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

Report Number: 116129-2TRFEMC

Products Marketing Name: Ultra and Game Interface

Test Specification:

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

Information technology equipment —

Immunity characteristics — Limits and methods of measurement

Reviewed by:

Signature
Daniel Hynes, Senior EMC Specialist

January 14, 2009
Date

Tested by: Ilya Fershtater, EMC Specialist
David Duchesne, Senior EMC Specialist

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

Report No: 116129-2TRFEMC

Declaratory Statements

Products Marketing Name: Ultra and Game Interface

Model #: Ultra – 950003

Model #: Game Interface – 950017



Trademark:

Serial #: None

Applicant:

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

Manufacturer:

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

Product Background details

- | | |
|-------------------------------------------------|----------------------------------------------|
| <input checked="" type="checkbox"/> New Product | <input type="checkbox"/> Engineering Changes |
| <input type="checkbox"/> Configuration Change | <input type="checkbox"/> Product Audit |
| <input type="checkbox"/> Other | |

Test Specification:

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

Test Location:

1500 Peter Robinson Road, West Carleton, Ontario, Canada, K0A 1L0
and
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, and will be so indicated in the report.

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	1kV Line To Earth 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	0.5kV Line To Earth 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	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



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Report No: 116129-2TRFEMC

Lab Environmental Conditions

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

Engineering Considerations

Product Modification Required for Compliance

None

Justification

None

Deviations from Standard Test Procedure

None

Test Report Revision History

Revision #	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 28, 2008

Nemko Identification Number: Items # 1 and 2

Description & Theory of Operation:

Connects existing "Non Communicable" Gaming Terminals together within a computer networked system.

EUT Clock and Operational Frequencies:

12MHz, 24MHz

Exercise/Monitoring method:

Ultra communicates between the Printer (Host) via RS485 and the Game Interface (To Gaming Terminal) via RS232, approx: 15 seconds

Software Version:

Fun-Co Firmware



Equipment Configuration

Equipment Configuration List

Item	Description	Identification: (MN#, SN#, PN#, Rev.)
(A)	Ultra (EUT)	MN# 950003
(B)	Spill Proof Printer	SN# 1001663
(C)	ITE Power Supply	MN# GT-21126-6024, SN# RoHS00768524/06, PN# 100600-0023-00-ROHS
(D)	Control Box	Part# 102812-0000R
(E)	Game Interface (EUT)	MN# 950017
(F)	GlobTek ITE Power Supply	MN# GT-21089-1512-W2, P/N #WR91E1250LCP-Y
(G)	Bar Code Slot Reader	MN# BR302B, SN# 109CYD00680
(H)	IBM ThinkPad T23 Lap Top Computer	Nemko Asset # FA001934

Ultra System EUT Ports

Item	Description	Qty
i.	RS-485 (2 – Parallel)	2
ii.	Terminal	6
iii.	DC Power	1
iv.	RS-232	1
v.	USB (Maintenance Port, not used during normal operation)	1
vi.	PS-2 Keyboard/Mouse (Maintenance Port, not used during normal operation)	1

Game Interface EUT Ports

Item	Description	Qty
vii.	Bar Coded Reader	1
viii.	Bill Acceptor	1
ix.	Coin Validator	1
x.	Coin Hopper	1
xi.	GP I/O	1
xii.	ULTRA Interface	1

None

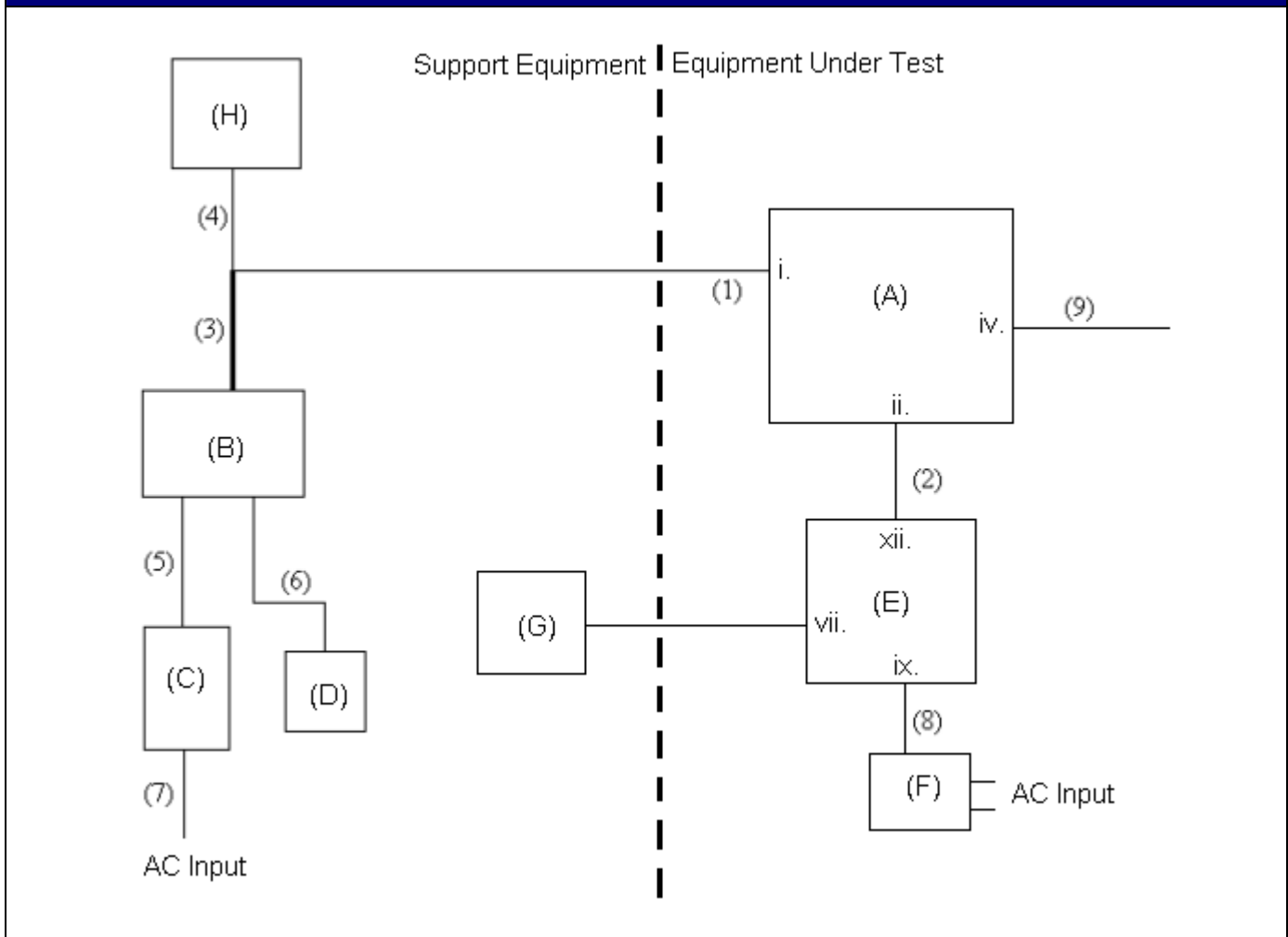
- The Ultra and Game Interface was powered via the coin validator port of the Game Interface with an external supply.
- The DC input power port of the Ultra is no utilized for this configuration.
- The bar coded reader, bill acceptor, coin hopper, and GP I/O port of the Game Interface support connection less than 1m.

Equipment Configuration, continued

Inter-Connection Cables

Item	Description	Length (m)
(1)	6 Conductor, RJ11 to RJ11, Unshielded Flat Communication Cable (PN# 102799-0100R-02)	10
(2)	8 Conductor, RJ45 to RJ45, Unshielded Flat Communication Cable	5
(3)	DB15 to DB9/RJ11 Communication Cable (P/N #210004-0001R-01)	0.5
(4)	DB9 (RS-232) Serial Communication Cable	3
(5)	2 Conductor DC Power Cable (Testing Purposes Only – via Coin Port)	2
(6)	6 Conductor, RJ11 Unshielded Flat Communication Cable	0.25
(7)	3 Conductor AC Mains North American Power Cable	2
(8)	2 Conductor DC Power Cable	2
(9)	DB9 Serial Communication Cable	2

Configuration of the Equipment Under Test (EUT)





Performance Criteria

Performance Criterion A	The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a 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 by what the user may reasonably expect from the equipment if used as intended.
Performance Criterion B	After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. 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 by what the user may reasonably expect from the equipment if used as intended.
Performance Criterion C	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.



Electrostatic Discharge

Test Date: November 20, 2008 and December 23, 2008

Engineer's Name: Ilya Fershtater and David Duchesne

Configuration: Table Top

Investigation Data

Contact Discharge

Discharge Point	Number at +/-	Test Voltage (kV)	Result
Please refer to "Electrostatic Discharge Test Location Points"	10	2, 4	See Notes

Indirect Discharge

Discharge Point	Number at +/-	Test Voltage (kV)	Result
HCP (All Sides)	10	2, 4	No Degradation
VCP (All Sides)	10	2, 4	No Degradation

Air Discharge

Discharge Point	Number at +/-	Test Voltage (kV)	Result
Please refer to "Electrostatic Discharge Test Location Points"	10	2, 4, 8	No Degradation

Notes

Repetition rate of discharge was applied at 1 pulse per second.
During contact discharge at 4kV applied to the serial connector of the Game Interface:

- The ultra board would occasionally lose communication with the remote PC.
- The Terminal A Coin Value A would increment in value.
- The card reader would occasionally beep.

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass

Test Equipment Used

Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
ESD Gun	KeyTek	MZ-15/EC	FA000791	Feb 19/09
ESD Gun	KeyTek	MZ-15/EC	FA001983	Jan. 24/09

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

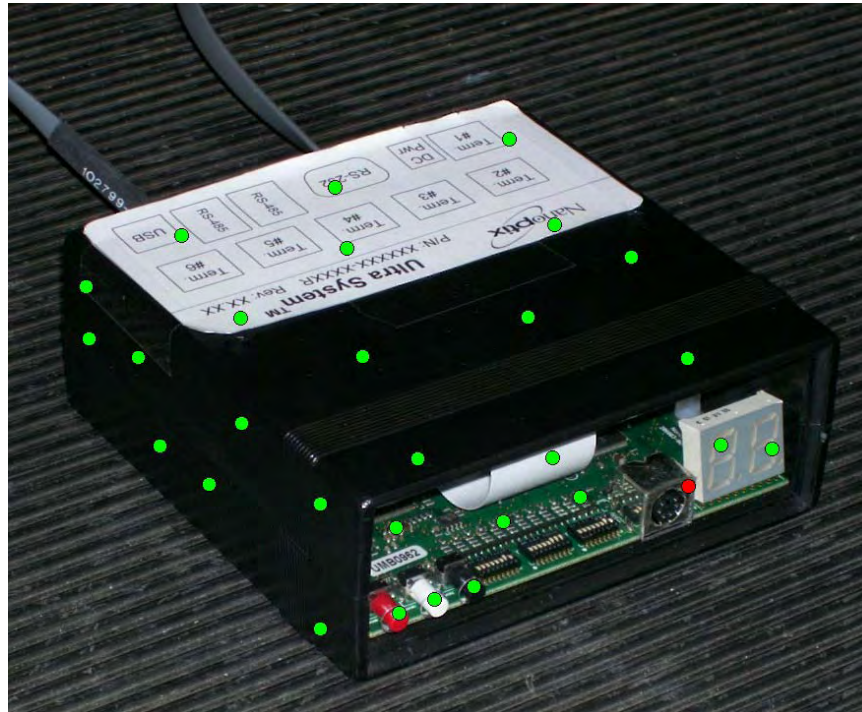
Electrostatic Discharge, continued

Setup Photos



Electrostatic Discharge, continued

Electrostatic Discharge Test Location Points

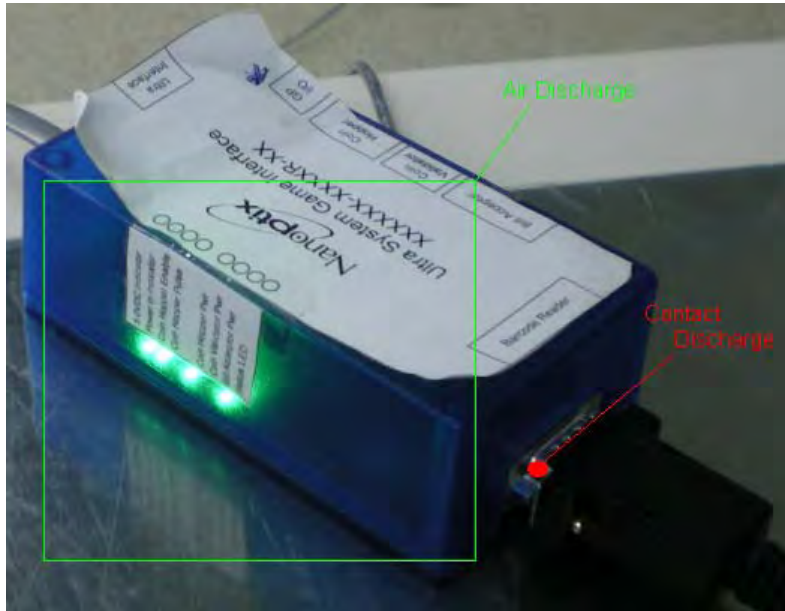


Green Dots = Air Discharge

Air Discharge = Contact Discharge

Electrostatic Discharge, continued

Electrostatic Discharge Test Location Points, continued



Radio-Frequency Continuous Conducted

Test Date: November 21, 2008

Engineer's Name: Ilya Fershtater

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
Annex A Frequencies (MHz): 0.2, 1, 7.1, 13.56, 21, 27.12 and 40.68	Dwell Time (s): 30

Ports Investigated

Test Port	Coupling Method	Result
Coin Validator (Game Interface) See Notes	CDN	No Degradation
ULTRA Interface (Game Interface)	Bulk Current Injection Probe	No Degradation
RS-232 (Ultra)	Bulk Current Injection Probe	No Degradation
RS-485 (Ultra)	Bulk Current Injection Probe	No Degradation
Terminal 1 (Ultra)	Bulk Current Injection Probe	No Degradation
Terminal 2 (Ultra)	Bulk Current Injection Probe	No Degradation

Notes

The AC input side of the external supply connected to the coin validator port was assessed.

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass

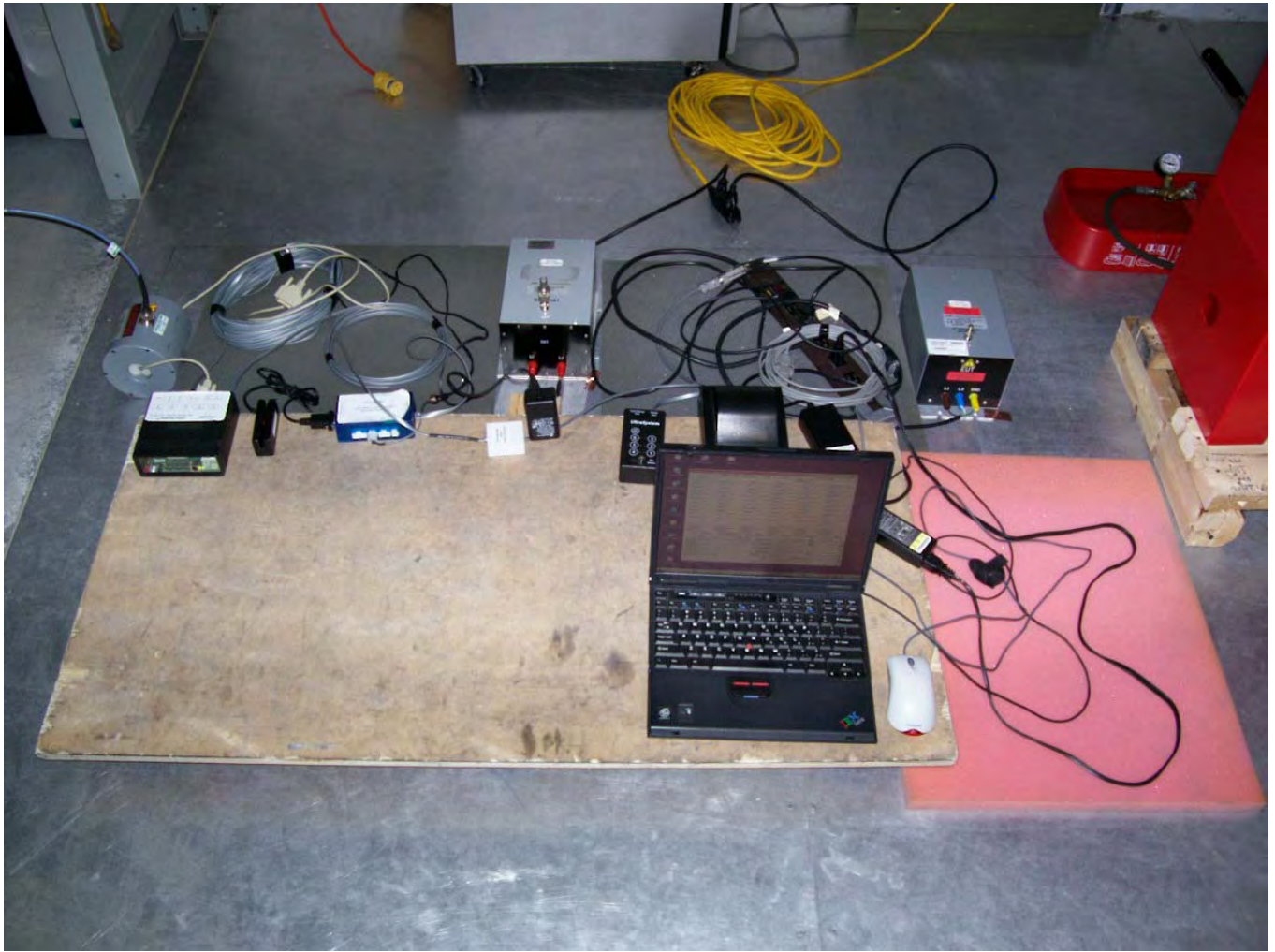
Test Equipment Used

Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
Bulk Current Injection Probe	FCC	F-120-9A	FA001599	Sept. 03/09
CDN	FCC	FCC-801-M2-16	FA000837	Aug. 14/09
Signal Generator	Marconi	2024	FA001674	Aug. 11/09
Amplifier	AR	150A220	FA001744	NCR

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

Radio-Frequency Continuous Conducted, continued

Setup Photos





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

Report No: 116129-2TRFEMC

Radio-Frequency Electromagnetic Field Amplitude Modulated

Test Date: December 24, 2008

Engineer's Name: David Duchesne

Configuration: 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): N/A

Annex A Frequencies (MHz): 80, 120, 160, 230, 434, 460, 600, 863 and 900 Dwell Time (s): 30

Enclosure Investigated

Facility: 3m 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

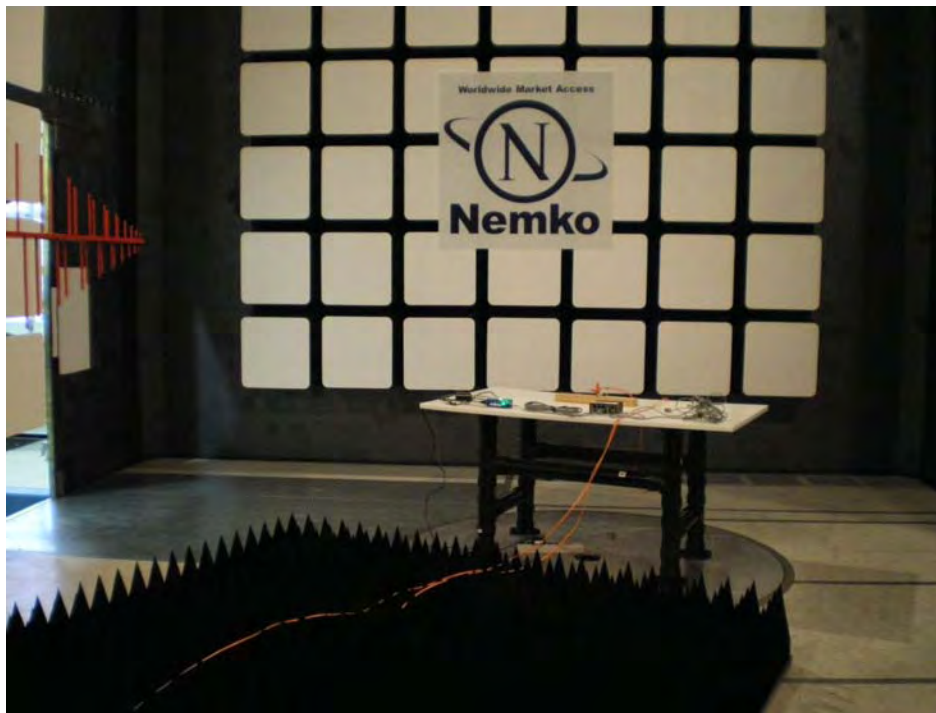
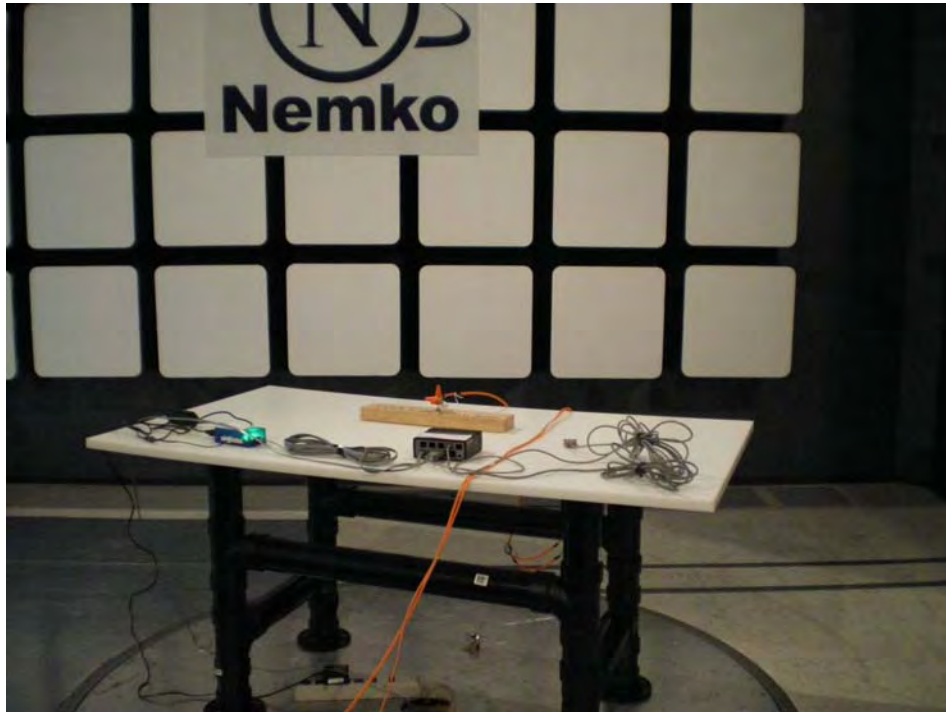
Test Equipment Used

Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
Electro-Magnetic Interference Test Chamber	TDK	SAC-3	FA002047	May 06/09
Directional Coupler 80MHz to 1000MHz	AR	DC6180	FA001659	Aug. 05/09
Power Meter	Rhode & Schwarz	NRP	FA002076	Aug. 12/09
Power Sensor	Rhode & Schwarz	NRP-Z91	FA002075	Aug. 12/09
Bilog	Sunol	JB3	FA002108	Jan. 21/09
50 Coax cable	HUBER + SUHNER	None	FA002022	July 07/09
50 Coax cable	HUBER + SUHNER	None	FA002074	July 07/09
Amplifier	AR	250W1000A	FA002038	NCR
Signal Generator	Rhode & Schwarz	SMH	FA000873	Nov. 10/09
Starprobe	AR	FL7006	FA002054	Oct. 08/09

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

Report No: 116129-2TRFEMC

Surge

Test Date: November 12, 2008

Engineer's Name: Ilya Fershtater

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): 30

Number of test at the selected points: 5

Test Port	Line to Line	Line to Earth	Test Voltage +/- (kV)	Result
Coin Validator (Game Interface) See Notes	<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

The AC input side of the external supply connected to the coin validator port was assessed.

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass

Test Equipment Used

Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
Control Centre	KeyTek	ECAT™ E-Class Series 100	FA000739	July 23/09
EFT/SURGE Coupler/Decoupler	KeyTek	E4551	FA000742	July 23/09
Surge Network Module	KeyTek	E501	FA000741	July 23/09

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

Surge, continued

Setup Photos



Fast Transients

Test Date: November 18, 2008

Engineer's Name: Ilya Fershtater

Investigation Data

Waveshape 5/50 Tr/Th ns	Freq. (Hz)	Burst Duration (ms)	Burst Period (ms)	Test Duration (s)
Phase: Asynchronous	5000	15	300	60

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
Coin Validator (Game Interface) See Notes	0.5, 1	No Degradation

Signal and Telecommunication Ports

Capacitive voltage clamp

Test Port	Test Voltage +/- (kV)	Result
ULTRA Interface (Game Interface)	0.25, 0.5	No Degradation
RS-232 (Ultra)	0.25, 0.5	No Degradation
RS-485 (Ultra)	0.25, 0.5	No Degradation
Terminal 1 (Ultra)	0.25, 0.5	No Degradation
Terminal 2 (Ultra)	0.25, 0.5	No Degradation

Notes

The AC input side of the external supply connected to the coin validator port was assessed.

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass

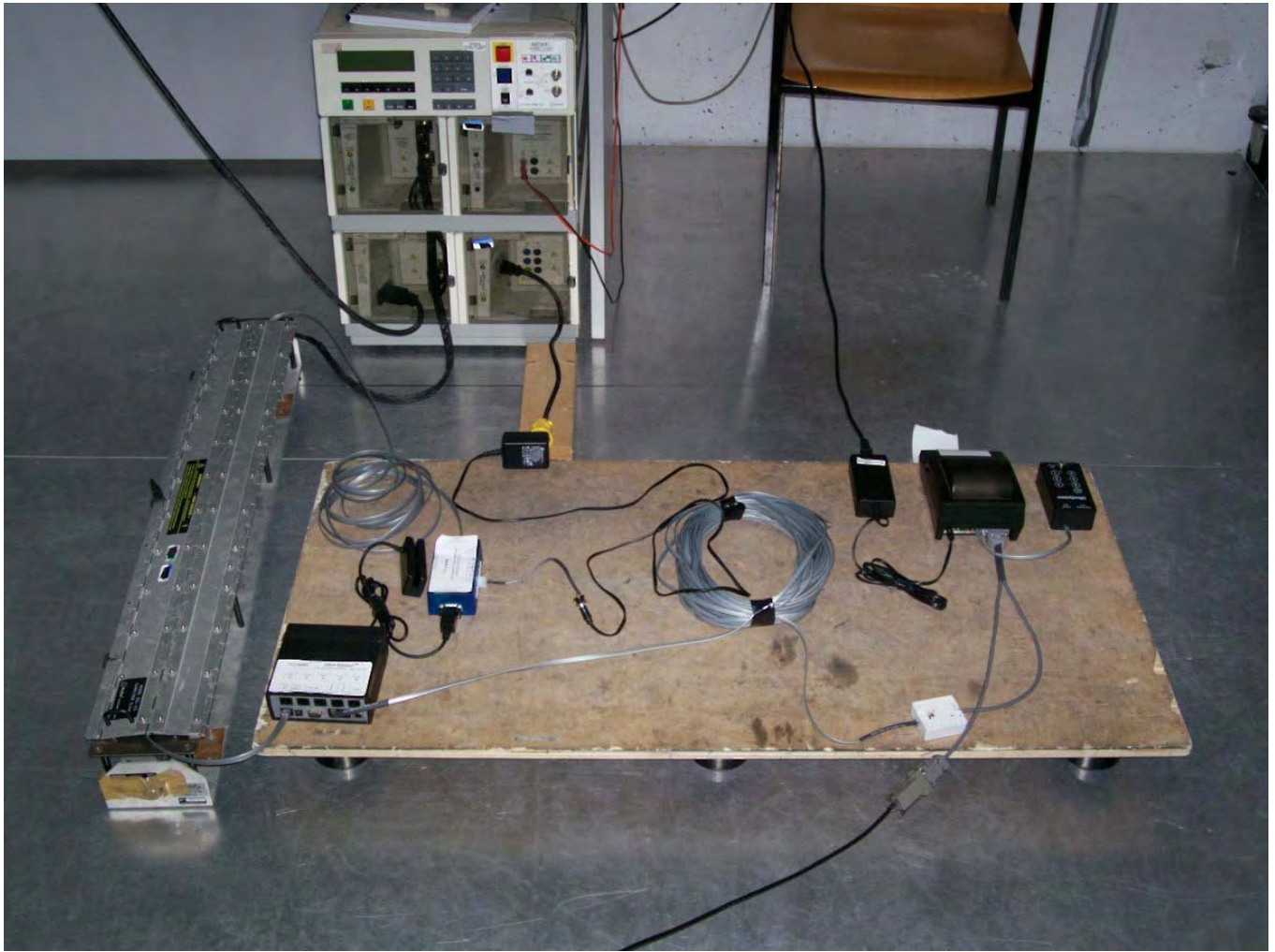
Test Equipment Used

Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
Control Centre	KeyTek	ECAT™ E-Class Series 100	FA000739	July 23/09
EFT/Burst Module	KeyTek	E411	FA000740	July 23/09
Capacitive Clamp	KeyTek	CCL-4/S	FA000743	NCR
EFT/SURGE Coupler/Decoupler	KeyTek	E4551	FA000742	July 23/09

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: November 21, 2008

Engineer's Name: Ilya Fershtater

Investigation Data

Input AC Power Ports

Seq. #	% Reduction	Cycles	Start Phase	Rep	Interval Between Dips (s)	Results
1	>95	0.5	0	3	10	No Degradation
2	>95	0.5	180	3	10	No Degradation
3	30	25	0	3	10	No Degradation
4	30	25	180	3	10	No Degradation
5	>95	250	0	3	10	EUT Power Cycled
6	>95	250	180	3	10	EUT Power Cycled

Notes

The AC input side of the external supply connected to the coin validator port was assessed.

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass

Test Equipment Used

Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
Power Source	California Instruments	5001ix	FA001770	Nov. 13/09
Electronic Output Switch	California Instruments	EOS-1	FA001771	Nov. 13/09

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

Voltage Dips and Voltage Interruptions, continued

Setup Photos

