EMC TEST REPORT

Report No.: CE11-LIE090126E

Product: LED SPOT LIGHT

Model No.: CE-15W5000K-AR3002, CE-15W3000K-AR3001

Applicant: SHEN ZHEN C.E OPTOELECTRONIC.CO., LTD

Address: A BLOCK, SHENG YANG TECHNOLOGY PARK, DA FU INDUSTRIAL AREA, GUAN LAN TOWN, BAO AN DISTRICT, SHEN ZHEN, CHINA

Issued by: Shenzhen EBO Testing Center

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1 Test Report Certification

Product:	LED SPOT LIGHT
Model No.:	CE-15W5000K-AR3002, CE-15W3000K-AR3001
Applicant:	SHEN ZHEN C.E OPTOELECTRONIC.CO., LTD
Applicant Address:	A BLOCK, SHENG YANG TECHNOLOGY PARK, DA FU INDUSTRIAL AREA, GUAN LAN TOWN, BAO AN DISTRICT, SHEN ZHEN, CHINA
Manufacturer:	SHEN ZHEN C.E OPTOELECTRONIC.CO., LTD
Manufacturer Address:	A BLOCK, SHENG YANG TECHNOLOGY PARK, DA FU INDUSTRIAL AREA, GUAN LAN TOWN, BAO AN DISTRICT, SHEN ZHEN, CHINA
Test Standards:	EN 55015:2006+A1:2007+A2:2009 EN 61547:2009
Test Result:	**PASS**

We, Shenzhen EBO Testing Center, hereby certify that the submitted samples of the above item, as detailed in chapter 2.1 of this report, has been tested in our facility. The test record, data evaluation and test configuration represented herein are true and accurate accounts of measurements of the sample's EMC characteristics under the conditions herein specified.

Tested by: Smart Li, Date: September 22, 2011

Smart Li

Approved by: Kevin Yu, Date: September 22, 2011

Kevin Yu

2 General Information

2.1 Description of EUT

Product: LED SPOT LIGHT

Model No.: CE-15W5000K-AR3002

Brand Name: /

Electrical Rating: 12V, 15W

I/O Ports: /

Accessories: /

NOTE:

1. Please refer to Appendix I for the photographs of the EUT. For more detailed features description about the EUT, please refer to User's Manual.

2.2 Objective

Perform ElectroMagnetic Interference (EMI) and ElectroMagnetic Susceptibility (EMS) tests for CE Marking.

2.3 Test Standards and Results

The EUT has been tested according to the following specifications:

EMISSION		
Standard	**Test Type**	**Result**
EN55015:2006+A1:2007+A2:2009	Radiated Electromagnetic Disturbance Measurement	PASS
IMMUNITY (EN61547:2009)		
Basic Standard	**Test Type**	**Result**
EN 61000-4-2	Electrostatic discharge immunity	PASS
EN 61000-4-3	Radiated, radio frequency electromagnetic field immunity	PASS

NOTE: The latest versions of basic standards are applied.

2.4 List of Equipments Used

Description	Manufacturer	Model No.	Serial No.
Test Receiver	Schwarzbeck	FCKL1528	A0304230
LISN	Schwarzbeck	NSLK8127	A0304233
Loop Antenna	Schwarzbeck	HXYZ8170	A0304232
Antenna	Amplifier Research	AR AT1080	A0304249
Power Frequency Test System	HAEFELY	PHF 555	A0103105
ESD Test System	HAEFELY	FESD16000	A0103108
Signal Generator	ROHDE&SCHWARZ	SML02	A0304261
Power Amplifier	Amplifier Research	AR 150W1000	A0304247
Power Amplifier	Amplifier Research	AR 75A250M	A0304255
Field Monitor	Amplifier Research	AR FM5004	305128
Magnetic Field Tester	HAEFELY	MAG 100.1	A0103109
Shield Room	Nanbo Tech	Site 3	A9901141
Shield Room	Nanbo Tech	Site 1	A0304210

NOTE: Equipments listed above have been calibrated and are in the period of validation.

3 Emission Test

3.1 EUT Setup and Operating Conditions

The EUT was power by DC 12V Mains.

3.2 Radiated Electromagnetic Disturbance Measurement

3.2.1 Limits of Radiated Electromagnetic Disturbance

Frequency range (MHz)	**QP Limits(dBμA), for loop antenna with a diameter of 2m**
0.009 to 0.07	88
0.07 to 0.15	88 to 58
0.15 to 2.2	58 to 26
2.2 to 3.0	58
3.0 to 30	22

Notes:

(1) The lower limit shall apply at the transition frequency.

(2) The limit decreases linearly with the logarithm of the frequency in the range 70 kHz to 150kHz.

(3) The limit increases linearly with the logarithm of the frequency in the range 150 kHz to 2.2MHz.

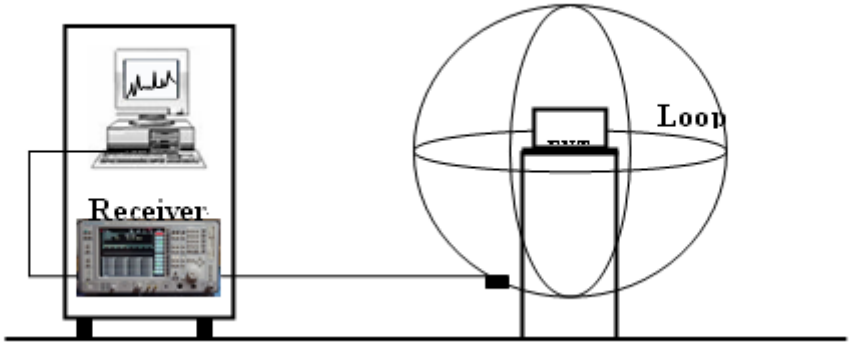
3.2.2 Test Procedure

a. The magnetic component of radiated electromagnetic disturbance is measured by means of a loop antenna.

b. The induced current in the loop antenna is measured by means of a current probe (1V/A) and the CISPR measuring receiver. By means of a coaxial switch, the three field directions are measured in sequence.

c. The EUT was placed in the center of the loop antenna, on an insulated table.

3.2.3 Test Setup

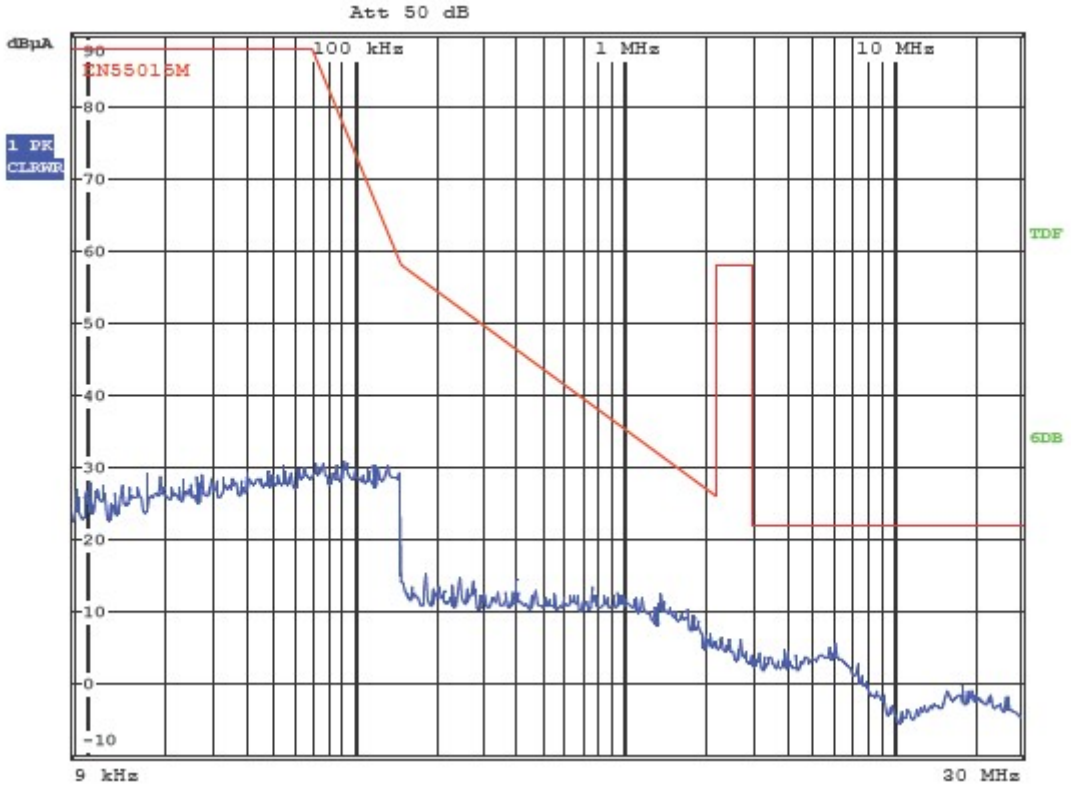


For the actual test configuration, please refer to the related item-Photographs of the Test Configuration.

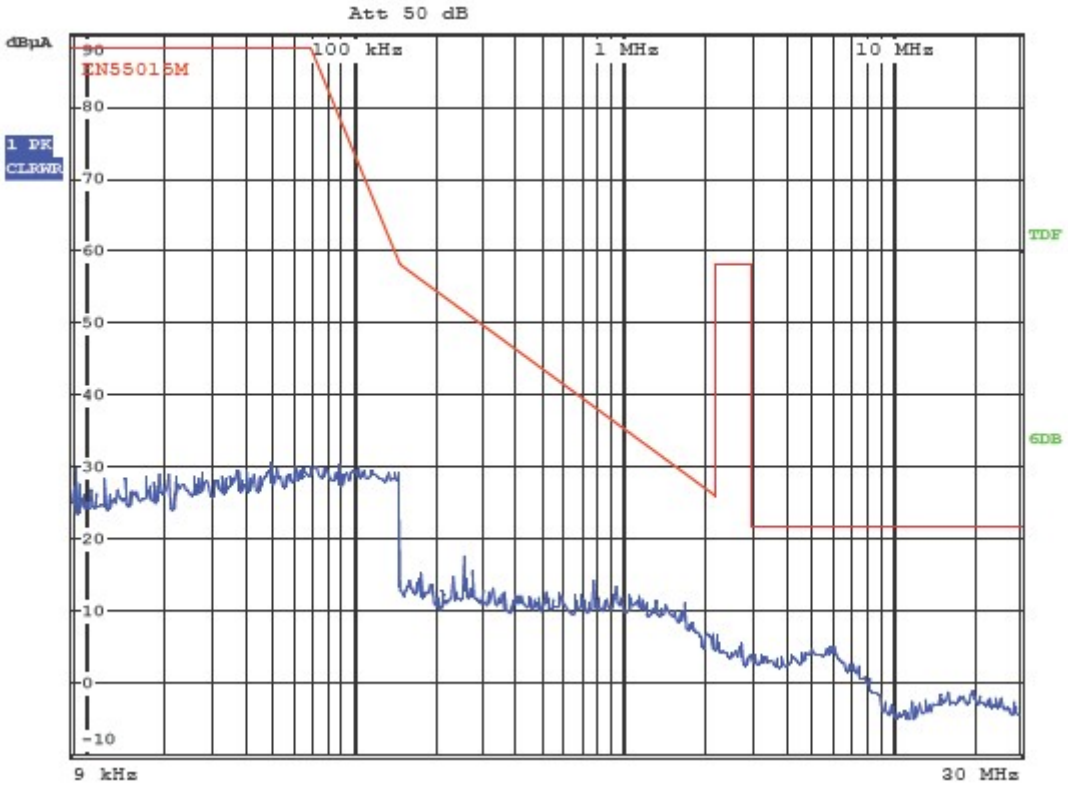
3.2.4 Test Results

No.	Antenna Direction	Frequency (MHz)	QP Limits (dBμA)	Emission Level (dBμA)
1	X/Y/Z	0.009-0.07	88	<30
2	X/Y/Z	0.07-0.15	88-58	<30
3	X/Y/Z	0.15-2.2	58-26	<20
4	X/Y/Z	2.2-3.0	58	<20
5	X/Y/Z	3.0-30	22	<10

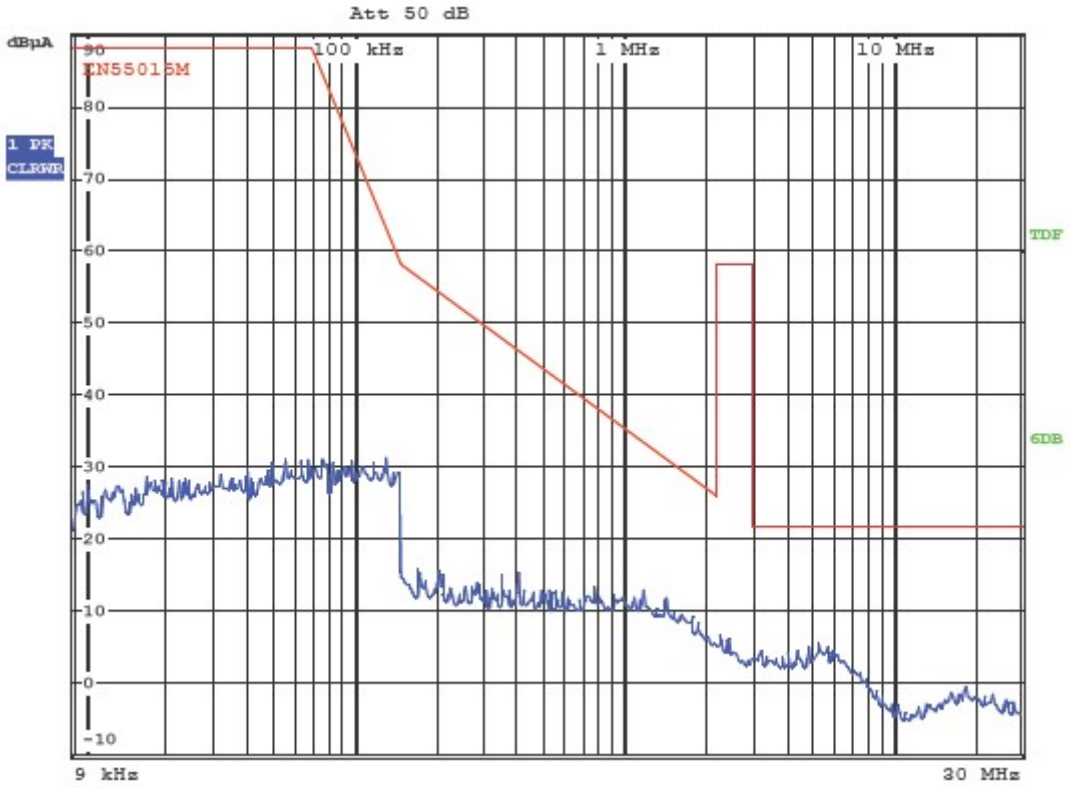
1. Radiated electromagnetic disturbance, loop antenna direction: X



2. Radiated electromagnetic disturbance, loop antenna direction: Y



3. Radiated electromagnetic disturbance, loop antenna direction: Z



4 Immunity Test

4.1 EUT Setup and Operating Conditions

Same as 3.1

4.2 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 minute. 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 minutes, all functions shall return to normal if necessary be 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 switch off. After half an hour it is switched on again. The lighting equipment shall start and operate as intended.

4.3 Electrostatic Discharge Immunity Test

4.3.1 Test Specification

Basic Standard:	EN 61000-4-2
Discharge Impedance	330Ω / 150 pF
Discharge Voltage:	Air Discharge – 8 kV Contact Discharge – 4 kV
Polarity:	Positive / Negative
Number of Discharge:	Minimum 20 times at each test point
Discharge Mode:	Single discharge
Discharge Period:	1-second minimum

4.3.2 Test Procedure

The discharges shall be applied in two ways:

a. Contact discharges to the conductive surfaces and coupling planes:

The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three contact test points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

b. Air discharges at slots and apertures and insulating surfaces:

On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled selected test point for each such area.

The basic test procedure was in accordance with EN 61000-4-2:

a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.

b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.

c. The time interval between two successive single discharges was at least 1 second.

d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.

e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.

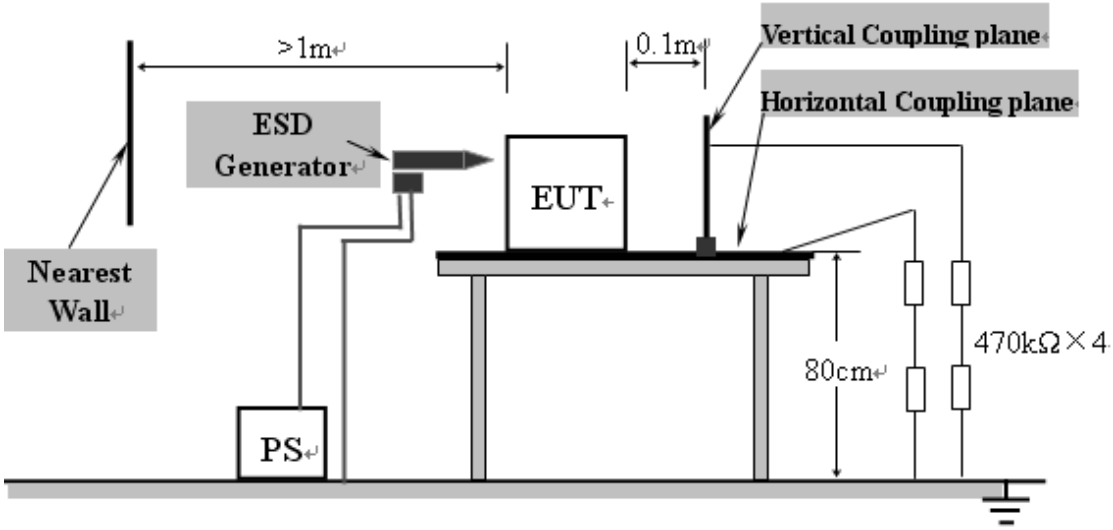
f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were completed.

g. At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator was positioned

vertically at a distance of 0.1 meters from the EUT with the discharge electrode touching the HCP.

h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m×0.5m) was placed vertically to and 0.1 meters from the EUT.

4.3.3 Test Setup



4.3.4 Test Result

Test Points	Discharge Level (kV)	Discharge Mode	Observation	Comply with Criterion
HCP	±4	Contact	Note(1)	A
VCP	±4	Contact	Note(1)	A
LED lamp	±4, ±8	Air	Note(1)	B

NOTE:

(1). The EUT continued to operate as intended. No degradation of performance was observed..

4.4 Radiated, Radio Frequency Electromagnetic Field Immunity Test

4.4.1 Test Specification

Basic Standard:	EN 61000-4-3
Frequency Range:	80 MHz – 1000MHz
Field Strength:	3V/m
Modulation:	1kHz sine wave, 80%, AM modulation
Frequency Step:	1% of fundamental
Polarity of Antenna	Horizontal and Vertical
Test Distance:	3m
Antenna Height:	1.5m
Dwell Time:	3 seconds

4.4.2 Test Procedure

The test procedure was in accordance with EN 61000-4-3.

a. The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.

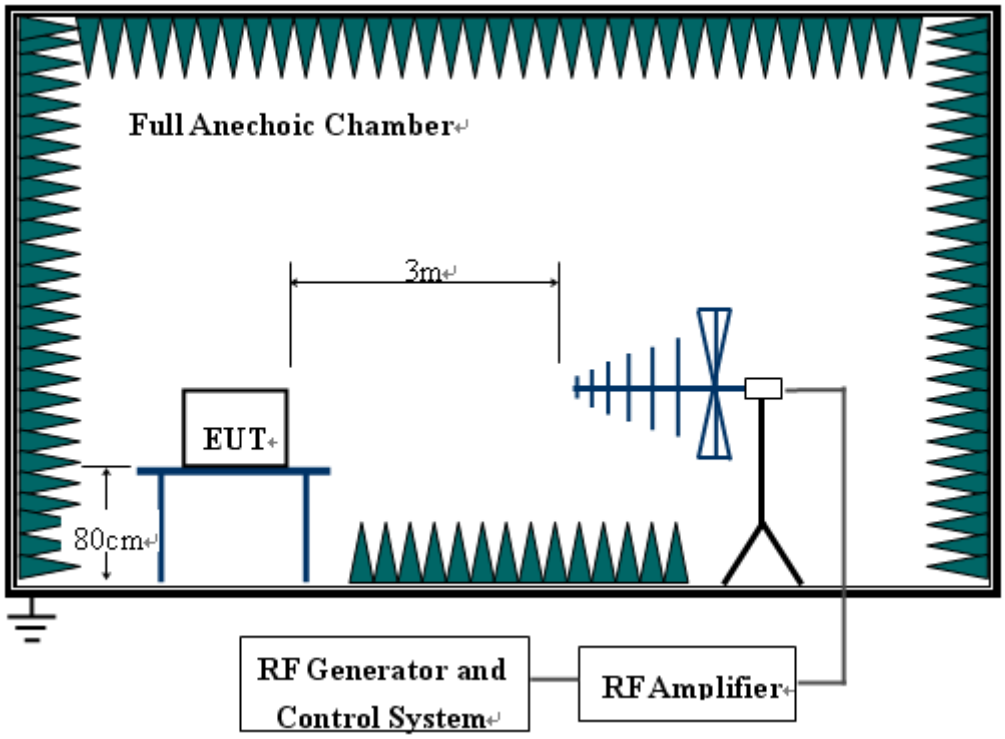
b. The frequency range is swept from 80 MHz to 1000MHz with the signal 80% amplitude modulated with a 1 kHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.

c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

d. The field strength level was 3V/m.

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

4.4.3 Test Setup



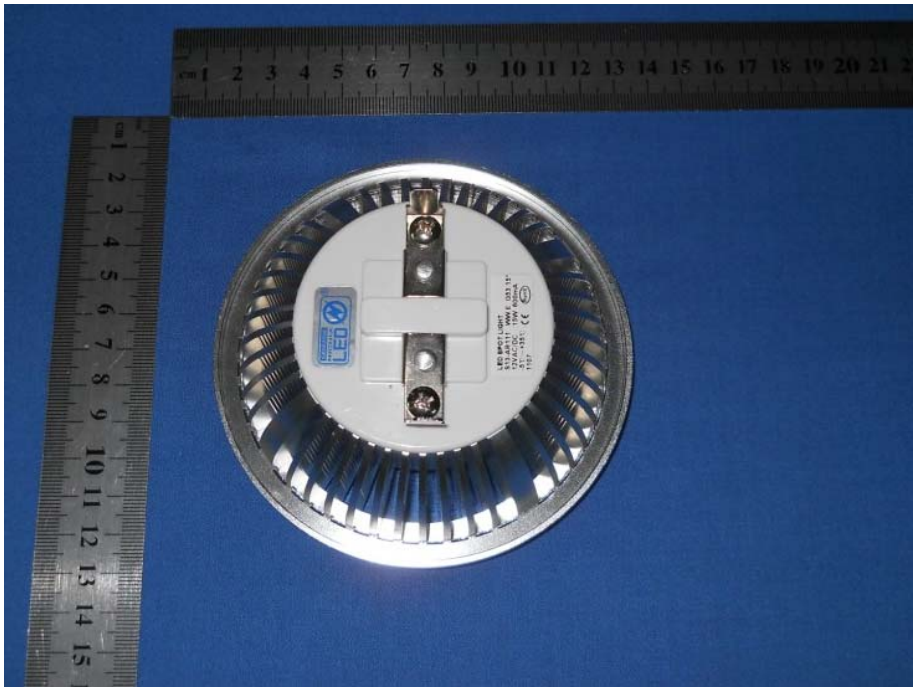
4.4.4 Test Result

Frequency	Polarity	Azimuth	Field Strength (V/m)	Observation	Comply with Criterion
80-1000 MHz	V&H	0	3	Note(1)	A
80-1000 MHz	V&H	90	3	Note(1)	A
80-1000 MHz	V&H	180	3	Note(1)	A
80-1000 MHz	V&H	270	3	Note(1)	A

NOTE:

(1). The EUT continued to operate as intended. No degradation of performance was observed.

Appendix I: Photographs of the EUT



(EBO authenticate the photo on original report only)

*** End of Report ***