TCB

GRANT OF EQUIPMENT AUTHORIZATION

TCB

Certification
Issued Under the Authority of the
Federal Communications Commission
By:

PHOENIX TESTLAB GmbH
Koenigswinkel 10
32825 Blomberg,
Germany

Date of Grant: 06/12/2014

Application Dated: 06/12/2014

Audioengine Ltd

7FI Rm 703,Kowloon Bldg,555 Nathan Rd,Kowloon,HK

Hong Kong,
China

Attention: Brday Bargenquast , Director

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER: PIBB1
Name of Grantee: Audioengine Ltd
Equipment Class: **Digital Transmission System**
Notes: **Audioengine B1 (Bluetooth Music Receiver)**

Grant Notes	FCC Rule Parts	Frequency Range (MHZ)	Output Watts	Frequency Tolerance	Emission Designator
	15C	2402.0 - 2480.0	0.005		

Output Power listed is peak conducted.

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT

OF

Audioengine B1

Model No.: B1

Brand Name: Audioengine

FCC ID: PIBB1

Report No.: KAD140506012E

Issue Date: June 12, 2014

Prepared for

Audioengine Ltd
Room 703, Kowloon Building, 555 Nathan Road, Kowloon, HK

Prepared by

DONGGUAN EMTEK CO., LTD.

No.281, Guantai Road, Nancheng District,
Dongguan, Guangdong, China
TEL: 86-769-22807078
FAX: 86-769-22807079

VERIFICATION OF COMPLIANCE

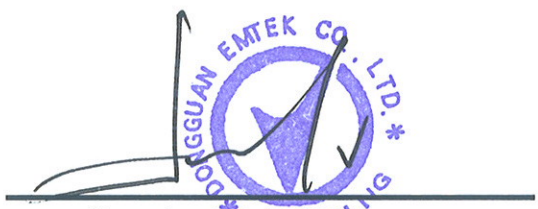
Applicant:	Audioengine Ltd Room 703, Kowloon Building, 555 Nathan Road, Kowloon, HK
Manufacturer:	Ether Electronics Co., Ltd 4F, 5 Building, Dongfangming Industrial Park, No. 83, Dabao Road, Baoan District, Shenzhen City, China
Product Description:	Audioengine B1
Brand Name:	Audioengine
Model Number:	B1
File Number:	KAD140506012E
Date of Test:	May 06, 2014 to May 21, 2014

We hereby certify that:

The above equipment was tested by DONGGUAN EMTEK 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 conducted and radiated emission limits of FCC Rules Part 15.247(2013).

The test results of this report relate only to the tested sample identified in this report.

Approved By



Sam.Lv / Q.A. Manager
DONGGUAN EMTEK CO., LTD.

Modified Information

Version	Summary	Revision Date	Report No.
Ver.1.0	Original Report	/	KAD140506012E

Table of Contents

1. GENERAL INFORMATION

1.1 Product Description

The Audioengine, Model: B1 (referred to as the EUT in this report) The EUT is an short range, lower power transmitter as an Input Device. It is designed by way of utilizing the following modulation achieves the system operating.

A). Operation Frequency: 2402-2480MHz
B). Kind of device: Bluetooth 4.0
C). Modulation: GFSK
D). Number of Channel: 40
E). Channel space: 2MHz
F). Rated RF Output Power: 6.55dBm
G). Antenna Type: dipole antenna
H). Antenna GAIN: 1.0 dBi
I). Input Rating: DC 5.0V, 200mA come from Adapter
J) information of Adapter:
Model: GPE060B-050100-Z
Input: AC 100-240V, 50/60Hz, 0.2A
Output: DC 5V, 1000mA, 5W

Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	**2402**	15	2430	29	2458
02	2404	16	2432	30	2460
03	2406	17	2434	31	2462
04	2408	18	2436	32	2464
05	2410	19	2438	33	2466
06	2412	20	2440	34	2468
07	2414	21	**2442**	35	2470
08	2416	22	2444	36	2472
09	2418	23	2446	37	2474
10	2420	24	2448	38	2476
11	2422	25	2450	39	2478
12	2424	26	2452	40	**2480**
13	2426	27	2454		
14	2428	28	2456		

Note:
1. Test of channel was included the lowest 2402MHz, middle 2442MHz and highest frequency 2480MHz in highest data rate and to perform the test, then record on this report.

1.2 Test Methodology

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

Tested in accordance with FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03 (April 2013) for compliance to FCC 47CFR 15.247 requirements.

1.3 Special Accessories

Not available for this EUT intended for grant.

1.4 Equipment Modifications

Not available for this EUT intended for grant.

1.5 Test Facility

Site Description

EMC Lab.	:	Accredited by FCC, Aug. 18, 2011 The Certificate Number is 247565 Accredited by Industry Canada, February 19, 2014 The Certificate Number is 9444A.
Name of Firm	:	DONGGUAN EMTEK CO., LTD
Site Location	:	No.281, Guantai Road, Nancheng District, Dongguan, Guangdong, China

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous transmission application.

2.2 EUT Exercise

The Transmitter was operated in the transmission operating mode. the Tx frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4-2009. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. Emission was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4-2009.

2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

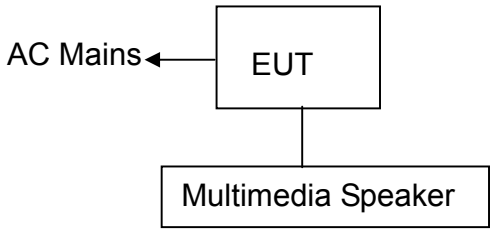


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
1.	Audioengine B1	Audioengine	B1	PIBB1	N/A	***EUT***
2	Multimedia speaker	/	e3360BT	/	/	***Support Equipment***

Note:

(1) Unless otherwise denoted as EUT in『Remark』column , device(s) used in tested system is a support equipment.

3. Description of test modes

This is Digital Transmission system(DTS) and have one type of modulation GFSK.

The 3 channels of lower, middle and higher were chosen for test.

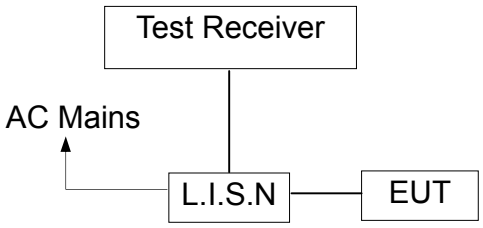
1. For lowest channel : 2402MHz(Channel 01)
2. For middle channel : 2442MHz(Channel 21)
3. For highest channel: 2480MHz(Channel 40)

4. Conducted Emissions Test

4.1 Measurement Procedure:

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

4.2 Test SET-UP (Block Diagram of Configuration)



4.3 Measurement Equipment Used:

Conducted Emission Test Site # 4					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**Last Cal.**	**Due date**
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	May 16, 2014	May 15, 2015
L.I.S.N	Rohde & Schwarz	ESH2-Z5	834549/005	May 16, 2014	May 15, 2015
L.I.S.N	Rohde & Schwarz	ESH2-Z5	834549/005	May 16, 2014	May 15, 2015
50ΩCoaxial Switch	Anritsu	MP59B	M20531	May 19, 2014	May 18, 2015

4.4 Conducted Emission Limit

(7) Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

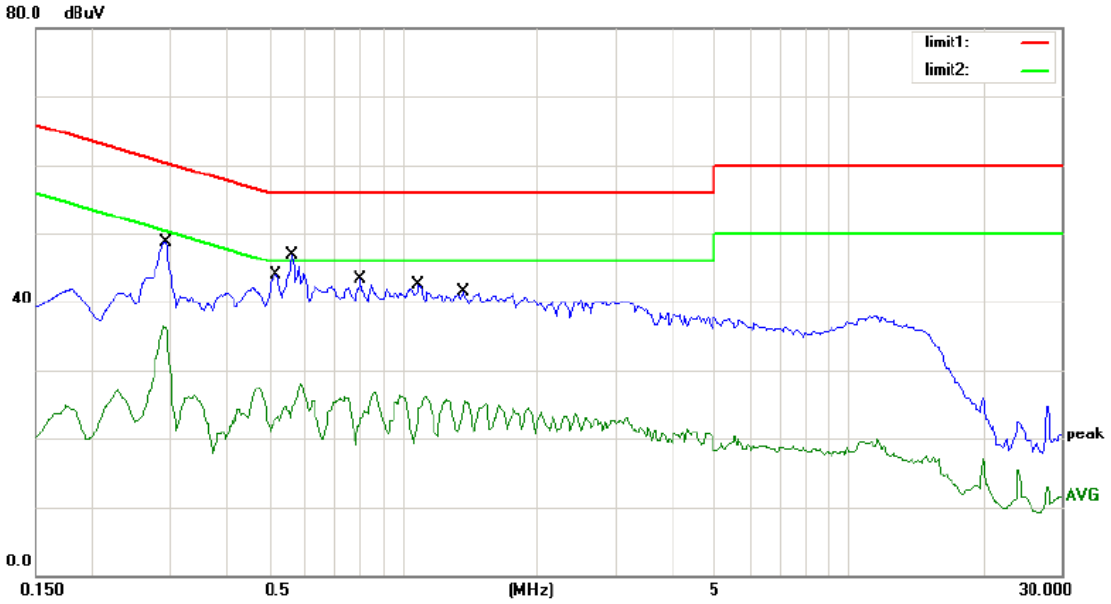
Note:

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

4.5 Measurement Result:

Pass.

Please refer to the following pages.



Site site #1 Phase: L1 Temperature: 24

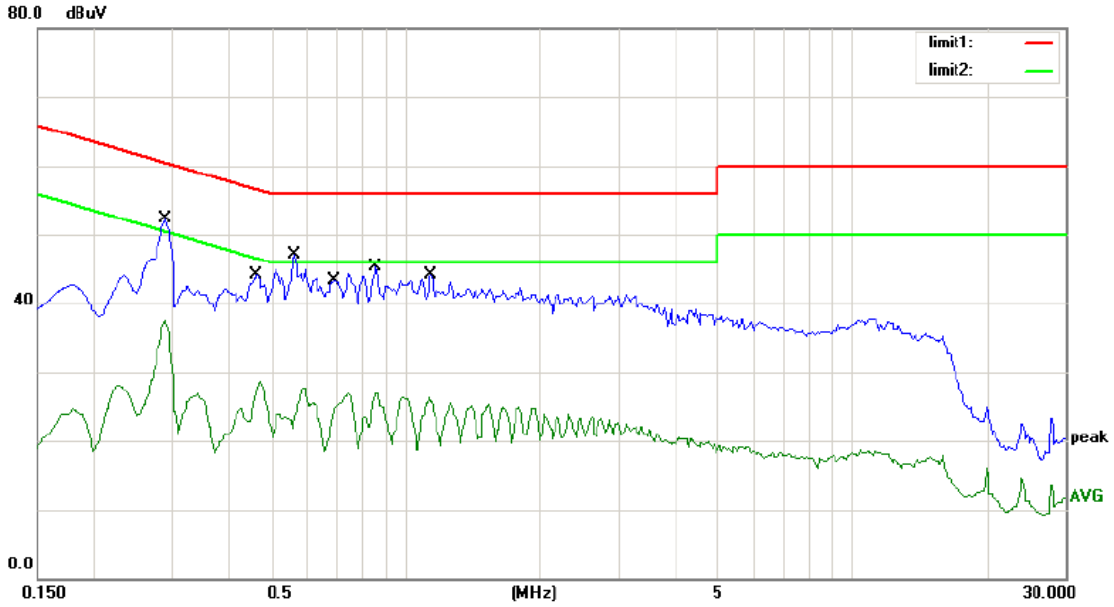
Limit: (CE)FCC PART 15 class C_QP Power: AC 120V/60Hz Humidity: 55 %

Mode: TX

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2950	45.60	0.00	45.60	60.38	-14.78	QP	
2		0.2950	36.42	0.00	36.42	50.38	-13.96	AVG	
3		0.5200	41.10	0.00	41.10	56.00	-14.90	QP	
4		0.5200	24.13	0.00	24.13	46.00	-21.87	AVG	
5	*	0.5650	43.90	0.00	43.90	56.00	-12.10	QP	
6		0.5650	27.57	0.00	27.57	46.00	-18.43	AVG	
7		0.8050	40.20	0.00	40.20	56.00	-15.80	QP	
8		0.8050	24.05	0.00	24.05	46.00	-21.95	AVG	
9		1.0850	39.50	0.00	39.50	56.00	-16.50	QP	
10		1.0850	25.30	0.00	25.30	46.00	-20.70	AVG	
11		1.3650	38.50	0.00	38.50	56.00	-17.50	QP	
12		1.3650	25.47	0.00	25.47	46.00	-20.53	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver.

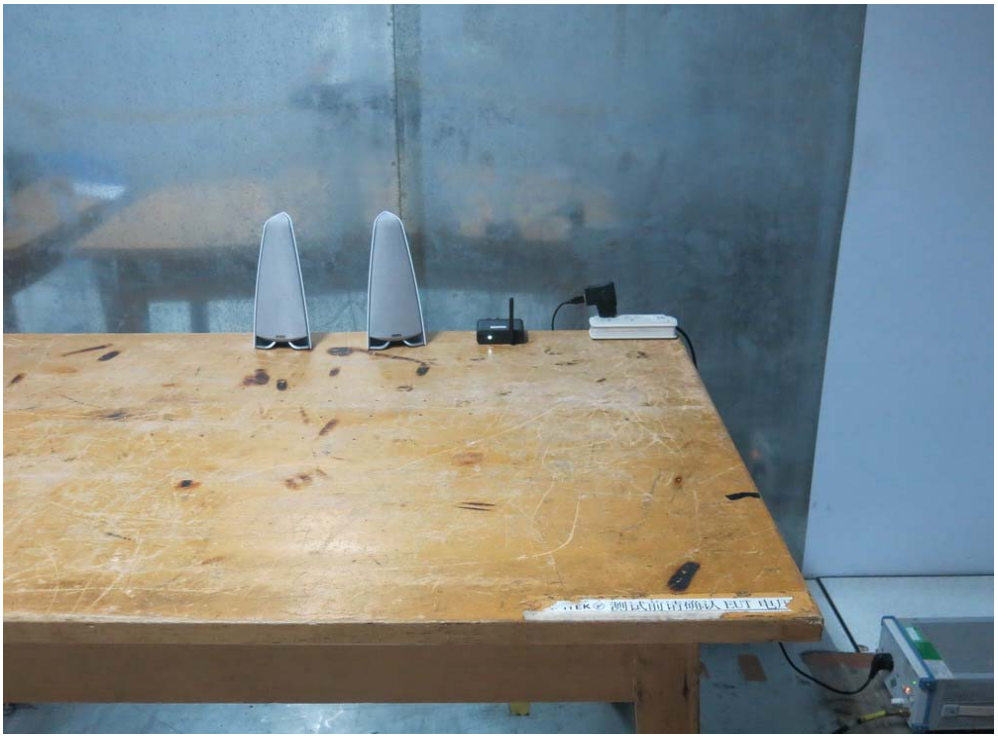


Site site #1 Phase: N Temperature: 24
Limit: (CE)FCC PART 15 class C_QP Power: AC 120V/60Hz Humidity: 55 %
Mode: TX
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.2900	49.20	0.00	49.20	60.52	-11.32	QP	
2		0.2900	37.59	0.00	37.59	50.52	-12.93	AVG	
3		0.4650	41.00	0.00	41.00	56.60	-15.60	QP	
4		0.4650	28.65	0.00	28.65	46.60	-17.95	AVG	
5		0.5650	44.30	0.00	44.30	56.00	-11.70	QP	
6		0.5650	25.52	0.00	25.52	46.00	-20.48	AVG	
7		0.7010	40.10	0.00	40.10	56.00	-15.90	QP	
8		0.7010	25.03	0.00	25.03	46.00	-20.97	AVG	
9		0.8600	42.10	0.00	42.10	56.00	-13.90	QP	
10		0.8600	27.00	0.00	27.00	46.00	-19.00	AVG	
11		1.1400	41.20	0.00	41.20	56.00	-14.80	QP	
12		1.1400	26.35	0.00	26.35	46.00	-19.65	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver.

4.6 Conducted Measurement Photos:



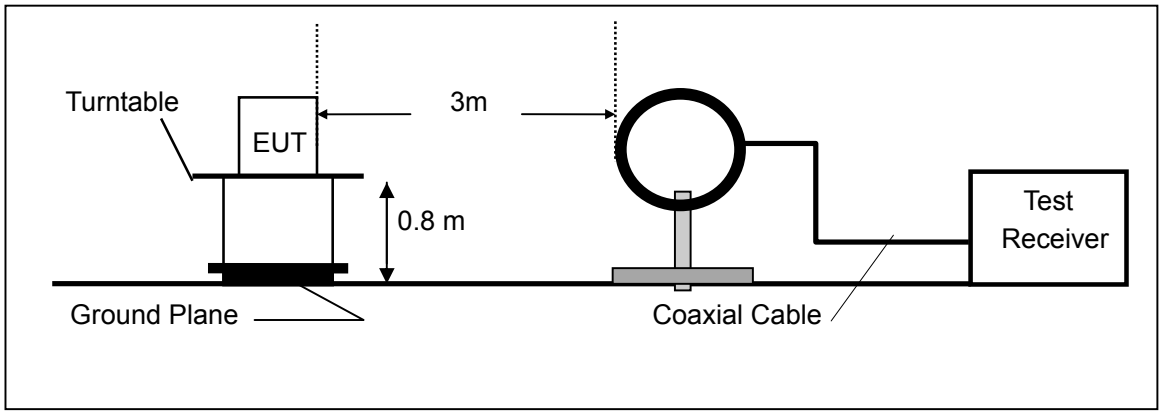
5. Radiated Emission Test

5.1 Measurement Procedure

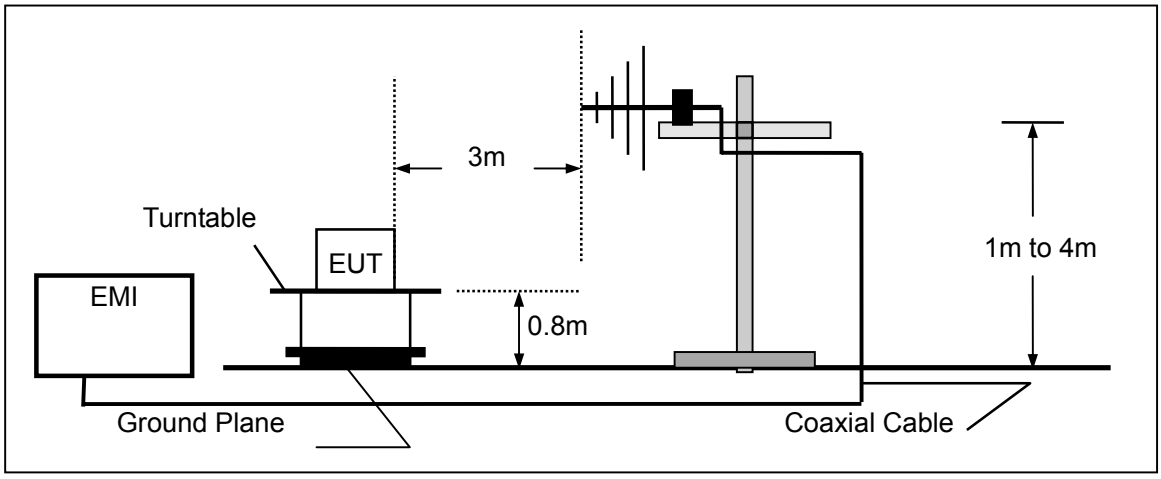
1 The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.
5. Three orthogonal panels X, Y, Z position of EUT are tested, and the worst case was found when EUT in X position. All test modes were tested, only the result of the worst case was recorded in the report.

5.2 Test SET-UP (Block Diagram of Configuration)

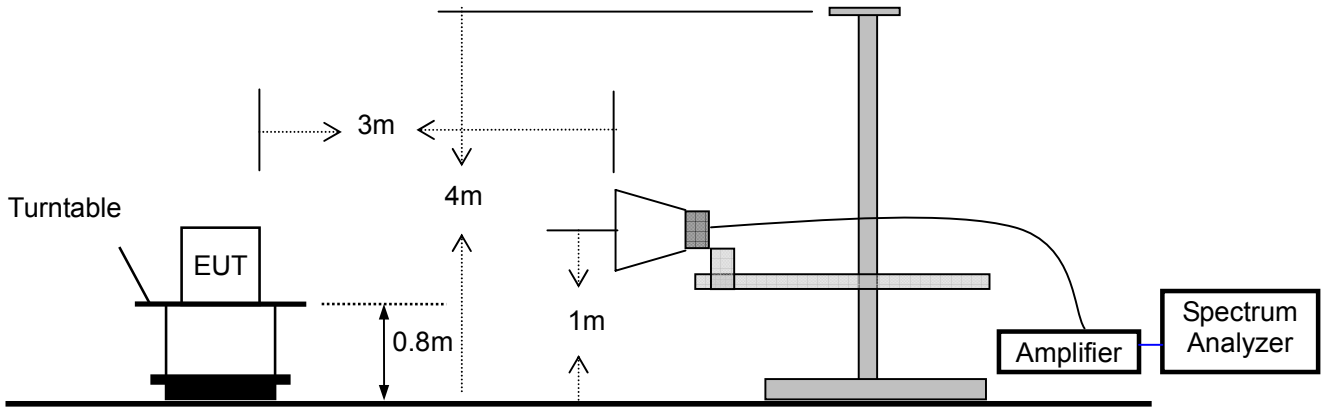
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



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



5.3 Measurement Equipment Used:

EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	May 10, 2014	May 09, 2015
Pre-Amplifier	HP	8447D	2944A07999	May 10, 2014	May 09, 2015
Bilog Antenna	SCHWARZBECK	VULB9163	142	May 16, 2014	May 15, 2015
Loop Antenna	ARA	PLA-1030/B	1029	May 16, 2014	May 15, 2015
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170399	May 16, 2014	May 15, 2015
Horn Antenna	SCHWARZBECK	BBHA 9120	D143	May 16, 2014	May 15, 2015
Cable	SCHWARZBECK	AK9513	ACRX1	May 19, 2014	May 18, 2015
Cable	SCHWARZBECK	N/A	FP2RX2	May 19, 2014	May 18, 2015
Cable	SCHWARZBECK	AK9513	CRPX1	May 19, 2014	May 18, 2015
Cable	SCHWARZBECK	AK9513	CRRX2	May 19, 2014	May 18, 2015

5.4 Radiated emission limit

Frequency MHz	Distance Meter	Field Strength uV/m	Field Strength dBuV/m
0.009 – 0.490	300	10000 * 2400/F(KHz)	20log 2400/F(KHz) + 80
0.490 – 1.705	30	100 * 24000/F(KHz)	20log 24000/F(KHz) + 40
1.705 – 30.00	30	100* 30	20log 30 + 40
30~88	3	100	40.0
88~216	3	150	43.5
216~960	3	200	46.0
Above 960	3	500	54.0

Note: The frequencies above 1000MHz, as measured using instrumentation with a peak detector function was corresponding to 20dB above maximum permitted average limit.

5.5 Measurement Result

Operation Mode:	TX	Test Date :	May 08, 2014
Frequency Range:	9KHz~30MHz	Temperature :	28℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	Andy

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
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Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Operation Mode:	TX Mode(Channel 01)	Test Date :	May 08, 2014
Frequency Range:	30~1000MHz	Temperature :	25 ℃
Test Result:	PASS	Humidity :	50%
Measured Distance:	3m	Test By:	Andy

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)	Note
30.0000	V	31.97	40.00	-8.03	PK
65.8900	V	21.75	40.00	-18.25	PK
112.4500	V	26.77	43.50	-16.73	PK
200.7200	V	25.10	43.50	-18.40	PK
344.2800	V	26.64	46.00	-19.36	PK
395.6900	V	29.33	46.00	-16.67	PK
331.6700	H	28.82	46.00	-17.18	PK
363.6800	H	31.14	46.00	-14.86	PK
376.2900	H	31.21	46.00	-14.79	PK
408.3000	H	32.72	46.00	-13.28	PK
436.4300	H	30.85	46.00	-15.15	PK
476.2000	H	31.91	46.00	-14.09	PK

Note: (1) All Readings are Peak Value.
(2) Emission Level= Reading Level+ Probe Factor +Cable Loss
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

Operation Mode:	TX Mode(Channel 21)	Test Date :	May 08, 2014
Frequency Range:	30~1000MHz	Temperature :	25 ℃
Test Result:	PASS	Humidity :	50 %
Measured Distance:	3m	Test By:	Andy

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)	Note
42.4500	V	30.91	40.00	-9.09	PK
66.3900	V	26.56	40.00	-13.44	PK
118.2500	V	21.67	43.50	-21.83	PK
210.4500	V	24.56	43.50	-18.94	PK
344.4600	V	26.67	46.00	-19.33	PK
395.7300	V	27.67	46.00	-18.33	PK
331.6200	H	28.22	46.00	-17.78	PK
363.7500	H	31.56	46.00	-14.44	PK
376.2200	H	33.78	46.00	-12.22	PK
404.6500	H	32.22	46.00	-13.78	PK
432.4200	H	30.86	46.00	-15.14	PK
466.5600	H	31.45	46.00	-14.55	PK

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+ Probe Factor +Cable Loss.
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

Operation Mode:	TX Mode(Channel 40)	Test Date :	May 08, 2014
Frequency Range:	30~1000MHz	Temperature :	25 ℃
Test Result:	PASS	Humidity :	50 %
Measured Distance:	3m	Test By:	Andy

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)	Note
46.6000	V	30.34	40.00	-9.66	PK
76.1100	V	28.25	40.00	-11.75	PK
112.4300	V	26.63	43.50	-16.87	PK
200.5200	V	25.40	43.50	-18.1	PK
344.2200	V	26.11	46.00	-19.89	PK
395.5600	V	27.56	46.00	-18.44	PK
334.5600	H	28.31	46.00	-17.69	PK
343.3800	H	31.14	46.00	-14.86	PK
376.5600	H	31.67	46.00	-14.33	PK
408.2000	H	32.31	46.00	-13.69	PK
436.6700	H	30.67	46.00	-15.33	PK
476.4200	H	31.45	46.00	-14.55	PK

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+ Probe Factor +Cable Loss
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

Operation Mode:	TX Mode (CH01: 2402MHz)	Test Date :	May 08, 2014
Frequency Range:	1-25GHz	Temperature :	25 ℃
Test Result:	PASS	Humidity :	50 %
Measured Distance:	3m	Test By:	Andy

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
2402	V	65.14	48.72	74	54	-8.86	-5.28
4804	V	64.55	47.95	74	54	-9.45	-6.05
7206	V	63.21	46.12	74	54	-10.79	-7.88
9608	V	62.69	45.32	74	54	-11.31	-8.68
12010	V	61.28	44.28	74	54	-12.72	-9.72
2402	H	64.29	48.21	74	54	-9.71	-5.79
4804	H	63.22	47.18	74	54	-10.78	-6.82
7206	H	62.95	46.22	74	54	-11.05	-7.78
9608	H	61.85	45.66	74	54	-12.15	-8.34
12010	H	60.79	44.95	74	54	-13.21	-9.05

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+ Probe Factor +Cable Loss.
(3) The average measurement was not performed when the peak measured data under the limit of average detection.
(4) These test result outsourced to SHENZHEN EMTEK CO., LTD

Operation Mode:	TX Mode (CH21: 2442MHz)	Test Date :	May 08, 2014
Frequency Range:	1-25GHz	Temperature :	25 ℃
Test Result:	PASS	Humidity :	50 %
Measured Distance:	3m	Test By:	Andy

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
2442	V	64.72	47.05	74	54	-9.28	-6.95
4884	V	63.84	46.13	74	54	-10.16	-7.87
7326	V	62.15	45.28	74	54	-11.85	-8.72
9768	V	61.42	44.95	74	54	-12.58	-9.05
12210	V	60.28	43.28	74	54	-13.72	-10.72
2442	H	65.99	46.59	74	54	-8.01	-7.41
4884	H	64.18	45.92	74	54	-9.82	-8.08
7326	H	63.22	44.28	74	54	-10.78	-9.72
9768	H	62.47	43.18	74	54	-11.53	-10.82
12210	H	64.72	47.05	74	54	-9.28	-6.95

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+ Probe Factor +Cable Loss.
(3) The average measurement was not performed when the peak measured data under the limit of average detection.
(4) These test result outsourced to SHENZHEN EMTEK CO., LTD

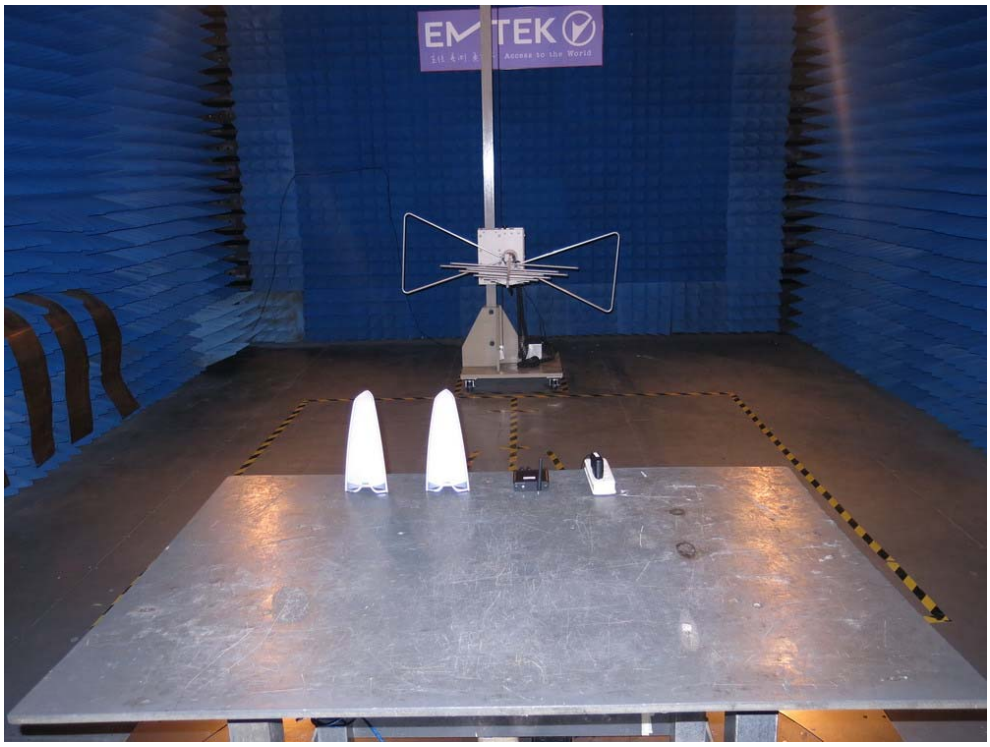
Operation Mode:	TX Mode (CH40: 2480MHz)	Test Date :	May 08, 2014
Frequency Range:	1-25GHz	Temperature :	25 ℃
Test Result:	PASS	Humidity :	50 %
Measured Distance:	3m	Test By:	Andy

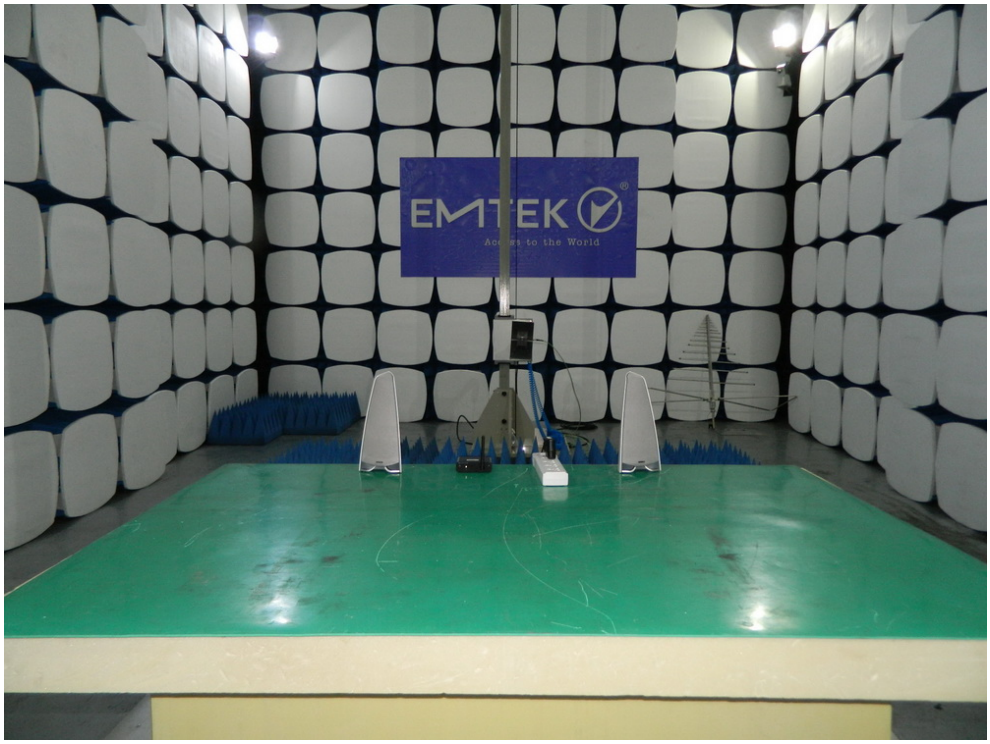
Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
2480	V	65.25	46.52	74	54	-8.75	-7.48
4960	V	64.87	45.75	74	54	-9.13	-8.25
7440	V	63.22	44.38	74	54	-10.78	-9.62
9920	V	62.91	43.24	74	54	-11.09	-10.76
12400	V	61.85	42.11	74	54	-12.15	-11.89
2480	H	64.32	45.74	74	54	-9.68	-8.26
4960	H	63.34	44.62	74	54	-10.66	-9.38
7440	H	62.93	43.28	74	54	-11.07	-10.72
9920	H	61.64	42.95	74	54	-12.36	-11.05
12400	H	60.48	41.22	74	54	-13.52	-12.78

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+ Probe Factor +Cable Loss.
(3) The average measurement was not performed when the peak measured data under the limit of average detection.
(4) These test result outsourced to SHENZHEN EMTEK CO., LTD

5.6 Radiated Measurement Photos:



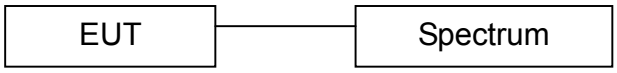


6. 6dB Bandwidth Measurement

6.1 Measurement Procedure

The EUT was operating in Bluetooth mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

6.2 Test SET-UP (Block Diagram of Configuration)



6.3 Measurement Equipment Used:

EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Rohde & Schwarz	ESCI	1166.5950.03	05/16/2014	05/15/2015

6.4 Limit

The minimum 6dB bandwidth shall be at least 500kHz.

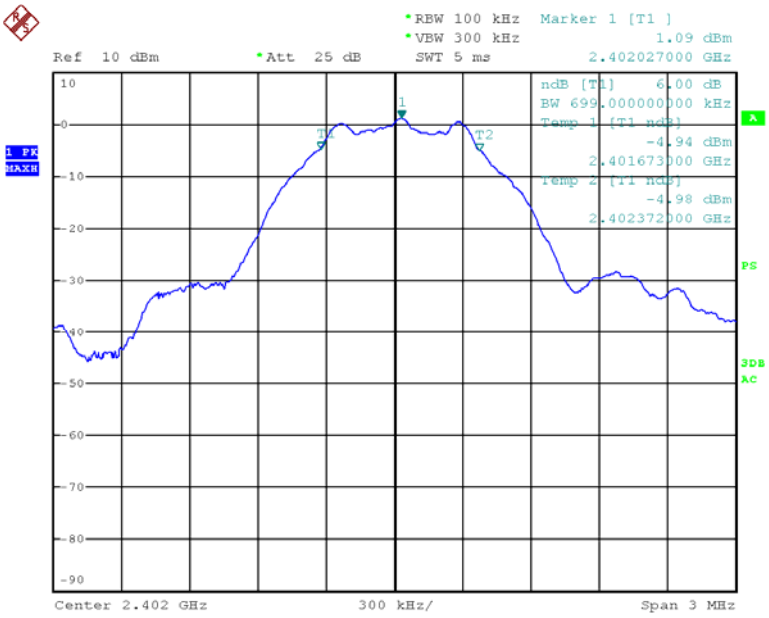
6.5 Measurement Results:

Refer to attached data chart.

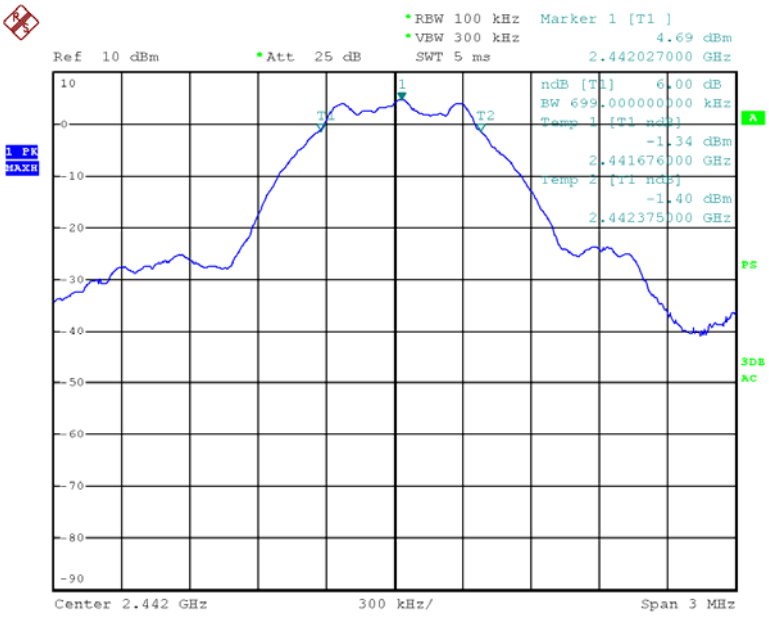
Spectrum Detector:	PK	Test Date :	May 08, 2014
Test By:	Andy	Temperature :	25 ℃
Test Result:	PASS	Humidity :	50 %

Channel number	Channel frequency (MHz)	Measurement level (KHz)	Required Limit (KHz)
01	2402	699	>500
21	2442	699	>500
40	2480	702	>500

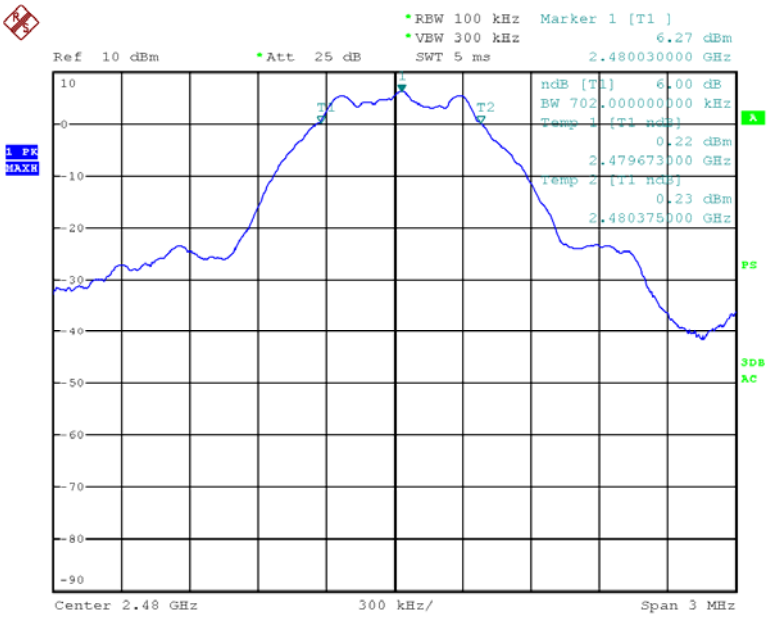
Channel 01:



Channel 21:



Channel 40:

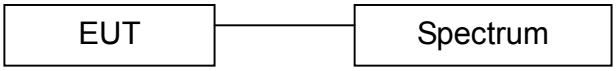


7. MAX IMUM PEAK OUTPUT POWER TEST

7.1 Measurement Procedure

a. The Transmitter output (antenna port) was connected to the spectrum Analyzer.
b. Turn on the EUT and then record the peak power value.
c. Repeat above procedures on all channels needed to be tested.

7.2 Test SET-UP (Block Diagram of Configuration)



7.3 Measurement Equipment Used:

EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Rohde & Schwarz	ESCI	1166.5950.03	05/16/2014	05/15/2015

7.4 Peak Power output limit

The maximum peak power shall be less 1Watt.

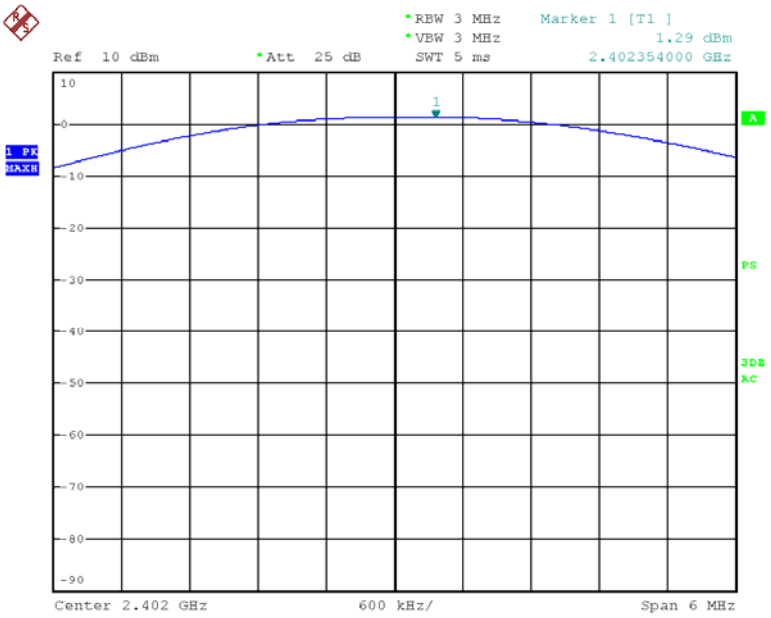
7.5 Measurement Results:

Refer to attached data chart.

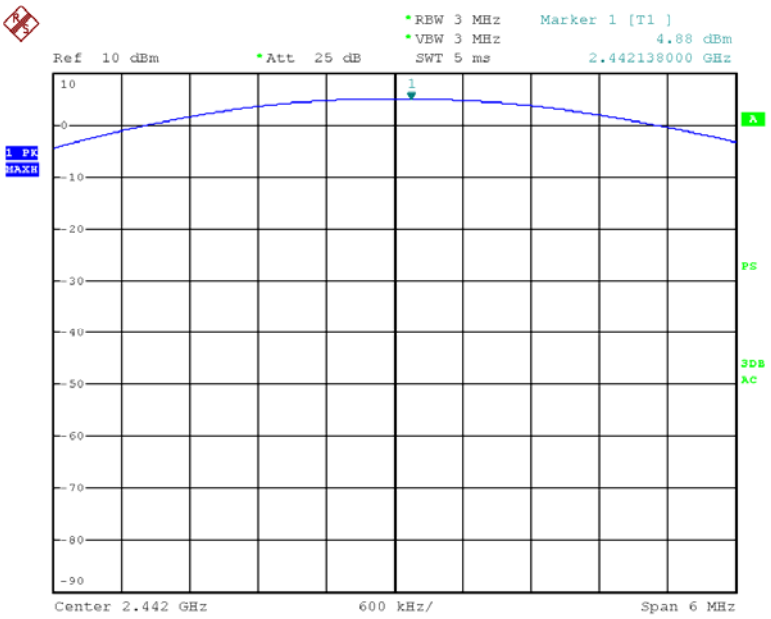
Spectrum Detector:	PK	Test Date :	May 08, 2014
Test By:	Andy	Temperature :	25 ℃
Test Result:	PASS	Humidity :	50 %

Channel number	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power Limit(W)	Pass/Fail
01	2402	1.29	1W(30dBm)	PASS
21	2442	4.88	1W(30dBm)	PASS
40	2480	**6.55**	1W(30dBm)	PASS

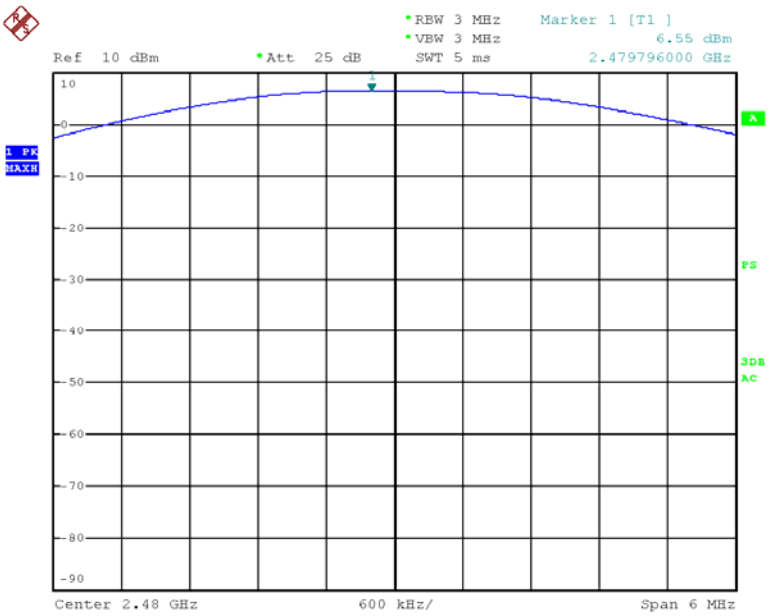
Channel 01



Channel 21



Channel 40

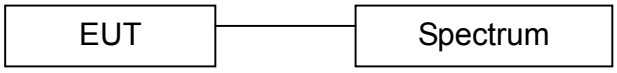


8. Power Spectral Density Measurement

8.1 Measurement Procedure

The EUT was operating in Bluetooth mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

8.2 Test SET-UP (Block Diagram of Configuration)



8.3 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	ESCI	1166.5950.03	05/16/2014	05/15/2015

8.4 Measurement Procedure

8.4.1 The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

8.4.2. Set to the maximum power setting and enable the EUT transmit continuously.

8.4.3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)

8.4.4. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.

8.4.5. Measure and record the results in the test report.

8.4.6. The Measured power density (dBm)/ 100KHz is a reference level and used as 20dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

8.5 Measurement Results:

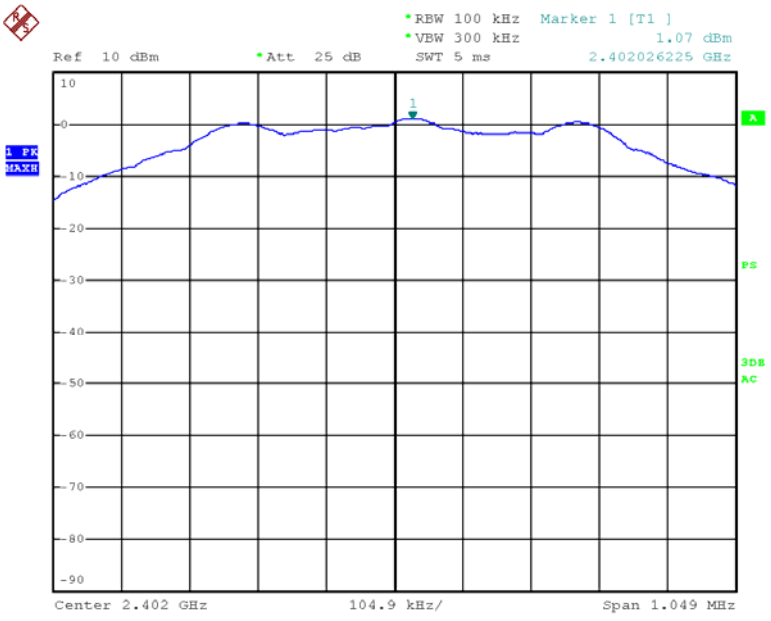
Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	May 08, 2014
Test By:	Andy	Temperature :	25 ℃
Test Result:	PASS	Humidity :	50 %

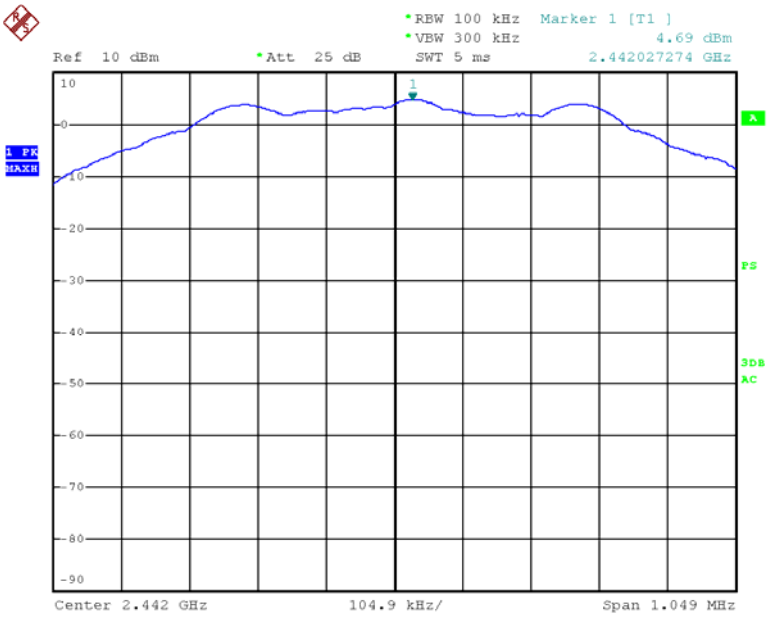
Channel number	Channel frequency (MHz)	Measurement level (dBm)		Required Limit (dBm)	Pass/Fail
01	2402	1.07	-14.60	8	PASS
21	2442	4.69	-11.02	8	PASS
40	2480	6.24	-9.54	8	PASS

PSD 100kHz Plot:

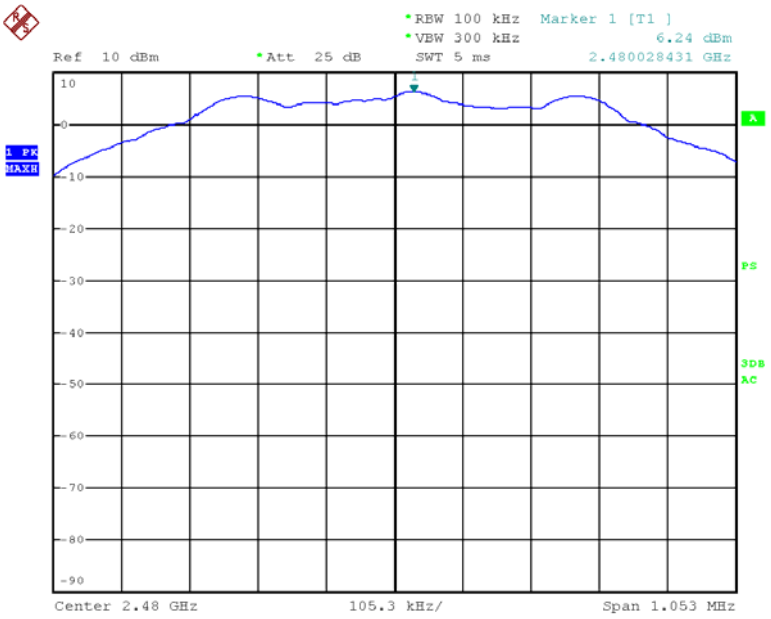
Channel 01



Channel 21

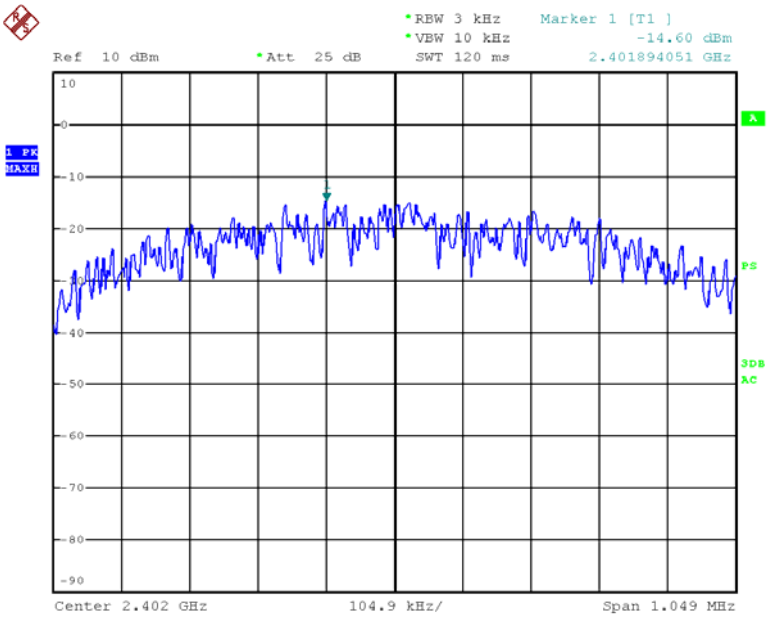


Channel 40

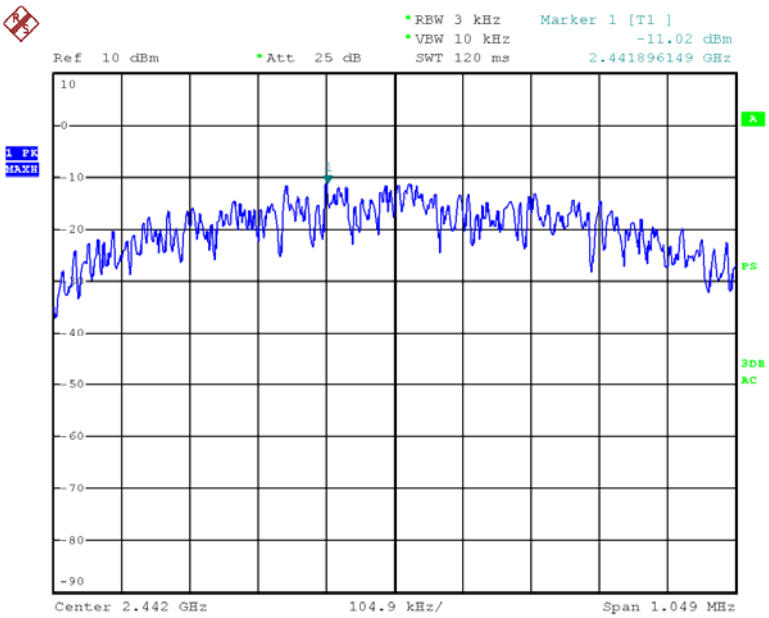


PSD 3KHz Plot:

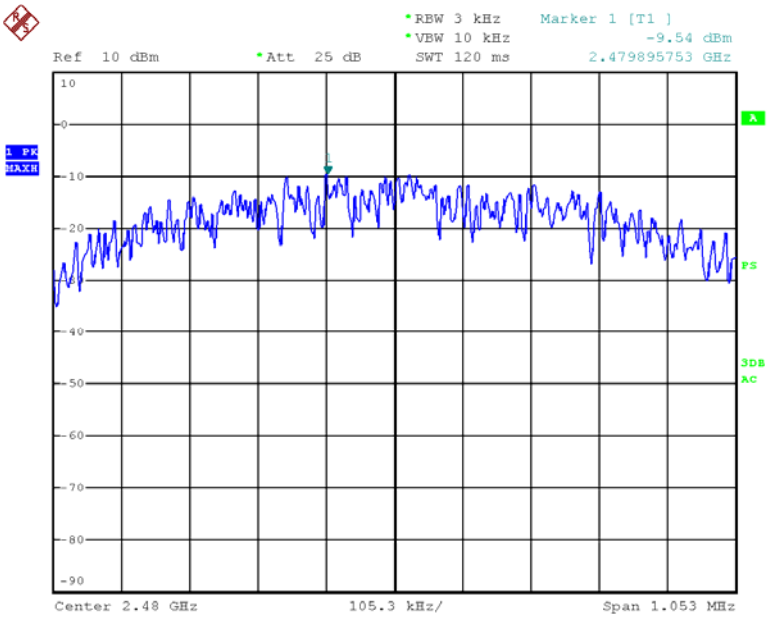
Channel 01



Channel 21



Channel 40


RBW 3 kHz
VBW 10 kHz
SWT 120 ms
Marker 1 [T1]
-9.54 dBm
2.479895753 GHz
Ref 10 dBm
Att 25 dB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PS
3DB
AC
Center 2.48 GHz
105.3 kHz/
Span 1.053 MHz

9. Band EDGE test

9.1 Measurement Procedure

For Conducted Test

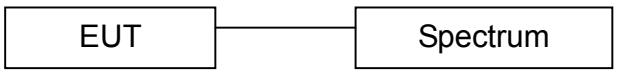
1. The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100KHz. The video bandwidth is set to 300KHz.
2. The spectrum from 30MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.
3. Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were preformed with all chains feeding a combiner.

For Radiated emission Test

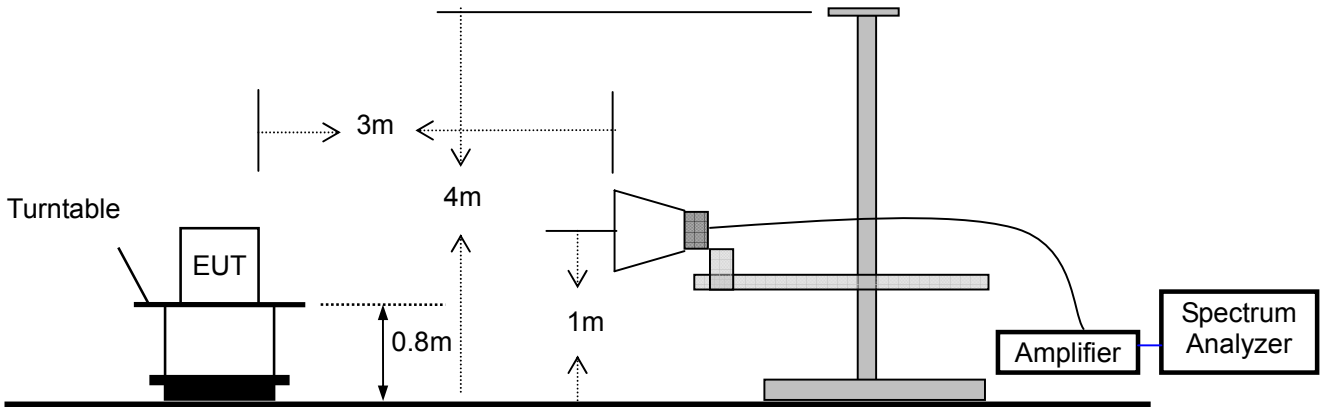
1. The EUT was Operating in hopping mode or could be controlled its channel. Printed out test result from the spectrum by hard copy function.
2. The EUT was placed on a turn table which is 0.8m above ground plane.
3. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Repeat above procedures until all frequency measured were complete.

9.2 Test SET-UP (Block Diagram of Configuration)

For Conducted Test



For Radiated emission Test



9.3 Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	May 08, 2014
Test By:	Andy	Temperature :	25 ℃
Test Result:	PASS	Humidity :	50 %

1. Conducted Test

Frequency (MHz)	Peak Power Output(dBm)	Emission read Value(dBm)	Result of Band edge(dBc)	Band edge Limit(dBc)
<2400	1.07	-38.86	39.93	>20dBc
>2483.5	6.24	-44.73	50.97	>20dBc

2. Radiated emission Test

Frequency (MHz)	Antenna polarization (H/V)	Emission (dBuV/m)		Band edge Limit (dBuV/m)	
		PK	AV	PK	AV
<2400	H	60.45	45.34	74.00	54.00
<2400	V	62.17	46.56	74.00	54.00
>2483.5	H	59.56	42.23	74.00	54.00
>2483.5	V	58.46	43.15	74.00	54.00

10 Antenna Application

10.1 Antenna requirement

The EUT'S antenna is met the requirement of FCC part 15C section 15.203 and 15.247.

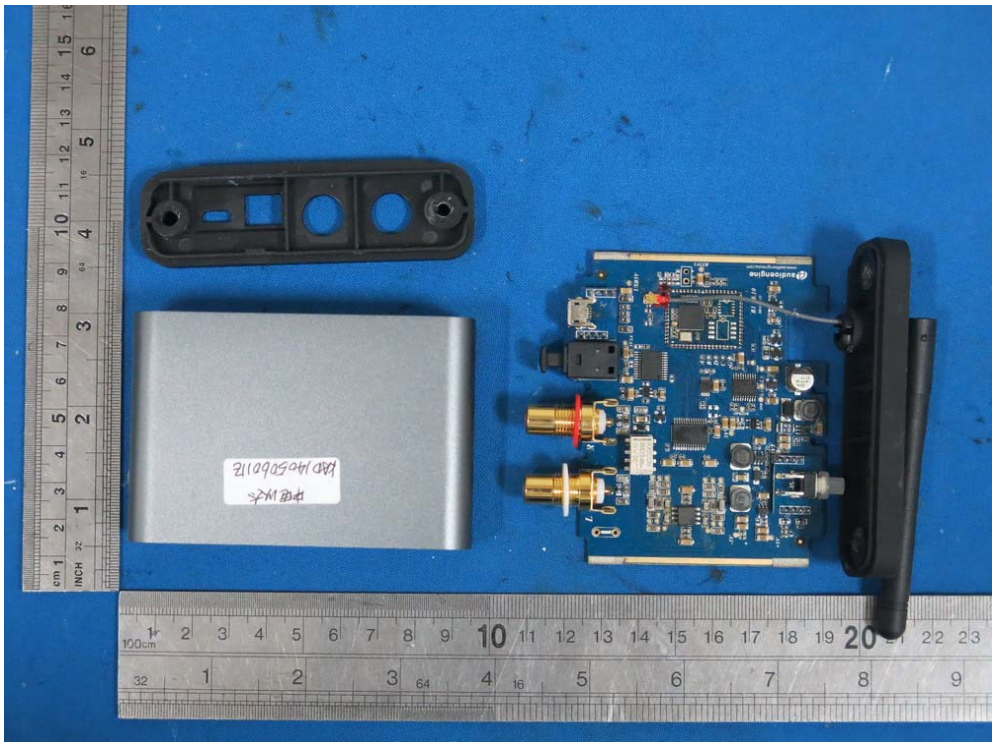
FCC part 15C section 15.247 requirements:
Systems operating in the 2402-2480MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

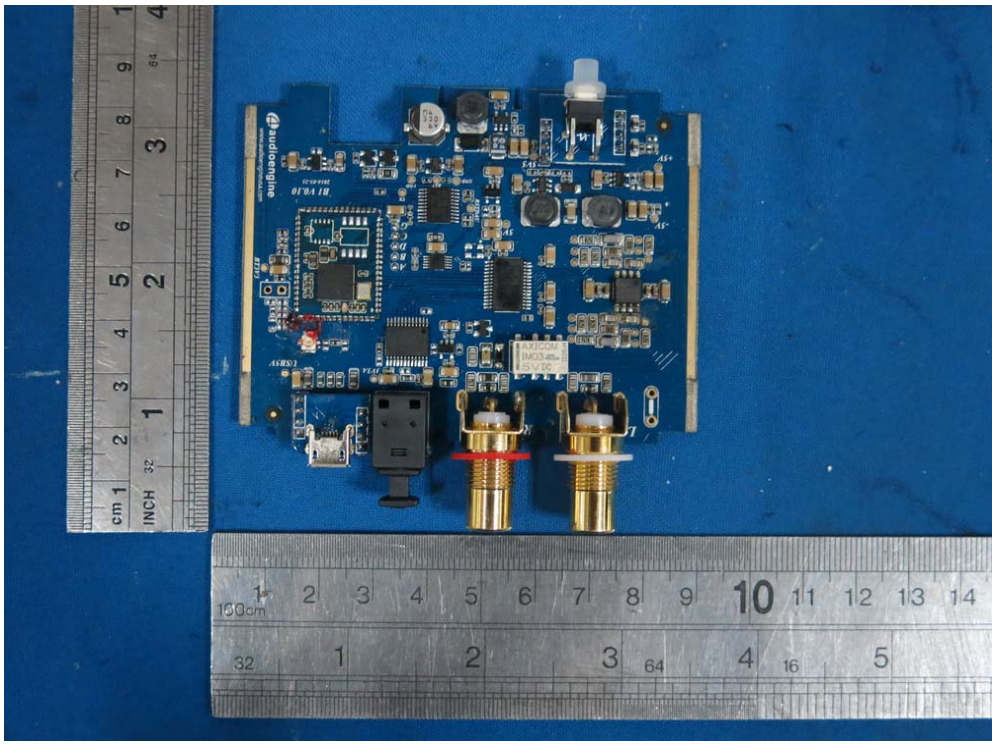
10.2 Result

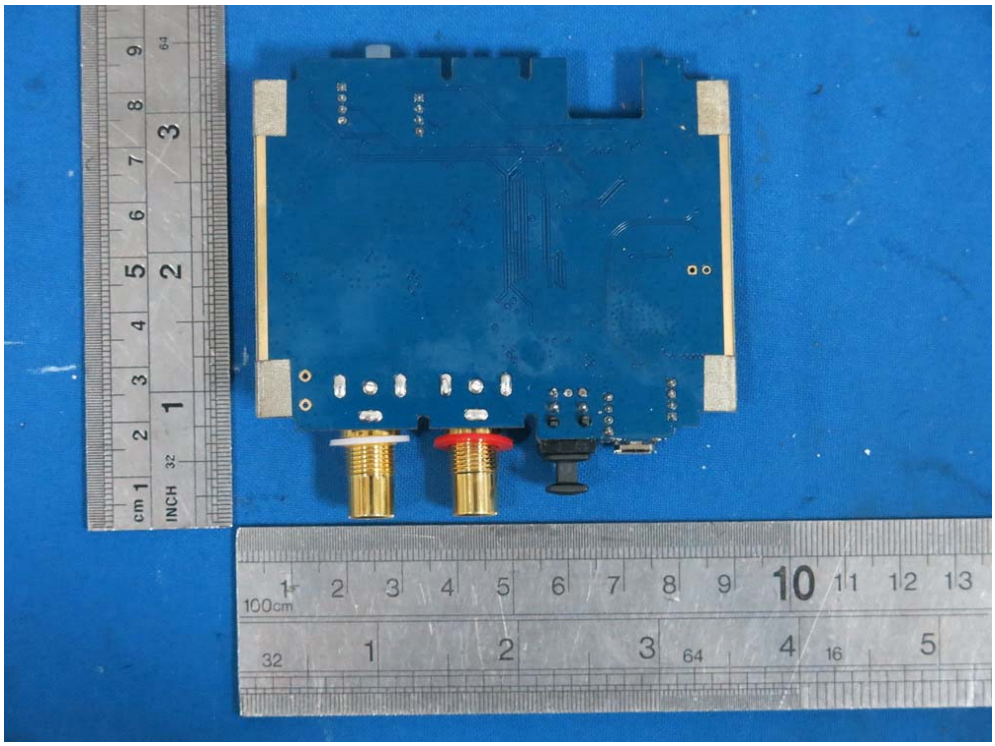
The EUT's antenna is dipole antenna. The antenna's gain is 1.0 dBi and meets the requirement.

APPENDIX I
(PHOTOS OF EUT)


Paudioengine






cm 1
INCH
100cm