



Report #: 6R74702.1 Issue 2

ElectroMagnetic Compatibility Test Report

EN 55024: 1998 + amendment A1: 2001 + amendment A2: 2003

Information technology equipment —
Immunity characteristics — Limits and methods of measurement

Reviewed by:

A handwritten signature in blue ink, appearing to read 'David Duchesne'.

Signature
David Duchesne, EMC Specialist

January 8, 2007

Date

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Table of Contents

Declaratory Statements	3
Lab Environmental Conditions	4
Statement of Compliance	5
Engineering Considerations	7
General Information Regarding the Equipment Under Test (EUT).....	8
Equipment Configuration.....	9
Performance Criteria	10
Electrostatic Discharge	11
Radio-Frequency Continuous Conducted.....	13
Radio-Frequency Electromagnetic Field Amplitude Modulated	15
Surge	17
Fast Transients	19
Voltage Dips and Voltage Interruptions	21



Nemko Canada Inc.,
303 River Road, R.R. 5, Ottawa, Ontario, Canada, K1V 1H2

Report No: 6R74702.1 Issue 2

Declaratory Statements

Product: Spill Proof

Model #: 100769



Trademark:

Serial #: 1001815

Applicant:

Nanoptix Inc.
699 Champlain Street
Dieppe, New Brunswick, Canada
E1A 1P6

Manufacturer:

Nanoptix Inc.
699 Champlain Street
Dieppe, New Brunswick, Canada
E1A 1P6

Product Background Information

The test was performed for the following reasons.

- New Product
- Engineering Changes
- Configuration Change
- Product Audit
- Other

Test Procedure: EN 55024: 1998 + amendment A1: 2001 + amendment A2: 2003

Test Location: 1500 Peter Robinson Road, West Carleton, Ontario, Canada, K0A 1L0

Limits of Responsibility

The results included in this test report apply only to the equipment listed within this report as being the Equipment Under Test (EUT). Equipment listed as support equipment is not considered to be part of the EUT. In some instances, the EUT may consist of multiple devices in a single enclosure, and will be so indicated in the report.



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Report No: 6R74702.1 Issue 2

Lab Environmental Conditions

Ambient Temperature: 15°C to 35°C,
Relative Humidity: 30% to 60%,
Atmospheric Pressure: 86kPa (860mbar) to 106kPa (1 060mbar)

Statement of Compliance

EN 55024: 1998 + amendment A1: 2001 + amendment A2: 2003

Immunity, Enclosure Port

Environmental Phenomenon	Test Specification	Basic Standard	TEST RESULT PASS/FAIL/NA
Power-frequency magnetic Field	50 Hz 1 A/m	IEC 61000-4-8	N/A
Radio-frequency electromagnetic field Amplitude modulated	80-1000 MHz 3V/m 80 % AM (1 kHz)	IEC 61000-4-3	PASS
Electrostatic discharge	4kV (Contact discharge) 8kV (Air discharge)	IEC 61000-4-2	PASS

Immunity, Signal Ports and Telecommunication Ports

Environmental Phenomenon	Test Specification	Basic Standard	TEST RESULT PASS/FAIL/NA
Radio-frequency continuous conducted	0.15-80 MHz 3Vrms 80% AM (1 kHz)	IEC 61000-4-6	PASS
Surge Line to Ground	1kV 1.2/50 (8/20) Tr/Th μ s	IEC 61000-4-5	N/A
Fast transients	0.5kV 5/50 Tr/Th ns 5kHz	IEC 61000-4-4	PASS

Immunity, Input DC Power Port (excluding equipment marketed with an a.c/d.c. power converter)

Environmental Phenomenon	Test Specification	Basic Standard	TEST RESULT PASS/FAIL/NA
Radio-frequency continuous conducted	0.15-80 MHz 3Vrms 80% AM (1 kHz)	IEC 61000-4-6	N/A
Surge Line to Ground	0.5kV 1.2/50 (8/20) Tr/Th μ s	IEC 61000-4-5	N/A
Fast transients	0.5kV 5/50 Tr/Th ns 5kHz	IEC 61000-4-4	N/A

Notes

- System Power: 230VAC/50Hz

Statement of Compliance, continued

EN 55024: 1998 + amendment A1: 2001 + amendment A2: 2003

Immunity, Input AC Power Ports (including equipment marketed with a separate a.c./d.c power converter)

Environmental Phenomenon	Test Specification	Basic Standard	TEST RESULT PASS/FAIL/NA
Radio-frequency continuous conducted	0.15-80 MHz 3Vrms 80% AM (1 kHz)	IEC 61000-4-6	PASS
Surge Line to Ground	1.2/50 (8/20) 1kV Line to Line 2kV Line To Earth	IEC 61000-4-5	PASS
Fast transients	1kV 5/50 Tr/Th ns 5kHz	IEC 61000-4-4	PASS
Voltage dips	>95% Reduction 0.5 Period 30% Reduction 25 Period	IEC 61000-4-11	PASS
Voltage interruptions	>95% Reduction 250 Period	IEC 61000-4-11	PASS
Notes			
– System Power: 230VAC/50Hz			



Engineering Considerations

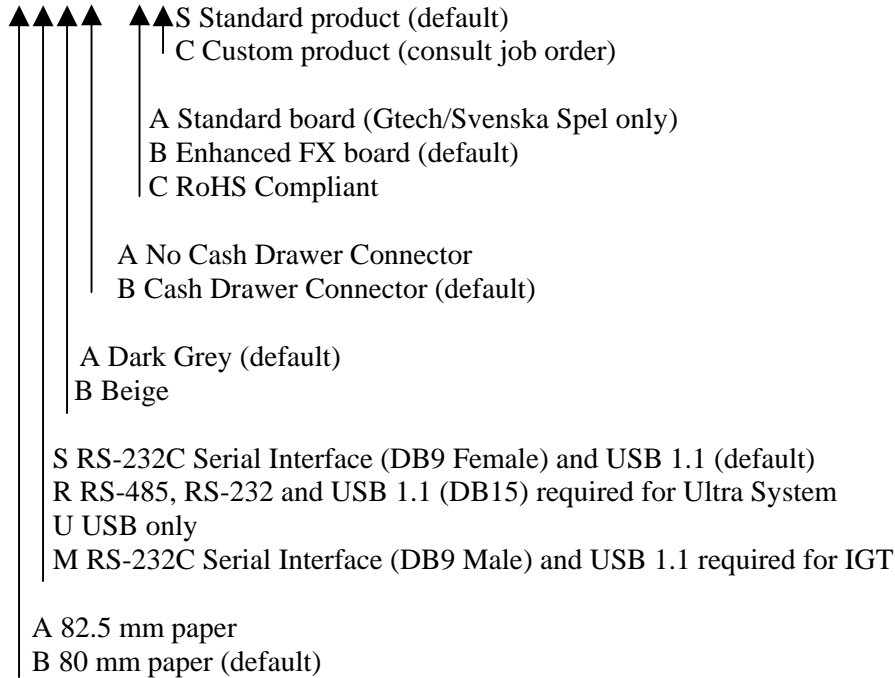
Product Modification Required for Compliance

None

Justification

There are several options available for the Nanoptix Spill Proof printer. The chart below details the options available to end customer.

C21 – X X X X X X



Deviations from Standard Test Procedure

None

Test Report Revision History

Issue #	Details of changes made to test report
-	Original Report Issued
2	Report updated to include the EUT order code within the justification section of this report.



Nemko Canada Inc.,
303 River Road, R.R. 5, Ottawa, Ontario, Canada, K1V 1H2

Report No: 6R74702.1 Issue 2

General Information Regarding the Equipment Under Test (EUT)

Date Received In Laboratory: December 14, 2006

Nemko Identification Number: Item #1

Description & Theory of Operation:
Spill Proof Thermal Printer with 80mm roll of paper

EUT Clock and Operational Frequencies:
12MHz (crystal), 192MHz internal to DSP processor

Exercise/Monitoring method:
Continual Printing Feature. Press paper feed button once prints one ticket, hold for 5 seconds will print continually.
Continual Printing Feature, no errors should occur during testing process, unit will recover if failure occurs.

Software Version:
Continual Printing Feature 1.44G



Equipment Configuration

Equipment Configuration List

Item	Description	Identification: (MN#, SN#, PN#, Rev.)
(A)	Spill Proof Printer	M/N #100769, S/N#1001815
(B)	ITE Power Supply	M/N #GT-21126-6024, P/N #1006000-0023-00-ROHS, S/N #RoHS00828724/06

EUT Ports

Item	Description	Indoor/Outdoor	Type (See Legend)	Qty
i.	24VDC Input	Indoor	2	1
ii.	AC Input	Indoor	1	1
iii.	USB	Indoor	4	1
iv.	Serial (DB9)	Indoor	4	1

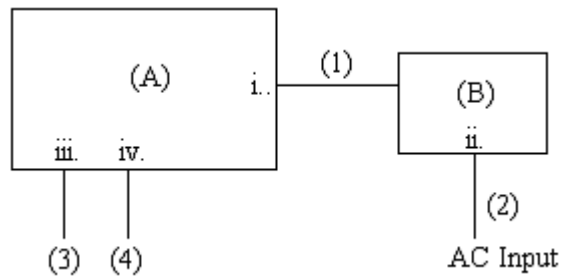
Inter-Connection Cables

Item	Description	Length (m)
(1)	18AWG Two conductor	1
(2)	Three Conductor Power Cable	2
(3)	USB	2
(4)	DB9 to DB9 Serial Cable	5

Legend:

1 = AC Power Input/Output, 2 = DC Power Input/Output, 3 = Telecom, 4 = Non-telecom I/O, 5 = Maintenance, 6 = Fiber Optic

Configuration of the Equipment Under Test (EUT)



Notes

None

Performance Criteria

Annex D (normative) of EN55024: 1998

Printers

D.1 Particular test conditions

Data shall be printed with printers or plotters. No standard image is required, but the use of a text containing more than three character fonts and at least one grid of lines is recommended. Character pitch and line spacing should be small. If the dot density can be selected, the highest density shall be chosen. Tests shall be carried out with the EUT in the printing mode.

D.2 Particular performance criteria

Performance criterion A

The EUT shall operate without degradation of performance during and after the application of the disturbance. For example, there shall be no:

- loss or corruption of data during input/output operations;
- degradation of the printed image beyond the manufacturer's specification;
- change in output mode or character font;
- perceptible change in dot-pitch;
- unintended line or page feed.

Performance criterion B

As for performance criterion A, with the following exceptions:

- degradation of the printed image beyond the manufacturer's specification is allowed;
- misalignment of the grid lines is allowed;
- unintended line feed is allowed.

After the disturbance is removed, normal operation of the EUT is self-recoverable to the condition immediately before the application of the test; this may involve an operator response to re-initiate the operation.

Performance criterion C

Degradation of the performance as described in criteria A and B is permitted provided that the normal operation of the EUT is self-recoverable to the condition immediately before the application of the test or can be restored after the test by the operator.



Nemko Canada Inc.,
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Report No: 6R74702.1 Issue 2

Electrostatic Discharge

Test Date: December 19, 2006

Engineer's Name: Daniel Hynes

Tested as per: Table Top

Investigation Data

Contact Discharge

Discharge Point	Number at +/-	Test Voltage (kV)	Result
Screw on bottom of EUT	25	2, 4	No Degradation
Rear Plate for interface connections	25	2, 4	No Degradation
Shield of DB9 Connector	25	2, 4	No Degradation

Indirect Discharge

Discharge Point	Number at +/-	Test Voltage (kV)	Result
HCP (All Sides)	25	2, 4	No Degradation
VCP (All Sides)	25	2, 4	No Degradation

Air Discharge

Discharge Point	Number at +/-	Test Voltage (kV)	Result
Power Connector	10	2, 4, 8	No Degradation
USB Connector	10	2, 4, 8	No Degradation
DB9 Connector	10	2, 4, 8	No Degradation
Paper Area Cover	10	2, 4, 8	No Degradation
Inside Paper Area	10	2, 4, 8	No Degradation
All sides of EUT	10	2, 4, 8	No Degradation
Print Button	10	2, 4, 8	No Degradation

Notes

None

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass

Test Equipment Used

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
1 Year	ESD Gun	KeyTek	MZ-15/EC	FA000791	Feb. 17/07

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use

Electrostatic Discharge, continued

Setup Photos





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Report No: 6R74702.1 Issue 2

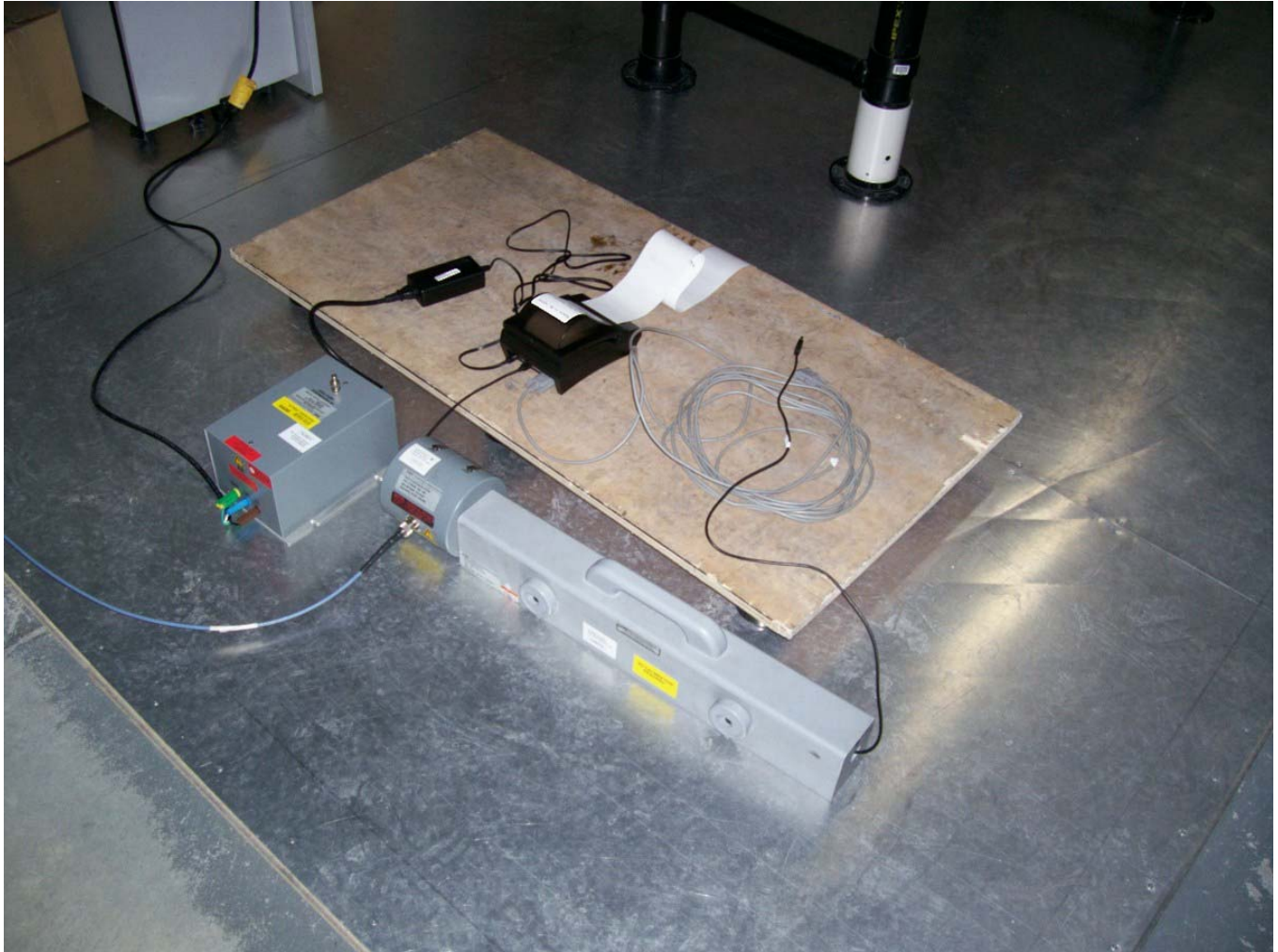
Radio-Frequency Continuous Conducted

Test Date: December 19, 2006				
Engineer's Name: Daniel Hynes				
Tested as per: Table Top				
Investigation Data				
Swept Frequency Test				
Start Freq. (MHz)	Stop Freq. (MHz)	Step Size (%)	Dwell Time (s)	Level (Volts)
0.150	80	1	3	3
Modulation Details				
Modulation Type: AM		Freq. Mod (kHz): 1	% Modulation: 80	
Additional Spot Frequencies investigated				
EUT Frequencies (MHz): All EUT clock frequencies within specified test band.				Dwell Time (s): 30
EN 55024 Annex A Frequencies (MHz): 0.2, 1, 7.1, 13.56, 21, 27.12 and 40,68 (± 1 %).				Dwell Time (s): 30
Ports Investigated				
Test Port	Coupling Method		Result	
AC input	CDN		No Degradation	
USB	Bulk Current Injection Probe		No Degradation	
DB9	Bulk Current Injection Probe		No Degradation	
Notes				
None				
Deviations				
Refer to Engineering Considerations.				
Test Result				
Final Test Result: Pass				

Test Equipment Used					
CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
1 Year	Bulk Injection Current Probe	FCC	F-120-9A	FA001599	Sept. 15/07
NCR	Amplifier	AR	150A220	FA001744	NCR
1 Year	Signal Generator	IFR	2024	FA001674	July 25/07
1 Year	CDN	FCC	FCC-801-M3-16	FA001776	Sept. 15/07
Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use, OUT = Out For CAL/Repair					

Radio-Frequency Continuous Conducted, continued

Setup Photos





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Report No: 6R74702.1 Issue 2

Radio-Frequency Electromagnetic Field Amplitude Modulated

Test Date: December 19 & 20, 2006

Engineer's Name: Daniel Hynes

Tested as per: Table Top

Enclosure Investigation Data

Swept Frequency Test

Start Freq. (MHz)	Stop Freq. (MHz)	Step Size (%)	Dwell Time (s)	Level (Volts/Meter)
80	1000	1	3	3

Modulation Details

Modulation Type: AM Freq. Mod (kHz): 1 % Modulation: 80

Additional Spot Frequencies investigated

EUT Frequencies (MHz): All EUT clock frequencies within specified test band. Dwell Time (s): 30

EN 55024 Annex A Frequencies (MHz):
80, 120, 160, 230, 434, 460, 600, 863 and 900 ($\pm 1\%$). Dwell Time (s): 30

Enclosure Investigated

Facility: Ottawa Chamber

Polarization Assessed: Vertical Horizontal

Sides Assessed: Front Side Rear Side Left Side Right Side

Result: No Degradation

Notes

None

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass

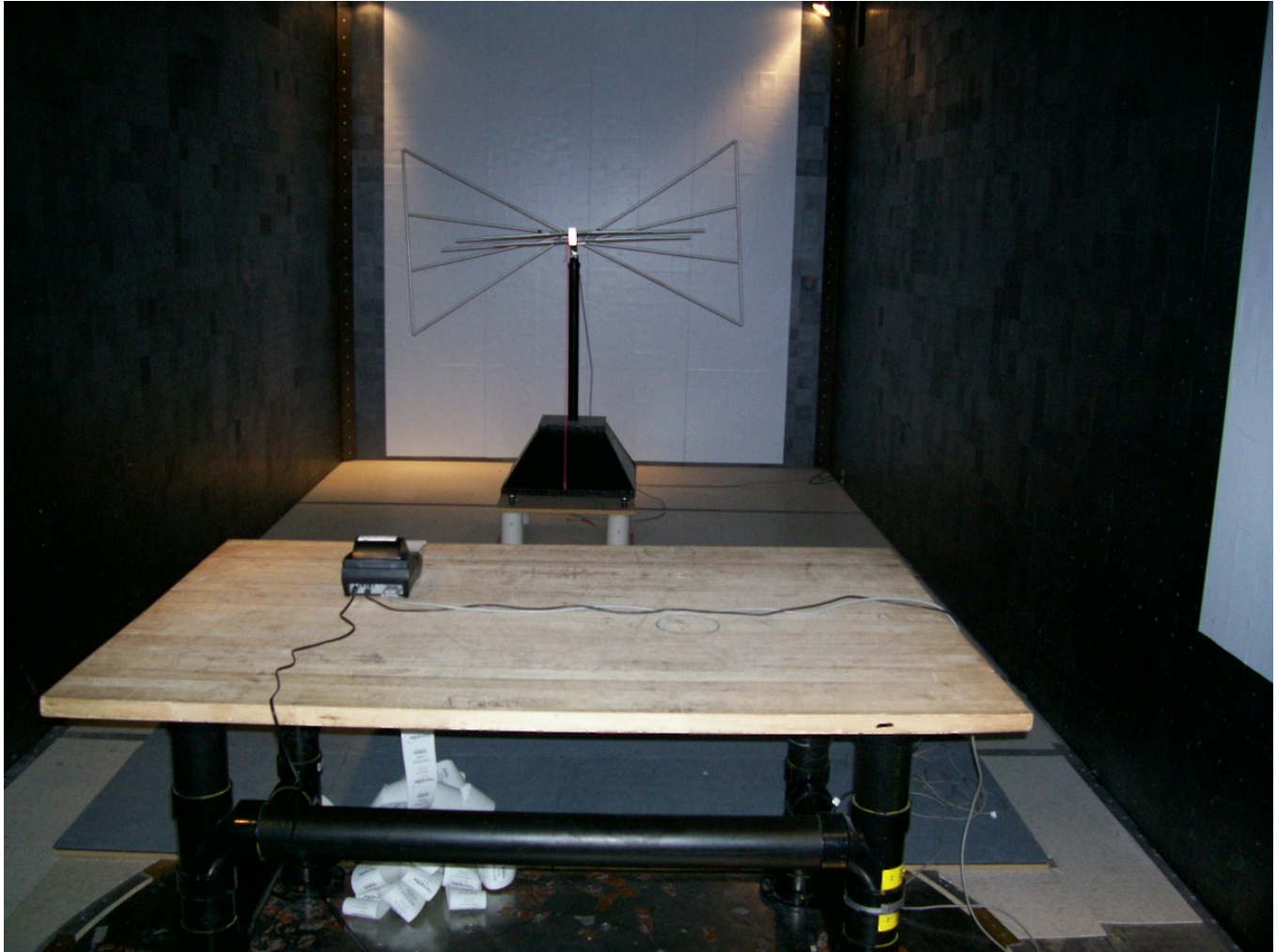
Test Equipment Used

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
1 Year	Signal Generator	IFR	2024	FA001674	July 25/07
NCR	Amplifier	AR	150A220	FA001744	NCR
NCR	Amplifier	AR	30W1000B	FA001743	NCR
NCR	Biconilog	EMCO	3146	FA000815	NCR

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use

Radio-Frequency Electromagnetic Field Amplitude Modulated, continued

Setup Photos





Nemko Canada Inc.,
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Report No: 6R74702.1 Issue 2

Surge

Test Date: December 18, 2006

Engineer's Name: Daniel Hynes

Investigation Data

Input AC Power Ports (Including Equipment Marketed With An AC/DC Power Converter)

Waveshape (1,2/50 μ s – 8/20 μ s)

Phase: 0, 90, 180, and 270

Repetition Rate - time between each surge (s): 3

Number of test at the selected points: 5

Test Port	Line to Line	Line to Earth	Test Voltage +/- (kV)	Result
AC input	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0.5, 1	No Degradation
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0.5, 1, 2	No Degradation

Notes

None

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass

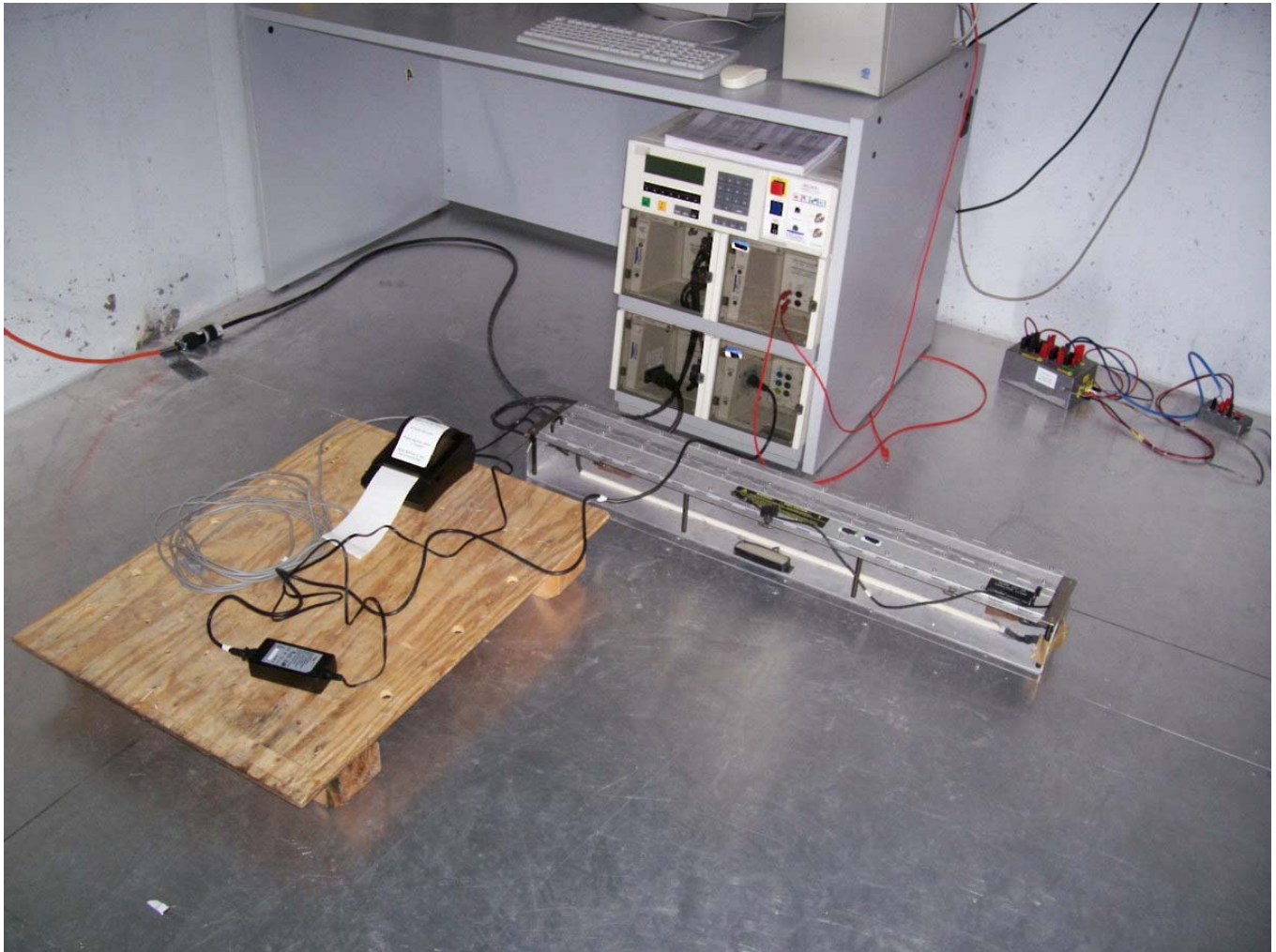
Test Equipment Used

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
1 Year	Control Centre	KeyTek	ECAT™ E-Class Series 100	FA000739	Mar. 23/07
1 Year	EFT/SURGE Coupler/Decoupler	KeyTek	E4551	FA000742	Mar. 23/07
1 Year	Surge Network Module	KeyTek	E501	FA000741	Mar. 23/07

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use

Surge, continued

Setup Photos





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Report No: 6R74702.1 Issue 2

Fast Transients

Test Date: December 18, 2006

Engineer's Name: Daniel Hynes

Tested as per: Floor Standing

Investigation Data

Waveshape 5/50 Tr/Th ns	Freq. (Hz)	Burst Duration (ms)	Burst Period (ms)
Phase: Asynchronous	5000	15	300

Input AC Power Ports (Including Equipment Marketed With An AC/DC Power Converter)

CPL reference with earth: L1-N-PE, N-PE, L1-PE, L1-N, PE, L1, N

Test Port	Test Voltage +/- (kV)	Result
AC input	0.5, 1	No Degradation

Signal and Telecommunication Ports

Capacitive voltage clamp

Test Port	Test Voltage +/- (kV)	Result
USB	0.5	No Degradation
DB9	0.5	No Degradation

Notes

None

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass

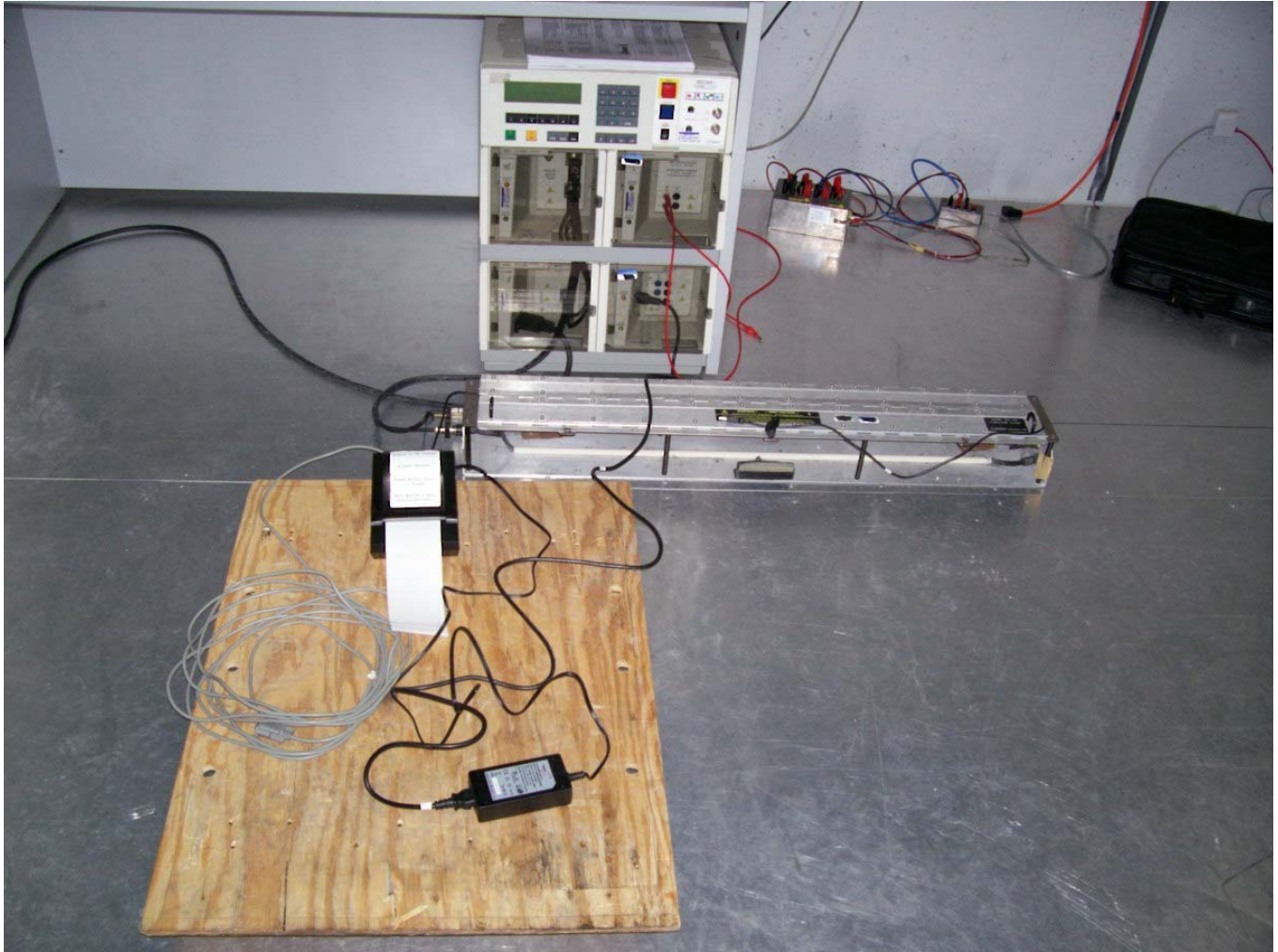
Test Equipment Used

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
1 Year	Control Centre	KeyTek	ECAT™ E-Class Series 100	FA000739	Mar. 23/07
1 Year	EFT/Burst Module	KeyTek	E411	FA000740	Mar. 23/07
NCR	Capacitive Clamp	KeyTek	CCL-4/S	FA000743	NCR
1 Year	EFT/SURGE Coupler/Decoupler	KeyTek	E4551	FA000742	Mar. 23/07

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use

Fast Transients, continued

Setup Photos





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Report No: 6R74702.1 Issue 2

Voltage Dips and Voltage Interruptions

Test Date: December 19, 2006

Engineer's Name: Daniel Hynes

Investigation Data

Input AC Power Ports (Including Equipment Marketed With An AC/DC Power Converter)

Seq. #	% Reduction	Cycles	Start Phase	Rep	Result
1	>95	0.5	0	3	No Degradation
2	>95	0.5	180	3	No Degradation
3	30	25	0	3	No Degradation
4	30	25	180	3	No Degradation
5	>95	250	0	3	See Notes
6	>95	250	180	3	See Notes

Notes

During sequence 5 and 6 the EUT power cycled. Printing had to be manually reset.

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass

Test Equipment Used

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
1 Year	Power Source	California Instruments	5001ix	FA001770	May 23/07
1 Year	Electronic Output Switch	California Instruments	EOS-1	FA001771	May 23/07

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use

Voltage Dips and Voltage Interruptions, continued

Setup Photo

