Rev B

Immunity Characteristics per EN 61000-4-2:1995, EN 61000-4-4:1995, EN 61000-4-5:1995, EN 61000-4-6:1996, EN 61000-4-11 :1995 Emissions Requirements per EN55022:1998 Class A

On Model

Type 39, 4U, 8 Slots Rack-mount Chassis

Model Numbers

39CO8ED248Y3HP2X

&

39C08CC148Y3HQ2X

Report No.

20040105-01-CE

Judgement

Complies as Tested

Provided for evaluation by

ELMA Electronics Inc.

44350 S.Grimmer Blvd.
Fremont
CA 95438
United States

Tests and Report by

ITC Engineering Services, Inc.

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Lab Code 200172-0

EN45001 Accredited Compliance Laboratory (RES-GmbH)
Registration number: TTI-P-G 159/98-00 (RES-GmbH)

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PART 1: DOCUMENTATION

General Information

Model Name **Model Number** **Serial Numbers**	Type 39, 4U, 8 Slots, Rack-Mount Chassi 39CO8ED248Y3HP2X & 39C08CC148Y3HQ2X 115329 (with 3 Power Supplies) & 106665 (with 2 Power Supplies)	
Manufacturer's Name **Manufacturer's Address** **Contact**	ELMA Electronics Inc. 44350 S. Grimmer Blvd. Fremont, CA 95438 United States Tel: +1(510) 656-3400 Mr. Ram Rajan	 Fax: +1(510) 656-3783 RamR@Elma.com
Test Laboratory	ITC Engineering Services, Inc. 9959 Calaveras Road, PO Box 543 Sunol, CA 94586-0543 Email: docs@itcemc.com Web Site: http://www.itcemc.com	 Tel: +1(925) 862-2944 Fax: +1(925) 862-9013
Test Number and Report Numbers	20040105-01	20040105-01-CE
Test Date(s) & Issue Date	February 3, 4, 5 & 6, 2004	February 23rd, 2004
Test Engineer	Lan Vu	
Documentation	Gurjit Khosa	
Total Number of Pages	34	

ITC Engineering Services, Inc. as an independent testing laboratory, declares that the equipment tested as specified above conforms to:

Emissions Regulations

1. Power Line Conducted Emissions per EN 55022:1998 Class A
2. Open Field Radiated Emissions per EN 55022:1998 Class A

Immunity Regulations

1. EN 61000-4-2: 1995, Electrostatic discharge immunity test.
2. EN 61000-4-4: 1995, Electrical fast transient/burst immunity test.
3. EN 61000-4-5: 1995, Surge immunity test.
4. EN 61000-4-6: 1996, Immunity to conducted disturbances, induced by radio-frequency fields
5. EN 61000-4-11: 1995, Power Line Dips & Brownout

PREPARED BY:

Gurjit Khosa
Technical Writer

REVIEWED BY:

Michael Gbadebo, PE
(California License # 11303)
Chief Engineer

Declaration/Disclaimer

It is the manufacturer's responsibility to assure that additional production units of these models are manufactured with identical electrical and mechanical characteristics.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full with our written approval. The applicant/manufacturer shall not use this report to claim product endorsement by NIST, NVLAP or any US Government agency.

Test Setup Configurations

EUT Description:
Elma Electronic's Products with model numbers 39CO8ED248Y3HP2X and 39C08CC148Y3HQ2X , or the "EUTs", are Type 39, 4U, 8 Slots, Rack-mount Chassis'.

The EUTs have the following ports and connectors:

EUT Ports & Connectors:
External:

1. One (1) Power Socket
2. Seven (7) CPCI Load Board (S/N 106665)
3. Six (6) CPCI Load Board (S/N 115329)

Test Voltage(s): 230 V AC @ 50 Hz

Measurement Uncertainty

Description	Biconical Setup	Log Periodic Setup
Antenna (a)	+/- 1.87 dB	+/- 1.13 dB
Cable (b)	-	-
Spectrum Analyzer (c)	+/- 2.5 dB	+/- 2.5 dB
Preselector and QP Adapter (d)	+/- .5 db	+/- 5.dB
Total Uncertainty (a*b*c*d)	+/- 2.34dB	+/- 1.41 dB

General Test Remarks

The EUT and peripheral equipment were operated under the following conditions during testing

☑	Standby	☐	Test Program (H - Pattern)
☐	Test Program (Color Bar)	☐	Test Program (Customer Specific)
☐	TV/VCR Signal Input	☐	Signal Generator Input
☐	Continuous Audio Tone (1kHz)	☐	Cycled Audio Tone (1kHz)
☐	Printer/Parallel Function	☐	Modem/Serial Function
☐	Serpentine Program with I/O	☐	Serpentine Program without I/O
☐	Practice Operation	☐	Normal Operating Mode
☐	Essential Operation (Functional Safety)	☐	Continuous Unmonitored Operation
☑	Continuous Monitored Operation	☐	Non-Continuous Operation

PART 2: EMISSIONS TESTS

Power Line Conducted Emissions per EN 55022: 1998 Class A

EUT Configuration and Test Procedure

The equipment under testing (EUT), Type 39, 4U, 8 Slots, Rack-Mount Chassis', were set up on a wooden table, 80cm above the horizontal reference plane and 40cm away from the vertical reference plane in a shielded room. The power line conducted EMI tests were run on all the current carrying conductors of the power cords according to requirements specified in EN 55022: 1998 Class A. Excess cords of the EUTs were bundled in the center or shortened to appropriate lengths.

Frequencies where the peak values of the emissions are within -3 db of the limit were also measured with quasi-peak detector.

Test Equipment Used

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due
Spectrum Analyzer	Hewlett-Packard	8568B	2841A04315	12-11-04
Spectrum Analyzer Display	Hewlett-Packard	85662A	2848A17028	12-11-04
Quasi Peak Adapter	Hewlett-Packard	85650	2521A00871	12-11-04
Preselector	Hewlett-Packard	85685A	2620A00265	12-11-04
LISN (25 Amp)	EMCO	38825/2	1229	02-05-05

Test Software Used

Description	Manufacturer	Model Name	Version Number	Calibration/Validation Date
Test Software	ITC	1.04b1	Rev. 3	12-28-04
Cable Software	ITC	Line Conducted	Rev. 4	02-13-05

Spectrum Analyzer Configuration (during swept frequency scans)

Analyzer Mode (for Peak Measurements)..... Peak
- Sweep Speed ..... Manual
- IF Bandwidth..... 9 kHz
- Resolution Bandwidth..... 10 kHz
- Video Bandwidth..... 10 kHz
- Quasi Peak Adapter Mode ..... Disabled
- Quasi Peak Adapter bandwidth..... 9 kHz
- Attenuation..... 0 dB

Analyzer Mode (for Quasi-Peak Measurements) ..... Quasi-Peak/Linear
- Resolution Bandwidth..... 100 kHz
- Video Bandwidth..... 100 kHz
- Quasi Peak Adapter Mode ..... Normal

Analyzer Mode (for Average Measurements)..... Video Averaging
- Resolution Bandwidth..... 100 kHz
- Video Bandwidth..... 100 kHz
- Quasi Peak Adapter Mode ..... Disabled

Administrative and Environmental Details

Test Date:	February 3rd, 2004
Test Engineer:	Lan Vu
Temperature:	22°C
Humidity:	51%
Site Used:	Shielded Room: 16' x 12' x 9'

Power Line Conducted Emissions (cont.)

Emissions Test Results for EUT, S/N: 115329

The tables which follow show summaries of the highest conducted emissions on the current carrying conductors supplying power to the host device for the EUT (S/N: 115329).

INDICATED		CORRECTION		CORR	TURNTABLE	ANT		CLASS A		CLASS B			
FREQ	AMPL	ANT	CAB	AMPL	ANG	HT	POL	AMPL	MARG	AMPL	MARG	FILTER	
MHz	dBuV/m	dB	dB	dBuV/m	DEG	m	-	dBuV/m	dB	dBuV/m	db	MODE	NOTES
0.17	73.0	-	0.5	73.5	-	-		79.0	-5.5	65.1	8.4	P	Neutral
0.17	72.0	-	0.5	72.5	-	-		79.0	-6.5	65.0	7.5	P	Hot
0.72	53.9	-	0.5	54.4	-	-		73.0	-18.6	56.0	-1.6	P	Neutral
0.72	50.2	-	0.5	50.7	-	-		73.0	-22.3	56.0	-5.3	P	Hot
0.99	37.9	-	0.5	38.4	-	-		73.0	-34.6	56.0	-17.6	P	Neutral
1.00	41.5	-	0.5	42.0	-	-		73.0	-31.0	56.0	-14.0	P	Hot
2.31	17.5	-	0.7	18.2	-	-		73.0	-54.8	56.0	-37.8	P	Neutral
2.36	17.8	-	0.7	18.5	-	-		73.0	-54.5	56.0	-37.5	P	Hot
13.16	3.6	-	1.2	4.8	-	-		73.0	-68.2	60.0	-55.2	P	Neutral
18.18	7.6	-	1.2	8.8	-	-		73.0	-64.2	60.0	-51.2	P	Hot
21.93	6.9	-	0.9	7.8	-	-		73.0	-65.2	60.0	-52.2	P	Neutral
21.93	6.9	-	0.9	7.8	-	-		73.0	-65.2	60.0	-52.2	P	Hot
28.52	11.7	-	0.5	12.2	-	-		73.0	-60.8	60.0	-47.8	P	Neutral
29.18	11.7	-	0.5	12.2	-	-		73.0	-60.8	60.0	-47.8	P	Hot

No emissions of significant levels were observed between the ranges 0.15MHz to 0.17MHz and 29.18MHz to 30MHz.

Emissions Test Results for EUT, S/N: 106665

The tables which follow show summaries of the highest conducted emissions on the current carrying conductors supplying power to the host device for the EUT (S/N: 106665).

INDICATED		CORRECTION		CORR	TURNTABLE	ANT		CLASS A		CLASS B			
FREQ	AMPL	ANT	CAB	AMPL	ANG	HT	POL	AMPL	MARG	AMPL	MARG	FILTER	
MHz	dBuV/m	dB	dB	dBuV/m	DEG	m	-	dBuV/m	dB	dBuV/m	db	MODE	NOTES
0.17	73.0	-	0.5	73.5	-	-		79.0	-5.5	65.1	8.4	P	Neutral
0.17	72.0	-	0.5	72.5	-	-		79.0	-6.5	65.0	7.5	P	Hot
0.72	53.9	-	0.5	54.4	-	-		73.0	-18.6	56.0	-1.6	P	Neutral
0.72	50.2	-	0.5	50.7	-	-		73.0	-22.3	56.0	-5.3	P	Hot
0.99	37.9	-	0.5	38.4	-	-		73.0	-34.6	56.0	-17.6	P	Neutral
1.00	41.5	-	0.5	42.0	-	-		73.0	-31.0	56.0	-14.0	P	Hot
2.31	17.5	-	0.7	18.2	-	-		73.0	-54.8	56.0	-37.8	P	Neutral
2.36	17.8	-	0.7	18.5	-	-		73.0	-54.5	56.0	-37.5	P	Hot
13.16	3.6	-	1.2	4.8	-	-		73.0	-68.2	60.0	-55.2	P	Neutral
18.18	7.6	-	1.2	8.8	-	-		73.0	-64.2	60.0	-51.2	P	Hot
21.93	6.9	-	0.9	7.8	-	-		73.0	-65.2	60.0	-52.2	P	Neutral
21.93	6.9	-	0.9	7.8	-	-		73.0	-65.2	60.0	-52.2	P	Hot
28.52	11.7	-	0.5	12.2	-	-		73.0	-60.8	60.0	-47.8	P	Neutral
29.18	11.7	-	0.5	12.2	-	-		73.0	-60.8	60.0	-47.8	P	Hot

No emissions of significant levels were observed between the ranges 0.15MHz to 0.17MHz and 29.18MHz to 30MHz.

Data Table Legend and Field Strength Calculation

Detector mode: Peak (P) or Quasi-Peak (QP) or Average (A)

The margin is calculated as follows:
Margin = Corrected Amplitude - Limit; where Corrected Amplitude = Amplitude + Cable Loss + Antenna Factor.

Power Line Conducted Emissions (cont.)

Test Setup Photographs

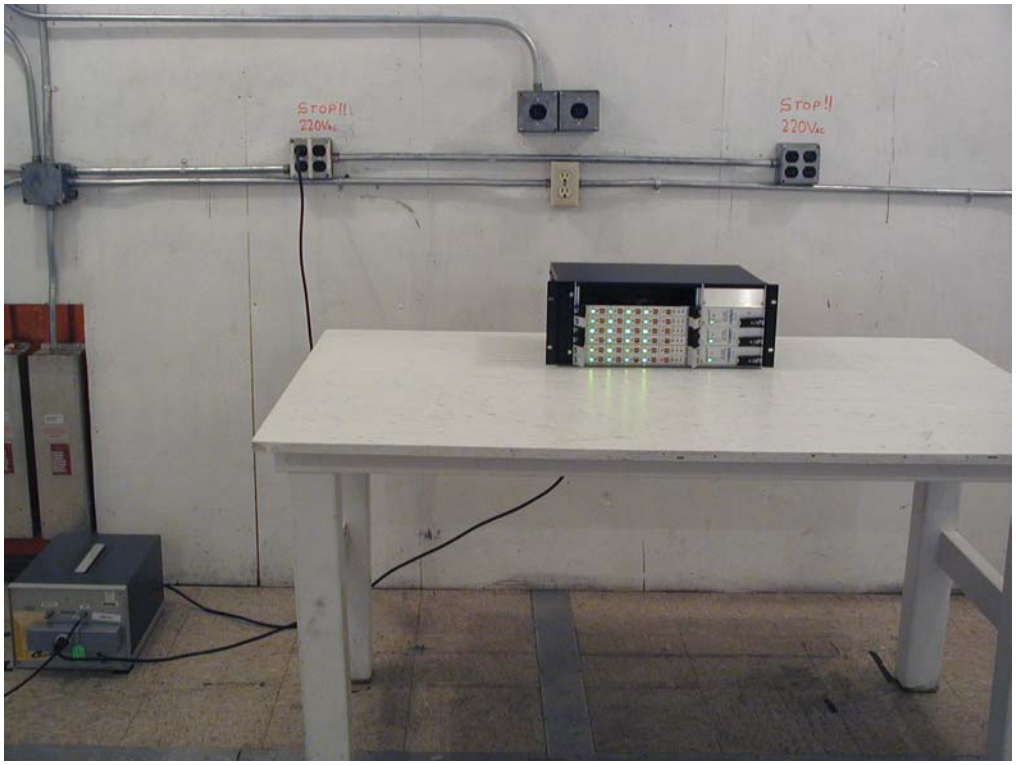

Figure 1: Front View, Power Line Conducted Maximized Emissions (S/N: 115329)

Figure 2: Rear View, Power Line Conducted Maximized Emissions (S/N: 115329)

Power Line Conducted Emissions (cont.)

Test Setup Photographs

Figure 3: Front View, Power Line Conducted Maximized Emissions (S/N: 106665)

Figure 4: Rear View, Power Line Conducted Maximized Emissions (S/N: 106665)

Chamber Radiated Emissions per EN 55022: 1998 Class A

EUT Configuration and Test Procedure

The EUTs, Type 39, 4U, 8 Slots, Rack-Mount Chassis', were set up on a wooden table, 80cm above the ground in a Chamber. The EUTs consisted of components as listed in the 'Test SetUp Configurations' section of this report. They were connected to peripherals as listed above, powered and tested continuously, in all modes, according to requirements specified in EN 55022: 1998 Class A. Excess cords of the EUTs were shortened to appropriate lengths.

Test Equipment Used

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due
Spectrum Analyzer	Hewlett-Packard	8566B	2618A02909	12-11-04
Spectrum Analyzer Display	Hewlett-Packard	85662A	2848A17028	12-11-04
Quasi Peak Adapter	Hewlett-Packard	85650	2521A00871	12-11-04
Preselector	Hewlett-Packard	85685A	2620A00265	12-11-04
Antenna Cable (OPTK45)	RG8/u	-	-	
Biconical Antenna	EMCO	3104	3549	01-23-05
L. P. Ant. (200-1000 MHz)	EMCO	3146	2075	01-28-05
Horn. Ant. (Above 1000 MHz)	EMCO	3115	8812-3050	12-19-05

Test Software Used

Description	Manufacturer	Model Name	Version Number	Calibration/Validation Date
Test Software	ITC	1.04b1	Rev. 4	02-05-05
Antenna Software	ITC	L.P-V/H 10m	Rev. 4	02-05-05
Antenna Software	ITC	B-V/H 10m	Rev. 4	02-05-05

Antenna Information

	Polarization	Antenna Factor File	Freq Range (MHz)	Calibration Due
VB	Vertical	Biconical 8901-3885 Vert 10m ver 4	30 – 200	01-23-05
HB	Horizontal	Biconical 8901-3885 Horiz 10m ver 4	30 – 200	01-23-05
VL	Vertical	Log Periodic 9510-4202 Vert 10m ver 4	200 – 1000	01-28-05
HL	Horizontal	Log Periodic 9510-4202 Horiz 10m ver 4	200 – 1000	01-28-05

Cable Information

Polarization	Cable Factor File	Freq Range (MHz)	Calibration Due
	Site 1 cable factors 30-1000MHZ Ver. 4	30-1000MHz	12-09-04

Spectrum Analyzer Settings

Video Bandwidth..... 120 kHz
IF Bandwidth..... 120 kHz
Sweep Speed ..... Auto
Analyzer Mode (for Peak Measurements)..... Peak
    Resolution Bandwidth..... 100 kHz
    Video Bandwidth..... 100 kHz
    Quasi-Peak Adapter Mode ..... Disabled
Analyzer Mode (for Quasi-Peak Measurements) ..... Quasi-Peak/Linear
    Quasi-Peak Adapter Mode ..... Normal
    Quasi-Peak Adapter Bandwidth ..... 120 kHz
    Resolution Bandwidth..... 1000 kHz
    Video Bandwidth..... 1000 kHz

Antenna Legend

	Polarization	Antenna	Freq Range (MHz)
VB	Vertical	EMCO 3104/sn 3549 Biconical	30 – 200
HB	Horizontal	EMCO 3104/sn 3549 Biconical	30 – 200
VL	Vertical	EMCO 3146/sn. 2075 Log Periodic	200 – 1000
HL	Horizontal	EMCO 3146/sn. 2075 Log Periodic	200 – 1000
VH	Vertical	EMCO 3115/sn. 8812-3050 Horn	Above 1000
HH	Horizontal	EMCO 3115/sn. 8812-3050 Horn	Above 1000

Chamber Radiated Emissions (cont.)

Chamber Radiated Emissions Test Results

Site Used

- ☐ Test Site 1: Shielded Room: 16' x 12' x 9'
- ☐ Test Site 1 - 3m Open Field Radiated Site
- ☐ Test Site 1 - 10m Open Field Radiated Site
- ☐ Test Site 2 - Environmental Lab
- ☐ EMC Lab 1 - Test Laboratory
- ☑ Semi-Anechoic Absorber Lined Shielded Chamber
- ☐ Other: _____

Administrative Details

Test Date:	February 9th, 2004
Test Engineer:	Lan Vu

Environmental Conditions

Temperature:	16ºC
Humidity:	77%

Chamber Radiated Emissions Test Results 30MHz to 1GHz for EUT, S/N: 115329

The tables below show summaries of the highest amplitudes of the radiated emissions from the equipment under test at various antenna heights, antenna polarizations, and EUT orientations:

INDICATED		CORRECTION		CORR	TURNTABLE	ANT		CLASS A		CLASS B		
FREQ	AMPL	ANT	CAB	AMPL	ANG	HT	POL	AMPL	MARG	AMPL	MARG	FILTER
MHz	dBuV/m	dB	dB	dBuV/m	DEG	m	-	dBuV/m	dB	dBuV/m	db	MODE
39.43	9.3	11.1	1.0	21.4	90	1.0	VB	40.0	-18.6	30.0	-8.6	P
41.72	11.4	11.8	1.0	24.1	0	1.5	HB	40.0	-15.9	30.0	-5.9	P
61.21	9.2	9.3	2.1	20.6	90	1.0	VB	40.0	-19.4	30.0	-9.4	P
63.53	14.2	9.0	1.9	25.1	90	1.5	HB	40.0	-14.9	30.0	-4.9	P
117.38	10.8	12.7	3.3	26.9	90	1.5	HB	40.0	-13.1	30.0	-3.1	P
142.30	11.7	11.4	4.5	27.6	90	1.0	VB	40.0	-12.4	30.0	-2.4	P
201.54	12.4	11.3	2.7	26.4	90	1.0	VL	40.0	-13.6	30.0	-3.6	P
250.18	16.6	12.0	4.0	32.6	0	1.0	VL	47.0	-14.4	37.0	-4.4	P
350.28	12.6	14.5	4.9	32.0	90	1.5	HL	47.0	-15.0	37.0	-5.0	P
378.95	15.5	14.8	4.6	34.8	90	1.0	VL	47.0	-12.2	37.0	-2.2	P
379.89	10.8	14.8	4.5	30.1	90	1.5	HL	47.0	-16.9	37.0	-6.9	P
432.58	7.8	15.4	4.2	27.4	0	1.5	HL	47.0	-19.6	37.0	-9.6	P
512.68	8.9	17.5	6.5	32.9	90	1.0	VL	47.0	-14.1	37.0	-4.1	P

No emission of significant level was observed below 39.43MHz and between 512.68MHz and 1GHz.

Chamber Radiated Emissions (cont.)

Chamber Radiated Emissions Test Results 30MHz to 1GHz for EUT, S/N: 106665

The tables below show summaries of the highest amplitudes of the radiated emissions from the equipment under test at various antenna heights, antenna polarizations, and EUT orientations:

INDICATED		CORRECTION		CORR	TURNTABLE	ANT		CLASS A		CLASS B		
FREQ	AMPL	ANT	CAB	AMPL	ANG	HT	POL	AMPL	MARG	AMPL	MARG	FILTER
MHz	dBuV/m	dB	dB	dBuV/m	DEG	m	-	dBuV/m	dB	dBuV/m	db	MODE
38.90	7.4	11.0	1.0	19.4	90	1.0	VB	40.0	-20.6	30.0	-10.6	P
42.58	0.0	11.8	0.9	12.8	0	1.5	HB	40.0	-27.2	30.0	-17.2	P
51.60	7.1	10.9	1.3	19.2	90	1.0	VB	40.0	-20.8	30.0	-10.8	P
59.38	14.8	9.9	2.1	26.8	90	1.2	HB	40.0	-13.2	30.0	-3.2	P
61.21	9.2	9.3	2.1	20.6	90	1.0	VB	40.0	-19.4	30.0	-9.4	P
63.53	14.2	9.0	1.9	25.1	90	1.5	HB	40.0	-14.9	30.0	-4.9	P
112.35	10.8	12.5	3.4	26.7	90	1.5	HB	40.0	-13.3	30.0	-3.3	P
142.30	11.7	11.4	4.5	27.6	90	1.0	VB	40.0	-12.4	30.0	-2.4	P
201.54	12.4	11.1	2.7	26.2	90	1.0	VL	40.0	-13.8	30.0	-3.8	P
250.18	16.6	12.0	4.0	32.6	90	1.0	VL	47.0	-14.4	37.0	-4.4	P
298.98	12.2	13.9	5.2	31.3	90	1.0	VL	47.0	-15.7	37.0	-5.7	P
378.91	14.6	14.8	4.6	33.9	90	1.0	VL	47.0	-13.1	37.0	-3.1	P
379.89	10.8	14.8	4.5	30.1	90	1.0	HL	47.0	-16.9	37.0	-6.9	P
435.58	7.8	15.5	4.1	27.4	90	1.0	HL	47.0	-19.6	37.0	-9.6	P
525.00	8.0	17.9	6.6	32.5	90	1.0	VL	47.0	-14.5	37.0	-4.5	P

No emission of significant level was observed between below 38.90MHz and between 525.00MHz and 1GHz.

Data Table Legend and Field Strength Calculation

Detector mode: Peak (P) or Quasi-Peak (QP) or Average (A)

The margin is calculated as follows:
Margin = Corrected Amplitude - Limit; where Corrected Amplitude = Amplitude + Cable Loss + Antenna Factor.

Chamber Radiated Emissions (cont.)

Test Setup Photographs

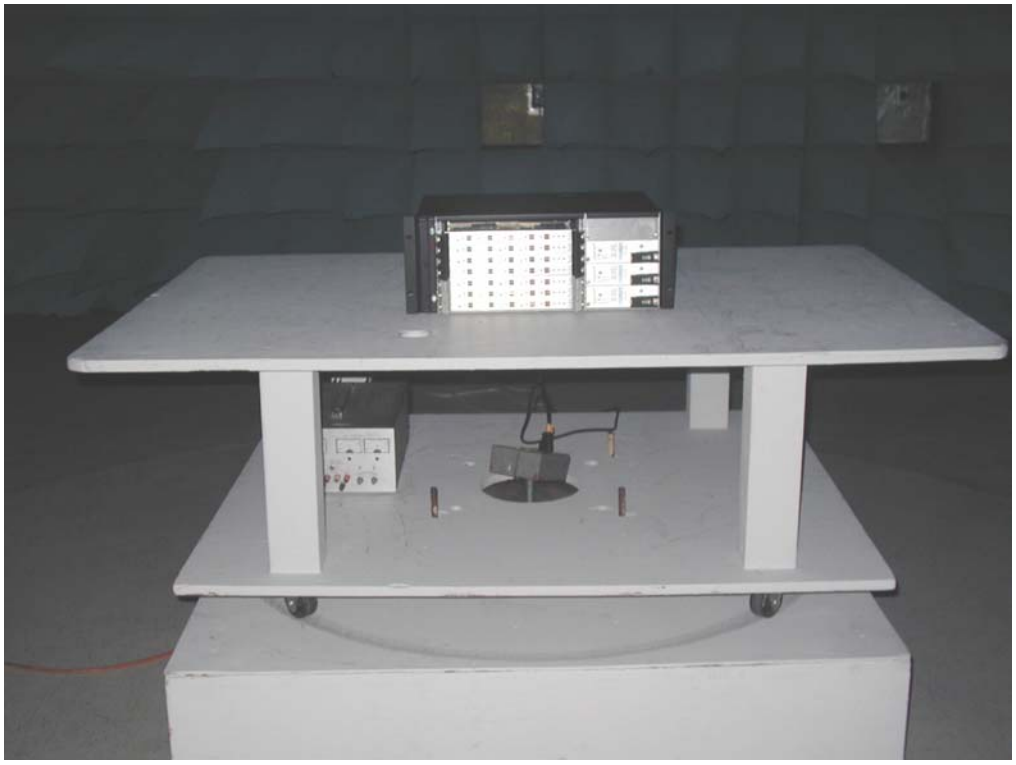

Figure 5: Front View: Chamber Radiated Maximized Emissions (S/N: 115329)

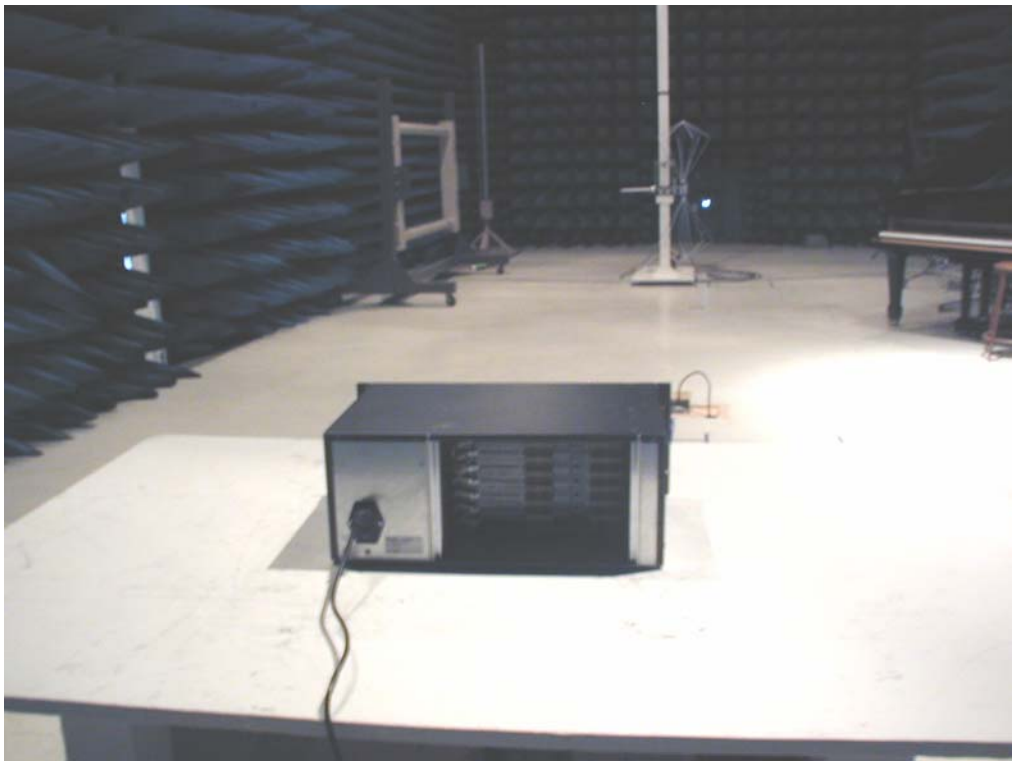

Figure 6: Rear View: Chamber Radiated Maximized Emissions (S/N: 115329)

Chamber Radiated Emissions (cont.)

Test Setup Photographs

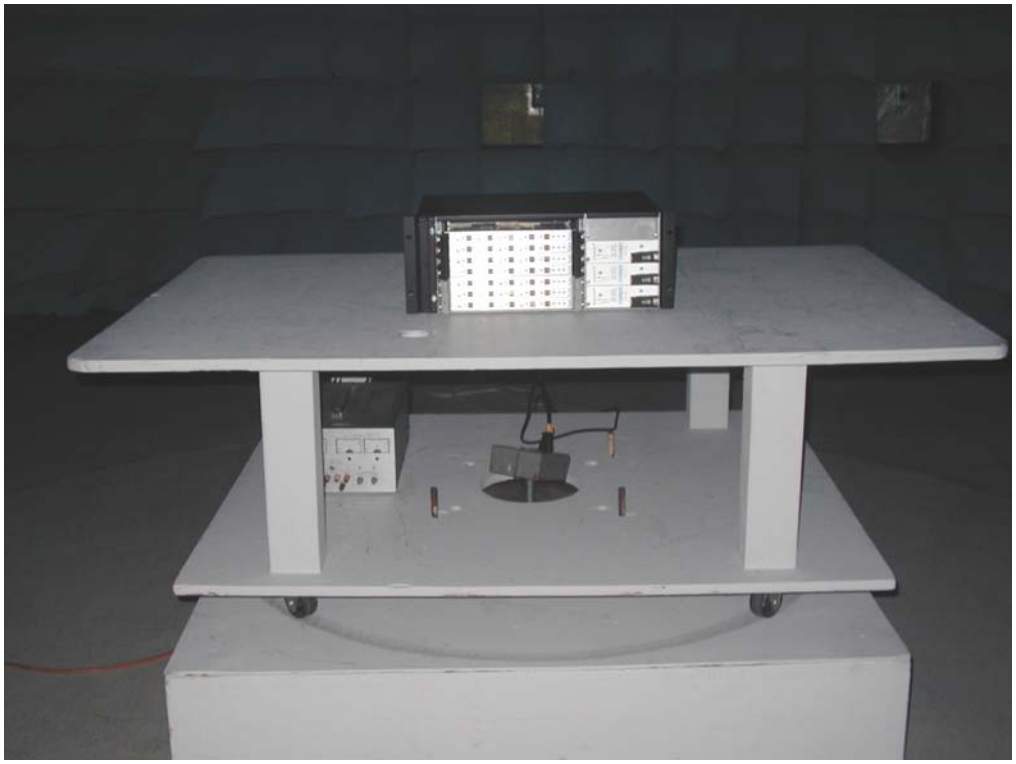

Figure 7: Front View: Chamber Radiated Maximized Emissions (S/N: 106665)

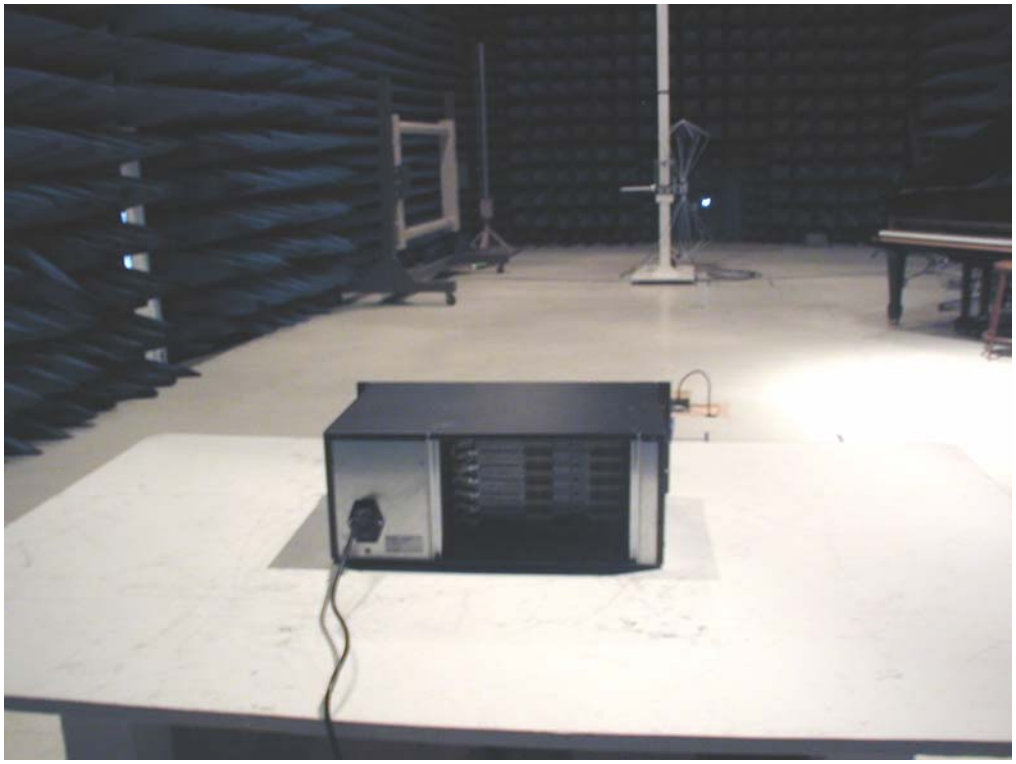

Figure 8: Rear View: Chamber Radiated Maximized Emissions (S/N: 106665)

PART 3 IMMUNITY TESTS

The EUTs were set up per applicable standard in a semi-anechoic chamber for the Radiated Immunity tests and was set up in a test laboratory room on a reference ground plane for all other tests. It was connected to peripherals as listed in the 'Test SetUp configurations' section of this report, powered and tested in a continuous mode to monitor functionality.

Electrostatic Discharge per EN 61000-4-2

Administrative and Environmental Details

Test Date	February 5th, 2004
Test Engineer	Lan Vu
Temperature	22.7ºC
Humidity	39%
Site Used	EMC Lab 1 – Test Laboratory

Test Equipment Used

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due
ESD Simulator	Haefely	PSD25B	081 486-02	04-14-04

Electrostatic Discharge Test Results

Test Specification

Discharge Voltage (Air)	☐ 2 kV	☑ 4 kV	☐ 6 kV	☑ 8 kV	☐ 15 kV	☐ _ kV
Discharge Voltage (Contact)	☑ 2kV	☑ 4 kV	☐ 6 kV	☐ 8 kV	☐ _ kV	☐ _ kV
Discharge Impedance	☑ 330 Ω / 150 pF			☐ 150 Ω / 150 pF		
Discharge Repetition Rate	☑ ≥ 1 second					
Number of Discharges	☑ ≥ 10 at all locations					
Kind of Discharges	☑ Air Discharge			☑ Contact Discharge		
	☑ Direct Contact			☑ Indirect Contact		
Polarity	☑ Positive			☑ Negative		
Location of Discharge	☑ Each location on the surface touchable by hand (see photographs)					
Ground Cable Resistance (HCP)	Total (tip-to-tip):	Resistance (top):		Resistance (bottom):		
Ground Cable Resistance (VCP)	Total (tip-to-tip):	Resistance (top):		Resistance (bottom):		

Test Results

☑	No Degradation of Function	Met Criterion A
☐	Distortion of Function	Met Criterion B
☐	Error of Function	Met Criterion C
☐	Loss of Function	Broken

Electrostatic Discharge (cont.)

ESD Discharge points (S/N: 115329)

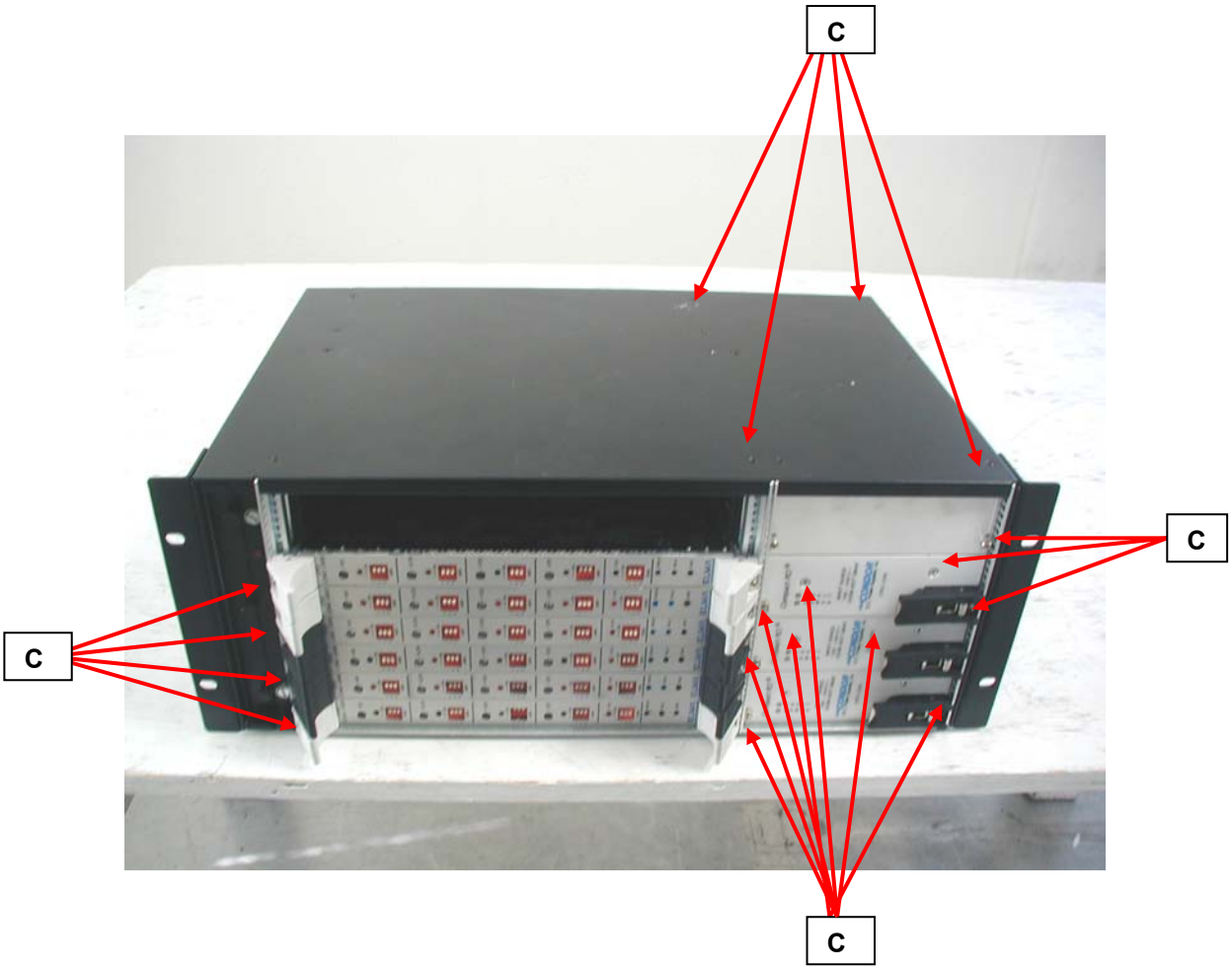

Figure 9: ESD Discharge Points (S/N: 115329)

Legend:
C = Contact Discharge points

Electrostatic Discharge (cont.)

ESD Discharge points (S/N: 115329)

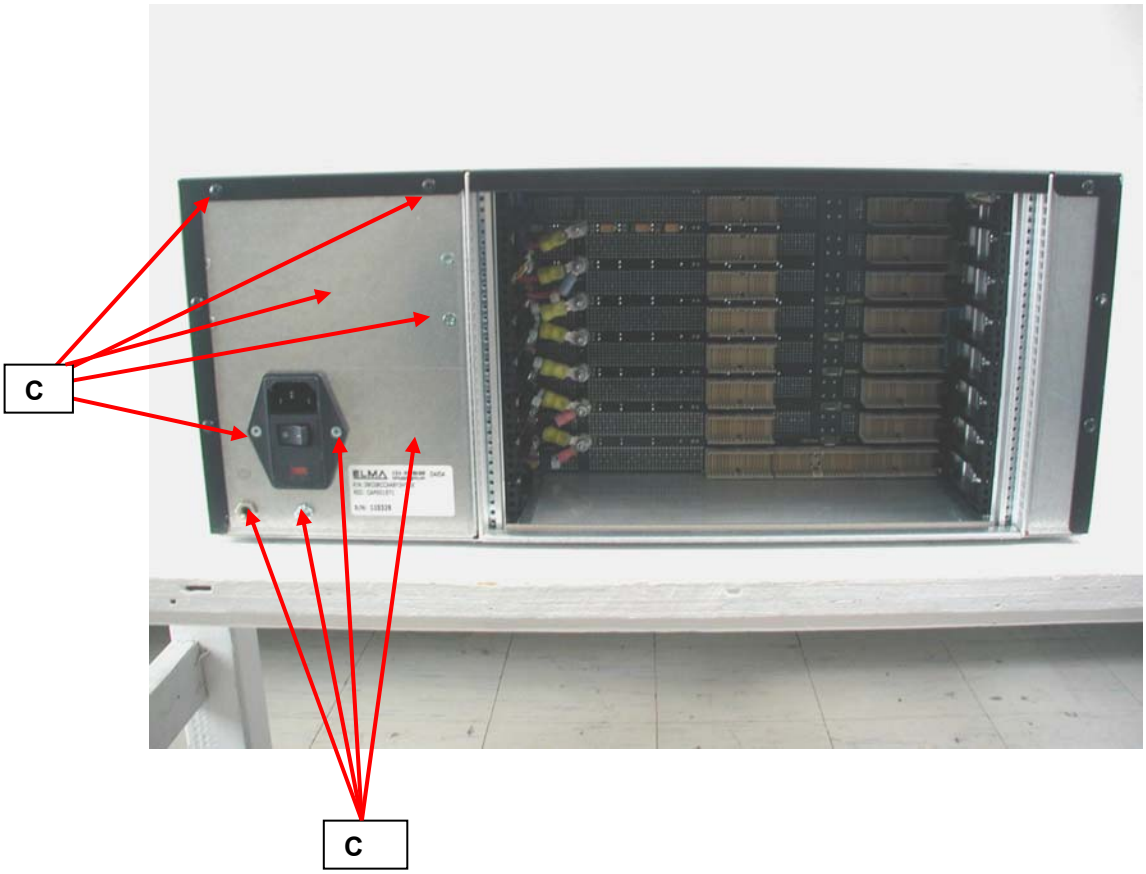

Figure 10: ESD Discharge Points (S/N: 115329)

Legend:
C = Contact Discharge points

Electrostatic Discharge (cont.)

ESD Discharge points (S/N: 106665)

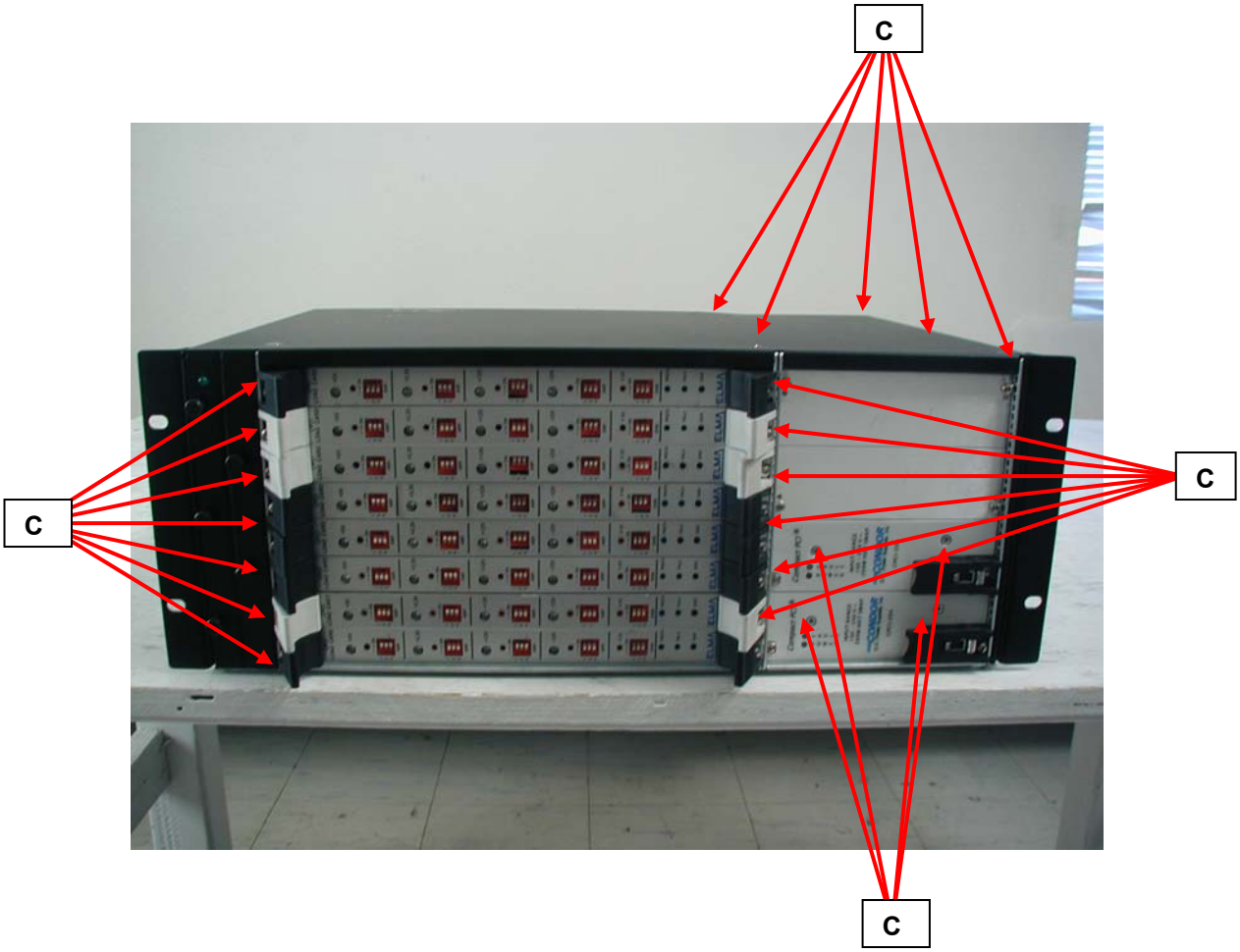

Figure 11: ESD Discharge Points (S/N: 106665)

Legend:
C = Contact Discharge points

Electrostatic Discharge (cont.)

ESD Discharge points (S/N: 106665)

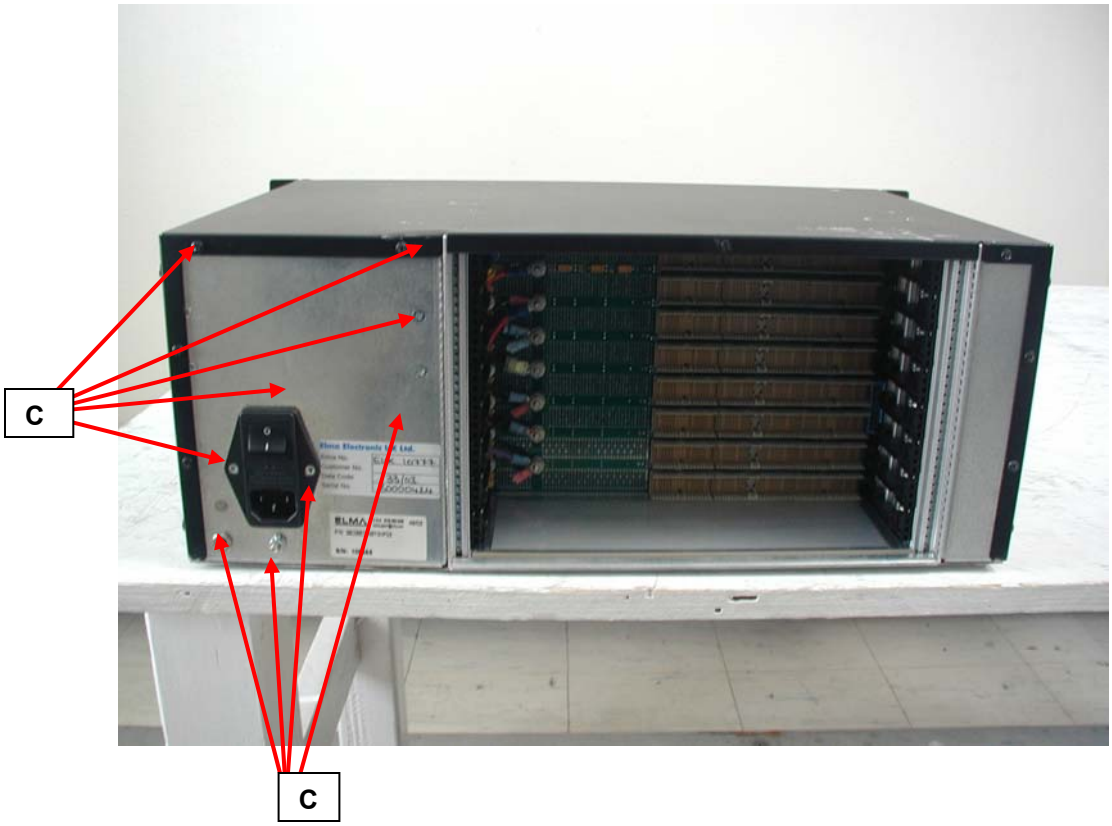

Figure 12: ESD Discharge Points (S/N: 106665)

Legend:
C = Contact Discharge points

Electrostatic Discharge (cont.)

Test Setup Photograph

Figure 13: ESD Test Setup (S/N: 115329)

Figure 14: ESD Test Setup (S/N: 106665)

Electrical Fast Transient/Burst per EN 61000-4-4

Administrative and Environmental Details

Test Date	February 4th, 2004
Test Engineer	Lan Vu
Temperature	74° F
Humidity	29%
Site Used	EMC Lab 1 – Test Laboratory

Test Equipment Used

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due
Burst-Tester Mainframe	Haefely Test Systems	PEFT.1	081 979-03	09-17-04
Coupling Filter Module	Haefely Test Systems	PHV 4/1	081 979-03	09-17-04
Control Unit Module	Haefely Test Systems	P90.1	0810979-03	09-17-04
Power Supply Module	Haefely Test Systems	PP53.1	081 979-03	09-17-04
Capacitive Coup. Clamp	Haefely Test Systems	IPA	083839-11	09-17-04
Coupling Filter	Haefely Test Systems	FP 16/3-1	082529-12	09-17-04

Test Software Used

Description	Manufacturer	Model Name	Version Number	Validation Date
Test Software	HAEFELY	PHU 41.2	1.64	01-08-04

Electrical Fast Transient/burst Test Results

Test Specification

Pulse Ampl. - AC Power Port	☐ 0.5 KV	☑ 1.0 KV	☐ 2.0 KV	☐ 4.0 KV
Pulse Ampl. - DC Power Port	☐ 0.5 KV	☐ 1.0 KV	☐ 2.0 KV	☐ 4.0 KV
Pulse Amplitude - Signal/Data	☐ 0.5 KV	☐ 1.0 KV	☐ 2.0 KV	☐ ___KV
N. C. Port Pulse Ampl. - Proc.	☐ 0.5 KV	☐ 1.0 KV	☐ 2.0 KV	☐ ___KV
Meas. & C. Port Burst Freq.	☐ 2.5 kHz	☑ 5.0 kHz	☐ ___ kHz	
Time of Coupling	☑ 60 seconds		☐ ___ seconds	
Coupling Method	☐ Coupling Clamp		☐ Coup./Decoup. Network	
Polarity	☑ Positive		☑ Negative	

Location of Coupling

Name of Lines	AC Mains	Length of Lines 6ft
Type of Lines	☐ Shielded	☑ Unshielded
Status of Lines	☑ Active	☐ Passive
Kind of Transmission	☑ Analog	☐ Digital

Test Results

☑	No Degradation of Function	Met Criterion A
☐	Distortion of Function	Met Criterion B
☐	Error of Function	Met Criterion C
☐	Loss of Function	Broken

Electrical Fast Transient/Burst (cont.)

Test Setup Photographs

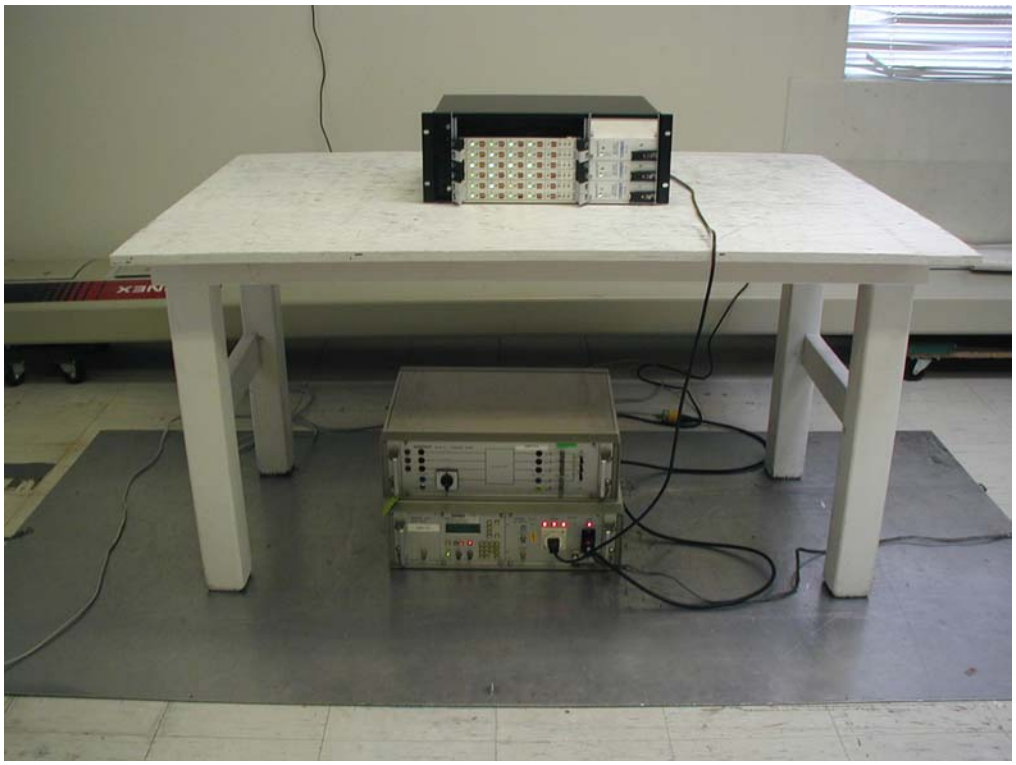

Figure 15: Electrical Fast Transients/Burst Test Setup (S/N: 115329)

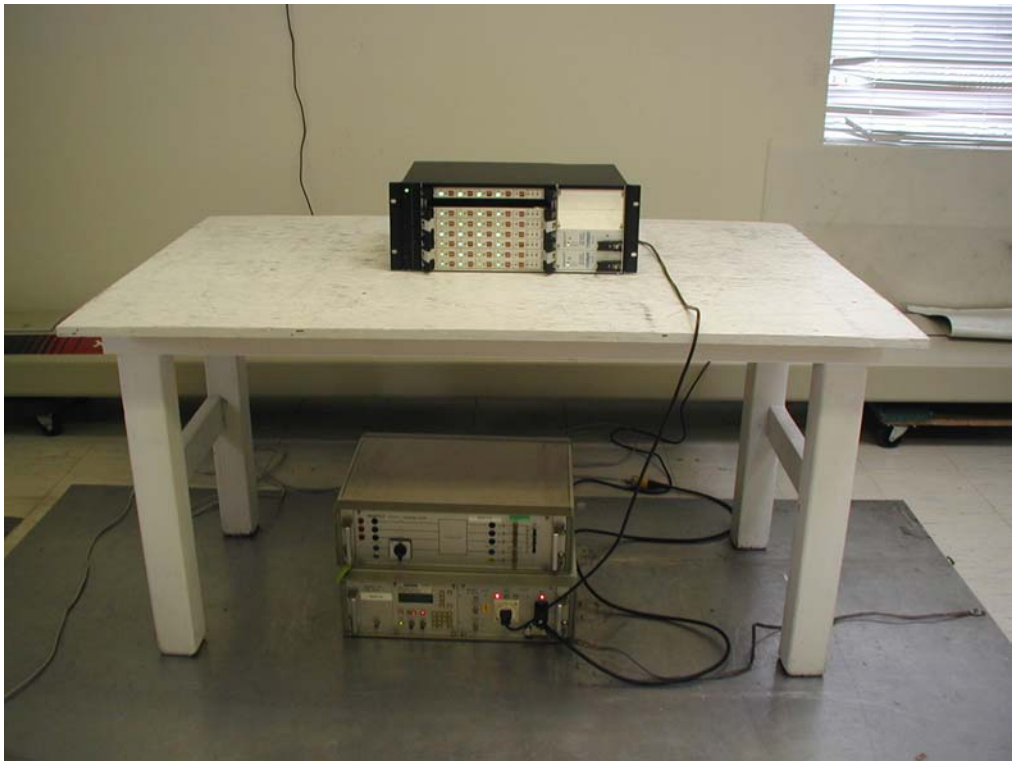

Figure 16: Electrical Fast Transients/Burst Test Setup (S/N: 106665)

Voltage Surge Immunity per EN 61000-4-5

Site Used

☑ EMC Lab 1 - Test Laboratory
☐ Semi-Anechoic Absorber Lined Shielded Room
☐ Other

Administrative & Environmental Details

Test Date	February 5th, 2004
Test Engineer	Lan Vu
Temperature	74° F
Humidity	29%
Site Used	EMC Lab 1 - Test Laboratory

Test Equipment Used

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due
Surge Generator	Schaffner	NSG650	119	04-15-04
Coupling Filter	Haefely Test Sys.	FP 20/3-3	Not Provided	N/A
Comm. Wave 1.2/50us, 8/20us.	Haefely Test Sys.	PHV1	Not Provided	N/A
H.V. Retractable Probe	Haefely Test Sys.	-	Not Provided	N/A
Isolation Transformer	Topaz Electronics	16630	Not Provided	N/A
Storage Oscilloscope	Hitachi	VC-6075	8110016	N/A

Voltage Surge Immunity Test Results
Test Specification

Pulse Amplitude- AC Power Port Com. Mode	☐ 0.5kV	☐ 1.0kV	☑ 2.0 kV	☐ 4.0kV
Differential Mode [Line - Neutral]	☐ 0.5kV	☑ 1.0kV	☐ 2.0 kV	☐ 4.0kV
Symmetrically Operated Circuit/Lines [L-G]	☐ 0.5kV	☐ 1.0kV	☐ 2.0 kV	☐ 4.0kV
Pulse Amplitude- DC Power Port	☐ 0.5kV	☐ 1.0kV	☐ 2.0 kV	☐ 4.0kV
Pulse Amplitude- Signal/Data	☐ 0.5kV	☐ 1.0kV	☐ 2.0 kV	☐ 4.0kV
Non Control Port : Pulse Amplitude - Process	☐ 0.5kV	☐ 1.0kV	☐ 2.0 kV	☐ 4.0kV

Measurement & Control Port Specifications

Source Impedance	☑ 2 Ω + 18μF	☑ 10 Ω + 9μF	☐ 42 Ω + 0.1μF	☐ 42 Ω + 0.5μF	
Number of Surges	☑ 2 Surges/Angle	☐ 10 Surges/Angle			
Angles	☑ 0^0	☑ 90^0	☑ 180^0	☑ 270^0	☐ 360^0
Repetition Rate	☑ 60 sec	☐ ___ Sec.			
Polarity	☑ Positive	☑ Negative			

Location of Coupling

Name of Lines	AC Mains	Length of Lines:6 ft
Type of Lines:	☐ Shielded	☑ Unshielded
Status of Lines:	☑ Active	☐ Passive

Test Results

☑	No Degradation of Function	Met Criterion A
☐	Distortion of Function	Met Criterion B
☐	Error of Function	Met Criterion C
☐	Loss of Function	Broken

Voltage Surge Immunity (cont.)

Test Setup Photographs

Figure 17: Surge Transients Test Setup (S/N: 115329)

Figure 18: Surge Transients Test Setup (S/N: 106665)

Immunity to Conducted Disturbances per EN 61000-4-6

Administrative and Environmental Details

Test Date	February 4th, 2004
Test Engineer	Lan Vu
Temperature	62º F
Humidity	47%
Site Used	EMC Lab 1 - Test Laboratory

Test Equipment Used

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due
Signal Generator	Hewlett Packard	8673C	2918A00649	12-09-04
Power Amplifier	Amplifier Research	100A100	10922	N/A
Power Amplifier	Amplifier Research	25W1000M7	10830	N/A
Leveling Amplifier	Amplifier Research	999	Not Provided	N/A
RFI Shielded Enclosure	Lindgren	46-2/5-0	8220	N/A
Spectrum Analyzer	Hewlett Packard	85662	2848A17028	12-11-04
P.L. Coup/Decoup.	Fischer Custom Comm.	FCC-801-M3-25A	02002	03-18-04
Current Probe	Solar electronics	6741-1	904408	08-05-04

Immunity to Conducted Disturbances Test Results

Test Specification

Frequency Range	☑ 150 kHz - 26 MHz		☑ 26 MHz - 80 MHz	
Field Strength	☐ 1 V	☑ 3 V	☐ 10 V	☐ _ V
Modulation	☑ AM ☐ FM ☑ Sine Wave	80 % __ % ☐ Unmodulated	1 kHz __ kHz	
Step	☑ < 0.015 decades / sec	☐ 1%		
Polarization of Antenna	☐ Horizontal	☐ Vertical	☑ Circular	
Step	☐ Continuous	☑ 1%		

Test Results

☑	No Degradation of Function	Met Criterion A
☐	Distortion of Function	Met Criterion B
☐	Error of Function	Met Criterion C
☐	Loss of Function	Broken

Conducted Disturbances (cont.)

Test Setup Photographs

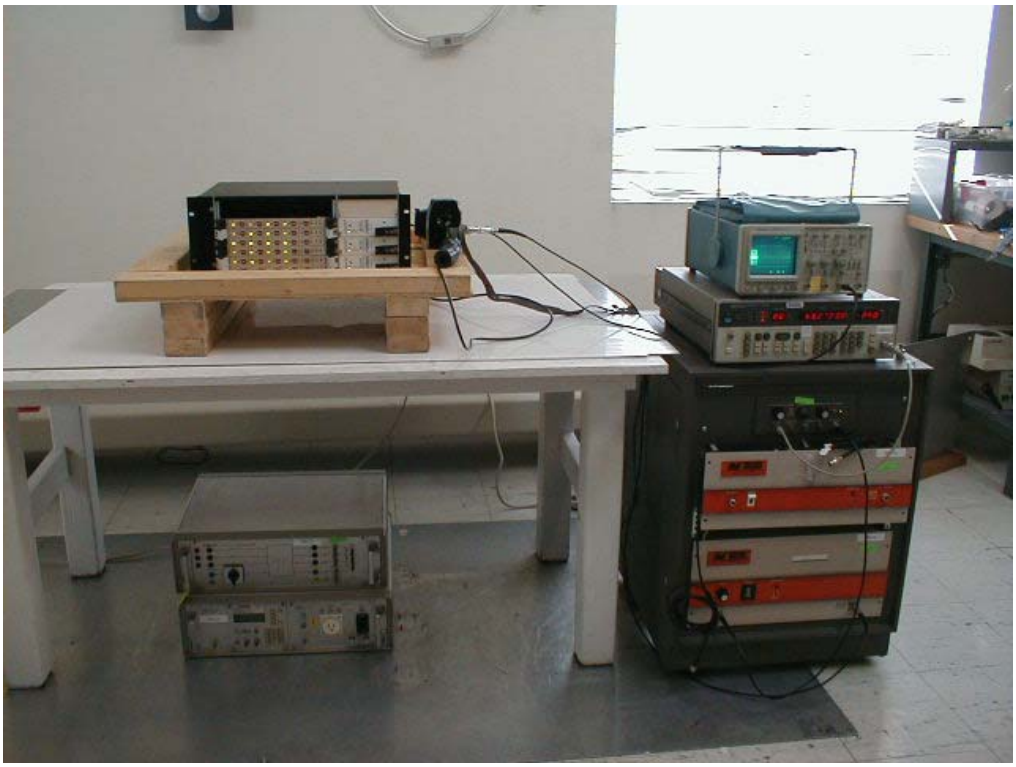

Figure 19: Immunity to Conducted Disturbances test setup (S/N: 115329)

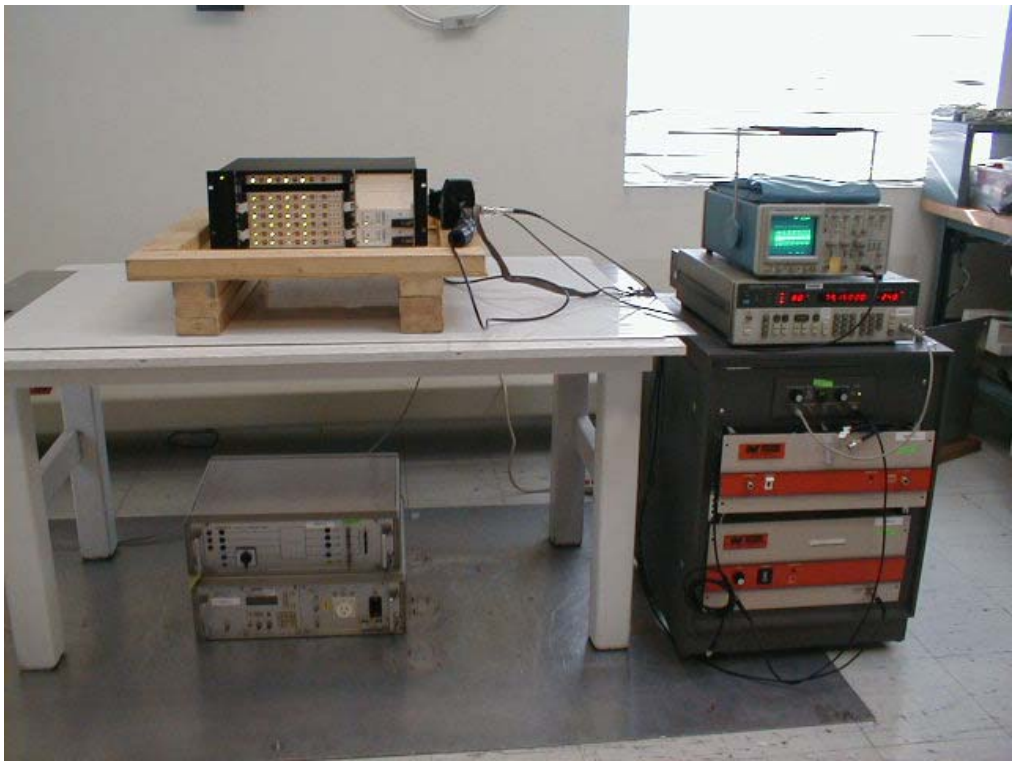

Figure 20: Immunity to Conducted Disturbances test setup (S/N: 106665)

Voltage Dips, Short Interruptions and Voltage Variations per EN 61000-4-11

Administrative and Environmental Details

Test Date	February 12, 2004
Test Engineer	Lan Vu
Temperature	62º F
Humidity	47%
Site Used	EMC Lab 1 - Test Laboratory

Test Equipment Used

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due
Line Voltage Simulator/Main Frame	Schaffner	NSG200E/NSG203A	2514	N/A
Variac	Powerstat	GP58004	801-5218	N/A
Variac	Powerstat	FAE/571	-	N/A
Digital Voltmeter	Fluke	112	77990215	12-10-04
Digital Voltmeter	Fluke	189	80310297	12-10-04

Voltage Dips, Short Interruptions and Voltage Variations Test Results

Test Specification

	Test Level %U_T	Voltage Dips and Short Interruptions %U_T	Duration (in period)
	0	**100**	**0.5** **1**
	40	**60**	**5** **10**
	70	**30**	**25** **50**

Test Results

☑	No Degradation of Function	Met Criterion A
☐	Distortion of Function	Met Criterion B
☐	Error of Function	Met Criterion C
☐	Loss of Function	Broken

Voltage Dips, Short Interruptions and Voltage Variations (cont.)

Test Setup Photograph

Figure 21: Voltage Dips, Short Interruptions and Voltage Variations Test Setup (S/N: 115329)

Figure 22: Voltage Dips, Short Interruptions and Voltage Variations Test Setup (S/N: 106665)

PART 4: APPENDICES

A1. EUT Technical Specification (S/N: 115329)

Applicant	ELMA ELECTRONICS INC.	
General Description	Type 39, 4U, 8-Slot, Rack-Mount Chassis	
Model Number:	39C08CC148Y3HQ2X	
Power Input	100-240VAC	
Approx. EUT Dimension	17.25" x 11.75" x 7"	
	PCB Description	Model/Part Number N/A / Rev A
	Three (3) Bustronic Power Interface Boards	Dimensions 5.25" x 1.5"
	PCB Description	Model/Part Number N/A
	8 Slot Compact PCI PCB	Dimensions 6.25" x 10.5"
Power Supply	3 x Model: Condor DC Power Supplies CPCI 204	
	Rating 100-240V Input, 200W	
	Cable Length: 6ft	Shielded ☐ or Unshielded ☒
Cable Name	Power Cord	

A2. EUT Technical Specification (S/N: 106665)

Applicant	ELMA ELECTRONICS INC.	
General Description	Type 39, 4U, 8-Slot, Rack-Mount Chassis	
Model Number:	39C08ED248Y3HP2X	
Power Input	100-240VAC	
Approx. EUT Dimension	17.25" x 11.75" x 7"	
	PCB Description	Model/Part Number N/A / Rev A
	Three (3) Bustronic Power Interface Boards	Dimensions 5.25" x 1.5"
	PCB Description	Model/Part Number N/A
	8 Slot Compact PCI PCB	Dimensions 6.25" x 10.5"
Power Supply	2 x Model: Condor DC Power Supplies CPCI 204	
	Rating 100-240V Input, 200W	
	Cable Length: 6ft	Shielded ☐ or Unshielded ☒
Cable Name	Power Cord	

B. EUT Photographs

Figure 23: EUT S/N: 115329, Front view

Figure 24: EUT S/N: 115329, Rear view

EUT Photographs (cont.)

Figure 25: EUT S/N: 115329, Side View

Figure 26: EUT S/N: 106665, Front view

EUT Photographs (cont.)

Figure 27: EUT S/N: 106665, Rear view

Figure 28: EUT S/N: 106665, Side View

C. Modification Letter

To Whom It May Concern:

The EUTs, ELMA Electronics' Type 39, 4U, 8 Slots, Rack-Mount Chassis', Model Numbers 39CO8ED248Y3HP2X and 39C08CC148Y3HQ2X, described in this report, had no modifications during testing in order to comply with the following standards:

Emissions Standards

1. Power Line Conducted Emissions per EN 55022:1998 Class A
2. Open Field Radiated Emissions per EN 55022:1998 Class A

Immunity Standards

1. EN 61000-4-2 Electrostatic discharge immunity test.
2. EN 61000-4-4 Electrical fast transient/burst immunity test.
3. EN 61000-4-5 Surge immunity test.
4. EN 61000-4-6 Immunity to conducted disturbances, induced by radio-frequency fields
5. EN 61000-4-11 Power Line Dips & Brownout

For further information, please contact the manufacturer at:

ELMA Electronics Inc.
44350 S. Grimmer Blvd
Fremont
CA 95438
United States

Tel: +1(510) 656-3400

Attention: Mr. Ram Rajan
RamR@Elma.com