Certificate of Conformity

The products

EUT : **LED modules**
Trade Name : **PARAGON**
Model No. : **CBAC-84-36185-120V-57**

which produced by

PARAGON SEMICONDUCTOR LIGHTING TECHNOLOGY CO LTD
3F NO 369 SEC 2 WENHUA 2ND RD LINKOU DIST
NEW TAIPEI CITY, 244 TAIWAN

Regulation Applied : FCC Rules and Regulations Part 15 Subpart B

I HEREBY CERTIFY THAT : The data shown in this report were made in accordance with the procedures given in ANSI C63.4 and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

S. S. Liou

Signature
S. S. Liou
Section Manager of EMC Testing Department II
Electronics Testing Center, Taiwan

Report Number : 13-11-RBF-023
Date of Issue: Dec. 26, 2013

Note:1. The result of the testing report relate only to the item tested.
2. The testing report shall not be reproduced expect in full, without the written approval of ETC.

ELECTRONICS TESTING CENTER, TAIWAN
NO. 34. LIN 5. DINGFU, LINKOU DIST.,
NEW TAIPEI CITY, TAIWAN, 24442, R.O.C.
TEL:(02)26023052
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FAX:(02)26010910
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Series Model: **: CBAC-42-30135-120V-XX,CBAC-42-30135-120V-XX(14W), CBAC-42-36185-120V-XX,CBAC-42-5028-120V-XX, CBAC-84-30135-120V-XX,CBAC-84-36185-120V-XX, CBAC-84-5028-120V-XX,CDAC-20-30135-120V-XX, CGAC-08-30135-120V-XX,CGAC-08-36135-120V-XX, DBAC-42-6038-120V-XX,DBAC-84-6038-120V-XX, HBAC-48-5028-120V-XX,HBAC-96-5028-120V-XX, HBAC-96-6038-120V-XX,LBAC-42-15520-120V-XX, LBAC-84-15520-120V-XX,SBAC-168-5050-120V-XX, SBAC-84-5050-120V-XX**

FCC Part 15 Subpart B
EMI TEST REPORT

of

E.U.T. : LED modules
Model No. : CBAC-84-36185-120V-57

For

APPLICANT : PARAGON SEMICONDUCTOR LIGHTING TECHNOLOGY CO LTD
ADDRESS : 3F NO 369 SEC 2 WENHUA 2ND RD LINKOU DIST NEW TAIPEI CITY, 244 TAIWAN

Test Performed by

ELECTRONICS TESTING CENTER (ETC) , TAIWAN
NO. 34. LIN 5. DINGFU, LINKOU DIST.,
NEW TAIPEI CITY, TAIWAN, 24442, R.O.C.

Tel : (02)26023052 Fax : (02)26010910

http://www.etc.org.tw ; e-mail: emc@etc.org.tw

Report Number : 13-11-RBF-023

TEST REPORT VERIFICATION

Applicant : PARAGON SEMICONDUCTOR LIGHTING TECHNOLOGY CO LTD
3F NO 369 SEC 2 WENHUA 2ND RD LINKOU DIST NEW TAIPEI CITY, 244 TAIWAN

Manufacture : PARAGON SEMICONDUCTOR LIGHTING TECHNOLOGY CO LTD
3F NO 369 SEC 2 WENHUA 2ND RD LINKOU DIST NEW TAIPEI CITY, 244 TAIWAN

Description of EUT

a) Type of EUT : LED modules
b) Trade Name : PARAGON
c) Model No. : CBAC-84-36185-120V-57
d) Series Model : Refer to Annex I (Description of model series)
e) Power Supply : 120Vac/60Hz

Regulation Applied : FCC Rules and Regulations Part 15 Subpart B

I HEREBY CERTIFY THAT: The data shown in this report were made in accordance with the procedures given in ANSI C63.4, and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Note: 1. The result of the testing report relate only to the item tested.
2. The testing report shall not be reproduced expect in full, without the written approval of ETC.

Date Test Item Received : Nov. 19, 2013
Date Test Campaign Completed : Nov. 28, 2013
Date of Issue : Dec. 26, 2013

Test Engineer : _____
(Tien-Lu Liao, Engineer)

Approve & Authorized : _____
S. S. Liou, Section Manager
EMC Dept. II of ELECTRONICS
TESTING CENTER, TAIWAN

Table of Contents Page

1 GENERAL INFORMATION

1.1 Product Description

a) Type of EUT : LED modules
b) Trade Name : PARAGON
c) Model No. : CBAC-84-36185-120V-57
d) Series Model : Refer to Annex I (Description of model series)
e) Power Supply : 120Vac/60Hz

1.2 Characteristics of Device

LED modules

1.3 Test Methodology

Both conducted, radiated, conducted RF output signal and spurious level and transfer switch isolation testing were performed according to the procedures in section 12.2 of ANSI C63.4 (2003).

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the roof top of Building at NO. 34. LIN 5. DINGFU, LINKOU DIST., NEW TAIPEI CITY, TAIWAN, 24442, R.O.C.

This site has been fully described in a report submitted to your office, the effective date through Jun. 30, 2013.

2 LIMITATIONS AND LABELING REQUIREMENT

2.1 Definition

Unintentional radiator:

A device that intentionally generates and radio frequency energy for use within the device, or that sends radio frequency signals by conduction to associated equipment via connecting wiring, but which is not intended to emit RF energy by radiation or induction.

Class A Digital Device:

A digital device which is marketed for use in commercial or business environment; exclusive of a device which is market for use by the general public, or which is intended to be used in the home.

Class B Digital Device :

A digital device which is marketed for use in a residential environment notwithstanding use in a commercial, business of industrial environment. Example of such devices that are marketed for the general public.

Note : A manufacturer may also qualify a device intended to be marketed in a commercial, business, or industrial environment as a Class B digital device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B Digital Device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B Digital Device, Regardless of its intended use.

2.2 Requirement for Compliance

(1) Conducted Emission Requirement

For unintentional device, according to CISPR Line Conducted Emission Limits class B is as following:

Frequency MHz	**Quasi Peak dB μ V**	**Average dB μ V**
0.15 - 0.5	66-56	56-46
0.5 - 5.0	56	46
5.0 - 30.0	60	50

(2) Radiated Emission Requirement

For unintentional device, according to FCC §15.109(a), the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency MHz	**Distance Meters**	**Radiated dB μV/m**	**Radiated μV/m**
30 - 88	3	40.0	100
88 - 216	3	43.5	150
216 - 960	3	46.0	200
above 960	3	54.0	500

For unintentional device, according to CISPR Line Radiated Emission Limits class B is as following:

Frequency MHz	**Distance Meters**	**Radiated dB μV/m**
30 to 230	10	30
230 to 1000	10	37

2.3 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device :

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions : (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2.4 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual.

The Federal Communications Commission Radio Frequency Interference Statement includes the following paragraph.

This equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio / TV technician for help.

3 SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in EUT is working.

The EUT was rotated to obtain the maximum level of radiated emissions .The antenna was varied in height above ground to obtain the maximum signal strength. The antenna height was varied from 1 to 4 meters.

3.2 Device for Tested System

Device	Manufacture	Model	Description
LED modules *	PARAGON SEMICONDUCTOR LIGHTING TECHNOLOGY CO LTD	CBAC-84-36185-120V-57	1.8m Non-shielded AC Power Cord 0.15 m Non-shielded AC Connected Cable

Remark "*" means equipment under test.

3.3 Configuration of Tested System

Please Refer to Setup photo.

3.4 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Uncertainty
Conducted emissions	150kHz ~ 30MHz	2.5dB(Mains)
Conducted emission at telecommunication ports	150kHz ~ 30MHz	2.22dB(Voltage)
		2.88dB(Current)
Radiated emissions	30MHz ~ 1GHz	3.90dB(30MHz≦f≦300MHz)
		3.95dB(300MHz＜f≦1GHz)
	Above 1GHz	4.42dB(1GHz≦f≦18GHz)
		4.86dB(18GHz≦f≦40GHz)

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.5 Deviation Statement

(If any deviation from additions to or exclusions from test method must be stated)

4 RADIATED EMISSION MEASUREMENT

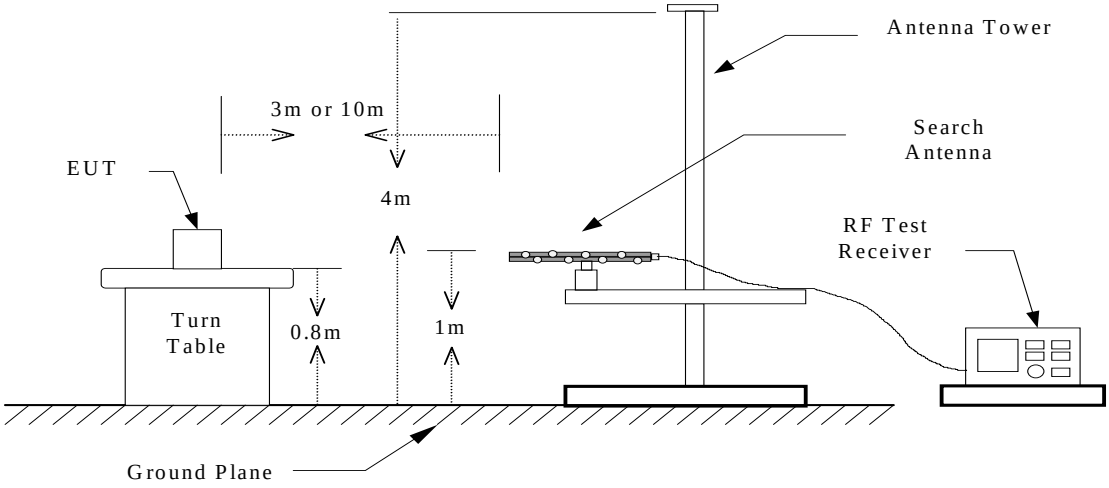
4.1 Applicable Standard

For unintentional radiator digital devices, the radiated emission shall comply with § 15.109(a). And according to §15.109 (g), as an alternative to the radiated emission limits is CISPR 22.

4.2 Measurement Procedure

1. Setup the configuration per figure 1.
2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a shielded chamber to determine the accurate frequencies of higher emissions will be checked on a open test site.
3. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ° to 360 ° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.
4. Repeat step 3 until all frequencies need to be measured were complete.
5. Repeat step 4 with search antenna in vertical polarized orientations.
6. Check the three frequencies of highest emission with varying the placement of cables associated with EUT to obtain the worse case and record the result.

Figure 1 : Frequencies measured below 1 GHz configuration



4.3 Measuring Instrument

The following instrument are used for radiated emissions measurement :

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Test Receiver	Rohde & Schwarz	ESVS30	2013/05/06	2014/05/05
EMI Test Receiver	Rohde & Schwarz	ESL	2013/07/29	2014/07/28
Bi-Log Antenna	ETC	MCTD 2756	2013/01/17	2014/01/16
Log-periodic Antenna	EMCO	3146	2013/10/16	2014/10/15
Biconical Antenna	EMCO	3110	2013/10/16	2014/10/15
Double Ridged Antenna	EMCO	3115	2013/04/29	2014/04/28
Amplifier	HP	8449B	2013/01/09	2014/01/08
Amplifier	HP	83051A	2013/05/06	2014/05/05
Amplifier	HP	8447D	2013/05/03	2014/05/02

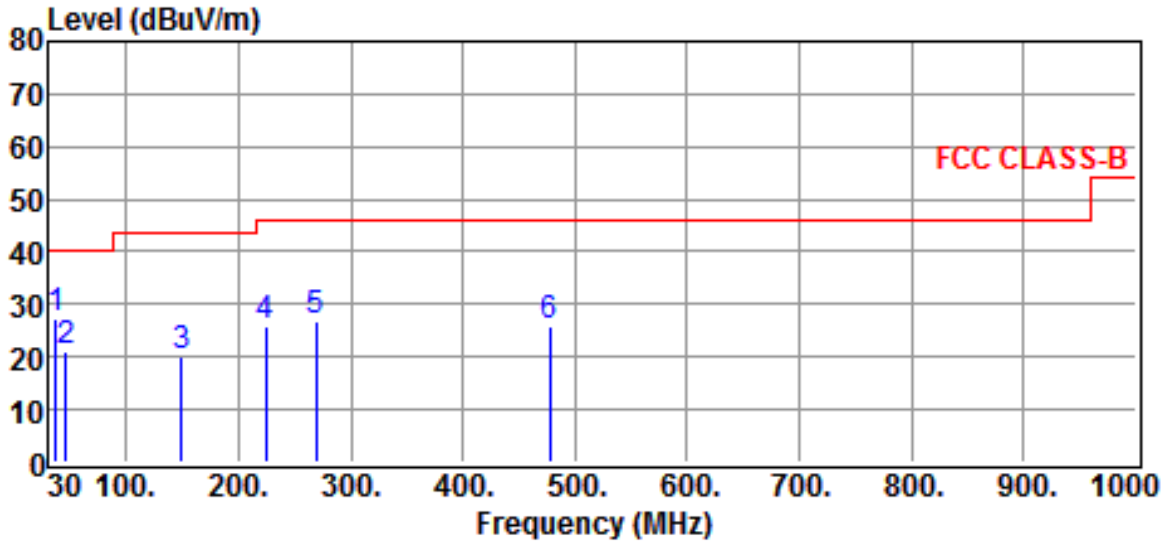
Note: The standards used to perform this calibration are traceable to NML/ROC, NIST/USA and NPL/UK.

Measuring instrument setup in measured frequency band when specified detector function is used :

Frequency Band (MHz)	Instrument	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	RF Test Receiver	Quasi-Peak	120 kHz	1 MHz
	Spectrum Analyzer	Peak	100 kHz	100 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz
	Spectrum Analyzer	Average	1 MHz	10Hz

4.4 Radiated Emission Data

A. Other spurious emissions

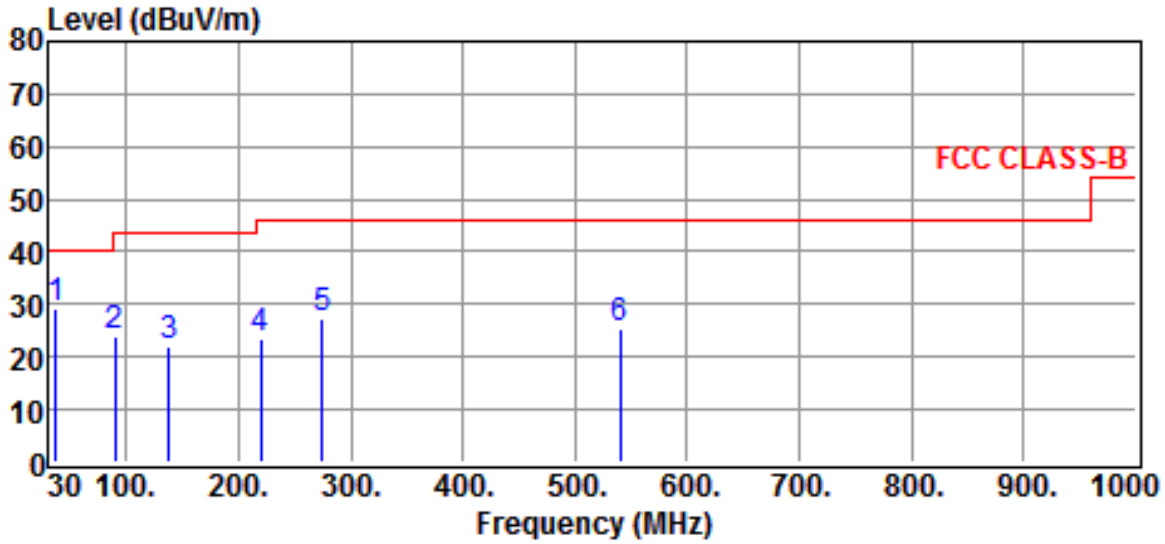


Site	:Open site	Date	:2013-11-28
EUT	:LED modules	Ant. Pol.	:HORIZONTAL
Model	:CBAC-84-36185-120V-57	Detector	:QP
Power Rating	:120Vac/60Hz	Engineer	:lu
Limit	:FCC CLASS-B	Temp.	:19 ˚C
Memo	:	Humi.	:60 %

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB
37.2900	13.5	13.9	27.4	40.0	-12.6
46.7400	8.6	12.5	21.1	40.0	-18.9
149.6100	6.4	13.9	20.3	43.5	-23.2
224.1300	11.7	14.2	25.9	46.0	-20.1
269.4900	11.3	15.4	26.7	46.0	-19.3
477.8000	4.7	21.1	25.8	46.0	-20.2

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss
3. The margin value=Limit - Result



Site	:Open site	Date	:2013-11-28
EUT	:LED modules	Ant. Pol.	:VERTICAL
Model	:CBAC-84-36185-120V-57	Detector	:QP
Power Rating	:120Vac/60Hz	Engineer	:lu
Limit	:FCC CLASS-B	Temp.	:19 ˚C
Memo	:	Humi.	:60 %

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB
37.2900	15.3	13.9	29.2	40.0	-10.8
89.9400	12.9	10.9	23.8	43.5	-19.7
138.5400	8.5	13.3	21.8	43.5	-21.7
219.8100	9.4	14.3	23.7	46.0	-22.3
274.6200	11.4	15.7	27.1	46.0	-18.9
540.1000	3.4	22.1	25.5	46.0	-20.5

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss
3. The margin value=Limit - Result

4.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor, High Pass Filter Loss and Cable Loss, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

where

Corrected Factor = Antenna FACTOR + Cable Loss + High Pass Filter Loss - Amplifier Gain

4.6 Photos of Radiation Measuring Setup

5 CONDUCTED EMISSION MEASUREMENT

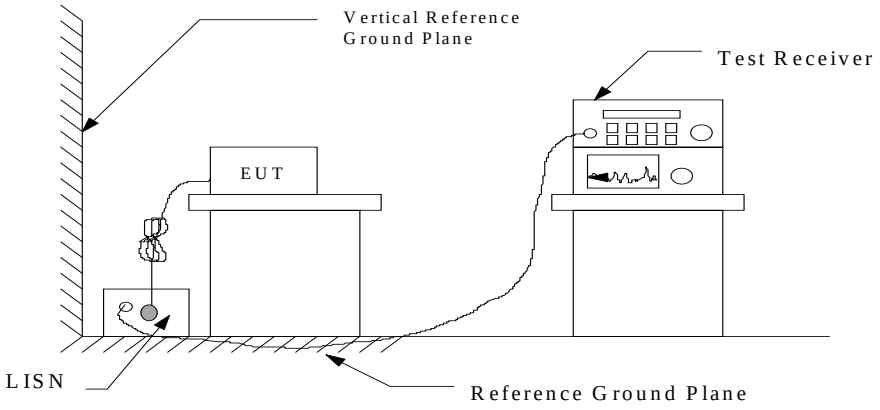
5.1 Standard Applicable

For unintentional and intentional device, Line Conducted Emission Limits are in accordance to §15.107(a) and §15.207(a) respectively. Both Limits are identical specification.

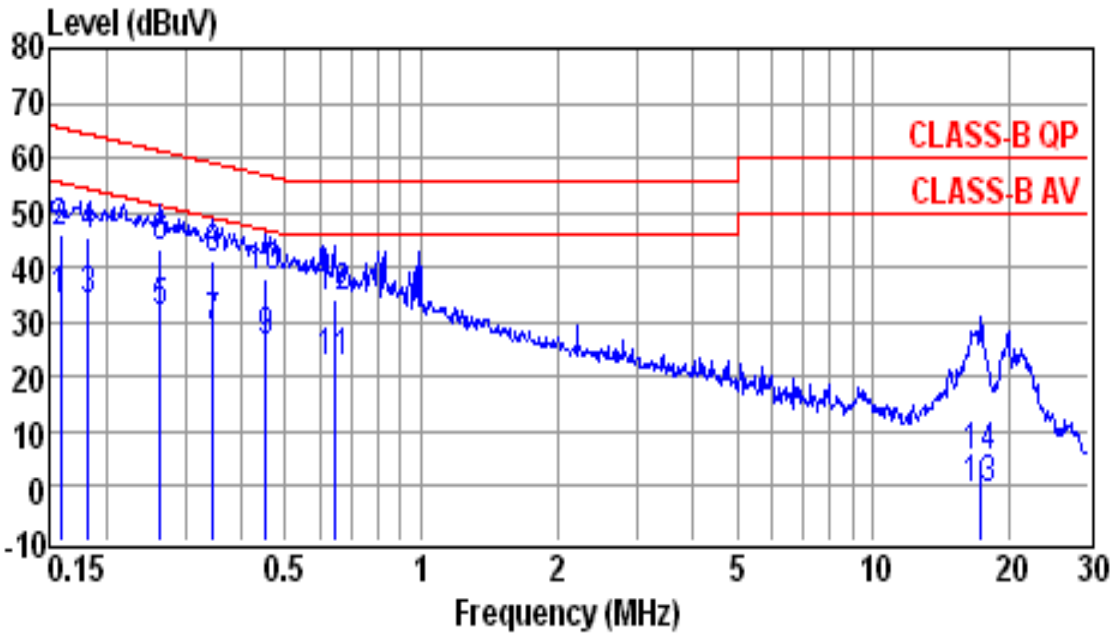
5.2 Measurement Procedure

1. Setup the configuration per figure 3.
2. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.
3. Record the 6 or 8 highest emissions relative to the limit.
4. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then record the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.
5. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.
6. Repeat all above procedures on measuring each operation mode of EUT.

Figure 3 : Conducted emissions measurement configuration



5.3 Conducted Emission Data

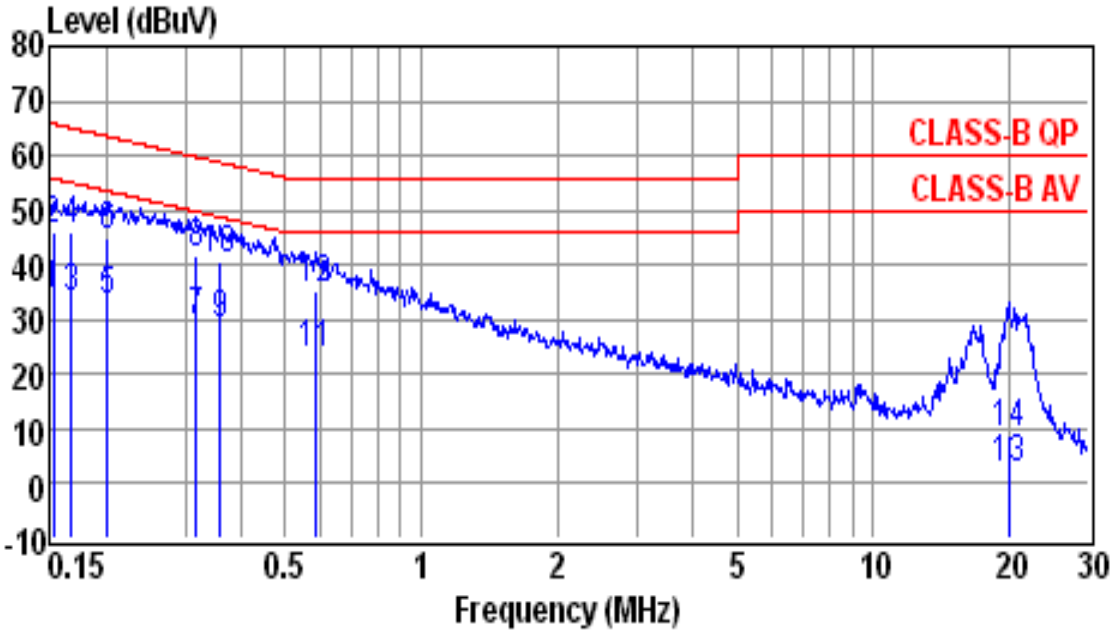


Site	: conducted #1	Date	: 11-28-2013
Condition	: CLASS-B QP	LISN	: NEUTRAL
Tem / Hum	: 20 ℃ / 56%	Test Mode	: Operation
EUT	: LED modules	Power Rating	: 120Vac/60Hz
Memo	:	Memo	:

Freq (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
0.1590	23.5	10.3	33.8	55.5	-21.7	Average
0.1590	35.6	10.3	45.9	65.5	-19.6	QP
0.1835	23.5	10.3	33.8	54.3	-20.5	Average
0.1835	35.0	10.3	45.3	64.3	-19.0	QP
0.2644	21.3	10.3	31.6	51.3	-19.7	Average
0.2644	33.1	10.3	43.4	61.3	-17.9	QP
0.3465	18.6	10.3	28.9	49.0	-20.1	Average
0.3465	30.8	10.3	41.1	59.0	-17.9	QP
0.4516	15.7	10.3	26.0	46.8	-20.8	Average
0.4516	27.8	10.3	38.1	56.8	-18.7	QP
0.6406	11.9	10.3	22.2	46.0	-23.8	Average
0.6406	23.9	10.3	34.2	56.0	-21.8	QP
17.3830	-11.5	10.8	-0.7	50.0	-50.7	Average
17.3830	-5.6	10.8	5.2	60.0	-54.8	QP

Note :

1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss



Site	: conducted #1	Date	: 11-28-2013
Condition	: CLASS-B QP	LISN	: LINE
Tem / Hum	: 20 ℃ / 56%	Test Mode	: Operation
EUT	: LED modules	Power Rating	: 120Vac/60Hz
Memo	:	Memo	:

Freq (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
0.1532	23.9	10.3	34.2	55.8	-21.6	Average
0.1532	35.7	10.3	46.0	65.8	-19.8	QP
0.1677	23.4	10.3	33.7	55.1	-21.4	Average
0.1677	35.5	10.3	45.8	65.1	-19.3	QP
0.2018	22.8	10.3	33.1	53.5	-20.4	Average
0.2018	34.7	10.3	45.0	63.5	-18.5	QP
0.3166	19.3	10.3	29.6	49.8	-20.2	Average
0.3166	31.5	10.3	41.8	59.8	-18.0	QP
0.3596	18.2	10.3	28.5	48.7	-20.2	Average
0.3596	30.3	10.3	40.6	58.7	-18.1	QP
0.5854	12.9	10.3	23.2	46.0	-22.8	Average
0.5854	24.7	10.3	35.0	56.0	-21.0	QP
19.9500	-9.0	11.1	2.1	50.0	-47.9	Average
19.9500	-2.1	11.1	9.0	60.0	-51.0	QP

Note :

1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss

5.4 Result Data Calculation

The result data is calculated by adding the LISN Factor to the measured reading. The basic equation with a sample calculation is as follows:

RESULT = READING + LISN FACTOR

Assume a receiver reading of 22.5 dB μ V is obtained, and LISN Factor is 0.1 dB, then the total of disturbance voltage is 22.6 dB μ V.

RESULT = 22.5 + 0.1 = 22.6 dB μ V

Level in μ V = Common Antilogarithm[(22.6 dB μ V)/20]

= 13.48 μ V

5.5 Conducted Measurement Equipment

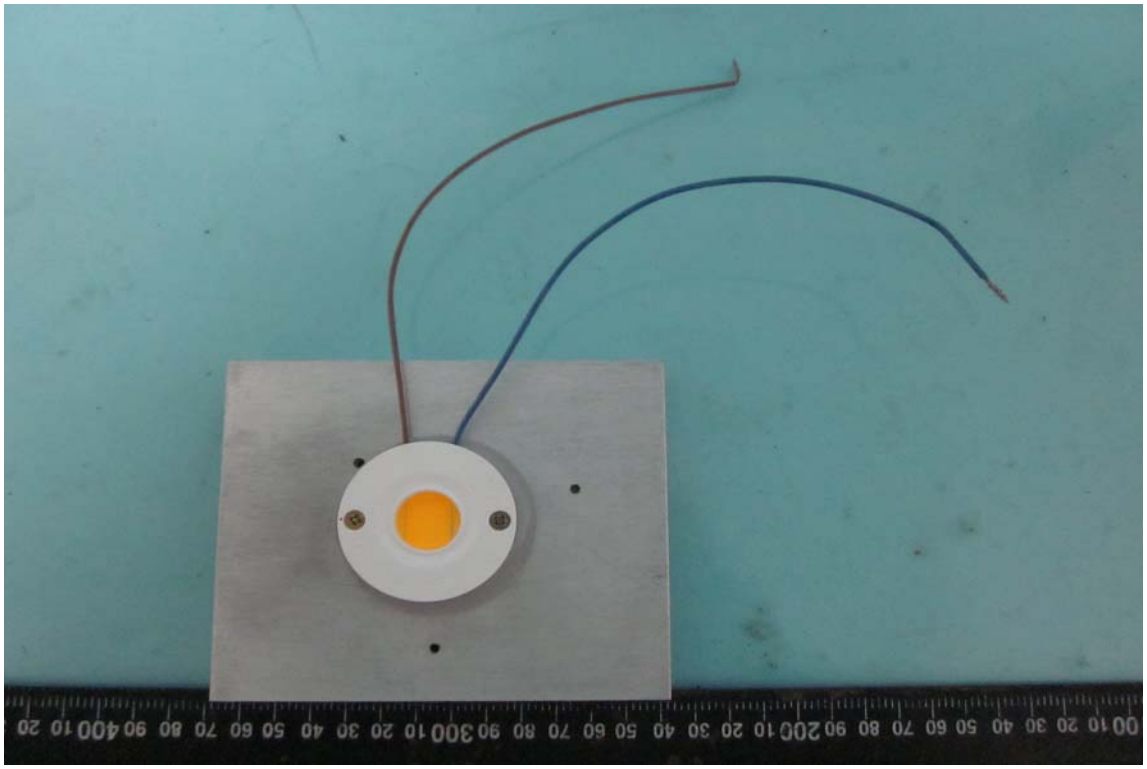
The following test equipment are used during the conducted test .

Equipment	Manufacturer	Model No.	Cal. Date	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	ESCI	2013/07/15	2014/07/14
LISN	EMCO	3625/2	2013/05/07	2014/05/06
Monitor	IBM	E54	N.C.R.	N.C.R.
Printer	HP	LaserJet 1000	N.C.R.	N.C.R.
Shielded Room	Riken	----	N.C.R.	N.C.R.
Computer	Acer	Veriton	N.C.R.	N.C.R.

5.6 Photos of Conduction Measuring Setup

CONSTRUCTED PHOTOS of EUT

1.



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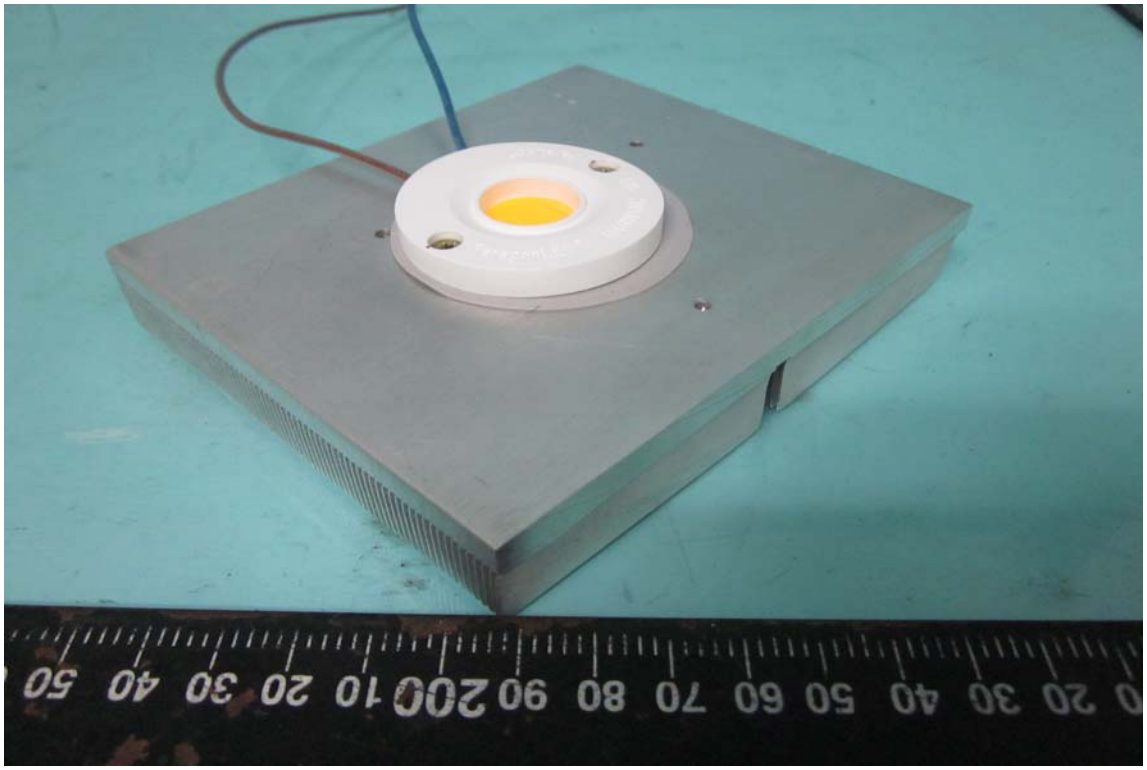

CONSTRUCTED PHOTOS of EUT

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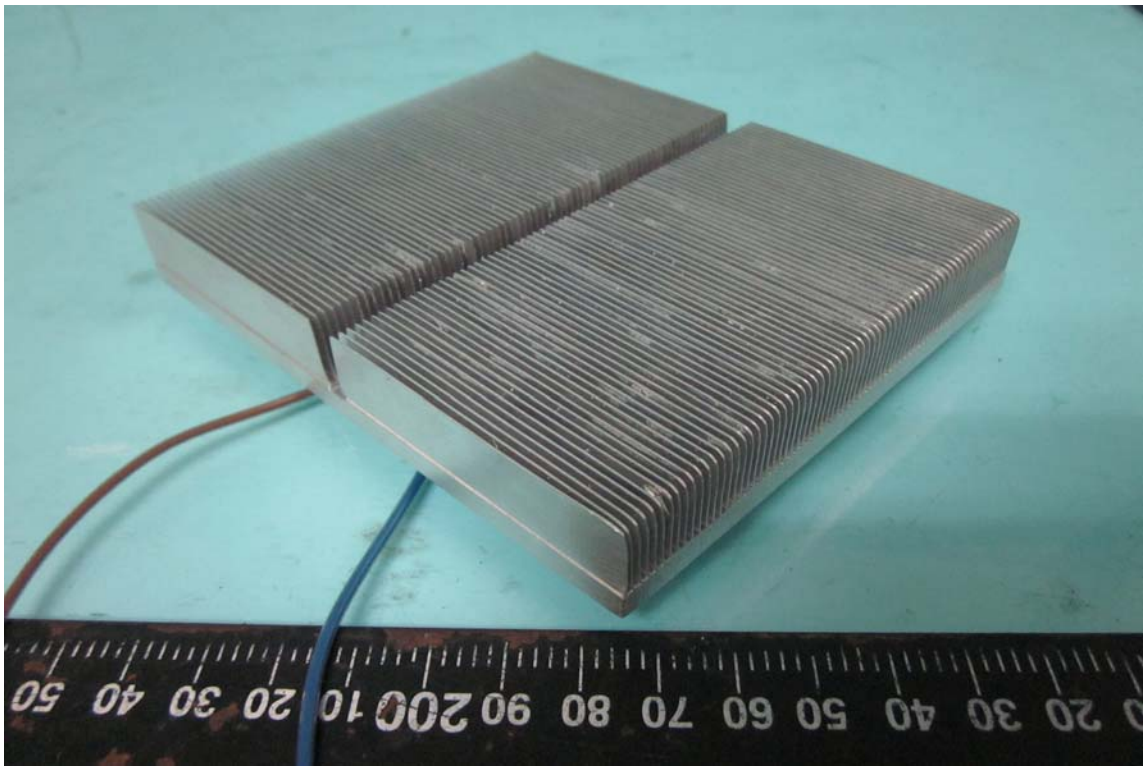

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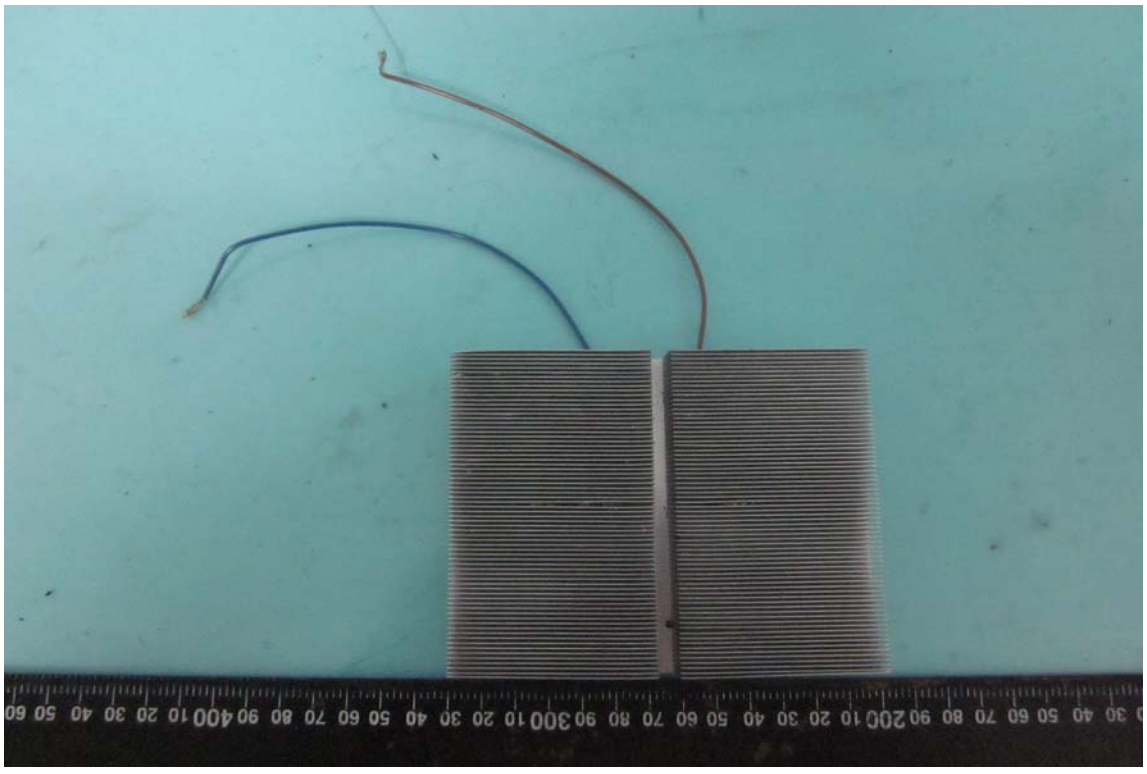

CONSTRUCTED PHOTOS of EUT

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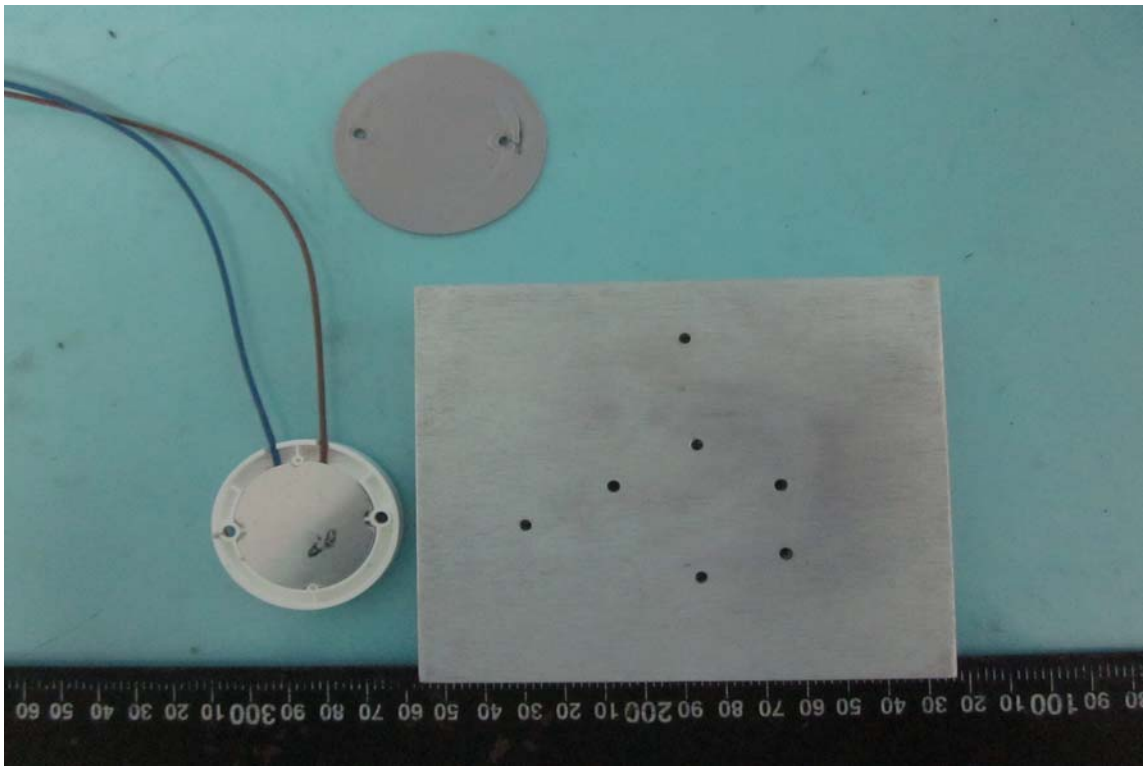
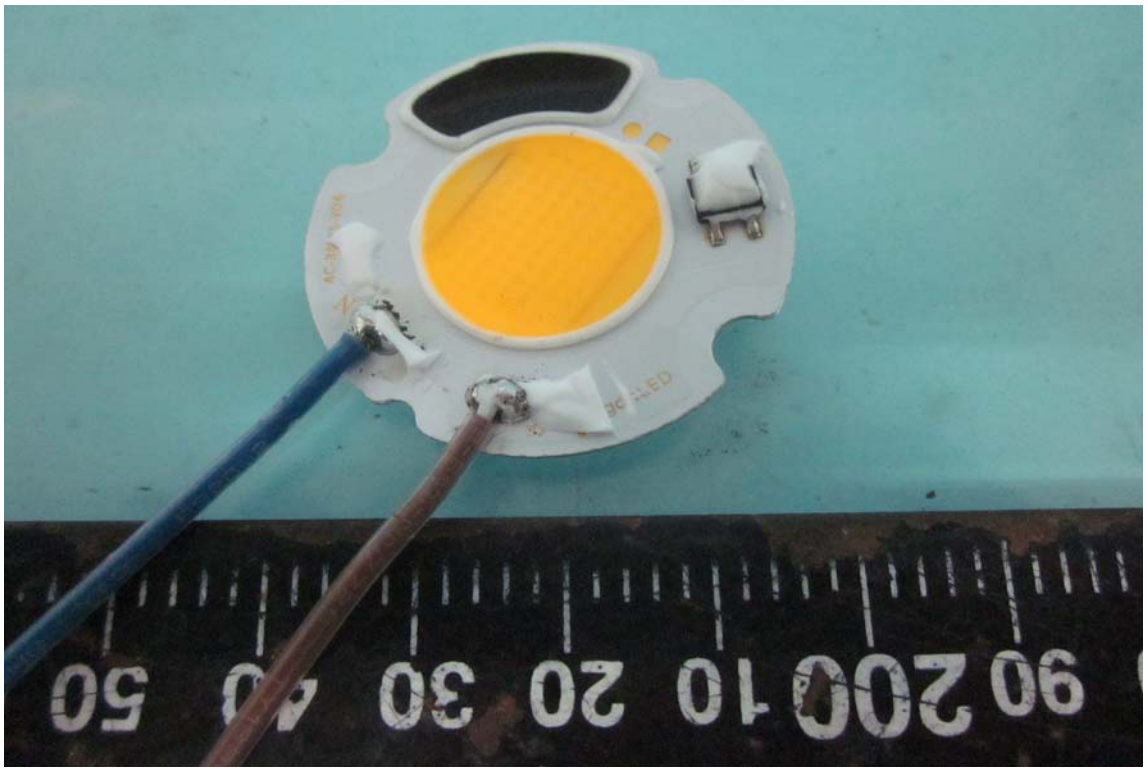
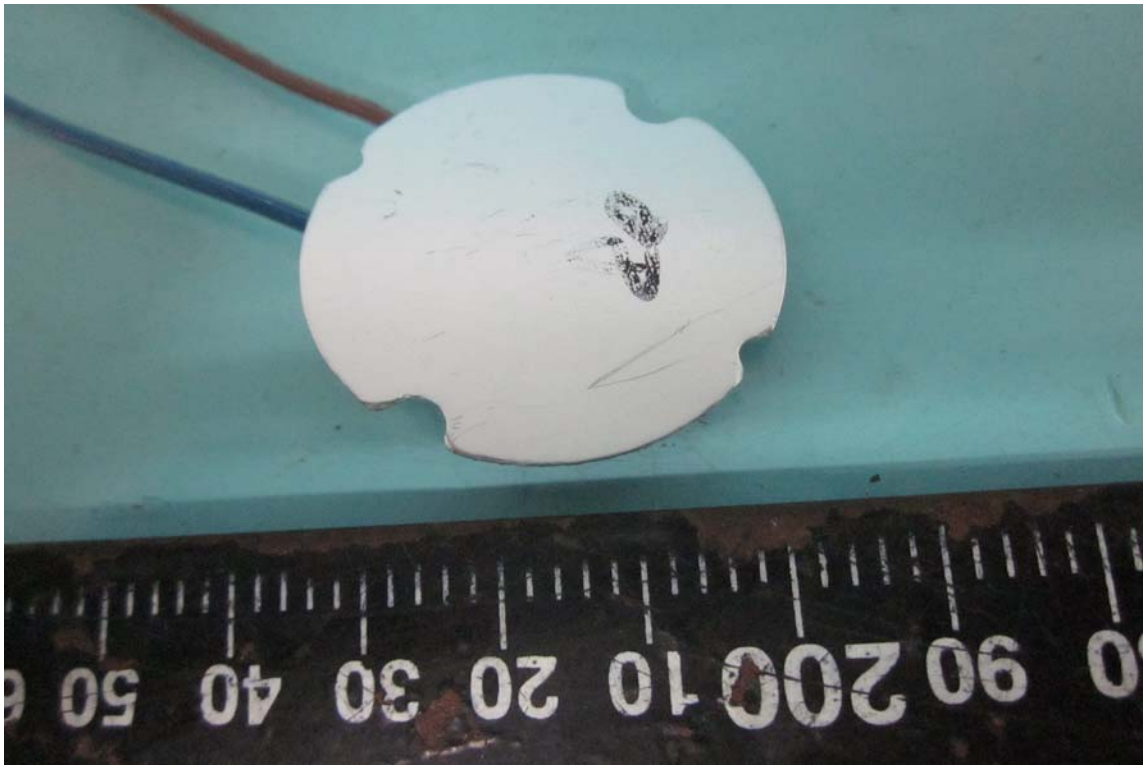


6.



CONSTRUCTED PHOTOS of EUT

7.



Annex I

DIFFERENCE INFORMATIONS OF SERIES MODEL

1. Test Model (Main Model): CBAC-84-36185-120V-57
2. Test Model (Series Model): Below

The Difference Information:

Model No. / Difference Item	Main Model:	Series Model:	Series Model:	Series Model:
	CBAC-84-36185-120V-57	CBAC-42-30135-120V-XX	CBAC-42-30135-120V-XX (14W)	CBAC-42-36185-120V-XX
PCB Layout and The Circuit Diagram	O	O	O	O
Components	O	O	O	O
Material	O	O	O	O
Function	O	O	O	O
Shape & Color	O	O	O	O
LED	O	O	O	O
Other	O	O	O	O
Notes: (1) " O " means the item is same with Main model. (2) " X "means the item is different with main model. And please explain it.				

Model No. / Difference Item	Series Model:	Series Model:	Series Model:	Series Model:
	CBAC-42-5028-120V-XX	CBAC-84-30135-120V-XX	CBAC-84-36185-120V-XX	CBAC-84-5028-120V-XX
PCB Layout and The Circuit Diagram	O	O	O	O
Components	O	O	O	O
Material	O	O	O	O
Function	O	O	O	O
Shape & Color	O	O	O	O
LED	O	O	O	O
Other	O	O	O	O
Notes: (1) " O " means the item is same with Main model. (2) " X "means the item is different with main model. And please explain it.				

Model No. / Difference Item	Series Model:	Series Model:	Series Model:	Series Model:
	CDAC-20-30135-120V-XX	CGAC-08-30135-120V-XX	CGAC-08-36135-120V-XX	DBAC-42-6038-120V-XX
PCB Layout and The Circuit Diagram	O	O	O	O
Components	O	O	O	O
Material	O	O	O	O
Function	O	O	O	O
Shape & Color	O	O	O	O
LED	O	O	O	O
Other	O	O	O	O
Notes: (1) " O " means the item is same with Main model. (2) " X "means the item is different with main model. And please explain it.				

Model No. / Difference Item	Series Model:	Series Model:	Series Model:	Series Model:
	DBAC-84-6038-120V-XX	HBAC-48-5028-120V-XX	HBAC-96-5028-120V-XX	HBAC-96-6038-120V-XX
PCB Layout and The Circuit Diagram	O	O	O	O
Components	O	O	O	O
Material	O	O	O	O
Function	O	O	O	O
Shape & Color	O	O	O	O
LED	O	O	O	O
Other	O	O	O	O
Notes: (1) " O " means the item is same with Main model. (2) " X "means the item is different with main model. And please explain it.				

Model No. / Difference Item	Series Model:	Series Model:	Series Model:	Series Model:
	LBAC-42-15520-120V-XX	LBAC-84-15520-120V-XX	SBAC-168-5050-120V-XX	SBAC-84-5050-120V-XX
PCB Layout and The Circuit Diagram	O	O	O	O
Components	O	O	O	O
Material	O	O	O	O
Function	O	O	O	O
Shape & Color	O	O	O	O
LED	O	O	O	O
Other	O	O	O	O

Notes: (1) " O " means the item is same with Main model.
(2) " X "means the item is different with main model. And please explain it.

Remark: 1. The multiple listing recognized without test basis is according to information supplied by manufacturer.
2.The manufacturer or supplier's quality system shall ensure that the tested model or apparatus is representative of the series-produced apparatus concerned.

Manufacturer / Supplier

Company Name: PARAGON SEMICONDUCTOR LIGHTING TECHNOLOGY CO LTD

Signature : _____

Name : _____ Date : _____