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Confidential Report

Client:	Test of:
VOX Power, **Vox Power Ltd** **Unit 2** **Red Cow interchange estate** **Ballymount** **Dublin 22** **Attention: Mr. Brian Mc Donald**	**Nevo+600M/ Nevo+600ML** **Nevo+600S/ Nevo+600SL** **Power Supply Unit** **To parts of:** **EN 55011: 2009 + A1: 2010** **EN 60601-1-2: 2007 (3rd Edition)** **EN 60601-1-2: 2014 (4th Edition)** **EN 61000-6-2: 2005,** **EN 61000-3-2: 2014 &** **EN 61000-3-3: 2013**

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REPORT REF: 07E2138-4 **TESTED BY: C Fee / G Monahan**

DATE RECEIVED: March 2007 **REPORT BY: C Fee / Monahan**

ISSUE DATE: January 2017 **SIGNATURE:**

This report 07E2138-4 supersedes 07E2138-3.

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Executive Summary

The equipment under test fulfils the standards listed below

Standard	Test result
EN 60601-1-2: 2014 (4th Edition) Title: Medical Electrical Equipment Section 1.2: Collateral standard: Electromagnetic Compatibility – Requirements and tests.	**Pass**
EN 60601-1-2: 2007 (3rd Edition) Title: Medical Electrical Equipment Section 1.2: Collateral standard: Electromagnetic Compatibility – Requirements and tests.	**Pass**

Declaration of conformity

The intention of these tests is such that the following statement can be added to the Declaration of Conformity I.e. DoC

The NEVO+600 S/SL/M/ML products comply with the EMC directive 2014/30/EU, EMC directive.
Conformity was demonstrated by testing to and passing the limits set in the following standards.

EN 55011:2009 +A1:2010 Class B
EN 61000-3-2:2014
EN 61000-3-3:2013
EN 60601-1-2:2007 (3rd Edition)
EN 60601-1-2:2014 (4th Edition)

Guidance and manufacturer's declaration – electromagnetic emissions		
The Device is intended for use in the electromagnetic environment specified below. The customer or the user of the Device should assure that it is used in such an environment		
Emissions test	**Compliance**	
RF Emissions CISPR 11 EN 55011: 2009 + A1: 2010	Group 1	The Device must emit electromagnetic energy in order to perform its intended function. Nearby electronic equipment may be affected.
RF Emissions CISPR 11 EN 55011: 2009 + A1: 2010	Class B	Class B equipment is equipment suitable for use in domestic establishments and in establishments directly connected to a low voltage power supply network which supplies buildings used for domestic purposes. In the documentation for the user, a statement shall be included drawing attention to the fact that there may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.
Harmonic emissions IEC 61000-3-2 EN 61000-3-2: 2014	Class A	
Voltage fluctuations / flicker emissions IEC 61000-3-3 EN 61000-3-3: 2013	All Parameters	

Table 201 – Guidance and manufacturer's declaration – electromagnetic emissions – for all equipment and systems

Guidance and manufacturer's declaration – electromagnetic immunity			
The Device is intended for use in the electromagnetic environment specified below. The customer or the user of the Device should assure that it is used in such an environment			
Immunity test	**IEC 60601 Test level**	**Compliance level**	**Electromagnetic environment - guidance**
Electrostatic discharge (ESD) IEC 61000-4-2 EN 61000-4-2: 2009	±8 kV contact ±15 kV air	±2, 4, 6 & 8 kV contact ±2, 4, 8 & 15 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4 EN 61000-4-4: 2012	±2kV for power supply lines ±1 kV for input/output lines	±2kV for power supply lines ±1kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment
Surge IEC 61000-4-5 EN 61000-4-5: 2006	±1kV differential mode ±2 kV common mode	±0.5 & 1kV differential mode ±0.5, 1 & 2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11 EN 61000-4-11: 2004	<5 % Ut (>95 % dip in Ut) for 0.5 cycle @ 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315° 70 % Ut (30 % dip in Ut) for 25 cycles <5 % Ut (>95 % dip in Ut) for 5 sec <5 % Ut (>95 % dip in Ut) for 1 cycle 40 % Ut (>60 % dip in Ut) for 5 cycle	<5 % Ut (>95 % dip in Ut) for 0.5 cycle @ 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315° 70 % Ut (30 % dip in Ut) for 25 cycles <5 % Ut (>95 % dip in Ut) for 5 sec <5 % Ut (>95 % dip in Ut) for 1 cycle 40 % Ut (>60 % dip in Ut) for 5 cycle	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Device requires continued operation during power mains operation, it is recommended that the Device must be powered from an uninterruptible power supply or battery
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8 EN 61000-4-8: 2010	30 A/m	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment
Note: Ut is the a.c. mains voltage prior to application of the test level			

Table 202 – Guidance and manufacturer's declaration – electromagnetic immunity – for all equipment and systems

Guidance and manufacturer's declaration – electromagnetic immunity			
The Device is intended for use in the electromagnetic environment specified below. The customer or the user of the Device should assure that it is used in such an environment			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
			Portable and mobile RF communications equipment should be used no closer to any part of the EUT, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance**
Conducted RF IEC 61000-4-6 EN 61000-4-6: 2014	3 Vrms outside industrial, scientific and medical (ISM) and amateur radio bands. 6 Vrms in ISM and amateur radio bands 150 kHz to 80 MHz	6 Vrms 150 kHz to 80 MHz	d = [1.17]√P
Radiated RF IEC 61000-4-3 EN 61000-4-3: 2006 + A1: 2008 + A2: 2010	10 V/m 80 MHz to 2.7 GHz	10 V/m 80 MHz to 2.7 GHz	d = [1.17]√P…80MHz to 800 MHz d = [2.33]√P…800 MHz to 2.5GHz
	27 V/m, 18 Hz PM 385 MHz 28 V/m, 50 %18 Hz PM 450 MHz 9 V/m, 217 Hz PM 710 MHz 9 V/m, 217 Hz PM 745 MHz 9 V/m, 217 Hz PM 780 MHz 28V/m, 18 Hz PM 810 MHz 28 V/m, 18 Hz PM 870 MHz 28 V/m, 18 Hz PM 930 MHz 28V/m, 217 Hz PM 1720 MHz 28 V/m, 217 Hz PM 1845 MHz	27 V/m, 18 Hz PM 385 MHz 28 V/m, 50 %18 Hz PM 450 MHz 9 V/m, 217 Hz PM 710 MHz 9 V/m, 217 Hz PM 745 MHz 9 V/m, 217 Hz PM 780 MHz 28V/m, 18 Hz PM 810 MHz 28 V/m, 18 Hz PM 870 MHz 28 V/m, 18 Hz PM 930 MHz 28V/m, 217 Hz PM 1720 MHz 28 V/m, 217 Hz PM 1845 MHz	Where P is the maximum output power rating of the transmitter in Watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m) Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, [a] should be less than the compliance level in each frequency range. [b] Interference may occur in the vicinity of equipment marked with the following symbol 

	28 V/m, 217 Hz PM 1970 MHz 27 V/m, 217 Hz PM 2450 MHz 9V/m, 217 Hz PM 5240 MHz 9 V/m, 217 Hz PM 5500 MHz 9 V/m, 217 Hz PM 5785 MHz	28 V/m, 217 Hz PM 1970 MHz 27 V/m, 217 Hz PM 2450 MHz 9V/m, 217 Hz PM 5240 MHz 9 V/m, 217 Hz PM 5500 MHz 9 V/m, 217 Hz PM 5785 MHz	

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the EUT is used exceeds the applicable RF compliance level above, the EUT should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orientating or relocating the EUT.

b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than $[V_1]$V/m

Table 204 – Guidance and manufacturer's declaration – electromagnetic immunity – for equipment and systems that are not life-supporting

Recommended separation distances between portable and mobile RF communication equipment and the EUT

The Device is intended for use in an electromagnetic environment specified in Table 201. The customer or the user of the Device can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Device as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz $d = [1.17]\sqrt{P}$	80 MHz to 800 MHz $d = [1.17]\sqrt{P}$	800 MHz to 2.5GHz $d = [2.33]\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.37	0.37	0.75
1	1.17	1.17	2.33
10	3.70	3.70	7.36
100	11.70	11.70	23.30

For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (w) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Table 206 – Recommended separation distances between portable and mobile RF communications equipment and the equipment and system – for equipment and systems that are not life supporting

CONTENTS

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Appendix 1: Test Equipment Used
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Appendix 5: Results after changes to EUT

1 Equipment Under Test (EUT)

1.1 Identification of EUT

Brand Name:	VOX Power
Description:	Modular 600W PSU
Model Number:	Nevo+600M/Nevo+600ML & Nevo+600s/Nevo+600SL

1.2 Description of EUT

The EUT was a modular 600W power supply unit.

1.3 Modifications

No Modifications.

1.4 Support Equipment List

Brand Name:	Array
Description:	Electronic Loads (4 of)
Model Number:	3710A

1.5 Date of Test

The tests were carried out on one sample of the EUT on the 14th of March and the 4th of October 2007.

Additional testing required to meet EN 60601-1-2: 2014 (4th Edition) & EN 55011 was carried out between the 5th of December 2016 & 17th of January 2017.

2 Test Specification, Methods and Procedures

2.1 Emissions

Emissions were assessed to the following standards:

EN 55011
Title:
Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement.

Fluctuating Harmonics

EN 61000-3-2
Title:
Limits for harmonic current emissions
(Equipment input current rating up to 16A per phase)

Flicker

EN 61000-3-3
Title:

Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current < 16A per phase and not subject to conditional connection

2.2 Apparatus and Methods:

Measuring apparatus used during tests was designed and built to the requirements of C.I.S.P.R. 16-1

2.3 Immunity

Immunity was assessed to the following standards:

EN 61000-6-2
Title:
Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

EN 60601-1-2: 4th Edition
Title:
Medical Electrical Equipment
Section 1.2: Collateral standard: Electromagnetic Compatibility – Requirements and tests.

EN 60601-1-2: 3rd Edition
Title:
Medical Electrical Equipment
Section 1.2: Collateral standard: Electromagnetic Compatibility – Requirements and tests.

EN 61000-4-3: 2006 + A1:2008 + A2:2010	Electromagnetic Compatibility (EMC) Part4: Testing and measurement techniques Section3: Radiated, radio-frequency, electromagnetic field immunity test
EN 61000-4-4: 2012	Electromagnetic Compatibility (EMC) Part4: Testing and measurement techniques Section4: Electrical fast transient/burst immunity test
EN 61000-4-5: 2006	Electromagnetic compatibility (EMC) Part 4. Testing and measurement techniques. Section 5. Surge immunity test.
EN 61000-4-6: 2014	Electromagnetic compatibility Part 4. Testing and measurement techniques. Section 6. Immunity to conducted disturbances, induced by radio-frequency fields.
EN 61000-4-11: 2004	Electromagnetic compatibility (EMC) Part 4. Testing and measurement techniques. Section 11. Voltage Dips & Interruptions test
EN 61000-4-2: 2009	Electromagnetic Compatibility (EMC) Part4: Testing and measurement techniques Section2: Electrostatic discharge immunity test
EN 61000-4-8: 2010	Electromagnetic Compatibility (EMC) Part4: Testing and measurement techniques Section4: Power frequency magnetic field immunity test

3 Deviations or Exclusions from the Test Specifications

3.1 Deviations

. There were no deviations from the test specification.

3.2 Exclusions

There were no exclusions from the test specification.

4 Operation of EUT During Testing

4.1 Operating Environment

Supply Voltage: 230 Vac, 50 Hz

The following were the conditions at the time of immunity testing.

Temperature: 17-19˚C
Humidity: 56-59%RH

4.2 Operating Modes:

The EUT was tested loaded at 450W.

5 Results

5.1 Conducted Emissions

Measurements of conducted emissions were carried out using the receiver analysis feature, which uses three detectors, peak, quasi peak and average. Using this mode the voltage emission spectrum was scanned in peak detection mode and emissions, which exceeded a sub range margin relevant to the respective limits, were further measured using the quasi peak and average detectors. At each such measurement point the live and neutral conductors were examined individually to determine the maximum. The receiver bandwidth was set to 10kHz. Appendix 3 shows the results.

5.1.1 Measurement Uncertainty

The measurement uncertainty (with a 95% confidence level) for the conducted voltage test was ±3.5 dB.

5.2 Radiated Emissions

Compliant measurements of radiated emissions were carried out in an Anechoic Chamber from 30 MHz to 1 GHz. The equipment and cable orientation were investigated to ensure that maximum emissions were obtained at critical frequencies. The antenna height was also adjusted through the range of 1m - 4m.
The receiver bandwidth was set to 120 kHz for frequencies between 30 MHz and 1 GHz. See Appendix 3 for results.

5.2.1 Measurement Uncertainty

The measurement uncertainty (with a 95% confidence level) for the radiated emissions test was ±5.3 dB (from 30 to 100 MHz), ±4.7 dB (from 100 to 300 MHz) and ±3.9 dB (from 300 to 1000 MHz

5.3 Immunity to Radiated, Radio Frequency Electromagnetic Fields

a) Radiated RF EM fields

Port:	Enclosure
Limit:	10 V/m (80% AM 1 kHz modulation)
Frequency range:	80-2700 MHz
Dwell time:	3 second dwell
Performance Criteria	A

The EUT was placed in the anechoic chamber.

The step sizes from 80-2700MHz were in 1% steps. The dwell time at each frequency was 3 seconds. The test level was maintained at over 10 V/m at all frequencies in accordance with EN 60601-1-2.

The distance of the antenna from the EUT was 2.2 metres. The tests were carried out with the antenna oriented in horizontal and vertical polarisations for each side of the EUT.

The EUT was deemed to comply in accordance with the manufacturer's specification.

Radiated Immunity Tests

Frequency MHz	Modulation Frequency	Polarisation (V/H)	Level (V/m)	Result
80-2700 MHz	1 kHz	V and H	10	Complied

b) Proximity fields from RF wireless communications equipment

Port: Enclosure
Dwell time: 3 second dwell
Performance Criteria A

The EUT was placed in the anechoic chamber.

The testing was carried out on the spot frequencies as listed below. The dwell time at each frequency was at least 3 seconds.

A field sensor was placed in close proximity to the system. The tests were carried out with the antenna oriented in horizontal and vertical polarisations for each side of the EUT.

The EUT was deemed to comply with Performance Criteria A when tested in accordance with the manufacturer's specification.

Radiated Immunity Tests

Frequency MHz	Modulation Frequency	Polarisation (V/H)	Level (V/m)	Result
385	18 Hz Pulse Modulation	V and H	27	Complied
450	50% 18 Hz Pulse Modulation	V and H	28	Complied
710	217 Hz Pulse Modulation	V and H	9	Complied
745	217 Hz Pulse Modulation	V and H	9	Complied
780	217 Hz Pulse Modulation	V and H	9	Complied
810	18 Hz Pulse Modulation	V and H	28	Complied
870	18 Hz Pulse Modulation	V and H	28	Complied
930	18 Hz Pulse Modulation	V and H	28	Complied
1720	217 Hz Pulse Modulation	V and H	28	Complied
1845	217 Hz Pulse Modulation	V and H	28	Complied
1970	217 Hz Pulse Modulation	V and H	28	Complied
2450	217 Hz Pulse Modulation	V and H	28	Complied
5240	217 Hz Pulse Modulation	V and H	9	Complied
5500	217 Hz Pulse Modulation	V and H	9	Complied
5785	217 Hz Pulse Modulation	V and H	9	Complied

5.4 Immunity to Conducted Radio Frequency Interference

Ports: AC Mains
Basic Standard: EN 61000-4-6
Performance Criterion: A
Limit: 10 Vrms (80%AM 1kHz modulation)
Frequency range: 150 kHz to 80 MHz

The monitor was observed for any deviations from normal operating mode.

The current was injected on the mains cable of the EUT in common mode. The current probe was located at 0.1m from the ac port. Each surface of the EUT was more than 0.5m from other metal surfaces.

The test configuration used was the EM Clamp injection method. The system was calibrated to provide a current input level equivalent to an injected voltage level of 10 Vrms into a 150Ωsystem.

The EUT functioned as normal during the testing and was subsequently found to be operating satisfactorily.

The test configuration is shown in Appendix 2.

Port	Disturbance type	Result
AC Mains	10 Vrms, 150 kHz - 80 MHz	Complied

Results of Conducted Immunity testing

5.5 Electrical Fast Transient Test

Ports:	AC Mains
Basic Standard:	EN 61000-4-4
Limit:	±0.5, ±1 & ±2 kV mains power ports ±0.5 & ±1 kV signal port
Repetition Rate:	5 kHz & 100 kHz

Positive and negative fast transient discharges of amplitude ±0.5, ±1 & ±2 kV were applied to the mains input & ±0.5 & 1 kV to the signal port in accordance with the requirements of
EN 61000-4-4.

The test was carried out at 230 Vac

The EUT functioned as normal during and after the testing.
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Test port	**Level**	**Result**
Live	±0.5, ±1 & ±2 kV	Complied
Neutral	±0.5, ±1 & ±2 kV	Complied
Earth	±0.5, ±1 & ±2 kV	Complied
L-N-E	±0.5, ±1 & ±2 kV	Complied

Results of Fast transient testing

5.6 Surge Immunity Test

Ports: AC Mains
Basic Standard: EN 61000-4-5
Performance Criterion: A
Limit, Line to Line: ± 0.5 kV & ±1 kV
Line to Earth: ± 0.5 kV, ±1 kV & ±2 kV

Positive and negative surges were applied to each of the mains inputs in accordance with the requirements of EN 61000-4-5.

Surges were applied to the mains conductors coupled line to line.

The tests were carried out with positive and negative surges. The test was repeated every 60 seconds for a total of 5 times in each polarity and in all coupling modes. The tests were performed at 0°, 90°, 180º and 270° phases for both polarities.

The test was carried out at 230 Vac

The EUT functioned as normal during and after the testing.

Port	Mode of conduction	Disturbance level	Result
PSU	L-N	± 0.5 kV & ±1 kV	Complied
PSU	L-E	± 0.5 kV, ±1 kV & ±2 kV	Complied
PSU	N-E	± 0.5 kV, ±1 kV & ±2 kV	Complied

Results of Surge Immunity testing

5.7 Voltage Dips and Interruptions

Ports: AC Mains
Basic Standard: EN 61000-4-11

Dips: Mains port - > 95% dip 0.5 cycles
At 0º, 45º, 90º, 135º, 180º, 225º, 270º & 315º
Mains port - >95% dip 1 cycle
Mains port – 30% dip 25 cycles
Mains port – 60% dip 10 cycles

Interruption: Mains port – Interruption 250 cycles

Performance Criteria A

Dips and interruptions were applied to the mains input in accordance with the requirements of EN 61000-4-11.

The test was carried out at 100 & 240 Vac

Data is recorded for the duration of the test and analysed after the test.

The EUT continued to operate throughout the duration of the test although with some degradation in performance. Degradation C was a momentary drop in output voltage to 0V.

Port	Disturbance type	Result
Mains supply 240 Vac	>95% dip 0.5 cycles At 0º, 45º, 90º, 135º, 180º, 225º, 270º & 315º	Complied A
Mains supply 240 Vac	>95% dip 1 cycles	Complied A
Mains supply 240 Vac	30% dip 25 cycles	Complied A
Mains supply 240 Vac	60% dip 10 cycles	Complied A
Mains supply 240 Vac	>95% interruption 250 cycles	Complied C

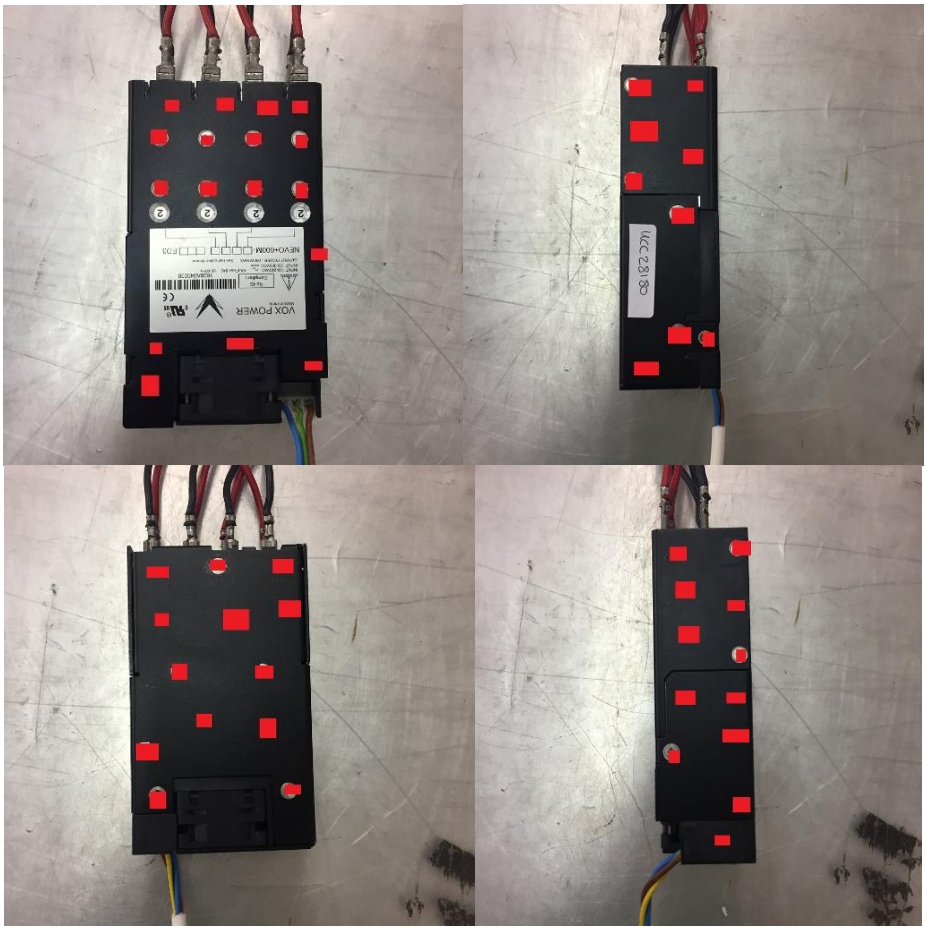
5.8 Electrostatic Discharge Test

Port:	Enclosure
Basic Standard:	EN 61000-4-2
Limit:	±2, ±4 & ±8 kV contact discharges ±2, ±4, ±8 & ±15 kV air discharges
Performance Criteria	A

The ESD generator contained a discharge capacitor of 150pF and resistor of 330Ω in accordance with the requirements of EN 61000-4-2. The tests were carried out using both positive and negative discharges. Discharges were applied to the EUT to comply with EN 61000-4-2.

Only parts of the equipment that can be touched during normal operation were subjected to discharges.
Air discharges of ±2, ±4, ±8 & ±15 kV, were applied to different points on the enclosure.
Contact discharges of ±2, ±4 & ±8 kV, were applied to conductive points on the enclosure, in addition to the horizontal and vertical coupling planes. 10 discharges of each polarity were applied at each location.

The EUT while powered complied with Performance Criteria A during and after the application of discharges. Discharges were applied to chassis screws and chassis only.



ESD Discharge Points

5.9 Fluctuating Harmonics

Ports:	AC power supply
Basic Standard:	EN 61000-3-2
Class:	A

The Fluctuating Harmonics test measures the current at each of the harmonic frequencies from the second harmonic up to the fortieth harmonic.

A 50 Hertz, 230 Volt AC source was used to power the unit in compliance with EN 61000-3-2The current harmonic levels were measured and compared with the limit levels for Class A waveforms.

See Appendix 3 for results.

5.10 Flicker

Ports:	AC power supply
Basic Standard:	EN 61000-3-3

The EUT was connected to an impedance network and a 50 Hertz, 230 Volt AC source to power the unit in compliance with EN 61000-3-3

Measurements were made over a two-hour period as required to measure Plt.

See Appendix 3 for results.

5.11 Power Frequency Magnetic Field Immunity Test

Basic Standard:	EN 61000-4-8
Level:	30 A/m (50 Hz & 60 Hz)
Performance Criteria	A

The unit was placed on a non-conductive table of 0.8-meter height from the ground plane.

The current level was set to 30 A/m and the unit was centred in the middle of the loop. The EUT was tested with the loop in both horizontal and vertical positions for one minute. The test was carried out at 230 Vac. The test was performed at 50 & 60 Hz.

The level of any interference seen was checked to ensure it remained within specified limits.

The EUT operated as normal for the duration of the test.

6 Analysis of Test Results, Conclusions

6.1 Measurement Uncertainties

The measurement uncertainties stated were calculated in accordance with the requirements of CISPR 16-4 with a confidence level of 95%.

6.2 Radiated Emissions to EN 55022.

The E.U.T. complied with the radiated emission specification of EN 55022 class B with a ferrite fitted as outlined in Section 1.3.

6.3 Conducted Emissions to EN 55022.

The E.U.T. complied with the EN 55022 Class B conducted emission specification by a margin of greater than 1 dB (Ave detector)

6.4 Immunity.

The EUT complied with the immunity tests carried out to demonstrate compliance with EN 61000-6-2 & EN 60601-1-2 when tested in accordance with the manufacturers specifications.

6.5 Steady State and Fluctuating Harmonics

The E.U.T. complied with the tests carried out to demonstrate compliance with EN 61000-3-2.

6.6 Flicker

The E.U.T. complied with the tests carried out to demonstrate compliance with EN 61000-3-3.

Appendix 1
Test Equipment Used:

Instrument	Mftr.	Model	Serial No.
Measuring Receiver	Rohde and Schwarz	ESVS30	607
Bilog Antenna	CEI	699	605
Signal Generator	Marconi	2022D	119164/021
Power Amplifier	Amplifier Research	150L	12396
Power Amplifier	Milmega	ASM1000-75R	981440
Field Monitor System	Amplifier Research	FM2000	13142
Field Probe	Amplifier Research	FP2000	13130
Bilog Antenna	Schaffner	CBL6111C	329
Transient Simulator	EMC Partner	Tema 4000	921
Open Area Test Site	CEI	-	666
EM Clamp	Schaffner	KEMZ 801	19810
Universal Power Analyser	Voltech	PM3000A	AM60 / 5432
Directional Coupler	Werlatone Inc.	C2630	3206
AC Power Source	Elgar	1751SL	14665
Function Generator	Hewlett Packard	3325A	675
Magnetic Loop	CEI	-	-
Signal Generator	Rohde & Schwarz	SMH	883739 /044
Electrostatic Discharge Simulator	Schaffner	NSG432	00978
Positive Discharge Adapter	Schaffner	402 628	9318
Negative Discharge Adapter	Schaffner	402 645	9325
AC Power Source	California Instruments	3001ix	-

Appendix 2
Test Configuration

Figure 1: Conducted Emissions Test Set up

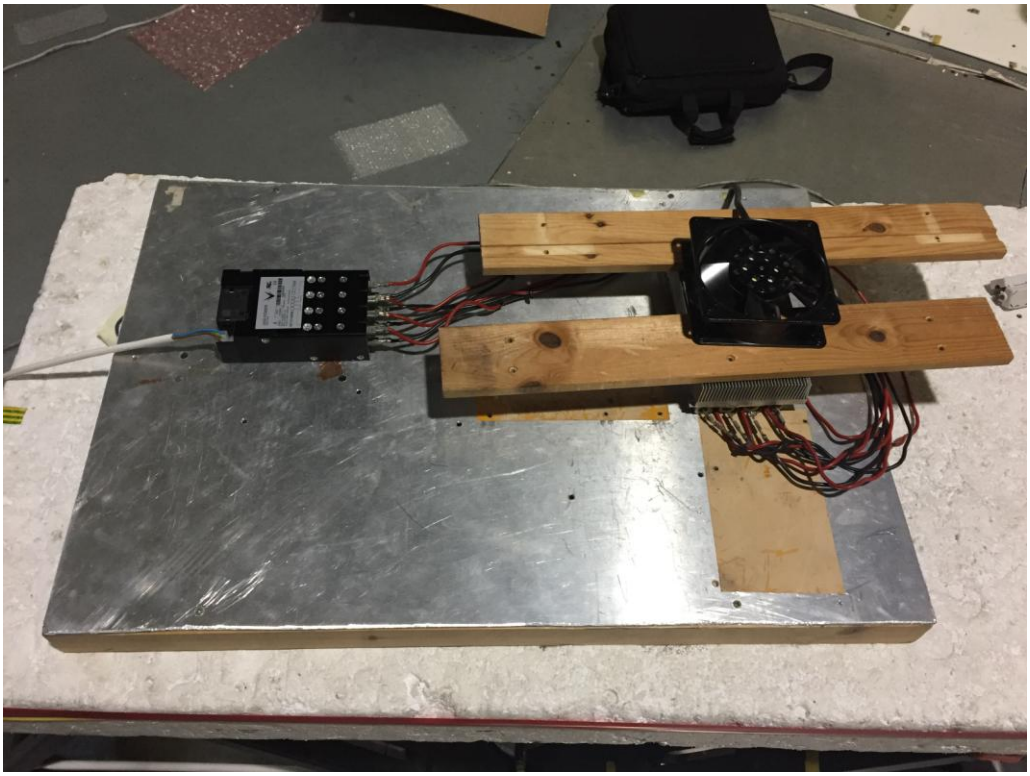


Figure 2: Radiated Emissions Test Set up

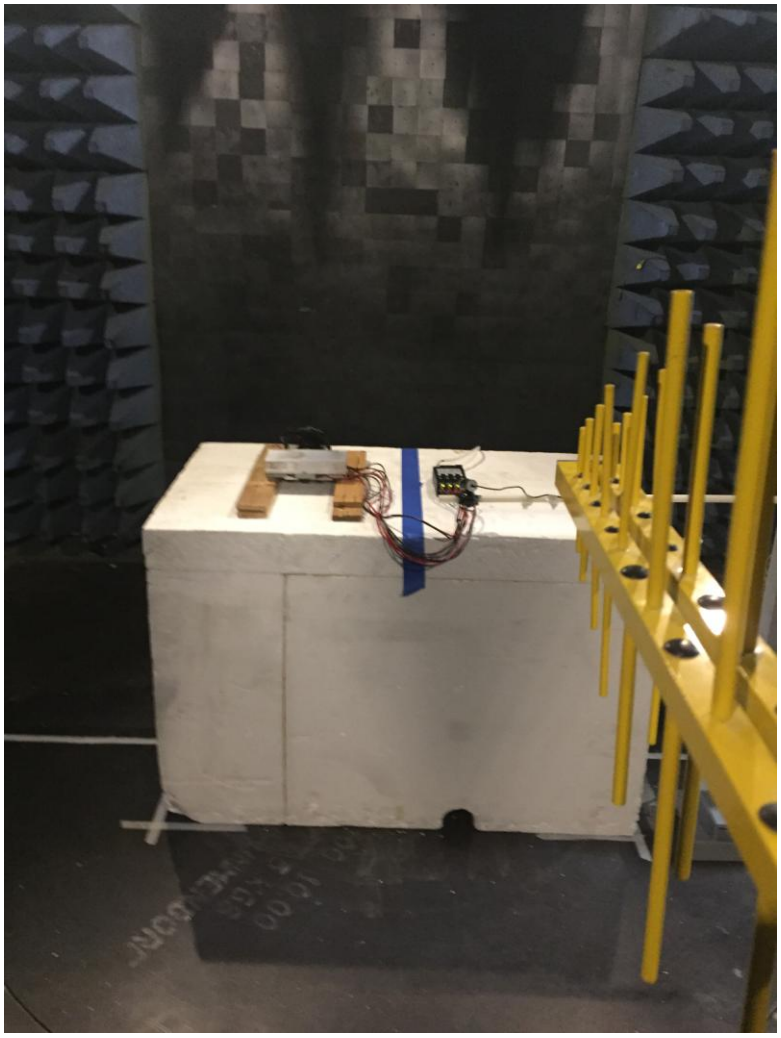


Figure 3: Radiated Immunity Test Set up

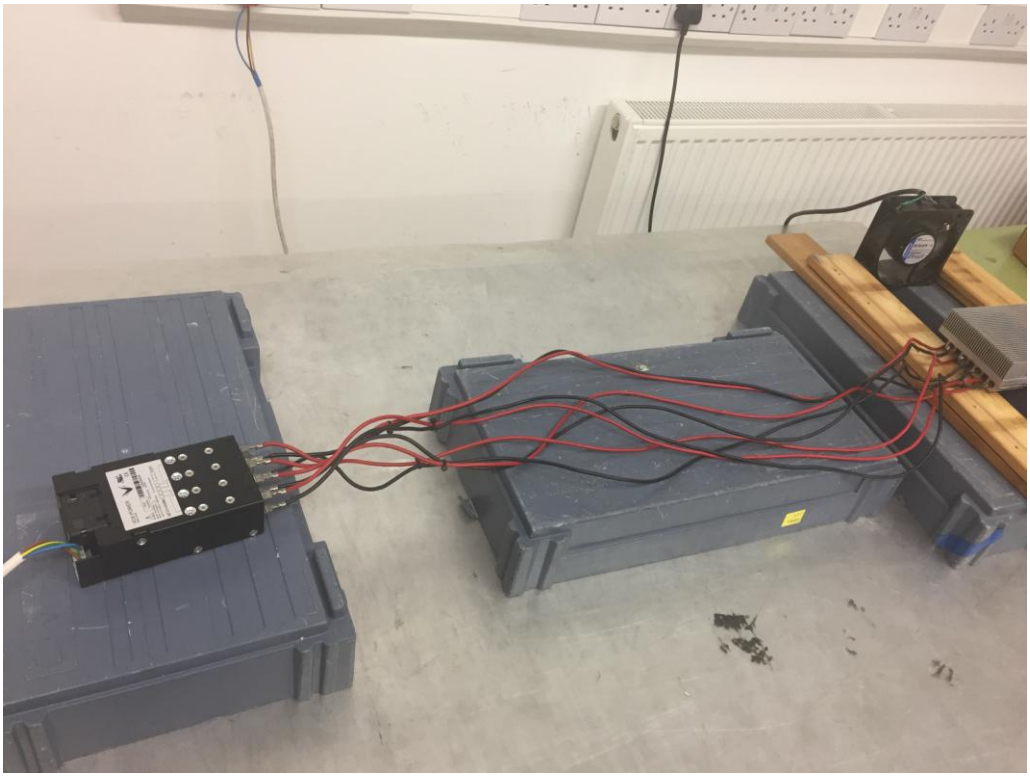


Figure 4: Fast Transients & Surges Test Set up

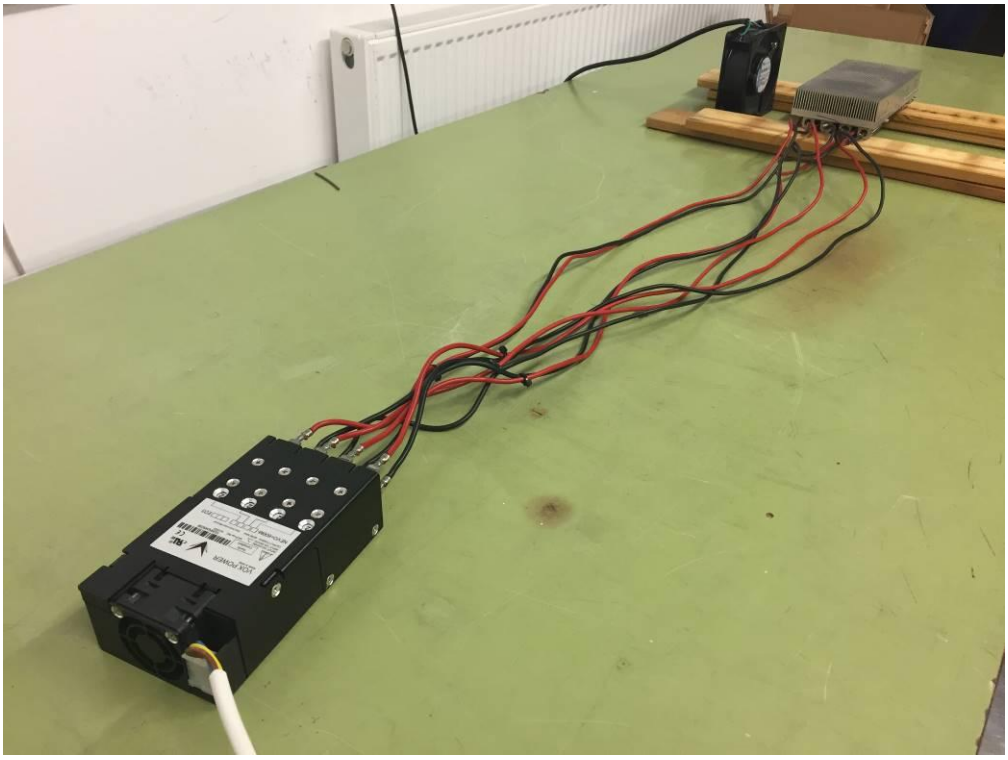


Figure 5: Voltage Dips & Surge Test Set up

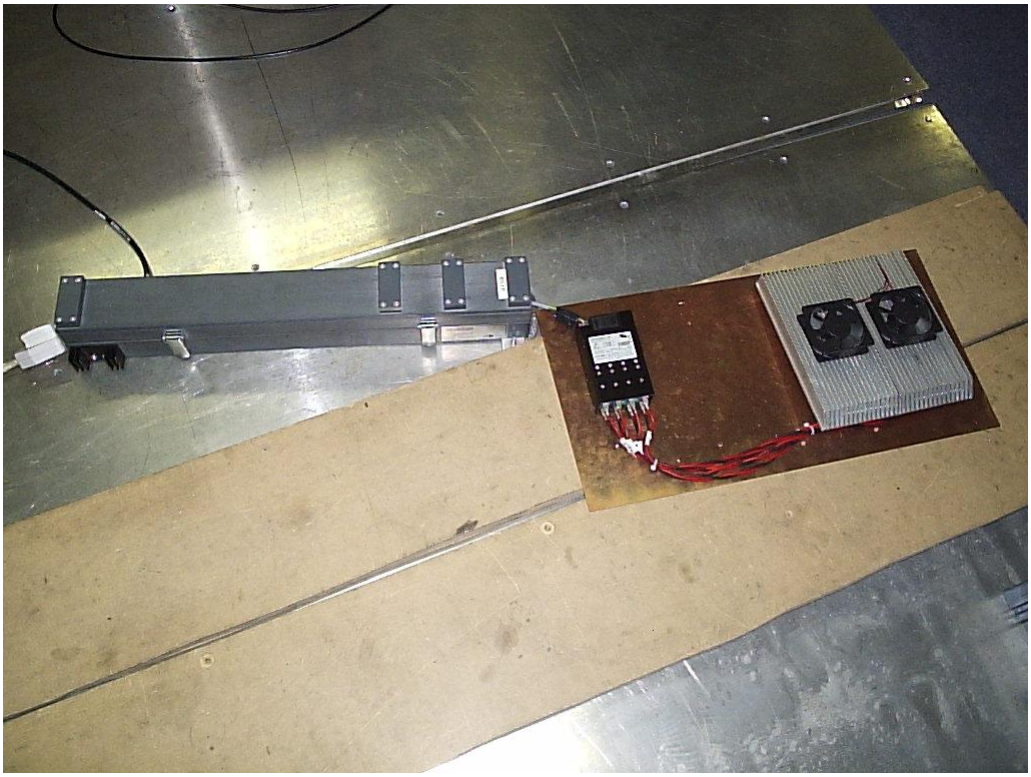


Figure 6: Conducted Immunity Test Set up

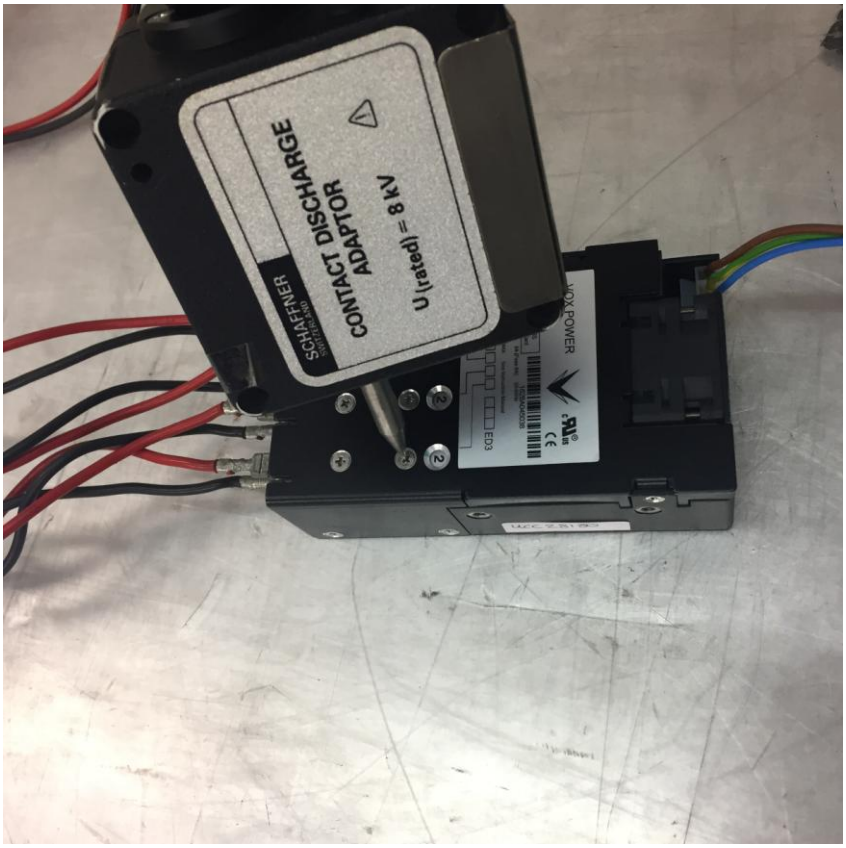


Figure 7: ESD Test Set up

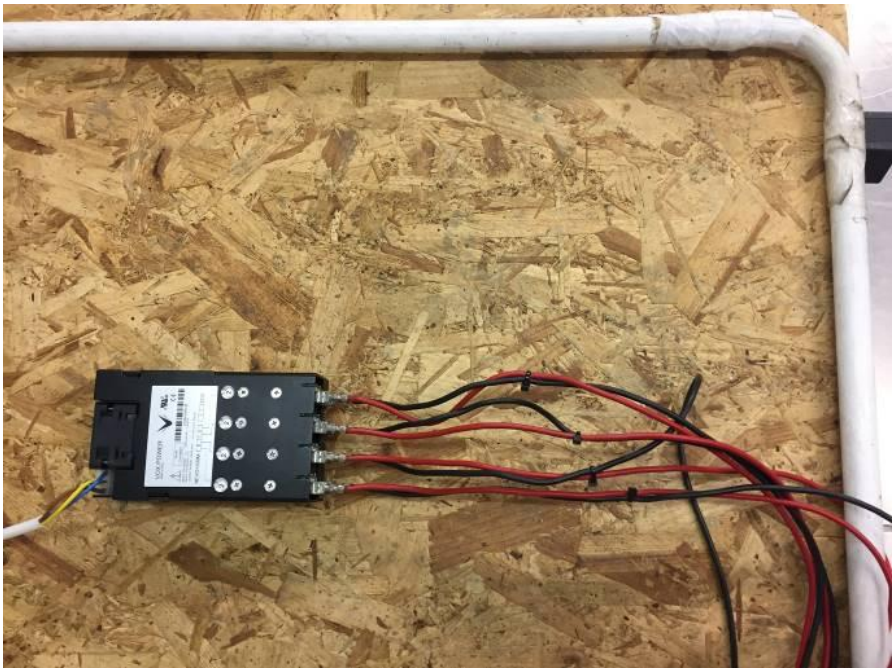


Figure 8: Magnetic Field Set up

Appendix 3
Test Results

Harmonic	Limit 1	Limit 2	Average Reading	Max Reading	Pass/FAIL
2	1.080000A	1.620000A	3.645091mA	3.749847mA	N/A
3	2.300000A	3.450000A	525.8662mA	528.7933mA	Pass
4	430.0000mA	645.0000mA	1.425351mA	2.333760mA	N/A
5	1.140000A	1.710000A	71.05048mA	71.88034mA	Pass
6	300.0000mA	450.0000mA	1.250003mA	1.249999mA	N/A
7	770.0000mA	1.155000A	90.32322mA	91.12167mA	Pass
8	230.0000mA	345.0000mA	1.250003mA	1.249999mA	N/A
9	400.0000mA	600.0000mA	25.94472mA	26.25036mA	Pass
10	184.0000mA	276.0000mA	1.250003mA	1.249999mA	N/A
11	330.0000mA	495.0000mA	21.23339mA	21.25024mA	Pass
12	153.3333mA	230.0000mA	1.250003mA	1.249999mA	N/A
13	210.0000mA	315.0000mA	21.29943mA	21.68369mA	Pass
14	131.4285mA	197.1428mA	1.250003mA	1.249999mA	N/A
15	150.0000mA	225.0000mA	16.28383mA	16.59631mA	Pass
16	115.0000mA	172.5000mA	1.250003mA	1.249999mA	N/A
17	132.3529mA	198.5294mA	13.54691mA	13.74959mA	N/A
18	102.2222mA	153.3333mA	1.250003mA	1.249999mA	N/A
19	118.4210mA	177.6315mA	6.866032mA	7.730126mA	N/A
20	92.00000mA	138.0000mA	1.250003mA	1.249999mA	N/A
21	107.1428mA	160.7142mA	4.012334mA	5.076766mA	N/A
22	83.63636mA	125.4545mA	1.250003mA	1.249999mA	N/A
23	97.82608mA	146.7391mA	11.29812mA	11.66844mA	N/A
24	76.66667mA	115.0000mA	1.250003mA	1.249999mA	N/A
25	90.00000mA	135.0000mA	11.67625mA	12.63260mA	N/A
26	70.76923mA	106.1538mA	1.250003mA	1.249999mA	N/A
27	83.33333mA	125.0000mA	4.959677mA	6.086349mA	N/A
28	65.71428mA	98.57142mA	1.268743mA	1.466155mA	N/A
29	77.58620mA	116.3793mA	15.05896mA	15.85531mA	Pass
30	61.33333mA	92.00000mA	1.250003mA	1.249999mA	N/A
31	72.58064mA	108.8709mA	14.04663mA	14.69779mA	N/A
32	57.50000mA	86.25000mA	1.263819mA	1.445293mA	N/A
33	68.18182mA	102.2727mA	11.34616mA	12.12549mA	N/A
34	54.11764mA	81.17647mA	1.250003mA	1.249999mA	N/A
35	64.28572mA	96.42857mA	11.30149mA	11.81411mA	N/A
36	51.11111mA	76.66667mA	1.291474mA	1.752734mA	N/A
37	60.81081mA	91.21622mA	6.168393mA	6.391883mA	N/A
38	48.42105mA	72.63158mA	1.252744mA	1.379877mA	N/A
39	57.69230mA	86.53846mA	8.698442mA	9.030342mA	N/A
40	46.00000mA	69.00000mA	1.251376mA	1.373112mA	N/A

Table 1: *Fluctuating Harmonics (230V, 50 Hz)*

N/A in Pass / FAIL column: Harmonic current below 0.6% of rated current or 5mA, whichever is greater, are disregarded.

	Pst	dc(%)	dmax(%)	3.3
Limit	1	3.3	4	500
Reading 1	0.071	0.015	0.07	0
Reading 2	0.071	0.015	0.07	0
Reading 3	0.071	0.015	0.07	0
Reading 4	0.071	0.015	0.07	0
Reading 5	0.071	0.015	0.063	0
Reading 6	0.071	0.015	0.063	0
Reading 7	0.071	0.015	0.063	0
Reading 8	0.071	0.015	0.063	0
Reading 9	0.071	0.015	0.07	0
Reading 10	0.071	0.015	0.063	0
Reading 11	0.071	0.015	0.063	0
Reading 12	0.071	0.021	0.063	0

Table 2: *Flicker Test Results (230V, 50 Hz)*

Conducted Emissions
LISN

04. Oct 07

Scan Settings (2 Ranges)

|-------- Frequencies ----------||---------- Receiver Settings ----------|

Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	3M	10k	10k	PK+AV	20ms	AUTO	LN OFF	60dB
3M	30M	10k	10k	PK+AV	20ms	AUTO	LN OFF	60dB

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 25
Acc Margin: 6dB

Transducer No.	Start	Stop	Name
2 1	150k	30M	NETC601
15	9k	30M	1pinslos

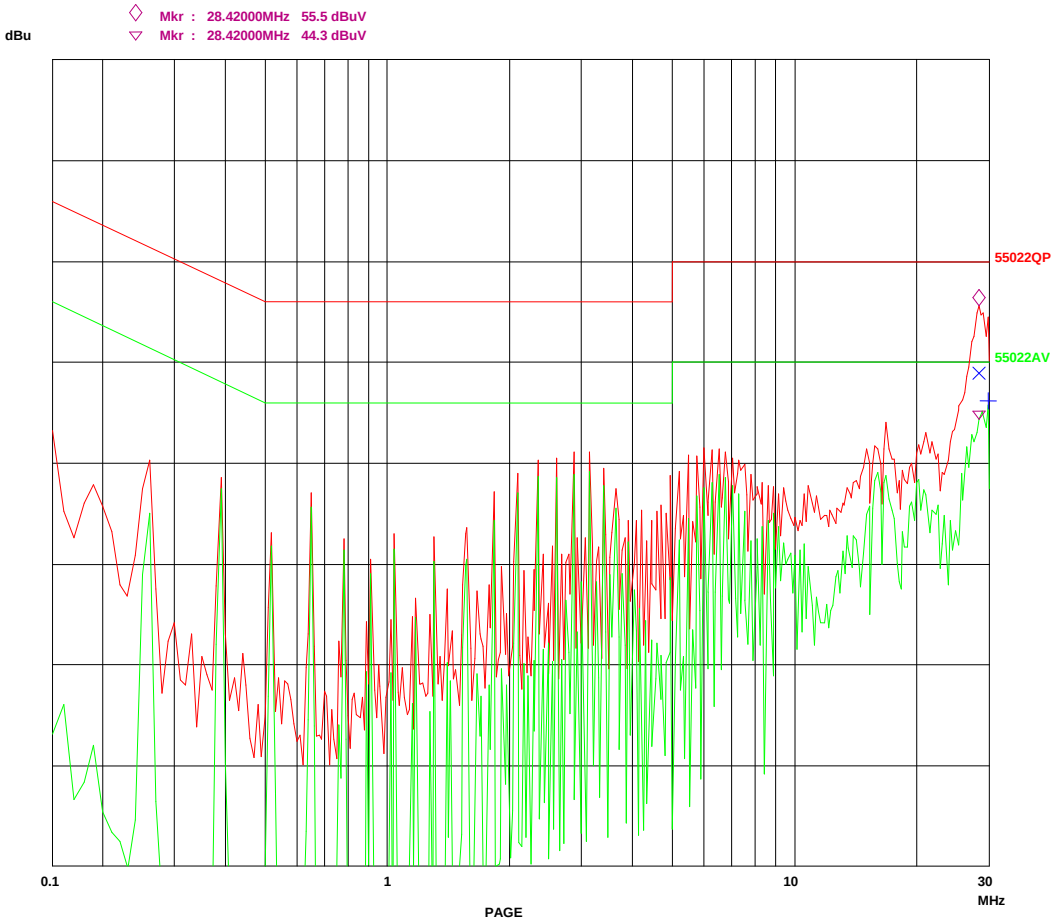


Figure 1: Conducted Emissions (live, 230V, 50Hz)

Conducted Emissions
LISN

04. Oct 07

Scan Settings (2 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	3M	10k	10k	PK+AV	20ms	AUTO	LN OFF	60dB
3M	30M	10k	10k	PK+AV	20ms	AUTO	LN OFF	60dB

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 25
Acc Margin: 6dB

Transducer No.	Start	Stop	Name
2	1 150k	30M	NETC601
	15 9k	30M	1pinslos

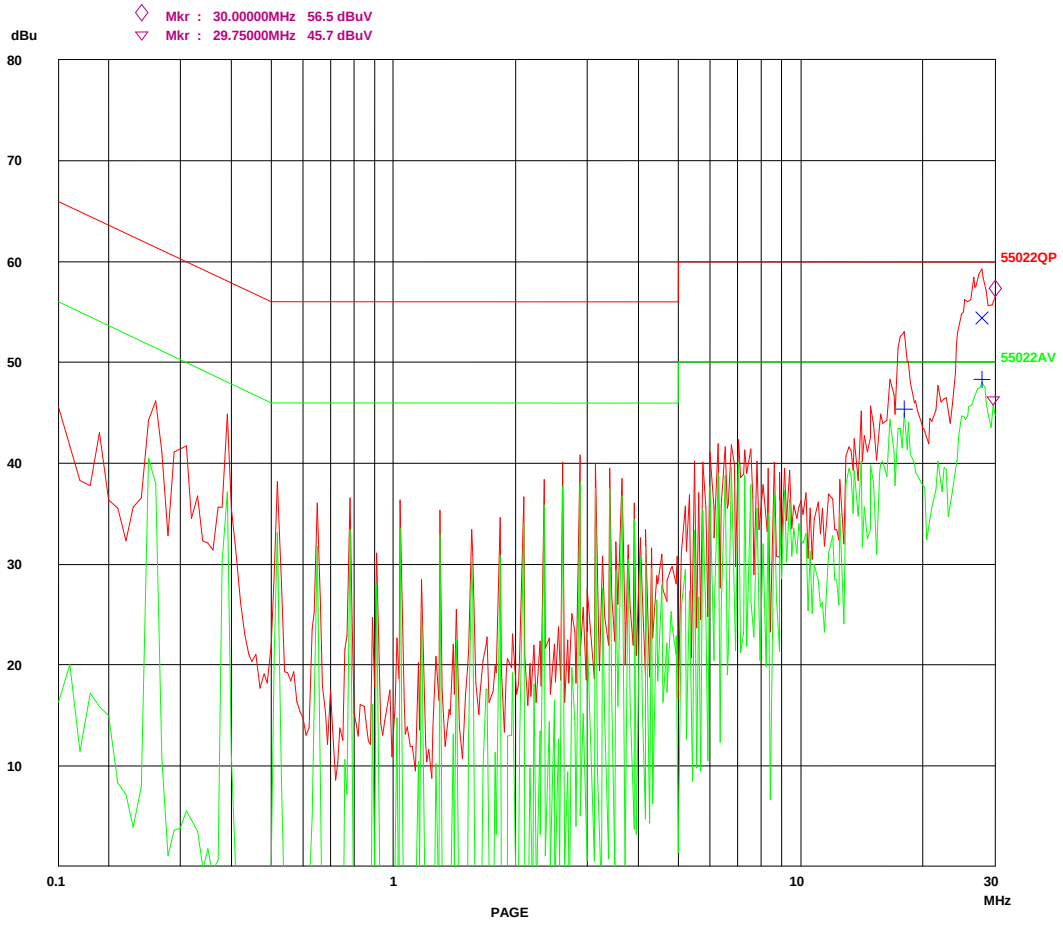


Figure 2: Conducted Emissions (neutral, 230V, 50Hz)

17. Jan 17 11:26

Scan Settings (1 Range)

|--------- Frequencies ----------||---------- Receiver Settings ----------|

Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
30M	1000M	120k	120k	PK	5ms	0dBLD	OFF	60dB

Transducer No.	Start	Stop	Name
1	20M	1000M	830CAB
9			
21	30M	1000M	BILOG889

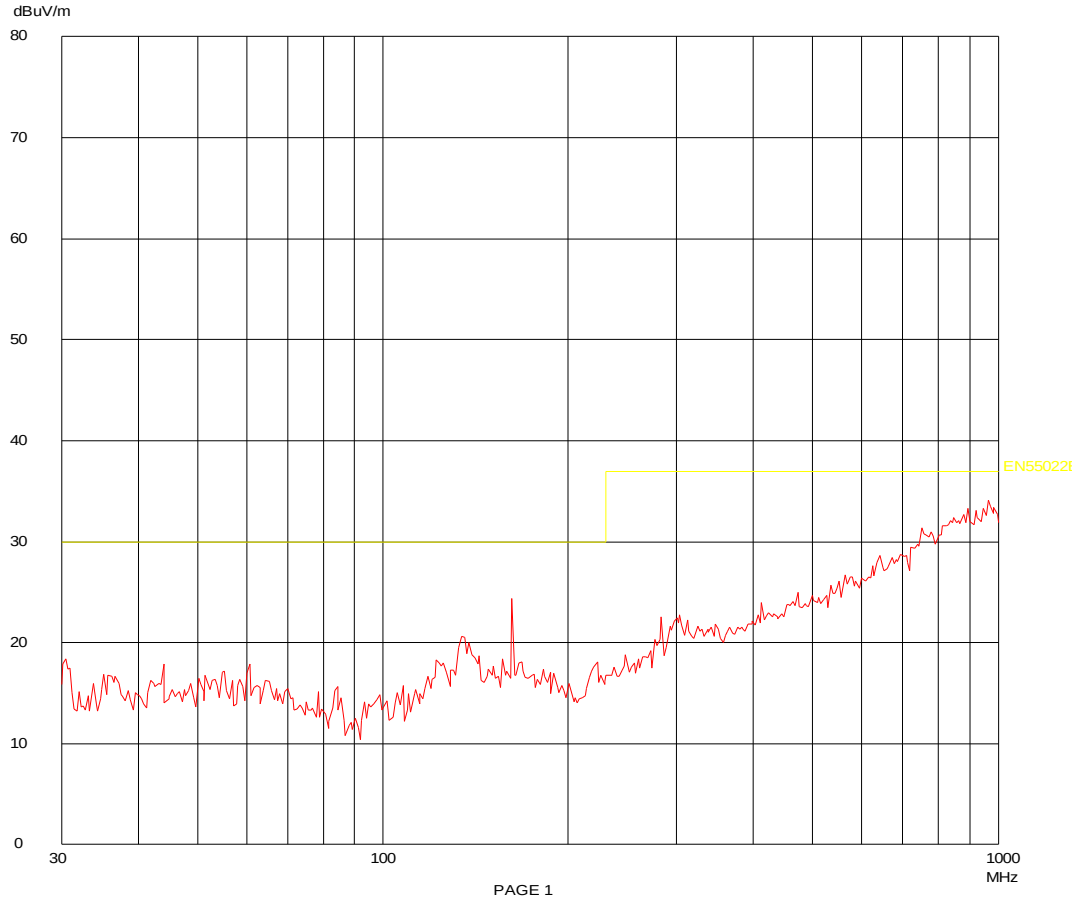


Figure 3: Radiated Emissions, Horizontal Scan (Class B)

17. Jan 17 11:43

Scan Settings (1 Range)

|--------- Frequencies ----------||---------- Receiver Settings ----------|

Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
30M	1000M	120k	120k	PK	5ms	0dBLD	OFF	60dB

Transducer	No.	Start	Stop	Name
1	9	20M	1000M	830CAB
	21	30M	1000M	BILOG889

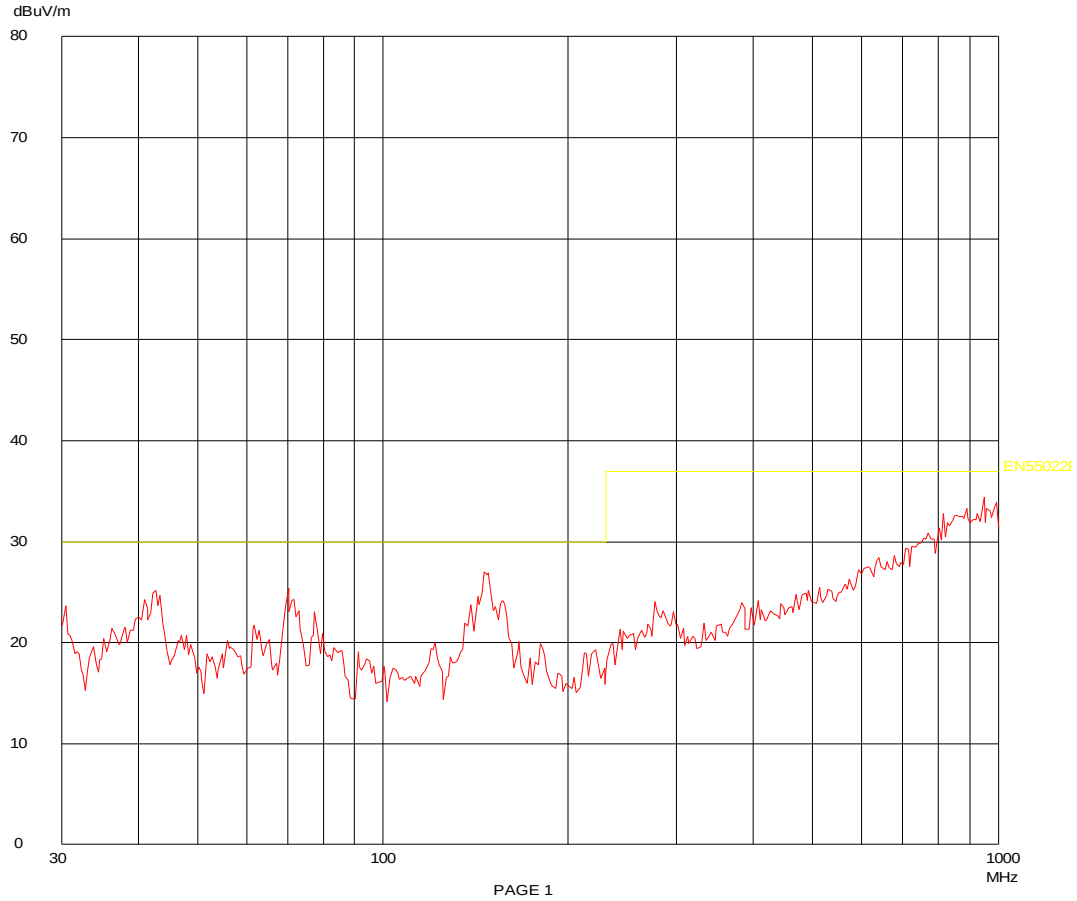


Figure 4: Radiated Emissions, Vertical Scan (Class B)

Frequency MHz	QP Level dBuV/m	EN55022 Limit dbuV/m	Antenna Polarity	Antenna Height (m)	Pass / Fail
30.1980	21.0	30	H	3.5	Pass
42.8800	20.9	30	V	1.5	Pass
70.1000	19.7	30	V	1	Pass
134.1700	22.8	30	H	4	Pass
148.6420	21.0	30	V	1	Pass

Table 3

Radiated Emissions 30MHz -1GHz, Class B Limits– Anechoic Chamber at 10metres