



CE/EMC TEST REPORT

For

Shenzhen Rose Lighting Technology Co., Ltd.

Product Name:	LED decorative Lighting
Brand Name:	Rose Lighting
Model Number:	RL-STR--ws2811-5050RGB-XXX(X may be number from 0 to 9 or letters from A to Z or blank) Please refer to the next page for additional models
Prepared For:	Shenzhen Rose Lighting Technology Co., Ltd.
Address:	No.53 Yuexing Rd, Guanlan Street, Longhua District, Shenzhen, China
Prepared By:	Shenzhen Yacetong Testing Technology Services Co., Ltd.
Address:	Room 5009 Baode Industry Center, Baode Industry Center, Lixin South Road, Huaide Community, Fuyong, Baoan District, Shenzhen, China
Report No.:	ATT2020SZ0520171E



Additional Model		
1	RL-STR--5050-XXX	RL-STR-sk6812-5050RGB-XXX
2	RL-STR--2535-XXX	RL-STR-sk6812-5050RGBW-XXX
3	RL-STR--3528-XXX	RL-STR-sk6812-3535RGBW-XXX
4	RL-STR--2216-XXX	RL-STR- sk6812-5050-W-XXX
5	RL-STR--020-XXX	RL-STR- ws2811-5050RGB-XXX
6	RL-STR--4040-XXX	RL-STR-UCS1903-5050RGB-XXX
7	RL-STR--3535-XXX	RL-STR- RT1809 -5050RGB-XXX
8	RL-STR--COB-XXX	RL-STR- ws2815-5050RGB-XXX
9	RL-STR--4020-XXX	RL-STR- ws2813-5050RGB-XXX
10	RL-STR--5050-5050RGB-XXX	RL-STR- GS8208-5050RGB-XXX
11	RL-STR--5050-5050RGBW-XXX	RL-STR-TM1814-5050-RGBW-XXX
12	RL-STR-sk9822A-5050RGB-XXX	RL-STR- ws2801-5050RGB-XXX
13	RL-STR- sk9822-5050RGB-XXX	RL-STR- DMX512-5050RGB-XXX
14	RL-STR- apa102C-5050RGB-XXX	RL-STR-DMX512-5050RGBW-XXX
15	RL-STR- HD107s-5050RGB-XXX	RL-STR--5630-XXX
16	RL-STR- HD108-5050RGB-XXX	RL-Bar- DMX512-5050RGB-XXX
17	RL-Bar- ws2811-5050RGB-XXX	RL-Bar-DMX512-5050RGBW-XXX
18	RL-Bar- sk6812-5050RGB-XXX	RL-Bar- ws2815-5050RGB-XXX
19	RL-Bar- GS8208-5050RGB-XXX	RL-Bar- DMX512-3535RGB-XXX
20	RL-Bar- DMX512-3535-white-XXX	RL-Bar- UCS2904-5050RGBW-XXX
21	RL-R-sk6812-XXXX	RL-P-sk6812-XXXX
22	RL-neon-1023	RL-neon-1020
23	RL-neon-1616	RL-neon-1225
24	RL-neon-3020	RL-neon-0612

Note: X may be number from 0 to 9 or letters from A to Z or blank



TABLE OF CONTENT

	Page
Test Report Declaration	6
1. GENERAL INFORMATION	6
1.1. Description of Device (EUT)	6
1.2. Tested System Details	6
1.3. Test Uncertainty	6
2. TEST INSTRUMENT USED	7
3. CONDUCTED EMISSION AT THE MAINS TERMINALS TEST	10
3.1. Block Diagram Of Test Setup	10
3.2. Test Standard	10
3.3. Power Line Conducted Emission Limit	10
3.4. EUT Configuration on Test	10
3.5. Operating Condition of EUT	10
3.6. Test Procedure	11
3.7. Test Result	11
4. MAGNETIC EMISSION TEST	12
4.1. Block Diagram Of Test Setup	12
4.2. Test Standard	12
4.3. Power Line Conducted Emission Limit	12
4.4. EUT Configuration on Test	12
4.5. Operating Condition of EUT	12
4.6. Test Procedure	13
4.7. Test Result	13
5. RADIATION EMISSION TEST	17
5.1. Block Diagram of Test Setup	17
5.2. Test Standard	17
5.3. Radiation Limit	17
5.4. EUT Configuration on Test	17
5.5. Operating Condition of EUT	18
5.6. Test Procedure	18
5.7. Test Result	18
6. HARMONIC CURRENT EMISSION TEST	21
6.1. Block Diagram of Test Setup	21
6.2. Test Standard	21
6.3. Operating Condition of EUT	21
6.4. Test Procedure	21
6.5. Test Results	21
7. VOLTAGE FLUCTUATIONS & FLICKER TEST	22
7.1. Block Diagram of Test Setup	22
7.2. Test Standard	22
7.3. Operating Condition of EUT	22
7.4. Test Procedure	22
7.5. Test Results	22
8. IMMUNITY TEST OF GENERAL THE PERFORMANCE CRITERIA	23
9. ELECTROSTATIC DISCHARGE IMMUNITY TEST	24
9.1. Block Diagram of Test Setup	24
9.2. Test Standard	24
9.3. Severity Levels and Performance Criterion	24
9.4. Test Procedure	25
9.5. Test Results	25



10. RF FIELD STRENGTH SUSCEPTIBILITY TEST26

10.1. Block Diagram of Test Setup..... 26

10.2. Test Standard..... 26

10.3. Severity Levels and Performance Criterion..... 26

10.4. Test Procedure 27

10.5. Test Results 27

11. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST28

11.1. Block Diagram of EUT Test Setup 28

11.2. Test Standard..... 28

11.3. Severity Levels and Performance Criterion..... 28

11.4. Test Procedure 28

11.5. Test Results 29

12. SURGE TEST30

12.1. Block Diagram of EUT Test Setup 30

12.2. Test Standard..... 30

12.3. Severity Levels and Performance Criterion..... 30

12.4. Test Procedure 30

12.5. Test Result 30

13. INJECTED CURRENTS SUSCEPTIBILITY TEST31

13.1. Block Diagram of EUT Test Setup 31

13.2. Test Standard..... 31

13.3. Severity Levels and Performance Criterion..... 31

13.4. Test Procedure 32

13.5. Test Result 32

14. MAGNETIC FIELD IMMUNITY TEST33

14.1. Block Diagram of Test Setup..... 33

14.2. Test Standard..... 33

14.3. Severity Levels and Performance Criterion..... 33

14.4. Test Procedure 33

14.5. Test Results 33

15. VOLTAGE DIPS AND INTERRUPTIONS TEST35

15.1. Block Diagram of EUT Test Setup 35

15.2. Test Standard..... 35

15.3. Severity Levels and Performance Criterion..... 35

15.4. Test Procedure 35

15.5. Test Result 35

16. EUT PHOTOS.....36



TEST RESULT CERTIFICATION

Applicant : Shenzhen Rose Lighting Technology Co., Ltd.
Address : No.53 Yuexing Rd, Guanlan Street, Longhua District, Shenzhen, China
Manufacturer : Shenzhen Rose Lighting Technology Co., Ltd.
Address : No.53 Yuexing Rd, Guanlan Street, Longhua District, Shenzhen, China
EUT : LED decorative Lighting
Brand Name : Rose Lighting
Model Number : RL-STR--WS2811-5050RGB-XXX
Please refer to the additional model on page 2
Date of Receipt: : May 11, 2020
Test Date : May 18-20, 2020
Date of Report : May 20, 2020
Test Result: : The equipment under test was found to be compliance with the requirements of the standards applied.

Test Procedure Used:

EMI : EN 55015:2013+A1:2015
EN 61000-3-2:2014, EN 61000-3-3:2013
EMS : EN 61547:2009
EN 61000-4-2:2009, EN 61000-4-3: 2006+A1:2008+A2:2010
EN 61000-4-4:2012, EN 61000-4-5:2014, EN 61000-4-6:2014
EN 61000-4-8:2010, EN 61000-4-11:2004

Prepared by(Engineer): Helen Lin
Reviewer(Supervisor): Peter peng
Approved(Manager): Jim he



This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen Yacetong Testing Technology Services Co., Ltd.



1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : LED decorative Lighting

Brand Name : Rose Lighting

Model Number : RL-STR--WS2811-5050RGB-XXX
Please refer to the additional model on page 2

Model Difference : Only model name, LED Specifications and length are different

Power Supply : DC 5-24V

Note: RL-STR--WS2811-5050RGB-XXX was selected as the test model and the data's have been recorded in this report.

1.2. Tested System Details

None.

1.3. Test Uncertainty

Conducted Emission Uncertainty : $\pm 2.66\text{dB}$

Radiated Emission Uncertainty : $\pm 4.26\text{dB}$



2. TEST INSTRUMENT USED

For Conducted Emission at the mains terminals Test

Conducted Emission Test (A --- site)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
843 Shielded Room	ChengYu	843 Room	843	Aug. 15, 2019	Aug. 14, 2020
EMI Receiver	R&S	ESCI	101421	Aug. 15, 2019	Aug. 14, 2020
LISN	Schwarzbeck	NSLK8127	8127739	Aug. 15, 2019	Aug. 14, 2020
Attenuator	R&S	ESH3-Z2	BCTC021E	Aug. 15, 2019	Aug. 14, 2020

For Magnetic Emission Test

Conducted Emission Test (A --- site)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
843 Shielded Room	ChengYu	843 Room	843	Aug. 15, 2019	Aug. 14, 2020
EMI Receiver	R&S	ESCI	101421	Aug. 15, 2019	Aug. 14, 2020
Three-loop antenna	DAZE	ZN30401	13017	Aug. 15, 2019	Aug. 14, 2020
Attenuator	R&S	ESH3-Z2	BCTC021E	Aug. 15, 2019	Aug. 14, 2020
843 Cable 2#	FUJIKURA	843C1#	002	Aug. 15, 2019	Aug. 14, 2020

For Radiated Emission Test

Radiation Emission Test (966 chamber)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
966 chamber	ChengYu	966 Room	966	Aug. 15, 2019	Aug. 14, 2020
Spectrum Analyzer	Agilent	E4407B	MY45109572	Aug. 15, 2019	Aug. 14, 2020
Amplifier	Schwarzbeck	BBV9743	9743-119	Aug. 15, 2019	Aug. 14, 2020
Amplifier	Schwarzbeck	BBV9718	9718-270	Aug. 15, 2019	Aug. 14, 2020
Log-periodic Antenna	Schwarzbeck	VULB9160	VULB9160-3369	Aug. 15, 2019	Aug. 14, 2020
EMI Receiver	R&S	ESCI	101421	Aug. 15, 2019	Aug. 14, 2020
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1275	Aug. 15, 2019	Aug. 14, 2020
966 Cable 1#	CHENGYU	966	004	Aug. 15, 2019	Aug. 14, 2020
966 Cable 2#	CHENGYU	966	003	Aug. 15, 2019	Aug. 14, 2020



For Harmonic & Flicker Test

For Harmonic / Flicker Test (A --- site)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Harmonic / Flicker Analyzer	KIKUSUI	KHA1000	VA002445	Aug. 15, 2019	Aug. 14, 2020
AC Power Supply	KIKUSUI	PCR4000M	UK001879	Aug. 15, 2019	Aug. 14, 2020
Line Impedance network	KIKUSUI	LIN1020JF	UL001611	Aug. 15, 2019	Aug. 14, 2020

For Electrostatic Discharge Immunity Test

For Electrostatic Discharge Immunity Test (A --- site)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
ESD Tester	KIKUSUI	KES4201A	UH002321	Aug. 15, 2019	Aug. 14, 2020

For RF Field Strength Susceptibility Test(SMQ)

For RF Field Strength Susceptibility Test (SMQ --- site)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Signal Generator	HP	8648A	3625U00573	Aug. 15, 2019	Aug. 14, 2020
Amplifier	A&R	500A100	17034	Aug. 15, 2019	Aug. 14, 2020
Amplifier	A&R	100W/1000M1	17028	Aug. 15, 2019	Aug. 14, 2020
Audio Analyzer (20Hz~1GHz)	Panasonic	2023B	202301/428	Aug. 15, 2019	Aug. 14, 2020
Isotropic Field Probe	A&R	FP2000	16755	Aug. 15, 2019	Aug. 14, 2020
Antenna	EMCO	3108	9507-2534	Aug. 15, 2019	Aug. 14, 2020
Log-periodic Antenna	A&R	AT1080	16812	Aug. 15, 2019	Aug. 14, 2020

For Electrical Fast Transient /Burst Immunity Test

For Electrical Fast Transient/Burst Immunity Test (A --- site)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Burst Tester	Prima	EFT61004AG	PR14054467	Aug. 15, 2019	Aug. 14, 2020
Coupling Clamp	Prima	EFT61004AG	BCTC009E	Aug. 15, 2019	Aug. 14, 2020



For Surge Test

For Surge Test (A --- site)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Surge Tester	Prima	SUG61005BX	PR12045446	Aug. 15, 2019	Aug. 14, 2020

For Injected Currents Susceptibility Test

For Injected Currents Susceptibility Test (A --- site)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
C/S Test System	SCHLODER	CDG600	126B1281	Aug. 15, 2019	Aug. 14, 2020
CDN	SCHLODER	CDN-M2+3	A2210320/2015	Aug. 15, 2019	Aug. 14, 2020
Injection Clamp	SCHLOBER	EMCL-20	132A1214/2015	Aug. 15, 2019	Aug. 14, 2020

For Magnetic Field Immunity Test

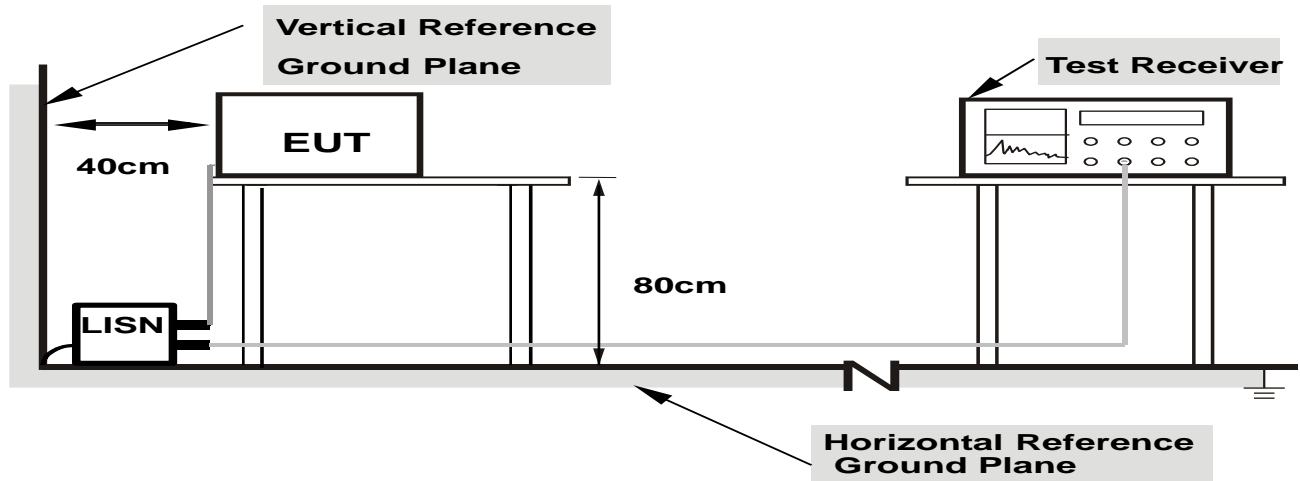
For Magnetic Field Immunity Test (A --- site)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Magnetic field generator	HTEC	HPFMF	15701	Aug. 15, 2019	Aug. 14, 2020

For Voltage Dips Interruptions Test

For Voltage Dips Interruptions Test (A --- site)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Dips Tester	Prima	DRP61011AG	PR14086284	Aug. 15, 2019	Aug. 14, 2020

3. CONDUCTED EMISSION AT THE MAINS TERMINALS TEST

3.1. Block Diagram Of Test Setup



- Note: 1. Support units were connected to second LISN.**
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.2. Test Standard

EN 55015

3.3. Power Line Conducted Emission Limit

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.009 ~ 0.05	110	N/A
0.05 ~ 0.15	90 ~ 80*	N/A
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

- Notes: 1. *Decreasing linearly with logarithm of frequency.
 2. The lower limit shall apply at the transition frequencies.

3.4. EUT Configuration on Test

The following equipments are installed on conducted emission test to meet EN55015 requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

3.5. Operating Condition of EUT

3.5.1 Setup the EUT and simulators as shown in Section 3.1.



3.5.2 Turn on the power of all equipments.

3.5.3 Let the EUT work in test modes and test it.

3.6. Test Procedure

The EUT is put on the ground and connected to the AC mains through a Artificial Mains Network (AMN). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are checked to find out the maximum conducted emission levels according to the EN55015 regulations during conducted emission test.

The bandwidth of the test receiver (R&S Test Receiver ESCI) is set at 10KHz.

The frequency range from 150 KHz to 30 MHz is investigated.

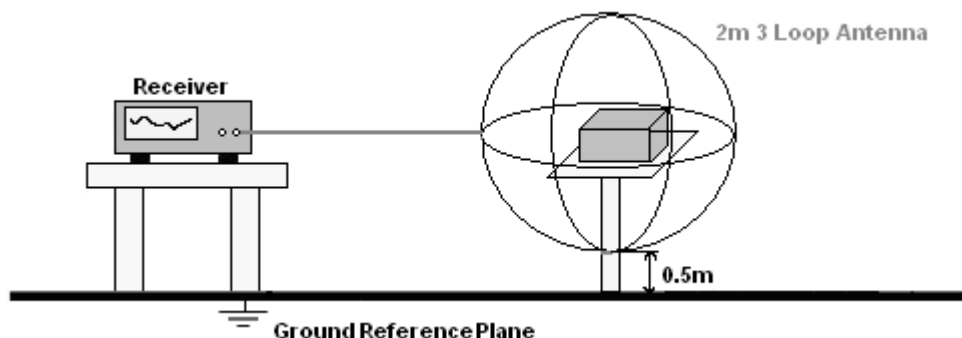
3.7. Test Result

The EUT is powered by DC5-24V, no requirements for this item.



4. MAGNETIC EMISSION TEST

4.1. Block Diagram Of Test Setup



4.2. Test Standard

EN 55015

4.3. Power Line Conducted Emission Limit

Frequency MHz	Limits dB(μ A)
	Quasi-peak Level
0.009 ~ 0.07	88
0.07 ~ 0.15	88 ~ 58*
0.15 ~ 0.50	58 ~ 22*
0.50 ~ 5.00	22

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

4.4. EUT Configuration on Test

The following equipments are installed on conducted emission test to meet EN55015 requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

4.5. Operating Condition of EUT

- 3.5.1 Setup the EUT and simulators as shown in Section 3.1.
- 3.5.2 Turn on the power of all equipments.
- 3.5.3 Let the EUT work in test modes and test it.



4.6. 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 is checked by means of a coax 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 field strength meter (R&S Test Receiver ESCI) is set at 200Hz. For frequency band 150KHz to 30MHz , the bandwidth is set at 10KHz.

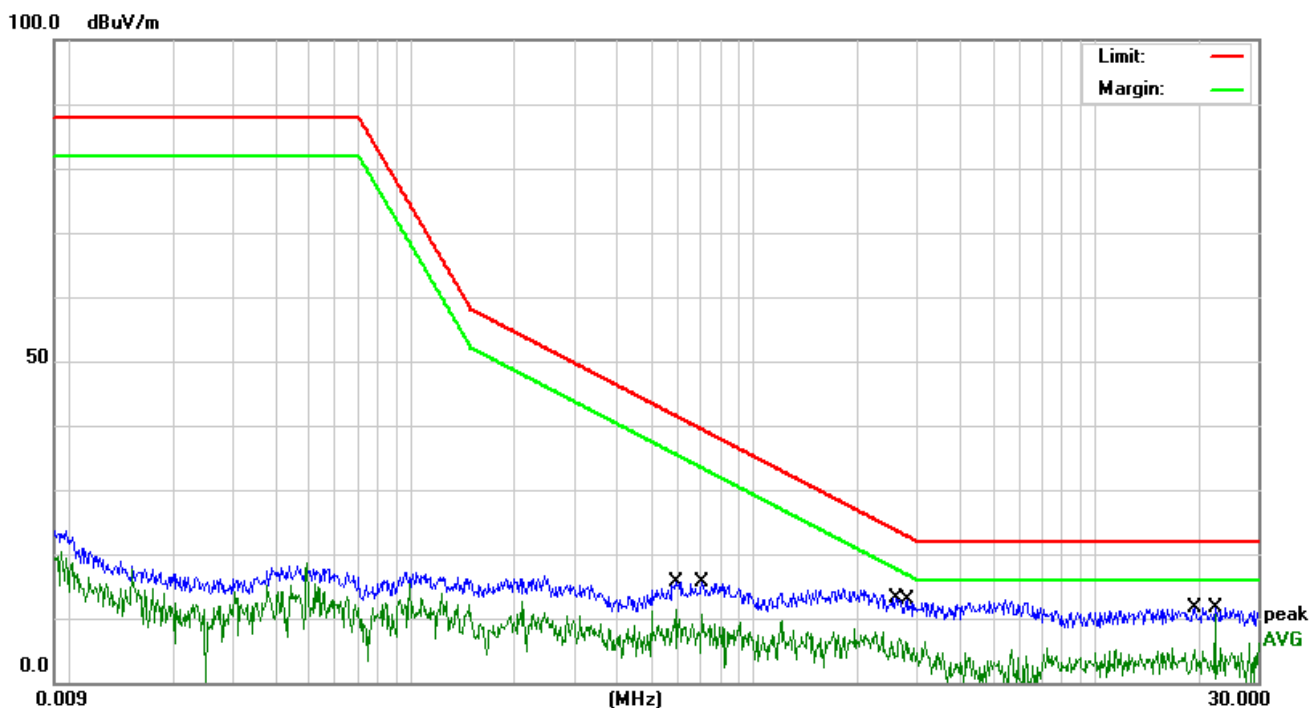
4.7. Test Result

PASS

Please refer to the following page.



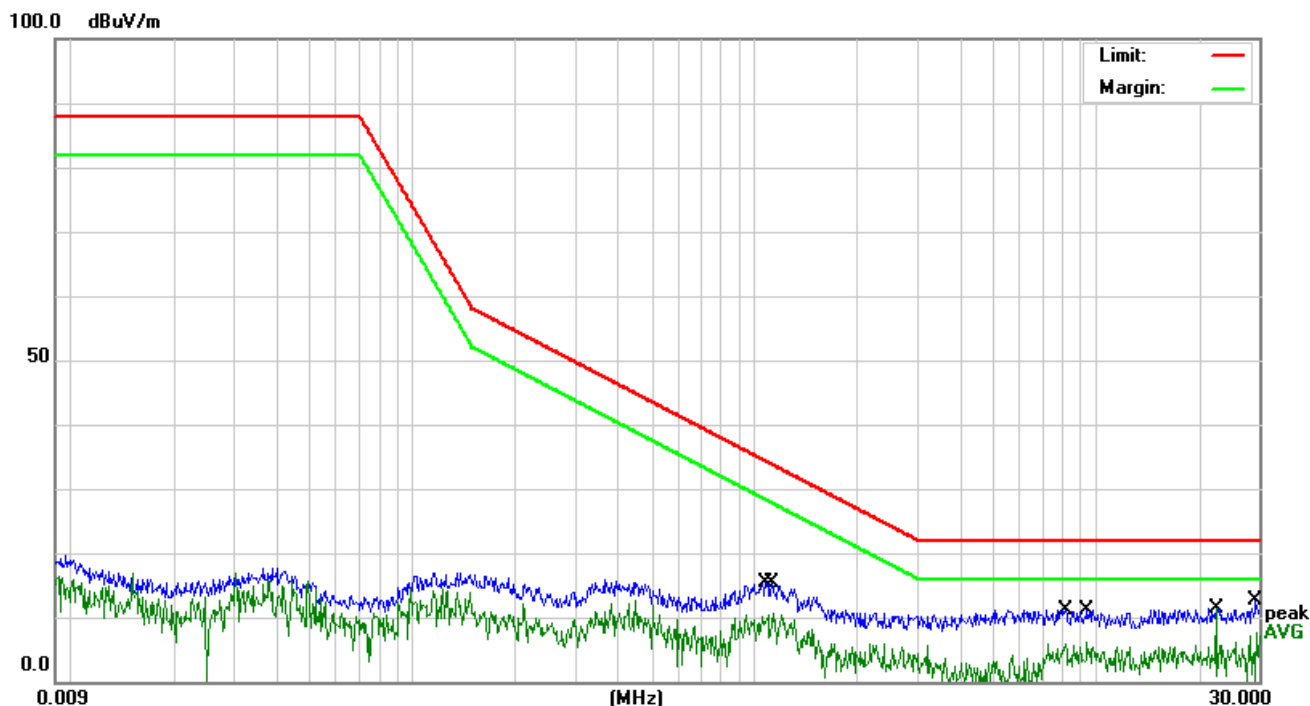
Magnetic Emission Test Data			
Temperature:	24.5 °C	Relative Humidity:	54%
Pressure:	1009hPa	Ant. Polarity	X
Test Voltage :	DC24V	Test Mode:	ON Mode



No.	Mk.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		0.5916	1.61	9.89	11.50	41.51	-30.01	AVG	
2		0.7072	5.86	9.89	15.75	39.36	-23.61	QP	
3		2.6748	-3.13	9.92	6.79	23.38	-16.59	AVG	
4	*	2.8311	3.07	9.93	13.00	22.70	-9.70	QP	
5		19.5167	10.75	1.00	11.75	22.00	-10.25	QP	
6		22.4024	9.73	1.00	10.73	22.00	-11.27	AVG	



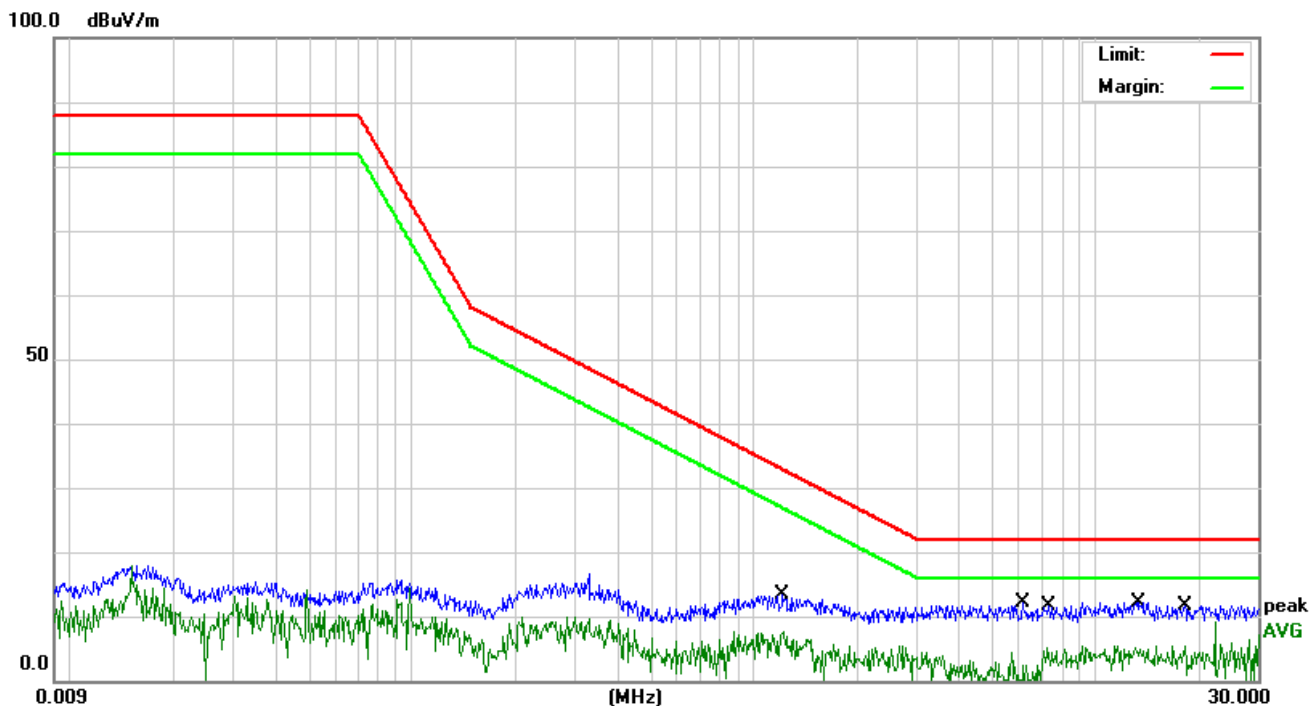
Magnetic Emission Test Data			
Temperature:	24.5 °C	Relative Humidity:	54%
Pressure:	1009hPa	Ant. Polarity	Y
Test Voltage :	DC24V	Test Mode:	ON Mode



No.	Mk.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		1.0783	5.60	9.90	15.50	34.29	-18.79	QP	
2		1.1320	0.68	9.90	10.58	33.71	-23.13	AVG	
3		8.1271	1.30	9.95	11.25	22.00	-10.75	QP	
4		9.4047	-3.91	9.95	6.04	22.00	-15.96	AVG	
5		22.4025	10.38	1.00	11.38	22.00	-10.62	AVG	
6	*	29.2787	11.68	0.87	12.55	22.00	-9.45	QP	



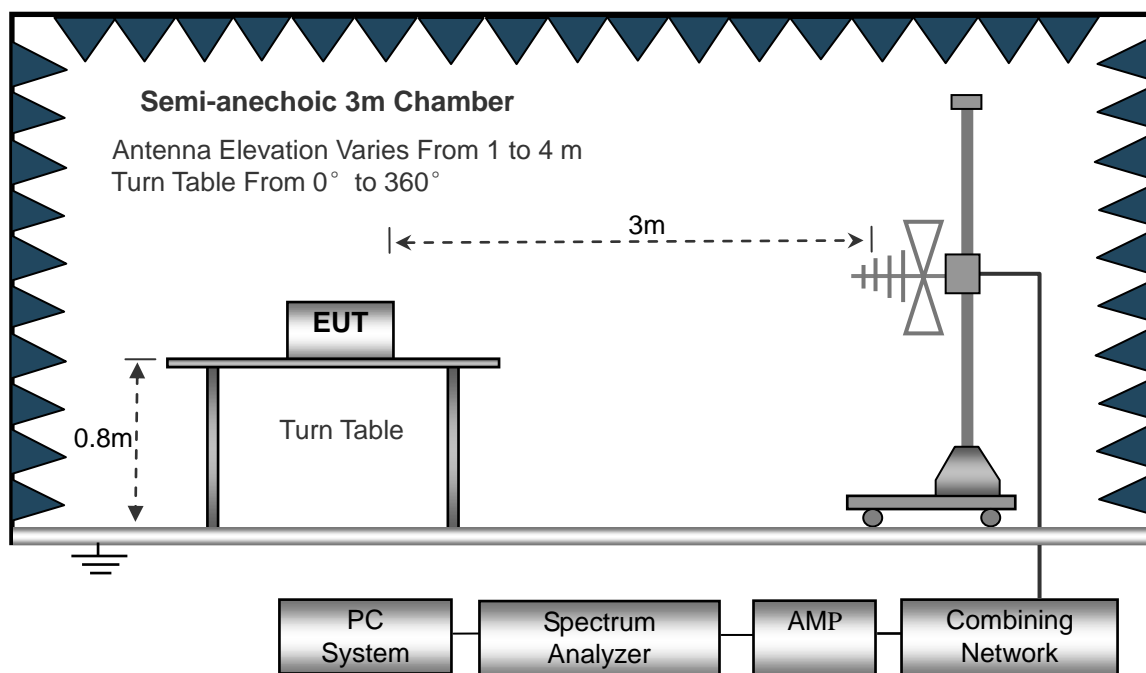
Magnetic Emission Test Data			
Temperature:	24.5 °C	Relative Humidity:	54%
Pressure:	1009hPa	Ant. Polarity	Z
Test Voltage :	DC24V	Test Mode:	ON Mode



No. Mk.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measurement dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	1.2178	3.50	9.90	13.40	32.83	-19.43	QP	
2	1.2276	-2.35	9.90	7.55	32.74	-25.19	AVG	
3	6.1183	2.27	9.93	12.20	22.00	-9.80	QP	
4	7.2546	-4.81	9.95	5.14	22.00	-16.86	AVG	
5 *	13.4386	11.25	1.00	12.25	22.00	-9.75	QP	
6	18.2905	4.32	1.00	5.32	22.00	-16.68	AVG	

5. RADIATION EMISSION TEST

5.1. Block Diagram of Test Setup



5.2. Test Standard

EN 55015

5.3. Radiation Limit

Frequency MHz	Distance (Meters)	Field Strengths Limits dB(μ V)/m
30 ~ 230	3	40.0
230 ~ 300	3	47.0

Remark:

- (1) Emission level (dB(μ V)/m) = 20 log Emission level (μ V/m)
- (2) The smaller limit shall apply at the cross point between two frequency bands.
- (3) Distance refers to the distance in meters between the measuring instrument, antenna and the closed point of any part of the device or system.

5.4. EUT Configuration on Test

The EN55015 regulations test method must be used to find the maximum emission during radiated emission test.

The configuration of EUT is the same as used in conducted emission test.

Please refer to Section 2.2.



5.5. Operating Condition of EUT

Same as conducted emission test, which is listed in Section 2.2 except the test set up replaced as Section 4.1.

5.6. Test Procedure

The EUT and its simulators are placed on a turned table that is 0.8 meter above the ground. The turned 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 that is mounted on the antenna tower. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated biconical and log periodical antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on test. In order to find the maximum emission levels, the interface cable must be manipulated according to EN55015 on radiated emission test.

The bandwidth setting on the field strength meter (R&S Test Receiver ESCI) is set at 120KHz.

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

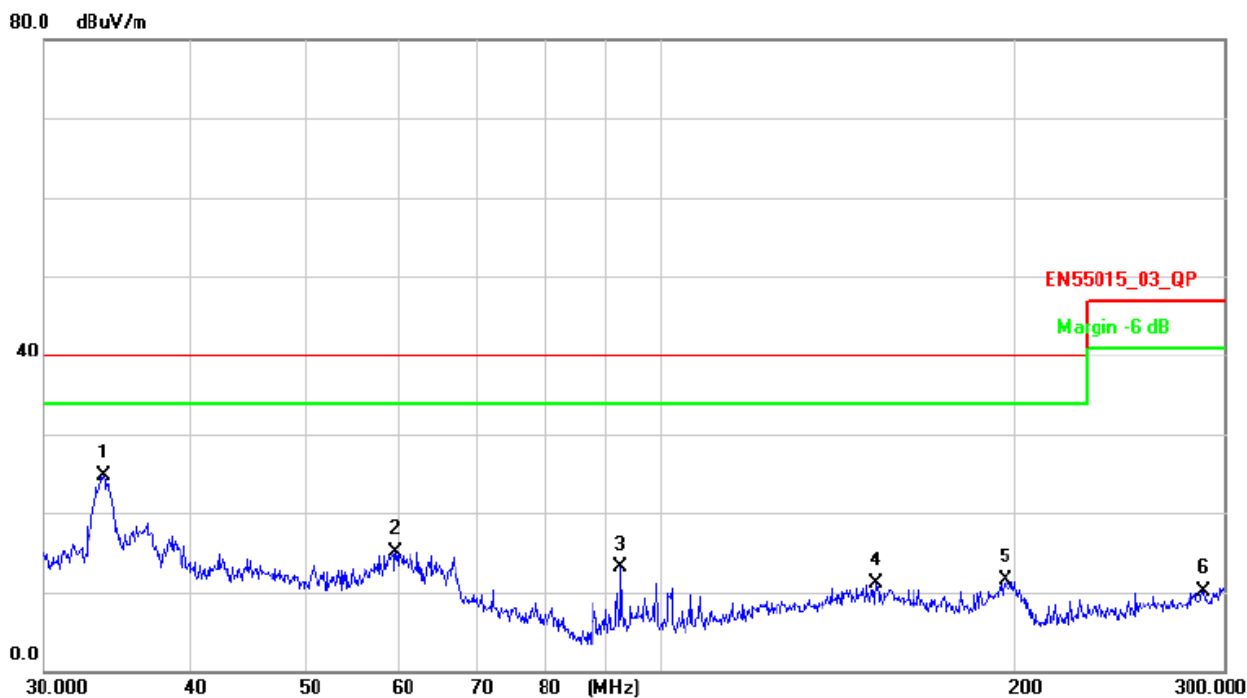
5.7. Test Result

PASS

Please refer to the following page.



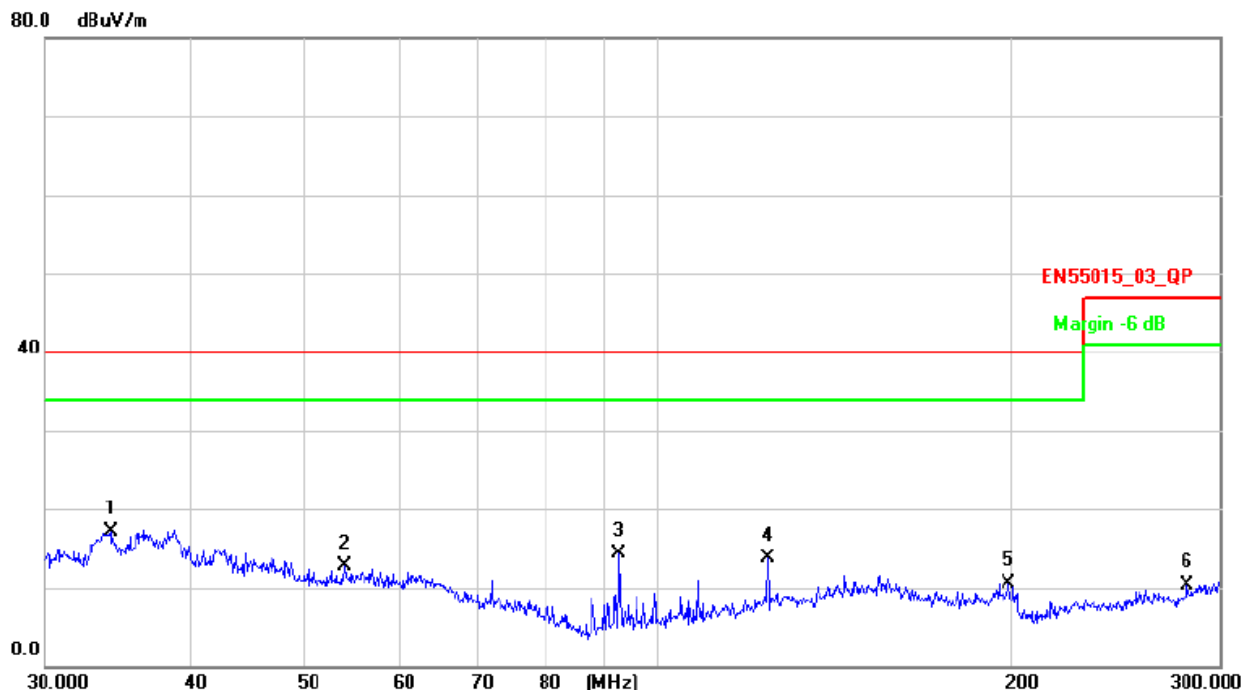
Radiation Emission Test Data			
Temperature:	24.5 °C	Relative Humidity:	54%
Pressure:	1009hPa	Phase :	Horizontal
Test Voltage :	DC24V	Test Mode:	ON Mode



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	33.7381	33.11	-8.43	24.68	40.00	-15.32	QP		
2		59.5828	26.62	-11.48	15.14	40.00	-24.86	QP		
3		92.4956	30.43	-17.26	13.17	40.00	-26.83	QP		
4		152.4478	23.87	-12.86	11.01	40.00	-28.99	QP		
5		195.9391	27.36	-15.95	11.41	40.00	-28.59	QP		
6		288.4837	22.92	-12.88	10.04	47.00	-36.96	QP		



Radiation Emission Test Data			
Temperature:	24.5 °C	Relative Humidity:	54%
Pressure:	1009hPa	Phase :	Vertical
Test Voltage :	DC24V	Test Mode:	ON Mode

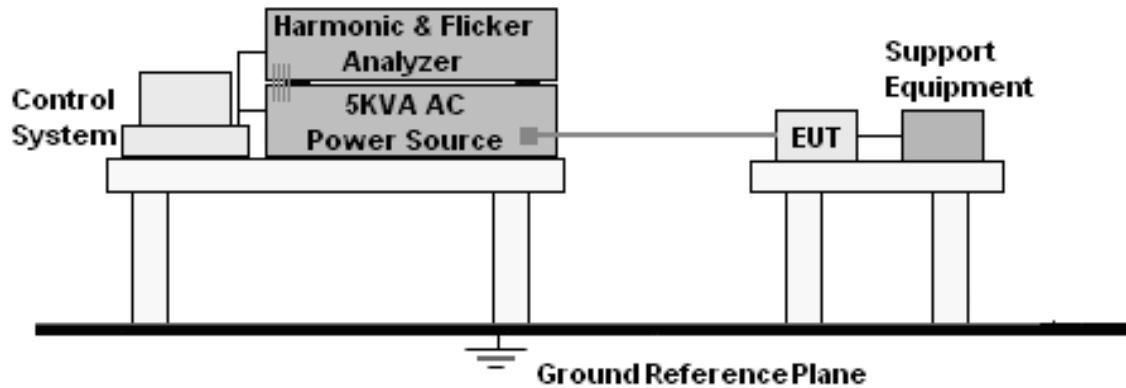


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1	*	34.1288	25.61	-8.46	17.15	40.00	-22.85	QP			
2		53.9661	23.59	-10.95	12.64	40.00	-27.36	QP			
3		92.4956	31.52	-17.26	14.26	40.00	-25.74	QP			
4		123.6293	28.15	-14.49	13.66	40.00	-26.34	QP			
5		198.6649	26.69	-16.12	10.57	40.00	-29.43	QP			
6		281.9170	23.35	-13.04	10.31	47.00	-36.69	QP			



6. HARMONIC CURRENT EMISSION TEST

6.1. Block Diagram of Test Setup



6.2. Test Standard

EN 61000-3-2

6.3. Operating Condition of EUT

Setup the EUT as shown in Section 5.1.
Turn on the power of all equipments.
Let the EUT work in test mode and test it.

6.4. Test Procedure

The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

6.5. Test Results

The EUT is powered by Battery, no requirements for this item.



7. VOLTAGE FLUCTUATIONS & FLICKER TEST

7.1. Block Diagram of Test Setup

Same as Section 6.1..

7.2. Test Standard

EN 61000-3-3:2013

7.3. Operating Condition of EUT

Same as Section 5.3.. The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

Flicker Test Limit

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

7.4. Test Procedure

The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

7.5. Test Results

The EUT is powered by Battery, no requirements for this item.

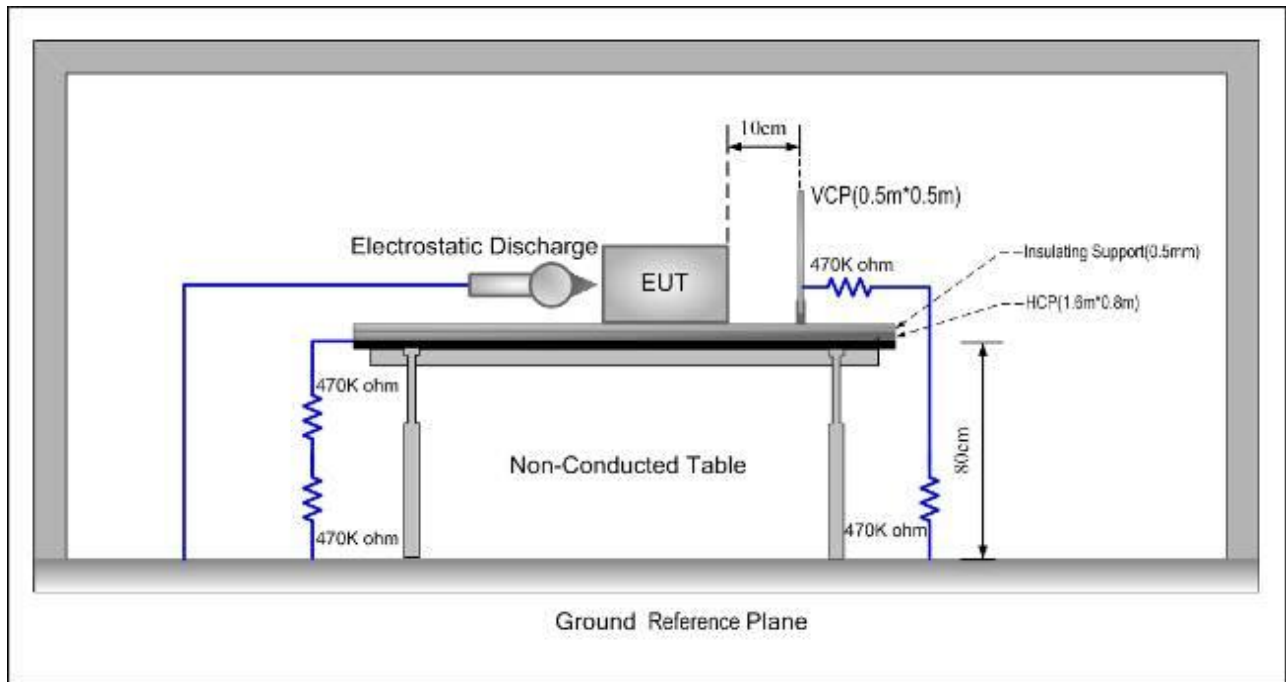


8. IMMUNITY TEST OF GENERAL THE PERFORMANCE CRITERIA

CRITERION A	During the test, no change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended.
CRITERION B	During the test the luminous intensity may change to any value. After the test the luminous intensity shall be restored to its initial value within 1 min. Regulating controls need not function during the test, but after the test the mode of the control shall be the same as before the test provided that during the test no mode changing commands were given.
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.

9. ELECTROSTATIC DISCHARGE IMMUNITY TEST

9.1. Block Diagram of Test Setup



9.2. Test Standard

EN 61547, EN 61000-4-2

Severity Level: 3 / Air Discharge: ± 8 KV

Level: 2 / Contact Discharge: ± 4 KV

9.3. Severity Levels and Performance Criterion

Severity 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

Performance criterion : B



9.4. Test Procedure

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.

Contact Discharge:

All the procedure shall be same as Section 7.6.1. Except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

Indirect discharge for horizontal coupling plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

Indirect discharge for vertical coupling plane

At least 10 single discharges (in the most sensitive polarity) 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 complete illuminated.

9.5. Test Results

PASS

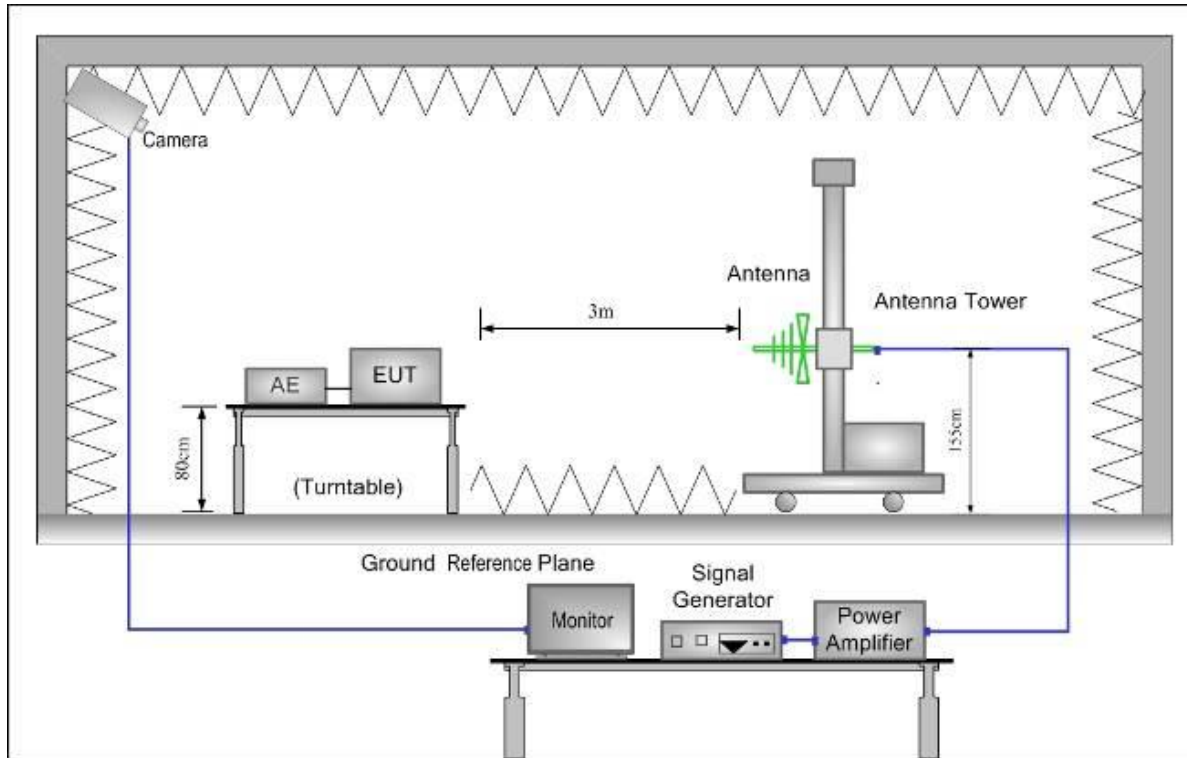
Please refer to the following data.

Electrostatic Discharge Test Data					
Temperature:	25.1°C	Humidity:	55%		
Power Supply :	DC24V	Test Mode:	ON Mode		
Discharge Method	Discharge Position	Voltage (±kV)	Min. No. of Discharge per polarity (Each Point)	Required Level	Result
Contact Discharge	Conductive Surfaces	4	10	B	Pass
	Indirect Discharge HCP	4	10	B	Pass
	Indirect Discharge VCP	4	10	B	Pass
Air Discharge	Slots, Apertures, and Insulating Surfaces	8	10	B	Pass



10. RF FIELD STRENGTH SUSCEPTIBILITY TEST

10.1. Block Diagram of Test Setup



10.2. Test Standard

EN 61547, EN 61000-4-3
Severity Level 2, 3V / m

10.3. Severity Levels and Performance Criterion

Severity level

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



10.4. 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.

All the scanning conditions are as follows :

Condition of TestRemarks

Fielded Strength	3 V/m (Severity Level 2)
Radiated Signal Modulated	
Scanning Frequency	80 – 1000 MHz
Dwell time of radiated	0.0015 decade/s
Waiting Time	1 Sec.

10.5. Test Results

PASS

Please refer to the following data.

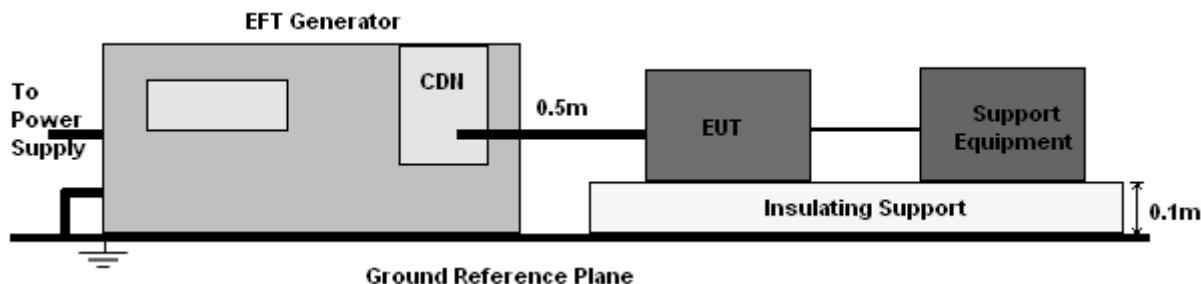
R/S Test Data				
Temperature:	25.1°C	Humidity:	55%	
Power Supply :	DC24V	Test Mode:	ON Mode	
Criterion:	A	Steps	1 %	
Frequency (MHz)	Position	Field Strength (V/m)	Required Level	Result
80 - 1000	Front, Right, Back, Left	3	A	Pass
Note: N/A				



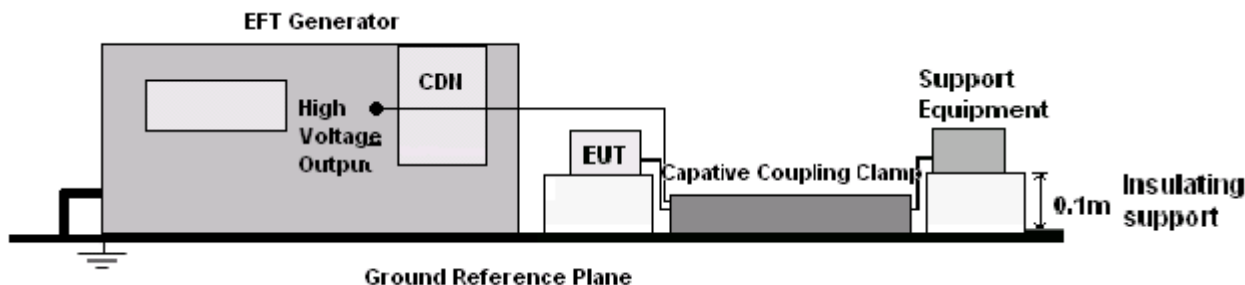
11. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

11.1. Block Diagram of EUT Test Setup

For input a.c. / d.c. power port:



For signal lines and control lines:



11.2. Test Standard

EN 61547, EN 61000-4-4

11.3. Severity Levels and Performance Criterion

Severity Level 2 at 1KV, Pulse Rise time & Duration: 5 nS / 50 nS

Severity Level:

Open Circuit Output Test Voltage $\pm 10\%$		
Level	On power ports	On I/O(Input/Output) Signal data and control ports
1.	0.5KV	0.25KV
2.	1KV	0.5KV
3.	2KV	1KV
4.	4KV	2KV
X.	Special	Special

Performance criterion: B

11.4. Test Procedure

1) EUT shall be placed 0.8m high above the ground reference plane which is a

Shenzhen Yacetong Testing Technology Services Co., Ltd.

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min.1m*1m metallic sheet with 0.65mm minimum thickness. 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

2) For input and output AC power ports:

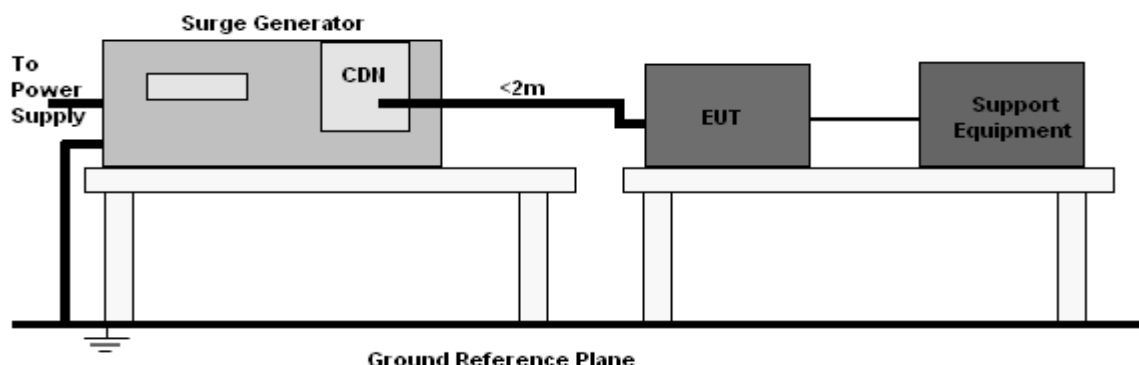
3) The EUT is connected to the power mains by YBg a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.

11.5. Test Results

The EUT is powered by DC5-24V, no requirements for this item.

12. SURGE TEST

12.1. Block Diagram of EUT Test Setup



12.2. Test Standard

EN 61547, EN61000-4-5

12.3. Severity Levels and Performance Criterion

Severity Level: Line to Line, Level 2 at 1KV;
 Severity Level: Line to Earth, Level 3 at 2KV.

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

Performance criterion: B

12.4. Test Procedure

- 1) Set up the EUT and test generator as shown on section 10.1
- 2) For line to line coupling mode, provide a 1KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.
- 3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
- 4) Different phase angles are done individually.
- 5) Repeat procedure 2) to 4) except the open-circuit test voltage change from 1KV to 2KV for line to earth coupling mode test.
- 6) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

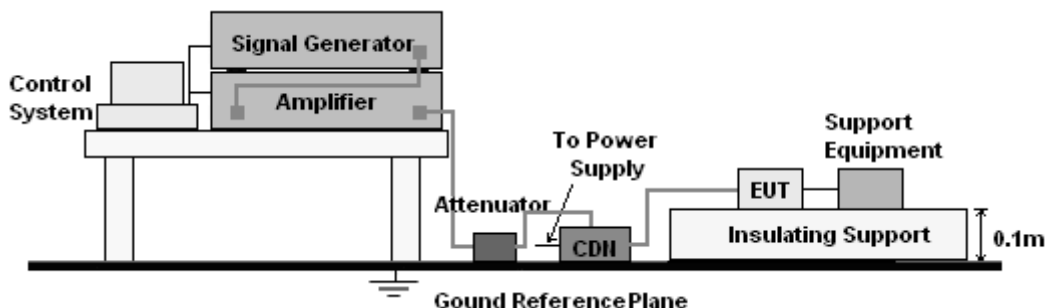
12.5. Test Result

The EUT is powered by DC5-24V, no requirements for this item.

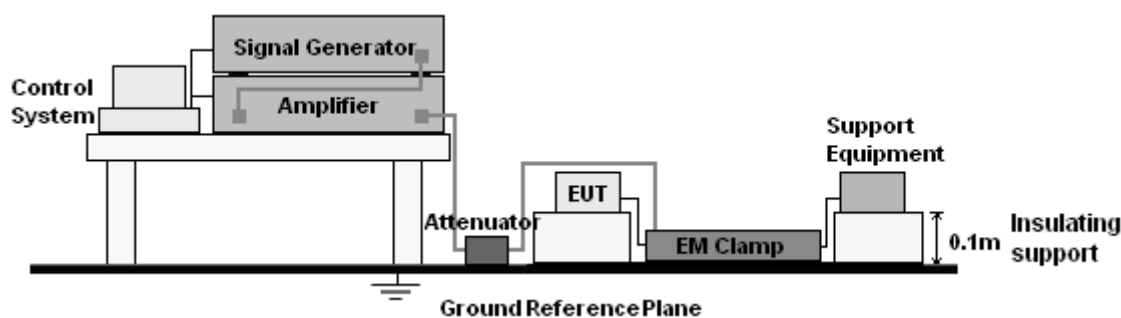
13. INJECTED CURRENTS SUSCEPTIBILITY TEST

13.1. Block Diagram of EUT Test Setup

For input a.c. / d.c. power port:



For signal lines and control lines:



13.2. Test Standard

EN 61547, EN61000-4-6

13.3. Severity Levels and Performance Criterion

Severity Level 2: 3V(rms), 150KHz ~ 80MHz

Severity Level:

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

Performance criterion: A



13.4. Test Procedure

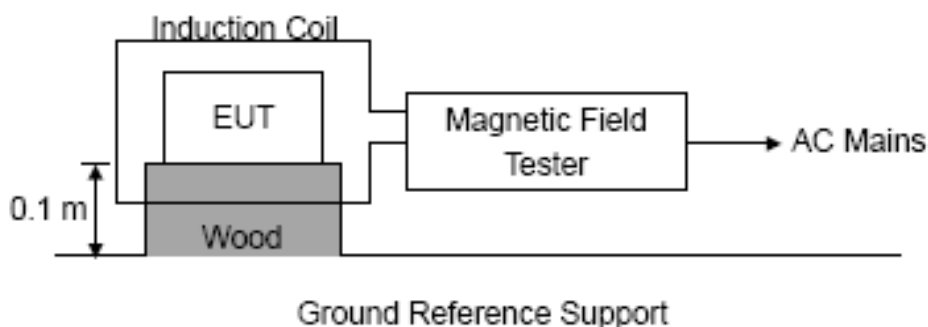
- 1) Set up the EUT, CDN and test generator as shown on section 13.1
- 2) Let EUT work in test mode and measure.
- 3) The EUT and supporting equipments are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane at above 0.1-0.3m 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 YBg 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^{-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 test and decide the EUT immunity criterion for above each test.

13.5. Test Result

The EUT is powered by DC5-24V, no requirements for this item.

14. MAGNETIC FIELD IMMUNITY TEST

14.1. Block Diagram of Test Setup



14.2. Test Standard

EN 61547, EN61000-4-8
Severity Level 2 at 3A/m

14.3. Severity Levels and Performance Criterion

Severity level

Level	Magnetic Field Strength A/m
1.	1
2.	3
3.	10
4.	30
5.	100
X.	Special

Performance criterion: B

14.4. Test Procedure

The EUT shall be subjected to the test magnetic field by YBg the induction coil of standard dimensions (1m*1m) and shown in Section 10.1. The induction coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations.

14.5. Test Results

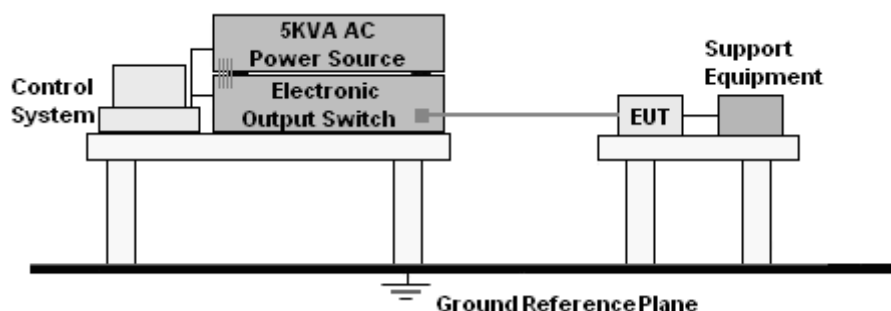


MS Test Data					
Temperature:	24.5°C		Humidity:	53%	
Power Supply :	DC24V		Test Mode:	ON Mode	
Environmental Phenomena	Test specification	Units	Coil Orientation	Performance Criterion	Result
Magnetic Field	3	A/m	X	A	PASS
			Y	A	PASS
			Z	A	PASS
Note: N/A					



15. VOLTAGE DIPS AND INTERRUPTIONS TEST

15.1. Block Diagram of EUT Test Setup



15.2. Test Standard

EN 61547, EN61000-4-11

15.3. Severity Levels and Performance Criterion

Severity Level:
 Input and Output AC Power Ports.
 Voltage Dips.
 Voltage Interruptions.

Environmental Phenomena	Test Specification	Units	Performance Criterion
Voltage Dips	70	% Reduction period	C
	10		
	0	% Reduction period	B
	0.5		

Performance criterion: C, B

15.4. Test Procedure

- 1) Set up the EUT and test generator as shown on section 13.1
- 2) The interruption is introduced at selected phase angles with specified duration. There is a 3mins minimum interval between each test event.
- 3) After each test a full functional check is performed before the next test.
- 4) Repeat procedures 2 & 3 for voltage dips, only the level and duration is changed.
- 5) Record any degradation of performance.

15.5. Test Result

The EUT is powered by DC5-24V, no requirements for this item.



16. EUT PHOHOTOS



***** END OF REPORT *****