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Document Title: **EMC Test Report for:**

AZ/ALT Power Drive Unit
CASS Power Drive Unit
Data Acquisition Unit

Document Number: **VIS-PRO-VER-01001-9012**

Issue: **1.0**

Document Interpreted By:	**Juan C. Delgadillo**	**Signature and Date:**	11 March 2005
Document Approved By:	**Ed Reese**	**Signature and Date:**	11 March 2005
Document Released By:	**Juan C. Delgadillo**	**Signature and Date:**	11 March 2005

ENGINEERING TEST REPORT

NUMBER: 4L0697EEU1

ON

Model No.(s):
Data Acquisition Unit
CASS Power Drive Unit
AZ/ALT Power Drive Unit

IN ACCORDANCE WITH:
EN 61000-6-4: 2001
&
EN 61000-6-2: 2001

TESTED FOR:
Vertex RSI
1219 Digital Dr.
Richardson, TX 75081

TESTED BY:
Nemko Dallas, Inc.
802 N. Kealy
Lewisville, Texas 75057-3136

APPROVED BY: Arturo Ruvalcaba DATE: 01/19/05
Arturo Ruvalcaba, EMC Engineer

NVLAP

NVLAP LAB CODE: 100426-0

Table of Contents

Section 1. Summary of Test Results

General:

All measurements are traceable to national standards.

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with the following standards:

- EN 61000-6-2: 2001, Generic standards – Immunity for industrial environments
- EN 61000-6-4 Generic standards – Emissions for industrial environments

All tests were performed using measurement procedure CISPR 16. Radiated emissions were performed on an open area test site.

Requirements and tests using the following standards as test methodologies:

Abstract:

Name of Test	Basic Standard	Results
Conducted Emissions (Mains port)	EN61000-6-4: 2001 (CISPR 11)	Complies
Radiated Emissions	EN61000-6-4: 2001 (CISPR 11)	Complies
Harmonics	EN61000-3-2: 2001	Complies
Flicker	EN61000-3-3: 2002	Complies

Abstract: Continued

Immunities:

Name of Test	Basic Standard	Test Specification	Results
Electrostatic Discharge	EN61000-4-2: 1995	4kV Contact Discharge 8kV Air Discharge	Complies
Radiated Electro-magnetic Field	EN61000-4-3: 1996	80MHz to 1000 MHz 80% AM @ 1 kHz 10V/m	Complies
Electrical Fast Transients / Burst	EN61000-4-4: 1995	1 kV on I/O Signal and Control Lines 2kV on Power Supply	Complies
Surge Immunity	EN61000-4-5: 1995	I/O Surge 1 kV Line to Earth 2kV Line to Line 1kV	Complies
RF Conducted Immunity	EN61000-4-6: 1996	150 kHz to 80MHz 10 Vrms 80% Mod.	Complies
Magnetic Immunity	EN61000-4-8: 1993	30A/M @ 50Hz, 60Hz (For CRT 1A/M)	N/A
Voltage Dips and Interruptions	EN61000-4-11: 1994	30% Reduction (500ms) 60% Reduction (100ms) 60% Reduction (1000ms) <95% Reduction (5s)	Complies

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE: **NONE**

Section 2. Equipment Under Test (E.U.T.)

Manufacturer:	Vertex RSI
Name:	Model 133 Mount Control System
Model Number:	Data Acquisition Unit, VISTA
Part Number:	99-343-3300-001
Serial Number:	001
Model Number:	CASS Power Drive Unit, VISTA
Part Number:	99-343-2010-001
Serial Number:	001
Model Number:	AZ/ALT Power Drive Unit, VISTA
Part Number:	99-343-2000-001
Serial Number:	001
Production Status:	Production

Description of E.U.T.:

Motor Control System

Modifications Incorporated in E.U.T.:

The E.U.T. has not been modified from what is described by the brand name and unique type identification stated above.

Justification:
The E.U.T. was configured for testing as per typical installation. Position and bundling of cables were investigated to establish maximum amplitude of emissions.

The following combinations were investigated to establish worst-case configuration:
The AZ/ALT Power Drive Unit will be cabled to the four Azimuth Motors, to the Altitude test motor and the Regen Cabinet. The CASS Power Drive Unit will be cabled to the three CASS motors and to the Regeneration cabinet. The Data Acquistion Unit will be connected to the host computer and to three temperature sensors.
All cabinets powered and all motors running.

Exercise Program:
The E.U.T. exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

The EUT was in the following exercise mode:
The Azimuth motors (4) and Altitude test motor (1) will be commanded (in rate loop mode) by the Portable Maintenance Unit to rate at LO rate. The Cassegrain motors will be commanded from the LCU Test Fixture to rotate at TRACK rate. The Data Acquisition Unit (DAQ) will establish communication with the Host Computer for the monitoring of 3 temperature sensors

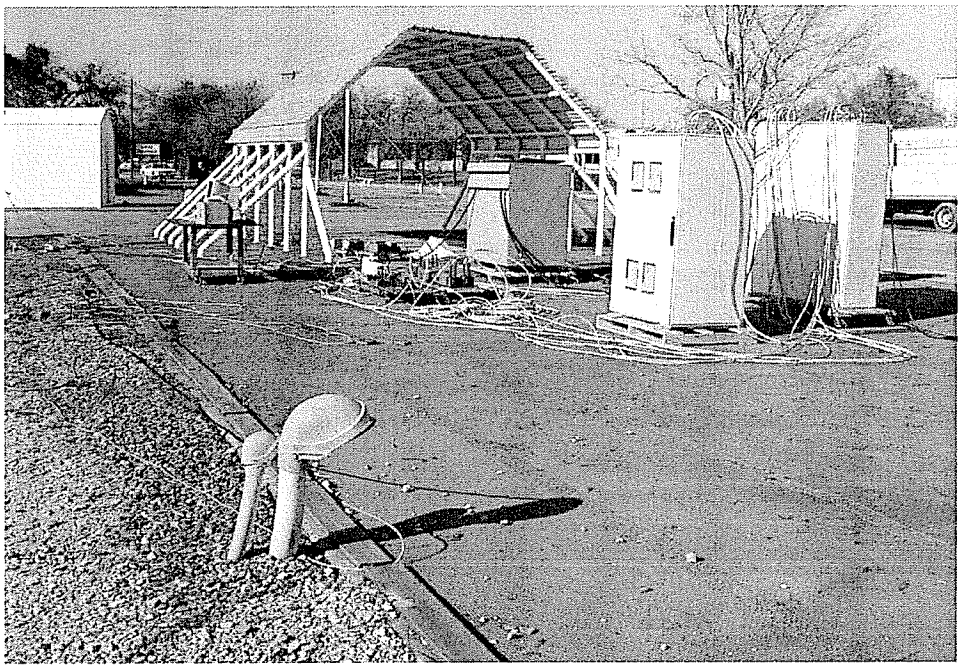
Performance Criteria:

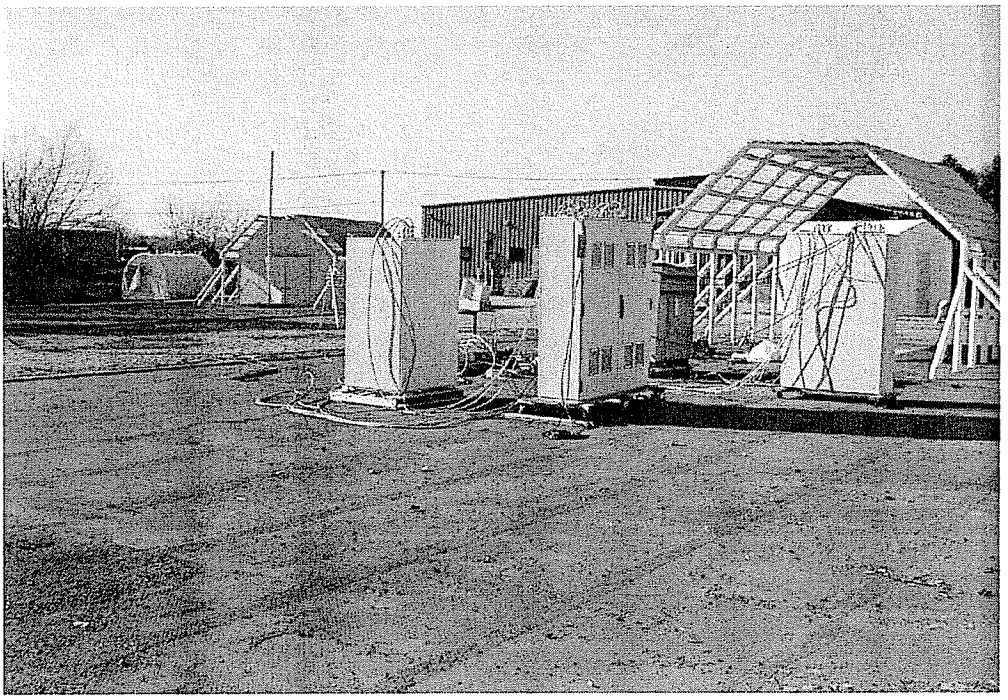
Criteria A: The apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer then either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Criteria B: The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer then either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Criteria C: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

E.U.T. Photographs:





Section 3. Equipment Configuration

Equipment Configuration List:

EQUIPMENT CONFIGURATION LIST (HARDWARE/PERIPHERALS):

Place an "*" next to EUT and any item that is part of the EUT.

Item	*	Generic Description	Manufacturer	Part No.	Serial #	Rev.	FCC ID Status[1]
(A)	*	AZ/ALT Power Drive Unit	Vertex RSI	99-343-2000-01	1	-	
(B)	*	CASS Power Drive Unit	Vertex RSI	99-343-2010-01	1	-	
(C)	*	Data Acquisition Unit	Vertex RSI	99-343-3300-01	1	-	
(D)		Isolation Transformer	Vertex RSI	99-343-4500-01	1	-	
(E)		Azimuth Drive Motors	Vertex RSI	99-343-3500-01	001-004	-	
(F)		Altitude Test Motor w/Encoder	Danaher				
(G)		CASS Drive Motors	Vertex RSI	99-343-3500-02	001-003	-	
(H)		Portable Maint Unit	Vertex RSI	99-343-3000-01	1	-	
(I)		Personal Computer	Generic		N/A		
(J)		LCU Test Fixture (for CASS)	Vertex RSI	--	N/A	-	
(K)		Regeneration Cabinet	Vertex RSI	99-343-2050-01	1	-	
(L)							

[1] FCC ID STATUS
1. FCC DOC
2. FCC A/B Verification
3. None - (If performing FCC testing, contact lab manager)
4. Certification (include FCC ID in parenthesis)

INTER-CONNECTION CABLES:

Place an "*" next to EUT and any item that is part of the EUT.

Item	*	Cable Type	Manufacturer	Ln (m)	Term[1]	Shield	Qty.
(1)	*	4 Cond, 6 mm^2	Lapp USA Inc. (W13-W17, W67, W144, W147)	21-39	3	Y	5
(2)	*	4 Cond, 1.5 mm^2	Lapp USA Inc. (W19-W21, W145, W146)	44-55	3	y	3
(3)	*	2 TSP. 0.25mm^2	Lapp USA Inc. (W72-W73, W98-W100)	7-25	3	Y	5
(4)	*	8 TSP, 0.25 mm^2	Lapp USA, Inc. (W3-W6, W9-W11)	21-55	3	Y	7
(5)	*	25 Cond, 0.34 mm^2	Lapp USA, Inc. (W37)	4	3	Y	1
(6)		1X2X0.2mm^2 + 1X2X0.32mm^2	Lapp USA, Inc. (W36)	10	5	Y	1
(7)	*	12 TSP, 0.25mm^2	Lapp USA, Inc. (W149)	8	3	Y	1
(8)							
(9)							
(10)							
(11)							
(12)							
(13)							

[2] **TERMINATION**
1. Peripheral
2. Loopback
3. EUT
4. Resistive
5. Remote Equipment
6. Other _____

Section 4. Conducted Emissions (Mains ports)

Purpose:

The test is intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) to the limits for conducted disturbance as defined by EN61000-6-4: 2001.

Specification Limits:
Limits for conducted disturbance at the mains ports

Frequency Range MHz	Limits dB (μV)	
	Quasi-peak	Average
0.15 to 0.50	79	66
0.50 to 5.00	73	60
5.00-30.0	73	60

Test Method:
See Section 15.

Test Information:		Test Conditions:	
Test #:	CEPV-01	Test Voltage:	230Vac
Tested By:	J. Fish	Temperature:	22°C
Date of Tests:	1/6/2005	Humidity:	38%

Test Results:
The E.U.T. complies.
The worst-case emission is 57.5 dBuV at 1.2 MHz on the Neutral side of the line.
This is 2.5 dB below the average specification limit of 60.0dBμV.

TEST EQUIPMENT

Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal	Cal Due
545	LISN	Schwarz Beck	8120	8120350	09/17/04	09/17/05
968	Filter, High pass 5khz	Solartron	7930-5.0	933124	08/17/04	08/17/05
1115	CABLE, 4.5m	KTL	RG223	N/A	03/08/04	03/08/05
1547	CABLE .6m	KTL	RG223	N/A	06/09/04	06/09/05
718	HP SPECTRUM ANALYZER	HEWLETT PACKARD	8591EM	3639A00980	02/11/04	02/10/05
716	Receiver	Polorad	ESH2	879342/005	02/02/04	02/01/05

Test Data –Conducted Emissions, Power Lines Test# CEPV-01

Conducted Emissions
Powerline Voltage Measurement

Complete: X
Preliminary:
Job # : 4L0697E
Page 1
Test # : CEPV-01
of 3

Client Name : Vertex RSI
EUT Name : Data Acquisition Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-3300-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-4
Reference :

Transducer # : 545
HP Filter # : 968
Cable 1 # : 1115
Cable 2 # : 1547
Detector 1 # : 718
Detector 2 # : 716
Limiter # :

Temp. (deg. C) : 22
Humidity (%) : 38
EUT Voltage : 230vAC
EUT Frequency : 50Hz
Peak Bandwidth: 10kHz
QP Bandwidth 10kHz
Avg. Bandwidth 10kHz

Date : 01/06/05
Time : 10:00
Staff : J. Fish
Location : SAC
Photo ID: 4L0697E CEPV-01

Meas Freq (MHz)	EUT Test Point	Detector Type (P,QP, A)	Limit Type (QP, A)	Meter Reading (dBuV)	Path Loss (dB)	Transducer Factor (dB)	Corrected Reading (dBuV)	Spec limit (dBuV) Q.P.	Spec limit (dBuV) Avg.	CR/SL Diff. (dB)	Pass Fail Unc.	Comment
0.48	H	P	A	39.4	0	0	39.4	79	66	-26.6	Pass	
0.74	H	P	A	48.6	0	0	48.6	73	60	-11.4	Pass	
1.6	H	P	A	41.3	0	0	41.3	73	60	-18.7	Pass	
2.9	H	P	A	37.6	0	0	37.6	73	60	-22.4	Pass	
6.7	H	P	A	40.2	0	0	40.2	73	60	-19.8	Pass	
15.4	H	P	A	34.1	0	0	34.1	73	60	-25.9	Pass	
20.3	H	P	A	31.3	0	0	31.3	73	60	-28.7	Pass	
0.48	H	P	A	40.2	0	0	40.2	79	66	-25.8	Pass	
0.74	H	P	A	47.4	0	0	47.4	73	60	-12.6	Pass	
1.6	H	P	A	40.9	0	0	40.9	73	60	-19.1	Pass	
2.9	H	P	A	39.7	0	0	39.7	73	60	-20.3	Pass	
6.7	H	P	A	41.1	0	0	41.1	73	60	-18.9	Pass	
15.4	H	P	A	33.2	0	0	33.2	73	60	-26.8	Pass	
20.3	H	P	A	34.8	0	0	34.8	73	60	-25.2	Pass	

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Test Data Conducted Emissions, Power Lines Test# CEPV-01 Cont.

Conducted Emissions
Powerline Voltage Measurement

Complete X
Preliminary

Job # : L0697E Test # : CEPV-01
Page 2 of 3

Client Name : Vertex RSI
EUT Name : CASS Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2010-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-4 Reference :

Meas Freq (MHz)	EUT Test Point	Detector Type (P,QP, A)	Limit Type (QP, A)	Meter Reading (dBuV)	Path Loss (dB)	Transducer Factor (dB)	Corrected Reading (dBuV)	Spec limit (dBuV) Q.P.	Spec limit (dBuV) Avg.	CR/SL Diff (dB)	Pass Fail Unc.	Comment
0.34	H	P	A	49.3	0	0	49.3	79	66	-16.7	Pass	
0.86	H	QP	QP	60	0	0	60.0	73	60	-13.0	Pass	
0.86	H	A	A	52	0	0	52.0	73	60	-8.0	Pass	
1.2	H	QP	QP	57	0	0	57.0	73	60	-16.0	Pass	
1.2	H	A	A	52	0	0	52.0	73	60	-8.0	Pass	
1.9	H	P	A	44.1	0	0	44.1	73	60	-15.9	Pass	
4.7	H	QP	QP	53	0	0	53.0	73	60	-20.0	Pass	
4.7	H	A	A	51.5	0	0	51.5	73	60	-8.5	Pass	
9.5	H	P	A	32.1	0	0	32.1	73	60	-27.9	Pass	
13.8	H	P	A	32.4	0	0	32.4	73	60	-27.6	Pass	
0.34	N	P	A	48.9	0	0	48.9	79	66	-17.1	Pass	
0.86	N	QP	QP	60	0	0	60.0	73	60	-13.0	Pass	
0.86	N	A	A	51.5	0	0	51.5	73	60	-8.5	Pass	
1.2	N	QP	QP	56.5	0	0	56.5	73	60	-16.5	Pass	
1.2	N	A	A	52	0	0	52.0	73	60	-8.0	Pass	
1.9	N	P	A	44.3	0	0	44.3	73	60	-15.7		
4.7	N	QP	QP	52.5	0	0	52.5	73	60	-20.5	Pass	
4.7	N	A	A	51	0	0	51.0	73	60	-9.0	Pass	
9.5	N	P	A	31.4	0	0	31.4	73	60	-28.6	Pass	
13.8	N	P	A	32.4	0	0	32.4	73	60	-27.6	Pass	

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Test Data Conducted Emissions, Power Lines Test# CEPV-01 Cont.

Conducted Emissions
Powerline Voltage Measurement

Complete X
Preliminary

Job # : L0697E Test # : CEPV-01
Page 3 of 3

Client Name : Vertex RSI
EUT Name : AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2000-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-4 Reference :

Meas Freq (MHz)	EUT Test Point	Detector Type (P,QP, A)	Limit Type (QP, A)	Meter Reading (dBuV)	Path Loss (dB)	Transducer Factor (dB)	Corrected Reading (dBuV)	Spec.limit (dBuV) Q.P.	Spec.limit (dBuV) Avg.	CR/SL Diff (dB)	Pass Fail Unc.	Comment
0.24	H	P	A	30.3	0.0	0.0	30.3	79.0	66.0	-35.7	Pass	
0.3	H	P	A	33.0	0.0	0.0	33.0	79.0	66.0	-33.0	Pass	
1.2	H	QP	QP	58.0	0.0	0.0	58.0	73.0	60.0	-15.0	Pass	
1.2	H	A	A	53.0	0.0	0.0	53.0	73.0	60.0	-7.0	Pass	
3.2	H	P	A	44.4	0.0	0.0	44.4	73.0	60.0	-15.6	Pass	
3.7	H	QP	QP	51.0	0.0	0.0	51.0	73.0	60.0	-22.0	Pass	
3.7	H	A	A	46.5	0.0	0.0	46.5	73.0	60.0	-13.5	Pass	
6.9	H	P	A	41.3	0.0	0.0	41.3	73.0	60.0	-18.7	Pass	
9.7	H	P	A	45.2	0.0	0.0	45.2	73.0	60.0	-14.8	Pass	
24.5	H	P	A	34.2	0.0	0.0	34.2	73.0	60.0	-25.8	Pass	
0.29	N	P	A	33.5	0.0	0.0	33.5	79.0	66.0	-32.5	Pass	
1.2	N	P	A	57.5	0.0	0.0	57.5	73.0	60.0	-2.5	Pass	
1.2	N	QP	QP	53.0	0.0	0.0	53.0	73.0	60.0	-20.0	Pass	
3.2	N	A	A	44.1	0.0	0.0	44.1	73.0	60.0	-15.9	Pass	
3.7	N	P	A	50.0	0.0	0.0	50.0	73.0	60.0	-10.0	Pass	
3.7	N	QP	QP	47.0	0.0	0.0	47.0	73.0	60.0	-26.0	Pass	
6.9	N	A	A	41.6	0.0	0.0	41.6	73.0	60.0	-18.4	Pass	
9.7	N	P	A	44.8	0.0	0.0	44.8	73.0	60.0	-15.2	Pass	
24.5	N	P	A	35.3	0.0	0.0	35.3	73.0	60.0	-24.7	Pass	
											Scanned from	
											0.15MHz to 30MHz	

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Test Information:		Test Conditions:	
Test #:	CEPV-02	Test Voltage:	400Vac
Tested By:	J. Fish	Temperature:	22°C
Date of Tests:	1/6/2005	Humidity:	38%

Test Results:
The E.U.T. complies.
The worst-case emission is 58.1 dBuV at 0.86 MHz on the Hot side of the line.
This is 1.9 dB below the average specification limit of 60.0dBµV.

TEST EQUIPMENT

Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal	Cal Due
545	LISN	Schwarz Beck	8120	8120350	09/17/04	09/17/05
968	Filter, High pass 5khz	Solartron	7930-5.0	933124	08/17/04	08/17/05
1115	CABLE, 4.5m	KTL	RG223	N/A	03/08/04	03/08/05
1547	CABLE .6m	KTL	RG223	N/A	06/09/04	06/09/05
718	HP SPECTRUM ANALYZER	HEWLETT PACKARD	8591EM	3639A00980	02/11/04	02/10/05
716	Receiver	Polorad	ESH2	879342/005	02/02/04	02/01/05

Test Data –Conducted Emissions, Power Lines Test# CEPV-02

Conducted Emissions
Powerline Voltage Measurement

Complete X
Preliminary

Job # : 4L0697E
Page 1

Test # : CEPV-02
of 2

Client Name : Vertex RSI
EUT Name : CASS Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2010-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-4
Reference :

Transducer # : 545
HP Filter # : 968
Cable 1 # : 1115
Cable 2 # : 1547
Detector 1 # : 718
Detector 2 # : 716
Limiter # :

Temp. (deg. C) : 22
Humidity (%) : 38
EUT Voltage : 400Vac
EUT Frequency : 50Hz
Peak Bandwidth: 10kHz
QP Bandwidth 10kHz
Avg. Bandwidth 10kHz

Date : 01/06/05
Time : 10:00
Staff : J. Fish
Location : SAC
Photo ID. 4L0697E CEPV-02

Meas Freq (MHz)	EUT Test Point	Detector Type (P,QP, A)	Limit Type (QP, A)	Meter Reading (dBuV)	Path Loss (dB)	Transducer Factor (dB)	Corrected Reading (dBuV)	Spec limit (dBuV) Q.P.	Spec limit (dBuV) Avg.	CR/SL Diff (dB)	Pass Fail Unc.	Comment
0.34	H	QP	QP	27.8	0	38.2	66.0	79	66	-13.0	Pass	
0.34	H	A	A	25.4	0	38.2	63.6	79	66	-2.4	Pass	
0.86	H	QP	QP	31.8	0	30.7	62.5	73	60	-10.5	Pass	
0.86	H	A	A	27.4	0	30.7	58.1	73	60	-1.9	Pass	
1.2	H	QP	QP	30.7	0	29.3	60.0	73	60	-13.0	Pass	
1.2	H	A	A	28.1	0	29.3	57.4	73	60	-2.6	Pass	
1.9	H	P	A	27.2	0	29.3	56.5	73	60	-3.5	Pass	
4.7	H	QP	QP	34.8	0	23.9	58.7	73	60	-14.3	Pass	
4.7	H	A	A	32.6	0	23.9	56.5	73	60	-3.5	Pass	
9.5	H	P	A	33.5	0	22.1	55.6	73	60	-4.4	Pass	
13.8	H	P	A	31.9	0	21.7	53.6	73	60	-6.4	Pass	
0.34	N	QP	QP	27.5	0	38.2	65.7	79	66	-13.3	Pass	
0.34	N	A	A	25.1	0	38.2	63.3	79	66	-2.7	Pass	
0.86	N	QP	QP	32.1	0	30.7	62.8	73	60	-10.2	Pass	
0.86	N	A	A	27.2	0	30.7	57.9	73	60	-2.1	Pass	
1.2	N	QP	QP	29.4	0	29.3	58.7	73	60	-14.3	Pass	
1.2	N	A	A	27.7	0	29.3	57.0	73	60	-3.0	Pass	
1.9	N	P	A	27.7	0	29.3	57.0	73	60	-3.0	Pass	
4.7	N	QP	QP	35.5	0	23.9	59.4	73	60	-13.6	Pass	
4.7	N	A	A	33.1	0	23.9	57.0	73	60	-3.0	Pass	
9.5	N	P	A	33.2	0	22.1	55.3	73	60	-4.7	Pass	
13.8	N	P	A	32.8	0	21.7	54.5	73	60	-5.5	Pass	

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Test Data Conducted Emissions, Power Lines Test# CEPV-02 Cont.

Conducted Emissions
Powerline Voltage Measurement

Complete X
Preliminary

Job # : L0697E Test # : CEPV-02
Page 2 of 2

Client Name : Vertex RSI
EUT Name : AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2000-01
EUT Serial # : 001
EUT Config : All cabinets powered and all motors running.

Specification : EN 61000-6-4 Reference :

Meas Freq (MHz)	EUT Test Point	Detector Type (P,QP, A)	Limit Type (QP, A)	Meter Reading (dBuV)	Path Loss (dB)	Transducer Factor (dB)	Corrected Reading (dBuV)	Spec.limit (dBuV) Q.P.	Spec.limit (dBuV) Avg.	CR/SL Diff (dB)	Pass Fail Unc.	Comment
0.3	H	QP	QP	26.9	0.0	38.2	65.1	79.0	66.0	-13.9	Pass	
0.3	H	A	A	25.8	0.0	38.2	64.0	79.0	66.0	-2.0	Pass	
1.2	H	QP	QP	28.5	0.0	29.3	57.8	73.0	60.0	-15.2	Pass	
1.2	H	A	A	26.9	0.0	29.3	56.2	73.0	60.0	-3.8	Pass	
3.2	H	P	A	29.8	0.0	25.2	55.0	73.0	60.0	-5.0	Pass	
3.7	H	QP	QP	32.1	0.0	25.2	57.3	73.0	60.0	-15.7	Pass	
3.7	H	A	A	30.6	0.0	25.2	55.8	73.0	60.0	-4.2	Pass	
6.9	H	P	A	32.6	0.0	22.1	54.7	73.0	60.0	-5.3	Pass	
9.7	H	P	A	34.9	0.0	22.1	57.0	73.0	60.0	-3.0	Pass	
24.5	H	P	A	34.1	0.0	23.8	57.9	73.0	60.0	-2.1	Pass	
0.3	H	QP	QP	26.1	0.0	38.2	64.3	79.0	66.0	-14.7	Pass	
0.3	H	A	A	25.4	0.0	38.2	63.6	79.0	66.0	-2.4	Pass	
1.2	N	QP	QP	28.8	0.0	29.3	58.1	73.0	60.0	-14.9	Pass	
1.2	N	A	A	27.2	0.0	29.3	56.5	73.0	60.0	-3.5	Pass	
3.2	N	P	A	30.6	0.0	25.2	55.8	73.0	60.0	-4.2	Pass	
3.7	N	QP	QP	32.3	0.0	25.2	57.5	73.0	60.0	-15.5	Pass	
3.7	N	A	A	30.9	0.0	25.2	56.1	73.0	60.0	-3.9	Pass	
6.9	N	P	A	33.1	0.0	22.1	55.2	73.0	60.0	-4.8	Pass	
9.7	N	P	A	34.3	0.0	22.1	56.4	73.0	60.0	-3.6	Pass	
24.5	N	P	A	33.6	0.0	23.8	57.4	73.0	60.0	-2.6	Pass	
											Scanned from	
											0.15MHz to 30MHz	

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Section 5. Radiated Emissions

Purpose:

The test is intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) to the limits for radiated emissions as defined by EN61000-6-4: 2001.

Specification Limits:
Limits for radiated emissions.

Frequency range (MHz)	Quasi-peak Limits dB (μV/m) @ 10 m
0.15 - 30	Under consideration
30 - 230	40
230 - 1000	47

Test Method:
See Section 15.

Test Information:		Test Conditions:	
Test # :	REHE-01	Test Voltage:	380
Tested By:	Kevin Rose	Temperature:	11°C
Date of Tests:	1/7/2005	Humidity:	80%

Test Results:
The E.U.T. complies.
The worst-case emission is 38.0 dBuV/m at 48 MHz in the Vertical polarity.
This is 2.0 dB below the quasi-peak specification limit of 40.0dBμV/m.

TEST EQUIPMENT

Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal	Cal Due
760	Antenna biconical	Electro Metrics	MFC-25	477	06/22/04	06/22/05
759	ANTENNA, LOG PERIODIC	A.H. SYSTEMS	SAS-200/510	556	07/23/04	07/23/05
1518	Cable Assy, LAB 4 - C OATS	KTL	Site C OATS	N/A	03/11/04	03/11/05
791	PREAMP, 25dB	ICC	LNA25	398	11/12/04	11/12/05

Test Data –Radiated Emissions, Electric Field, Test# REHE-01

Radiated Emissions Data

Complete: X
Preliminary:

Job # : 4L0697E
Page 1 of 8

Test # : REHE-01

Client Name : Vertex RSI
EUT Name : Data Acquisition Unit, VISTA; CASS Power Drive Unit, VISTA; AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-3300-01; 99-343-2010-01; 99-343-2000-01
EUT Serial # : 001; 001; 001
EUT Config. : All cabinets powered and all motors running.

Specification : CISPR 22: 1997, Class A
Reference : EN 61000-6-4: 2001

Rod. Ant. #:		Temp. (deg. C) :	11
Bicon Ant.#:	760	Humidity (%) :	80
Log Ant.#:	759	EUT Voltage :	380
Bilog Ant #:		EUT Frequency :	50
Dipole Ant #:		Phase:	
Cable#:	1518	Location:	C OATS
Preamp#:	791	Distance:	10m
Limiter#:	NA		
Atten #:	NA		
Detector#:			

Date : 01/07/05
Time : 8:00
Staff : Kevin Rose
Photo ID:
Peak Bandwidth: 100 KHz
Video Bandwidth 100 KHz

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Atten (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff (dB)	Pass Fail Unc.	QP readings Comment
30	V	0	32.3	14.2	1.9	24.9	23.5	40.0	-16.5	Pass	Front
30.105	V	0	32.8	14.2	1.9	24.9	24.0	40.0	-16.0	Pass	Front
30.3	V	0	32.9	14.2	1.9	24.9	24.1	40.0	-15.9	Pass	Front
31.7	V	0	38.4	14.2	1.9	24.9	29.6	40.0	-10.4	Pass	Front
35.1	V	0	38.2	12.8	1.9	24.9	28.0	40.0	-12.0	Pass	Front
36.6	V	0	39.1	12.8	1.9	24.9	28.9	40.0	-11.1	Pass	Front
48	V	0	44.9	11	1.9	24.8	33.0	40.0	-7.0	Pass	Front
54	V	0	44.2	9.8	2.4	24.8	31.6	40.0	-8.4	Pass	Front
56.54	V	0	37	9.1	2.4	24.8	23.7	40.0	-16.3	Pass	Front
58.465	V	0	42.9	9.1	2.4	24.8	29.6	40.0	-10.4	Pass	Front
72.2	V	0	38.8	8.3	2.9	24.7	25.3	40.0	-14.7	Pass	Front
40	V	0	32.8	11.9	1.9	24.8	21.8	40.0	-18.2	Pass	Front
125.3	V	0	38.4	12.3	4.0	24.6	30.1	40.0	-9.9	Pass	Front
60	V	0	42	8.8	2.4	24.7	28.5	40.0	-11.5	Pass	Front
160	V	0	35.3	13.5	4.0	24.6	28.2	40.0	-11.8	Pass	Front
174	V	0	30	13.5	4.0	24.6	22.9	40.0	-17.1	Pass	Front
175.25	V	0	32.9	13.7	4.0	24.5	26.1	40.0	-13.9	Pass	Front
140	V	0	29.7	12.2	4.0	24.6	21.3	40.0	-18.7	Pass	Front
196.6	V	0	25.4	15.1	4.0	24.5	20.0	40.0	-20.0	Pass	Front
240	V	0	31.3	16.5	5.3	24.5	28.6	47.0	-18.4	Pass	Front
280	V	0	28.9	19.2	6.0	24.4	29.7	47.0	-17.3	Pass	Front

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Test Data Radiated Emissions, Electric Field, Test# REHE-01 Cont.

Radiated Emissions Data

Complete X
Preliminary

Job # : L0697E Test # : REHE-01
Page 2 of 8

Client Name : Vertex RSI
EUT Name : Data Acquisition Unit, VISTA; CASS Power Drive Unit, VISTA; AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-3300-01; 99-343-2010-01; 99-343-2000-01
EUT Serial # : 001; 001; 001
EUT Config : All cabinets powered and all motors running.

Specification : CISPR 22: 1997, Class A Reference : EN 61000-6-4: 2001

Meas Freq (MHz)	Ant Pol (H/V)	Det Atten (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec limit (dBuV/m)	CR/SL Diff (dB)	Pass Fail Unc.	Comment
320	V	0	25	16.2	6.7	24.4	23.5	47.0	-23.5	Pass	Front
360	V	0	27.7	15.2	6.7	24.4	25.2	47.0	-21.8	Pass	Front
400	V	0	20.9	16.4	8.0	24.4	20.9	47.0	-26.1	Pass	Front
30	H	0	33.7	14.2	1.9	24.9	24.9	40.0	-15.1	Pass	Front
30.105	H	0	33.2	14.2	1.9	24.9	24.4	40.0	-15.6	Pass	Front
30.3	H	0	31.8	14.2	1.9	24.9	23.0	40.0	-17.0	Pass	Front
31.7	H	0	34.6	14.2	1.9	24.9	25.8	40.0	-14.2	Pass	Front
35.1	H	0	39	12.8	1.9	24.9	28.8	40.0	-11.2	Pass	Front
36.6	H	0	36.1	12.8	1.9	24.9	25.9	40.0	-14.1	Pass	Front
48	H	0	32.3	11	1.9	24.8	20.4	40.0	-19.6	Pass	Front
54	H	0	30.4	9.8	2.4	24.8	17.8	40.0	-22.2	Pass	Front
56.54	H	0	33.9	9.1	2.4	24.8	20.6	40.0	-19.4	Pass	Front
58.465	H	0	33.4	9.1	2.4	24.8	20.1	40.0	-19.9	Pass	Front
72.2	H	0	33.6	8.3	2.9	24.7	20.1	40.0	-19.9	Pass	Front
40	H	0	28.9	11.9	1.9	24.8	17.9	40.0	-22.1	Pass	Front
125.3	H	0	27.6	12.3	4.0	24.6	19.3	40.0	-20.7	Pass	Front
60	H	0	32.7	8.8	2.4	24.7	19.2	40.0	-20.8	Pass	Front
160	H	0	27.2	13.5	4.0	24.6	20.1	40.0	-19.9	Pass	Front
174	H	0	23.2	13.5	4.0	24.6	16.1	40.0	-23.9	Pass	Front
175.25	H	0	28.9	13.7	4.0	24.5	22.1	40.0	-17.9	Pass	Front
140	H	0	23.5	12.2	4.0	24.6	15.1	40.0	-24.9	Pass	Front
196.6	H	0	21.9	15.1	4.0	24.5	16.5	40.0	-23.5	Pass	Front
240	H	0	28.9	16.5	5.3	24.5	26.2	47.0	-20.8	Pass	Front
280	H	0	19.8	19.2	6.0	24.4	20.6	47.0	-26.4	Pass	Front
320	H	0	23.8	16.2	6.7	24.4	22.3	47.0	-24.7	Pass	Front
360	H	0	22.8	15.2	6.7	24.4	20.3	47.0	-26.7	Pass	Front
400	H	0	21.5	16.4	8.0	24.4	21.5	47.0	-25.5	Pass	Front

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Test Data Radiated Emissions, Electric Field, Test# REHE-01 Cont.

Radiated Emissions Data

Complete X
Preliminary

Job # : L0697E Test # : REHE-01
Page 3 of 8

Client Name : Vertex RSI
EUT Name : Data Acquisition Unit, VISTA; CASS Power Drive Unit, VISTA; AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-3300-01; 99-343-2010-01; 99-343-2000-01
EUT Serial # : 001; 001; 001
EUT Config : All cabinets powered and all motors running.

Specification : CISPR 22: 1997, Class A Reference : EN 61000-6-4: 2001

Meas Freq (MHz)	Ant Pol (H/V)	Det Atten (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec limit (dBuV/m)	CR/SL Diff (dB)	Pass Fail Unc.	Comment
30	V	0	34.7	14.2	1.9	24.9	25.9	40.0	-14.1	Pass	Left Side
30.105	V	0	34.8	14.2	1.9	24.9	26.0	40.0	-14.0	Pass	Left Side
30.3	V	0	35.3	14.2	1.9	24.9	26.5	40.0	-13.5	Pass	Left Side
31.7	V	0	42.3	14.2	1.9	24.9	33.5	40.0	-6.5	Pass	Left Side
35.1	V	0	47.8	12.8	1.9	24.9	37.6	40.0	-2.4	Pass	Left Side
36.6	V	0	45.3	12.8	1.9	24.9	35.1	40.0	-4.9	Pass	Left Side
48	V	0	44.2	11	1.9	24.8	32.3	40.0	-7.7	Pass	Left Side
54	V	0	37.7	9.8	2.4	24.8	25.1	40.0	-14.9	Pass	Left Side
56.54	V	0	42.8	9.1	2.4	24.8	29.5	40.0	-10.5	Pass	Left Side
58.465	V	0	35.2	9.1	2.4	24.8	21.9	40.0	-18.1	Pass	Left Side
72.2	V	0	34	8.3	2.9	24.7	20.5	40.0	-19.5	Pass	Left Side
40	V	0	38	11.9	1.9	24.8	27.0	40.0	-13.0	Pass	Left Side
125.3	V	0	35	12.3	4.0	24.6	26.7	40.0	-13.3	Pass	Left Side
60	V	0	35.3	8.8	2.4	24.7	21.8	40.0	-18.2	Pass	Left Side
160	V	0	31.9	13.5	4.0	24.6	24.8	40.0	-15.2	Pass	Left Side
174	V	0	22.2	13.5	4.0	24.6	15.1	40.0	-24.9	Pass	Left Side
175.25	V	0	20.8	13.7	4.0	24.5	14.0	40.0	-26.0	Pass	Left Side
140	V	0	21.2	12.2	4.0	24.6	12.8	40.0	-27.2	Pass	Left Side
196.6	V	0	22.7	15.1	4.0	24.5	17.3	40.0	-22.7	Pass	Left Side
240	V	0	32.4	16.5	5.3	24.5	29.7	47.0	-17.3	Pass	Left Side
280	V	0	22.1	19.2	6.0	24.4	22.9	47.0	-24.1	Pass	Left Side
320	V	0	26.2	16.2	6.7	24.4	24.7	47.0	-22.3	Pass	Left Side
360	V	0	20.3	15.2	6.7	24.4	17.8	47.0	-29.2	Pass	Left Side
400	V	0	19.9	16.4	8.0	24.4	19.9	47.0	-27.1	Pass	Left Side

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Test Data Radiated Emissions, Electric Field, Test# REHE-01 Cont.

Radiated Emissions Data

Complete X
Preliminary

Job # : L0697E Test # : REHE-01
Page 4 of 8

Client Name : Vertex RSI
EUT Name : Data Acquisition Unit, VISTA; CASS Power Drive Unit, VISTA; AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-3300-01; 99-343-2010-01; 99-343-2000-01
EUT Serial # : 001; 001; 001
EUT Config : All cabinets powered and all motors running.

Specification : CISPR 22: 1997, Class A Reference : EN 61000-6-4: 2001

Meas Freq (MHz)	Ant. Pol. (H/V)	Det Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec limit (dBuV/m)	CR/SL Diff (dB)	Pass Fail Unc.	Comment
30	H	0	36.4	14.2	1.9	24.9	27.6	40.0	-12.4	Pass	Left Side
30.105	H	0	36.3	14.2	1.9	24.9	27.5	40.0	-12.5	Pass	Left Side
30.3	H	0	36.6	14.2	1.9	24.9	27.8	40.0	-12.2	Pass	Left Side
31.7	H	0	41.4	14.2	1.9	24.9	32.6	40.0	-7.4	Pass	Left Side
35.1	H	0	42.9	12.8	1.9	24.9	32.7	40.0	-7.3	Pass	Left Side
36.6	H	0	40.8	12.8	1.9	24.9	30.6	40.0	-9.4	Pass	Left Side
48	H	0	34	11	1.9	24.8	22.1	40.0	-17.9	Pass	Left Side
54	H	0	24.8	9.8	2.4	24.8	12.2	40.0	-27.8	Pass	Left Side
56.54	H	0	30	9.1	2.4	24.8	16.7	40.0	-23.3	Pass	Left Side
58.465	H	0	23.7	9.1	2.4	24.8	10.4	40.0	-29.6	Pass	Left Side
72.2	H	0	25.6	8.3	2.9	24.7	12.1	40.0	-27.9	Pass	Left Side
40	H	0	32.4	11.9	1.9	24.8	21.4	40.0	-18.6	Pass	Left Side
125.3	H	0	22.5	12.3	4.0	24.6	14.2	40.0	-25.8	Pass	Left Side
60	H	0	27.3	8.8	2.4	24.7	13.8	40.0	-26.2	Pass	Left Side
160	H	0	28.4	13.5	4.0	24.6	21.3	40.0	-18.7	Pass	Left Side
174	H	0	22.2	13.5	4.0	24.6	15.1	40.0	-24.9	Pass	Left Side
175.25	H	0	28.3	13.7	4.0	24.5	21.5	40.0	-18.5	Pass	Left Side
140	H	0	21.6	12.2	4.0	24.6	13.2	40.0	-26.8	Pass	Left Side
196.6	H	0	19.1	15.1	4.0	24.5	13.7	40.0	-26.3	Pass	Left Side
240	H	0	29.8	16.5	5.3	24.5	27.1	47.0	-19.9	Pass	Left Side
280	H	0	21.3	19.2	6.0	24.4	22.1	47.0	-24.9	Pass	Left Side
320	H	0	23.6	16.2	6.7	24.4	22.1	47.0	-24.9	Pass	Left Side
360	H	0	24.3	15.2	6.7	24.4	21.8	47.0	-25.2	Pass	Left Side
400	H	0	21.6	16.4	8.0	24.4	21.6	47.0	-25.4	Pass	Left Side

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Test Data Radiated Emissions, Electric Field, Test# REHE-01 Cont.

Radiated Emissions Data

Complete X
Preliminary

Job # : L0697E Test # : REHE-01
Page 5 of 8

Client Name : Vertex RSI
EUT Name : Data Acquisition Unit, VISTA; CASS Power Drive Unit, VISTA; AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-3300-01; 99-343-2010-01; 99-343-2000-01
EUT Serial # : 001; 001; 001
EUT Config : All cabinets powered and all motors running.

Specification : CISPR 22: 1997, Class A Reference : EN 61000-6-4: 2001

Meas Freq (MHz)	Ant Pol (H/V)	Det Atten (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff (dB)	Pass Fail Unc.	Comment
30	V	0	45.4	14.2	1.9	24.9	36.6	40.0	-3.4	Pass	Back
30.105	V	0	45	14.2	1.9	24.9	36.2	40.0	-3.8	Pass	Back
30.3	V	0	44	14.2	1.9	24.9	35.2	40.0	-4.8	Pass	Back
31.7	V	0	45.3	14.2	1.9	24.9	36.5	40.0	-3.5	Pass	Back
35.1	V	0	46.9	12.8	1.9	24.9	36.7	40.0	-3.3	Pass	Back
36.6	V	0	43.8	12.8	1.9	24.9	33.6	40.0	-6.4	Pass	Back
48	V	0	49.9	11	1.9	24.8	38.0	40.0	-2.0	Pass	Back
54	V	0	40.6	9.8	2.4	24.8	28.0	40.0	-12.0	Pass	Back
56.54	V	0	45.5	9.1	2.4	24.8	32.2	40.0	-7.8	Pass	Back
58.465	V	0	38.7	9.1	2.4	24.8	25.4	40.0	-14.6	Pass	Back
72.2	V	0	38	8.3	2.9	24.7	24.5	40.0	-15.5	Pass	Back
40	V	0	44.5	11.9	1.9	24.8	33.5	40.0	-6.5	Pass	Back
125.3	V	0	45.2	12.3	4.0	24.6	36.9	40.0	-3.1	Pass	Back
60	V	0	41.7	8.8	2.4	24.7	28.2	40.0	-11.8	Pass	Back
160	V	0	39.5	13.5	4.0	24.6	32.4	40.0	-7.6	Pass	Back
174	V	0	26.8	13.5	4.0	24.6	19.7	40.0	-20.3	Pass	Back
175.25	V	0	28.2	13.7	4.0	24.5	21.4	40.0	-18.6	Pass	Back
140	V	0	30.4	12.2	4.0	24.6	22.0	40.0	-18.0	Pass	Back
196.6	V	0	26.4	15.1	4.0	24.5	21.0	40.0	-19.0	Pass	Back
240	V	0	34.6	16.5	5.3	24.5	31.9	47.0	-15.1	Pass	Back
280	V	0	26.7	19.2	6.0	24.4	27.5	47.0	-19.5	Pass	Back
320	V	0	23.8	16.2	6.7	24.4	22.3	47.0	-24.7	Pass	Back
360	V	0	21.3	15.2	6.7	24.4	18.8	47.0	-28.2	Pass	Back
400	V	0	21.8	16.4	8.0	24.4	21.8	47.0	-25.2	Pass	Back

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Test Data Radiated Emissions, Electric Field, Test# REHE-01 Cont.

Radiated Emissions Data

Complete X
Preliminary

Job # : L0697E Test # : REHE-01
Page 6 of 8

Client Name : Vertex RSI
EUT Name : Data Acquisition Unit, VISTA; CASS Power Drive Unit, VISTA; AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-3300-01; 99-343-2010-01; 99-343-2000-01
EUT Serial # : 001; 001; 001
EUT Config. : All cabinets powered and all motors running.

Specification : CISPR 22: 1997, Class A Reference : EN 61000-6-4: 2001

Meas Freq (MHz)	Ant Pol (H/V)	Det Atten (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail Unc.	Comment
30	H	0	38.8	14.2	1.9	24.9	30.0	40.0	-10.0	Pass	Back
30.105	H	0	37.9	14.2	1.9	24.9	29.1	40.0	-10.9	Pass	Back
30.3	H	0	37.1	14.2	1.9	24.9	28.3	40.0	-11.7	Pass	Back
31.7	H	0	40.8	14.2	1.9	24.9	32.0	40.0	-8.0	Pass	Back
35.1	H	0	37.2	12.8	1.9	24.9	27.0	40.0	-13.0	Pass	Back
36.6	H	0	33.3	12.8	1.9	24.9	23.1	40.0	-16.9	Pass	Back
48	H	0	35.3	11	1.9	24.8	23.4	40.0	-16.6	Pass	Back
54	H	0	25.7	9.8	2.4	24.8	13.1	40.0	-26.9	Pass	Back
56.54	H	0	32.8	9.1	2.4	24.8	19.5	40.0	-20.5	Pass	Back
58.465	H	0	31.9	9.1	2.4	24.8	18.6	40.0	-21.4	Pass	Back
72.2	H	0	31.9	8.3	2.9	24.7	18.4	40.0	-21.6	Pass	Back
40	H	0	34.2	11.9	1.9	24.8	23.2	40.0	-16.8	Pass	Back
125.3	H	0	27.3	12.3	4.0	24.6	19.0	40.0	-21.0	Pass	Back
60	H	0	32.3	8.8	2.4	24.7	18.8	40.0	-21.2	Pass	Back
160	H	0	25.4	13.5	4.0	24.6	18.3	40.0	-21.7	Pass	Back
174	H	0	20.2	13.5	4.0	24.6	13.1	40.0	-26.9	Pass	Back
175.25	H	0	24.5	13.7	4.0	24.5	17.7	40.0	-22.3	Pass	Back
140	H	0	21	12.2	4.0	24.6	12.6	40.0	-27.4	Pass	Back
196.6	H	0	19.5	15.1	4.0	24.5	14.1	40.0	-25.9	Pass	Back
240	H	0	23.1	16.5	5.3	24.5	20.4	47.0	-26.6	Pass	Back
280	H	0	21	19.2	6.0	24.4	21.8	47.0	-25.2	Pass	Back
320	H	0	24.4	16.2	6.7	24.4	22.9	47.0	-24.1	Pass	Back
360	H	0	21.3	15.2	6.7	24.4	18.8	47.0	-28.2	Pass	Back
400	H	0	23	16.4	8.0	24.4	23.0	47.0	-24.0	Pass	Back

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Test Data Radiated Emissions, Electric Field, Test# REHE-01 Cont.

Radiated Emissions Data

Complete X
Preliminary

Job # : L0697E Test # : REHE-01
Page 7 of 8

Client Name : Vertex RSI
EUT Name : Data Acquisition Unit, VISTA; CASS Power Drive Unit, VISTA; AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-3300-01; 99-343-2010-01; 99-343-2000-01
EUT Serial # : 001; 001; 001
EUT Config : All cabinets powered and all motors running.

Specification : CISPR 22: 1997, Class A Reference : EN 61000-6-4: 2001

Meas. Freq (MHz)	Ant Pol (H/V)	Det Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail Unc.	Comment
30	V	0	33.6	14.2	1.9	24.9	24.8	40.0	-15.2	Pass	Rght Side
30.105	V	0	32.6	14.2	1.9	24.9	23.8	40.0	-16.2	Pass	Right Side
30.3	V	0	39.9	14.2	1.9	24.9	31.1	40.0	-8.9	Pass	Right Side
31.7	V	0	35.2	14.2	1.9	24.9	26.4	40.0	-13.6	Pass	Right Side
35.1	V	0	33.3	12.8	1.9	24.9	23.1	40.0	-16.9	Pass	Right Side
36.6	V	0	35.2	12.8	1.9	24.9	25.0	40.0	-15.0	Pass	Right Side
48	V	0	42.2	11	1.9	24.8	30.3	40.0	-9.7	Pass	Right Side
54	V	0	35.2	9.8	2.4	24.8	22.6	40.0	-17.4	Pass	Right Side
56.54	V	0	21.6	9.1	2.4	24.8	8.3	40.0	-31.7	Pass	Right Side
58.465	V	0	22.6	9.1	2.4	24.8	9.3	40.0	-30.7	Pass	Right Side
72.2	V	0	35.5	8.3	2.9	24.7	22.0	40.0	-18.0	Pass	Right Side
40	V	0	38.8	11.9	1.9	24.8	27.8	40.0	-12.2	Pass	Right Side
125.3	V	0	31.2	12.3	4.0	24.6	22.9	40.0	-17.1	Pass	Right Side
60	V	0	36.3	8.8	2.4	24.7	22.8	40.0	-17.2	Pass	Right Side
160	V	0	22.5	13.5	4.0	24.6	15.4	40.0	-24.6	Pass	Right Side
174	V	0	26.3	13.5	4.0	24.6	19.2	40.0	-20.8	Pass	Right Side
175.25	V	0	25.3	13.7	4.0	24.5	18.5	40.0	-21.5	Pass	Right Side
140	V	0	21.58	12.2	4.0	24.6	13.2	40.0	-26.8	Pass	Right Side
196.6	V	0	21.5	15.1	4.0	24.5	16.1	40.0	-23.9	Pass	Right Side
240	V	0	19.9	16.5	5.3	24.5	17.2	47.0	-29.8	Pass	Right Side
280	V	0	19.8	19.2	6.0	24.4	20.6	47.0	-26.4	Pass	Right Side
320	V	0	21.3	16.2	6.7	24.4	19.8	47.0	-27.2	Pass	Right Side
360	V	0	22.1	15.2	6.7	24.4	19.6	47.0	-27.4	Pass	Right Side
400	V	0	19.8	16.4	8.0	24.4	19.8	47.0	-27.2	Pass	Right Side

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Test Data Radiated Emissions, Electric Field, Test# REHE-01 Cont.

Radiated Emissions Data

Complete X
Preliminary

Job # : L0697E Test # : REHE-01
Page 8 of 8

Client Name : Vertex RSI
EUT Name : Data Acquisition Unit, VISTA; CASS Power Drive Unit, VISTA; AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-3300-01; 99-343-2010-01; 99-343-2000-01
EUT Serial # : 001; 001; 001
EUT Config : All cabinets powered and all motors running.

Specification : CISPR 22: 1997, Class A Reference : EN 61000-6-4: 2001

Meas Freq (MHz)	Ant. Pol (H/V)	Det Atten (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff (dB)	Pass Fail Unc.	Comment
30	H	0	31.2	14.2	1.9	24.9	22.4	40.0	-17.6	Pass	Right Side
30.105	H	0	32.6	14.2	1.9	24.9	23.8	40.0	-16.2	Pass	Right Side
30.3	H	0	35.2	14.2	1.9	24.9	26.4	40.0	-13.6	Pass	Right Side
31.7	H	0	34.2	14.2	1.9	24.9	25.4	40.0	-14.6	Pass	Right Side
35.1	H	0	31.9	12.8	1.9	24.9	21.7	40.0	-18.3	Pass	Right Side
36.6	H	0	35.6	12.8	1.9	24.9	25.4	40.0	-14.6	Pass	Right Side
48	H	0	31.2	11	1.9	24.8	19.3	40.0	-20.7	Pass	Right Side
54	H	0	33	9.8	2.4	24.8	20.4	40.0	-19.6	Pass	Right Side
56.54	H	0	33.6	9.1	2.4	24.8	20.3	40.0	-19.7	Pass	Right Side
58.465	H	0	29.9	9.1	2.4	24.8	16.6	40.0	-23.4	Pass	Right Side
72.2	H	0	26.3	8.3	2.9	24.7	12.8	40.0	-27.2	Pass	Right Side
40	H	0	33.3	11.9	1.9	24.8	22.3	40.0	-17.7	Pass	Right Side
125.3	H	0	26.3	12.3	4.0	24.6	18.0	40.0	-22.0	Pass	Right Side
60	H	0	35.7	8.8	2.4	24.7	22.2	40.0	-17.8	Pass	Right Side
160	H	0	21.9	13.5	4.0	24.6	14.8	40.0	-25.2	Pass	Right Side
174	H	0	21.3	13.5	4.0	24.6	14.2	40.0	-25.8	Pass	Right Side
175.25	H	0	21.6	13.7	4.0	24.5	14.8	40.0	-25.2	Pass	Right Side
140	H	0	19.8	12.2	4.0	24.6	11.4	40.0	-28.6	Pass	Right Side
196.6	H	0	20.1	15.1	4.0	24.5	14.7	40.0	-25.3	Pass	Right Side
240	H	0	21.5	16.5	5.3	24.5	18.8	47.0	-28.2	Pass	Right Side
280	H	0	20.9	19.2	6.0	24.4	21.7	47.0	-25.3	Pass	Right Side
320	H	0	23.3	16.2	6.7	24.4	21.8	47.0	-25.2	Pass	Right Side
360	H	0	21.3	15.2	6.7	24.4	18.8	47.0	-28.2	Pass	Right Side
400	H	0	22.1	16.4	8.0	24.4	22.1	47.0	-24.9	Pass	Right Side
											Scanned from
											30MHz to 1GHz

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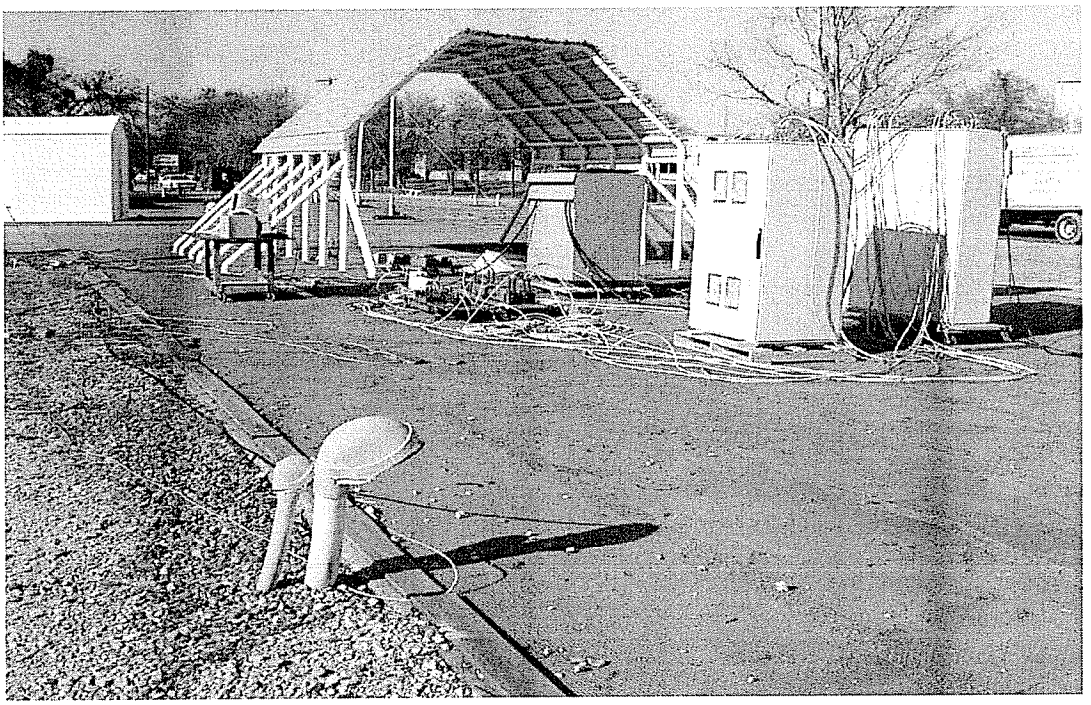
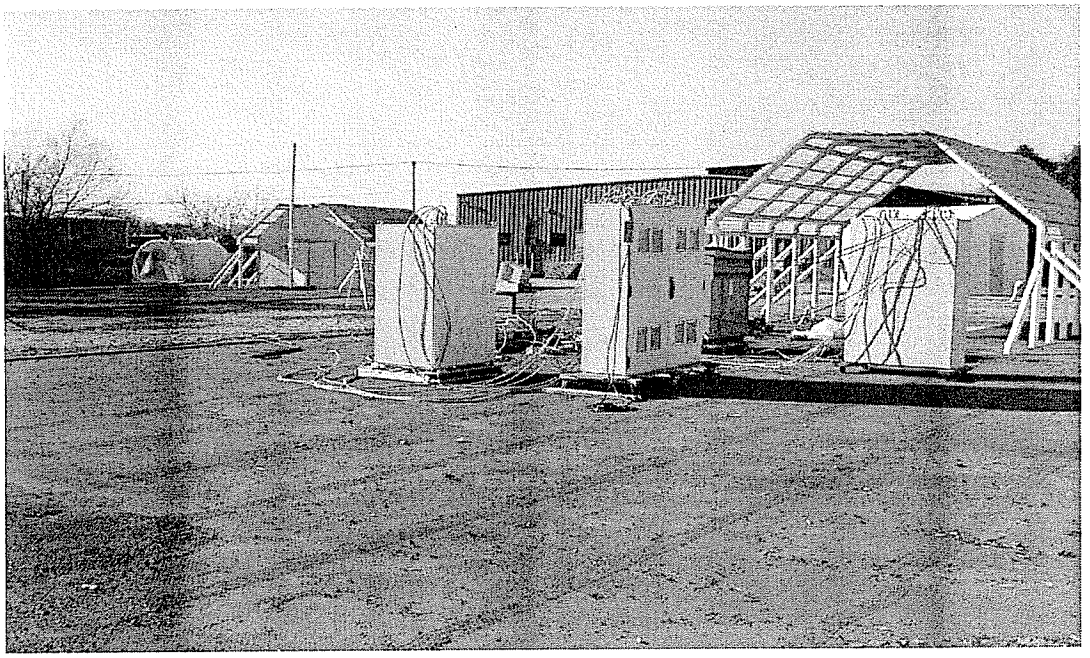
Test Photographs - Test # REHE-01





Section 6. Harmonics

Purpose:
The test is intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) to the limits on the magnitude of harmonic currents created by the equipment, as specified in EN 61000-3-2: 2001.

Specification Limits:
For Class A equipment, the harmonics of the input current shall not exceed the maximum permissible values given in Table 1 multiplied by a factor of 1.5.

Table 1 – Limits for Class A equipment.

Harmonic order n	Maximum permissible Harmonic current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
$15 \leq n \leq 39$	0.15 15/n
Even harmonics	
2	1.08
4	0.43
6	0.30
$8 \leq n \leq 40$	0.23 8/n

Test Method:
See Section 15.

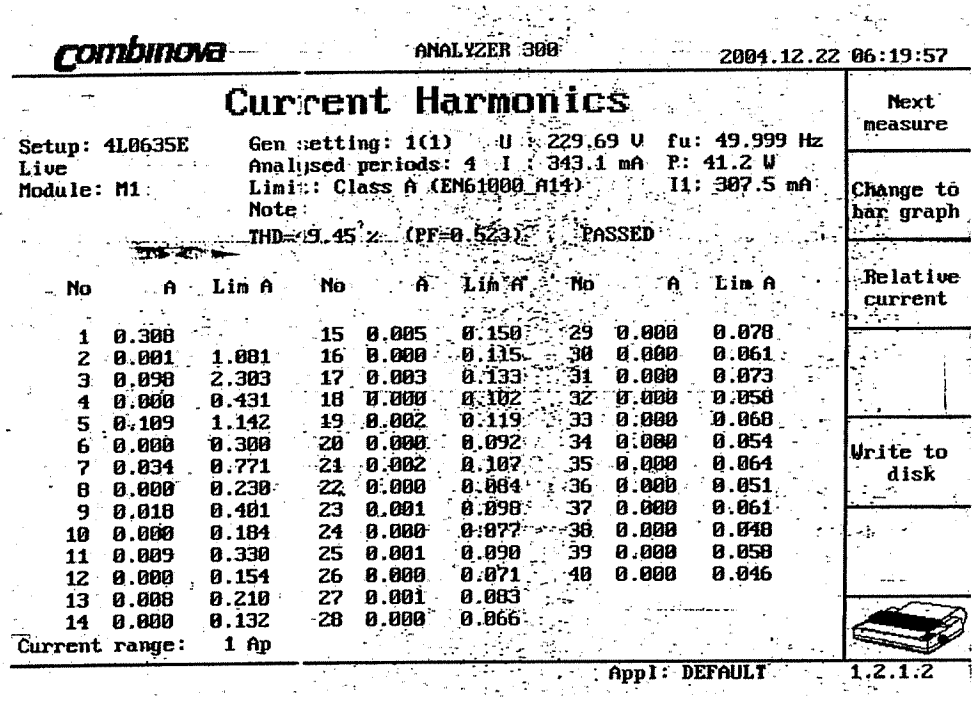
Test Information:		Test Conditions:	
Test #:	HARM-01	Test Voltage:	230Vac
Tested By:	J. Fish	Temperature:	23
Date of Tests:	12/21/04	Humidity:	39

Test Results:
The E.U.T. complies.

TEST EQUIPMENT

Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal	Cal Due
793	Analyzer Harmonics	Combinova	300	115	1/9/04	1/9/05

Test Data –Harmonics Test# HARM-01



combinova — ANALYZER 300 — 2004.12.22 06:19:57

Current Harmonics

Setup: 4L0635E
Live
Module: M1

Gen setting: 1(1) U : 229.69 V fu: 49.999 Hz
Analysed periods: 4 I : 343.1 mA P: 41.2 W
Limit: Class A (EN61000_A14) I1: 307.5 mA
Note:
THD=9.45 % (PF=0.523) PASSED

No	A	Lim A	No	A	Lim A	No	A	Lim A
1	0.308		15	0.005	0.150	29	0.000	0.078
2	0.001	1.081	16	0.000	0.115	30	0.000	0.061
3	0.098	2.303	17	0.003	0.133	31	0.000	0.073
4	0.000	0.431	18	0.000	0.102	32	0.000	0.058
5	0.109	1.142	19	0.002	0.119	33	0.000	0.068
6	0.000	0.300	20	0.000	0.092	34	0.000	0.054
7	0.034	0.771	21	0.002	0.107	35	0.000	0.064
8	0.000	0.230	22	0.000	0.084	36	0.000	0.051
9	0.018	0.401	23	0.001	0.098	37	0.000	0.061
10	0.000	0.184	24	0.000	0.077	38	0.000	0.048
11	0.009	0.330	25	0.001	0.090	39	0.000	0.058
12	0.000	0.154	26	0.000	0.071	40	0.000	0.046
13	0.008	0.210	27	0.001	0.083			
14	0.000	0.132	28	0.000	0.066			

Current range: 1 Ap

Next measure
Change to bar graph
Relative current
Write to disk

Appl: DEFAULT 1.2.1.2

Nemko

Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Complete X
Preliminary

Job # : 4L0697E Test # : HARM-01
Page 1 of 1

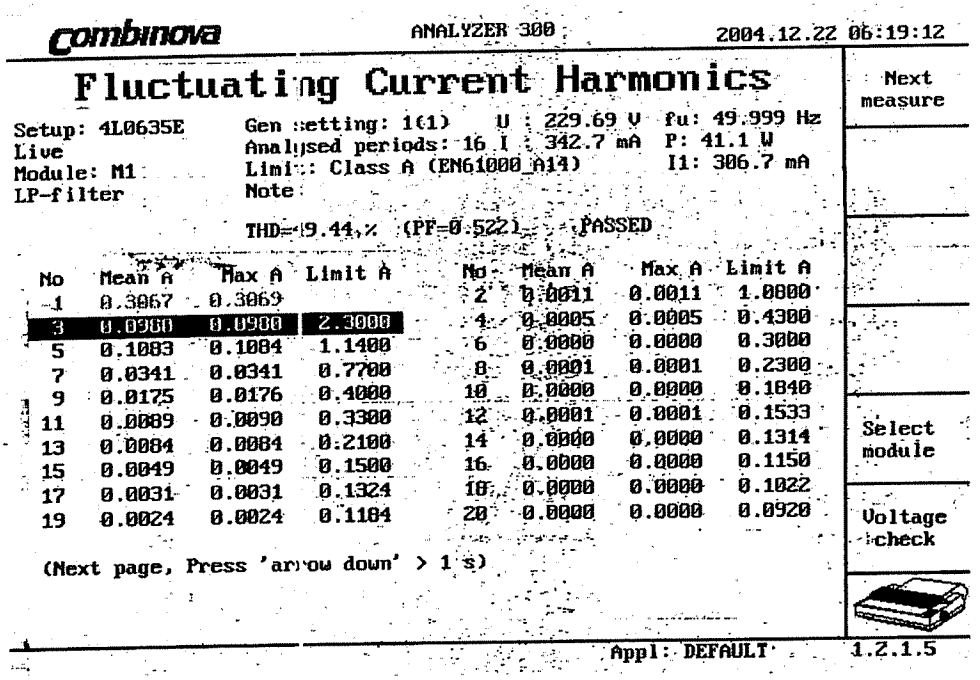
Client Name : Vertex RSI
EUT Name : Data Acquisition Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-3300-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-4
Transducer # : 793
Power Supply#: 795

Temp. (deg. C) : 23
Humidity (%) : 39
EUT Voltage : 230Vac
EUT Frequency : 50Hz

Reference : EN 6100-3-2
Date : 12/21/2004
Time : 8:00
Staff : J. Fish
Location : SAC
Photo ID: 4L0697E HARM-01

Test Data –Harmonics Test# HARM-02



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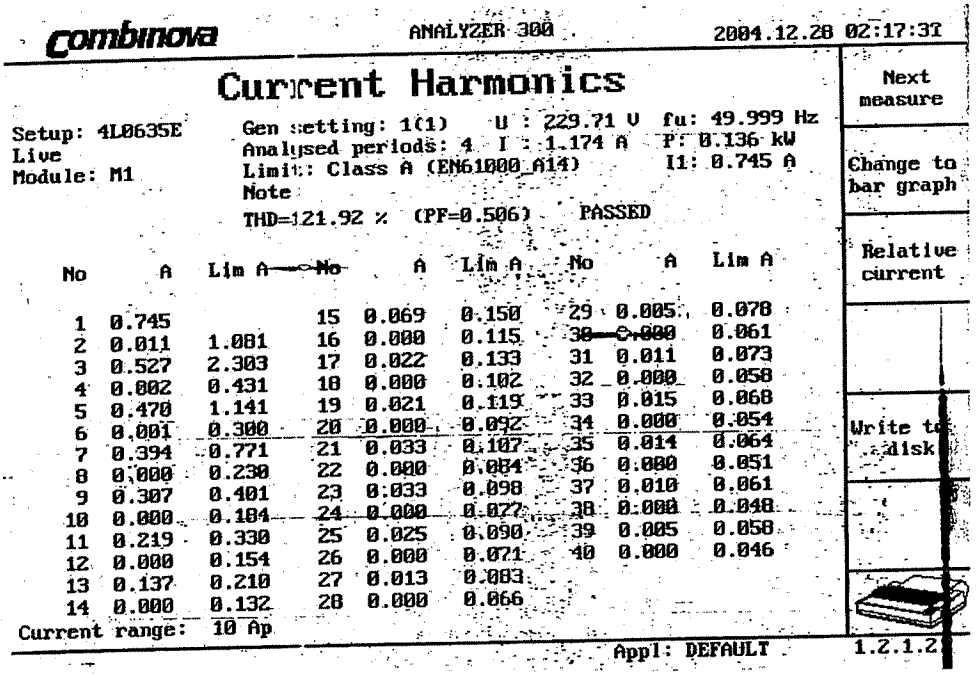
Complete	X	Job # : 4L0697E	Test # : HARM-02
Preliminary		Page 1	of 1

Client Name :	Vertex RSI				
EUT Name :	Data Acquisition Unit, VISTA				
EUT Model # :	Model 133 Mount Control System				
EUT Part # :	99-343-3300-01				
EUT Serial # :	001				
EUT Config. :	All cabinets powered and all motors running.				
Specification :	EN 61000-6-4			Reference :	EN 6100-3-2
Transducer # :	793	Temp. (deg. C) :	23	Date :	12/21/2004
Power Supply#:	795	Humidity (%) :	39	Time :	8:00
		EUT Voltage :	230Vac	Staff :	J. Fish
		EUT Frequency :	50Hz	Location :	SAC
				Photo ID:	4L0697E HARM-01

Test Data –Harmonics Test# HARM-03



combinova ANALYZER 300 2004.12.28 02:17:31

Current Harmonics

Next measure

Setup: 4L0635E
Live
Module: M1

Gen setting: 1(1) U : 229.71 V fu: 49.999 Hz
Analysed periods: 4 I : 1.174 A P: 0.136 kW
Limit: Class A (EN61000-A14) I1: 0.745 A
Note
THD=121.92 % (PF=0.506) PASSED

Change to bar graph

Relative current

No	A	Lim A	No	A	Lim A	No	A	Lim A
1	0.745		15	0.069	0.150	29	0.005	0.078
2	0.011	1.081	16	0.000	0.115	30	0.000	0.061
3	0.527	2.303	17	0.022	0.133	31	0.011	0.073
4	0.002	0.431	18	0.000	0.102	32	0.000	0.058
5	0.470	1.141	19	0.021	0.119	33	0.015	0.068
6	0.001	0.300	20	0.000	0.092	34	0.000	0.054
7	0.394	0.771	21	0.033	0.107	35	0.014	0.064
8	0.000	0.230	22	0.000	0.084	36	0.000	0.051
9	0.307	0.401	23	0.033	0.098	37	0.010	0.061
10	0.000	0.184	24	0.000	0.077	38	0.000	0.048
11	0.219	0.330	25	0.025	0.090	39	0.005	0.058
12	0.000	0.154	26	0.000	0.071	40	0.000	0.046
13	0.137	0.210	27	0.013	0.083			
14	0.000	0.132	28	0.000	0.066			

Write to disk

Current range: 10 Ap

Appl: DEFAULT 1.2.1.2

Dallas Headquarters:
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Tel: (972) 436-9600
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Complete X
Preliminary

Job # : 4L0697E Test # : HARM-03
Page 1 of 1

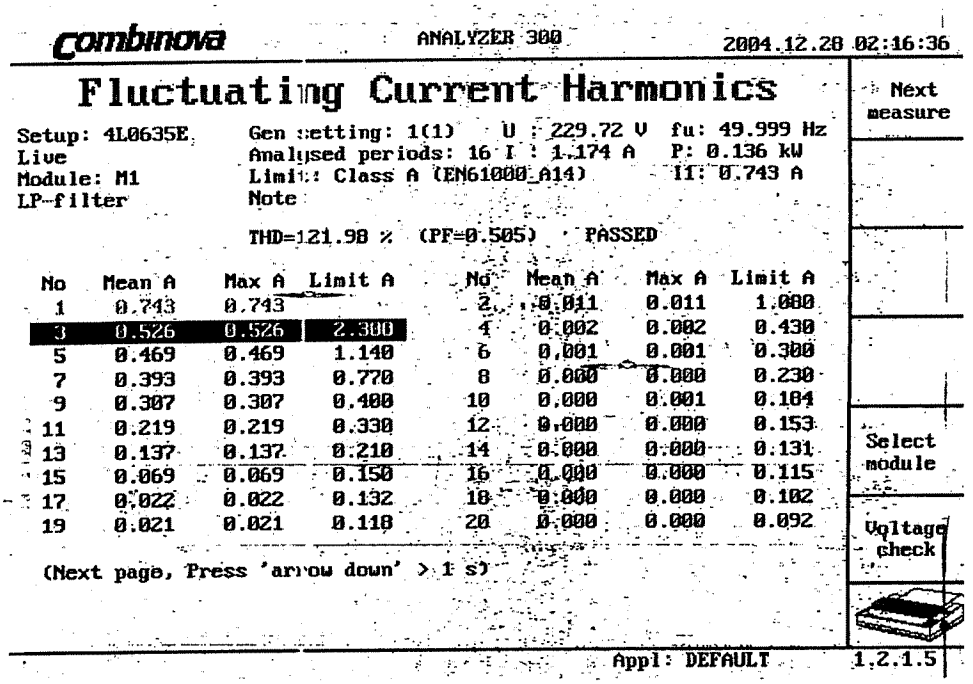
Client Name : Vertex RSI
EUT Name : CASS Power Drive Unit
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-2010-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-4
Transducer # : 793
Power Supply#: 795

Temp. (deg. C) : 23
Humidity (%) : 39
EUT Voltage : 230Vac
EUT Frequency : 50Hz

Reference : EN 6100-3-2
Date : 12/21/2004
Time : 8:00
Staff : J. Fish
Location : SAC
Photo ID: 4L0697E HARM-01

Test Data –Harmonics Test# HARM-04



combinova ANALYZER 300 2004.12.28 02:16:36

Fluctuating Current Harmonics

Next measure

Setup: 4L0635E
Live
Module: M1
LP-filter

Gen setting: 1(1) U : 229.72 V fu: 49.999 Hz
Analysed periods: 16 I : 1.174 A P: 0.136 kW
Limit: Class A (EN61000_A14) II: 0.743 A
Note

THD=121.98 % (PF=0.505) PASSED

No	Mean A	Max A	Limit A	No	Mean A	Max A	Limit A
1	0.743	0.743		2	0.011	0.011	1.080
3	0.526	0.526	2.300	4	0.002	0.002	0.430
5	0.469	0.469	1.140	6	0.001	0.001	0.300
7	0.393	0.393	0.770	8	0.000	0.000	0.230
9	0.307	0.307	0.400	10	0.000	0.001	0.184
11	0.219	0.219	0.330	12	0.000	0.000	0.153
13	0.137	0.137	0.210	14	0.000	0.000	0.131
15	0.069	0.069	0.150	16	0.000	0.000	0.115
17	0.022	0.022	0.132	18	0.000	0.000	0.102
19	0.021	0.021	0.118	20	0.000	0.000	0.092

(Next page, Press 'arrow down' > 1 s)

Select module

Voltage check

Appl: DEFAULT 1.2.1.5

Nemko

Dallas Headquarters:
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Fax: (972) 436-2667

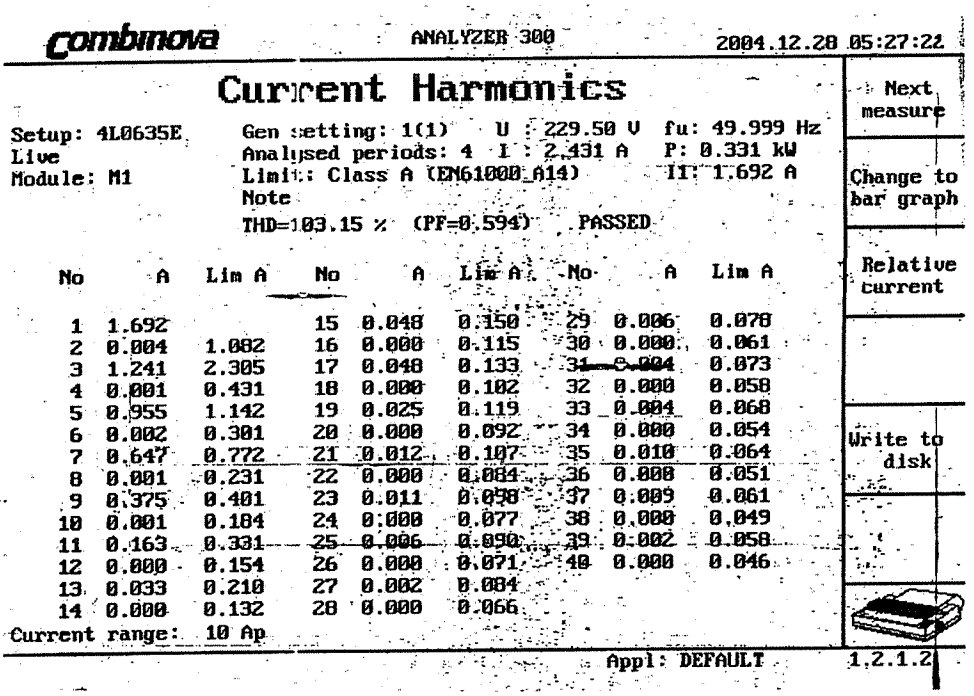
Complete X
Preliminary

Job # : 4L0697E Test # : HARM-04
Page 1 of 1

Client Name : Vertex RSI
EUT Name : CASS Power Drive Unit
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-2010-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-4 Reference : EN 6100-3-2
Transducer # : 793 Temp. (deg. C) : 23 Date : 12/21/2004
Power Supply#: 795 Humidity (%) : 39 Time : 8:00
EUT Voltage : 230Vac Staff : J. Fish
EUT Frequency : 50Hz Location : SAC
Photo ID: 4L0697E HARM-01

Test Data –Harmonics Test# HARM-05



combinova ANALYZER 300 2004.12.28 05:27:22

Current Harmonics

Next measure | Change to bar graph | Relative current | Write to disk

Setup: 4L0635E
Live
Module: M1

Gen setting: 1(1) U : 229.50 V fu: 49.999 Hz
Analysed periods: 4 I : 2.431 A P: 0.331 kW
Limit: Class A (EN61000-A14) II: 1.692 A
Note
THD=103.15 % (PF=0.594) PASSED

No	A	Lim A	No	A	Lim A	No	A	Lim A
1	1.692		15	0.048	0.150	29	0.006	0.078
2	0.004	1.082	16	0.000	0.115	30	0.000	0.061
3	1.241	2.305	17	0.048	0.133	31	0.004	0.073
4	0.001	0.431	18	0.000	0.102	32	0.000	0.058
5	0.955	1.142	19	0.025	0.119	33	0.004	0.068
6	0.002	0.301	20	0.000	0.092	34	0.000	0.054
7	0.647	0.772	21	0.012	0.107	35	0.010	0.064
8	0.001	0.231	22	0.000	0.084	36	0.000	0.051
9	0.375	0.401	23	0.011	0.098	37	0.009	0.061
10	0.001	0.184	24	0.000	0.077	38	0.000	0.049
11	0.163	0.331	25	0.006	0.090	39	0.002	0.058
12	0.000	0.154	26	0.000	0.071	40	0.000	0.046
13	0.033	0.210	27	0.002	0.084			
14	0.000	0.132	28	0.000	0.066			

Current range: 10 Ap

Appl: DEFAULT 1.2.1.2

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Complete X
Preliminary

Job # : 4L0697E Test # : HARM-05
Page 1 of 1

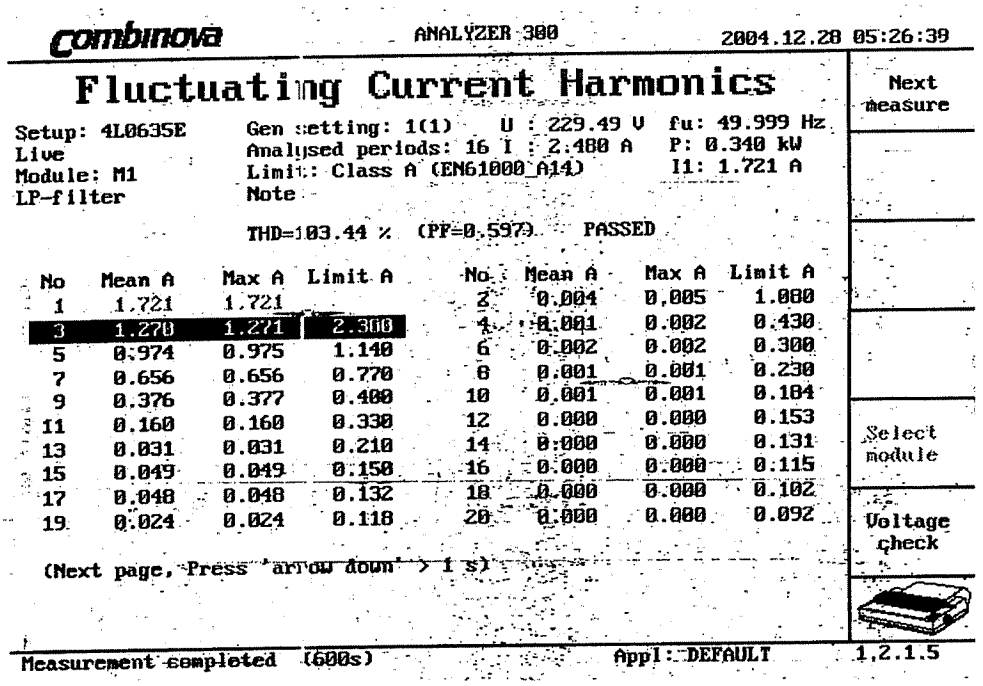
Client Name : Vertex RSI
EUT Name : AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2000-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-4
Transducer # : 793
Power Supply#: 795

Temp. (deg. C) : 23
Humidity (%) : 39
EUT Voltage : 230Vac
EUT Frequency : 50Hz

Reference : EN 6100-3-2
Date : 12/21/2004
Time : 8:00
Staff : J. Fish
Location : SAC
Photo ID: 4L0697E FLIC-01

Test Data –Harmonics Test# HARM-06



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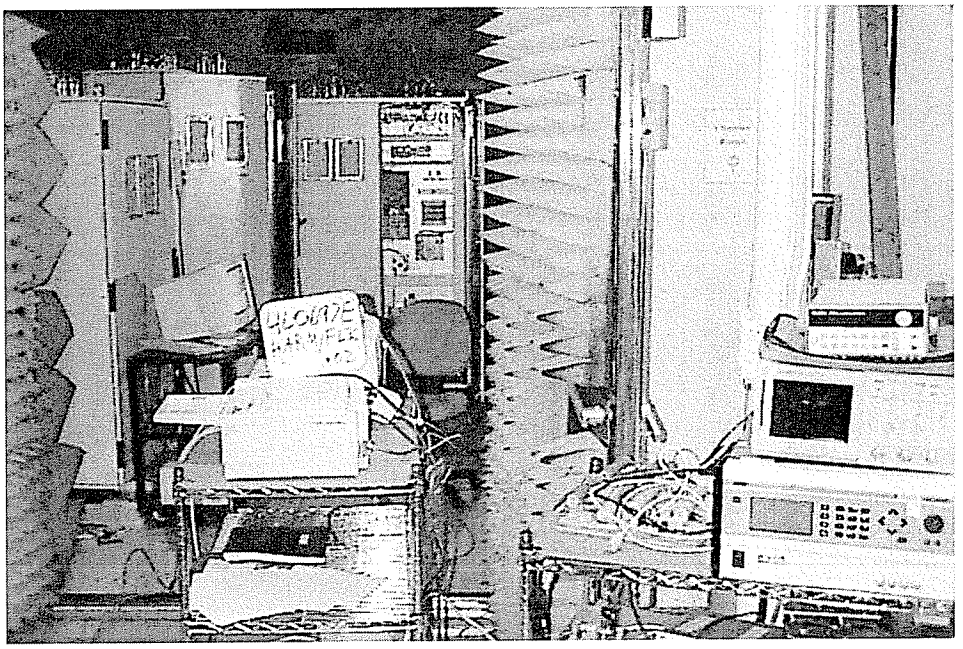
Complete	X	Job # : 4L0697E	Test # : HARM-06
Preliminary		Page 1	of 1

Client Name :	Vertex RSI
EUT Name :	AZ/ALT Power Drive Unit, VISTA
EUT Model # :	Model 133 Mount Control System
EUT Part # :	99-343-2000-01
EUT Serial # :	001
EUT Config. :	All cabinets powered and all motors running.

Specification :	EN 61000-6-4			Reference :	EN 6100-3-2
Transducer # :	793	Temp. (deg. C) :	23	Date :	12/21/2004
Power Supply#:	795	Humidity (%) :	39	Time :	8:00
		EUT Voltage :	230Vac	Staff :	J. Fish
		EUT Frequency :	50Hz	Location :	SAC
				Photo ID:	4L0697E FLIC-01

Test Photographs - Test # HARM-01



Section 7. Flicker

Purpose:
The test is intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) to the limits on the level of voltage fluctuations produced by the equipment, as specified in EN 61000-3-3: 2002.

Specification Limits:
The limits shall be applicable to voltage fluctuations and flicker at the supply terminals of the equipment under test.

The following limits apply:
- The value of P_{st} shall not be greater than 1.0.
- The value of P_{lt} shall not be greater than 0.65.
- The relative steady-state voltage change, d_c, shall not exceed 3%.
- The maximum relative voltage change, d_{max}, shall not exceed 4%.
- The value of $d(t)$ during a voltage change shall not exceed 3% for more than 200 ms.

If voltage changes are caused by manual switching or occur less frequently than once per hour, the P_{st} and P_{lt} requirements shall not be applicable. The three requirements related to voltage changes shall be applicable with the previously mentioned voltage values, multiplied by a factor of 1.33.

Test Method:
See Section 15.

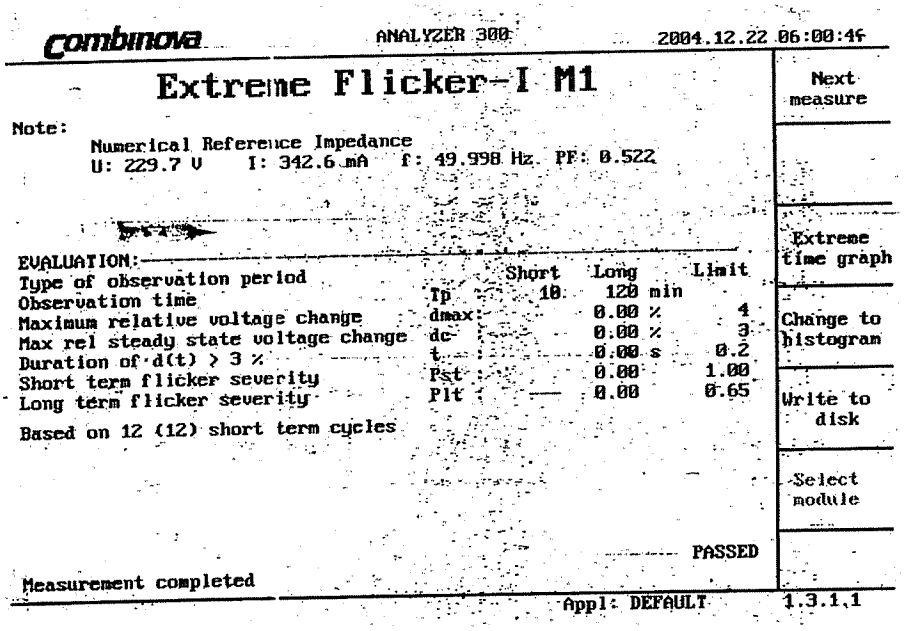
Test Information:		Test Conditions:	
Test # :	FLIC-01	Test Voltage:	230Vac
Tested By:	J. Fish	Temperature:	23
Date of Tests:	12/21/04	Humidity:	39

Test Results:
The E.U.T. complies

TEST EQUIPMENT

Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal	Cal Due
793	Analyzer Harmonics	Combinova	300	115	1/9/04	1/9/05

Test Data –Flicker Test# FLIC-01



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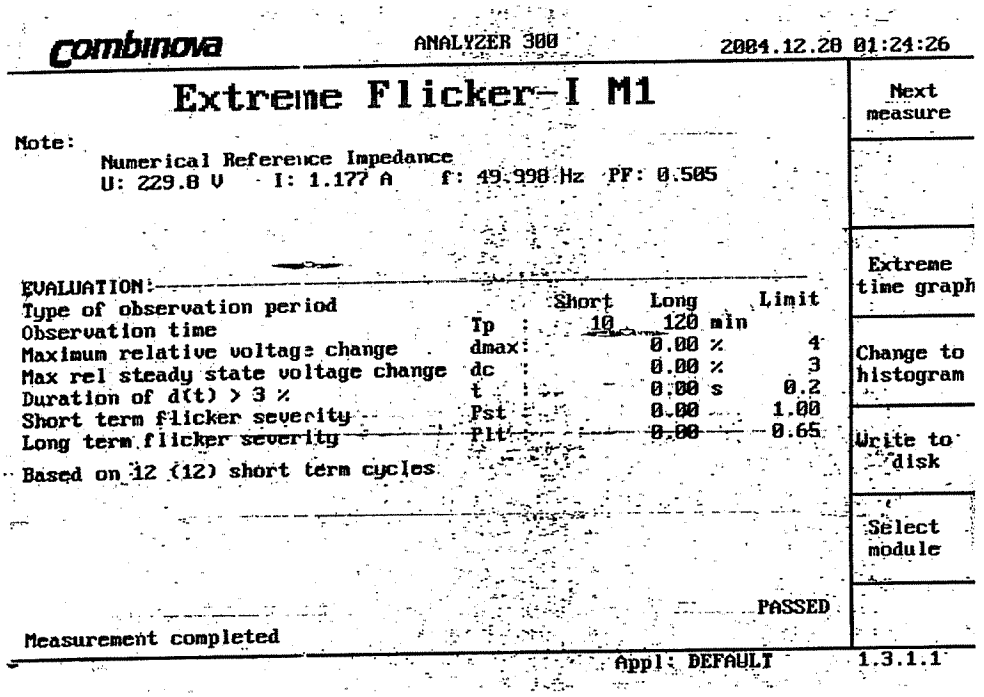
Complete	X			Job # : 4L0697E	Test # : FLIC-01
Preliminary				Page 1	of 1
Client Name :	Vertex RSI				
EUT Name :	Data Acquisition Unit, VISTA				
EUT Model # :	Model 133 Mount Control System				
EUT Part # :	99-343-3300-01				
EUT Serial # :	001				
EUT Config. :	All cabinets powered and all motors running.				
Specification :	EN 61000-6-4			Reference :	EN 6100-3-2
Transducer # :	793	Temp (deg. C) :	23	Date :	12/21/2004
Power Supply#:	795	Humidity (%) :	39	Time :	8:00
		EUT Voltage :	230Vac	Staff :	J. Fish
		EUT Frequency :	50Hz	Location :	SAC
				Photo ID:	4L0697E FLIC-01

Test Data –Flicker Test# FLIC-02



combinova ANALYZER 300 2004.12.20 01:24:26

Extreme Flicker-I M1

Next measure

Note:
Numerical Reference Impedance
U: 229.8 V I: 1.177 A f: 49.990 Hz PF: 0.505

Extreme time graph

EVALUATION:

Type of observation period		Short	Long	Limit
Observation time	Tp :	10	120 min	
Maximum relative voltage change	dmax:		0.00 %	4
Max rel steady state voltage change	dc :		0.00 %	3
Duration of d(t) > 3 %	t :		0.00 s	0.2
Short term flicker severity	Pst :		0.00	1.00
Long term flicker severity	Plt :		0.00	0.65

Based on 12 (12) short term cycles

Change to histogram

Write to disk

Select module

PASSED

Measurement completed

Appl: DEFAULT 1.3.1.1

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Complete X
Preliminary

Job # : 4L0697E Test # : FLIC-02
Page 1 of 1

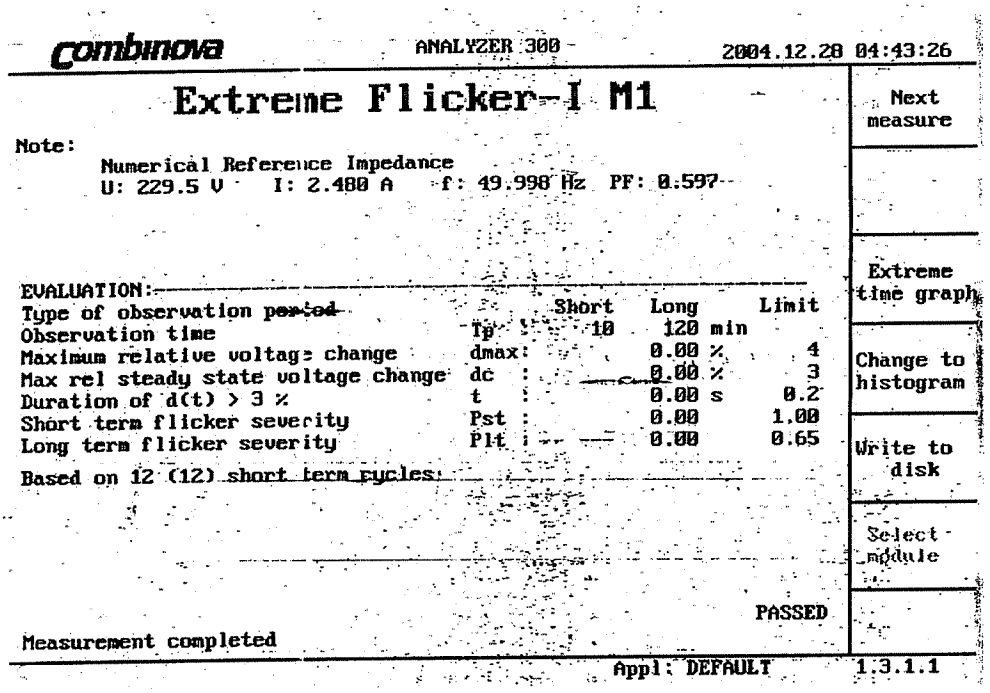
Client Name : Vertex RSI
EUT Name : CASS Power Drive Unit
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-2010-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-4
Transducer # : 793
Power Supply#: 795

Temp. (deg. C) : 23
Humidity (%) : 39
EUT Voltage : 230Vac
EUT Frequency : 50Hz

Reference : EN 6100-3-3
Date : 12/21/2004
Time : 8:00
Staff : J. Fish
Location : SAC
Photo ID: 4L0697E FLIC-01

Test Data –Flicker Test# FLIC-03



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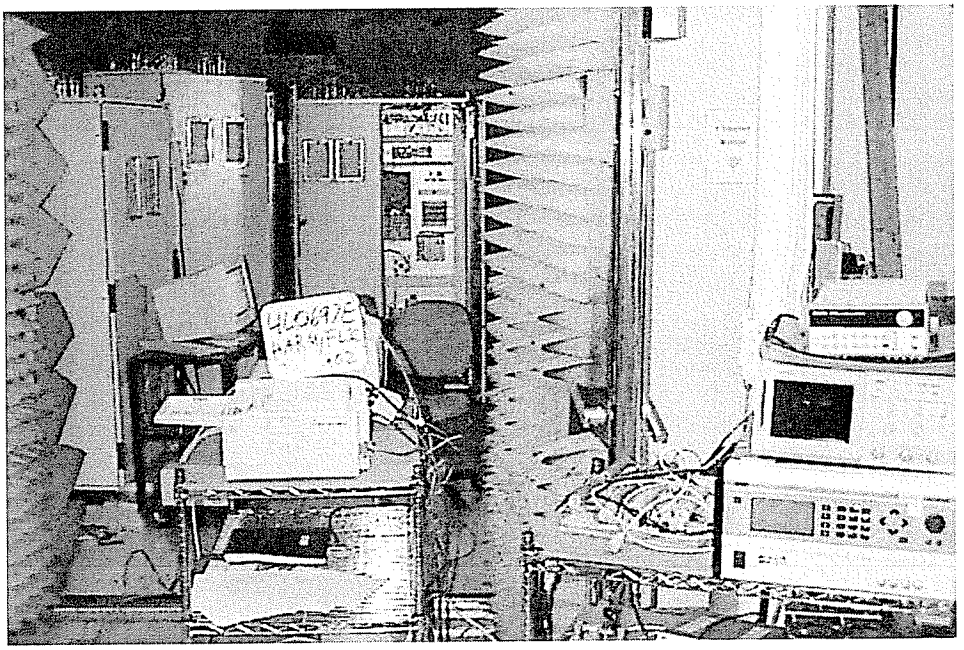
Complete	X	Job # : 4L0697E	Test # : FLIC-03
Preliminary		Page 1	of 1

Client Name :	Vertex RSI
EUT Name :	AZ/ALT Power Drive Unit, VISTA
EUT Model # :	Model 133 Mount Control System
EUT Part # :	99-343-2000-01
EUT Serial # :	001
EUT Config. :	All cabinets powered and all motors running.

Specification :	EN 61000-6-4			Reference :	EN 6100-3-3
Transducer # :	793	Temp. (deg. C) :	23	Date :	12/21/2004
Power Supply#:	795	Humidity (%) :	39	Time :	8:00
		EUT Voltage :	230Vac	Staff :	J. Fish
		EUT Frequency :	50Hz	Location :	SAC
				Photo ID:	4L0697E FLIC-01

Test Photographs - Test # FLIC-01



Section 8. Electrostatic Discharge Immunity

Purpose:
The test is intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) to electrostatics discharges.

Minimum Performance Criteria B

Test Method:
See Section 15.

Test Information:		Test Conditions:	
Test # :	ESDI-01	Test Voltage:	230Vac
Tested By:	J. Fish	Temperature:	22°C
Date of Tests:	12/23/05	Humidity:	41%

Test Results:
The E.U.T. complies.
The E.U.T. meets Performance Criteria A.

TEST EQUIPMENT

Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal	Cal Due
560	ESD Simulator	Keytek	MZ-15/AC	9205392	02/10/04	02/09/05

Test Data –Electrostatic Discharge Test# ESDI-01

Electrostatic Discharge Data

Complete X
Preliminary

Job # : 4L0697E Test # : ESDI-01
Page 1 of 3

Client Name : Vertex RSI
EUT Name : Data Acquisition Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-3300-01
EUT Serial # : 001
EUT Config : All cabinets powered and all motors running.

Specification : EN 61000-6-2
ESD Generator# 560
Cable#:

Temp (deg C) : 22
Humidity (%) : 41
EUT Voltage : 230Vac
EUT Frequency : 60Hz
Phase: 1
Location: SAC

Reference : EN 61000-4-2
Date : 12/23/05
Time : 10:00
Staff : J. Fish
Photo ID: 4L0697E ESDI-01
Performance Criteria: B
Table Top or Floor Floor

1 HCP X
2 VCP X
3 Enclosure
4 Connectors
5
6
7
8
9
10
11
12

Does product have any type of insulated coating on exterior surfaces? Yes No X
If yes, indicate where:

Test Point	ESD Level (kV)	Polarity	Contact or Air	Application Quantity	Effect Qty	Effects Type	Pass or Fail	Comments
1	2	+/-	Contact	20	0	N/A	Pass	
2	2	+/-	Contact	20	0	N/A	Pass	
3	2	+/-	Contact	20	0	N/A	Pass	
4	2	+/-	Contact	20	0	N/A	Pass	
1	4	+/-	Contact	20	0	N/A	Pass	
2	4	+/-	Contact	20	0	N/A	Pass	
3	4	+/-	Contact	20	0	N/A	Pass	
4	4	+/-	Contact	20	0	N/A	Pass	

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Test Data Electrostatic Discharge Test# ESDI-01 Cont.

Electrostatic Discharge Data

Complete X
Preliminary

Job # : 4L0697E Page 1 Test # : ESDI-01 of 3

Client Name : Vertex RSI
EUT Name : CASS Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2010-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-2
ESD Generator#: 560
Cable#:

Temp. (deg. C) : 22
Humidity (%) : 41
EUT Voltage : 230Vac
EUT Frequency : 60Hz
Phase: 1
Location: SAC

Reference : EN 61000-4-2
Date : 12/23/05
Time : 10:00
Staff : J. Fish
Photo ID: 4L0690\7E ESDI-01
Performance Criteria: B
Table Top or Floor Floor

1. HCP
2. VCP X
3 Enclosure
4 Connectors
5 Remote Pad
6
7
8
9
10
11
12

Does product have any type of insulated coating on exterior surfaces? Yes No X
If yes, indicate where:

Test Point	ESD Level (kV)	Polarity	Contact or Air	Application Quantity	Effect Qty	Effects Type	Pass or Fail	Comments
2	2	+/-	Contact	20	0	N/A	Pass	
3	2	+/-	Contact	20	0	N/A	Pass	
4	2	+/-	Contact	20	0	N/A	Pass	
2	4	+/-	Contact	20	0	N/A	Pass	
3	4	+/-	Contact	20	0	N/A	Pass	
4	4	+/-	Contact	20	0	N/A	Pass	
5	4	+/-	Contact	20	0	N/A	Pass	
5	2	+/-	Contact	20	0	N/A	Pass	
5	8	+/-	Contact	20	0	N/A	Pass	

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Test Data Electrostatic Discharge Test# ESDI-01 Cont.

Electrostatic Discharge Data

Complete X
Preliminary

Job # : 4L0697E
Page 1

Test # : ESDI-01
of 3

Client Name : Vertex RSI
EUT Name : AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2000-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-2
ESD Generator#: 560
Cable#:

Temp. (deg. C) : 22
Humidity (%) : 41
EUT Voltage : 230Vac
EUT Frequency : 60Hz
Phase: 1
Location: SAC

Reference : EN 61000-4-2
Date : 12/23/05
Time : 10:00
Staff : J. Fish
Photo ID: 4L0690\7E ESDI-01
Performance Criteria: B
Table Top or Floor Floor

1. HCP
2. VCP X
3 Enclosure
4 Connectors
5. Remote Pad
6.
7.
8.
9.
10.
11.
12.

Does product have any type of insulated coating on exterior surfaces? Yes No X
If yes, indicate where:

Test Point	ESD Level (kV)	Polarity	Contact or Air	Application Quantity	Effect Qty	Effects Type	Pass or Fail	Comments
2	2	+/-	Contact	20	0	N/A	Pass	
3	2	+/-	Contact	20	0	N/A	Pass	
4	2	+/-	Contact	20	0	N/A	Pass	
2	4	+/-	Contact	20	0	N/A	Pass	
3	4	+/-	Contact	20	0	N/A	Pass	
4	4	+/-	Contact	20	0	N/A	Pass	
5	4	+/-	Contact	20	0	N/A	Pass	
5	2	+/-	Contact	20	0	N/A	Pass	
5	8	+/-	Contact	20	0	N/A	Pass	

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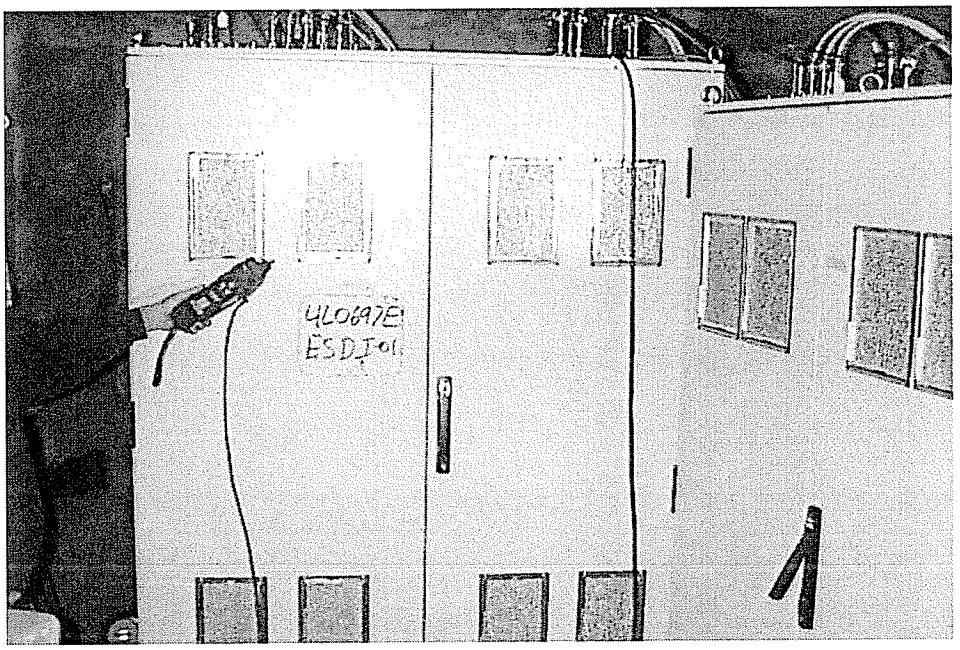
Test Photographs - Test # ESDI-01



Section 9. Radiated Electromagnetic Immunity

Purpose:
The test is intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) to radiated electromagnetic field energy.

Minimum Performance Criteria A

Test Method:
See Section 15.

Test Information:		Test Conditions:	
Test #:	RIHE-01	Test Voltage:	230Vac
Tested By:	J. Fish	Temperature:	22°C
Date of Tests:	12/23/04	Humidity:	35%

Test Results:
The E.U.T. complies.
The E.U.T. meets Performance Criteria A.

TEST EQUIPMENT

Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal	Cal Due
729	SIGNAL GENERATOR	HP	8656A	2402A05973	CNR	N/A
573	CABLE, 5.5m	KTL	RG213	N/A	02/05/04	02/04/05
970	CABLE, 14.8m	KTL	RG223	N/A	06/09/04	06/09/05
412	RF AMPLIFIER	Amplifier Research	100W1000M1A	21233	CNR	N/A
1131	Bilogical antenna	A.H. Systems	SAS-200/521	0	CNR	N/A
718	HP SPECTRUM ANALYZER	HEWLETT PACKARD	8591EM	3639A00980	02/11/04	02/10/05

Test Data –Radiated Electromagnetic Field Test# RIHE-01

Radiated Immunity Electric Field Test Data

Complete X
Preliminary

Job # : 4L0697E Test # : RIHE-01
Page 1 of 1

Client Name : Vertex RSI
EUT Name : Data Acquisition Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-3300-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-2
Signal Gen #: 729
Signal Gen #:
Cable#: 573
Cable#: 970
Cable#:
Amp#: 412
Amp#:
Amp#:
Amp#:
Antenna#: 1131
Antenna#:

Temp. (deg. C) : 22
Humidity (%) : 35
EUT Voltage : 230Vac
EUT Frequency : 60Hz
Phase: 1
Location: SAC
Monitor Probe#:
Field Monitor#:
Power Meter#:
Spectrum Analyzer#: 718

Reference : EN 61000-4-6
Date : 12/23/04
Time : 2:00
Staff : J. Fish
Photo ID: 4L0697E RIHE-01
Performance Criteria: A
Table Top or Floor: Floor
Sweep rate:
Step Size: 1%
Modulated: 80%

Freq. Start (MHz)	Freq. Stop (MHz)	Field Strength (V/m)	Effect Qty	Effects Type	Polarity (H or V)	Front or Back	Pass or Fail	Comments:
80	1000	10	0	N/A	H	Front	Pass	
80	1000	10	0	N/A	V	Front	Pass	

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Test Data Radiated Electromagnetic Field Test# RIHE-01 Cont.

Radiated Immunity Electric Field Test Data

Complete	X			Job # : 4L0697E	Test # : RIHE-01
Preliminary				Page 1	of 1
Client Name :	Vertex RSI				
EUT Name :	CASS Power Drive Unit, VISTA				
EUT Model # :	Model 133 Mount Control System				
EUT Part # :	99-343-2010-01				
EUT Serial # :	001				
EUT Config :	All cabinets powered and all motors running.				
Specification :	EN 61000-6-2			Reference :	EN 61000-4-6
Signal Gen.#:	729	Temp. (deg. C) :	22	Date :	12/23/04
Signal Gen.#:		Humidity (%) :	35	Time :	2:00
Cable#:	749	EUT Voltage :	230Vac	Staff :	J. Fish
Cable#:	970	EUT Frequency :	60Hz	Photo ID:	4L0697E RIHE-01
Cable#:		Phase:	1	Performance Criteria:	A
Amp#:	412	Location:	SAC	Table Top or Floor:	Floor
Amp#:		Monitor Probe#:		Sweep rate:	
Amp#:		Field Monitor#:		Step Size:	1%
Amp#:		Power Meter#:		Modulated:	80%
Antenna#:	1131	Spectrum Analyzer#	718		
Antenna#:					

Freq. Start (MHz)	Freq. Stop (MHz)	Field Strength (V/m)	Effect Qty	Effects Type	Polarity (H or V)	Front or Back	Pass or Fail	Comments:
80	1000	10	0	N/A	H	Front	Pass	
80	1000	10	0	N/A	V	Front	Pass	

Test Data Radiated Electromagnetic Field Test# RIHE-01 Cont.

Radiated Immunity Electric Field Test Data

Complete: X
Preliminary:

Job # : 4L0697E
Page 1

Test # : RIHE-01
of 1

Client Name : Vertex RSI
EUT Name : AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2000-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

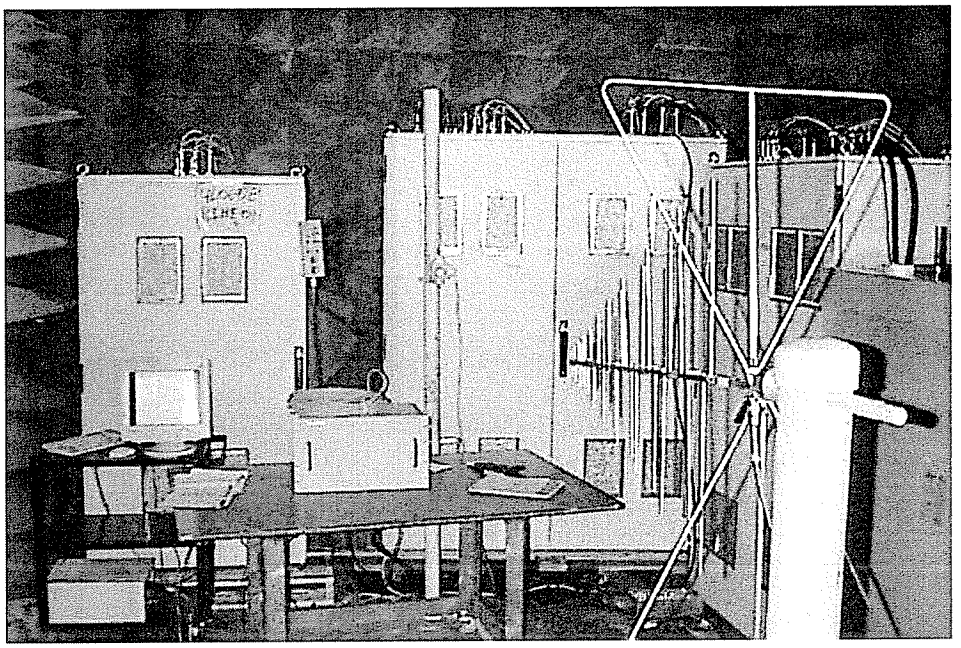
Specification : EN 61000-6-2
Signal Gen #: 729
Signal Gen #:
Cable#: 749
Cable#: 970
Cable#:
Amp#: 412
Amp#:
Amp#:
Amp#:
Antenna#: 1131
Antenna#:

Temp. (deg C) : 22
Humidity (%) : 35
EUT Voltage : 230Vac
EUT Frequency : 60Hz
Phase: 1
Location: SAC
Monitor Probe#:
Field Monitor#:
Power Meter#:
Spectrum Analyzer# 718

Reference : EN 61000-4-6
Date : 12/23/04
Time : 2:00
Staff : J. Fish
Photo ID: 4L0697E RIHE-01
Performance Criteria: A
Table Top or Floor: Floor
Sweep rate:
Step Size: 1%
Modulated: 80%

Freq Start (MHz)	Freq Stop (MHz)	Field Strength (V/m)	Effect Qty	Effects Type	Polarity (H or V)	Front or Back	Pass or Fail	Comments:
80	1000	10	0	N/A	H	Front	Pass	
80	1000	10	0	N/A	V	Front	Pass	

Test Photographs - Test # RIHE-01



Section 10. Electrical Fast Transient / Burst

Purpose:
The test is intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) to repetitive electrical fast transients (bursts), on supply, signal, or control lines.

Minimum Performance Criteria B

Test Method:
See Section 15.

Test Information:		Test Conditions:	
Test # :	EFTP-01	Test Voltage:	230Vac
Tested By:	J. Fish	Temperature:	24°C
Date of Tests:	12/20/05	Humidity:	36%

Test Results:
The E.U.T. complies.
The E.U.T. meets Performance Criteria A.

TEST EQUIPMENT

Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal	Cal Due
590	PEFT (EFT generator)	Haefely	DGFT junior	589071-03	02/02/04	02/01/05
559	Capacitive clamp	ICC	0	0	CNR	N/A

Test Data –Electrical Fast Transient / Burst Test# EFTP-01

Electrically Fast Transient Data

Complete	X			Job # : 4L0697E	Test # : EFTP-01
Preliminary				Page 1	of 3
Client Name :	Vertex RSI				
EUT Name :	Data Acquisition Unit, VISTA				
EUT Model # :	Model 133 Mount Control System				
EUT Part # :	99-343-3300-01				
EUT Serial # :	001				
EUT Config. :	All cabinets powered and all motors running.				
Specification :	EN 61000-6-2			Reference :	EN 61000-4-4
Generator#:	590	Temp. (deg. C) :	24	Date :	12/20/05
Clamp#:	559	Humidity (%) :	36	Time :	2:00
Probe#:	NA	EUT Voltage :	230Vac	Staff :	J. Fish
1. L	X	EUT Frequency :	60Hz	Photo ID:	4L0697E EFTP-01
2. N	X	Phase:	1	Performance Criteria:	B
3. PE	X	Location:	SAC	Table Top or Floor	Floor
4. L+N	X	7. L+N+PE	X	10.	
5. L+PE	X	8.		11	
6. N+PE	X	9.		12.	

Test Point	EFT Level (kV)	Direct or Capacitive	Polarity	Time Duration	Effects Number	Effects Type	Pass or Fail	Comments:
1	0.5	Direct	+/-	2	0	N/A	Pass	Logic Power
2	0.5	Direct	+/-	2	0	N/A	Pass	
3	0.5	Direct	+/-	2	0	N/A	Pass	
4	0.5	Direct	+/-	2	0	N/A	Pass	
5	0.5	Direct	+/-	2	0	N/A	Pass	
6	0.5	Direct	+/-	2	0	N/A	Pass	
7	0.5	Direct	+/-	2	0	N/A	Pass	
1	1	Direct	+/-	2	0	N/A	Pass	
2	1	Direct	+/-	2	0	N/A	Pass	
3	1	Direct	+/-	2	0	N/A	Pass	
4	1	Direct	+/-	2	0	N/A	Pass	
5	1	Direct	+/-	2	0	N/A	Pass	
6	1	Direct	+/-	2	0	N/A	Pass	
7	1	Direct	+/-	2	0	N/A	Pass	
1	2	Direct	+/-	2	0	N/A	Pass	
2	2	Direct	+/-	2	0	N/A	Pass	
3	2	Direct	+/-	2	0	N/A	Pass	
4	2	Direct	+/-	2	0	N/A	Pass	
5	2	Direct	+/-	2	0	N/A	Pass	
6	2	Direct	+/-	2	0	N/A	Pass	
7	2	Direct	+/-	2	0	N/A	Pass	

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Test Data Electrical Fast Transient / Burst Test# EFTP-01 Cont.

Electrically Fast Transient Data

Complete: X
Preliminary:

Job # : 4L0697E Test # : EFTP-01
Page 1 of 3

Client Name : Vertex RSI
EUT Name : CASS Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2010-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-2
Reference : EN 61000-4-4

Generator#:	590	Temp. (deg. C) :	24	Date :	12/20/05
Clamp#:	559	Humidity (%) :	36	Time :	2:00
Probe#:	NA	EUT Voltage :	230Vac	Staff :	J. Fish
1. L	X	EUT Frequency :	60Hz	Photo ID:	4L0697E EFTP-01
2. N	X	Phase:	1	Performance Criteria:	B
3. PE	X	Location:	SAC	Table Top or Floor	Floor
4. L+N	X	7. L+N+PE	X	10.	
5. L+PE	X	8.		11.	
6. N+PE	X	9.		12.	

Test Point	EFT Level (kV)	Direct or Capacitive	Polarity	Time Duration	Effects Number	Effects Type	Pass or Fail	Comments:
1	0.5	Direct	+/-	2	0	N/A	Pass	Logic Power
2	0.5	Direct	+/-	2	0	N/A	Pass	
3	0.5	Direct	+/-	2	0	N/A	Pass	
4	0.5	Direct	+/-	2	0	N/A	Pass	
5	0.5	Direct	+/-	2	0	N/A	Pass	
6	0.5	Direct	+/-	2	0	N/A	Pass	
7	0.5	Direct	+/-	2	0	N/A	Pass	
1	1	Direct	+/-	2	0	N/A	Pass	
2	1	Direct	+/-	2	0	N/A	Pass	
3	1	Direct	+/-	2	0	N/A	Pass	
4	1	Direct	+/-	2	0	N/A	Pass	
5	1	Direct	+/-	2	0	N/A	Pass	
6	1	Direct	+/-	2	0	N/A	Pass	
7	1	Direct	+/-	2	0	N/A	Pass	
1	2	Direct	+/-	2	0	N/A	Pass	
2	2	Direct	+/-	2	0	N/A	Pass	
3	2	Direct	+/-	2	0	N/A	Pass	
4	2	Direct	+/-	2	0	N/A	Pass	
5	2	Direct	+/-	2	0	N/A	Pass	
6	2	Direct	+/-	2	0	N/A	Pass	
7	2	Direct	+/-	2	0	N/A	Pass	

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Test Data Electrical Fast Transient / Burst Test# EFTP-01 Cont.

Electrically Fast Transient Data

Complete: X
Preliminary:

Job # : 4L0697E Page 1 Test # : EFTP-01 of 3

Client Name : Vertex RSI
EUT Name : AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2000-01
EUT Serial # : 001
EUT Config : All cabinets powered and all motors running.

Specification : EN 61000-6-2
Reference : EN 61000-4-4

Generator#:	590	Temp. (deg. C) :	24	Date :	12/20/05
Clamp#:	559	Humidity (%) :	36	Time :	2:00
Probe#:	NA	EUT Voltage :	230Vac	Staff :	J. Fish
1. L	X	EUT Frequency :	60Hz	Photo ID:	4L0697E EFTP-01
2. N	X	Phase:	1	Performance Criteria:	B
3. PE	X	Location:	SAC	Table Top or Floor	Floor
4. L+N	X	7. L+N+PE	X	10.	
5. L+PE	X	8.		11	
6. N+PE	X	9.		12.	

Test Point	EFT Level (kV)	Direct or Capacitive	Polarity	Time Duration	Effects Number	Effects Type	Pass or Fail	Comments:
1	0.5	Direct	+/-	2	0	N/A	Pass	Logic Power
2	0.5	Direct	+/-	2	0	N/A	Pass	
3	0.5	Direct	+/-	2	0	N/A	Pass	
4	0.5	Direct	+/-	2	0	N/A	Pass	
5	0.5	Direct	+/-	2	0	N/A	Pass	
6	0.5	Direct	+/-	2	0	N/A	Pass	
7	0.5	Direct	+/-	2	0	N/A	Pass	
1	1	Direct	+/-	2	0	N/A	Pass	
2	1	Direct	+/-	2	0	N/A	Pass	
3	1	Direct	+/-	2	0	N/A	Pass	
4	1	Direct	+/-	2	0	N/A	Pass	
5	1	Direct	+/-	2	0	N/A	Pass	
6	1	Direct	+/-	2	0	N/A	Pass	
7	1	Direct	+/-	2	0	N/A	Pass	
1	2	Direct	+/-	2	0	N/A	Pass	
2	2	Direct	+/-	2	0	N/A	Pass	
3	2	Direct	+/-	2	0	N/A	Pass	
4	2	Direct	+/-	2	0	N/A	Pass	
5	2	Direct	+/-	2	0	N/A	Pass	
6	2	Direct	+/-	2	0	N/A	Pass	
7	2	Direct	+/-	2	0	N/A	Pass	

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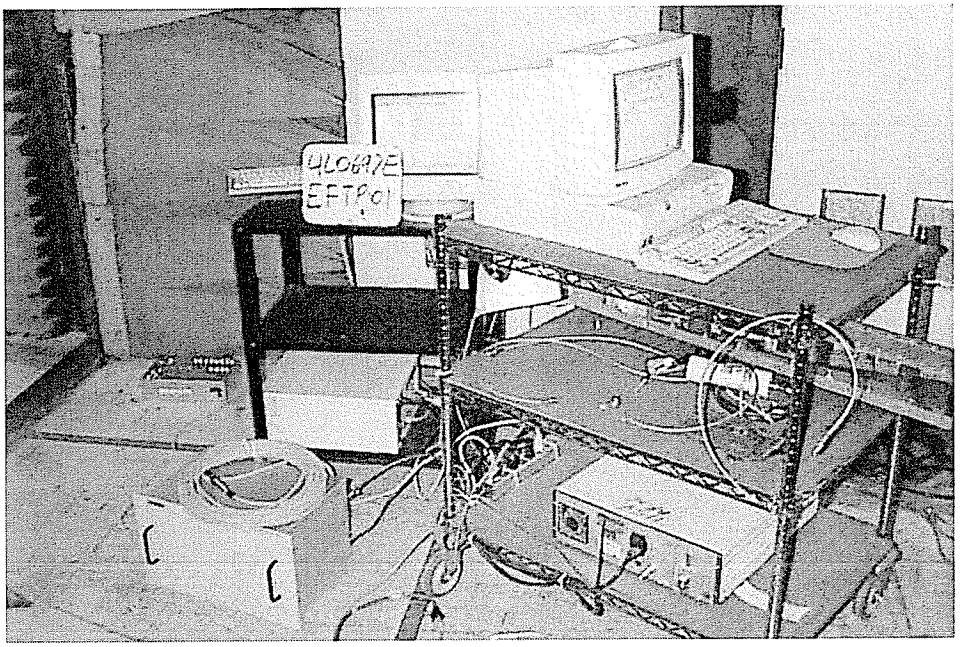
Test Photographs - Test # EFTP-01



Test Information:		Test Conditions:	
Test # :	EFTP-02	Test Voltage:	400Vac
Tested By:	J. Fish	Temperature:	24°C
Date of Tests:	12/20/05	Humidity:	36%

Test Results:
The E.U.T. complies.
The E.U.T. meets Performance Criteria A.

TEST EQUIPMENT

Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal	Cal Due
590	PEFT (EFT generator)	Haefely	DGFT junior	589071-03	02/02/04	02/01/05
559	Capacitive clamp	ICC	0	0	CNR	N/A

Test Data –Electrical Fast Transient / Burst Test# EFTP-02

Electrically Fast Transient Data

Complete: X
Preliminary:

Job # : 4L0697E Page 1
Test # : EFTP-02 of 2

Client Name : Vertex RSI
EUT Name : CASS Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2010-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-2
Generator#: 590
Clamp#: 559
Probe#: NA
1. L1: X
2. L2: X
3. L3: X
4. N: X
5. PE: X
6. N+PE:

Temp. (deg. C) : 24
Humidity (%) : 36
EUT Voltage : 400Vac
EUT Frequency :
Phase: 1
Location: SAC
7. L+N+PE:
8.
9.

Reference : EN 61000-4-4
Date : 12/20/05
Time : 3:30
Staff : J. Fish
Photo ID: 4L0697E EFTP-02
Performance Criteria: B
Table Top or Floor: Floor
10
11
12.

Test Point	EFT Level (kV)	Direct or Capacitive	Polarity	Time Duration	Effects Number	Effects Type	Pass or Fail	Comments:
1	0.5	Direct	+/-	2	0	N/A	Pass	Motor Power
2	0.5	Direct	+/-	2	0	N/A	Pass	
3	0.5	Direct	+/-	2	0	N/A	Pass	
4	0.5	Direct	+/-	2	0	N/A	Pass	
5	0.5	Direct	+/-	2	0	N/A	Pass	
1	1	Direct	+/-	2	0	N/A	Pass	
2	1	Direct	+/-	2	0	N/A	Pass	
3	1	Direct	+/-	2	0	N/A	Pass	
4	1	Direct	+/-	2	0	N/A	Pass	
5	1	Direct	+/-	2	0	N/A	Pass	
1	2	Direct	+/-	2	0	N/A	Pass	
2	2	Direct	+/-	2	0	N/A	Pass	
3	2	Direct	+/-	2	0	N/A	Pass	
4	2	Direct	+/-	2	0	N/A	Pass	
5	2	Direct	+/-	2	0	N/A	Pass	

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Test Data Electrical Fast Transient / Burst Test# EFTP-02 Cont.

Electrically Fast Transient Data

Complete: X
Preliminary:

Job # 4L0697E Page 1 of 2
Test # EFTP-02

Client Name: Vertex RSI
EUT Name: AZ/ALT Power Drive Unit, VISTA
EUT Model #: Model 133 Mount Control System
EUT Part #: 99-343-2000-01
EUT Serial #: 001
EUT Config.: All cabinets powered and all motors running.

Specification: EN 61000-6-2
Reference: EN 61000-4-4

Generator#:	590	Temp. (deg. C):	24	Date:	12/20/05
Clamp#:		Humidity (%):	36	Time:	3:30
Probe#:	800	EUT Voltage:	400Vac	Staff:	J. Fish
1. L1	X	EUT Frequency:		Photo ID:	4L0697E EFTP-02
2. L2	X	Phase:	1	Performance Criteria:	B
3. L3	X	Location:	SAC	Table Top or Floor	Floor
4. N	X	7. L+N+PE		10.	
5. PE	X	8.		11.	
6. N+PE		9.		12.	

Test Point	EFT Level (kV)	Direct or Capacitive	Polarity	Time Duration	Effects Number	Effects Type	Pass or Fail	Comments:
1	0.5	Direct	+/-	2	0	N/A	Pass	Motor Power
2	0.5	Direct	+/-	2	0	N/A	Pass	
3	0.5	Direct	+/-	2	0	N/A	Pass	
4	0.5	Direct	+/-	2	0	N/A	Pass	
5	0.5	Direct	+/-	2	0	N/A	Pass	
1	1	Direct	+/-	2	0	N/A	Pass	
2	1	Direct	+/-	2	0	N/A	Pass	
3	1	Direct	+/-	2	0	N/A	Pass	
4	1	Direct	+/-	2	0	N/A	Pass	
5	1	Direct	+/-	2	0	N/A	Pass	
1	2	Direct	+/-	2	0	N/A	Pass	
2	2	Direct	+/-	2	0	N/A	Pass	
3	2	Direct	+/-	2	0	N/A	Pass	
4	2	Direct	+/-	2	0	N/A	Pass	
5	2	Direct	+/-	2	0	N/A	Pass	
6	2	Direct	+/-	2	0	N/A	Pass	
7	2	Direct	+/-	2	0	N/A	Pass	

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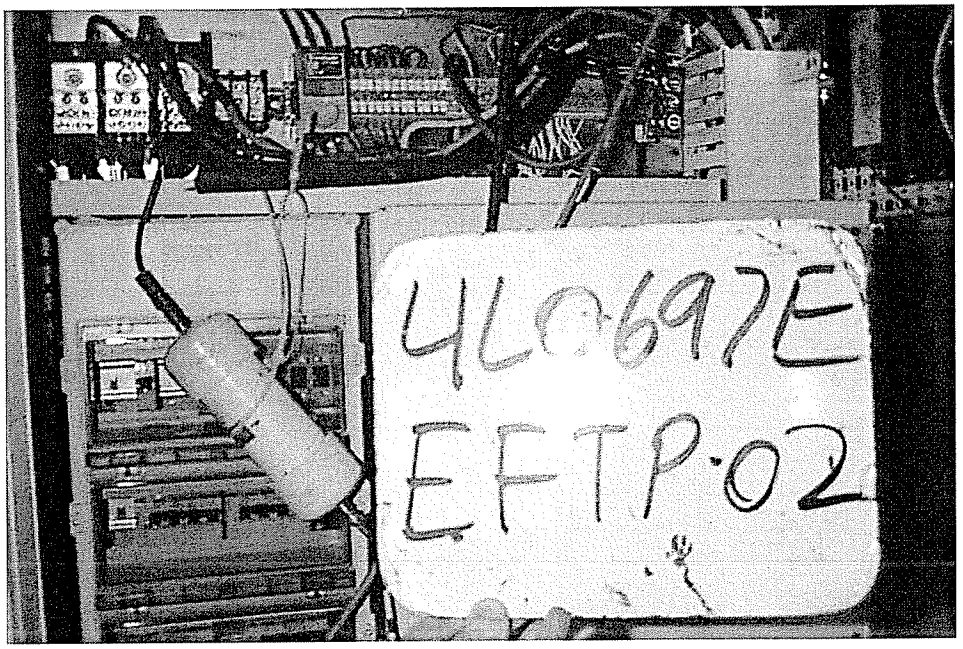
Test Photographs - Test # EFTP-02



Test Information:		Test Conditions:	
Test # :	EFTI-01	Test Voltage:	230Vac
Tested By:	J. Fish	Temperature:	24°C
Date of Tests:	12/20/05	Humidity:	36%

Test Results:
The E.U.T. complies.
The E.U.T. meets Performance Criteria A.

TEST EQUIPMENT

Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal	Cal Due
590	PEFT (EFT generator)	Haefely	DGFT junior	589071-03	02/02/04	02/01/05
559	Capacitive clamp	ICC	0	0	CNR	N/A

Test Data –Electrical Fast Transient / Burst Test# EFTI-01

Electrically Fast Transient Data

Complete: X
Preliminary:

Job # : 4L0697E Page 1
Test # : EFTI-01 of 3

Client Name : Vertex RSI
EUT Name : Data Acquisition Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-3300-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-2
Generator#: 590
Clamp#: 559
Probe#: NA
1 L
2 N
3 PE
4 L+N
5 L+PE
6 N+PE

Temp. (deg. C) : 24
Humidity (%) : 36
EUT Voltage : 230Vac
EUT Frequency : 60Hz
Phase: 1
Location: SAC
7 L+N+PE
8 All I/O Lines
9

Reference : EN 61000-4-4
Date : 12/20/05
Time : 4:00
Staff : J. Fish
Photo ID. 4L0697E EFTI-01
Performance Criteria: B
Table Top or Floor: Floor
10
11
12

Test Point	EFT Level (kV)	Direct or Capacitive	Polarity	Time Duration	Effects Number	Effects Type	Pass or Fail	Comments:
8	0.5	Capacitive	+/-	2	0	N/A	Pass	All I/O Lines
8	1	Capacitive	+/-	2	0	N/A	Pass	All I/O Lines

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Test Data Electrical Fast Transient / Burst Test# EFTI-01 Cont.

Electrically Fast Transient Data

Complete: X
Preliminary:

Job # : 4L0697E Test # : EFTI-01
Page 1 of 3

Client Name : Vertex RSI
EUT Name : CASS Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2010-01
EUT Serial # : 001
EUT Config. . : All cabinets powered and all motors running.

Specification : EN 61000-6-2
Reference : EN 61000-4-4
Generator#: 590
Clamp#: 559
Probe#: NA
1. L
2. N
3. PE
4. L+N
5. L+PE
6. N+PE

Temp. (deg. C) : 24
Humidity (%) : 36
EUT Voltage : 230Vac
EUT Frequency : 60Hz
Phase. 1
Location. SAC
7. L+N+PE
8.
9.

Date : 12/20/05
Time : 4:00
Staff : J. Fish
Photo ID. 4L0697E EFTI-01
Performance Criteria. B
Table Top or Floor Floor
10.
11.
12.

Test Point	EFT Level (kV)	Direct or Capacitive	Polarity	Time Duration	Effects Number	Effects Type	Pass or Fail	Comments:
8	0.5	Capacitive	+/-	2	0	N/A	Pass	All I/O Lines
8	1	Capacitive	+/-	2	0	N/A	Pass	All I/O Lines

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Test Data Electrical Fast Transient / Burst Test# EFTI-01 Cont.

Electrically Fast Transient Data

Complete: X
Preliminary:

Job # : 4L0697E Test # : EFTI-01
Page 1 of 3

Client Name : Vertex RSI
EUT Name : AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2000-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-2
Reference : EN 61000-4-4

Generator#:	590	Temp. (deg. C) :	24	Date :	12/20/05
Clamp#.	559	Humidity (%) :	36	Time :	4:00
Probe#:	NA	EUT Voltage :	230Vac	Staff .	J. Fish
1. L		EUT Frequency .	60Hz	Photo ID:	4L0697E EFTI-01
2. N		Phase:	1	Performance Criteria:	B
3. PE		Location:	SAC	Table Top or Floor	Floor
4. L+N		7. L+N+PE		10.	
5. L+PE		8.		11.	
6. N+PE		9.		12.	

Test Point	EFT Level (kV)	Direct or Capacitive	Polarity	Time Duration	Effects Number	Effects Type	Pass or Fail	Comments:
8	0.5	Capacitive	+/-	2	0	N/A	Pass	All I/O Lines
8	1	Capacitive	+/-	2	0	N/A	Pass	All I/O Lines

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Section 11. Surge Immunity

Purpose:
The test is intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) to electrical surge on supply lines and I/O lines.

Minimum Performance Criteria B

Test Method:
See Section 15.

Test Information:		Test Conditions:	
Test # :	SGIP-01	Test Voltage:	230Vac
Tested By:	J. Fish	Temperature:	24°C
Date of Tests:	12/20/05	Humidity:	36%

Test Results:
The E.U.T. complies.
The E.U.T. meets Performance Criteria A.

TEST EQUIPMENT

Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal	Cal Due
585	SURGE GENERATOR	HAEFELY	P SURGE 4.1	83070-03	03/30/04	03/30/05

Test Data –Surge Test# SGIP-01

Surge Immunity Test Data

Complete X
Preliminary

Job # : 4L0697E
Page 1

Test # : SGIP-01
of

Client Name : Vertex RSI
EUT Name : Data Acquisition Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-3300-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-2
Generator#: 585
Plugin#:

Temp (deg C) : 24
Humidity (%) : 48
EUT Voltage : 230Vac
EUT Frequency : 60Hz
Phase: 1
Location: SAC

Reference : EN 61000-4-5
Date : 12/20/04
Time : 1:00
Staff : J. Fish
Photo ID: 4L0697E SGIP-01
Performance Criteria: B
Table Top or Floor: Table

Coupling			L1-E			L2-E			L1-L2			Comments
			Surge	Effect	Efect	Surge	Effect	Efect	Surge	Effect	Efect	
Level	Phase	Polarity	QTY	QTY	Type	QTY	QTY	Type	QTY	QTY	Type	230Vac
0.5kV	0 Deg.	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	90 Deg.	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	180 Deg	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	270 Deg	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	360 Deg	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
1.0kv	0 Deg.	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	90 Deg.	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	180 Deg	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	270 Deg	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	360 Deg	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
2.0kv	0 Deg.	+/-	2	0	N/A	2	0	N/A				
	90 Deg.	+/-	2	0	N/A	2	0	N/A				
	180 Deg	+/-	2	0	N/A	2	0	N/A				
	270 Deg	+/-	2	0	N/A	2	0	N/A				
	360 Deg	+/-	2	0	N/A	2	0	N/A				
4.0kv	0 Deg.	+/-										
	90 Deg.	+/-										
	180 Deg	+/-										
	270 Deg	+/-										
	360 Deg	+/-										

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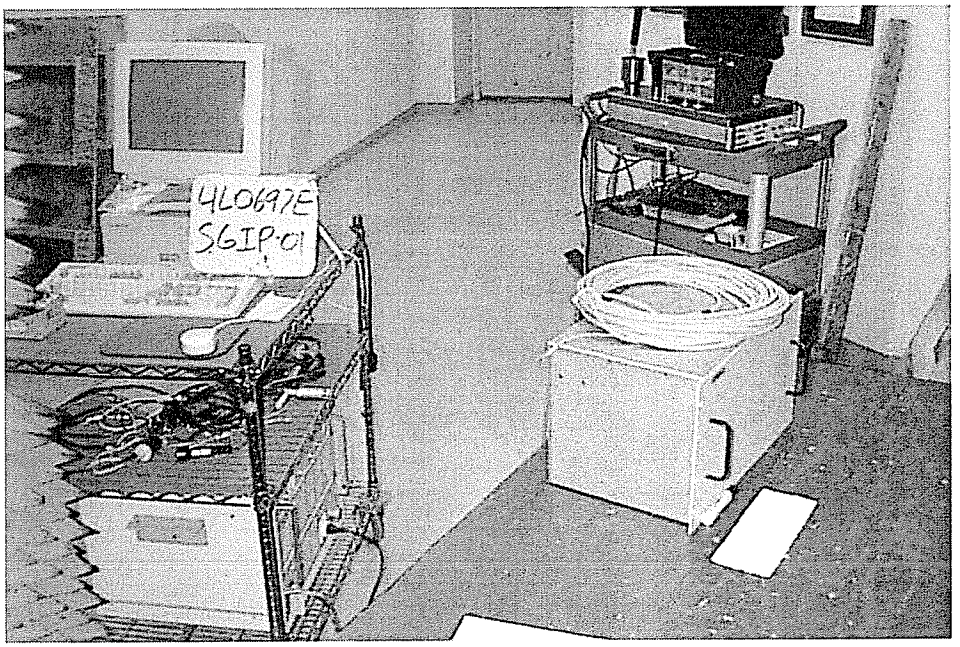
Test Photographs - Test # SGIP-01



Test Information:		Test Conditions:	
Test # :	SGIP-02	Test Voltage:	230Vac
Tested By:	J. Fish	Temperature:	24°C
Date of Tests:	12/20/05	Humidity:	36%

Test Results:
The E.U.T. complies.
The E.U.T. meets Performance Criteria A.

TEST EQUIPMENT

Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal	Cal Due
585	SURGE GENERATOR	HAEFELY	P SURGE 4.1	83070-03	03/30/04	03/30/05

Test Data –Surge Test# SGIP-02

Surge Immunity Test Data

Complete X
Preliminary

Job # : 4L0697E
Page 1

Test # : SGIP-02
of 2

Client Name : Vertex RSI
EUT Name : CASS Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2010-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.
Logic Power

Specification : EN 61000-6-2
Generator#: 585
Plugin#:

Temp. (deg. C) : 24
Humidity (%) : 48
EUT Voltage : 230Vac
EUT Frequency : 60Hz
Phase: 1
Location: SAC

Reference : EN 61000-4-5
Date : 12/22/04
Time : 9:00
Staff : J. Fish
Photo ID: 4L0697E SGIP-02
Performance Criteria: B
Table Top or Floor: Table

Coupling			L1-E			L2-E			L1-L2			Comments
			Surge	Effect	Efect	Surge	Effect	Efect	Surge	Effect	Efect	
Level	Phase	Polarity	QTY	QTY	Type	QTY	QTY	Type	QTY	QTY	Type	230Vac
0.5kV	0 Deg.	+/-	2	0	N/A	2	0	N/A	2	0	N/A	Logic
	90 Deg.	+/-	2	0	N/A	2	0	N/A	2	0	N/A	Power
	180 Deg	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	270 Deg	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	360 Deg	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
1.0kv	0 Deg.	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	90 Deg.	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	180 Deg	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	270 Deg	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	360 Deg	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
2.0kv	0 Deg.	+/-	2	0	N/A	2	0	N/A				
	90 Deg.	+/-	2	0	N/A	2	0	N/A				
	180 Deg	+/-	2	0	N/A	2	0	N/A				
	270 Deg	+/-	2	0	N/A	2	0	N/A				
	360 Deg	+/-	2	0	N/A	2	0	N/A				
4.0kv	0 Deg.	+/-										
	90 Deg.	+/-										
	180 Deg	+/-										
	270 Deg	+/-										
	360 Deg	+/-										

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Test Data –Surge Test# SGIP-02 - Cont.

Surge Immunity Test Data

Complete X
Preliminary

Job # : 4L0697E
Page 1

Test # . SGIP-02
of 2

Client Name : Vertex RSI
EUT Name : AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2000-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.
Logic Power
Specification : EN 61000-6-2
Generator#: 585
Plugin#.

Temp (deg. C) : 24
Humidity (%) . 48
EUT Voltage : 230Vac
EUT Frequency . 60Hz
Phase: 1
Location: SAC

Reference : EN 61000-4-5
Date : 12/22/04
Time : 11:30
Staff . J. Fish
Photo ID: 4L0697E SGIP-02
Performance Criteria: B
Table Top or Floor. Table

Coupling			L1-E			L2-E			L1-L2			Comments
			Surge	Effect	Efect	Surge	Effect	Efect	Surge	Effect	Efect	
Level	Phase	Polarity	QTY	QTY	Type	QTY	QTY	Type	QTY	QTY	Type	230Vac
0.5kV	0 Deg.	+/-	2	0	N/A	2	0	N/A	2	0	N/A	Logic
	90 Deg.	+/-	2	0	N/A	2	0	N/A	2	0	N/A	Power
	180 Deg	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	270 Deg	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	360 Deg	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
1.0kv	0 Deg.	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	90 Deg.	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	180 Deg	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	270 Deg	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
	360 Deg	+/-	2	0	N/A	2	0	N/A	2	0	N/A	
2.0kv	0 Deg.	+/-	2	0	N/A	2	0	N/A				
	90 Deg.	+/-	2	0	N/A	2	0	N/A				
	180 Deg	+/-	2	0	N/A	2	0	N/A				
	270 Deg	+/-	2	0	N/A	2	0	N/A				
	360 Deg	+/-	2	0	N/A	2	0	N/A				
4.0kv	0 Deg.	+/-										
	90 Deg.	+/-										
	180 Deg	+/-										
	270 Deg	+/-										
	360 Deg	+/-										

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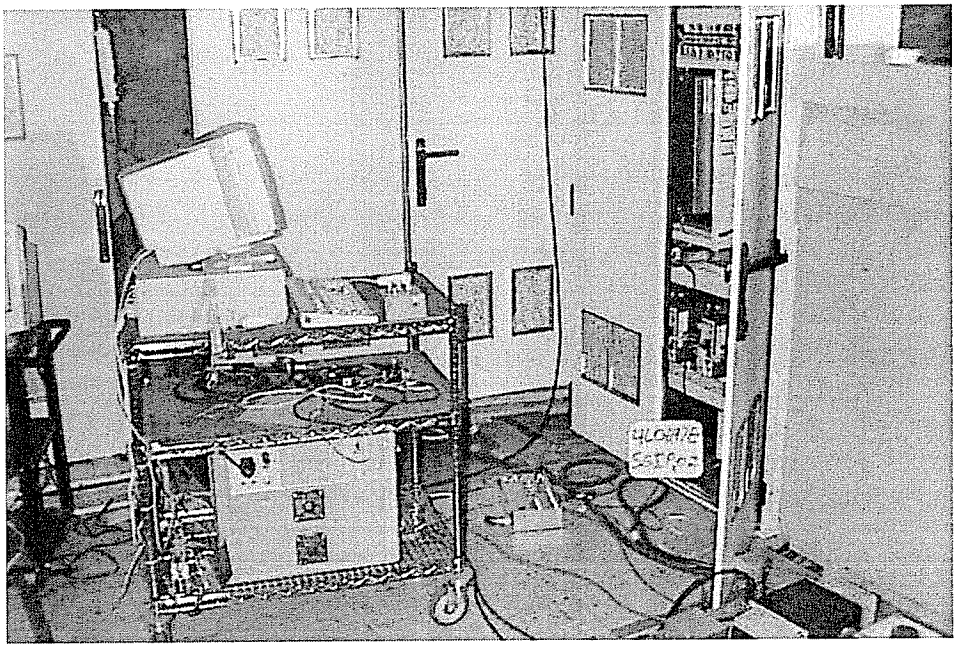
Test Photographs - Test # SGIP-02



Test Information:		Test Conditions:	
Test #:	SGIP-03	Test Voltage:	400Vac
Tested By:	J. Fish	Temperature:	24°C
Date of Tests:	12/20/05	Humidity:	36%

Test Results:
The E.U.T. complies.
The E.U.T. meets Performance Criteria B.

TEST EQUIPMENT

Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal	Cal Due
585	SURGE GENERATOR	HAEFELY	P SURGE 4.1	83070-03	03/30/04	03/30/05

Test Data –Surge Test# SGIP-03

Surge Immunity Test Data

Complete X
Preliminary

Job # : 4L0697E
Page 1

Test # : SGIP-03
of 2

Client Name : Vertex RSI
EUT Name : CASS Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2010-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.
Motor Power

Specification : EN 61000-6-2
Generator#: 649
Plugin#: 659

Temp. (deg. C) : 24
Humidity (%) : 48
EUT Voltage : 400Vac
EUT Frequency :
Phase: 3
Location: SAC

Reference : EN 61000-4-5
Date : 12/22/04
Time : 9:00
Staff : J. Fish
Photo ID. 4L0697E SGIP-03
Performance Criteria: B
Table Top or Floor. Table

Coupling			L1-E			L2-E			L1-L2			Comments
			Surge	Effect	Efect	Surge	Effect	Efect	Surge	Effect	Efect	
Level	Phase	Polarity	QTY	QTY	Type	QTY	QTY	Type	QTY	QTY	Type	400Vac
0.5kV		+/-	5	0	N/A	5	0	N/A	5	0	N/A	Motor
1.0kv		+/-	5	0	N/A	5	0	N/A	5	0	N/A	Power
2.0kv		+/-	5	0	N/A	5	0	N/A				

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Test Data Surge Test# SGIP-03 Cont.

Surge Immunity Test Data

Complete X
Preliminary

Job # : 4L0697E
Page 1

Test # : SGIP-02
of 2

Client Name : Vertex RSI
EUT Name : AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2000-01
EUT Serial # : 001
EUT Config : All cabinets powered and all motors running.
Motor Power
Specification : EN 61000-6-2
Generator#: 649
Plugin#: 659

Temp. (deg. C) : 24
Humidity (%) : 48
EUT Voltage : 400Vac
EUT Frequency :
Phase: 3
Location: SAC

Reference : EN 61000-4-5
Date : 12/22/04
Time : 9:00
Staff : J. Fish
Photo ID: 4L0697E SGIP-03
Performance Criteria: B
Table Top or Floor. Table

Coupling			L1-E			L2-E			L1-L2			Comments
			Surge	Effect	Efect	Surge	Effect	Efect	Surge	Effect	Efect	
Level	Phase	Polarity	QTY	QTY	Type	QTY	QTY	Type	QTY	QTY	Type	230Vac
0.5kV		+/-	5	0	N/A	5	0	N/A	5	0	N/A	Motor
1.0kv		+/-	5	0	N/A	5	0	N/A	5	0	N/A	Power
2.0kv		+/-	5	0	N/A	5	0	N/A	5	0	N/A	
			N-E			L1-L2			L1-L3			
			Surge	Effect	Efect	Surge	Effect	Efect	Surge	Effect	Efect	
Level	Phase	Polarity	QTY	QTY	Type	QTY	QTY	Type	QTY	QTY	Type	
0.5kV		+/-	5	0	N/A	5	0	N/A	5	0	N/A	
1.0kv		+/-	5	0	N/A	5	0	N/A	5	0	N/A	
2.0kv		+/-	5	0	N/A							
			L2-L3			L1-N			L2-N			
			Surge	Effect	Efect	Surge	Effect	Efect	Surge	Effect	Efect	
Level	Phase	Polarity	QTY	QTY	Type	QTY	QTY	Type	QTY	QTY	Type	
0.5kV		+/-	5	0	N/A	5	0	N/A	5	0	N/A	
1.0kv		+/-	5	0	N/A	5	0	N/A	5	0	N/A	
2.0kv		+/-	5	0	N/A							
			L3-N									
			Surge	Effect	Efect	Surge	Effect	Efect	Surge	Effect	Efect	
Level	Phase	Polarity	QTY	QTY	Type	QTY	QTY	Type	QTY	QTY	Type	
0.5kV		+/-	5	0	N/A							
1.0kv		+/-	5	0	N/A							

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Section 12. RF Common Mode (A.M.)

Purpose:
The test is intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) to the electromagnetic fields generated from intentional radiators.

Minimum Performance Criteria A

Test Method:
See Section 15.

Test Information:		Test Conditions:	
Test # :	CIPC-01	Test Voltage:	230Vac
Tested By:	J. Fish	Temperature:	22°C
Date of Tests:	12/21/04	Humidity:	36%

Test Results:
The E.U.T. complies.
The E.U.T. meets Performance Criteria A.

TEST EQUIPMENT

Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal	Cal Due
411	SIGNAL GENERATOR	MARCONI	2022D	119223029	CNR	N/A
1986	CABLE, 1m	KTL	RG223	N/A	06/09/04	06/09/05
573	CABLE, 5.5m	KTL	RG213	N/A	02/05/04	02/04/05
1080	CABLE, 3m	KTL	RG223	N/A	03/08/04	03/08/05
1553	CABLE 1m	KTL	RG223	N/A	06/09/04	06/09/05
1448	RF amplifier	EIN	3100LA	467	CNR	N/A
718	HP SPECTRUM ANALYZER	HEWLETT PACKARD	8591EM	3639A00980	02/11/04	02/10/05
715	Injection clamp	Fisher	F-140	83	CNR	N/A

Test Data –R.F. Common Mode (A.M.) Test# CIPC-01

Conducted Immunity Test Data

Complete X
Preliminary

Job # 4L0697E
Page 1

Test # : CIPC-01
of 3

Client Name : Vertex RSI
EUT Name : Data Acquisition Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-3300-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-2
Signal Gen #: 411
Cable#: 1986
Cable#: 573
Cable#: 1080
Cable#: 1553
Cable#:
Amp#: 1448
Amp#:

Temp. (deg. C) : 22
Humidity (%) : 36
EUT Voltage :
EUT Frequency :
Phase:
Location: SAC
Analyzer#: 718
Clamp#: 715

Reference : EN 61000-4-6
Date : 12/21/04
Time : 8:00
Staff : J. Fish
Photo ID: 4L0697E CIPC-01
Performance Criteria: A
Table Top or Floor: Floor
Sweep rate:
Step Size: 1%
Modulated: 80%

Freq Start (MHz)	Freq. Stop (MHz)	Field Strength (Vrms)	Time Duration (min)	Effect Qty	Effects Type	Pass or Fail	Comments:
0.15	80	10	30	0	N/A	Pass	230Vac Power Line
0.15	80	10	30	0	N/A	Pass	All I/O Lines

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Test Data R.F. Common Mode (A.M.) Test# CIPC-01 Cont.

Conducted Immunity Test Data

Complete X
Preliminary

Job # 4L0697E
Page 1

Test # : CIPC-01
of 3

Client Name : Vertex RSI
EUT Name : CASS Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2010-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-2
Reference : EN 61000-4-6

Signal Gen.#:	411	Temp. (deg. C) :	22	Date :	12/21/04
Cable#:	1986	Humidity (%) :	36	Time :	9:00
Cable#:	573	EUT Voltage :		Staff :	J. Fish
Cable#:	1080	EUT Frequency :		Photo ID:	4L0697E CIPC-01
Cable#:	1553	Phase:		Performance Criteria:	A
Cable#:		Location:	SAC	Table Top or Floor:	Floor
Amp#:	1448	Analyzer#:	718	Sweep rate:	
Clamp#:		Clamp#:	715	Step Size:	1%
				Modulated:	80%

Freq Start (MHz)	Freq Stop (MHz)	Field Strength (Vrms)	Time Duration (min)	Effect Qty	Effects Type	Pass or Fail	Comments:
0.15	80	10	30	0	N/A	Pass	230Vac Logic Power
0.15	80	10	30	0	N/A	Pass	Motor Power
0.15	80	10	30	0	N/A	Pass	All I/O Lines

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Test Data R.F. Common Mode (A.M.) Test# CIPC-01 Cont.

Conducted Immunity Test Data

Complete X
Preliminary

Job # 4L0697E
Page 1

Test # : CIPC-01
of 3

Client Name : Vertex RSI
EUT Name : AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2000-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-2
Signal Gen #: 411
Cable#: 1986
Cable#: 573
Cable#: 1080
Cable#: 1553
Cable#:
Amp#: 1448
Clamp#:

Temp. (deg. C) : 22
Humidity (%) : 36
EUT Voltage :
EUT Frequency :
Phase:
Location: SAC
Analyzer#: 718
Clamp#: 715

Reference : EN 61000-4-6
Date : 12/21/04
Time : 10:00
Staff : J. Fish
Photo ID: 4L0697E CIPC-01
Performance Criteria: A
Table Top or Floor: Floor
Sweep rate:
Step Size: 1%
Modulated: 80%

Freq Start (MHz)	Freq Stop (MHz)	Field Strength (Vrms)	Time Duration (min)	Effect Qty	Effects Type	Pass or Fail	Comments:
0.15	80	10	30	0	N/A	Pass	230Vac Logic Power
0.15	80	10	30	0	N/A	Pass	Motor Power
0.15	80	10	30	0	N/A	Pass	All I/O Lines

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Test Photographs - Test # CIPC-01

Section 13. Magnetic Immunity

Purpose:
The test is intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) to magnetic disturbances at power frequency related to industrial installations and power plants.

Minimum Performance Criteria A
This test was not performed for the following reason:

Unit has no components susceptible to a magnetic field.

Section 14. Voltage Dips and Interruptions

Purpose:
The test is intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) when subjected to voltage dips, short interruptions, and voltage variations.

Minimum Performance Criteria B (10ms) and Criteria B (100ms) for voltage dips and Criteria C (5000ms) for voltage interruptions.

Test Method:
See Section 15.

Test Information:		Test Conditions:	
Test # :	VDIP-01	Test Voltage:	230Vac
Tested By:	J. Fish	Temperature:	22°C
Date of Tests:	12/21/04	Humidity:	39%

Test Results:
The E.U.T. complies.

TEST EQUIPMENT

Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal	Cal Due
795	SWITCHING AMPLIFIER	ELGAR	SW 5250A	834	05/07/04	05/07/05

Test Data –Voltage Dips and Interruptions Test# VDIP-01

Voltage Dips and Interruptions Test Data

Complete X
Preliminary

Job # 4L0697E Test # VDIP-01
Page 1 of 3

Client Name : Vertex RSI
EUT Name : Data Acquisition Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-3300-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-2
Reference :

Voltage Source#: 795

Temp. (deg. C) : 22
Humidity (%) : 39
EUT Voltage : 230Vac
EUT Frequency : 50Hz
Phase. 1
Location. SAC

Date : 12/21/04
Time : 3:00
Staff : J. Fish
Photo ID. 4L0697E VDIP-01
Performance Criteria. See Below
Table Top or Floor. Floor

Voltage Reduction (%)	Test Level (Volts)	Test Duration (ms)	Test Application Quantity	Spec. Perf Criteria	EUT Actual Perf.	Comments
30%	161	10	3	B	A	
60%	92	100	3	C	A	
60%	92	1000	3	C	A	
95%	9	5000	3	C	C	

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Test Data Voltage Dips and Interruptions Test# VDIP-01 Cont.

Voltage Dips and Interruptions Test Data

Complete X
Preliminary

Job # : L0697E Test # : VDIP-01
Page 2 of 3

Client Name : Vertex RSI
EUT Name : CASS Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2010-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-2 Reference :

Voltage n (%)	Test Level (Volts)	Test Duration (periods)	Test Application Quantity	Spec. Perf Criteria	EUT Actual Perf.	Comments
30%	161	10	3	B	A	Logic Power
60%	92	100	3	C	A	
60%	92	1000	3	C	A	
95%	9	5000	3	C	C	

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Test Data Voltage Dips and Interruptions Test# VDIP-01 Cont.

Voltage Dips and Interruptions Test Data

Complete X
Preliminary

Job # : L0697E Test # : VDIP-01
Page 3 of 3

Client Name : Vertex RSI
EUT Name : AZ/ALT Power Drive Unit, VISTA
EUT Model # : Model 133 Mount Control System
EUT Part # : 99-343-2000-01
EUT Serial # : 001
EUT Config. : All cabinets powered and all motors running.

Specification : EN 61000-6-2 Reference :

Voltage n (%)	Test Level (Volts)	Test Duration (periods)	Test Application Quantity	Spec. Perf. Criteria	EUT Actual Perf.	Comments
30%	161	10	3	B	A	Logic Power
60%	92	100	3	C	A	
60%	92	1000	3	C	A	
95%	9	5000	3	C	C	

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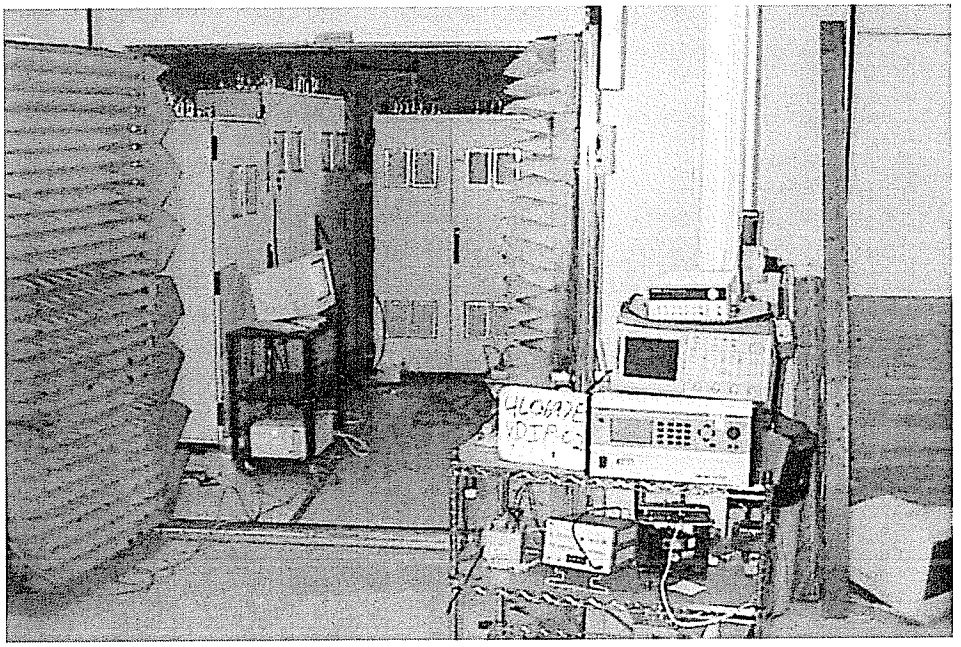
Test Photographs - Test # VDIP-01

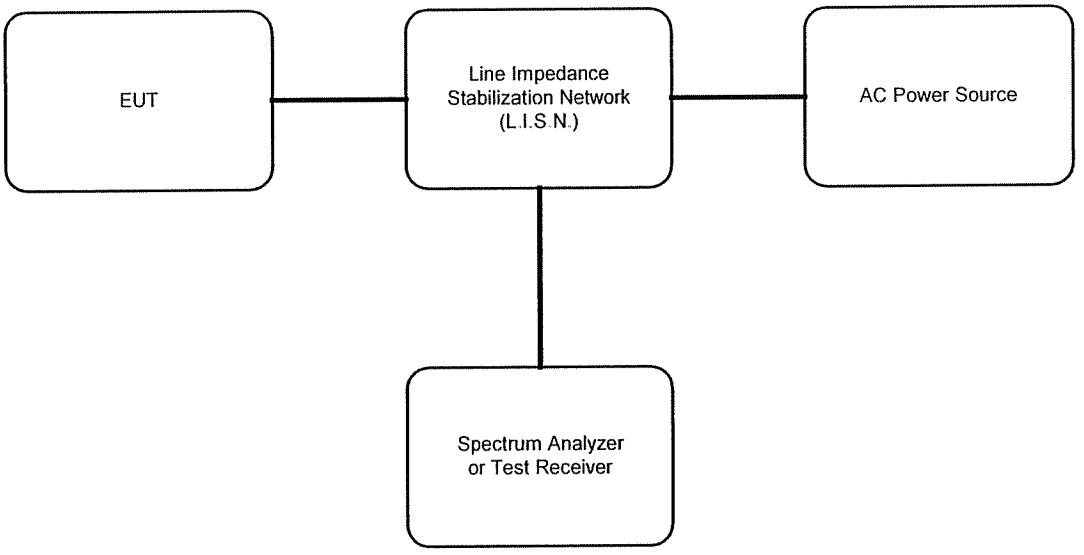


Section 15. Test Methods and Block Diagrams.

Conducted Emissions (Mains Ports)

- Applicable Test Standard: EN 61000-6-3, EN 61000-6-4.
- The test set-up is as per the test configuration diagram.
- The E.U.T. is configured as typically used.
- The E.U.T. and any accessories are operated with typical load conditions.
- Conducted powerline measurements are made from 150 kHz to 30 MHz.
- For each current carrying conductor of each power cord associated with the E.U.T., the emission closest to the limit is recorded.
- Final measurements are made using a spectrum analyzer with 10 kHz RBW, peak detector.
- Any emissions that are close to the limit are measured using a test receiver with 10 kHz bandwidth, CISPR quasi-peak detector.
- Bandwidths used on the test receiver are those specified in EN 61000-6-3, EN 61000-6-4

Test Configuration - Powerline Conducted Emissions:

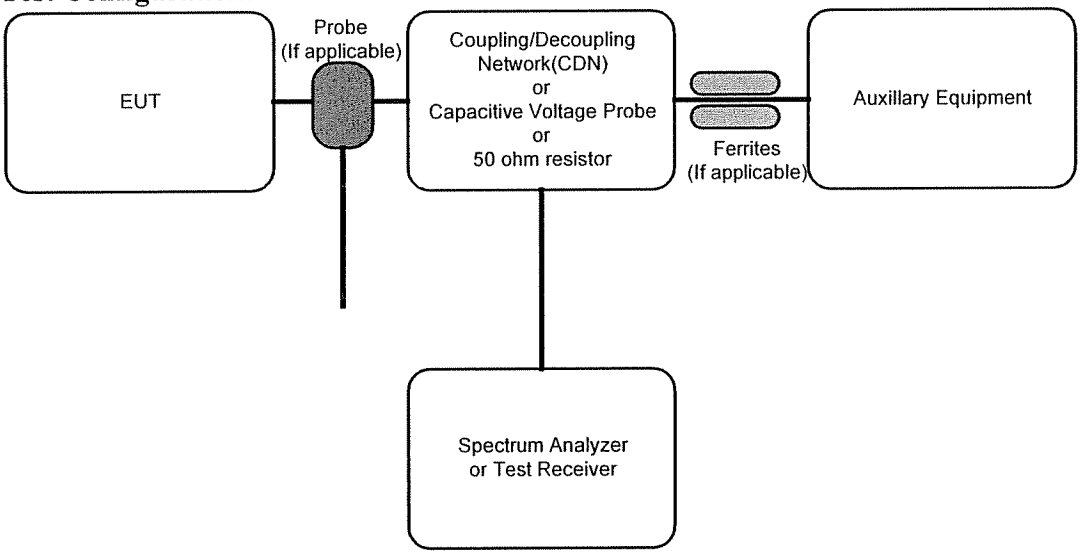


Conducted Emissions (Telecommunication Ports)

Test Method:

- Applicable Test Standard: EN 61000-6-3, EN 61000-6-4
- The test set-up is as per the test configuration diagram and as further defined in EN 61000-6-3, EN 61000-6-4
- The E.U.T. is configured as typically used.
- The E.U.T. and any accessories are operated with typical load conditions. LAN cable measurements may be taken with a LAN utilization in excess of 10%.
- For each telecommunication port, conducted current and/or voltage measurements are made from 150 kHz to 30 MHz.
- Measurements are taken with peak, quasi-peak, and/or average detectors. Quasi-peak and/or average detector measurements take precedence over peak detector measurements.
- Detector bandwidths are those specified in EN 61000-6-3, EN 61000-6-4

Test Configuration:



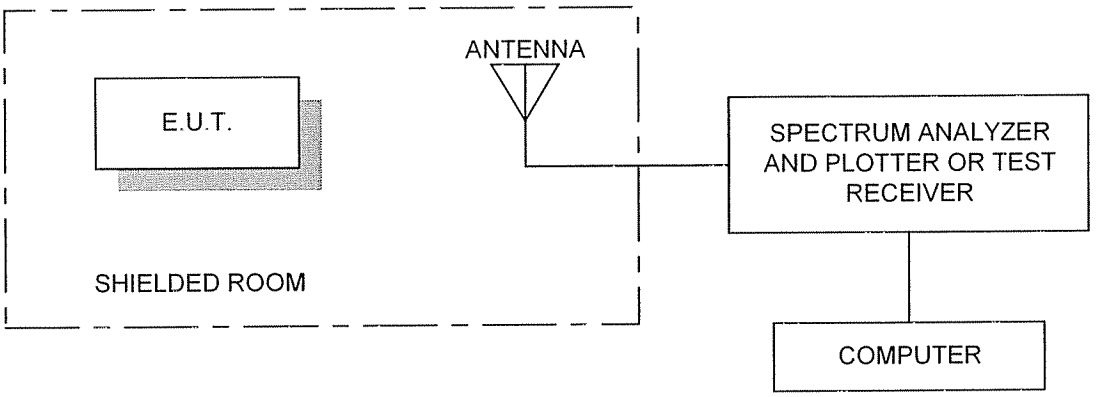
Radiated Emissions

Test Method - Radiated Emissions:

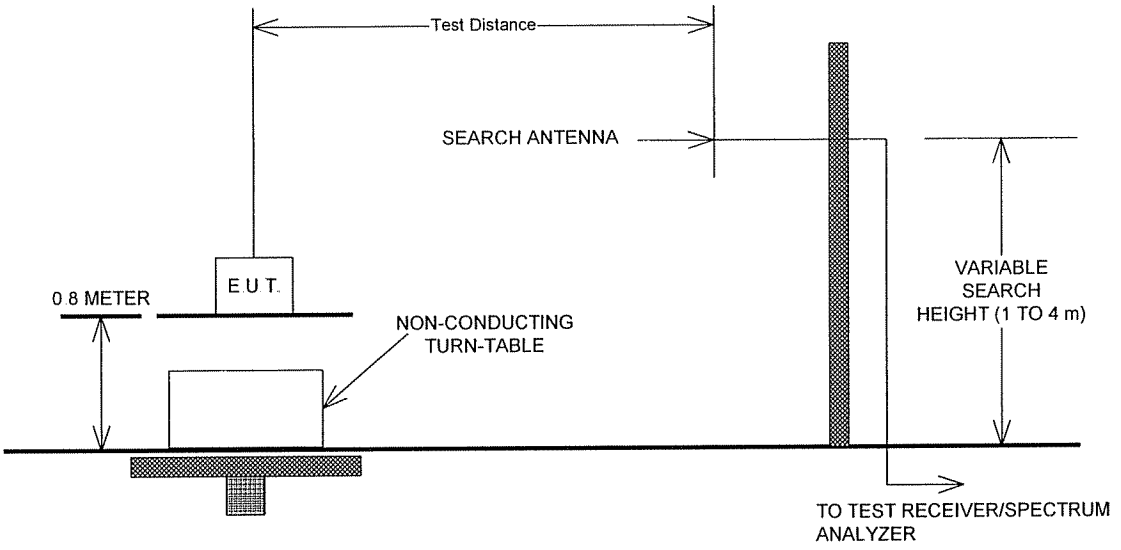
- Applicable Test Standard: EN 61000-6-3, EN 61000-6-4.
- The test set-up in the shielded room is as per the test configuration diagram.
- The E.U.T. is configured as typically used.
- The E.U.T. and any accessories are operated with typical load conditions.
- Radiated emissions measurements are made from 30 MHz to 1000 MHz.
- The equipment was prescanned in the shielded room using a spectrum analyzer and broadband antenna to produce a list of frequencies to be investigated in the open area test site.
- The equipment is then set-up on an open area test site.
- Variations in antenna height, antenna polarization, and E.U.T. azimuth are explored to produce the emission that has the highest amplitude relative to the limit.
- The frequencies noted in the preliminary test are investigated on the open-air site where amplitude measurements are made.
- If ambient signal field strength is high at 10 meter, the measurements may be performed at 3 meter and extrapolated to the requisite distance.
- All emissions within ±5 dB of the limit are re-measured using a dipole antenna.
- If less than six emissions are better than 20 dB below limit, the noise level of the measuring instrument at representative frequencies is also reported.
- Any emissions above 1 GHz are measured using a horn antenna and low noise pre-amplifier.

Test Configuration - Radiated Emissions:

Radiated Pre-scan:



Outdoor Test Site for Radiated Emissions:

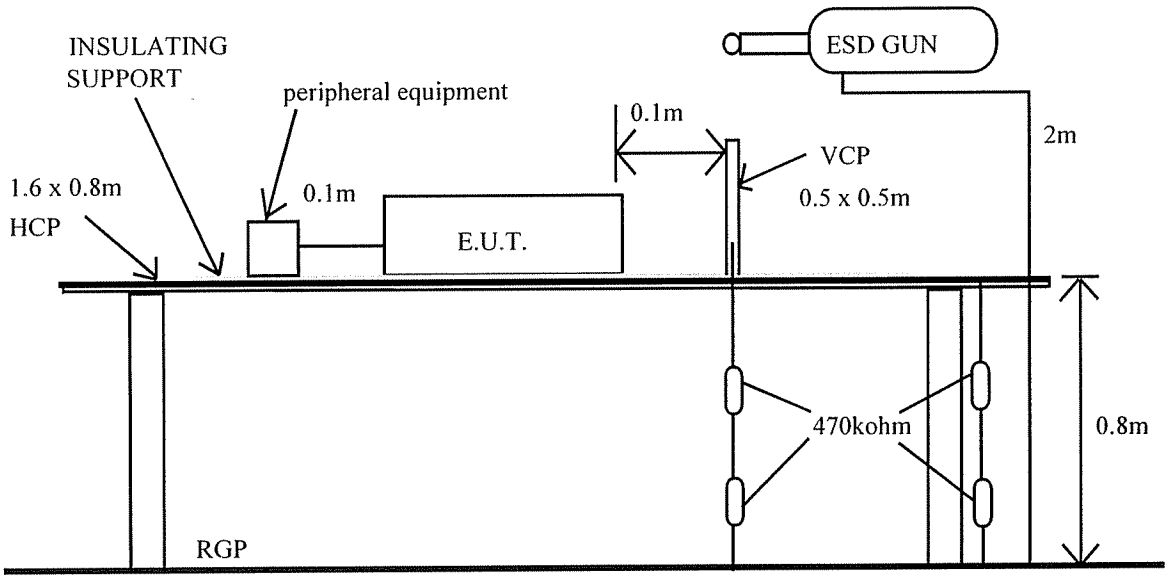


Electrostatic Discharge

Test Method - Electrostatic Discharge:

- Applicable Test Method: EN61000-4-2: 1995.
- The test set-up is as per the test configuration diagram.
- The electrostatic discharge has been applied to all points and surfaces which are accessible to personnel during normal usage of the E.U.T. (refer to test data table for a listing).
- The generator is re-triggered for a new single discharge.
- This procedure is repeated ten times in each polarity for each point.
- The E.U.T. is exercised during testing.

Test Configuration - Electrostatic Discharge:



The reference ground plane size projects beyond the horizontal coupling plane by at least 0.5 m on all sides.

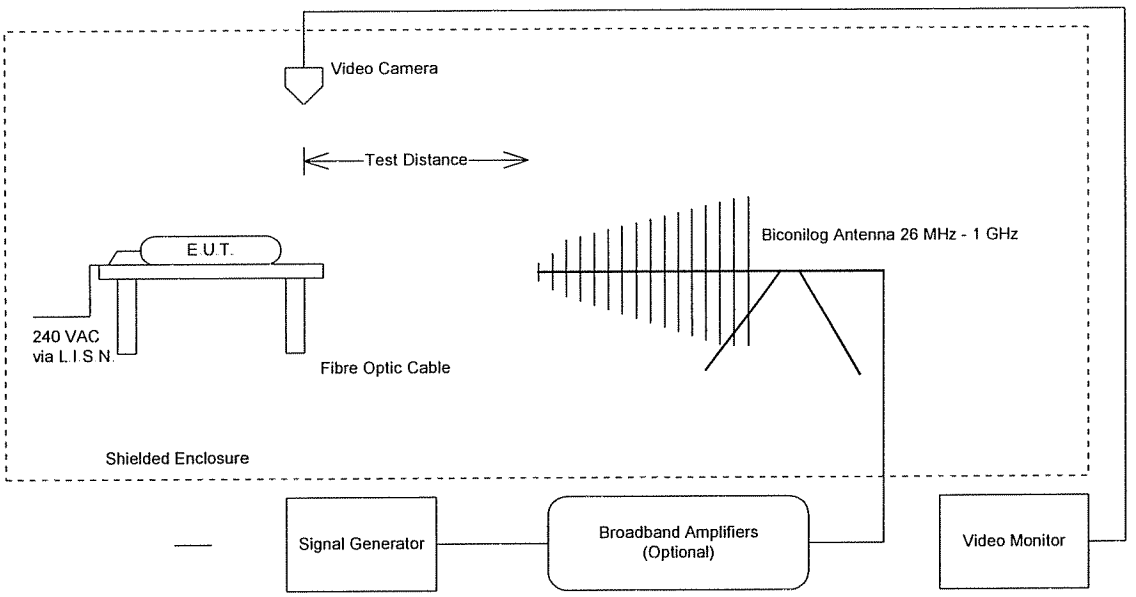
HCP - Horizontal Coupling Plane VCP - Vertical Coupling Plane RGP - Reference Ground Plane

Radiated Electromagnetic Field (Shielded Room)

Test Method - Radiated Electromagnetic Field (Shielded Room):

- Applicable Test Method: EN61000-4-3: 1997.
- The E.U.T. is placed in the center of the Shielded Room and connected to power and signal leads.
- The test set-up is as per the test configuration diagram.
- The frequency range is swept from 80 to 1000 MHz.
- The modulation is 80% AM with a 1 kHz sinewave.
- The sweep rate is 1.5×10^{-3} decades second or slower.
- The step size is 1% of previous frequency (i.e. previous frequency * 1.01).
- The antenna is rotated in order to test both horizontal and vertical polarization.
- The E.U.T is exercised during testing.

Test Configuration - Radiated Electromagnetic Immunity (Shielded Room)

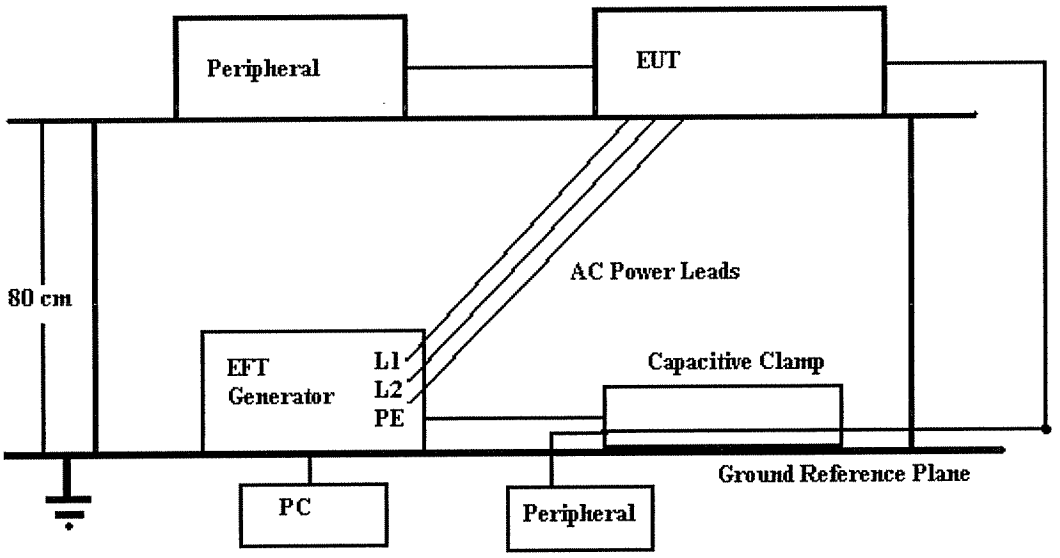


Electrical Fast Transient/Burst/Surge

Test Method - Electrical Fast Transient/Burst/Surge:

- Applicable Test Method: EN61000-4-4: 1995 and EN61000-4-5: 1995.
- The E.U.T. is configured as shown in the test configuration diagram.
- The waveform is verified before testing commenced.

Test Configuration – Electrical Fast Transient/Burst/Surge:



The EFT/Burst/Surge waveform is directly coupled to the AC mains cable of the E.U.T. via Mains Coupler E4551. EFT/Burst only are indirectly coupled to the data I/O cables via the CCL-4/S Capacitive Clamp.

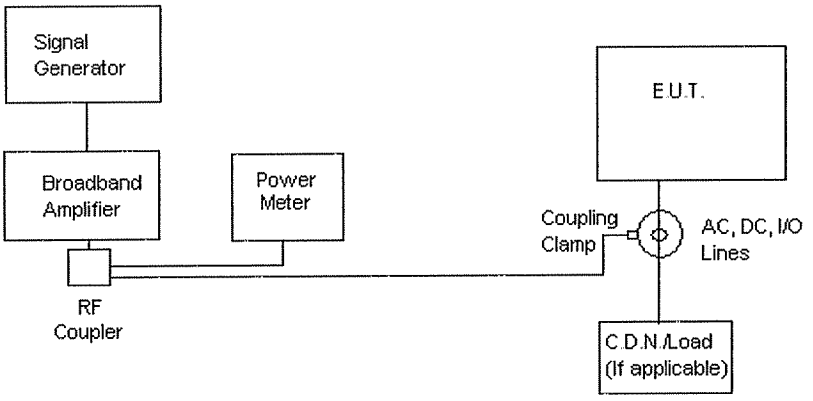
R.F. Common Mode (A.M)

Test Method - R.F. Common Mode (A.M.):

- Applicable Test Method: EN61000-4-6: 1996.
- The E.U.T. is configured as shown in the test configuration diagram.
- The frequency range is swept from 150 kHz to 80 MHz.
- The disturbance signal is 80% amplitude modulated with a 1 kHz sinewave.
- The rate of sweep is 1.5 x 10^{-3} decades per second or slower.
- The frequency is incremented at 1% of the start and thereafter 1 % of the preceding frequency value.

Test Configuration - R.F. Common Mode (A.M.):

Setting Immunity Levels:

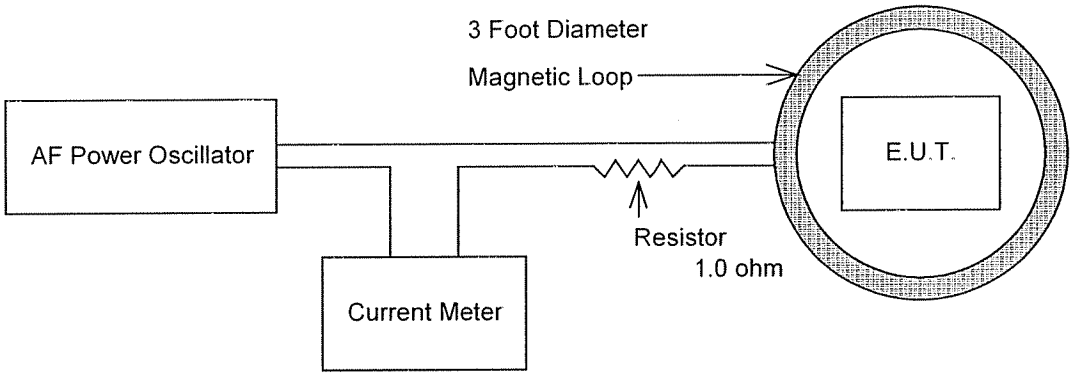


Magnetic Immunity

Test Method - Magnetic Immunity:

- Applicable Test Method: EN 50082-1: 1997 (EN 61000-4-8: 1993).
- The test set-up is as per the test configuration diagram.
- Power and other functional electrical quantities are applied to the E.U.T.
- Preliminary verification of equipment performance is carried out.
- The continuous magnetic field is applied at 50 Hz.

Test Configuration - Magnetic Immunity:



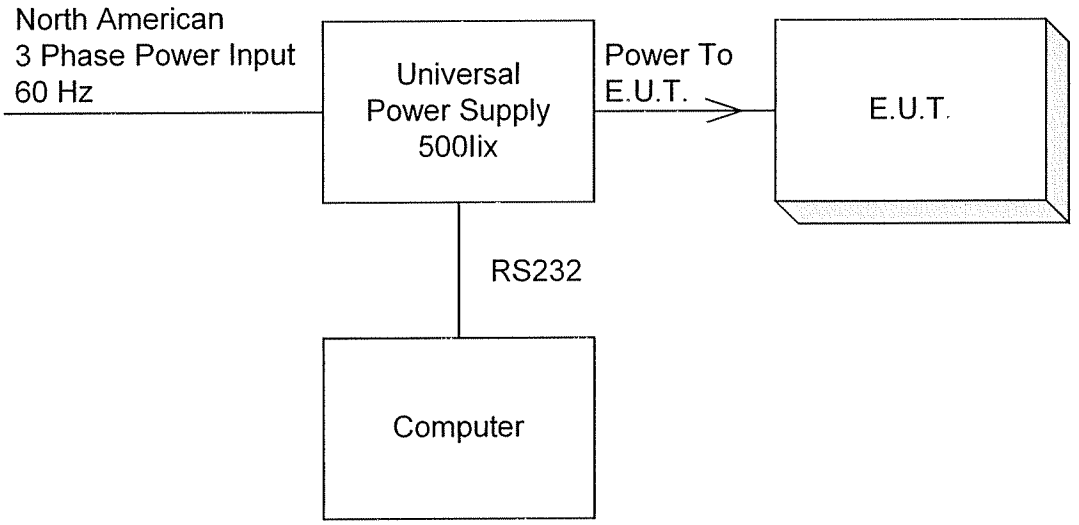
The current meter is used to calibrate the magnetic field

Voltage Dips and Interruptions

Test Method - Voltage Dips and Interruptions:

- Power to the E.U.T. is varied per the requirements specified in EN61000-4-11.
- The E.U.T. is monitored for normal operation.

Test Configuration – Voltage Dips and Interruptions Tests:

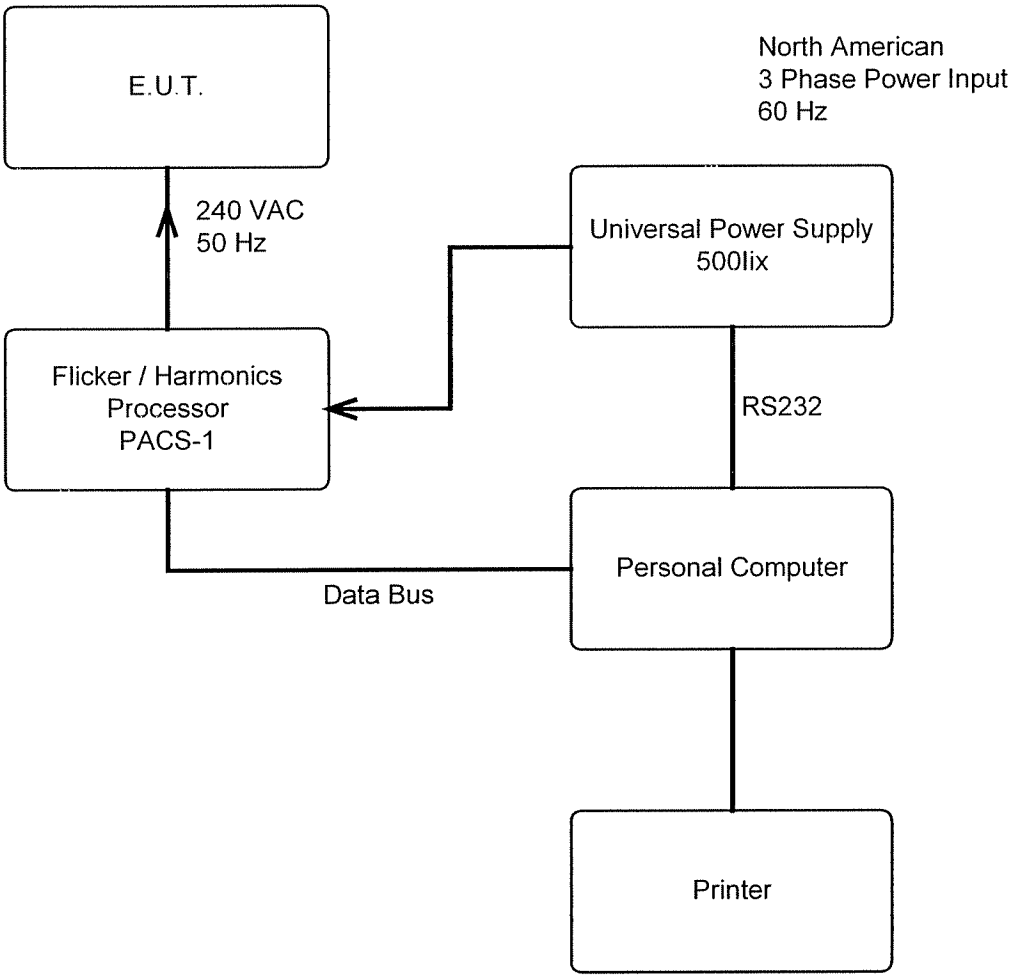


Harmonics

Test Method – Harmonics:

- Applicable Test Method: EN 61000-3-2: 1995.
- The E.U.T. is configured as shown in the test configuration diagram.

Test Configuration – Harmonics:

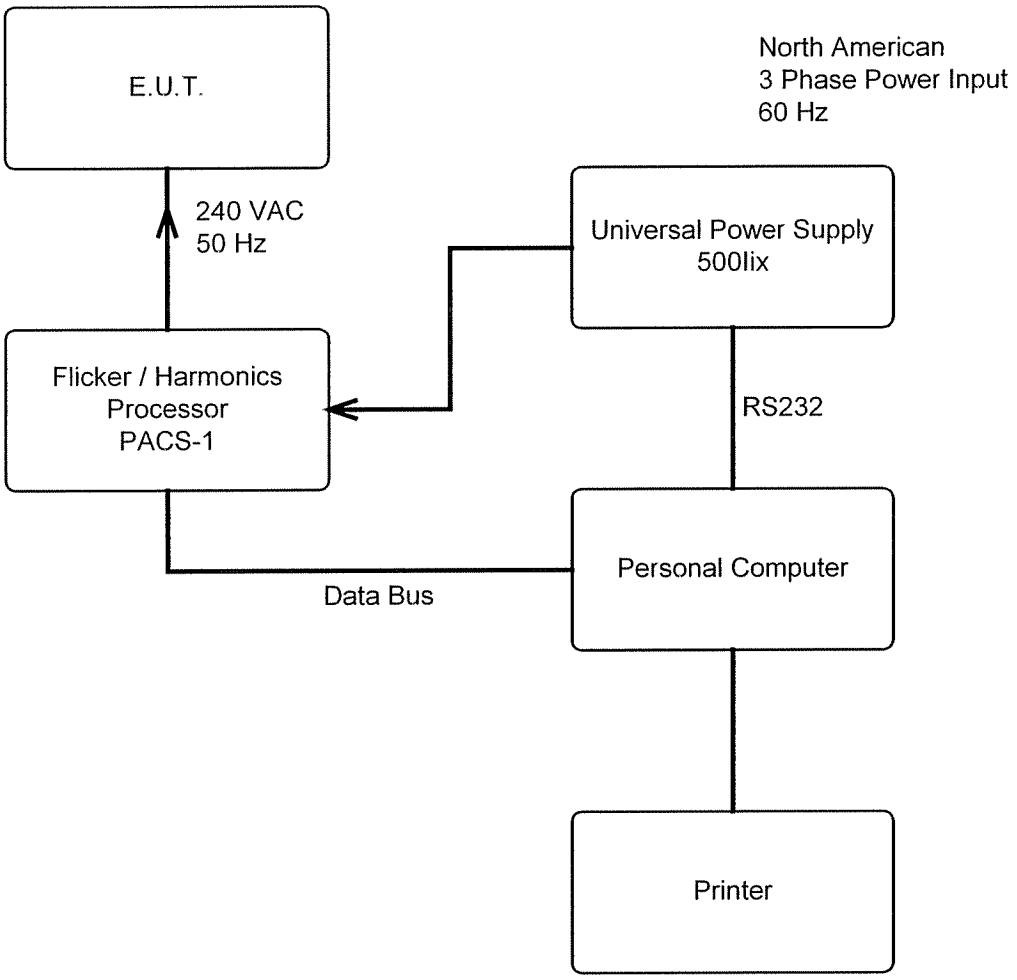


Flicker

Test Method – Flicker

- Applicable Test Method: EN 61000-3-3: 1995.
- The E.U.T. is configured as shown in the test configuration diagram.
- The equipment is exercised for not less than 5 minutes and not more than 15 minutes.

Test Configuration – Flicker :



Section 16. Performance Criteria.

Date: 12/6/2004

Nemko USE ONLY
JOB #:

Company: VertexRSI

MANUFACTURER'S PERFORMANCE CRITERIA

The enclosed Performance Criteria Form is required to be completed before the start of immunity tests. The passing or failing of the test is almost exclusively dependent on the criteria that have been established by the manufacturer. However, some cases are automatic failures such as an unsafe condition that might be caused by an immunity condition or catastrophic failure that requires repair of the product.

Performance criteria have been grouped into three categories, namely A, B, and C:

Performance Criteria A: Normal operation of the EUT is expected.

Please define:

The Azimuth and Altitude test motor will be commanded in Rate Loop mode by the Portable Maintenance Unit, while the Cassegrain motors will be commanded from the LCU test fixture. The Data Acquisition Unit (DAQ) will establish communication with the Host Computer. During these tests, it will be verified that the AZ/ALT/CASS motors remain active and that the DAQ communication link to the Host computer is not lost.

Performance Criteria B: Degradation of product performance is allowed only during the application of the test. No change of stored data is allowed.

Please define:

Degraded performance from Performance Criteria A is allowed (ie fluctuation of motor speed, occassional data link drop-outs, etc.)

Performance Criteria C: Temporary loss of function is allowed as long as the operator can restore proper operation after completion of the test.

Please define:

DAQ data link is lost and AZ/ALT/CASS motors cease movement. DAQ behaves normally after cycling Logic Power to the DAQ/Host Computer. AZ/ALT and CASS Power Drive Units behaves normally after cycling Logic Power and re-enabling the axes from the PMU/LCU Text Fixture.

Manufacturer's Representative: Juan C. Delgadillo

Performance Criteria should be as specific as possible. For example:

Criteria A: Green LED indicator ON. Meter reading between 5 and 10.
Criteria B: Meter reading outside the 5 and 10 range but returning to normal range after application of the electromagnetic phenomena. Red LED on would be considered a failure.
Criteria C: Display indicates "error" message. User must press reset button in order for normal operation to continue. EUT behaves normally after the reset button has been depressed.