



Test Report: 4R33535


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

Equipment Under Test: Spill Proof Cuts

Model Number: SPC

In Accordance With: **EN 55024: 1998 + amendment A1: 2001 + amendment A2: 2003**
Information technology equipment —
Immunity characteristics —
Limits and methods of measurement

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



Authorized By: Michel Dorion, EMC Specialist

Date: 30 June 2005

Total Number of Pages: 20



Nemko Canada Inc., Ottawa, Ontario Canada

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

Test Report No: 4R33535

Equipment (EUT): Spill Proof Cuts

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Nemko Canada Inc., Ottawa, Ontario Canada

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


Test Report No: 4R33535

Equipment (EUT): Spill Proof Cuts

Lab Environmental Conditions

Lab Conditions

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

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Declaration

Product Name: Spill Proof Cuts


Model No: SPC

Trademark: 

Serial No: SPC000006


Name of Applicant: Nanoptix Inc.

Name of Manufacturer: Nanoptix Inc.

 Nemko Canada Inc., Ottawa, Ontario Canada	TEST RESULT	
	PASS	FAIL
In the configuration tested, the EUT complied with the requirements of: EN 55024: 1998 + amendment A1: 2001 + amendment A2: 2003	X	

Note: See Summary of Test Results and Engineering Considerations for full details.


Tested by: Phil Taffinder, EMC Specialist



Signature
Daniel Hynes, EMC Specialist

30 June 2005


Date



Signature
Michel Dorion, EMC Specialist

Reviewed by: 30 June 2005

Date



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Nemko Canada Inc., Ottawa, Ontario Canada

Reference Standard:
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Equipment (EUT): Spill Proof Cuts

Summary of Test Results

General

Tests were conducted on a sample of this equipment in order to demonstrate compliance with EN 55024: 1998 + amendment A1: 2001 + amendment A2: 2003 Information Technology Equipment using the following test standards as test methodologies:

Immunity, Enclosure Port

Environmental Phenomenon	Test Specification	Units	Basic Standard	Remarks	Performance Criterion	Result (Pass/Fail)
Power-frequency magnetic Field	50 1	Hz A/m (r.m.s.)	IEC 61000-4-8	Note 1	A (Note 3)	N/A
Radio-frequency electromagnetic field Amplitude modulated	80-1000 3 80	MHz V/m (unmodulated, r.m.s.) % AM (1kHz)	IEC 61000-4-3	Note 2 and 4	A	Pass
Electrostatic discharge	4 (Contact discharge) 8 (Air discharge)	kV (charge voltage) kV (charge voltage)	IEC 61000-4-2	None	B	Not Tested (6)

Notes


1. Applicable only to equipment containing devices susceptible to magnetic fields, such as CRT monitors, Hall elements, electrodynamic microphones magnetic field sensors, etc.
2. The frequency range is scanned as specified. However, when specified in Annex A of EN55024: 1998 + A1: 2001 + A2: 2003, an additional comprehensive functional test shall be carried out at a limited number of frequencies. The selected frequencies are 80, 120, 160, 230, 434, 460, 600, 863 and 900MHz ($\pm 1\%$).
3. See Annex B of EN55024: 1998 + A1: 2001 + A2: 2003
4. The test level specified is prior to modulation.
5. Performance criterion details are documented in the "General Information regarding the Equipment Under Test (EUT)" section of this report.
6. Test was not performed at the request of the client.

Immunity, Signal Ports and Telecommunication Ports

Environmental Phenomenon	Test Specification	Units	Basic Standard	Remarks	Performance Criterion	Result (Pass/Fail)
Radio-frequency continuous conducted	0.15-80 3 80	MHz V (Unmodulated, r.m.s.) % AM (1 kHz)	IEC 61000-4-6	Note 1 & 3	A	Pass
Surge Line to Ground	1 1.2/50 (8/20)	kV (Peak) Tr/Th μ s	IEC 61000-4-5	Note 2 & 4	B	N/A
Fast transients	0.5 5/50 5	kV (Peak) Tr/Th ns Repetition Frequency kHz	IEC 61000-4-4	Note 3	B	Pass

Notes

1. The frequency range is scanned as specified. However, when specified in Annex A of EN55024: 1998 + A1: 2001 + A2: 2003, an additional comprehensive functional test shall be carried out at a limited number of frequencies. The selected frequencies for conducted tests are 0.2, 1, 7.1, 13.56, 21, 27.12 and 40.68MHz ($\pm 1\%$).
2. Applicable only to ports which according to the manufacturer's specification may connect directly to outdoor cables.
3. Applicable only to cables which according to the manufacturer's specification supports communication on cable lengths greater than 3m.
4. Where normal functioning cannot be achieved because of the impact of the CDN on the EUT, no test shall be required.
5. Performance criterion details are documented in the "General Information regarding the Equipment Under Test (EUT)" section of this report.

 Nemko Nemko Canada Inc., Ottawa, Ontario Canada	Reference Standard: EN 55024: 1998 + amendment A1: 2001 amendment A2: 2003
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Summary of Test Results, continued

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

Environmental Phenomenon	Test Specification	Units	Basic Standard	Remarks	Performance Criterion	Result (Pass/Fail)
Radio-frequency continuous conducted	0.15 – 80 3 80	MHz V (unmodulated, r.m.s.) % AM (1 kHz)	IEC 61000-4-6	Note 1	A	N/A
Surges	1.2/50 (8/20) 0.5	Tr/Th μ s kV (Peak)	IEC 61000-4-5	Note 2 and 3	B	N/A
Fast transients	0.5 5/50 5	kV (Peak) Tr/Th ns Repetition frequency kHz	IEC 61000-4-4	None	B	N/A

Notes

- The frequency range is scanned as specified. However, when specified in Annex A of EN55024: 1998 + A1: 2001 + A2: 2003, an additional comprehensive functional test shall be carried out at a limited number of frequencies. The selected frequencies for conducted test are 0.2, 1, 7.1, 13.56, 21, 27.12 and 40.68 MHz ($\pm 1\%$).
- Applicable only to ports which according to the manufacturer's specification may connect directly to outdoor cables.
- Test applied lines to earth (ground).
- Performance criterion details are documented in the "General Information regarding the Equipment Under Test (EUT)" section of this report.

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

Environmental Phenomenon	Test Specification	Units	Basic Standard	Remarks	Performance Criterion	Result (Pass/Fail)
Radio-frequency continuous conducted	0.15 – 80 3 80	MHz V (unmodulated, r.m.s.) % AM (1kHz)	IEC 61000-4-6	Note 1	A	Pass
Voltage dips	>95 0.5	% Reduction Period	IEC 61000-4-11	Note 2	B	Pass
	30 25	% Reduction Periods			C	Pass
Voltage interruptions	>95 250	% Reduction Periods	IEC 61000-4-11	Note 2	C	Pass
Surges	1.2/50 (8/20) 1 Line to Line 2 Line To Earth (Ground)	Tr/Th μ s kV (Peak) kV (Peak)	IEC 61000-4-5	Note 3	B	Pass
Fast transients	1.0 5/50 5	kV (Peak) Tr/Th ns Repetition frequency kHz	IEC 61000-4-4	None	B	Pass

Notes

- The frequency range is scanned as specified. However, when specified in Annex A of EN55024: 1998 + A1: 2001 + A2: 2003, an additional comprehensive functional test shall be carried out at a limited number of frequencies. The selected frequencies for conducted test are 0.2, 1, 7.1, 13.56, 21, 27.12 and 40.68MHz ($\pm 1\%$).
- Changes to occur at 0 degrees crossover point of the voltage waveform.
- When the manufacturer specifies protection measures and it is impractical to simulate these measures during the tests, then the applied test levels shall be reduced to 0.5kV and 1kV.
- Performance criterion details are documented in the "General Information regarding the Equipment Under Test (EUT)" section of this report.



Nemko Canada Inc., Ottawa, Ontario Canada

Reference Standard: EN 55024: 1998 + amendment A1: 2001 amendment A2: 2003
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Equipment (EUT): Spill Proof Cuts

Engineering Considerations

Product Modification	
To achieve compliance the following change(s) were made during compliance testing: None	
Justification	
None	
Deviations	
The following deviations from, additions to, or exclusions from the test specification have been made: At the request of the customer ESD testing was not performed on the EUT.	
Test Report Revision History	
Issue #	Details of changes made to test report
-	Original Report Issued
N/A	N/A




Nemko Canada Inc., Ottawa, Ontario Canada

Reference Standard:
EN 55024: 1998 + amendment A1: 2001 amendment A2: 2003
Test Report No: 4R33535
Equipment (EUT): Spill Proof Cuts

General Information Regarding the Equipment Under Test (EUT)

Date Received In Laboratory:	November 9, 2004
Nemko Identification Number:	Refer to Nemko Canada receiving report.
EUT Mains Input Voltage and Frequency	
Voltage: 100-240VAC Frequency: 50-60Hz	
Description & Theory of Operation	
The EUT is a thermal printer with cutter for point of sale applications.	
EUT Clock and Operational Frequencies	
0.052MHz, 0.1MHz, 6.25MHz, 12MHz, 48MHz, 96MHz, 192MHz	
Exercise/Monitoring method	
The EUT was tested while printing a ticket continuously every 3 seconds.	
Software Version	
Firmware version: 0.25B	

 Nemko Canada Inc., Ottawa, Ontario Canada	Reference Standard:
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General Information Regarding the Equipment Under Test (EUT), continued

EN 55024: 1998 + amendment A1: 2001 amendment A2: 2003 Performance Criterion	
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	<p>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.</p> <p>During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.</p> <p>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.</p>
Performance Criterion C	<p>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.</p> <p>Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p>



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Reference Standard:
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Equipment (EUT): Spill Proof Cuts

Equipment Configuration

Equipment Configuration List

Item	Description	Identification: (M/N #, S/N #, P/N #, Rev.)
(A)	Spill Proof Cuts	M/N #SPC, S/N #SPC000006

EUT Ports

Item	Description	Indoor/Outdoor	Type (See Legend)	Qty
i.	AC Mains	Indoor	1	1
ii.	USB	Indoor	4	1
iii.	Serial (DB25)	Indoor	4	1
iv.	Cash Drawer (RJ11)	Indoor	4	1

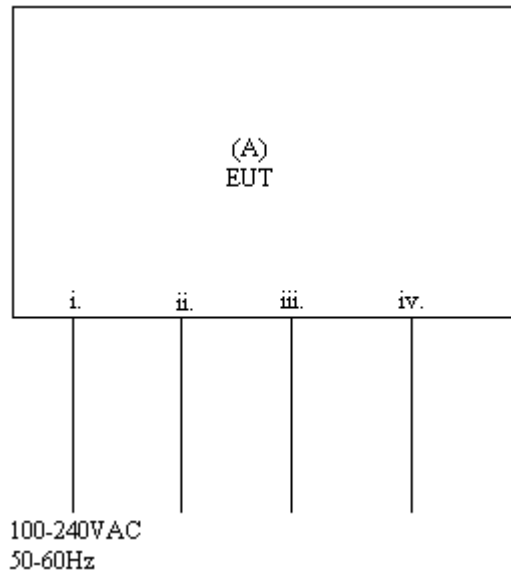
Inter-Connection Cables

Item	Description	Shielded	Ferrite	Length (m)
(1)	North American 3 Conductor Power Cable	No	No	2
(2)	Standard USB Cable	Yes	No	5
(3)	DB25 to DB9 Serial Cable (RS232)	Yes	No	3
(4)	4 Conductor RJ11 Cable	No	No	1

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



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Equipment (EUT): Spill Proof Cuts

Radio-Frequency Continuous Conducted

Test Date: November 22, 2004				
Engineer's Name: Phil Taffinder				
Tested as per: Table Top				
Mains Input Voltage: 230VAC			Mains Input Frequency: 50Hz	
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				
(MHz): All EUT clock frequencies within specified test band.			Dwell Time (s): 30	
Ports Investigated				
Test Port	Coupling Method	Result		
AC Mains	CDN	No Degradation		
RS232	Direct Injection	No Degradation		
Cash Drawer	CDN	No Degradation		
USB	Direct Injection	No Degradation		
Notes				
None				
Deviations				
Refer to Engineering Considerations.				
Test Result				
Final Test Result: Pass				



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Reference Standard:
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Test Report No: 4R33535

Equipment (EUT): Spill Proof Cuts

Radio-Frequency Continuous Conducted, continued

Radio-Frequency Continuous Conducted Test Equipment Used

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	Signal Generator	IFR	2024	FA001674	July 09/04	July 09/05
NCR	Amplifier	AR	150A220	FA001744	NCR	NCR
1 Year	CDN	FCC	FCC-801-M3-16	FA001776	Oct 15/04	Oct 15/05
1 Year	Signal line CDN	FCC	FCC-801-T2	FA001782	Oct 15/04	Oct 15/05
1 Year	Direct Injection 100 Ohm Resistor	Nemko	N/A	FA001751	Oct 15/04	Oct 15/05

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

Radio-Frequency Continuous Conducted Setup Photos





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Reference Standard:
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 Equipment (EUT): Spill Proof Cuts

Radio-Frequency Electromagnetic Field Amplitude Modulated

Test Date: June 27, 2005

Engineer's Name: Daniel Hynes

Tested as per: Table Top

Mains Input Voltage: 230VAC

Mains Input Frequency: 50Hz

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

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

Enclosure Investigated

Facility: Almonte Chamber

Result: No Degradation

Notes

None

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass



Nemko Canada Inc., Ottawa, Ontario Canada

Reference Standard:
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Test Report No: 4R33535
Equipment (EUT): Spill Proof Cuts

Radio-Frequency Electromagnetic Field Amplitude Modulated, continued

Radio-Frequency Electromagnetic Field Amplitude Modulated Test Equipment Used

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	Signal Generator	IFR	2024	FA001674	July 09/04	July 09/05
NCR	Amplifier	AR	150A220	FA001744	NCR	NCR
NCR	Amplifier	AR	30W1000B	FA001743	NCR	NCR
NCR	Biconilog	EMCO	3146	FA000815	NCR	NCR

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

Radio-Frequency Electromagnetic Field Amplitude Modulated Setup Photos





Nemko Canada Inc., Ottawa, Ontario Canada

Reference Standard:
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Test Report No: 4R33535
Equipment (EUT): Spill Proof Cuts

Surge

Test Date: November 19, 2004				
Engineer's Name: Phil Taffinder				
Mains Input Voltage: 230VAC			Mains Input Frequency: 50Hz	
Input AC Power Ports (Including Equipment Marketed With An AC/DC Power Converter)				
Waveshape (1,2/50 μ s – 8/20 μ s)			Phase (synchronized to the voltage 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
AC Mains	<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				



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Reference Standard:
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Equipment (EUT): Spill Proof Cuts

Surge, continued

Surge Test Equipment Used

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	Control Centre	KeyTek	ECAT™ E-Class Series 100	FA000739	Jan. 27/04	Jan. 27/05
1 Year	EFT/SURGE Coupler/Decoupler	KeyTek	E4551	FA000742	Jan. 27/04	Jan. 27/05
1 Year	Surge Network Module	KeyTek	E501	FA000741	Jan. 27/04	Jan. 27/05

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

Surge Setup Photos





Nemko Canada Inc., Ottawa, Ontario Canada

Reference Standard:
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Fast Transients

Test Date: November 22, 2004

Engineer's Name: Phil Taffinder

Tested as per: Table Top

Mains Input Voltage: 230VAC

Mains Input Frequency: 50Hz

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

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

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

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

Signal and Telecommunication Ports

Waveshape 5/50 Tr/Th ns	Freq. (Hz)	Burst Duration (ms)	Burst Period (ms)
Phase: Asynchronous	5000	15.0	300.0

Capacitive voltage clamp

Test Port	Test Voltage +/- (kV)	Result
RS232	0.5	No Degradation
USB	0.5	No Degradation
Drawer Cable	0.5	No Degradation

Notes

None

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass



Nemko Canada Inc., Ottawa, Ontario Canada

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Fast Transients, continued

Fast Transients Test Equipment Used

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	Control Centre	KeyTek	ECAT™ E-Class Series 100	FA000739	Jan. 27/04	Jan. 27/05
1 Year	EFT/Burst Module	KeyTek	E411	FA000740	Jan. 27/04	Jan. 27/05
NCR	Capacitive Clamp	KeyTek	CCL-4/S	FA000743	NCR	NCR
1 Year	EFT/SURGE Coupler/Decoupler	KeyTek	E4551	FA000742	Jan. 27/04	Jan. 27/05

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

Fast Transients Setup Photos





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Reference Standard:
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Test Report No: 4R33535

Equipment (EUT): Spill Proof Cuts

Voltage Dips and Voltage Interruptions

Test Date: November 23, 2004

Engineer's Name: Phil Taffinder

Tested as per: Table Top

Mains Input Voltage: 230VAC

Mains Input Frequency: 50Hz

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

The EUT reset and required user intervention.

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass



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Reference Standard:
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Equipment (EUT): Spill Proof Cuts

Voltage Dips and Voltage Interruptions, continued

Voltage Dips and Voltage Interruptions Test Equipment Used

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	Power Source	California Instruments	500lix	FA001770	Jul. 29/04	Jul. 29/05
1 Year	Electronic Output Switch	California Instruments	EOS-1	FA001771	Jul. 29/04	Jul. 29/05

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

Voltage Dips and Voltage Interruptions Setup Photos

