12U-CLOS	Minimum flammability rating:V-0	UL94	UL
28.) Backplane right	Myricom	10G-12U-CLOS	Minimum flammability rating:V-0	UL94	UL
29.) Backplane left	Myricom	10G-12U-EDGE	Minimum flammability rating:V-0	UL94	UL
30.) Backplane right	Myricom	10G-12U-EDGE	Minimum flammability rating:V-0	UL94	UL
31.) Backplane left	Myricom	10G-7U-CLOS	Minimum flammability rating:V-0	UL94	UL
32.) Backplane right	Myricom	10G-7U-CLOS	Minimum flammability rating:V-0	UL94	UL
33.) Backplane left	Myricom	10G-7U-EDGE	Minimum flammability rating:V-0	UL94	UL
34.) Backplane right	Myricom	10G-7U-EDGE	Minimum flammability rating:V-0	UL94	UL
35.)Power Cord (U.K.)	Voalex	2922	250V, 10A, 13A fuse, 1mm2	--	ASTA, BSI

36.) Power Cord (Germany / Europe)	Volex or equivalent	17850 or equivalent	Rating: 300V, 10A, 1.0mm ²	--	VDE, N, FI, S, D, I
37.) Power Cord (U.S.)	Volex	17504	125V, 15A, 14 AWG	--	UL, CSA
38.) Power Cord (Japan)	Feller	5330-440	125V, 15A, 2.0mm ²	--	DENTORI
39.) Transceiver (10G-SW32LC-16Q/ 10G-THRU-16Q/ 10G-SW32LC-8Q8ER/ 10G-THRU-8Q8ER)	Zarlink	ZL60304-MKDA	Class I M laser	IEC/EN 60825-1	TUV, UL
40.) Transceiver (10G-SW32LC-8Q8ER/ 10G-THRU-8Q8ER/ 10G-SW32LC-16Q/ 10G-THRU-16Q)	Avago	HFBR-7934EHZ	Class I M laser	IEC/EN 60825-1	TUV, UL
41.) Transceiver (10G-SW32LC-8M8ER/ 10G-THRU-8M8ER/ 10G-SW32LC-8Q8ER/ 10G-THRU-8Q8ER/ 10G-SW32LC-8QP8ER)	Finisar	FLTX8511D3	Class I M laser	IEC/EN 60825-1	TUV, UL
42.) Transceiver (10G-SW32LC-8M8ER/ 10G-THRU-8M8ER/ 10G-SW32LC-8Q8ER/ 10G-THRU-8Q8ER/ 10G-SW32LC-8QP8ER)	Finisar	FTLX1411D3	Class I M laser	IEC/EN 60825-1	TUV, UL

43.) Transceiver (10G-SW32LC-8M8ER/ 10G-THRU-8M8ER/ 10G-SW32LC-8Q8ER/ 10G-THRU-8Q8ER/ 10G-SW32LC-8QP8ER)	Finisar	FTLX1412D3BCL	Class I laser	EN 60825-1 EN 60825-2 EN 60950-1 CSA 60950-1-03 CDRH	TUV, CSA, FDA
44.) Transceiver (10G-SW32LC-8QP8ER/ 10G-SW32LC-16QP/ 10G-THRU-16QP)	Zarlink	ZL60505MJDA	Class I M laser	IEC/EN 60825-1	TUV, UL
45.) Transceiver (10G-SW32LC-16ES)	Finisar	FTLX8571D3BCL	Class I laser	EN 60825-1 EN 60825-2 EN 60950-1 CDRH	TUV, FDA
46.) Transceiver (10G-SW32LC-16ES)	Finisar	FTLX1471D3BCL	Class I laser	EN 60825-1 EN 60825-2 EN 60950-1 CDRH	TUV, FDA
47.) Transceiver (10G-SW32LC-8QP8ER/ 10G-SW32LC-16QP/ 10G-THRU-16QP)	Tyco Electronics	1985554-x 1985861-x 1-198554-0 1-1985861-0 1-1985861-1	Class I M laser	EN 60825-1 EN 60825-2 EN 60950-1 CSA 60950-1-03 CDRH	TUV, CSA, FDA
48.) Insulation Tape/ used on the internal chassis adjacent to metal bus bar	3M	Type 1206	Rated 155°C	UL510	UL
49.) Temperature Sensor	National Semiconductor	LM74	3.0V/2.65V to 5.5V, -10°C to 65°C	-	-
50.) Power Distribution Board	Myricom	10G-POWER v1.1.	Minimum flammability rating:V-0	UL94	UL

END of TEST REPORT