



FCC TEST REPORT

47 CFR FCC Part 15 Subpart B

Report Reference No.....: TRE1403009201 R/C: 79199

FCC ID.....: N9STY-S-433-24

Compiled by

(position+printed name+signature)..: File administrators Eric Wang

Eric Wang

Supervised by

(position+printed name+signature)..: Test Engineer Yuchao Wang

yuchao.wang

Approved by

(position+printed name+signature)..: Manager Wenliang Li

Wenliang Li

Date of issue.....: Mar 31, 2014

Testing Laboratory Name: Shenzhen Huatongwei International Inspection Co., Ltd

Address: Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China

Applicant's name: TOYO ELECTRIC MFG. Co., LTD.

Address: 9TH,FL 30 SEC 3 RENAI RD DAAN DISTRICT, TAIPEI 106
TAIWAN

Test specification:

Standard: 47 CFR FCC Part 15 Subpart B - Unintentional Radiators
ANSI C63.4: 2009

TRF Originator.....: Shenzhen Huatongwei International Inspection CO., Ltd

Master TRF.....: Dated 2006-06

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Test item description: Light Set with 10 to 300 bulbs Operated by 433MHz Module Controller

Trade Mark: TOYO

Model/Type reference.....: 10L ~ 300L With TY-S-433-24 433MHz Module Controller

Listed Models:

Manufacturer: T&Y ELECTRIC(SHENZHEN)Co., LTD.

Rating: AC 120V/60Hz

Result.....: PASS

T E S T R E P O R T

Test Report No. : TRE1403007406	Mar 31, 2014 Date of issue
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Equipment under Test : Light Set with 10 to 300 bulbs Operated by 433MHz
Module Controller

Model /Type : 10L ~ 300L With TY-S-433-24 433MHz
Module Controller

Listed Models :

Applicant : **TOYO ELECTRIC MFG. Co., LTD.**

Address : 9TH,FL 30 SEC 3 RENAI RD DAAN DISTRICT, TAIPEI
106 TAIWAN

Manufacturer : **T&Y ELECTRIC(SHENZHEN)Co., LTD.**

Address : ANLIANG INDUSTRIAL ZONE, HENGANG,
LONGGANG DISTRICT,GD,CHINA

Test Result	PASS
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

[47 CFR FCC Part 15 Subpart B](#) - Unintentional Radiators

[ANSI C63.4: 2009](#) – American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Feb 11, 2014
Testing commenced on	:	Feb 12, 2014
Testing concluded on	:	Mar 31, 2014

2.2. Product Description

The **TOYO ELECTRIC MFG. Co., LTD's** Model: 10L ~ 300L With TY-S-433-24 433MHz Module Controller or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

Name of EUT	Light Set with 10 to 300 bulbs Operated by 433MHz Module Controller
Model Number	10L ~ 300L With TY-S-433-24 433MHz Module Controller
FCC ID	N9STY-S-433-24

2.3. Equipment Under Test

Power supply system utilised

Power supply voltage	:	☒ 120V / 60 Hz	☐ 115V / 60Hz
		☐ 12 V DC	☐ 24 V DC
		☐ Other (specified in blank below)	

2.4. EUT operation mode

The EUT has been tested under typical operating condition.

2.5. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: N9STY-S-433-24** filing to comply with the FCC Part 15, Subpart B Rules.

2.6. Internal Identification of AE used during the test

AE ID*	
AE1	
AE2	

*AE ID: is used to identify the test sample in the lab internally.

Note: We not used Charger when FCC Part 15B test.

2.7. Modifications

No modifications were implemented to meet testing criteria.

2.8. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

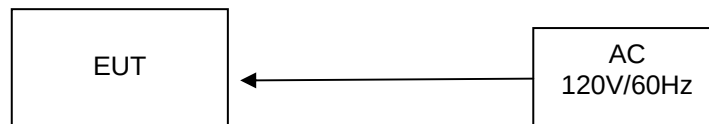
● - supplied by the manufacturer

○ - supplied by the lab

○	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/
○	Multimeter	Manufacturer :	/
		Model No. :	/

2.9. Configuration of Tested System

Configuration of Tested System



Equipment Used in Tested System

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Huatongwei International Inspection Co., Ltd
Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Phone: 86-755-26715686 Fax: 86-755-26748089

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) and CISPR Publication 22.

3.2. Test Facility

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

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: Mar. 29, 2012. Valid time is until Feb. 28, 2015.

A2LA-Lab Cert. No. 2243.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until Sept. 30, 2015.

FCC-Registration No.: 662850

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 662850, Renewal date June. 01, 2012, valid time is until June. 01, 2015.

IC-Registration No.: 5377A

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Jan. 25, 2011, valid time is until Jan. 24, 2014.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

VCCI

The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) and Shielded Room (8m×4m×3m) of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2010. Valid time is until Dec. 23, 2013.

Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: Dec. 20, 2009. Valid time is until Dec. 19, 2012.

Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 07, 2010. Valid time is until May 06, 2013.

DNV

Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2016.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.24 dB	(1)
Radiated Emission	1~18GHz	5.16 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	3.39 dB	(1)

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

3.5. Equipments Used during the Test

Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI TEST RECEIVER	Rohde & Schwarz	ESCI	100106	2013/10/26
2	ARTIFICIAL MAINS	Rohde & Schwarz	ESH2-Z5	100028	2013/10/26
3	PULSE LIMITER	Rohde & Schwarz	ESHSZ2	100044	2013/10/26
4	EMI TEST SOFTWARE	Rohde & Schwarz	ES-K1	N/A	N/A

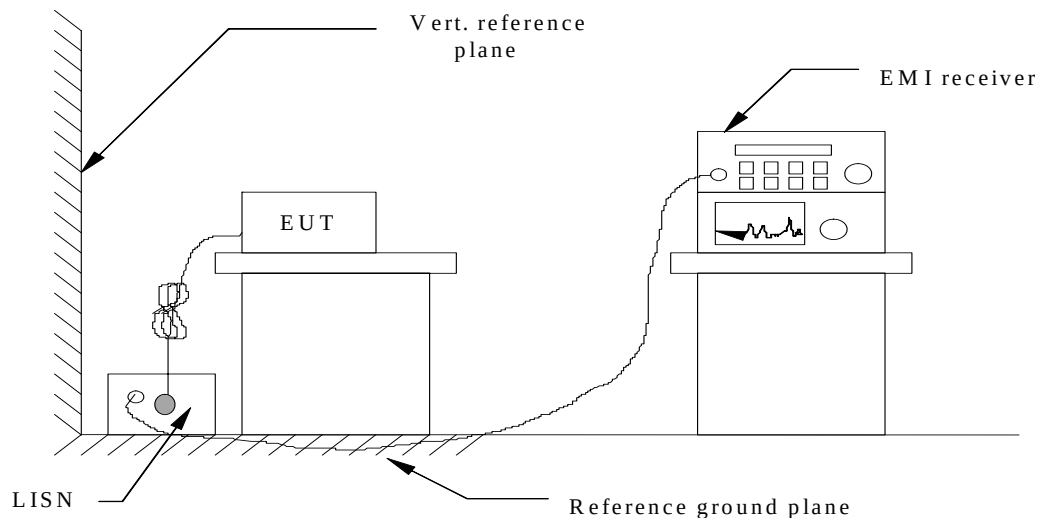
Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ULTRA-BROADBAND ANTENNA	ShwarzBeck	VULB9163	538	2013/10/26
2	EMI TEST RECEIVER	Rohde & Schwarz	ESI 26	100009	2013/10/26
3	EMI TEST Software	Audix	E3	N/A	N/A
4	TURNTABLE	MATURO	TT2.0	----	N/A
5	ANTENNA MAST	MATURO	TAM-4.0-P	----	N/A
6	EMI TEST Software	Rohde & Schwarz	ESK1	N/A	N/A
7	ULTRA-BROADBAND ANTENNA	Rohde&Schwarz	HL562	100015	2013/10/26
8	Amplifer	Sonoma	310N	E009-13	2013/10/26
9	JS amplifer	Rohde & Schwarz	JS4-00101800-28-5A	F201504	2013/10/26
11	TURNTABLE	ETS	2088	2149	N/A
12	ANTENNA MAST	ETS	2075	2346	N/A
13	HORN ANTENNA	Rohde&Schwarz	HF906	100039	2013/10/26

The calibration interval was one year.

4. TEST CONDITIONS AND RESULTS

4.1. Conducted Emissions Test

TEST CONFIGURATION



TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4-2009.
2. Support equipment, if needed, was placed as per ANSI C63.4-2009.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4-2009.
4. The EUT received DC 5.0 from USB powered from AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

CONDUCTED POWER LINE EMISSION LIMIT

For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following :

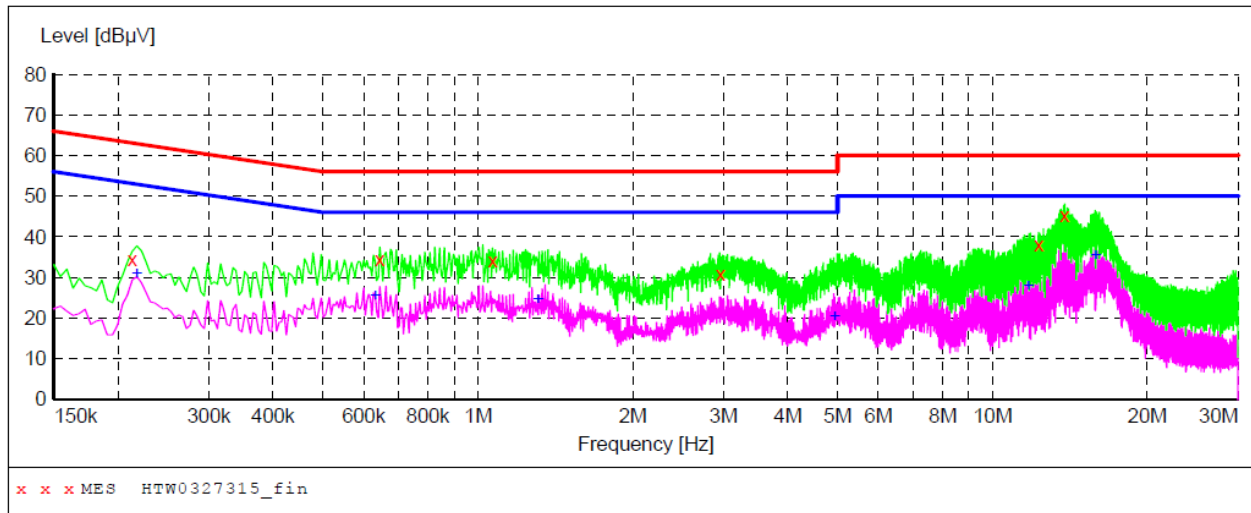
Frequency (MHz)	Maximum RF Line Voltage (dB μ V)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

TEST RESULTS

SCAN TABLE: "Voltage (9K-30M) FIN"

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "HTW0327315_fin"**

3/27/2014 10:45AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.213000	34.60	10.4	63	28.5	QP	L1	GND
0.645000	34.50	10.3	56	21.5	QP	L1	GND
1.068000	34.20	10.3	56	21.8	QP	L1	GND
2.962500	30.70	10.3	56	25.3	QP	L1	GND
12.304500	38.10	10.7	60	21.9	QP	L1	GND
13.807500	45.20	10.7	60	14.8	QP	L1	GND

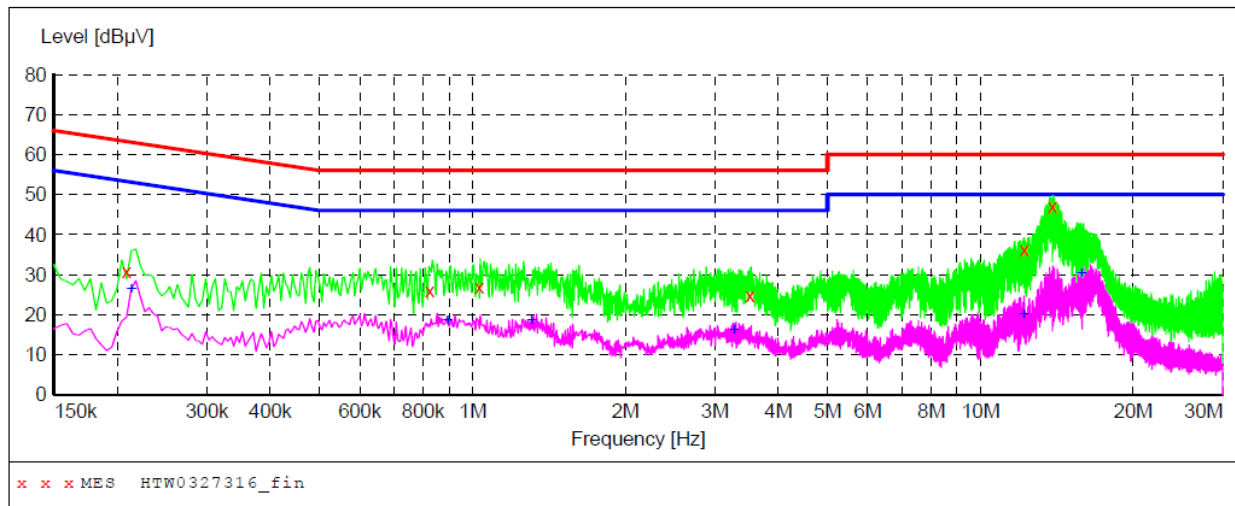
MEASUREMENT RESULT: "HTW0327315_fin2"

3/27/2014 10:45AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.217500	30.70	10.4	53	22.2	AV	L1	GND
0.631500	25.40	10.3	46	20.6	AV	L1	GND
1.306500	24.50	10.3	46	21.5	AV	L1	GND
4.938000	20.20	10.3	46	25.8	AV	L1	GND
11.751000	27.70	10.6	50	22.3	AV	L1	GND
15.868500	35.30	10.7	50	14.7	AV	L1	GND

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "HTW0327316_fin"**

3/27/2014 10:48AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.208500	30.80	10.4	63	32.5	QP	N	GND
0.825000	26.00	10.2	56	30.0	QP	N	GND
1.032000	26.90	10.3	56	29.1	QP	N	GND
3.525000	24.80	10.3	56	31.2	QP	N	GND
12.228000	36.10	10.6	60	23.9	QP	N	GND
13.870500	47.10	10.7	60	12.9	QP	N	GND

MEASUREMENT RESULT: "HTW0327316_fin2"

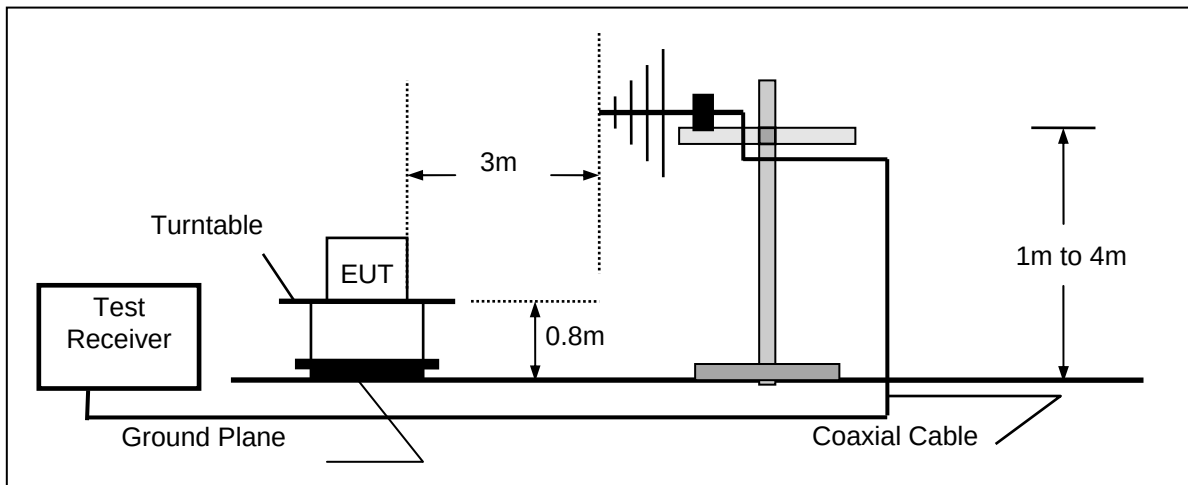
3/27/2014 10:48AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.213000	26.30	10.4	53	26.8	AV	N	GND
0.892500	18.40	10.2	46	27.6	AV	N	GND
1.306500	18.40	10.3	46	27.6	AV	N	GND
3.273000	16.00	10.3	46	30.0	AV	N	GND
12.165000	19.90	10.6	50	30.1	AV	N	GND
15.805500	30.20	10.7	50	19.8	AV	N	GND

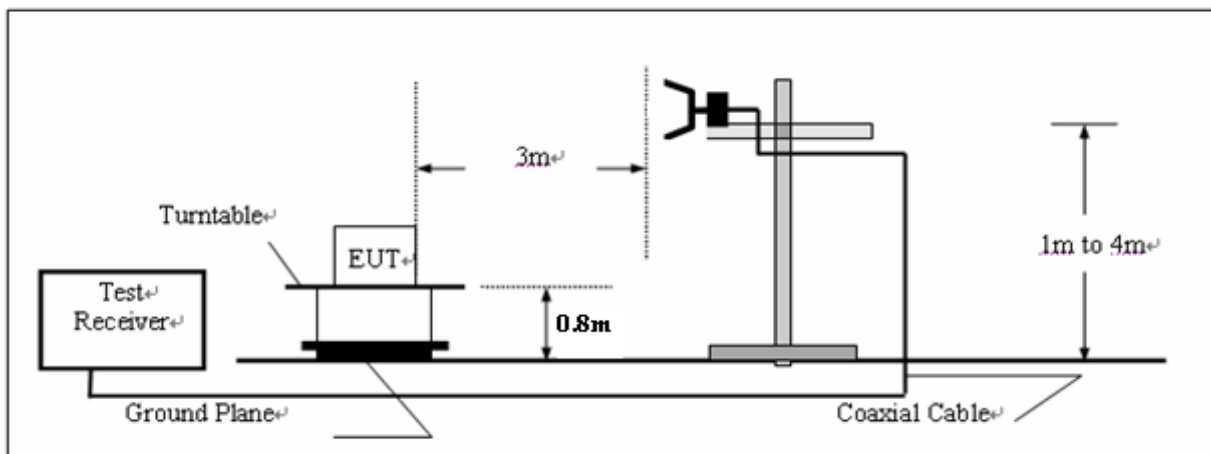
4.2. Radiated Emission Test

TEST CONFIGURATION

a) Radiated Emission Test Set-Up, Frequency below 1000MHz



b) Radiated Emission Test Set-Up, Frequency above 1000MHz



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The maximum operation frequency was 512MHz, the radiated emission test frequency from 30MHz to 18GHz.

FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

For example

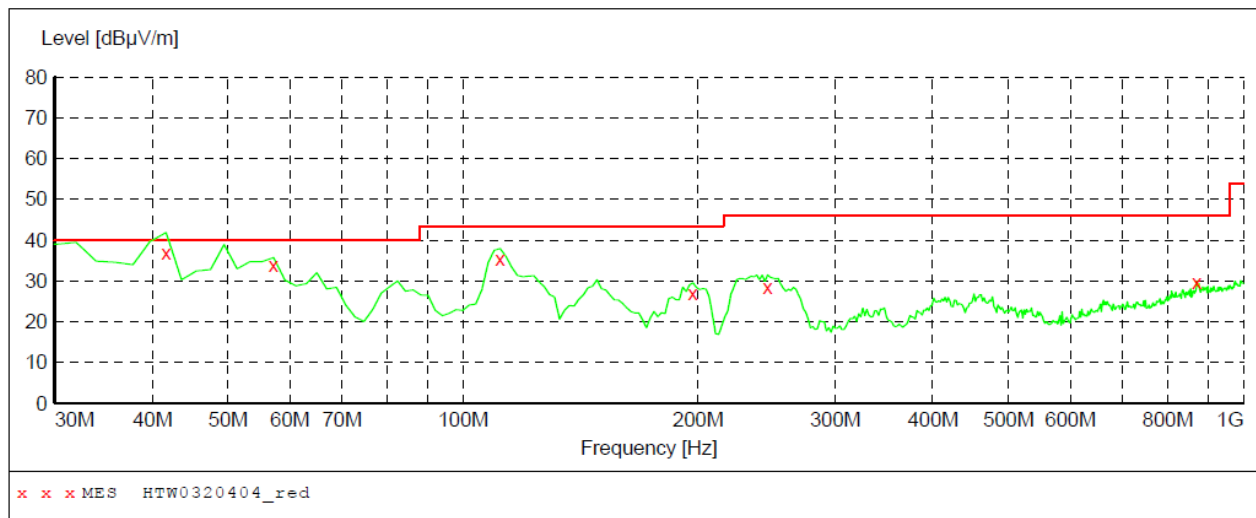
Frequency (MHz)	FS (dBμV/m)	RA (dBμV/m)	AF (dB)	CL (dB)	AG (dB)	Transd (dB)
300.00	40	58.1	12.2	1.6	31.90	-18.1

$$\text{Transd} = \text{AF} + \text{CL} - \text{AG}$$

RADIATION LIMIT

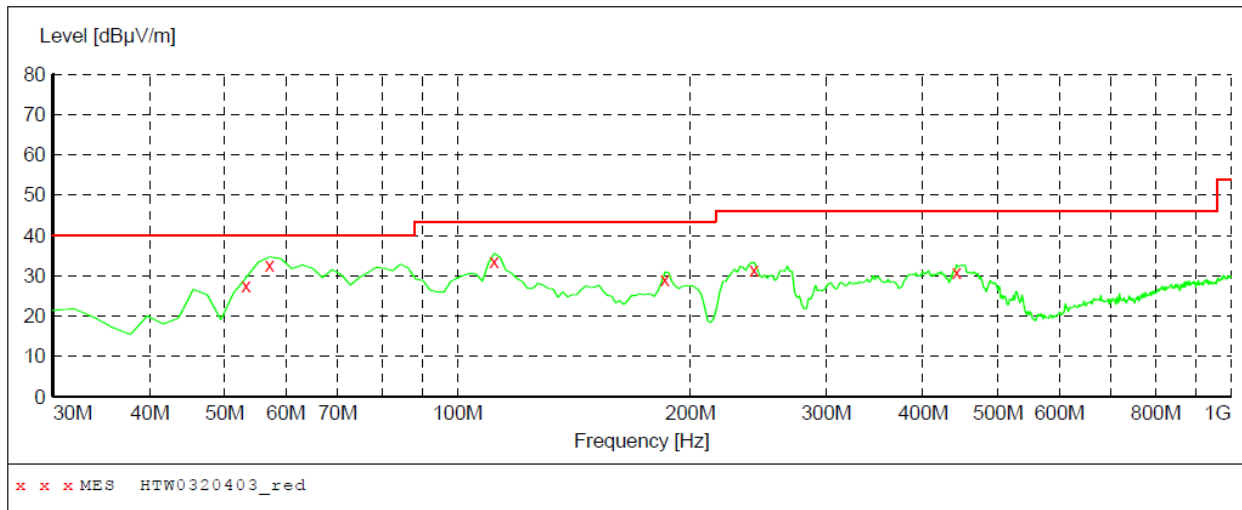
For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/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

TEST RESULTS**MEASUREMENT RESULT: "HTW0320404_red"**

3/20/2014 8:56AM

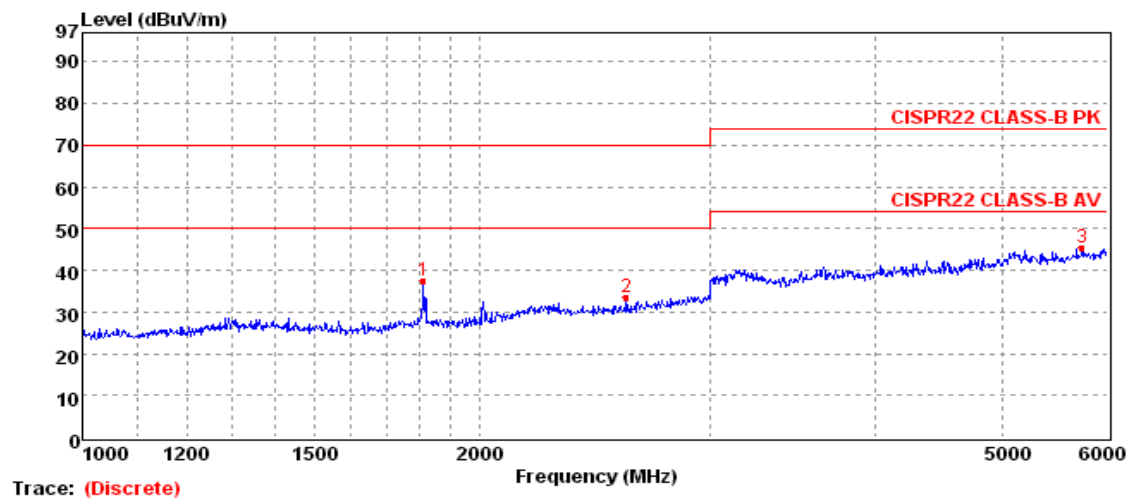
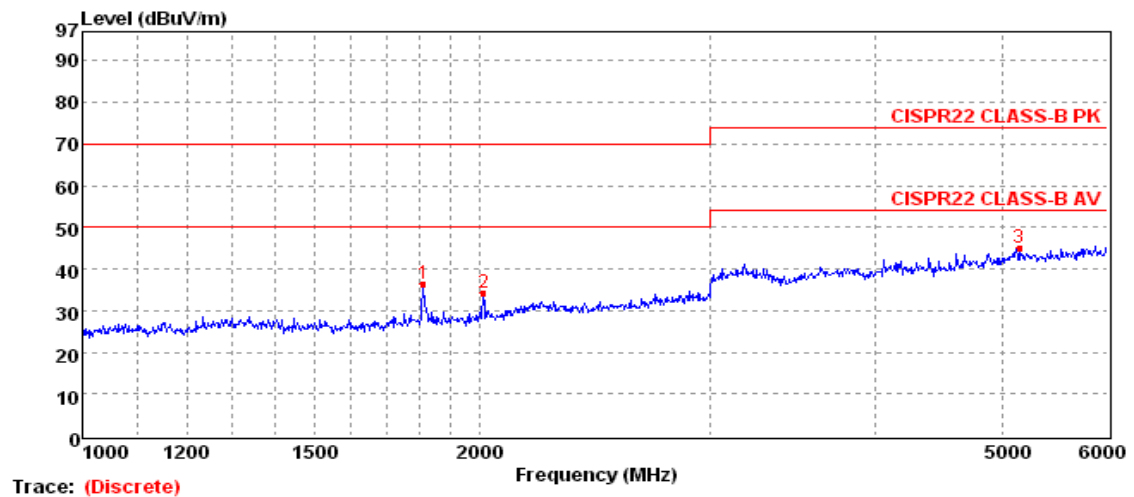
Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
41.663327	37.50	-16.2	40.0	2.5	Qp	100.0	97.00	VERTICAL
57.214429	32.70	-23.1	40.0	7.3	Qp	100.0	66.00	VERTICAL
111.643287	34.90	-18.1	43.5	8.6	Qp	100.0	119.00	VERTICAL
197.174349	27.60	-19.9	43.5	15.9	Qp	300.0	317.00	VERTICAL
245.771543	29.50	-17.1	46.0	16.5	Qp	100.0	304.00	VERTICAL
871.703407	29.80	-4.4	46.0	16.2	Qp	200.0	331.00	VERTICAL



MEASUREMENT RESULT: "HTW0320403_red"

3/20/2014 8:54AM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
53.326653	27.60	-21.9	40.0	12.4	Qp	300.0	135.00	HORIZONTAL
57.214429	32.70	-23.1	40.0	7.3	Qp	300.0	139.00	HORIZONTAL
111.643287	33.60	-18.1	43.5	9.9	Qp	300.0	170.00	HORIZONTAL
185.511022	28.90	-20.6	43.5	14.6	Qp	100.0	222.00	HORIZONTAL
241.883768	31.30	-17.2	46.0	14.7	Qp	100.0	147.00	HORIZONTAL
442.104208	30.70	-13.1	46.0	15.3	Qp	100.0	50.00	HORIZONTAL

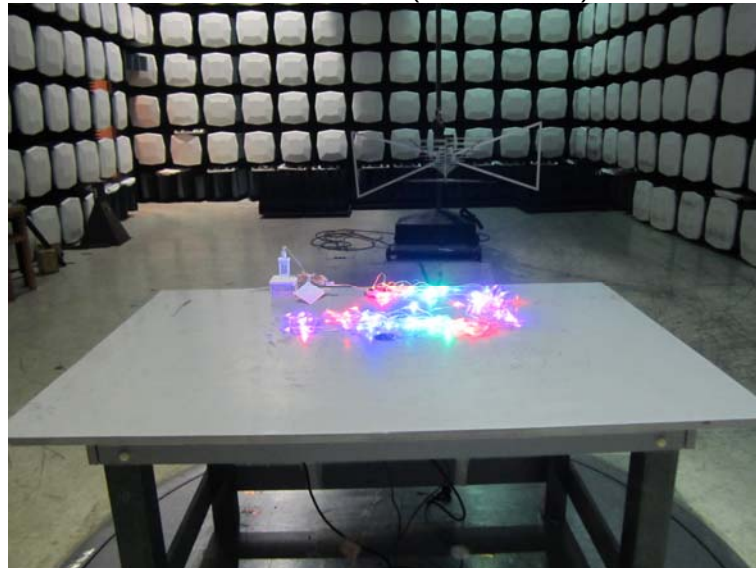


5. Test Setup Photos of the EUT

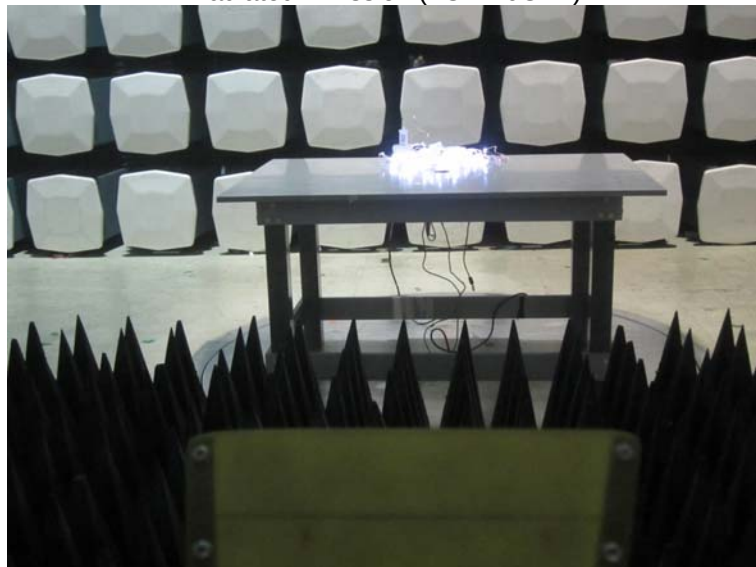
Conducted Emission (AC Mains)



Radiated Emission (30MHz-1GHz)

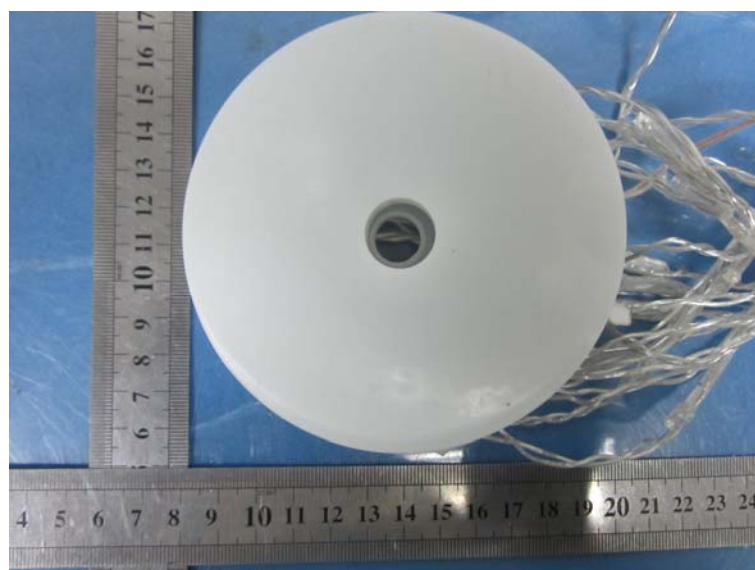


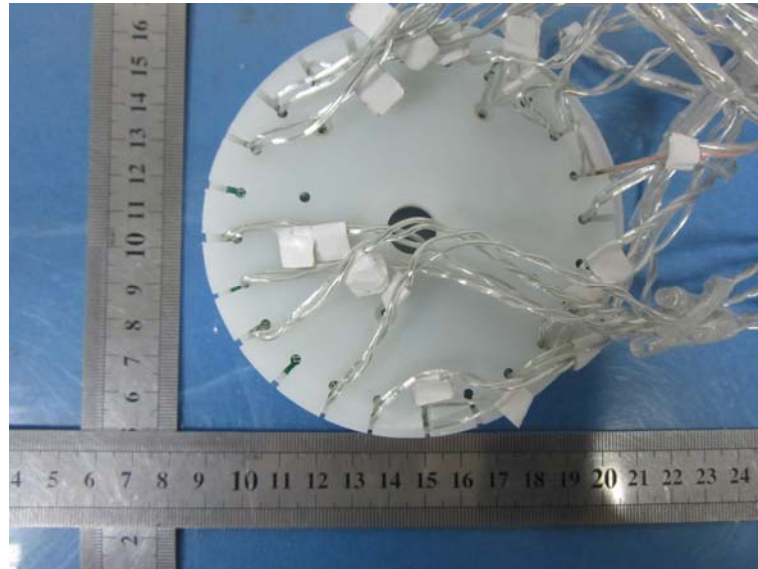
Radiated Emission (1GHz-6GHz)

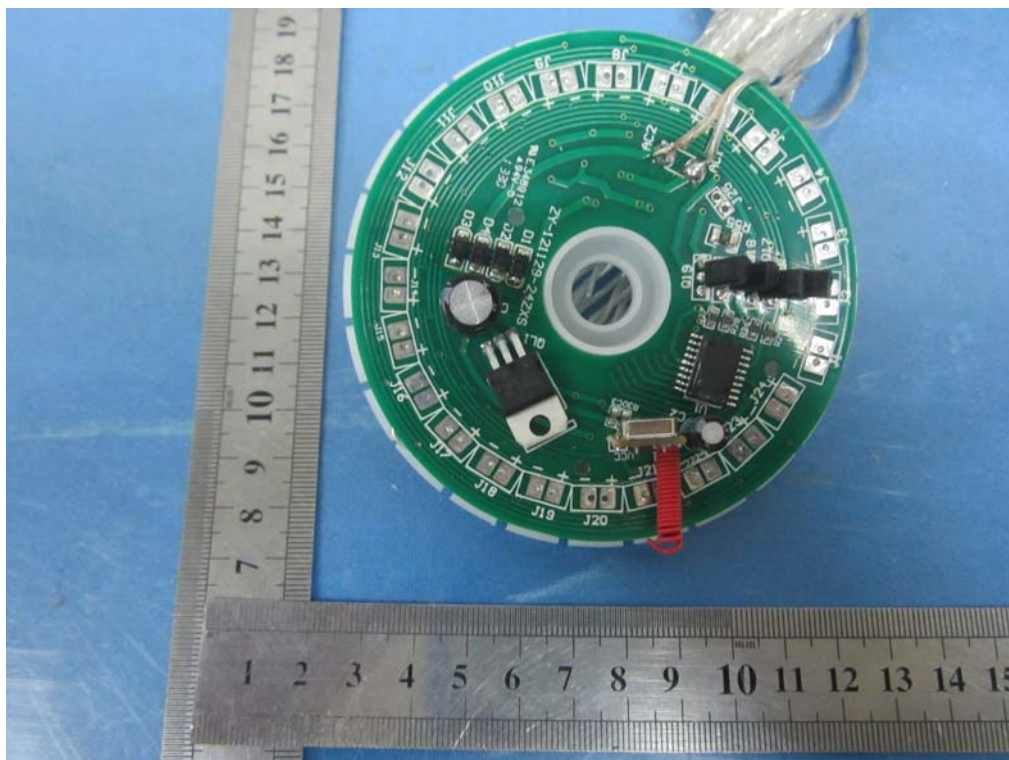


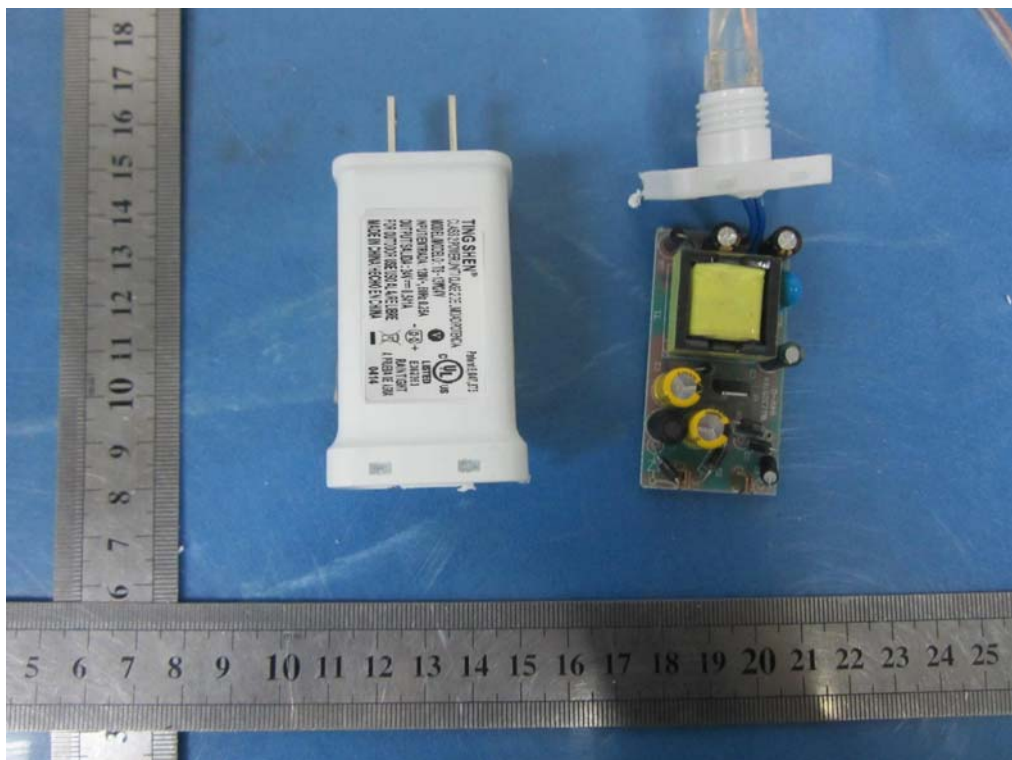
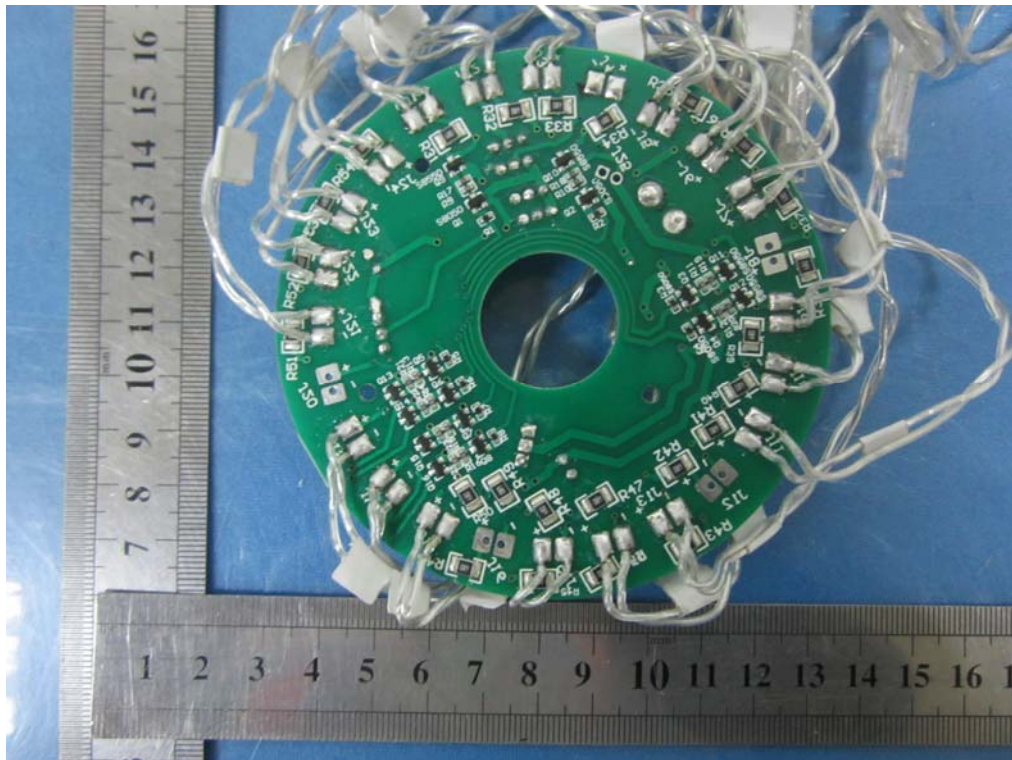
6. External and Internal Photos of the EUT

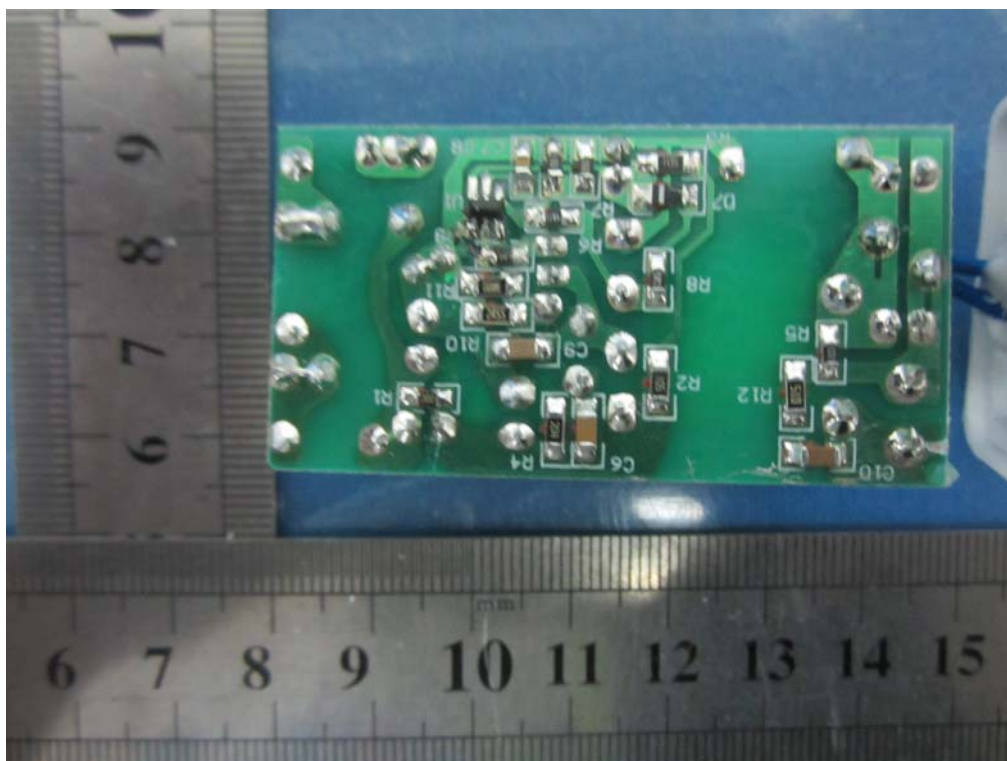
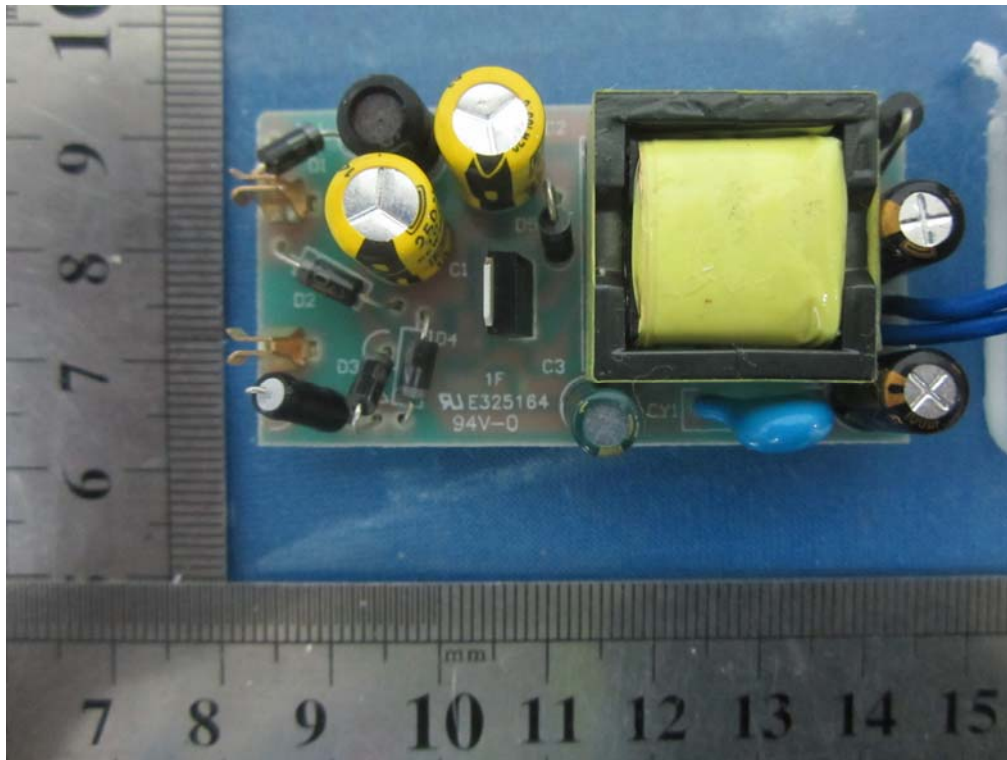
External photos of the EUT





Internal photos of the EUT





.....End of Report.....