

# FCC TEST REPORT

for

Dongguan Lowen Electric Appliance Company Limited

Allaire Bluetooth 4B Bookshelf Speaker

Model Number: A4B-2PK-MBP-Y1&A4B-2PK-MWP-Y1

FCC ID: 2ABAPA4B

Prepared for : Dongguan Lowen Electric Appliance Company Limited  
Address : Yayuan Industrial Park, Nancheng District, Dongguan City,  
Guangdong Province, China

Prepared by : Keyway Testing Technology Co., Ltd.  
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Report No. : 13KWE111008F

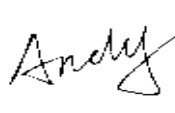


Date of Test : Nov. 1~ 8, 2013

Date of Report : Nov. 8, 2013

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## Keyway Testing Technology Co., Ltd.

<b>Applicant: Address:</b>	Dongguan Lowen Electric Appliance Company Limited Yayuan Industrial Park, Nancheng District, Dongguan City, Guangdong Province, China		
<b>Manufacturer: Address:</b>	Dongguan Lowen Electric Appliance Company Limited Yayuan Industrial Park, Nancheng District, Dongguan City, Guangdong Province, China		
<b>E.U.T:</b>	Allaire Bluetooth 4B Bookshelf Speaker		
<b>Model Number:</b>	A4B-2PK-MBP-Y1&A4B-2PK-MWP-Y1		
<b>Trade Name:</b>	Aperion Audio	<b>Serial No.:</b>	-----
<b>Date of Receipt:</b>	Nov. 1, 2013	<b>Date of Test:</b>	Nov. 1~ 8, 2013
<b>Test Specification:</b>	FCC Part 15, Subpart C: Oct. 1, 2012 ANSI C63.4:2009 KDB558074 D01 DTS Meas Guidance v03r01		
<b>Test Result:</b>	The equipment under test was found to be compliance with the requirements of the standards applied.		
<b>Issue Date: Nov. 8, 2013</b>			
Tested by:	Reviewed by:	Approved by:	
 <hr style="width: 100%;"/>	 <hr style="width: 100%;"/>	 <hr style="width: 100%;"/>	
Andy Gao / Engineer	Jade Yang/ Supervisor	Chris Du / Manager	
<b>Other Aspects:</b>	None.		
<i>Abbreviations: OK/P=passed    fail/F=failed    n.a/N=not applicable    E.U.T=equipment under tested</i>			
<i>This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Keyway Testing Technology Co., Ltd.</i>			

# 1. GENERAL PRODUCT INFORMATION

## 1.1. Product Function

Refer to Technical Construction Form and User Manual.

## 1.2. Description of Device (EUT)

Product Name:	Allaire Bluetooth 4B Bookshelf Speaker
Model No.:	A4B-2PK-MBP-Y1&A4B-2PK-MWP-Y1
Operation Frequency:	2402~2480MHz
Channel numbers:	40 Channels
Bluetooth Version:	4.0
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK
Antenna Type:	Integral
Antenna gain:	0dBi
Power supply:	AC 120V/60Hz

## 1.3. Difference between Model Numbers

None.

## 1.4. Independent Operation Modes

The basic operation modes are:

1.4.1. EUT work continues TX mode and frequency as below:

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	11	2422MHz	21	2442MHz	31	2462MHz
2	2404MHz	12	2424MHz	22	2444MHz	32	2464MHz
3	2406MHz	13	2426MHz	23	2446MHz	33	2466MHz
4	2408MHz	14	2428MHz	24	2448MHz	34	2468MHz
5	2410MHz	15	2430MHz	25	2450MHz	35	2470MHz
6	2412MHz	16	2432MHz	26	2452MHz	36	2472MHz
7	2414MHz	17	2434MHz	27	2454MHz	37	2474MHz
8	2416MHz	18	2436MHz	28	2456MHz	38	2476MHz
9	2418MHz	19	2438MHz	29	2458MHz	39	2478MHz
10	2420MHz	20	2440MHz	30	2460MHz	40	2480MHz

Note: In section 15.31(m), regards to the operating frequency range over 10 MHz, the lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
Low	2402MHz
Middle	2440MHz
High	2480MHz

## 2. TEST SUMMARY

Test Items	Test Requirement	Result
Conducted Emissions	15.207	PASS
Radiated Emissions	15.205(a) 15.209 15.247(d)	PASS
Conducted Peak Output Power	15.247 (b)(3)	PASS
6dB Occupied Bandwidth	15.247 (a)(2)	PASS
Power Spectral Density	15.247 (e)	PASS
Band Edge (Radiated Emission)	15.247(d)	PASS
Antenna Requirement	15.203	PASS

### 3. TEST SITES

#### 3.1. Test Facilities

Lab Qualifications : 944 Shielded Room built by ETS-Lindgren, USA  
Date of completion: March 28, 2011

966 Chamber built by ETS-Lindgren, USA  
Date of completion: March 28, 2011

Certificated by TUV Rheinland, Germany.  
Registration No.: UA 50207153  
Date of registration: July 13, 2011

Certificated by UL, USA  
Registration No.: 100567-237  
Date of registration: September 1, 2011

Certificated by Intertek  
Registration No.: 2011-RTL-L1-31  
Date of registration: October 11, 2011

Certificated by Industry Canada  
Registration No.: 9868A  
Date of registration: December 8, 2011

Certificated by FCC, USA  
Registration No.: 370994  
Date of registration: February 21, 2012

Certificated by CNAS China  
Registration No.: CNAS L5783  
Date of registration: August 8, 2012

Name of Firm : Keyway Testing Technology Co., Ltd.

Site Location : Baishun Industrial Zone, Zhangmutou Town,  
Dongguan, Guangdong, China

### 3.2. List of Test and Measurement Instruments

#### 3.2.1. For conducted emission at the mains terminals test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	May 9,13	May 9,14
Artificial Mains Network	Rohde&Schwarz	ENV216	101315	May 9,13	May 9,14
Artificial Mains Network (AUX)	Rohde&Schwarz	ENV216	101314	May 9,13	May 9,14
RF Cable	FUJIKURA	3D-2W	944 Cable	May 9,13	May 9,14

#### 3.2.2. For radiated emission test (Below 1GHz)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	May 9,13	May 9,14
Bilog Antenna	ETS-LINDGREEN	3142D	135452	May 20,13	May 20,14
Spectrum Analyzer	Agilent	E4411B	MY4511304	May 9,13	May 9,14
3m Semi-anechoic Chamber	ETS-LINDGREEN	966	KW01	May 9,13	May 9,14
Signal Amplifier	SONOMA	310	187016	May 9,13	May 9,14
Signal Amplifier	Agilent	8449B	3008A00251	May 9,13	May 9,14
RF Cable	IMRO	IMRO-400	966 Cable 1#	N/A	N/A
MULTI-DEVICE Controller	ETS-LINDGREEN	2090	126913	N/A	N/A

#### 3.2.3. For above 1GHz radiated emission, output power, band edge, 6dB bandwidth test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	DAZE	ZN30701	11003	May. 11,13	May. 11,14
Horn Antenna	SCHWARZBECK	BBHA9170	9170-068	May. 11,13	May. 11,14
Spectrum Analyzer	Agilent	8593E	3911A04271	May. 9,13	May. 9,14
Spectrum Analyzer	Agilent	E4408B	MY44211125	May. 9,13	May. 9,14
3m Semi-anechoic Chamber	ETS-LINDGREN	966	KW01	May. 9,13	May. 9,14
Signal Amplifier	DAZE	ZN3380C	11001	May. 9,13	May. 9,14
Signal Amplifier	Agilent	8449B	3008A00251	May. 9,13	May. 9,14
High Pass filter	Micro	HPM50111	324216	May. 9,13	May. 9,14
Power Meter	R&S	NRVS	101824	May. 9,13	May. 9,14
Peak and Avg Power Sensor	Rohde&Schwarz	URV5-Z7	100655	May. 9,13	May. 9,14
RF Cable	IMRO	IMRO-400	966 Cable 1#	May. 9,13	May. 9,14
MULTI-DEVICE Controller	ETS-LINDGREN	2090	126913	N/A	N/A
Antenna Holder	ETS-LINDGREN	2070B	00109601	N/A	N/A

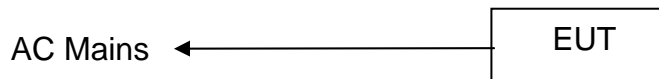
## 4. TEST SET-UP AND OPERATION MODES

### 4.1. Principle of Configuration Selection

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

### 4.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators



*(EUT: Allaire Bluetooth 4B Bookshelf Speaker)*

### 4.3. Test Operation Mode and Test Software

None.

### 4.4. Special Accessories and Auxiliary Equipment

None.

### 4.5. Countermeasures to Achieve EMC Compliance

None.



## 5. EMISSION TEST RESULTS

### 5.1. Conducted Emission at the Mains Terminals Test

#### 5.1.1. Limit 15.209 limits

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

#### 5.1.2. Test Setup

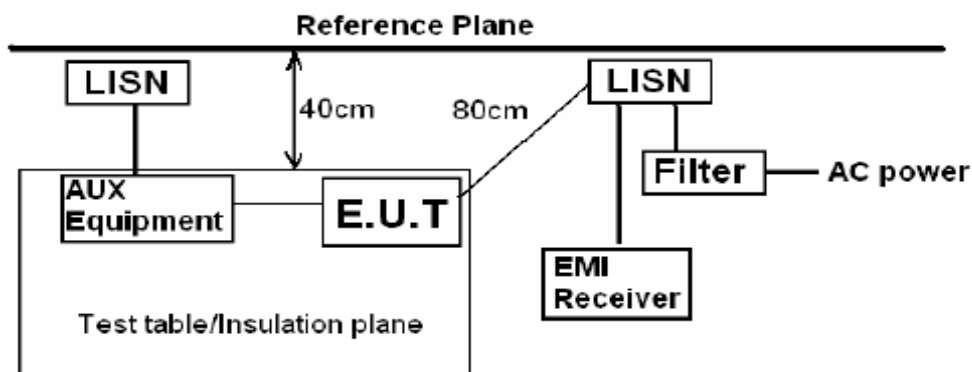
The EUT was put on a wooden table which was 0.8 m high above the ground and connected to the AC mains through the Artificial Mains Network (AMN). Where the mains cable supplied by the manufacture was longer than 0.8 m, the excess was folded back and forth parallel to the cable at the centre so as to form a bundle no longer than 0.4 m.

The EUT was kept 0.4 m from any other earthed conducting surface. Both sides of AC line were checked to find out the maximum conducted emission levels according to the test procedure during the conducted emission test.

The frequency range from 150 kHz to 30 MHz was investigated.

The bandwidth of the test receiver was set at 9 kHz.

Pretest for all mode, The test data of the worst case condition(s) was reported on the following page.



*Remark:*  
*E.U.T: Equipment Under Test*  
*LISN: Line Impedance Stabilization Network*  
*Test table height=0.8m*

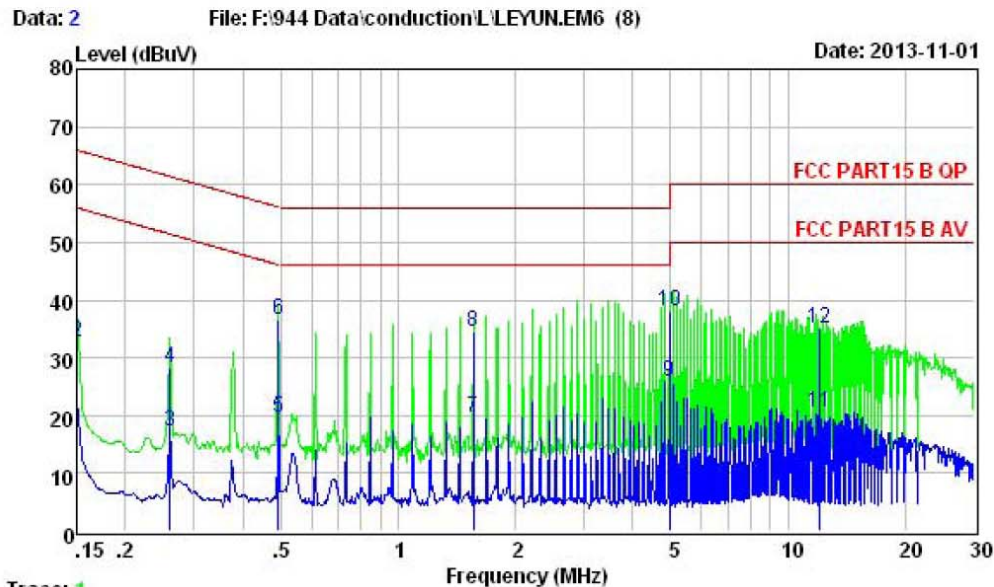
#### 5.1.3. Test Mode

Set EUT in TX mode.

## Test Data



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 Mail: kwtest@keywaytest.com



Site : 944 Shielded Room  
 Condition : FCC PART15 B QP LINE  
 EUT : Allaire Bluetooth 4B Bookshelf Speaker  
 POWER : AC 120V/60Hz  
 M/N : A4B-2PK-MBP-Y1  
 Test Engineer: Andy  
 Comment : Temp:24.9'; Humi:56%; Press:101.52kPa  
 Test Mode : TX Mode

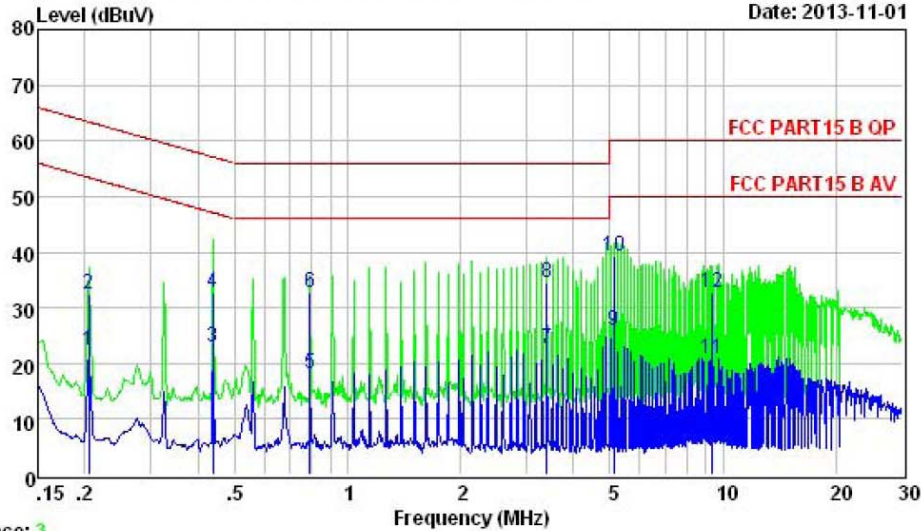
			Limit	Over	
	Freq	Level	Line	Limit	Remark
	MHz	dBuV	dBuV	dB	
1	0.150	22.00	56.00	-34.00	Average
2	0.150	32.80	66.00	-33.20	QP
3	0.260	17.20	51.42	-34.22	Average
4	0.260	28.40	61.42	-33.02	QP
5	0.494	19.69	46.10	-26.41	Average
6	0.494	36.70	56.10	-19.40	QP
7	1.560	19.61	46.00	-26.39	Average
8	1.560	34.40	56.00	-21.60	QP
9	4.952	25.79	46.00	-20.21	Average
10	4.952	38.20	56.00	-17.80	QP
11	11.996	20.66	50.00	-29.34	Average
12	11.996	35.20	60.00	-24.80	QP



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Data: 4 File: F:\944 Data\conduction\L\LEYUN.EM6 (8)

Date: 2013-11-01



Trace: 3

Site : 944 Shielded Room  
 Condition : FCC PART15 B QP NEUTRAL  
 EUT : Allaire Bluetooth 4B Bookshelf Speaker  
 POWER : AC 120V/60Hz  
 M/N : A4B-2PK-MBP-Y1  
 Test Engineer: Andy  
 Comment : Temp:24.9°; Humi:56%; Press:101.52kPa  
 Test Mode : TX Mode

			Limit	Over	
	Freq	Level	Line	Limit	Remark
	MHz	dBuV	dBuV	dB	
1	0.205	22.25	53.40	-31.15	Average
2	0.205	32.40	63.40	-31.00	QP
3	0.440	22.79	47.07	-24.28	Average
4	0.440	32.60	57.07	-24.47	QP
5	0.796	18.24	46.00	-27.76	Average
6	0.796	32.60	56.00	-23.40	QP
7	3.399	22.66	46.00	-23.34	Average
8	3.399	34.50	56.00	-21.50	QP
9	5.112	25.81	50.00	-24.19	Average
10	5.112	39.20	60.00	-20.80	QP
11	9.352	20.88	50.00	-29.12	Average
12	9.352	32.60	60.00	-27.40	QP

## 5.2. Radiated Emission Test

### 5.2.1. Limit 15.209 limits

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)	

### 5.2.2. Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 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	( <sup>2</sup> )

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

### 5.2.3. Test setup

The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector from the spectrum, and all the final readings from the test receiver were measured with the Quasi-Peak detector.

The bandwidth of the EMI test receiver is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz.

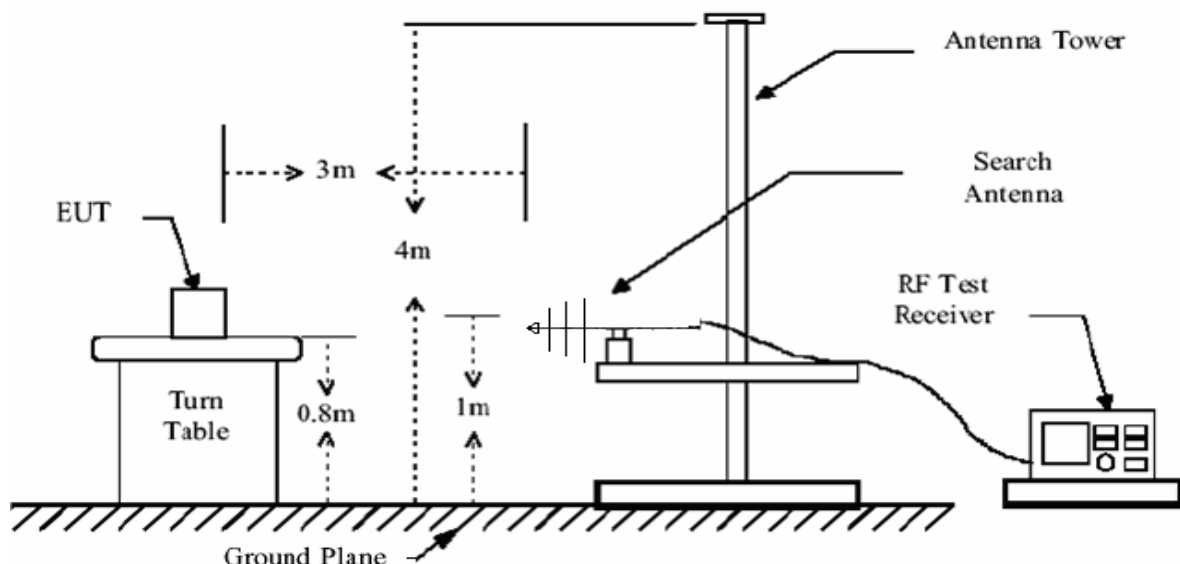
The frequency range from 30MHz to 10<sup>th</sup> harmonic (25GHz) are checked. and no any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.

Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.

2. Measurement Uncertainty:  $\pm 3.2$  dB at a level of confidence of 95%.

3. For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.

4. For emissions below 1GHz, pretest for all mode, The test data of the worst case condition(s) was reported on the following pages.



## Test Data

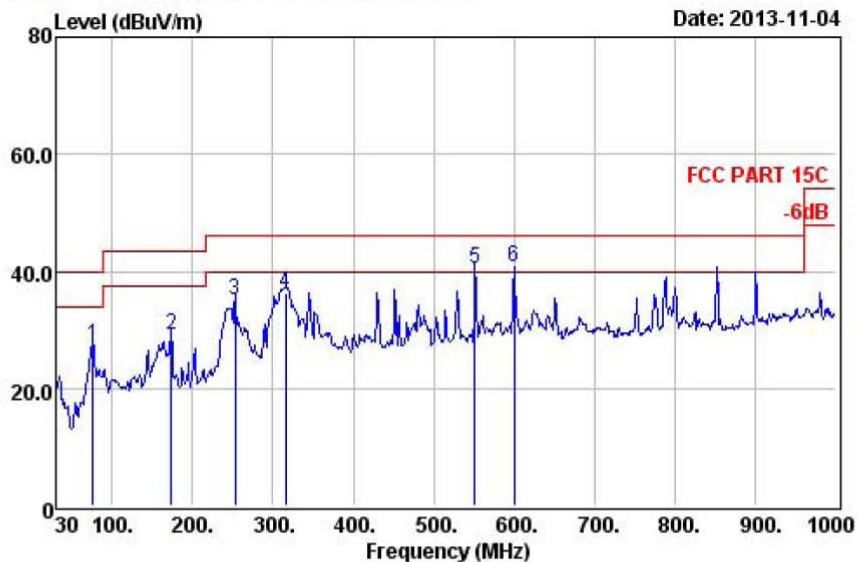


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Data: 24 File: D:\966 data\L\eyun.EM6 (24)

Date: 2013-11-04



Site : 966 Chamber  
Condition: FCC PART 15C 3m 3142D HORIZONTAL  
EUT : Allaire Bluetooth 4B Bookshelf Speaker  
M/N : A4B-2PK-MBP-Y1&A4B-2PK-MWP-Y1  
Power : AC 120V/60Hz  
Test By : Andy  
Comment : Temp:24.8'C Humi:56% Press:101.52kPa  
Test Mode: TX Mode

		Preamp	Read	Cable	Antenna		Limit	Over	
	Freq	Factor	Level	Loss	Factor	Level	Line	Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	76.56	31.33	50.08	0.85	7.83	27.43	40.00	-12.57	QP
2	173.56	31.18	48.75	1.39	10.21	29.17	43.50	-14.33	QP
3	253.10	30.97	51.38	1.70	12.91	35.02	46.00	-10.98	QP
4	316.15	30.87	51.03	1.94	14.25	36.35	46.00	-9.65	QP
5 !	551.86	30.88	48.54	3.12	19.52	40.30	46.00	-5.70	QP
6 !	600.36	30.62	47.46	3.29	20.61	40.74	46.00	-5.26	QP



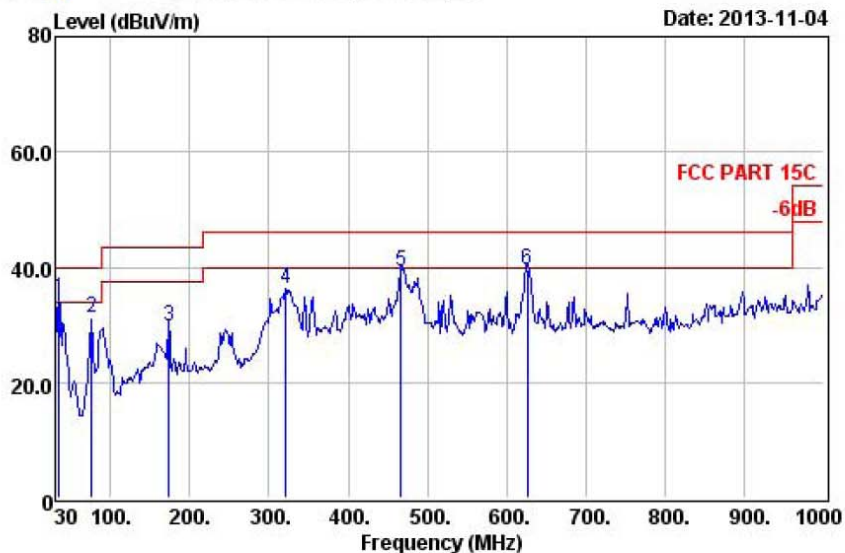


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Data: 23 File: D:\966 data\L\eyun.EM6 (24)

Date: 2013-11-04



Site : 966 Chamber  
Condition: FCC PART 15C 3m 3142D VERTICAL  
EUT : Allaire Bluetooth 4B Bookshelf Speaker  
M/N : A4B-2PK-MBP-Y1&A4B-2PK-MWP-Y1  
Power : AC 120V/60Hz  
Test By : Andy  
Comment : Temp:24.8'C Humi:56% Press:101.52kPa  
Test Mode: TX Mode

		Preamp	Read	Cable	Antenna		Limit	Over	
	Freq	Factor	Level	Loss	Factor	Level	Line	Limit	Remark
	MHz		dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	34.85	31.38	49.47	0.56	15.94	34.59	40.00	-5.41	QP
2	76.56	31.33	54.02	0.85	7.83	31.37	40.00	-8.63	QP
3	173.56	31.18	49.40	1.39	10.21	29.82	43.50	-13.68	QP
4	321.00	30.84	50.60	2.02	14.39	36.17	46.00	-9.83	QP
5	466.50	30.60	49.18	2.69	18.06	39.33	46.00	-6.67	QP
6	626.55	30.69	45.50	3.47	21.31	39.59	46.00	-6.41	QP

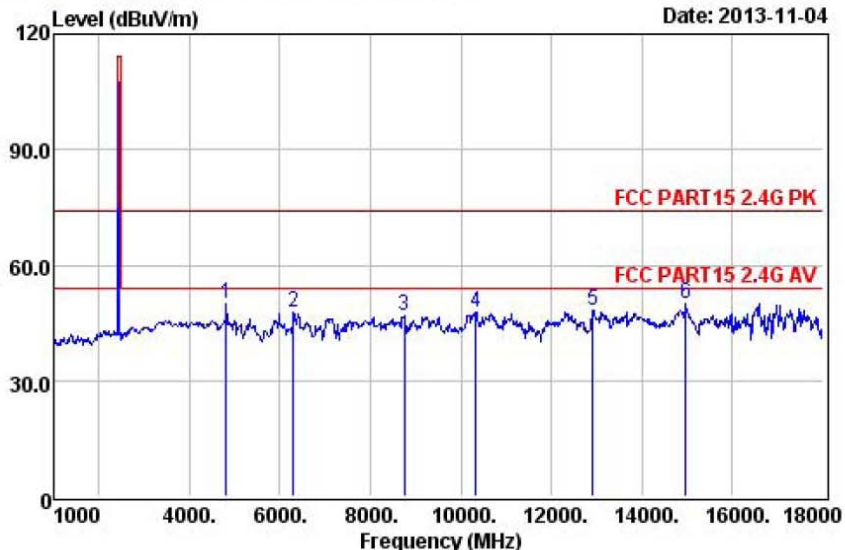


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Data: 17 File: D:\966 data\L\veyun.EM6 (24)

Date: 2013-11-04



Site : 966 Chamber  
Condition: FCC PART15 2.4G PK 3m ZN30701 VERTICAL  
EUT : Allaire Bluetooth 4B Bookshelf Speaker  
M/N : A4B-2PK-MBP-Y1&A4B-2PK-MWP-Y1  
Power : AC 120V/60Hz  
Test By : Andy  
Comment : Temp:24.8'C Humi:56% Press:101.52kPa  
Test Mode: TX 2402MHz

		Preamp	Read	Cable	Antenna		Limit	Over	
	Freq	Factor	Level	Loss	Factor	Level	Line	Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	4804.00	27.49	32.61	11.96	32.94	50.02	74.00	-23.98	Peak
2	6304.00	27.76	23.38	16.60	35.62	47.84	74.00	-26.16	Peak
3	8752.00	28.32	21.01	16.83	37.10	46.62	74.00	-27.38	Peak
4	10333.00	28.83	20.49	17.03	38.93	47.62	74.00	-26.38	Peak
5	12917.00	29.18	18.87	18.14	40.50	48.33	74.00	-25.67	Peak
6	14974.00	29.55	20.73	19.99	38.64	49.81	74.00	-24.19	Peak



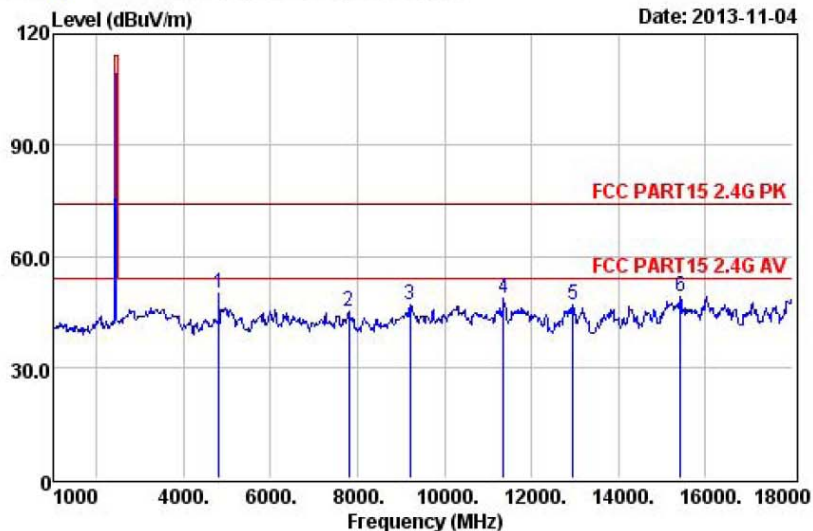


**Keyway  
Testing**

Keyway Testing Technology Co., Ltd.  
Baishun Industrial Zone, Zhangmutou  
Town, Dongguan, Guangdong, China  
Tel: 0769-87182258  
Fax: 0769-87181058  
Mail: kwtest@keywaytest.com

Data: 18 File: D:\966 data\L\eyun.EM6 (24)

Date: 2013-11-04



Site : 966 Chamber  
Condition: FCC PART15 2.4G PK 3m ZN30701 HORIZONTAL  
EUT : Allaire Bluetooth 4B Bookshelf Speaker  
M/N : A4B-2PK-MBP-Y1&A4B-2PK-MWP-Y1  
Power : AC 120V/60Hz  
Test By : Andy  
Comment : Temp:24.8'C Humi:56% Press:101.52kPa  
Test Mode: TX 2402MHz

		Preamp	Read	Cable	Antenna		Limit	Over	
	Freq	Factor	Level	Loss	Factor	Level	Line	Limit	Remark
	MHz		dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB
1	4804.00		27.49	32.57	11.96	32.94	49.98	74.00	-24.02 Peak
2	7800.00		28.06	19.58	16.65	36.80	44.97	74.00	-29.03 Peak
3	9211.00		28.48	20.70	16.90	37.65	46.77	74.00	-27.23 Peak
4	11353.00		28.94	20.45	17.24	39.78	48.53	74.00	-25.47 Peak
5	12951.00		29.19	17.43	18.17	40.58	46.99	74.00	-27.01 Peak
6	15416.00		29.61	19.81	20.26	38.42	48.88	74.00	-25.12 Peak

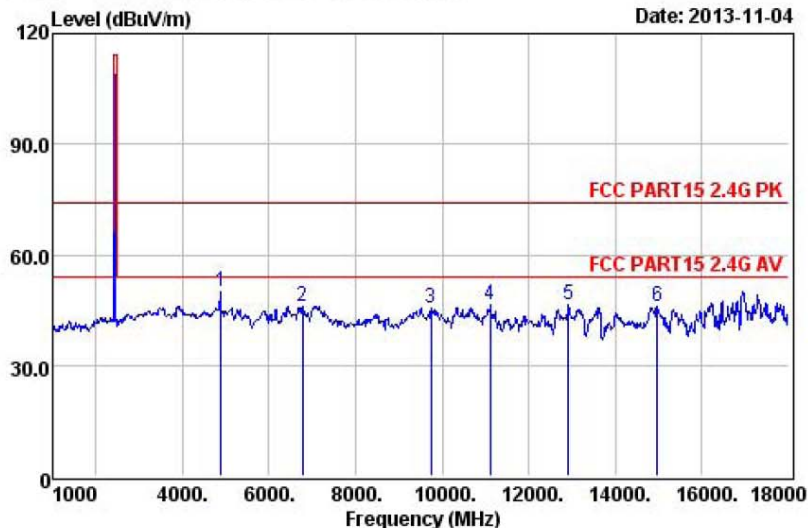


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Mail: kwtest@keywaytest.com

Data: 19 File: D:\966 data\L\eyun.EM6 (24)

Date: 2013-11-04



Site : 966 Chamber  
Condition: FCC PART15 2.4G PK 3m ZN30701 VERTICAL  
EUT : Allaire Bluetooth 4B Bookshelf Speaker  
M/N : A4B-2PK-MBP-Y1&A4B-2PK-MWP-Y1  
Power : AC 120V/60Hz  
Test By : Andy  
Comment : Temp:24.8'C Humi:56% Press:101.52kPa  
Test Mode: TX 2440MHz

		Preamp	Read	Cable	Antenna		Limit	Over	
	Freq	Factor	Level	Loss	Factor	Level	Line	Limit	Remark
	MHz		dB	dB	dB/m	dBuV/m	dBuV/m	dB	
1	4880.00	27.53	32.16	12.14	33.11	49.88	74.00	-24.12	Peak
2	6780.00	27.86	20.63	16.60	36.62	45.99	74.00	-28.01	Peak
3	9738.00	28.70	19.20	16.94	38.19	45.63	74.00	-28.37	Peak
4	11115.00	28.91	18.32	17.19	39.59	46.19	74.00	-27.81	Peak
5	12917.00	29.18	16.87	18.14	40.50	46.33	74.00	-27.67	Peak
6	14974.00	29.55	16.73	19.99	38.64	45.81	74.00	-28.19	Peak

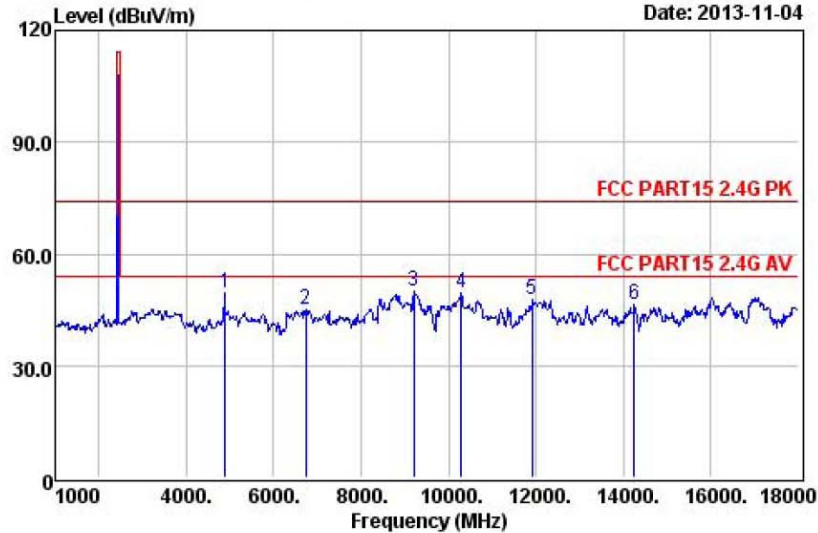


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Data: 20 File: D:\966 data\L\eyun.EM6 (24)

Date: 2013-11-04



Site : 966 Chamber  
Condition: FCC PART15 2.4G PK 3m ZN30701 HORIZONTAL  
EUT : Allaire Bluetooth 4B Bookshelf Speaker  
M/N : A4B-2PK-MBP-Y1&A4B-2PK-MWP-Y1  
Power : AC 120V/60Hz  
Test By : Andy  
Comment : Temp:24.8'C Humi:56% Press:101.52kPa  
Test Mode: TX 2440MHz

		Preamp	Read	Cable	Antenna		Limit	Over	
	Freq	Factor	Level	Loss	Factor	Level	Line	Limit	Remark
	MHz		dB	dB	dB/m	dBuV/m	dBuV/m	dB	
1	4880.00	27.53	31.72	12.14	33.11	49.44	74.00	-24.56	Peak
2	6729.00	27.85	19.64	16.60	36.48	44.87	74.00	-29.13	Peak
3	9211.00	28.48	23.70	16.90	37.65	49.77	74.00	-24.23	Peak
4	10282.00	28.83	22.49	17.02	38.85	49.53	74.00	-24.47	Peak
5	11914.00	28.99	20.01	17.35	39.49	47.86	74.00	-26.14	Peak
6	14243.00	29.44	14.39	19.52	42.10	46.57	74.00	-27.43	Peak

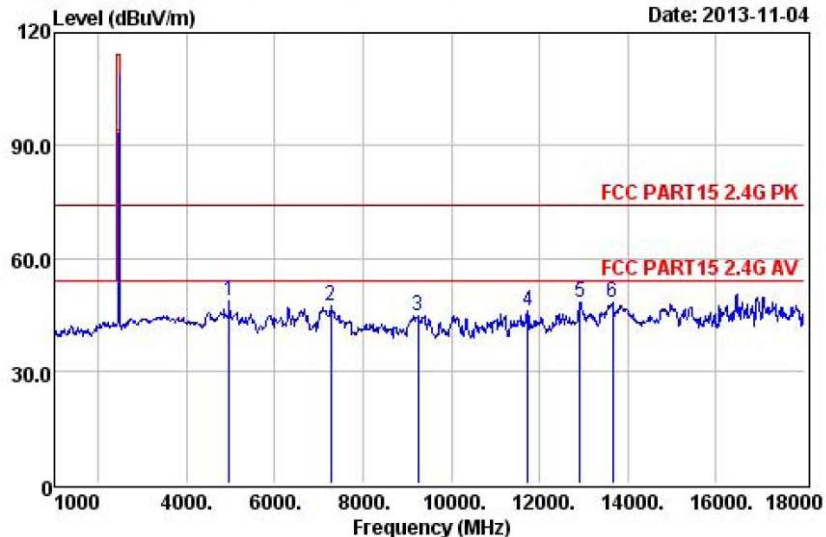


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Data: 21 File: D:\966 data\L\eyun.EM6 (24)

Date: 2013-11-04



Site : 966 Chamber  
Condition: FCC PART15 2.4G PK 3m ZN30701 VERTICAL  
EUT : Allaire Bluetooth 4B Bookshelf Speaker  
M/N : A4B-2PK-MBP-Y1&A4B-2PK-MWP-Y1  
Power : AC 120V/60Hz  
Test By : Andy  
Comment : Temp:24.8'C Humi:56% Press:101.52kPa  
Test Mode: TX 2480MHz

		Preamp	Read	Cable	Antenna		Limit	Over	
	Freq	Factor	Level	Loss	Factor	Level	Line	Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	4960.00	27.58	30.35	12.36	33.32	48.45	74.00	-25.55	Peak
2	7273.00	27.95	21.51	16.61	37.31	47.48	74.00	-26.52	Peak
3	9245.00	28.50	18.41	16.90	37.69	44.50	74.00	-29.50	Peak
4	11727.00	28.97	17.95	17.31	39.68	45.97	74.00	-28.03	Peak
5	12917.00	29.18	18.87	18.14	40.50	48.33	74.00	-25.67	Peak
6	13648.00	29.33	15.36	18.96	43.15	48.14	74.00	-25.86	Peak



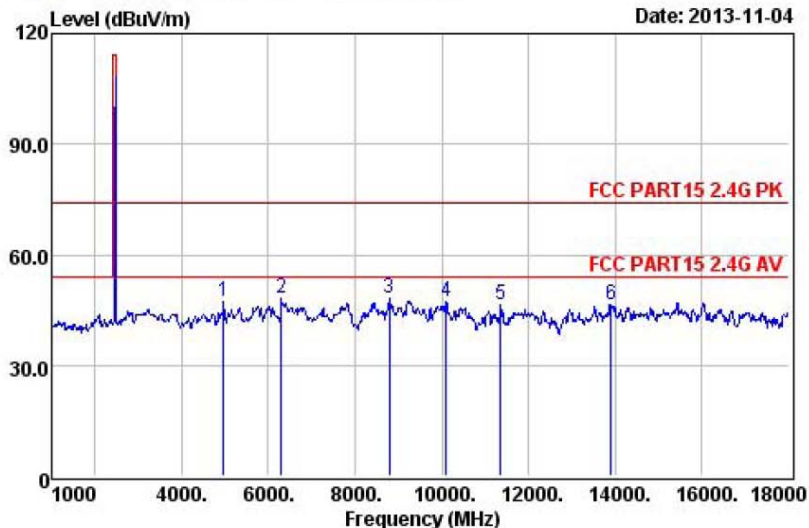
**Keyway  
Testing**

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Baishun Industrial Zone,Zhangmutou  
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Tel: 0769-87182258  
Fax: 0769-87181058  
Mail: kwtest@keywaytest.com

Data: 22

File: D:\966 data\L\eyun.EM6 (24)

Date: 2013-11-04

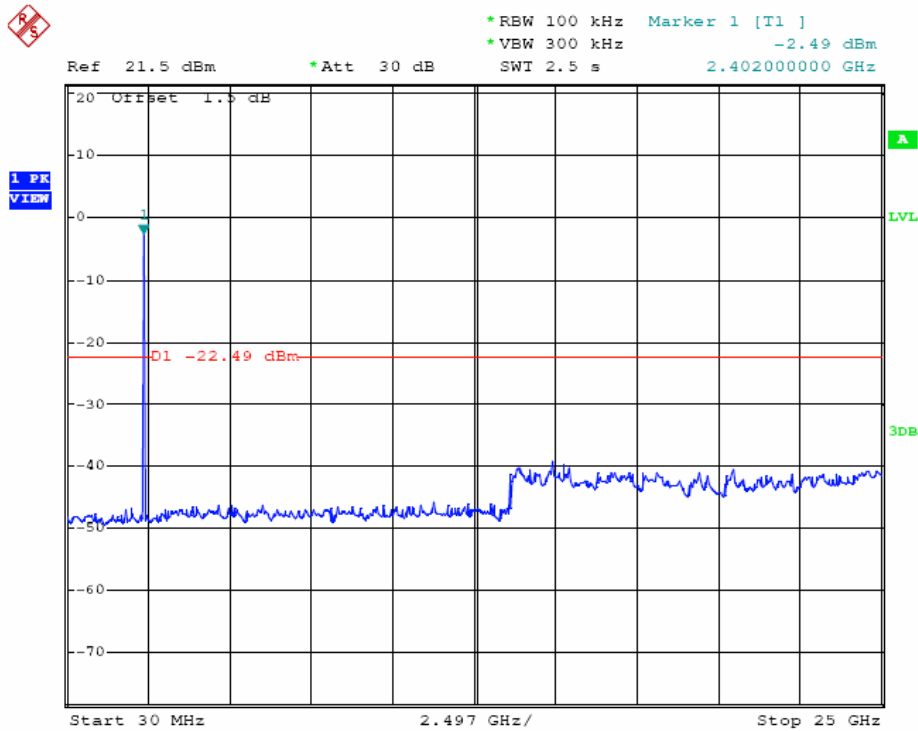


Site : 966 Chamber  
Condition: FCC PART15 2.4G PK 3m ZN30701 HORIZONTAL  
EUT : Allaire Bluetooth 4B Bookshelf Speaker  
M/N : A4B-2PK-MBP-Y1&A4B-2PK-MWP-Y1  
Power : AC 120V/60Hz  
Test By : Andy  
Comment : Temp:24.8'C Humi:56% Press:101.52kPa  
Test Mode: TX 2480MHz

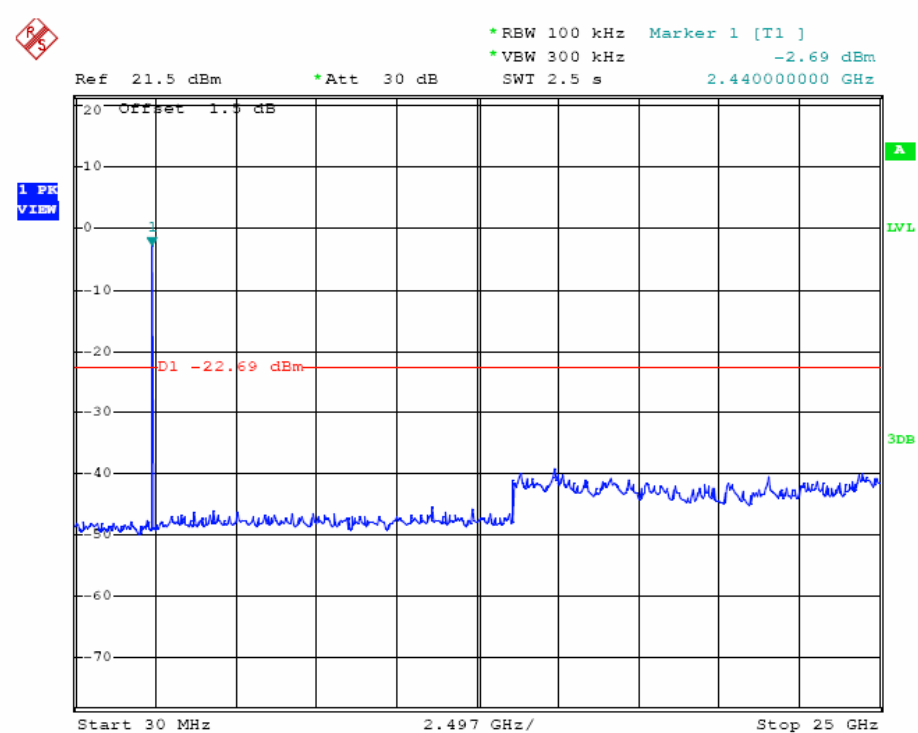
		Preamp	Read	Cable	Antenna		Limit	Over	
	Freq	Factor	Level	Loss	Factor	Level	Line	Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	4960.00	27.58	29.18	12.36	33.32	47.28	74.00	-26.72	Peak
2	6304.00	27.76	23.76	16.60	35.62	48.22	74.00	-25.78	Peak
3	8786.00	28.33	22.50	16.83	37.14	48.14	74.00	-25.86	Peak
4	10095.00	28.81	20.53	16.98	38.56	47.26	74.00	-26.74	Peak
5	11353.00	28.94	18.45	17.24	39.78	46.53	74.00	-27.47	Peak
6	13903.00	29.38	13.25	19.24	43.40	46.51	74.00	-27.49	Peak

For conducted test

GFSK 2402MHz



GFSK 2440MHz





## 6. 6DB OCCUPY BANDWIDTH

### 6.1. Limits

According to FCC Section 15.247(a)(2), Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB band-width shall be at least 500 kHz.

### 6.2. Test setup

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the RBW =100kHz.
3. Set the VBW  $\geq 3$  time RBW
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Measure and record the result in the test report.

Test data:

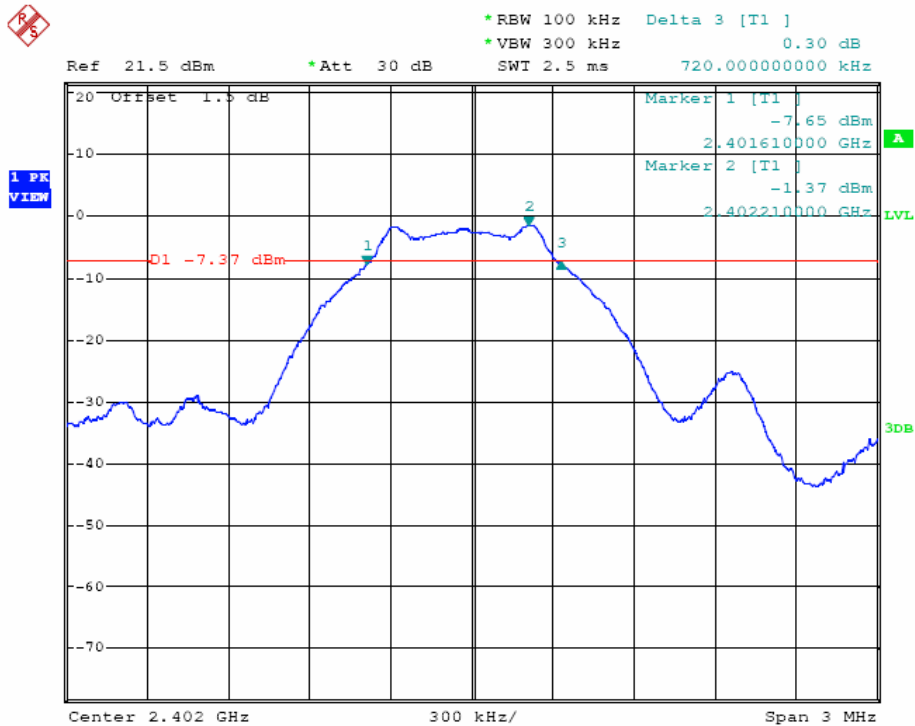
Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
2402	0.720	$\geq 0.5$	PASS
2440	0.708	$\geq 0.5$	PASS
2480	0.696	$\geq 0.5$	PASS

Test plot as follows:

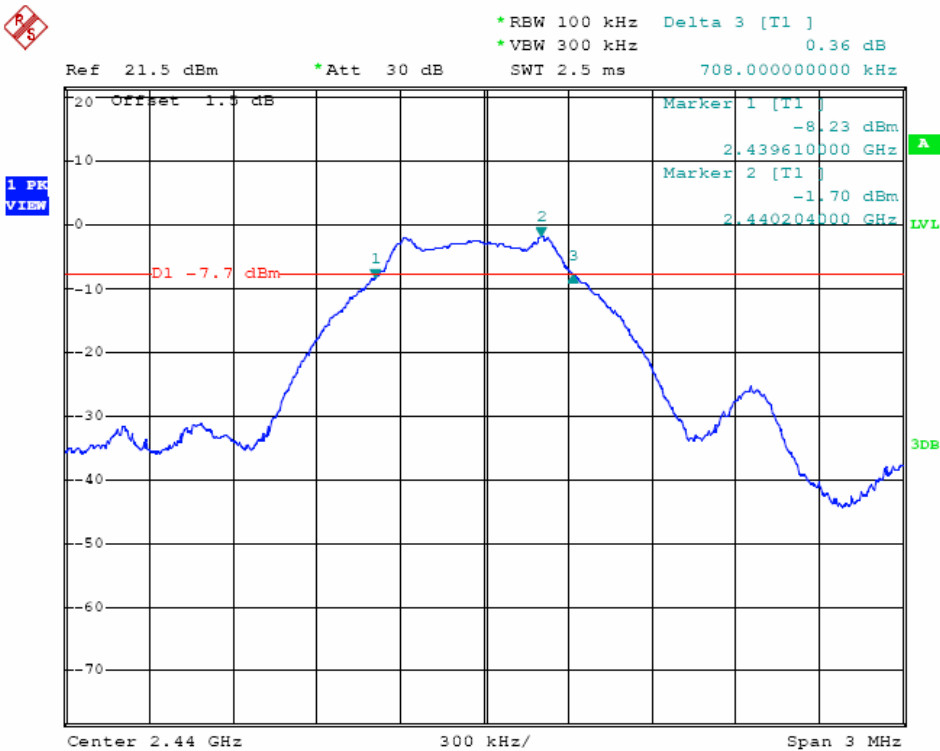


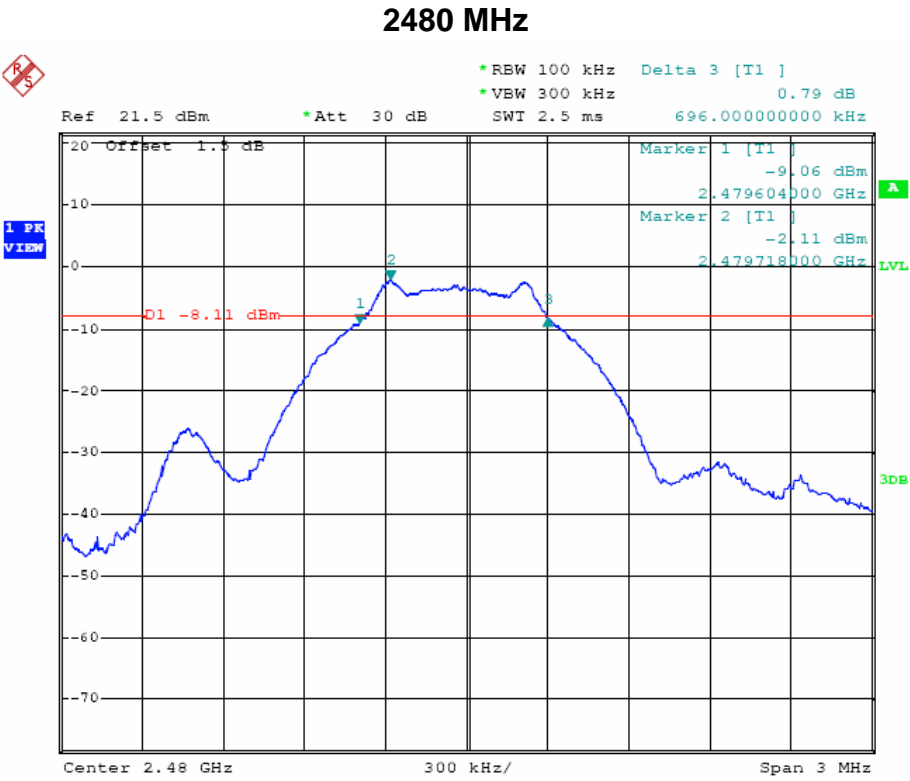
GFSK

2402MHz



2440 MHz





## 7. POWER SPECTRAL DENSITY

### 7.1. Limits

According to FCC Section 15.247(e)(1), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

### 7.2. Test setup

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to least 1.5 times the DTS channel bandwidth.
3. Set the RBW = 3kHz.
4. Set the VBW = 3 times RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.

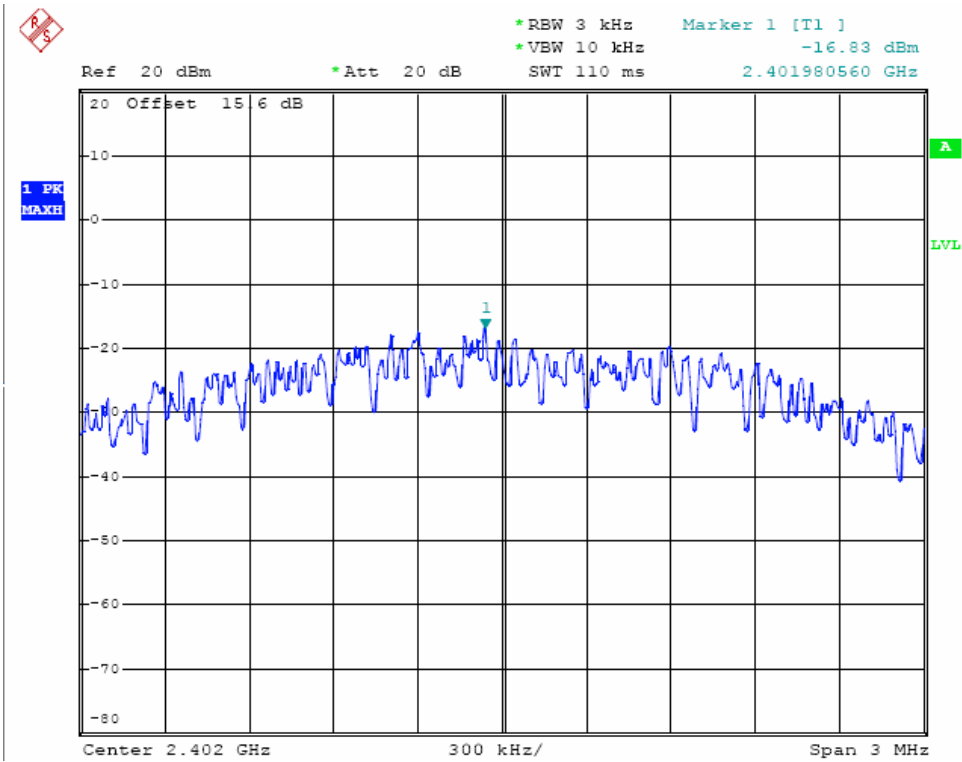
Test data:

Channel	Power Spectral Density (dBm)	Limit(dBm)	Result
2402MHz	-16.83	≤8.00	PASS
2440MHz	-17.30	≤8.00	PASS
2480MHz	-18.19	≤8.00	PASS

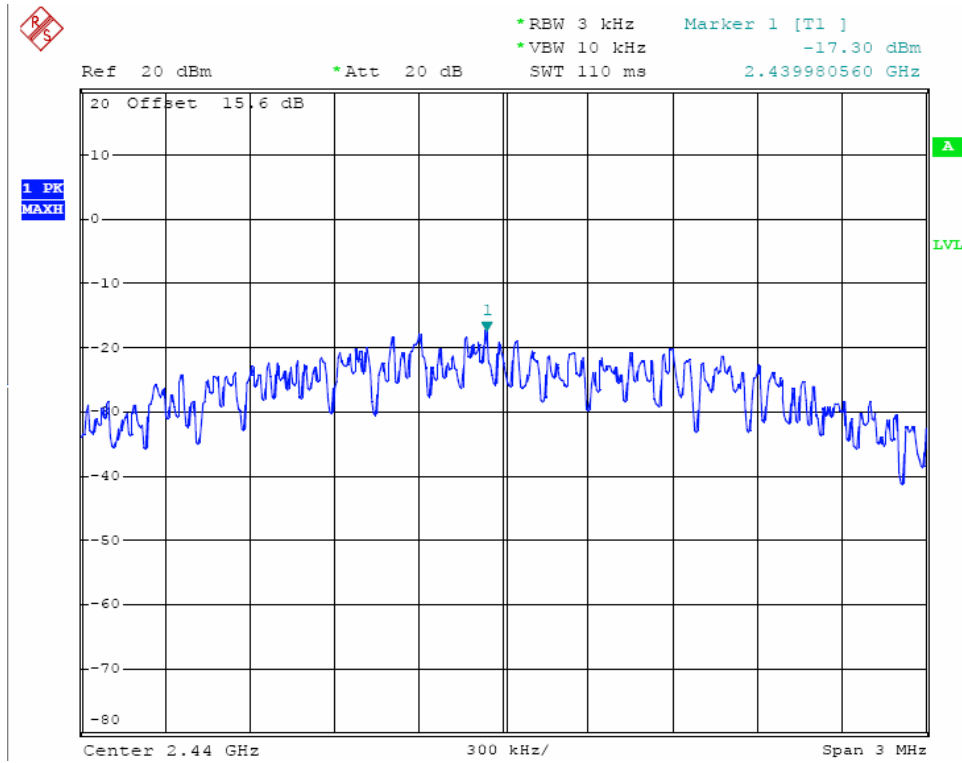
Test plot as follows:

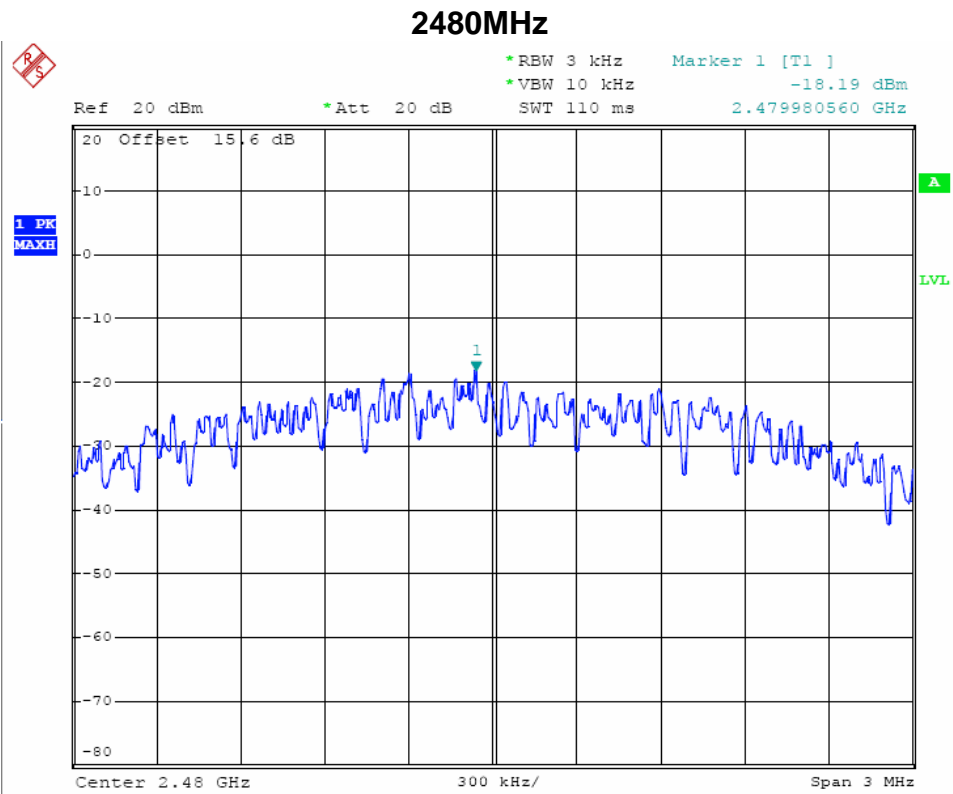
GFSK

2402MHz



2440MHz





## 8. MAXIMUM PEAK OUTPUT POWER

### 8.1. Limits

According to FCC Section 15.247(b)(1), For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. for all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

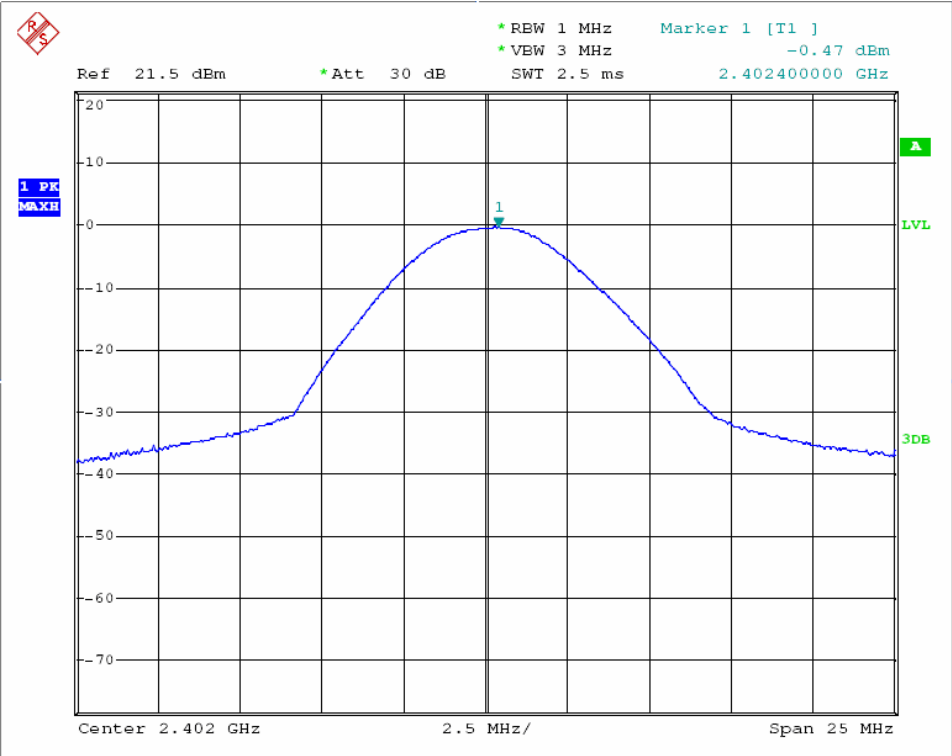
### 8.2. Test setup

1. This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set the  $RBW \geq DTS$  bandwidth,
4. Set  $VBW \geq 3$  RBW,
5. Set  $span \geq 3$  RBW,
6. Sweep=auto
7. Detector =peak,
8. Trace=max hold
9. Allow trace to fully stabilize.
10. Measure the conducted output power and record the results in the test report.

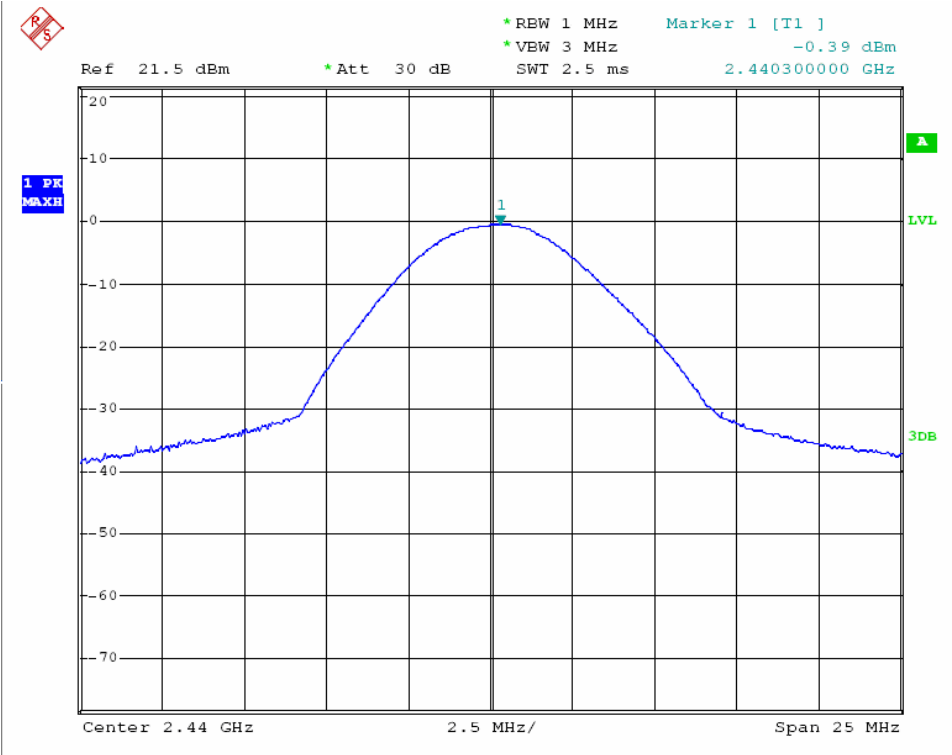
Test data:

	Channel Frequency (MHz)	Reading	Factor	Peak output Power	Limit (dBm)	Result
		dBm	dB	dBm	dBm	
GFSK	2402	-0.47	1.5	1.03	30	Pass
	2440	-0.39	1.5	1.11	30	Pass
	2480	-0.53	1.5	0.97	30	Pass

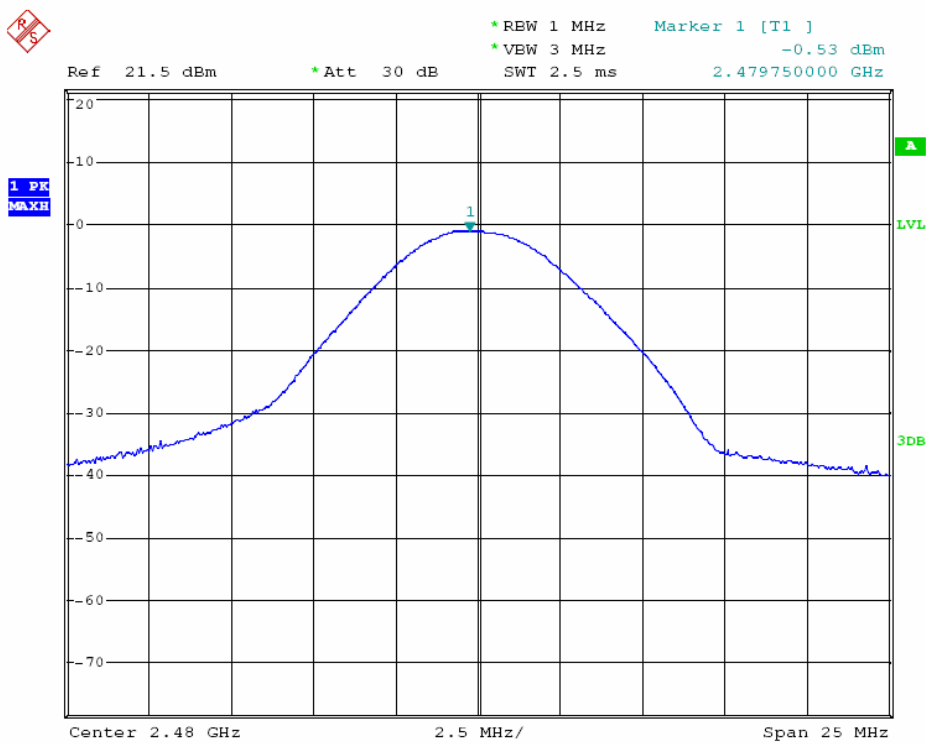
2402MHz



2440MHz



2480MHz





## 9. BAND EDGE COMPLIANCE TEST

### 9.1. Limits

According to FCC Section 15.247(d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement

### 9.2. Test setup

The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure.

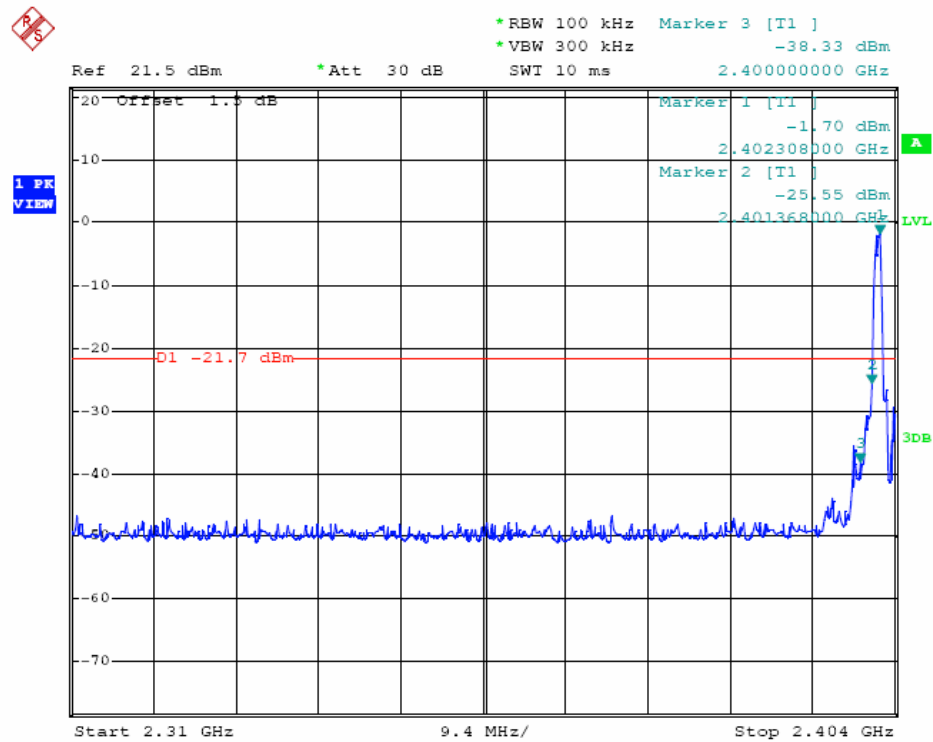
For conduct test, VBW is set at 300kHz and RBW is set at 100kHz for measurement.

Note: If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

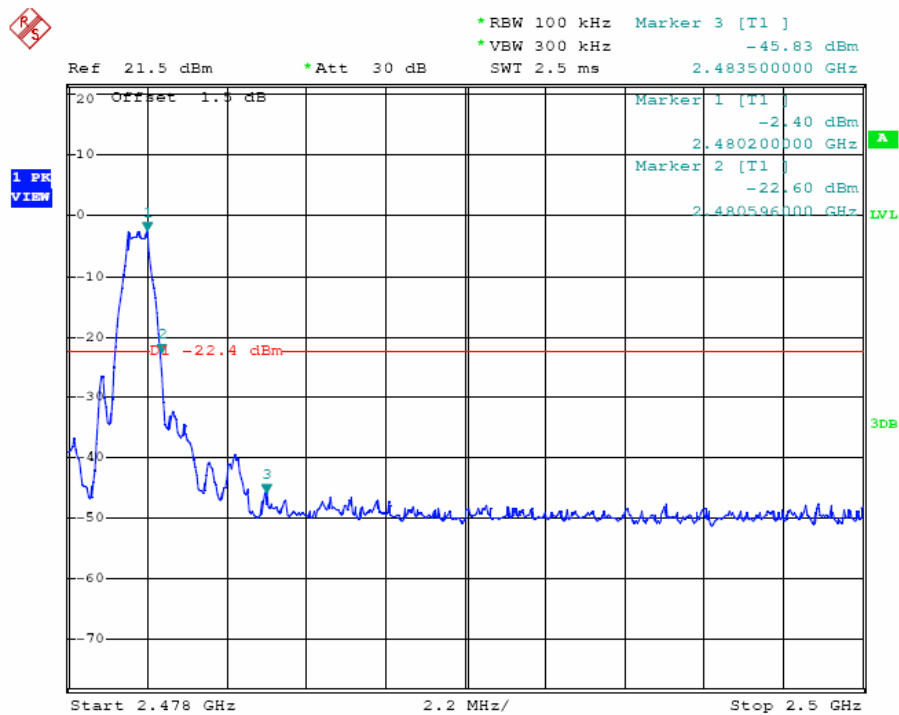
For radiated test as follows:

Frequency (MHz)	Antenna polarization (H/V)	Emission (dBuV/m)		Band edge Limit (dBuV/m)	
		PK	AV	PK	AV
<2400	H	50.48	42.32	74.00	54.00
<2400	V	49.36	41.35	74.00	54.00
>2483.5	H	50.12	42.52	74.00	54.00
>2483.5	V	49.03	41.44	74.00	54.00

For 2402MHz



For 2480MHz



## 10. ANTENNA REQUIREMENTS

### 10.1.Limits

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 15.247 (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.

### 10.2. Result

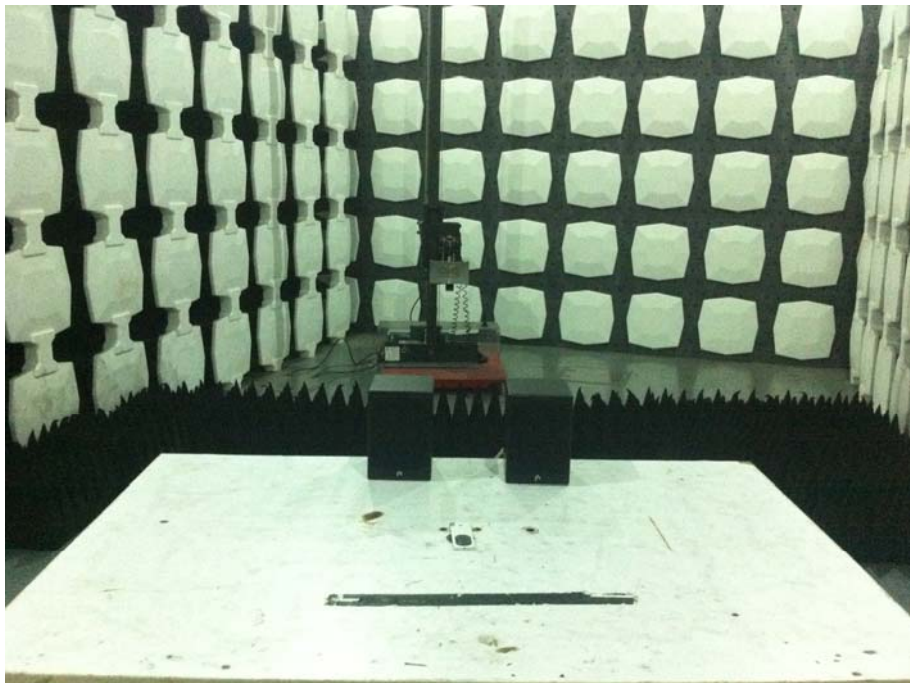
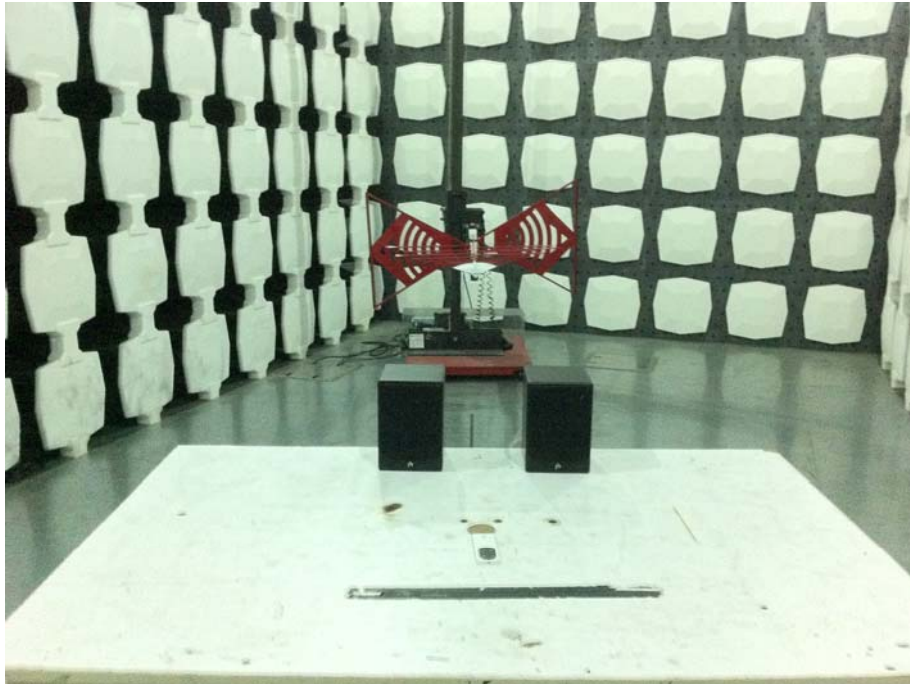
The antennas used for this product are integral Patch Antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 0dBi.

## 11. PHOTOGRAPHS OF TEST SET-UP

### 11.1. Set-up for Conducted Emission Test



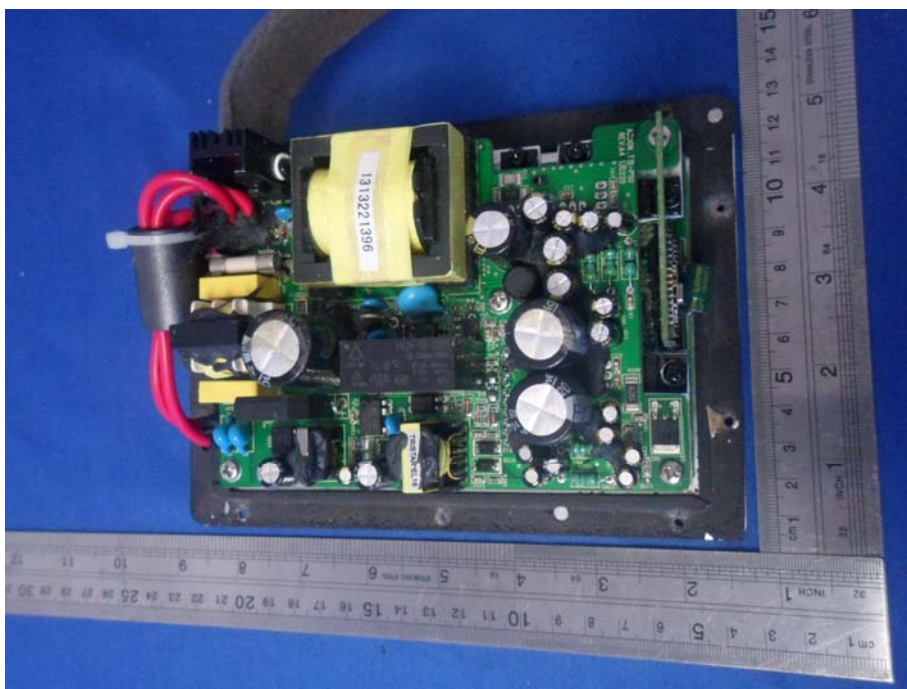
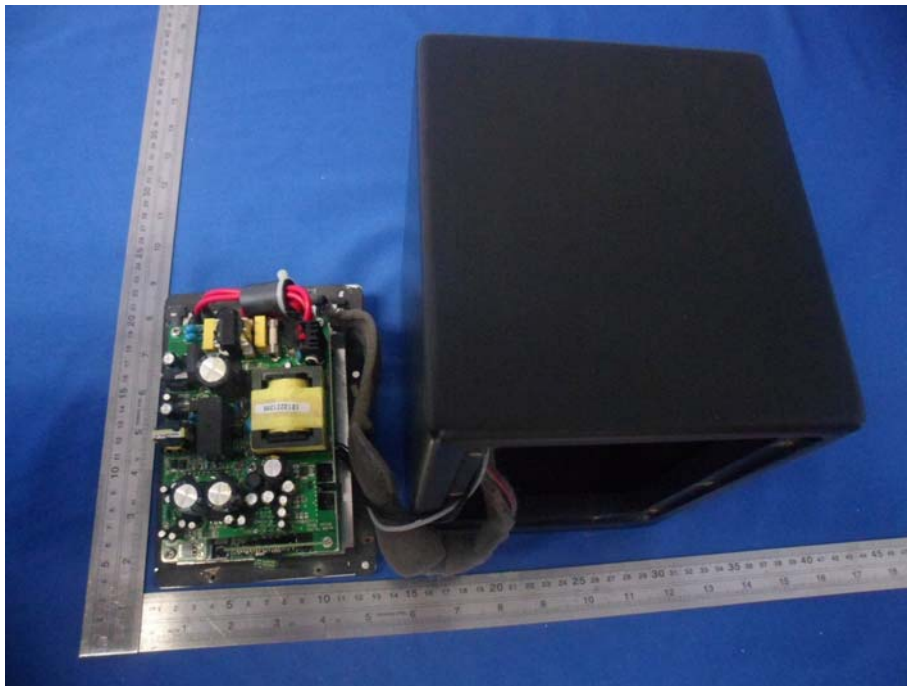
## 11.2. Set-up for Radiated Emission Test



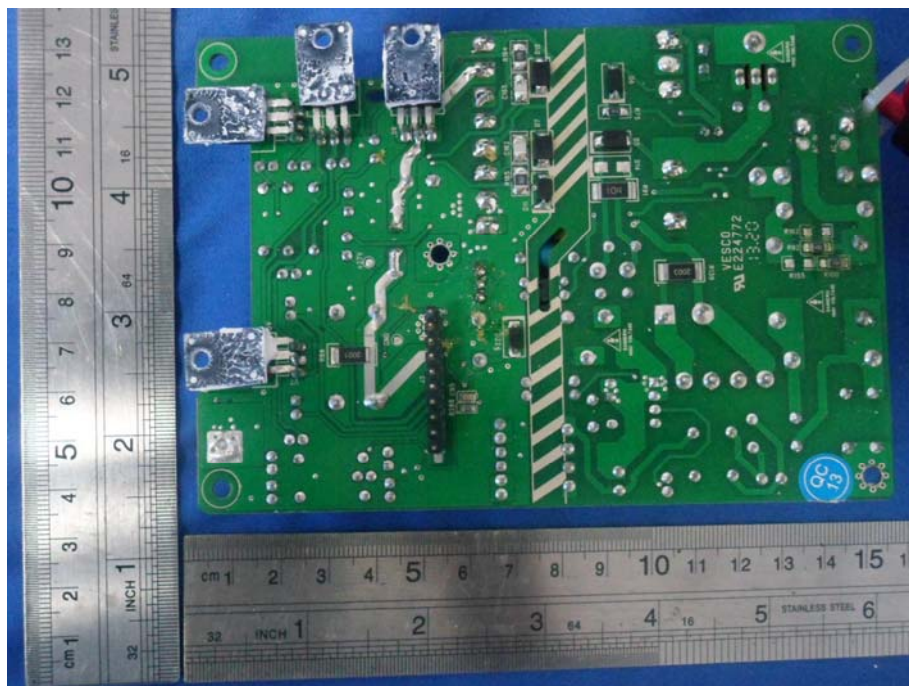
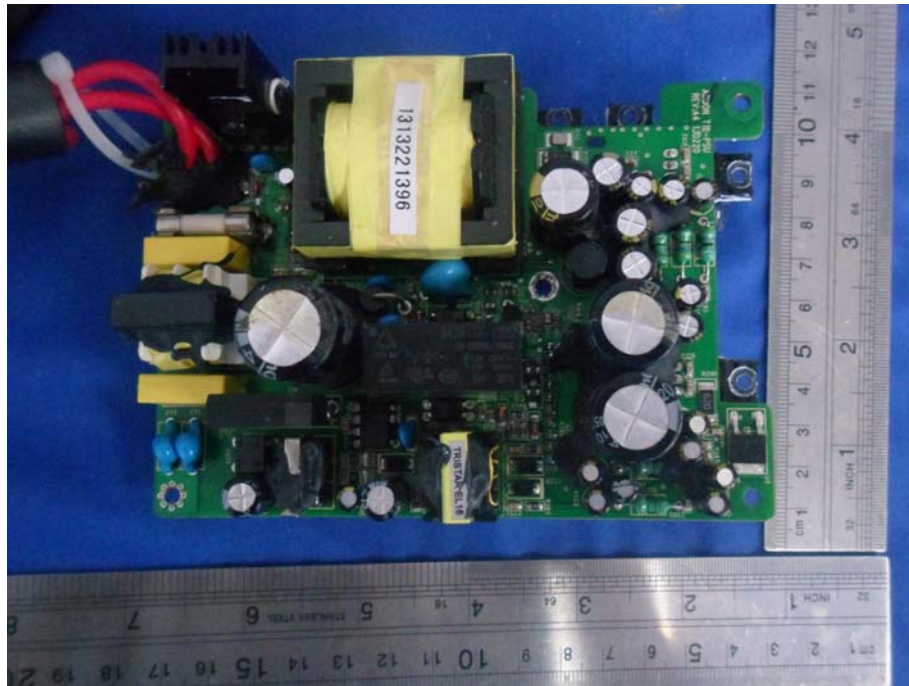
## 12. PHOTOGRAPHS OF THE EUT

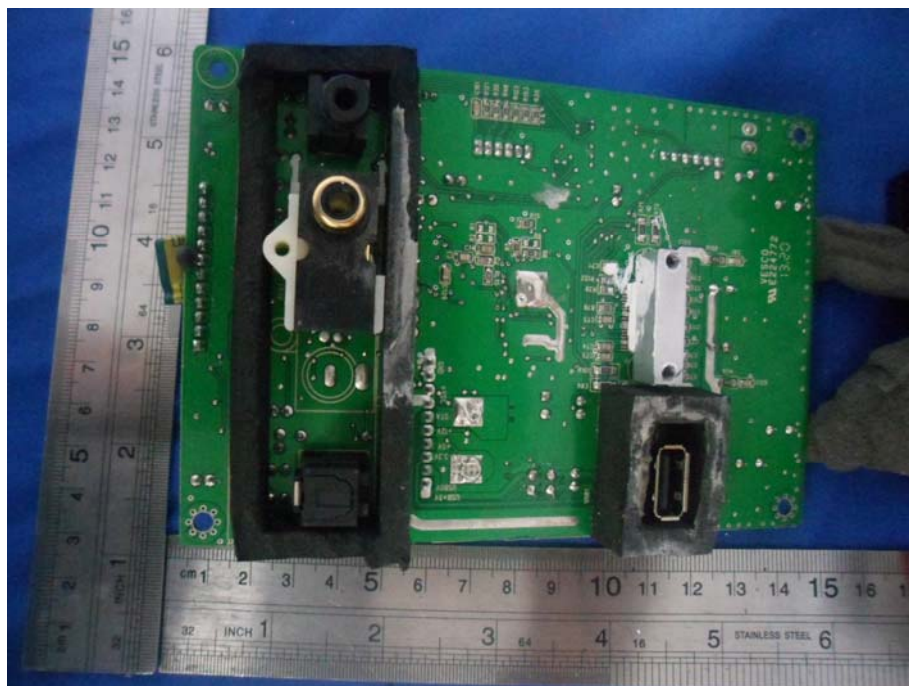






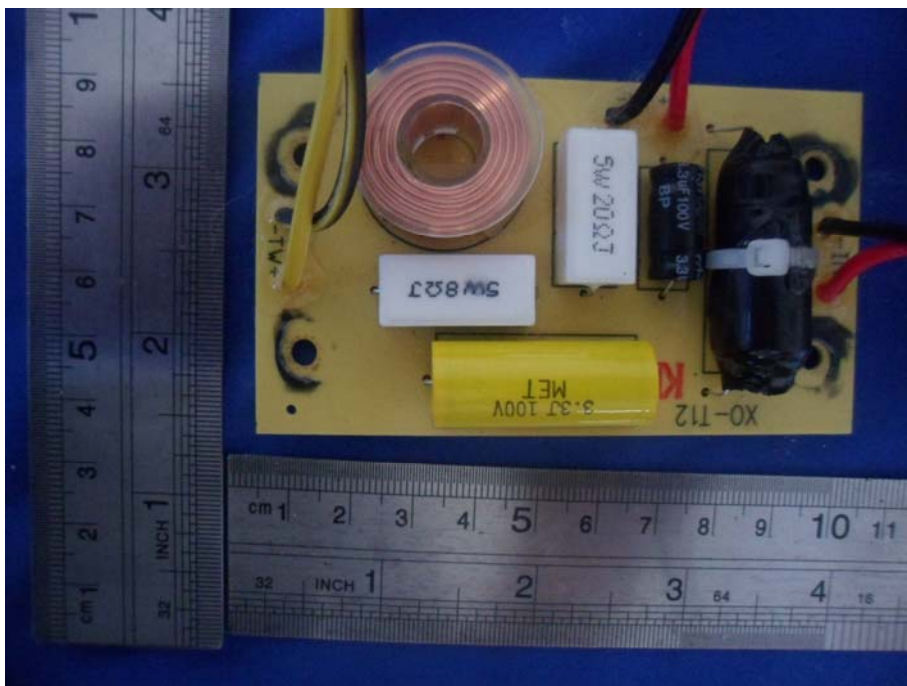


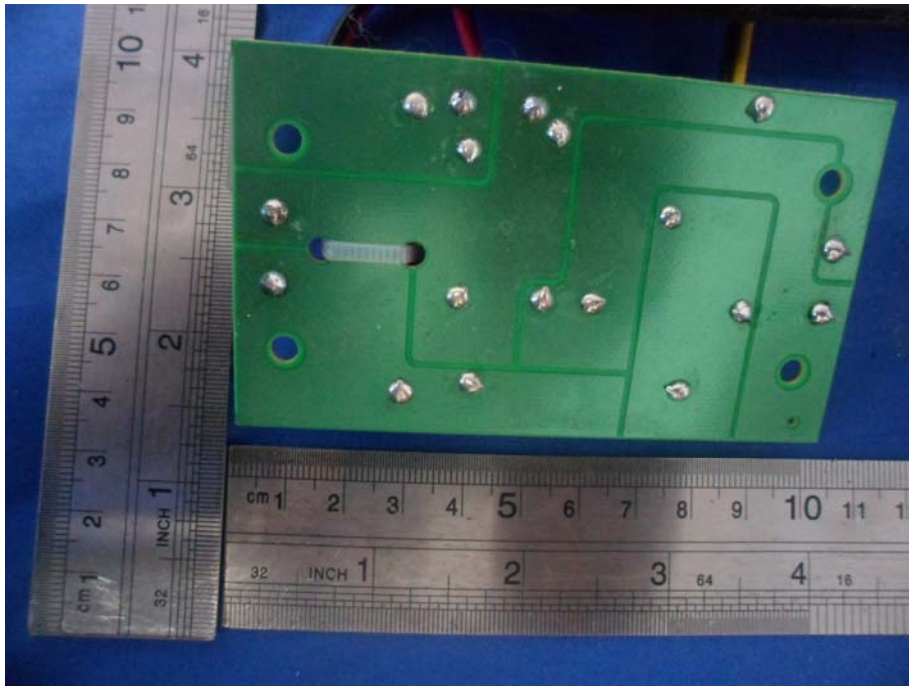




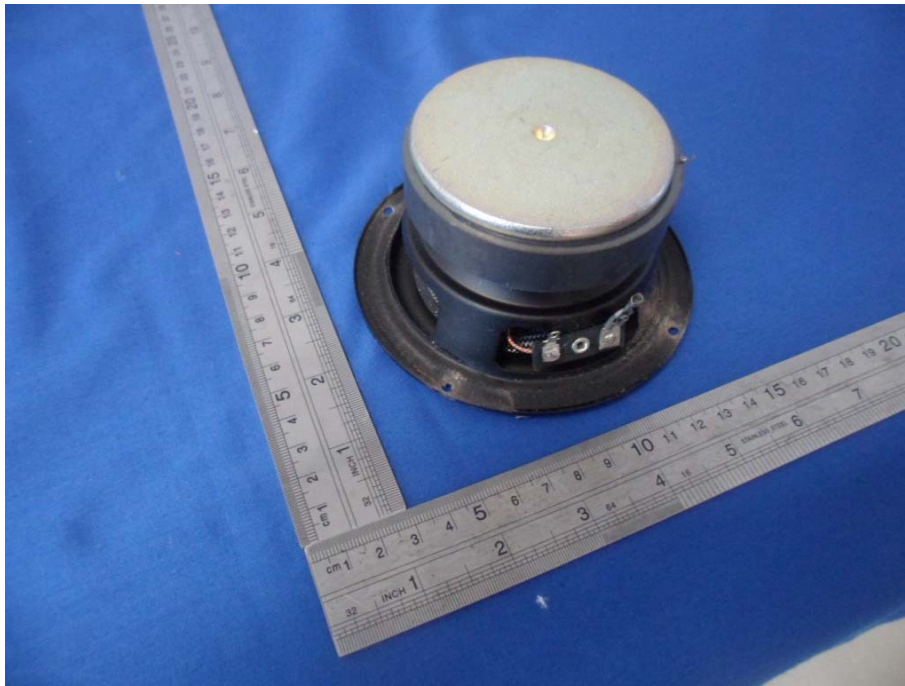












END.