

Tracopower Model: TEX 120-112 EMC – Test Report

EUT: Tracopower Model: TEX 120-112

Serial No.: 10834000086

Manufacturer: Convertec Ltd.
Whitemill Industrial Estate
Wexford
Republic of Ireland

Tester: Colin Doyle, Convertec

Date: 31/10/2008

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1 Conducted Input Emissions Test

Equipment Under Test: TEX 120-112
EUT Serial No.: 10834000086
Customer Spec: CS-120WPP1XX.doc
Date: 20/10/2008
Standards: IEC61000-6-3: 2006 referring to CISPR 16-1-2: 2003

Notes:

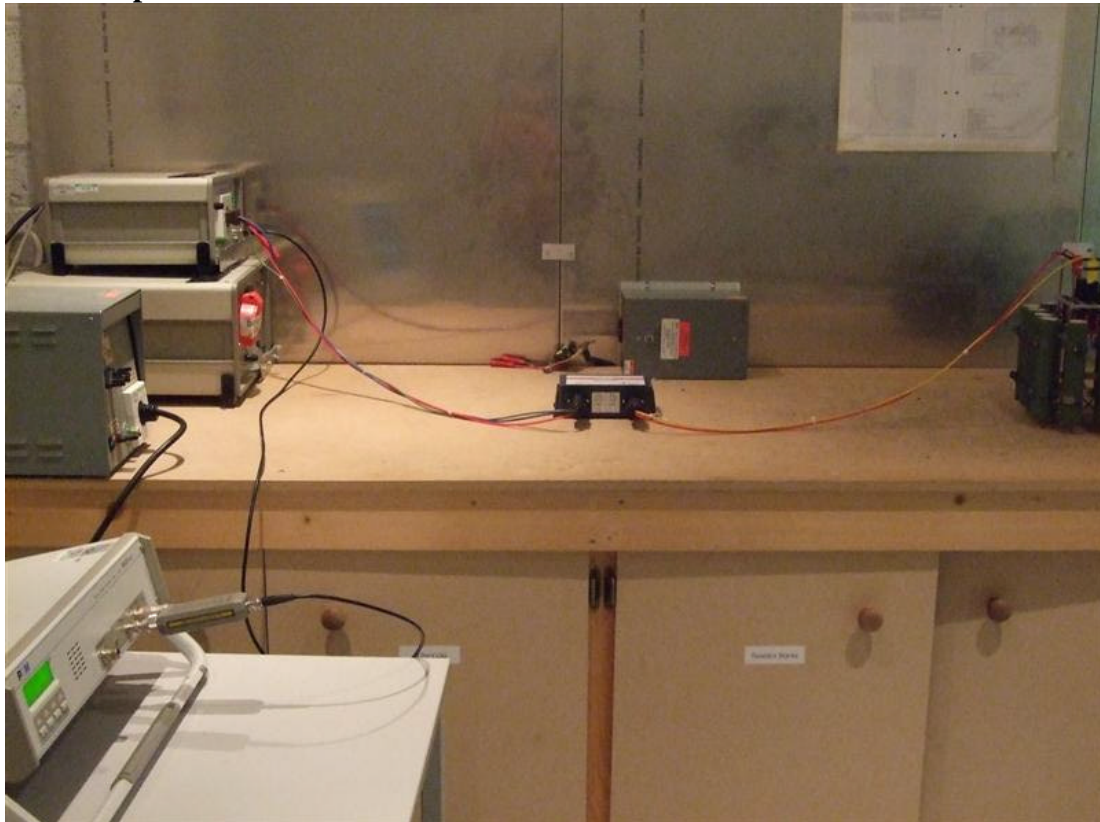
- EUT tested under normal operating conditions of 230V 50Hz input at full load (12V/8A Resistive)
- Conducted Emissions measured using PMM 8000 analyzer and PMM LISN
- Tested to CISPR 16 -1-2:2003 Class B limits
- Transient limiter used to protect PMM 8000, with appropriate correction factors applied
- Tests carried out in shielded room

1.1 Test Setup

Test Equipment Settings:

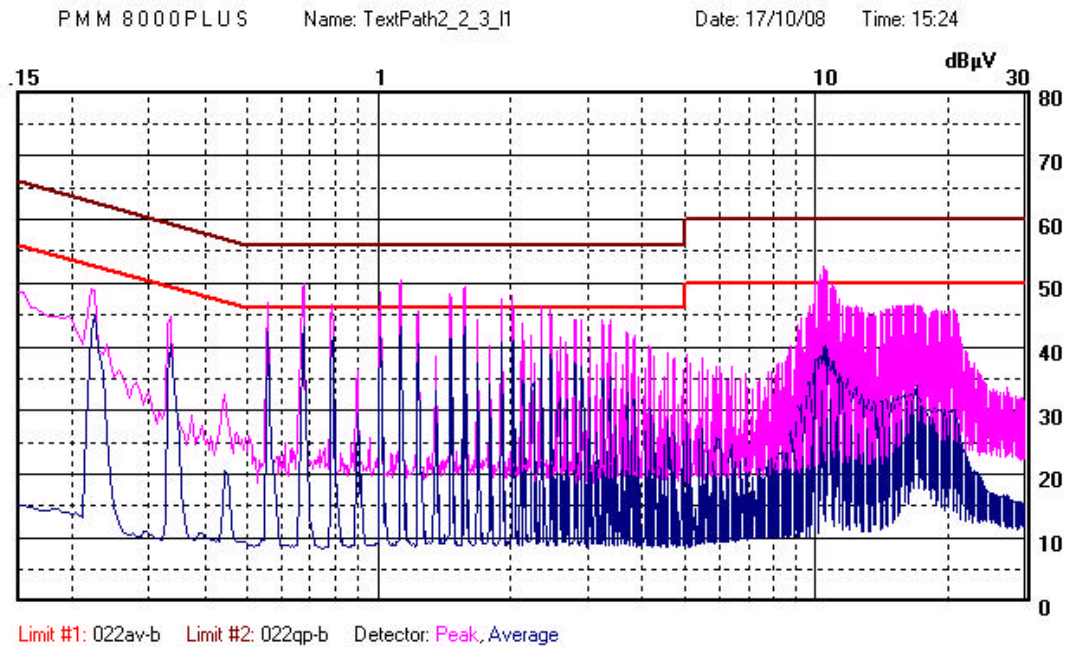
Start Freq.	Stop Freq.	Step	Pk Time	Avg Time
150kHz	30MHz	5kHz	50ms	50ms

Test Setup:

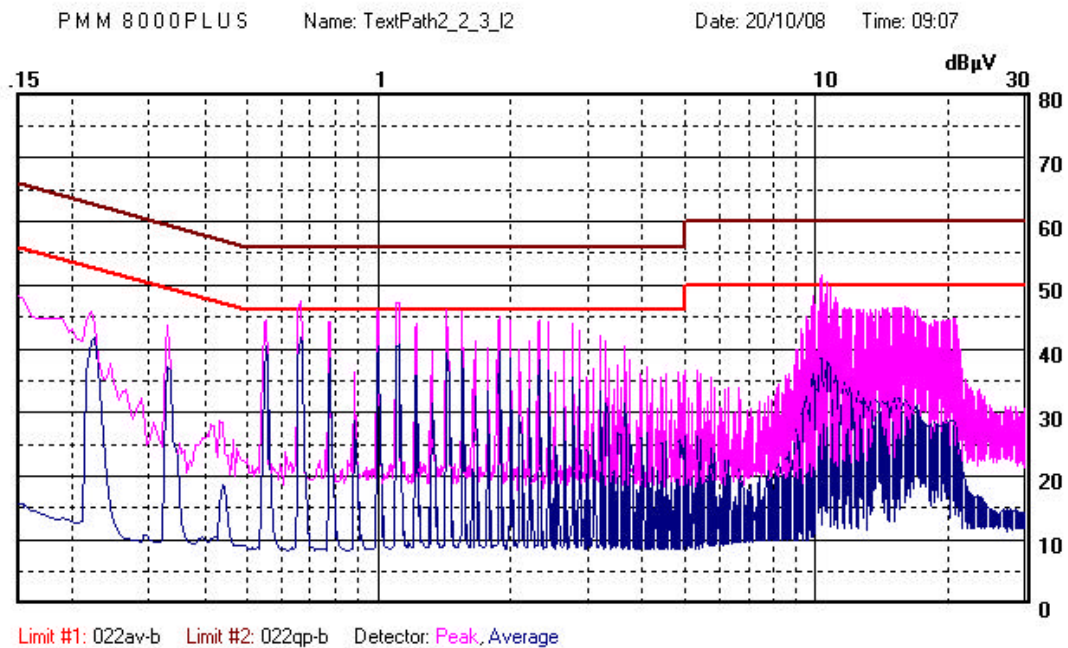


1.2 Conducted Input Emissions Results

L1



L2



PASS

2 Conducted Output Emissions Test

Equipment Under Test: TEX 120-112
EUT Serial No: 10834000086
Customer Spec: CS-120WPP1XX.doc
Date: 20/10/2008
Standards: IEC61000-6-3: 2006 referring to CISPR 16-1-2: 2003

Notes:

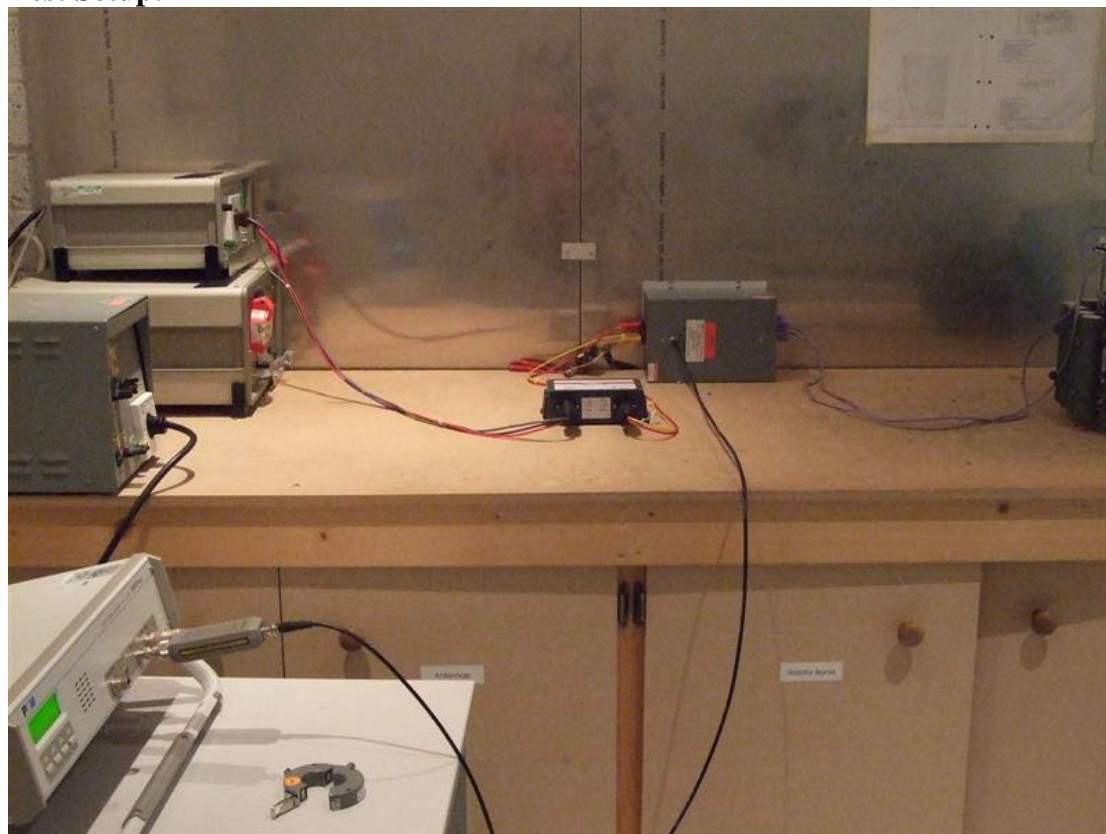
- EUT tested under normal operating conditions of 230V 50Hz input at full load (12V/8A Resistive)
- Emissions measured using PMM 8000 analyzer and FCC LISN
- Tested to CISPR 16 -1-2:2003 Class B limits
- Transient limiter used to protect PMM 8000, with appropriate correction factors applied
- Appropriate correction factor also applied for output LISN
- Tests carried out in shielded room

2.1 Test Setup

Test Equipment Settings:

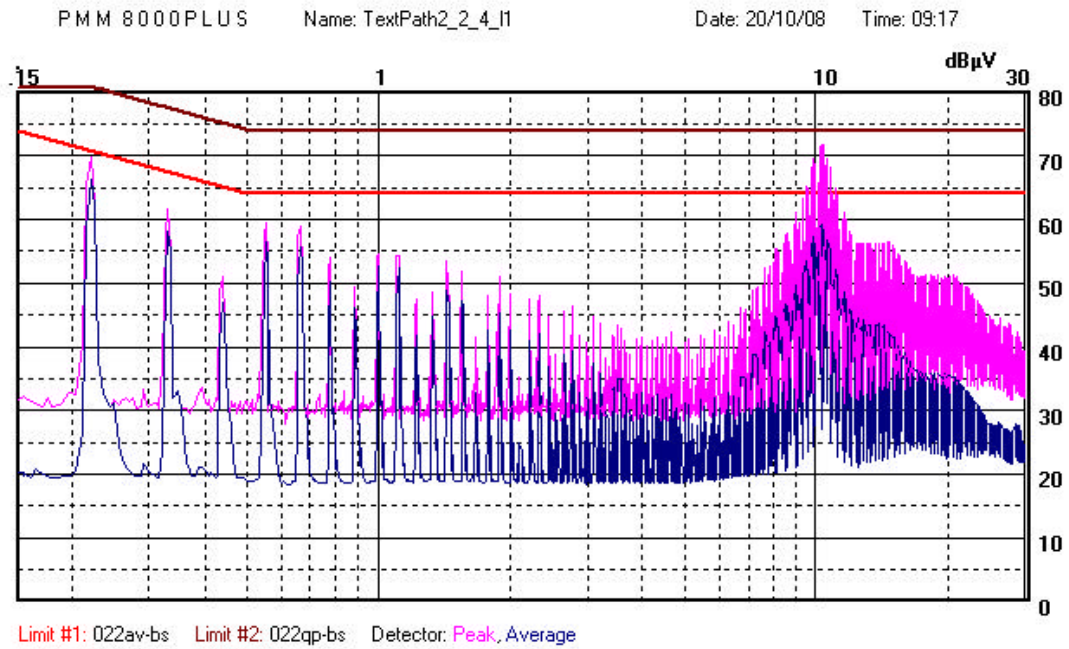
Start Freq.	Stop Freq.	Step	Pk Time	Avg Time
150kHz	30MHz	5kHz	50ms	50ms

Test Setup:



2.2 Conducted Output Emissions Results

Output DC Lines:



PASS

3 Radiated Emissions Test

Equipment Under Test: TEX 120-112
EUT Serial No.: 10834000086
Customer Spec: CS-120WPP1XX.doc
Date: 20/10/2008
Standards: IEC61000-6-3:2006 referring to CISPR 16-2-3:2003

Notes:

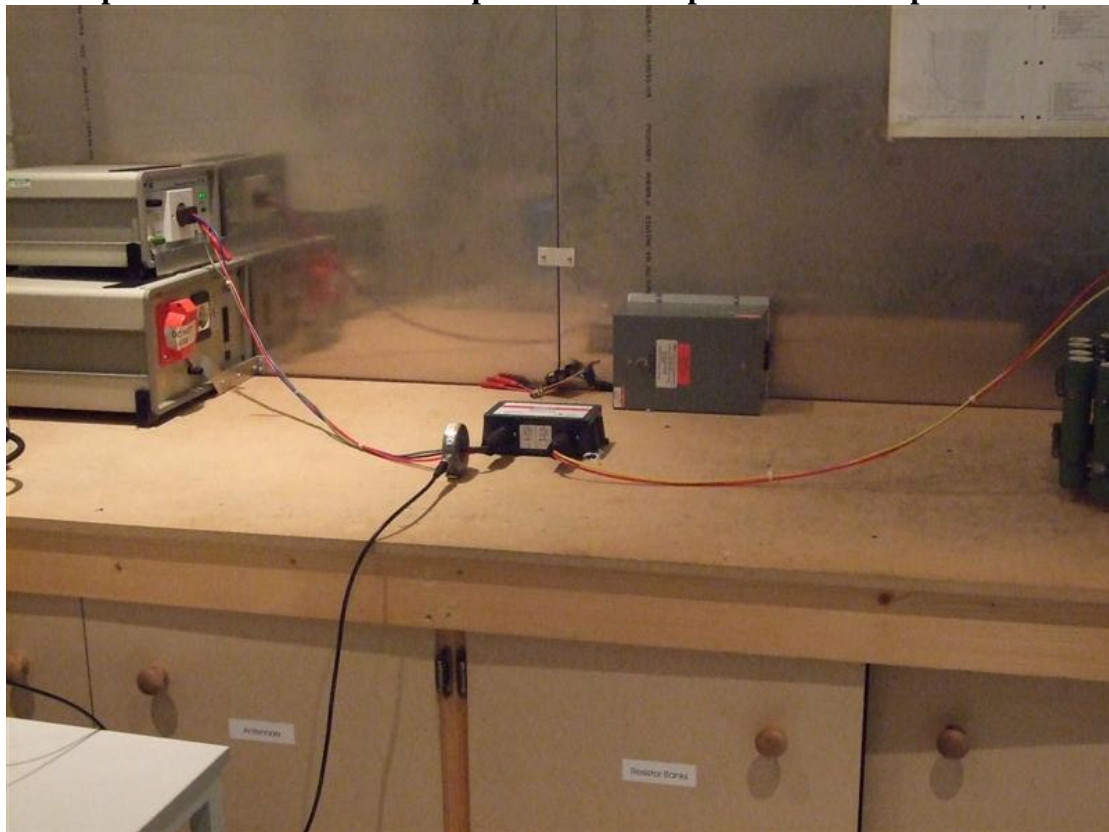
- EUT tested under normal operating conditions of 230V 50Hz input at full load (12V/8A Resistive)
- Emissions measured using PMM 8000 analyzer and FCC RF current probe
- RF current probe kept a distance of 10cm from input/output
- Tests carried out in shielded room
- Tested to CISPR 16 -2-3:2003 Class B limits

3.1 Test Setup

Test Equipment Settings:

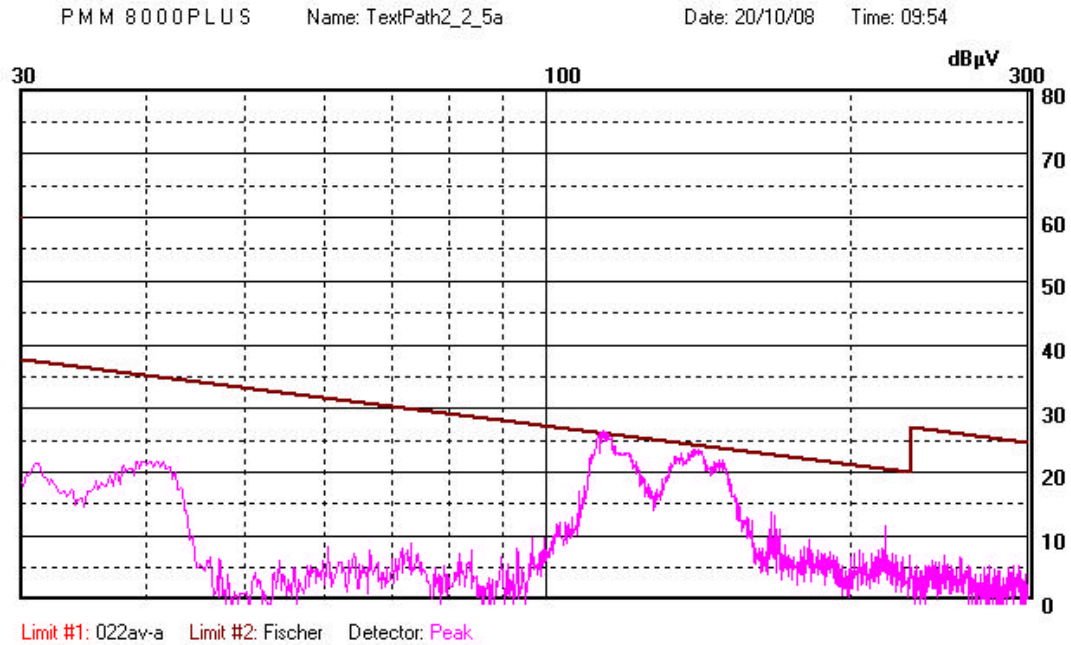
Start Freq.	Stop Freq.	Step	Pk Time
30MHz	300MHz	100kHz	10ms

Test Setup: The following shows the setup used for input lines, the setup used for the output lines was the same except that the clamp was on the output lines.

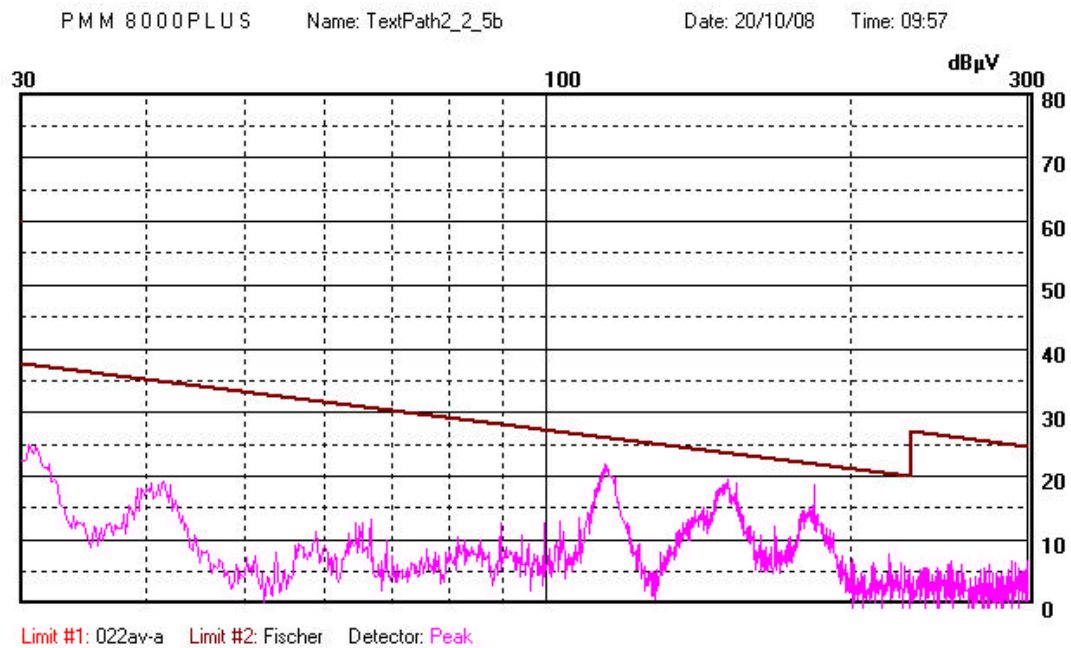


3.2 Radiated Emissions Results

Input Lines:



Output Lines:



PASS

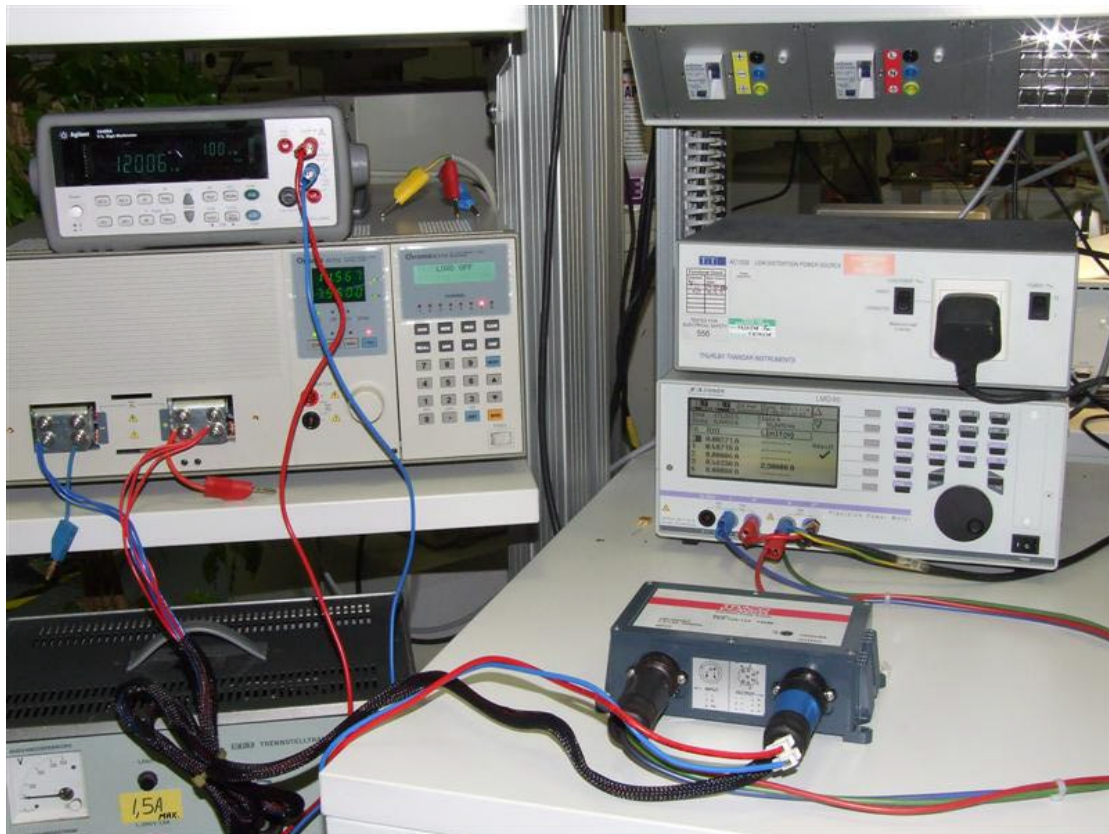
4 Harmonic Current Emissions Test

Equipment Under Test: TEX 120-112
EUT Serial No.: 10834000086
Customer Spec: CS-120WPP1XX.doc
Date: 30/10/2008
Standard: IEC61000-6-3: 2006 referring to IEC 61000-3-2: 2005

Notes:

- EUT tested under normal operating conditions of 230V 50Hz input at full load (12V/8A)
- EUT powered by low-distortion AC Voltage Source, TTI AC-1000
- Harmonic Limits measured using LMG 95 Power Meter
- Tested to IEC61000-3-2 Table 1 Class A

4.1 Test Set-Up:



4.2 Harmonic Emissions Results

n	Harmonic Limit	Measured Values
3	2.3	0.474
5	1.14	0.439
7	0.77	0.391
9	0.4	0.332
11	0.33	0.268
13	0.21	0.202
15	0.15	0.139
17	0.1324	0.083
19	0.1184	0.039
21	0.1071	0.014
23	0.0978	0.027
25	0.09	0.038
27	0.0833	0.041
29	0.0776	0.036
31	0.0726	0.027
33	0.0682	0.016
35	0.0643	0.006
37	0.0608	0.007
39	0.0577	0.013

PASS

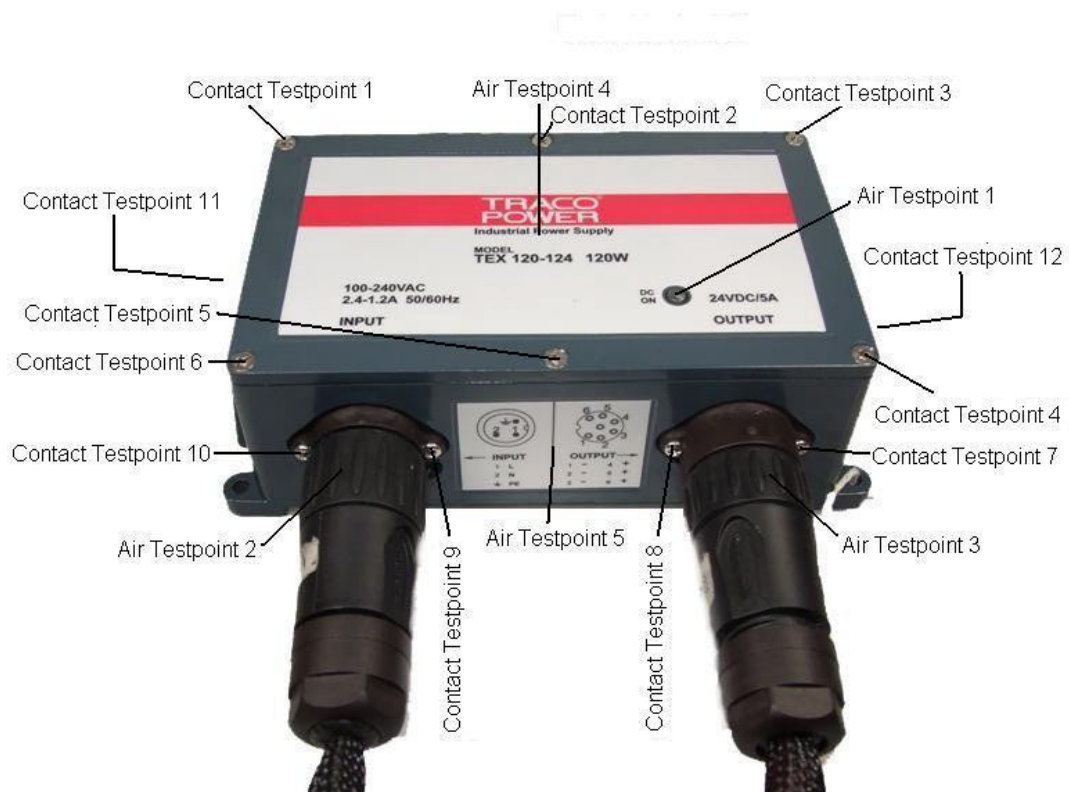
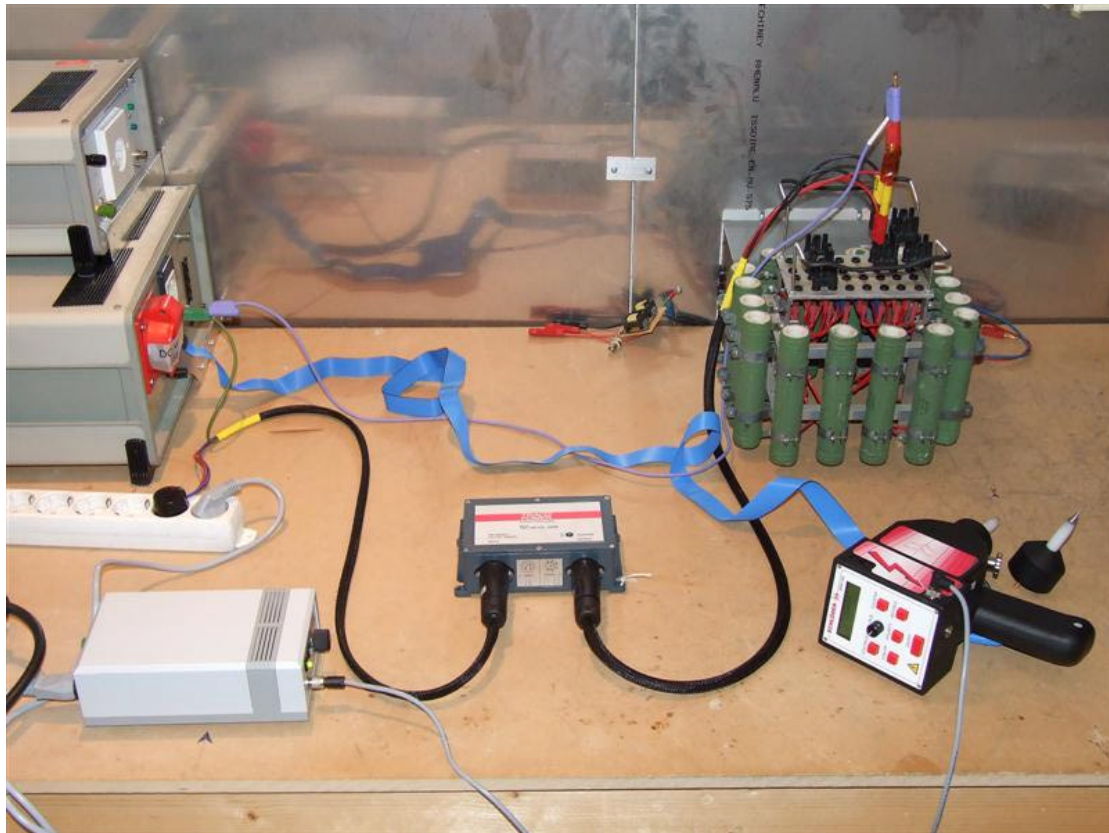
5 Electrostatic Discharge Test

Equipment Under Test: TEX 120-112
EUT Serial No.: 10834000086
Customer Spec: CS-120WPP1XX.doc
Date: 22/10/2008
Standard: IEC61000-6-2: 2005 referring to IEC 61000-4-2: 2000

Notes:

- EUT tested under normal operating conditions of 230V 50Hz input at full load (12V/8A Resistive)
- Since the EUT output is isolated from earth, a 470K HV resistor was placed between output and Earth to provide a discharge path between spikes
- Insulated Connector shells with insulated cover material shall be tested using air discharge tests only in accordance with IEC61000-4-2 8.3.1(d)
- Contact discharge tests shall be applied to all areas exposed to the end user under final installation (See contact testpoints in diagram) using ESD gun SESD 200
- Test voltage shall be increased from 8kV/4kV (air/contact) up to the max 15kV/8kV in order to determine a failure threshold if any
- The test shall be performed with single discharges
- At least 10 discharges were applied per test-point (in both polarities)
- A time interval between discharges of at least 1s was used
- The ESD generator was held perpendicular to the test-point wherever possible for repeatability of results.
- In the case of contact discharges, the tip shall touch the EUT before the discharge is applied (Tester set to 1Hz repetitive and 10 audible clicks counted)
- In the case of air discharges, the trigger is engaged at about 20cm and the tester is moved quickly toward the testpoint until spark occurs and trigger is released

5.1 Test Setup



5.2 ESD Results

	Contact Testpoints:	Air Testpoint:
EUT: 10834000086	PASS	PASS

Conclusion:

EUTs still function as expected after tests therefore are in accordance with IEC61000-4-2

PASS

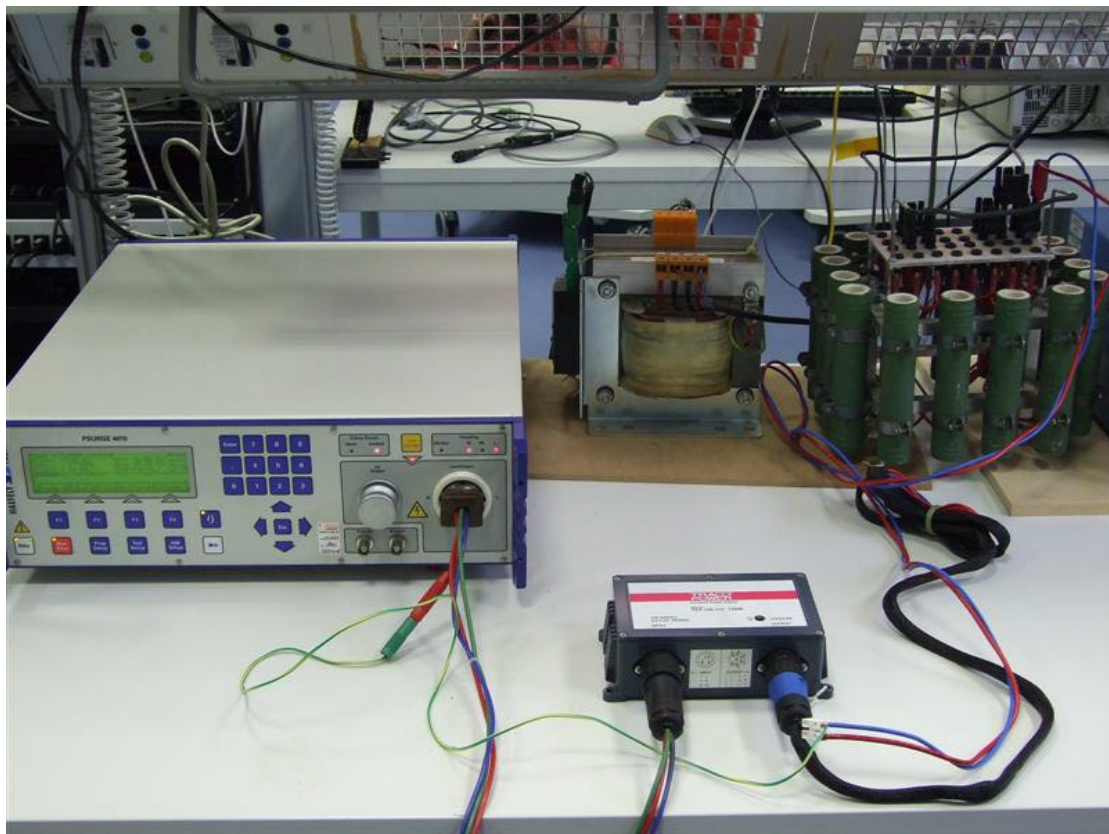
6 Surge Test

Equipment Under Test: TEX 120-112
EUT Serial No.: 10834000086
Customer Spec: CS-120WPP1XX.doc
Date: 24/10/2008
Standard: IEC61000-6-2: 2005 referring to IEC 61000-4-5: 2005

Notes:

- EUT tested under normal operating conditions of 230V 50Hz input at full load (12V/8A Resistive)
- Secondary side (0V) connected to Primary earth
- Used Haefely Surge generator PSURGE 4010
- Voltage test level: +/- 2kV Line-Line, +/- 4kV Line-Earth (installation class 4)
- No. of Surges per set: 5 tests Positive at 0, 90, 180, and 270 and 5 tests Negative at 0, 90, 180, and 270
- Interval Between Surges: 10s

6.1 Test Setup



6.2 Surge Results

	L to N	L to PE	N to PE
EUT: 10834000086	PASS	PASS	PASS

Conclusion:

Meets Classification A (Ref. Section 9, IEC 61000-4-5)

Only Class B performance criteria are required as per Table 6, IEC 61204-3

PASS

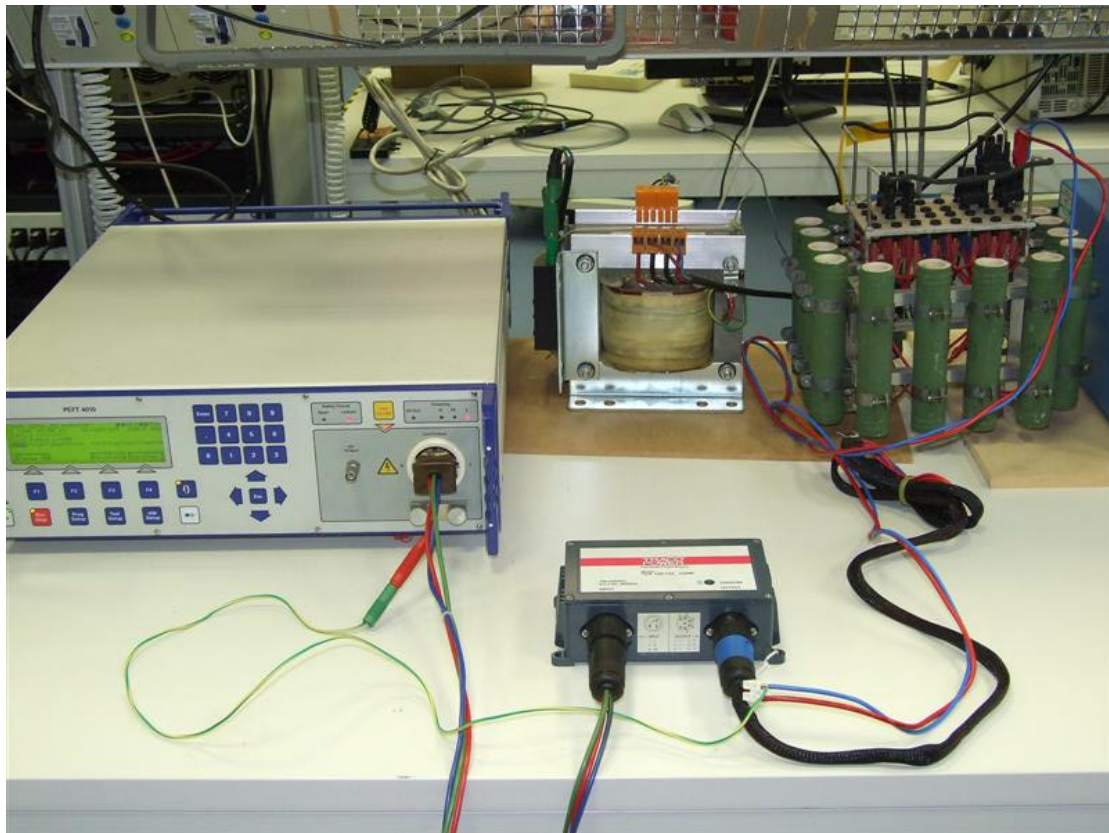
7 Fast Transient Test (Burst)

Equipment Under Test: TEX 120-112
EUT Serial No.: 10834000086
Customer Spec: CS-120WPP1XX.doc
Date: 30/10/2008
Standard: IEC61000-6-2: 2005 referring to IEC 61000-4-4: 2004

Notes:

- EUT tested under normal operating conditions of 230V 50Hz input at full load (12V/8A Resistive)
- Secondary side (0V) connected to Primary earth
- Units tested to IEC61000-4-4 test level 4
- Used Haefely Burst tester PEFT 4010
- Voltage test level: $\pm 4\text{Kv}$
- Burst Duration: 0.75ms
- Repetition rate: 100kHz
- Burst Period: 300ms
- Individual test time: 1 min
- Polarity: Positive and Negative

7.1 Test Setup



7.2 Burst Results

EUT: 10834000086	L-G	N-G	PE-G	L,N-G	L,PE-G	N,PE-G	L,N,PE-G
Positive	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Negative	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Conclusion:

Meets Classification A (Ref. Section 9, IEC 61000-4-5)

Only Class B performance criteria are required as per Table 6, IEC 61204-3

PASS

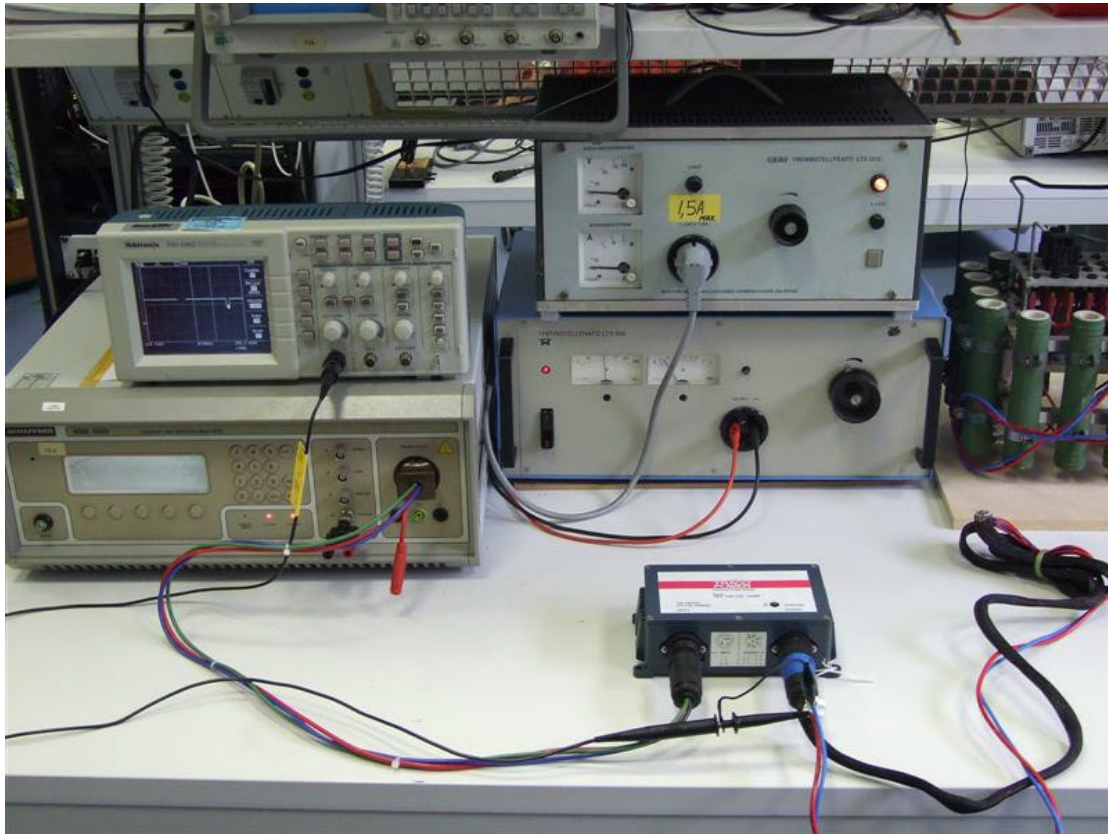
8 Voltage Dips and Short Interruptions

Equipment Under Test: TEX 120-112
EUT Serial No.: 10834000086
Customer Spec: CS-120WPP1XX.doc
Date: 30/10/2008
Standard: IEC61000-6-2:2005 referring to IEC 61000-4-11:2004

Notes:

- EUT tested under normal operating conditions of 230V 50Hz input at full load (12V/8A Resistive)
- Test carried out using 2 Variacs and dropout simulator NSG 1003
- Tested according to class 3 IEC61000-4-11
- Units tested with highest and lowest nominal voltage (240V/100V) in accordance with IEC61000-4-11 section 5
- Interval between dropouts and short interruptions was 10s
- Phase angle was set to 0°, 90°, 180° and 270° for each voltage level tested
- Dropouts were tested from 100%-80% for 250 Mains cycles in accordance with IEC61000-4-11 table 2
- Dropouts were tested from 100%-70% for 25 Mains cycles in accordance with IEC61000-4-11 table 2
- Dropouts were tested from 100%-40% for 10 Mains cycles in accordance with IEC61000-4-11 table 2
- Dropouts were tested from 100%-0% for 1 Mains cycle in accordance with IEC61000-4-11 table 2
- 3 dropouts and 3 short interruptions were carried out per test
- Short interruptions tests were carried out at 100% to 0% for 0.1s, 0.2s, 0.5s, 1s, 2s, and 5s durations
- Short interruptions were done at worst case 0° phase angle

8.1 Test Setup



8.2 Voltage Dips & Short Interruptions Results

Voltage Dips

240VAC				
Phase Angle:	0	90	180	270
100%-0%	Class A	Class A	Class A	Class A
100%-40%	Class A	Class A	Class A	Class A
100%-70%	Class A	Class A	Class A	Class A
100%-80%	Class A	Class A	Class A	Class A
115VAC				
Phase Angle:	0	90	180	270
100%-0%	Class A	Class A	Class A	Class A
100%-40%	Class B	Class B	Class B	Class B
100%-70%	Class A	Class A	Class A	Class A
100%-80%	Class A	Class A	Class A	Class A

Short Interruptions

100%-0%	0.1s	0.2s	0.5s	1s	2s	5s
115VAC	Class B	Class B	Class B	Class B	Class B	Class B
240VAC	Class A	Class A	Class A	Class A	Class A	Class A

Conclusion:

- In accordance with Class B, IEC61000-4-11 section 9 (b)

PASS

9 Summary

Regulation	Class/Test Level	Result	Comments
IEC61000-6-3: 2006 + CISPR 16-1-2: 2003 + CISPR 16-2-3: 2003			
Conducted Input (0.15-30MHz)	Class B	PASS	
Conducted Output (0.15-30MHz)	Class B	PASS	
Radiated (30-300MHz)	Class B	PASS	
IEC61000-6-3: 2006 + IEC 61000-3-2: 2005			
Harmonic Current Emissions	Class A	PASS	
IEC61000-6-2: 2005 + IEC 61000-4-2: 2000			
Electrostatic Discharge			
-Air Discharge	+/- 8/15kV (Class B)	PASS	
-Contact Discharge	+/- 4/8kV (ClassB)	PASS	
IEC61000-6-2: 2005 + IEC 61000-4-5: 2005			
Surge			
-AC Supply	+/- 2kV (ClassB) L-N	PASS	
	+/- 4kV (ClassB) L-PE	PASS	
	+/- 4kV (ClassB) N-PE	PASS	
IEC61000-6-2: 2005 + IEC 61000-4-4: 2004			
Fast Transient (Burst)			
-AC Supply	+/- 4kV (ClassB)	PASS	
	Between all lines		
IEC61000-6-2:2005 + IEC 61000-4-11:2004			
Voltage Dips			
-AC Supply	100%-0% (Class A)	PASS	
	100%-40% (Class B)	PASS	
	100%-70% (Class A)	PASS	
	100%-80% (Class A)	PASS	
Short Interruptions (100%-0% for: 0.1s, 0.2s, 0.5s, 1s, 2s and 5s)	Class B	PASS	

10 List of Equipment Used:

Description	Model No.	Manufacturer	Serial No.
Test Signal Analyzer	PMM 8000PLUS	PMM	0100J91001
LISN 1	PMM L2-16	PMM	1230L00301
LISN 2	FCC-801-M2-50A	FCC	3035
RF Current Probe	F-33-1	FCC	759
Transient Limiter	11947A	Agilent	3107A03645
Precision Power Meter	LMG95	Zimmer	10790709
Low-Distortion AC Source	AC1000	Thurlby Thandar Instruments	151093
ESD Gun	SESD 200	Schloder	142261
Surge Generator	PSURGE 4010	Haefely	583 334-63
Burst generator	PEFT 4010	Haefely	080 981-08
Dropout & Variation Simulator	NSG 1003	Schaffner	106
Electronic Load	6314/63106	Chroma	63145803
High Power Resistors	n/a	n/a	n/a
Multimeter	M2008	BBC	M24119181
Multimeter	Hit 23S	Metra	NE4126
Oscilloscope	TDS1002	Tektronix	C016388
Cables	Type	Length	Comments
Mains Supply Cable	3-wire	1m	Unshielded
DC Lines Cable	2-wire	1m	Unshielded