Report #: 6R74703.1

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: 

Signature
Daniel Hynes, EMC Specialist

November 1, 2006
Date

Nemko Canada Inc., a testing laboratory, is accredited by the Standards Council of Canada.
The tests included in this report are within the scope of this accreditation.

Table of Contents

Declaratory Statements

Product: H/S Kiosk "C" and H/S Kiosk "V"

Model #: 103544

Model Variants #: 103430

Trademark: Nanoptix

Serial #: None

Applicant:
Nanoptix Inc.
699 Champlain Street
Dieppe, New Brunswick, Canada
E1A1P6

Manufacturer:
Nanoptix Inc.
699 Champlain Street
Dieppe, New Brunswick, Canada
E1A1P6

Factory:
Nanoptix Inc.
699 Champlain Street
Dieppe, New Brunswick, Canada
E1A1P6

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

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.

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 µs	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 µs	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

Client provided two units for assessment (H/S Kiosk "C" and H/S Kiosk "V" Printer). Both samples were pre-scanned at 3m in a lined chamber. Advised client that units had a similar emissions footprint. Client then decided to continue testing on H/S Kiosk "C" Printer as the worst-case representative. The two samples have the same electrical hardware. The only difference is the housing.

Deviations from Standard Test Procedure

None

Test Report Revision History

Issue #	Details of changes made to test report
-	Original Report Issued
N/A	N/A

General Information Regarding the Equipment Under Test (EUT)

Date Received In Laboratory: October 16, 2006
Nemko Identification Number: Item #1
Description & Theory of Operation: High Speed Kiosk Compact Version Thermal Printer with 80mm roll of paper, right hand side paper loading.
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.

Equipment Configuration

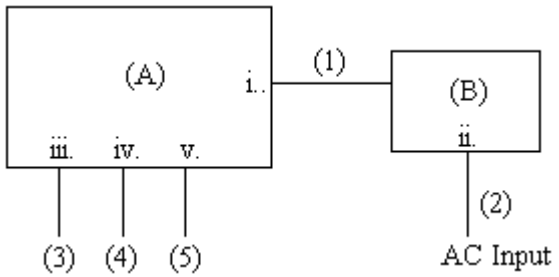
Equipment Configuration List		
Item	Description	Identification: (MN#, SN#, PN#, Rev.)
(A)	H/S Kiosk "C" Printer	MN# 103544
(B)	Nanoptix ITE Power Supply	PN# 100600-0023-00-ROHS, MN# GT-21126-6024

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 (DB25 to DB9)	Indoor	4	1
v.	JR11	Indoor	5	1

Inter-Connection Cables		
Item	Description	Length (m)
(1)	18AWG Two conductor	0.5
(2)	Three Conductor Power Cable	1.8
(3)	USB	2.5
(4)	DB25 to DB9 Serial Cable	2.5
(5)	RJ11	2.5

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.

Electrostatic Discharge

Test Date: October 26, 2006

Engineer's Name: David Duchesne

Tested as per: Table Top

Investigation Data

Contact Discharge

Discharge Point	Number at +/-	Test Voltage (kV)	Result
Refer to "Detailed Electrostatic Discharge Test Location Points" photos of this section	25	2, 4	See Notes

Indirect Discharge

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

Air Discharge

Discharge Point	Number at +/-	Test Voltage (kV)	Result
Refer to "Detailed Electrostatic Discharge Test Location Points" photos of this section	10	2, 4, 8	See Notes

Notes

- Contact discharge to the USB connector caused the continuous print function to halt. The printer would be in an idle state waiting for re-initiation from operator. The printer would function normally after manually resetting the print routine.
- Air discharge around the initiate button and LEDs caused the continuous print function to halt. The printer would be in an idle state waiting for re-initiation from operator. The printer would function normally after manually resetting the print routine.

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass

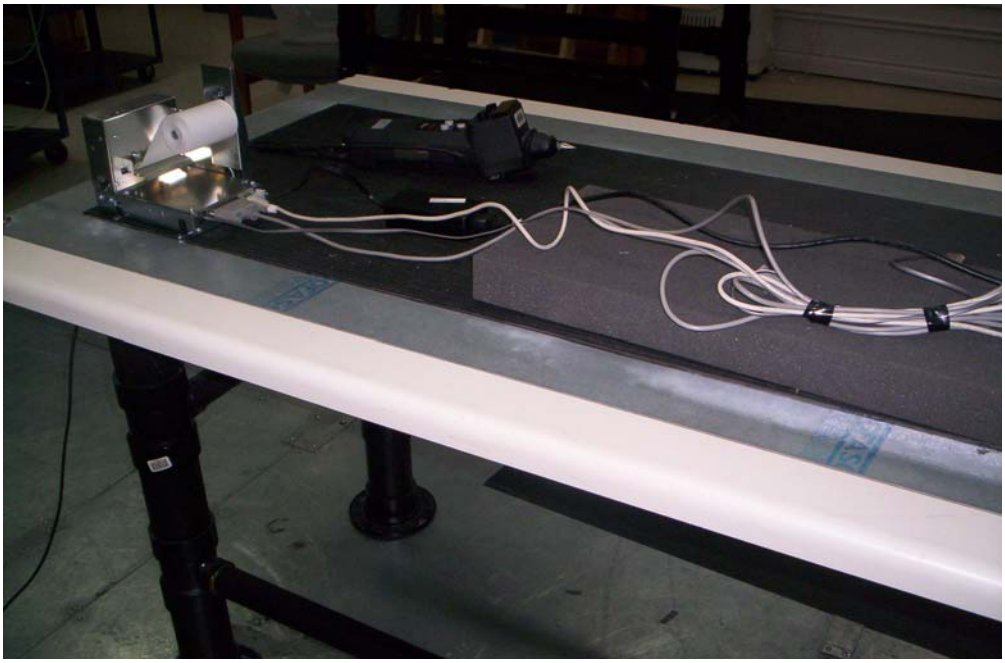
Test Equipment Used

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

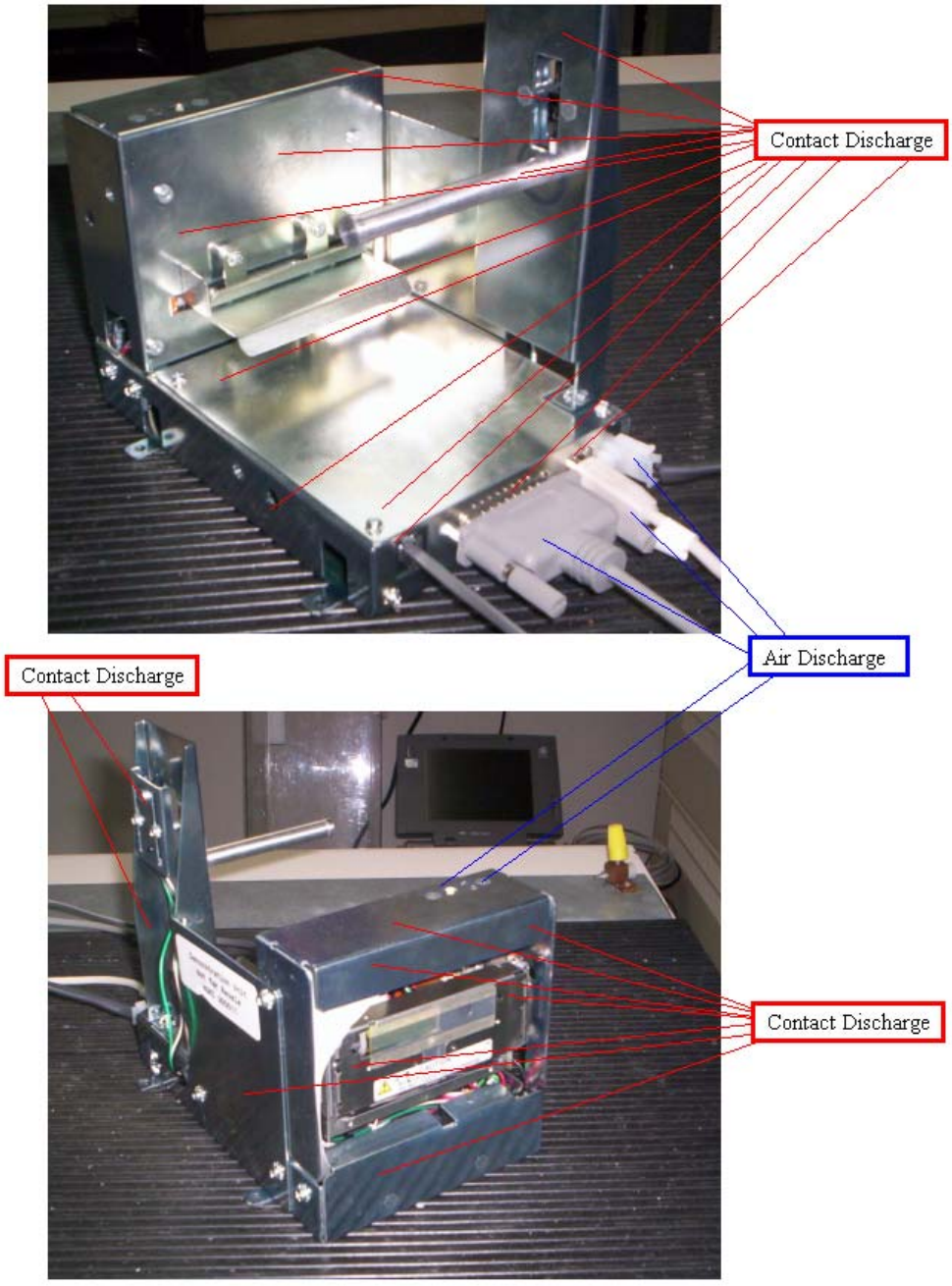
Electrostatic Discharge, continued

Setup Photos



Electrostatic Discharge, continued

Electrostatic Discharge Test Location Points



Radio-Frequency Continuous Conducted

Test Date: October 25, 2006

Engineer's Name: David Duchesne

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): 3
EN 55024 Annex A Frequencies (MHz): 0.2, 1, 7.1, 13.56, 21, 27.12 and 40,68 (±1 %).	Dwell Time (s): 3

Ports Investigated

Test Port	Coupling Method	Result
AC input	CDN	No Degradation
USB	EM clamp	No Degradation
DB25	EM clamp	No Degradation
RJ11	EM clamp	No Degradation

Notes

None

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass

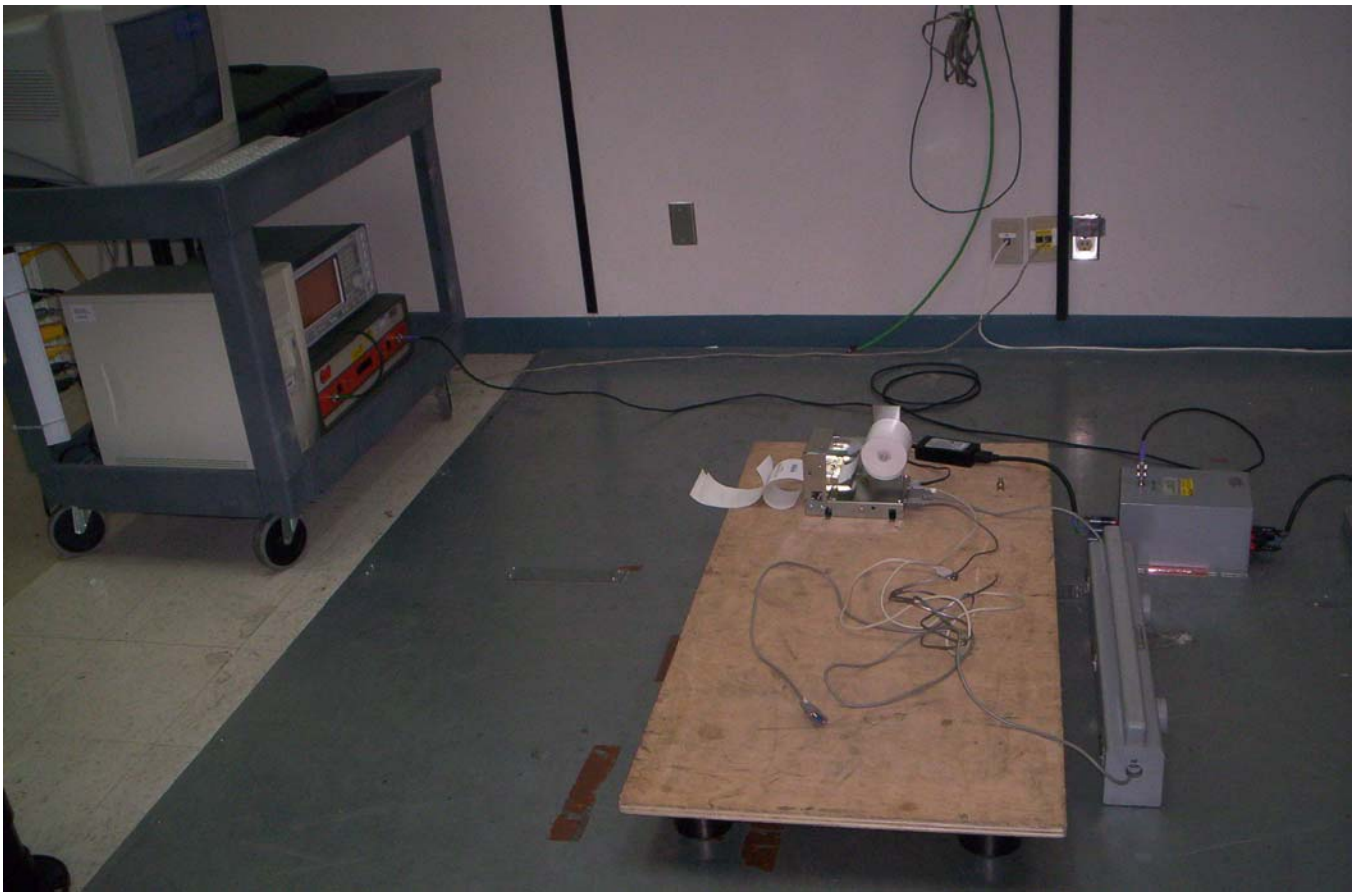
Test Equipment Used

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
NCR	Amplifier	AR	75A250A	FA001943	NCR
1 Year	Signal Generator	Rhode & Schwarz	SMT 02	FA001854	July 10/07
1 Year	CDN	Fischer	FCC-801-M3-16	FA000838	Jan. 20/07 *
1 Year	EM Injection Clamp	FCC	F-2031-23mm	FA001762	Jan. 20/07 *

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use, OUT = Out For CAL/Repair
* Specific calibration for R.F. Continuous Conducted.

Radio-Frequency Continuous Conducted, continued

Setup Photos



Radio-Frequency Electromagnetic Field Amplitude Modulated

Test Date: October 26, 2006

Engineer's Name: David Duchesne

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

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

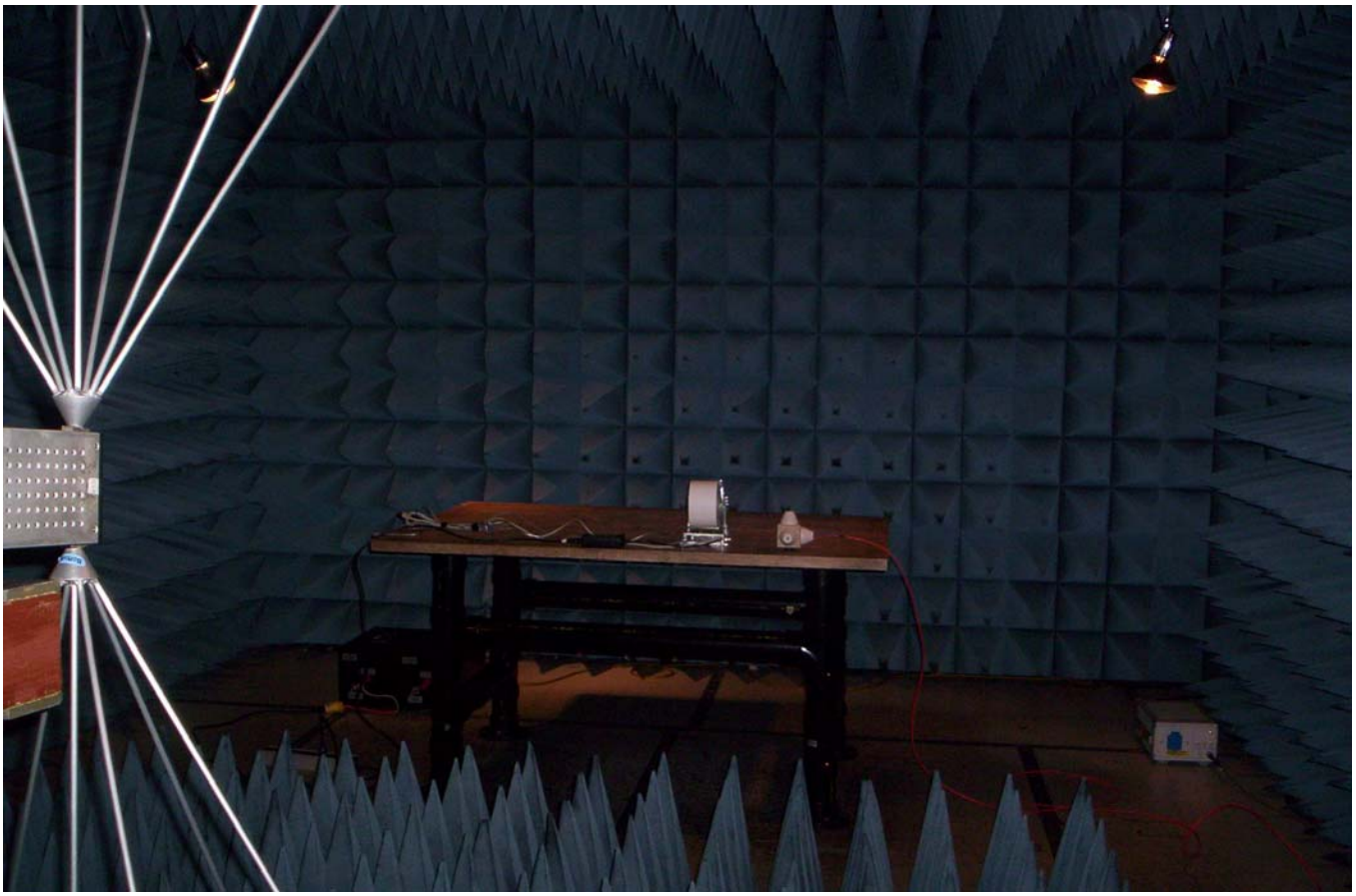
Test Equipment Used

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
1 Year	Signal Generator	Rhode & Schwarz	SMH	FA000873	Oct. 16/07
NCR	Amplifier	AR	250W1000A	FA002038	NCR
NCR	Amplifier	AR	25S1G4A	FA001956	NCR
1 Year	Field Sensing Probe	AR	FP4000	FA001707	Mar. 14/07
1 Year	Biconical (1) Antenna	EMCO	3109	FA000805	May 03/07
1 Year	Log Periodic Antenna #4	EMCO	3146	FA001455	Mar. 24/07
1 Year	50 Coax cable	HUBER + SUHNER	None	FA002015	Sept. 08/07
1 Year	50 Coax cable	HUBER + SUHNER	None	FA002013	Sept. 08/07
1 Year	50 Coax cable	HUBER + SUHNER	None	FA002016	Sept. 08/07
1 Year	50 Coax cable	WFU	None	FA002029	Oct. 02/07
1 Year	Shielded Room #1	ETS	N/A	FA000729	Oct. 23/07

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

Radio-Frequency Electromagnetic Field Amplitude Modulated, continued

Setup Photos



Surge

Test Date: October 25, 2006

Engineer's Name: David Duchesne

Investigation Data

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

Waveshape (1,2/50 µs – 8/20µs)	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	☒	☐	0.5, 1	See Notes
	☐	☒	0.5, 1, 2	See Notes

Notes

Surge to the ac input caused the continuous print function to halt. The printer would be in an idle state waiting for re-initiation from operator. The printer would function normally after manually resetting the print routine.

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass

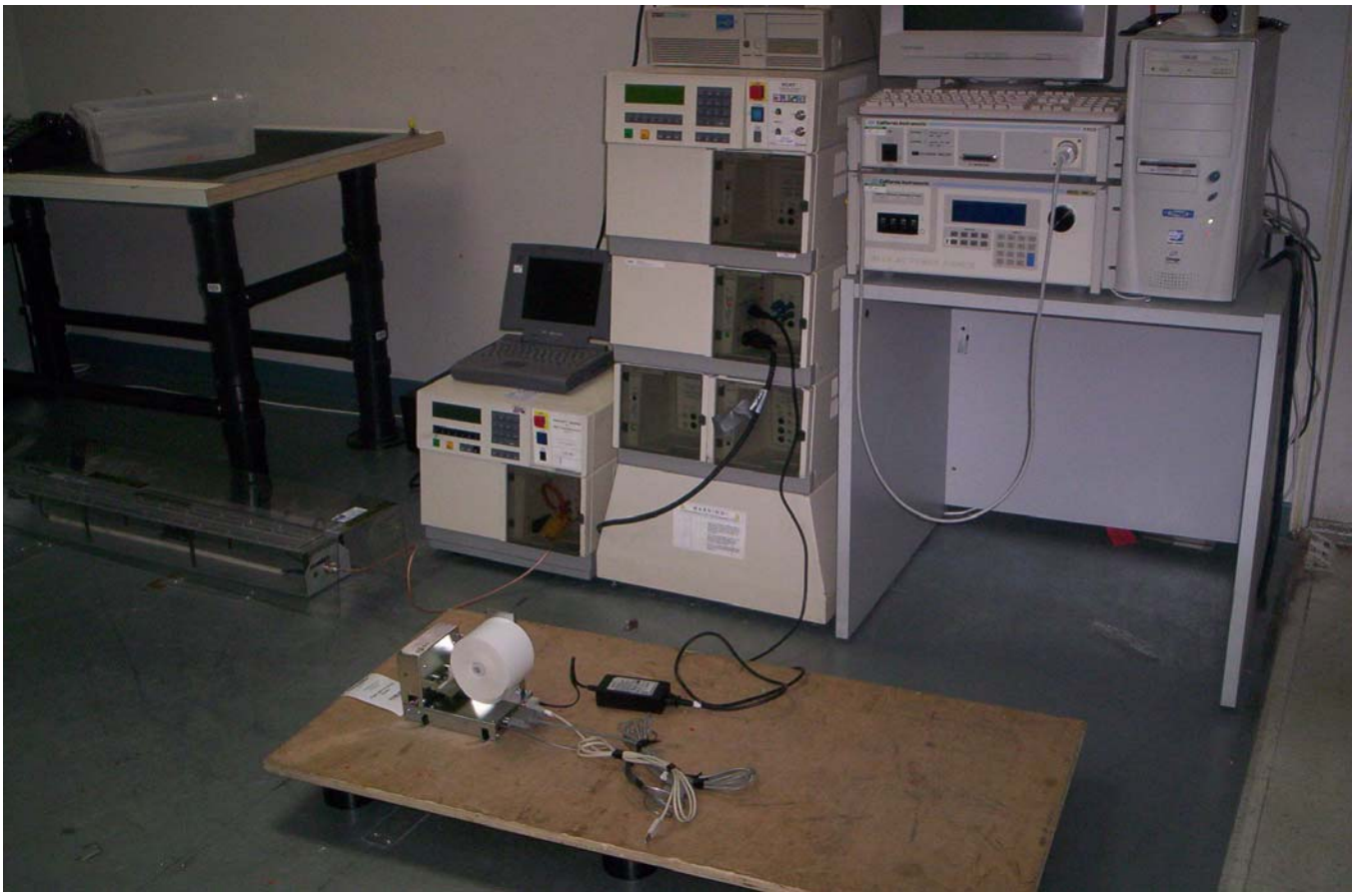
Test Equipment Used

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
1 Year	Control Centre	KeyTek	E-Class Series 100	FA0001348	Mar. 23/07
1 Year	SURGE Coupler/Decoupler	KeyTek	E551	FA0001348	Mar. 23/07

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

Surge, continued

Setup Photos



Fast Transients

Test Date: October 25, 2006

Engineer's Name: David Duchesne

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
DB25	0.5	No Degradation
RJ11	0.5	No Degradation

Notes

None

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass

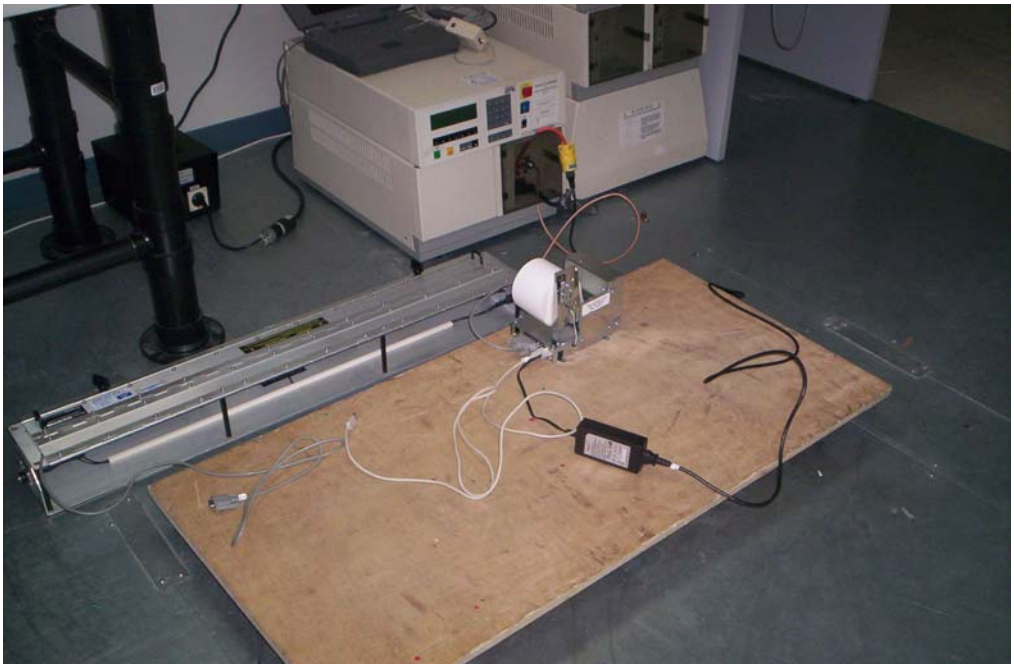
Test Equipment Used

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
1 Year	EFT Generator (Rental)	KeyTek	CE-40	SN. 9511491	Aug, 10/07
1 Year	Capacitive Clamp (Rental)	KeyTek	CE 40 CCL	None	Oct. 19/07

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

Fast Transients, continued

Setup Photos



Voltage Dips and Voltage Interruptions

Test Date: October 25, 2006

Engineer's Name: David Duchesne

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	Waveform Analyzer	California Instruments	PACS-1	FA001239	March 21/07
1 Year	Power Source	California Instruments	5001ix	FA001238	March 21/07

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

Voltage Dips and Voltage Interruptions, continued

Setup Photos