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

EMC TEST REPORT

For The
Power supply for building-in

Models:
CPFE1000F-28

Prepared for:

TDK-Lambda Americas Inc.
3055 Del Sol Blvd
San Diego, CA 92154

Testing performed per the following:

EMC
Directive
2004/108/EC

CE

PREPARED on June 06, 2011

REPORT NUMBER: 2011 06175707-2 EMC

PROJECT NUMBER: 1027254

NEX NUMBER: 175707

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DOCUMENT HISTORY

REVISION	DATE	COMMENTS
-	June 06, 2011	Prepared By: Alex Chang
-	June 06, 2011	Initial Release: Alan Laudani

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 May 13, 2011.
- Testing was performed on the unit described in this report on May 13, 2011 to May #, 2011.
- The Test Results reported herein apply only to the Unit actually tested, and to substantially identical Units.
- This report does not imply the endorsement of the Federal Communications Commission (FCC), NVLAP or any other government agency.

CERTIFICATION

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

Testing and data collection were accomplished in accordance with the test methods listed in this report.

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

Alan Laudani,
EMC/RF TEST ENGINEER

1. ADMINISTRATIVE DATA AND TEST SUMMARY

1.1. Administrative Data

CLINET:	TDK-Lambda Americas Inc. 3055 Del Sol Blvd San Diego, CA 92154 (619) 628-2844
CONTACT: E-MAIL:	Phong Ly phong.ly@us.tdk-lambda.com
DATES OF TESTING:	May 13, 2011 to June 03, 2011
EQUIPMENT UNDER TEST (EUT):	Power supply for building-in
MODEL:	CPFE1000F-28
SERIAL NUMBER:	CLW-132S17-0008 S490
HIGHEST FREQUENCY GENERATED OR USED:	200 KHZ
CONDITION UPON RECEIPT:	Suitable for Test
TEST SPECIFICATIONS:	Radio Frequency Emissions in accordance with requirements of EN 55022: 2006/A1: 2007. Electromagnetic Immunity tests in accordance with requirements of EN 55024: 1998/A1: 2001/A2: 2003/IS1: 2007

1.2. Referenced Standards for Radiated Emissions

Test Type	*In Accordance with Document*	*Document Title*
Conducted and Radiated Emissions	EN 55022: 2006/A1: 2007	Information technology equipment—Radio disturbance characteristics —Limits and methods of measurement

1.3. Referenced Standards for Electromagnetic Compatibility

Test Type	*In Accordance with Document*	*Document Title*
Power Line Harmonics	EN 61000-3-2: 2006	Electromagnetic Compatibility, Limits for Harmonic Current Emissions, Equipment Input Current ≤ 16A
Power Line Flicker	EN 61000-3-3: 2008	Electromagnetic Compatibility, Limitation of Voltage Fluctuations and Flicker In Low-Voltage Supply Systems for Equipment with Rated Current ≤ 16A
Electrostatic Discharge Immunity	IEC 61000-4-2: 2008	Electromagnetic Compatibility—Testing and measurement techniques - Electrostatic discharge immunity test
Radio Frequency Immunity	IEC 61000-4-3: 2006	Electromagnetic Compatibility—Testing and measurement techniques - Radiated radio frequency electromagnetic field immunity test
Electrical Fast Transient Burst Immunity	IEC 61000-4-4: 2004	Electromagnetic Compatibility—Testing and measurement techniques - Electrical fast transient / burst immunity
Power Line Surge Immunity	IEC 61000-4-5: 2005	Electromagnetic Compatibility—Testing and measurement techniques - Surge immunity test
RF Common Mode Immunity	IEC 61000-4-6: 2008	Electromagnetic Compatibility—Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
Power Frequency Magnetic Field	IEC 61000-4-8: 2009	Electromagnetic Compatibility—Testing and measurement techniques - for Power Frequency Magnetic Field, 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
Ring wave immunity test	IEC 61000-4-12: 2006	Electromagnetic Compatibility—Testing and measurement techniques - Ring wave immunity test
Voltage fluctuation immunity test	IEC 61000-4-14: 1999 + A1:2004	Electromagnetic Compatibility—Testing and measurement techniques - Voltage fluctuation immunity test

1.4. Test Summary

1.4.1. Emissions Test Summary

The Compliance Status is a judgment based on the calculated highest emissions to appropriate standard limits. Measurement uncertainty values, provided on calibration certificates, were not be used in the judgment of the final status of compliance.

Test Methods	*Frequency Range*	*Compliance Status*
EN 55022: 2006/A1: 2007, Class "**B**" Conducted Emissions	0.15 MHz – 30 MHz	**PASS**
EN 55022: 2006/A1: 2007, Class "**B**" Telecom Conducted Emissions	0.15 MHz – 30 MHz	**No telecom ports. Not applicable**
EN 55022: 2006/A1: 2007, Class "**B**" Radiated Emissions	30 MHz – 1000 MHz	**PASS**
EN 61000-3-2: 2006 Power Line Harmonics	up to the 40th Harmonic	**PASS**
EN 61000-3-3: 2008 Power Line Flicker	less than or equal to 4% Maximum Relative Voltage Change; Value of D(T) less than or equal to 3% for more than 200 ms	**PASS**

Alan Laudani,
EMC/RF Test Engineer.

1.4.2. Immunity Test Summary

Test Methods	*Minimum Criterion Level Required as per EN 55024*	*Criterion Level Tested as per customer requested*	*Compliance Status*
IEC 61000-4-2: 2008 - 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: 2006 - Radio Frequency Immunity	**Criterion A** 3 V/m from 80-1000 MHz (80% AM at 1kHz)	**Criterion A** 10 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 ± 2 kV; I/O Line Pulses of ± 1 kV	**PASS**
IEC 61000-4-5: 2005 -Surge Immunity	**Criterion B** ± 2kV Common mode surges, ± 1kV Differential mode surges	**Criterion B** ± 4 kV Common Mode Surges, ± 2 kV Differential Mode Surges	**PASS**
IEC 61000-4-6: 2008 -RF Common Mode Immunity	**Criterion A** 150 kHz - 80 MHz at 3 Vrms 1 kHz 80% amplitude modulated	**Criterion B** 150 kHz - 80 MHz at 10 Vrms 1kHz 80% amplitude modulated	**PASS***
IEC 61000-4-8: 2009 Power Frequency Magnetic Field	**Criterion A** Inductive loop at 50 Hz, to 1.0 amps (rms) per meter	**Criterion A** Inductive loop at 50 Hz, to 30 amps (rms) per meter	**PASS**
IEC 61000-4-11: 2004 - Voltage Dips and Short Interruptions	**Criterion B and C** Voltage Dips of 30% and >95%; Interruptions of >95%.	**Criterion B and C** Voltage Dips of 60%, 30%, 20% and >95%; Interruptions of >95%.	**PASS**
MIL STD 461/462D CE102.			**PASS**
IEC 61000-4-12: 2006 - Oscillatory waves immunity	**N/A**	**Criterion A** ± 2kV common mode ring ± 1kV differential mode ring	**PASS**
IEC 61000-4-14: 1999 + A1:2004 - Voltage fluctuation immunity	**N/A**	**Criterion A** $\Delta U = \pm 12\% U_n$ $\Delta U = + 12\% U_n$ $\Delta U = - 12\% U_n$	**PASS**

***** Customer upon agreed to lower the criteria, which the EUT is self-recoverable during the test. Refer to result section for detail information.

REFER TO THE TEST RESULTS SECTION FOR FURTHER DETAILS.

Alan Laudani,
EMC/RF Test Engineer

2. SYSTEM CONFIGURATION

2.1. System Components and Power Cables

DEVICE	MANUFACTURER MODEL # SERIAL #	POWER CABLE
EUT - Power supply for building-in with 28VDC output	TDK-Lambda Americas Inc. CPFE1000F-28 CLW-132S17-0008 S490	1m, unshielded, 16AWG, 3-wire, IEC connector
Support – Heat sink	N/A	None
Support – 0.8Ω resistor load for 28VDC output model	Custom made	None

2.2. Device Interconnection and I/O Cables

Connection	I/O Cable
EUT to resistor loads	< 1m, unshielded, 8AWG cables

2.3. Description and Method of Exercising the EUT

The CPFE1000F-28 is a Power supply for building-in. Their function is to supply 28VDC output, respectively. The EUT was exercised with resistors load 0.8 Ω on the output connections. The load is considered as maximum condition. The EUT has been monitored DC voltages by a multimeter; if the DC voltage is disrupted as seen/indicated by meter ±56mV, or there is loss of functionality, this may be considered a failure.

2.4. Design Modifications for Compliance

Device:
Power supply for building-in
Model: CPFE1000F-28

The following design modifications were made to the EUT during testing.

None. No design modifications were made to the EUT during testing.

Photograph 1. EUT Front and Rear of 28VDC output model

EUT Front

EUT Rear

3. DESCRIPTION OF TEST SITE AND EQUIPMENT

3.1. Description of Test Site

The test site is located at 11696 Sorrento Valley Road, Suite F, San Diego, CA 92121. The site is physically located 18 miles Northwest of downtown San Diego. The general area is a valley 1.5 miles east of the Pacific Ocean. This particular part of the valley tends to minimize ambient levels, i.e. radio and TV broadcast stations and land mobile communications. The three and ten-meter Open Area Test Site (OATS) is located behind the office/lab building. It conforms to the normalized site attenuation limits and construction specifications as set in the EN 55022: 2006/A1: 2007, CISPR 16: 2003 and ANSI C63.4: 2009 documents.

3.2. Facility Accreditation and Authorization

Registrations of the facility sites are on file with:

Organization	Registration numbers
Federal Communications Commission	0013750831
VCCI	R-3027 (Radiated) and C-3352 (Conducted)
Industry Canada	2040B-1 and 2040B-2

4. DESCRIPTION OF TESTING METHODS

4.1. Introduction

Nemko USA, Inc. is accredited to ISO/IEC 17025 by the National Voluntary Laboratory Accreditation Program (NVLAP) for Electromagnetic Compatibility and Telecommunications testing. Part of the accreditation process involves the demonstration of competence in various test methods.

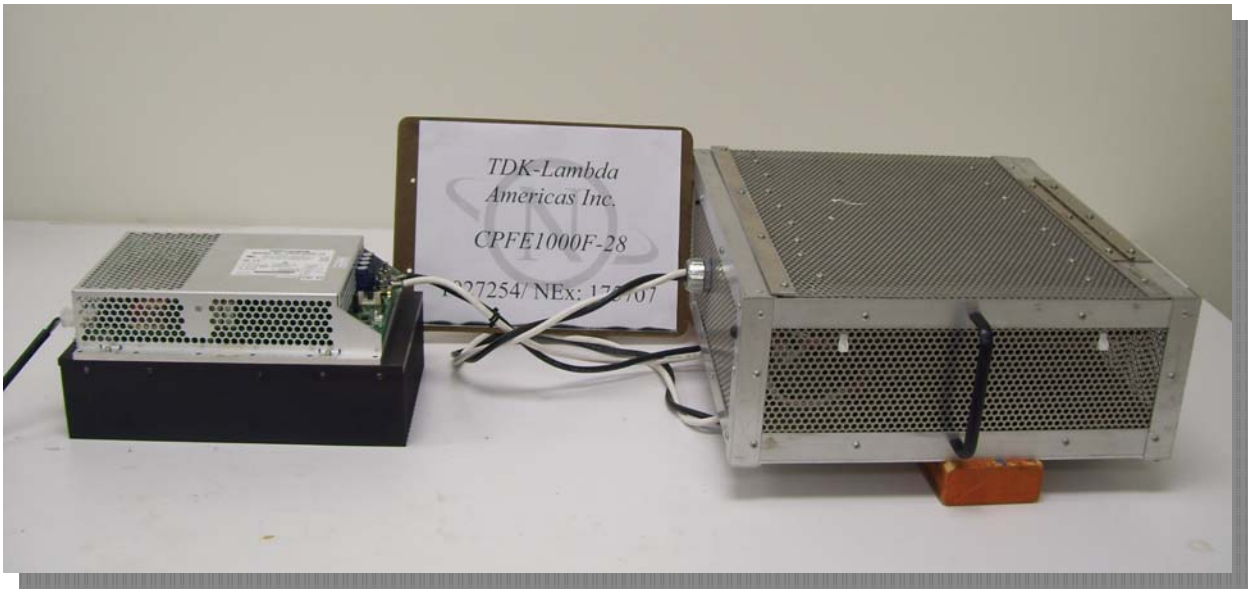
Prior to the beginning of work, Nemko personnel work with their clients to ensure the proper test standards and test methods are utilized. Applicable tests and the minimum criteria for a pass condition are listed in the administrative section of this report.

4.2. Test Methods

The harmonized documents published for Information Technology Equipment are **EN 55022: 2006/A1: 2007** for radio frequency emissions and **EN 55024: 1998/A1: 2001/A2:** 2003/IS1: 2007 for electromagnetic immunity. The methods employed to test the emissions and immunity characteristics of the Equipment Under Test are those mandated by the European Standards EN 55022 and EN 55024. The applicable tests and the minimum criteria for a pass condition that are listed in the administrative section of this report are taken from these standards.

Digital devices sold in Canada are required to comply with the Interference Causing Equipment Standard for Digital Apparatus, ICES-003, Issue 4. These test methods and limits are specified in the Canadian Standards Association's Standard CAN/CSA-CISPR 22-02 and are "essentially equivalent" with the CISPR 22 (EN55022) rules for unintentional radiators per EMCAB-3, Issue 4 (December 2005). No additional testing is required for compliance to ICES-003.

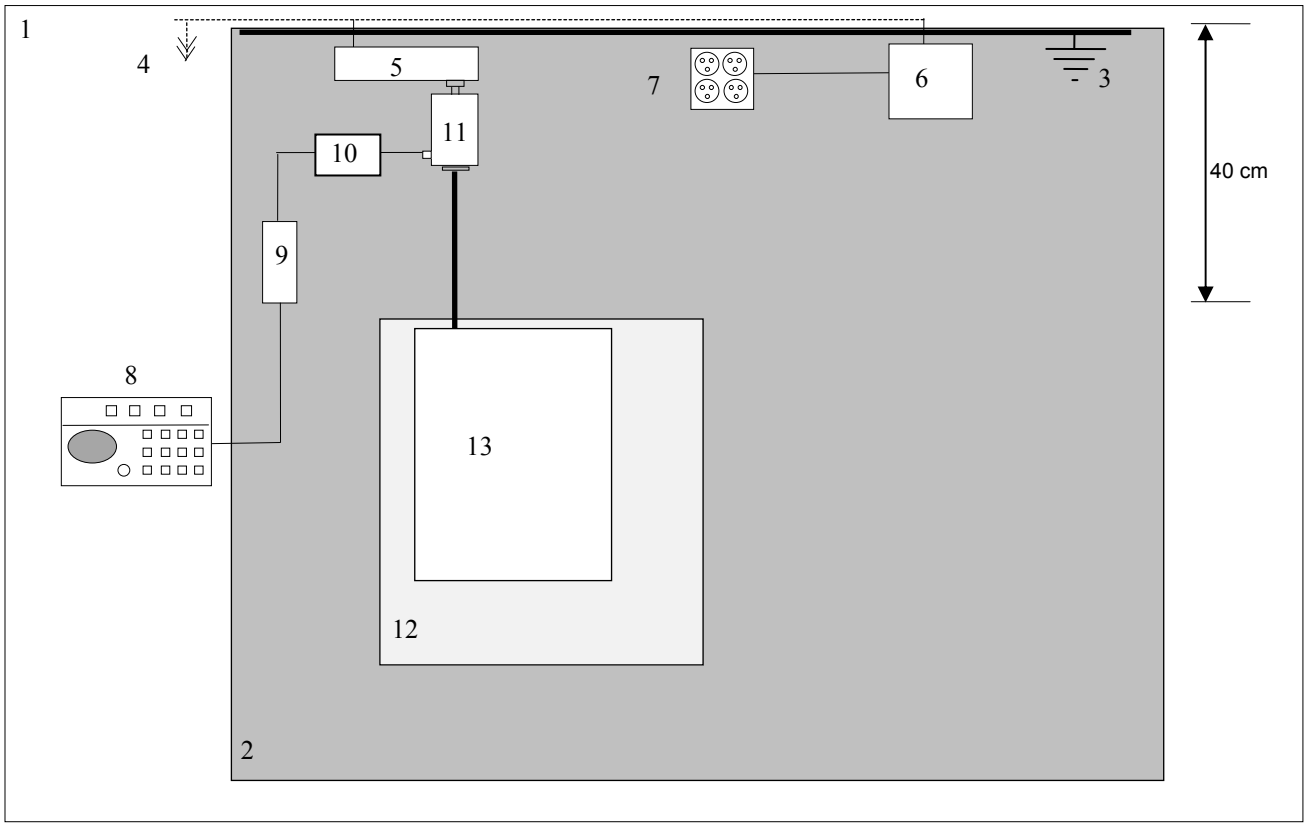
Photograph 2. General EUT Test Configuration of 28VDC output model



4.3. Configuration and Methods of Measurements for Conducted Emissions

This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices. Testing was performed in accordance with the test standard(s) referenced in the test summary section of this report. The Equipment Under Test (EUT) was configured based upon the requirements of the applicable test standard.

Figure 1. Conducted Emissions Test Setup Diagram



NOT TO SCALE

CONFIGURATION LEGEND

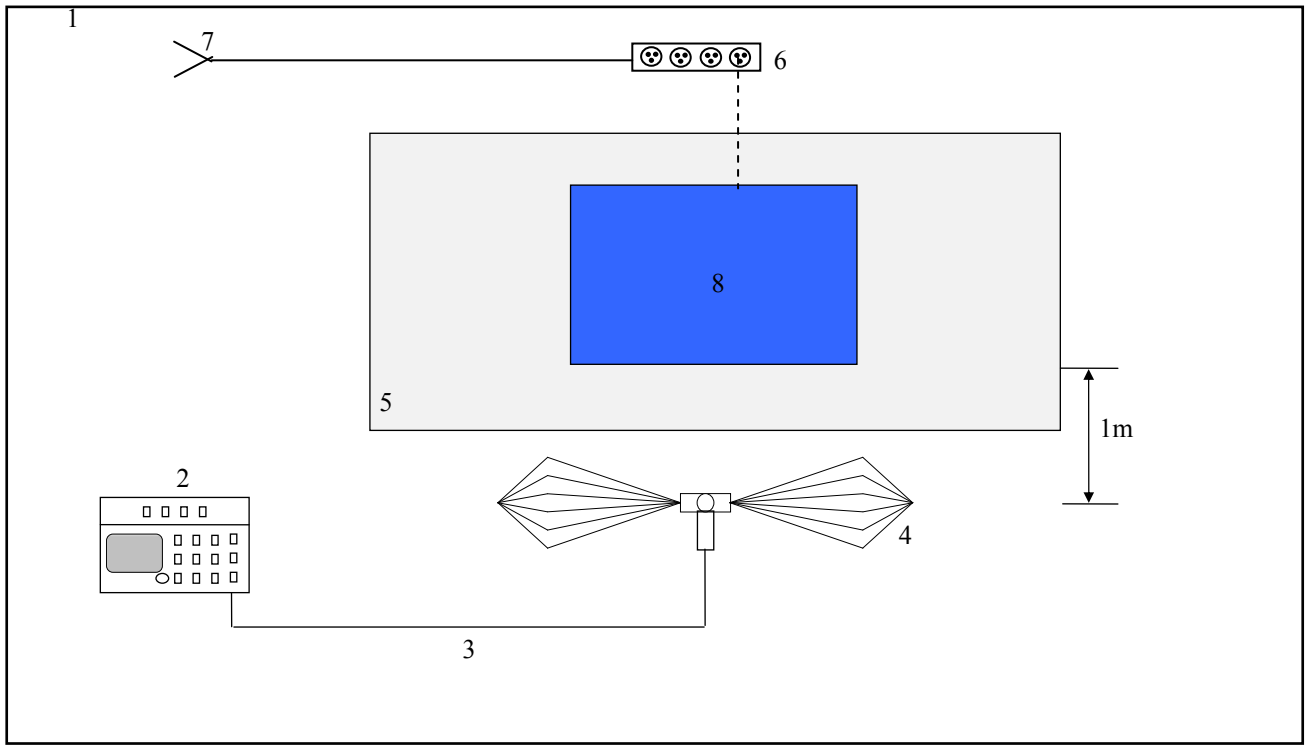
1. Test Laboratory (6 X 6 meters)
2. Ground Plane (15 square meters)
3. Vertical Conducting Wall (Grounded through Ground Plane via 10' ground rod)
4. AC Power for Devices
5. Power Line Filter, Lindgren, 120 dB, 30 amp
6. Artificial Mains Network (AMN) for peripheral devices
7. Power Distribution Box for peripheral devices
8. Spectrum Analyzer with Quasi-Peak Adapter
9. High Pass Filter
10. Coax input from EUT AMN to Spectrum Analyzer
11. AMN for EUT
12. Non-conducting table
13. EUT and Associated System

4.4. 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. Incoming power lines are filtered using a 120 dB, 30-ampere; 115/208-volt filter to assist in reducing ambient signals for tests of levels of conducted emissions. Ambients 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 which is also demonstrating significant ambient signals, the spectrum analyzer is placed in the peak mode, the bandwidth is narrowed, 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.

For Frequency ID Test Configuration please refer to the figure on the following page.

Figure 2. Frequency ID of Radiated Emissions Test Setup Diagram



NOT TO SCALE

CONFIGURATION LEGEND

1. Test Laboratory
2. Spectrum Analyzer with Quasi-Peak Adapter
3. Coax interconnect from Antenna to Spectrum Analyzer
4. Receive Antenna (basic relative position)
5. Non-Conducting table 80 cm above ground plane
6. Power strip for EUT and peripherals
7. AC power for devices
8. EUT: Power supply for building-in and Associated System

4.5. Configuration and Methods of Measurements for Radiated Emissions

This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices. Testing was performed in accordance with the test standard(s) referenced in the test summary section of this report. The Equipment Under Test (EUT) was configured based upon the requirements of the applicable test standard. 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 while the turntable is rotated to determine the worst emitting configuration. The numerical results 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 as demonstrated by the example below:

A	B	C	D	E	F	G	H	I	J	K
Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail
47.2	44.5	44.6	Q	-	1.0	44.6	24.2	30.0	-5.8	Pass

A. Frequency Measured in MHz.

B. Meter Reading: Emission Amplitude as measured with the antenna in Vertical polarity in dBµV, this is from the EMI receiver or Spectrum Analyzer.

C. Meter Reading: Emission Amplitude as measured with the antenna in Horizontal polarity in dBµV, this is from the EMI receiver or Spectrum Analyzer.

D. Detector used: Q for Quasi-Peak, A for average, P for peak.

E. EUT Side F/L/R/B: Side of EUT facing the receiving antenna. Front, Left, Right, Back. If not noted, emission did not peak in a significant manner to discriminate which side of the EUT emitted the emission.

F. Ant. Height m: Antenna height in meters of strongest emission measured when raised from 1 to 4 meters.

G. Max Reading: Max meter reading of B vertical and C horizontal in dBµV.

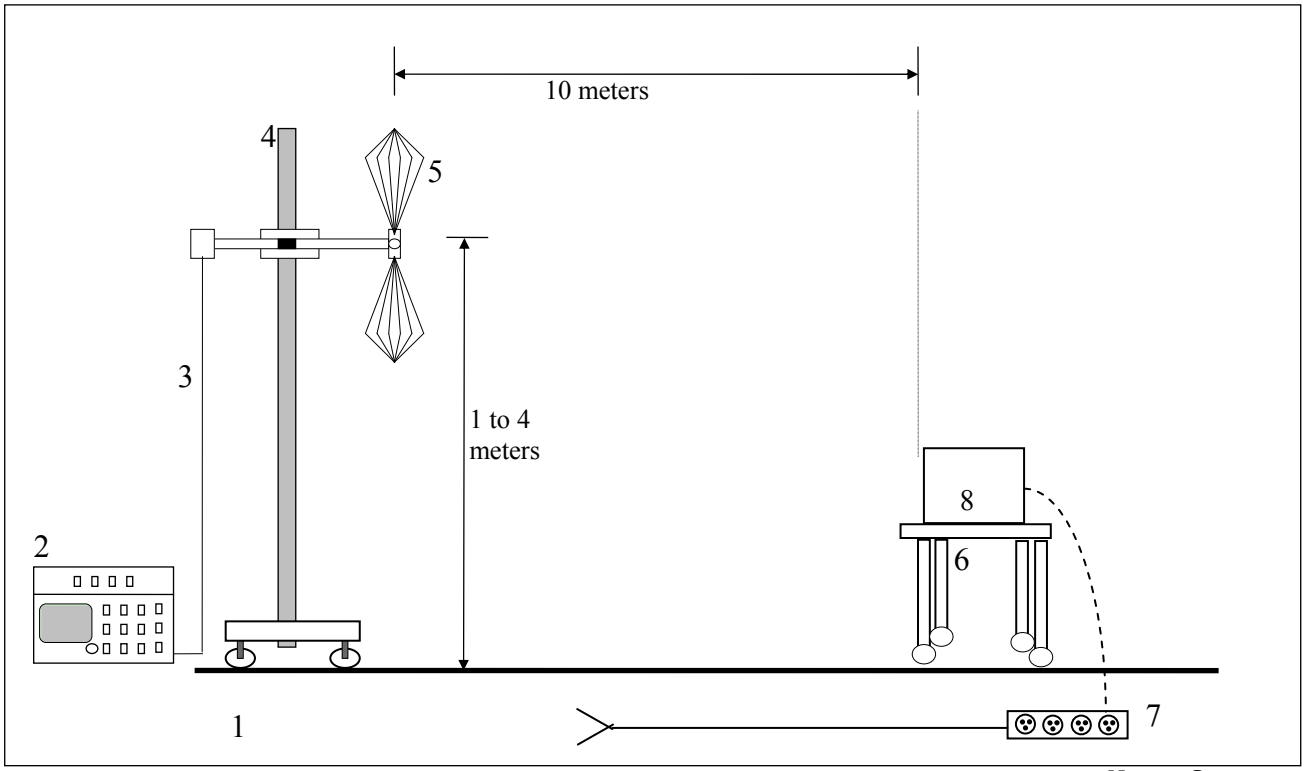
H. Corrected Reading: Corrected Reading in dBµV/m; Max Reading corrected for cable loss (dB), antenna factor (dBV/m) and preamplifier gain (dB).

I. Spec limit: Specification Limit at the measured frequency in dBµV/m.

J. CR/SL Diff.: Difference in dB of Corrected Reading and Specification Limit, negative results indicate a margin value below the specification limit.

K. Pass Fail: Result; EUT does or does not comply at this frequency.

Figure 3. Radiated Emissions Test Setup Diagram



NOT TO SCALE

CONFIGURATION LEGEND

1. Ground plane (11 X 17 meters)
2. Spectrum Analyzer with Quasi-Peak Adapter
3. Coax interconnect from Receive Antenna to Spectrum Analyzer
4. Antenna Mast with motorized mounting assembly
5. Receive Antenna (basic relative position)
6. Non-Conducting table 80 cm above ground plane
7. Mains power for devices
8. EUT and Associated System

4.6. Power Line Harmonics: EN 61000-3-2: 2006

This test evaluates the potential for the EUT to cause distortion on the AC power lines. Testing was performed in accordance with EN 61000-3-2. It is applicable to electrical and electronic equipment having an input current up to and including 16 amps per phase, and intended to be connected to public low-voltage distribution systems.

Basic requirements of the AC source include a ± 2% voltage regulation and a ± 0.5% frequency limit. A low distortion sine wave output is required to ensure that the AC source does not adversely contribute distortion to the load, meeting the following limits:

- 0.9% for 3rd order harmonics
- 0.4% for 5th order harmonics
- 0.3% for 7th order harmonics
- 0.2% for 9th order harmonics
- 0.2% for even harmonics of order 2 to 10
- 0.1% for odd harmonic order from 11 to 40

For further information, please refer to the technical sections in the EN 61000-3 in addition to the test results section and photographs of the test set-up provided in this report.

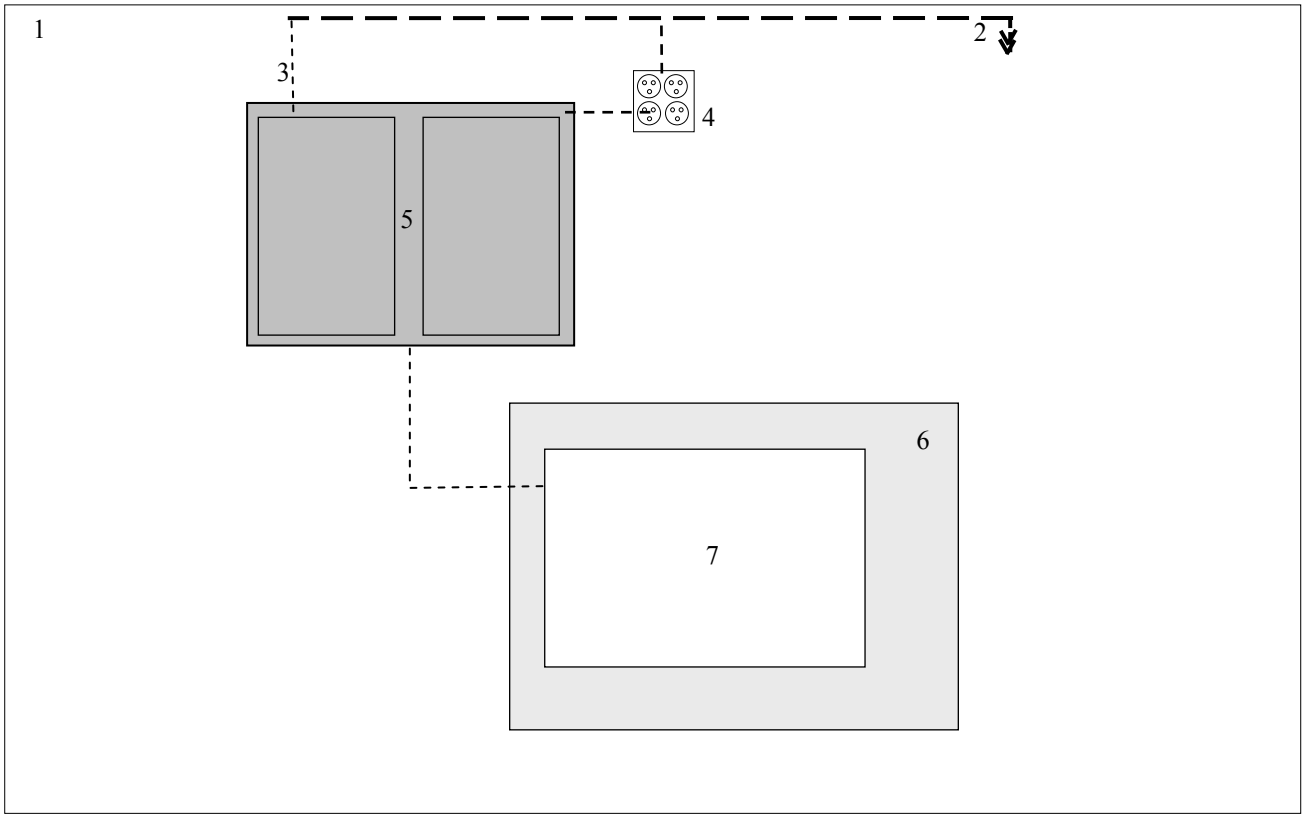
4.7. Power Line Fluctuations/Flicker: EN 61000-3-3: 2008

Testing was performed in accordance with EN 61000-3-3. It is applicable to household appliances and similar electrical and electronic equipment having an input current up to and including 16 amps per phase. The objective of this standard is to set limits for voltage fluctuations of equipment within its scope, and ensures that home appliances and certain other electrical equipment do not adversely affect lighting equipment when connected to the same utility power line. Large current variations combined with high utility line power impedance can cause excessive changes in the AC supply voltage. If these voltage changes are repeated at short intervals, objectionable fluctuations of luminance (flicker) could be generated in illumination sources connected to the same utility line network.

This test requires an AC power source with a standard impedance network and a power analyzer. Measurements of steady state and fluctuating harmonics, along with flicker and voltage deviations, are conducted using a power analyzer, often called a "flickermeter."

For further information, please refer to the technical sections in the EN 61000-3-3 in addition to the test results section and photographs of the test set-up provided in this report.

Figure 4. Harmonics & Flicker Test Setup Diagram



NOT TO SCALE

CONFIGURATION LEGEND

1. Test Laboratory (6 X 6 meters)
2. AC Power for Devices
3. 120/208VAC/60Hz Power for Harmonics/Flicker Test Equipment
4. 115V/60 Hz Power Distribution Box
5. Power Source Rack with Computer Analysis System
6. Non-conducting table
7. EUT and Associated System

4.8. Device Performance Criteria for Immunity Tests

- **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, the test standard specifies the appropriate criterion to be met.

4.9. Electrostatic Discharge Immunity: IEC 61000-4-2: 2008

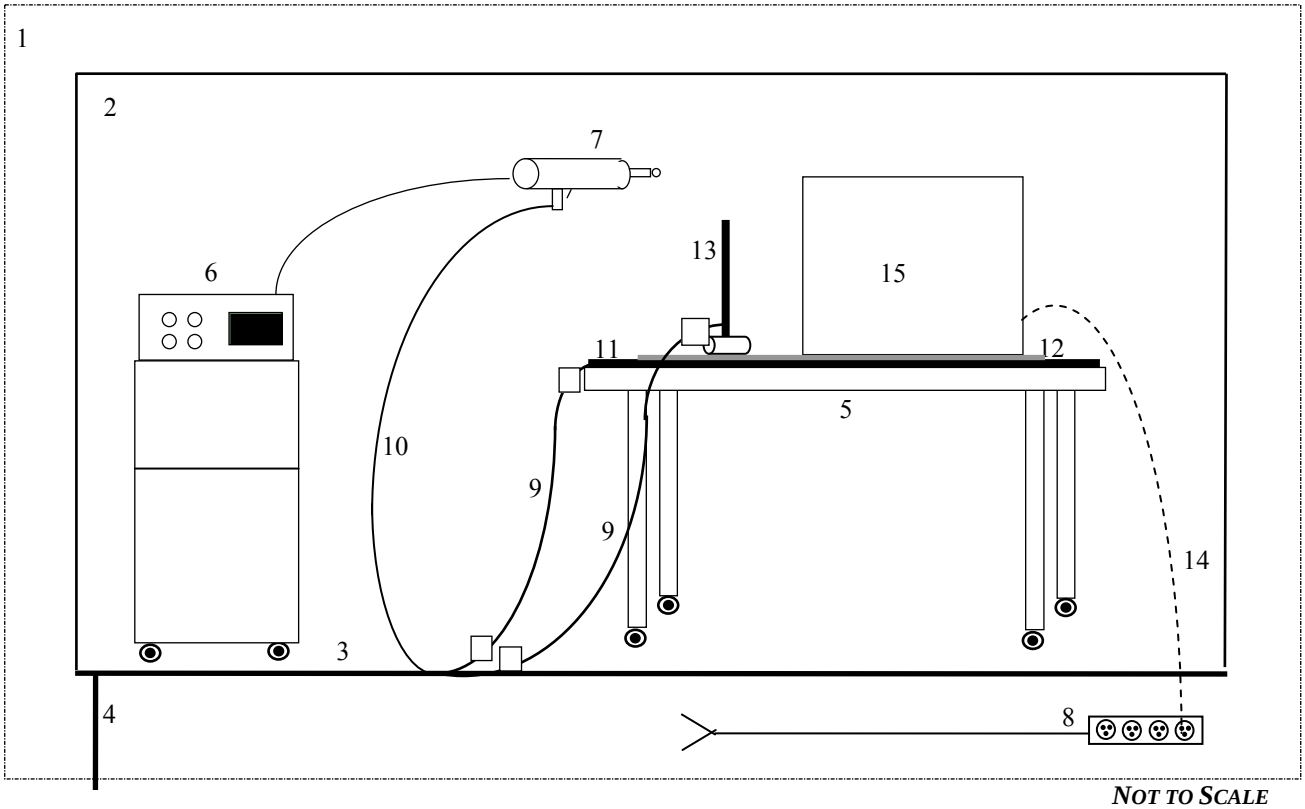
This test simulates electrostatic events (similar to being "zapped" by touching a light switch) and evaluates the ability of the EUT to tolerate such events. Testing was performed in accordance with IEC 61000-4-2. Tabletop devices are placed on an insulated mat on a horizontal coupling plane. Air discharges 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 points (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 publication in addition to the test results section and photographs of the test set-up provided in this report.

Figure 5. ESD Test Setup Diagram



NOT TO SCALE

CONFIGURATION LEGEND

1. Test Laboratory (6 x 7 meters)
2. Vertical Conducting Wall (3 x 3 m, grounded)
3. Ground Plane (14 square meters), grounded to Grounding Rod
4. Ground Rod extending 3 m under ground plane
5. Non-Conducting table for ESD Simulator Control Box
6. ESD Simulator Control Box on cart
7. Electro-Static Discharge (ESD) Gun (hand held, grounded to grounding rod)
8. Mains power for devices
9. Ground strap with two 470 kOhm resistors
10. Grounding Strap
11. Horizontal Coupling Plane
12. Insulating Mat
13. Vertical Coupling Plane
14. EUT Power Cord
15. EUT and Associated System

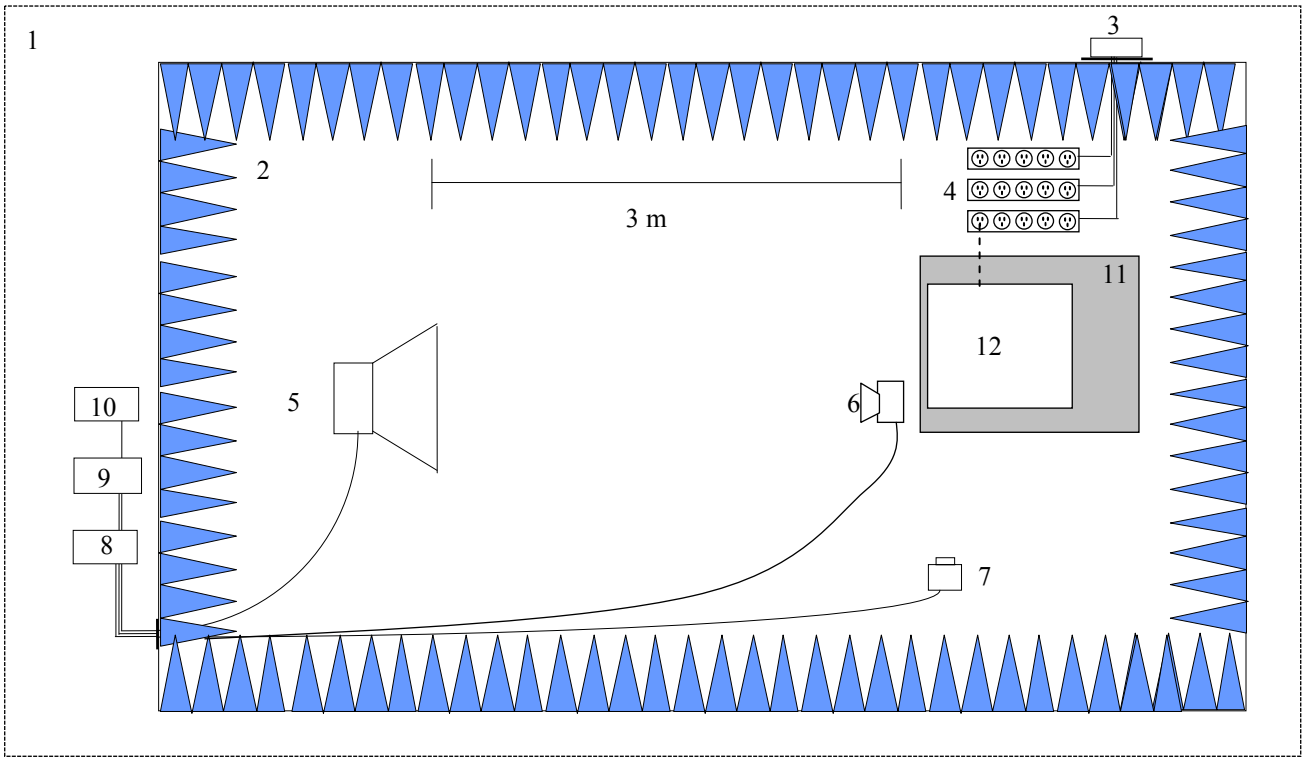
4.10.Radio Frequency Immunity: IEC 61000-4-3: 2006

This test bombards the EUT with electric fields that may couple into the system via chassis slots and interface cables and evaluates the product's immunity. Testing was performed in accordance with IEC 61000-4-3. 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 EUT is set up inside a shielded, semi-anechoic chamber with a radiating antenna at a distance of 3 meters from the EUT. The antennas use for radiating have a VSWR characteristic of 2:1 or better, Per CISPR16.

For further information, please refer to the technical sections in the IEC 61000-4-3 publication in addition to the test results section and photographs of the test set-up provided in this report.

Figure 6. Radio Frequency Immunity Test Setup Diagram



NOT TO SCALE

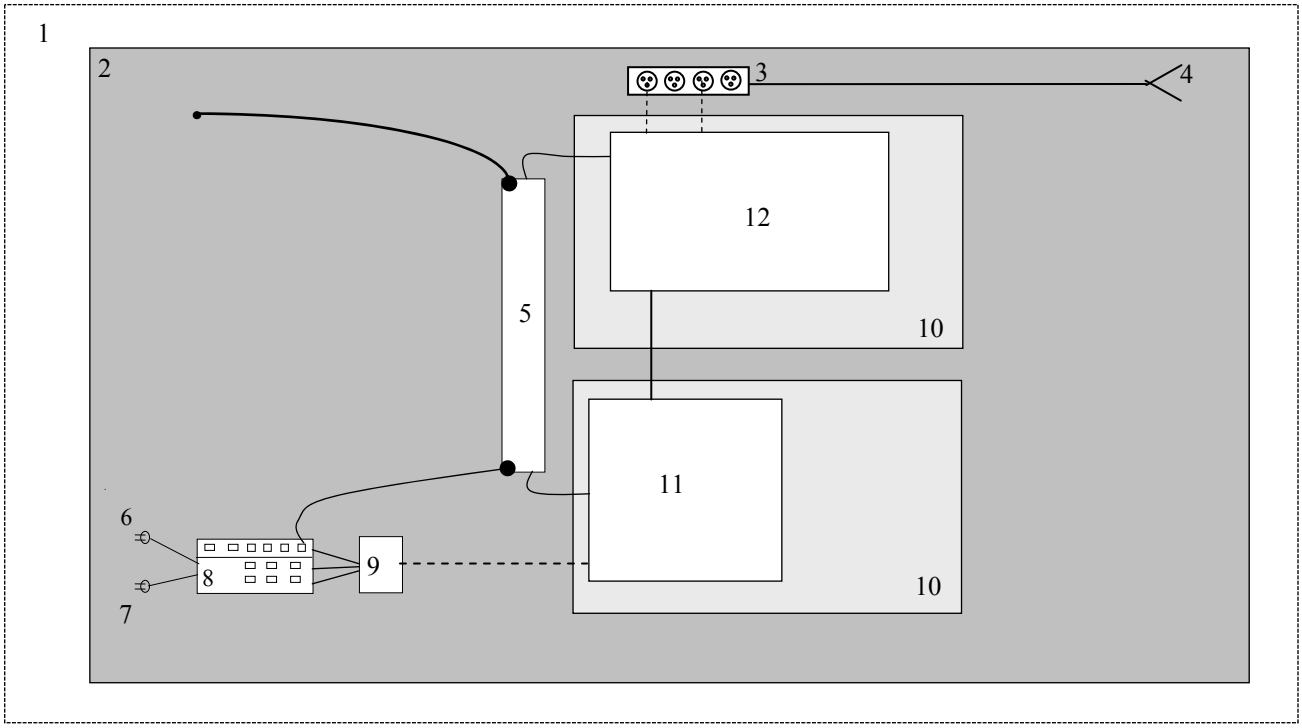
CONFIGURATION LEGEND

1. Test laboratory
2. Shielded anechoic chamber (Anechoic absorber material on walls and ceiling; ferrite tiles on ceiling and floor)
3. Power Line filters and power distribution breaker box
4. Power strip for EUT and peripherals
5. Transmit antennas
6. E-Field sensor
7. Monitoring camera for EUT
8. Broadband power amplifiers
9. E-Field probe monitoring system
10. Signal Generators
11. Non-Conducting table
12. EUT and Associated System

4.11.Electrical Fast Transient Immunity: IEC 61000-4-4: 2004

This test injects a transient/burst interference onto the AC/DC power supply and signal I/O lines. Testing was performed in accordance with IEC 61000-4-4. The standard configuration for "type tests" outlined in IEC 61000-4-4 is used. For further information, please refer to the technical sections in the IEC 61000-4-4 in addition to the test results section and photographs of the test set-up provided in this report.

Figure 7. EFT Immunity Test Setup Diagram



NOT TO SCALE

CONFIGURATION LEGEND

1. Test Laboratory (6 x 7 meters)
2. Ground Plane
3. Power Strip for Peripherals from power line filter
4. Mains Power for Devices
5. Capacitive Coupling Clamp (grounded)
6. Mains Power for EUT
7. AC Power for Fast Transient Noise Generator (120V)
8. Fast Transient Noise Generator
9. Coupling Network
10. 10cm Non-Conducting Platform
11. EUT
12. Associated System

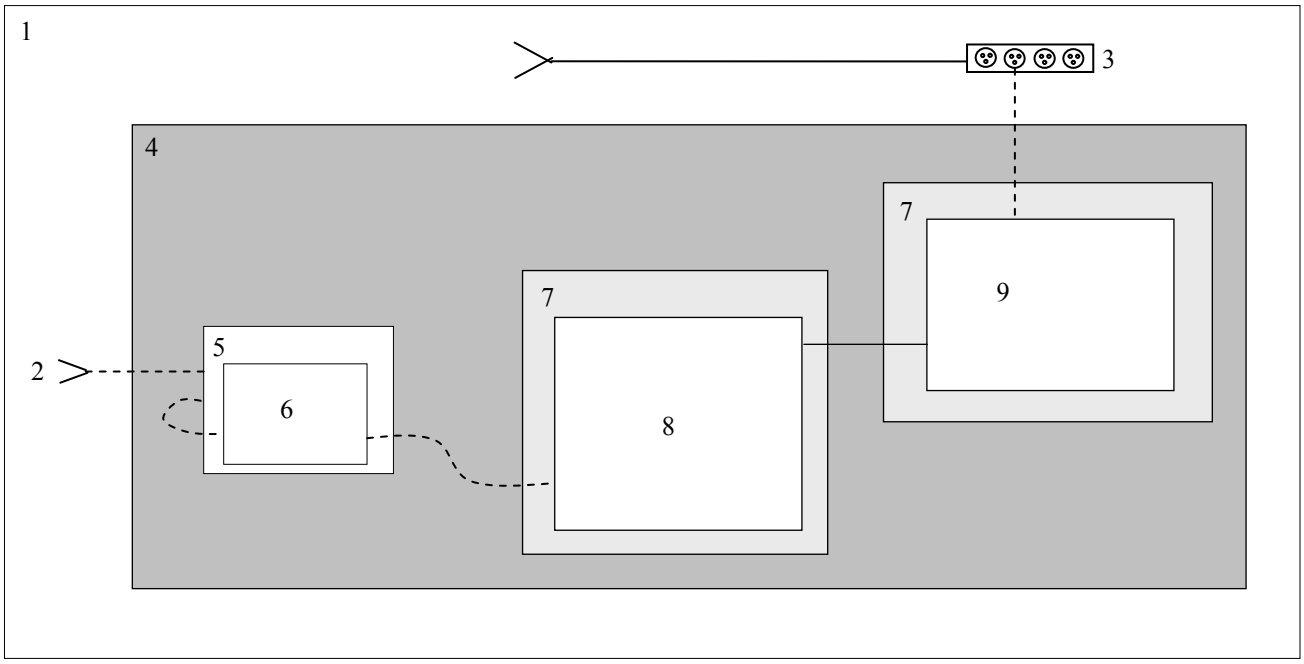
4.12.Power Line Surge Immunity: IEC 61000-4-5: 2005

This test simulates a lightning event by inducing transients onto the AC/DC power supply lines in common and differential mode. Testing was performed in accordance with IEC 61000-4-5.
Each device was tested in a total of three surge configurations:

Surge #1: Combination Wave, Line to Protective Earth with 9uF and 10Ohm, common mode, generator earthed.
Surge #2: Combination Wave, Neutral to Protective Earth with 9uF and 10Ohm, common mode, generator earthed.
Surge #3: Combination Wave, Line to Neutral with 18uF, differential mode, generator floated.

For further information, please refer to the technical sections in the IEC 61000-4-5 in addition to the test results section and photographs of the test set-up provided in this report.

Figure 8. Power Line Surge Immunity Test Setup Diagram



NOT TO SCALE

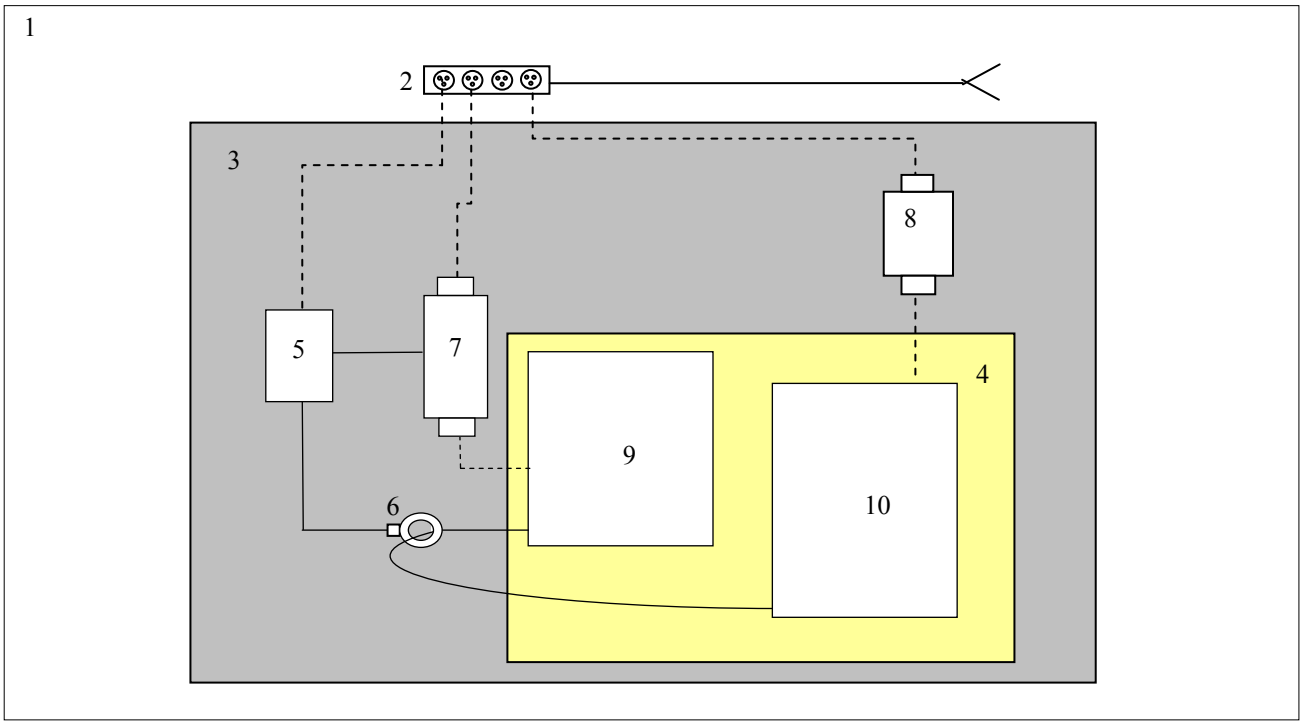
CONFIGURATION LEGEND

1. Test Laboratory
2. AC power for Devices
3. Power strip for associated devices from power line filter
4. Copper Ground Plane
5. Surge Generator
6. Surge Coupling Network
7. Nonconductive tables 80cm above Ground Plane
8. EUT
9. Associated System

4.13. Radio Frequency Conducted Common Mode Immunity: IEC 61000-4-6: 2008

This test injects a disturbance directly onto AC/DC power and signal I/O cables. Testing was performed in accordance with IEC 61000-4-6. The standard configuration as outlined in the IEC 61000-4-6 was used. For further information, please refer to the technical sections of the IEC 61000-4-6 publication in addition to the test results section and photographs of the test set-up provided in this report.

Figure 9. RF Common Mode Immunity Test Setup Diagram



NOT TO SCALE

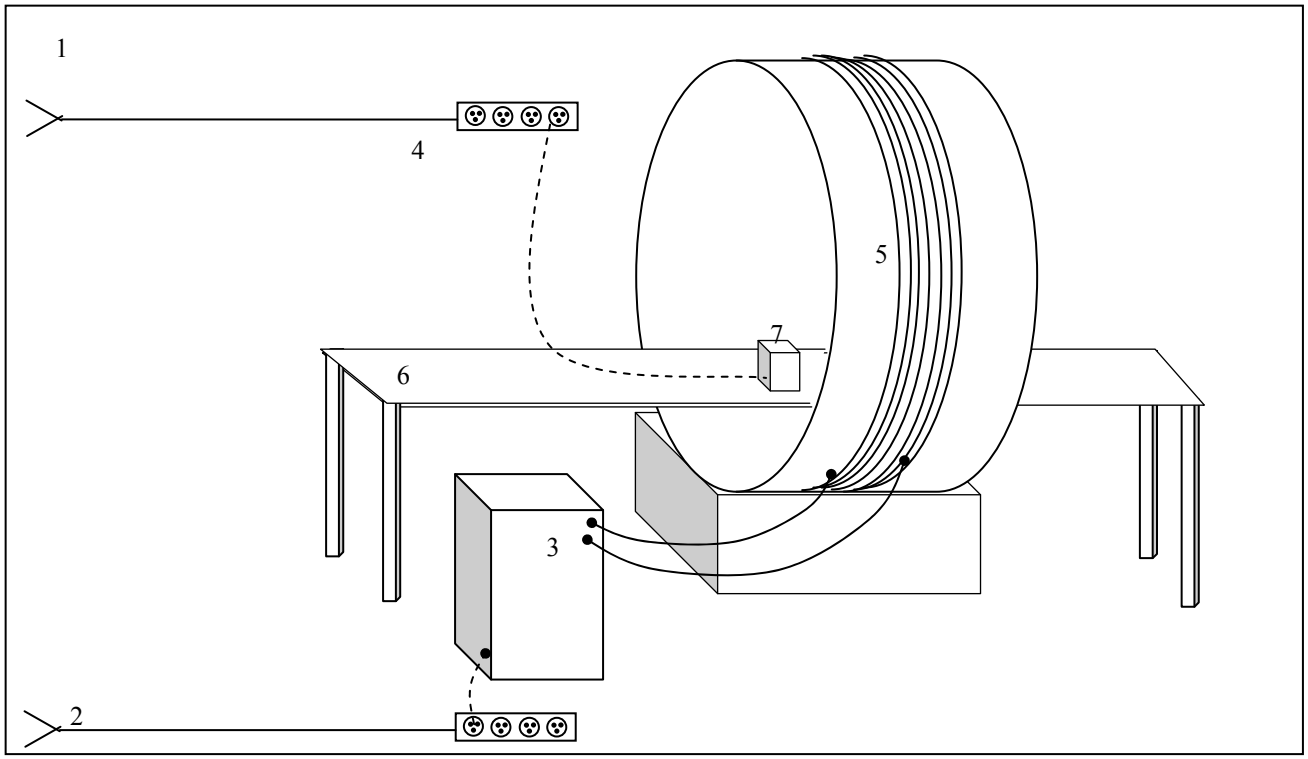
CONFIGURATION LEGEND

1. Test Laboratory
2. Mains power for EUT
3. Ground Plane
4. 10cm wooden Platform
5. Test Generator
6. Current Probe
7. Coupling/Decoupling Network
8. Coupling/Decoupling Network
9. EUT
10. Associated System

4.14. Power Frequency Magnetic Field Immunity: IEC 61000-4-8: 2009

This test subjects devices to the fields produced by current carrying conductors of standard building power. Testing was performed in accordance with IEC 61000-4-8. The standard configuration as outlined in IEC 61000-4-8 was used. For further information, please refer to the technical sections of IEC 61000-4-8 in addition to the test results section and photographs of the test set-up provided in this report.

Figure 10. Power Frequency Magnetic Field Immunity Test Setup



NOT TO SCALE

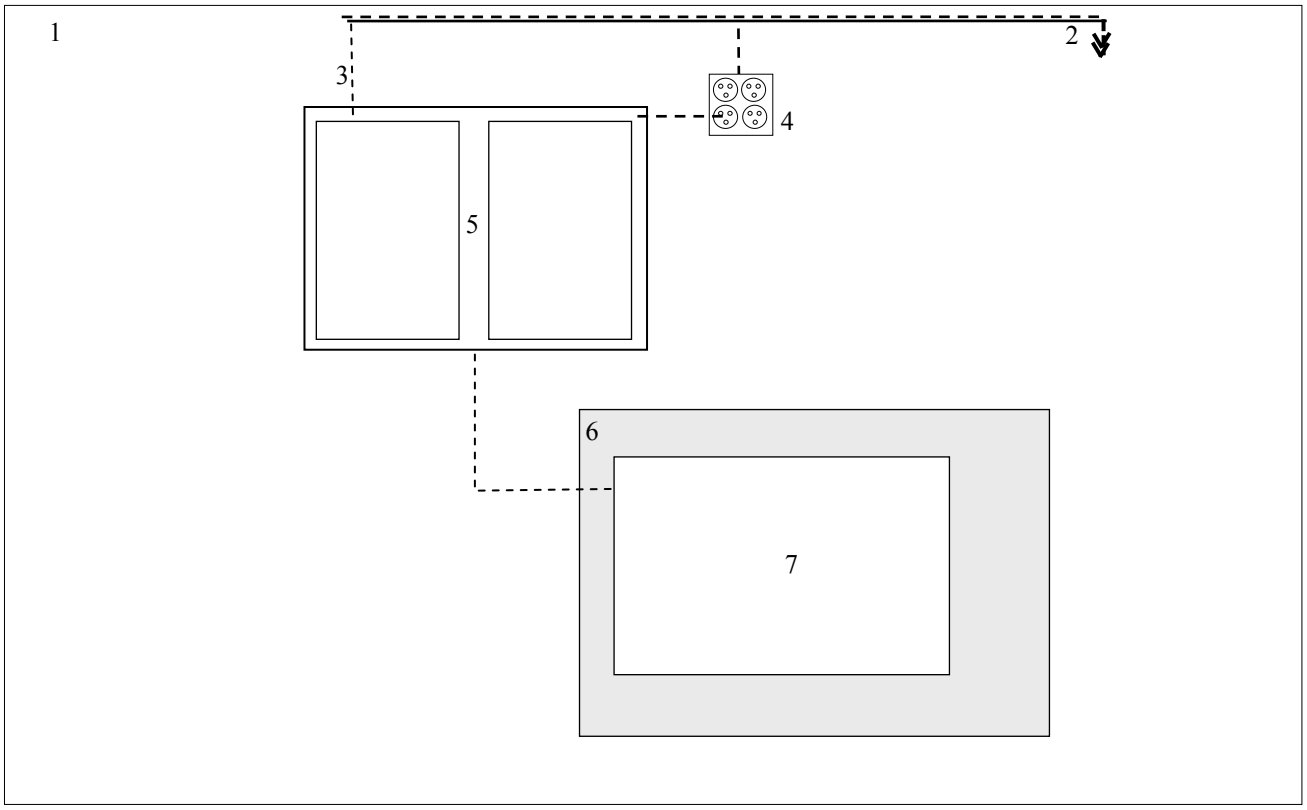
CONFIGURATION LEGEND

1. Test laboratory
2. AC Power for devices
3. AC Power Supply
4. Mains Power for EUT
5. Helmholtz Coil
6. Non-Conductive Table
7. EUT

4.15. Voltage Dips and Short Interruptions: IEC 61000-4-11: 2004

This test subjects the EUT to power network faults and "brownouts". Testing was performed in accordance with IEC 61000-4-11. The standard configuration as outlined in the IEC 61000-4-11 was used. The EUT is powered up to a nominal voltage of 230 VAC 50 Hz, and then software-controlled voltage dips and interruptions are introduced. For further information, please refer to the technical sections of the IEC 61000-4-11 in addition to the test results section and photographs of the test set-up provided in this report.

Figure 11. Voltage Dips and Short Interruptions Test Setup Diagram



NOT TO SCALE

CONFIGURATION LEGEND

1. Test Laboratory (6 X 6 meters)
2. AC Power for Devices
3. 120/208VAC/60Hz Power for Harmonics/Flicker Test Equipment
4. 115V/60 Hz Power Distribution Box
5. Power Source Rack with Computer Analysis System
6. Non-conducting table
7. EUT and Associated System

4.16. Oscillatory Waves Immunity: IEC 61000-4-12: 2006

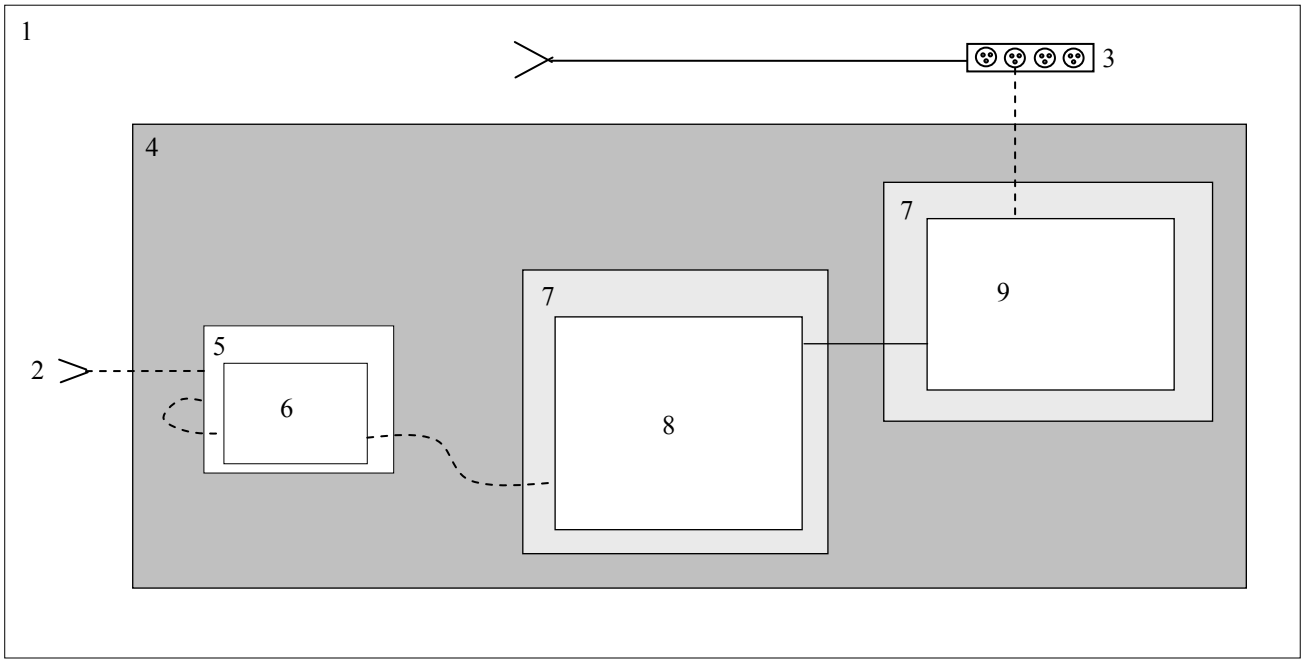
The standard relates to the immunity requirements, test methods, and range of recommended test levels for low voltage equipment to oscillatory waves / transients. The standard configuration as outlined in IEC 61000-4-12: 2006, section 8 was used.

Each device was tested in a total of three configurations:

#1: Ring Wave, Line to Protective Earth with 12 Ohm, common mode, generator earthed.
#2: Ring Wave, Neutral to Protective Earth with 12 Ohm, common mode, generator earthed.
#3: Ring Wave, Line to Neutral with 12 Ohm, differential mode, generator floated.

For further information, please refer to the technical sections in the IEC 61000-4-12: 2006 in addition to the test results section and photographs of the test set-up provided in this report.

Figure 12. Oscillatory Waves Immunity Test Setup Diagram



NOT TO SCALE

CONFIGURATION LEGEND

1. Test Laboratory
2. AC power for Devices
3. Power strip for associated devices from power line filter
4. Copper Ground Plane
5. Surge Generator
6. Surge Coupling Network
7. Nonconductive tables 80cm above Ground Plane
8. EUT
9. Associated System

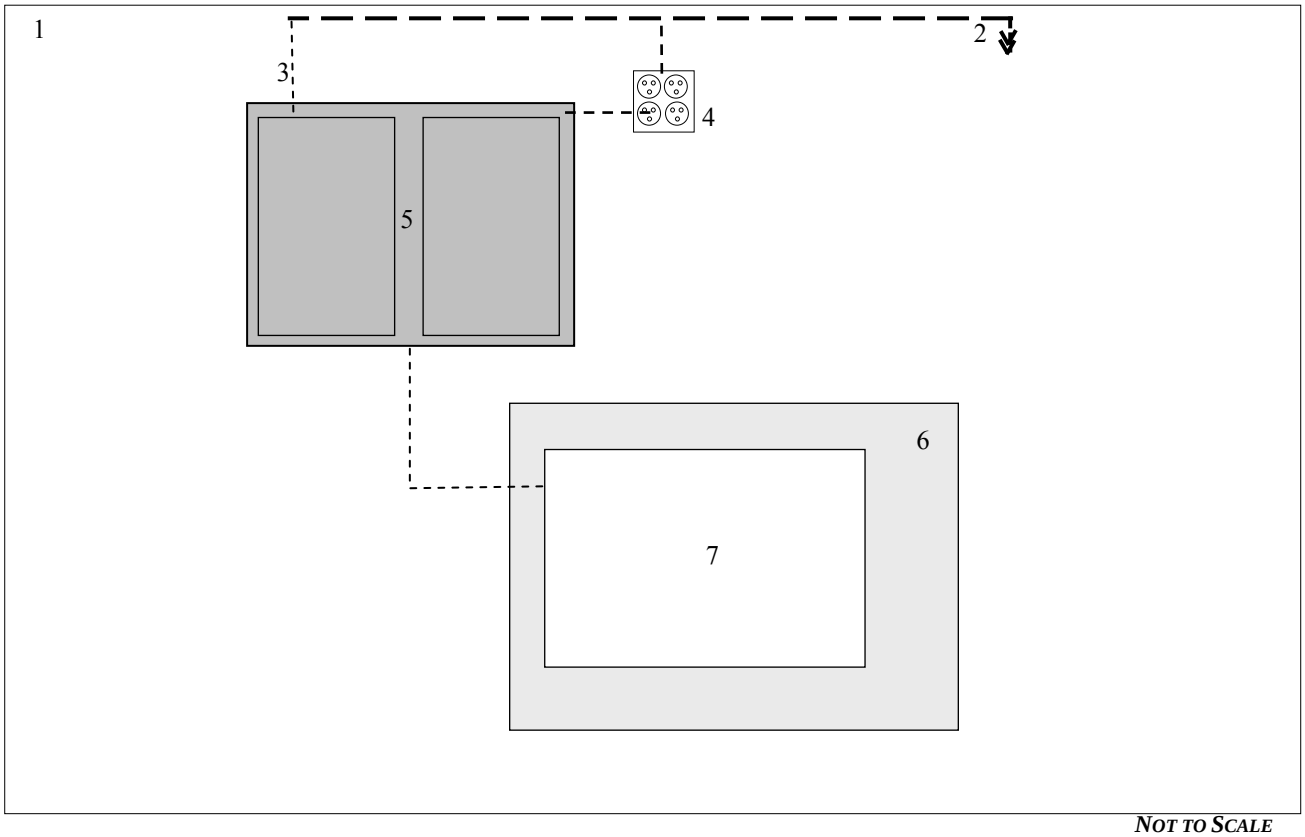
4.17. Voltage Fluctuation Immunity: IEC 61000-4-14:1999 + A1:2004

The standard relates to the immunity requirements, test methods, and range of recommended test levels for low amplitude voltage fluctuations. The standard configuration as outlined in IEC 61000-4-14:1999 + A1:2004, section 5 was used.

Each device was tested in a level as customer requested as Class 3: $\Delta U = 12\% U_n$ for equipment connected to heavily disturbed networks (i.e. industrial networks).

For further information, please refer to the technical sections in the IEC 61000-4-14:1999 + A1:2004 in addition to the test results section and photographs of the test set-up provided in this report.

Figure 13. Voltage Fluctuation Immunity Test Setup Diagram



NOT TO SCALE

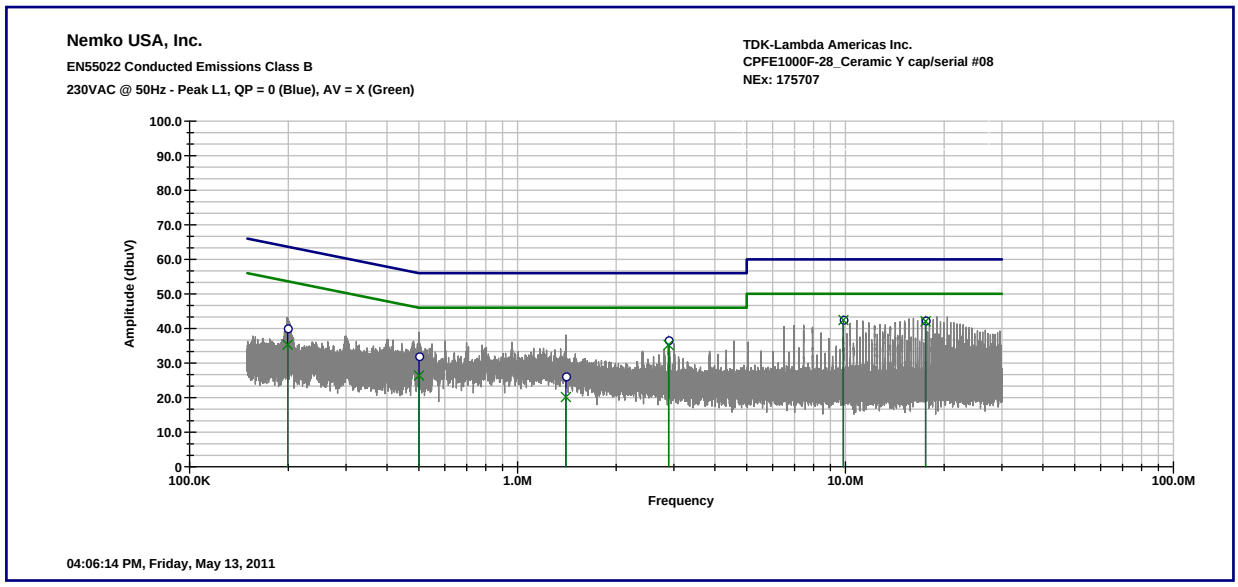
CONFIGURATION LEGEND

1. Test Laboratory (6 X 6 meters)
2. AC Power for Devices
3. 120/208VAC/60Hz Power for Harmonics/Flicker Test Equipment
4. 115V/60 Hz Power Distribution Box
5. Power Source Rack with Computer Analysis System
6. Non-conducting table
7. EUT and Associated System

5. CE-mark Test Results

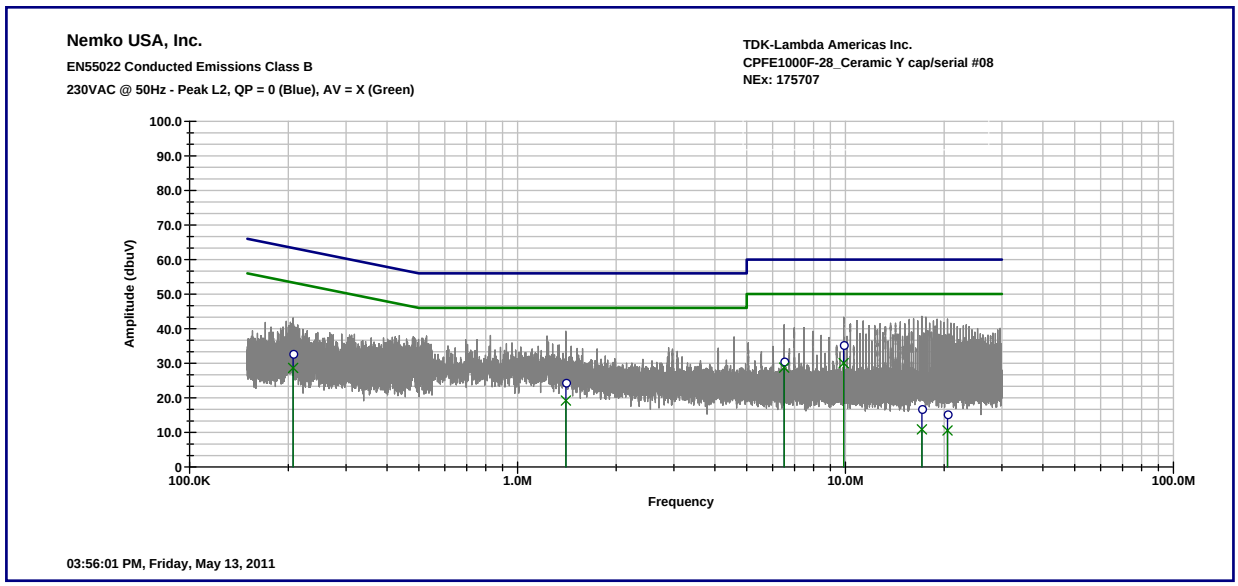
5.1. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc.	Temperature	21	°C
Quote #:	1027254	Relative Humidity	48	%
EUT Name	Power supply for building-in	Barometric Pressure	101.4	kPa
EUT Model	CPFE1000F-28	Test Location	Enclosure 1	
Governing Doc	EN 55022	Test Engineer	Alex Chang	
Basic Standard	CISPR 22	Date	May 13, 2011	
Voltage:	230 Vac / 50Hz, Line 1			



Frequency	Measured		Limit		Margin	
(kHz)	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
199.1	40.1	35.3	63.6	53.6	-23.6	-18.3
500.9	32.0	26.4	56.0	46.0	-24.0	-19.6
1404.0	26.2	20.2	56.0	46.0	-29.8	-25.8
2887.0	36.7	35.3	56.0	46.0	-19.3	-10.7
9859.0	42.5	42.5	60.0	50.0	-17.5	-7.6
17555.0	42.4	42.1	60.0	50.0	-17.6	-7.9

Client	TDK-Lambda Americas Inc.	Temperature	21	°C
Quote #:	1027254	Relative Humidity	48	%
EUT Name	Power supply for building-in	Barometric Pressure	101.4	kPa
EUT Model	CPFE1000F-28	Test Location	Enclosure 1	
Governing Doc	EN 55022	Test Engineer	Alex Chang	
Basic Standard	CISPR 22	Date	May 13, 2011	
Voltage:	230 Vac / 50Hz, Line 2			



Frequency	Measured		Limit		Margin	
(kHz)	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
206.9	32.8	28.6	63.3	53.3	-30.5	-24.7
1404.0	24.4	19.2	56.0	46.0	-31.6	-26.8
6503.0	30.6	28.7	60.0	50.0	-29.4	-21.3
9871.0	35.3	30.0	60.0	50.0	-24.7	-20.0
17097.0	16.8	10.9	60.0	50.0	-43.2	-39.1
20469.0	15.3	10.6	60.0	50.0	-44.7	-39.4

Conducted Emissions Test Equipment

Client	TDK-Lambda Americas Inc.	EUT Name	Power supply for building-in
Quote #:	1027254	EUT Model	CPFE1000F-28

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
E1018	Spectrum Analyzer	R & S	FSP7	835363/0003	Feb. 01, 2011	Feb. 01, 2012
684	Transient Limiter	HP	11974A	3107A02636	Sep. 10, 2010	Sep. 10, 2011
805	LISN	Solar	9348-50-R-24-BNC	992823	Feb. 07, 2011	Feb. 07, 2012

5.2. Radiated Emissions Test Data

Radiated Emissions Data

Job # :	1027254	Date :	5/16 and 5/18	Page 1 of 1	
NEX #:	175707	Time :	10:30am		
		Staff :	AC		
Client Name :	TDK-Lambda Americas Inc.			EUT Voltage :	230
EUT Name :	Power supply for building-in			EUT Frequency :	50
EUT Model # :	CPFE1000F-28			Phase:	1
EUT Serial # :	CLW-132S17-0008 S490			NOATS	X
EUT Config. :	EUT with 0.8 ohm resistors load			SOATS	
				Distance < 1000 MHz:	10 m
				Distance > 1000 MHz:	3 m
Specification :	EN55022: Class B				
Loop Ant. #:	NA				
Bicon Ant.#:	128_10m	Temp. (°C) :	21		
Log Ant.#:	755_10m	Humidity (%) :	48		
DRG Ant. #	NA	Spec An.#:	898/899		
Cable LF#:	NOATS	Spec An. Display #:	898/899		
Cable HF#:	NA	QP #:	898/899		
Preamp LF#:	NA	PreSelect#:	N/A		
Preamp HF#	NA				

Quasi-Peak	RBW:	120 kHz
	Video Bandwidth	300 kHz
Peak	RBW:	1 MHz
	Video Bandwidth	3 MHz
Average	RBW:	1 MHz
	Video Bandwidth	10 Hz

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.

Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
33.5	15.3	15.6	Q	R	2.5	15.6	29.3	30.0	-0.7	Pass	28V model
35.9	14.5	12.8	Q	R	1.5	14.5	26.7	30.0	-3.3	Pass	
67.2	16.2	7.3	Q	R	1.5	16.2	27.3	30.0	-2.7	Pass	
137.3	12.0	9.0	Q	L	1.0	12	24.8	30.0	-5.2	Pass	
145.1	12.4	7.4	Q	L	1.0	12.4	26.0	30.0	-4.0	Pass	
150.9	13.2	8.8	Q	L	1.5	13.2	27.8	30.0	-2.2	Pass	

Radiated Emissions Test Equipment

Client	TDK-Lambda Americas Inc.	EUT Name	Power supply for building-in
Quote #	1027254	EUT Model	CPFE1000F-28

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
128	Bicon Antenna	EMCO	3104	2882	Mar. 21, 2011	Mar. 21, 2013
755	LPA Antenna	EMCO	3147	1246	Jul. 23, 2009	Jul. 23, 2011
898	EMI Receiver & filter set	HP	8546A	3625A00348	Jun. 22, 2010	Jun. 22, 2011
899	Filter Section	HP	85460A	3448A00288	Jun. 22, 2010	Jun. 22, 2011

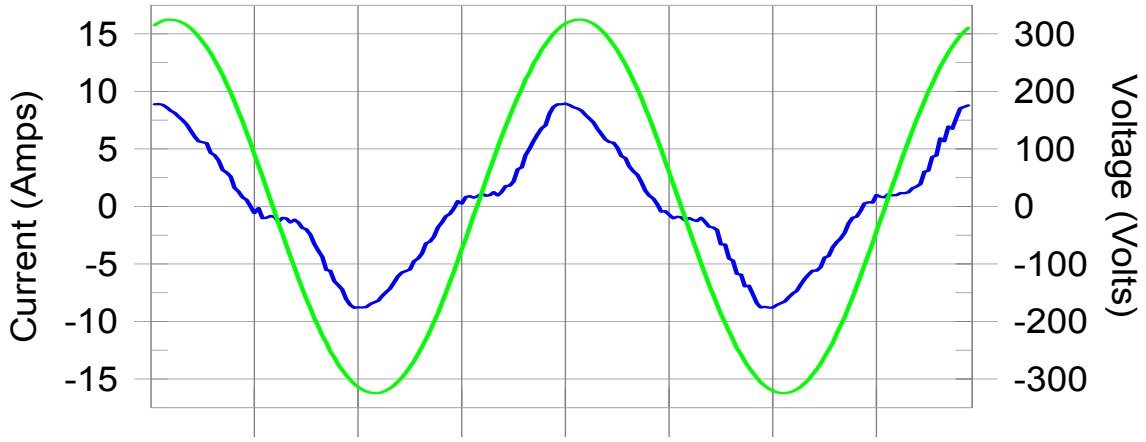
5.3. Power Line Harmonics Test Results

Harmonics – Class-A per Ed. 3.2 (2009)(Run time)

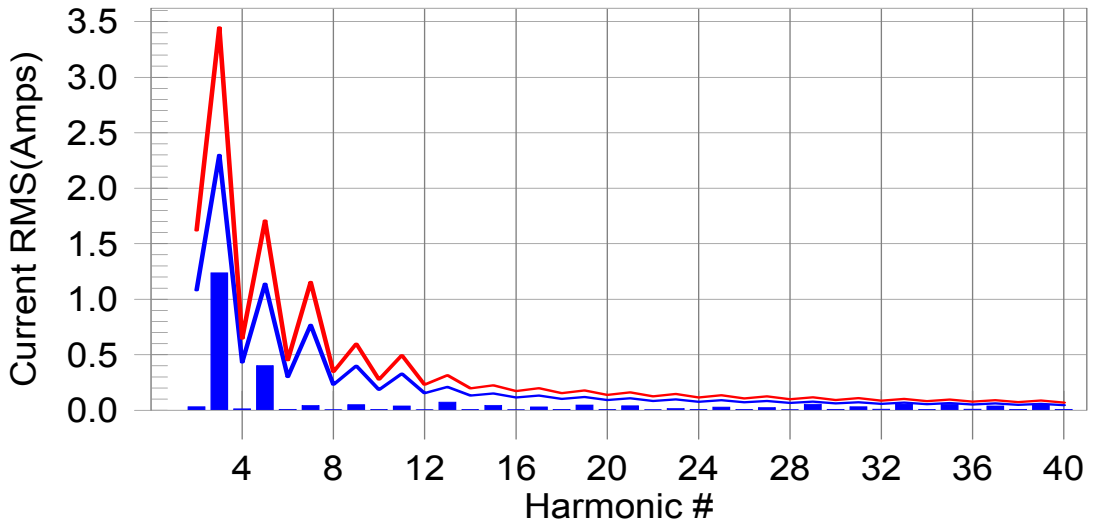
EUT: Power supply for building-in — Tested by: Alex Chang
Test category: Class-A per Ed. 3.2 (2009) (European limits) — Test Margin: 100
Test date: 5/17/2011 — Start time: 10:34:01 AM — End time: 11:04:22 AM
Test duration (min): 30 — Data file name: H-000085.cts_data
Comment: **28VDC output model with 0.8ohm resistor load**
Customer: TDK-Lambda Americas Inc.

Test Result: Pass — Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line — European Limits



Test result: Pass — Worst harmonic was #39 with 78.28% of the limit.

Current Test Result Summary (Run time)

EUT: Power supply for building-in
Tested by: Alex Chang
Test category: Class-A per Ed. 3.2 (2009) (European limits)
Test Margin: 100
Test date: 5/17/2011
Start time: 10:34:01 AM
End time: 11:04:22 AM
Test duration (min): 30
Data file name: H-000085.cts_data
Comment: **28VDC output model with 0.8ohm resistor load**
Customer: TDK-Lambda Americas Inc.

Test Result: Pass
Source qualification: Normal
THC(A): 1.30
I-THD(%): 26.42
POHC(A): 0.089
POHC Limit(A): 0.295
Highest parameter values during test:

V_RMS (Volts):	230.01	Frequency(Hz):	50.00
I_Peak (Amps):	9.047	I_RMS (Amps):	5.223
I_Fund (Amps):	5.070	Crest Factor:	1.773
Power (Watts):	1154.8	Power Factor:	0.964

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.031	1.080	2.9	0.032	1.620	1.97	Pass
3	1.226	2.300	53.3	1.237	3.450	35.84	Pass
4	0.011	0.430	0.0	0.012	0.645	1.82	Pass
5	0.400	1.140	35.1	0.402	1.710	23.49	Pass
6	0.007	0.300	0.0	0.008	0.450	1.81	Pass
7	0.021	0.770	4.7	0.043	1.155	3.70	Pass
8	0.002	0.230	0.0	0.003	0.345	0.93	Pass
9	0.044	0.400	11.0	0.049	0.600	8.23	Pass
10	0.005	0.184	0.0	0.006	0.276	2.12	Pass
11	0.006	0.330	10.7	0.039	0.495	7.95	Pass
12	0.003	0.153	0.0	0.003	0.230	1.41	Pass
13	0.070	0.210	33.2	0.074	0.315	23.38	Pass
14	0.004	0.131	0.0	0.005	0.197	2.52	Pass
15	0.029	0.150	24.3	0.044	0.225	19.50	Pass
16	0.001	0.115	0.0	0.003	0.173	1.81	Pass
17	0.024	0.132	0.0	0.030	0.199	15.00	Pass
18	0.006	0.102	0.0	0.007	0.153	4.57	Pass
19	0.024	0.118	30.5	0.047	0.178	26.36	Pass
20	0.004	0.092	0.0	0.004	0.138	3.08	Pass
21	0.037	0.107	35.0	0.040	0.161	24.81	Pass
22	0.002	0.084	0.0	0.003	0.125	2.58	Pass
23	0.014	0.098	0.0	0.015	0.147	10.04	Pass
24	0.005	0.077	0.0	0.005	0.115	4.65	Pass
25	0.020	0.090	0.0	0.028	0.135	21.06	Pass
26	0.002	0.071	0.0	0.005	0.106	4.96	Pass
27	0.007	0.083	0.0	0.023	0.125	18.41	Pass
28	0.003	0.066	0.0	0.004	0.099	4.05	Pass
29	0.044	0.078	57.1	0.054	0.116	46.68	Pass
30	0.003	0.061	0.0	0.007	0.092	8.00	Pass
31	0.019	0.073	43.6	0.032	0.109	29.37	Pass
32	0.007	0.058	0.0	0.008	0.086	9.70	Pass
33	0.029	0.068	58.6	0.056	0.102	54.59	Pass
34	0.003	0.054	0.0	0.005	0.081	6.49	Pass
35	0.049	0.064	76.9	0.053	0.096	55.40	Pass
36	0.006	0.051	0.0	0.010	0.077	13.37	Pass
37	0.027	0.061	55.0	0.038	0.091	42.09	Pass
38	0.005	0.048	0.0	0.008	0.073	10.40	Pass
39	0.045	0.058	78.3	0.049	0.087	56.49	Pass
40	0.002	0.046	0.0	0.008	0.069	10.93	Pass

Voltage Source Verification Data (Run time)

EUT: Power supply for building-in
Tested by: Alex Chang
Test category: Class-A per Ed. 3.2 (2009) (European limits)
Test Margin: 100
Test date: 5/17/2011
Start time: 10:34:01 AM
End time: 11:04:22 AM
Test duration (min): 30
Data file name: H-000085.cts_data
Comment: **28VDC output model with 0.8ohm resistor load**
Customer: TDK-Lambda Americas Inc.

Test Result: Pass
Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms):	230.01	Frequency(Hz):	50.00
I_Peak (Amps):	9.047	I_RMS (Amps):	5.223
I_Fund (Amps):	5.070	Crest Factor:	1.773
Power (Watts):	1154.8	Power Factor:	0.964

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.085	0.460	18.54	OK
3	0.514	2.070	24.84	OK
4	0.075	0.460	16.37	OK
5	0.256	0.920	27.84	OK
6	0.042	0.460	9.19	OK
7	0.082	0.690	11.92	OK
8	0.023	0.460	5.05	OK
9	0.075	0.460	16.32	OK
10	0.012	0.460	2.56	OK
11	0.047	0.230	20.56	OK
12	0.023	0.230	9.89	OK
13	0.052	0.230	22.82	OK
14	0.011	0.230	4.72	OK
15	0.042	0.230	18.23	OK
16	0.007	0.230	2.85	OK
17	0.023	0.230	9.79	OK
18	0.021	0.230	9.09	OK
19	0.039	0.230	16.80	OK
20	0.015	0.230	6.47	OK
21	0.032	0.230	14.01	OK
22	0.008	0.230	3.29	OK
23	0.016	0.230	6.84	OK
24	0.021	0.230	9.26	OK
25	0.040	0.230	17.22	OK
26	0.011	0.230	4.59	OK
27	0.037	0.230	16.22	OK
28	0.012	0.230	5.06	OK
29	0.080	0.230	34.89	OK
30	0.020	0.230	8.79	OK
31	0.049	0.230	21.10	OK
32	0.021	0.230	9.07	OK
33	0.095	0.230	41.32	OK
34	0.020	0.230	8.68	OK
35	0.094	0.230	41.09	OK
36	0.033	0.230	14.21	OK
37	0.095	0.230	41.26	OK
38	0.023	0.230	10.21	OK
39	0.102	0.230	44.17	OK
40	0.025	0.230	11.03	OK

Flicker Test Summary per EN/IEC61000-3-3 (Run time)

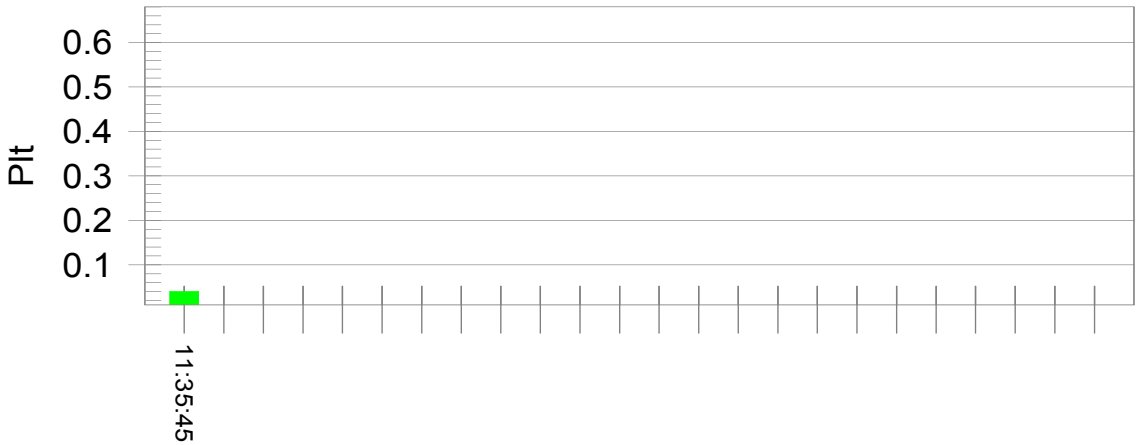
EUT: Power supply for building-in
Test category: All parameters (European limits)
Test date: 5/17/2011 Start time: 11:05:25 AM End time: 11:35:46 AM
Test duration (min): 30 Data file name: F-000086.cts_data
Comment: **28VDC output model with 0.8ohm resistor load**
Customer: TDK-Lambda Americas Inc.

Tested by: Alex Chang
Test Margin: 100

Test Result: Pass Status: Test Completed

Pst_i and limit line European Limits

Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	228.39			
Highest dt (%):	0.00	Test limit (%):	3.30	Pass
Time(mS) > dt:	0.0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.00	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.064	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.040	Test limit:	0.650	Pass

Power Line Harmonics and Flicker Test Equipment

Client	TDK-Lambda Americas Inc.	Temperature	23	°C
Quote #:	1027254	Relative Humidity	46	%
EUT Name	Power supply for building-in	Barometric Pressure	101.7	kPa
EUT Model	CPFE1000F-28	Test Location	West Ground Plane 2	
		Test Engineer	Alex Chang	
		Date	May 17, 2011	

Governing Doc	X	**IEC/EN 61000**		**IEC/EN 60601-1-2**		
Basic Standard	X	**IEC 61000-3-2**	X	**IEC 61000-3-3**		**IEC 61000-4-11**
Test Voltage	X	**230VAC @ 50Hz**		**120VAC @ 60Hz**		**220VAC @ 60Hz**

Equipment Used	**Used**	**Asset #**	**Cal Done**	**Cal Due**
California Instruments AC Power	X	604	Mar. 21, 2011	Mar. 21, 2012
Xitron 2520 Standard Impedance	X	581	Mar. 21, 2011	Mar. 21, 2012
Teseq CCN 1000-3-75	X	961	Mar. 21, 2011	Mar. 21, 2012

Photo X

5.4. Electrostatic Discharge Immunity Test Results & Test Points

Client:	TDK-Lambda Americas Inc.	Temperature:	23	°C
Quote #:	1027254	Relative Humidity:	38	%
EUT Name:	Power supply for building-in	Barometric Pressure:	100.9	kPa
EUT Model:	CPFE1000F-28	Test Location	ESD Room	
Governing Doc:	EN 55024	Test Engineer	Alex Chang	
Basic Standard:	IEC 61000-4-2	Date:	May 24, 2011	
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, Schaffner	NSG 435	818	X	Jul. 06, 2010	Jul. 06, 2011
Multimeter, Fluke	111	815	X	Aug. 04, 2010	Aug. 04, 2011

Contact Discharge

Voltage (kV)	Polarity		Locations	HCP	VCP
	Pos	Neg			
2	X	X		X	X
4	X	X		X	X

Comments: No susceptibility noted.

Air Discharge

Voltage (kV)	Polarity		Locations
	Pos	Neg	
2	X	X	
4	X	X	
8	X	X	

Comments: No susceptibility noted.

"Spark" event locations.

Compliant	X	Non-Compliant		Photo	X

Figure 14. ESD Test Points

Contact Discharges =

Air Discharges =

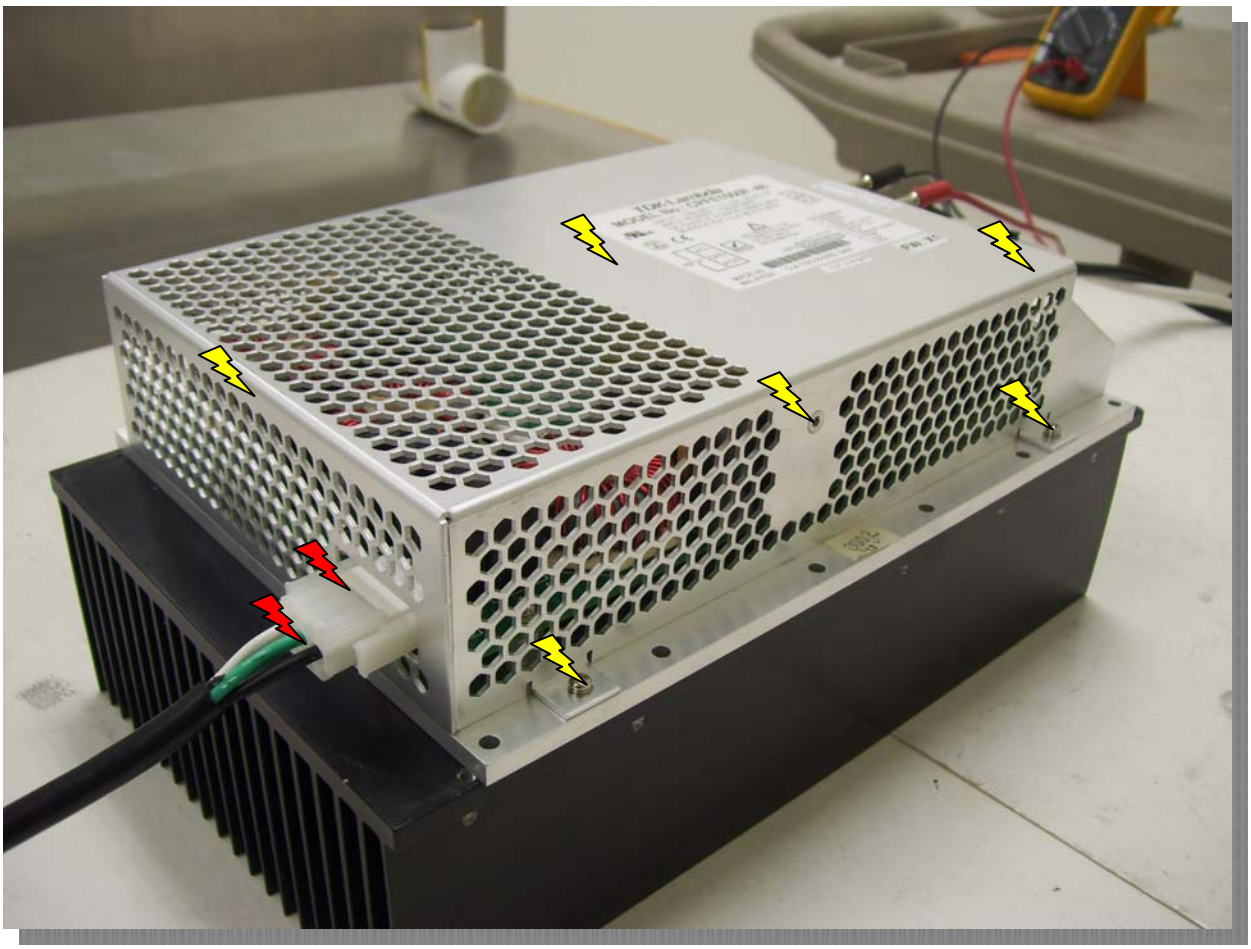


Figure 15. ESD Test Points

Contact Discharges =

Air Discharges =

5.5. Radio Frequency Immunity Test Results

Client:	TDK-Lambda Americas Inc.	Temperature:	23 °C
Quote #:	1027254	Relative Humidity:	46 %
EUT Name:	Power supply for building-in	Barometric Pressure:	101.7 kPa
EUT Model:	CPFE1000F-28	Test Location	Anechoic Chamber
Governing Doc:	EN 55024	Test Engineer	Alex Chang
Basic Standard:	IEC 61000-4-3	Date:	May 14, 2011
Voltage:	230VAC/ 50Hz		

Threat Levels

Frequency (MHz):		27-500	X	80-1000		26-1000		80-2500
Test Level:		1V/m		3V/m	X	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	X		F	DC output voltage fluctuated, but within customer voltage tolerance
80-200	X	X	X		R	DC output voltage fluctuated, but within customer voltage tolerance
80-200	X	X	X		SL	DC output voltage fluctuated, but within customer voltage tolerance
80-200	X	X	X		SR	DC output voltage fluctuated, but within customer voltage tolerance
200-1000	X	X	X		SR	No susceptibility noted.
200-1000	X	X	X		SL	No susceptibility noted.
200-1000	X	X	X		R	No susceptibility noted.
200-1000	X	X	X		F	No susceptibility noted.

Compliant [X] Not Compliant [ ] Photo [X]

Radio Frequency Immunity Test Equipment

Client	TDK-Lambda Americas Inc.	EUT Name	Power supply for building-in
Quote #:	1027254	EUT Model	CPFE1000F-28

Device Type	*Model #*	*Asset #*	*Used*	*Cal Done*	*Cal Due*
Signal Generator					
Agilent	E8254A	836			
HP	8648	746			
Gigatronics	1018	440			
Fluke	6060B	212			
Pulse Function Generator	8116A	407			
SIGNAL GENERATOR, HP	8673C	932	X	May 24, 2010	May 24, 2011
Signal Generator, HP	8642B	751	X	May 27, 2010	May 27, 2011
Other					
Boonton	EMCO				
Multimeter, Fluke	111	814	X	Oct. 04, 2010	Oct. 04, 2011
Field Sensors					
AR	FP4000	730			
AR	FP4080	733			
ETS Lindgren	HI-6005	922	X	Dec. 17, 2010	Dec. 17, 2011
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	X	NCR	NCR
AR	DC714D	724		NCR	NCR
AR	200T2G8M4	848		NCR	NCR
AR	DC7280	726		NCR	NCR
AR	200T8G18M3	745		NCR	NCR
AR	DC7450	723		NCR	NCR
Antennas					

Manufacturer	*Model*	*VSWR*	*Asset #*	*Used*	*Cal Done*	*Cal Due*
EMCO	3109	1.9:1	EA 2466	X	NCR	NCR
Electro-Metrics	RGA-25	2.0:1	372	X	NCR	NCR
Electro-Metrics	RGA-30	1.5:1	350			
EMCO	3115	1.5:1	752		NCR	NCR
EMCO	3115	1.5:1	529		NCR	NCR
AH Systems	SAS-571	1.6:1	877		NCR	NCR
AR	AT4002A	1.6:1	728	X	NCR	NCR

5.6. Electrical Fast Transient Burst Immunity Test Results

Client	TDK-Lambda Americas Inc.	Temperature	21	°C
Quote #:	1027254	Relative Humidity	46	%
EUT Name	Power supply for building-in	Barometric Pressure	101.6	kPa
EUT Model	CPFE1000F-28	Test Location	West Ground Plane 2	
Governing Doc	EN 55024	Test Engineer	Alex Chang	
Basic Standard	IEC 61000-4-4	Date	May 19, 2011	

Test Level:

AC / DC Mains / Control Ports	X	0.5kV	X	1.0kV	X	2.0kV		4.0kV		_____
Signal Ports		0.25kV		0.5kV		1.0kV		2.0kV		_____

Test Duration: [X] 61 sec [ ] _____

Test Equipment	**Asset #**	**Used**	**Calibration Done**	**Calibration Due**
EMC Partner Transient 2000	845	X	Oct. 04, 2010	Oct. 04, 2011
Fluke Multimeter	815	X	Aug. 04, 201	Aug. 04, 2011

Performance Criteria: [ ] **A** [X] **B** [ ] **C**

Direct Injection Output Path

Test Level	Polarity (+/-)	L1	L2	PE	Comments
2.0kV	+/-	X			Minor mV fluctuation
2.0kV	+/-		X		Minor mV fluctuation
2.0kV	+/-			X	EUT voltage fluctuated 250mV on 28VDC output model, self-recoverable
2.0kV	+/-	X	X		Minor mV fluctuation
2.0kV	+/-		X	X	Minor mV fluctuation
2.0kV	+/-	X		X	Minor mV fluctuation
2.0kV	+/-	X	X	X	Minor mV fluctuation

Cable Description (Clamp Injection)

.5kV	+/-		No I/O port.

Compliant [X] Non-Compliant [ ] Photo [X]

5.7. Power Line Surge Immunity Test Results

Client	TDK-Lambda Americas Inc.	Temperature	27	°C
Quote #:	1027254	Relative Humidity	33	%
EUT Name	Power supply for building-in	Barometric Pressure	100.9	kPa
EUT Model	CPFE1000F-28	Test Location	ESD Room	
Governing Doc	EN 55024	Test Engineer	Alex Chang	
Basic Standard	IEC 61000-4-5	Date	May 24, 2011	

EUT Power:	**Number of Strikes per Voltage:**	**Angle**	**Repetitions**	**Polarity**
[X] 230VAC @ 50Hz	[ ] Five (5)	0º	5	+/-
[ ] 220VAC @ 60Hz	[X] Twenty (20)	90º	5	+/-
[ ] 120VAC @ 60 Hz	[ ]	180º	5	+/-
[ ] 230/400VAC @ 50 Hz	[ ]	270º	5	+/-
		360º	0	+/-

Waveform Generator Type: [ ] Ring Wave [X] Combination

Test Equipment:	**Used**	**Asset #**	**Calibration Done**	**Calibration Due**
EMC Partner Multi Generator	X	845	Oct. 04, 2010	Oct. 04, 2011
Fluke Multimeter	X	815	Aug. 04, 201	Aug. 04, 2011

Performance Criteria: [ ] A [X] B [ ] **C**

L - Gnd	[X] 0.5kV (Level 1)	[X] 1.0kV (Level 2)	[X] 2.0kV (Level 3)	[X] 4.0kV (Level 4)	[ ] ??kV (Special)
L - L	[X] 0.25kV (Level 1)	[X] 0.5kV (Level 2)	[X] 1.0kV (Level 3)	[X] 2.0kV (Level 4)	[ ] ??kV (Special)

	Level 1				**Level 2**				**Level 3**				**Level 4**				**Special**			
	CM		DM		CM		DM		CM		DM		CM		DM		CM		DM	
	0.5kV		0.25kV		1.0kV		0.5kV		2.0kV		1.0kV		4.0kV		2.0kV					
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
N–Gnd	**X**	**X**			**X**	**X**			**X**	**X**			**X**	**X**						
L1–Gnd	**X**	**X**			**X**	**X**			**X**	**X**			**X**	**X**						
N-L1			**X**	**X**		**X**	**X**			**X**	**X**				**X**	**X**				

Compliant [X] Non-Compliant [ ] Photo [X]

5.8. RF Conducted Common Mode Disturbance Immunity Test Results

Client	TDK-Lambda Americas Inc.	Temperature	22 ˚C
Quote #:	1027254	Relative Humidity	46 %
EUT Name	Power supply for building-in	Barometric Pressure	101.7 kPa
EUT Model	CPFE1000F-28	Test Location	West Ground Plane 2
Governing Doc	EN 55024	Test Engineer	Alex Chang
Basic Standard	IEC 61000-4-6	Date	May 19, 2011

Test Level:		3Vrms	X	10Vrms		Selected Frequencies
Modulation:		None (CW)		80%AM @ 1kHz		
Frequency Range:	X	0.15 – 80 MHz		0.15-230MHz		
Step:	X	1%		10%		1.5 x 10^{-3} /decade
Dwell:	X	3 seconds				
Performance Criteria:		A	X	B		

1	Injection Point	AC Mains	Injection Method:	Clamp	X CDN
Comments:		EUT voltage fluctuated 280mV on 28VDC output model, self-recoverable			
2	Injection Point		Injection Method:	Clamp	CDN
Comments:					
3	Injection Point (Cable)		Injection Method:	Clamp	CDN
Comments:					
4	Injection Point (Cable)		Injection Method:		
Comments:					
5	Injection Point (Cable)		Injection Method:		
Comments:					

Test Equipment Used	Asset #	X if Used	Calibration Done	Calibration Due
HP 8657A (Signal Generator)	948	X	Nov. 18, 2010	Nov. 18, 2011
Boonton 4232A (RF Power Meter)	887	X	Aug. 11, 2010	Aug. 11, 2011
Werlatone, Directional Coupler	878	X	Apr. 21, 2011	Apr. 21, 2012
Boonton 51011-EMC, Power Sensor	888	X	Aug, 11, 2010	Aug. 11, 2011
Microlab TB-5MN, Termination	330	X	Sep. 29, 2010	Sep. 29, 2011
FCC-801-M3-25 (CDN)	466	X	Aug. 12, 2010	Aug. 12, 2011
EIN 3100L (Amplifier)	913	X	NCR	NCR
Fluke 111, Multimeter	815	X	Aug. 04, 2010	Aug. 04, 2011

Compliant	X	Non-Compliant		Photo	X

5.9. Power Frequency Magnetic Field Immunity

Client:	TDK-Lambda Americas Inc.	Temperature:	23 °C
Quote #:	1027254	Relative Humidity:	54 %
EUT Name:	Power supply for building-in	Barometric Pressure:	101.8 kPa
EUT Model:	CPFE1000F-28	Test Location:	West Ground Plane 2
Governing Doc:	EN 55024	Test Engineer:	Alex Chang
Basic Standard:	IEC 61000-4-8	Date:	May 17, 2011
Voltage:	230VAC @ 50Hz		

Frequency:		DC		60Hz	X	50Hz		
Threat Level:		1A/m		3A/m	X	30A/m		
Duration Per Axis:	X	5 Min						
Criteria:	X	A		B		C		

Test Equipment List

Test Equipment Used	Asset #	Used	Calibration Done	Calibration Due
Nemko Magnetic Coil, Small	821	X	NCR	NCR
ELGAR Power Supply	220	X	NCR	NCR
Narda ELT-400	851	X	Jul. 14, 2010	Jul. 14, 2011
Narda B-field sensor	852	X	Jul. 14, 2010	Jul. 14, 2011
Fluke Multimeter Model 111	815	X	Aug. 04, 2010	Aug. 04, 2011
Beckman Digital Multimeter, Model 2020	516	X	Jul. 06, 2010	Jul. 06, 2011

Test Axis	Compliant Y	Compliant N	Comments
X	X		No susceptibility noted.
Y	X		No susceptibility noted.
Z	X		No susceptibility noted.

Photo X

5.10. Voltage Dips and Interruptions Immunity Test Results

Client	TDK-Lambda Americas Inc.	Temperature	22	°C
Quote #:	1027254	Relative Humidity	45	%
EUT Name	Power supply for building-in	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000F-28	Test Location	Environmental Room	
Governing Doc	EN 55024	Test Engineer	Alex Chang	
Basic Standard	IEC 61000-4-11	Date	May 26, 2011	

EUT Voltage: [X] **230VAC @ 50Hz** [ ] **120VAC @ 60Hz** [ ]

Equipment Used	Used	Asset #	Cal Done	Cal Due
California Instruments AC Power	X	604	Mar. 21, 2011	Mar. 21, 2012
Xitron 2520 Standard Impedance	X	581	Mar. 21, 2011	Mar. 21, 2012
Teseq CCN 1000-3-75	X	961	Mar. 21, 2011	Mar. 21, 2012
Fluke Multimeter Model 111	X	815	Aug. 04, 2010	Aug. 04, 2011

Changes Occur At: [X] **Zero Crossing** [ ]

Voltage Dips

	% Reduction	Duration sec/period	Criteria A	Criteria B	Criteria C	Compliance Yes	Compliance No
[X]	>95%	10msec / 0.5		X		X	
[ ]	30%	10msec / 0.5					
[X]	>95%	20msec / 1		X		X	
[ ]	30%	500msec / 25					
[X]	60%	200msec / 25			X	X	
[X]	30%	500msec / 25			X	X	
[X]	20%	5000msec / 250			X	X	
[ ]							
[ ]	Not Required						

Comments: No disturbance noted

Voltage Interruptions

	% Reduction	Duration sec/period	Criteria A	Criteria B	Criteria C	Compliance Yes	Compliance No
[X]	>95%	5000msec / 250			X	X	
[ ]	100%	20msec / 1.0					
[ ]							
[ ]	Not Required						

Comments: EUT shuts down and power back up, recovers by itself.

Photo [X]

5.11. Oscillatory Waves Immunity Test Results

Client	TDK-Lambda Americas Inc.	Temperature	21	°C
Quote #:	1027254	Relative Humidity	36	%
EUT Name	Power supply for building-in	Barometric Pressure	100.9	kPa
EUT Model	CPFE1000F-28	Test Location	Environmental Room	
Governing Doc	EN 55024	Test Engineer	Alex Chang	
Basic Standard	IEC 61000-4-12	Date	Jun. 02, 2011 and Jun. 03, 2011	

EUT Power:	**Number of Strikes per Voltage:**	**Angle**	**Repetitions**	**Polarity**
[X] 230VAC @ 50Hz	[ ] Five (5)	0º	5	+/-
[ ] 220VAC @ 60Hz	[X] Twenty (20)	90º	5	+/-
[ ] 120VAC @ 60 Hz	[ ]	180º	5	+/-
[ ] 230/400VAC @ 50 Hz	[ ]	270º	5	+/-
		360º	0	+/-

Waveform Generator Type: [X] Ring Wave [ ] Combination

Test Equipment:	**Used**	**Asset #**	**Calibration Done**	**Calibration Due**
Keytek EMC Pro System	X	1303	Test equipment verified prior to the test	
Fluke Multimeter	X	815	Aug. 04, 2010	Aug. 04, 2011
Oscilloscope	X	935	Sept. 14, 2010	Sept. 14, 2011

Performance Criteria: [X] A [ ] B [ ] **C**

L - Gnd	[ ] 0.5kV (Level 1)	[ ] 1.0kV (Level 2)	[X] 2.0kV (Level 3)	[ ] 4.0kV (Level 4)	[ ] ??kV (Special)
L - L	[ ] 0.25kV (Level 1)	[ ] 0.5kV (Level 2)	[X] 1.0kV (Level 3)	[ ] 2.0kV (Level 4)	[ ] ??kV (Special)

	Class 1				**Class 2**				**Class 3**				**Level 4**				**Special**			
	CM		DM		CM		DM		CM		DM		CM		DM		CM		DM	
	0.5kV		0.25kV		1.0kV		0.5kV		2.0kV		1.0kV		4.0kV		2.0kV					
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
N–Gnd									**X**	**X**										
L1–Gnd									**X**	**X**										
N-L1											**X**	**X**								

Compliant [X] Non-Compliant [ ] Photo [X]

5.12. Voltage Fluctuation Immunity Test Results

Client	TDK-Lambda Americas Inc.	Temperature	22	°C
Quote #:	1027254	Relative Humidity	41	%
EUT Name	Power supply for building-in	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000F-28	Test Location	Environmental Room	
Governing Doc	EN 55024	Test Engineer	Alex Chang	
Basic Standard	IEC 61000-4-14	Date	May 26, 2011	

EUT Voltage: [X] **230VAC @ 50Hz** [ ] **120VAC @ 60Hz** [ ]

Equipment Used	Used	Asset #	Cal Done	Cal Due
California Instruments AC Power	X	604	Mar. 21, 2011	Mar. 21, 2012
Xitron 2520 Standard Impedance	X	581	Mar. 21, 2011	Mar. 21, 2012
Teseq CCN 1000-3-75	X	961	Mar. 21, 2011	Mar. 21, 2012
Fluke Multimeter Model 111	X	815	Aug. 04, 2010	Aug. 04, 2011

Voltage fluctuation % ($\Delta U = \pm 12\% U_n$)

% Fluctuation	Repetition period / Duration	Criteria A	Criteria B	Criteria C	Compliance Yes	Compliance No
[X] +12% (257.6V)	5sec / 2sec	X			X	
[X] -12% (202.4V)	5sec / 2sec	X			X	
[ ]						
[ ] Not Required						

Comments: No disturbance noted

Photo [X]

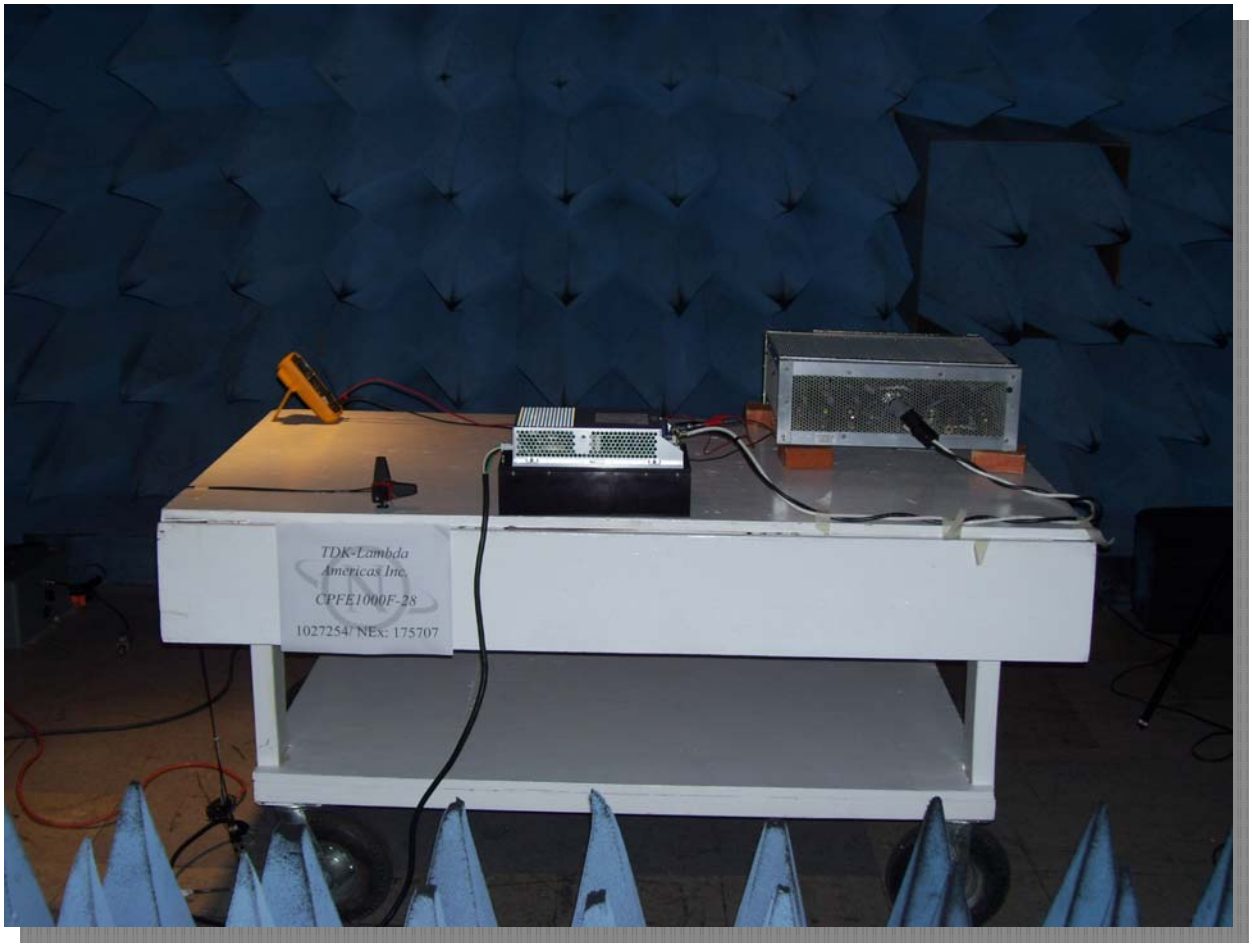
Photograph 3. Conducted Emissions Test Configuration

Photograph 4. Radiated Emissions Test Configuration

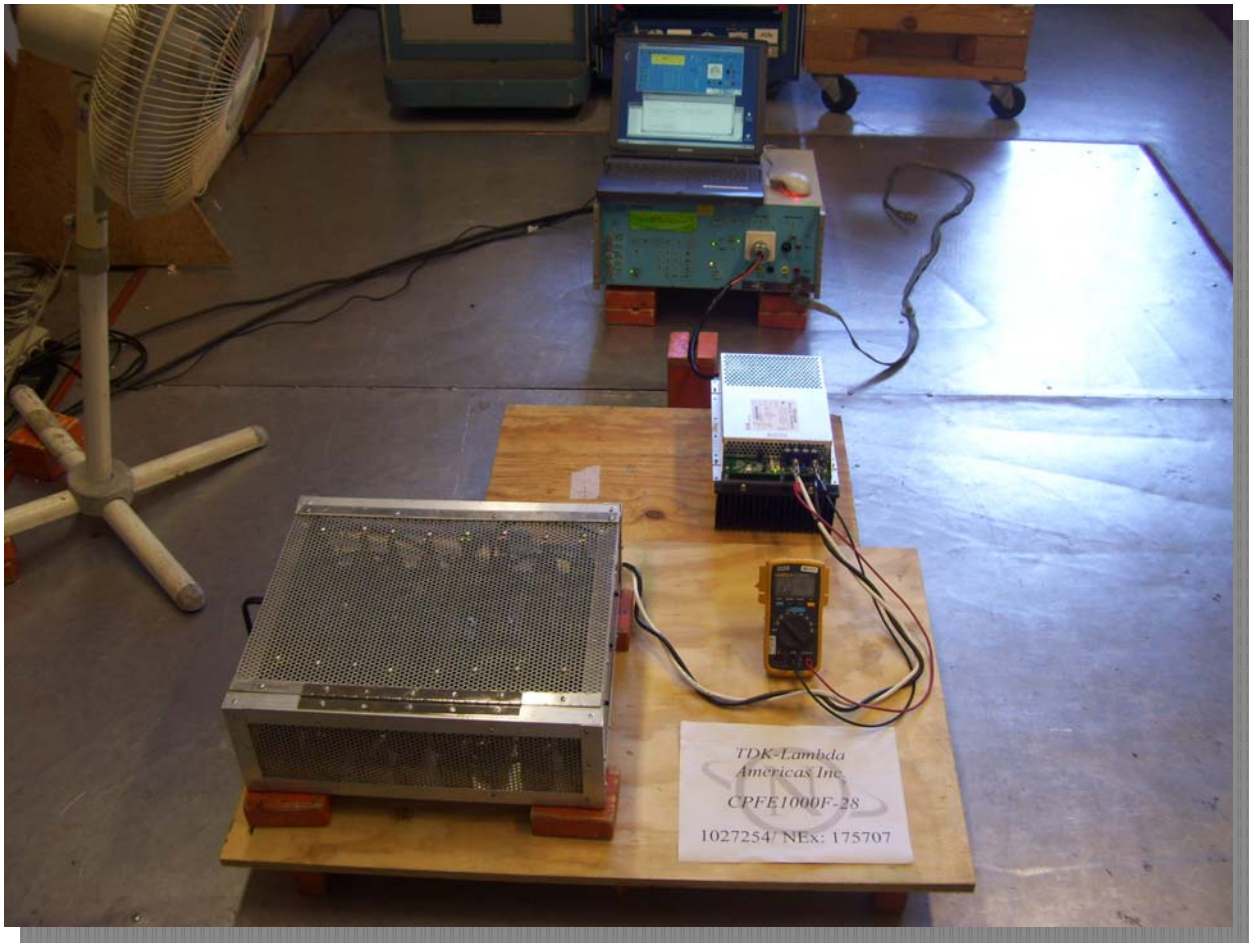
Photograph 5. Harmonics & Flicker Test Configuration

Photograph 6. ESD Test Configuration

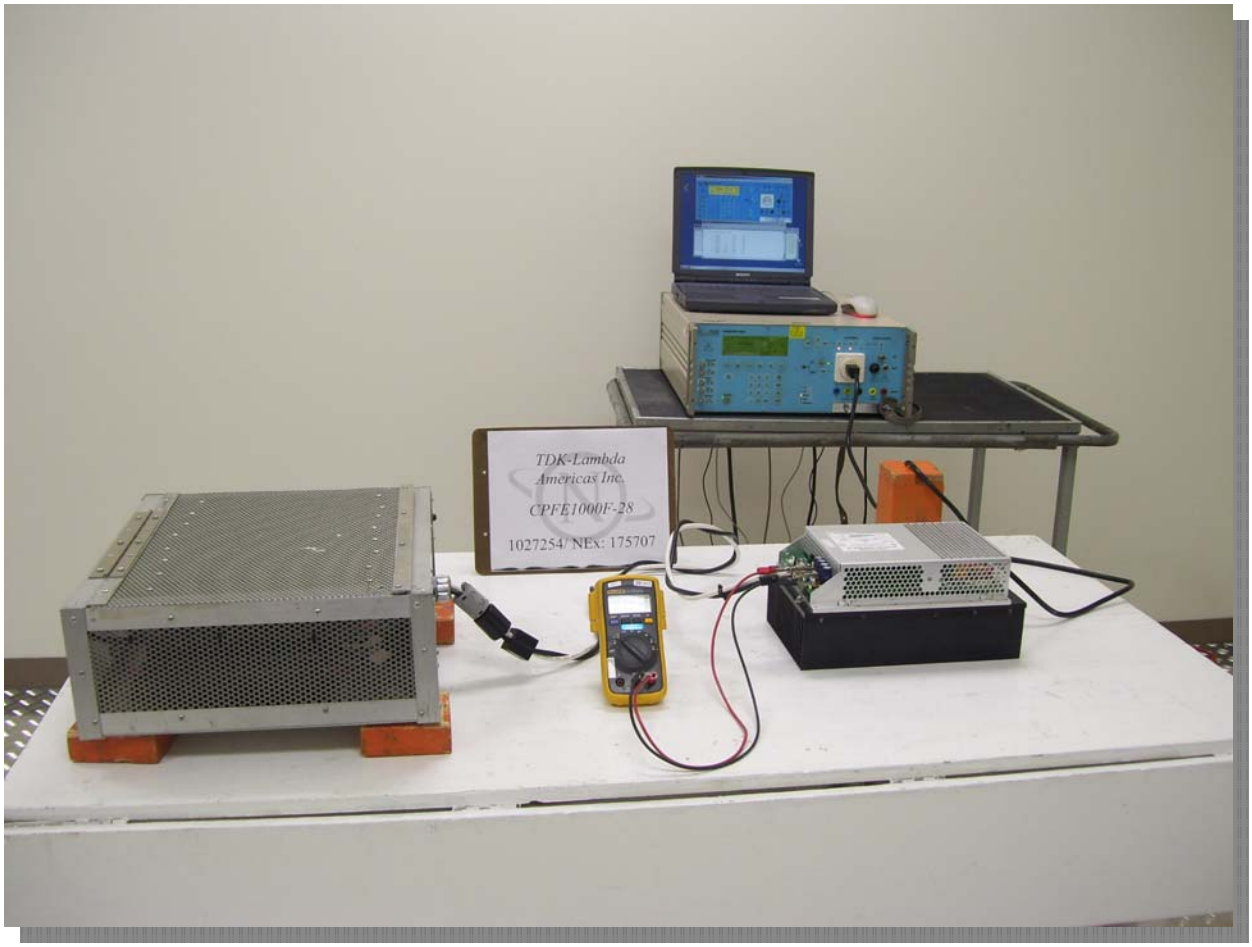
Photograph 7. Radio Frequency Immunity Test Configuration



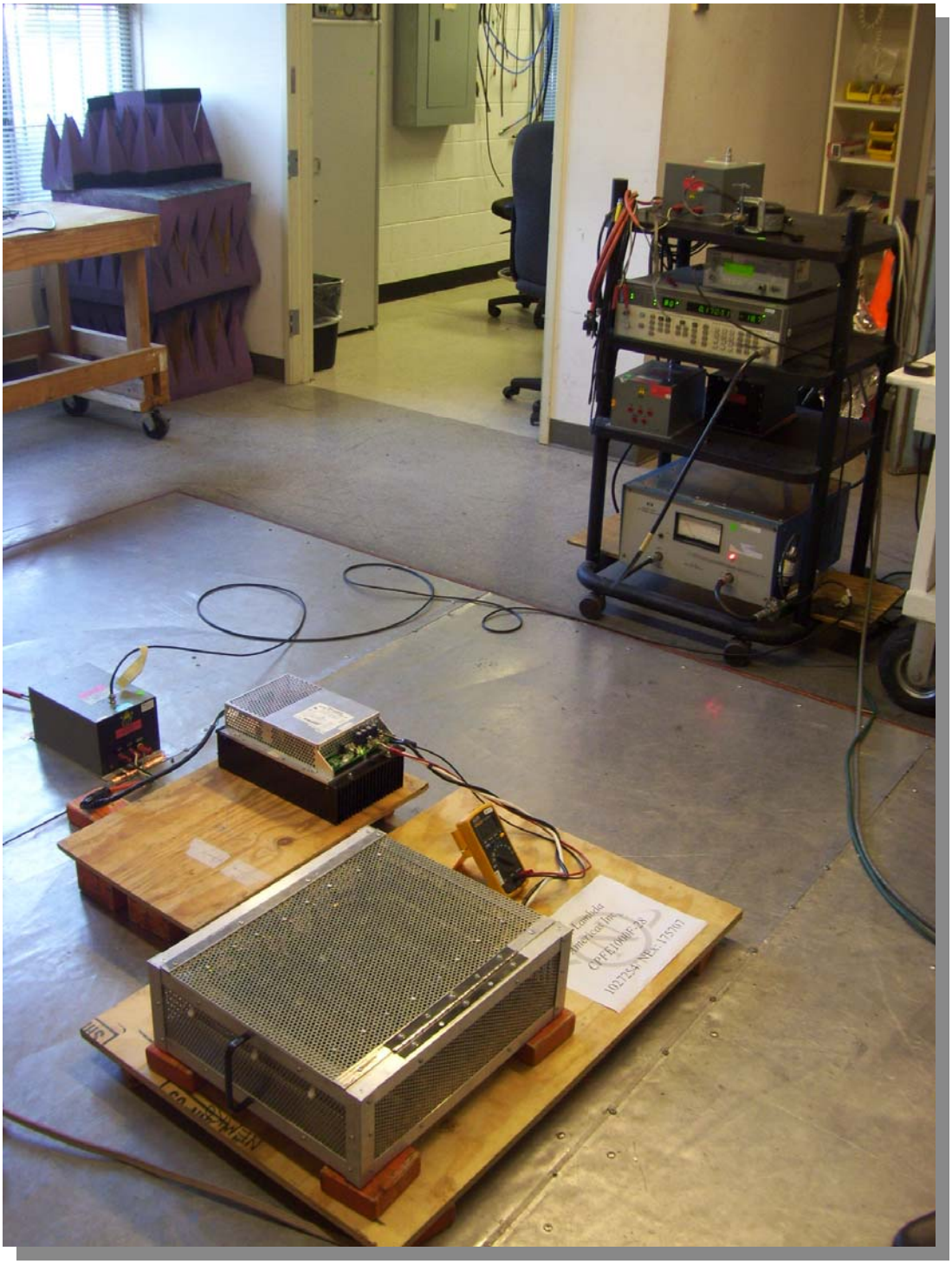
Photograph 8. EFT Immunity Test Configuration



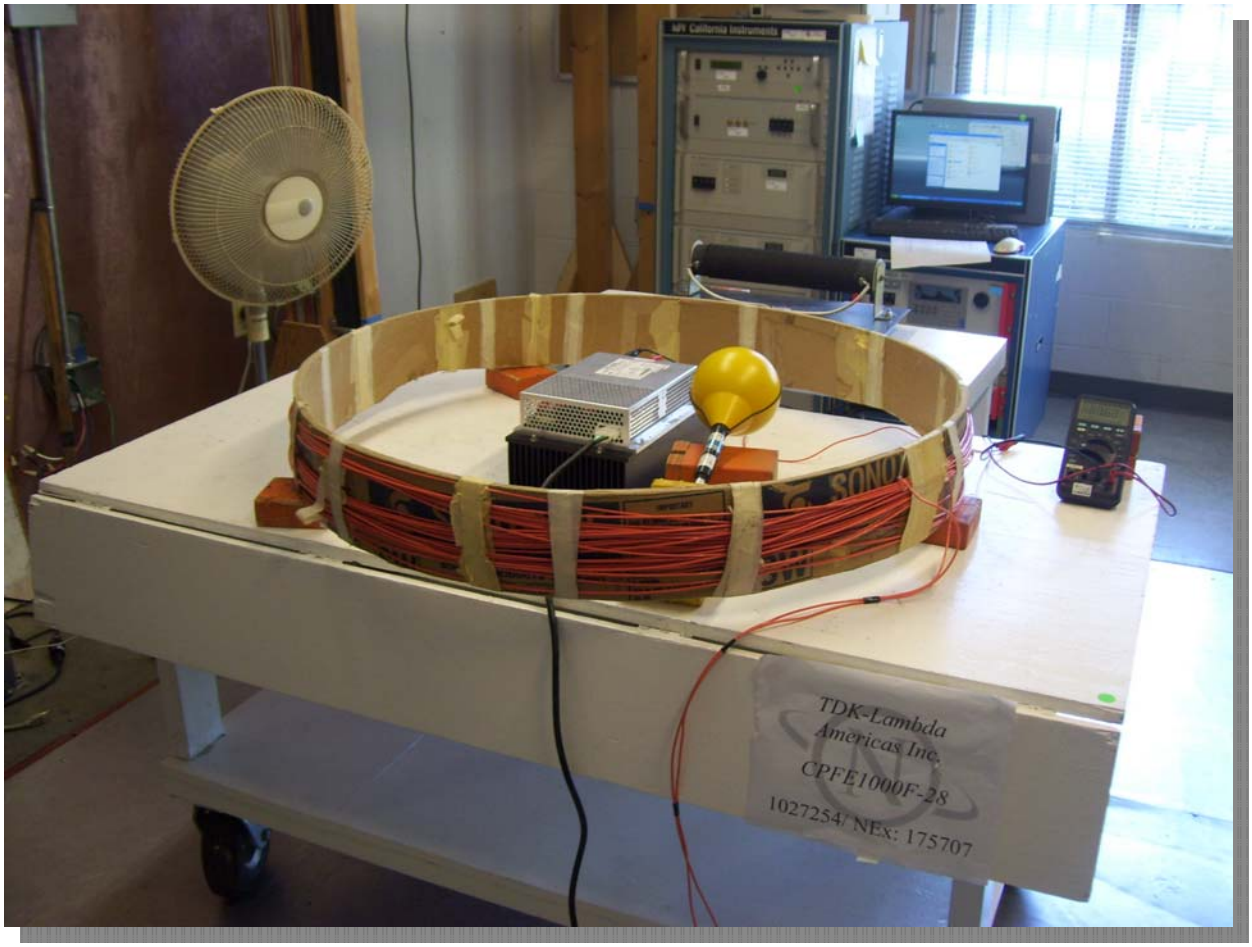
Photograph 9. Power Line Surge Immunity Test Configuration



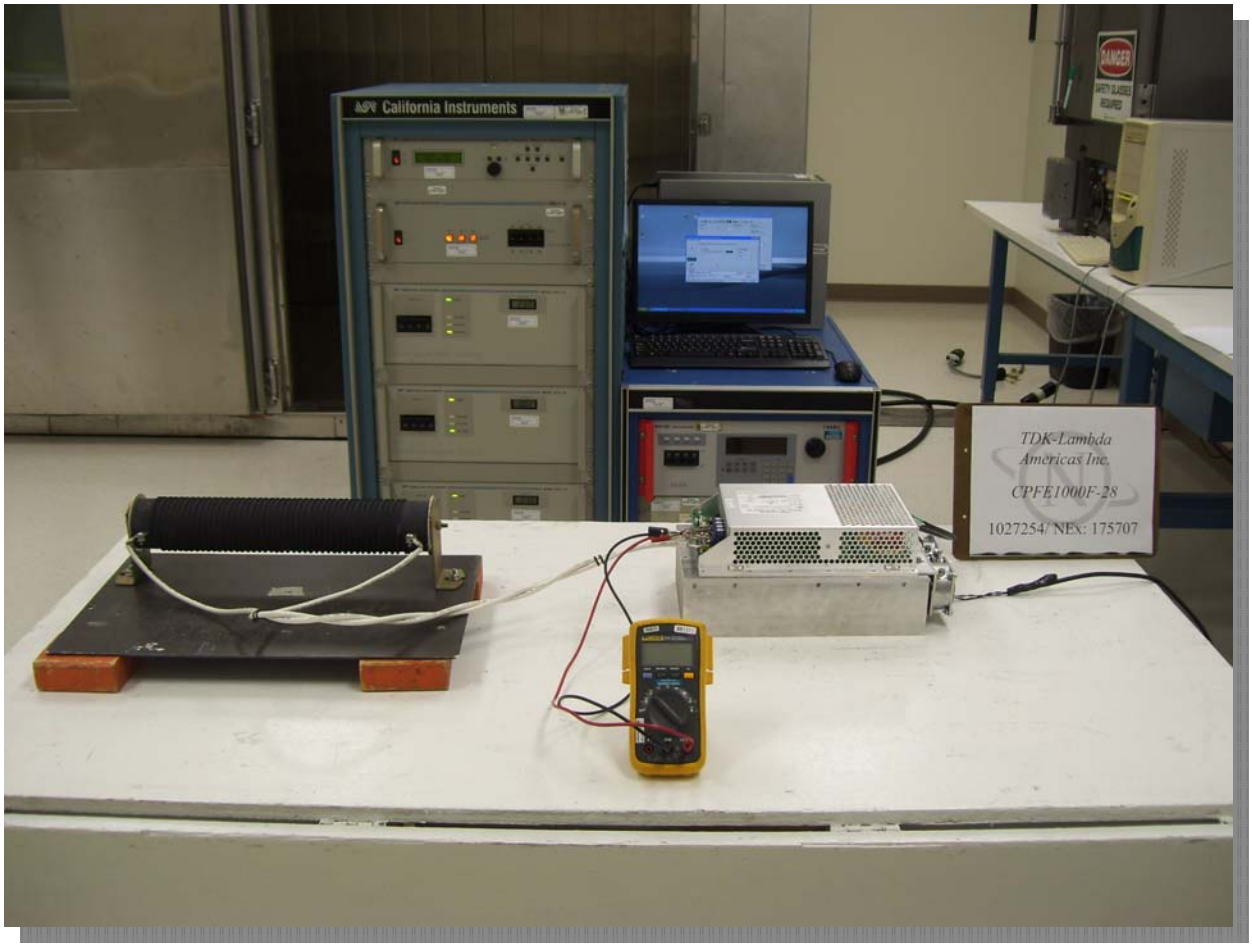
Photograph 10. RF Conducted Immunity Test Configuration



Photograph 11. Power Frequency Magnetic Field Immunity Test Configuration

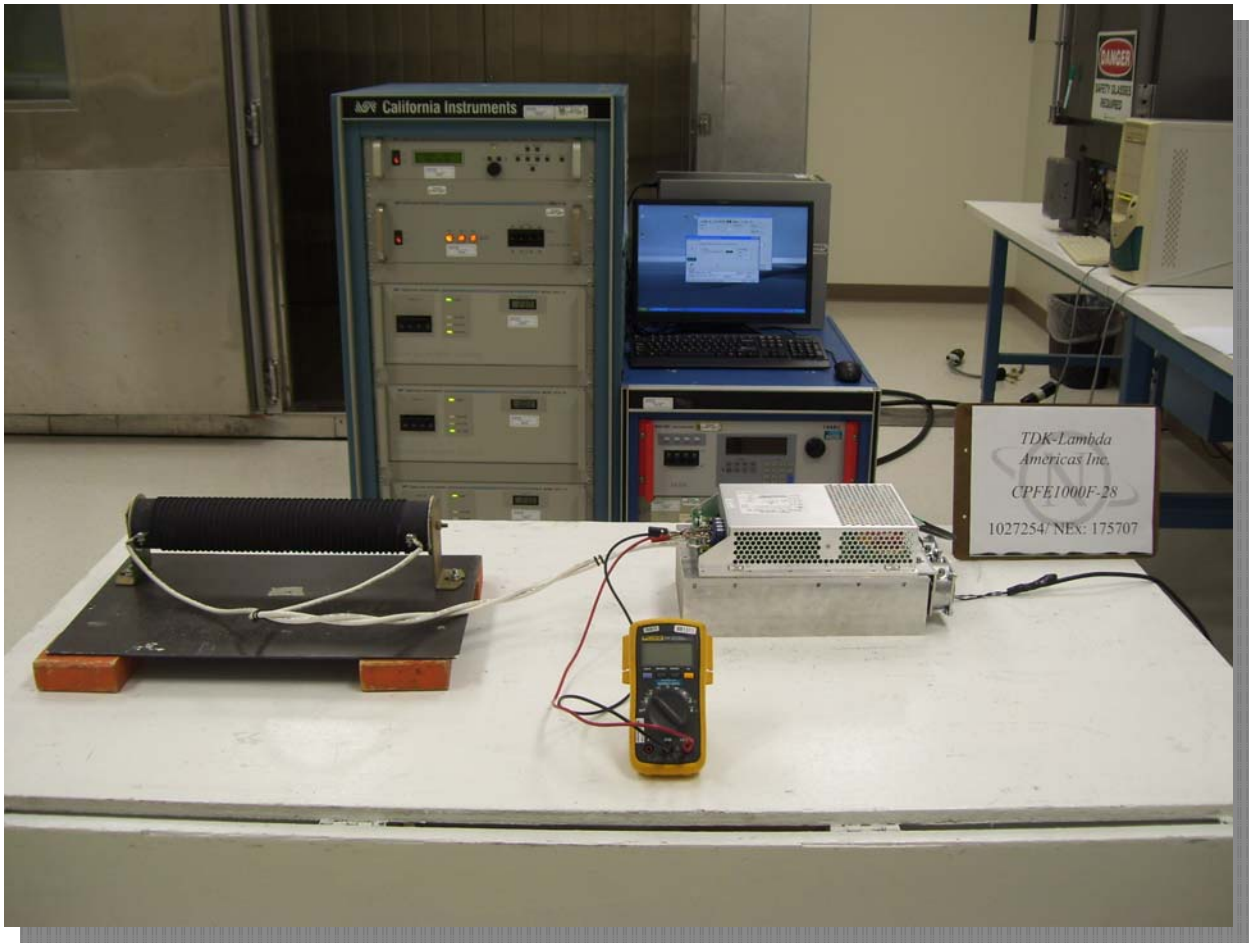


Photograph 12. Voltage Dips and Interruptions Immunity Test Configuration



Photograph 13. Oscillatory Waves Immunity Test Configuration

Photograph 14. Voltage Fluctuation Immunity Test Configuration



APPENDIX A
A. Radiated Emissions Measurement Uncertainties

1. Introduction

ISO/IEC 17025:2005 and ANSI/NCSL Z540.3: 2006 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

Radiated Emissions Measurement Detection Systems	Applicable Frequency Range	"U" for a k=2 Coverage Factor
Spectrum Analyzer with QPA & Preamplifier	30 MHz - 200 MHz	+3.9 dB, -4.0 dB
Spectrum Analyzer with QPA & Preamplifier	200 MHz-1000 MHz	+/- 3.5 dB
Spectrum Analyzer with Preamplifier	1 GHz - 18 GHz	+2.5 dB, -2.6 dB
Spectrum Analyzer with 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

3. Practical Explanation of the Meaning of 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:

- *ANSI Z540.2 (2002) Guide to the Expression of Uncertainty in Measurement*
- 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.

APPENDIX B
B. Nemko USA, Inc. 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 Z540.3: 2006, ISO 10012:2003, ISO/IEC 17025:2005, and ISO-9000: 2000. Nemko USA, Inc.'s calibrations program therefore meets or exceeds the US national commercial and military requirements [N.B. ANSI/NCSL Z540-1-1994 replaced 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 Guide 25-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 Guide 25-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 Guide 25-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 Guide 25-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 Guide 25).

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 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 A2LA) ISO Standard 17025-Accredited third-party Antenna Calibration Laboratory or by the antenna's OEM if the OEM is NIST or A2LA ISO Standard 17025-accredited as an antenna calibration laboratory. The antenna calibrations are performed using the methods specified in Annex G.5 of CISPR 16-1(2003) or ANSI C63.5-2004, including the "Three-Antenna Method". Certain other kinds of antennas (e.g. magnetic-shielded loop antennas) are calibrated annually by either a NIST (or A2LA) ISO Standard 17025-accredited third-party antenna calibration laboratory, or by the antenna's OEM if the OEM is NIST or A2LA 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 Sub clause 16.6 and Annex G.2 of CISPR 16-1 (2003), and, ANSI C63.4-2003 when performing the normalized site attenuation measurements.

APPENDIX C
C. NVLAP Accreditation

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200116-0

Nemko USA, Inc. - San Diego EMC Division
San Diego, CA

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2011-01-01 through 2011-12-31
Effective dates

Sally S. Bruce
For the National Institute of Standards and Technology

NVLAP-01C (REV. 2009-01-28)

APPENDIX D

CONDUCTED EMISSIONS PER MIL-STD-461D/E CE102

D.1.1 CE102 Conducted Emissions Test Method

The purpose of this test was to measure the conducted emissions appearing on the power lines of the UUT in the frequency range 10 kHz to 10 MHz and to determine whether these emissions were in compliance with the CE102 requirements defined in MIL-STD-461E.

The UUT configured as shown in Figure D.1-1. During this test, the UUT was placed on a conductive ground plane and bonded to the plane. The power lines were connected through the Line Impedance Stabilization Network (LISN). The LISN measurement port was then connected via coaxial cable to the detection system located adjacent to the ground plane. The test equipment was configured as indicated in Figure D.1-2 and Figure D.1-3 and complete lists of the test equipment and calibration data are provided in D.1.3.

The equipment was configured as indicated in Figure D.1-2. Test set up calibration was then performed as described in MIL-STD-461E. The power to the LISN was temporary disconnected and a signal generator connected to the input of the LISN. An oscilloscope was then connected at the input as indicated in Figure D.1-3 in order to monitor the output of the signal generator. A calibrated signal of amplitude 6 dB below the CE102 limit was then applied at frequencies of 10 kHz, 100 kHz, 2 MHz and 10 MHz. The oscilloscope was used to monitor the strength and waveform of the signal at 10 kHz and 100 kHz. The signal was verified to be sinusoidal and the appropriate level. The data were then reduced by applying the LISN correction factors and plotted together with the applicable MIL-STD-461E limit.

The test data sheets pertaining to this test are presented in Section D.1.2.

Test Results: Passed. The UUT is in compliance with the CE101 requirement of MIL-STD-461E.

Figure D.1-1. Photo of CE102 Test Setup

Figure D.1-2. CE102 Test Configuration

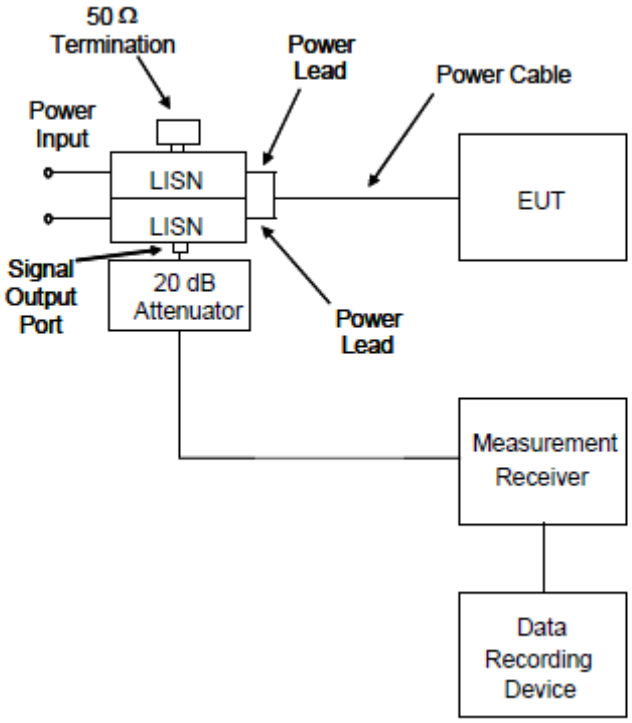
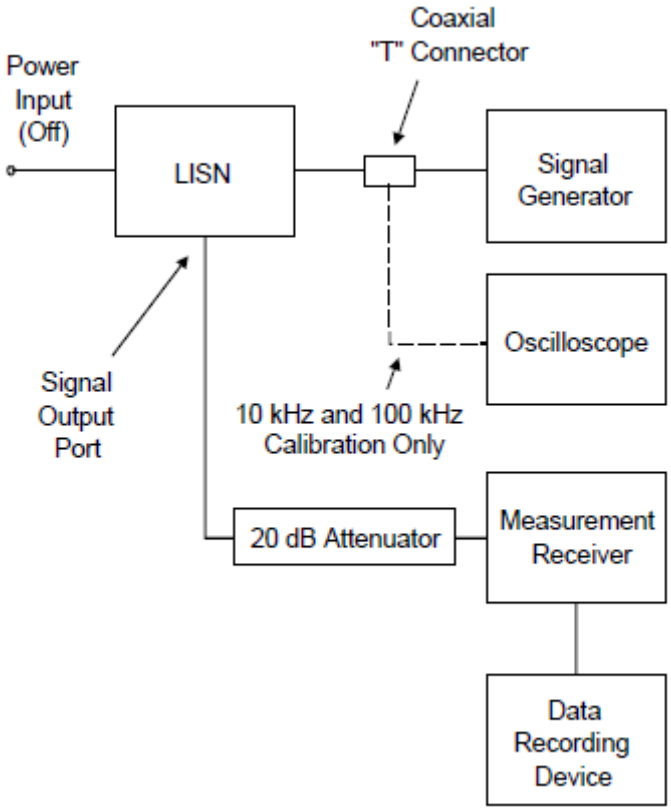
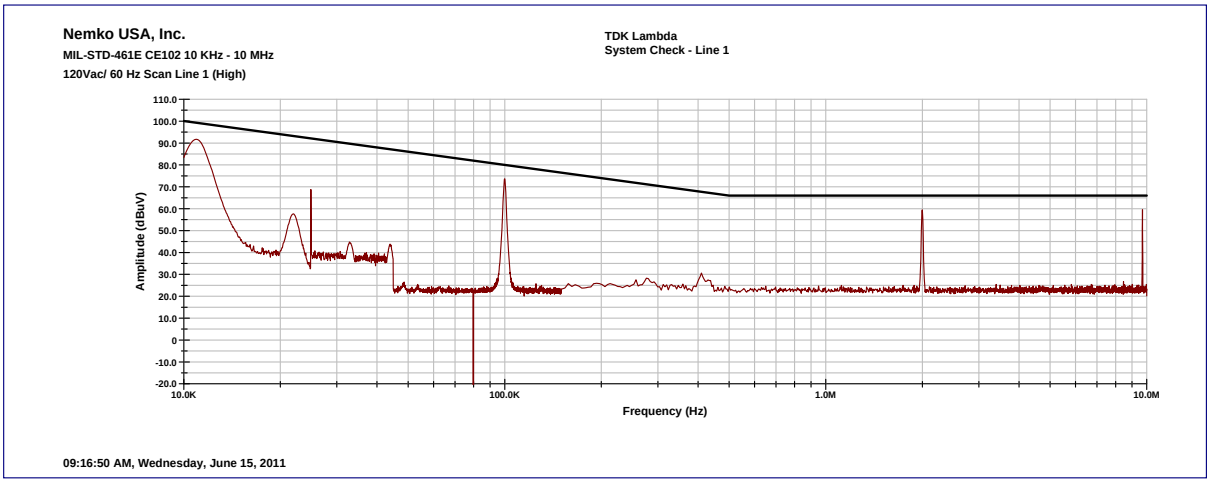


Figure D.1-3. CE102 Calibration Configuration



D.1.2 CE102 Test Data

Figure D.1-4. CE102 System Check Line 1



Frequency (kHz)	Amplitude (dBuV)	Margin
11.33	94.445	+0.445
100.37	74.58	+0.58
1982.1	60.348	+0.348
9692.68	59.645	-0.355

Figure D.1-5. CE102 System Check Line 2

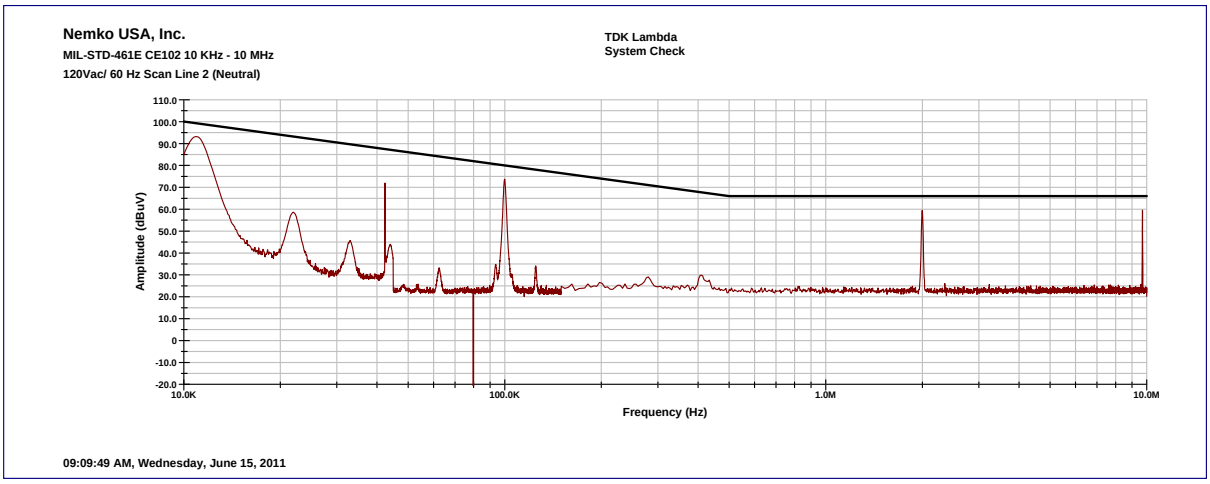


Figure D.1-6. CE102 Ambient Scan Line 230 Vac/ 60 Hz High Line

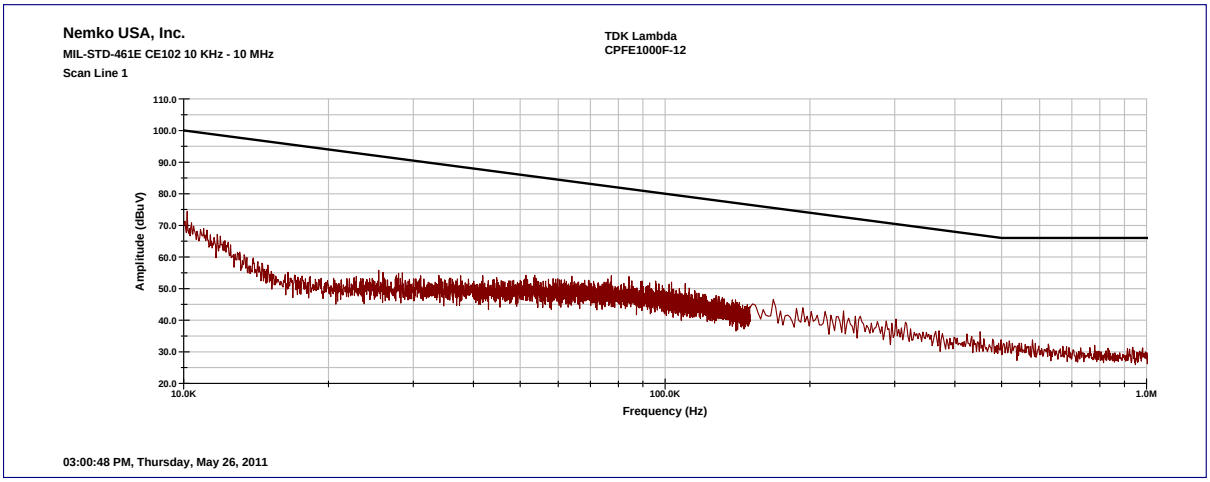


Figure D.1-7. CE102 120Vac/60 Hz High Line

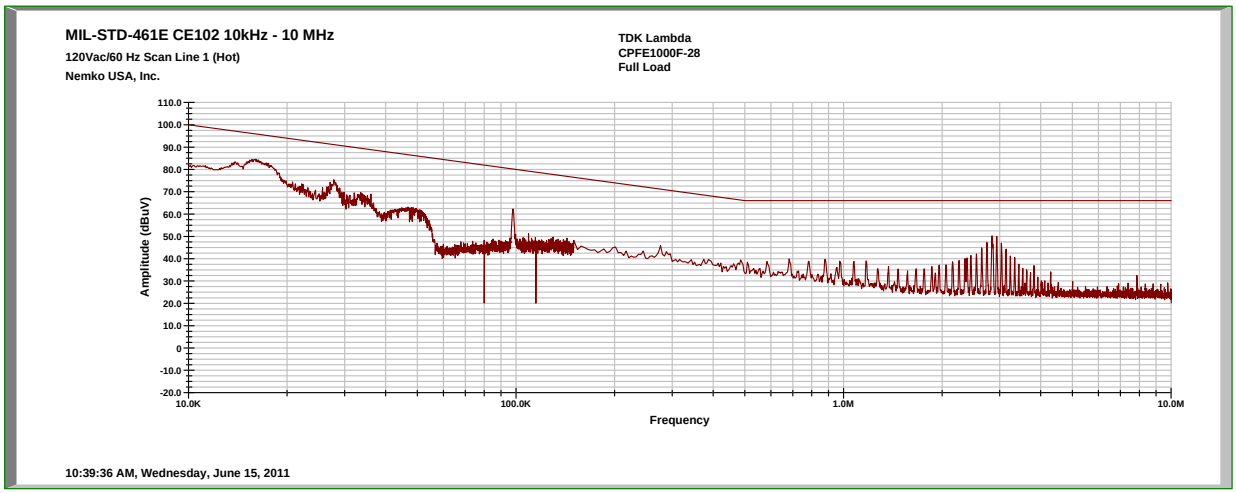


Figure D.1-8. CE102 120Vac/60 Hz Neutral Line

"Data Graph Missing due to corrupted file. Results of testing confirmed to pass requirements".

Figure D.1-9. CE102 230Vac/50 Hz High Line

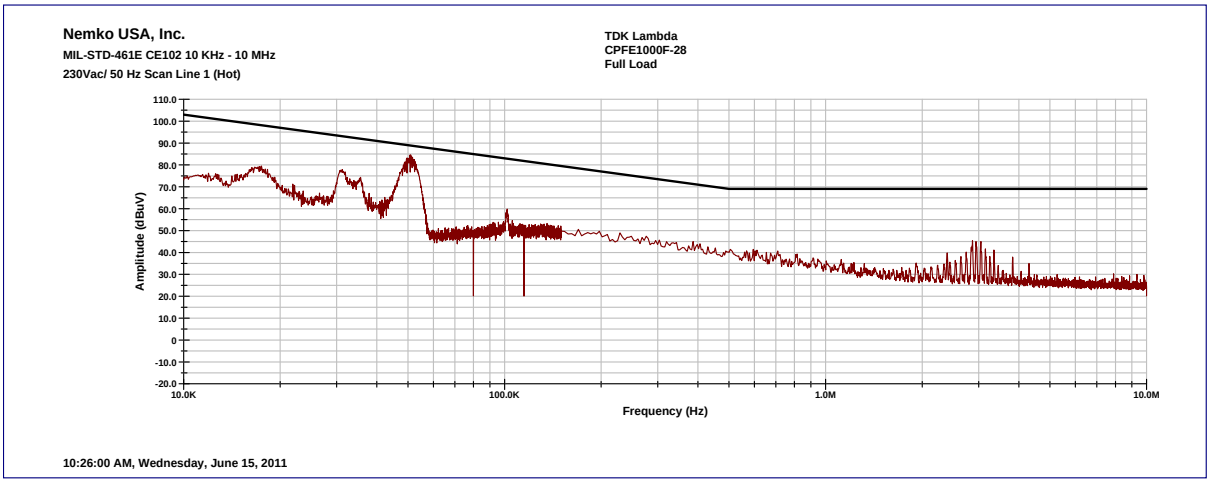
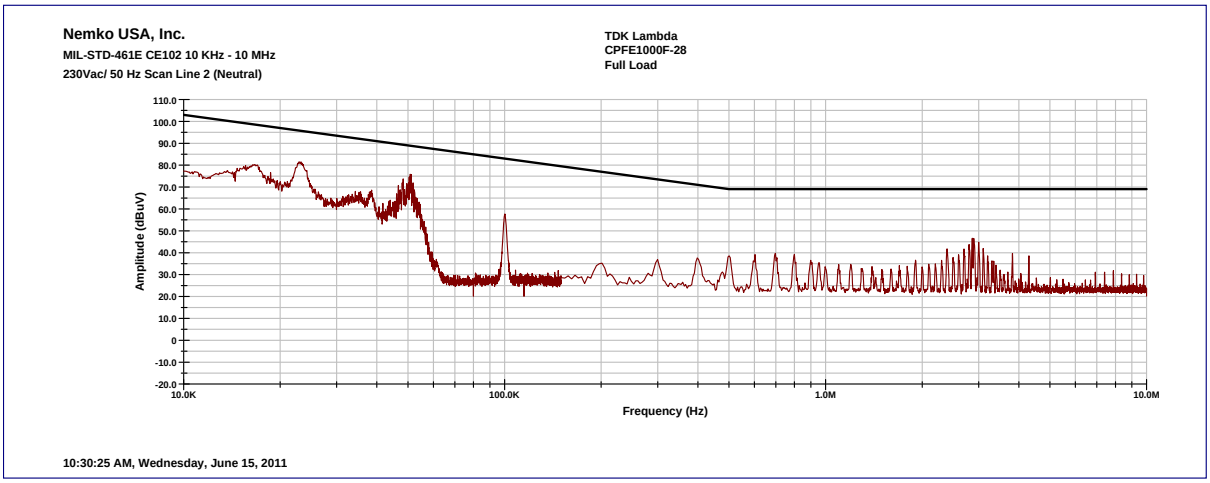


Figure D.1-10. CE102 230Vac/50 Hz Neutral Line



D.1.3 Conducted Emissions CE102 Equipment List

Asset No.	Description	Model Number	Serial #	Last Cal.	Cal due
422	Spectrum Analyzer, HP	8568B	2403A01672	8/20/2010	8/20/2011
825	LISN Set, Com-Power	LI-400	25064	6/16/2011	6/16/2012
746	Signal Generator, HP	8648B	36421905	1/7/2011	1/7/2012
935	Oscilloscope, Agilent	54845A	US40380201	9/14/2010	9/14/2011
956	10 dB (2) Attenuators, Narda	118A/4	314090,31340	2/7/2011	2/7/2012
868	Isolation Transformer	RTE Deltec	N/A	N/A	N/A
870	Power Conditioner	OneAC	N/A	N/A	N/A
-	50 Ohm Termination	HP 908A	N/A	N/A	N/A