Shenzhen Huatongwei International Inspection Co., Ltd.
Keji S,12th , Road, Hi-tech Industrial Park, Shenzhen, Guangdong, China
Phone:86-755-26748099 Fax:86-755-26748089 http://www.szhtw.com.cn

CNASL1225

FCC TEST REPORT

47 CFR FCC Part 15 Subpart B

Report Reference No.....:	**TRE13050143 R/C:50249**
FCC ID.....:	**N9STY-16F**
Compiled by (position+printed name+signature)..:	File administrators Yuchao.Wang
Supervised by (position+printed name+signature)..:	Test Engineer Jerome Luo
Approved by (position+printed name+signature)..:	Manager Wenliang Li
Date of issue.....:	May 30, 2013
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**
	ANSI C63.4: 2009
TRF Originator.....:	Shenzhen Huatongwei International Inspection CO., Ltd
Master TRF.....:	Dated 2006-06

Test item description .....:	Light Set with 10 to 300 bulbs Operated by Controller
Trade Mark .....:	TOYO
Model/Type reference.....:	10L ~ 300L With TY-16F Controller
Listed Models .....:	10L ~ 300L With TYC-16F Controller, 10L ~ 300L With TY-16F -GE Controller
Operation Frequency.....:	433.92MHz
Result.....:	**Positive**

T E S T R E P O R T

Test Report No. :	**TRE13050143**	May 30, 2013 Date of issue

Equipment under Test	:	Light Set with 10 to 300 bulbs Operated by Controller
Model /Type	:	10L ~ 300L With TY-16F Controller
Listed Models	:	10L ~ 300L With TYC-16F Controller, 10L ~ 300L With TY-16F -GE Controller
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, HENGGANG, LONGGANG DISTRICT,GD,CHINA

Test Result according to the standards on page 4:	**Positive**

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.

Contents

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	:	May 24, 2013
Testing commenced on	:	May 24, 2013
Testing concluded on	:	May 30, 2013

2.2. 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)		

/

2.3. Short description of the Equipment under Test (EUT)

433.92MHz (Light Set with 10 to 300 bulbs Operated by Controller (10L ~ 300L With TY-16F Controller))

For more details, refer to the user's manual of the EUT.

Serial number: Prototype

2.4. EUT operation mode

The EUT has been tested under typical operating condition.

2.5. Modifications

No modifications were implemented to meet testing criteria.

2.6. Configuration of Tested System

Configuration of Tested System

2.7. NOTE

The EUT is a Light Set with 10 to 300 bulbs Operated by Controller,The functions of the EUT listed as below:

	Test Standards	Reference Report
EMC REPORT	FCC PART 15 Subpart B	TRE13050143

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: August 02, 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, 2013.

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, 2015.

IC-Registration No.: 5377

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. 5377 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.

NEMKO-Aut. No.: ELA125

Shenzhen Huatongwei International Inspection Co., Ltd has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025:2005 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10; the Authorization is valid through July 07, 2013.

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.: R-2484. Date of Registration: December 20, 2009. Valid time is until December 19, 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: December 20, 2009. Valid time is until December 19, 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, 2013.

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	9K-30MHz	3.22 dB	(1)
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	2012/10/27
2	ARTIFICIAL MAINS	Rohde & Schwarz	ESH2-Z5	100028	2012/10/27
3	PULSE LIMITER	Rohde & Schwarz	ESHSZ2	100044	2012/10/27
4	EMI TEST SOFTWARE	Rohde & Schwarz	ES-K1	N/A	2012/10/27

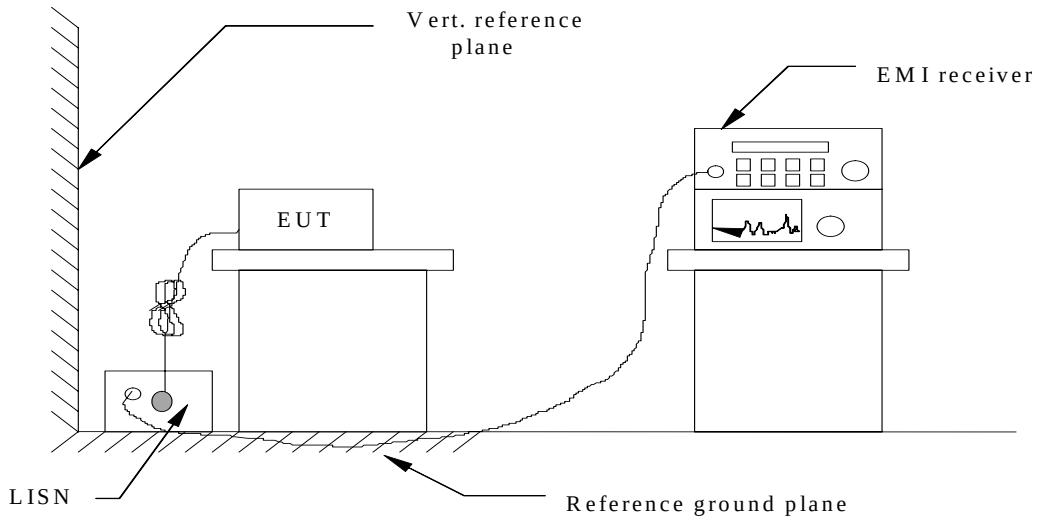
Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ULTRA-BROADBAND ANTENNA	Rohde & Schwarz	HL562	100015	2012/10/27
2	EMI TEST RECEIVER	Rohde & Schwarz	ESI 26	100009	2012/10/27
3	RF TEST PANEL	Rohde & Schwarz	TS / RSP	335015/ 0017	2012/10/27
4	TURNTABLE	ETS	2088	2149	2012/10/27
5	ANTENNA MAST	ETS	2075	2346	2012/10/27
6	EMI TEST OFTWARE	Rohde & Schwarz	ESK1	N/A	2012/10/27
7	HORN ANTENNA	Rohde & Schwarz	HF906	100039	2012/10/27
8	Amplifer	Sonoma	310N	E009-13	2012/10/27
9	JS amplifer	Rohde & Schwarz	JS4-00101800-28-5A	F201504	2012/10/27
10	High pass filter	Compliance Direction systems	BSU-6	34202	2012/10/27
13	Loop Antenna	Rohde&Schwarz	HFH2-Z2	100020	2012/10/27

The calibration interval was one year.

4. TEST CONDITIONS AND RESULTS

4.1. Conducted Emissions

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 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.

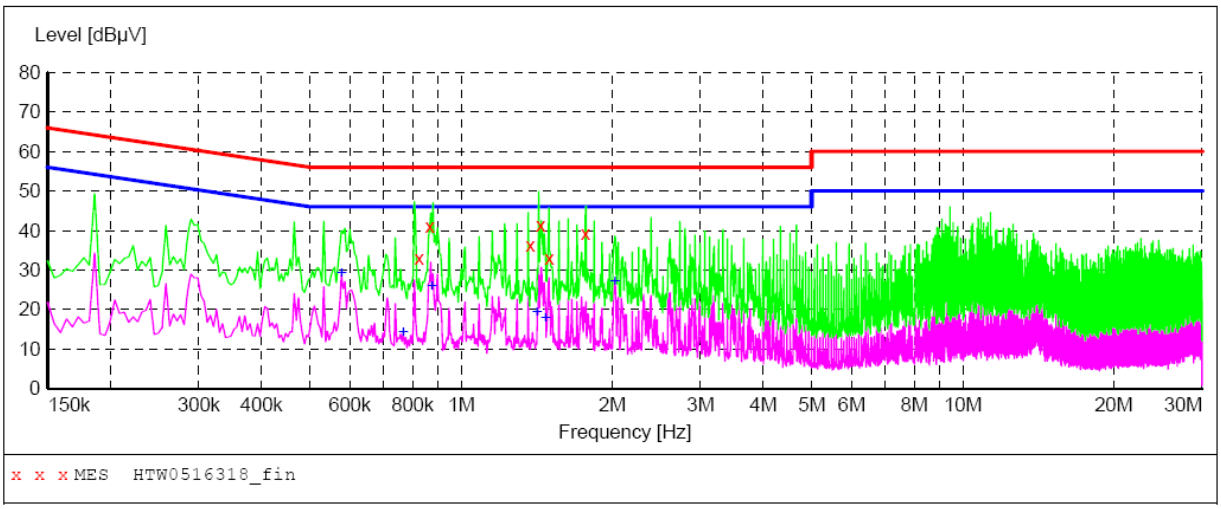
CONDUCTED POWER LINE EMISSION LIMIT

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

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	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

TEST RESULTS

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "HTW0516318_fin"

5/16/2013 9:47AM

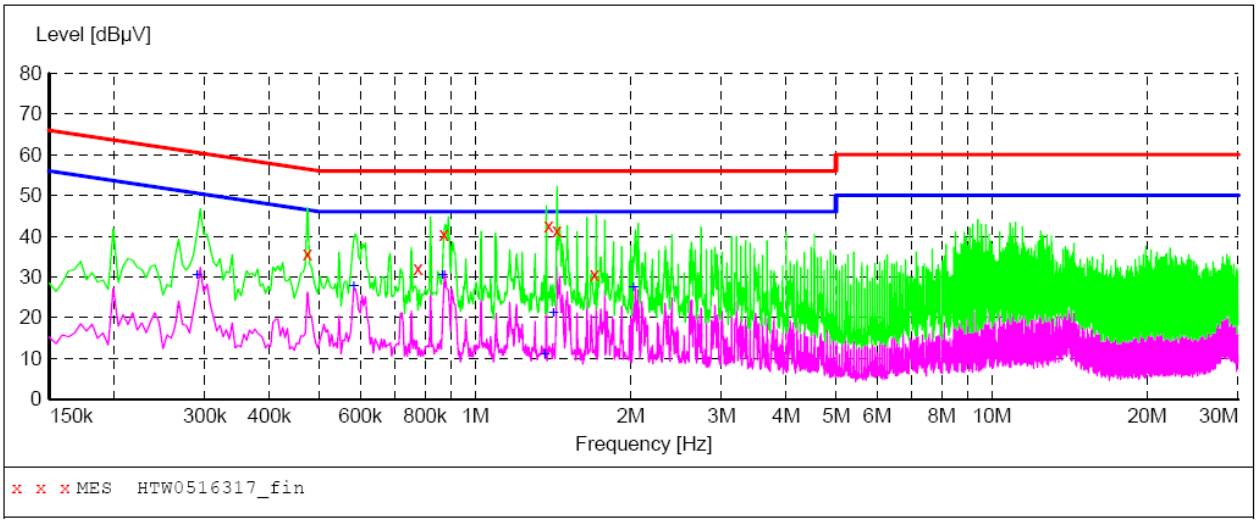
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.825000	33.10	10.1	56	22.9	QP	L1	GND
0.865500	41.00	10.1	56	15.0	QP	L1	GND
1.374000	36.40	10.2	56	19.6	QP	L1	GND
1.441500	41.50	10.2	56	14.5	QP	L1	GND
1.500000	32.90	10.2	56	23.1	QP	L1	GND
1.770000	39.40	10.2	56	16.6	QP	L1	GND

MEASUREMENT RESULT: "HTW0516318_fin2"

5/16/2013 9:47AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.577500	29.00	10.3	46	17.0	AV	L1	GND
0.766500	14.10	10.1	46	31.9	AV	L1	GND
0.874500	25.90	10.1	46	20.1	AV	L1	GND
1.414500	19.20	10.2	46	26.8	AV	L1	GND
1.473000	17.70	10.2	46	28.3	AV	L1	GND
2.026500	27.10	10.2	46	18.9	AV	L1	GND

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "HTW0516317_fin"

5/16/2013 9:44AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.474000	35.60	10.4	56	20.8	QP	N	GND
0.775500	32.10	10.1	56	23.9	QP	N	GND
0.870000	40.40	10.1	56	15.6	QP	N	GND
1.387500	42.70	10.2	56	13.3	QP	N	GND
1.441500	41.30	10.2	56	14.7	QP	N	GND
1.702500	30.60	10.2	56	25.4	QP	N	GND

MEASUREMENT RESULT: "HTW0516317_fin2"

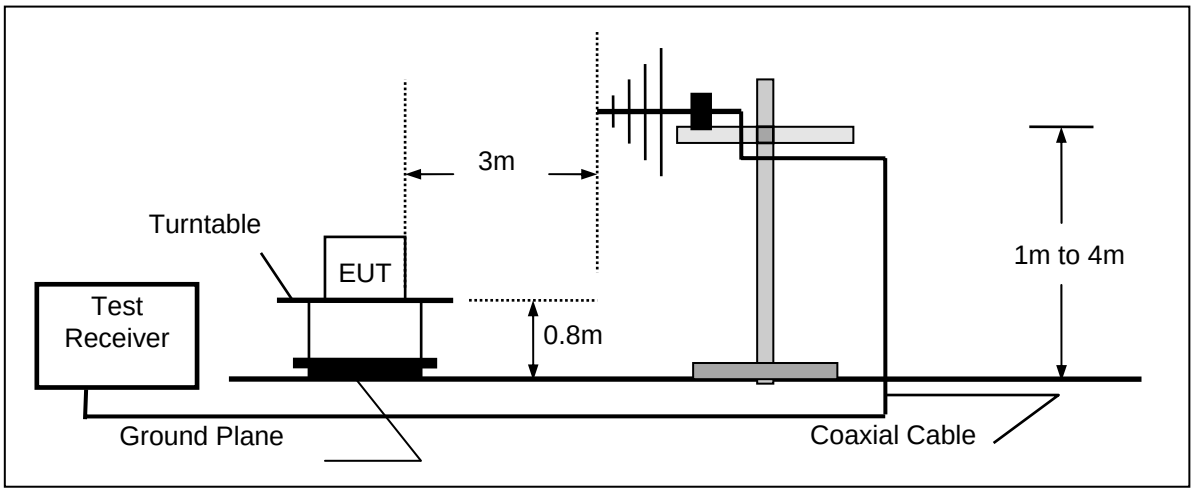
5/16/2013 9:44AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.289500	30.20	10.3	51	20.3	AV	N	GND
0.582000	27.60	10.3	46	18.4	AV	N	GND
0.865500	30.30	10.1	46	15.7	AV	N	GND
1.365000	10.80	10.2	46	35.2	AV	N	GND
1.419000	21.10	10.2	46	24.9	AV	N	GND
2.026500	27.20	10.2	46	18.8	AV	N	GND

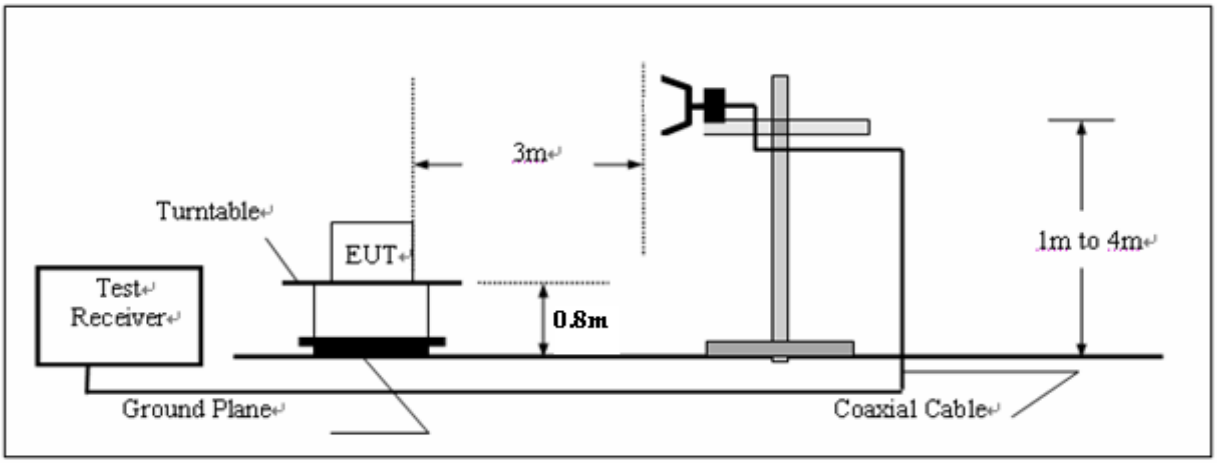
4.2. Radiated Emission

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 minimum oscillator frequency was 433.92MHz,so we test frequency from 30MHz to 6GHz.

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

Transd=AF +CL-AG

RADIATION LIMIT

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：

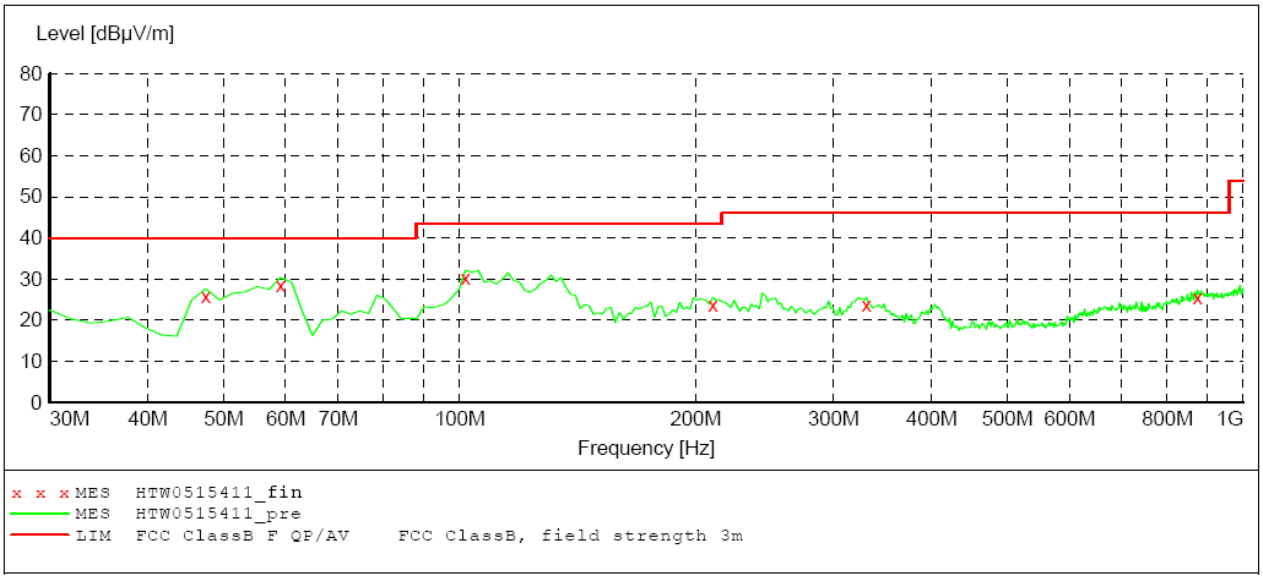
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST RESULTS

SCAN TABLE: "test Field (30M-1G) QP"

Short Description: Field Strength (30M-1G)

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	60.0 kHz	QuasiPeak	1.0 s	120 kHz	HL562



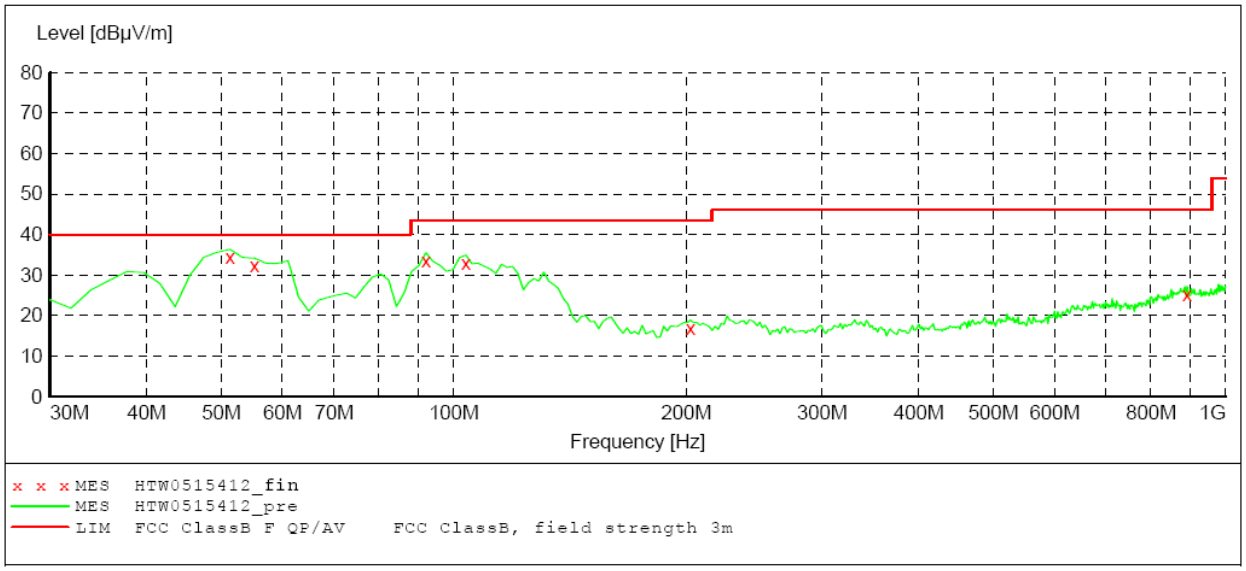
MEASUREMENT RESULT: "HTW0515411_fin"

5/15/2013 10:12AM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	25.60	-21.4	40.0	14.4	QP	300.0	273.00	HORIZONTAL
59.100000	28.30	-25.3	40.0	11.7	QP	300.0	294.00	HORIZONTAL
101.780000	30.10	-20.3	43.5	13.4	QP	300.0	103.00	HORIZONTAL
210.420000	23.50	-21.7	43.5	20.0	QP	100.0	136.00	HORIZONTAL
330.700000	23.60	-17.2	46.0	22.4	QP	100.0	101.00	HORIZONTAL
873.900000	25.30	-8.8	46.0	20.7	QP	100.0	173.00	HORIZONTAL

SCAN TABLE: "test Field (30M-1G) QP"

Short Description:			Field Strength (30M-1G)			
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	60.0 kHz	QuasiPeak	1.0 s	120 kHz	HL562



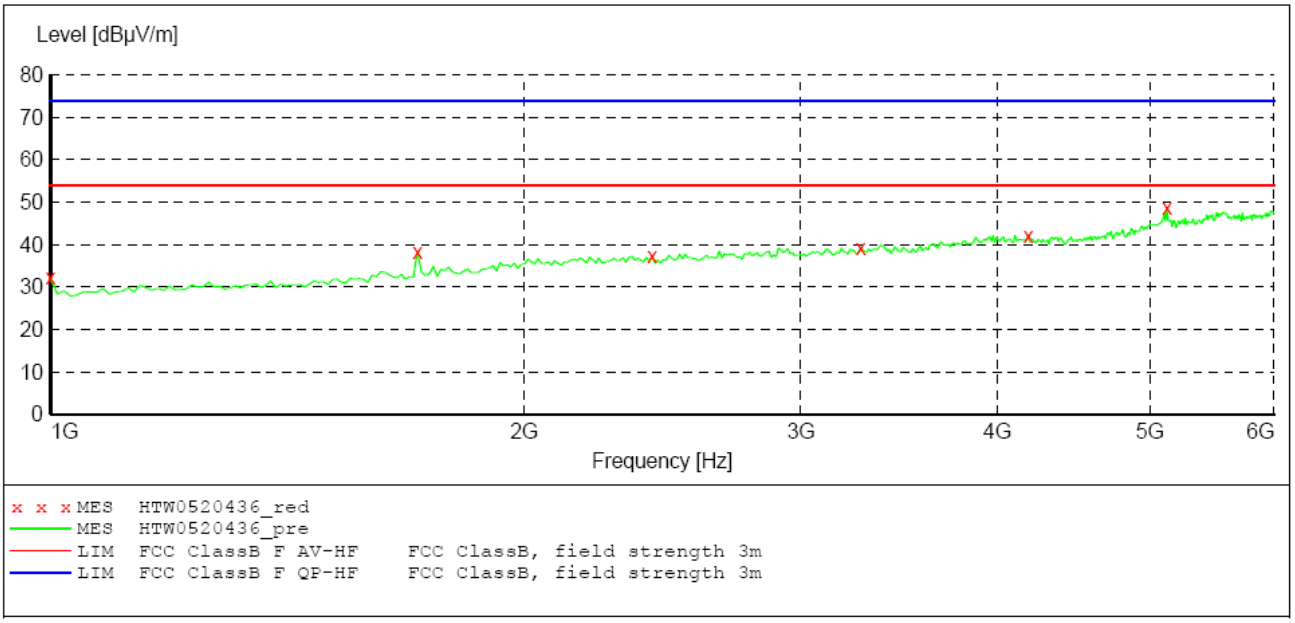
MEASUREMENT RESULT: "HTW0515412_fin"

5/15/2013 10:24AM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
51.340000	34.30	-23.1	40.0	5.7	QP	100.0	24.00	VERTICAL
55.220000	32.20	-24.2	40.0	7.8	QP	100.0	0.00	VERTICAL
92.080000	33.50	-20.6	43.5	10.0	QP	100.0	127.00	VERTICAL
103.720000	32.90	-20.2	43.5	10.6	QP	100.0	148.00	VERTICAL
202.660000	16.90	-22.1	43.5	26.6	QP	100.0	311.00	VERTICAL
891.360000	25.20	-8.5	46.0	20.8	QP	100.0	0.00	VERTICAL

SWEEP TABLE: "test (1G-18G) P"

Short Description:		Field Strength			
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	HF906



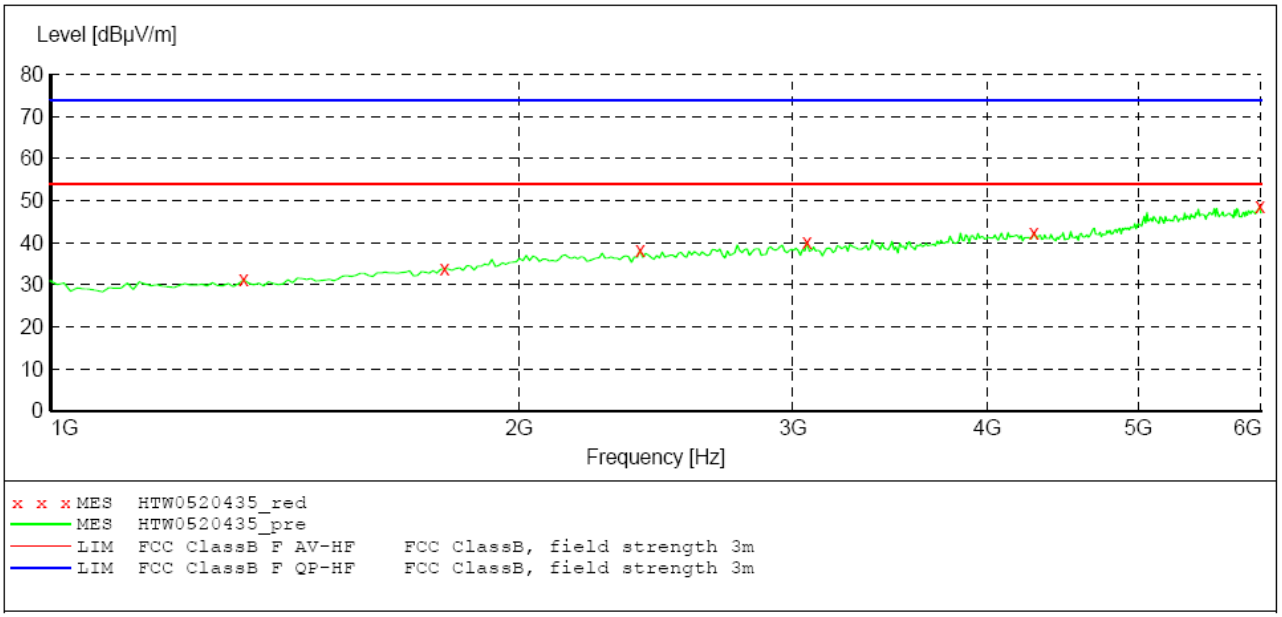
MEASUREMENT RESULT: "HTW0520436_red"

5/20/2013 4:50PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1000.000000	32.30	-12.3	54.0	21.7	PK	100.0	148.00	HORIZONTAL
1711.422846	38.40	-8.5	54.0	15.6	PK	200.0	53.00	HORIZONTAL
2412.825651	37.40	-4.9	54.0	16.6	PK	100.0	80.00	HORIZONTAL
3274.549098	39.30	-2.9	54.0	14.7	PK	200.0	157.00	HORIZONTAL
4186.372745	42.20	-0.5	54.0	11.8	PK	200.0	284.00	HORIZONTAL
5128.256513	48.60	1.5	54.0	5.4	PK	100.0	59.00	HORIZONTAL

SWEEP TABLE: "test (1G-18G) P"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	HF906

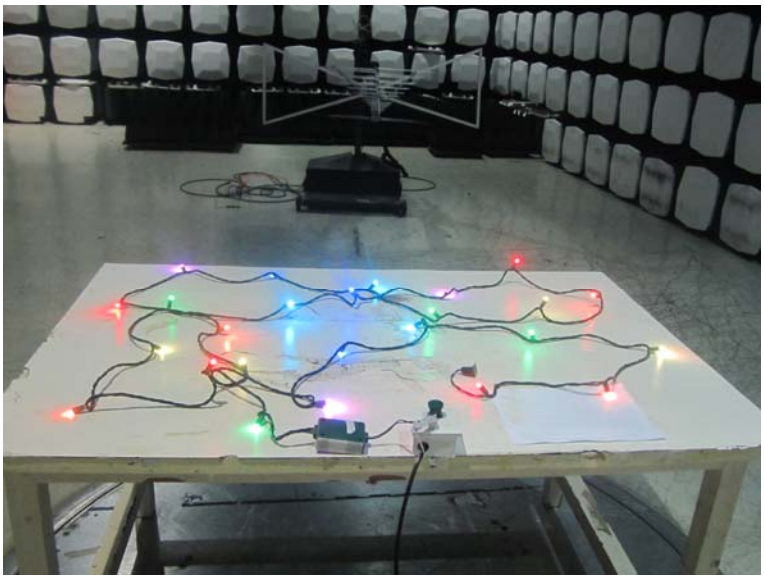


MEASUREMENT RESULT: "HTW0520435_red"

5/20/2013 4:48PM

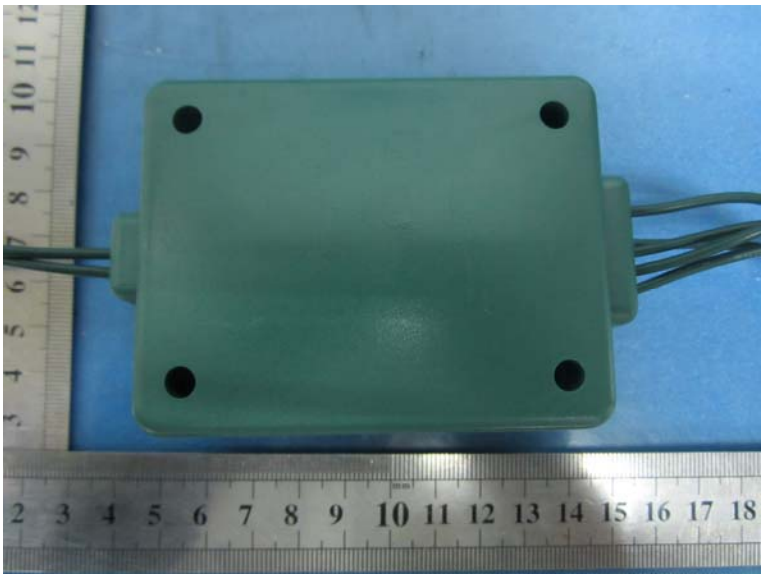
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1330.661323	31.20	-10.7	54.0	22.8	PK	200.0	244.00	VERTICAL
1791.583166	33.90	-7.9	54.0	20.1	PK	100.0	186.00	VERTICAL
2392.785571	38.20	-5.0	54.0	15.8	PK	200.0	196.00	VERTICAL
3064.128257	40.20	-3.2	54.0	13.8	PK	100.0	34.00	VERTICAL
4286.573146	42.50	-0.6	54.0	11.5	PK	200.0	354.00	VERTICAL
5989.979960	48.70	2.6	54.0	5.3	PK	200.0	249.00	VERTICAL

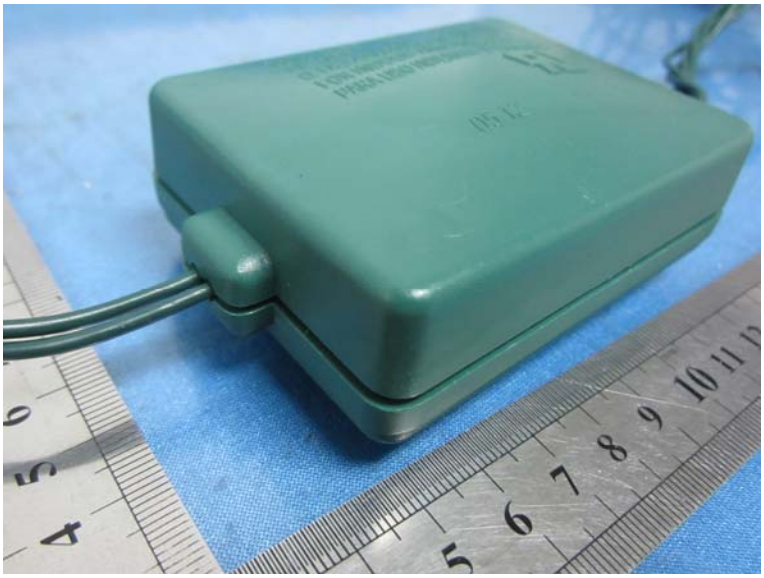
5. Test Setup Photos of the EUT



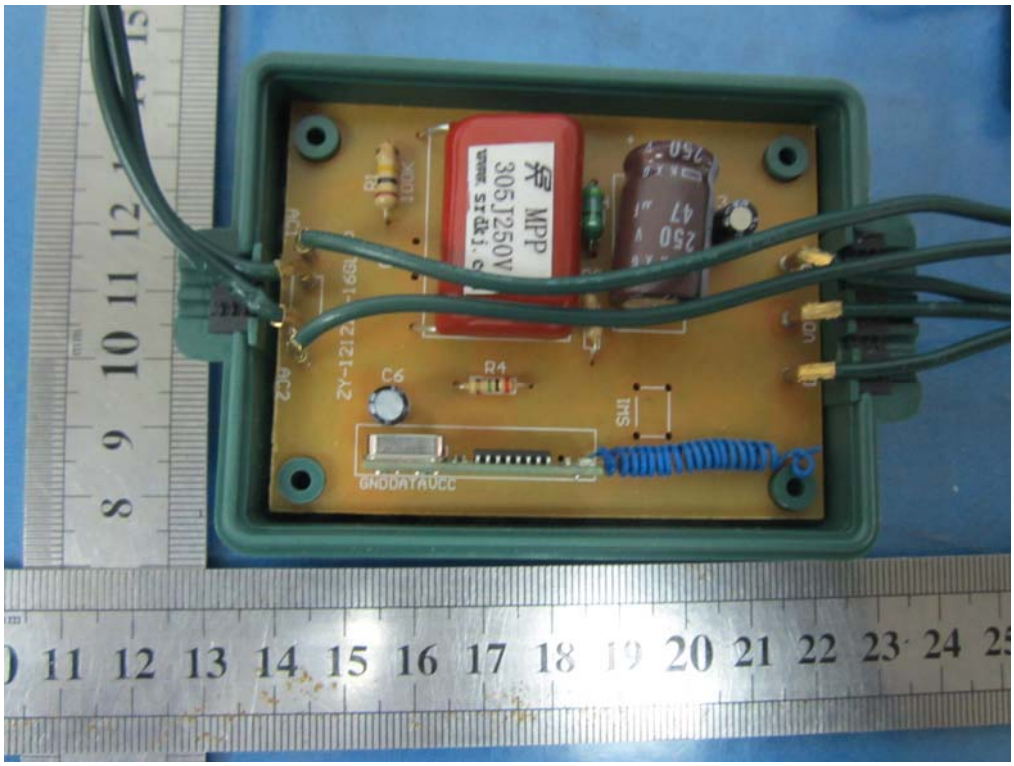
6. External and Internal Photos of the EUT

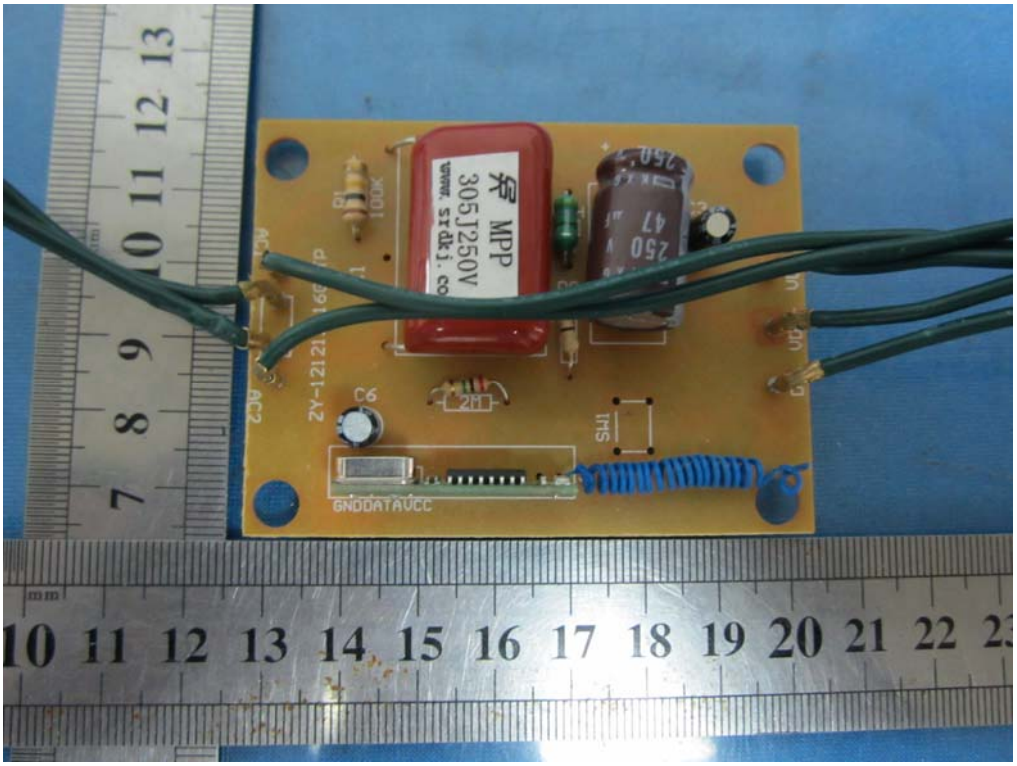
External Photos

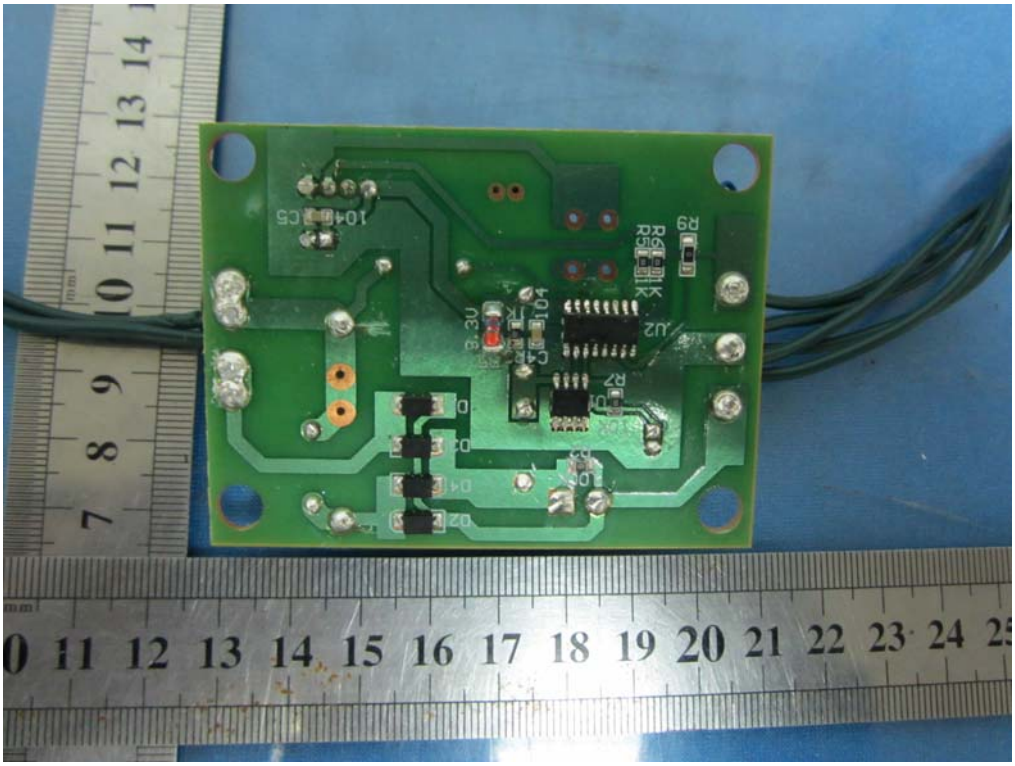


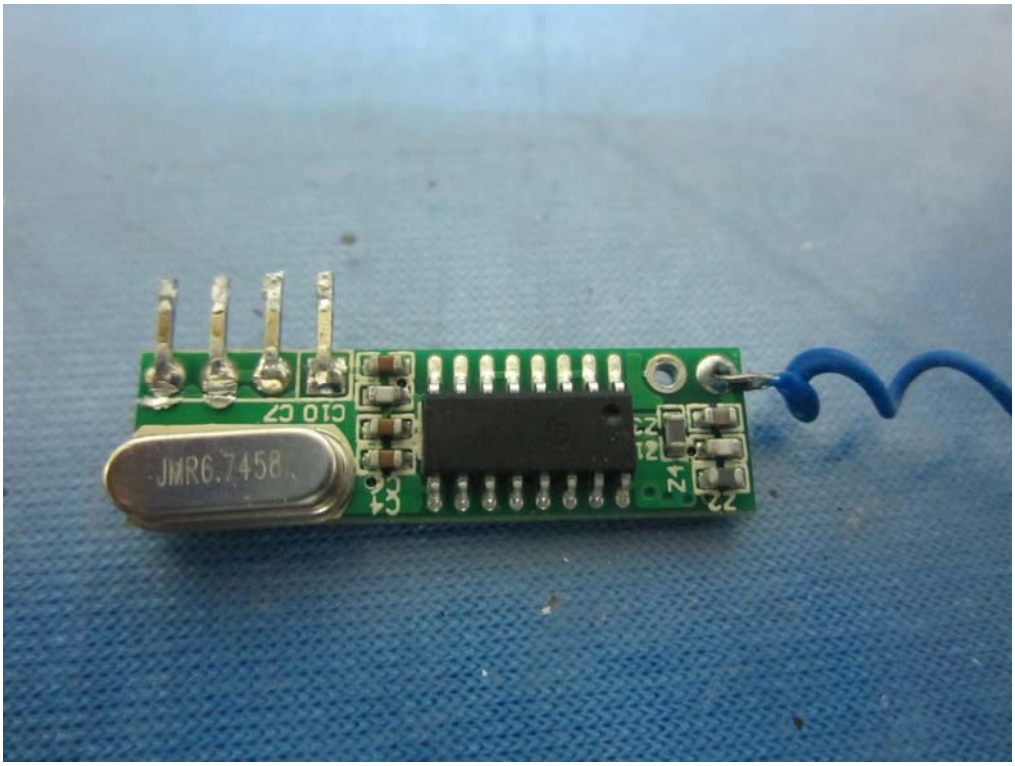


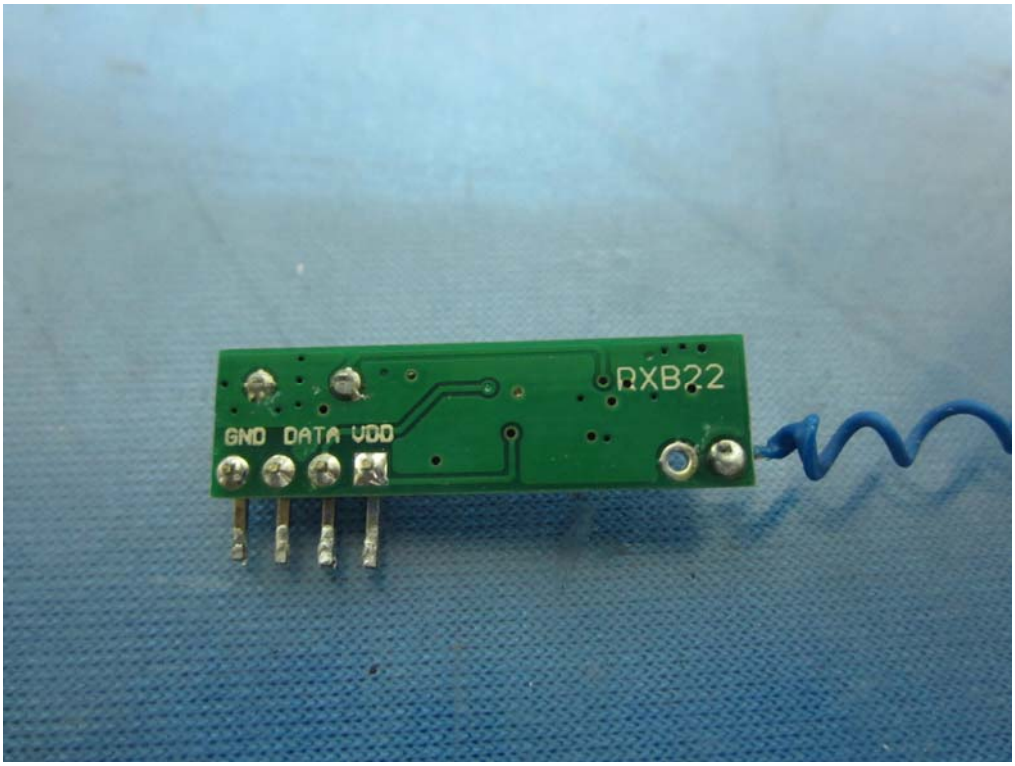
Internal Photos








JMR6.7458



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