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EMC DIRECTIVE 89/336/EEC

# CE EVALUATION

# TEST REPORT

PER EN 61326-1

For The **SureTest Circuit Tracer System**

Model: **61-958 Series**

PREPARED FOR:

**Ideal Industries**
**9145 Balboa Avenue**
**San Diego, CA  92123**

PREPARED ON 12/06/05

REPORT NUMBER **2005 121056 CE**

PROJECT NUMBER:  **25-1056-IDE-R1**

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# DOCUMENT HISTORY

| REVISION | DATE | COMMENTS |
|---|---|---|
| - | **12/06/05** | Prepared By: **Rodel Resolme** |
| - | **12/06/05** | Initial Release: C.F. Fleury |

NOTE: Nemko USA, Inc. hereby makes the following statements so as to conform to the Subclause 5.10 Requirements of ISO/IEC 17025 "General Criteria For the Competence Of Testing and Calibration Laboratories":

- The unit described in this report was received at Nemko USA, Inc.'s facilities on **November 22, 2005** . Testing was performed on the unit described in this report on **November 22, 2005** to December 6, 2005 .
- The Test Results reported herein apply only to the Unit actually tested, and to substantially identical Units.
- This test report must not be used to claim product endorsement by any Government agency.

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# CERTIFICATION

The compatibility testing and this report have been prepared by Nemko USA, Inc., an independent electromagnetic compatibility consulting and test laboratory.

As specified by European Union harmonized document EN 61326, the testing and test methods were accomplished in accordance with European Norm's specifications for Electrical Equipment for Measurement, Control, and Laboratory Use.

I certify the data evaluation and equipment configuration herein to be a true and accurate representation of the sample's immunity and emission characteristics, as of the test date(s), and for the design of the test sample utilized to compile this report.

*JR Fleury*
Chip Fleury
Senior EMC Engineer

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# 1. ADMINISTRATIVE DATA AND TEST SUMMARY

## 1.1. Administrative Data

CLIENT: **Ideal Industries**
**9145 Balboa Avenue**
**San Diego, CA 92123**
**858 715-7081**
**858 715-7005**-FAX

CONTACT: **Jarek Kanikula**

DATE (S) OF TEST: **November 22, 2005** to December 6, 2005

EQUIPMENT UNDER TEST (EUT): **SureTest Circuit Tracer System**

Model **61-958 Series**

Condition Upon Receipt Suitable for Test

TEST SPECIFICATION:

Radio Frequency Emissions and Electromagnetic Immunity tests in accordance with requirements of EN 61326 (1997), A1(1998), A2(2001), A3(2003)

as follows:

| ***Test Type*** | ***In Accordance with Document*** | ***Document Title*** |
|---|---|---|
| Conducted and Radiated Emissions | EN 61326 (1997), A1(1998), A2(2001), A3(2003) Class "**A**" | Electrical equipment for measurement, control and laboratory use - EMC requirements |
| Power Line Harmonics | EN 61000-3-2 (2000), A1(2001), A2(2005) | Electromagnetic Compatibility, Limits for Harmonic Current Emissions, Equipment Input Current $\leq$ 16A |
| Power Line Flicker | EN 61000-3-3 (1995), A1(2001) | Electromagnetic Compatibility, Limitation of Voltage Fluctuations and Flicker In Low-Voltage Supply Systems for Equipment with Rated Current $\leq$ 16A |
| Electrostatic Discharge Immunity | IEC 61000-4-2 (2001) | Electromagnetic Compatibility for Industrial Process Measurement and Control Equipment Electrostatic Discharge Requirements |

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| | | |
|---|---|---|
| Radio Frequency Immunity | IEC 61000-4-3 (2002) | Electromagnetic Compatibility, Basic Immunity Standard, Radiated Radio Frequency Electromagnetic Field, Immunity Test |
| Electrical Fast Transient Burst Immunity | IEC 61000-4-4 (2004) | Electromagnetic Compatibility for Industrial Process Measurement and Control Equipment Electrical Fast Transient / Burst Requirements |

Test Specifications Continued:

| | | |
|---|---|---|
| Power Line Surge Immunity | IEC 61000-4-5 (2001) | Electromagnetic Compatibility, Power Line Surge Immunity |
| RF Common Mode Immunity | IEC 61000-4-6 (2004) | Electromagnetic Compatibility - Basic Immunity Standard - Conducted Disturbances Induced By Radio-Frequency Fields - Immunity Test |
| Voltage Dips and Short Interruptions Immunity | IEC 61000-4-11(2004) | Electromagnetic Compatibility - Testing and Measurement Techniques - Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests |

## 1.2. Test Summary

### 1.2.1. Emissions Test Summary

| ***Specification*** | ***Frequency Range*** | ***Compliance Status*** |
|---|---|---|
| EN 61326 (1997), A1(1998), A2(2001), A3(2003)<br>, Class "**A**"<br>Conducted Emissions | 0.15 MHz – 30 MHz | **N/A** |
| EN 61326 (1997), A1(1998), A2(2001), A3(2003)<br>, Class "**A**"<br>Radiated Emissions | 30 MHz – 1000 MHz | **PASS** |
| EN 61000-3-2 (2000), A1(2001), A2(2005)<br><br>Power Line Harmonics | up to the 40$^{th}$ Harmonic | **N/A** |
| EN 61000-3-3 (1995), A1(2001)<br>Power Line Flicker | $\leq$ 4% Maximum Relative Voltage Change; Value of D(T) $\leq$ 3% for more than 200 Ms | **N/A** |

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### 1.2.2. Immunity Test Summary

| *Specification* | *Minimum Criterion Level Required as per EN 61326* | *Criterion Level Tested* | *Compliance Status* |
|---|---|---|---|
| IEC 61000-4-2 (2001) - ESD Immunity | **Criterion B** ±8 kV air discharge, ±4 kV contact discharge | **Criterion B** ±8 kV air discharge, ±4 kV contact discharge | **PASS** |
| IEC 61000-4-3 (2002) Radio Frequency Immunity | **Criterion A** 3 V/m from 80-1000 MHz (80% AM at 1kHz) | **Criterion B** 3 V/m from 80-1000 MHz (80% AM at 1kHz) | **PASS** |
| IEC 61000-4-4 (2004) -Electrical Fast Transient Immunity | **Criterion B** power line pulses of ± 1 kV; I/O line pulses of ± 0.5 kV | **Criterion B** power line pulses of ± 1 kV I/O line pulses of ± 0.5 kV | **N/A** |
| IEC 61000-4-5 (2001) -Surge Immunity | **Criterion B** ±1kV common mode surges, ±0.5kV differential mode surges | **Criterion B** ±1kV common mode surges, ±0.5kV differential mode surges | **N/A** |
| IEC 61000-4-6 (2004) -RF Common Mode Immunity | **Criterion A** 150 kHz - 80 MHz at 3 Vrms 1 kHz 80% amplitude modulated | **Criterion A** 150 kHz - 80 MHz at 3 Vrms 1 kHz 80% amplitude modulated | **N/A** |
| IEC 61000-4-11(2004) - Voltage Dips and Short Interruptions | **Criterion B and C** Voltage Reductions of 100% for 1 cycle. | **Criterion B and C** Voltage Reductions of 100% for 1 cycle. | **N/A** |

**Test Supervisor**: *FR Fleury*
F.R. Fleury, Nemko USA, Inc.

*Refer to the test results section for further details.*

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# 2. SYSTEM CONFIGURATION

## 2.1. Description and Method of Exercising the EUT

**The 61-958 Series** is a **SureTest Circuit Tracer System**. The SureTest Circuit Tracers are powerful, versatile, easy-to-use troubleshooting test tools for finding breakers and hidden wire problems in residential/commercial/industrial environments.. The EUT was exercised by having the transmitter on and the receiver on and watching the measured receiving level on the receiver. It fails if the receiver measured level drops and does not recover.

## 2.2. System Components and Power Cables

| DEVICE | MANUFACTURER<br>MODEL #<br>SERIAL # | POWER CABLE |
|---|---|---|
| EUT - **SureTest Circuit Tracer System** | **Ideal Industries**<br>**61-958 Series**<br>Serial #: | N/A |
| EUT -Transmitter | **Ideal Industries**<br>Model #Tr-958<br>Serial # N/A | N/A |
| EUT-Receiver | Ideal Industries<br>Model #RC-958<br>Serial # N/A | N/A |
| EUT-Test Lead Kit | Ideal Industries<br>Model #TL-958<br>Serial # N/A | N/A |
| EUT-Inductive Clamp | Ideal Industries<br>Model #IC-958<br>Serial # N/A | N/A |
| EUT-Battery Pack | Ideal Industries<br>Model #BP-958<br>Serial # N/A | N/A |

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## 2.3. Device Interconnection and I/O Cables

| CONNECTION | I/O CABLE |
|---|---|
| No connections | |

## 2.4. Design Modifications for Compliance

***Device:*** **SureTest Circuit Tracer System**

***Model:*** **61-958 Series**

**No design modifications** were made to the EUT during testing.

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# 3. DESCRIPTION OF TESTING METHODS

## 3.1. Introduction

Under the EMC Directive 89/336/EEC (as amended by 92/31/EEC) of the European Union (EU), a device is required to be constructed so that "the electromagnetic disturbance it generates does not exceed a level allowing radio and telecommunications equipment and other apparatus to operated as intended" and that the device "has an adequate level of intrinsic immunity of electromagnetic disturbance to enable it to operate as intended." The Directive requires that all products brought into service within the EU comply with all applicable EMC requirements published as harmonized documents known as European Norms (EN).

The methods employed to test the emissions and immunity characteristics of the Equipment Under Test are those mandated by the European Standard EN 61326 (1997), A1(1998), A2(2001), A3(2003) , Which is the harmonized document published for Measurement, Control and Laboratory use equipment. The applicable tests are listed in the administrative section of this report.

For General Test Configuration please refer to the following page.

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# Photograph 1.  General EUT Test Configuration

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## 3.2. Configuration and Methods of Measurements for Frequency Identification

When performing all testing of equipment, the actual emissions of the EUT are segregated from ambient signals present within the laboratory or the open-field test range. Preliminary testing is performed to ensure that ambient signals are sufficiently low to allow for proper observation of the emissions from the EUT. Ambient signals within the laboratory are compared to those noted at the nearby open-field site to discriminate between signals produced from the EUT and ambient signals. In the event that a significant emission is produced by the EUT at a frequency that is also demonstrating significant ambient signals, the spectrum analyzer is placed in the peak mode, the bandwidth is narrowed and the EUT's signal is centered on the analyzer. The scan width is expanded to 50 kHz while monitoring the audio to ensure that only the EUT signal is present, the analyzer is switched to quasi-peak mode, and the level of the EUT signal is recorded.

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## 3.3. Configuration and Methods of Measurements for Radiated Emissions

EN 61326 also specifies limits and methodology for radiated emissions testing. Initially, the primary emission frequencies are identified inside a shielded chamber by positioning a broadband receive antenna one meter from the EUT. Next, the EUT and associated system are placed on a turntable on a ten-meter open area test site (OATS) with known attenuation characteristics and all significant radiated emissions are recorded. To ensure that the maximum emission at each discrete frequency of interest is observed, the receive antenna is varied in height from one to four meters and rotated to produce horizontal and vertical polarities, and the turntable is also rotated to determine the worst emitting configuration. The numerical results of the test are included herein to demonstrate compliance. The numerical results of the test are included herein to demonstrate compliance.

The numerical results that are applied to the emissions limits are arrived at by the following method:
Example: A=RR+CL+AF
A = Amplitude dBuV/M
RR = Receiver Reading dBuV
CL = cable loss dB
AF = antenna factor dBm-1

Example Frequency = 110MHz
18.5 dBuV (spectrum analyzer reading)
+3.0 dB (cable loss @ frequency)
21.5 dBuV
+15.4 dBm-1 (antenna factor @ frequency)
36.9 dBuV/M Final adjusted value

The final adjusted value is then compared to the appropriate emission limit to determine compliance.

## 3.4. Statistical Sampling Required for Continued Compliance

For quality assurance of ongoing productions to comply with RFI interference limits, CISPR 22 Clause 7 stipulates a statistical sampling procedure. In summary, this rule states that the manufacturer should ensure 80% of the units must be in compliance with an 80% confidence level. Refer to CISPR Publication 22,, Clause 7 for a detailed description of the sampling procedure.

## 3.5. Device Performance Criteria for Immunity Tests

Three criteria of acceptable performance are defined by EN 61326. These are as follows

- **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.

- **Criterion B** - During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. After the test, the equipment shall continue to operate as intended without operator intervention. The performance level may be replaced by a permissible loss of performance. If the manufacturer does not specify the minimal performance level (or the permissible performance loss), then either of these may be derived from the product description and documentation, or by what the user may reasonably expect from the equipment if used as intended.

- **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.

For each test method, EN 61326 specifies the appropriate criterion to be met.

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## 3.6. Electrostatic Discharge Immunity: IEC 61000-4-2 (2001)

EN 61326 specifies the IEC 61000-4-2 Standard as the basic procedure for ESD testing. The standard configuration as outlined in IEC 61000-4-2 (2001) is used. Tabletop devices are placed on an insulated mat on a horizontal coupling plane. Air discharges and contact charges are made to the EUT on connectors and conducting surfaces (as illustrated in the Test Results section of this Test Report). The discharges shall be applied in two ways:

a) Contact Discharges to the conductive surfaces and to coupling planes:

The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test pints (a minimum of 50 discharges at each point). One of the test points shall be subjected to at least 50 indirect discharges (contact) to the center of the front edge of the horizontal-coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode.

b) Air Discharge at slots and apertures, and insulating surfaces:

On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. This investigation should be restricted to those areas normally handled by the user. A minimum of 10 single air discharges of each polarity and test level shall be applied to the selected test point for each area.

For further information, please refer to the technical sections in the IEC 61000-4-2 (2001) publication in addition to the test results section and photographs of the test set-up provided in this report.

For ESD tests, EN 61326 requires that the EUT meet at least performance Criterion B for discharges of up to ±8 kV air discharge and ±4 kV contact discharge.

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## 3.7. Radio Frequency Immunity: IEC 61000-4-3 (2002)

EN 61326 specifies the IEC 61000-4-3 Standard for radio frequency (RF) immunity requirements and test methods for equipment that is required to withstand electromagnetic (EM) fields. The RF immunity test entails subjecting the equipment under test to a uniform field of radiated electromagnetic energy of a specified field strength and frequency, and monitoring the functionality of the device as the frequency is swept over a specified frequency range.

The specification limits and technical parameters for testing are outlined in the IEC 61000-4-3 (2002) Standard. This edition of the publication specifies a transmit antenna to EUT distance of 3m and a frequency range of 80 MHz to 1000 MHz (80% amplitude modulated at a 1 kHz rate). The standard configuration as outlined in IEC 61000-4-3 (2002) is used. The EUT is set up inside a shielded, semi-anechoic chamber with a radiating antenna at a distance of 3 meters from the EUT. For further information, please refer to the technical sections in the IEC 61000-4-3 (2002) publication in addition to the test results section and photographs of the test set-up provided in this report.

For radio frequency immunity tests, EN 61326 specifies that the EUT meet performance Criterion A for a minimum field strength of 3 V/m.

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Test Results

### 3.8. Radiated Emissions Test Data

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## Radiated Emissions Data

| | | | | | |
|---|---|---|---|---|---|
| Complete | X | | | Job # : | 25-1056-IDE-R1 |
| Preliminary | | | | Page | 1 |
| Client Name : | Ideal Industries | | | Test # : | |
| EUT Name : | Sure Test Circuit Tracer System | | | of | 1 |
| EUT Model # : | 61-958 Series | | | | |
| EUT Part # : | | | | | |
| EUT Serial # : | | | | | |
| EUT Config. : | | | | | |
| Specification : | EN61326: 1998, Class A | | | Reference : | |
| Rod. Ant. #: | NA | Temp. (deg. C) : | | Date : | 11/22/2005 |
| Bicon Ant.#: | 115 | Humidity (%) : | | Time : | |
| Log Ant.#: | 111 | EUT Voltage : | VDC | Staff : | RR |
| DRG Ant. # | NA | EUT Frequency : | | Photo ID: | |
| Dipole Ant.#: | NA | Phase: | | Peak Bandwidth: | 100 kHz |
| Cable#: | Soats2 | Location: | Soats | Video Bandwidth | 100 kHz |
| Preamp#: | 827 | Distance: | 10m | | |
| Spec An.#: | 107 | | | | |
| QP #: | 538 | | | | |
| PreSelect#: | NA | | | | |

| 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. | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 118.65 | H | 0 | 43 | 15 | 1.8 | 32.6 | 27.2 | 40.0 | -12.8 | Pass | |
| 135.85 | H | 0 | 50.58 | 11.8 | 1.8 | 32.6 | 31.6 | 40.0 | -8.4 | Pass | |
| 143.68 | H | 0 | 50.23 | 12.1 | 1.8 | 32.6 | 31.5 | 40.0 | -8.5 | Pass | |
| 206.45 | V | 0 | 45.6 | 11.2 | 1.8 | 32.7 | 25.9 | 40.0 | -14.1 | Pass | |
| 209.45 | H | 0 | 56.46 | 11.2 | 1.8 | 32.7 | 36.8 | 40.0 | -3.2 | Pass | |
| 220.48 | H | 0 | 53.8 | 10.8 | 1.8 | 32.7 | 33.7 | 40.0 | -6.3 | Pass | |
| 234.45 | H | 0 | 51.47 | 10.8 | 1.8 | 32.7 | 31.4 | 47.0 | -15.6 | Pass | |
| 274.77 | H | 0 | 42.8 | 12.8 | 1.8 | 32.8 | 24.6 | 47.0 | -22.4 | Pass | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
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| | | | | | | | | | | | |

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# Radiated Emissions Test Equipment

| Client | **Ideal Industries** | EUT Name | **SureTest Circuit Tracer System** |
|---|---|---|---|
| PAN # | **25-1056-IDE-R1** | EUT Model | **61-958 Series** |

| *Device Type* | *Model #* | *Asset #* | *Used* | *Cal Done* | *Cal Due* |
|---|---|---|---|---|---|
| **Pre-Amplifier** | | | | | |
| Amplifier, HP | 8447A | 342 | | | |
| Amplifier, HP | 8447A | 166 | | | |
| Amplifier, HP | 8447A | 603 | | | |
| Amplifier, HP | 8449A | 317 | | | |
| Amplifier, Mini-Circuits | ZHL-1042J | 630 | | | |
| Amplifier, Mini-Circuits | ZHL-2 | 635 | | | |
| Amplifier, Com Power | PA-103 | 827 | X | 12/22/04 | 12/22/05 |
| **Antenna OATS #1 (North)** | | | | | |
| Antenna, Biconical | | | | | |
| Antenna, Log Periodic | | | | | |
| Antenna, Ridged Guide | 3115 | | | | |
| Antenna, Loop | ALR-25M | | | | |
| Antenna, Rod | RVR-25M | | | | |
| **Antenna OATS #1 (South)** | | | | | |
| Antenna, Biconical | | 115 | X | 02/03/05 | 02/03/06 |
| Antenna, Log Periodic | | 111 | X | 02/03/05 | 02/03/06 |
| Antenna, Ridged Guide | 3115 | | | | |
| Antenna, Loop | ALR-25M | | | | |
| Antenna, Rod | RVR-25M | | | | |
| **Spectrum Analyzer / Receiver** | | | | | |
| Quasi-Peak Adapter, HP<br>Spectrum Analyzer Display, HP<br>Spectrum Analyzer, HP | 85650A<br>85662A<br>8566B | 533<br>404<br>104 | | | |
| RF Preselector, HP | 85650A | 673 | | | |
| Quasi-Peak Adapter, HP<br>Spectrum Analyzer Display, HP<br>Spectrum Analyzer, HP | 85650A<br>85662A<br>8568B | 438<br>534<br>107 | X | 08/11/05 | 02/11/06 |
| Quasi-Peak Adapter, HP<br>Spectrum Analyzer Display, HP<br>Spectrum Analyzer, HP | 85650A<br>85662A<br>8568B | 676<br>675<br>674 | | | |
| Quasi-Peak Adapter, HP<br>Spectrum Analyzer Display, HP<br>Spectrum Analyzer, HP | 85650A<br>85662A<br>8568B | 421<br>422<br>535 | | | |
| Quasi-Peak Adapter, HP<br>Spectrum Analyzer Display, HP<br>Spectrum Analyzer, HP | 85650A<br>85662A<br>8566B | 538<br>537<br>711 | | | |
| RF Preselector, HP | 85685A | 403 | | | |
| Spectrum Analyzer, Advantest | R3261 | 523 | | | |

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## 3.9. Electrostatic Discharge Immunity Test Results & Test Points

| | | | | |
|---|---|---|---|---|
| Client: | **Ideal Industries** | Temperature: | 70 | degF |
| PAN #: | **25-1056-IDE-R1** | Relative Humidity: | 38 | % |
| EUT Name: | **SureTest Circuit Tracer System** | Barometric Pressure: | 30.4 | Hg |
| EUT Model: | **61-958 Series** | Test Location | West Ground Plane | |
| Governing Doc: | EN 61326 | Test Engineer | Rodel Resolme | |
| Basic Standard: | IEC 61000-4-2 | Date: | 12/07/05 | |
| Voltage: | 230VAC/ 50Hz | | | |
| Discharge Rep. Rate | X | ≥ 1 per second | | |
| Number of Discharges | X | ≥ 10 per location | | |

### *Equipment Used*

| *Device Type* | *Model #* | *Asset #* | *Used* | *Cal Done* | *Cal Due* |
|---|---|---|---|---|---|
| ESD Gun, Haefely | PSD-25B | 639 | | | |
| ESD Gun, Keytek | PSC | 377 | | | |
| EMC Partner, | TRA2000 | 845 | X | 08/30/05 | 02/28/05 |
| | | | | | |

### *Location of Discharge*

### *Contact Discharge*

| Voltage (kV) | Polarity | | Numbers | HCP | VCP |
|---|---|---|---|---|---|
| | Pos | Neg | | | |
| 2 | X | X | 1-4 | X | X |
| 4 | X | X | 1-4 | X | X |
| 8 | | | | | |
| | | | | | |

Comments:

### *Air Discharge*

| Voltage (kV) | Polarity | | Numbers |
|---|---|---|---|
| | Pos | Neg | |
| 2 | X | X | 1-4 |
| 4 | X | X | 1-4 |
| 8 | X | X | 1-4 |
| | | | |

Comments:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Compliant | X | | Non-Compliant | | | Photo | X |

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## Figure 1. ESD Test Points

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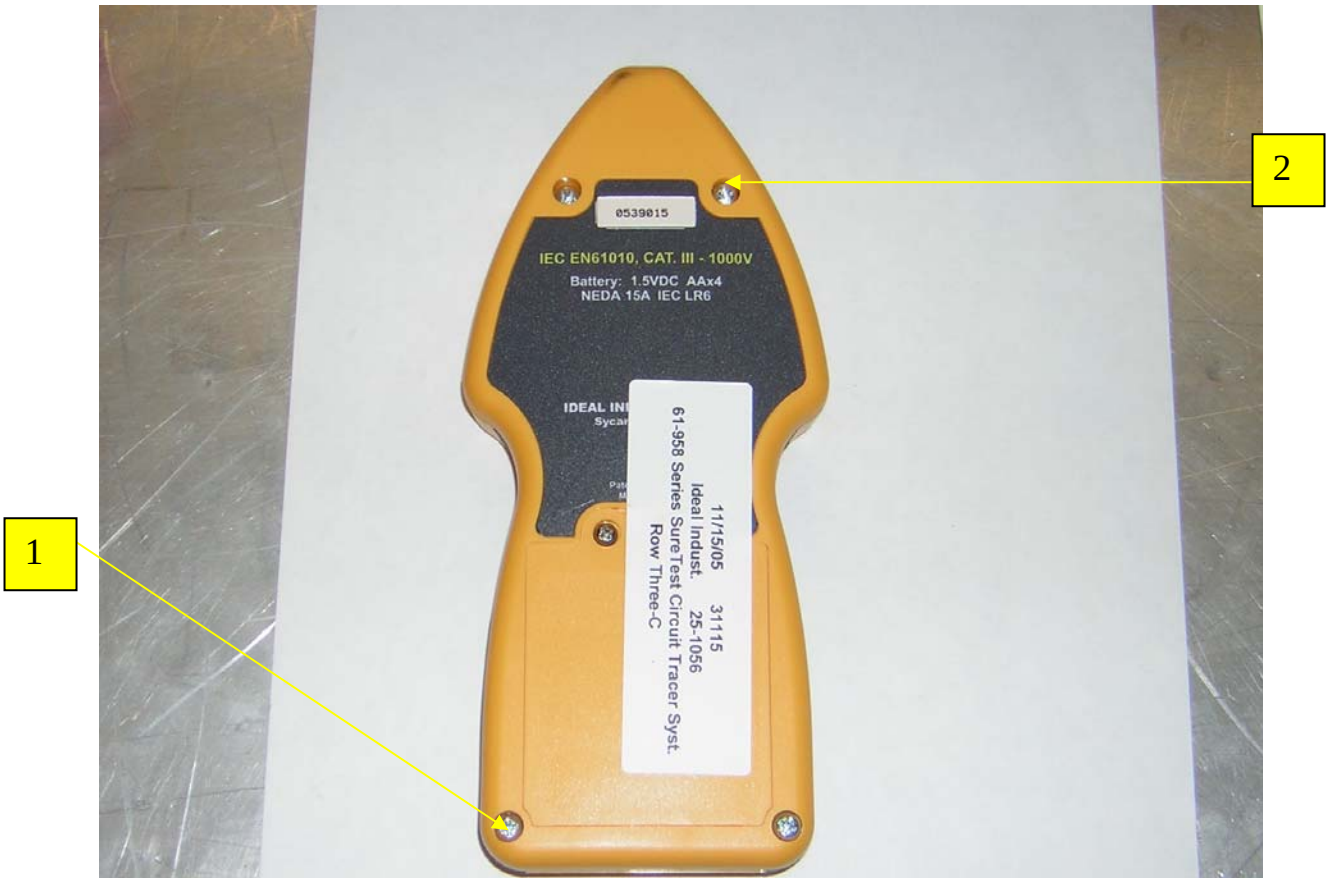

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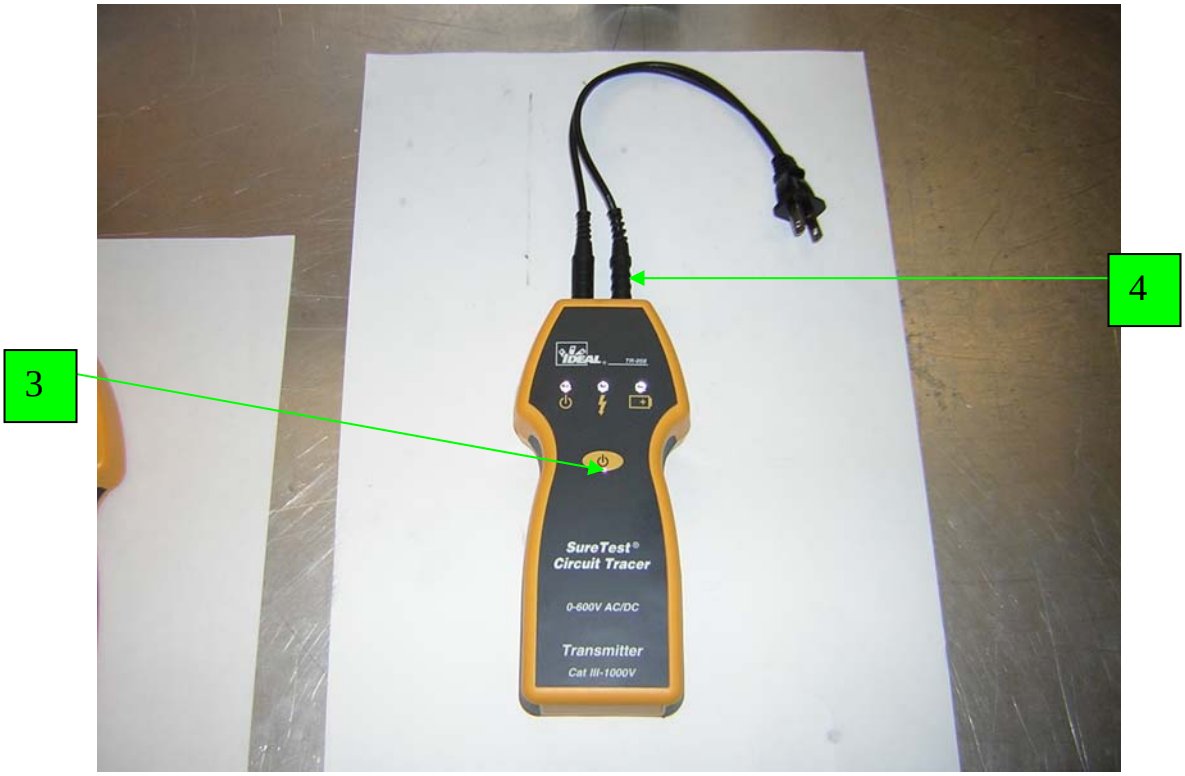

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## 3.10.Radio Frequency Immunity Test Results

| | | | | | |
|---|---|---|---|---|---|
| Client: | **Ideal Industries** | Temperature: | 70 | degF | |
| PAN #: | **25-1056-IDE-R1** | Relative Humidity: | 35 | % | |
| EUT Name: | **SureTest Circuit Tracer System** | Barometric Pressure: | 30.4 | Hg | |
| EUT Model: | **61-958 Series** | Test Location | Anachoic Chamber | | |
| Governing Doc: | EN 61326 | Test Engineer | Rodel Resolme | | |
| Basic Standard: | IEC 61000-4-3 | Date: | 12/06/05 | | |
| Voltage: | 230VAC/ 50Hz | | | | |

**Threat Levels**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Frequency (MHz):** | | 27-500 | X | 80-1000 | | 26-1000 | | |
| **Test Level:** | | 1V/m | X | 3V/m | | 10V/m | | 200V/m |
| **Modulation:** | | None (CW) | X | 80% AM, 1kHz | | 50% PM, 200Hz | | |
| **Frequency Step:** | X | 1% | | 3% | | | | |
| **Dwell Time:** | | 1 sec | X | 3 sec | | 10 sec | | |
| **Criteria:** | X | A | | B | | C | | |

| Frequency (MHz) | Antenna Polarization | | Compliant | | Orientation F: Front R: Rear SL: Side, Left SR: Side, Right | Comments |
|---|---|---|---|---|---|---|
| | **H** | **V** | **Y** | **N** | | |
| **80-200** | | X | X | | Front | |
| **80-200** | X | | X | | Front | Affected* |
| **80-200** | X | | X | | Back | Affected* |
| **80-200** | | X | X | | Back | Affected* |
| **200-1000** | | X | X | | Back | Affected* |
| **200-1000** | X | | X | | Back | Affected* |
| **200-1000** | X | | X | | Front | |
| **200-1000** | | X | X | | Front | |
| | | | | | | |
| | | | | | | Display reading fluctuating from 99 to 57 during test but EUT recovers. * |
| | | | | | | |
| | | | | | | |
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| | | | | | | |

Compliant | X | Criteria B Not Compliant | | | Photo | X |

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# Radio Frequency Immunity Test Equipment

| Client | **Ideal Industries** | EUT Name | **SureTest Circuit Tracer System** |
|---|---|---|---|
| PAN # | **25-1056-IDE-R1** | EUT Model | **61-958 Series** |

| *Device Type* | *Model #* | *Asset #* | *Used* | *Cal Done* | *Cal Due* |
|---|---|---|---|---|---|
| **Signal Generator** | | | | | |
| HP | 8642B | 751 | | | |
| HP | 8648B | 746 | | | |
| Gigatronics | 1018 | 440 | | | |
| Fluke | 6060B | 212 | X | 06/24/05 | 12/24/05 |
| | | | | | |
| **Power Meter** | | | | | |
| Boonton | 4230 | 718 | | | |
| | | | | | |
| **Field Sensors** | | | | | |
| AR | FP4000 | 730 | | | |
| AR | FP4080 | 733 | | | |
| | | | | | |
| **Amplifier / Directional Couplers** | | | | | |
| AR | 2500L: | 739 | | NCR | NCR |
| AR | DC2035 | 727 | | NCR | NCR |
| AR | 500W1000M5 | 740 | X | NCR | NCR |
| AR | DC618D | 747 | | NCR | NCR |
| AR | 200T1G3M3 | 743 | | NCR | NCR |
| AR | DC714D | 724 | | NCR | NCR |
| AR | 200T2G8M4 | 744 | | NCR | NCR |
| AR | DC7280 | 726 | | NCR | NCR |
| AR | 200T8G18M3 | 745 | | NCR | NCR |
| AR | DC7450 | 723 | | NCR | NCR |
| **Antennas** | | | | | |
| IFI | EFG-38 | 748 | | NCR | NCR |
| Bicon | 3109 | EA 2466 | X | NCR | NCR |
| Electro-Metrics | RGA-25 | 372 | | NCR | NCR |
| Electro-Metrics | RGA-30 | 350 | X | NCR | NCR |
| EMCO | 3115 | 723 | | NCR | NCR |
| AR | AT4002A | 728 | | NCR | NCR |
| | | | | | |

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# Photograph 2.  Radiated Emissions Test Configuration

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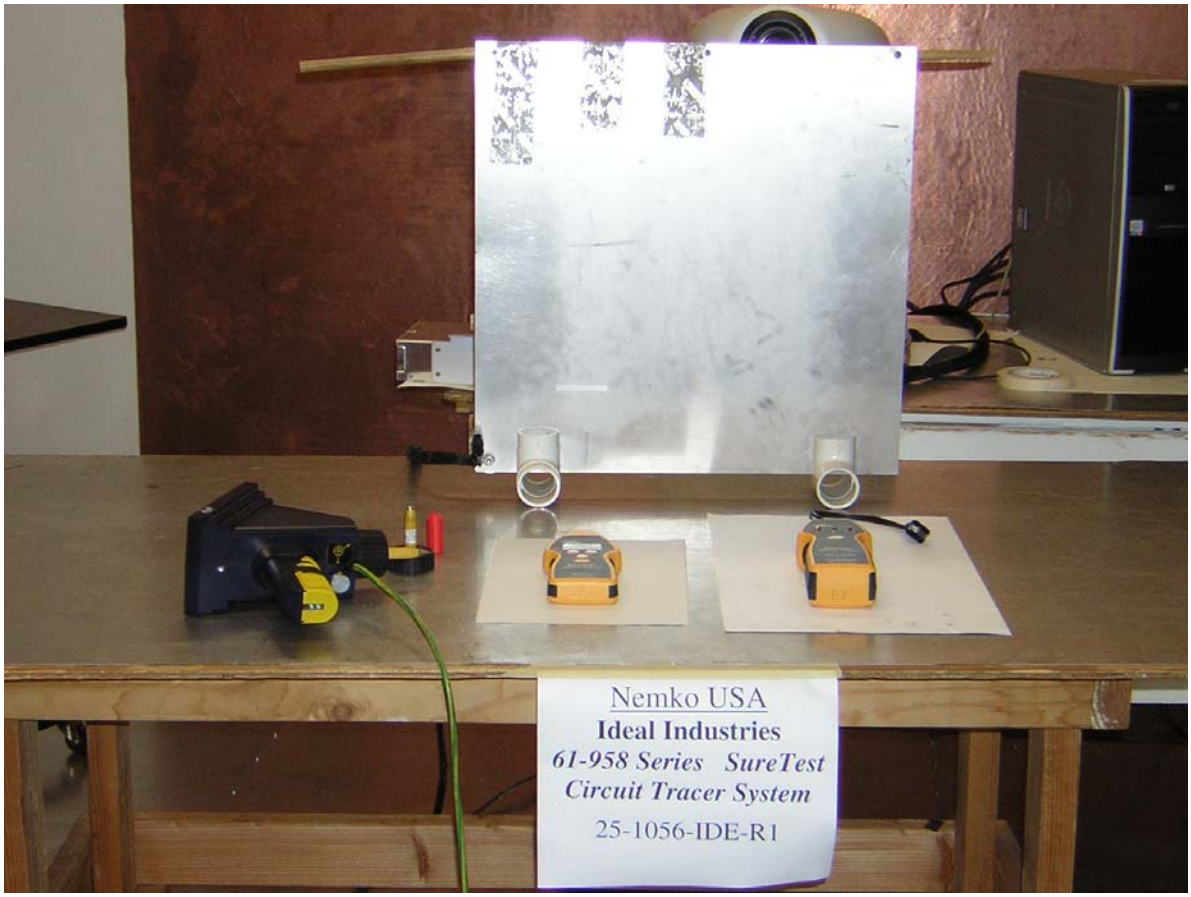
# Photograph 3.  ESD Test Configuration



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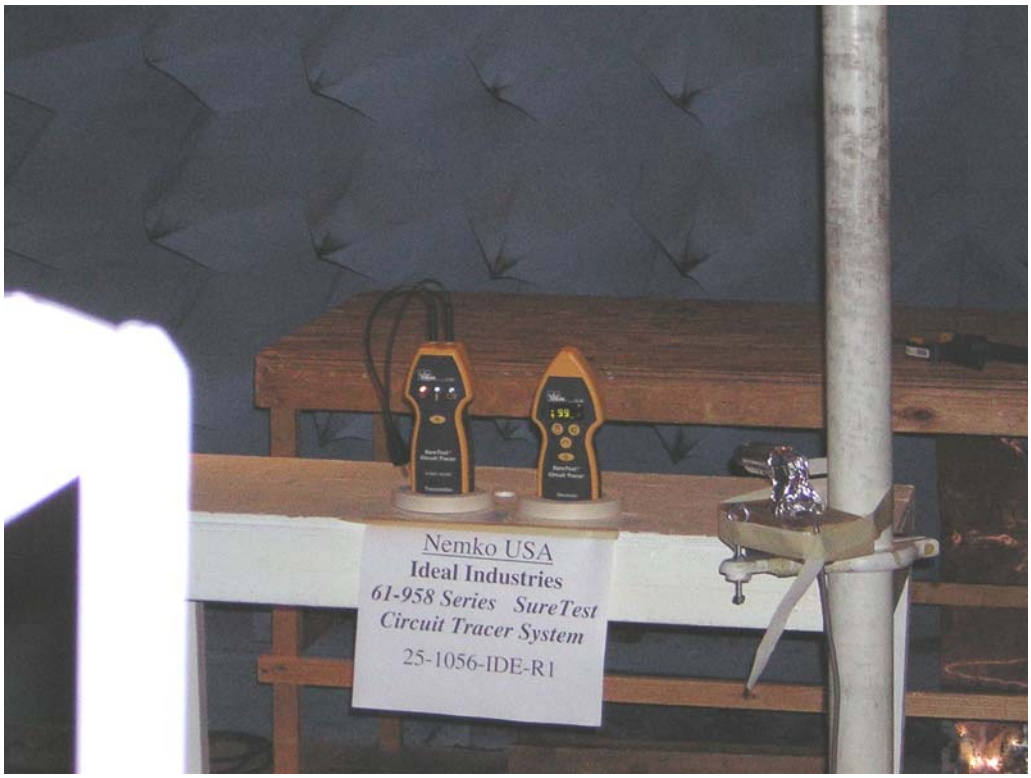
# Photograph 4.  Radio Frequency Immunity Test Configuration



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# APPENDIX A
# A. Conducted & Radiated Emissions Measurement Uncertainties

## 1. Introduction

ISO Standard 17025 and ANSI/NCSL Z540-1 (1994) require that all measurements contained in a test report be "traceable". "Traceability" is defined in the *International Vocabulary of Basic and General Terms in Metrology* (ISO: 1993) as: "the property of the result of a measurement... whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons, *all having stated uncertainties*".

The purposes of this Appendix are to "state the *Measurement Uncertainties*" of the conducted emissions and radiated emissions measurements contained in Section 5 of this Test Report, and to provide a practical explanation of the meaning of these measurement uncertainties.

## 2. Statement of the Worst-Case Measurement Uncertainties for the Conducted and Radiated Emissions Measurements Contained in This Test Report

**Table 1: Worst-Case Expanded Uncertainty "U" of Measurement for a k=2 Coverage Factor**

| **Conducted Emissions Measurement Detection Systems** | **Applicable Frequency Range** | **"U" for a k=2 Coverage Factor** |
|---|---|---|
| HP8568B Spectrum Analyzer with QPA and HP8447F Preamplifier | 150 kHz - 30 MHz | +/- 3.0 dB |
| HP8566B Spectrum Analyzer with QPA and Preselector | 9 kHz - 30 MHz | +/- 2.9 dB |
| | | |
| **Radiated Emissions Measurement Detection Systems** | **Applicable Frequency Range** | **"U" for a k=2 Coverage Factor** |
| HP8568B Spectrum Analyzer with QPA & HP8447F Preamplifier | 30 MHz - 200 MHz | +4.0 dB, -4.1 dB |
| HP8568B Spectrum Analyzer with QPA & HP8447F Preamplifier | 200 MHz-1000 MHz | +/- 3.5 dB |
| HP8566B Spectrum Analyzer with QPA & Preselector | 30 MHz - 200 MHz | +3.9 dB, -4.0 dB |
| HP8566B Spectrum Analyzer with QPA & Preselector | 200 MHz-1000 MHz | +/- 3.4 dB |
| HP8566B Spectrum Analyzer with QPA & HP 8449A Preamplifier | 1 GHz - 18 GHz | +2.5 dB, -2.6 dB |
| HP8566B Spectrum Analyzer with QPA & HP8449A Preamplifier | 18 GHz - 40 GHz | +/- 3.4 dB |

NOTES:
1. Applies to 3 and 10 meter measurement distances
2. Applies to all valid combinations of Transducers (i.e. LISNs, Line Voltage Probes, and Antennas, as appropriate)
3. Excludes the Repeatability of the EUT

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## 3. Practical Explanation of the Meaning of the Conducted and Radiated Emissions Measurement Uncertainties

In general, a "Statement of Measurement Uncertainty" means that with a certain (specified) confidence level, the "true" value of a measurand will be between a (stated) upper bound and a (stated) lower bound.

In the specific case of EMC Measurements in this test report, the measurement uncertainties of the conducted emissions measurements and the radiated emissions measurements have been calculated in accordance with the method detailed in the following documents:

- *ISO Guide to the Expression of Uncertainty in Measurement* (ISO, 1993)
- NIS 81:1994, *The Treatment of Uncertainty in EMC Measurements* (NAMAS, 1994)
- NIST Technical Note 1297(1994), *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results* (NIST, 1994)

The calculation method used in these documents requires that the stated uncertainty of the measurements be expressed as *an "expanded uncertainty", U, with a k=2 coverage factor*. The practical interpretation of this method of expressing measurement uncertainty is shown in the following example:

EXAMPLE:

Assume that at 39.51 MHz, the (measured) radiated emissions level was equal to +26.5 dBuV/m, and that the +/- 2 standard deviations (i.e. 95% confidence level) measurement uncertainty was +/- 3.4 dB.

In the example above, the phrase "k = 2 Coverage Factor" simply means that the measurement uncertainty is stated to cover +/-2 standard deviations (i.e. a 95% confidence interval) about the measurand. The measurand is the radiated emissions measurement of +26.5 dBuV/m at 39.51 MHz, and the 95% bounds for the uncertainty are –3.4 dB to + 3.4 dB. One can thus be 95% confident that the "true" value of the radiated emissions measurement is between +23.1 dBuV/m and +29.5 dBuV/m. *In effect, this means that in the above example there is only a 2.5% chance that the "true" radiated emissions value exceeds +29.5 dBuV/m.*

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# APPENDIX B
# B. Nemko USA, Inc.'s Test Equipment & Facilities Calibration Program

Nemko USA, Inc. operates a comprehensive Periodic Calibration Program in order to ensure the validity of all test data. Nemko USA's Periodic Calibration Program is fully compliant to the requirements of NVLAP Policy Guide PG-1-1988, ANSI/NCSL Z540-1 (1994), ISO 10012-1 (1993-05-01), ISO Standard 17025, ISO-9000 and EN 45001. Nemko USA, Inc.'s calibrations program therefore meets or exceed the US national commercial and military requirements [N.B. ANSI/NCSL Z540-1 (1994) replaces MIL-STD-45662A].

Specifically, all of Nemko USA's *primary reference standard devices* (e.g. vector voltmeters, multimeters, attenuators and terminations, RF power meters and their detector heads, oscilloscope mainframes and plug-ins, spectrum analyzers, RF preselectors, quasi-peak adapters, interference analyzers, impulse generators, signal generators and pulse/function generators, field-strength meters and their detector heads, etc.) and certain *secondary standard devices* (e.g. RF Preamplifiers used in CISPR 11/22 and FCC Part 15/18 tests) are periodically recalibrated by:

- A Nemko USA-approved independent (third party) metrology laboratory that uses NIST-traceable standards and that is ISO Standard 17025-accredited as a calibration laboratories by NIST; or,
- A Nemko USA-approved independent (third party) metrology laboratory that uses NIST-traceable standards and that is ISO Standard 17025-accredited as a calibration laboratory by another accreditation body (such as A2LA) that is mutually recognized by NIST; or,
- A manufacturer of Measurement and Test Equipment (M&TE), if the manufacturer uses NIST-traceable standards and is ISO Standard 17025-accredited as calibration laboratory either by NIST or by another accreditation body (such as A2LA) that is mutually recognized by NIST; or
- A manufacturer of M&TE (or by a Nemko USA-approved independent third party metrology laboratory) that is not ISO Standard 17025-accredited. (In these cases, Nemko USA conducts an annual audit of the manufacturer or metrology laboratory for the purposes of proving traceabilty to NIST, ensuring that adequate and repeatable calibration procedures are being applied, and verifying conformity with the other requirements of ISO Standard 17025).

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In all cases, the entity performing the Calibration is required to furnish Nemko USA with a calibration test report and/or certificate of calibration, and a "calibration sticker" on each item of M&TE that is successfully calibrated.

Calibration intervals are normally one year, except when the manufacture advises a shorter interval (e.g. the HP 8568B Spectrum Analyzer is recalibrated every six months) or if US Government directives or client requirements demand a shorter interval. Items of instrumentation/related equipment which fail during routine use, or which suffer visible mechanical damage (during use or while in transit), are sidelined pending repair and recalibration. (Repairs are carried out either in-house [if minor] or by a Nemko USA-approved independent [third party] metrology laboratory, or by the manufacturer of the item of M&TE).

Each antenna used for CISPR 11 and CISPR 22 and FCC Part 15 and Part 18 radiated emissions testing (and for testing to the equivalent European Norms) is calibrated annually by either a NIST (or NVLAP) ISO Standard 17025-Accredited third-party Antenna Calibration Laboratory or by the antenna's OEM if the OEM is NIST or NVLAP ISO Standard 17025-accredited as an antenna calibration laboratory. The antenna calibrations are performed using the methods specified in Annex G.5 of CISPR 16 (2003) or ANSI C63.4 (2003) , including the "Three-Antenna Method". Certain other kinds of antennas (e.g. magnetic-shielded loop antennas) are calibrated annually by either a NIST (or NVLAP) ISO Standard 17025-accredited third-party antenna calibration laboratory, or by the antenna's OEM if the OEM is NIST or NVLAP ISO Standard 17025-accredited as an antenna calibration laboratory using the procedures specified in the latest version of SAE ARP-958.

In accordance with FCC and other regulations, Nemko USA recalibrates its suite of antennas used for radiated emissions tests on an annual basis. These calibrations are performed as a precursor to the FCC-required annual revalidation of the Normalized Site Attenuation properties of Nemko USA's Open Area Test Site. Nemko USA, Inc. uses the procedures given in both Subclause 16.6 and Annex G.2 of CISPR 16 (2003) , and ANSI C63.4 (2003) when performing the normalized site attenuation measurements.

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# APPENDIX C
## C. NVLAP Accreditation / Nemko Authorization

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation

ISO/IEC 17025:1999
ISO 9002:1994

**NEMKO USA, INC. - SAN DIEGO EMC DIVISION**
SAN DIEGO, CA

*is recognized by the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria set forth in NIST Handbook 150:2001, all requirements of ISO/IEC 17025:1999, and relevant requirements of ISO 9002:1994. Accreditation is awarded for specific services, listed on the Scope of Accreditation, for:*

**ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS**

December 31, 2005
*Effective through*

*For the National Institute of Standards and Technology*
NVLAP Lab Code: 200116-0

NVLAP-01C (06-01)

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*11696 Sorrento Valley Rd., Suite F*
*San Diego, CA 92121-1024*
*Phone (858) 755-5525 Fax (858) 452-1810*

NVLAP® National Voluntary Laboratory Accreditation Program

## SCOPE OF ACCREDITATION TO ISO/IEC 17025:1999

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11696 Sorrento Valley Road, Suite F
San Diego, CA 92121
Mr. Ricky Hill
Phone: 858-755-5525 x207 Fax: 858-793-9914
E-Mail: rick.hill@nemko.com
URL: http://www.nemko.com

Revised Scope 06/22/2005

**ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS** **NVLAP LAB CODE 200116-0**

| *NVLAP Code* | *Designation / Description* |
|---|---|
| **Emissions Test Methods:** | |
| 12/CIS14 | CISPR 14-1 (March 30, 2000): Limits and Methods of Measurement of Radio interference Characteristics of Household Electrical Appliances, Portable Tools and Similiar Electrical Apparatus - Part 1: Emissions |
| 12/CIS14a | EN 55014-1 (1993), A1 (1997), A2 (1999): |
| 12/CIS14b | AS/NZS 1044 (1995): |
| 12/CIS14c | CNS 13783-1: Electromagnetic Compatibility Requirements for household appliances, electric tools and similar apparatus - Part 1: Emissions |
| 12/CIS15b | CNS 13439 (2000) + A1 (2001): Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment |
| 12/CIS22 | IEC/CISPR 22 (1997) & EN 55022 (1998) + A1(2000): Limits and methods of measurement of radio disturbance characteristics of information technology equipment |
| 12/CIS22a | IEC/CISPR 22 (1993) and EN 55022 (1994): Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1 (1995) and Amendment 2 (1996) |
| 12/CIS22b | CNS 13438 (1997): Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment |

2005-01-01 through 2005-12-31
*Effective dates*

*For the National Institute of Standards and Technology*

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**National Voluntary Laboratory Accreditation Program**

Revised Scope 06/22/2005

**ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS**

**NVLAP LAB CODE 200116-0**

| *NVLAP Code* | *Designation / Description* |
|---|---|
| 12/EM02a | IEC 61000-3-2, Edition 2.1 (2001-10), EN 61000-3-2 (2000), and AS/NZS 2279.1 (2000): Electromagnetic compatibility (EMC) Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A) |
| 12/EM03b | IEC 61000-3-3, Edition 1.1(2002-03) & EN 61000-3-3, A1(2001): EMC - Part 3-3: Limits - Limitations of voltage changes, voltage flucuations and flicker, in public low-voltage supply-systems, for equipment with rated current <=16 A per phase and not subject to conditional connections |
| 12/F18 | FCC OST/MP-5 (1986): FCC Methods of Measurement of Radio Noise Emissions for ISM Equipment (cited in FCC Method 47 CFR Part 18 - Industrial, Scientific, and Medical Equipment) |
| 12/T51 | AS/NZS CISPR 22 (2002) and AS/NZS 3548 (1997): Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment |

**Immunity Test Methods:**

| | |
|---|---|
| 12/I01 | IEC 61000-4-2, Ed. 1.2 (2001) + A1, A2; EN 61000-4-2: Electrostatic Discharge Immunity Test |
| 12/I02 | IEC 61000-4-3, Ed. 2.0 (2002-03); EN 61000-4-3 (2002): Radiated Radio-Frequency Electromagnetic Field Immunity Test |
| 12/I03 | IEC 61000-4-4(1995), A1(2000), A2(2001); EN 61000-4-4: Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical Fast Transient/Burst Immunity Test |
| 12/I04 | IEC 61000-4-5, Ed. 1.1 (2001-04); EN 61000-4-5: Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test |
| 12/I05 | IEC 61000-4-6, Ed. 2.0 (2003-05); EN 61000-4-6: Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields |
| 12/I06 | IEC 61000-4-8, Ed. 1.1 (2001); EN 61000-4-8: Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test |

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| *NVLAP Code* | *Designation / Description* |
|---|---|
| 12/I07 | IEC 61000-4-11, Ed. 1.1 (2001-03); EN 61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests |

**MIL-STD-462 : Conducted Emissions:**

| | |
|---|---|
| 12/A13 | MIL-STD-462 Version D Method CE101 |
| 12/A14 | MIL-STD-462 Version D Method CE102 |
| 12/A15 | MIL-STD-462 Version D Method CE106 |
| 12/A16 | MIL-STD-461 Version E Method CE101 |
| 12/A17 | MIL-STD-461 Version E Method CE102 |
| 12/A18 | MIL-STD-461 Version E Method CE106 |

**MIL-STD-462 : Conducted Susceptibility:**

| | |
|---|---|
| 12/B12 | MIL-STD-462 Version D Method CS101 |
| 12/B13 | MIL-STD-462 Version D Method CS103 |
| 12/B14 | MIL-STD-462 Version D Method CS104 |
| 12/B15 | MIL-STD-462 Version D Method CS105 |
| 12/B16 | MIL-STD-462 Version D Method CS109 |
| 12/B17 | MIL-STD-462 Version D Method CS114 |
| 12/B18 | MIL-STD-462 Version D Method CS115 |
| 12/B19 | MIL-STD-462 Version D Method CS116 |
| 12/B20 | MIL-STD-461 Version E Method CS101 |
| 12/B21 | MIL-STD-461 Version E Method CS103 |
| 12/B22 | MIL-STD-461 Version E Method CS104 |

2005-01-01 through 2005-12-31
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**NVLAP LAB CODE 200116-0**

| *NVLAP Code* | *Designation / Description* |
|---|---|
| 12/B23 | MIL-STD-461 Version E Method CS105 |
| 12/B24 | MIL-STD-461 Version E Method CS109 |
| 12/B25 | MIL-STD-461 Version E Method CS114 |
| 12/B26 | MIL-STD-461 Version E Method CS115 |
| 12/B27 | MIL-STD-461 Version E Method CS116 |
| **MIL-STD-462 : Radiated Emissions:** | |
| 12/D04 | MIL-STD-462 Version D Method RE101 |
| 12/D05 | MIL-STD-462 Version D Method RE102 |
| 12/D06 | MIL-STD-462 Version D Method RE103 |
| 12/D07 | MIL-STD-461 Version E Method RE101 |
| 12/D08 | MIL-STD-461 Version E Method RE102 |
| 12/D09 | MIL-STD-461 Version E Method RE103 |
| **MIL-STD-462 : Radiated Susceptibility:** | |
| 12/E08 | MIL-STD-462 Version D Method RS101 |
| 12/E09 | MIL-STD-462 Version D Method RS103 |
| 12/E10 | MIL-STD-462 Version D Method RS105 |
| 12/E11 | MIL-STD-461 Version E Method RS101 |
| 12/E12 | MIL-STD-461 Version E Method RS103 |
| 12/E13 | MIL-STD-461 Version E Method RS105 |

2005-01-01 through 2005-12-31

*Effective dates*

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Nemko

# Nemko Laboratory Authorisation

## Aut. No.: ELA 137-a

EMC Laboratory: **Nemko USA, Inc.**
**11696 Sorrento Valley Rd. Suite F**
**San Diego, CA 92121**
**USA**

Scope of Authorization: **All standards for EMC and radio transmission that are listed on the accompanying page.**

Nemko has assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA -10. During the visit by the Nemko representative it was found that the Laboratory is capable of performing tests within the Scope of the Authorisation.

Accordingly, Nemko will normally accept test results from the laboratory on a partial or complete basis for certification of the products.

In order to maintain the Authorisation, the information given in the pertinent NLA-10 must be carefully followed. Nemko is to be promptly notified about any changes in the situation at the Laboratory, which may affect the basis for this Authorisation. The Authorisation may be withdrawn at any time if the conditions are no longer considered to be fulfilled.

**The Authorisation is valid through 31. December 2005.**

Oslo, 2003.04.03

For Nemko AS:

Kjell Bergh

Kjell Bergh, Nemko Group EMC Co-ordinator



Nemko AS Gaustadalléen 30 P.O.Box 73 Blindern N-0314 Oslo Norway **T** +47 22 96 03 30 **F** +47 22 96 05 50 Enterprise number NO974404532

*Nemko USA, Inc.*
*11696 Sorrento Valley Rd., Suite F*
*San Diego, CA 92121-1024*
*Phone (858) 755-5525  Fax (858) 452-1810*

# Nemko Laboratory Authorisation

## Aut. No.: ELA 137-b

## R&TTE Directive

EMC Laboratory: **Nemko EESI, Inc.**
**11696 Sorrento Valley Road, Suite F**
**San Diego, CA 92121**
**USA**

Scope of Authorization: **All standards for EMC and radio transmission that are listed on the accompanying page with reference to the R&TTE Directive.**

Nemko has assessed the quality assurance system , the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA -10. During the visit by the Nemko representative it was found that the Laboratory is capable of performing tests within the Scope of the Authorisation.

Accordingly, Nemko will normally accept test results from the laboratory on a partial or complete basis for certification of the products.

In order to maintain the Authorisation, the information given in the pertinent NLA-10 must be carefully followed. Nemko is to be promptly notified about any changes in the situation at the Laboratory, which may affect the basis for this Authorisation. The Authorisation may be withdrawn at any time if the conditions are no longer considered to be fulfilled.

**The Authorisation is valid through 31. December 2005.**

Oslo, 2003.04.03

For Nemko AS:

Kjell Bergh

Kjell Bergh, Nemko Group EMC Co-ordinator



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Nemko

# Nemko Laboratory
# MDD – EMC Authorisation
## Aut. No.: ELA 137-c

EMC Laboratory: **Nemko USA, Inc.**
**11696 Sorrento Valley Rd. Suite F**
**San Diego, CA 92121**
**USA**

Scope of Authorization: **All standards for the Medical Electric Devices Directive, related to EMC that are listed on the accompanying page.**

Nemko has assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA -10. During the visit by the Nemko representative it was found that the Laboratory is capable of performing tests within the Scope of the Authorisation.

Accordingly, Nemko will normally accept test results from the laboratory on a partial or complete basis for certification of the products.

In order to maintain the Authorisation, the information given in the pertinent NLA-10 must be carefully followed. Nemko is to be promptly notified about any changes in the situation at the Laboratory, which may affect the basis for this Authorisation. The Authorisation may be withdrawn at any time if the conditions are no longer considered to be fulfilled.

**The Authorisation is valid through 31. December 2005.**

Oslo, 2003.04.03

For Nemko AS:

Kjell Bergh

Kjell Bergh, Nemko Group EMC Co-ordinator



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