

FCC CERTIFICATION TEST REPORT FOR

FCC ID: X5B-904005T

Report Reference No. : 15FAB05022 51

Date of issue : 2015-05-28

Testing Laboratory : ATT Product Service Co., Ltd.

Address : No. 3, ChangLianShan Industrial Park, ChangAn Town,
DongGuan City, GuangDong, China.

Applicant's name : PERFORMANCE DESIGNED PRODUCTS, LLC

Address : 14144 Ventura Blvd, Suite 200, Sherman Oaks, CA 91423
U.S.A

Manufacturer : PERFORMANCE DESIGNED PRODUCTS, LLC

Test specification:

Test item description : WIRELESS KEYBOARD

Trade Mark : rock candy

Model/Type reference : 904-005T

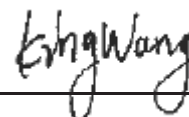
Ratings : 3V dc (AAA 1.5V*2Pcs)

Responsible Engineer



(Rock Huang/ Engineer)

Approved by



(King Wang /EMC Manager)

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TEST REPORT DECLARE

Applicant	:	PERFORMANCE DESIGNED PRODUCTS, LLC
Address	:	14144 Ventura Blvd,Suite 200,Sherman Oaks,CA 91423 U.S.A
Equipment under Test	:	WIRELESS KEYBOARD
Model No	:	904-005T
Trade Mark	:	rock candy
Manufacturer	:	PERFORMANCE DESIGNED PRODUCTS, LLC
Address	:	14144 Ventura Blvd,Suite 200,Sherman Oaks,CA 91423 U.S.A

Test Standard Used: FCC Rules and Regulations Part 15 Subpart C: 2013

Test procedure used: ANSI C63.10:2009; ANSI C63.4: 2009
FCC Public Notice DA 00-705

We Declare:

The equipment described above is tested by ATT Product Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and ATT Product Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation X/Y/Z axis of the EUT. will record worst case in this report.
our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.

Report No:	15FAB05022 51		
Date of Test:	2015-05-20 to 2015-05-26	Date of Report:	2015-05-28

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of ATT Product Service Co., Ltd.

1.Summary of test Standards and results

The EUT have been tested according to the applicable standards as referenced below.

Description of Test Item	Standard	Results
20dB Bandwidth	&15. 215(c) ANSI C63.10 :2009	PASS
Radiated Emission	15.209,&15.205,&15.249 ANSI C63.10 :2009	PASS
Conducted Emissions	&15.207(a) ANSI C63.10 :2009	N/A
Antenna requirement	&15.203	PASS
Outside of Band Emission	&15.249(d)	PASS

Note: N/A is an abbreviation for Not Applicable.

2 General test information

2.1 ACCREDITATIONS

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

USA **FCC** **Registration Number :923232**
Canada **INDUSTRY CANADA** **Registration Number 11033A**

2.2 Description of EUT

EUT* Name	:	WIRELESS KEYBOARD
Model Number	:	904-005T
Trade Mark	:	rock candy
EUT function description	:	Please reference user manual of this device
Power supply	:	3V dc (AAA 1.5V*2Pcs)
Operation frequency	:	2402MHz -2480MHz
Modulation	:	GFSK
Data rate	:	1Mbps
Antenna Type	:	PCB Antenna, Max gain 2.3 dBi.
Date of Receipt	:	2015-05-20
Sample Type	:	Series production

2.3 Accessories of EUT

Description of Accessories	Manufacturer	Model number or Type	Other
/	/	/	/

2.4 Assistant equipment used for test

N/A

2.5 Block diagram of EUT configuration for test

Tested mode, channel, information		
Test Mode	Channel	Frequency (MHz)
Tx Mode	Low	2402
	Middle	2441
	High	2480

2.6 Test environment conditions

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

Temperature range:	21-25℃
Humidity range:	40-75%
Pressure range:	86-106kPa

2.7 Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.44dB
Uncertainty for Radiation Emission test (150KHz-30MHz)	3.21dB
Uncertainty for Radiation Emission test (30MHz-200MHz)	3.42 dB (Polarize: V)
	3.52 dB (Polarize: H)
Uncertainty for Radiation Emission test (200MHz-1GHz)	3.52 dB (Polarize: V)
	3.54 dB (Polarize: H)
Uncertainty for Radiation Emission test (1GHz to 25GHz)	4.20 dB (Polarize: V)
	4.20 dB (Polarize: H)
Uncertainty for radio frequency	1×10-9
Uncertainty for conducted RF Power	0.65dB

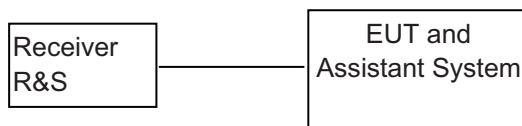
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3 20dB Bandwidth

3.1 Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	EMI Test Receiver	R&S	ESCI	101307	2015/12/26	1Y
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2015/12/26	1Y
3	RF Cable	Micable	C10-01-01-1	100309	2015/12/26	1Y

3.2 Block diagram of test setup



3.3 Applicable Standard

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated...

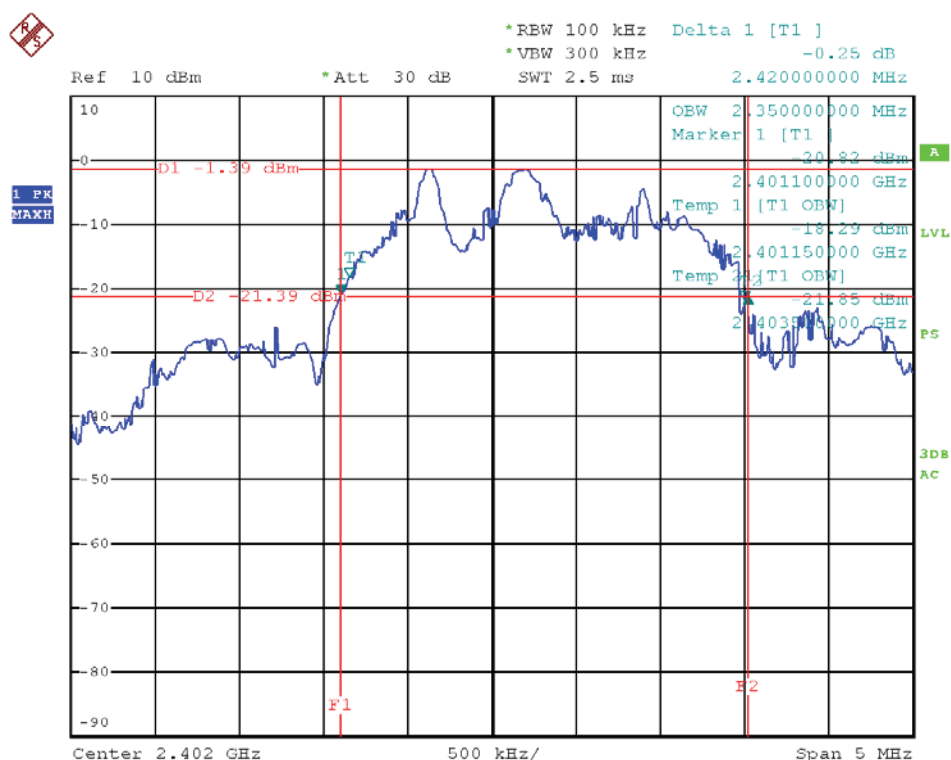
3.4 Test Procedure

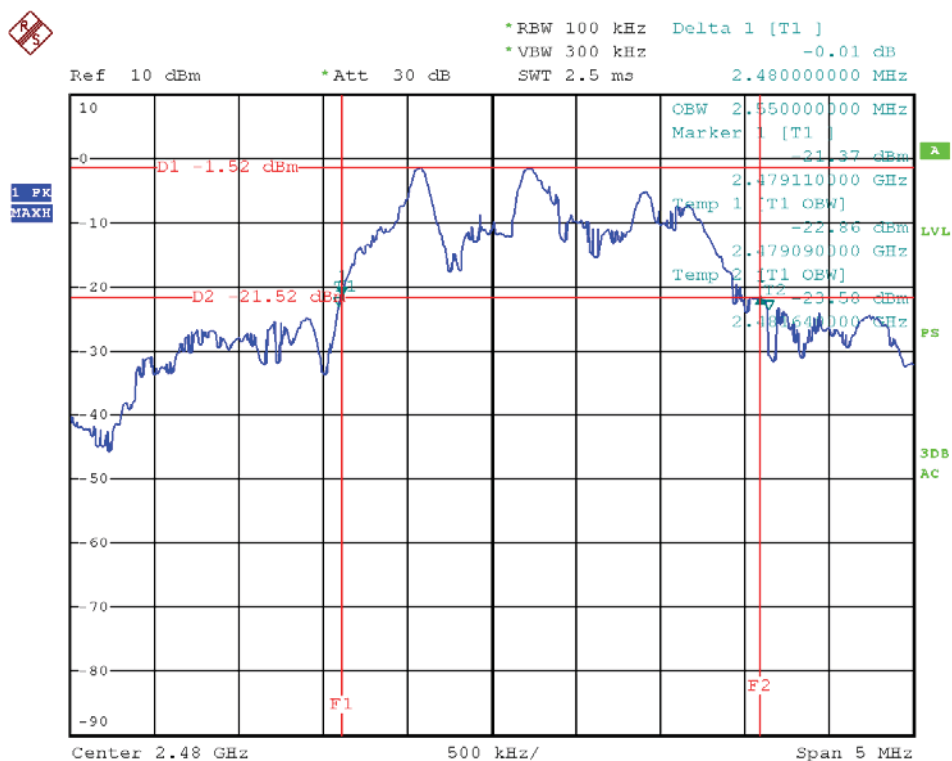
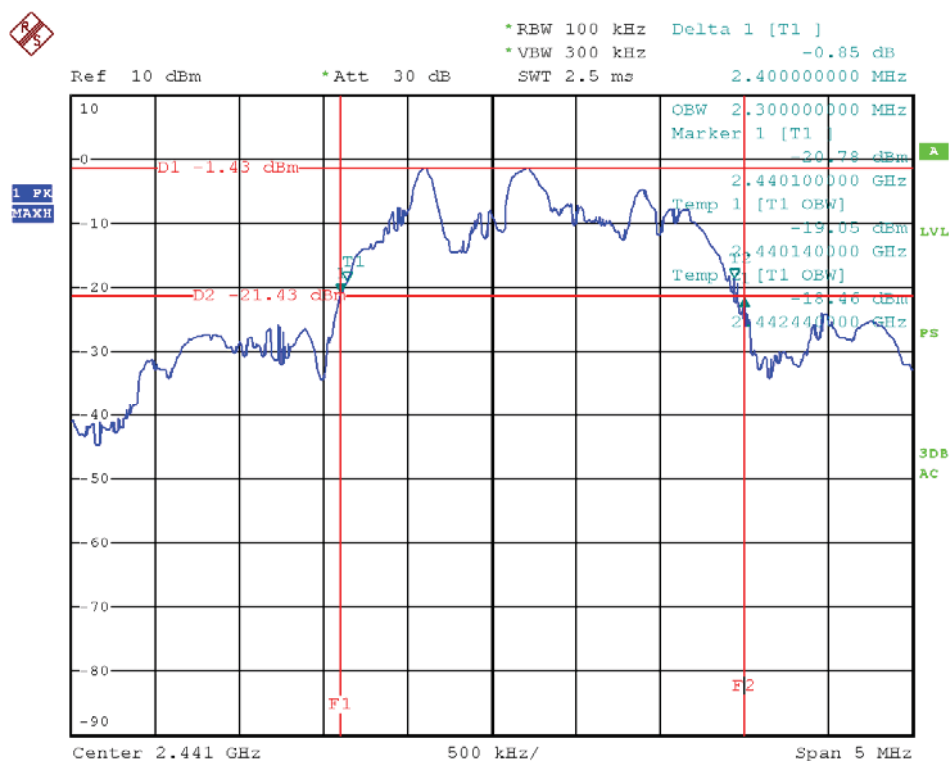
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on the test table without connection to measurement instrument. Turn on the EUT. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete..

3.5 Test Result

EUT: WIRELESS KEYBOARD			M/N: 904-005T		
Mode	Freq (MHz)	Result (MHz)	Limit (MHz)	Margin (MHz)	Conclusion
Tx	2402	2.42	/	/	PASS
	2441	2.4	/	/	PASS
	2480	2.48	/	/	PASS

3.6 Original test data





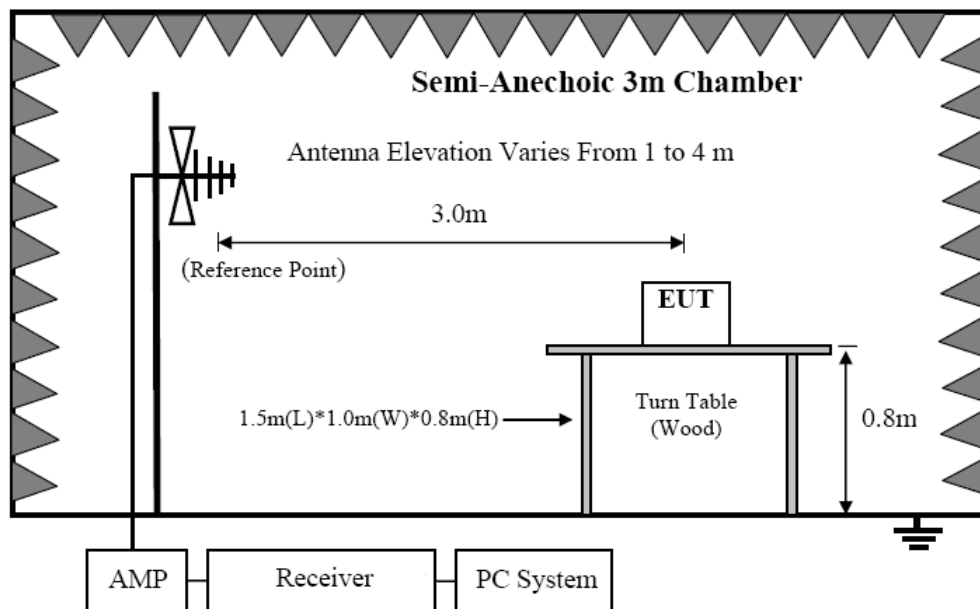
4 Radiated emission

4.1 Test equipment

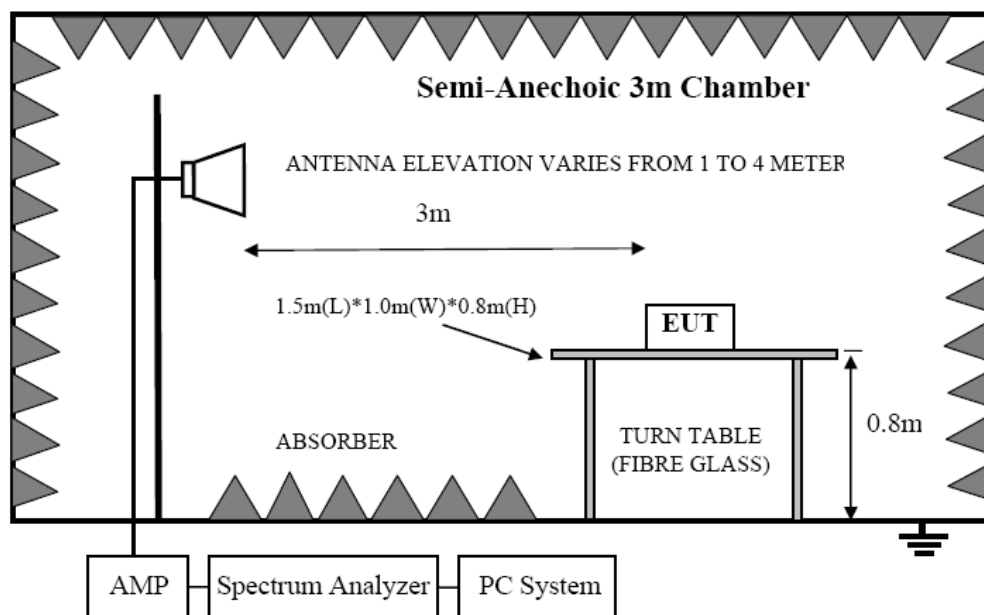
Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	EMI Test Receiver	R&S	ESCI	101307	2015/12/26	1Y
2	Spectrum analyzer	Agilent	E4407B	US40240708	2015/07/13	1Y
3	Loop antenna	Chase	HLA6120	20129	2015/12/26	1Y
4	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2015/12/26	1Y
5	Double Ridged Horn Antenna	R&S	HF907	100276	2015/12/26	1Y
6	Pre-Amplifier	R&S	SCU-01	10049	2015/12/26	1Y
7	Pre-amplifier	A.H.	PAM0-0118	360	2015/12/26	1Y
8	RF Cable	R&S	R01	10403	2015/12/26	1Y
9	RF Cable	R&S	R02	10512	2015/12/26	1Y
10	Horn Antenna	EMCO	3116	9608-4877	2015/12/26	1Y

4.2 Block diagram of test setup

In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

4.3 Limit

4.3.1 FCC 15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

4.3.2 FCC 15.209 Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

4.3.2 FCC 15.249 Limit

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

4.3.3 Limit for this EUT

The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4:2009. The specification used was the FCC 15.209, and FCC 15.249 limits.

4.4 Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
- (2) Setup EUT and assistant system according clause 2.4 and 8.2
- (3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
 - (a) Change work frequency or channel of device if practicable.
 - (b) Change modulation type of device if practicable.
 - (c) New battery is used during test.
 - (d) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
- (4) Spectrum frequency from 9MHz to 25GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 9KHz to 30MHz and 18GHz to 25GHz, so below final test was performed with frequency range from 30MHz to 18GHz.
- (5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 2009 on Radiated Emission test.
- (6) For emissions from 30MHz to 1GHz, Quasi-Peak values were measured with EMI Receiver and the bandwidth of Receiver is 120 KHz.
- (7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz Peak detector for Peak measure ;RMS detector for AV value. For fundamental frequency ,RBW is set to be 3MHz .
- (8) After test and evaluation X/Y/Z axis of the EUT . will record worst case in this report.

4.5 Test result

PASS. (See below detailed test result)

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C and section 15.205, 15.209 and 15.249, Vertical and Horizontal mode all have been tested, with the worst margin reading of:

Radiated Emission Test Result

Test Site	3m Chamber		
Test Date	2015-05-25	Tested By	Lake
EUT	WIRELESS KEYBOARD	Model Number	904-005T
Power Supply	DC 3V	Test Mode	Keeping Tx
Condition	Temp:24℃,Humi:55%	Antenna/Distance	3m

Frequ ncy	Receiver		Rx Antenna		Cable Loss (dB)	Amplifier Gain (dB)	Result Level (dBμV/m)	FCC 15.249	
(MHz)	Reading (dBμV)	PK/QP/ AV	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel (2402MHz)									
2402	95.41	PK	H	28.00	3.65	31.95	95.11	114.00	-18.89
2402	81.29	AV	H	28.00	3.65	31.95	80.99	94.00	-13.01
2402	96.37	PK	V	28.00	3.65	31.95	96.07	114.00	-17.93
2402	82.24	AV	V	28.00	3.65	31.95	81.94	94.00	-12.06
2390	66.58	PK	H	27.80	3.57	31.95	66.00	74.00	-8.00
2390	48.15	AV	H	27.80	3.57	31.95	47.57	54.00	-6.43
2390	67.68	PK	V	27.80	3.57	31.95	67.10	74.00	-6.90
2390	48.26	AV	V	27.80	3.57	31.95	47.68	54.00	-6.32
2400	65.59	PK	H	28.00	3.57	31.95	65.21	74.00	-8.79
2400	49.75	AV	H	28.00	3.57	31.95	49.37	54.00	-4.63
2400	66.84	PK	V	28.00	3.57	31.95	66.46	74.00	-7.54
2400	50.12	AV	V	28.00	3.57	31.95	49.74	54.00	-4.26
4804	55.49	PK	H	32.30	5.91	31.78	61.92	74.00	-12.08
4804	37.26	AV	H	32.30	5.91	31.78	43.69	54.00	-10.31
4804	56.34	PK	V	32.30	5.91	31.78	62.77	74.00	-11.23
4804	38.42	AV	V	32.30	5.91	31.78	44.85	54.00	-9.15
7206	47.16	PK	H	36.30	6.34	30.97	58.83	74.00	-15.17
7206	30.59	AV	H	36.30	6.34	30.97	42.26	54.00	-11.74
7206	48.75	PK	V	36.30	6.34	30.97	60.42	74.00	-13.58
7206	32.28	AV	V	36.30	6.34	30.97	43.95	54.00	-10.05
9608	45.94	PK	H	37.90	8.01	30.86	60.99	74.00	-13.01
9608	30.12	AV	H	37.90	8.01	30.86	45.17	54.00	-8.83
9608	46.57	PK	V	37.90	8.01	30.86	61.62	74.00	-12.38
9608	33.46	AV	V	37.90	8.01	30.86	48.51	54.00	-5.49
125.12	38.56	QP	V	14.20	2.74	27.60	27.90	43.50	-15.60
125.08	45.87	QP	H	14.20	2.74	27.60	35.21	43.50	-8.29
Middle Channel (2441MHz)									
2441	92.43	PK	H	28.30	3.69	31.95	92.47	114.00	-21.53
2441	83.19	AV	H	28.30	3.69	31.95	83.23	94.00	-10.77
2441	96.38	PK	V	28.30	3.69	31.95	96.42	114.00	-17.58
2441	84.23	AV	V	28.30	3.69	31.95	84.27	94.00	-9.73
4882	57.54	PK	H	32.90	6.34	31.78	65.00	74.00	-9.00
4882	38.57	AV	H	32.90	6.34	31.78	46.03	54.00	-7.97
4882	58.42	PK	V	32.90	6.34	31.78	65.88	74.00	-8.12
4882	40.03	AV	V	32.90	6.34	31.78	47.49	54.00	-6.51
7323	48.06	PK	H	37.10	6.72	30.97	60.91	74.00	-13.09

7323	35.44	AV	H	37.10	6.72	30.97	48.29	54.00	-5.71
7323	49.17	PK	V	37.10	6.72	30.97	62.02	74.00	-11.98
7323	36.56	AV	V	37.10	6.72	30.97	49.41	54.00	-4.59
9764	44.59	PK	H	38.60	8.43	30.86	60.76	74.00	-13.24
9764	32.58	AV	H	38.60	8.43	30.86	48.75	54.00	-5.25
9764	45.07	PK	V	38.60	8.43	30.86	61.24	74.00	-12.76
9764	33.41	AV	V	38.60	8.43	30.86	49.58	54.00	-4.42
125.23	40.56	QP	V	14.20	2.74	27.60	29.90	43.50	-13.60
125.23	46.33	QP	H	14.20	2.74	27.60	35.67	43.50	-7.83
High Channel (2480MHz)									
2480	96.88	PK	H	28.70	3.72	31.93	97.37	114.00	-16.63
2480	83.21	AV	H	28.70	3.72	31.93	83.70	94.00	-10.30
2480	98.65	PK	V	28.70	3.72	31.93	99.14	114.00	-14.86
2480	84.23	AV	V	28.70	3.72	31.93	84.72	94.00	-9.28
2483.5	61.19	PK	H	28.70	3.72	31.93	61.68	74.00	-12.32
2483.5	43.52	AV	H	28.70	3.72	31.93	44.01	54.00	-9.99
2483.5	63.13	PK	V	28.70	3.72	31.93	63.62	74.00	-10.38
2483.5	45.06	AV	V	28.70	3.72	31.93	45.55	54.00	-8.45
4960	54.83	PK	H	33.10	6.39	31.78	62.54	74.00	-11.46
4960	36.59	AV	H	33.10	6.39	31.78	44.30	54.00	-9.70
4960	56.79	PK	V	33.10	6.39	31.78	64.50	74.00	-9.50
4960	39.24	AV	V	33.10	6.39	31.78	46.95	54.00	-7.05
7440	52.18	PK	H	37.20	6.77	30.97	65.18	74.00	-8.82
7440	34.57	AV	H	37.20	6.77	30.97	47.57	54.00	-6.43
7440	53.24	PK	V	37.20	6.77	30.97	66.24	74.00	-7.76
7440	35.16	AV	V	37.20	6.77	30.97	48.16	54.00	-5.84
9920	46.28	PK	H	38.70	8.48	30.86	62.60	74.00	-11.40
9920	30.18	AV	H	38.70	8.48	30.86	46.50	54.00	-7.50
9920	47.25	PK	V	38.70	8.48	30.86	63.57	74.00	-10.43
9920	31.11	AV	V	38.70	8.48	30.86	47.43	54.00	-6.57
125.51	40.34	QP	V	14.20	2.74	27.60	29.68	43.50	-13.82
125.51	41.79	QP	H	14.20	2.74	27.60	31.13	43.50	-12.37

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – Amp Factor.

2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit.

5 Antenna Requirements

5.1 Limit

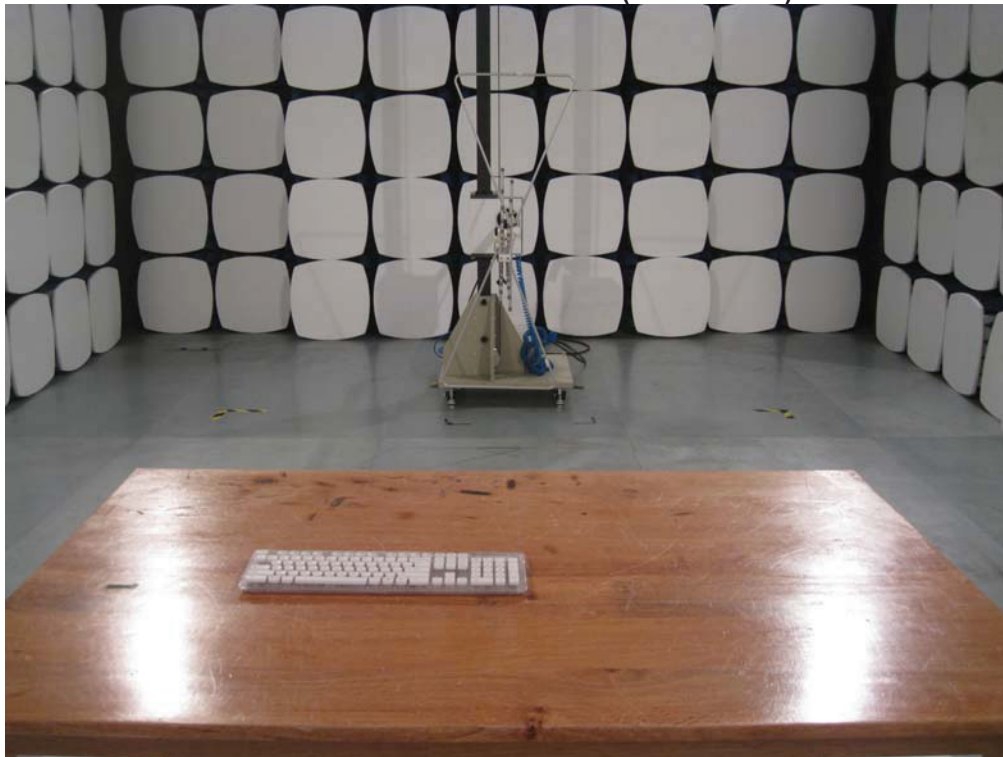
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.249 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

5.2 Result

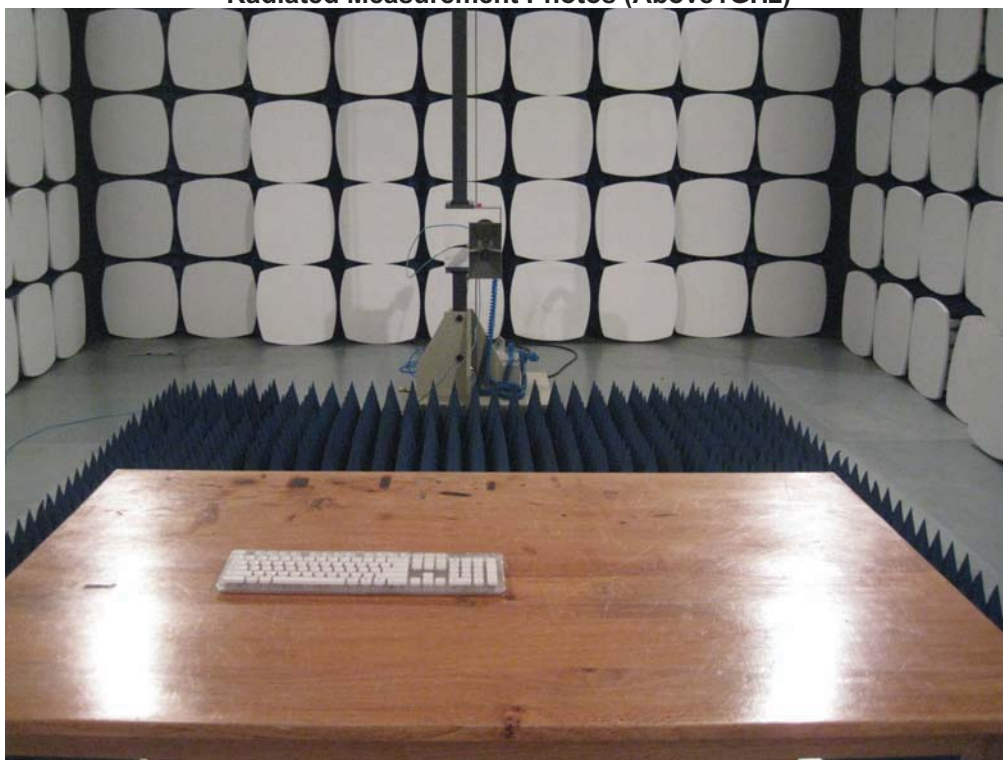
The EUT has an internal chip antenna permanently soldering on the printed circuit board, which complied with 15.203, the maximum gain was 2.3 dBi.

6 EUT TEST PHOTOS

Radiated Measurement Photos (Below 1GHz)

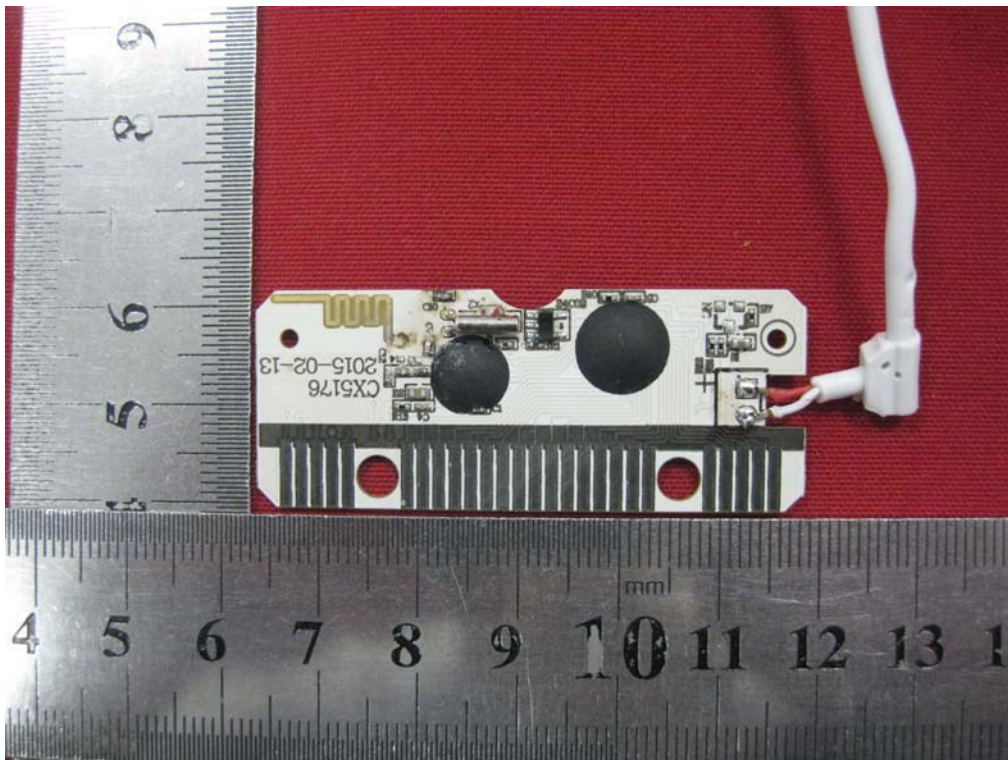
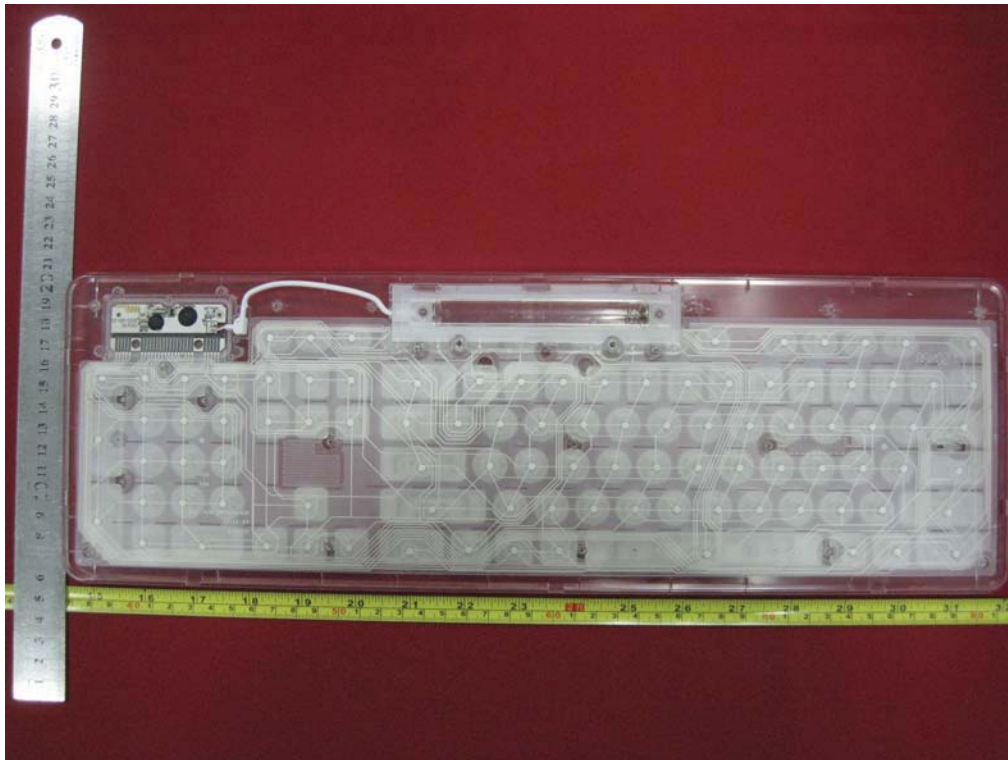


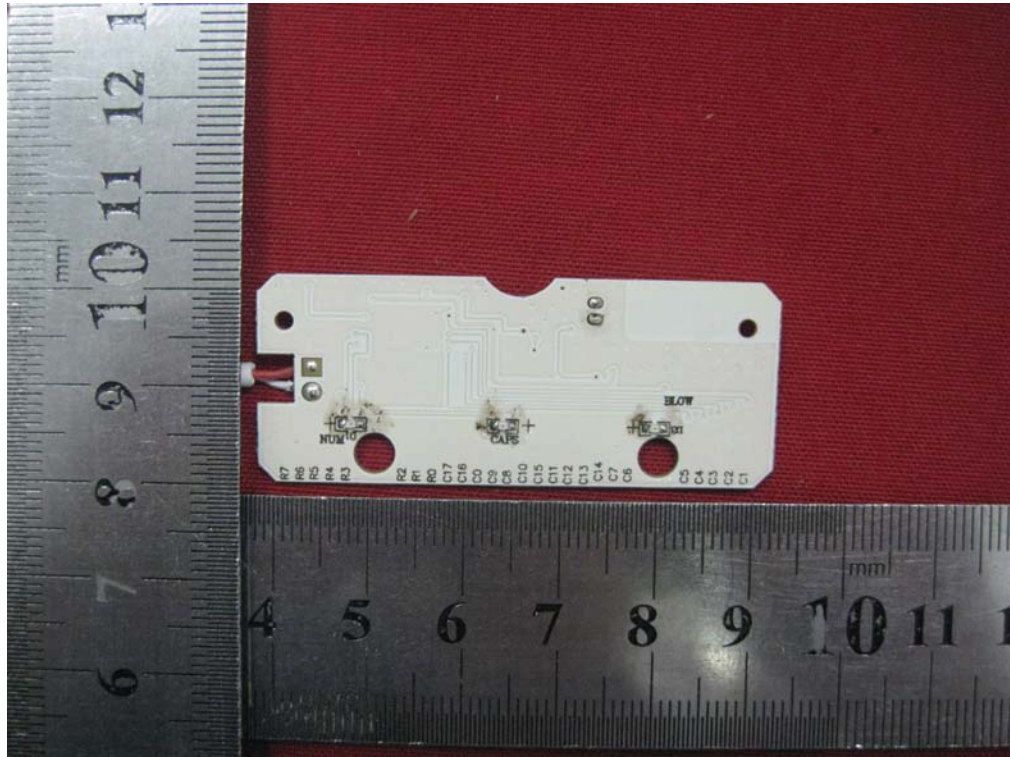
Radiated Measurement Photos (Above 1GHz)



EUT PHOTO







THE END