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# FCC Test Report

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Report No.: AGC03023150401FE01

**FCC ID** : 2ACIG-9751USRX15

**APPLICATION PURPOSE** : Original Equipment

**PRODUCT DESIGNATION** : THE ELF LIGHT WITH REMOTE CONTROL & STAND  
(GREEN AND RED LIGHT)

**BRAND NAME** : ELF LIGHT

**MODEL NAME** : 9751

**CLIENT** : LF PRODUCTS PTE LTD

**DATE OF ISSUE** : Apr.11, 2015

**STANDARD(S)** : FCC Part 15 Rules

**REPORT VERSION** : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Apr.11, 2015	Valid	Original Report

TABLE OF CONTENTS

1. VERIFICATION OF CONFORMITY ..... 4

2. GENERAL INFORMATION ..... 5

    2.1. PRODUCT DESCRIPTION.....5

    2.2. RELATED SUBMITTAL(S) / GRANT (S).....5

    2.3. TEST METHODOLOGY.....5

    2.4. SPECIAL ACCESSORIES .....5

    2.5. EQUIPMENT MODIFICATIONS .....5

3. MEASUREMENT UNCERTAINTY..... 6

4. DESCRIPTION OF TEST MODES..... 6

5. SYSTEM TEST CONFIGURATION ..... 6

    5.1. EQUIPMENT USED IN EUT SYSTEM .....6

    5.2. SUMMARY OF TEST RESULTS .....6

6. TEST FACILITY ..... 7

7. RADIATED EMISSION ..... 8

    7.1. MEASUREMENT PROCEDURE .....8

    7.2. TEST SETUP ..... 10

    7.3. TEST RESULT ..... 11

8. FCC LINE CONDUCTED EMISSION TEST ..... 13

    12.1. LIMITS OF LINE CONDUCTED EMISSION TEST ..... 13

    8.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST ..... 13

    8.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST ..... 14

    8.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST ..... 14

    8.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST ..... 15

APPENDIX A: PHOTOGRAPHS OF TEST SETUP ..... 17

APPENDIX B: PHOTOGRAPHS OF EUT ..... 18

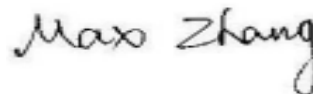
## 1. VERIFICATION OF CONFORMITY

<b>Applicant</b>	LF PRODUCTS PTE LTD
<b>Address</b>	10 RAEBURN PARK, #03/08 BLOCK A
<b>Manufacturer</b>	Max-Plus Co., Ltd.
<b>Address</b>	No.4 Floor, A Building, No.3 Jinye Street, Pingnan Village, Sanxiang Town, Zhongshan City, Guangdong Province, China
<b>Product Designation</b>	THE ELF LIGHT WITH REMOTE CONTROL & STAND (GREEN AND RED LIGHT)
<b>Brand Name</b>	ELF LIGHT
<b>Test Model:</b>	9751
<b>Date of test</b>	Apr.03, 2015 to Apr.11, 2015
<b>Deviation</b>	None
<b>Condition of Test Sample</b>	Normal
<b>Report Template</b>	AGCRT-US-BR/RF (2013-03-01)

We hereby certify that:

The above equipment was tested by Shenzhen STS Test Services Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2009) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part .

Prepared By



Max Zhang

Apr.11, 2015

Checked By



Kidd Yang

Apr.11, 2015

Authorized By



Solger Zhang

Apr.11, 2015

## 2. GENERAL INFORMATION

### 2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

Operation Frequency	433.92MHz
Field Strength(3m)	38.0dBuV/m(PK)@3m
Modulation	ASK
Number of channels	1
Hardware Version	N/A
Software Version	N/A
Antenna Designation	Fixed antenna
EUT Supply	DC 12.0V by adapter
Adapter Supply	AC 120V/60Hz
Note: This device is a superheterodyne receiver.	

### 2.2. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2ACIG-9751USRX15** filing to comply with Section 15.231 of the FCC Part 15, Subpart C Rules.

### 2.3. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (2009). Radiated testing was performed at an antenna to EUT distance 3 meters.

### 2.4. SPECIAL ACCESSORIES

Refer to section 5.1.

### 2.5. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

3. MEASUREMENT UNCERTAINTY

Conducted measurement:  $\pm 3.18\text{dB}$   
Radiated measurement:  $\pm 3.91\text{dB}$

4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Receiver mode

5. SYSTEM TEST CONFIGURATION

5.1. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	N/A	N/A	N/A	N/A

5.2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.109	Radiated Emission	Compliant
§15.107	Conducted Emission	Compliant

## 6. TEST FACILITY

<b>Site</b>	Shenzhen STS Test Services Co., Ltd.
<b>Location</b>	1/F, Building 2, Zhuoke Science Park, Chongqing Road, Fuyong, Baoan District, Shenzhen, China.
<b>FCC Registration No.</b>	842334
<b>Description</b>	The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2009.

## ALL TEST EQUIPMENT LIST

### Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Spectrum Analyzer	Agilent	E4407B	MY50140340	2014.10.25	2015.10.24
Test Receiver	R&S	ESCI	101427	2014.10.25	2015.10.24
Bilog Antenna	TESEQ	CBL6111D	34678	2014.10.27	2015.10.26
50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2014.06.06	2015.06.06
Horn Antenna	R&S	9120D	152265	2014.10.27	2015.10.26
Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2014.07.06	2015.07.05
Amplifier	EM	EM-30180	060538	2014.12.22	2015.12.21
Loop Antenna	ARA	PLA-1030/B	1029	2014.06.08	2015.06.07
Power Meter	Anritsu	ML2495A	1204003	2014.10.25	2015.10.24
Power Sensor	Anritsu	MA2411B	100309	2014.10.25	2015.10.24

### Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	102086	102086	2014.10.25	2015.10.24
LISN	R&S	ENV216	101242	2014.10.25	2015.10.24
LISN	EMCO	3810/2NM	000-23625	2014.10.25	2015.10.24
50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2014.06.06	2015.06.06
Passive Voltage Probe	R&S	ESH2-Z3	100196	2014.06.06	2015.06.06
Absorbing clamp	R&S	MDS-21	100668	2014.10.27	2015.10.26

## 7. RADIATED EMISSION

### 7.1. MEASUREMENT PROCEDURE

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions below 1GHz, use 120KHz RBW and VBW $\geq$ 3RBW for QP reading.
7. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
8. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
9. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
10. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
11. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.
12. An unmodulated CW signal at the operating frequency of the EUT shall be supplied to the EUT for all measurements. Such a signal may be supplied by either a signal generator with an antenna in close proximity to the EUT. The signal level shall be sufficient to stabilize the local oscillator of the EUT.
13. Only the worst case is reported.



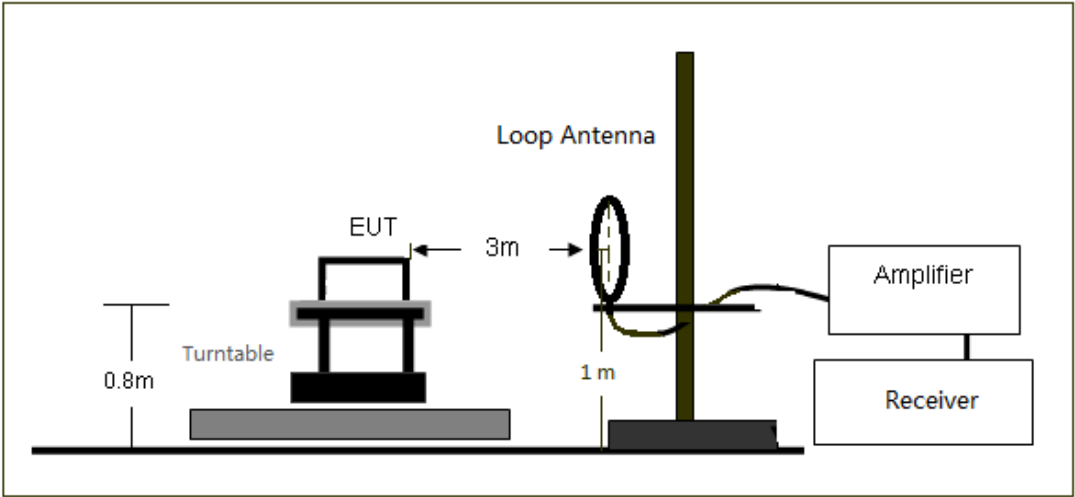
The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RBW 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RBW 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/1MHz for Peak, 1MHz/10Hz for Average

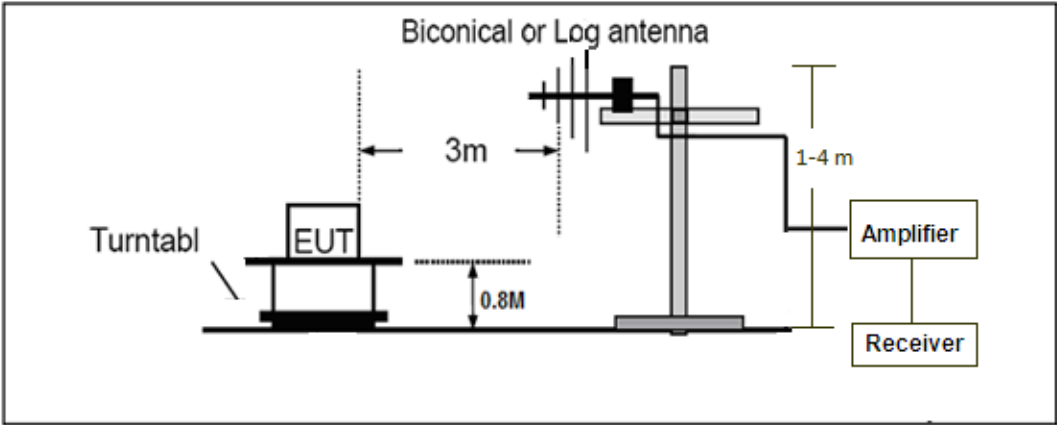
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RBW 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RBW 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP

7.2. TEST SETUP

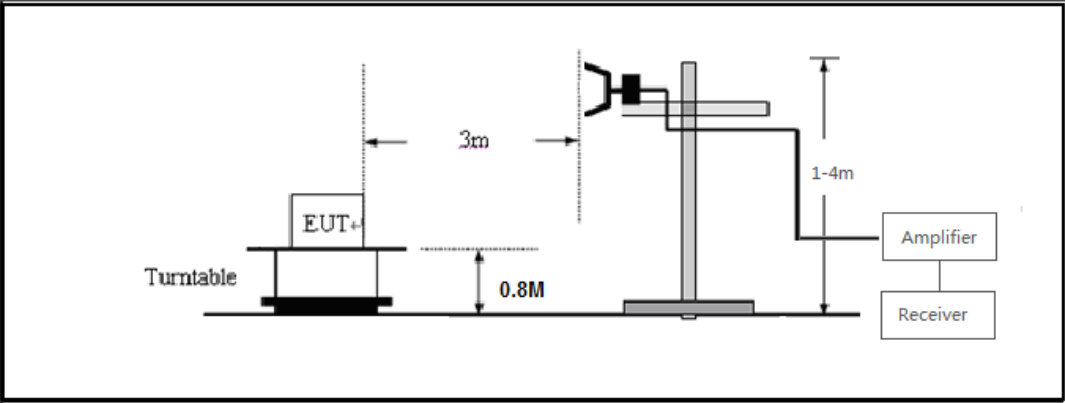
RADIATED EMISSION TEST SETUP BELOW 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



### 7.3. TEST RESULT

Test Mode: EUT @ 433.92MHz for RF Receiver

RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.

RADIATED EMISSION BELOW 1GHZ-Horizontal

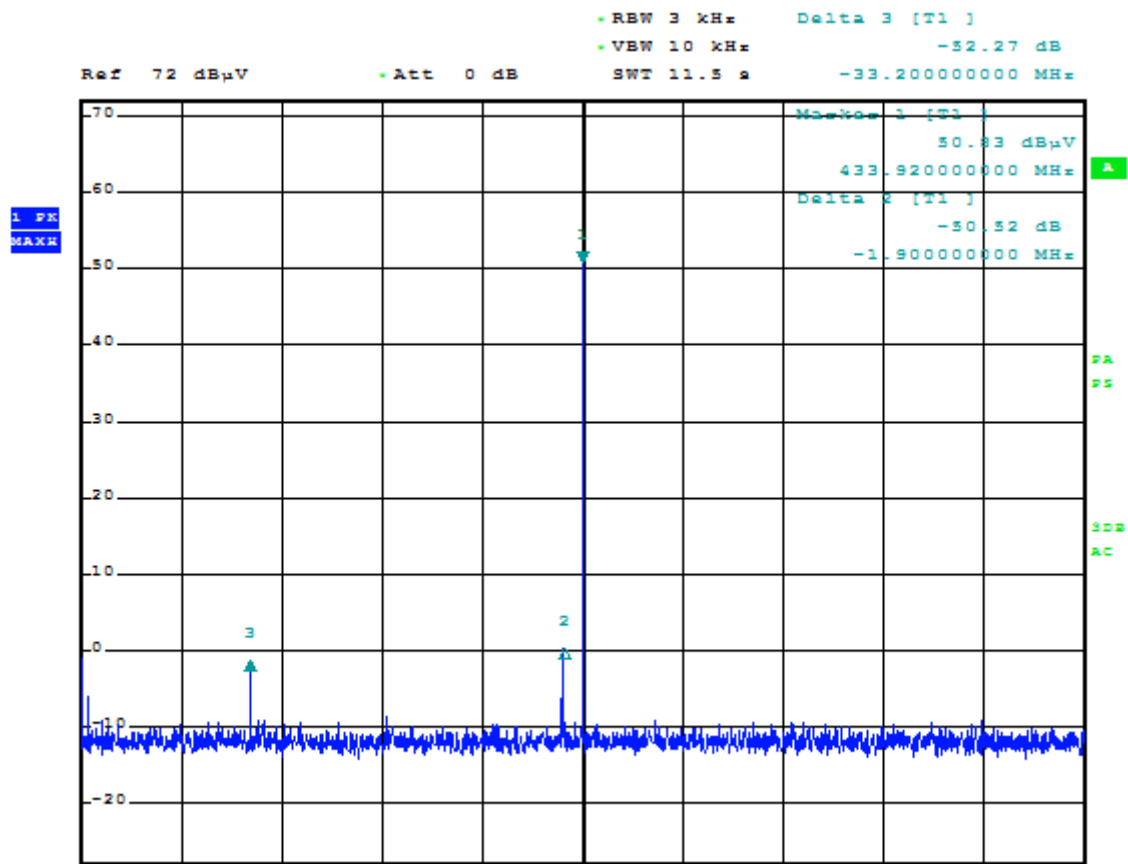
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		59.1000	16.04	11.16	27.20	40.00	-12.80	peak			
2	*	86.5833	22.21	9.52	31.73	40.00	-8.27	peak			
3		99.5167	21.15	10.43	31.58	43.50	-11.92	peak			
4		149.6333	15.56	15.26	30.82	43.50	-12.68	peak			
5		510.1500	6.48	21.40	27.88	46.00	-18.12	peak			
6		649.1833	3.35	23.85	27.20	46.00	-18.80	peak			

RADIATED EMISSION BELOW 1GHZ-Vertical

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	!	41.3167	25.89	8.81	34.70	40.00	-5.30	peak			
2	*	84.9667	31.55	3.58	35.13	40.00	-4.87	peak			
3	!	114.0667	34.10	3.91	38.01	43.50	-5.49	peak			
4		152.8667	20.08	15.28	35.36	43.50	-8.14	peak			
5		607.1500	1.15	22.89	24.04	46.00	-21.96	peak			
6		784.9833	-1.56	27.11	25.55	46.00	-20.45	peak			

**RESULT: PASS**

Stabilization Waveform



- Note:** 1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.
2. The “Factor” value can be calculated automatically by software of measurement system.
3. Emissions above 1G have 20dB margin. No recording in the test report.
- 4.The stabilization waveform is compliance with the provisions of this section.

8. FCC LINE CONDUCTED EMISSION TEST

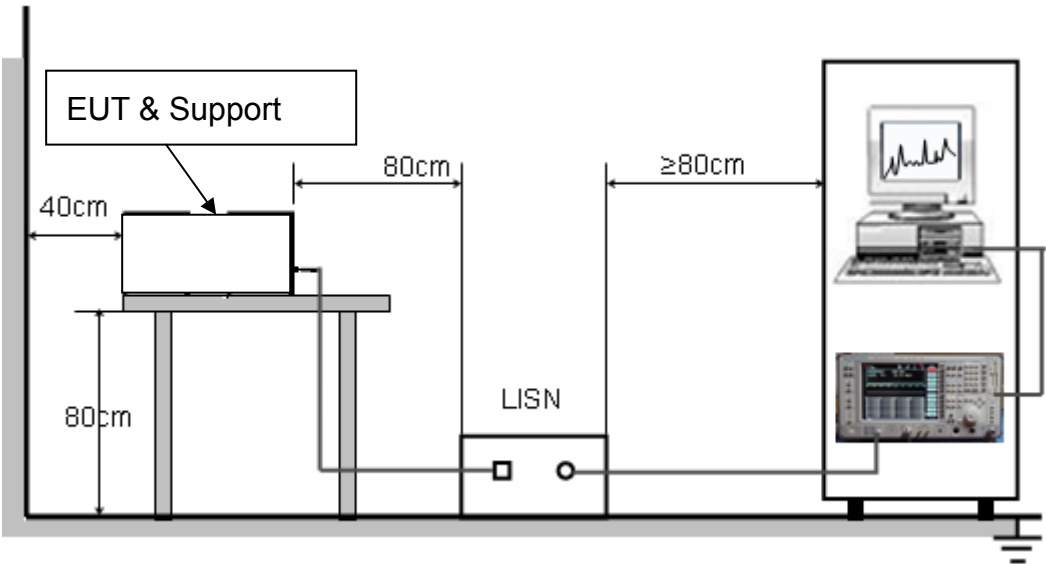
12.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.( dBuV)	Average( dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

- 1. The lower limit shall apply at the transition frequency.
- 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

8.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



### **8.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST**

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When 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 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.4.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC charging voltage by PC which received 120V/60Hz power by a LISN..
6. The 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.
9. The test mode(s) were scanned during the preliminary test.

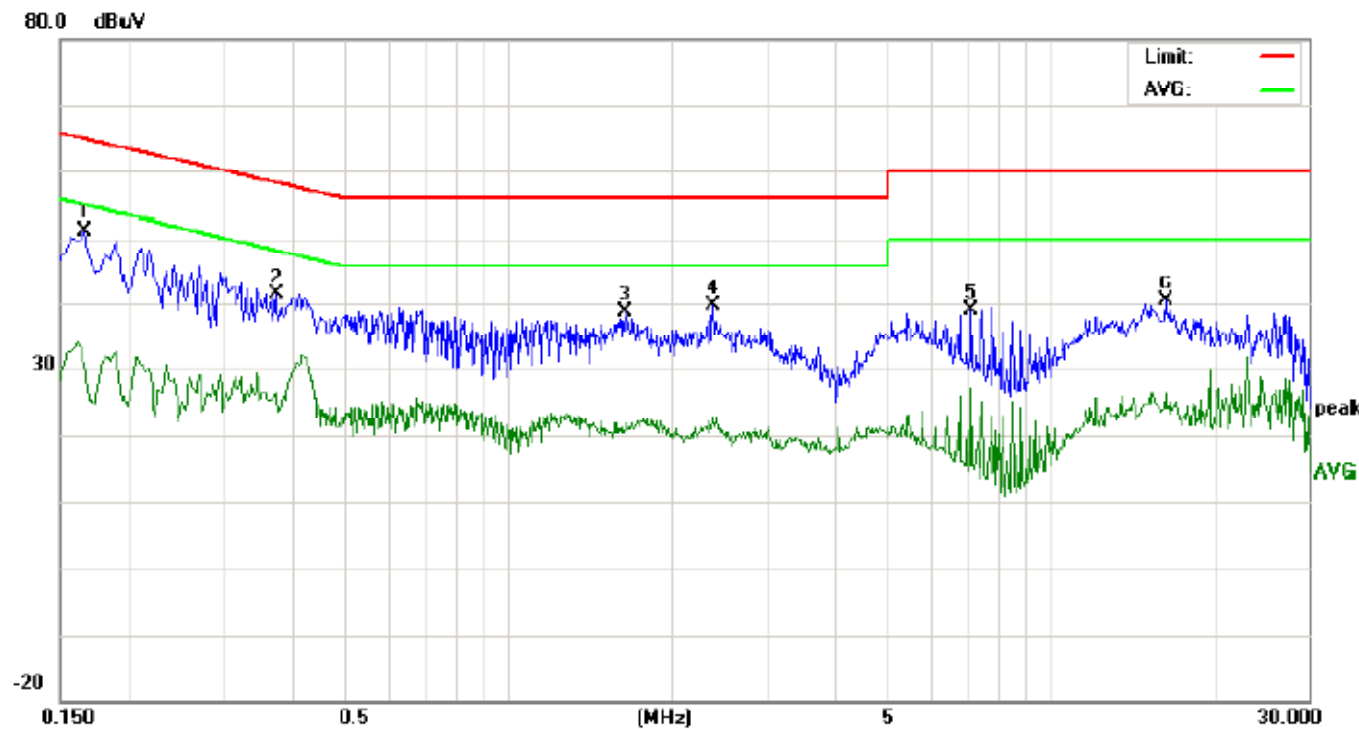
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

### **8.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST**

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

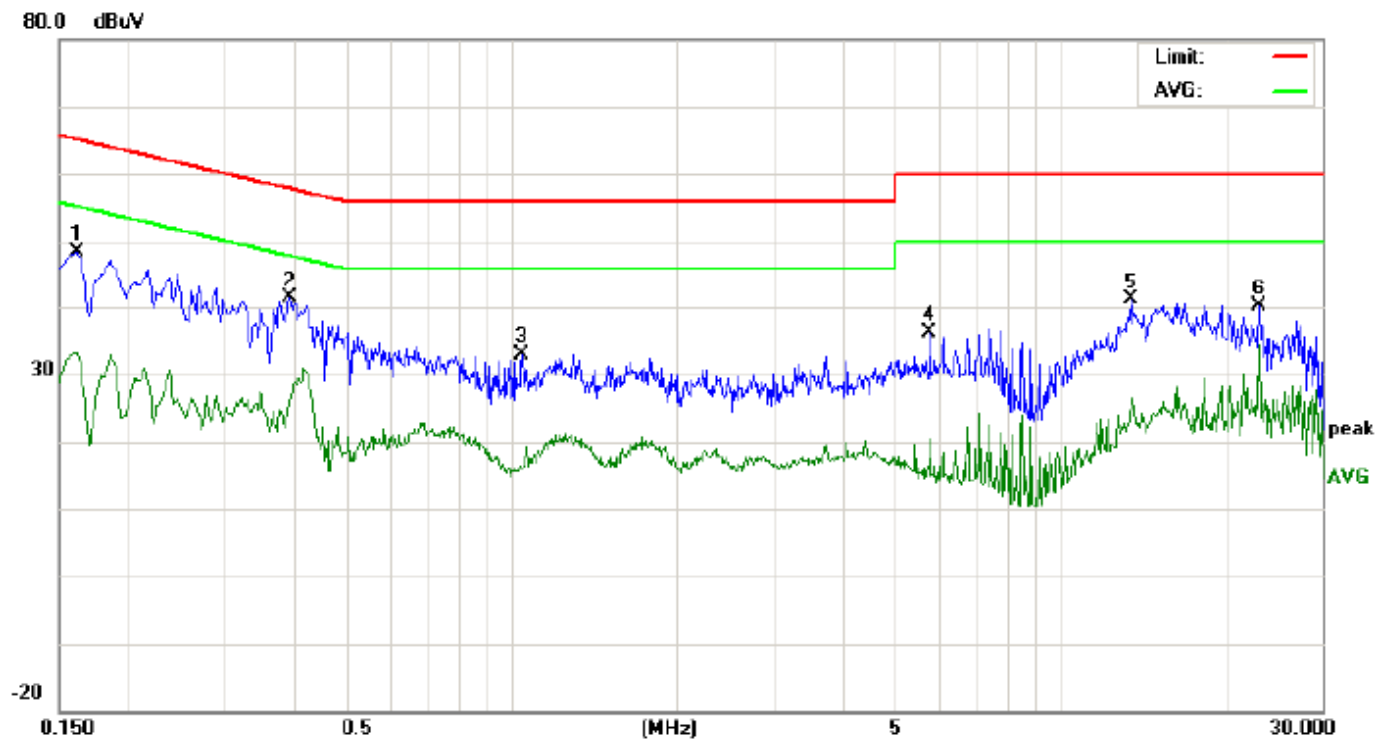
8.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

Line Conducted Emission Test Line 1-L



No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1660	40.93		20.42	10.18	51.11		30.60	65.15	55.15	-14.04	-24.55	P	
2	0.3740	31.02		16.10	10.32	41.34		26.42	58.41	48.41	-17.07	-21.99	P	
3	1.6380	28.21		10.39	10.34	38.55		20.73	56.00	46.00	-17.45	-25.27	P	
4	2.3860	29.32		12.33	10.38	39.70		22.71	56.00	46.00	-16.30	-23.29	P	
5	7.1500	28.60		16.75	10.35	38.95		27.10	60.00	50.00	-21.05	-22.90	P	
6	16.2300	30.17		16.16	10.11	40.28		26.27	60.00	50.00	-19.72	-23.73	P	

Line Conducted Emission Test Line 2-N



No.	Freq (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1620	38.31		22.90	10.17	48.48		33.07	65.36	55.36	-16.88	-22.29	P	
2	0.3940	31.09		15.40	10.33	41.42		25.73	57.98	47.98	-16.56	-22.25	P	
3	1.0460	22.59		5.69	10.37	32.96		16.06	56.00	46.00	-23.04	-29.94	P	
4	5.7819	25.75		10.22	10.27	36.02		20.49	60.00	50.00	-23.98	-29.51	P	
5	13.4220	30.89		16.40	10.13	41.02		26.53	60.00	50.00	-18.98	-23.47	P	
6	23.1299	30.01		24.21	10.11	40.12		34.32	60.00	50.00	-19.88	-15.68	P	

RESULT: PASS

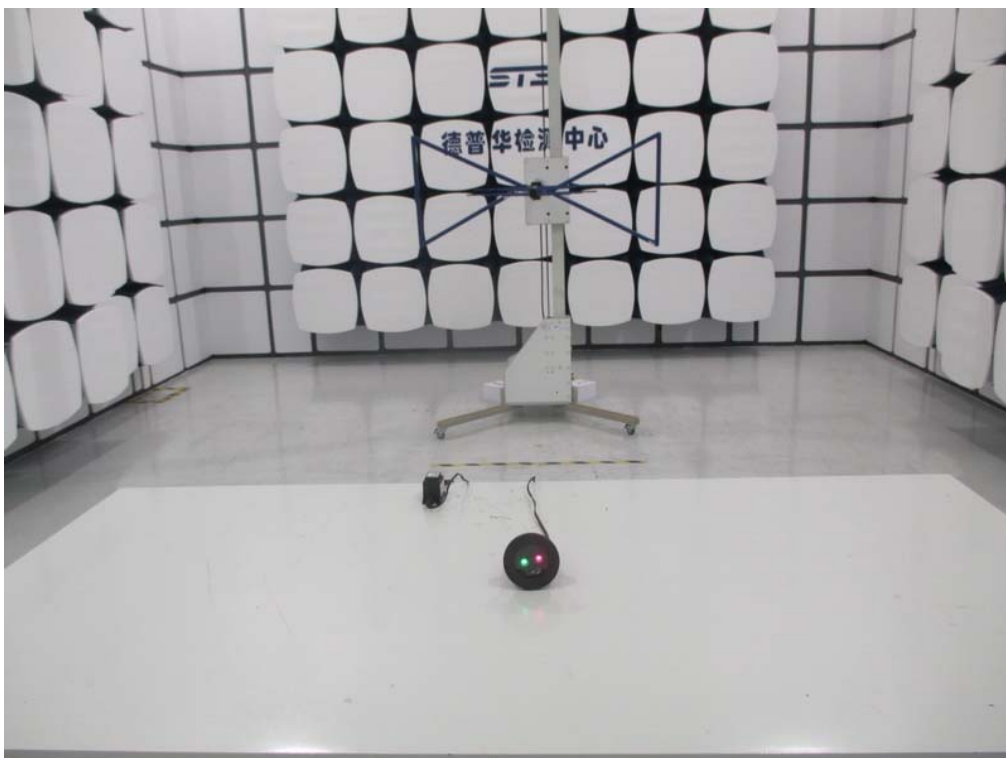


## APPENDIX A: PHOTOGRAPHS OF TEST SETUP

### LINE CONDUCTED EMISSION TEST SETUP



RADIATED EMISSION TEST SETUP



APPENDIX B: PHOTOGRAPHS OF EUT  
ALL VIEW OF EUT



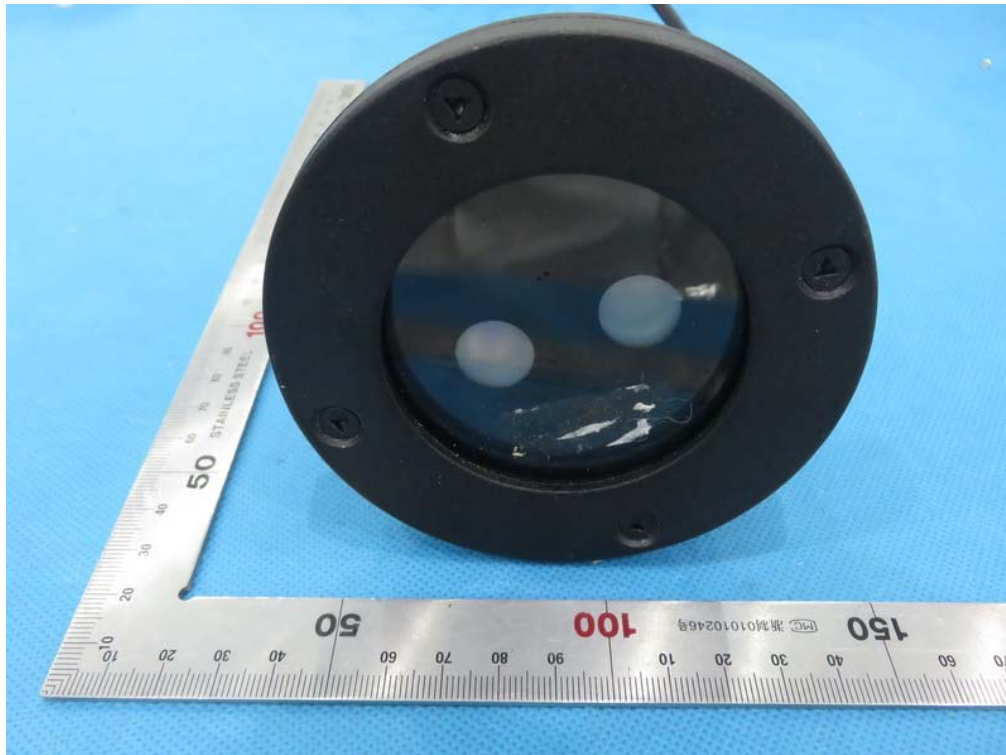
TOP VIEW OF EUT



### BOTTOM VIEW OF EUT

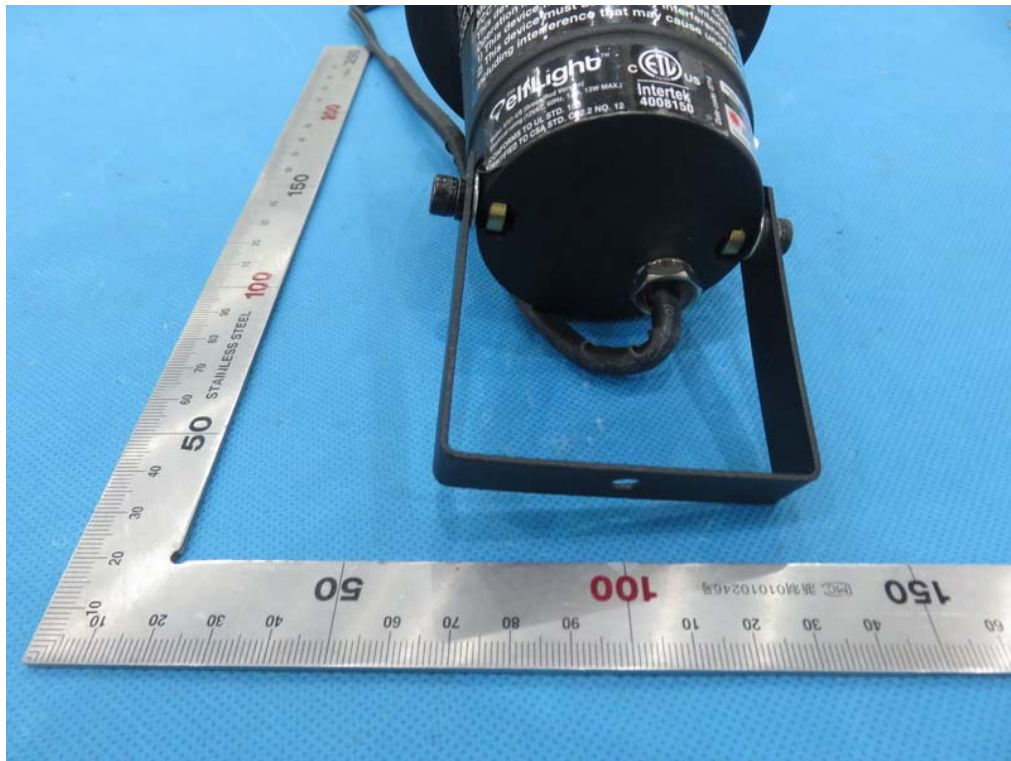


FRONT VIEW OF EUT





BACK VIEW OF EUT



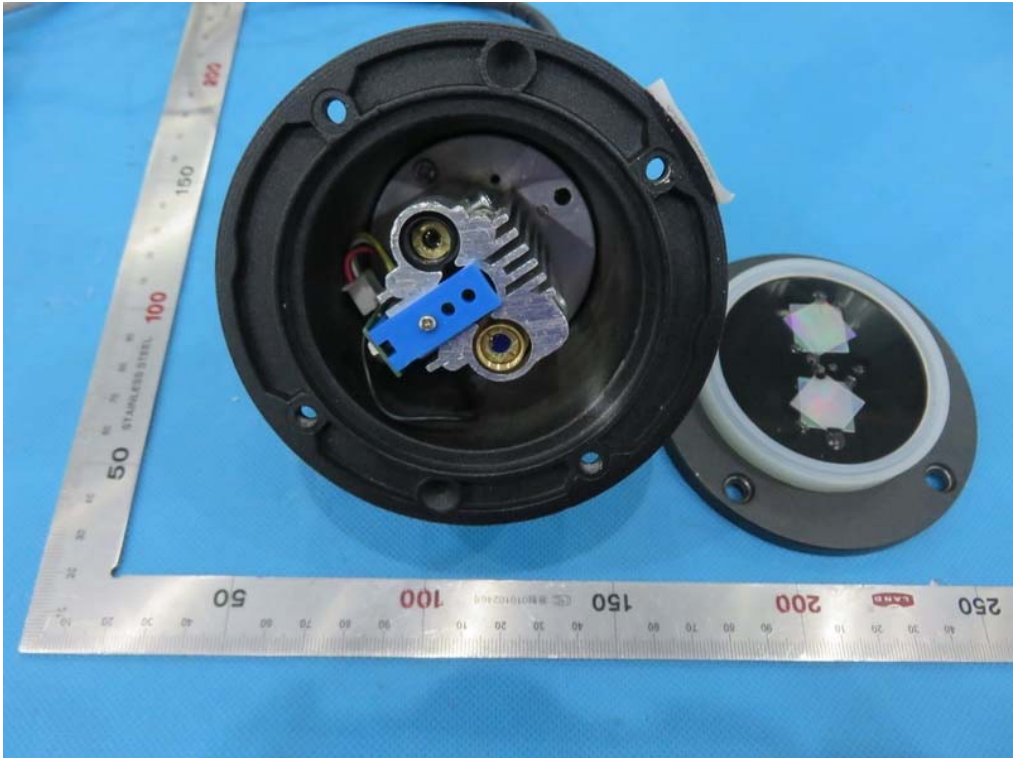
LEFT VIEW OF EUT



RIGHT VIEW OF EUT

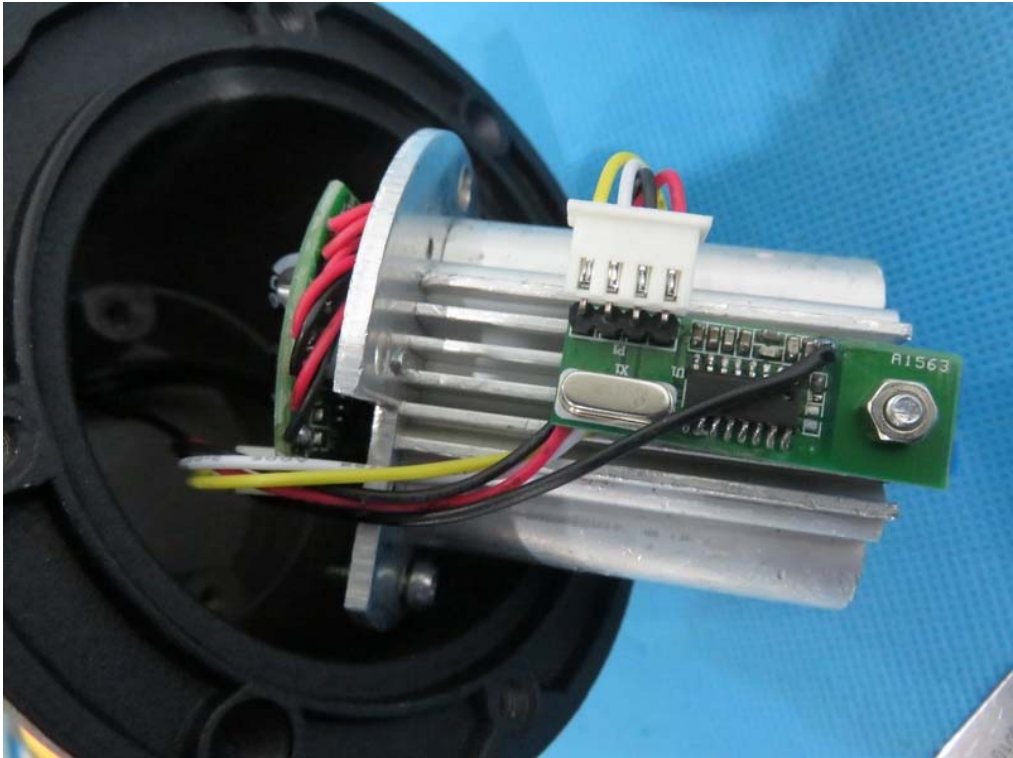


OPEN VIEW OF EUT-1

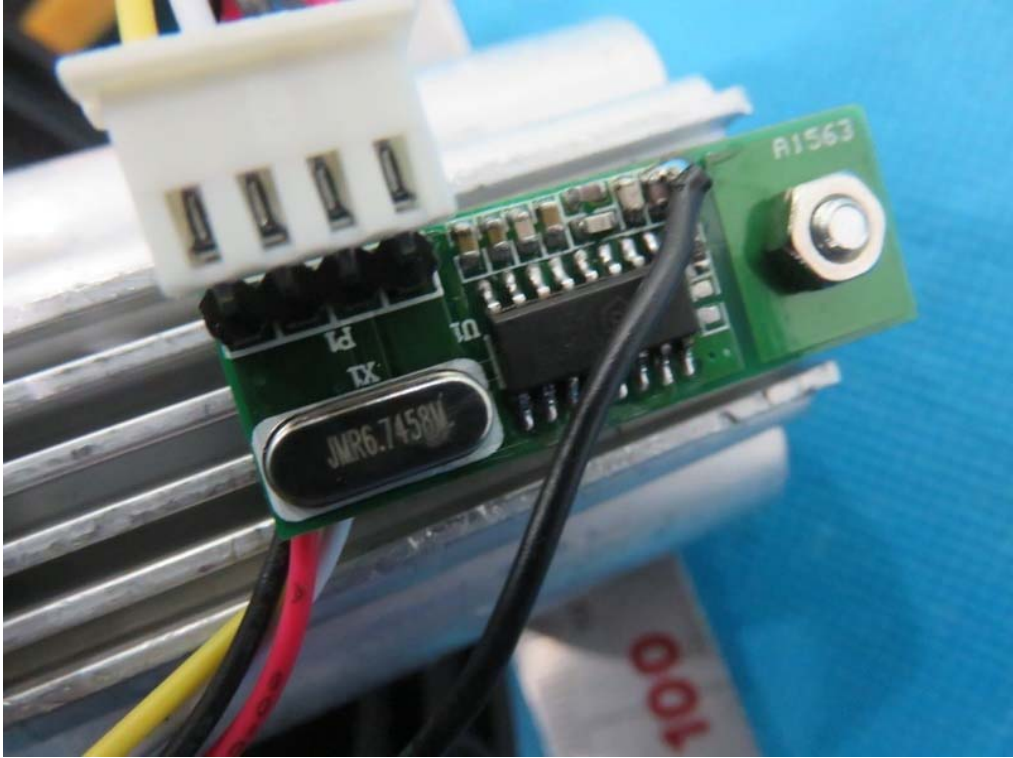




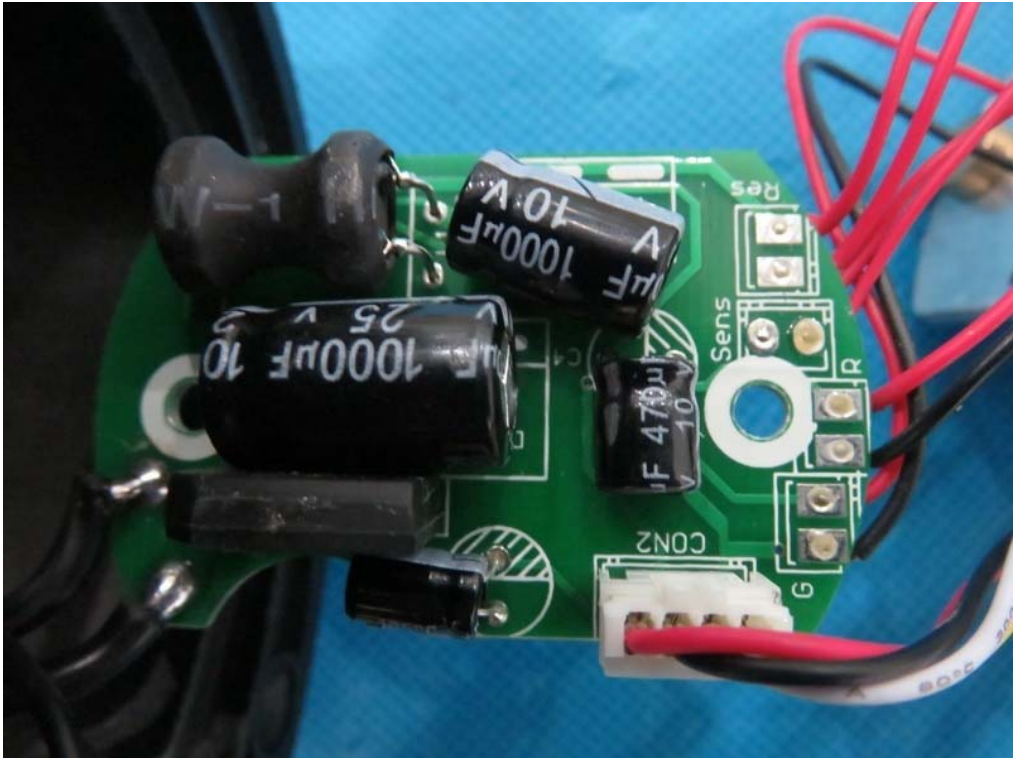
INTERNAL VIEW OF EUT-1



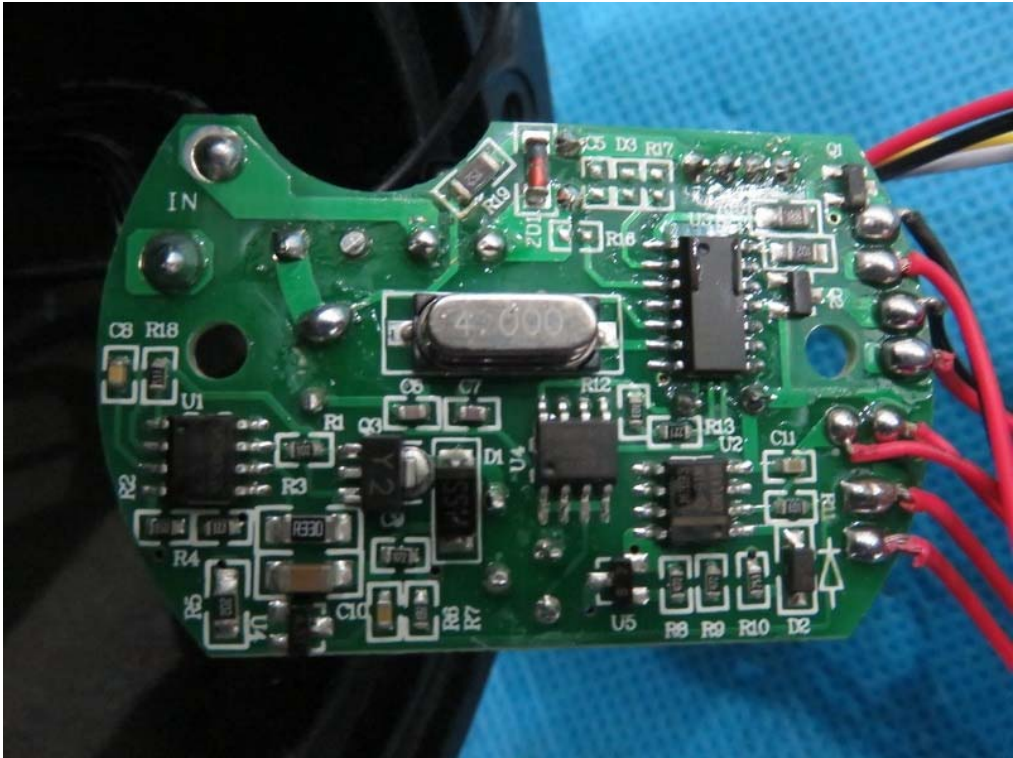
INTERNAL VIEW OF EUT-2



INTERNAL VIEW OF EUT-3

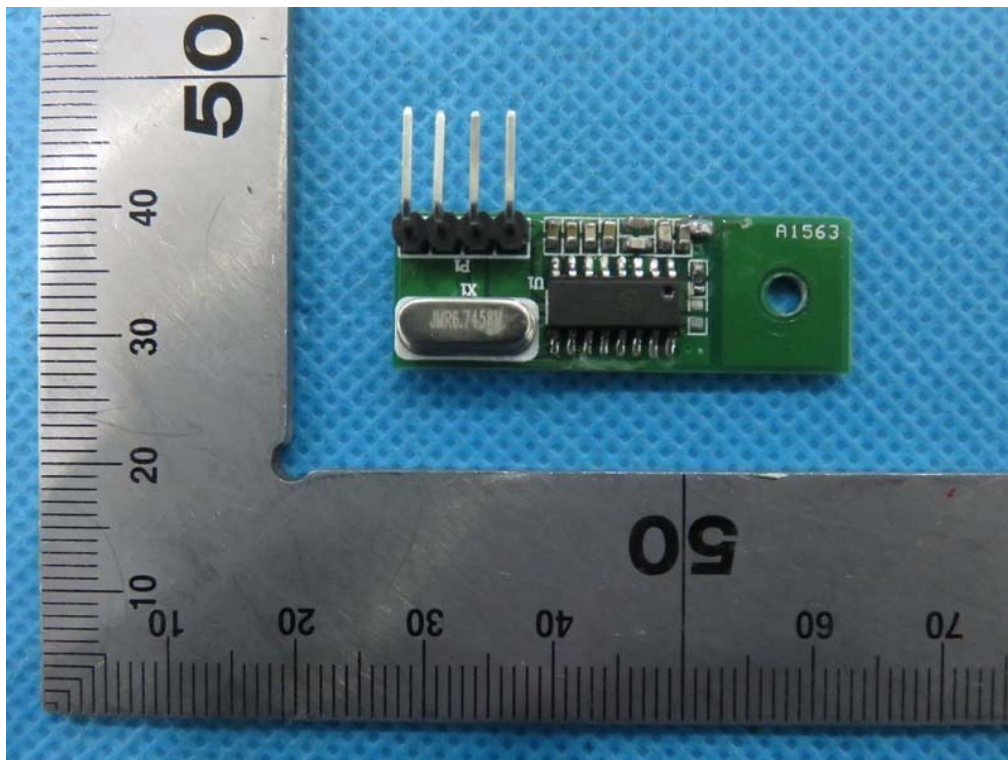


INTERNAL VIEW OF EUT-4

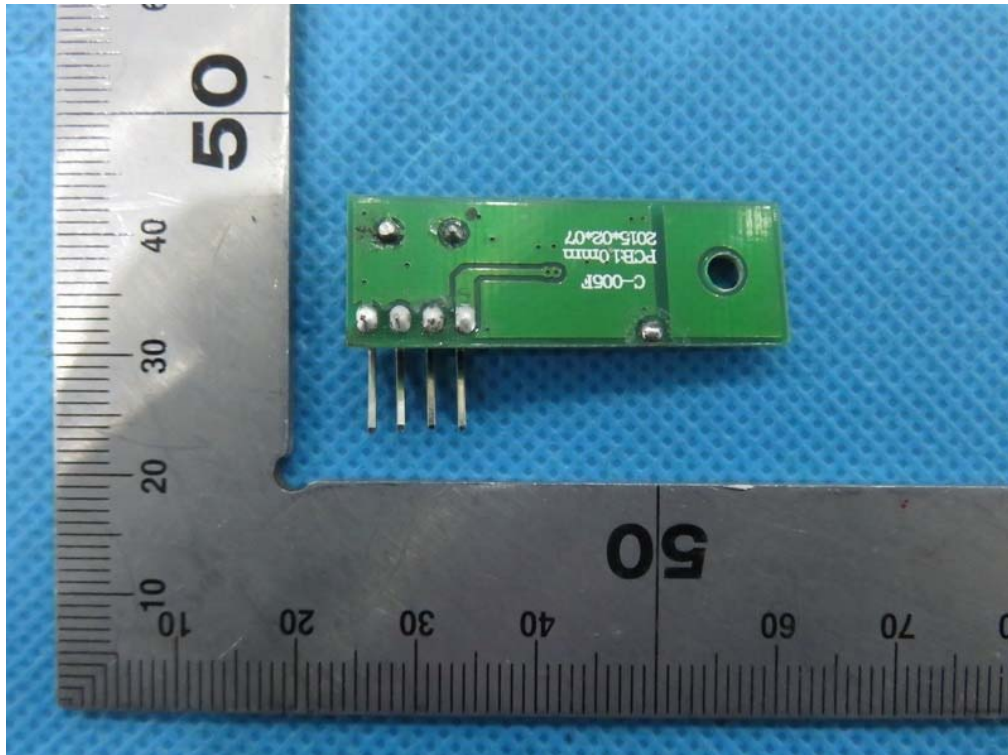




INTERNAL VIEW OF EUT-5



INTERNAL VIEW OF EUT-6



-----END OF REPORT-----