



EMC TEST REPORT

For

Switching Power Supply

Models Number: EE-ATX-420W-C1-PFC, EE-ATX-420W-C1-BR, EE-ATX-500W-IR,
SP-ATX-400WT-PFC, SP-ATX-350WT-PFC, SP-ATX-380WTN-PFC,
SP-ATX-420WTN-PFC, SP-ATX-420WTB-PFC-1



Reference No. : CT10031986-S-E
Applicant : Bytecom Fanner B.V.
Address : Rondven 38, 6026PX Maarheeze The Netherlands
Date of Test : March 10, 2010 to March 12, 2010
Date of Issue : March 13, 2010



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TEST REPORT DECLARATION

Applicant : Bytecom Fanner B.V.
Address : Rondven 38, 6026PX Maarheeze The Netherlands
Manufacturer : Spire Coolers Corp.
Address : FL7/8, Building B, houhai Blvd, Dongjiaotou Industrial Park,
Shekou, Nanshan, 518067 Shenzhen, China
Product : Switching Power Supply
Models No. : EE-ATX-420W-C1-PFC, EE-ATX-420W-C1-BR, EE-ATX-500W-IR,
SP-ATX-400WT-PFC, SP-ATX-350WT-PFC, SP-ATX-380WTN-PFC,
SP-ATX-420WTN-PFC, SP-ATX-420WTB-PFC-1

Test Standards:

EN55022:2006+A1:2007;
EN61000-3-2:2006+A2:2009;
EN61000-3-3:2008;
EN55024:1998+A1:2001+A2:2003.

The device described above is tested by Shenzhen Academy of Metrology and quality Inspection to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and EUT's performance criterion. The test results are contained in this test report. Shenzhen CCE Test Electronic Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests. Also, this report shows that the EUT technically complies with the 89/336/EEC directive and its amendment 2004/108/EC directive requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen CCE Test Electronic Co., Ltd.

Tested By:

Mike Chen

Reviewed By:

Thomas Tao

Test Result :

PASS *

* The sample detailed above has been tested to the requirements of Council Directives 2004/108/EC. The test results have been reviewed against the Directives above and found to meet their essential requirement.

1. TEST SUMMARY

Test Items	Test Results
Conducted disturbance	Pass
Radiated disturbance	Pass
Harmonic current	Pass
Voltage fluctuation and flicker	Pass
Electrostatic discharge immunity	Pass
Radio-frequency electromagnetic fields	Pass
Electric fast transient burst immunity	Pass
Injected currents	Pass
Surges immunity	Pass
Voltage dips and interruptions	Pass

Remark: “N/A” means “Not applicable.”



2. TEST LABORATORY AND FACILITY INFORMATION

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC – Registration No.: 759397**
Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory (Guangdong EMC compliance testing center) has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in SMQ files. Registration 274801.
- **IC – Registration No.: IC4174**
Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory (Guangdong EMC compliance testing center) has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in SMQ files. Registration IC4174.

2.1. Test Location

All Emissions tests were performed at:-

Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory (SMQ) at Bldg. of Metrology & Quality Inspection, Longzhu Road, Nanshan District, Shenzhen, Guangdong, China

3. GENERAL INFORMATION

3.1. EUT Description

Product : Switching Power Supply

Models No. : EE-ATX-420W-C1-PFC,EE-ATX-420W-C1-BR,EE-ATX-500W-IR,
SP-ATX-400WT-PFC,SP-ATX-350WT-PFC,SP-ATX-380WTN-PFC,
SP-ATX-420WTN-PFC,SP-ATX-420WTB-PFC-1

Technical Data: : AC 220-240V,47-63Hz

Applicant : Bytecom Fanner B.V

Manufacturer : Spire Coolers Corp.

Note : All above models are identical in schematic, structure, except for different models No., dimension and shape, EMI and EMS testing were performed with EE-ATX-420W-C1-PFC only.

3.2. Block Diagram of EUT Configuration



3.3. Test Conditions

Temperature: 23-26 °C
Relative Humidity: 51-60%

3.4. Performance Criterion

Performance criterion A: The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus 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, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance criterion B: The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.



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Performance criterion C: During and after the test any change of the luminous intensity is allowed and the lamp(s) may be extinguished. After the test, within 30 min, all functions shall return to normal if necessary by temporary interruption of the mains supply and/or operating the regulating control.

Additional requirement for lighting equipment incorporating a starting device: After the test the lighting equipment is switched off.

After half an hour it is switched on again. The lighting equipment shall start and operate as intended.



4. TEST EQUIPMENT USED

List of test equipment for EMI

Equipment	Brand Name	Model	Cal. Int Months	Last Cal. Date
3m Anechoic chamber				
EMC Analyzer	Agilent	E7402A	12	2009-08
EMI Test Receiver	R&S	ESS	12	2009-08
Pre Amplifier	Anritsu	MH648A	12	2009-08
Bilog Antenna	SCHAFFNER	CBL6111C	12	2009-08
AM/FM Stereo Signal Generator	Panasonic	VP-8122A	12	2009-08
Signal Generator	R&S	SMG	12	2009-08
EMI Shielded Room				
Spectrum analyzer	ADVANTEST	R3261C	12	2009-08
EMI Test Receiver	R&S	ESPI3	12	2009-08
Pre Amplifier	Anritsu	MH648A	12	2009-08
LISN	R&S	ENV216	12	2009-08
LISN	Kyoritsu	KNW-407	12	2009-08
LISN	Kyoritsu	KNW-242C	12	2009-08
Absorbing Clamp	R&S	MDS-21	12	2009-08
Absorbing Clamp	R&S	MDS-21	12	2009-08
Absorbing Clamp	Kyoritsu	KT-20	12	-
Distortion Meter	MEGURO	MAK-6578A	12	2009-08
AM/FM Stereo Signal Generator	Panasonic	VP-8122A	12	2009-08
Oscilloscope	LEADER	LS1020	12	2009-08
Function Generator	National	VP-7422A	12	2009-08
Signal Generator	R&S	SMG	12	2009-08
3D loop antenna(2m)	Schwarz beck	HXYZ9710	12	2009-08
Harmonic & Flicker Test				
Signal Conditioning Unit	SCHAFFNER	CCN1000-1	12	2009-08
Signal Phase Impedance Network	SCHAFFNER	INA2152		
5KVA AC Power Source	SCHAFFNER	NSG1007		

**List of test equipment for EMS**

Equipment	Brand Name	Model	Cal. Int Months	Last Cal. Date
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3m Anechoic chamber

Power Reflection Meter	R&S	NAP	12	2009-08
RF Power Amplifier	TOYO	AS300SSS	12	2009-08
Distortion Meter	HM-250	KNEWOOD	12	2009-08
Synthesized Function Generator	FC110	YOKOGAWA	12	2009-08
Noise Meter	MEGURO	MN-446A	12	2009-08
AM/FM Stereo Signal Generator	Panasonic	VP-8122A	12	2009-08
Oscilloscope	LEADER	LS1020	12	2009-08
Function Generator	National	VP-7422A	12	2009-08
Signal Generator	R&S	SMG	12	2009-08

TEST Room

Fast Transient Burst Generator	SCHAFFENR	NSG3025	12	2009-08
AC Power Supply	KIKUSUI	PCR2000L	12	2009-08
Electrostatic Discharge Simulator	Noiseken	ESS-200AX	12	2009-08
AM/FM Stereo Signal Generator	Panasonic	VP-8122A	12	2009-08
Function Generator	National	VP-7422A	12	2009-08
AC Power Supply	KIKUSUI	PCR4000L	12	2009-08
Simulator	EMTEST	UCS500M4	12	2009-08
CW sine Generator	EMTEST	CWS500	12	2009-08
CDN	EMTEST	CDN-M2	12	2009-08
EMC PRO	EMTEST	UCS500M4	12	2009-08

5. CONDUCTED DISTURBANCE TEST

5.1. Test Standard and Limit

5.1.1. Test standard

EN55022:2006+A1:2007

5.1.2. Limits of disturbance voltage at the mains terminal

Frequency	Maximum RF Line Voltage (dB μ V)	
	Quasi-peak Level	Average Level
150kHz to 0.5MHz	66 to 56 *	56 to 46 *
0.5MHz to 5MHz	56	46
5MHz to 30MHz	60	50

* Decreasing linearly with logarithm of the frequency

5.2. Test Procedure

The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI test receiver is used to test the emissions form both sides of AC line. The bandwidth of EMI test receiver is set at 9 kHz.

5.3. Test Arrangement

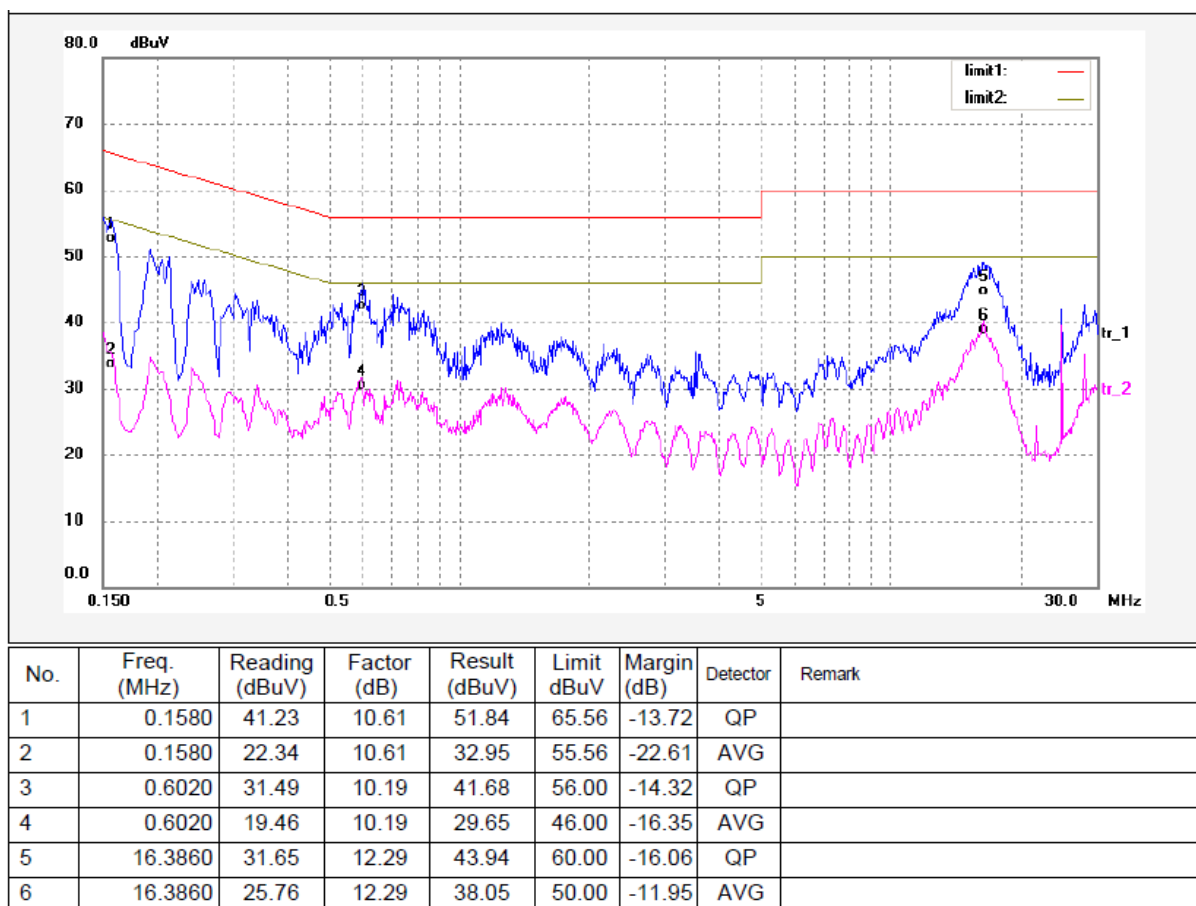
The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

5.4. Test Data

Refer to see the following pages.

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Live Line:

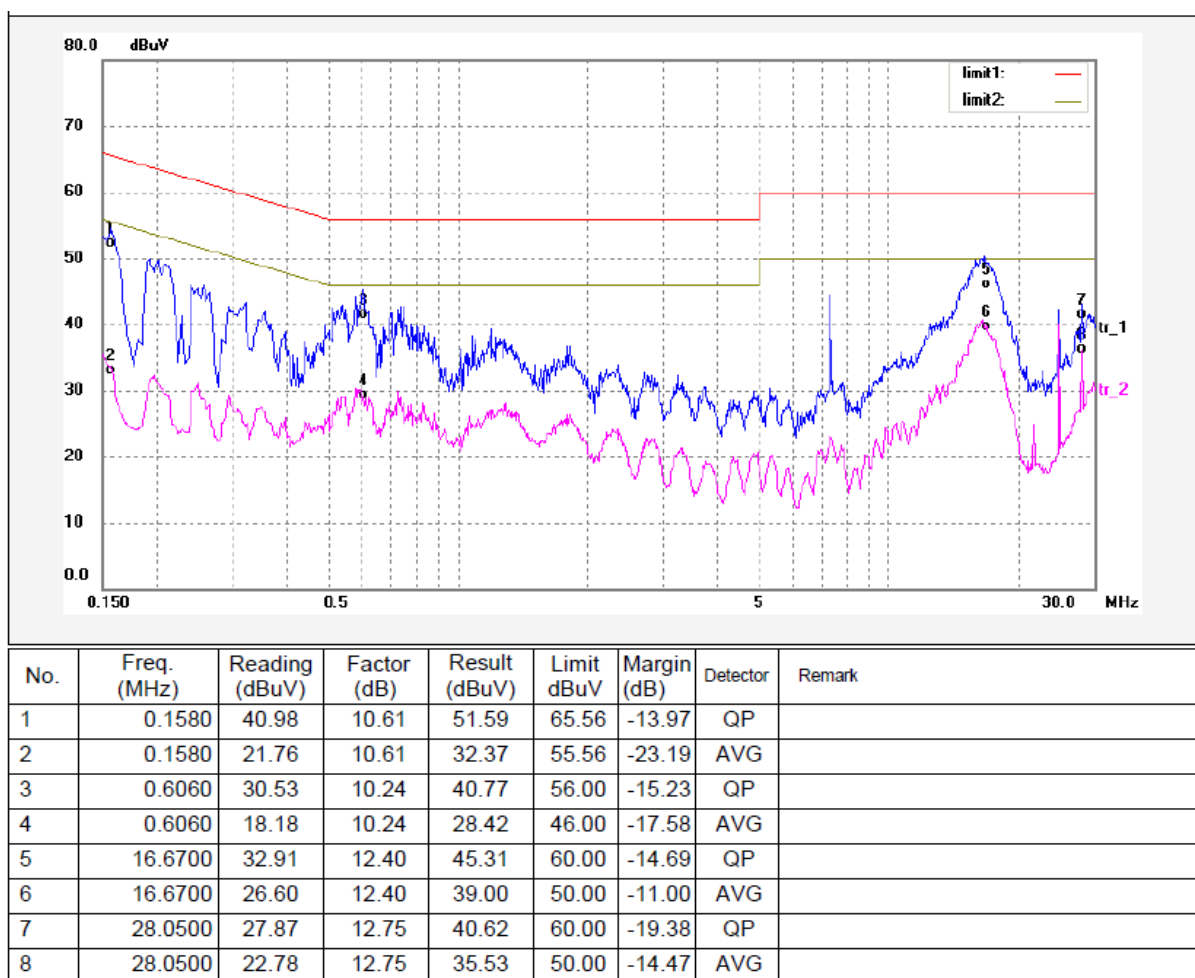


Neutral Line:

Shenzhen CCE Test Electronic Co., Ltd.

Rm. 703, Baijin Building, Baomin 1st Road, Bao'an District, Shenzhen, China

Tel:0755-61159795 FAX:0755-86114052 Website:www.ccetest.com



6. RADIATED DISTURBANCE TEST

6.1. Test Standard and Limit

6.1.1. Test standard

EN55022:2006+A1:2007

6.1.2. Limits of radiated disturbances at 3 m distance

Frequency	Limit (dB μ V/m)
	Quasi-peak Level
30MHz to 230MHz	40
230MHz to 1000MHz	47

* The lower limit shall apply at the transition frequency.

* The test distance is 3m.

6.2. Test Procedure

The EUT is placed on a turntable, which is 0.8 meter above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test.

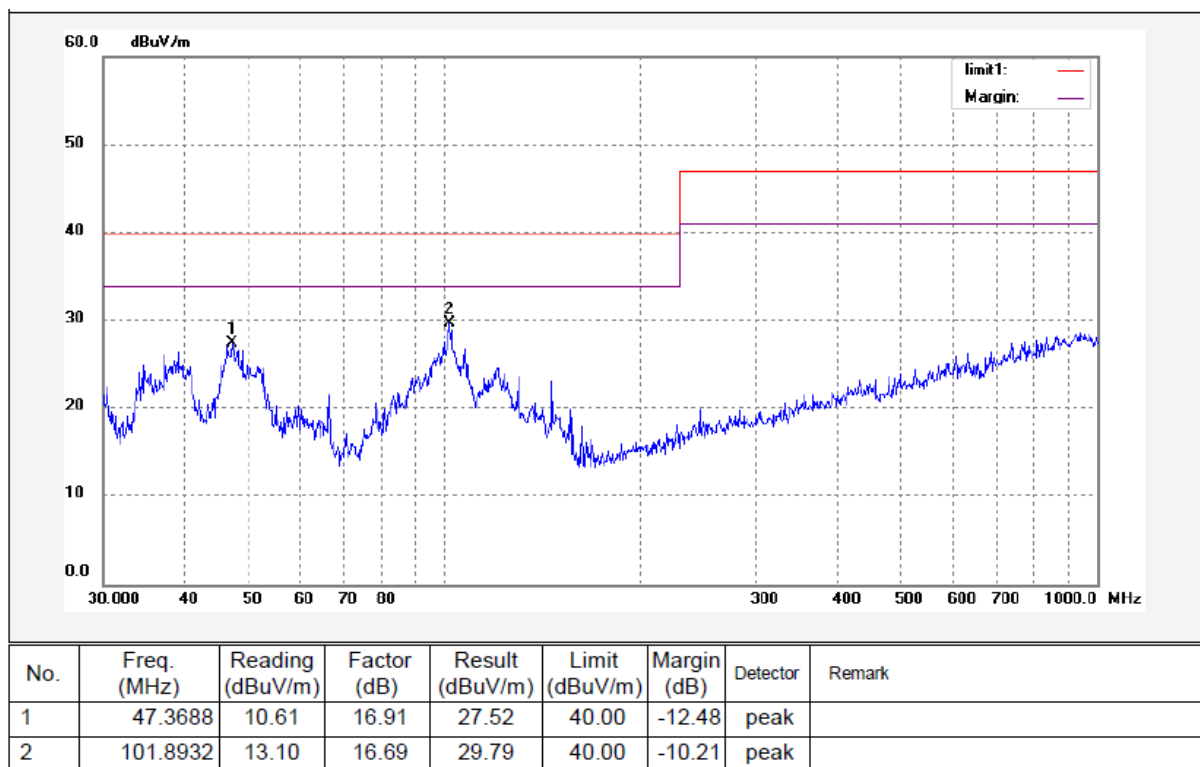
6.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

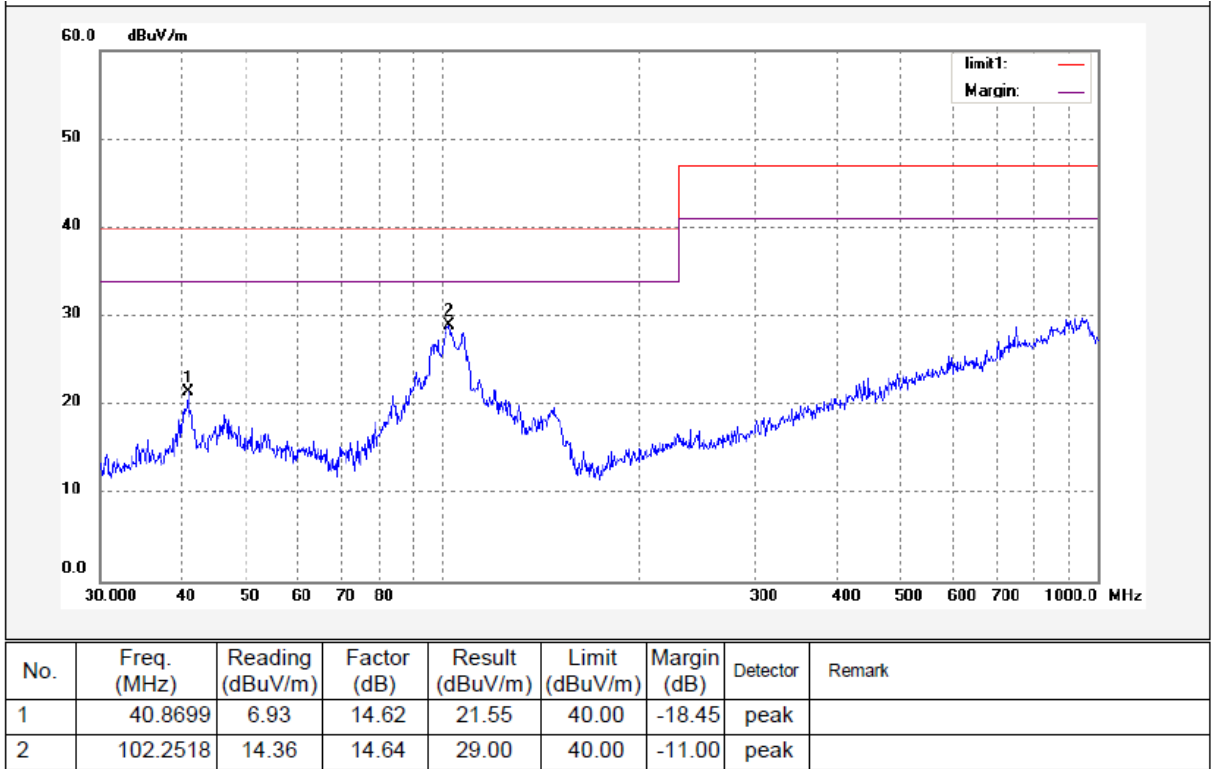
6.4. Test Data

Refer to see the following pages.

Horizontal:



Vertical:



7. HARMONIC CURRENT EMISSION TEST

7.1. Test Standard and Limit

7.1.1. Test standard

EN61000-3-2:2006+A2:2009

7.1.2. Limit of harmonic current test limit (Class A)

Harmonic order n	Maximum permissible harmonic current A
Odd harmonics	
3	2,30
5	1,14
7	0,77
9	0,40
11	0,33
13	0,21
$15 \leq n \leq 39$	$0,15 \frac{15}{n}$
Even harmonics	
2	1,08
4	0,43
6	0,30
$8 \leq n \leq 40$	$0,23 \frac{8}{n}$

7.2. Test Procedure

Connected the power cord to the test equipment power output port, Turn on the power of the EUT and let the EUT work in the test mode.

7.3. Test Data

Refer to see the following pages.

Average harmonic current results

Hn	I _{eff} [A]	I _{eff} [%]	Limit [A]	Result
1	1.119	100.000		
2	761.419E-6	0.068	1.08	PASS
3	47.133E-3	4.211	2.30	PASS
4	3.141E-3	0.281	430.00E-3	PASS
5	27.210E-3	2.431	1.14	PASS
6	1.009E-3	0.090	300.00E-3	PASS
7	19.051E-3	1.702	770.00E-3	PASS
8	773.890E-6	0.069	230.00E-3	PASS
9	14.222E-3	1.271	400.00E-3	PASS
10	875.556E-6	0.078	184.00E-3	PASS
11	10.804E-3	0.965	330.00E-3	PASS
12	871.598E-6	0.078	153.33E-3	PASS
13	8.540E-3	0.763	210.00E-3	PASS
14	765.103E-6	0.068	131.43E-3	PASS
15	6.986E-3	0.624	150.00E-3	PASS
16	750.439E-6	0.067	115.00E-3	PASS
17	5.658E-3	0.506	132.35E-3	PASS
18	892.606E-6	0.080	102.22E-3	PASS
19	4.302E-3	0.384	118.42E-3	PASS
20	785.211E-6	0.070	92.00E-3	PASS
21	3.469E-3	0.310	160.71E-3	PASS
22	1.167E-3	0.104	83.64E-3	PASS
23	2.901E-3	0.259	146.74E-3	PASS
24	1.214E-3	0.108	76.66E-3	PASS
25	2.124E-3	0.190	135.00E-3	PASS
26	1.342E-3	0.120	70.77E-3	PASS
27	1.690E-3	0.151	124.99E-3	PASS
28	1.166E-3	0.104	65.71E-3	PASS
29	1.298E-3	0.116	116.39E-3	PASS
30	1.271E-3	0.114	61.33E-3	PASS
31	1.259E-3	0.112	108.87E-3	PASS
32	1.141E-3	0.102	57.50E-3	PASS
33	903.276E-6	0.081	102.27E-3	PASS
34	1.047E-3	0.094	54.12E-3	PASS
35	952.084E-6	0.085	96.44E-3	PASS
36	794.648E-6	0.071	51.11E-3	PASS
37	840.862E-6	0.075	91.21E-3	PASS
38	752.926E-6	0.067	48.42E-3	PASS
39	1.041E-3	0.093	86.53E-3	PASS
40	757.125E-6	0.068	46.00E-3	PASS

Maximum harmonic current results

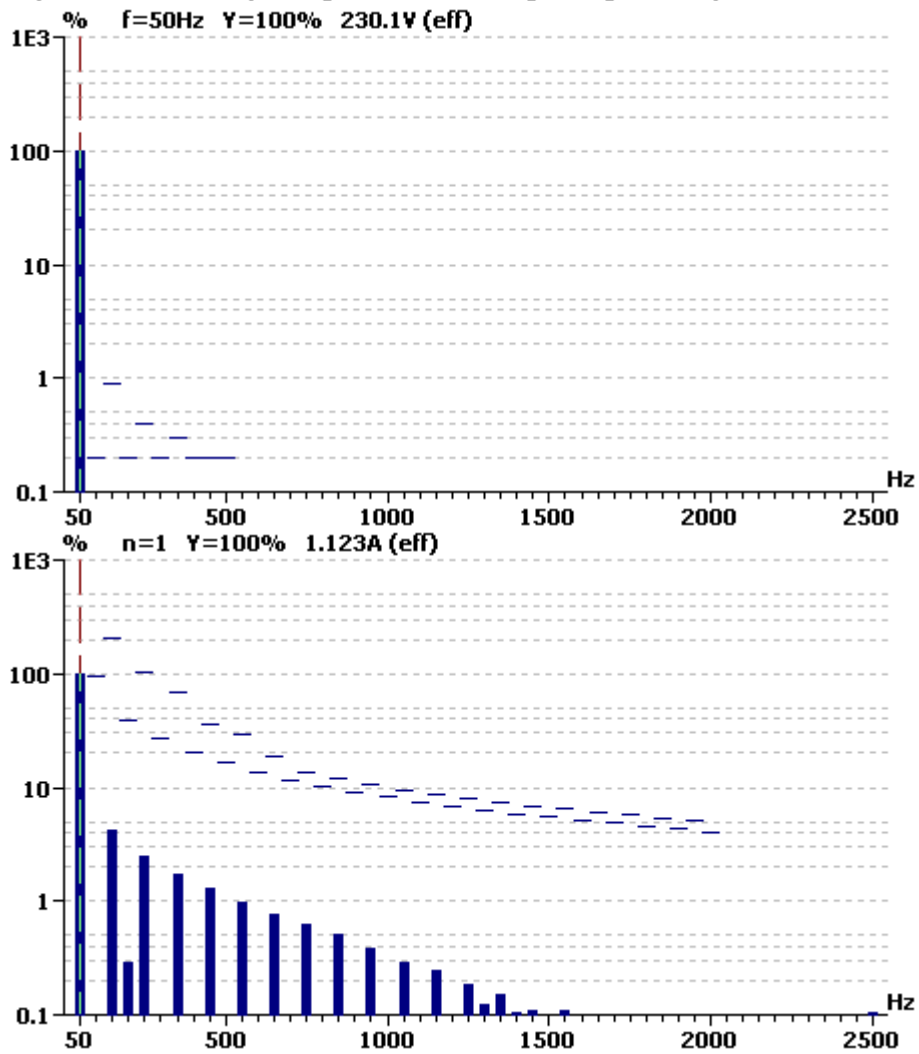
Hn	I _{eff} [A]	I _{eff} [%]	Limit [A]	Result
1	1.124	100.000		
2	842.462E-6	0.075	1.62	PASS
3	47.982E-3	4.270	3.45	PASS
4	3.404E-3	0.303	645.00E-3	PASS
5	27.775E-3	2.471	1.71	PASS
6	1.600E-3	0.142	450.00E-3	PASS
7	19.392E-3	1.725	1.15	PASS
8	976.051E-6	0.087	345.00E-3	PASS
9	14.477E-3	1.288	600.00E-3	PASS
10	1.467E-3	0.131	276.00E-3	PASS
11	11.066E-3	0.985	495.00E-3	PASS
12	1.534E-3	0.136	229.99E-3	PASS
13	8.770E-3	0.780	315.00E-3	PASS
14	860.468E-6	0.077	197.15E-3	PASS
15	7.127E-3	0.634	225.00E-3	PASS
16	888.228E-6	0.079	172.50E-3	PASS
17	5.778E-3	0.514	198.52E-3	PASS
18	1.058E-3	0.094	153.33E-3	PASS
19	4.440E-3	0.395	177.63E-3	PASS
20	915.449E-6	0.081	138.00E-3	PASS
21	4.018E-3	0.358	160.71E-3	PASS
22	1.367E-3	0.122	125.46E-3	PASS
23	3.471E-3	0.309	146.74E-3	PASS
24	1.762E-3	0.157	114.99E-3	PASS
25	2.227E-3	0.198	135.00E-3	PASS
26	2.384E-3	0.212	106.16E-3	PASS
27	1.815E-3	0.162	124.99E-3	PASS
28	2.274E-3	0.202	98.57E-3	PASS
29	1.567E-3	0.139	116.39E-3	PASS
30	1.739E-3	0.155	92.00E-3	PASS
31	1.391E-3	0.124	108.87E-3	PASS
32	1.629E-3	0.145	86.25E-3	PASS
33	1.024E-3	0.091	102.27E-3	PASS
34	1.629E-3	0.145	81.18E-3	PASS
35	1.040E-3	0.093	96.44E-3	PASS
36	945.241E-6	0.084	76.66E-3	PASS
37	1.139E-3	0.101	91.21E-3	PASS
38	871.375E-6	0.078	72.63E-3	PASS
39	1.282E-3	0.114	86.53E-3	PASS
40	843.024E-6	0.075	69.00E-3	PASS

Maximum harmonic voltage results

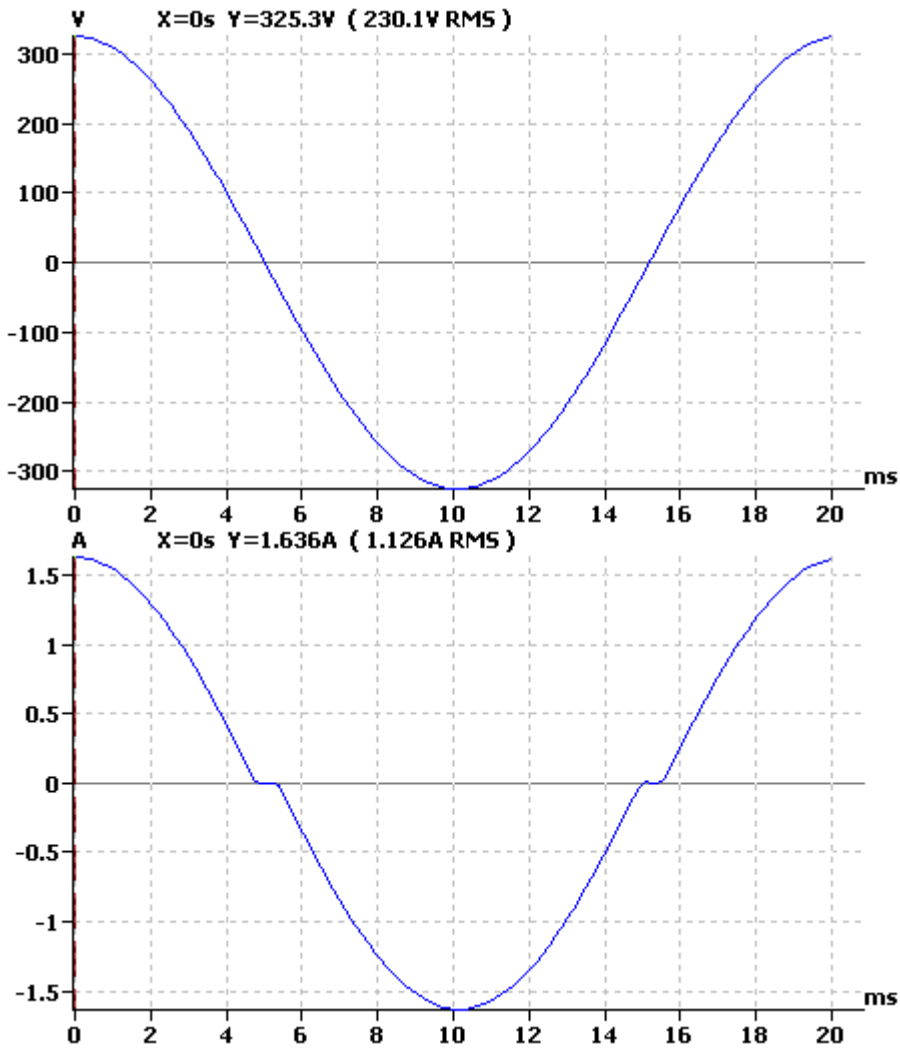
Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	230.13	100.055		
2	83.13E-3	0.036	0.2	PASS
3	106.94E-3	0.046	0.9	PASS
4	15.01E-3	0.007	0.2	PASS
5	42.48E-3	0.018	0.4	PASS
6	10.66E-3	0.005	0.2	PASS
7	35.74E-3	0.016	0.3	PASS
8	9.10E-3	0.004	0.2	PASS
9	70.30E-3	0.031	0.2	PASS
10	17.18E-3	0.007	0.2	PASS
11	35.88E-3	0.016	0.1	PASS
12	16.79E-3	0.007	0.1	PASS
13	48.88E-3	0.021	0.1	PASS
14	7.33E-3	0.003	0.1	PASS
15	72.76E-3	0.032	0.1	PASS
16	13.43E-3	0.006	0.1	PASS
17	44.21E-3	0.019	0.1	PASS
18	12.16E-3	0.005	0.1	PASS
19	42.89E-3	0.019	0.1	PASS
20	14.31E-3	0.006	0.1	PASS
21	72.38E-3	0.031	0.1	PASS
22	14.61E-3	0.006	0.1	PASS
23	47.22E-3	0.021	0.1	PASS
24	10.75E-3	0.005	0.1	PASS
25	44.28E-3	0.019	0.1	PASS
26	9.30E-3	0.004	0.1	PASS
27	63.12E-3	0.027	0.1	PASS
28	9.33E-3	0.004	0.1	PASS
29	46.36E-3	0.020	0.1	PASS
30	8.45E-3	0.004	0.1	PASS
31	33.25E-3	0.014	0.1	PASS
32	7.82E-3	0.003	0.1	PASS
33	49.98E-3	0.022	0.1	PASS
34	6.84E-3	0.003	0.1	PASS
35	33.43E-3	0.015	0.1	PASS
36	8.57E-3	0.004	0.1	PASS
37	36.19E-3	0.016	0.1	PASS
38	9.66E-3	0.004	0.1	PASS
39	46.38E-3	0.020	0.1	PASS
40	9.17E-3	0.004	0.1	PASS

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No partial calculation (average odd harmonics [21..39] < 100%)



Reference No.: CT10031986-S-E



8. VOLTAGE FLUCTUATION AND FLICKER TEST

8.1. Test Standard and Limit

8.1.1. Test standard

EN61000-3-3:2008

8.1.2. Limit of flicker test

Test items	Limits
Pst	1.0
dc	3.3%
dmax	4.0%
dt	Not exceed 3.3% for 500ms

8.2. Test Procedure

Connected the power cord to the test equipment power output port, Turn on the power of the EUT and let the EUT work in the test mode.

8.3. Test Data

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.004	3.30	PASS
dmax [%]	0.207	4.00	PASS
dt [s]	0.000	0.50	PASS

9. ELECTROSTATIC DISCHARGE IMMUNITY

9.1. Test Requirements

9.1.1. Test standard

EN55024:1998+A2:2003

9.1.2. Test level for ESD

Port	Test Specification
Enclosure Port	$\pm 8\text{kV}$ air discharge $\pm 4\text{kV}$ contact discharge

9.1.3. Performance criterion: **B**

9.2. Test Procedure

9.2.1. Contact discharge:

The ESD generator is held perpendicular to the surface to which the discharge is applied and the tips of the discharge electrode touch the surface of EUT. Then turn the discharge switch. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

9.2.2. Air discharge:

Air discharge is used where contact discharge can't be applied. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

9.2.3. Indirect discharge for coupling plane

At least 10 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. At least 10 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.



Reference No.: CT10031986-S-E

9.3. Test Data

Immunity	ESD Electrostatic Discharge			☒ EN 61000-4-2
Criterion:	B			Total: PASS
EUT	Switching Power Supply(EE-ATX-420W-C1-PFC)			
Ambient:	25°C	53% RH	1011mbar	
Test Site:				
Air Discharge:	± 8 kV	10 Discharges per test		
Contact/Indirect	± 4 kV	10 Discharges per test		
Operation Mode:	Working.			
Location		Kind Air Cont.	Result	
All Exposed Surface & Seams		Air	PASS	
All metallic part		Cont.	PASS	
HCP		Cont.	PASS	
VCP		Cont.	PASS	
Note: Minimum 10 times at each test point				

10. RADIO-FREQUENCY ELECTROMAGNETIC FIELDS

10.1. Test Requirements

10.1.1. Test standard

EN55024:1998+A2:2003

10.1.2. Test level for Radio-frequency electromagnetic fields

Port	Test Specification
Enclosure Port	80-1000MHz 3 V/m(unmodulated) 1kHz ,80 % AM, sine wave

10.1.3. Performance criterion: A

10.2. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on Test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor EUT work states.



Reference No.: CT10031986-S-E

10.3.Test Data

Immunity Enclosure				RS Radiated Susceptibility				☒ EN 61000-4-3					
Criterion:				A				Total: PASS					
EUT				Switching Power Supply(EE-ATX-420W-C1-PFC)									
Ambient:				26°C		52% RH		1009mbar					
Operation Mode:				Working.									
		Electromagnetic Field				Key Carrier				Magnetic Field			
Freq. Range:		80-1000MHz				Frequency:				Frequency:		50/60Hz	
Field Strength:		3 V/m				Field Strength:		V/m		Field Strength:		A/m	
		Modulation						Modulation:					
none		AM		Pulse									
☐		☒		☐		80		1		Pulse: 50%		Repetition time: 200Hz	
Steps		1%				#		/		#		/	
Front		Vertical		PASS		Front		Horizontal		PASS			
Left		Vertical		PASS		Left		Horizontal		PASS			
Back		Vertical		PASS		Back		Horizontal		PASS			
Right		Vertical		PASS		Right		Horizontal		PASS			
Comments:													

11. ELECTRICAL FAST TRANSIENTS/BURSTS

11.1. Test Requirements

11.1.1. Test standard

EN55024:1998+A2:2003

11.1.2. Test level for EFT

Port	Test Specification
AC Power input	1kV (peak) 5/50 ns(Rise time/hold time) 5kHz (repetition frequency)

11.1.3. Performance criterion : B

11.2. Test Procedure

11.2.1. For AC mains power ports:

The EUT is connected to the power mains by using a coupling device, which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 1 minute.

11.3. Test Data

Immunity	EFT(Fast Transient / Burst)			☒ EN 61000-4-4		
Criterion:	B			Total: PASS		
EUT:	Switching Power Supply(EE-ATX-420W-C1-PFC)					
Ambient:	24°C	52% RH	1012mbar			
Operation Mode:	Working.					
Line:	☒ AC Mains	☐ DC Supply	☐ Signal:			
Coupling:	☒ Direct	☐ Capacitive Clamp				
Conductor	Voltage	+	-	Voltage	+	-
L	1kV	PASS	PASS	0.5kV	N/A	N/A
N	1kV	PASS	PASS	0.5kV	N/A	N/A
PE	1kV	PASS	PASS	0.5kV	N/A	N/A
L,PE	1kV	PASS	PASS	0.5kV	N/A	N/A
N,PE	1kV	PASS	PASS	0.5kV	N/A	N/A
L,N	1kV	PASS	PASS	0.5kV	N/A	N/A



12. SURGES

12.1. Test Requirements

12.1.1. Test standard

EN55024:1998+A2:2003

12.1.2. Test level for surges

Port	Test Specification
AC Mains	1.2/50(8/20) μ s Tr/Th 1KV L-N and 2KV Line-PE

12.1.3. Performance criterion: C

12.2. Test Procedure

Set up the EUT and test generator as shown above. A coupling device is used to couple the surge signal to the EUT. Five positive and five negative pulses is applicable and the duration of the test is 1 minutes.



Reference No.: CT10031986-S-E

12.3.Test Data

Immunity	Surges				☒ EN 61000-4-5						
Criterion:	C				Total: PASS						
EUT:	Switching Power Supply(EE-ATX-420W-C1-PFC)										
Repetition:	5 times per test		Interval:		60 sec.						
Ambient:	24°C		52% RH		1012mbar						
Operation Mode:	Working.										
Line:	☒ AC Mains ☐ DC Supply ☐ Signal:										
	Volt:	500V		1kV		2kV		3kV		4kV	
Conductor	Phase	+	-	+	-	+	-	+	-	+	-
L – PE	0°	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐
	90°	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐
	180°	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐
	270°	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐
N – PE	0°	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐
	90°	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐
	180°	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐
	270°	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐
L – N	0°	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐
	90°	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐
	180°	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐
	270°	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐



13. INJECTED CURRENTS

13.1. Test Requirements

13.1.1. Test standard

EN55024:1998+A2:2003

13.1.2. Test level for injected currents

Characteristics	Test levels
Frequency range	0.15 MHz to 80 MHz
Test level	3V r.m.s.(unmodulated)
Modulation	1 kHz, 80%AM,Sine wave
Source impedance	150

13.1.3. Performance criterion: **A**

13.2. Test Procedure

Set up the EUT, CDN and test generators as shown above. The test is performed with the generator contacted to each CDN in turn. The frequency range is swept form 150kHz to 80MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.

13.3. Test Data

Immunity	Injected Currents			☒ EN 61000-4-6
Voltage level	3 V	Criterion:	A	Total: PASS
EUT:	Switching Power Supply(EE-ATX-420W-C1-PFC)			
Frequency Range:	150kHz to 80 MHz			
Modulation:	☐ none	☒ AM	☐ Pulse	1 kHz, 80%
Ambient:	24°C,	52% RH,	1012mbar	
Operation Mode:	Working.			
Line:	☒ AC Mains ☐ DC Supply ☐ Signal:			
Step Size:	1%			
Coupling:	☐ Cable Shielding, Grounding: ☐ 2 Sides ☐ 1 Side (+ 10nF)			
	☒ CDN			
Frequency	Note			

14. VOLTAGE DIPS AND INTERRUPTIONS

14.1. Test Requirements

14.1.1. Test standard

EN55024:1998+A2:2003

14.1.2. Test level for voltage dips and interruptions

Port	Test Level %UT	Voltage reduction %	Duration (In Period)
AC Mains	0	$\geq 95\%$	0.5
	0	$\geq 95\%$	250
	70	30	25

14.1.3. Performance criterion: **B&C**

14.2. Test Procedure

Set up the EUT and test generator as shown above. The EUT is tested for each selected combination of test level and duration with a sequence of three dips/interruptions with intervals of 10s minimum.

14.3. Test Data

Immunity	Voltage dips, short interruptions and voltage variations			☒ EN61000-4-11		
Criterion:	B&C			Total: PASS		
EUT:	Switching Power Supply(EE-ATX-420W-C1-PFC)					
Ambient:	24°C	52% RH	1012mbar			
Operation Mode:	Working.					
Voltage dips and short interruptions						
	Test level % UN	Voltage dip and short interruptions % UT	Duration (in period/time)	Result		Observations (Performance Criterion)
				Pass	Fail	
☒	100	>95	0.5	☒	☐	
☒	100	>95	250	☒	☐	
☒	70	30	25	☒	☐	
Note:						



Reference No.: CT10031986-S-E

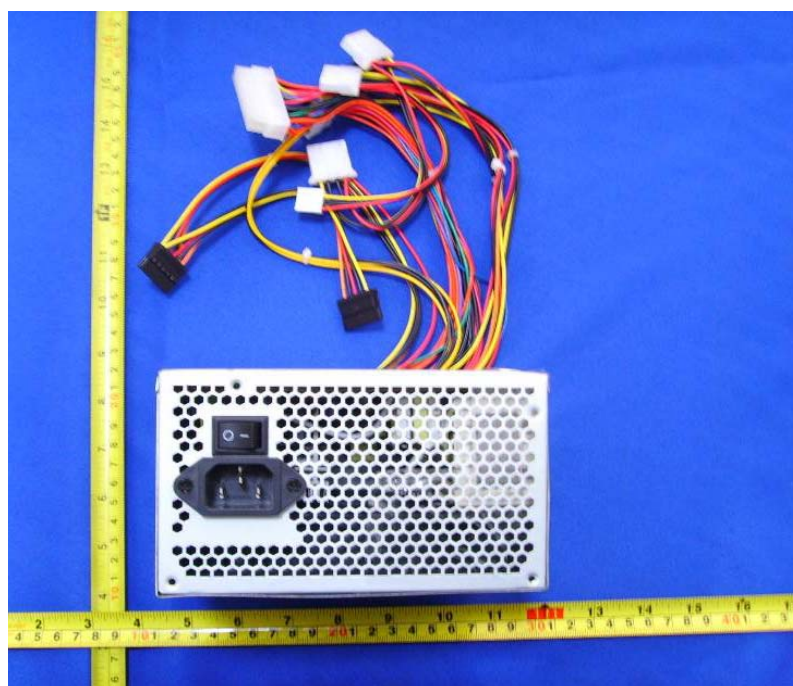
APPENDIX: EUT PHOTOGRAPHS AND TEST PICTURES

Reference No.: CT10031986-S-E

Photo 1 Appearance View of EUT



Photo 2 Appearance View of EUT



Reference No.: CT10031986-S-E

Photo 3 Open View of EUT

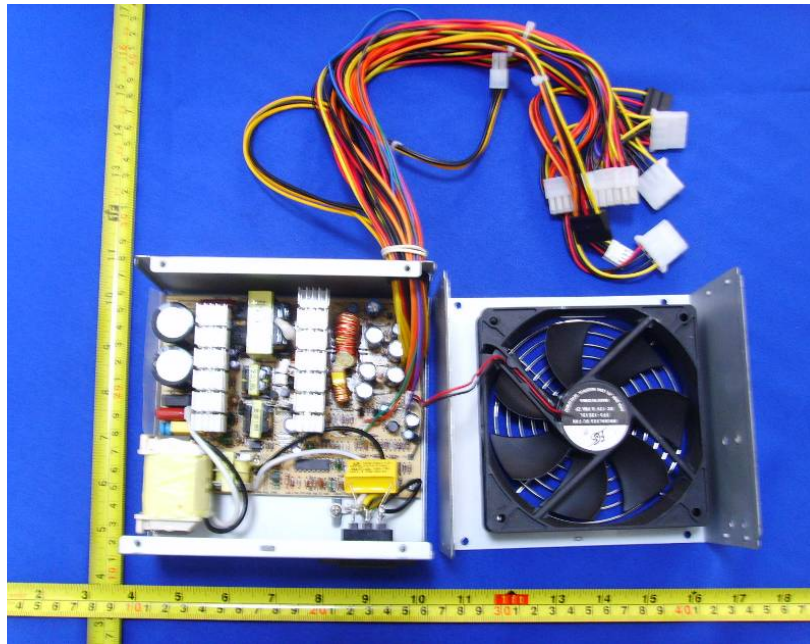
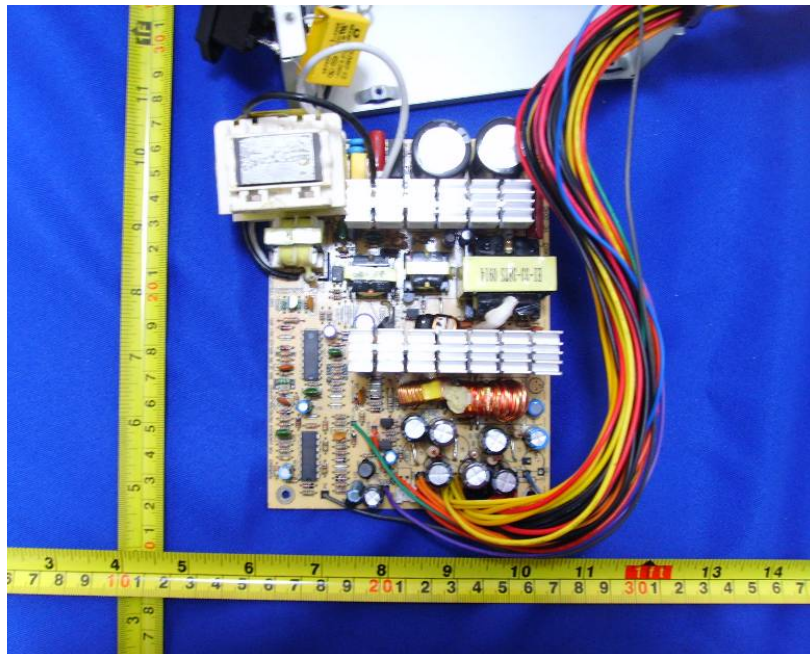
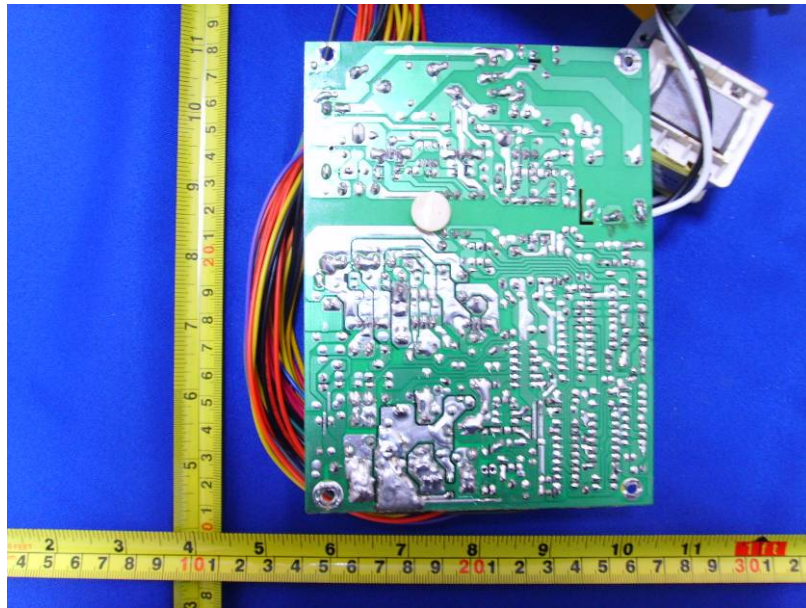


Photo 4 Front View of PCB



Reference No.: CT10031986-S-E

Photo 5 Rear View of PCB



Reference No.: CT10031986-S-E

Photo 6 Conducted Disturbance Test



Photo 7 Radiated Disturbance Test

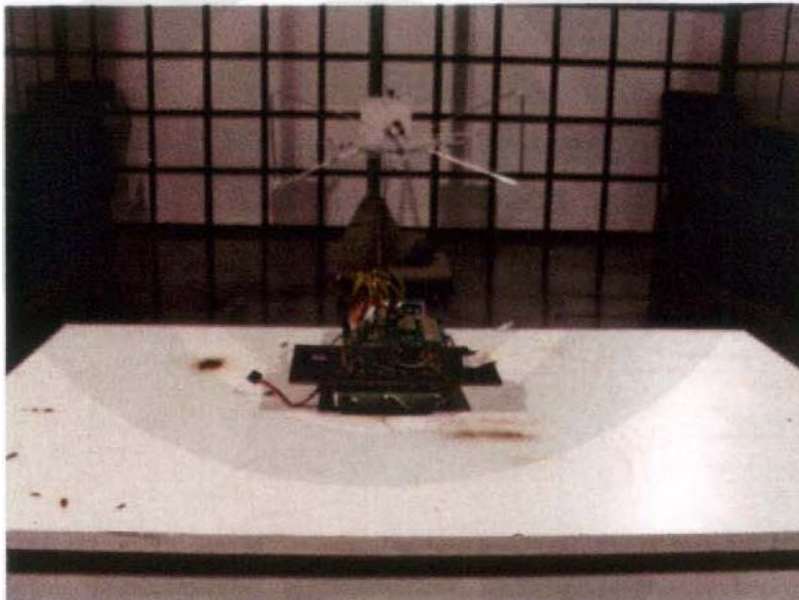


Photo 8 Harmonic Current /Voltage Fluctuation and Flicker

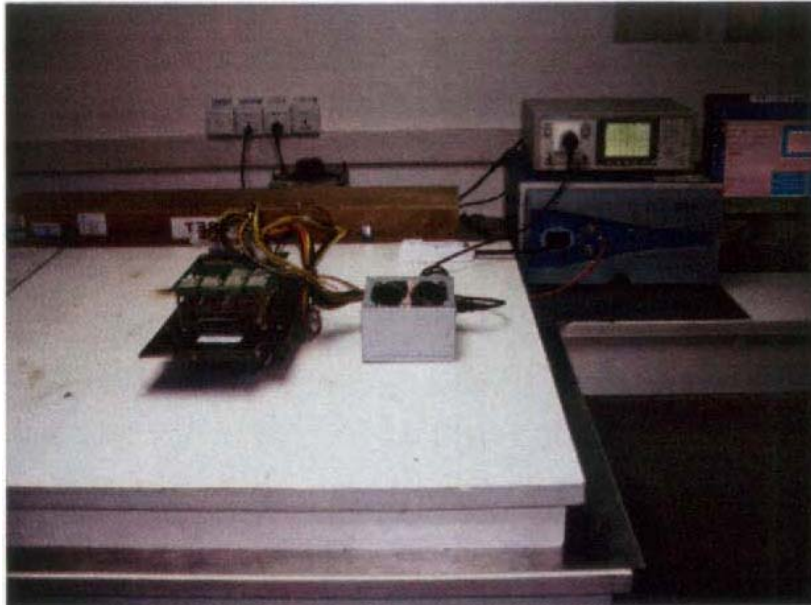


Photo 9 ESD Immunity Test



Reference No.: CT10031986-S-E

Photo 10 EFT, Surges and Dips Immunity Test



Photo 11 Radio-Frequency Electromagnetic Fields Test

