

FCC TEST REPORT
for
Hunan Ocean Wing E-commerce Technology Co., Ltd.

2.4G Wireless Keyboard
Model No.: 98ANWPSS-K1M1A

Prepared for : Hunan Ocean Wing E-commerce Technology Co., Ltd.
Address : 25 Floor, Jitian International Building, #359 Furong Zhonglu,
Changsha, Hunan Province, China

Prepared By : Shenzhen Anbotek Compliance Laboratory Limited
Address : 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road,
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Report Number : 201310700F
Date of Test : Oct. 12~ 25, 2013
Date of Report : Oct. 25, 2013

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TEST REPORT

Applicant : Hunan Ocean Wing E-commerce Technology Co., Ltd.
Manufacturer : Hunan Ocean Wing E-commerce Technology Co., Ltd.
EUT : 2.4G Wireless Keyboard
Model No. : 98ANWPSS-K1M1A
Serial No. : N/A
Trade Mark : ANKER
Rating : DC 1.5V Battery

Measurement Procedure Used:

FCC Part15 Subpart C, Paragraph 15.207, 15.249 & 15.209

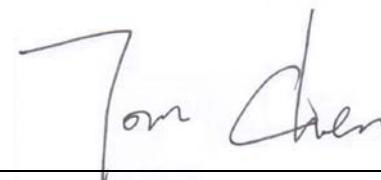
The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test : Oct. 12~ 25, 2013

Prepared by : 
(Tested Engineer / Rock Zeng)

Reviewer : 
(Project Manager / Sally Zhang)

Approved & Authorized Signer : 
(Manager / Tom Chen)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : 2.4G Wireless Keyboard

Model Number : 98ANWPSS-K1M1A

Test Power Supply : DC 1.5V

Frequency : 2402-2479MHz

No. of Channel : 78

Channel Space : 1MHz

Antenna Specification : Printed Antenna:0 dBi

Applicant Address : Hunan Ocean Wing E-commerce Technology Co., Ltd.
: 25 Floor, Jiatian International Building, #359 Furong Zhonglu,
Changsha, Hunan Province, China

Manufacturer Address : Hunan Ocean Wing E-commerce Technology Co., Ltd.
: 25 Floor, Jiatian International Building, #359 Furong Zhonglu,
Changsha, Hunan Province, China

Date of receiver : Oct. 12, 2013

Date of Test : Oct. 12~ 25, 2013

1.2. Auxiliary Equipment Used during Test

PC	: Manufacturer: DELL M/N: OPTIPLEX 380 S/N: 1J63X2X CE , FCC: DOC
MONITOR	: Manufacturer: DELL M/N: E170Sc S/N: CN-00V539-64180-055-0UPS CE , FCC: DOC
MOUSE	: Manufacturer: DELL M/N: M-UARDEL7 S/N: N/A CE , FCC: DOC Cable: 1m, unshielded
Printer	: Manufacturer:Brother M/N: MFC-3360C S/N: N/A CE, FCC:DOC
Power Line	: Non-Shielded, 1.5m
VGA Cable	: Non-Shielded, 1.5m
Network Cable	: Non-Shielded, 1.5m

1.3. Description of Test Facility

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

CNAS - LAB Code: L3503

Shenzhen Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

FCC-Registration No.: 752021

Shenzhen Anbotek Compliance Laboratory Limited, 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 752021, July 10, 2013.

IC-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A-1, February 22, 2013.

Test Location

All Emissions tests were performed at

Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

1.4. Measurement Uncertainty

Radiation Uncertainty : Ur = 4.3dB

Conduction Uncertainty : Uc = 3.4dB

2. Test Procedure

GENERAL: This report shall NOT be reproduced except in full without the written approval of Shenzhen Anbotek Compliance Laboratory Limited. The EUT was transmitting a test signal during the testing.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-2009 using a spectrum analyzer with a pre-selector. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100KHz and the video bandwidth was 300KHz up to 1.0GHz and 1.0MHz with a video BW of 3.0MHz above 1.0GHz. The ambient temperature of the EUT was 74.3oF with a humidity of 69%.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the Spectrum Analyzer Meter Reading.

Example:

Freq (MHz) METER READING + ACF = FS
20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m

ANSI STANDARD C63.4-2009 10.1.7 MEASUREMENT PROCEDURES: The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

3. Radiation Interference

3.1. Requirements (15.249, 15.209):

3.1.1. Test Limits (< 30 MHZ)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30

3.1.2. Test Limits (\geq 30 MHZ)

FIELD STRENGTH of Fundamental: @3M 902-928 MHZ 2.4-2.4835 GHz 94 dB μ V/m @3m	FIELD STRENGTH of Harmonics 54 dB μ V/m @3m	S15.209 30 - 88 MHz 88 - 216 MHz 216 - 960 MHz ABOVE 960 MHz	40 dB μ V/m 43.5 46 54dB μ V/m
--	---	--	---

For range 9KHz~30MHz, The measured value is really too low to be recorded.

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in 15.209, whichever is the lesser attenuation.

3.2 Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

All readings from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. All reading are above 1GHz, peak & average values with a resolution bandwidth of 1MHz. The EUT is tested in 9*6*6 Chamber.

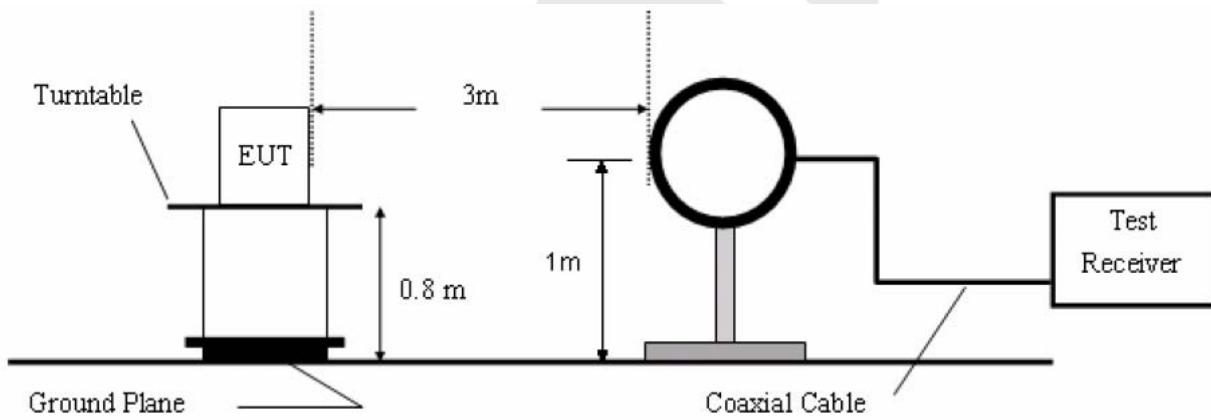
The test results are listed in Section 3.3.

Test Equipment

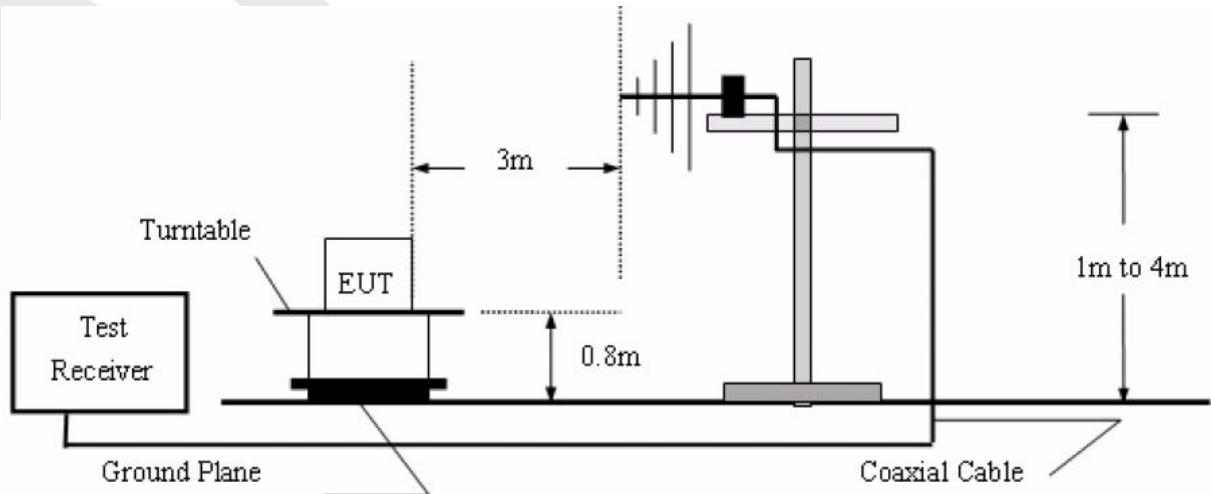
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 09, 2013	1 Year
2.	Preamplifier	Instruments corporation	EMC01183 0	980100	Aug. 09, 2013	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2013	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 23, 2013	3 Year
6.	Loop Antenna	ARA	PLA-1030/ B	1029	Apr. 23, 2013	3 Year
7.	Pre-amplifier	SONOMA	310N	186860	Apr. 23, 2013	1 Year
8.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

3.3. Test Configuration:

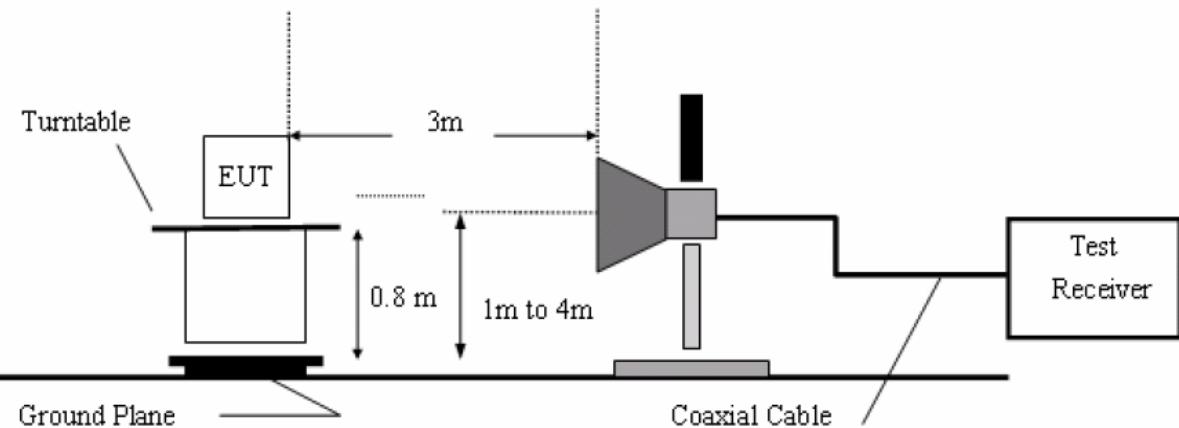
3.3.1. 9k to 30MHz emissions:



3.3.2. 30M to 1G emissions:



3.3.3. 1G to 40G emissions:



3.3 Test Results

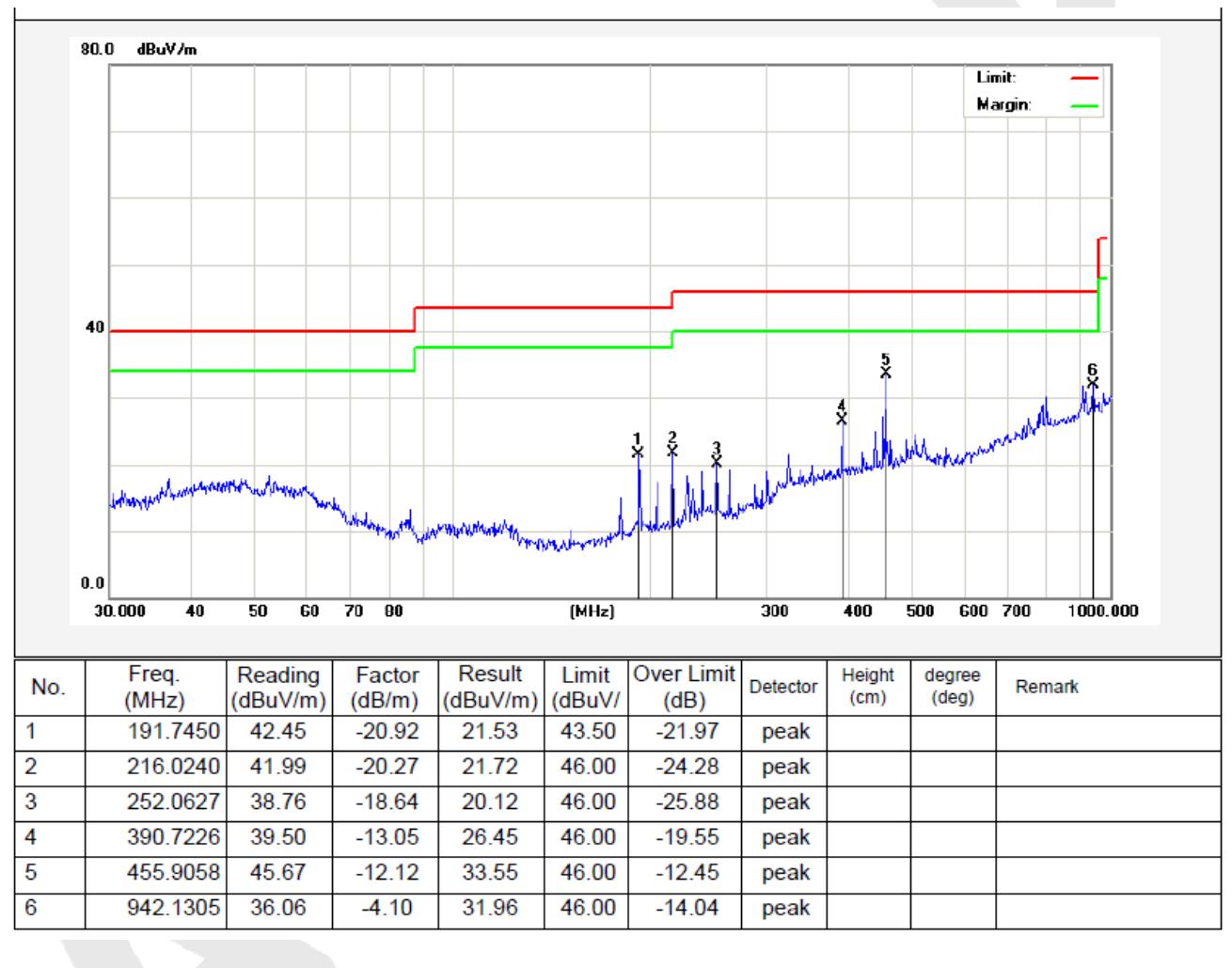
PASS.

Please refer the following pages.

Data:

Below 1GHz:

Job No.:	AT1310639F	Polarization:	Horizontal
Standard:	(RE)FCC PART15 C _3m	Power Source:	DC 1.5V
Test item:	Radiation Test	Date:	2013/10/15
Temp.(C)/Hum.(%RH):	24.3(C)/55%RH	Time:	16/49/14
EUT:	2.4G Wireless Keyboard	Test By:	Rock Zeng
Model:	98ANWPSS-K1M1A	Distance:	3m
Mode:	ON		
Note:	30-1000MHz		



Job No.: AT1310639F **Polarization:** Vertical
Standard: (RE)FCC PART15 C _3m **Power Source:** DC 1.5V
Test item: Radiation Test **Date:** 2013/10/15
Temp.(C)/Hum.(%RH): 24.3(C)/55%RH **Time:** 16/45/02
EUT: 2.4G Wireless Keyboard **Test By:** Rock Zeng
Model: 98ANWPSS-K1M1A **Distance:** 3m
Mode: ON
Note: 30-1000MHz



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	40.9881	36.67	-14.37	22.30	40.00	-17.70	peak			
2	390.7226	41.37	-12.05	29.32	46.00	-16.68	peak			
3	455.9058	45.71	-11.91	33.80	46.00	-12.20	peak			
4	497.6765	40.73	-11.02	29.71	46.00	-16.29	peak			
5	785.0935	38.27	-5.96	32.31	46.00	-13.69	peak			
6	903.3094	39.30	-3.71	35.59	46.00	-10.41	QP	100	0	

Above 1 GHz:

 Horizontal
 CH Low (2402MHz)

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dB μ V	Level dB μ V/m	Limit dB μ V/m	Over Limit dB	Remark
2402.000	2.17	31.21	35.30	91.01	89.09	114.0	-24.91	Peak
2402.000	2.17	31.21	35.30	82.54	80.62	94.0	-13.38	AV
4804.000	2.56	34.01	34.71	47.02	48.88	74.0	-25.12	Peak
4804.000	2.56	34.01	34.71	34.44	36.3	54.0	-17.7	AV
7206.000	2.98	36.16	35.15	45.12	49.11	74.0	-24.89	Peak
7206.000	2.98	36.16	35.15	29.01	33.00	54.0	-21.00	AV
9608.000	---	---	---	---	---	---	---	---
9608.000	---	---	---	---	---	---	---	---
12010.000	---	---	---	---	---	---	---	---
12010.000	---	---	---	---	---	---	---	---
---	.							

 Vertical
 CH Low (2402MHz)

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dB μ V	Level dB μ V/m	Limit dB μ V/m	Over Limit dB	Remark
2402.000	2.17	31.21	35.30	91.84	89.92	114.0	-24.08	Peak
2402.000	2.17	31.21	35.30	80.02	78.10	94.0	-15.90	AV
4804.000	2.56	34.01	34.71	43.75	45.61	74.0	-28.39	Peak
4804.000	2.56	34.01	34.71	35.62	37.48	54.0	-16.52	AV
7206.000	2.98	36.16	35.15	42.33	46.32	74.0	-27.68	Peak
7206.000	2.98	36.16	35.15	34.19	38.18	54.0	-15.82	AV
9608.000	---	---	---	---	---	---	---	---
9608.000	---	---	---	---	---	---	---	---
12010.000	---	---	---	---	---	---	---	---
12010.000	---	---	---	---	---	---	---	---
---	.							

**NOTE: “---” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
 The results of different modulations are the same.**

Horizontal
 CH Middle (2439MHz)

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dB μ V	Level dB μ V/m	Limit dB μ V/m	Over Limit dB	Remark
2439.000	2.19	31.22	34.60	93.58	92.39	114.0	-21.61	Peak
2439.000	2.19	31.22	34.60	82.62	81.43	94.0	-12.57	AV
4878.000	2.57	35.00	34.58	44.53	47.52	74.0	-26.48	Peak
4878.000	2.57	35.00	34.58	39.84	42.83	54.0	-11.17	AV
7317.000	3.00	36.17	35.14	42.44	46.47	74.0	-27.53	Peak
7317.000	3.00	36.17	35.14	38.12	42.15	54.0	-11.85	AV
9756.000	---	---	---	---	---	---	---	---
9756.000	---	---	---	---	---	---	---	---
12915.000	---	---	---	---	---	---	---	---
12915.000	---	---	---	---	---	---	---	---

 Vertical
 CH Middle (2439MHz)

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dB μ V	Level dB μ V/m	Limit dB μ V/m	Over Limit dB	Remark
2439.000	2.19	31.22	34.60	90.62	89.43	114.0	-24.57	Peak
2439.000	2.19	31.22	34.60	83.76	82.57	94.0	-11.43	AV
4878.000	2.57	35.00	34.58	42.15	45.14	74.0	-28.86	Peak
4878.000	2.57	35.00	34.58	40.84	43.83	54.0	-10.17	AV
7317.000	3.00	36.17	35.14	41.49	45.52	74.0	-28.48	Peak
7317.000	3.00	36.17	35.14	36.12	40.15	54.0	-13.85	AV
9756.000	---	---	---	---	---	---	---	---
9756.000	---	---	---	---	---	---	---	---
12915.000	---	---	---	---	---	---	---	---
12915.000	---	---	---	---	---	---	---	---

NOTE: “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
The results of different modulations are the same.

Horizontal
 CH High (2479MHz)

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dB μ V	Level dB μ V/m	Limit dB μ V/m	Over Limit dB	Remark
2479.000	2.20	31.65	36.00	94.12	91.97	114.0	-22.03	Peak
2479.000	2.20	31.65	36.00	82.05	79.9	94.0	-14.1	AV
4958.000	2.58	35.06	34.79	46.86	49.71	74.0	-24.29	Peak
4958.000	2.58	35.06	34.79	35.03	37.88	54.0	-16.12	AV
7437.000	3.02	36.19	34.90	42.75	47.06	74.0	-26.94	Peak
7437.000	3.02	36.20	35.20	36.42	40.44	54.0	-13.56	AV
9916.000	---	---	---	---	---	---	---	---
9916.000	---	---	---	---	---	---	---	---
12395.000	---	---	---	---	---	---	---	---
12395.000	---	---	---	---	---	---	---	---

 Vertical
 CH High (2479MHz)

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dB μ V	Level dB μ V/m	Limit dB μ V/m	Over Limit dB	Remark
2479.000	2.20	31.65	36.00	92.94	90.79	114.0	-23.21	Peak
2479.000	2.20	31.65	36.00	82.87	80.72	94.0	-13.28	AV
4958.000	2.58	35.06	34.79	43.54	46.39	74.0	-27.61	Peak
4958.000	2.58	35.06	34.79	36.33	39.18	54.0	-14.82	AV
7437.000	3.02	36.19	34.90	41.12	45.43	74.0	-28.57	Peak
7437.000	3.02	36.20	35.20	36.58	40.6	54.0	-13.4	AV
9916.000	---	---	---	---	---	---	---	---
9916.000	---	---	---	---	---	---	---	---
12395.000	---	---	---	---	---	---	---	---
12395.000	---	---	---	---	---	---	---	---

NOTE: “---” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
 The results of different modulations are the same.

4. Occupied Bandwidth

4.1. Requirements (15.249):

The field strength of any emissions appearing outside the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 50 dB below the level of the carrier or to the general limits of 15.249.

4.2. Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 09, 2013	1 Year
2.	Preamplifier	Instruments corporation	EMC01183 0	980100	Aug. 09, 2013	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2013	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 23, 2013	3 Year
6.	Loop Antenna	ARA	PLA-1030/ B	1029	Apr. 23, 2013	3 Year
7.	Pre-amplifier	SONOMA	310N	186860	Apr. 23, 2013	1 Year
8.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

4.3. Test Configuration:

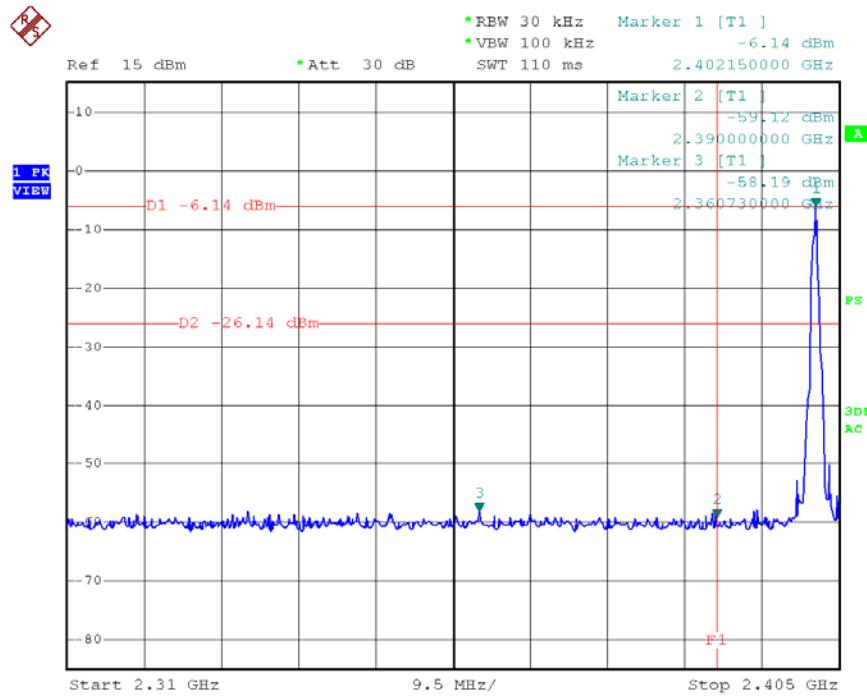
Same as the test configuration in 3.3.

4.4. Test Results

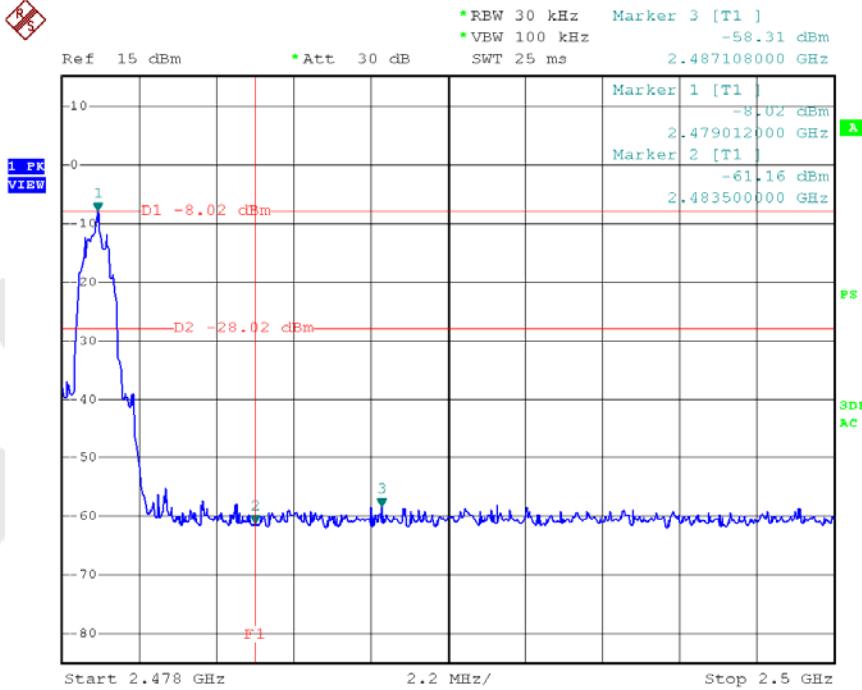
Pass.

Please refer the following plot.

(Note: Marker 3 means the highest value in 2.39GHz~2.4GHz or 2.4835~2.5GHz)

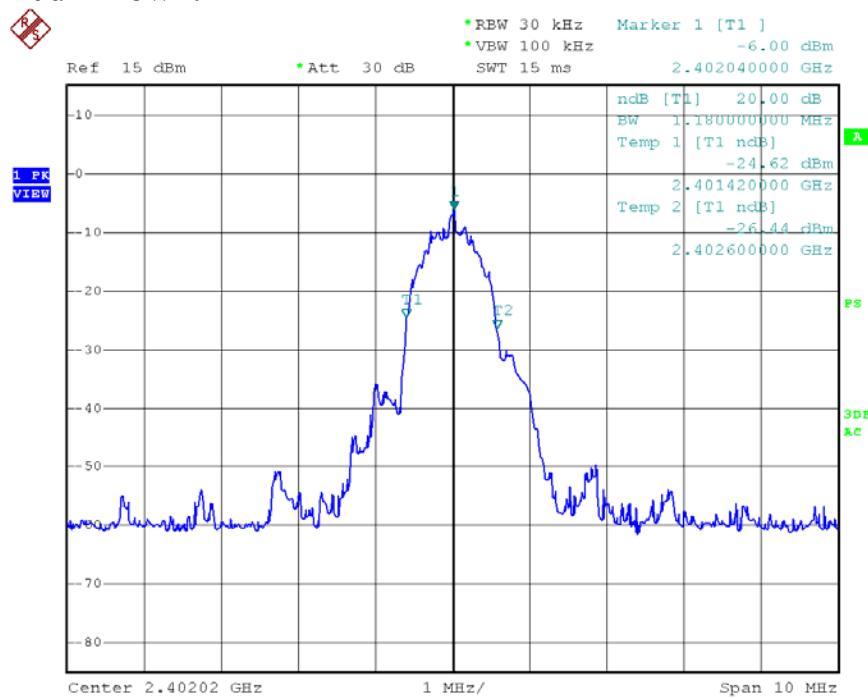


Date: 24.OCT.2013 12:39:08

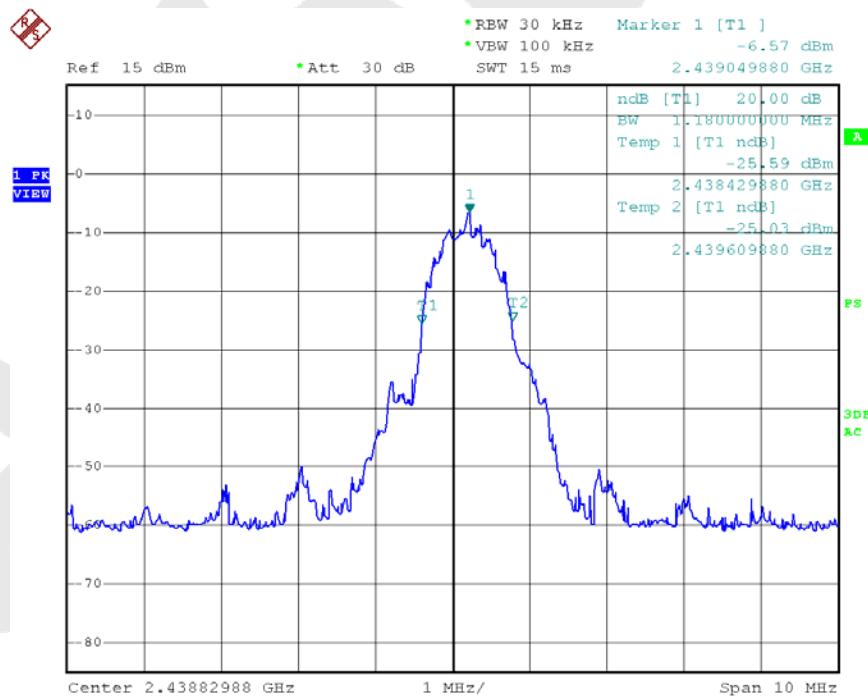


Date: 24.OCT.2013 12:37:49

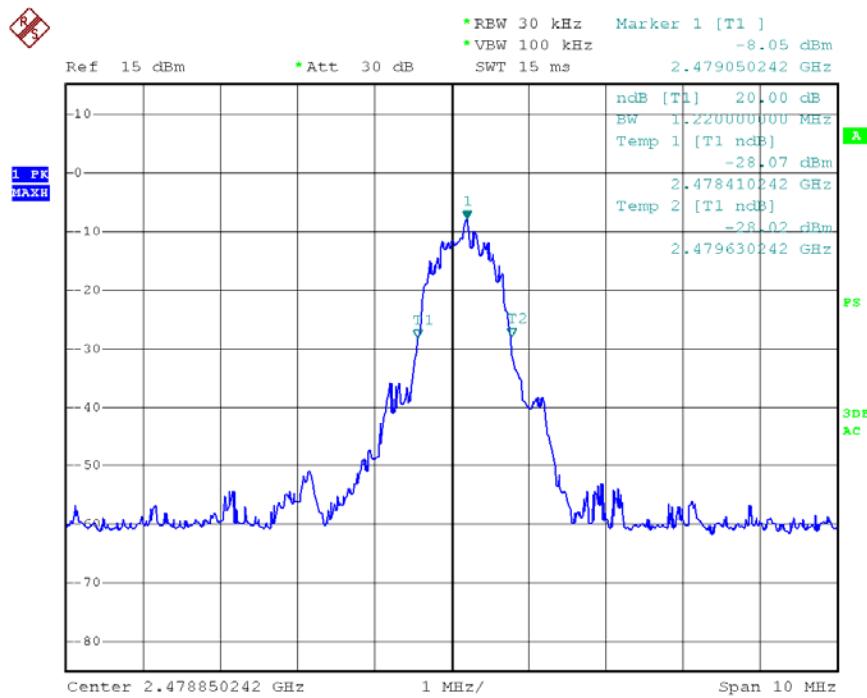
20dB Down:



Date: 24.OCT.2013 12:34:16



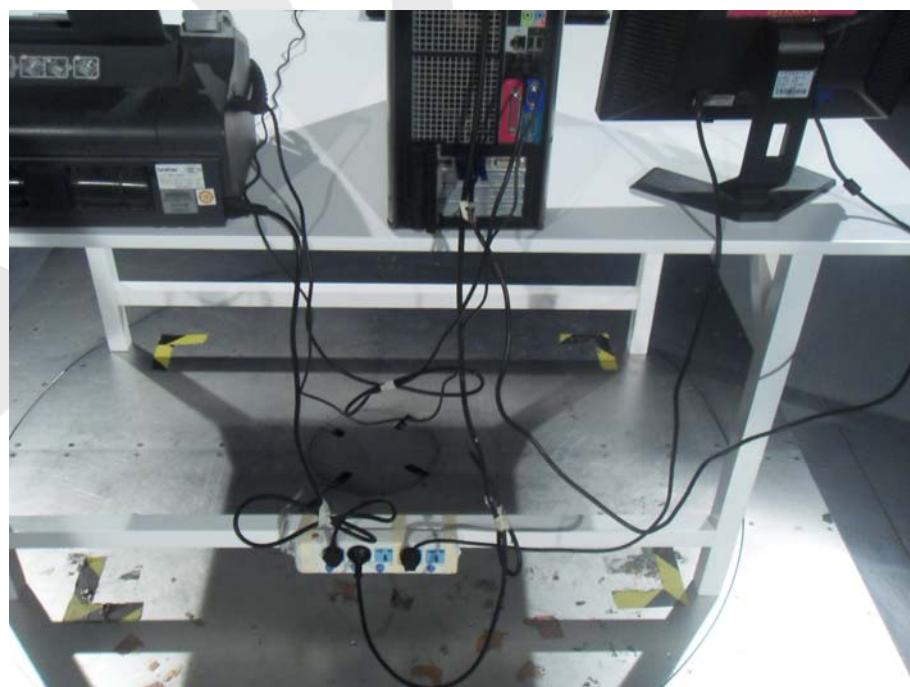
Date: 24.OCT.2013 12:35:26



Date: 24.OCT.2013 12:36:25

5. PHOTOGRAPH

5.1. Photo of Radiation Emission Test



APPENDIX I (External Photos)

Figure 1
The EUT-Top View

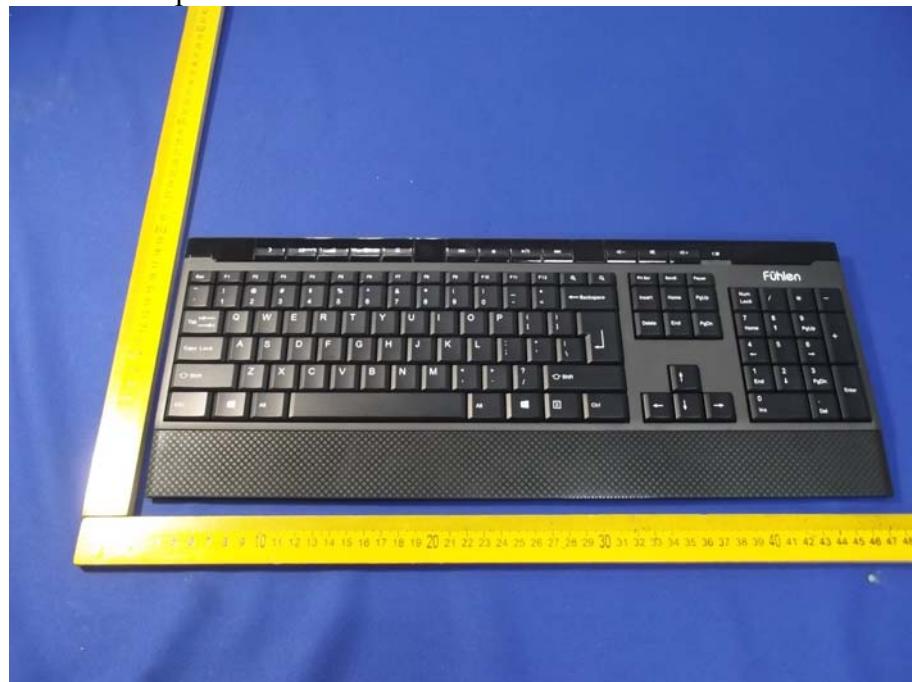


Figure 2
The EUT-Bottom View

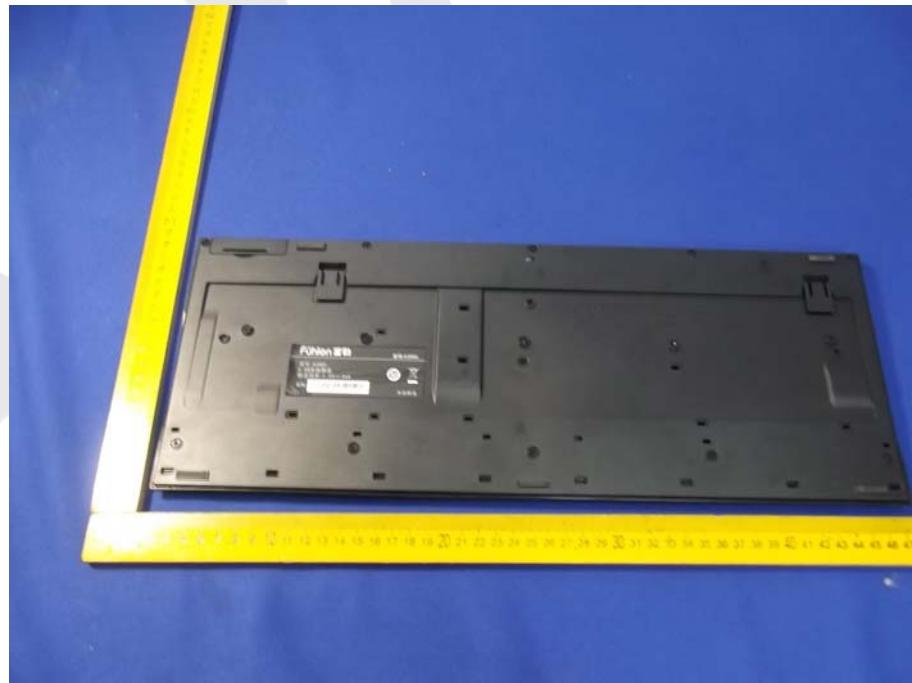


Figure3
The EUT-Left View



Figure 4
The EUT-Right View

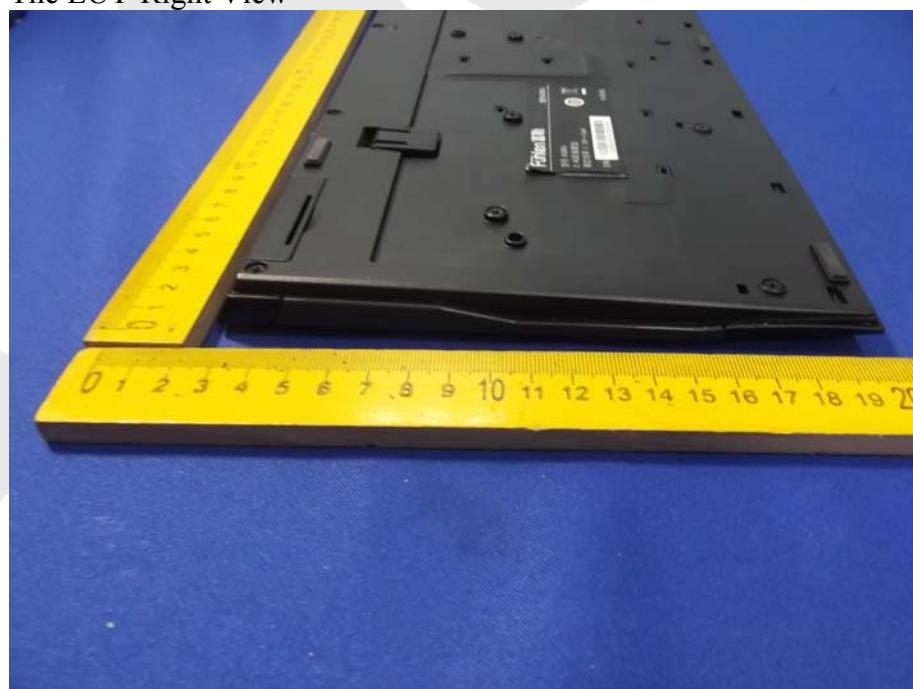


Figure 5
The EUT-Front View



Figure 6
The EUT-Rear View



APPENDIX II (Internal Photos)

Figure 7
The EUT-Inside View

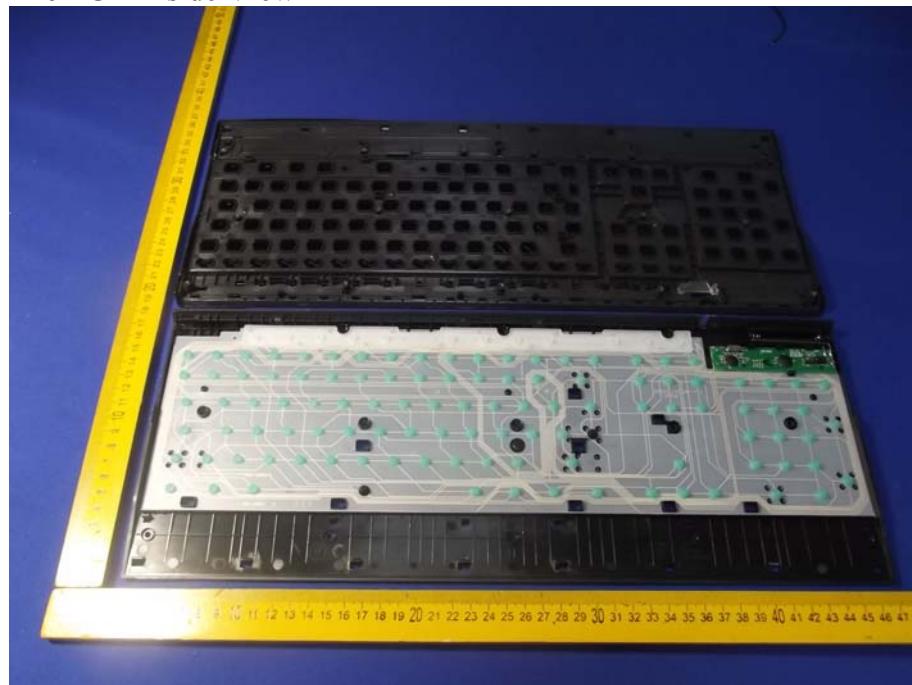


Figure 8
PCB of the EUT-Front View

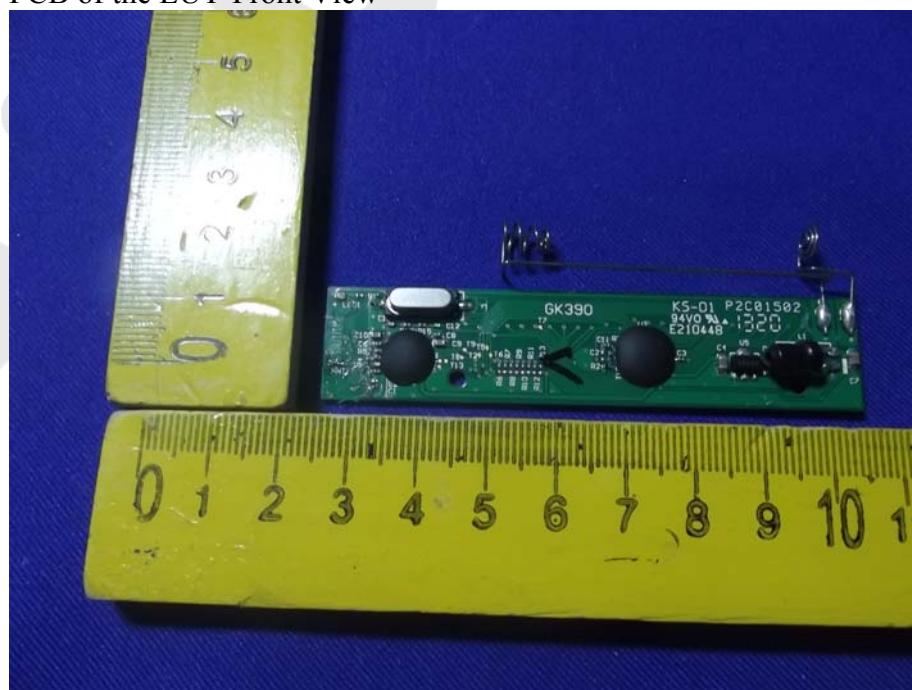


Figure 9
PCB of the EUT-Back View

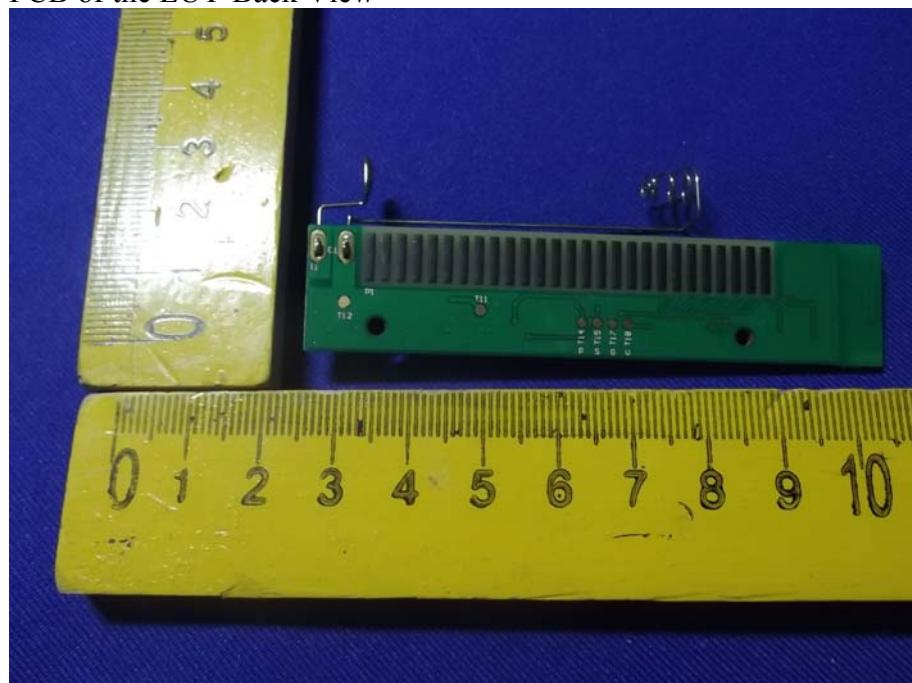


Figure 10
PCB of the EUT-Front View

