

# EMC Test Report

For  
Yalong Trade s.r.o.  
Stimlight  
Model No.: BP-016

Prepared For : Yalong Trade s.r.o.  
Address : M.Bodickeho 1517/14 05001 Revúca, Slovakia

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# TEST REPORT

Applicant : Yalong Trade s.r.o.  
Manufacturer : Shenzhen Perfect Idea Tech. Co., Ltd.  
Product Name : Stimlight  
Model No. : BP-016  
Trade Mark : Stimlight™  
Rating(s) : Adapter:  
Input: AC100-240V, 50/60Hz, 0.2A Max  
Output: DC15V, 0.4A  
Product: DC15V, 5W

**Test Standard(s) : EN 55014-1: 2017;  
EN 61000-3-2: 2014;  
EN 61000-3-3: 2013;  
EN 55014-2: 2015  
(IEC 61000-4-2; IEC 61000-4-4; IEC 61000-4-5; IEC 61000-4-6; IEC 61000-4-11)**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited To determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. This report shows the EUT to be technically compliant with the EN 55014-1, EN 61000-3-2, EN 61000-3-3 and EN 55014-2 requirements. The test results are contained in this report and Shenzhen Anbotek Compliance Laboratory Limited Is assumed full responsibility for the accuracy and completeness of these tests.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited

Date of Test: Jan. 10~17, 2019

Prepared By:



*Alice Yu*

(Engineer / Alice Yu)

Reviewer:

*Well Wang*

(Supervisor / Well Wang)

Approved & Authorized Signer:

*Sally Zhang*

(Manager / Sally Zhang)

## 1. General Information

### 1.1. Client Information

Applicant	:	Yalong Trade s.r.o.
Address	:	M.Bodickeho 1517/14 05001 Revúca, Slovakia
Manufacturer	:	Shenzhen Perfect Idea Tech. Co., Ltd.
Address	:	Floor 4th, Building, FuHua Ind. Zone, Tangwei, Fu Yong Town, Bao'an, Shenzhen, China
Factory	:	Shenzhen Perfect Idea Tech. Co., Ltd.
Address	:	Floor 4th, Building, FuHua Ind. Zone, Tangwei, Fu Yong Town, Bao'an, Shenzhen, China

### 1.2. Description of Device (EUT)

Product Name	:	Stimlight
Model No.	:	BP-016
Trade Mark	:	Stimlight™
Test Power Supply	:	DC 15V via adapter AC 230V, 50Hz/ DC 15V via adapter AC 120V, 50Hz
Test Sample No.	:	S1
Product Description	:	Adapter: Input: AC100-240V, 50/60Hz, 0.2A Max Output: DC15V, 0.4A
<b>Remark:</b> (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.		

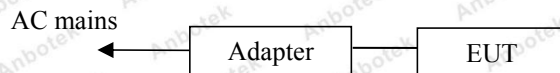
### 1.3. Auxiliary Equipment Used During Test

N/A	
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### 1.4. Description of Test Mode

Pretest Mode	Description
Mode 1	On

For Mode 1 Block Diagram of Test Setup



### 1.5. Test Summary

Test Items	Test Mode	Status
Power Line Conducted Emission Test (150kHz To 30MHz)	Mode 1	P
Disturbance Power Test (30MHz To 300MHz)	Mode 1	P
Radiated Emission Test (30MHz To 1000MHz)	/	N
Harmonic Current Test	/	N
Voltage Fluctuations and Flicker Test	Mode 1	P
Electrostatic Discharge immunity Test	Mode 1	P
RF Field Strength susceptibility Test	/	N
Electrical Fast Transient/Burst Immunity Test	Mode 1	P
Surge Immunity Test	Mode 1	P
Injected Currents Susceptibility Test	Mode 1	P
Voltage Dips and Interruptions Test	Mode 1	P
P) Indicates "PASS".		
N) Indicates "Not applicable".		

Note: The EUT is Category II Products, No Requirement for R/S Testing

## 1.6. Test Equipment List

### Conducted Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Nov. 26, 2018	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Nov. 05, 2018	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov. 05, 2018	1 Year
4.	Software Name EZ-EMC	Ferrari Technology	ANB-03A	N/A	N/A	N/A

### Power Clamp Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Absorbing Clamp	FCC	F-201-23MM	08166	Nov. 26, 2018	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Nov. 05, 2018	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov. 05, 2018	1 Year
4.	Software Name EZ-EMC	Ferrari Technology	ANB-03A	N/A	N/A	N/A

### Harmonic and Flicker Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Programmable AC Power source	IVYTECH	APS-5005A	632734	Jun. 15, 2018	1 Year
2.	Harmonic and Flicker Analyzer	EMC-PARTNER	HMONICS 1000-1P	164	Nov. 26, 2018	1 Year
3.	Harmonics-1000	N/A	Ed.3.0+4.0	N.A	N/A	N/A

### Electrostatic Discharge Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Simulators	3Ctest	EDS-30T	ES0131505	Nov. 26, 2018	1 Year

### Electrical Fast Transient/Burst Immunity Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.1	EFT Burst Simulator	PRIMA	EFT61004B	PR10114282	Nov. 05, 2018	1 Year
1.2	EFT-Clamp	PRIMA	EFT-Clamp	/	Nov. 05, 2018	1 Year
2.1	EFT Burst Simulator	TESEQ	NSG 3060	1480	Nov. 05, 2018	1 Year
2.2	CDN	TESEQ	CDN 3061	1408	Nov. 05, 2018	1 Year

### Surge Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.1	6kV Surge Generator	TESEQ	NSG 3060	1480	Nov. 05, 2018	1 Year
1.2	CDN	TESEQ	CDN 3061	1408	Nov. 05, 2018	1 Year
2.1	6kV Surge Generator	EMPEK	LSG-5060G	06010017N	Nov. 05, 2018	1 Year
2.2	CDN	EMPEK	CDN-5110G	061100005N	Nov. 05, 2018	1 Year

**Injected Currents Susceptibility Measurement**

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	C/S Conducted Immunity Test System	FRANKONIA	CIT-10	126A1196/2012	Nov. 26, 2018	1 Year
2.	CDN	FRANKONIA	CDN - M2+ M3	A2210178/2012	Nov. 26, 2018	1 Year
3.	6dB Attenuator	FRANKONIA	DAM 26W	1172202	Nov. 05, 2018	1 Year
4.	CIT-10	FRANKONIA	Version1.1.7	N/A	N.A	N/A

**Voltage Dips and Interruptions Measurement**

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	CYCLE SAG Simulator	PRIMA	DRP61011AG	PR12046234	Nov. 05, 2018	1 Year

**1.7. Description of Test Facility**

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

**FCC-Registration No.: 184111**

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory 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 our files. Registration No. 184111, July 31, 2017.

**ISED-Registration No.: 8058A-1**

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A-1, June 13, 2016.

**Test Location**

Shenzhen Anbotek Compliance Laboratory Limited.  
1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102



### 1.8. EMS Performance Criteria

- √ A: Normal performance within the specification limits
- √ B: Temporary degradation or loss of function or performance which is self-recoverable
- √ C: Temporary degradation or loss of function or performance which requires operator intervention or system reset
- √ D: Degradation or loss of function which is not recoverable due to damage of equipment (components) or software, or loss of data

Note: The manufacturer's specification may define effects on the EUT which may be considered insignificant, and therefore acceptable.

This classification may be used as a guide in formulating performance criteria, by committees responsible for generic, product and product-family standards, or as a framework for the agreement on performance criteria between the manufacturer and the purchaser, for example where no suitable generic, product or product-family standard exists.

## 2. Power Line Conducted Emission Test

### 2.1. Test Standard and Limit

Test Standard	EN 55014-1
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Limits for conducted emissions

Test Limit	Frequency (MHz)	At mains terminals (dB $\mu$ V)	
		Quasi-peak Level	Average Level
	0.15 ~ 0.50	66.0 ~ 56.0*	59.0 ~ 46.0*
	0.50 ~ 5.00	56.0	46.0
	5.00 ~ 30.00	60.0	50.0

**Remark:** (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

### 2.2. Test Setup



### 2.3. EUT Configuration on Measurement

The following equipments are installed on Conducted Emission Measurement to meet EN 55014-1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

### 2.4. Operating Condition of EUT

2.4.1. Setup the EUT as shown in Section 2.2.

2.4.2. Turn on the power of all equipments.

2.4.3. Let the EUT work in test mode and measure it.

## 2.5. Test Procedure

The EUT is put on the plane 0.8 m high above the ground by insulating support and connected to the AC mains through Line Impedance Stability Network(L.I.S.N). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are investigated to find out the maximum conducted emission according to the EN 55014-1 regulations during conducted emission measurement.

The bandwidth of the field strength meter (R&S Test Receiver ESCI) is set at 9kHz in 150kHz~30MHz.

The frequency range from 150kHz to 30MHz is investigated for AC mains.

All the test results are listed in Section 2.6.

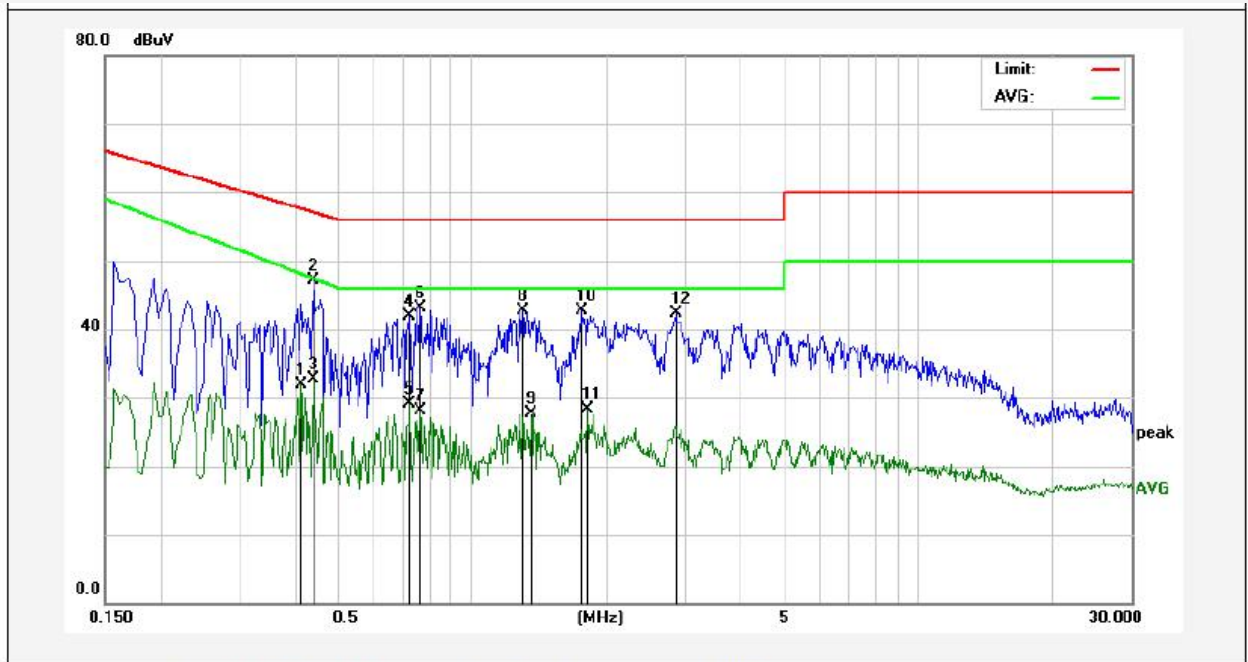
## 2.6. Test Results

**PASS**

The test curves are shown in the following pages.

**Conducted Emission Test Data**

Test Site: 1# Shielded Room  
 Test Specification: DC 15V via adapter AC 230V, 50Hz  
 Comment: Live Line  
 Temp.: 24.0°C Hum.: 47%

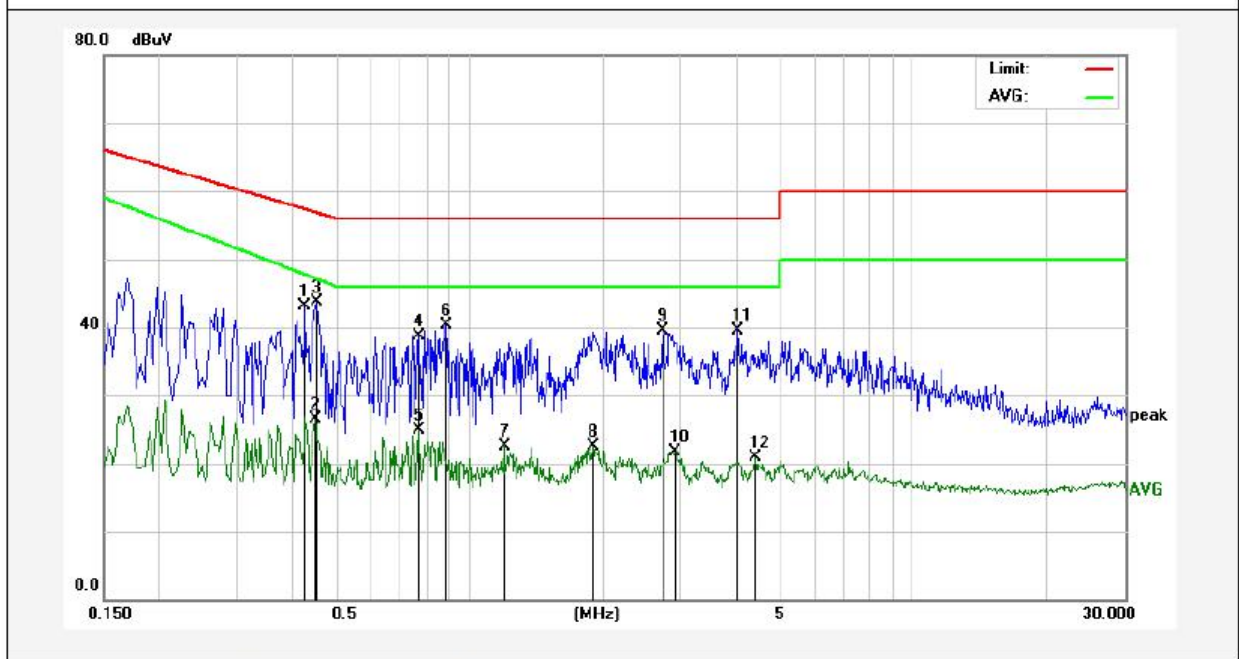


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.4140	11.93	19.94	31.87	48.04	-16.17	AVG	
2	0.4420	27.22	19.95	47.17	57.02	-9.85	QP	
3	0.4420	12.77	19.95	32.72	47.33	-14.61	AVG	
4	0.7260	21.87	20.05	41.92	56.00	-14.08	QP	
5	0.7260	9.01	20.05	29.06	46.00	-16.94	AVG	
6	0.7660	23.06	20.06	43.12	56.00	-12.88	QP	
7	0.7660	7.97	20.06	28.03	46.00	-17.97	AVG	
8	1.2980	22.56	20.13	42.69	56.00	-13.31	QP	
9	1.3619	7.66	20.13	27.79	46.00	-18.21	AVG	
10	1.7660	22.65	20.14	42.79	56.00	-13.21	QP	
11	1.8100	8.11	20.14	28.25	46.00	-17.75	AVG	
12	2.8580	22.16	20.16	42.32	56.00	-13.68	QP	

**Note:** Result=Reading+Factor Over Limit=Result-Limit

**Conducted Emission Test Data**

Test Site: 1# Shielded Room  
 Test Specification: DC 15V via adapter AC 230V, 50Hz  
 Comment: Neutral Line  
 Temp.: 24.0°C Hum.: 47%

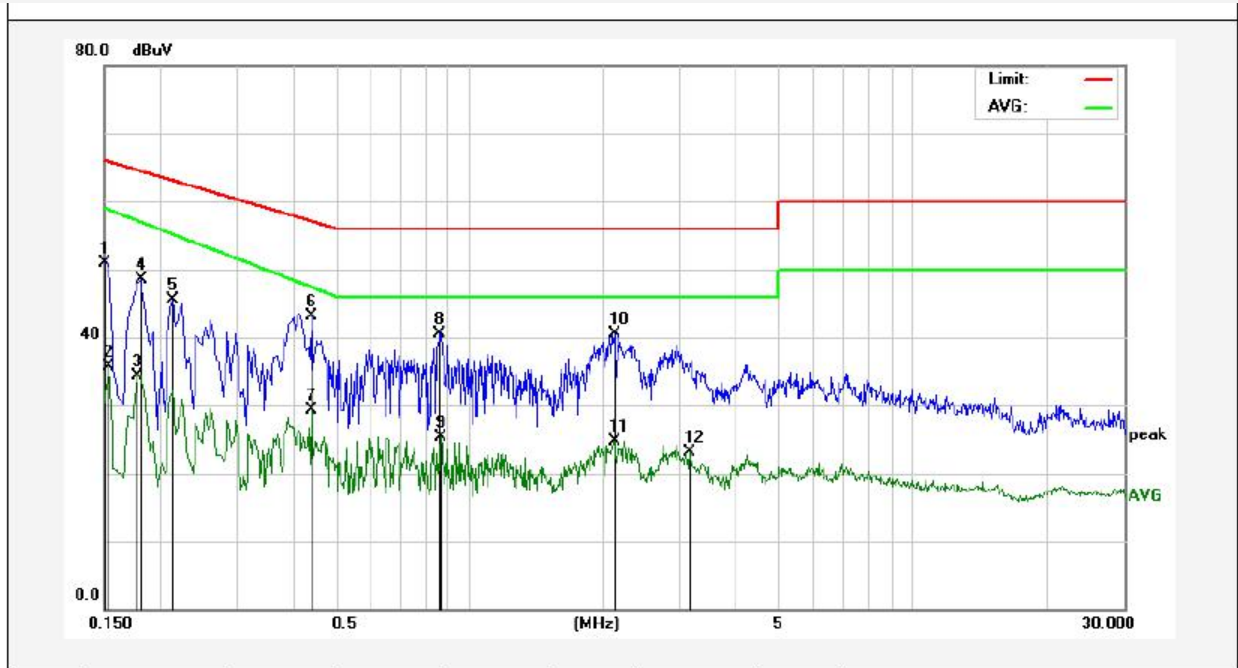


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.4260	23.06	19.95	43.01	57.33	-14.32	QP	
2	0.4500	6.45	19.96	26.41	47.14	-20.73	AVG	
3	0.4540	23.83	19.96	43.79	56.80	-13.01	QP	
4	0.7700	18.56	20.06	38.62	56.00	-17.38	QP	
5	0.7700	4.75	20.06	24.81	46.00	-21.19	AVG	
6	0.8860	20.28	20.09	40.37	56.00	-15.63	QP	
7	1.2020	2.48	20.12	22.60	46.00	-23.40	AVG	
8	1.9020	2.28	20.14	22.42	46.00	-23.58	AVG	
9	2.7260	19.31	20.15	39.46	56.00	-16.54	QP	
10	2.9020	1.52	20.16	21.68	46.00	-24.32	AVG	
11	4.0300	19.42	20.18	39.60	56.00	-16.40	QP	
12	4.4220	0.62	20.19	20.81	46.00	-25.19	AVG	

**Note:** Result=Reading+Factor Over Limit=Result-Limit

**Conducted Emission Test Data**

Test Site: 1# Shielded Room  
 Test Specification: DC 15V via adapter AC 120V, 50Hz  
 Comment: Live Line  
 Temp.: 24.0°C Hum.: 47%

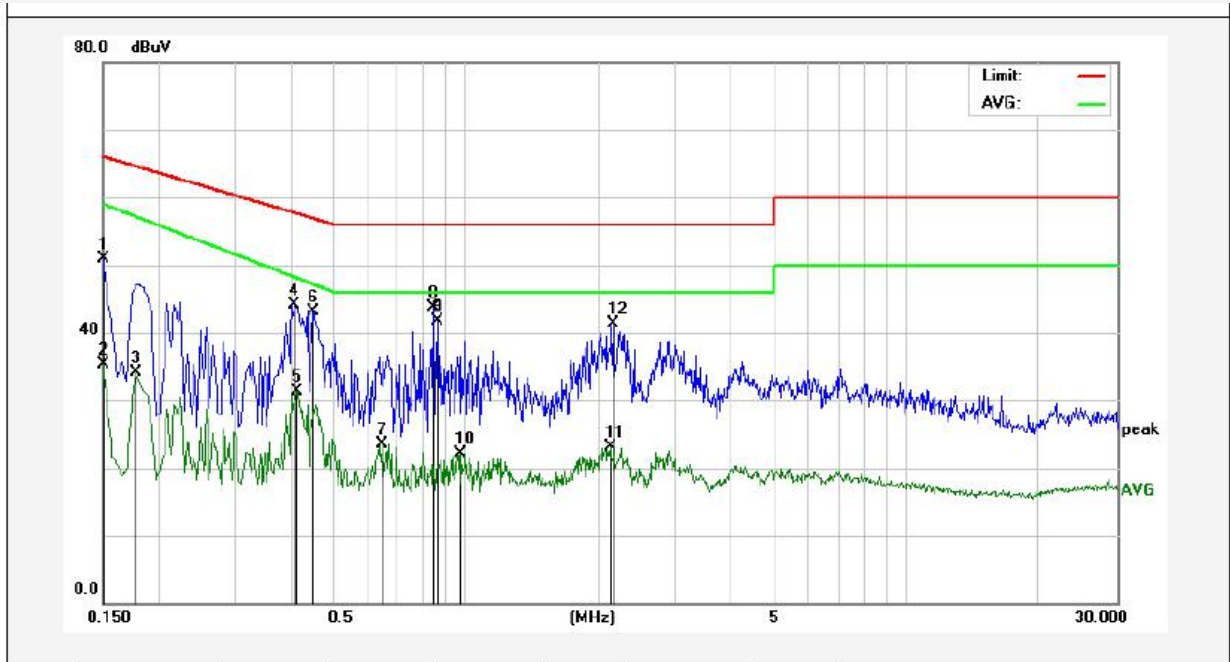


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1500	31.02	19.90	50.92	65.99	-15.07	QP	
2	0.1539	15.85	19.90	35.75	58.72	-22.97	AVG	
3	0.1780	14.44	19.90	34.34	57.15	-22.81	AVG	
4	0.1819	28.58	19.90	48.48	64.39	-15.91	QP	
5	0.2140	25.62	19.90	45.52	63.04	-17.52	QP	
6	0.4420	23.14	19.95	43.09	57.02	-13.93	QP	
7	0.4420	9.41	19.95	29.36	47.33	-17.97	AVG	
8	0.8580	20.46	20.08	40.54	56.00	-15.46	QP	
9	0.8620	5.28	20.08	25.36	46.00	-20.64	AVG	
10	2.1300	20.36	20.14	40.50	56.00	-15.50	QP	
11	2.1300	4.65	20.14	24.79	46.00	-21.21	AVG	
12	3.1540	2.86	20.16	23.02	46.00	-22.98	AVG	

**Note:** Result=Reading+Factor Over Limit=Result-Limit

**Conducted Emission Test Data**

Test Site: 1# Shielded Room  
 Test Specification: DC 15V via adapter AC 120V, 50Hz  
 Comment: Neutral Line  
 Temp.: 24.0°C Hum.: 47%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1500	31.06	19.90	50.96	65.99	-15.03	QP	
2	0.1500	15.48	19.90	35.38	58.99	-23.61	AVG	
3	0.1780	14.20	19.90	34.10	57.15	-23.05	AVG	
4	0.4100	24.12	19.94	44.06	57.65	-13.59	QP	
5	0.4140	11.45	19.94	31.39	48.04	-16.65	AVG	
6	0.4500	23.13	19.96	43.09	56.87	-13.78	QP	
7	0.6460	3.48	20.02	23.50	46.00	-22.50	AVG	
8	0.8460	23.63	20.08	43.71	56.00	-12.29	QP	
9	0.8620	21.54	20.08	41.62	56.00	-14.38	QP	
10	0.9740	1.99	20.11	22.10	46.00	-23.90	AVG	
11	2.1220	3.01	20.14	23.15	46.00	-22.85	AVG	
12	2.1580	21.08	20.14	41.22	56.00	-14.78	QP	

**Note:** Result=Reading+Factor Over Limit=Result-Limit

### 3. Disturbance Power Test

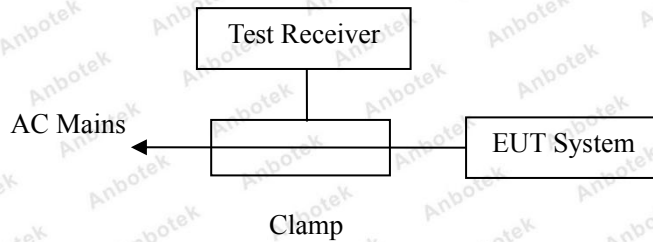
#### 3.1. Test Standard and Limit

Test Standard	EN 55014-1
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Disturbance Power Test Limit

Test Limit	Frequency (MHz)	At mains terminals (dB $\mu$ V)	
		Quasi-peak Level	Average Level
	30 ~300	45 Increasing Linearly with Frequency to 55	35 Increasing Linearly with Frequency to 45

#### 3.2. Test Setup



#### 3.3. EUT Configuration on Measurement

The EN 55014-1 Regulations test method must be used to find the maximum emission during disturbance power measurement. The configuration of the EUT is the same as used in conducted emission measurement.

#### 3.4. Operating Condition of EUT

- 3.4.1. Setup the EUT as shown in Section 3.2.
- 3.4.2. Turn on the power of all equipments.
- 3.4.3. Let the EUT work in test mode and measure it.



### 3.5. Test Procedure

The EUT is placed on the ground and away from other metallic surface at least 0.8m. It is connected to the power mains through an extension cord of 6m min. The absorber clamp clamps the cord and moves from the far end to the EUT to measure the disturbing energy emitted from the cord.

The bandwidth of the test receiver(R&S ESCI) is set at 120kHz.

All the test results are listed in Section 3.6.

### 3.6. Test Results

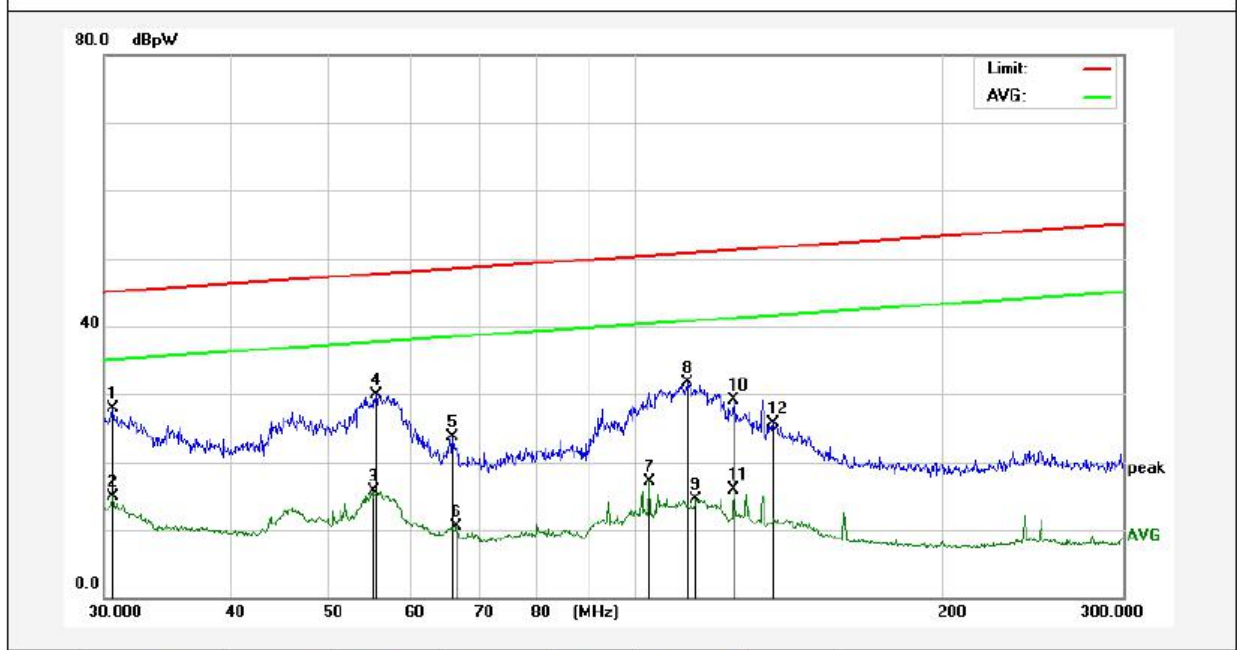
**PASS**

The frequency spectrum from 30MHz to 300MHz is investigated.

The test curves are shown in the following pages.

**Power Clamp Test Data**

Test Site: 1# Shielded Room  
 Test Specification: DC 15V via adapter AC 230V, 50Hz  
 Comment: AC LINE  
 Temp.: 24.0°C Hum.: 47%

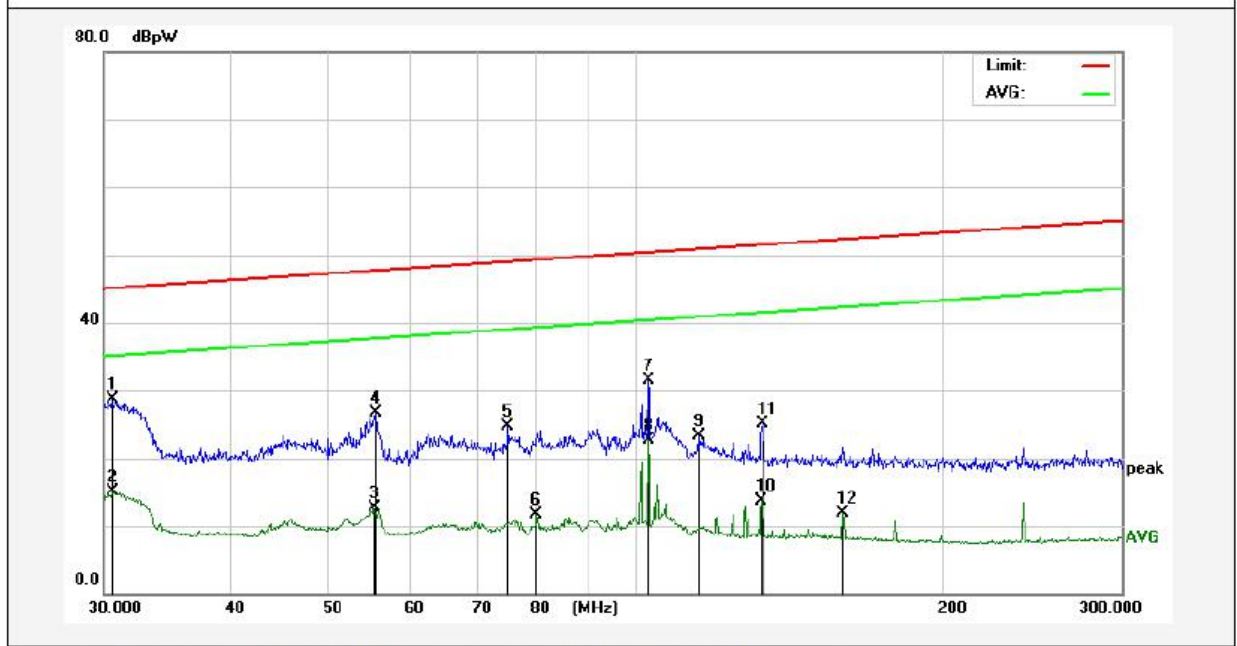


No.	Freq. (MHz)	Reading (dBpW)	Factor (dB)	Result (dBpW)	Limit (dBpW)	Over Limit (dB)	Detector	Remark
1	30.6400	1.98	26.00	27.98	45.09	-17.11	QP	
2	30.6400	-11.14	26.00	14.86	35.09	-20.23	AVG	
3	55.3200	-10.35	26.00	15.65	37.66	-22.01	AVG	
4	55.5600	3.81	26.00	29.81	47.68	-17.87	QP	
5	65.9600	-2.34	26.00	23.66	48.42	-24.76	QP	
6	66.4400	-15.53	26.00	10.47	38.45	-27.98	AVG	
7	103.0000	-8.88	26.00	17.12	40.36	-23.24	AVG	
8	112.2800	5.73	26.00	31.73	50.73	-19.00	QP	
9	114.5600	-11.53	26.00	14.47	40.82	-26.35	AVG	
10	124.6000	3.04	26.00	29.04	51.18	-22.14	QP	
11	124.6000	-10.12	26.00	15.88	41.18	-25.30	AVG	
12	135.9600	-0.20	26.00	25.80	51.56	-25.76	QP	

**Note:** Result=Reading+Factor Over Limit=Result-Limit

**Power Clamp Test Data**

Test Site: 1# Shielded Room  
 Test Specification: DC 15V via adapter AC 230V, 50Hz  
 Comment: DC LINE  
 Temp.: 24.0°C Hum.: 47%

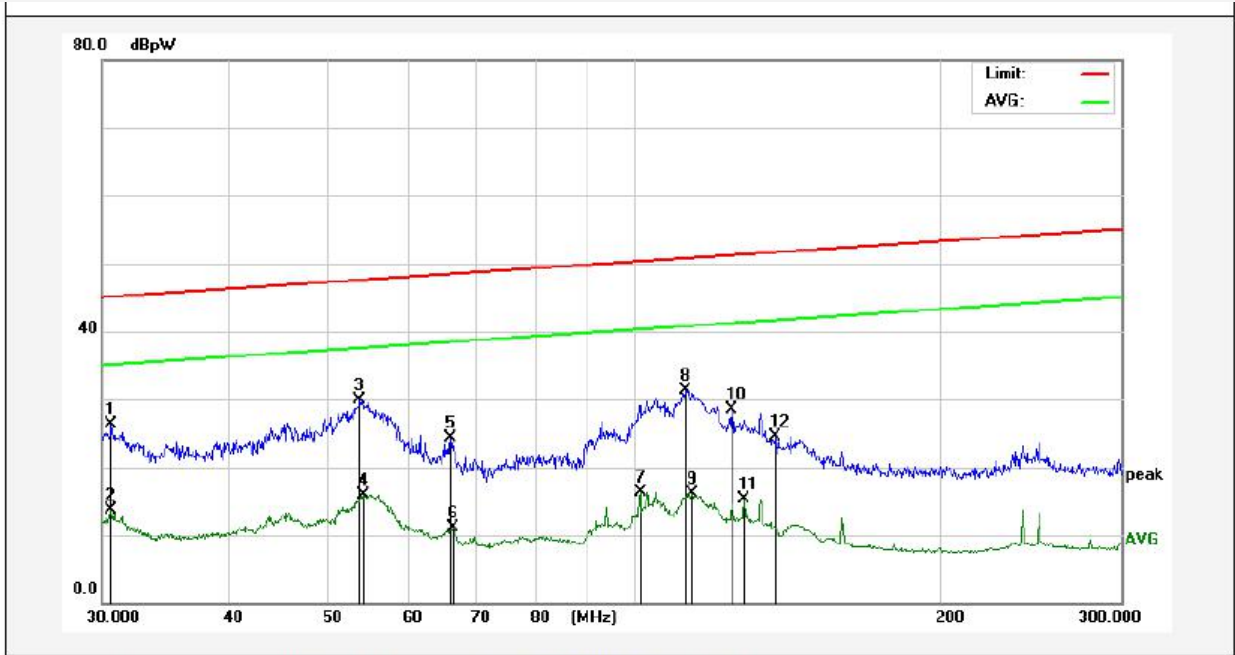


No.	Freq. (MHz)	Reading (dBpW)	Factor (dB)	Result (dBpW)	Limit (dBpW)	Over Limit (dB)	Detector	Remark
1	30.6000	2.75	26.00	28.75	45.09	-16.34	QP	
2	30.6400	-10.84	26.00	15.16	35.09	-19.93	AVG	
3	55.3200	-13.31	26.00	12.69	37.66	-24.97	AVG	
4	55.5600	0.66	26.00	26.66	47.68	-21.02	QP	
5	74.8800	-1.25	26.00	24.75	48.97	-24.22	QP	
6	80.0000	-14.22	26.00	11.78	39.26	-27.48	AVG	
7	103.0400	5.43	26.00	31.43	50.36	-18.93	QP	
8	103.0400	-3.35	26.00	22.65	40.36	-17.71	AVG	
9	115.3600	-2.79	26.00	23.21	50.85	-27.64	QP	
10	132.9600	-12.28	26.00	13.72	41.47	-27.75	AVG	
11	133.1200	-0.91	26.00	25.09	51.47	-26.38	QP	
12	160.0000	-14.04	26.00	11.96	42.27	-30.31	AVG	

**Note:** Result=Reading+Factor Over Limit=Result-Limit

**Power Clamp Test Data**

Test Site: 1# Shielded Room  
 Test Specification: DC 15V via adapter AC 120V, 50Hz  
 Comment: AC LINE  
 Temp.: 24.0°C Hum.: 47%

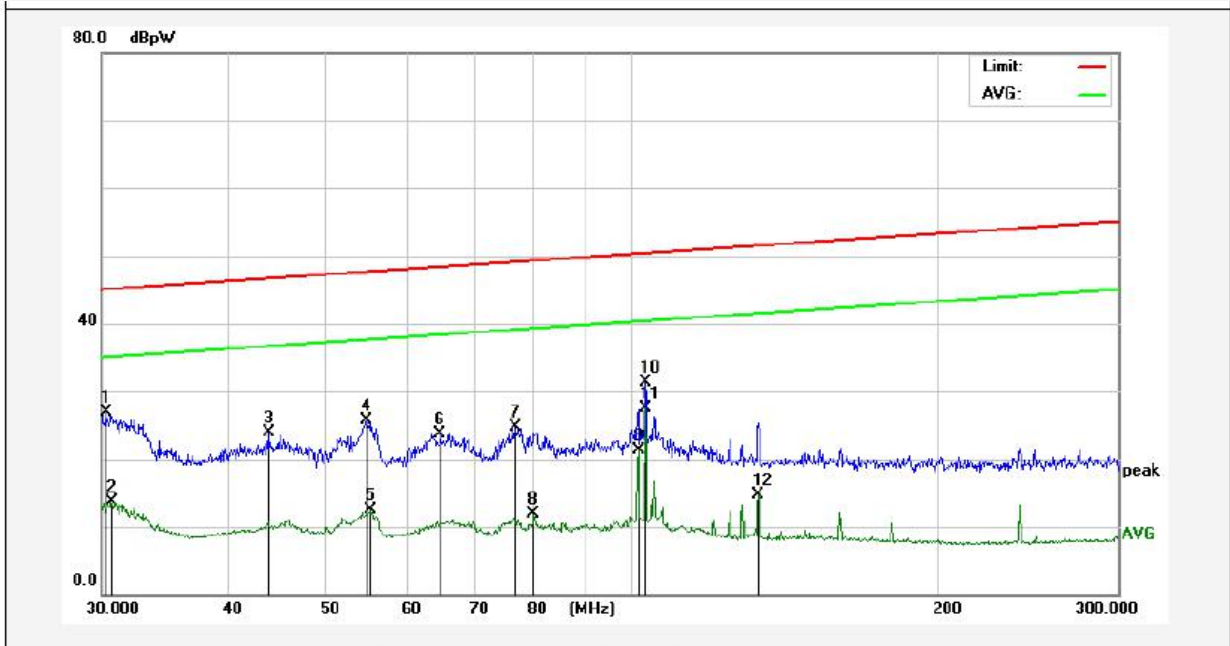


No.	Freq. (MHz)	Reading (dBpW)	Factor (dB)	Result (dBpW)	Limit (dBpW)	Over Limit (dB)	Detector	Remark
1	30.6400	0.29	26.00	26.29	45.09	-18.80	QP	
2	30.6400	-12.26	26.00	13.74	35.09	-21.35	AVG	
3	53.7200	3.97	26.00	29.97	47.53	-17.56	QP	
4	54.1600	-10.08	26.00	15.92	37.57	-21.65	AVG	
5	65.9600	-1.61	26.00	24.39	48.42	-24.03	QP	
6	66.3600	-14.87	26.00	11.13	38.45	-27.32	AVG	
7	101.2000	-9.71	26.00	16.29	40.28	-23.99	AVG	
8	112.1200	5.25	26.00	31.25	50.73	-19.48	QP	
9	113.8400	-9.83	26.00	16.17	40.79	-24.62	AVG	
10	124.6000	2.58	26.00	28.58	51.18	-22.60	QP	
11	128.0000	-10.76	26.00	15.24	41.30	-26.06	AVG	
12	137.2000	-1.52	26.00	24.48	51.60	-27.12	QP	

**Note:** Result=Reading+Factor Over Limit=Result-Limit

**Power Clamp Test Data**

Test Site: 1# Shielded Room  
 Test Specification: DC 15V via adapter AC 120V, 50Hz  
 Comment: DC LINE  
 Temp.: 24.0°C Hum.: 47%



No.	Freq. (MHz)	Reading (dBpW)	Factor (dB)	Result (dBpW)	Limit (dBpW)	Over Limit (dB)	Detector	Remark
1	30.3200	0.99	26.00	26.99	45.05	-18.06	QP	
2	30.6400	-12.21	26.00	13.79	35.09	-21.30	AVG	
3	43.8000	-2.03	26.00	23.97	46.64	-22.67	QP	
4	54.6400	-0.31	26.00	25.69	47.60	-21.91	QP	
5	55.2800	-13.52	26.00	12.48	37.65	-25.17	AVG	
6	64.7200	-2.32	26.00	23.68	48.34	-24.66	QP	
7	76.6000	-1.27	26.00	24.73	49.07	-24.34	QP	
8	80.0000	-14.11	26.00	11.89	39.26	-27.37	AVG	
9	101.2000	-4.71	26.00	21.29	40.28	-18.99	AVG	
10	103.0000	5.33	26.00	31.33	50.36	-19.03	QP	
11	103.0000	1.51	26.00	27.51	40.36	-12.85	AVG	
12	132.8400	-11.38	26.00	14.62	41.46	-26.84	AVG	

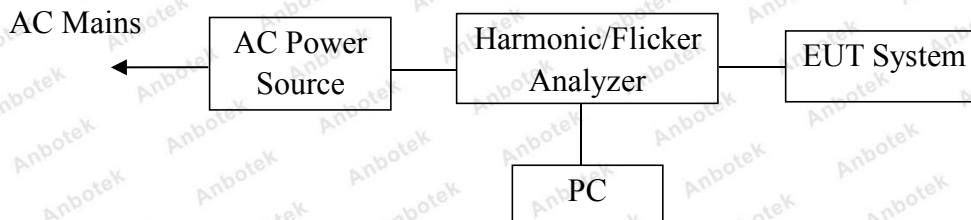
**Note:** Result=Reading+Factor Over Limit=Result-Limit

## 4. Harmonic Current Emission Test

### 4.1. Test Standard

Test Standard	EN 61000-3-2
---------------	--------------

### 4.2. Test Setup



### 4.3. Operating Condition of EUT

- 4.3.1. Setup the EUT as shown on Section 4.2.
- 4.3.2. Turn on the power of all equipments.
- 4.3.3. After that, let the EUT work in test mode measure it.

### 4.4. Test Results

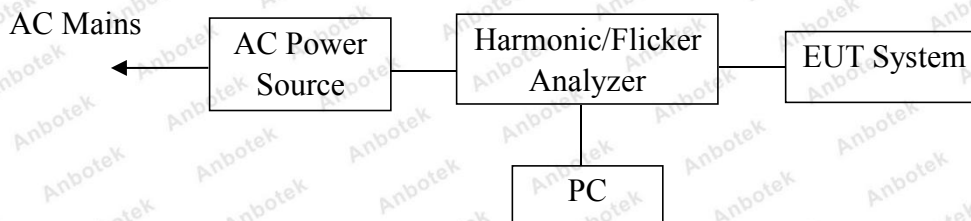
The active input power of the EUT is less than 75W. Therefore, according to EN 61000-3-2, no limits are necessary.

## 5. Voltage Fluctuations & Flicker Test

### 5.1. Test Standard

Test Standard	EN 61000-3-3
---------------	--------------

### 5.2. Test Setup



### 5.3. Operating Condition of EUT

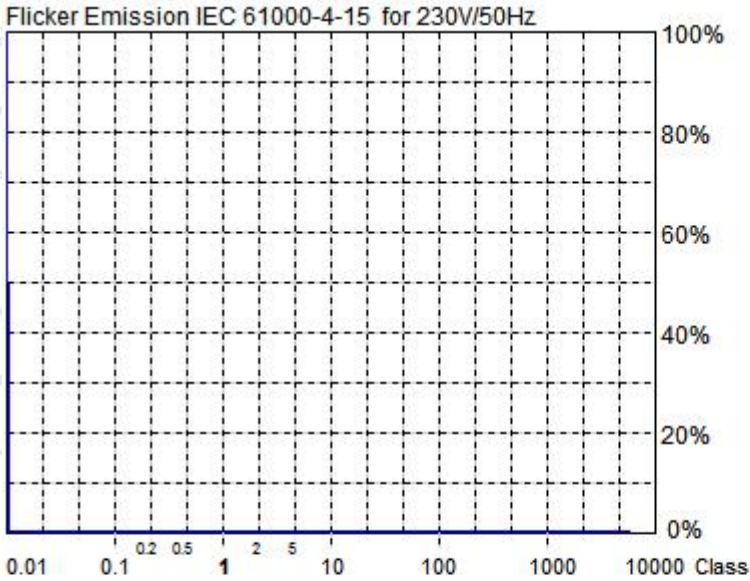
- 5.3.1. Setup the EUT as shown on Section 5.2.
- 5.3.2. Turn on the power of all equipments.
- 5.3.3. After that, let the EUT work in test mode measure it.

### 5.4. Test Results

**PASS**

The test curves are shown in the following pages.

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



<b>Actual Flicker (Fli):</b>	<b>0.00</b>
<b>Short-term Flicker (Pst):</b>	<b>0.07</b>
Limit (Pst):	1.00
<b>Long-term Flicker (Plt):</b>	<b>0.00</b>
Limit (Plt):	0.65
<b>Maximum Relative Volt. Change (dmax):</b>	<b>0.00%</b>
Limit (dmax):	4.00%
<b>Relative Steady-state Voltage Change (dc):</b>	<b>0.00%</b>
Limit (dc):	3.00%
<b>Tmax 3.30% (dt):</b>	<b>0.00ms</b>
Limit (dt>Lim):	500ms

**Flicker Emission - IEC 61000-3-3, EN 61000-3-3**

Urms = 229.5 V	P = 2.828 W	Range: 0.25 A
Irms = 0.031 A	pf = 0.397	V-nom: 230 V

**Test aborted, Result: PASSED**

HAR-1000 EMC-Partner

- Full Bar : Actual Values**
- Empty Bar : Maximum Values**
- Circles : Average Values**
- Blue : Current , Green : Voltage , Red : Failed**

Urms = 229.5V	Freq = 49.987	Range: 0.25 A
Irms = 0.031A	Ipk = 0.162A	cf = 5.224
P = 2.828W	S = 7.116VA	pf = 0.397

**Test - Time :** 1 x 10min = 10min (100 %)

**LIN (Line Impedance Network) :** L: 0.24ohm +j0.15ohm N: 0.16ohm +j0.10ohm

<b>Limits :</b>	<b>Plt : 0.65</b>	<b>Pst : 1.00</b>
	<b>dmax : 4.00 %</b>	<b>dc : 3.00 %</b>
	<b>dtLim: 3.30 %</b>	<b>dt&gt;Lim: 500ms</b>

**Test aborted, Result: PASSED**

	<b>dmax</b>	<b>dc</b>	<b>dt&gt;Lim</b>
	<b>[%]</b>	<b>[%]</b>	<b>[ms]</b>
<b>1</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>



## 6. Electrostatic Discharge Immunity Test

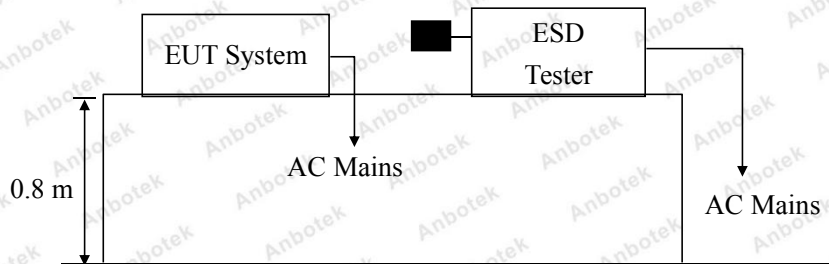
### 6.1. Test Standard and Level

Test Standard:	EN 55014-2 (IEC 61000-4-2)
Performance Criterion:	B
Severity Level: 3 / Air Discharge: $\pm 8\text{kV}$ , Level: 2 / Contact Discharge: $\pm 4\text{kV}$	

Test Level

Level	Test Voltage Contact Discharge (kV)	Test Voltage Air Discharge (kV)
1.	$\pm 2$	$\pm 2$
2.	$\pm 4$	$\pm 4$
3.	$\pm 6$	$\pm 8$
4.	$\pm 8$	$\pm 15$
X	Special	Special

### 6.2. Test Setup



### 6.3. EUT Configuration on Measurement

The following equipments are installed on Electrostatic Discharge immunity Measurement to meet EN 55014-2 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

### 6.4. Operating Condition of EUT

- 6.4.1. Setup the EUT as shown on Section 6.2.
- 6.4.2. Turn on the power of all equipments.
- 6.4.3. After that, let the EUT work in test mode measure it.

## 6.5. Test Procedure

### 6.5.1. Air Discharge:

This test is done on a non-conductive surface. 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.

### 6.5.2. Contact Discharge:

All the procedure shall be same as Section 6.5.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

### 6.5.3. Indirect discharge for horizontal coupling plane

At least 20 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

### 6.5.4. Indirect discharge for vertical coupling plane

At least 20 single discharge shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m × 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.

## 6.6. Test Results

**PASS**

Please refer to the following page.

## Electrostatic Discharge Test Results

Air discharge :	±8.0kV	Temperature :	21.5°C
Contact discharge :	±4.0kV	Humidity :	52%
Power Supply :	DC 15V via adapter AC 230V, 50Hz	Criterion required :	B
Number of discharge :	10	Test Result:	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Location		Kind A-Air Discharge C-Contact Discharge	Result
Slot of the EUT	10 points	A	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
Others	8 points	A	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
Function Keys	6 points	A	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
Screws	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
HCP	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
VCP of the front	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
VCP of the rear	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
VCP of the left	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
VCP of the right	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
<b>Remark:</b> Discharge should be considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).			

## 7. Electrical Fast Transient/Burst Immunity Test

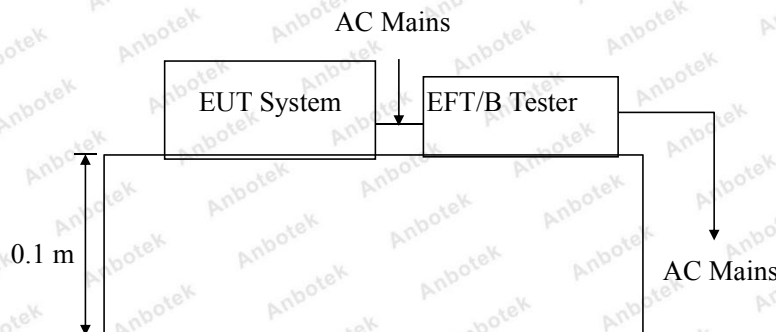
### 7.1. Test Standard and Level

Test Standard:	EN 55014-2 (IEC 61000-4-4)
Performance criterion:	B
Severity Level 2: 1.00kV	

#### Test Level

Open Circuit Output Test Voltage $\pm 10\%$		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1.	0.50 kV	0.25 kV
2.	1.00 kV	0.50 kV
3.	2.00 kV	1.00 kV
4.	4.00 kV	2.00 kV
X.	Special	Special

### 7.2. Test Setup



### 7.3. EUT Configuration on Measurement

The following equipments are installed on Electrical Fast Transient/Burst Immunity Measurement to meet EN 55014-2 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

### 7.4. Operating Condition of EUT

7.4.1. Setup the EUT as shown in Section 7.2.

7.4.2. Turn on the power of all equipments.

7.4.3. Let the EUT work in test mode and measure it.

## 7.5. Test Procedure

The EUT is put on the table which is 0.1 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

### 7.5.1. For input and output AC 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 2 mins.

### 7.5.2. For signal lines and control lines ports:

Select tests based on product characteristics.

### 7.5.3. For DC output line ports:

Select tests based on product characteristics.

## 7.6. Test Results

**PASS**

Please refer to the following page.

## Electrical Fast Transient/Burst Test Results

Ambient Condition : 21.1°C / 51% RH		Criterion required : B	
Power Supply : DC 15V via adapter AC 230V, 50Hz		Test Result : <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	
Inject Line : AC Mains		Inject Method: Direct	Inject Time(s): 120
Line	Polarity	Test Voltage (kV)	Result
AC Line	±	1.00kV	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
DC Line			
Signal Line			

## 8. Surge Immunity Test

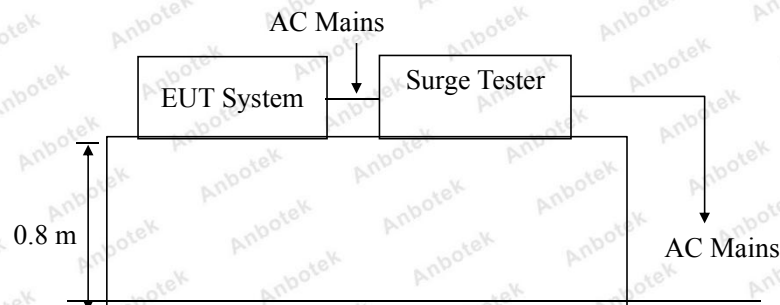
### 8.1. Test Standard and Level

Test Standard:	EN 55014-2 (IEC 61000-4-5)
Performance criterion:	B
Severity Level 2, Line to Line: 1.0kV	

Test Level

Severity Level	Open-Circuit Test Voltage (kV)
1.	0.5
2.	1.0
3.	2.0
4.	4.0
X.	Special

### 8.2. Test Setup



### 8.3. EUT Configuration on Measurement

The following equipments are installed on Surge immunity Measurement to meet EN 55014-2 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

### 8.4. Operating Condition of EUT

- 8.4.1. Setup the EUT as shown in Section 8.2.
- 8.4.2. Turn on the power of all equipments.
- 8.4.3. Let the EUT work in test mode and measure it.

## 8.5. Test Procedure

- 8.5.1. Set up the EUT and test generator as shown on Section 8.2.
- 8.5.2. For line to line coupling mode, provide a 1.0kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.
- 8.5.3. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
- 8.5.4. Different phase angles are done individually.
- 8.5.5. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

## 8.6. Test Results

### PASS

Please refer to the following page.



## Surge Immunity Test Results

Humidity :	55%	Temperature :	22.1°C		
Power Supply :	DC 15V via adapter AC 230V, 50Hz	Criterion required:	B		
Test Result :	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail				
Location	Polarity	Phase Angle	Number of Pulse	Pulse Voltage (kV)	Result
L-N	±	<input type="checkbox"/> 0° <input checked="" type="checkbox"/> 90° <input type="checkbox"/> 180° <input checked="" type="checkbox"/> 270°	5	1.0kV	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
L-PE					
N-PE					

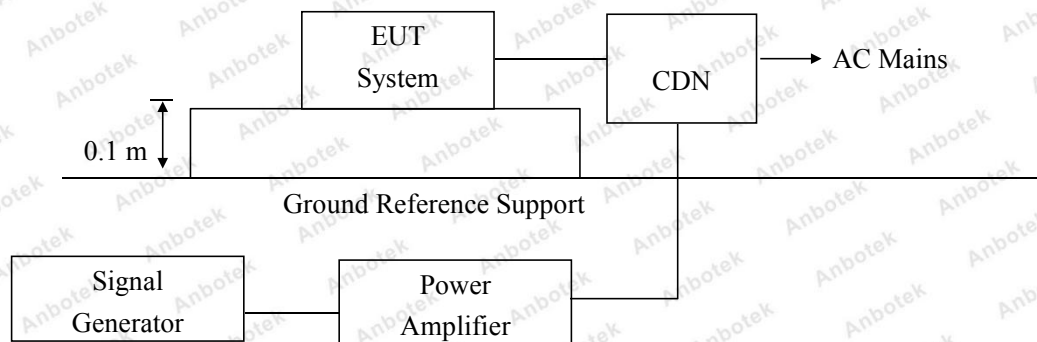
## 9. Injected Currents Susceptibility Test

### 9.1. Test Standard and Level

Test Standard	EN 55014-2 (IEC 61000-4-6)
Performance criterion	A
Severity Level 2: 3V (rms), (0.15MHz ~230MHz)	

Test Level	
Level	Field Strength V
1.	1
2.	3
3.	10
X.	Special

### 9.2. Test Setup



### 9.3. EUT Configuration

The following equipments are installed on currents susceptibility Measurement to meet EN 55014-2 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

### 9.4. Operating Condition of EUT

- 9.4.1. Setup the EUT as shown in Section 9.2.
- 9.4.2. Turn on the power of all equipments.
- 9.4.3. Let the EUT work in test mode and measure it.

## 9.5. Test Procedure

- 1) Set up the EUT, CDN and test generators as shown on Section 9.2.
- 2) Let the EUT work in test mode and measure it.
- 3) The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
- 4) The disturbance signal described below is injected to EUT through CDN.
- 5) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- 6) The frequency range is swept from 150KHz to 230MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sine wave.
- 7) The rate of sweep shall not exceed  $1.5 \cdot 10^{-3}$  decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
- 8) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

### 9.5.1. For signal lines and control lines ports:

Select tests based on product characteristics.

### 9.5.2. For DC output line ports:

Select tests based on product characteristics.

## 9.6. Test Results

**PASS**

Please refer to the following page.

## Injected Currents Susceptibility Test Results

Humidity : 54%		Temperature : 22.8℃	
Power Supply : DC 15V via adapter AC 230V, 50Hz		Criterion required: A	
Test Result : <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail			
Frequency Range (MHz)		Injected Position	
0.15 ~ 230		AC Mains	
		Strength (Unmodulated)	
		3V	
		Result	
		<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D	
<b>Remark : 1. Modulation Signal:1KHz 80% AM</b>			

## 10. Voltage Dips And Interruptions Test

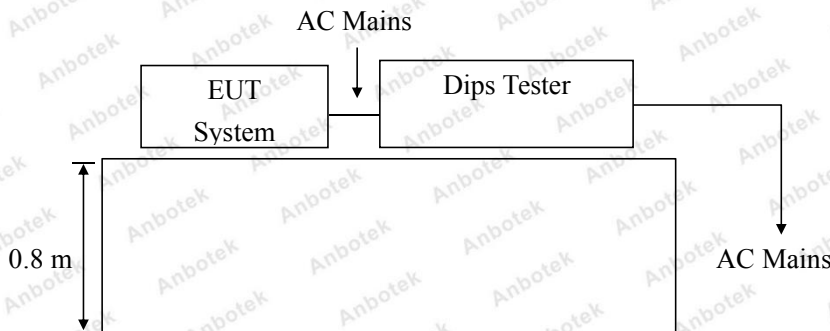
### 10.1. Test Standard and Level

Test Standard:	EN 55014-2 (IEC 61000-4-11)
Performance Criterion:	C

Test Level

Test Level %UT	Voltage dip and short interruptions %UT	Duration (in period)
0	100	0.5
40	60	1
		5
		10
		25
70	30	50
/	/	*

### 10.2. Test Setup



### 10.3. EUT Configuration on Measurement

The following equipments are installed on Voltage dips and interruptions Measurement to meet EN 55014-2 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

## 10.4. Operating Condition of EUT

10.4.1. Setup the EUT as shown in Section 10.2.

10.4.2. Turn on the power of all equipments.

10.4.3. Let the EUT work in test mode and measure it.

## 10.5. Test Procedure

- 1) Set up the EUT and test generator as shown on Section 10.2.
- 2) The interruptions is introduced at selected phase angles with specified duration.
- 3) Record any degradation of performance.

## 10.6. Test Results

**PASS**

Please refer to the following page.

## Voltage Dips and Interruptions Test Results

Temperature : 23.3℃		Humidity : 53%																	
Power Supply : DC 15V via adapter AC 230V, 50Hz		Criterion required : C																	
Test Result : <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Test Level % UT</th> <th style="width: 25%;">Voltage Dips &amp; Short Interruptions % UT</th> <th style="width: 25%;">Duration (in periods)</th> <th style="width: 25%;">Result</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">100</td> <td style="text-align: center;">0.5P</td> <td style="text-align: center;"> <input type="checkbox"/> A <input type="checkbox"/> B  <input checked="" type="checkbox"/> C <input type="checkbox"/> D                 </td> </tr> <tr> <td style="text-align: center;">40</td> <td style="text-align: center;">60</td> <td style="text-align: center;">10P</td> <td style="text-align: center;"> <input type="checkbox"/> A <input type="checkbox"/> B  <input checked="" type="checkbox"/> C <input type="checkbox"/> D                 </td> </tr> <tr> <td style="text-align: center;">70</td> <td style="text-align: center;">30</td> <td style="text-align: center;">25P</td> <td style="text-align: center;"> <input type="checkbox"/> A <input type="checkbox"/> B  <input checked="" type="checkbox"/> C <input type="checkbox"/> D                 </td> </tr> </tbody> </table>				Test Level % UT	Voltage Dips & Short Interruptions % UT	Duration (in periods)	Result	0	100	0.5P	<input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D	40	60	10P	<input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D	70	30	25P	<input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D
Test Level % UT	Voltage Dips & Short Interruptions % UT	Duration (in periods)	Result																
0	100	0.5P	<input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D																
40	60	10P	<input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D																
70	30	25P	<input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D																
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Test Level % UT</th> <th style="width: 25%;">Voltage Dips &amp; Short Interruptions % UT</th> <th style="width: 25%;">Duration (in periods)</th> <th style="width: 25%;">Result</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>				Test Level % UT	Voltage Dips & Short Interruptions % UT	Duration (in periods)	Result												
Test Level % UT	Voltage Dips & Short Interruptions % UT	Duration (in periods)	Result																

## APPENDIX I-- TEST SETUP PHOTOGRAPH

Photo of Power Line Conducted Emission Test



Photo of Disturbance Power Test





Photo of Flicker/ Harmonic Test

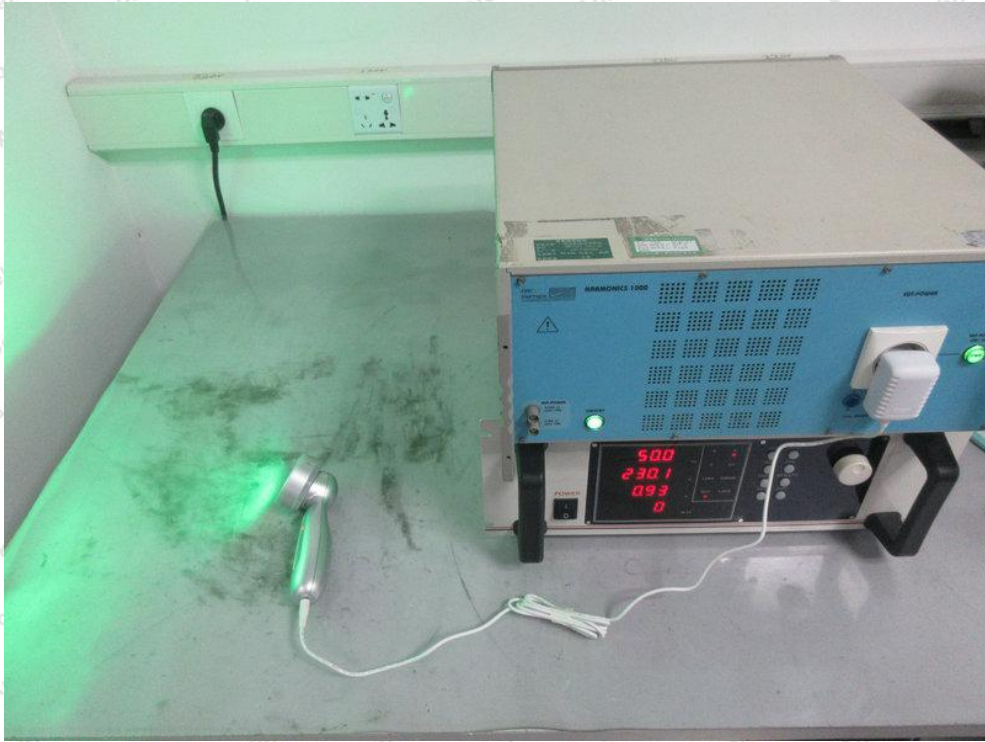


Photo of Electrostatic Discharge Immunity Test

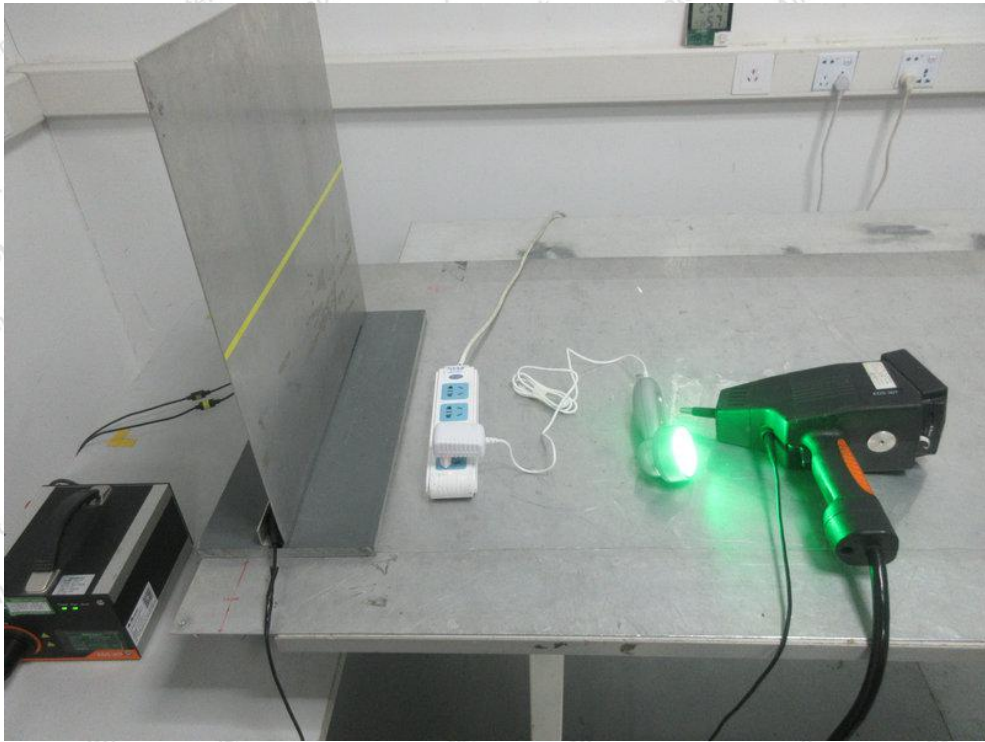


Photo of Electrical Fast Transient/Burst Immunity Test

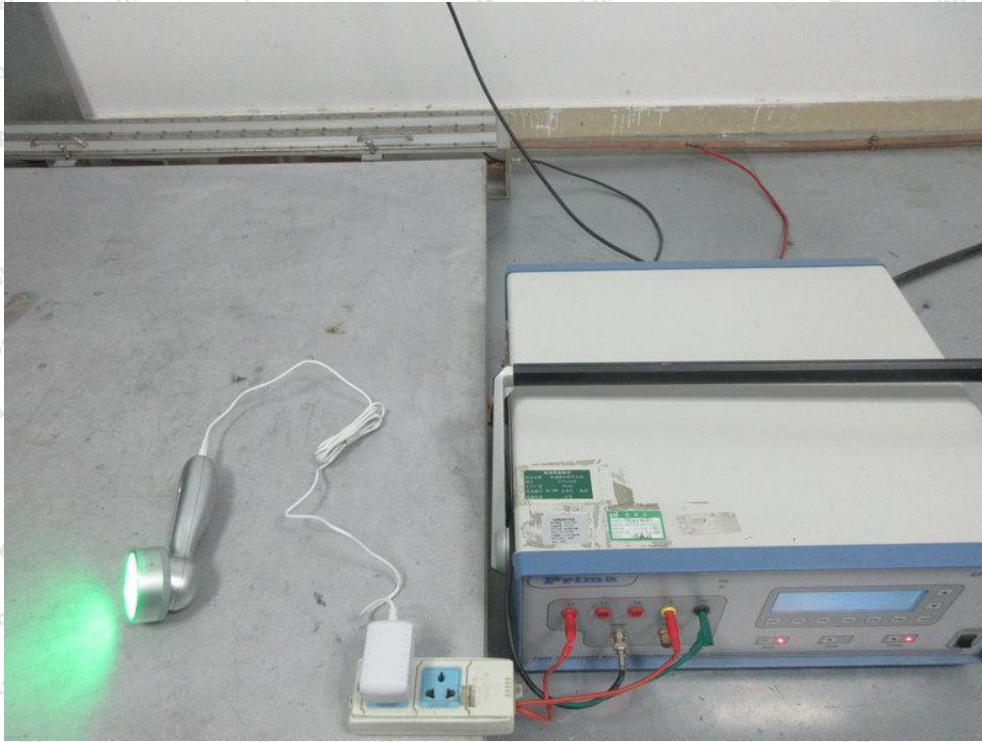


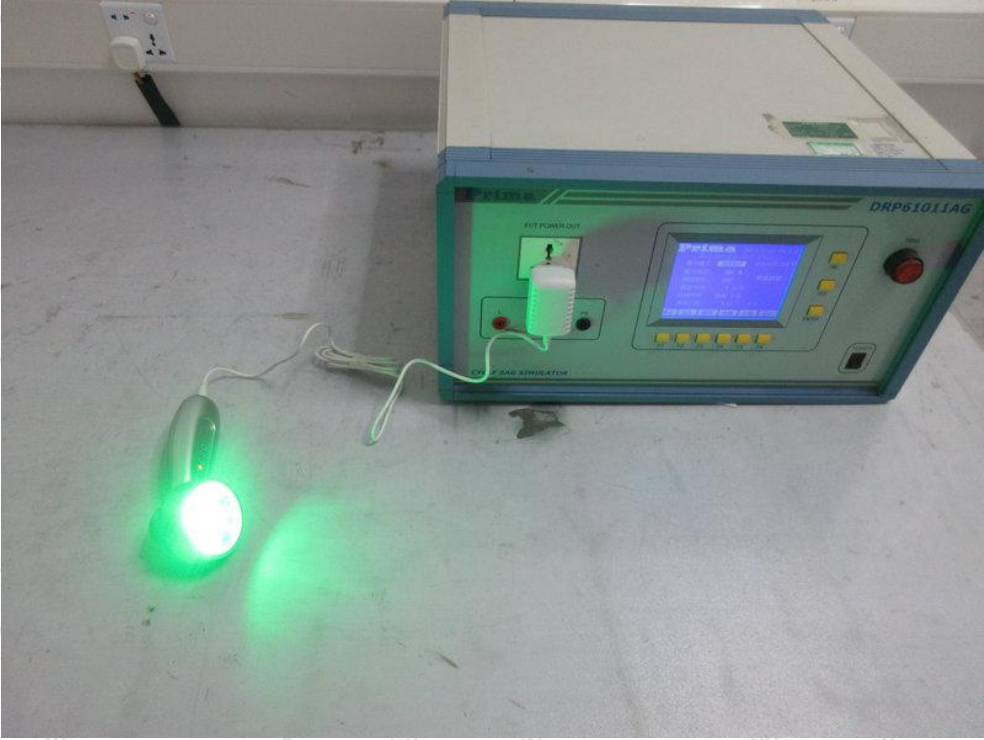
Photo of Surge Immunity Test



Photo of Injected currents susceptibility Test



Photo of Voltage Dips and Interruptions Test



## APPENDIX II -- EXTERNAL PHOTOGRAPH

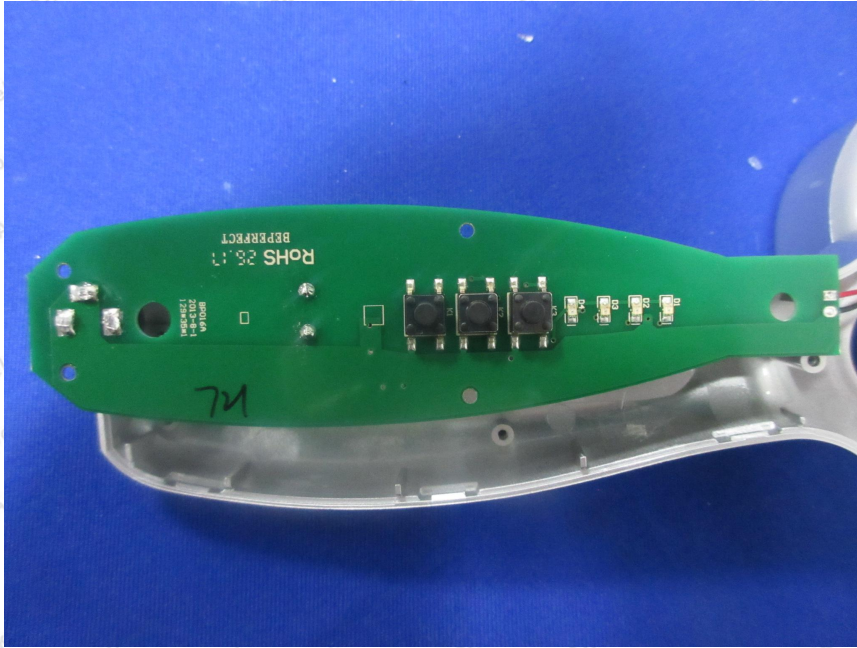




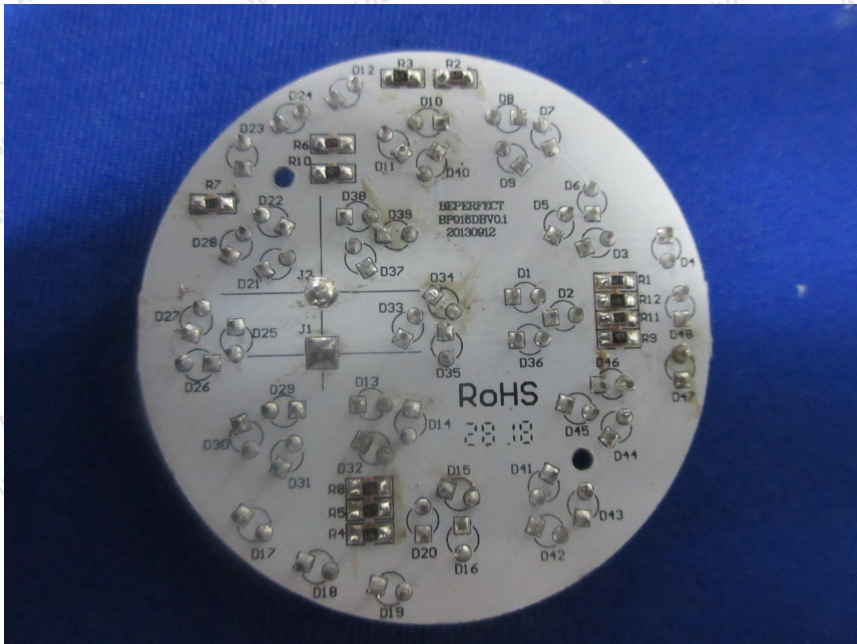
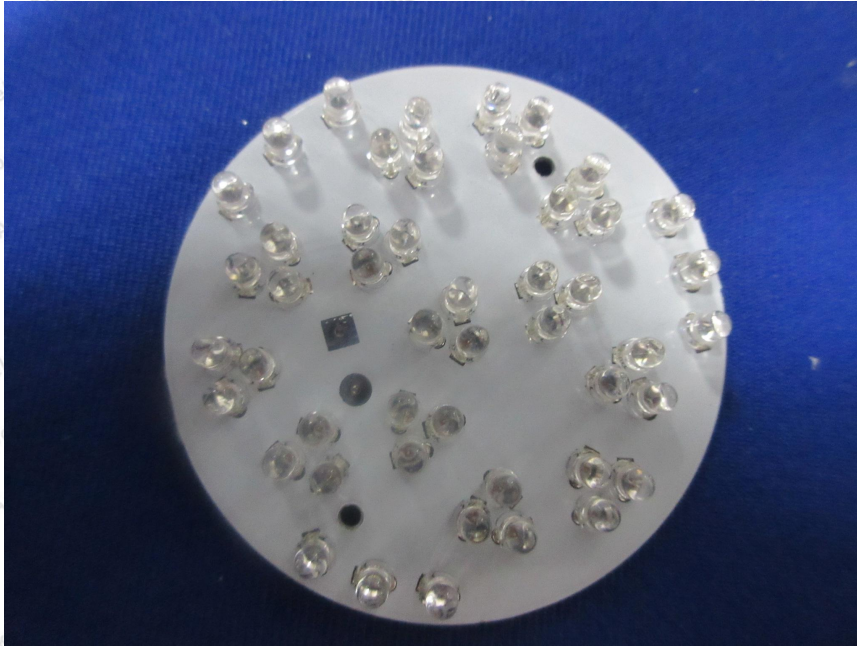


### APPENDIX III -- INTERNAL PHOTOGRAPH









## CE Label

1. The CE conformity marking must consist of the initials 'CE' taking the following form:

If the CE marking is reduced or enlarged, the proportions given in the above graduated drawing must be respected.

2. The CE marking must have a height of at least 5 mm except where this is not possible on account of the nature of the apparatus.

3. The CE marking must be affixed to the product or to its data plate. Additionally it must be affixed to the packaging, if any, and to the accompanying documents.

4. The CE marking must be affixed visibly, legibly and indelibly.

It must have the same height as the initials 'CE'.

----- End of Report -----