

EMC TEST REPORT

For The DC Power Supply

Model: CPFE1000Fi Series

Prepared for:

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

Testing performed per the following:

EMC Directive 2004/108/EC



PREPARED ON JULY 19, 2013

REPORT NUMBER: 2013 07236803 EMC

PROJECT NUMBER: 236803

NEX NUMBER: 236803



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Nemko USA, Inc.

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DOCUMENT HISTORY

REVISION	DATE	COMMENTS
-	July 19, 2013	Prepared By: Danny Long
-	July 19, 2013	Initial Release: Mike Krumweide

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":

- o The unit described in this report was received at Nemko USA, Inc.'s facilities on May 17, 2013.
- o Testing was performed on the unit described in this report on May 17, 2013 to July 19, 2013.
- o The Test Results reported herein apply only to the Unit actually tested, and to substantially identical Units.
- o This report does not imply the endorsement of the Federal Communications Commission (FCC), NVLAP or any other 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.

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.

FOR:
Bruce Ketterling
EMC Division Manager, Nemko USA, Inc.

Michael T.
Krumweide

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1. ADMINISTRATIVE DATA AND TEST SUMMARY

1.1. Administrative Data

CLIENT: TDK-Lambda Americas Inc
3055 Del Sol Blvd
San Diego, CA 92154
619-628-2890

CONTACT: Kenneth Rose
E-Mail: Kenneth.rose@us.tdk-lambda.com

DATE (S) OF TEST: May 17, 2013 to July 19, 2013.

EQUIPMENT UNDER TEST (EUT): DC Power Supply

MODEL: CPFE1000Fi Series (see configuration details)
(CPFE1000Fi-12, CPFE1000Fi-28, CPFE1000Fi-48)

SERIAL NUMBER: N/A (see configuration details)

SOFTWARE REVISION: NO software & revision

HIGHEST FREQUENCY GENERATED OR USED: 8 MHz

CONDITION UPON RECEIPT: Suitable for Test

TEST SPECIFICATION: Radio Frequency Emissions in accordance with requirements of
EN 55022: 2010+AC: 2011 and FCC Part 15B.

Electromagnetic Immunity tests in accordance with requirements
of EN 55024: 2010 and manufacturers test requirements

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1.2. Test Plan

Emissions:

EN55022 (Radiated & Conducted Emissions) - level B conducted and Level A radiated.

Immunity: Test at 230VAC

EN 61000-4-2 (ESD Immunity) - Contact level 2, Air Discharge level 3. Per Criteria B

EN61000-4-3 (RF Immunity) - Level 3; 10V/m; Per Criteria A

EN61000-4-4 (EFT) - Level 3; Power line Pulses of +/-2KV;l/O Line Pulses of+/-1KV; Per Criteria A

EN61000-4-5 (Surge) - Level 3; +/- 2KV CM Surges,+/- 1KV DM Surges; Per Criteria

EN61000-4-6 (RF Immunity) - Level 3; 10Vrms; Per Criteria A

EN 61000-4-8 (Magnetic Field Immunity) - Level 4. Per Criteria A

EN61000-4-11(Voltage Dips and Interrupts) - 30% 10 ms,Per Criteria A, 60% 100ms, Per Criteria B,100% 5000ms, Per Criteria B- Testing to be conducted at input voltage of 120V.)

EN 61000-4-12 (Ringwave) - Level 3 (\pm 2kV common mode, \pm 1kV differential mode). Per Criteria A

EN 61000-4-14 (Voltage Fluctuation Immunity) - Level 3. Per Criteria A

1.3. Test Matrix

	CE Class B	2x voltage prescan	RE Class A	4-2	4-3	4-4	4-5	4-6	4-8	4-11	4-12	4-14	
Model1: CPFE1000Fi-12	x	x	x	x	x			x	x	any 1 of 3			
Model2: CPFE1000Fi-12/C	x	x	x	x	x	x	x	x	x			x	x
Model3: CPFE1000Fi-12/P	x	x	x		x			x					
Model4: CPFE1000Fi-28	x	x	x	x	x			x	x	any 1 of 3			
Model5: CPFE1000Fi-28/C	x	x	x	x	x	x	x	x	x			x	x
Model6: CPFE1000Fi-28/P	x	x	x		x			x					
Model7: CPFE1000Fi-48	x	x	x	x	x			x	x	any 1 of 3			
Model8: CPFE1000Fi-48/C	x	x	x	x	x	x	x	x	x			x	x
Model9: CPFE1000Fi-48/P	x	x	x		x			x					

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1.4. Referenced Standards for Conducted and Radiated RF Emissions

Test Type	In Accordance with Document	Document Title
Conducted and Radiated Emissions	EN 55022: 2010+AC: 2011	Information technology equipment—Radio disturbance characteristics —Limits and methods of measurement

1.5. Referenced Standards for Electromagnetic Compatibility

Test Type	In Accordance with Document	Document Title
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 A1:2007 +A2: 2010	Electromagnetic Compatibility—Testing and measurement techniques - Radiated radio frequency electromagnetic field immunity test
Electrical Fast Transient Burst Immunity	IEC 61000-4-4: 2004+A1: 2010	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	IEC 61000-4-12: 2006	Electromagnetic Compatibility—Testing and measurement techniques – Ring wave immunity tests
Voltage Fluctuation Immunity	EN 61000-4-14: 2009	Electromagnetic Compatibility—Testing and measurement techniques - Voltage Fluctuation immunity tests



1.6. Test Summary

1.6.1. 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: 2010+AC: 2011, Class "B" Conducted Emissions	0.15 MHz – 30 MHz	PASS
EN 55022: 2010+AC: 2011, Class "B" Telecom Conducted Emissions	0.15 MHz – 30 MHz	Or No telecom ports
EN 55022: 2010+AC: 2011, Class "A" Radiated Emissions	30 MHz – 1000 MHz	PASS
EN 55022: 2010+AC: 2011, Class "A" Radiated Emissions	30 MHz – 1000 MHz	PASS

EMC Supervisor:

Michael T. Krumweide, Nemko USA, Inc.

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1.6.2. Immunity Test Summary

Test Methods	Minimum Criterion Level Required as per <u>Client Test Plan</u>	Criterion Level Tested	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 A1:2007 +A2: 2010 - Radio Frequency Immunity	Criterion A 10 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+A1: 2010 -Electrical Fast Transient Immunity	Criterion B Power line pulses of ± 2 kV; I/O line pulses of ± 1kV	Criterion B Power Line Pulses of ± 2 kV; I/O Line Pulses of ± 1kV	PASS
IEC 61000-4-5: 2005 -Surge Immunity	Criterion B ±2kV common mode surges, ±1kV differential mode surges	Criterion B ±2kV Common Mode Surges, ±1kV Differential Mode Surges	PASS
IEC 61000-4-6: 2008 -RF Common Mode Immunity	Criterion B 150 kHz - 80 MHz at 10 Vrms 1 kHz 80% amplitude modulated	Criterion B 150 kHz - 80 MHz at 10 Vrms 1kHz 80% amplitude modulated	PASS(x9)
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 1.0 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 30% and >95%; Interruptions of >95%.	PASS
IEC 61000-4-12: 2006 - Ring Wave Immunity	Criterion B ±0.5kV, ±1kV, ±2kV, 4kV, common mode surges. ±0.25kV, ±0.5kV, ±1kV, ±2kV, differential mode surges	Criterion B ±1kV, ±2kV, common mode surges. ±0.5kV, ±1kV, differential mode surges	PASS
EN 61000-4-14 Voltage Fluctuation Immunity	Criterion A Level 3 ΔU=12 % Un	Criterion A Level 3 ΔU=12 % Un	PASS

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Refer to the test results section for further details.

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2. SYSTEM CONFIGURATION

2.1. System Components and Power Cables

DEVICE	MANUFACTURER MODEL # SERIAL #	POWER CABLE
EUT – 12V DC Power Supply	TDK-Lambda Americas Inc Model: CPFE1000Fi-12 Serial #: 131222012006	2.0m, unshielded, 14 AWG, 3-wire
EUT – 28V DC Power Supply	TDK-Lambda Americas Inc Model: CPFE1000Fi-28 Serial #: 131222028005	2.0m, unshielded, 14 AWG, 3-wire
EUT – 48V DC Power Supply	TDK-Lambda Americas Inc Model: CPFE1000Fi-48 Serial #: 130322048008	2.0m, unshielded, 14 AWG, 3-wire
Support –Resistor Load	Model: N/A Serial: N/A	1.5m, unshielded, 10 AWG, 2-wire

2.2. Device Interconnection and I/O Cables

Connection	I/O Cable
EUT to Resistor Load	1.5m, unshielded, 10 AWG, 2-wire



2.3. Description and Method of Exercising the EUT

The CPFE1000Fi Series is a DC Power Supply, total 9 models in series. Its function is to output DC supply. The EUT was exercised by loading 1000W model 48 & 28 series, and 720W model 12 series. If the power input and output is disrupted as indicated by no output, or there is loss of functionality, may be considered a failure. The CPFE1000Fi Series has NO software & revision.

Description:

Input Voltage: 85-265VAC

Output Power: 1008W

Mechanical Size: approx. 114.3x42x254mm (WxHxL)
 with another 2" added to height with external heatsink.

Models in series	Output voltage	Configuration
Model 1: CPFE1000Fi-12	12V DC	Chassis Base
Model 2: CPFE1000Fi-12/C	12V DC	Chassis base with cover
Model 3: CPFE1000Fi-12/P	12V DC	Without chassis
Model 4: CPFE1000Fi-28	28V DC	Chassis Base
Model 5: CPFE1000Fi-28/C	28V DC	Chassis base with cover
Model 6: CPFE1000Fi-28/P	28V DC	Without chassis
Model 7: CPFE1000Fi-48	48V DC	Chassis Base
Model 8: CPFE1000Fi-48/C	48V DC	Chassis base with cover
Model 9: CPFE1000Fi-48/P	48V DC	Without chassis

The EUT's performance during test was evaluated against the performance criterion specified by applicable test standards. Performance results are detailed in the test results section of this report.

2.4. Design Modifications for Compliance

Device: DC Power Supply

Model: CPFE1000Fi Series

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

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

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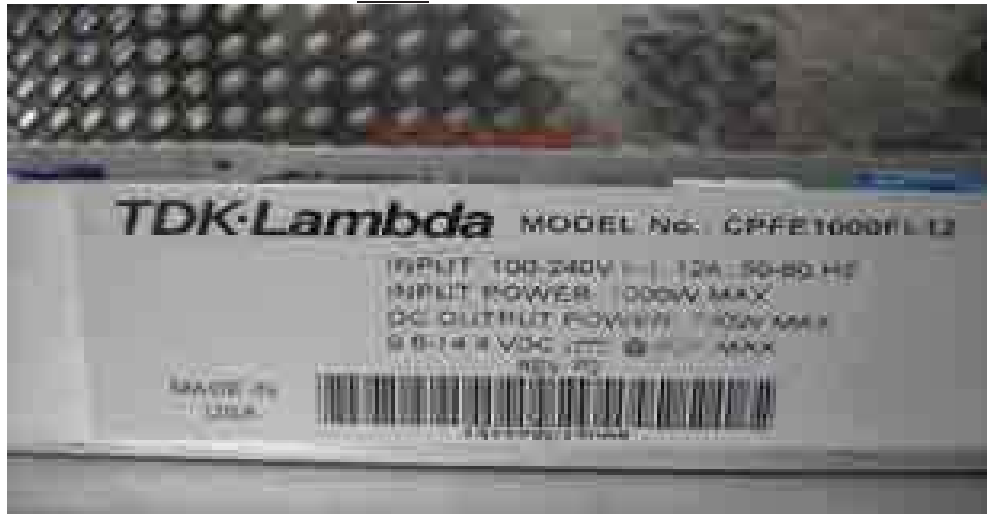
Photograph 1.EUT Front and Rear

EUT: CPFE1000Fi Series



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EUT: CPFE1000Fi-12



EUT: CPFE1000Fi-12



EUT: CPFE1000Fi-28



EUT: CPFE1000Fi-28



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EUT: CPFE1000Fi-48



EUT: CPFE1000Fi-48



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Photograph 2. General EUT Test Configuration



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3. DESCRIPTION OF TEST SITE AND EQUIPMENT

3.1. Description of Test Site

The test site is located at 2210 Faraday Ave., Suite 150, Carlsbad, CA 92008. Within the EMC facility there is a 10 meter semi-anechoic chamber and an area designated for future installation of a 3 meter semi-anechoic chamber. There are 3 general purpose EMC semi-anechoic chambers: two chambers are designed and built as MIL STD Emissions and Radiated Susceptibility chambers and one chamber has those characteristics with an additional capability to perform IEC/EN 61000-4-3 radiated susceptibility. Four test ground planes are located in the EMC area dedicated for: Conducted Emissions, EFT / Surge plane/ Conducted RF immunity, and a dedicated ESD test plane.

Radiated emissions measurements are performed in the 10 meter Semi-Anechoic chamber, which conforms to the volumetric normalized site attenuation (VNSA) for three and ten-meter measurements. The chamber also conforms to the SVSWR compliance requirements for 1-18 GHz measurements. The VNSA and SVSWR meet the technical requirements, as set, in the CISPR 16 and ANSI C63.4 documents. Facility test areas for conducted emissions and immunity testing also meet the construction and characteristics, as required by CISPR 16 and ANSI C63.4 documents.

Nemko’s EMC test facility is in compliance with all the current national and international requirements and is accredited by the US National Institute for Standards and Technology (NIST) National Voluntary laboratory Accreditation Program (NVLAP) under “Electromagnetic Compatibility and Telecommunications”. We have a large scope of accreditation which includes all necessary Commercial, Avionics and Military tests

Emissions measurements are performed using TILE software. Version 4.0.A.7 for radiated and version 3.4.K.24 for conducted.

3.2. Facility Accreditation and Authorization

Nemko USA, Inc. is accredited through National Voluntary Laboratory Accreditation Program.



NVLAP LAB CODE 200116-0

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Organization	Registration and Recognition numbers
Federal Communications Commission	0013750831 / US5058
Industry Canada	2040B-3
VCCI	R-3856 / G-549 (Radiated emissions) and C-4320 / T-1315(Conducted emissions)
Korean Ministry (APEC Tel MRA)	US0088

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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: 2010+AC: 2011 for radio frequency emissions and EN 55024: 2010 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.

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.

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4.4. 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. Initial prescans for radiated emissions were performed as suggested per ANSI 63.22. The antenna is positioned at several heights while the EUT is rotated 360°. At each antenna height, the receiver scans and records the maximum emissions in the required frequency range as required by the applicable standards. From the recorded scans, a list of discrete frequencies is developed. 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
Measurement Frequency (MHz)	Meter Reading (dBµV)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Pass Fail	Comments

A. Frequency Measured in MHz.

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

C. Turn Table reading in degrees.

D. Antenna Height in centimeters.

E. Corrected Reading, the meter reading with the antenna factor, cable loss, attenuator loss, and preamplifier gain added in. This is the emission value to compare to the limit.

F. Limit from the specification.

G. Margin: difference in dB of Corrected Reading and Specification Limit, negative results indicate a margin value below the specification limit.

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

I. Comments. If any, the technician enters remarks special to the test performed.



4.5. 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.

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4.6. 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.

4.7. Radio Frequency Immunity: IEC 61000-4-3: 2006 A1:2007 +A2: 2010

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 used 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.

4.8. Electrical Fast Transient Immunity: IEC 61000-4-4: 2004+A1: 2010

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.

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4.9. 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 100Ohm, common mode, generator earthed.

Surge #2: Combination Wave, Neutral to Protective Earth with 9uF and 100Ohm, 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.

4.10. 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.

4.11. 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.

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

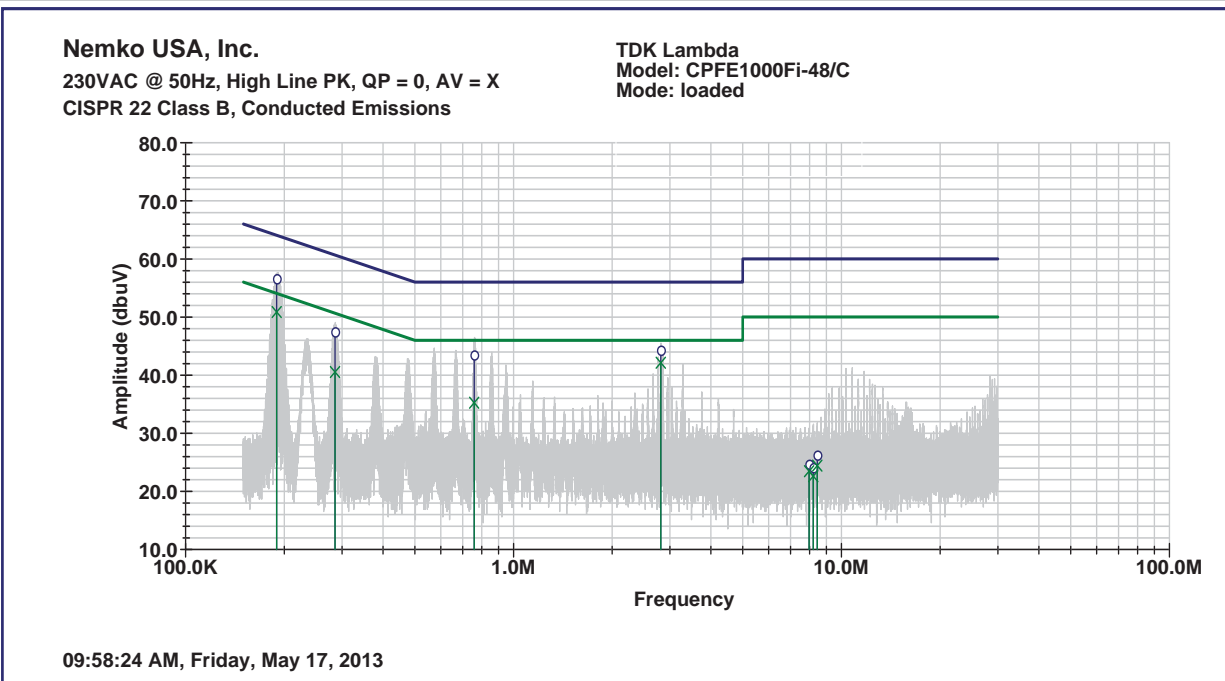
This test subjects the EUT to power network faults and “brownouts”. Testing was performed in accordance with IEC 61000-4-11. The standard configuration as outlined in the IEC 61000-4-11 was used. The EUT is powered up to a nominal voltage of 230 VAC 50 Hz, and then software-controlled voltage dips and 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.

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5. Test Results

5.1. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	51	%
EUT Name	DC Power Supply	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000Fi-48/C	Test Location	Ground Plane	
Governing Doc	EN 55022	Test Engineer	Danny Long	
Basic Standard	CISPR 22	Date	5/17/2013	
Voltage:	230 Vac, 50Hz			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
189.62	56.6	50.9	64.9	54.1	-8.3	-3.2
285.61	47.5	40.5	62.1	50.7	-14.6	-10.2
758.67	43.5	35.2	56.0	46.0	-12.5	-10.8
2812.69	44.3	42.1	56.0	46.0	-11.7	-3.9
7970.21	24.7	23.5	60.0	50.0	-35.3	-26.5
8206.07	24.1	22.6	60.0	50.0	-35.9	-27.4
8438.96	26.3	24.4	60.0	50.0	-33.7	-25.6

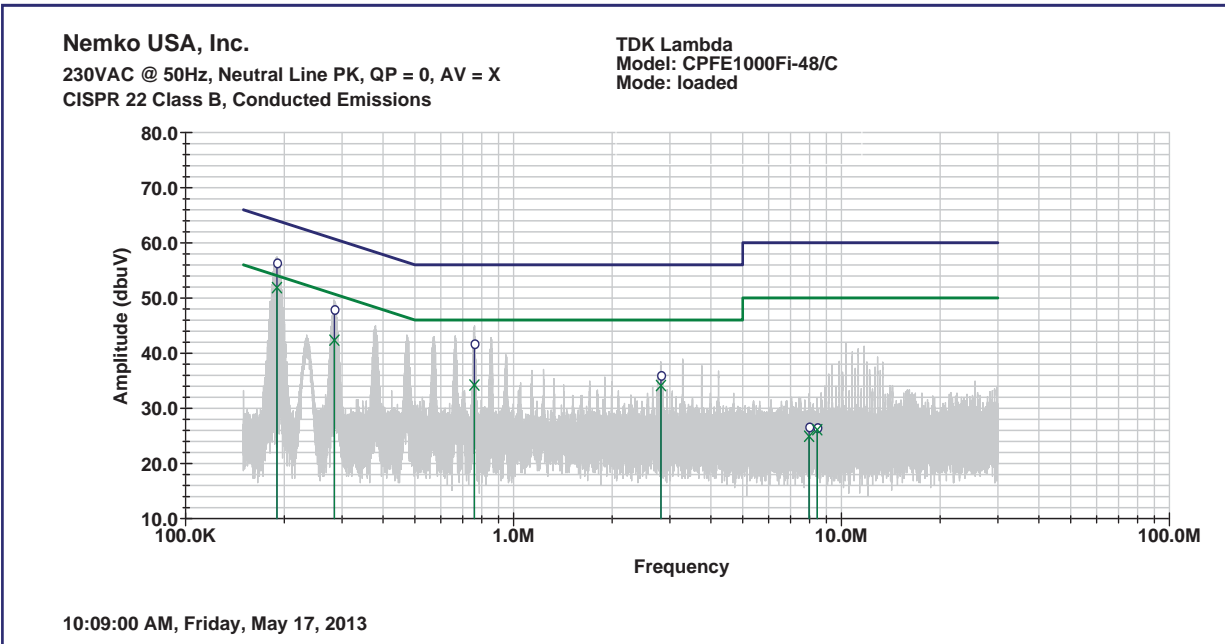
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5.1.1. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	51	%
EUT Name	DC Power Supply	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000Fi-48/C	Test Location	Ground Plane	
Governing Doc	EN 55022	Test Engineer	Danny Long	
Basic Standard	CISPR 22	Date	5/17/2013	
Voltage:	230 Vac, 50Hz			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
190.02	56.4	51.9	64.9	54.0	-8.5	-2.1
284.43	47.9	42.3	62.2	50.7	-14.3	-8.4
759.36	41.7	34.2	56.0	46.0	-14.3	-11.8
2813.65	36.0	34.1	56.0	46.0	-20.0	-11.9
7971.13	26.7	24.9	60.0	50.0	-33.3	-25.1
8441.43	26.5	26.1	60.0	50.0	-33.5	-23.9

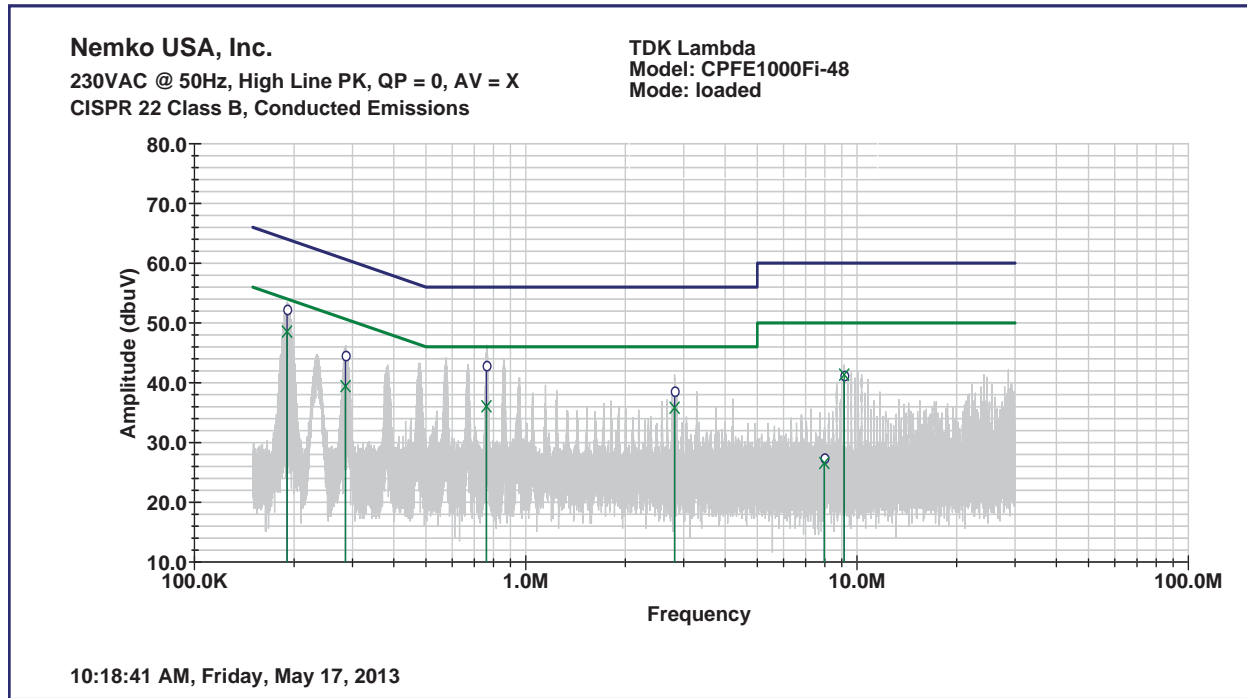
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5.1.2. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	51	%
EUT Name	DC Power Supply	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000Fi-48	Test Location	Ground Plane	
Governing Doc	EN 55022	Test Engineer	Danny Long	
Basic Standard	CISPR 22	Date	5/17/2013	
Voltage:	230 Vac, 50Hz			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
190.38	52.3	48.5	64.8	54.0	-12.5	-5.5
285.84	44.6	39.4	62.1	50.6	-17.5	-11.2
761.10	42.9	36.0	56.0	46.0	-13.1	-10.0
2814.73	38.6	35.8	56.0	46.0	-17.4	-10.2
7971.12	27.4	26.5	60.0	50.0	-32.6	-23.5
9142.89	41.2	41.3	60.0	50.0	-18.8	-8.7

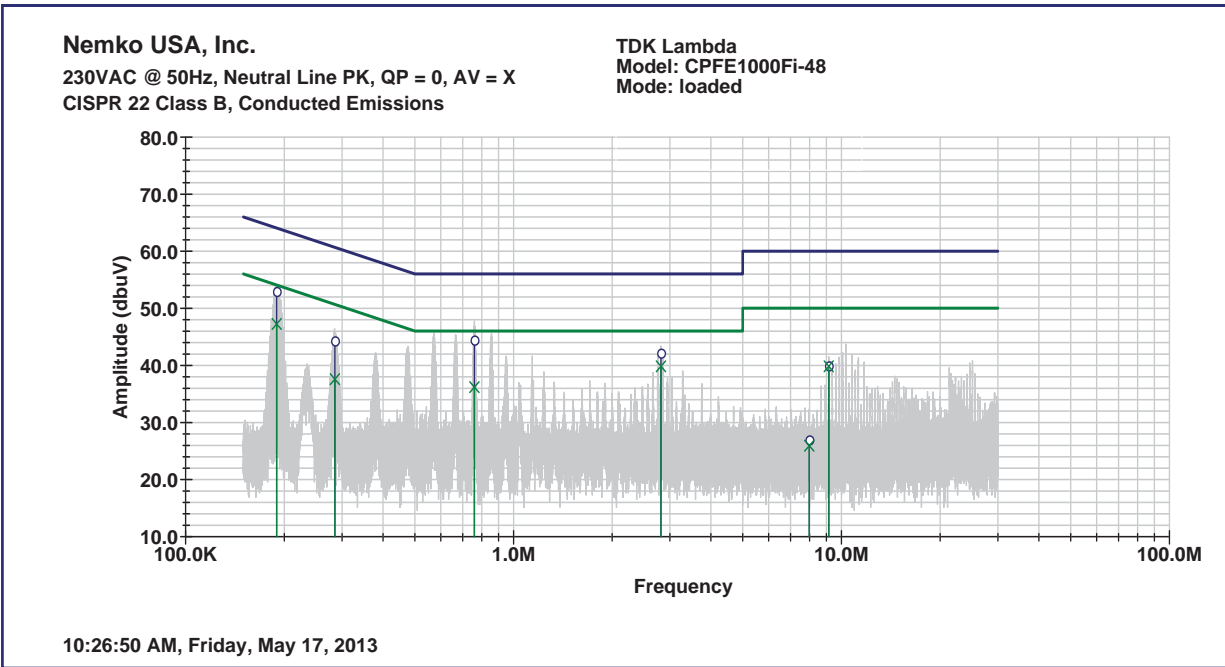
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5.1.3. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	51	%
EUT Name	DC Power Supply	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000Fi-48	Test Location	Ground Plane	
Governing Doc	EN 55022	Test Engineer	Danny Long	
Basic Standard	CISPR 22	Date	5/17/2013	
Voltage:	230 Vac, 50Hz			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
189.67	53.0	47.2	64.9	54.1	-11.9	-6.9
285.38	44.3	37.6	62.1	50.7	-17.8	-13.1
759.56	44.4	36.2	56.0	46.0	-11.6	-9.8
2814.03	42.2	39.8	56.0	46.0	-13.8	-6.2
7972.80	27.0	25.9	60.0	50.0	-33.0	-24.1
9143.41	39.9	39.8	60.0	50.0	-20.1	-10.2

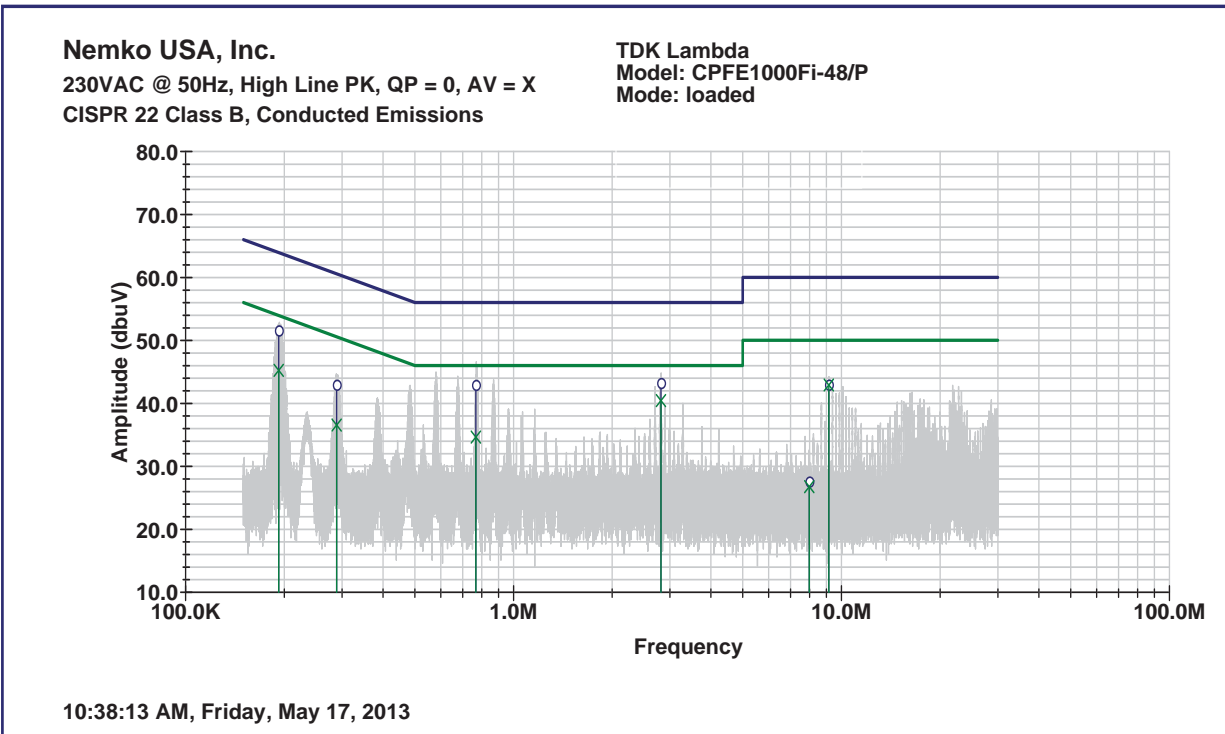
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5.1.4. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	51	%
EUT Name	DC Power Supply	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000Fi-48/P	Test Location	Ground Plane	
Governing Doc	EN 55022	Test Engineer	Danny Long	
Basic Standard	CISPR 22	Date	5/17/2013	
Voltage:	230 Vac, 50Hz			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
192.31	51.6	45.2	64.8	53.9	-13.2	-8.7
288.94	43.0	36.5	62.0	50.6	-19.0	-14.1
767.51	43.0	34.6	56.0	46.0	-13.0	-11.4
2815.45	43.3	40.4	56.0	46.0	-12.7	-5.6
7977.19	27.6	26.7	60.0	50.0	-32.4	-23.3
9150.32	43.0	42.9	60.0	50.0	-17.0	-7.1

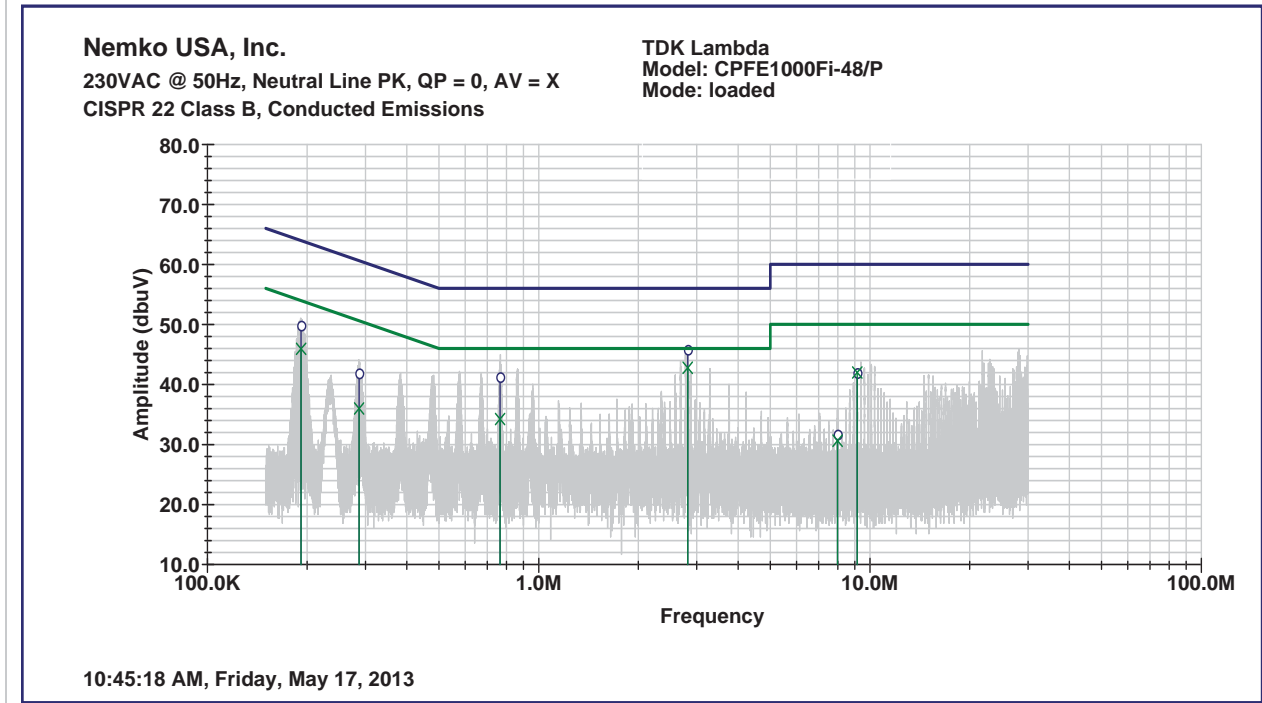
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5.1.5. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	51	%
EUT Name	DC Power Supply	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000Fi-48/P	Test Location	Ground Plane	
Governing Doc	EN 55022	Test Engineer	Danny Long	
Basic Standard	CISPR 22	Date	5/17/2013	
Voltage:	230 Vac, 50Hz			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
191.90	49.8	45.9	64.8	54.0	-15.0	-8.1
287.05	41.9	36.0	62.1	50.6	-20.2	-14.6
764.93	41.3	34.2	56.0	46.0	-14.7	-11.8
2815.37	45.8	42.8	56.0	46.0	-10.2	-3.2
7977.16	31.7	30.6	60.0	50.0	-28.3	-19.4
9150.49	42.0	42.0	60.0	50.0	-18.0	-8.0

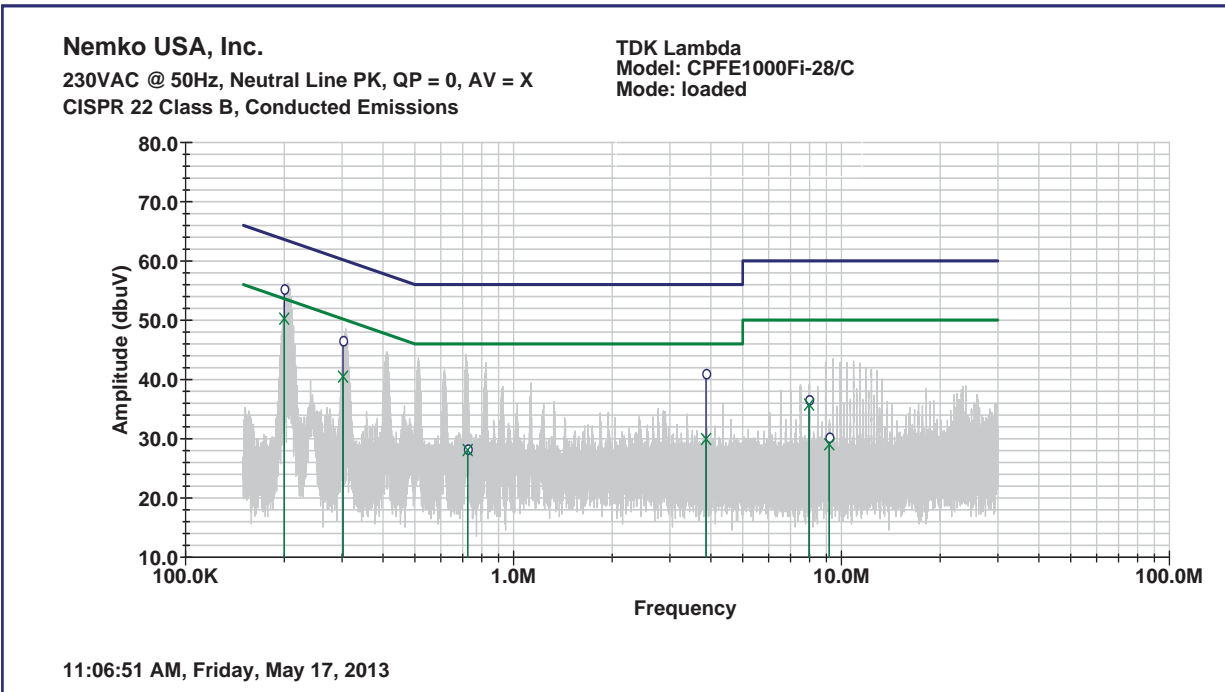
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5.1.6. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	51	%
EUT Name	DC Power Supply	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000Fi-28/C	Test Location	Ground Plane	
Governing Doc	EN 55022	Test Engineer	Danny Long	
Basic Standard	CISPR 22	Date	5/17/2013	
Voltage:	230 Vac, 50Hz			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
199.70	55.9	49.9	64.6	53.6	-8.7	-3.7
299.10	47.1	40.2	61.7	50.3	-14.6	-10.1
398.58	41.0	34.5	58.9	47.9	-17.9	-13.4
2795.68	41.8	35.8	56.0	46.0	-14.2	-10.2
7968.71	26.2	25.1	60.0	50.0	-33.8	-24.9
9177.19	27.5	26.5	60.0	50.0	-32.5	-23.5

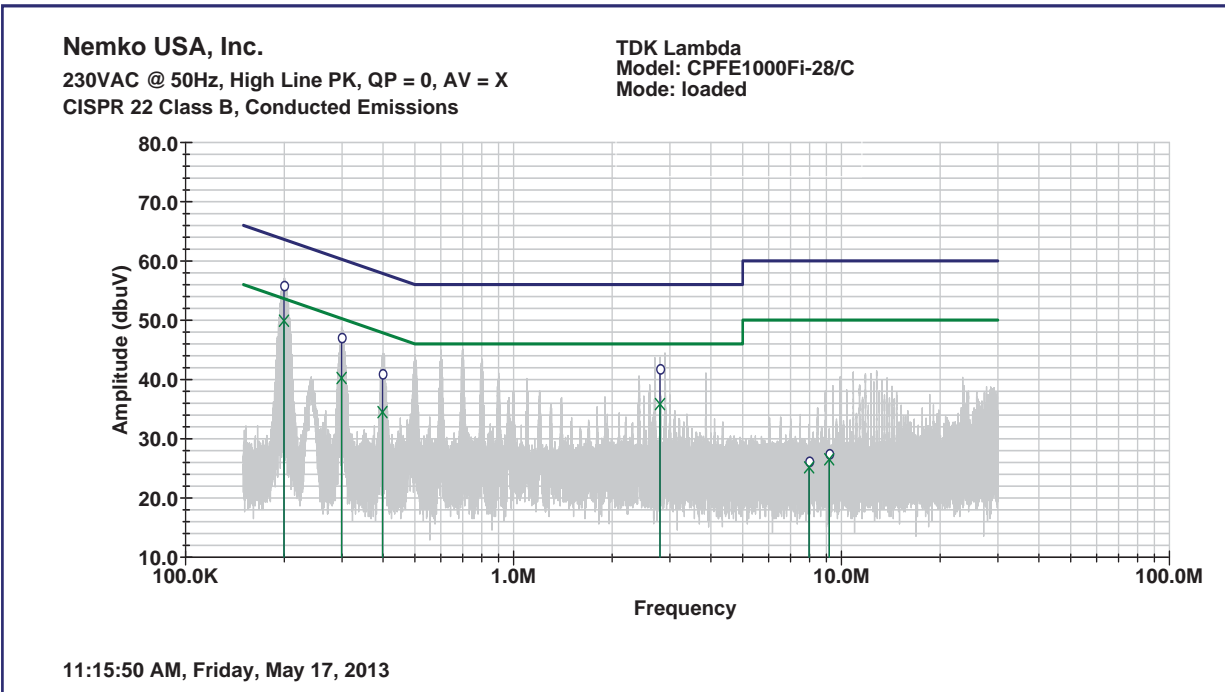
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5.1.7. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	51	%
EUT Name	DC Power Supply	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000Fi-28/C	Test Location	Ground Plane	
Governing Doc	EN 55022	Test Engineer	Danny Long	
Basic Standard	CISPR 22	Date	5/17/2013	
Voltage:	230 Vac, 50Hz			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
199.89	55.3	50.3	64.6	53.6	-9.3	-3.3
302.01	46.6	40.5	61.7	50.2	-15.1	-9.7
725.07	28.3	28.1	56.0	46.0	-27.7	-17.9
3864.52	41.0	29.9	56.0	46.0	-15.0	-16.1
7968.96	36.6	35.8	60.0	50.0	-23.4	-14.2
9178.14	30.3	29.0	60.0	50.0	-29.7	-21.0

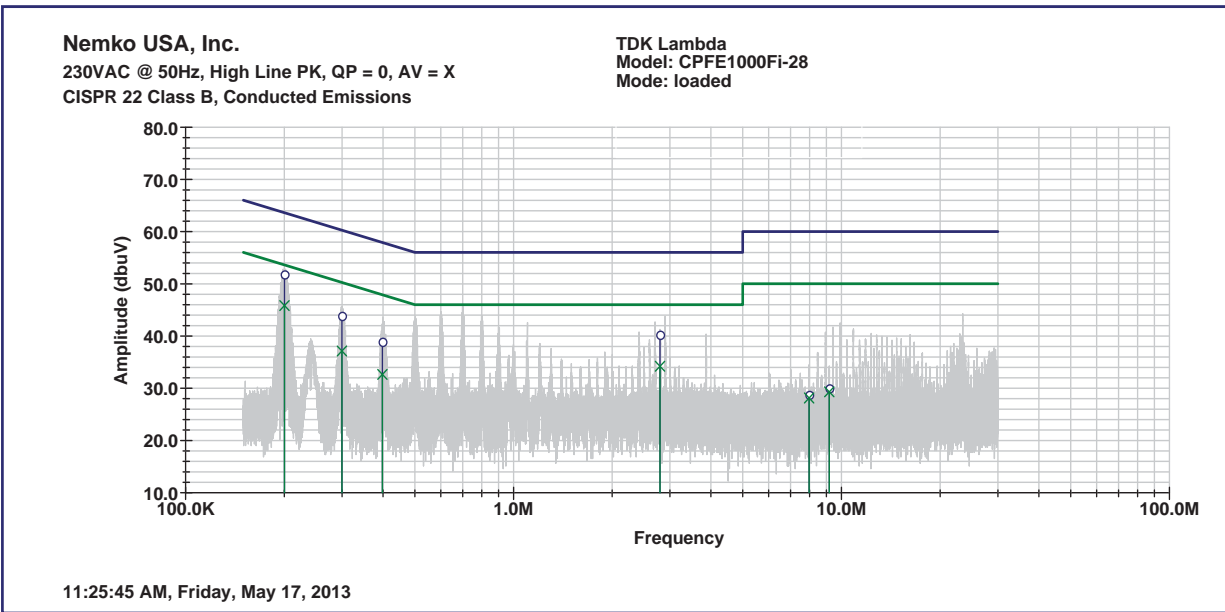
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5.1.8. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	51	%
EUT Name	CPFE1000Fi-28	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000Fi Series	Test Location	Ground Plane	
Governing Doc	EN 55022	Test Engineer	Danny Long	
Basic Standard	CISPR 22	Date	5/17/2013	
Voltage:	230 Vac, 50Hz			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
200.26	51.8	45.8	64.6	53.6	-12.8	-7.8
299.66	43.9	37.1	61.7	50.3	-17.8	-13.2
398.12	38.9	32.6	58.9	47.9	-20.0	-15.3
2796.08	40.3	34.2	56.0	46.0	-15.7	-11.8
7968.63	28.8	28.1	60.0	50.0	-31.2	-21.9
9178.74	30.0	29.3	60.0	50.0	-30.0	-20.7

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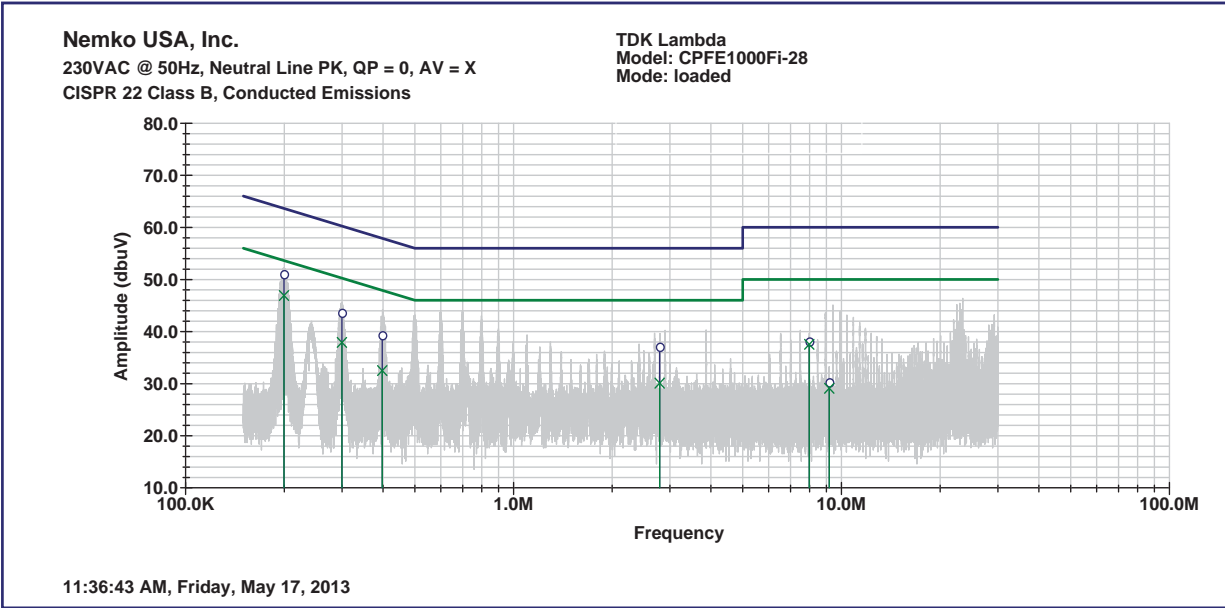
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5.1.9. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	51	%
EUT Name	CPFE1000Fi-28	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000Fi Series	Test Location	Ground Plane	
Governing Doc	EN 55022	Test Engineer	Danny Long	
Basic Standard	CISPR 22	Date	5/17/2013	
Voltage:	230 Vac, 50Hz			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
199.67	51.0	46.9	64.6	53.6	-13.6	-6.7
299.72	43.6	37.9	61.7	50.3	-18.1	-12.4
398.10	39.3	32.5	58.9	47.9	-19.6	-15.4
2791.90	37.1	30.1	56.0	46.0	-18.9	-15.9
7971.64	38.1	37.5	60.0	50.0	-21.9	-12.5
9181.27	30.3	29.1	60.0	50.0	-29.7	-20.9

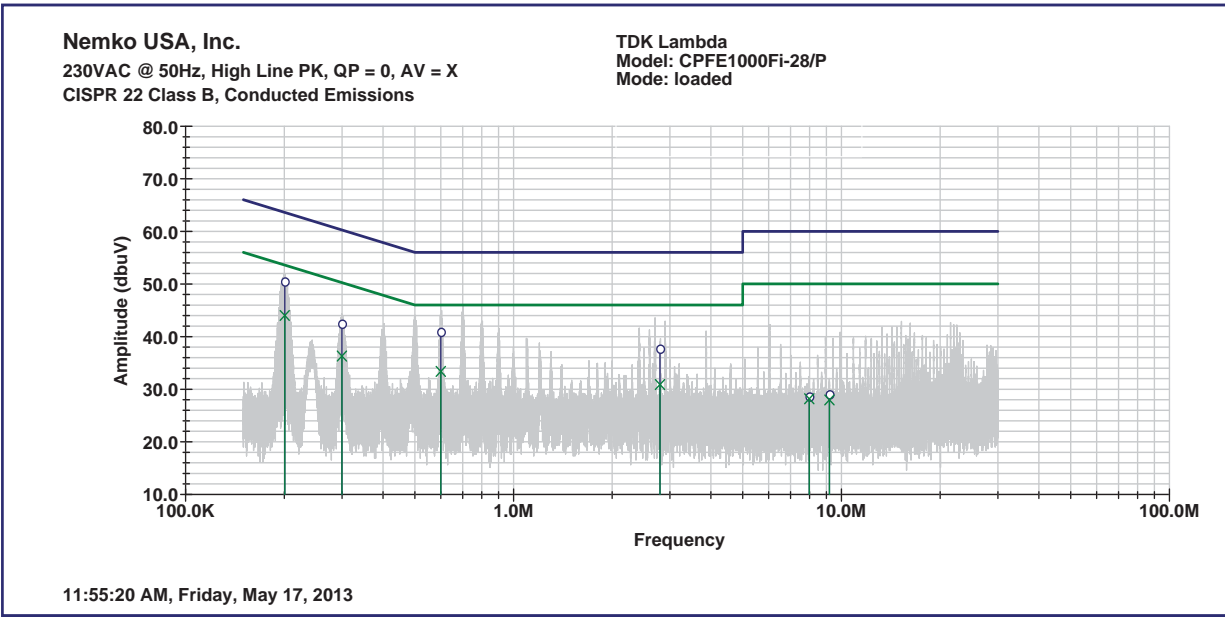
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5.1.10. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	51	%
EUT Name	DC Power Supply	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000Fi-20/P	Test Location	Ground Plane	
Governing Doc	EN 55022	Test Engineer	Danny Long	
Basic Standard	CISPR 22	Date	5/17/2013	
Voltage:	230 Vac, 50Hz			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
200.67	50.5	44.0	64.6	53.6	-14.1	-9.6
299.85	42.5	36.3	61.7	50.2	-19.2	-13.9
600.51	40.9	33.4	56.0	46.0	-15.1	-12.6
2796.80	37.7	30.9	56.0	46.0	-18.3	-15.1
7974.31	28.6	28.2	60.0	50.0	-31.4	-21.8
9184.66	29.1	28.0	60.0	50.0	-30.9	-22.0

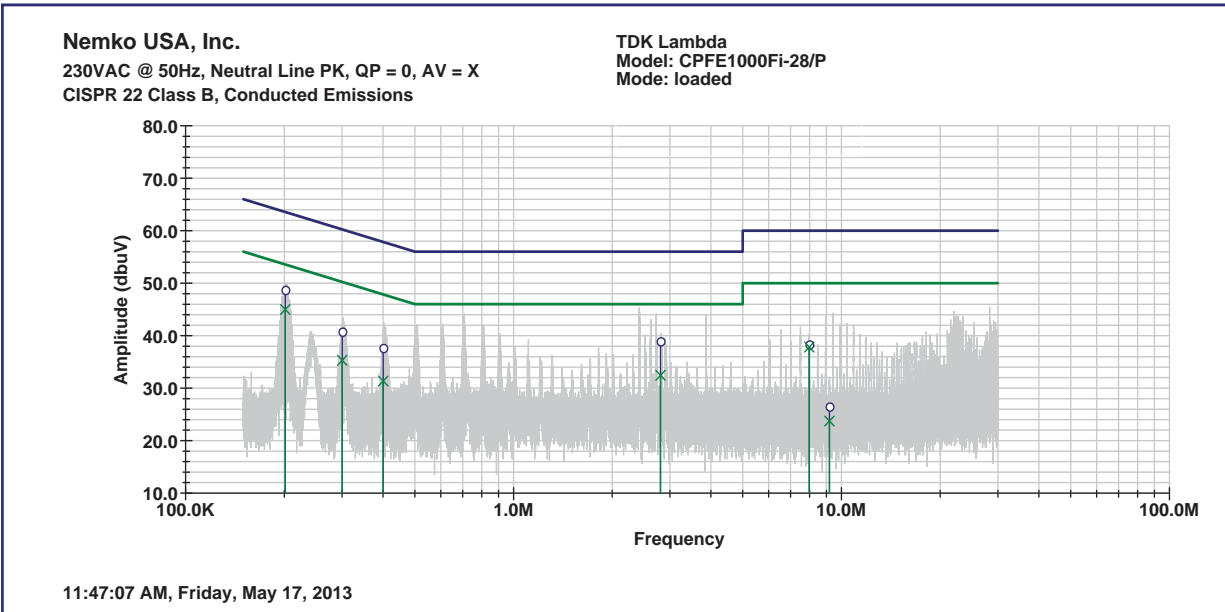
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5.1.11. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	51	%
EUT Name	DC Power Supply	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000Fi-28/P	Test Location	Ground Plane	
Governing Doc	EN 55022	Test Engineer	Danny Long	
Basic Standard	CISPR 22	Date	5/17/2013	
Voltage:	230 Vac, 50Hz			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
201.27	48.7	45.0	64.5	53.6	-15.8	-8.6
300.44	40.8	35.3	61.7	50.2	-20.9	-14.9
400.57	37.6	31.3	58.8	47.8	-21.2	-16.5
2805.64	38.9	32.4	56.0	46.0	-17.1	-13.6
7975.20	38.3	37.8	60.0	50.0	-21.7	-12.2
9186.26	26.5	23.7	60.0	50.0	-33.5	-26.3

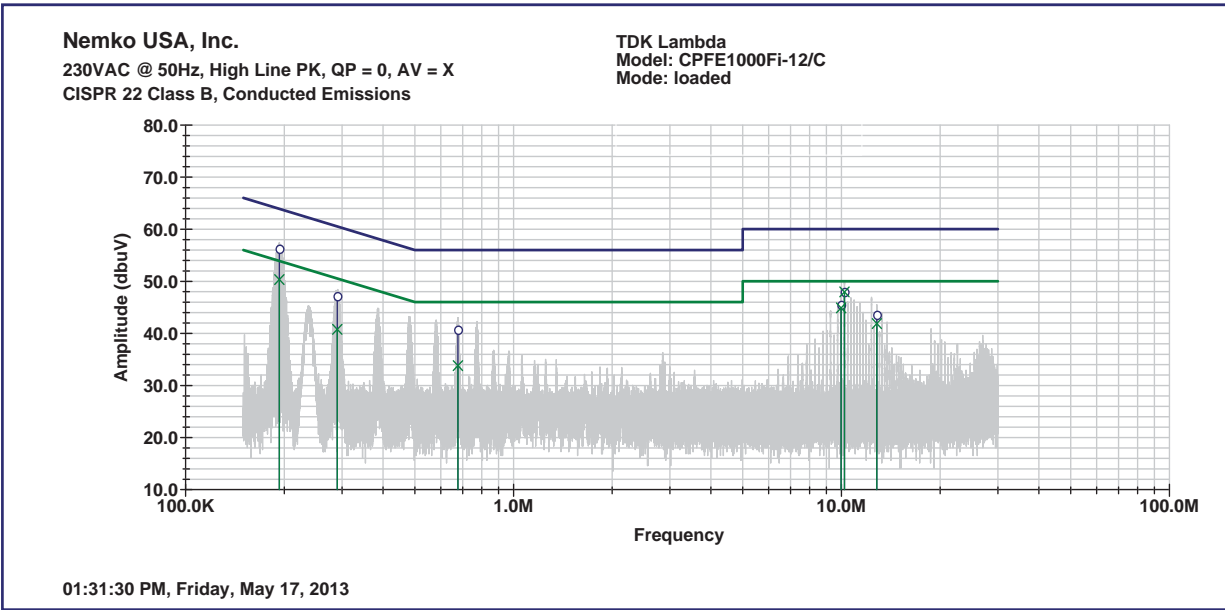
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5.1.12. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	51	%
EUT Name	DC Power Supply	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000Fi-12/C	Test Location	Ground Plane	
Governing Doc	EN 55022	Test Engineer	Danny Long	
Basic Standard	CISPR 22	Date	5/17/2013	
Voltage:	230 Vac, 50Hz			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
193.19	56.3	50.3	64.8	53.9	-8.5	-3.6
289.94	47.2	40.8	62.0	50.5	-14.8	-9.7
676.62	40.7	33.8	56.0	46.0	-15.3	-12.2
9976.36	45.5	44.9	60.0	50.0	-14.5	-5.1
10211.80	48.0	47.9	60.0	50.0	-12.0	-2.1
12823.10	43.6	41.9	60.0	50.0	-16.4	-8.1

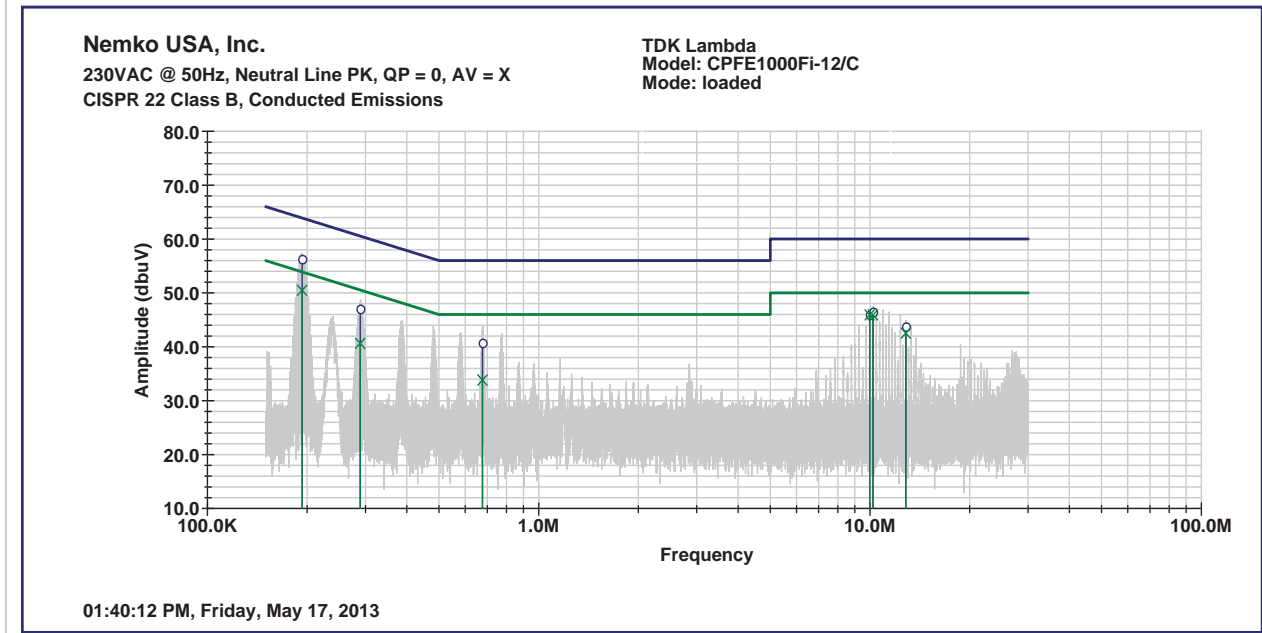
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5.1.13. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	51	%
EUT Name	DC Power Supply	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000Fi-12/C	Test Location	Ground Plane	
Governing Doc	EN 55022	Test Engineer	Danny Long	
Basic Standard	CISPR 22	Date	5/17/2013	
Voltage:	230 Vac, 50Hz			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
193.18	56.3	50.5	64.8	53.9	-8.5	-3.4
289.16	47.1	40.6	62.0	50.5	-14.9	-9.9
676.32	40.7	33.8	56.0	46.0	-15.3	-12.2
9975.01	46.0	45.9	60.0	50.0	-14.0	-4.1
10211.90	46.5	45.9	60.0	50.0	-13.5	-4.1
12823.30	43.8	42.5	60.0	50.0	-16.2	-7.5

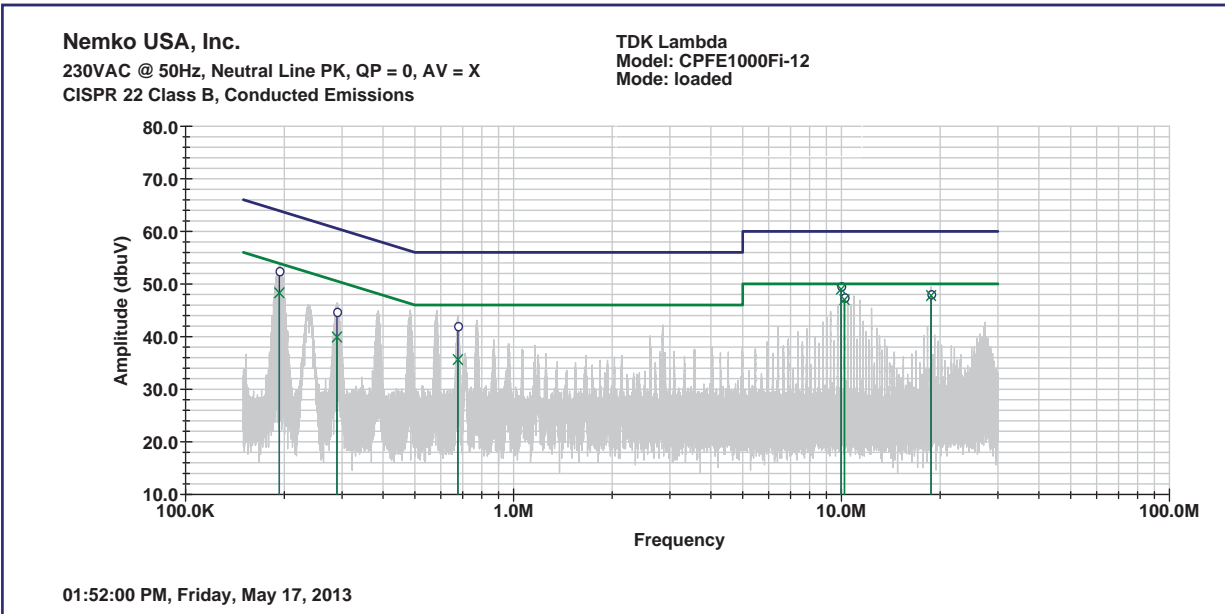
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 Carlsbad, CA 92008
 Phone (760) 444-3500 Fax (760) 444-3005



5.1.14. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	51	%
EUT Name	DC Power Supply	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000Fi-12	Test Location	Ground Plane	
Governing Doc	EN 55022	Test Engineer	Danny Long	
Basic Standard	CISPR 22	Date	5/17/2013	
Voltage:	230 Vac, 50Hz			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
193.30	52.9	47.1	64.8	53.9	-11.9	-6.8
289.56	44.3	37.4	62.0	50.5	-17.7	-13.1
676.12	41.7	35.2	56.0	46.0	-14.3	-10.8
9978.00	48.3	47.6	60.0	50.0	-11.7	-2.4
10214.40	47.7	47.0	60.0	50.0	-12.3	-3.0
18764.30	47.1	45.9	60.0	50.0	-12.9	-4.1

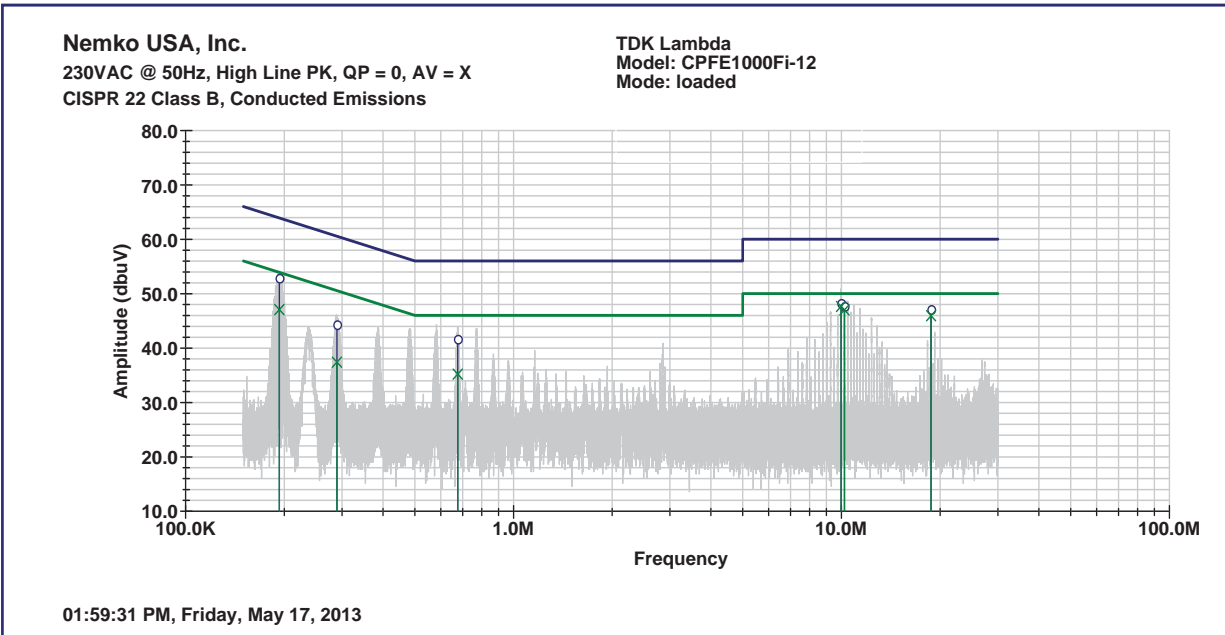
Nemko USA, Inc.

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5.1.15. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	51	%
EUT Name	DC Power Supply	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000Fi-12	Test Location	Ground Plane	
Governing Doc	EN 55022	Test Engineer	Danny Long	
Basic Standard	CISPR 22	Date	5/17/2013	
Voltage:	230 Vac, 50Hz			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
193.28	52.5	48.3	64.8	53.9	-12.3	-5.6
289.35	44.7	39.9	62.0	50.5	-17.3	-10.6
676.90	42.0	35.6	56.0	46.0	-14.0	-10.4
9977.63	49.6	49.0	60.0	50.0	-10.4	-1.0
10213.70	47.5	47.0	60.0	50.0	-12.5	-3.0
18765.90	48.0	47.8	60.0	50.0	-12.0	-2.2

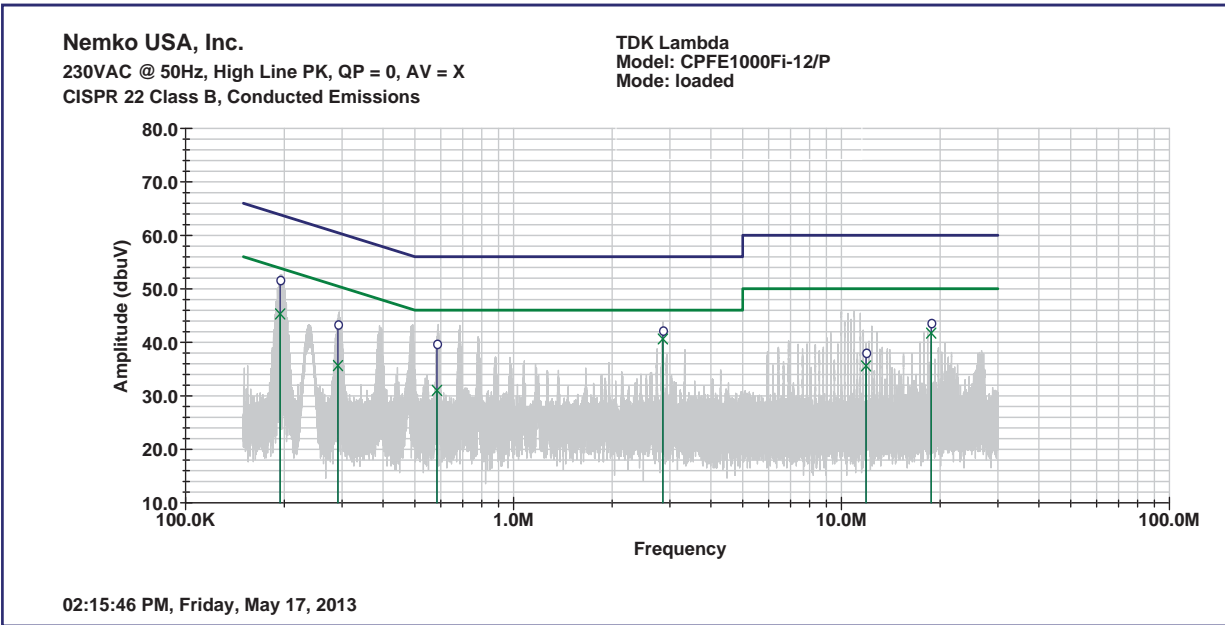
Nemko USA, Inc.

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 Phone (760) 444-3500 Fax (760) 444-3005



5.1.16. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	51	%
EUT Name	DC Power Supply	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000Fi-12/P	Test Location	Ground Plane	
Governing Doc	EN 55022	Test Engineer	Danny Long	
Basic Standard	CISPR 22	Date	5/17/2013	
Voltage:	230 Vac, 50Hz			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
194.28	51.7	45.3	64.7	53.9	-13.0	-8.6
291.64	43.4	35.6	62.0	50.5	-18.6	-14.9
584.23	39.7	31.0	56.0	46.0	-16.3	-15.0
2852.57	42.2	40.6	56.0	46.0	-13.8	-5.4
11881.40	38.1	35.6	60.0	50.0	-21.9	-14.4
18775.70	43.6	41.7	60.0	50.0	-16.4	-8.3

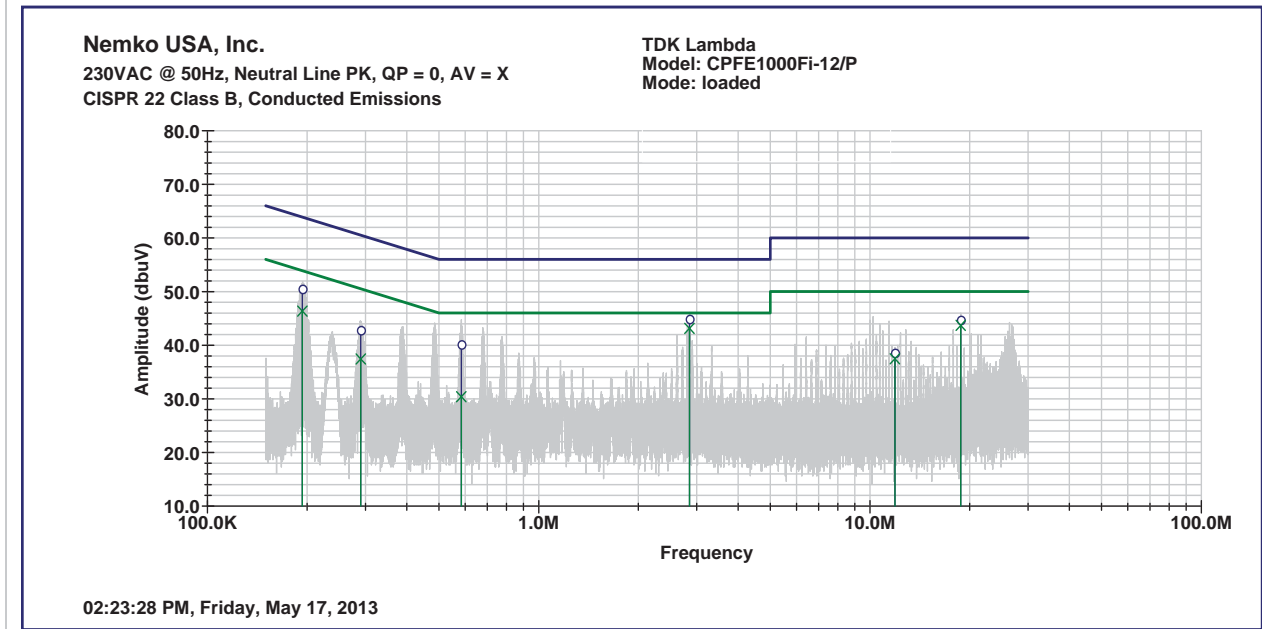
Nemko USA, Inc.

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 Phone (760) 444-3500 Fax (760) 444-3005



5.1.17. Conducted Emissions Test Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	51	%
EUT Name	DC Power Supply	Barometric Pressure	100.7	kPa
EUT Model	CPFE1000Fi-12/P	Test Location	Ground Plane	
Governing Doc	EN 55022	Test Engineer	Danny Long	
Basic Standard	CISPR 22	Date	5/17/2013	
Voltage:	230 Vac, 50Hz			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
193.60	50.5	46.4	64.8	53.9	-14.3	-7.5
290.32	42.8	37.4	62.0	50.5	-19.2	-13.1
584.11	40.1	30.4	56.0	46.0	-15.9	-15.6
2851.72	44.9	43.1	56.0	46.0	-11.1	-2.9
11885.00	38.6	37.5	60.0	50.0	-21.4	-12.5
18776.70	44.7	43.7	60.0	50.0	-15.3	-6.3

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5.1.18. Conducted Emissions Equipment

Client	TDK-Lambda Americas Inc	EUT Name	DC Power Supply
NEx #:	236803	EUT Model	CPFE1000Fi Series

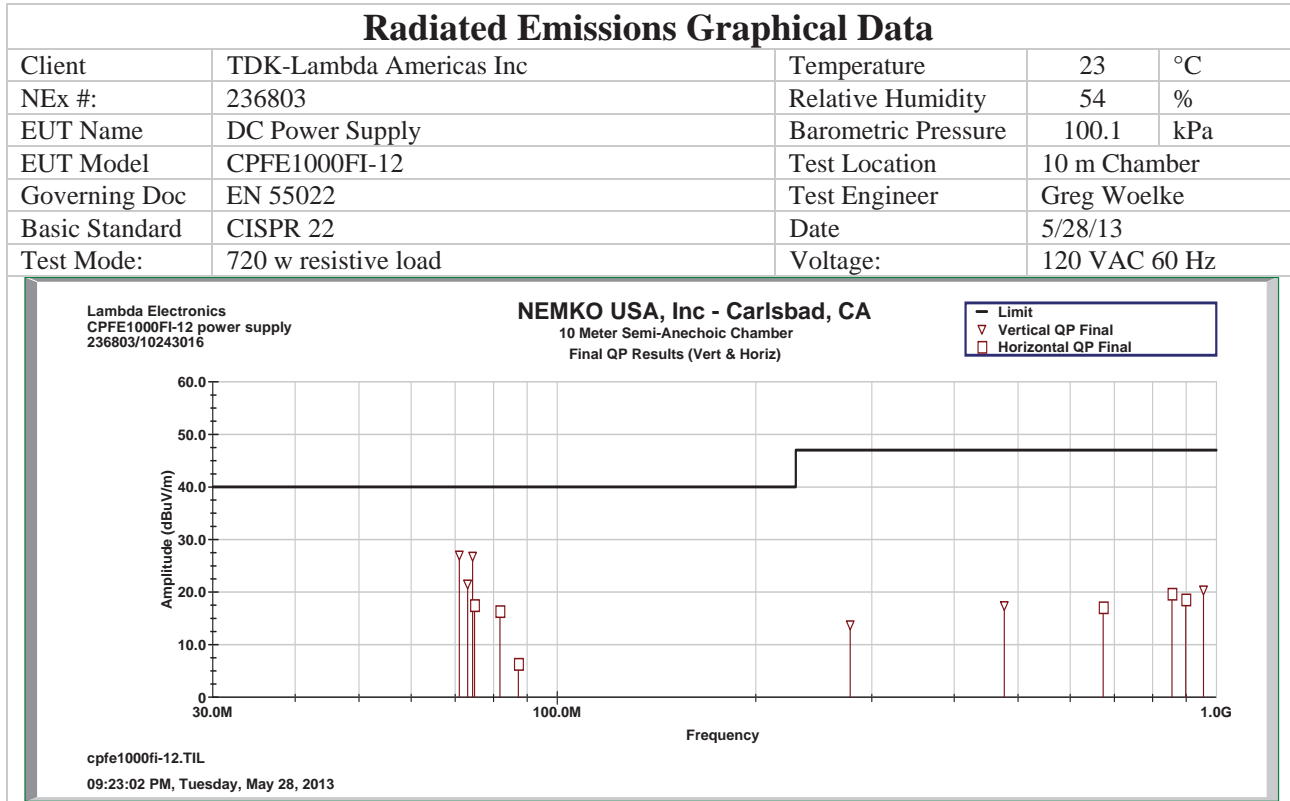
Conducted Emissions Test Equipment						
Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
E1018	9kHz to 7GHz Spectrum Analyzer	Rohde & Schwarz	FSP7	835363/0003	2/23/12	2/23/13
E1020	Two Line V-Network	Rohde & Schwarz	ENV216	101044	4/6/2012	4/6/2013
E1019	Two Line V-Network	Rohde & Schwarz	ENV216	101045	4/6/2012	4/6/2013
805	LISN	Solar	9348-50-R-24-BNC	992823	2/24/2012	2/24/2013
384	LISN	Solar	9348-50-R-24-BNC	941716	9/26/2011	9/26/2012
E1032	CISPR 22: Balanced Telecom ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02-09, Including T8ALCL-1	112254	12/19/2011	12/19/2012
811	Multimeter,	Fluke Corp	111	78130057	2/10/2013	2/10/2014
E1035	Variac (Variable Transformer) 3KVA	Shanghai China	TDGC	N/A	NCR	NCR
241	Variable Autotransformer	Staco Energy Prod.	1520 CT	NA	NCR	NCR

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5.2. Radiated Emissions Test Data

5.2.1. CPFE1000FI-12





Radiated Emissions Tabular Data

Horizontal RE Data								
Measurement Frequency (MHz)	QP Measured (dBµV)	Adjustments (dBm)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Pass Fail
74.86	39.7	-22.1	7	110	17.5	40.0	-22.5	Pass
81.81	38.7	-22.3	261	110	16.4	40.0	-23.6	Pass
87.28	28.3	-21.9	353	110	6.4	40.0	-33.6	Pass
673.43	23.3	-6.2	0	110	17.1	47.0	-29.9	Pass
856.20	22.8	-3.1	3	110	19.7	47.0	-27.3	Pass
898.58	22.4	-3.8	3	110	18.6	47.0	-28.4	Pass

Vertical RE Data								
Measurement Frequency (MHz)	QP Measured (dBµV)	Adjustments (dBm)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Pass Fail
71.02	49.0	-22.0	167	110	27.0	40.0	-13.0	Pass
73.08	43.6	-22.1	7	110	21.6	40.0	-18.4	Pass
74.38	49.0	-22.1	173	110	26.8	40.0	-13.2	Pass
278.21	29.7	-15.9	3	110	13.8	47.0	-33.2	Pass
476.54	28.2	-10.8	63	110	17.4	47.0	-29.6	Pass
955.91	22.0	-1.6	7	110	20.4	47.0	-26.6	Pass

Calculation:

Meter Reading + antenna factor + cable loss – preamplifier = Corrected Reading

(Antenna factor, cable loss, preamplifier values are not listed.)

Corrected Reading – Spec. Limit = Margin

Negative Margin indicates passing emissions.

Meter Readings are Quasi-Peak maximum hold for turntable direction and antenna height.

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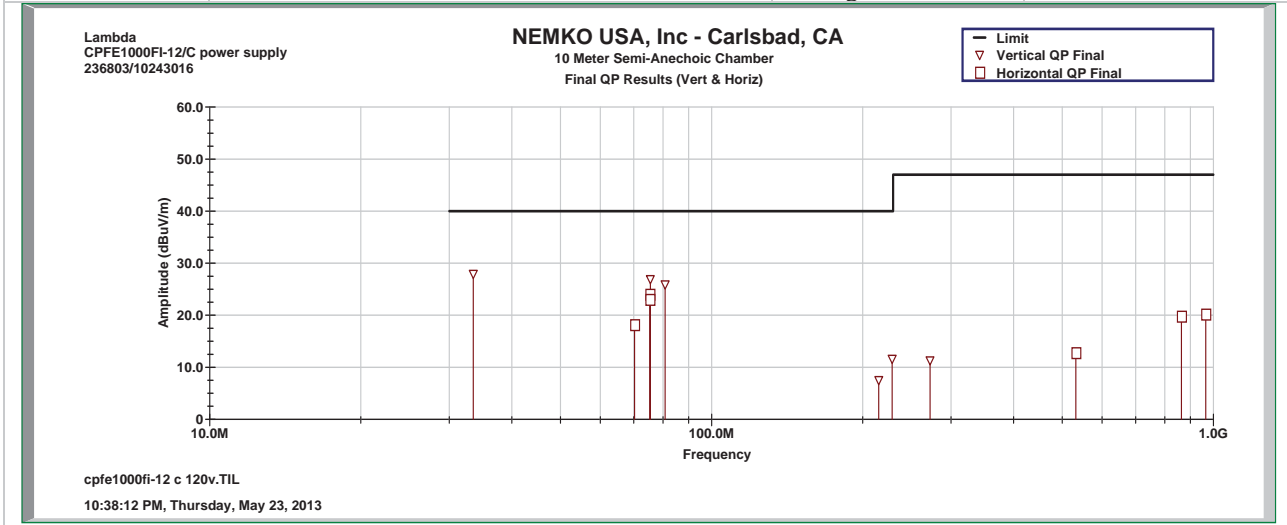


Client	TDK-Lambda Americas Inc	EUT Name	DC Power Supply
NEx #:	236803	EUT Model	CPFE1000Fi Series

5.2.1. CPFE1000FI-12/C

Radiated Emissions Graphical Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	54	%
EUT Name	DC Power Supply	Barometric Pressure	100.1	kPa
EUT Model	CPFE1000FI-12/C	Test Location	10 m Chamber	
Governing Doc	EN 55022	Test Engineer	Greg Woelke	
Basic Standard	CISPR 22	Date	5/28/13	
Test Mode:	720 w resistive load	Voltage:	120 VAC 60 Hz	



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Radiated Emissions Tabular Data

Horizontal RE Data								
Measurement Frequency (MHz)	QP Measured (dBμV)	Adjustments (dBm)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	Pass / Fail
70.25	40.1	-21.9	-1	374	18.2	40.0	-21.8	Pass
75.36	46.2	-22.2	189	389	24.0	40.0	-16.0	Pass
75.39	45.2	-22.2	10	388	23.1	40.0	-16.9	Pass
532.12	23.4	-10.6	10	389	12.8	47.0	-34.2	Pass
863.50	22.8	-2.9	3	389	19.8	47.0	-27.2	Pass
965.31	21.7	-1.5	-1	388	20.2	47.0	-26.8	Pass

Vertical RE Data								
Measurement Frequency (MHz)	QP Measured (dBμV)	Adjustments (dBm)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	Pass / Fail
33.51	47.4	-19.4	119	111	28.0	40.0	-12.0	Pass
75.50	49.1	-22.2	11	111	26.9	40.0	-13.1	Pass
80.79	48.3	-22.3	3	111	25.9	40.0	-14.1	Pass
215.32	26.1	-18.6	360	389	7.6	40.0	-32.4	Pass
229.00	30.0	-18.4	127	389	11.6	40.0	-28.4	Pass
272.46	27.6	-16.3	79	389	11.3	47.0	-35.7	Pass

Calculation:

Meter Reading + antenna factor + cable loss – preamplifier = Corrected Reading

(Antenna factor, cable loss, preamplifier values are not listed.)

Corrected Reading – Spec. Limit = Margin

Negative Margin indicates passing emissions.

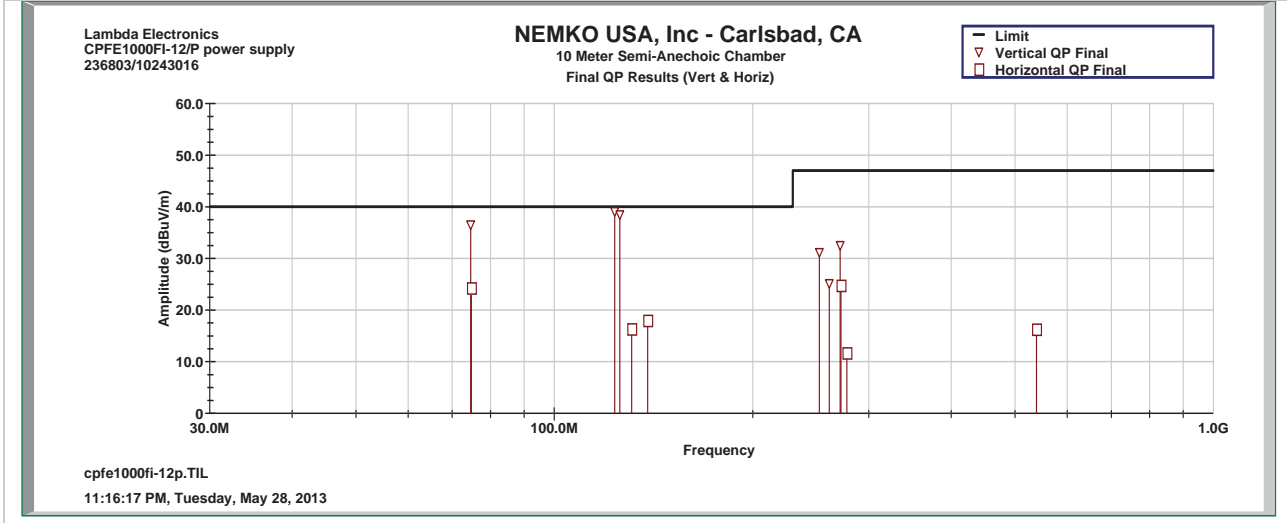
Meter Readings are Quasi-Peak maximum hold for turntable direction and antenna height.

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5.2.1. CPFE1000FI-12/P

Radiated Emissions Graphical Data				
Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	53	%
EUT Name	DC Power Supply	Barometric Pressure	100.1	kPa
EUT Model	CPFE1000FI-12/P	Test Location	10 m Chamber	
Governing Doc	EN 55022	Test Engineer	Greg Woelke	
Basic Standard	CISPR 22	Date	5/28/13	
Test Mode:	720 w resistive load	Voltage:	120 VAC 60 Hz	





Radiated Emissions Tabular Data

Horizontal RE Data								
Measurement Frequency (MHz)	QP Measured (dBμV)	Adjustments (dBm)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	Pass Fail
74.85	46.4	-22.1	4	110	24.3	40.0	-15.7	Pass
131.05	35.1	-18.8	2	110	16.4	40.0	-23.6	Pass
138.56	36.8	-18.8	2	110	18.0	40.0	-22.0	Pass
272.28	41.0	-16.3	134	110	24.8	47.0	-22.2	Pass
277.90	27.6	-15.9	6	110	11.7	47.0	-35.3	Pass
539.05	26.9	-10.6	95	110	16.3	47.0	-30.7	Pass

Vertical RE Data								
Measurement Frequency (MHz)	QP Measured (dBμV)	Adjustments (dBm)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	Pass Fail
74.65	58.7	-22.1	239	110	36.5	40.0	-3.5	Pass
123.49	58.2	-19.1	50	110	39.1	40.0	-0.9	Pass
125.70	57.5	-19.0	5	110	38.5	40.0	-1.5	Pass
252.34	48.4	-17.2	181	110	31.2	47.0	-15.8	Pass
261.30	41.9	-16.7	6	110	25.2	47.0	-21.8	Pass
271.44	48.9	-16.3	188	110	32.5	47.0	-14.5	Pass

Calculation:

Meter Reading + antenna factor + cable loss – preamplifier = Corrected Reading

(Antenna factor, cable loss, preamplifier values are not listed.)

Corrected Reading – Spec. Limit = Margin

Negative Margin indicates passing emissions.

Meter Readings are Quasi-Peak maximum hold for turntable direction and antenna height.

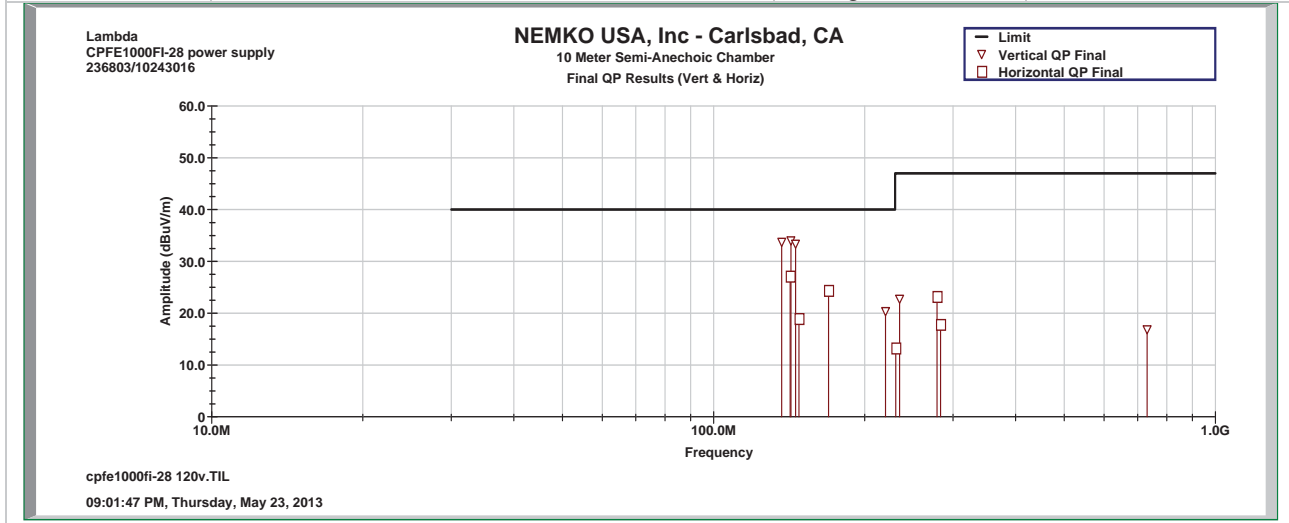
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5.2.1. CPFE1000FI-28

Radiated Emissions Graphical Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	48	%
EUT Name	DC Power Supply	Barometric Pressure	100.6	kPa
EUT Model	CPFE1000FI-28	Test Location	10 m Chamber	
Governing Doc	EN 55022	Test Engineer	Greg Woelke	
Basic Standard	CISPR 22	Date	5/23/13	
Test Mode:	1000 w resistive load	Voltage:	120 VAC 60 Hz	





Radiated Emissions Tabular Data

Horizontal RE Data								
Measurement Frequency (MHz)	QP Measured (dBμV)	Adjustments (dBm)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	Pass / Fail
142.19	45.9	-18.7	287	337	27.2	40.0	-12.8	Pass
147.99	37.6	-18.6	349	389	19.0	40.0	-21.0	Pass
169.49	41.7	-17.3	356	389	24.4	40.0	-15.6	Pass
230.76	31.6	-18.3	11	328	13.3	47.0	-33.7	Pass
278.85	39.1	-15.8	118	389	23.2	47.0	-23.8	Pass
283.22	33.5	-15.6	11	389	17.8	47.0	-29.2	Pass

Vertical RE Data								
Measurement Frequency (MHz)	QP Measured (dBμV)	Adjustments (dBm)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	Pass / Fail
136.71	52.5	-18.8	42	168	33.8	40.0	-6.2	Pass
142.63	52.8	-18.7	11	111	34.0	40.0	-6.0	Pass
145.66	52.1	-18.7	5	111	33.4	40.0	-6.6	Pass
220.17	38.9	-18.5	360	388	20.4	40.0	-19.6	Pass
234.84	41.0	-18.2	230	169	22.8	47.0	-24.2	Pass
731.02	23.8	-6.9	65	111	16.9	47.0	-30.1	Pass

Calculation:

Meter Reading + antenna factor + cable loss – preamplifier = Corrected Reading

(Antenna factor, cable loss, preamplifier values are not listed.)

Corrected Reading – Spec. Limit = Margin

Negative Margin indicates passing emissions.

Meter Readings are Quasi-Peak maximum hold for turntable direction and antenna height.

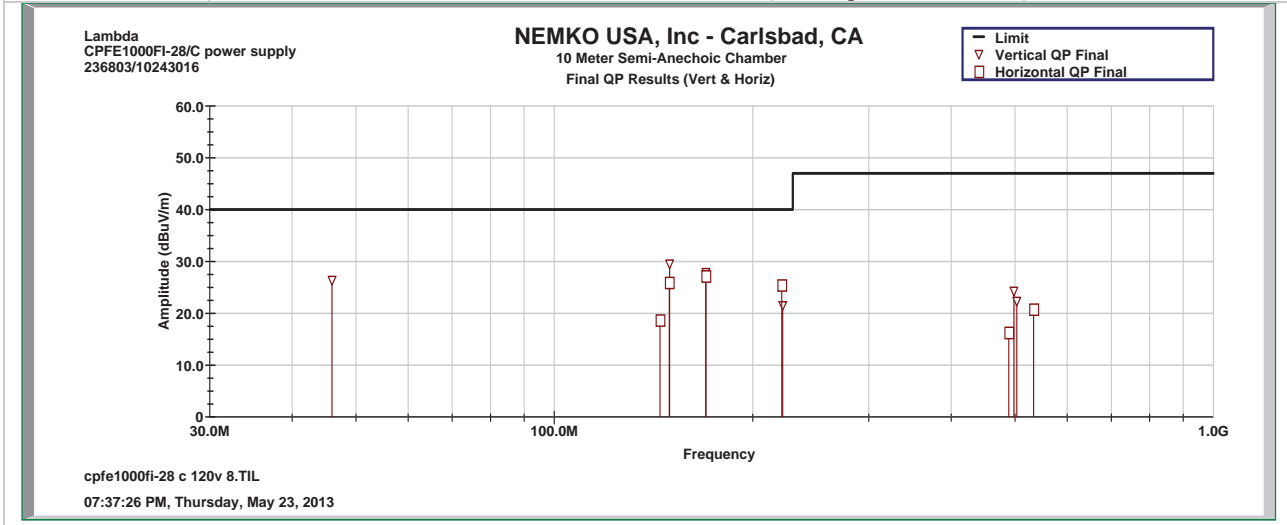
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5.2.1. CPFE1000FI-28/C

Radiated Emissions Graphical Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	46	%
EUT Name	DC Power Supply	Barometric Pressure	100.5	kPa
EUT Model	CPFE1000FI-28/C	Test Location	10 m Chamber	
Governing Doc	EN 55022	Test Engineer	Greg Woelke	
Basic Standard	CISPR 22	Date	5/23/13	
Test Mode:	1000 w resistive load	Voltage:	120 VAC 60 Hz	





Radiated Emissions Tabular Data

Horizontal RE Data								
Measurement Frequency (MHz)	QP Measured (dBμV)	Adjustments (dBm)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	Pass Fail
144.64	37.4	-18.7	10	363	18.7	40.0	-21.3	Pass
149.39	44.6	-18.6	132	390	26.0	40.0	-14.0	Pass
169.77	44.5	-17.3	265	389	27.2	40.0	-12.8	Pass
221.36	43.9	-18.5	62	368	25.5	40.0	-14.5	Pass
489.13	26.8	-10.5	10	223	16.3	47.0	-30.7	Pass
533.69	31.4	-10.6	2	111	20.8	47.0	-26.2	Pass

Vertical RE Data								
Measurement Frequency (MHz)	QP Measured (dBμV)	Adjustments (dBm)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	Pass Fail
46.00	46.9	-20.5	87	111	26.4	40.0	-13.6	Pass
149.61	48.1	-18.6	8	111	29.5	40.0	-10.5	Pass
169.83	45.2	-17.3	159	112	27.9	40.0	-12.1	Pass
222.11	40.0	-18.4	360	389	21.5	40.0	-18.5	Pass
497.97	34.3	-10.0	170	389	24.3	47.0	-22.7	Pass
503.31	32.1	-9.7	349	113	22.4	47.0	-24.6	Pass

Calculation:

Meter Reading + antenna factor + cable loss – preamplifier = Corrected Reading

(Antenna factor, cable loss, preamplifier values are not listed.)

Corrected Reading – Spec. Limit = Margin

Negative Margin indicates passing emissions.

Meter Readings are Quasi-Peak maximum hold for turntable direction and antenna height.

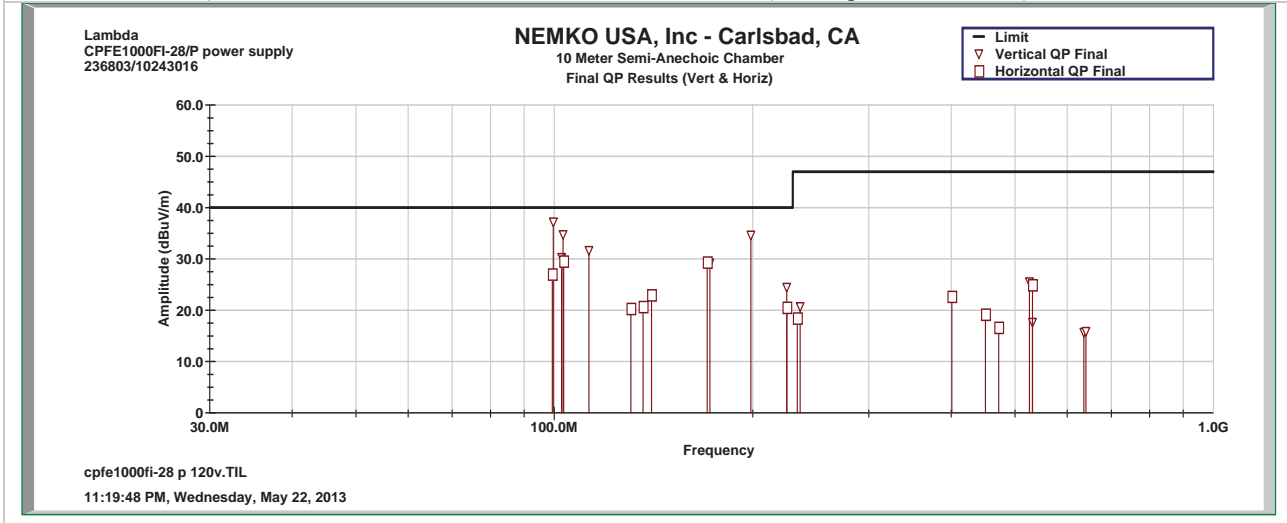
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5.2.1. CPFE1000FI-28/P

Radiated Emissions Graphical Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	46	%
EUT Name	DC Power Supply	Barometric Pressure	100.5	kPa
EUT Model	CPFE1000FI-28/P	Test Location	10 m Chamber	
Governing Doc	EN 55022	Test Engineer	Greg Woelke	
Basic Standard	CISPR 22	Date	5/23/13	
Test Mode:	1000 w resistive load	Voltage:	120 VAC 60 Hz	





Radiated Emissions Tabular Data

Horizontal RE Data								
Measurement Frequency (MHz)	QP Measured (dBµV)	Adjustments (dBm)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Pass Fail
99.27	48.4	-21.4	317	377	27.0	40.0	-13.0	Pass
103.31	50.4	-20.9	77	388	29.6	40.0	-10.4	Pass
130.64	39.1	-18.8	9	389	20.4	40.0	-19.6	Pass
136.34	39.5	-18.8	3	390	20.7	40.0	-19.3	Pass
140.39	41.8	-18.8	315	389	23.0	40.0	-17.0	Pass
170.62	46.7	-17.3	272	388	29.4	40.0	-10.6	Pass
225.32	39.0	-18.4	361	319	20.6	40.0	-19.4	Pass
233.70	36.7	-18.3	360	390	18.5	47.0	-28.5	Pass
401.00	35.9	-13.2	360	224	22.7	47.0	-24.3	Pass
451.07	31.2	-12.0	111	111	19.2	47.0	-27.8	Pass
472.34	27.5	-10.8	10	111	16.7	47.0	-30.3	Pass
531.59	35.5	-10.6	297	220	25.0	47.0	-22.0	Pass

Vertical RE Data								
Measurement Frequency (MHz)	QP Measured (dBµV)	Adjustments (dBm)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Pass Fail
99.64	58.6	-21.4	267	112	37.2	40.0	-2.8	Pass
102.57	51.3	-21.0	351	111	30.3	40.0	-9.7	Pass
103.06	55.7	-20.9	229	111	34.8	40.0	-5.2	Pass
112.86	51.4	-19.7	349	111	31.7	40.0	-8.3	Pass
172.26	46.4	-17.2	356	111	29.2	40.0	-10.8	Pass
198.69	50.6	-16.0	28	111	34.7	40.0	-5.3	Pass
225.21	42.9	-18.4	194	147	24.5	40.0	-15.5	Pass
236.09	38.9	-18.2	349	111	20.7	47.0	-26.3	Pass
526.06	36.1	-10.5	242	111	25.6	47.0	-21.4	Pass
531.50	28.3	-10.6	351	111	17.7	47.0	-29.3	Pass
636.01	23.6	-7.9	358	111	15.7	47.0	-31.3	Pass
640.78	23.4	-7.4	361	111	15.9	47.0	-31.1	Pass
577.66	27.8	-9.6	357	210	18.2	37.0	-18.8	Pass

Calculation:

Meter Reading + antenna factor + cable loss – preamplifier = Corrected Reading
 (Antenna factor, cable loss, preamplifier values are not listed.)

Corrected Reading – Spec. Limit = Margin

Negative Margin indicates passing emissions.

Meter Readings are Quasi-Peak maximum hold for turntable direction and antenna height.

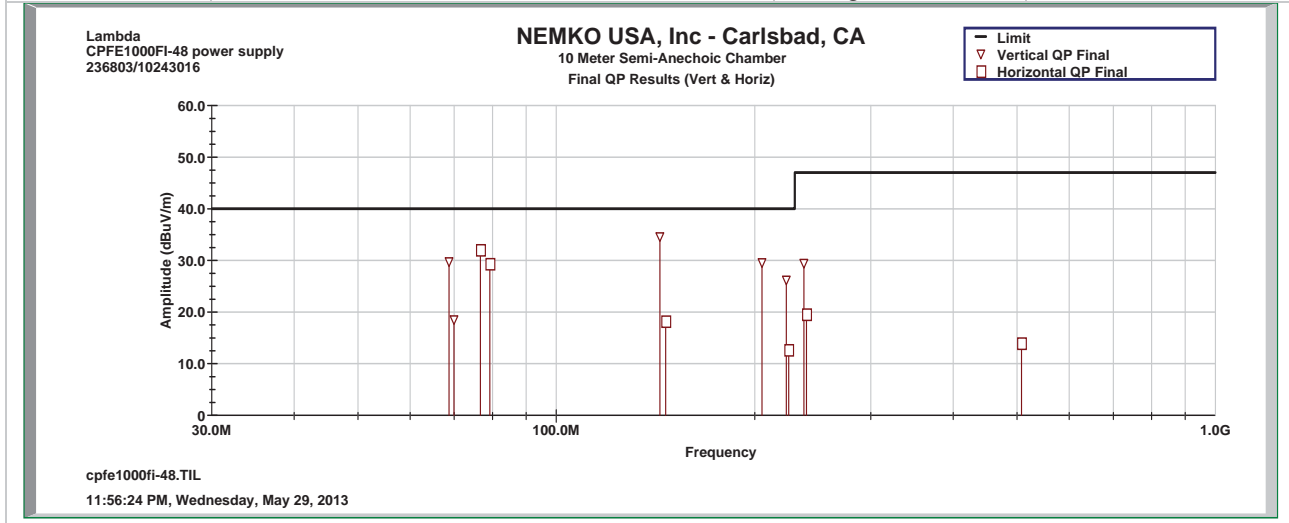
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5.2.1. CPFE1000FI-48

Radiated Emissions Graphical Data

Client	TDK-Lambda Americas Inc	Temperature	24	°C
NEx #:	236803	Relative Humidity	52	%
EUT Name	DC Power Supply	Barometric Pressure	100.1	kPa
EUT Model	CPFE1000FI-48	Test Location	10 m Chamber	
Governing Doc	EN 55022	Test Engineer	Greg Woelke	
Basic Standard	CISPR 22	Date	5/29/13	
Test Mode:	1000 w resistive load	Voltage:	120 VAC 60 Hz	





Radiated Emissions Tabular Data

Horizontal RE Data								
Measurement Frequency (MHz)	QP Measured (dBμV)	Adjustments (dBm)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	Pass Fail
76.72	54.3	-22.2	357	110	32.1	40.0	-7.9	Pass
79.28	51.7	-22.4	357	110	29.4	40.0	-10.6	Pass
146.57	36.9	-18.7	358	110	18.3	40.0	-21.7	Pass
225.20	31.1	-18.4	355	110	12.7	40.0	-27.3	Pass
239.72	37.6	-18.0	20	110	19.6	47.0	-27.4	Pass
507.94	23.7	-9.7	7	110	14.0	47.0	-33.0	Pass

Measurement Frequency (MHz)	QP Measured (dBμV)	Adjustments (dBm)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	Pass Fail
68.76	51.7	-21.9	237	110	29.8	40.0	-10.2	Pass
69.95	40.5	-21.9	353	110	18.5	40.0	-21.5	Pass
143.58	53.3	-18.7	360	110	34.6	40.0	-5.4	Pass
205.19	48.1	-18.4	89	110	29.6	40.0	-10.4	Pass
223.30	44.7	-18.4	6	110	26.2	40.0	-13.8	Pass
237.47	47.6	-18.1	309	110	29.5	47.0	-17.5	Pass

Calculation:

Meter Reading + antenna factor + cable loss – preamplifier = Corrected Reading

(Antenna factor, cable loss, preamplifier values are not listed.)

Corrected Reading – Spec. Limit = Margin

Negative Margin indicates passing emissions.

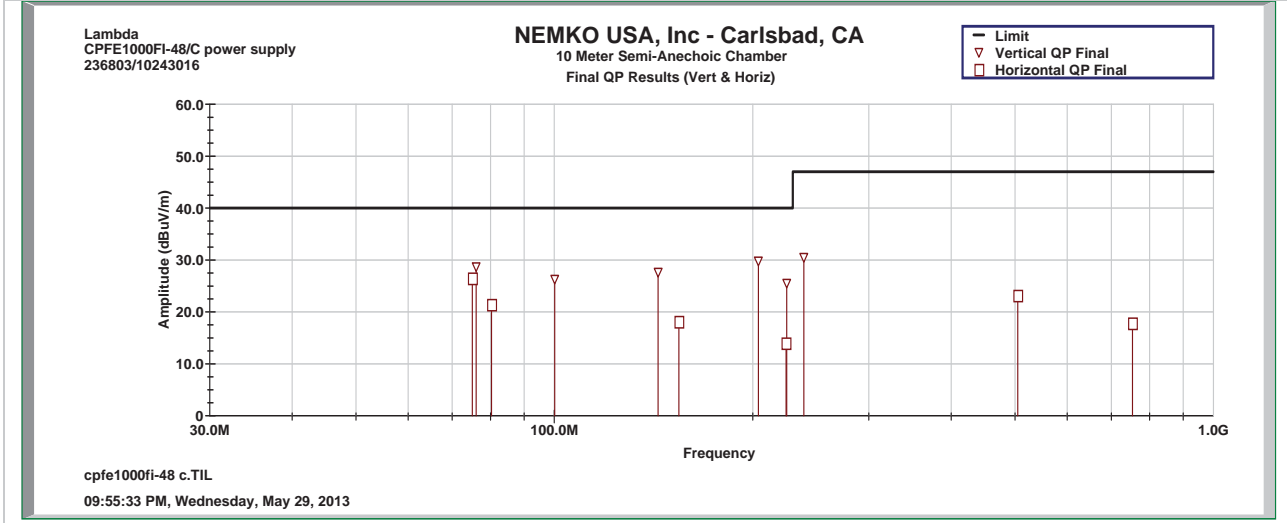
Meter Readings are Quasi-Peak maximum hold for turntable direction and antenna height.

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5.2.1. CPFE1000FI-48/C

Radiated Emissions Graphical Data				
Client	TDK-Lambda Americas Inc	Temperature	26	°C
NEx #:	236803	Relative Humidity	47	%
EUT Name	DC Power Supply	Barometric Pressure	100.0	kPa
EUT Model	CPFE1000FI-48/C	Test Location	10 m Chamber	
Governing Doc	EN 55022	Test Engineer	Greg Woelke	
Basic Standard	CISPR 22	Date	5/29/13	
Test Mode:	1000 w resistive load	Voltage:	120 VAC 60 Hz	





Radiated Emissions Tabular Data

Horizontal RE Data								
Measurement Frequency (MHz)	QP Measured (dBμV)	Adjustments (dBm)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	Pass / Fail
75.09	48.6	-22.2	4	110	26.5	40.0	-13.5	Pass
80.31	43.8	-22.4	2	110	21.4	40.0	-18.6	Pass
154.51	36.3	-18.1	192	110	18.1	40.0	-21.9	Pass
224.68	32.4	-18.4	354	110	14.0	40.0	-26.0	Pass
504.86	32.8	-9.7	22	110	23.2	47.0	-23.8	Pass
753.62	23.7	-5.9	6	110	17.8	47.0	-29.2	Pass

Vertical RE Data								
Measurement Frequency (MHz)	QP Measured (dBμV)	Adjustments (dBm)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	Pass / Fail
76.08	50.9	-22.2	88	110	28.7	40.0	-11.3	Pass
100.13	47.7	-21.3	7	110	26.3	40.0	-13.7	Pass
143.74	46.4	-18.7	0	110	27.7	40.0	-12.3	Pass
203.97	48.3	-18.4	59	110	29.8	40.0	-10.2	Pass
225.18	44.0	-18.4	7	110	25.6	40.0	-14.4	Pass
239.03	48.6	-18.0	306	110	30.5	47.0	-16.5	Pass

Calculation:

Meter Reading + antenna factor + cable loss – preamplifier = Corrected Reading

(Antenna factor, cable loss, preamplifier values are not listed.)

Corrected Reading – Spec. Limit = Margin

Negative Margin indicates passing emissions.

Meter Readings are Quasi-Peak maximum hold for turntable direction and antenna height.

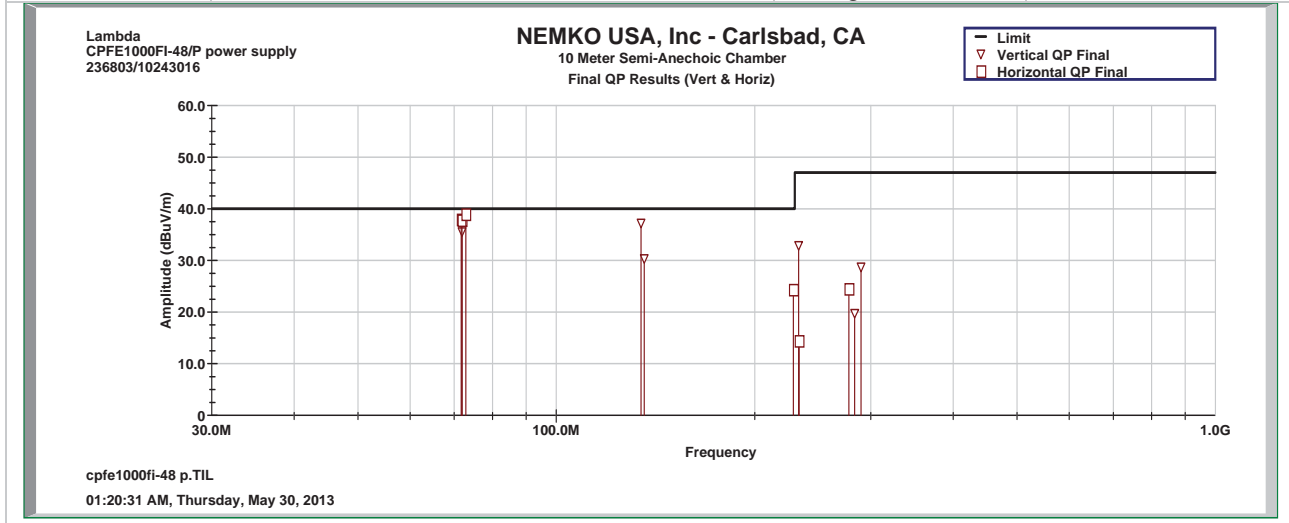
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5.2.1. CPFE1000FI-48/P

Radiated Emissions Graphical Data

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	52	%
EUT Name	DC Power Supply	Barometric Pressure	100.1	kPa
EUT Model	CPFE1000FI-48/P	Test Location	10 m Chamber	
Governing Doc	EN 55022	Test Engineer	Greg Woelke	
Basic Standard	CISPR 22	Date	5/29/13	
Test Mode:	1000 w resistive load	Voltage:	120 VAC 60 Hz	





Radiated Emissions Tabular Data

Horizontal RE Data								
Measurement Frequency (MHz)	QP Measured (dBµV)	Adjustments (dBm)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Pass Fail
71.71	60.0	-22.0	360	110	38.0	40.0	-2.0	Pass
71.94	59.8	-22.0	357	110	37.8	40.0	-2.2	Pass
72.88	61.0	-22.0	208	110	39.0	40.0	-1.0	Pass
228.94	42.7	-18.4	98	110	24.3	40.0	-15.7	Pass
233.56	32.7	-18.3	7	110	14.5	47.0	-32.5	Pass
277.97	40.4	-15.9	143	110	24.5	47.0	-22.5	Pass

Vertical RE Data								
Measurement Frequency (MHz)	QP Measured (dBµV)	Adjustments (dBm)	Turn Table (degrees)	Antenna Height (cm)	Corrected Reading (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Pass Fail
71.94	57.6	-22.0	177	112	35.6	40.0	-4.4	Pass
134.46	56.0	-18.8	264	111	37.3	40.0	-2.7	Pass
135.95	49.1	-18.8	354	111	30.4	40.0	-9.6	Pass
233.13	51.2	-18.3	313	111	32.9	47.0	-14.1	Pass
283.56	35.4	-15.6	354	111	19.8	47.0	-27.2	Pass
289.98	44.3	-15.6	154	111	28.8	47.0	-18.2	Pass

Calculation:

Meter Reading + antenna factor + cable loss – preamplifier = Corrected Reading

(Antenna factor, cable loss, preamplifier values are not listed.)

Corrected Reading – Spec. Limit = Margin

Negative Margin indicates passing emissions.

Meter Readings are Quasi-Peak maximum hold for turntable direction and antenna height.

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Radiated Emissions Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
911	Spectrum Analyzer	Agilent	E4440A	US41421266	10/15/2012	10/15/2013
111	Antenna, LPA	EMCO	3146	1382	1/9/2013	1/9/2014
E1046	Biconical Antenna	A.H. Systems Inc.	SAS-540	736	4/22/2013	4/22/2014
901	Pre-Amplifier	Sonoma	310N	130607	10/15/2012	10/15/2013



5.3. Electrostatic Discharge Immunity Test Results & Test Points

Client:	TDK-Lambda Americas Inc	Temperature:	23	°C
NEx #:	236803	Relative Humidity:	49	%
EUT Name:	DC Power Supply	Barometric Pressure:	100.3	kPa
EUT Model:	CPFE1000Fi-12/C, CPFE1000Fi-12/P CPFE1000Fi-28/C, CPFE1000Fi-28/P CPFE1000Fi-48/C, CPFE1000Fi-48/P	Test Location	ESD Room	
Governing Doc:	EN 55024	Test Engineer	Danny Long	
Basic Standard:	IEC 61000-4-2	Date:	5/23/2013	
Test Voltage:	230 VAC @ 50 Hz	Photo:	<input checked="" type="checkbox"/>	

Test Conditions

Discharge Rep. Rate	<input checked="" type="checkbox"/> ≥ 1 per second
Number of Discharges	<input checked="" type="checkbox"/> ≥ 10 per location
Performance Criteria:	A
EUT Mode:	full load condition using resistive loads

Contact Discharge

Voltage: (+/- kV) 2 4 6 8 Other: ____

Location	Comments
Vertical Coupling Plane	No susceptibility noted.
Horizontal Coupling Plane	No susceptibility noted.
Contact Locations	No susceptibility noted.

Air Discharge



Voltage: (+/- kV) 2 4 8 15 Other: ____

Location	Comments
Air Locations	No susceptibility noted.
“Spark” event(s)	No spark events noted.
Compliant	<input checked="" type="checkbox"/>
Non-Compliant	<input checked="" type="checkbox"/>

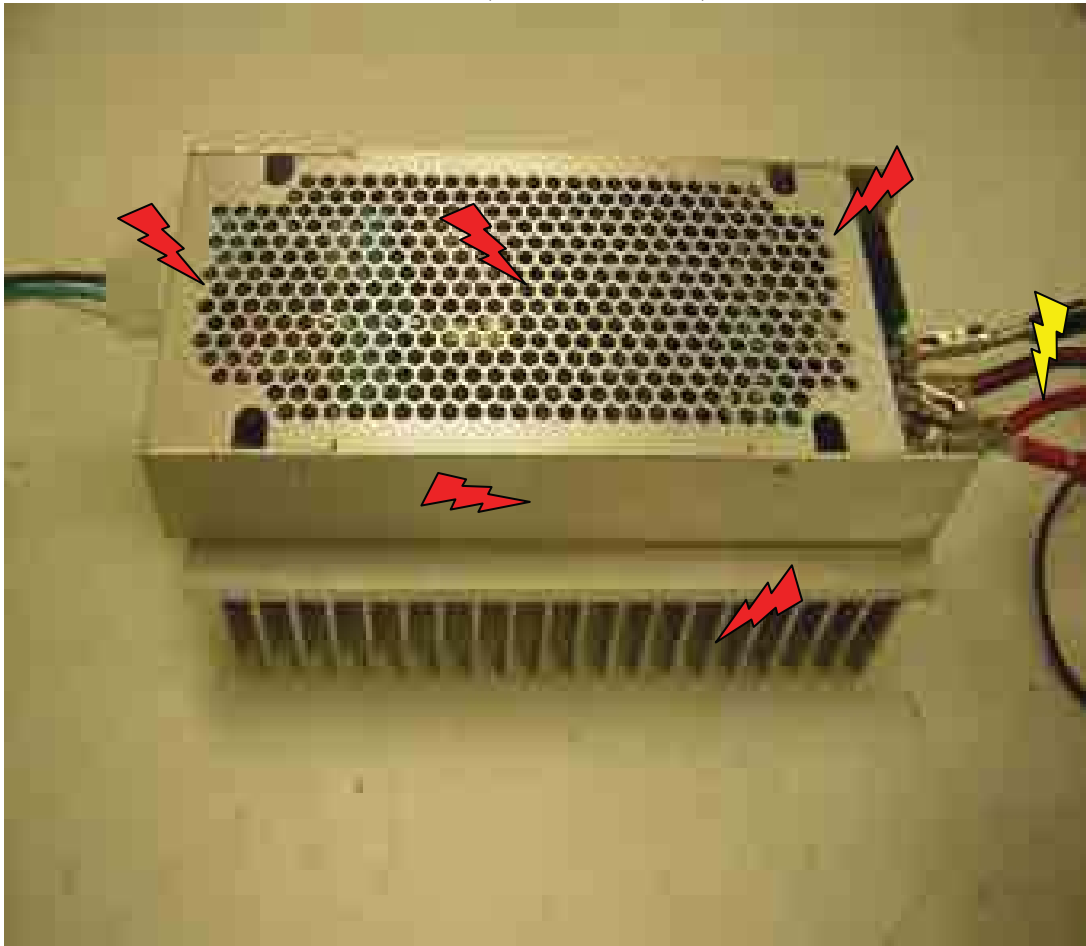
ESD Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
818	ESD Gun	Schaffner	NSG 435	5111	11/27/2012	11/27/2013
811	Multimeter,	Fluke Corp	111	7813005 7	2/10/2013	2/10/2014

Figure 1.ESD Test Points



Contact Discharges =	
Air Discharges =	

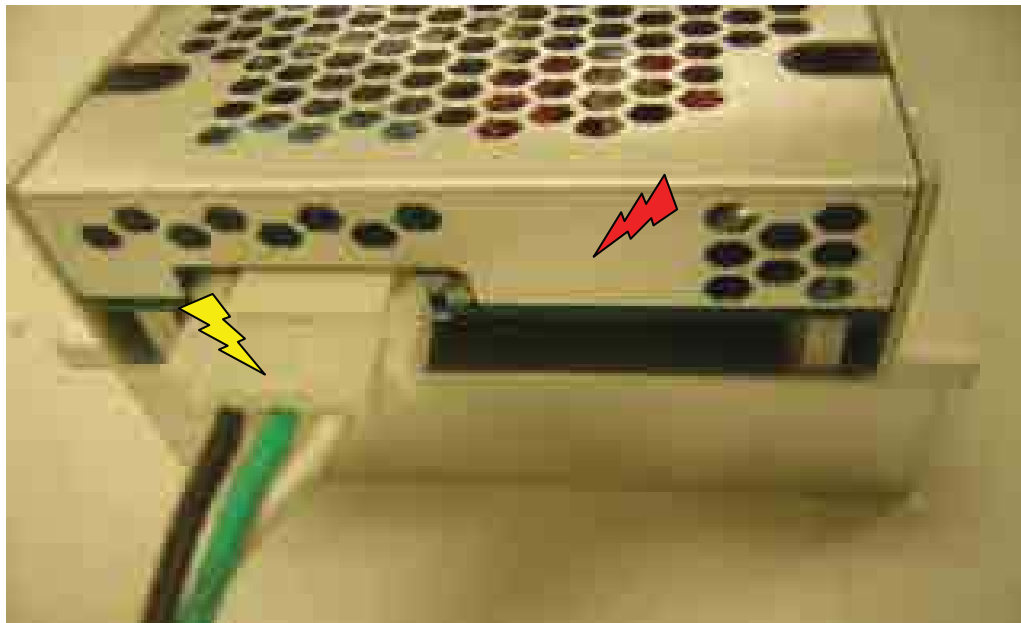
MODELS: CPFE1000Fi-12/C, CPFE1000Fi-28/C, CPFE1000Fi-48/C



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ESD Test Points

Contact Discharges = 
Air Discharges = 

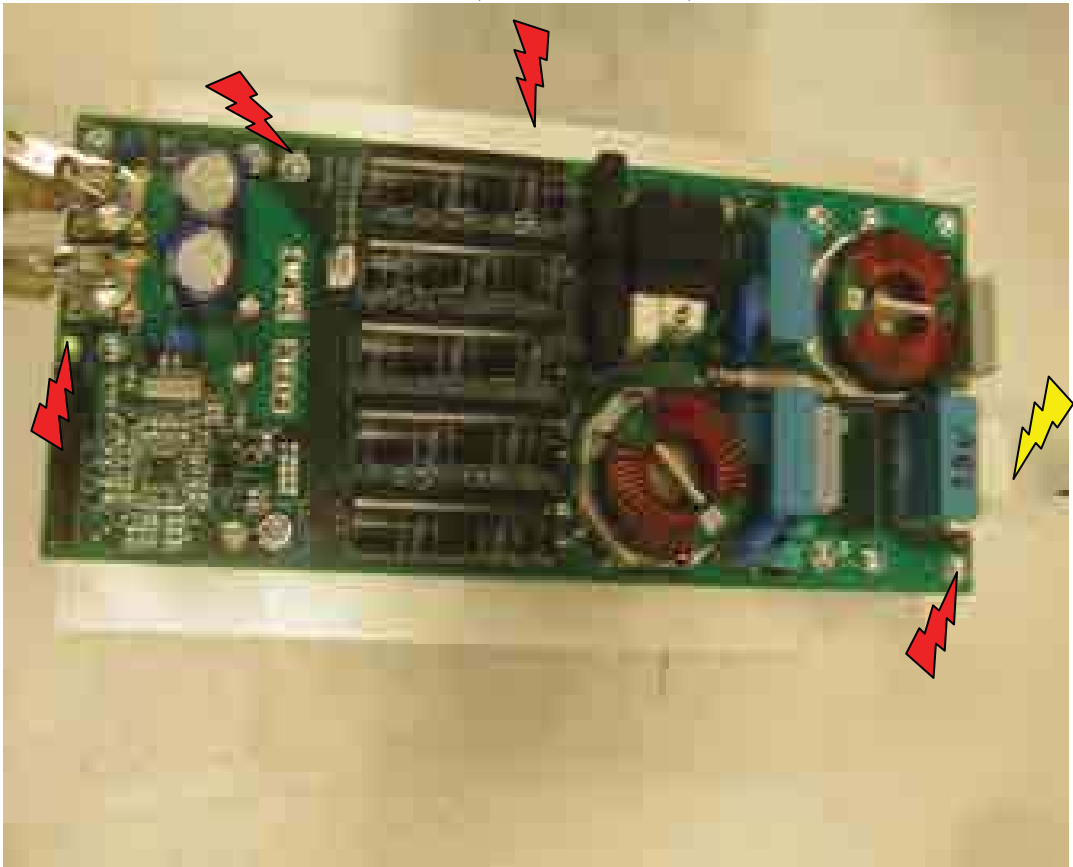


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ESD TEST POINTS

Contact Discharges =	
Air Discharges =	

MODELS: CPFE1000Fi-12/P, CPFE1000Fi-28/P, CPFE1000Fi-48/P



(NOTE: TEST POINT PER CUSTOMER REQUEST)

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5.4. Radio Frequency Immunity Test Results

Client:	TDK-Lambda Americas Inc	Temperature:	23	°C
NE _x #:	236803	Relative Humidity:	55	%
EUT Name:	DC Power Supply	Barometric Pressure:	100.6	kPa
EUT Model:	CPFE1000Fi-12/C, CPFE1000Fi-12/P CPFE1000Fi-28/C, CPFE1000Fi-28/P CPFE1000Fi-48/C, CPFE1000Fi-48/P CPFE1000Fi-12, CPFE1000Fi-28 CPFE1000Fi-48	Test Location	RFI Chamber	
Governing Doc:	EN 55024	Test Engineer	Danny Long	
Basic Standard:	IEC 61000-4-3	Date:	5/22/2013	
Test Voltage:	230 VAC @ 50 Hz	Photo:	<input checked="" type="checkbox"/>	

Test Conditions

Test Level:	10V/m
Frequency Swept:	80 to 1000 MHz
Selected Frequencies:	N/A
Modulation:	80 % Depth, 1 kHz AM Modulation
Frequency Step:	1 %
Dwell Time:	3 seconds
Performance Criteria:	A
EUT Mode:	full load condition using resistive loads

Test Scans Accomplished

Frequency (MHz)	Antenna Polarization		Compliant		Orientation F: Front R: Rear SL: Side, Left SR: Side, Right	Comments
	H	V	Y	N		
80-200	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		F	No susceptibility noted
80-200	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		R	No susceptibility noted.
200-1000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		F	No susceptibility noted.
200-1000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		R	No susceptibility noted.

		Additional Comments:
Compliant	<input checked="" type="checkbox"/>	No susceptibility noted.
Non-Compliant	<input type="checkbox"/>	

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Radio Frequency Immunity Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
751	Signal Generator	HP	8642B	3034A03286	6/24/2012	6/24/2013
932	Signal Generator	HP	8673C	2822A00556	6/24/2012	6/24/2013
733	Field Probe	AR	FP4080	23418	7/18/2012	7/18/2013
740	RF Amplifier	Amplifier Research	500W1000M5	23680	NCR	NCR
811	Multimeter,	Fluke Corp	111	78130057	2/10/2013	2/10/2014

Antennas

Nemko ID	VSWR	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
EA 2466	1.9:1	EMCO	3109	9403-2801	NCR	NCR
372	2.0:1	Electro-Metrics	RGA-25	2225	11/5/2012	11/5/2014

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5.5. Electrical Fast Transient Burst Immunity Test Results

Client	TDK-Lambda Americas Inc	Temperature	24	°C
NEx #:	236803	Relative Humidity	56	%
EUT Name	DC Power Supply	Barometric Pressure	100.5	kPa
EUT Model	CPFE1000Fi-12/C, CPFE1000Fi-28/C, CPFE1000Fi-48/C	Test Location	Ground Plane	
Governing Doc	EN 55024	Test Engineer	Danny Long	
Basic Standard	IEC 61000-4-4	Date	5/21/2013	
Test Voltage:	230 VAC @ 50 Hz	Photo:	<input checked="" type="checkbox"/>	

Test Conditions

Power Port:	AC Mains
Highest Power Port Test Level:	2.0 kV
Highest Signal Port Test Level:	1.0 kV
Test Duration:	61 Seconds
Burst:	5 kHz
Performance Criteria:	A
EUT Mode:	full load condition using resistive loads

Direct Injection Output Path

Test Level	L1	L2	PE	Comments
+/- 2.0kV	<input checked="" type="checkbox"/>			No Susceptibility Noted
+/- 2.0kV		<input checked="" type="checkbox"/>		No Susceptibility Noted
+/- 2.0kV			<input checked="" type="checkbox"/>	No Susceptibility Noted
+/-2.0kV		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	No Susceptibility Noted
+/- 2.0kV	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		No Susceptibility Noted
+/- 2.0kV	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	No Susceptibility Noted

Cable Description (Clamp Injection)

+/- 1.00kV	Vdc Output Cable	No Susceptibility Noted
------------	------------------	-------------------------

Additional Comments

Compliant	<input checked="" type="checkbox"/>	No susceptibility noted.
Non-Compliant	<input type="checkbox"/>	

Test Equipment

Electrical Fast Transient/Burst Immunity Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
416	Generator	Haefely	PEFT Jr.	083 180-40	06/06/2012	06/06/2013
E1015	Clamp	Haefely	093 506.1	083 874-08	NCR	NCR
811	Multimeter,	Fluke Corp	111	78130057	2/10/2013	2/10/2014

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5.6. Power Line Surge Immunity Test Results

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	54	%
EUT Name	DC Power Supply	Barometric Pressure	100.6	kPa
EUT Model	CPFE1000Fi-12/C	Test Location	Ground Plane	
Governing Doc	EN 55024	Test Engineer	Danny Long	
Basic Standard	IEC 61000-4-5	Date	05/20/2013	
Test Voltage:	230 VAC @ 50 Hz	Photo:	<input checked="" type="checkbox"/>	

Test Conditions

Power Port:	AC Mains
Highest Power Port Test Level Line – Line:	1.0 kV (Level 3)
Highest Power Port Test Level Line – Ground:	2.0 kV (Level 3)
Highest Signal Port Test Level:	None
Rest Duration between Strikes:	61 Seconds
Number of Strikes per Voltage:	Twenty (20)
Repetitions	5 each Polarity
Polarity	Negative And Positive
Strike Angles on power frequency phase:	0° 90° 180° 270°
Waveform Generator Type:	Combination
Performance Criteria:	B
EUT Mode:	full load condition using resistive loads

Test Strikes Accomplished

	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	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
L1-Gnd	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
N-L1			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>

		Additional Comments
Compliant	<input checked="" type="checkbox"/>	No susceptibility noted.
Non-Compliant	<input type="checkbox"/>	

Test Equipment

Power Line Surge Immunity Test Equipment						
Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
Avalon 6150	Conducted Immunity Tester	Schaffner	Modula 6150	34434	12/7/12	12/7/13
811	Multimeter,	Fluke Corp	111	78130057	2/10/2013	2/10/2014

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5.6.1. Power Line Surge Immunity Test Results

Client	TDK-Lambda Americas Inc	Temperature	22	°C
NEx #:	236803	Relative Humidity	54	%
EUT Name	DC Power Supply	Barometric Pressure	100.6	kPa
EUT Model	CPFE1000Fi-28/C	Test Location	Ground Plane	
Governing Doc	EN 55024	Test Engineer	Danny Long	
Basic Standard	IEC 61000-4-5	Date	05/21/2013	
Test Voltage:	230 VAC @ 50 Hz	Photo:	<input checked="" type="checkbox"/>	

Test Conditions

Power Port:	AC Mains
Highest Power Port Test Level Line – Line:	1.0 kV (Level 3)
Highest Power Port Test Level Line – Ground:	2.0 kV (Level 3)
Highest Signal Port Test Level:	None
Rest Duration between Strikes:	61 Seconds
Number of Strikes per Voltage:	Twenty (20)
Repetitions	5 each Polarity
Polarity	Negative And Positive
Strike Angles on power frequency phase:	0° 90° 180° 270°
Waveform Generator Type:	Combination
Performance Criteria:	B
EUT Mode:	full load condition using resistive loads

Test Strikes Accomplished

	Level 1		Level 2		Level 3		Level 4		Special									
	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	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
L1-Gnd	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>				
N-L1			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>

		Additional Comments
Compliant	<input checked="" type="checkbox"/>	No susceptibility noted.
Non-Compliant	<input type="checkbox"/>	

Test Equipment

Power Line Surge Immunity Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
Avalon 6150	Conducted Immunity Tester	Schaffner	Modula 6150	34434	12/7/12	12/7/13
811	Multimeter,	Fluke Corp	111	78130057	2/10/2013	2/10/2014

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5.6.2. Power Line Surge Immunity Test Results

Client	TDK-Lambda Americas Inc	Temperature	22	°C
NEx #:	236803	Relative Humidity	54	%
EUT Name	DC Power Supply	Barometric Pressure	100.6	kPa
EUT Model	CPFE1000Fi-48/C	Test Location	Ground Plane	
Governing Doc	EN 55024	Test Engineer	Danny Long	
Basic Standard	IEC 61000-4-5	Date	05/21/2013	
Test Voltage:	230 VAC @ 50 Hz	Photo:	<input checked="" type="checkbox"/>	

Test Conditions

Power Port:	AC Mains
Highest Power Port Test Level Line – Line:	1.0 kV (Level 3)
Highest Power Port Test Level Line – Ground:	2.0 kV (Level 3)
Highest Signal Port Test Level:	None
Rest Duration between Strikes:	61 Seconds
Number of Strikes per Voltage:	Twenty (20)
Repetitions	5 each Polarity
Polarity	Negative And Positive
Strike Angles on power frequency phase:	0° 90° 180° 270°
Waveform Generator Type:	Combination
Performance Criteria:	B
EUT Mode:	full load condition using resistive loads

Test Strikes Accomplished

	Level 1		Level 2		Level 3		Level 4		Special											
	CM		DM		CM		DM		CM		DM									
	0.5kV	0.25kV	1.0kV	0.5kV	2.0kV	1.0kV	4.0kV	2.0kV	CM	DM	CM	DM								
	+	-	+	-	+	-	+	-	+	-	+	-								
N-Gnd	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
L1-Gnd	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
N-L1			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>

		Additional Comments
Compliant	<input checked="" type="checkbox"/>	No susceptibility noted.
Non-Compliant	<input type="checkbox"/>	

Test Equipment

Power Line Surge Immunity Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
Avalon 6150	Conducted Immunity Tester	Schaffner	Modula 6150	34434	12/7/12	12/7/13
811	Multimeter,	Fluke Corp	111	78130057	2/10/2013	2/10/2014

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5.7. Ring Wave Immunity Test Results

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	55	%
EUT Name	DC Power Supply	Barometric Pressure	100.5	kPa
EUT Model	CPFE1000Fi-12/C	Test Location	Ground Plane 3	
Governing Doc	EN 55024	Test Engineer	Mike Krumweide	
Basic Standard	IEC 61000-4-12	Date	07/18/2013	
Test Voltage:	230 VAC @ 50 Hz	Photo:	<input checked="" type="checkbox"/>	

Test Conditions

Power Port:	AC Mains
Highest Power Port Test Level Line – Line:	0.5 kV (Level 2) 1 kV (Level 3)
Highest Power Port Test Level Line – Ground:	1 kV (Level 2) 2.0 kV (Level 3)
Highest Signal Port Test Level:	None
Rest Duration between Strikes:	60 Seconds
Number of Strikes per Voltage:	Twenty (20)
Repetitions	5 each Polarity
Polarity	Negative And Positive
Strike Angles on power frequency phase:	0° 90° 180° 270°
Waveform Generator Type:	Ring Wave
Performance Criteria:	B
EUT Mode:	full load condition using resistive loads
Internal Impedance selected	12 Ohms

Test Strikes Accomplished

	Level 2				Level 3											
	CM		DM		CM		DM									
	1.0kV	0.5kV	2.0kV	1.0kV												
	+	-	+	-	+	-	+	-								
N-Gnd	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>										
L1-Gnd	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>										
N-L1			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>								

		Additional Comments
Compliant	<input checked="" type="checkbox"/>	No susceptibility noted.
Non-Compliant	<input type="checkbox"/>	

Test Equipment

Ring Wave Immunity Test Equipment						
Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
811	Multimeter	Fluke	111	78130057	20-Feb-2013	20-Feb-2014
945	Temp/Humidity Indicator	Davis Instruments	7400	PC00502A16	15-Jan-2013	15-Jan-2014
--	Advanced EMC Immunity Test System	Keytek	EMC Pro	0204295	3-July-2013	3-July-2014

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5.7.1. Ring Wave Immunity Test Results

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	55	%
EUT Name	DC Power Supply	Barometric Pressure	100.5	kPa
EUT Model	CPFE1000Fi-28/C	Test Location	Ground Plane 3	
Governing Doc	EN 55024	Test Engineer	William Dey	
Basic Standard	IEC 61000-4-12	Date	07/18,19/2013	
Test Voltage:	230 VAC @ 50 Hz	Photo:	<input checked="" type="checkbox"/>	

Test Conditions

Power Port:	AC Mains
Highest Power Port Test Level Line – Line:	0.5 kV (Level 2) 1 kV (Level 3)
Highest Power Port Test Level Line – Ground:	1 kV (Level 2) 2.0 kV (Level 3)
Highest Signal Port Test Level:	None
Rest Duration between Strikes:	60 Seconds
Number of Strikes per Voltage:	Twenty (20)
Repetitions	5 each Polarity
Polarity	Negative And Positive
Strike Angles on power frequency phase:	0° 90° 180° 270°
Waveform Generator Type:	Ring Wave
Performance Criteria:	B
EUT Mode:	full load condition using resistive loads
Internal Impedance selected	12 Ohms

Test Strikes Accomplished

	Level 2				Level 3											
	CM		DM		CM		DM									
	1.0kV	0.5kV	2.0kV	1.0kV												
	+	-	+	-	+	-	+	-								
N-Gnd	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>										
L1-Gnd	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>										
N-L1			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>								

		Additional Comments
Compliant	<input checked="" type="checkbox"/>	No susceptibility noted.
Non-Compliant	<input type="checkbox"/>	

Test Equipment

Ring Wave Immunity Test Equipment						
Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
811	Multimeter	Fluke	111	78130057	20-Feb-2013	20-Feb-2014
945	Temp/Humidity Indicator	Davis Instruments	7400	PC00502A16	15-Jan-2013	15-Jan-2014
--	Advanced EMC Immunity Test System	Keytek	EMC Pro	0204295	3-July-2013	3-July-2014

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5.7.2. Ring Wave Immunity Test Results

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	64	%
EUT Name	DC Power Supply	Barometric Pressure	100.2	kPa
EUT Model	CPFE1000Fi-48/C	Test Location	Ground Plane 3	
Governing Doc	EN 55024	Test Engineer	William Dey	
Basic Standard	IEC 61000-4-12	Date	07/19/2013	
Test Voltage:	230 VAC @ 50 Hz	Photo:	<input checked="" type="checkbox"/>	

Test Conditions

Power Port:	AC Mains
Highest Power Port Test Level Line – Line:	0.5 kV (Level 2) 1 kV (Level 3)
Highest Power Port Test Level Line – Ground:	1 kV (Level 2) 2.0 kV (Level 3)
Highest Signal Port Test Level:	None
Rest Duration between Strikes:	60 Seconds
Number of Strikes per Voltage:	Twenty (20)
Repetitions	5 each Polarity
Polarity	Negative And Positive
Strike Angles on power frequency phase:	0° 90° 180° 270°
Waveform Generator Type:	Ring Wave
Performance Criteria:	B
EUT Mode:	full load condition using resistive loads
Internal Impedance selected	12 Ohms

Test Strikes Accomplished

	Level 2				Level 3											
	CM		DM		CM		DM									
	1.0kV	0.5kV	2.0kV	1.0kV												
	+	-	+	-	+	-	+	-								
N-Gnd	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>										
L1-Gnd	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>										
N-L1			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>								

		Additional Comments
Compliant	<input checked="" type="checkbox"/>	No susceptibility noted.
Non-Compliant	<input type="checkbox"/>	

Test Equipment

Ring Wave Immunity Test Equipment						
Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
811	Multimeter	Fluke	111	78130057	20-Feb-2013	20-Feb-2014
945	Temp/Humidity Indicator	Davis Instruments	7400	PC00502A16	15-Jan-2013	15-Jan-2014
--	Advanced EMC Immunity Test System	Keytek	EMC Pro	0204295	3-July-2013	3-July-2014

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5.8. RF Conducted Common Mode Disturbance Immunity Test Results

Client	TDK-Lambda Americas Inc	Temperature	24	°C
NEx #:	236803	Relative Humidity	55	%
EUT Name	DC Power Supply	Barometric Pressure	100.6	kPa
EUT Model	CPFE1000Fi-12/C, CPFE1000Fi-12/P CPFE1000Fi-28/C, CPFE1000Fi-28/P CPFE1000Fi-48/C, CPFE1000Fi-48/P CPFE1000Fi-12, CPFE1000Fi-28 CPFE1000Fi-48	Test Location	Ground Plane	
Governing Doc	EN 55024	Test Engineer	Mike Krumweide	
Basic Standard	IEC 61000-4-6	Date	5/20/2013	
Test Voltage:	230 VAC @ 50 Hz	Photo:	<input checked="" type="checkbox"/>	
Test Conditions				
Test Level:	10 V/m			
Modulation:	80 % Depth, 1 kHz AM Modulation			
Frequency Range:	0.15 to 80 MHz			
Selected Frequencies:				
Step:	1 %			
Dwell Time:	3 seconds			
Performance Criteria:	A			
EUT Mode:	full load condition using resistive loads			
	Injection Point	AC Mains	Injection Method: <input type="checkbox"/> Clamp <input checked="" type="checkbox"/> CDN	
Comments:	No susceptibility noted.			
	Injection Point	None	Injection Method: <input type="checkbox"/> Clamp <input type="checkbox"/> CDN	
Comments:				
	Additional Comments			
Compliant	<input checked="" type="checkbox"/>	No susceptibility noted.		
Non-Compliant	<input type="checkbox"/>			

RF Conducted Common Mode Disturbance Immunity Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
948	Signal Generator	Hewlett Packard	8657A	3430U02365	1/10/2013	1/10/2014
846	CDN	FCC	FCC-801-M3-25A	5015	7/5/2012	7/5/2013
913	Amplifier	EIN	3100L	103	NCR	NCR
811	Multimeter,	Fluke Corp	111	78130057	2/10/2013	2/10/2014

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5.9. Power Frequency Magnetic Field Immunity

Client:	TDK-Lambda Americas Inc	Temperature:	22	°C
NEx #:	236803	Relative Humidity:	54	%
EUT Name:	DC Power Supply	Barometric Pressure:	100.6	kPa
EUT Model:	CPFE1000Fi-12/C, CPFE1000Fi-12/P CPFE1000Fi-28/C, CPFE1000Fi-28/P CPFE1000Fi-48/C, CPFE1000Fi-48/P	Test Location:	ESD Room	
Governing Doc:	EN 55024	Test Engineer:	Danny Long	
Basic Standard:	IEC 61000-4-8	Date:	5/22/2013	
Test Voltage:	230 VAC @ 50 Hz	Photo:	<input checked="" type="checkbox"/>	

Test Conditions

Threat Level:	30 A/m
Frequency:	50Hz and 60Hz
Duration Per Axis:	5 Minutes
Performance Criteria:	A
EUT Mode:	full load condition using resistive loads

Test Axis	Compliant		Comments
	Yes	No	
X	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No susceptibility noted.
Y	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No susceptibility noted.
Z	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No susceptibility noted.

Additional Comments:

Compliant	<input checked="" type="checkbox"/>	No susceptibility noted.
Non-Compliant	<input type="checkbox"/>	

Test Equipment

Power Frequency Magnetic Field Immunity

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
851	B-field sensor	Narda	ELT-400	F-0011	11/06/2012	11/06/2013
821	Magnetic Coil, Small	Nemko	N/A	N/A	NCR	NCR
962	AC Power Supply	Teseq	NSG 1007-5-208	58962	2/25/2013	2/25/2014
811	Multimeter,	Fluke Corp	111	78130057	2/10/2013	2/10/2014

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5.10. Voltage Dips and Interruptions Immunity Test Results

Client	TDK-Lambda Americas Inc	Temperature	23	°C
NEx #:	236803	Relative Humidity	49	%
EUT Name	DC Power Supply	Barometric Pressure	100.3	kPa
EUT Model	CPFE1000Fi-12/C, CPFE1000Fi-28/C, CPFE1000Fi-48/C	Test Location	ESD Room	
Governing Doc	EN 55024	Test Engineer	Danny Long	
Basic Standard	IEC 61000-4-11	Date	5/23/2013	
Test Voltage:	Other: 120V/50Hz	Photo:	<input checked="" type="checkbox"/>	

Test Conditions

Voltage Dips

Performance Criteria:	Per test plan	
Changes Occur At:	Zero Crossing	
% Reduction	Duration sec/period	Compliant
30%	10msec / 0.5	<input checked="" type="checkbox"/> to criteria A
60%	100msec / 25	<input checked="" type="checkbox"/> to criteria B
Comments:		
Compliant	<input checked="" type="checkbox"/>	No susceptibility noted.
Non-Compliant	<input type="checkbox"/>	

Voltage Interruptions

Performance Criteria:	B	
% Reduction	Duration sec/period	Compliant
100%	5000msec / 250	<input checked="" type="checkbox"/>
Comments:		
Compliant	<input checked="" type="checkbox"/>	No susceptibility noted.
Non-Compliant	<input type="checkbox"/>	

Voltage Dips and Interruptions Immunity Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
604	AC Power Supply	California Instruments	Cabinet L	CS91167	2/25/2013	2/25/2014
NA	PCI, PC DAQ	National Instruments	6250	139A6B3	NCR	NCR
581	Standard Impedance	Xitron	2520	2526911004	2/25/2013	2/25/2014
961	Signal Conditioning Unit	Teseq	CCN 1000-3-75	72694	2/25/2013	2/25/2014
962	5kVA Power Source	Teseq	NSG 1007-5-208	58962	2/25/2013	2/25/2014
811	Multimeter,	Fluke Corp	111	78130057	2/10/2013	2/10/2014
963	NI DAQ Board/PC System	NI/HP-Compaq	PCI6250/DC5800	139A6B3/MXL83000P8	2/25/2013	2/25/2014



5.11. Voltage Fluctuation Immunity Test Results

California Instruments
 Compliance Test System
 Model 91000-8-14 Test Report

Report Print Date = 06/29/2013 09:53:23
 Program Name = AC Source GUSTY 1.00101-Mod 02 2006

TEST RESULT - A PASS

Test start method = Thursday, May 23, 2013 8:48:46 AM
 Test test completed = Thursday, May 23, 2013 10:48:46 AM
 Reported test file = General 91000-8-14 Test Class Level 1 Pass
 Reported test type = Voltage Fluctuation test
 Test operator = J. Long
 Test site = 0.5015000

TEST CONDITIONS

Nominal voltage (Vrms) = 200 Vrms
 Nominal freq. (Hz) = 50 Hz
 Ambient Temperature = 23 °C
 Relative Humidity = 40 %
 Pressure =

Equipment under test description
 CPFE1000Fi-120
 User comment regarding this test
 IEC 60008-1-4 Test Level 3

TEST PARAMETERS

	Limit (%)	Test Level (%)	Level Passed	Date	Passes
1	100	10	0	06/13	1
2	100	10	0	06/13	1
3	100	10	0	06/13	1

California Instruments | Printed on 06/29/2013 09:53 AM

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5.11.1. Voltage Fluctuation Immunity Test Results

Customer Information
 Compliance Test System
 (E) 1000-4-14 Test Report

Report File Name: 07-27-2013 09:00:00
 Program Name: AC Source G5522 1.00-0.0 | Rev: 30_0000

DC TEST RESULT + PASS

Test Run Started: Thursday, May 23, 2013 9:28:35 AM
 Test Run Completed: Thursday, May 23, 2013 9:00:00 AM
 Selected Test No: General DC 1000-4-14 Test Case 2.414_Fail
 Selected Test Type: Voltage Fluctuation Test
 Test Operator: D. Long
 Test Site: ESD Room

TEST CONDITIONS

Nominal Voltage (Vrms): 200 Vrms
 Nominal freq. (Hz): 60 Hz
 Ambient Temperature: 23 °C
 Relative Humidity: 46 %
 Pressure: *

Equipment under test description:
 CPFE1000Fi-380
 User comment regarding the test:
 (E) 1000-4-14 Test Level 3

TEST PARAMETERS

	Upper (%)	Test Level (%)	Lower Program	Delta	Repeat
I	100	12	3	90.0	5
II	80	12	3	80.0	5
III	110	12	3	90.0	5

Observations:

Customer Information - Printed on: 5/23/2013 9:00:00 AM

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5.11.2. Voltage Fluctuation Immunity Test Results

Customer Information
 Company: Test Support
 Report Title: IEC 60000-4-14 Test Report

Report Print Date: 05/23/2013 08:19 AM
 Program Version: AC Source (0001) 1.00.00 - Rev 00.0000

IEC TEST RESULT = PASS

Tested Model: CPFE1000Fi-400
 Test Date Completed: Thursday, May 23, 2013 8:19:22 AM
 Internal Test No: 000001
 Internal Test Type: Voltage Fluctuation Test
 Test Station: T1 Long
 Test Rate: 0.000 Hz/min

Test Conditions:

Normal Voltage (Um): 230 Vrms
 Nominal freq. (fN): 50 Hz
 Ambient Temperature: 23 °C
 Relative Humidity: 40 %
 Pressure: 1

Equipment under test description:
 CPFE1000Fi-400
 Test comment regarding the test:
 IEC 60000-4-14 test (Level 1)

Test Parameters Table:

Test No.	Level (%)	Test Level (Hz)	Level Program	Drop	Result
1	10%	10	1	Pass	Pass
2	5%	5	2	Pass	Pass
3	1%	1	3	Pass	Pass

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**Voltage Fluctuation Immunity Test Equipment**

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
604	AC Power Supply	California Instruments	Cabinet L	CS91167	2/25/2013	2/25/2014
NA	PCI, PC DAQ	National Instruments	6250	139A6B3	NCR	NCR
581	Standard Impedance	Xitron	2520	2526911004	2/25/2013	2/25/2014
961	Signal Conditioning Unit	Teseq	CCN 1000-3-75	72694	2/25/2013	2/25/2014
962	5kVA Power Source	Teseq	NSG 1007-5-208	58962	2/25/2013	2/25/2014
811	Multimeter,	Fluke Corp	111	78130057	2/10/2013	2/10/2014
963	NI DAQ Board/PC System	NI/HP-Compaq	PCI6250/ DC5800	139A6B3/ MXL83000P8	2/25/2013	2/25/2014

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Photograph 3. Conducted Emissions Test Configuration



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Photograph 4. Radiated Emissions Test Configuration



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Photograph 5. ESD Test Configuration



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Photograph 6. Radio Frequency Immunity Test Configuration

CPFE1000Fi-48/C CPFE1000Fi-28/C CPFE1000Fi-12/C



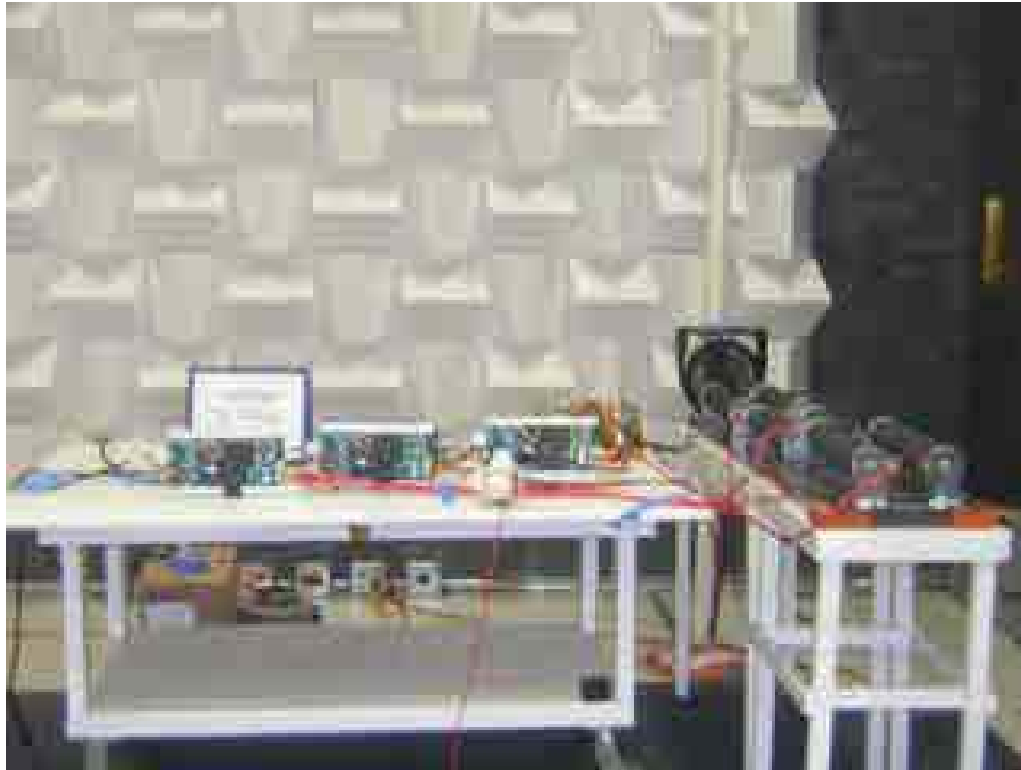
CPFE1000Fi-48 CPFE1000Fi-28 CPFE1000Fi-12



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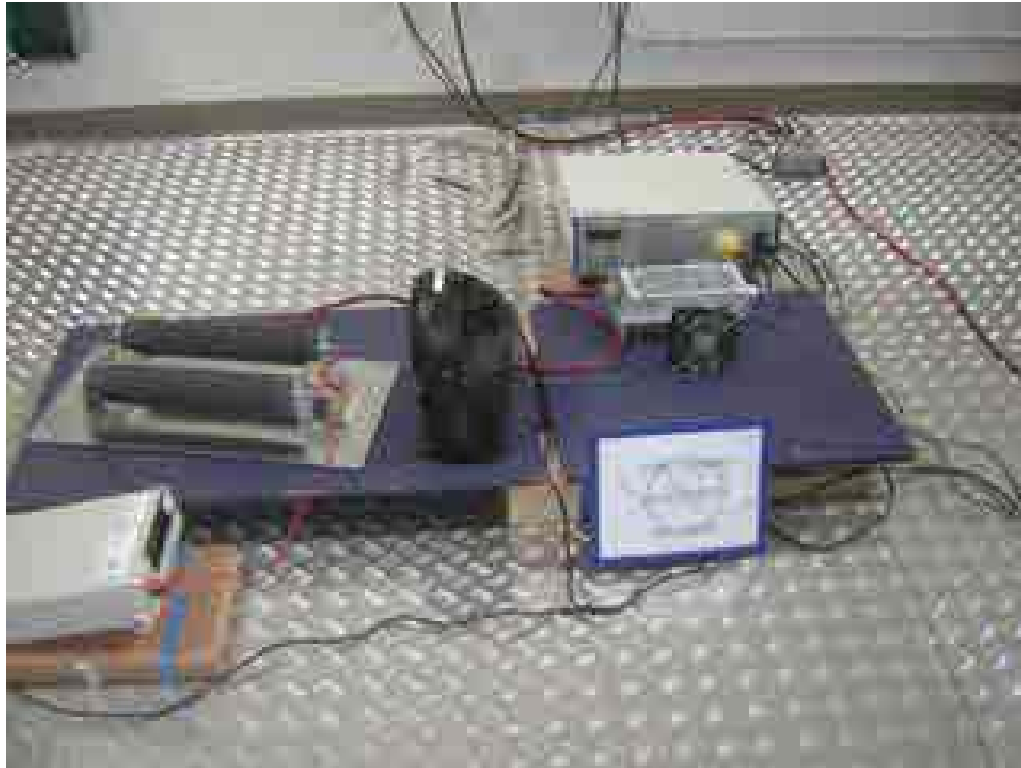
RF CONDUCTED IMMUNITY TEST CONFIGURATION

CPFE1000Fi-48/P CPFE1000Fi-28/P CPFE1000Fi-12/P



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Photograph 7. EFT Immunity Test Configuration



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Photograph 8. Power Line Surge Immunity Test Configuration



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Photograph 9. Power Line Ring Wave Test Configuration



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Photograph 10. RF Conducted Immunity Test Configuration



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RF CONDUCTED IMMUNITY TEST CONFIGURATION



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Photograph 11. Power Frequency Magnetic Field Immunity Test Configuration



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Photograph 12. Voltage Dips and Interruptions and Voltage Fluctuation Immunity Test Configuration



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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

Conducted and Radiated Emissions Measurement Detection Systems	Applicable Frequency Range	"U" for a k=2 Coverage Factor
Spectrum Analyzer and LISN	100 kHz – 30 MHz	+/-2.8 dB
Spectrum Analyzer and Telecom ISN	100 kHz – 30 MHz	+/-1.38dB
Spectrum Analyzer, Pre-amp, and Antenna	30 MHz-200 MHz	+/-3.9 dB
Spectrum Analyzer, Pre-amp, and Antenna	200 MHz-1000 MHz	+/- 3.5 dB
Spectrum Analyzer, Pre-amp, and Antenna	1 GHz - 18 GHz	+/-2.6 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 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:

- o ANSI Z540.2 (2002) Guide to the Expression of Uncertainty in Measurement
- o NIS 81:1994, The Treatment of Uncertainty in EMC Measurements (NAMAS, 1994)
- o 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.

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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 traceability to NIST, ensuring that adequate and repeatable calibration procedures are being applied, and verifying conformity with the other requirements of ISO Guide 25).

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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 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, CISPR 14, 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 CISPR 16-1-4 or ANSI C63.5-2006, 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 10-meter Semi-Anechoic chamber. Nemko USA, Inc. uses the procedures given in CISPR 16-1-4 and, ANSI C63.4-2009 when performing the normalized site attenuation measurements.

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