



TESTING

CERT #803.01, 803.02, 803.05, 803.06

MYRICOM, INC. TEST REPORT

FOR THE

SERVER RACK, 10G-PCIE2-8B2-2S & 10G-PCIE2-8B2-2QP

EN55024 (1998 W/A1: 01 & A2: 03) & EN55022 (2006) CLASS A

TESTING

DATE OF ISSUE: MARCH 25, 2009

PREPARED FOR:

Myricom, Inc.
325 North Santa Anita Ave.
Arcadia, CA 91006

P.O. No.: 09564
W.O. No.: 89253

PREPARED BY:

Mary Ellen Clayton
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Date of test: February 24 - March 2, 2009

Report No.: CE09-077

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ADMINISTRATIVE INFORMATION

DATE OF TEST: February 24 - March 2, 2009

DATE OF RECEIPT: February 24, 2009

REPRESENTATIVE: Alan Kulawik

MANUFACTURER:
Myricom, Inc.
325 North Santa Anita Ave.
Arcadia, CA 91006

TEST LOCATION:
CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92823

TEST METHOD*: EN55024 (1998 w/A1: 01 & A2: 03) and EN55022 (2006)


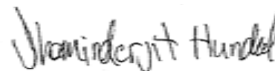
*Note: 2004/108/EC Article 6.2 stipulates that compliance with the relevant harmonized standard whose references have been published in the Official Journal (OJ) of the European Union shall raise presumption, on the part of the Member States, of conformity with the essential requirements referred to in Annex I to which such standards relate. However, for convenience and to reduce confusion, the date of the CENELEC harmonized standard is used in this report. Should questions arise, the national standard transposed from the harmonized (BS EN) is the official standard used.

PURPOSE OF TEST: To perform the testing of the Server Rack, 10G-PCIE2-8B2-2S & 10G-PCIE2-8B2-2QP with the requirements for EN55024 and EN55022 Class A devices.

APPROVALS

QUALITY ASSURANCE:

TEST PERSONNEL:

Steve Behm, Director of Engineering Services

Shamnderjit Hundal, Test Engineer

SITE FILE REGISTRATION NUMBERS

Location	Japan	Canada	FCC
Brea A	R-2945, C-3248 & T-266	3082D-1	90473

SUMMARY OF RESULTS

Test	Specification/Method	Results
Mains Conducted Emissions	EN55022 (2006) Class A	Pass
Radiated Emissions	EN55022 (2006) Class A	Pass
Electrostatic Discharge	EN61000-4-2 (1995) EN55024 (1998 w/A1: 01 & A2: 03)	Pass
Radiated Immunity	EN61000-4-3 (1997) EN55024 (1998 w/A1: 01 & A2: 03)	Pass
Electrical Fast Transient Burst	EN61000-4-4 (1995) EN55024 (1998 w/A1: 01 & A2: 03)	Pass
Surge	EN61000-4-5 (1995) EN55024 (1998 w/A1: 01 & A2: 03)	Pass
Conducted Immunity	EN61000-4-6 (1996) EN55024 (1998 w/A1: 01 & A2: 03)	Pass
Magnetic Immunity	EN61000-4-8 (1994) EN55024 (1998 w/A1: 01 & A2: 03)	Pass
Voltage Dips & Interrupts	EN61000-4-11 (1994) EN55024 (1998 w/A1: 01 & A2: 03)	Pass

CONDITIONS DURING TESTING

No modifications to the EUT were necessary during testing.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The customer declares the EUT tested by CKC Laboratories was representative of a production unit.

EQUIPMENT UNDER TEST

Server Rack

Manuf: Myricom, Inc.
Model: 10G-PCIE2-8B2-2QP
Serial: NA

Server Rack

Manuf: Myricom, Inc.
Model: 10G-PCIE2-8B2-2S
Serial: NA

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Mouse

Manuf: Lenovo
Model: NA
Serial: NA

Keyboard

Manuf: Lenovo
Model: NA
Serial: NA

Monitor

Manuf: MPC
Model: NA
Serial: NA

MEASUREMENT UNCERTAINTIES

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k=2$. Compliance is deemed to occur provided measurements are below the specified limits.

REPORT OF EMISSIONS MEASUREMENTS

TESTING PARAMETERS

The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in $\text{dB}\mu\text{V}/\text{m}$, the spectrum analyzer reading in $\text{dB}\mu\text{V}$ was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS		
	Meter reading	(dB μ V)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dB μ V/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. The following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used. When conducted emissions testing was performed, a 10 dB external attenuator was used with internal offset correction in the analyzer.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the highest readings, this is indicated as a "QP" or an "Ave" on the appropriate rows of the data sheets. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer/receiver readings recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the measuring device called "peak hold," the measuring device had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the quasi-peak detector.

Average

For certain frequencies, average measurements may be made using the spectrum analyzer/receiver. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.

CONDUCTED EMISSIONS

Test Setup Photos



Test Data Sheets

Test Location: CKC Laboratories, Inc. • 110. N. Olinda Place. • Brea, CA 92821 • (714) 993-6112

Customer: **Myricom, Inc.**
 Specification: **EN55022 A (2006) COND AVG**
 Work Order #: **89253** Date: 3/2/2009
 Test Type: **Conducted Emissions** Time: 5:42:35 PM
 Equipment: Server Rack Sequence#: 4
 Manufacturer: Myricom, Inc. Tested By: S.Hundal
 Model: 10G-PCIE2-8B2-2QP & 10G-PCIE2-8B2-2S 230V 50Hz
 S/N: NA

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	US44300438	07/23/2008	07/23/2010	02672
LISN	1104	12/09/2008	12/09/2010	00847
6dB Attenuator	None	10/14/2008	10/14/2010	P05886
150kHz HPF	G7755	01/09/2008	01/09/2010	02610
Conducted Emission Cable	Cable #21	05/12/2008	05/12/2010	P04358

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Server rack	Myricom, Inc.	10G-PCIE2-8B2-2QP	NA
Server rack	Myricom, Inc.	10G-PCIE2-8B2-2S	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Mouse	Lenovo	NA	NA
Keyboard	Lenovo	NA	NA
Monitor	MPC	NA	NA

Test Conditions / Notes:

The two EUTs are plugged into slots in the computer. The computer is hooked up to a monitor, keyboard and mouse.

Transducer Legend:

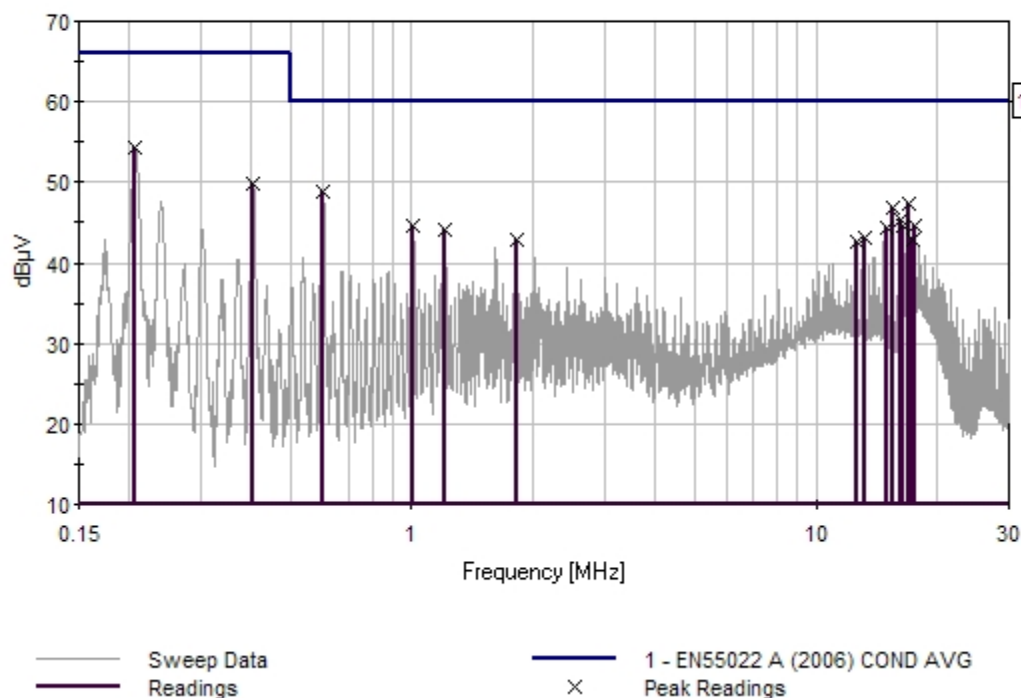
T1=150kHz HPF AN02610_010910	T2=6dB atten-P05886-101410.TRN
T3=Cable #21 -P04358- Site A 05/12/10	T4=L1 Insertion Loss AN00847_120910

Measurement Data: Reading listed by margin. Test Lead: Black

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	602.322k	42.5	+0.2	+6.1	+0.0	+0.0	+0.0	48.8	60.0	-11.2	Black
2	207.449k	47.9	+0.2	+6.1	+0.0	+0.0	+0.0	54.2	66.0	-11.8	Black
3	17.049M	39.8	+0.3	+6.1	+0.3	+0.9	+0.0	47.4	60.0	-12.6	Black
4	15.544M	39.5	+0.3	+6.1	+0.3	+0.7	+0.0	46.9	60.0	-13.1	Black

5	16.148M	37.8	+0.3	+6.1	+0.3	+0.8	+0.0	45.3	60.0	-14.7	Black
6	1.009M	38.2	+0.3	+6.1	+0.1	+0.0	+0.0	44.7	60.0	-15.3	Black
7	16.445M	37.2	+0.3	+6.1	+0.3	+0.8	+0.0	44.7	60.0	-15.3	Black
8	17.643M	37.1	+0.3	+6.1	+0.3	+0.9	+0.0	44.7	60.0	-15.3	Black
9	14.950M	36.9	+0.3	+6.1	+0.3	+0.7	+0.0	44.3	60.0	-15.7	Black
10	1.209M	37.7	+0.3	+6.1	+0.1	+0.0	+0.0	44.2	60.0	-15.8	Black
11	404.522k	43.5	+0.2	+6.1	+0.0	+0.0	+0.0	49.8	66.0	-16.2	Black
12	13.157M	35.8	+0.2	+6.1	+0.3	+0.6	+0.0	43.0	60.0	-17.0	Black
13	17.346M	35.3	+0.3	+6.1	+0.3	+0.9	+0.0	42.9	60.0	-17.1	Black
14	1.813M	36.4	+0.2	+6.1	+0.1	+0.0	+0.0	42.8	60.0	-17.2	Black
15	12.562M	35.4	+0.2	+6.1	+0.3	+0.6	+0.0	42.6	60.0	-17.4	Black

CKC Laboratories, Inc. Date: 3/2/2009 Time: 5:42:35 PM Myricom, Inc. WO#: 89253
 EN55022 A (2006) COND AVG Test Lead: Black 230V 50Hz Sequence#: 4



Test Location: CKC Laboratories, Inc. • 110. N. Olinda Place. • Brea, CA 92821 • (714) 993-6112

Customer: **Myricom, Inc.**
 Specification: **EN55022 A (2006) COND AVG**
 Work Order #: **89253** Date: 3/2/2009
 Test Type: **Conducted Emissions** Time: 5:45:27 PM
 Equipment: Server Rack Sequence#: 5
 Manufacturer: Myricom, Inc. Tested By: S.Hundal
 Model: 10G-PCIE2-8B2-2QP & 10G-PCIE2-8B2-2S 230V 50Hz
 S/N: NA

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	US44300438	07/23/2008	07/23/2010	02672
LISN	1104	12/09/2008	12/09/2010	00847
6dB Attenuator	None	10/14/2008	10/14/2010	P05886
150kHz HPF	G7755	01/09/2008	01/09/2010	02610
Conducted Emission Cable	Cable #21	05/12/2008	05/12/2010	P04358

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Server rack	Myricom, Inc.	10G-PCIE2-8B2-2QP	NA
Server rack	Myricom, Inc.	10G-PCIE2-8B2-2S	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Mouse	Lenovo	NA	NA
Keyboard	Lenovo	NA	NA
Monitor	MPC	NA	NA

Test Conditions / Notes:

The two EUTs are plugged into slots in the computer. The computer is hooked up to a monitor, keyboard and mouse.

Transducer Legend:

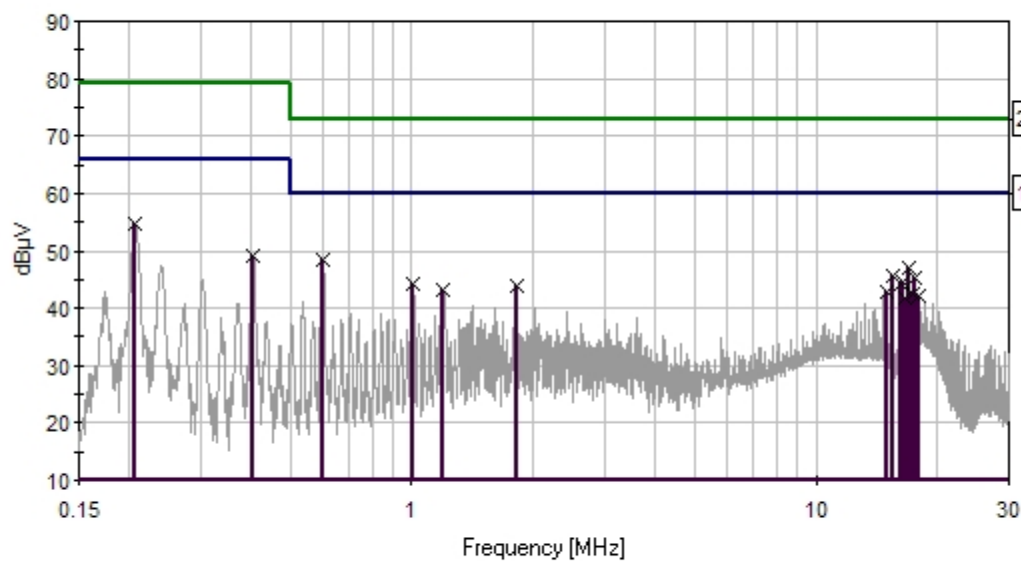
T1=150kHz HPF AN02610_010910	T2=6dB atten-P05886-101410.TRN
T3=Cable #21 -P04358- Site A 05/12/10	T4=L2 Insertion Loss AN00847_120910

Measurement Data: Reading listed by margin. Test Lead: White

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	207.449k	48.3	+0.2	+6.1	+0.0	+0.1	+0.0	54.7	66.0	-11.3	White
2	600.868k	42.0	+0.2	+6.1	+0.0	+0.0	+0.0	48.3	60.0	-11.7	White
3	17.049M	39.5	+0.3	+6.1	+0.3	+0.8	+0.0	47.0	60.0	-13.0	White
4	15.553M	38.3	+0.3	+6.1	+0.3	+0.7	+0.0	45.7	60.0	-14.3	White

5	17.652M	37.7	+0.3	+6.1	+0.3	+0.9	+0.0	45.3	60.0	-14.7	White
6	16.454M	37.2	+0.3	+6.1	+0.3	+0.8	+0.0	44.7	60.0	-15.3	White
7	16.157M	37.0	+0.3	+6.1	+0.3	+0.7	+0.0	44.4	60.0	-15.6	White
8	1.009M	37.6	+0.3	+6.1	+0.1	+0.1	+0.0	44.2	60.0	-15.8	White
9	1.813M	37.3	+0.2	+6.1	+0.1	+0.1	+0.0	43.8	60.0	-16.2	White
10	404.522k	42.9	+0.2	+6.1	+0.0	+0.0	+0.0	49.2	66.0	-16.8	White
11	1.196M	36.6	+0.3	+6.1	+0.1	+0.1	+0.0	43.2	60.0	-16.8	White
12	14.959M	35.5	+0.3	+6.1	+0.3	+0.6	+0.0	42.8	60.0	-17.2	White
13	17.346M	35.0	+0.3	+6.1	+0.3	+0.9	+0.0	42.6	60.0	-17.4	White
14	17.941M	34.5	+0.3	+6.1	+0.3	+0.9	+0.0	42.1	60.0	-17.9	White
15	16.598M	34.3	+0.3	+6.1	+0.3	+0.8	+0.0	41.8	60.0	-18.2	White

CKC Laboratories, Inc. Date: 3/2/2009 Time: 5:45:27 PM Myricom, Inc. WO#: 89253
 EN55022 A (2006) COND AVG Test Lead: White 230V 50Hz Sequence#: 5



— Sweep Data
 — 1 - EN55022 A (2006) COND AVG
 — 2 - EN55022 A (2006) COND QP
 x Peak Readings

RADIATED EMISSIONS

Test Setup Photos



Test Data Sheets

Test Location: CKC Laboratories, Inc. • 110. N. Olinda Place. • Brea, CA 92821 • (714) 993-6112

Customer: **Myricom, Inc.**

Specification: **EN55022(2006) Class A RADIATED**

Work Order #: **89253**

Date: 2/24/2009

Test Type: **Maximized Emissions**

Time: 22:50:45

Equipment: Server Rack

Sequence#: 1

Manufacturer: Myricom, Inc.

Tested By: S.Hundal

Model: 10G-PCIE2-8B2-2QP & 10G-PCIE2-8B2-2S

S/N: NA

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	US44300438	07/23/2008	07/23/2010	02672
Bilog Antenna	2451	01/21/2008	01/21/2010	01995
Pre amp to SA Cable	Cable #10	05/16/2007	05/16/2009	P05050
Cable	Cable15	01/05/2009	01/05/2011	P05198
Pre Amp	1937A02548	05/02/2008	05/02/2010	00309

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Server rack	Myricom, Inc.	10G-PCIE2-8B2-2QP	NA
Server rack	Myricom, Inc.	10G-PCIE2-8B2-2S	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Mouse	Lenovo	NA	NA
Keyboard	Lenovo	NA	NA
Monitor	MPC	NA	NA

Test Conditions / Notes:

The two EUTs are plugged into slots in the computer. The computer is hooked up to a monitor, keyboard and mouse.

Transducer Legend:

T1=Bilog-AN01995 BILOG_012110
T2=Cable #10_P05050_051609
T3=Cable #15, Site A, 010511
T4=Pre_amp_HP8447D-AN00309-050210

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	624.999M	54.9	+20.1	+0.5	+4.6	-27.3	-10.0	42.8	47.0	-4.2	Vert
2	607.527M	53.5	+20.0	+0.5	+4.5	-27.4	-10.0	41.1	47.0	-5.9	Horiz
3	624.989M	52.3	+20.1	+0.5	+4.6	-27.3	-10.0	40.2	47.0	-6.8	Horiz
4	801.530M	48.9	+22.5	+0.6	+5.3	-27.2	-10.0	40.1	47.0	-6.9	Vert
5	107.488M	55.3	+10.8	+0.2	+1.7	-27.9	-10.0	30.1	40.0	-9.9	Horiz

6	810.050M	45.1	+22.6	+0.6	+5.3	-27.2	-10.0	36.4	47.0	-10.6	Vert
7	468.730M	50.8	+17.6	+0.4	+3.9	-27.8	-10.0	34.9	47.0	-12.1	Horiz
8	31.305M	45.6	+17.9	+0.1	+0.8	-28.0	-10.0	26.4	40.0	-13.6	Vert
9	120.915M	50.5	+11.6	+0.3	+1.8	-27.9	-10.0	26.3	40.0	-13.7	Horiz
10	468.751M	48.5	+17.6	+0.4	+3.9	-27.8	-10.0	32.6	47.0	-14.4	Vert
11	810.049M	40.8	+22.6	+0.6	+5.3	-27.2	-10.0	32.1	47.0	-14.9	Horiz
12	106.700M	50.0	+10.7	+0.2	+1.7	-27.9	-10.0	24.7	40.0	-15.3	Horiz
13	400.773M	48.9	+16.0	+0.4	+3.6	-27.8	-10.0	31.1	47.0	-15.9	Vert
14	801.290M	38.7	+22.5	+0.6	+5.3	-27.2	-10.0	29.9	47.0	-17.1	Horiz
15	613.460M	41.9	+20.0	+0.5	+4.6	-27.3	-10.0	29.7	47.0	-17.3	Vert
16	108.440M	47.4	+10.8	+0.2	+1.7	-27.9	-10.0	22.2	40.0	-17.8	Horiz
17	367.348M	47.7	+15.2	+0.3	+3.4	-27.8	-10.0	28.8	47.0	-18.2	Vert
18	114.378M	46.0	+11.2	+0.3	+1.7	-27.9	-10.0	21.3	40.0	-18.7	Vert
19	312.515M	48.4	+13.6	+0.2	+3.1	-27.8	-10.0	27.5	47.0	-19.5	Vert
20	399.980M	44.9	+16.0	+0.4	+3.6	-27.8	-10.0	27.1	47.0	-19.9	Horiz
21	366.038M	45.9	+15.1	+0.3	+3.4	-27.8	-10.0	26.9	47.0	-20.1	Vert
22	201.665M	45.6	+9.2	+0.2	+2.4	-28.0	-10.0	19.4	40.0	-20.6	Horiz
23	408.520M	43.6	+16.2	+0.4	+3.6	-27.8	-10.0	26.0	47.0	-21.0	Horiz
24	436.810M	39.8	+16.9	+0.4	+3.7	-27.8	-10.0	23.0	47.0	-24.0	Horiz
25	383.170M	40.5	+15.6	+0.4	+3.5	-27.8	-10.0	22.2	47.0	-24.8	Horiz
26	371.195M	39.6	+15.3	+0.3	+3.4	-27.8	-10.0	20.8	47.0	-26.2	Horiz

REPORT OF IMMUNITY MEASUREMENTS

EUT Setup: The two EUTs are plugged into slots in the computer. The computer is hooked up to a monitor, keyboard and mouse

Monitoring: The monitor outputs a string of 0's every sec. If this string changes in any way there is a failure.

ELECTROSTATIC DISCHARGE

Test Equipment

Asset #	Equipment	Manufacturer	Model #	Serial #	Cal Date	Cal Due
00629	ESD Simulator	Keytek	MZ-15EC	9407571	12/18/2008	12/18/2010

Test Setup Photos





EN61000-4-2 ESD (Direct Discharge) in accordance with EN55024

Tested By: Shamnderjit Hundal

Location of discharge	Type of discharge	Test Level	Pass / Fail / NA	Performance Criterion
Front	HCP	4kV	Pass	B
Right	HCP	4kV	Pass	B
Back	HCP	4kV	Pass	B
Left	HCP	4kV	Pass	B
Front	VCP	4kV	Pass	B
Right	VCP	4kV	Pass	B
Back	VCP	4kV	Pass	B
Left	VCP	4kV	Pass	B
Front	Contact	4kV	Pass	B
Right	Contact	4kV	Pass	B
Back	Contact	4kV	Pass	B
Left	Contact	4kV	Pass	B
Front	Air	8kV	Pass	B
Back	Air	8kV	Pass	B
Left	Air	8kV	Pass	B
Right	Air	8kV	Pass	B
Top	Air	8kV	Pass	B

HCP=Horizontal Coupling Plane VCP=Vertical Coupling Plane

Temperature: 21 °C

Relative Humidity: 37 %

Atmospheric Pressure: 101 kPa

Performance Criteria B: After the disturbance is removed, normal operation of the EUT is self-recoverable.

RADIATED IMMUNITY

Test Equipment

Asset #	Equipment	Manufacturer	Model #	Serial #	Cal Date	Cal Due
01370	Antenna, Bilog	EMCO	3143	9409-1047	NCR	NCR
00627	Amplifier	AR	50W1000A	14335	1/15/2009	1/15/2011
01612	Directional Coupler	Werlatone	C2630	5156	1/11/2008	1/11/2010
00042	Spectrum Analyzer	HP	8568B	2415A00481	3/20/2008	3/20/2010
00043	IF Section of SA	HP	85662A	2403A07316	3/20/2008	3/20/2010
00090	QP Adapter	HP	85650A	2043A00231	3/20/2008	3/20/2010
02227	Generator, Signal	Marconi	2024	112282/515	8/18/2007	8/18/2009
00636	Field Monitor	AR	FM2000	14294	8/3/2007	8/3/2009
00638	Field Probe	AR	FP2000	14318	6/15/2007	6/15/2009
P04270	Cable # 3v	Andrew	Hardline	25"	NCR	NCR
P04286	Cable # 4	Andrew	Hardline	60"	NCR	NCR
02710	Anechoic Chamber	CKC	Chamber	NA	1/26/2009	1/26/2011

NCR = No Cal Required

Test Setup Photos





EN61000-4-3 Radiated Immunity in accordance with EN55024

Tested By: Shamnderjit Hundal

Frequency Range MHz	Test Distance	Front V/H	Back V/H	Left Side V/H	Right Side V/H	Performance Criterion
80-1000	1.5m	Pass	Pass	Pass	Pass	A

V=Vertical H=Horizontal Test Level: 3 V/m, 80% 1 kHz Amplitude Modulated (AM)

Note: The field strength at the required 40 cm height was 3.2 V/m.

Performance Criteria: The EUT shall operate without degradation of performance during and after the application of disturbance.

ELECTRICAL FAST TRANSIENT BURST

Test Equipment

Asset #	Equipment	Manufacturer	Model #	Serial #	Cal Date	Cal Due
01495	Generator, EFTB	Velonex	V3300A	16922	1/19/2009	1/19/2011
01692	Coupling Clamp	Velonex	V-3334	166701	1/19/2009	1/19/2011

Test Setup Photos



EN61000-4-4 EFTB (Power Cable) in accordance with EN55024

Tested By: Shamnderjit Hundal

EFTB insertion point	+ 1 kV pass / fail	- 1 kV pass / fail	Performance Criterion
Line to Ground	Pass	Pass	B
Neutral to Ground	Pass	Pass	B
Protective Earth to Ground	Pass	Pass	B
Line/Neutral/Protective Earth to Ground.	Pass	Pass	B

EN61000-4-4 EFTB (I/O Cables) in accordance with EN55024

Tested By: Shamnderjit Hundal

Cable tested	+ .5 kV pass / fail	- .5 kV pass / fail	Performance Criterion
10G-PCIE2-8B2-2S I\O	Pass	Pass	B
10G-PCIE2-8B2-2QP I\O	Pass	Pass	B
DC Power	NA	NA	NA

NA=Not Applicable because the EUT has no DC power lines.

Temperature: 21 °C
 Relative Humidity: 37 %
 Atmospheric Pressure: 101 kPa

Performance Criteria B: After the disturbance is removed, normal operation of the EUT is self-recoverable.

SURGE

Test Equipment

Asset #	Equipment	Manufacturer	Model #	Serial #	Cal Date	Cal Due
01495	Generator, EFTB	Velonex	V3300A	16922	1/19/2009	1/19/2011

Test Setup Photos



EN61000-4-5 Surge (Power Mains) in accordance with EN55024

Tested By: Shamnderjit Hundal

Voltage level kV	Insertion points	0 degrees input +voltage-	90 degrees input +voltage-	180 degrees input +voltage-	270 degrees input +voltage-	Performance Criterion Met
		pass / fail	pass / fail	pass / fail	pass / fail	
1	Line-Neutral	Pass	Pass	Pass	Pass	A
2	Line-Ground	Pass	Pass	Pass	Pass	A
2	Neutral-Ground	Pass	Pass	Pass	Pass	A

EN61000-4-5 Surge (I/O Cables) in accordance with EN55024

Voltage level kV	Cable	pass / fail +	pass / fail -	Performance Criterion Met
		0.5	DC Power Lines	
0.5	Signal Line	NA	NA	NA

NA=Not Applicable because the EUT has no DC power lines and has no ports directly connected to outside lines.

Temperature: 21 °C
 Relative Humidity: 37 %
 Atmospheric Pressure: 101 kPa

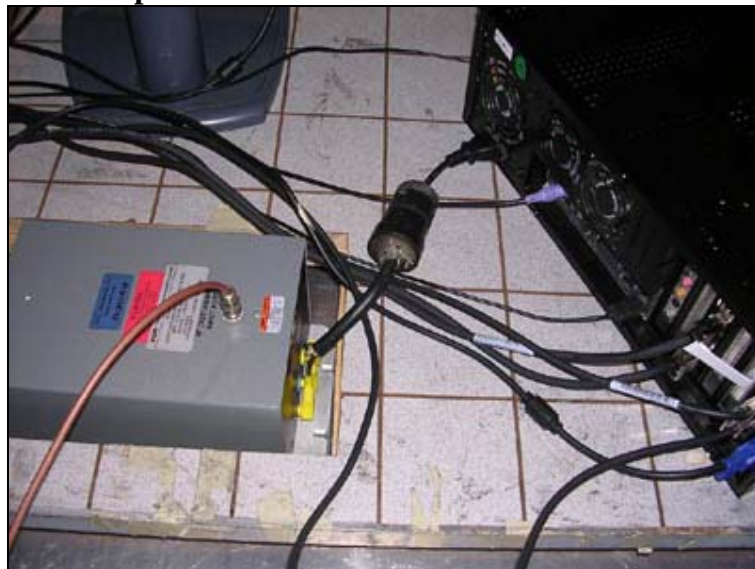
Performance Criteria: The EUT shall operate without degradation of performance during and after the application of disturbance.

CONDUCTED IMMUNITY

Test Equipment

Asset #	Equipment	Manufacturer	Model #	Serial #	Cal Date	Cal Due
02041	CDN	FCC	801-M3-25	51	4/12/2007	4/12/2009
00628	Amplifier	AR	100A100	14328	1/15/2009	1/15/2011
01612	Directional Coupler	Werlatone	C2630	5156	1/11/2008	1/11/2010
00042	Spectrum Analyzer	HP	8568B	2415A00481	3/20/2008	3/20/2010
00043	IF Section of SA	HP	85662A	2403A07316	3/20/2008	3/20/2010
00090	QP Adapter	HP	85650A	2043A00231	3/20/2008	3/20/2010
02227	Generator, Signal	Marconi	2024	112282/515	8/18/2007	8/18/2009
P04358	6 Meter Coaxial Cable 2111	Harbour Industries	RG142	cable21	5/12/2008	5/12/2010
01647	Injection Probe	FCC	F-120-1	62	1/11/2009	1/11/2011
00296	Current Probe	Solar	6741-1	8020-9	5/22/2007	5/22/2009

Test Setup Photos





EN61000-4-6 Conducted Immunity in accordance with EN55024

Tested By: Shamnderjit Hundal

Cable Tested	Frequency Range	Pass/fail	Performance Criterion
AC Power Line	.15-80MHz	Pass	A
10G-PCIE2-8B2-2S I\O	.15-80MHz	Pass	A
10G-PCIE2-8B2-2QP I\O	.15-80MHz	Pass	A

Modulated with a 1 kHz AM sine wave at 80%, 3 Vrms.

Performance Criteria: The EUT shall operate without degradation of performance during and after the application of disturbance.

MAGNETIC IMMUNITY

Test Equipment

Asset #	Equipment	Manufacturer	Model #	Serial #	Cal Date	Cal Due
P05007	Mag Loop Fixture	CKC	10 TURNS	001	6/5/2007	6/5/2009
01695/01 696	AC power Source	Pacific PSC	345AMXT- UPC32	250	5/15/2007	5/15/2009

Test Setup Photos



EN61000-4-8 Magnetic Immunity in accordance with EN55024

Tested By: Shamnderjit Hundal

Amplitude	X-Axis	Y-Axis	Z-Axis	Performance Criterion
1 A/m	Pass	Pass	Pass	A

Performance Criteria: The EUT shall operate without degradation of performance during and after the application of disturbance.

VOLTAGE DIPS AND INTERRUPTS

Test Equipment

Asset #	Equipment	Manufacturer	Model #	Serial #	Cal Date	Cal Due
01695/ 01696	AC power Source	Pacific PSC	345AMXT- UPC32	250	5/15/2007	5/15/2009

Test Setup Photos



EN61000-4-11 Voltage Dips & Interrupts in accordance with EN55024

Tested By: Shamnderjit Hundal

% reduction	Duration	Pass/fail	Performance Criterion	Notes
>95	0.5 period (10ms)	Pass	B	3 interrupts with 10 sec between each
30	25 periods (500ms)	Pass	C	3 interrupts with 10 sec between each
>95	250 periods (5 sec)	Pass	C	3 interrupts with 10 sec between each

Performance Criteria B: After the disturbance is removed, normal operation of the EUT is self-recoverable.

Performance Criteria C: After the disturbance is removed, normal operation of the EUT can be restored by the operator.