CERTIFICATE

Anbotek
Product Safety

CERTIFICATE

Of Conformity
EU Council Directive 2014/30/EU
Electromagnetic Compatibility

Registration No.: ATSZALE181015004

Report No.: SZALE181015004-01

Applicant	:	**Ledlenser Corporation Ltd.** No.25, Yudong 1 Road, Dongcheng Town, Yangdong District, Yangjiang City, GD 529931, P. R. China
Product	:	**X21R rechargeable flashlight**
Identification	:	**Model No.** : **X21R**
		Trade Mark : LEDLENSER
		Rating : **DC19V, 2.1A, 40W**
Test Standards	:	**EN 55015: 2013+A1: 2015** **EN 61000-3-2: 2014** **EN 61000-3-3: 2013** **EN 61547: 2009**

The certificate of conformity is based on an evaluation of a sample of the above-mentioned product. Technical report and documentation are at the applicant's disposal. This is to certify that the tested sample is in conformity with all provisions of Annex II of Council Directive 2014/30/EU, in its latest amended version, referred to EMC Directive. The certificate does not imply assessment of the production and does not permit the use of Lab's logo. The applicant of the certificate is authorized to use this certificate in connection with EU declaration of conformity to Article 15 of the Directive.

ANBOTEK Anbotek CERTIFICATION

Certified by

Sally Zhang

Sally Zhang
Manager

Oct. 24, 2018
Date

CE **The CE Marking may only be used if all relevant and effective EU Directives are complied with** CE

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
Tel: (86)755-26066440 Fax: (86)755-26014772
Http://www.anbotek.com Email: service@anbotek.com

EMC Test Report

For

Ledlenser Corporation Ltd.

X21R rechargeable flashlight

Model No.: X21R

Prepared For	:	Ledlenser Corporation Ltd.
Address	:	No.25, Yudong 1 Road, Dongcheng Town, Yangdong District, Yangjiang City, GD 529931, P. R. China
Prepared By	:	Shenzhen Anbotek Compliance Laboratory Limited
Address	:	1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102 Tel: (86) 755-26066440 Fax: (86) 755-26014772
Report Number	:	SZALE181015004-01
Date of Receipt	:	Oct. 15, 2018
Date of Test	:	Oct. 15~23, 2018
Date of Report	:	Oct. 23, 2018

Contents

TEST REPORT

Applicant	:	Ledlenser Corporation Ltd.
Manufacturer	:	Ledlenser Corporation Ltd.
Product Name	:	X21R rechargeable flashlight
Model No.	:	X21R
Trade Mark	:	LEDLENSER
Rating(s)	:	DC19V, 2.1A, 40W
Test Standard(s)	**:**	**EN 55015: 2013+A1: 2015;** **EN 61000-3-2: 2014;** **EN 61000-3-3: 2013;** **EN 61547: 2009;** **(IEC 61000-4-2; IEC 61000-4-3; 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. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the EN 55015, EN 61000-3-2, EN 61000-3-3 and EN 61547 requirements.

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: Oct. 15~23, 2018

Prepared By: Oliay Yang
(Engineer / Oliay Yang)

Reviewer: Well Wang
(Supervisor / Well Wang)

Approved & Authorized Signer: Sally Zhang
(Manager / Sally Zhang)

1. General Information

1.1. Client Information

Applicant	:	Ledlenser Corporation Ltd.
Address	:	No.25, Yudong 1 Road, Dongcheng Town, Yangdong District, Yangjiang City, GD 529931, P. R. China
Manufacturer	:	Ledlenser Corporation Ltd.
Address	:	No.25, Yudong 1 Road, Dongcheng Town, Yangdong District, Yangjiang City, GD 529931, P. R. China
Factory	:	Ledlenser Corporation Ltd.
Address	:	No.25, Yudong 1 Road, Dongcheng Town, Yangdong District, Yangjiang City, GD 529931, P. R. China

1.2. Description of Device (EUT)

Product Name	:	X21R rechargeable flashlight	
Model No.	:	X21R	
Trade Mark	:	LEDLENSER	
Test Power Supply	:	DC 19V via adapter AC 230V, 50Hz / DC 7.4V	
Test Sample No.	:	S1	
Product Description	:	Adapter:	Model: PSA40W-190 Input: 100-240V~, 50-60Hz, 1.0A Max 84-118VA Output: 19V⎓ 2.1A MAX
Remark: (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.			

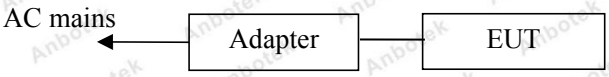
1.3. Auxiliary Equipment Used During Test

N/A		

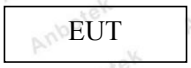
1.4. Description of Test Modes

Pretest Modes	Descriptions
Mode 1	Charging
Mode 2	On

For Mode 1 Block Diagram of Test Setup



For Mode 2 Block Diagram of Test Setup



1.5. Test Summary

Test Items	Test Modes	Status
Power Line Conducted Emission Test (9KHz To 30MHz)	Mode 1	P
Radiated Emission Test (30MHz To 300MHz)	All Mode	P
Magnetic Radiated Emission Test (9KHz To 30MHz)	Mode 2	P
Harmonic Current Test	/	N
Voltage Fluctuations and Flicker Test	Mode 1	P
Electrostatic Discharge immunity Test	All Mode	P
RF Field Strength susceptibility Test	All Mode	P
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”		

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. 17, 2017	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Nov. 17, 2017	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov. 17, 2017	1 Year
4.	Software Name EZ-EMC	Ferrari Technology	ANB-03A	N/A	N/A	N/A

Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Nov. 17, 2017	1 Year
2.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 20, 2017	1 Year
3.	Pre-amplifier	SONOMA	310N	186860	Nov. 17, 2017	1 Year
4.	Software Name EZ-EMC	Ferrari Technology	ANB-03A	N/A	N/A	N/A

Magnetic Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Nov. 17, 2017	1 Year
2.	Triple-Loop Antenna(2M)	EVERFINE	LLA-2	905003	Nov. 17, 2017	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov. 17, 2017	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	June 15, 2018	1 Year
2.	Harmonic and Flicker Analyzer	EMC-PARTNER	HRRMOINCS -1000-1P	164	Dec. 16, 2017	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	ESD-30T	ES0131505	Nov. 17, 2017	1 Year

R/S Immunity Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Signal Generator	Agilent	N5182A	MY48180656	Nov. 17, 2017	1 Year
2	Amplifier	Amplifier Research	150W1000M3	309410	N/A	N/A
3	Amplifier	Amplifier Research	60S1G3	309433	N/A	N/A
4	Log-Periodic Antenna	Schwarzbeck	VULP9118E	00992	Aug. 17, 2018	3 Year
5	Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 18, 2017	3 Year
6	Power Sensor	Agilent	E9301A	MY41498906	N/A	N/A
7	Power Sensor	Agilent	E9301A	MY41498088	N/A	N/A
8	Power Meter	Agilent	E4419B	GB40202909	N/A	N/A
9	Field Probe	ETS-Lindgren	HI-6006	00212747	Apr. 20, 2017	3 Year
10	software	EMtrace	EM 3	N/A	N/A	N/A

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. 17, 2017	1 Year
1.2	EFT-Clamp	PRIMA	EFT-Clamp	/	Nov. 17, 2017	1 Year
2.1	EFT Burst Simulator	TESEQ	NSG 3060	1480	Nov. 17, 2017	1 Year
2.2	CDN	TESEQ	CDN 3061	1408	Nov. 17, 2017	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. 17, 2017	1 Year
1.2	CDN	TESEQ	CDN 3061	1408	Nov. 17, 2017	1 Year
2.1	6kV Surge Generator	EMPEK	LSG-5060G	06010017N	Nov. 17, 2017	1 Year
2.2	CDN	EMPEK	CDN-5110G	061100005N	Nov. 17, 2017	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. 17, 2017	1 Year
2.	CDN	FRANKONIA	CDN - M2+ M3	A2210178/2012	Nov. 17, 2017	1 Year
3.	6dB Attenuator	FRANKONIA	DAM 26W	1172202	Nov. 17, 2017	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. 17, 2017	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 registed 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

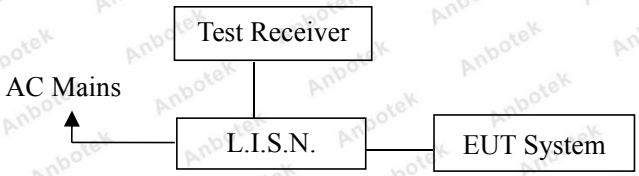
Test Standard	EN 55015

Limits for conducted emissions

	Frequency	At mains terminals (dBμV)	
		Quasi-peak Level	Average Level
Test Limit	9kHz ~ 50kHz	110	--
	50kHz ~ 150kHz	90 ~ 80*	--
	150kHz ~ 0.5MHz	66 ~ 56*	56 ~ 46*
	0.5MHz ~ 5.0MHz	56	46
	5.0MHz ~ 30MHz	60	50

Remark: (1) At the transition frequency the lower limit applies.
(2) * decreasing linearly with logarithm of the frequency.

2.2. Test Setup



2.3. EUT Configuration on Measurement

The following equipments are installed on Conducted Emission Measurement to meet EN 55015 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 table which is 0.8 meter high above the ground and connected to the AC mains through a Line Impedance Stabilization Network (L.I.S.N.). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are checked to find out the maximum conducted emission according to the EN 55015 regulations during conducted emission measurement. And the voltage probe had been used for the load terminals measurement according to the EN 55015 standard.

The bandwidth of the test receiver (R&S ESCI) is set at 200Hz in 9K~150KHz range and 9KHz in 150K~30MHz range.

The frequency range from 9KHz to 30MHz is checked.

All the test results are listed in Section 2.6.

2.6. Test Results

PASS

The test curves are shown in the following pages.

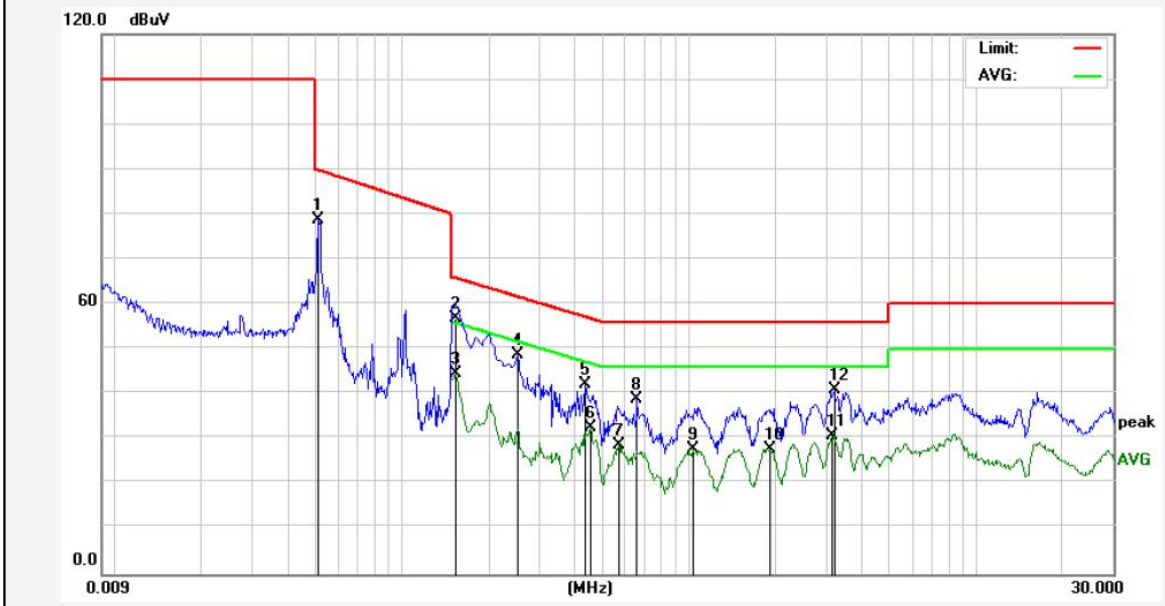
Conducted Emission Test Data

Test Site: 1# Shielded Room

Test Specification: DC 19V via adapter AC 230V, 50Hz

Comment: Live Line

Temp.: 24℃ Hum.: 53%

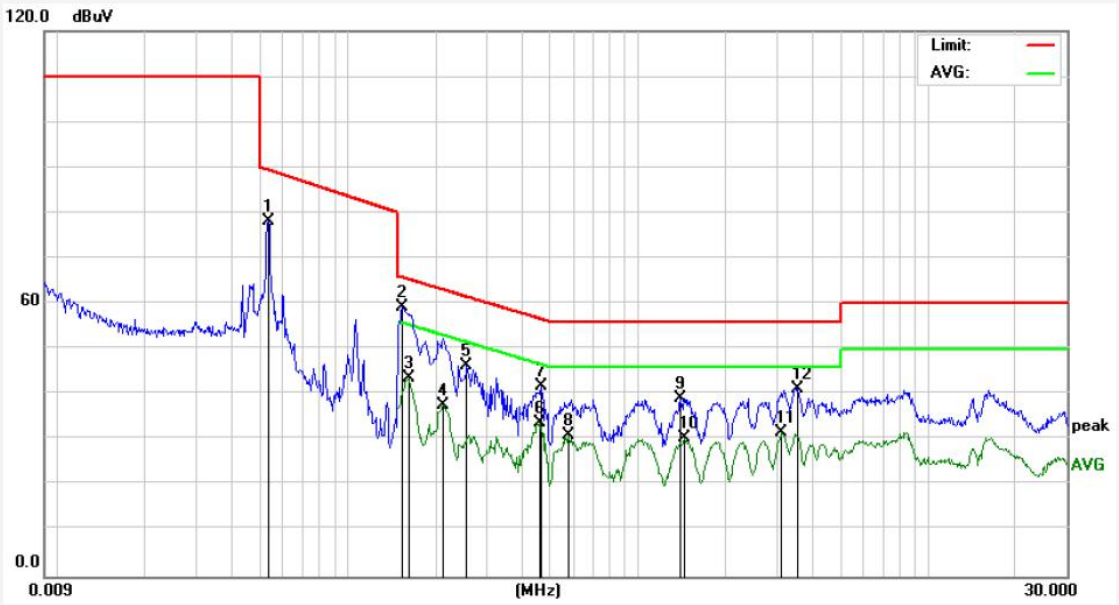


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.0514	58.97	19.88	78.85	89.75	-10.90	QP	
2	0.1539	37.06	19.90	56.96	65.78	-8.82	QP	
3	0.1539	24.53	19.90	44.43	55.78	-11.35	AVG	
4	0.2540	28.72	19.89	48.61	61.62	-13.01	QP	
5	0.4380	22.28	19.95	42.23	57.10	-14.87	QP	
6	0.4540	12.69	19.96	32.65	46.80	-14.15	AVG	
7	0.5700	8.74	20.00	28.74	46.00	-17.26	AVG	
8	0.6620	18.73	20.03	38.76	56.00	-17.24	QP	
9	1.0300	7.73	20.12	27.85	46.00	-18.15	AVG	
10	1.9140	7.71	20.14	27.85	46.00	-18.15	AVG	
11	3.1540	10.70	20.16	30.86	46.00	-15.14	AVG	
12	3.2139	20.86	20.16	41.02	56.00	-14.98	QP	

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

Conducted Emission Test Data

Test Site:	1# Shielded Room
Test Specification:	DC 19V via adapter AC 230V, 50Hz
Comment:	Neutral Line
	Temp.: 24℃ Hum.: 53%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.0533	58.25	19.88	78.13	89.42	-11.29	QP	
2	0.1539	39.31	19.90	59.21	65.78	-6.57	QP	
3	0.1620	23.77	19.90	43.67	55.36	-11.69	AVG	
4	0.2140	17.90	19.90	37.80	53.04	-15.24	AVG	
5	0.2580	26.46	19.89	46.35	61.49	-15.14	QP	
6	0.4580	13.73	19.96	33.69	46.73	-13.04	AVG	
7	0.4660	21.83	19.96	41.79	56.58	-14.79	QP	
8	0.5740	10.98	20.00	30.98	46.00	-15.02	AVG	
9	1.4060	18.96	20.13	39.09	56.00	-16.91	QP	
10	1.4460	10.44	20.13	30.57	46.00	-15.43	AVG	
11	3.1140	11.40	20.16	31.56	46.00	-14.44	AVG	
12	3.5620	21.20	20.17	41.37	56.00	-14.63	QP	

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

3. Radiated Emission Test

3.1. Test Standard and Limit

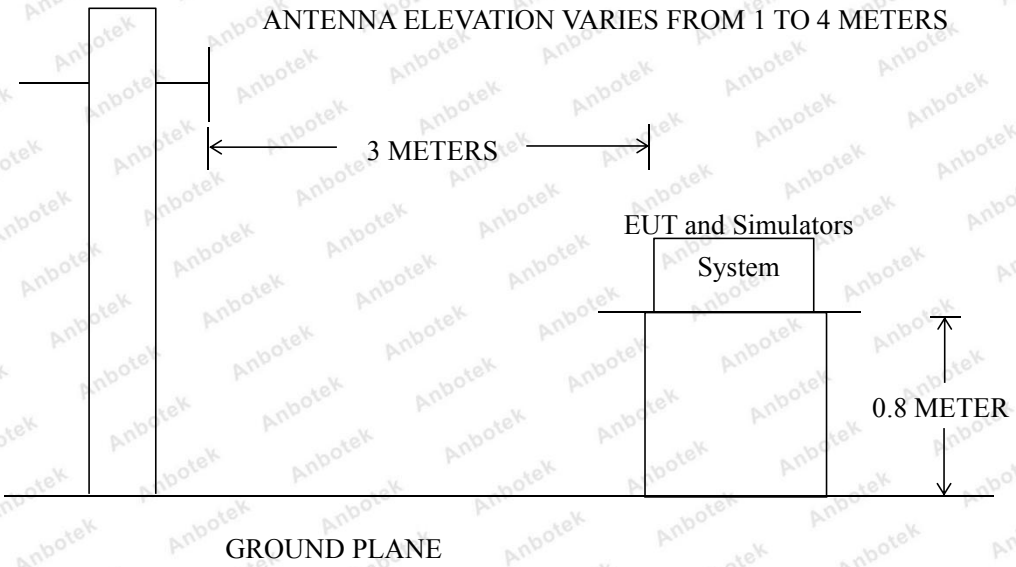
Test Standard	EN 55015

Radiated Emission Test Limit

Test Limit	Frequency (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMIT (dBμV/m)
	30 ~ 230	3	40
	230 ~ 300	3	47

Remark: (1) The smaller limit shall apply at the combination point between two frequency bands.
(2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.

3.2. Test Setup



3.3. EUT Configuration on Measurement

The EN 55015 regulations test method must be used to find the maximum emission during radiated 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 a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on an antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Bilog antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna are set on test.

The bandwidth of the Receiver (ESCI) is set at 120kHz.

The EUT is tested in Chamber.

The test results are listed in Section 3.6.

3.6. Test Results

PASS

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

The test curves are shown in the following pages.

Test item:	**Radiation Test**	**Polarization:**	**Horizontal**
Standard:	**(RE)EN55015**	**Power Source:**	**DC 19V via adapter AC 230V, 50Hz**
Distance:	**3m**	**Temp.(℃)/Hum.(%RH):**	**24.8(℃)/54%RH**
Test Mode:	**Charging**		

No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	30.0000	47.83	-18.55	29.28	40.00	-10.72	peak			
2	37.9421	30.99	-15.50	15.49	40.00	-24.51	peak			
3	56.3795	29.50	-17.80	11.70	40.00	-28.30	peak			
4	103.7818	42.03	-21.71	20.32	40.00	-19.68	peak			
5	201.8930	48.62	-19.92	28.70	40.00	-11.30	peak			
6	233.4110	43.61	-19.08	24.53	47.00	-22.47	peak			

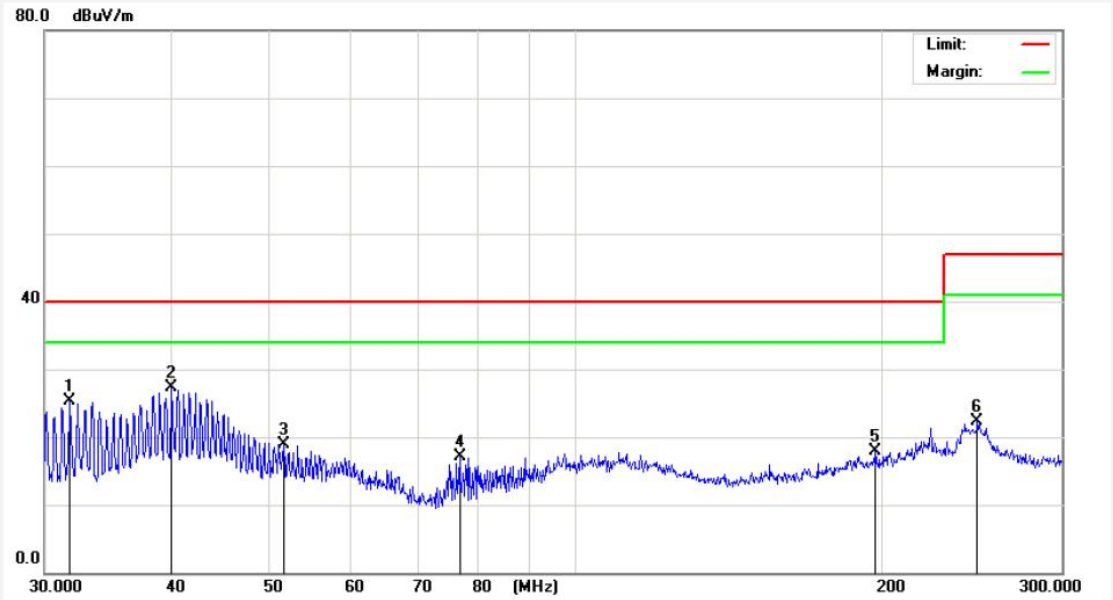
Note: **Result=Reading+Factor Over Limit=Result-Limit**

Test item:	**Radiation Test**	**Polarization:**	**Vertical**
Standard:	**(RE)EN55015**	**Power Source:**	**DC 19V via adapter AC 230V, 50Hz**
Distance:	**3m**	**Temp.(℃)/Hum.(%RH):**	**24.8(℃)/54%RH**
Test Mode:	**Charging**		

No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	30.2792	50.36	-17.47	32.89	40.00	-7.11	QP	100	0	
2	35.7373	43.81	-15.68	28.13	40.00	-11.87	peak			
3	41.7947	38.00	-13.89	24.11	40.00	-15.89	peak			
4	86.9203	43.18	-18.69	24.49	40.00	-15.51	peak			
5	148.6351	39.62	-18.36	21.26	40.00	-18.74	peak			
6	240.5034	39.38	-14.49	24.89	47.00	-22.11	peak			

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

Test item:	**Radiation Test**	**Polarization:**	**Horizontal**
Standard:	**(RE)EN55015**	**Power Source:**	**DC 7.4V**
Distance:	**3m**	**Temp.(℃)/Hum.(%RH):**	**24.8(℃)/54%RH**
Test Mode:	**On**		



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	31.7776	43.39	-18.03	25.36	40.00	-14.64	peak			
2	40.0056	41.74	-14.37	27.37	40.00	-12.63	peak			
3	51.5373	36.49	-17.62	18.87	40.00	-21.13	peak			
4	76.7576	40.14	-23.01	17.13	40.00	-22.87	peak			
5	196.8436	38.08	-20.21	17.87	40.00	-22.13	peak			
6	247.8114	41.33	-18.93	22.40	47.00	-24.60	peak			

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

Test item:	**Radiation Test**	**Polarization:**	**Vertical**
Standard:	**(RE)EN55015**	**Power Source:**	**DC 7.4V**
Distance:	**3m**	**Temp.(℃)/Hum.(%RH):**	**24.8(℃)/54%RH**
Test Mode:	**On**		

No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	32.2940	44.12	-16.88	27.24	40.00	-12.76	peak			
2	38.9153	40.12	-13.96	26.16	40.00	-13.84	peak			
3	42.1814	39.23	-14.00	25.23	40.00	-14.77	peak			
4	76.2292	33.21	-21.40	11.81	40.00	-28.19	peak			
5	157.0801	29.30	-18.00	11.30	40.00	-28.70	peak			
6	239.9503	35.24	-14.49	20.75	47.00	-26.25	peak			

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

4. Magnetic Radiated Emission Test

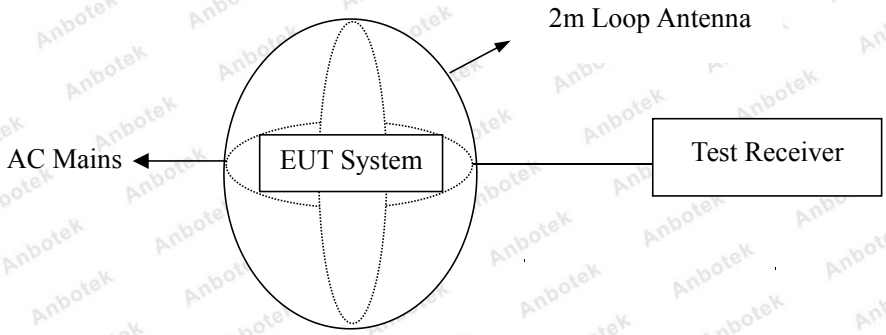
4.1. Test Standard and Limit

Test Standard	EN 55015

Limits for Magnetic Radiated Emission

	Frequency	Limits for loop diameter (dBμA)
		2m
Test Limit	9KHz ~ 70KHz	88
	70KHz ~ 150KHz	88 ~ 58*
	150KHz ~ 3.0MHz	58 ~ 22*
	3.0MHz ~ 30MHz	22
Remark: (1) At the transition frequency the lower limit applies. (2) * decreasing linearly with logarithm of the frequency.		

4.2. Test Setup



4.3. EUT Configuration on Measurement

The following equipments are installed on Magnetic Radiated emission Measurement to meet EN 55015 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

4.4. Operating Condition of EUT

4.4.1. Setup the EUT as shown in Section 4.2.

4.4.2. Turn on the power of all equipments.

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

4.5. Test Procedure

The EUT is placed on a wood table in the center of a loop antenna. The induced current in the loop antenna is measured by means of a current probe and the test receiver. Three field components are checked by means of a coaxial switch.

The frequency range from 9KHz to 30MHz is investigated. The receiver is measured with the quasi-peak detector. For frequency band 9KHz to 150KHz, the bandwidth of the test receiver (ESCI) is set at 200Hz. For frequency band 150KHz to 30MHz, the bandwidth is set at 9KHz.

All the test results are listed in Section 4.6.

4.6. Test Results

PASS

The frequency range from 9KHz to 30MHz is investigated.

The test curves are shown in the following pages.

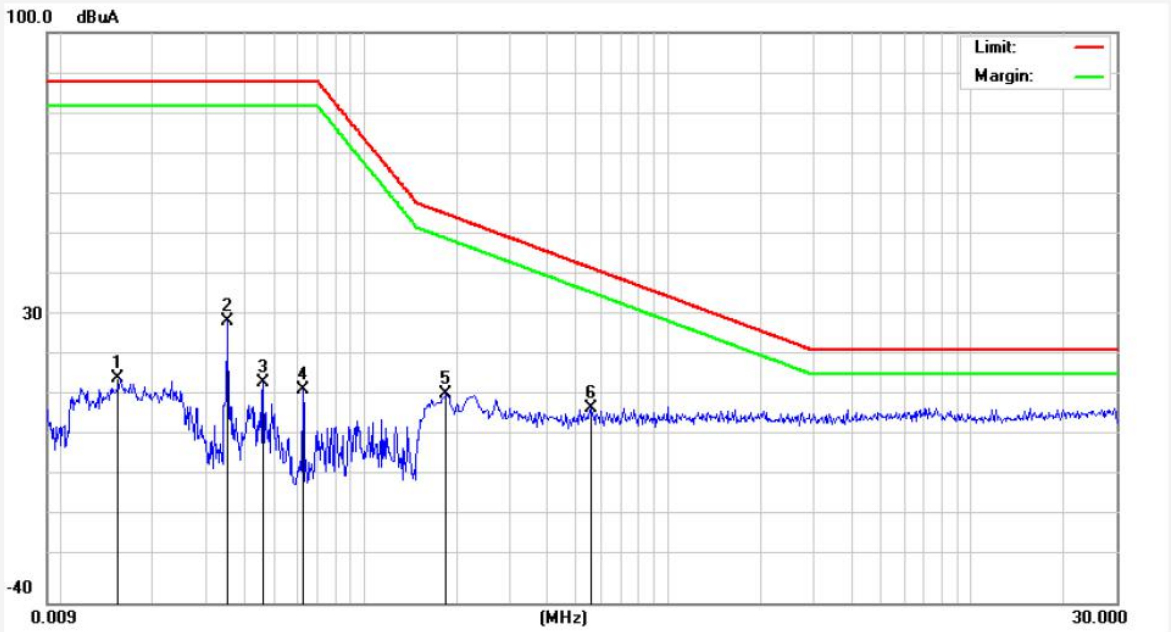
Magnetic Radiated Emission Test

Test Site: 1# Shielded Room

Test Specification: DC 7.4V

Comment: X

Temp.: 24.2℃ Hum.: 59%



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Over Limit (dB)	Detector	Remark
1	0.0154	15.07	0.02	15.09	88.00	-72.91	QP	
2	0.0352	28.97	0.02	28.99	88.00	-59.01	QP	
3	0.0463	14.01	0.01	14.02	88.00	-73.98	QP	
4	0.0629	12.15	0.02	12.17	88.00	-75.83	QP	
5	0.1859	11.12	0.01	11.13	55.41	-44.28	QP	
6	0.5620	7.74	0.01	7.75	42.12	-34.37	QP	

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

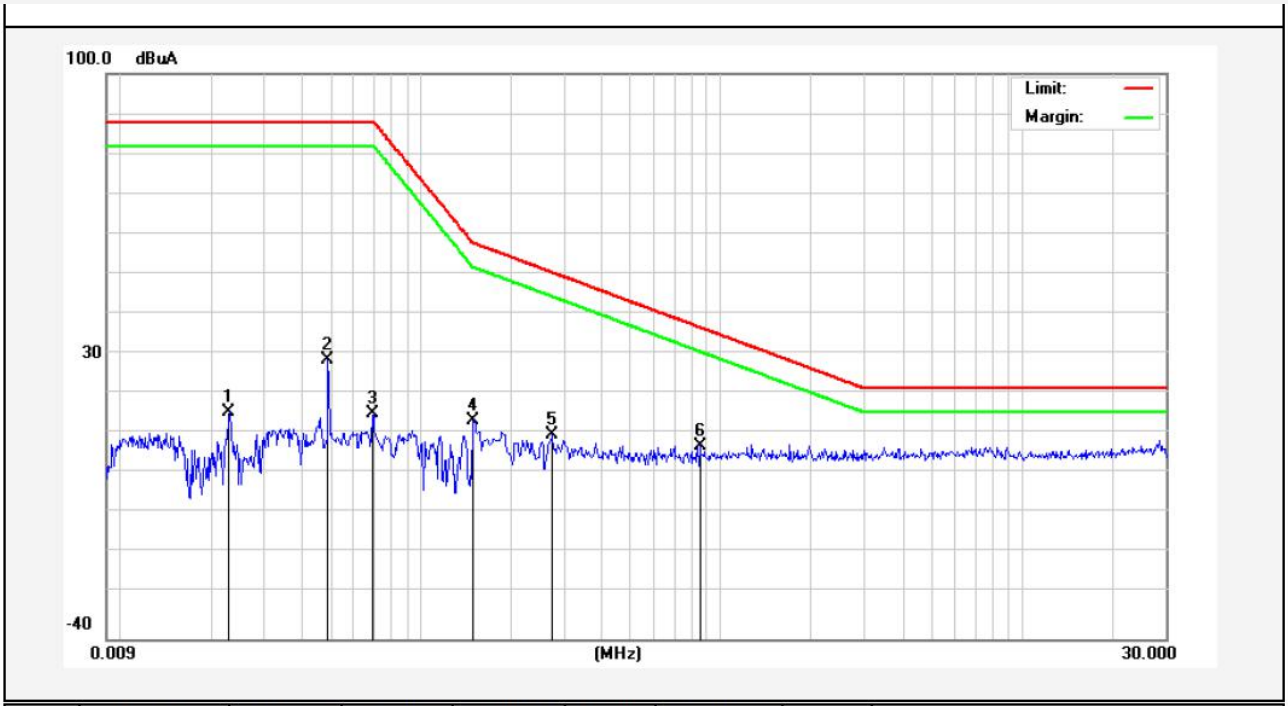
Magnetic Radiated Emission Test

Test Site: 1# Shielded Room

Test Specification: DC 7.4V

Comment: Y

Temp.: 24.2℃ Hum.: 59%

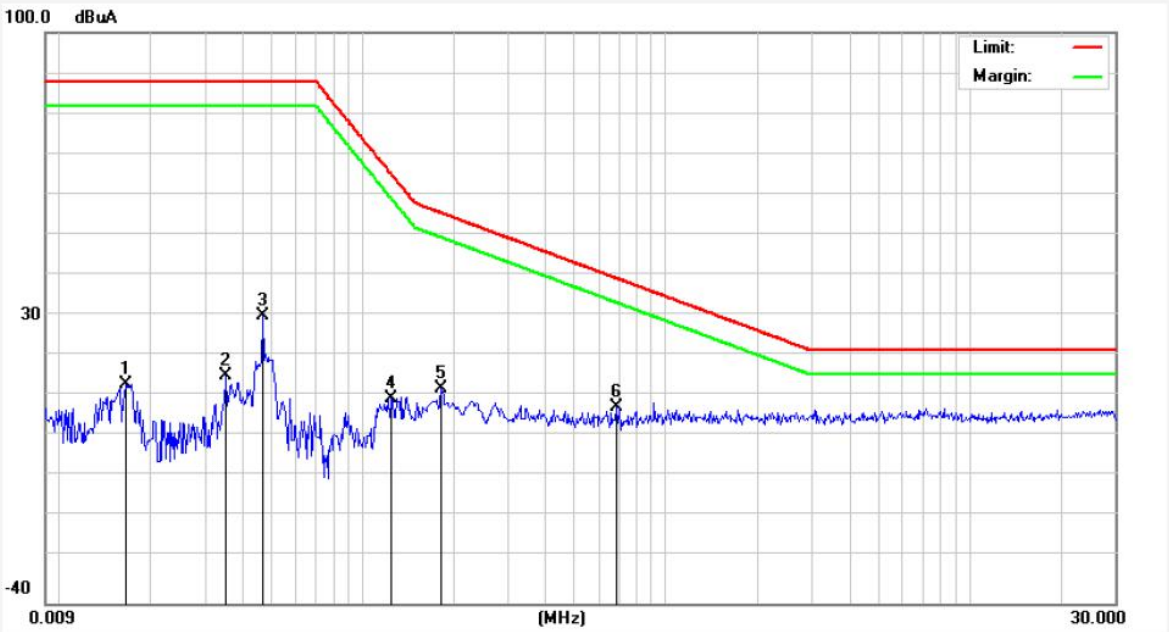


No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Over Limit (dB)	Detector	Remark
1	0.0229	16.30	0.01	16.31	88.00	-71.69	QP	
2	0.0492	29.16	0.01	29.17	88.00	-58.83	QP	
3	0.0694	15.80	0.01	15.81	88.00	-72.19	QP	
4	0.1499	13.90	0.01	13.91	58.00	-44.09	QP	
5	0.2740	10.47	0.01	10.48	50.75	-40.27	QP	
6	0.8497	7.75	0.01	7.76	37.16	-29.40	QP	

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

Magnetic Radiated Emission Test

Test Site:	1# Shielded Room
Test Specification:	DC 7.4V
Comment:	Z
	Temp.: 24.2℃ Hum.: 59%



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Over Limit (dB)	Detector	Remark
1	0.0165	13.70	0.02	13.72	88.00	-74.28	QP	
2	0.0354	15.74	0.02	15.76	88.00	-72.24	QP	
3	0.0466	30.49	0.01	30.50	88.00	-57.50	QP	
4	0.1241	10.23	0.01	10.24	65.44	-55.20	QP	
5	0.1819	12.65	0.01	12.66	55.68	-43.02	QP	
6	0.6860	8.23	0.01	8.24	39.73	-31.49	QP	

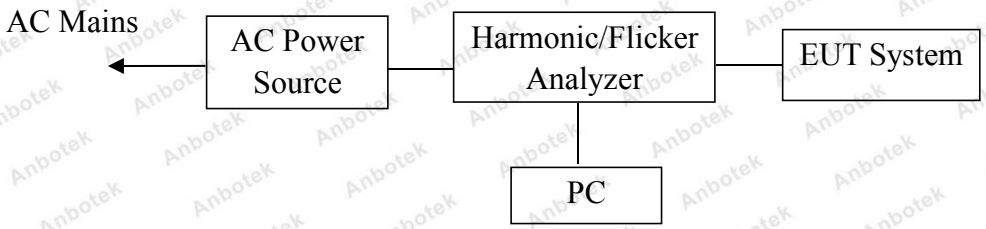
Note: **Result=Reading+Factor** **Over Limit=Result-Limit**

5. Harmonic Current Emission Test

5.1. Test Standard

Test Standard	EN 61000-3-2

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

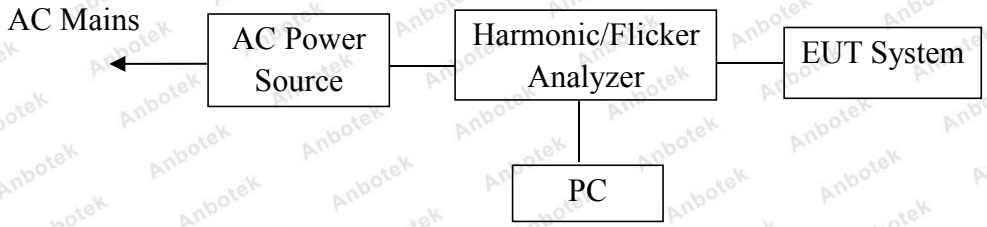
The active input power of the EUT is less than 25W. Therefore, according to EN 61000-3-2, no limits are necessary.

6. Voltage Fluctuations & Flicker Test

6.1. Test Standard

Test Standard	EN 61000-3-3

6.2. Test Setup



6.3. Operating Condition of EUT

6.3.1. Setup the EUT as shown on Section 6.2.

6.3.2. Turn on the power of all equipments.

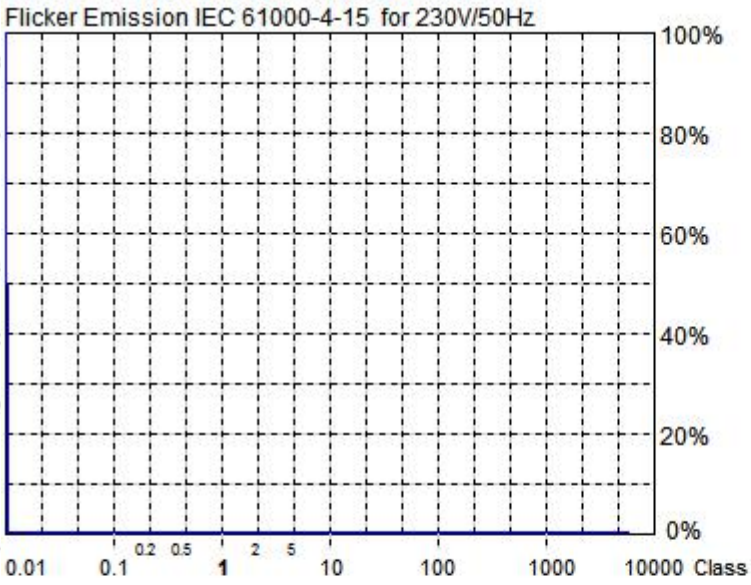
6.3.3. After that, let the EUT work in test mode measure it.

6.4. Test Results

PASS

The test curves are shown in the following pages.

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



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

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

Urms =	229.5	V	P =	22.19	W
Irms =	0.237	A	pf =	0.407	

Range: 2 A
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 =**	**50.000**	**Range:**	**2 A**
Irms =	**0.237A**	**Ipk =**	**1.121A**	**cf =**	**4.724**
P =	**22.19W**	**S =**	**54.47VA**	**pf =**	**0.407**

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

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

Limits :	**Plt :**	**0.65**	**Pst :**	**1.00**
	dmax :	**4.00 %**	**dc :**	**3.00 %**
	dtLim:	**3.30 %**	**dt>Lim:**	**500ms**

Test aborted, Result: PASSED

	dmax [%]	dc [%]	dt>Lim [ms]
1	0.000	0.000	0.000

7. Electrostatic Discharge Immunity Test

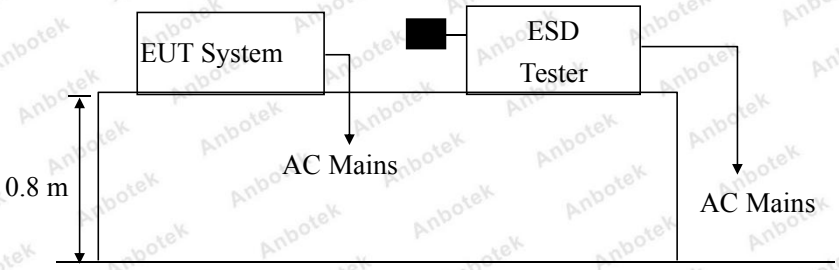
7.1. Test Standard and Level

Test Standard:	EN 61547 (IEC 61000-4-2)
Performance Criterion:	A
Severity Level: 3 / Air Discharge: ±8kV, Level: 2 / Contact Discharge: ±4kV	

Test Level

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

7.2. Test Setup



7.3. EUT Configuration on Measurement

The following equipments are installed on Electrostatic Discharge immunity Measurement to meet EN 61547 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 on Section 7.2.

7.4.2. Turn on the power of all equipments.

7.4.3. After that, let the EUT work in test mode measure it.

7.5. Test Procedure

7.5.1. 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.

7.5.2. Contact Discharge:

All the procedure shall be same as Section 7.5.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

7.5.3. 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.

7.5.4. 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.

7.6. Test Results

PASS

Please refer to the following page.

Electrostatic Discharge Test Results

Air discharge :	±8.0kV	Temperature :	21.5℃
Contact discharge :	±4.0kV	Humidity :	53.2%
Power Supply :	DC 19V via adapter AC 230V, 50Hz / DC 7.4V	Criterion required :	A
Test Result :	☒ Pass ☐ Fail		
# For each point positive 10 times and negative 10 times discharge			

Location		**Kind** A-Air Discharge C-Contact Discharge	**Result**
Surface Crack	10 points	A	☑ A ☐ B ☐ C ☐ D
Charging Port	4 points	A	☑ A ☐ B ☐ C ☐ D
Button	4 points	A	☑ A ☐ B ☐ C ☐ D
HCP	4 points	C	☑ A ☐ B ☐ C ☐ D
VCP of the front	4 points	C	☑ A ☐ B ☐ C ☐ D
VCP of the rear	4 points	C	☑ A ☐ B ☐ C ☐ D
VCP of the left	4 points	C	☑ A ☐ B ☐ C ☐ D
VCP of the right	4 points	C	☑ A ☐ B ☐ C ☐ D

Remark: Discharge should be considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).

8. RF Field Strength Susceptibility Test

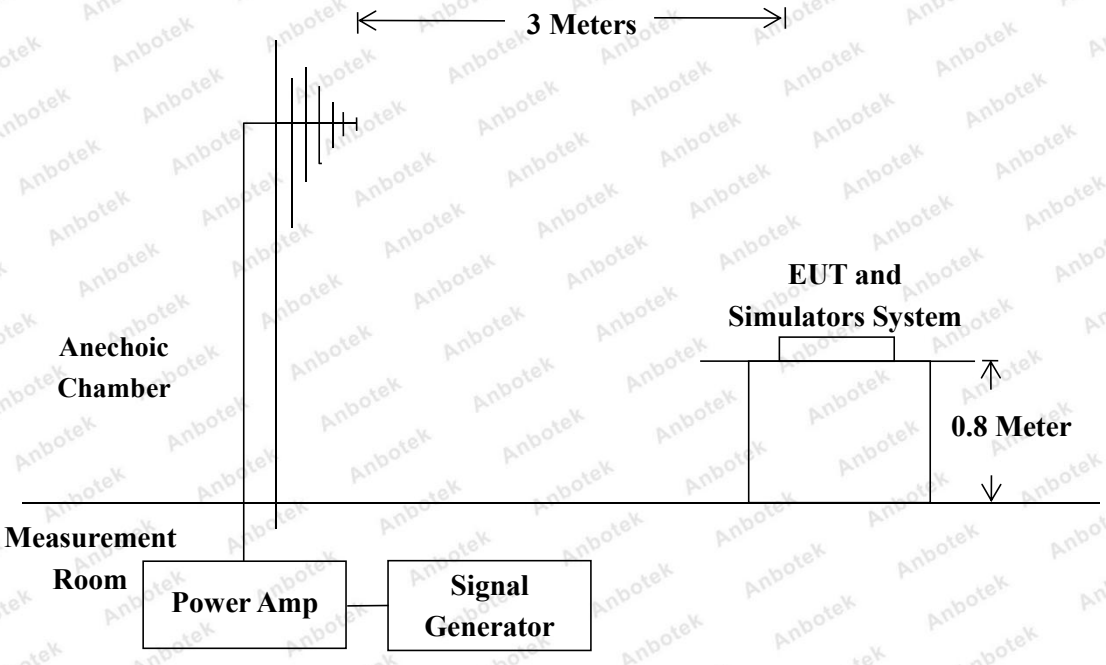
8.1. Test Standard and Level

Test Standard:	EN 61547 (IEC 61000-4-3)
Required Performance:	A
Frequency Range:	80MHz to 1000MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	at least 0.5s

Test Level

Level	Field Strength V/m
1.	1
2.	3
3.	10
X.	Special

8.2. Test Setup



8.3. EUT Configuration on Measurement

The following equipments are installed on RF Field Strength susceptibility Measurement to meet EN 61547 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 on Section 8.2.

8.4.2. Turn on the power of all equipments.

8.4.3. After that, let the EUT work in test mode measure it.

8.5. Test Procedure

The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber. The testing distance from antenna to the EUT was 3 meters.

1) The field strength level was 3V/m.

2) The frequency range is swept from 80 MHz to 1000 MHz with the signal 80% amplitude modulated with a 1kHz sine wave.

3) The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond, but shall in no case be less than 0.5s.

4) The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

8.6. Measuring Results

PASS

Please refer to the following page.

RF Field Strength Susceptibility Test Results

Field Strength :	3V/m	Temperature :	22℃
Criterion required :	A	Humidity :	54%
Power Supply :	DC 19V via adapter AC 230V, 50Hz / DC 7.4V	Test Result :	☒ Pass ☐ Fail
Dwell Time:	1s		

Frequency Range (MHz)	Antenna Polarity	R.F. Field Strength	Azimuth	Result
80~1000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	☑ A ☐ B ☐ C ☐ D
			Rear	
			Left	
			Right	

9. Electrical Fast Transient/Burst Immunity Test

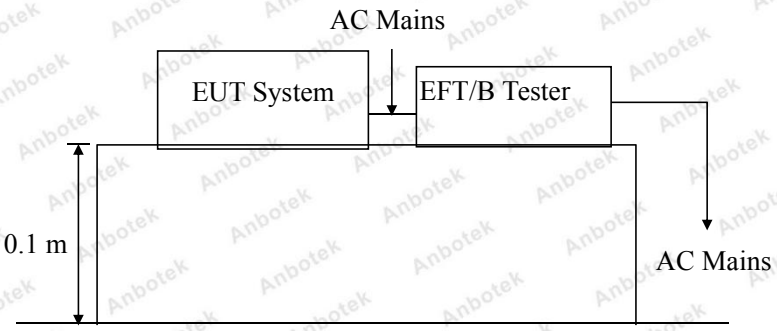
9.1. Test Standard and Level

Test Standard:	EN 61547 (IEC 61000-4-4)
Performance criterion:	B
Severity Level 2: 1.00kV	

Test Level

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

9.2. Test Setup



9.3. EUT Configuration on Measurement

The following equipments are installed on Electrical Fast Transient/Burst Immunity Measurement to meet EN 61547 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

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.

9.5.1. 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.

9.5.2. For signal lines and control lines ports:

Select tests based on product characteristics.

9.5.3. For DC output line ports:

Select tests based on product characteristics.

9.6. Test Results

PASS

Please refer to the following page.

Electrical Fast Transient/Burst Test Results

Ambient Condition : 22.5℃ / 58% RH	Criterion required : B
Power Supply .: DC 19V via adapter AC 230V, 50Hz	Test Result : ☒ Pass ☐ Fail

Inject Line : AC Mains	Inject Method: Direct	Inject Time(s): 120

Line	Polarity	Test Voltage (kV)	Result
AC Line	±	1.00kV	☑ A ☐ B ☐ C ☐ D
DC Line			
Signal Line			

10. Surge Immunity Test

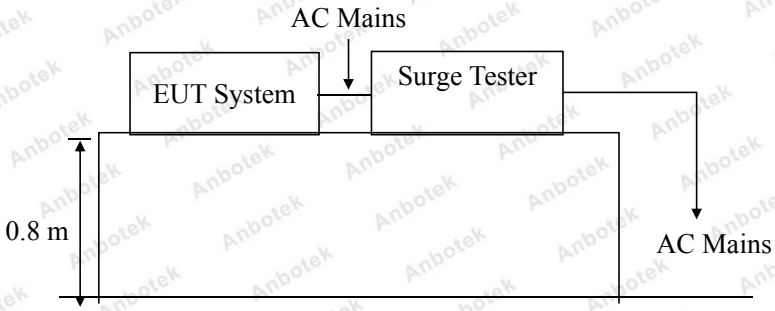
10.1. Test Standard and Level

Test Standard:	EN 61547 (IEC 61000-4-5)
Performance criterion:	B
Severity Level 1, Line to Line: 0.5kV	

Test Level

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

10.2. Test Setup



10.3. EUT Configuration on Measurement

The following equipments are installed on Surge immunity Measurement to meet EN 61547 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

10.5.1. Set up the EUT and test generator as shown on Section 10.2.

10.5.2. For line to line coupling mode, provide a 0.5 kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.

10.5.3. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.

10.5.4. Different phase angles are done individually.

10.5.5. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

10.6. Test Results

PASS

Please refer to the following page.

Surge Immunity Test Results

Humidity :	59%	Temperature :	21.6℃
Power Supply :	DC 19V via adapter AC 230V, 50Hz	Criterion required:	B
Test Result :	☒ Pass ☐ Fail		

Location	Polarity	Phase Angle	Number of Pulse	Pulse Voltage (kV)	Result
L-N	±	☐ 0° ☒ 90° ☐ 180° ☒ 270°	5	0.5kV	☑ A ☐ B ☐ C ☐ D
L-PE					
N-PE					

11. Injected Currents Susceptibility Test

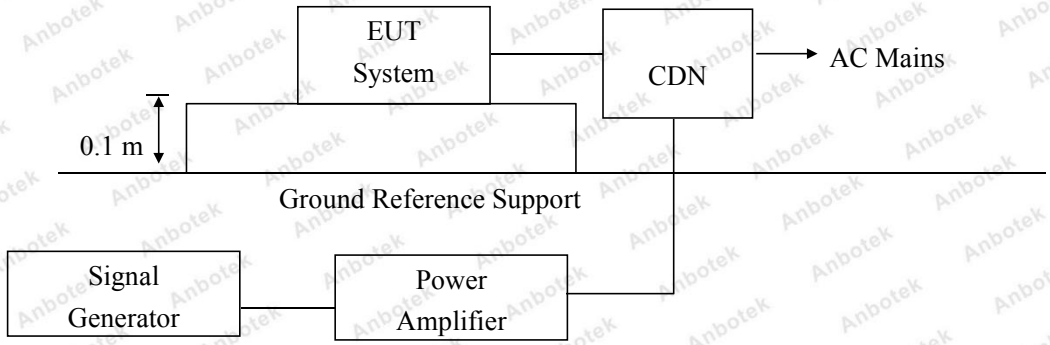
11.1. Test Standard and Level

Test Standard:	EN 61547 (IEC 61000-4-6)
Performance criterion:	A
Severity Level 2: 3V (rms), (0.15MHz ~80MHz)	

Test Level

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

11.2. Test Setup



11.3. EUT Configuration

The following equipments are installed on currents susceptibility Measurement to meet EN 61547 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

11.4. Operating Condition of EUT

11.4.1. Setup the EUT as shown in Section 11.2.

11.4.2. Turn on the power of all equipments.

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

11.5. Test Procedure

1) Set up the EUT, CDN and test generators as shown on Section 11.2.
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 80MHz 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*10-3decades/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.

11.6. Test Results

PASS

Please refer to the following page.

Injected Currents Susceptibility Test Results

Humidity : 55%		Temperature : 25℃	
Power Supply : DC 19V via adapter AC 230V, 50Hz		Criterion required: A	
Test Result : ☒ Pass ☐ Fail			
Frequency Range (MHz)	Injected Position	Strength (Unmodulated)	Result
0.15 ~ 80	AC Mains	3V	☑ A ☐ B ☐ C ☐ D

Remark : 1. Modulation Signal:1KHz 80% AM

12. Voltage Dips And Interruptions Test

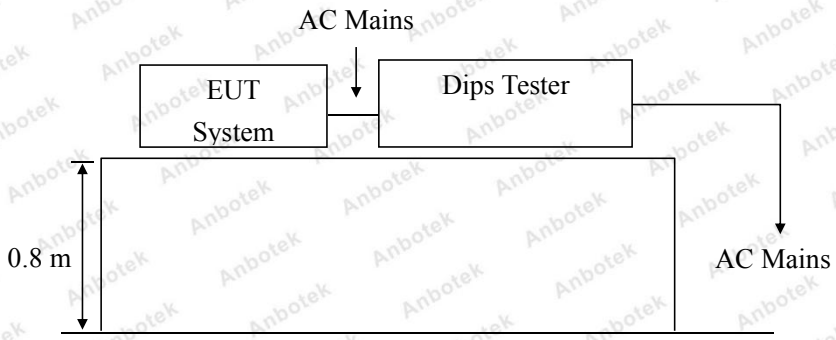
12.1. Test Standard and Level

Test Standard:	EN 61547 (IEC 61000-4-11)
Performance Criterion:	B&C

Test Level

Test Level %UT	Voltage dip and short interruptions %UT	Duration (in period)
0	100	0.5
70	30	10 *

12.2. Test Setup



12.3. EUT Configuration on Measurement

The following equipments are installed on Voltage dips and interruptions Measurement to meet EN 61547 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

12.4. Operating Condition of EUT

12.4.1. Setup the EUT as shown in Section 12.2.

12.4.2. Turn on the power of all equipments.

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

12.5. Test Procedure

1) Set up the EUT and test generator as shown on Section 12.2.
2) The interruptions is introduced at selected phase angles with specified duration.
3) Record any degradation of performance.

12.6. Test Results

PASS

Please refer to the following page.

Voltage Dips and Interruptions Test Results

Temperature : 23℃		Humidity : 57%	
Power Supply : DC 19V via adapter AC 230V, 50Hz		Criterion required : B&C	
Test Result : ☒ Pass ☐ Fail			
Test Level % UT	Voltage Dips & Short Interruptions % UT	Duration (in periods)	Result
0	100	0.5P	☐ A ☑ B ☐ C ☐ D
70	30	10P	☐ A ☐ B ☑ C ☐ D
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 Radiated Emission Test

Photo of Magnetic Radiated Emission Test

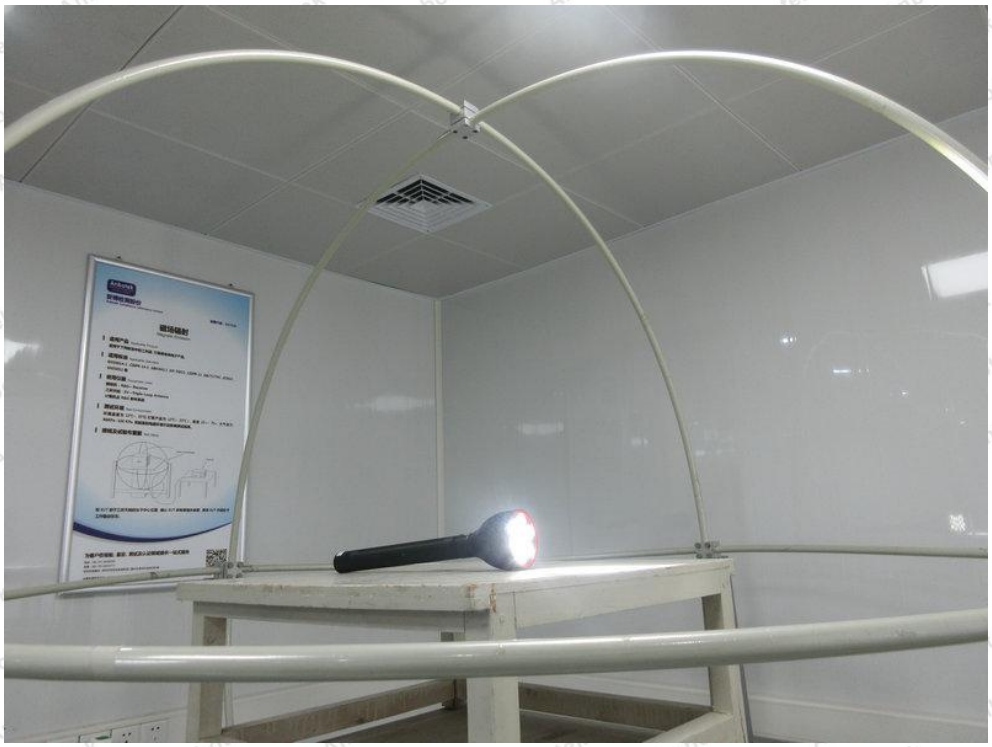


Photo of Flicker/ Harmonic Test

Photo of Electrostatic Discharge Immunity Test

Photo of Electrostatic Discharge Immunity Test

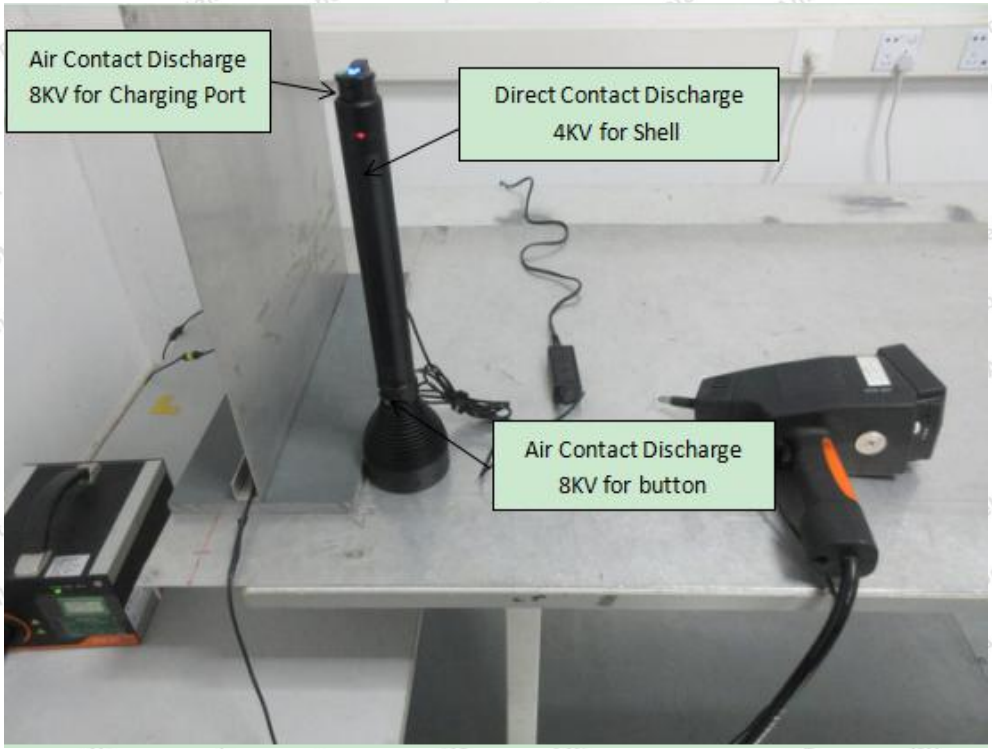


Photo of RF Field Strength susceptibility Test

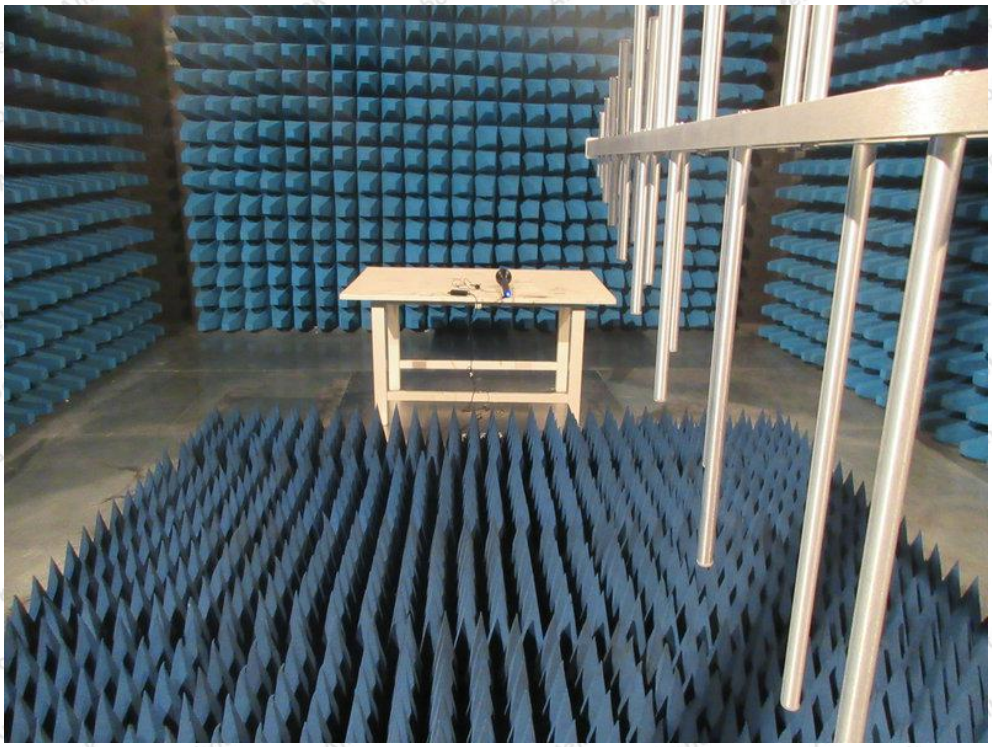


Photo of Electrical Fast Transient/Burst Immunity Test

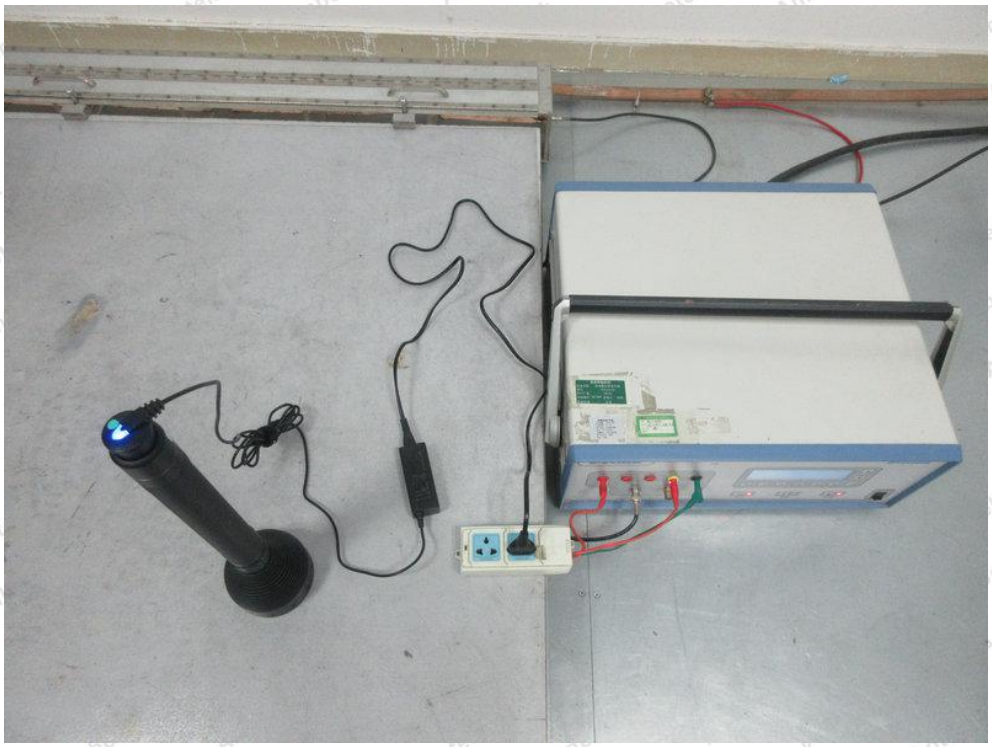


Photo of Surge Immunity Test

Photo of Injected currents susceptibility Test

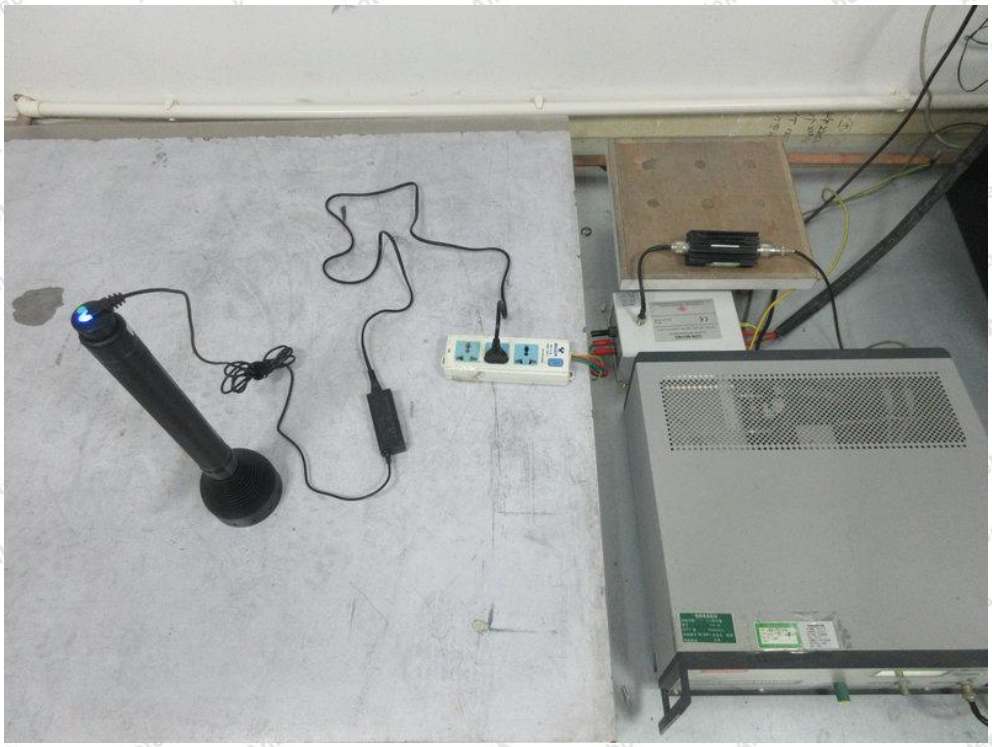
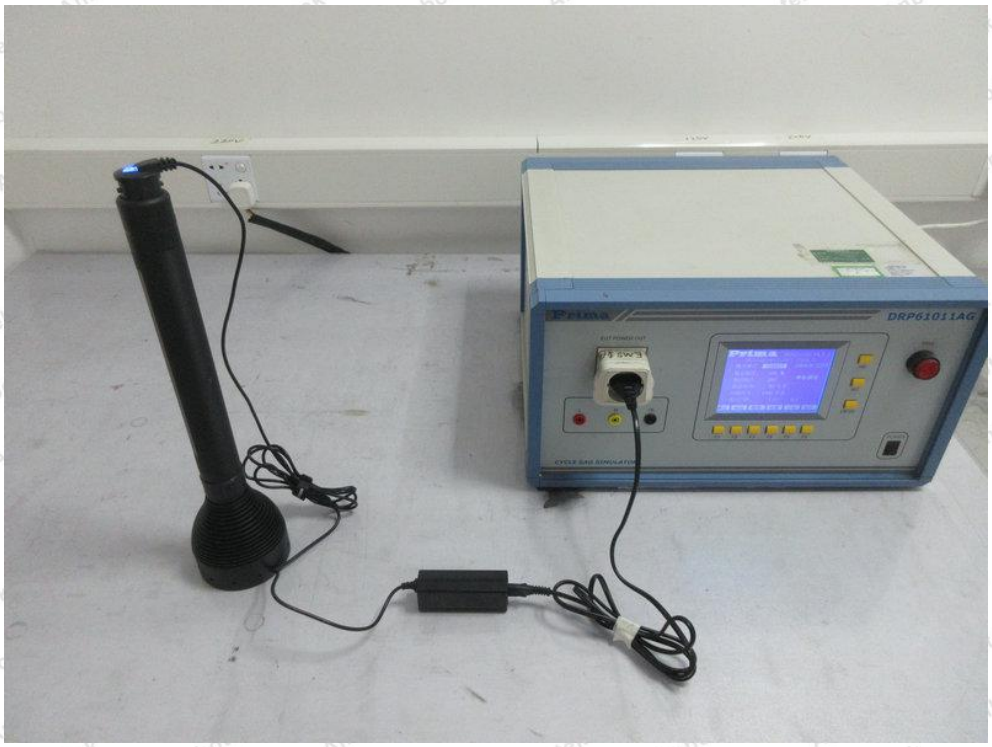
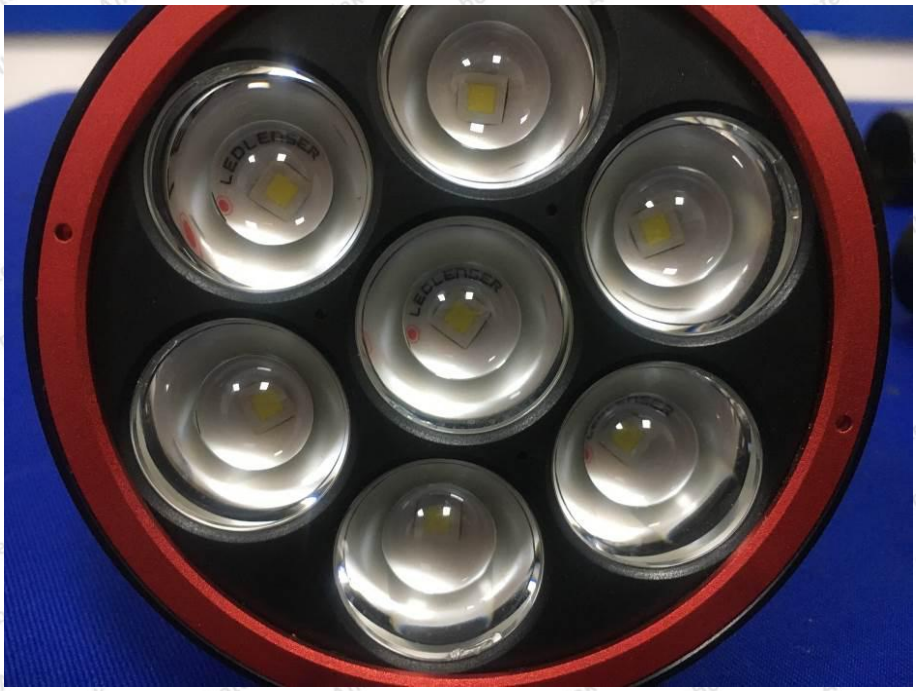


Photo of Voltage Dips and Interruptions Test



APPENDIX II -- EXTERNAL PHOTOGRAPH

APPENDIX III -- INTERNAL PHOTOGRAPH




Ledlenser GmbH & Co. KG
Kronenstr. 5-7
42699 Solingen
Germany
CE

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 ----------