FCC Test Report

Report No.: AGC01854150801FE08

FCC ID	:	2ABDS750-910-JHE
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Freedom Bluetooth Speaker
BRAND NAME	:	Jimi Hendrix
MODEL NAME	:	750-910-JHE
CLIENT	:	Steren Electronics International LLC.
DATE OF ISSUE	:	Oct.12,2015
STANDARD(S)	:	FCC Part 15 Rules
REPORT VERSION	:	V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

CAUTION:
This report shall not be reproduced except in full without the written permission of the test laboratory and shall not be quoted out of context.

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Oct.12,2015	Valid	Original Report

TABLE OF CONTENTS

1. VERIFICATION OF COMPLIANCE 5
2.GENERAL INFORMATION 6
2.1PRODUCT DESCRIPTION 6
2.2 RELATED SUBMITTAL(S)/GRANT(S) 6
2.3TEST METHODOLOGY 6
2.4 TEST FACILITY 6
2.5 SPECIAL ACCESSORIES 7
2.6 EQUIPMENT MODIFICATIONS 7
2.7 MEASUREMENT UNCERTAINTY 7
3. SYSTEM TEST CONFIGURATION 8
3.1 CONFIGURATION OF TESTED SYSTEM 8
3.2 EQUIPMENT USED IN TESTED SYSTEM 8
3.3. SUMMARY OF TEST RESULTS 8
4. DESCRIPTION OF TEST MODES 9
5. ANTENNA REQUIREMENT 9
5.1. STANDARD APPLICABLE 9
5.2. TEST RESULT 9
6. TEST FACILITY 10
7. RADIATED EMISSION 11
7.1 MEASUREMENT PROCEDURE 11
7.2 TEST SETUP 12
7.3 LIMITS AND MEASUREMENT RESULT 13
7.4 TEST RESULT (WORST MODULATION: GFSK) 13
8. BAND EDGE EMISSION 26
8.1. MEASUREMENT PROCEDURE 26
8.2. TEST SET-UP 26
8.3. TEST RESULT 27
9. 6DB BANDWIDTH 31
9.1. TEST PROCEDURE 31
9.2. SUMMARY OF TEST RESULTS/PLOTS 31
10. CONDUCTED OUTPUT POWER 33
10.1. MEASUREMENT PROCEDURE 33
10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 33
10.3. LIMITS AND MEASUREMENT RESULT 34
11. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY 36
11.1 MEASUREMENT PROCEDURE 36

11.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....36
11.3 LIMITS AND MEASUREMENT RESULT.....36
12. FCC LINE CONDUCTED EMISSION TEST 39
12.1 LIMITS.....39
12.2 TEST SETUP.....39
12.3 PRELIMINARY PROCEDURE 40
12.4 FINAL TEST PROCEDURE.....40
12.5 TEST RESULT OF POWER LINE 41
APPENDIX A: PHOTOGRAPHS OF TEST SETUP 43
APPENDIX B: PHOTOGRAPHS OF EUT.....45

1. VERIFICATION OF COMPLIANCE

Applicant	Steren Electronics International LLC.
Address	6920 Carroll Road, Suite 100/ San Diego CA 92121
Manufacturer	Sanoway Speaker Box & Wooden Prod(Shenzhen)Co., Ltd
Address	Huangpu Fucheng Ind.Area Shangnan East Rd 99#, Shajing Town, Bao'an Dist., Shenzhen, China
Product Designation	Freedom Bluetooth Speaker
Brand Name	Jimi Hendrix
Test Model	750-910-JHE
Date of test	Jul.29,2015 to Jul.31,2015
Deviation	None
Condition of Test Sample	Normal
Report Template	AGCRT-US-BLE/RF (2013-03-01)

WE HEREBY CERTIFY THAT:

The above equipment was tested by Compliance Certification Service(Shenzhen) Inc. 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 requirement of FCC Part 15 Rules requirement.

Tested By _____
Time Huang(Huang Nanhui) Oct.12,2015

Reviewed By _____
Forrest Lei(Lei Yonggang) Oct.12,2015

Approved By _____
Solger Zhang(Zhang Hongyi) Oct.12,2015
Authorized Officer

2.GENERAL INFORMATION

2.1PRODUCT DESCRIPTION

The EUT is designed as a “Freedom Bluetooth Speaker”. It is designed by way of utilizing the FHSS technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	2.402 GHz to 2.480GHz
Max output power	6.60dBm
Bluetooth Version	V4.0
Modulation	GFSK
Number of channels	40 Channel(37 Hopping Channel,3 advertising Channel)
Antenna Designation	PCB Antenna
Antenna Gain	0dBi
Hardware Version	V1.0
Software Version	1.0
Power Supply	Powered by adapter INPUT:100~240V AC,50/60Hz .06A MAX OUTPUT:12V＝2A
Note: 1.The USB port only used for charging for phone and can’t be used to transfer data with PC. 2.The EUT support BLE function	

2.2 RELATED SUBMITTAL(S)/GRANT(S)

This submittal(s) (test report) is intended for **FCC ID: 2ABDS750-910-JHE** filing to comply with Section 15.247of the FCC Part 15, Subpart C Rules.

2.3TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.
The test has been referenced the KDB 558074 D01 DTS Meas Guidance v03r02
The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions. The EUT was tested in all three orthogonal planes and the worse case was showed.

2.4 TEST FACILITY

All measurement facilities used to collect the measurement data are located at
Compliance Certification Service(Shenzhen) Inc.

No.10-1 Mingkeda Logistics Park, No.18 Huanguan South RD. Guan lan Town,Baoan Distr
FCC register No.:441872

2.5 SPECIAL ACCESSORIES

Refer to section 2.2.

2.6 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

2.7 MEASUREMENT UNCERTAINTY

Radiation Emission:+/-3.2

Conduction Emission:+/-2.5

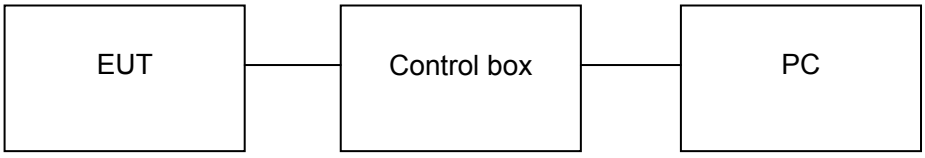
3. SYSTEM TEST CONFIGURATION

3.1 CONFIGURATION OF TESTED SYSTEM

Configuration: Normal Operating

Note: During the test, the adapter was involved

Configuration: Continuous TX



3.2 EQUIPMENT USED IN TESTED SYSTEM

Item	Equipment	Mfr/Brand	Model/Type No.	Remark
1	Freedom Bluetooth Speaker	Jimi Hendrix	750-910-JHE	EUT
2	PC	Dell	INSPIRON	A.E
3	Control box	N/A	N/A	A.E
4	Adapter	JIMI	750-910-JHE	Part of EUT
5	Audio Cable	N/A	0.3m, unshielded	A.E
6	IPOD	APPLE	A1367	A.E

3.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§ 15.203	Antenna Requirement	Compliant
§15.209 §15.247(d)	Radiated Emission	Compliant
§15.247(d)	Band Edges	Compliant
§15.247	6 dB Bandwidth	Compliant
§15.247(b)	Conducted Power	Compliant
§15.247(e)	Maximum Conducted Output Power SPECTRAL Density	Compliant
§15.207	Line Conduction Emission	Compliant

4. DESCRIPTION OF TEST MODES

The EUT has been operated in one modulation: GFSK .

NO.	TEST MODE DESCRIPTION
1	Low channel TX
2	Middle channel TX
3	High channel TX
4	BT Link

Note:
1. Only the result of the worst case was recorded in the report if no any records.
2. Transmitting duty cycle >98%, The average correction factor is about -0.18

5. ANTENNA REQUIREMENT

5.1. STANDARD APPLICABLE

According to FCC 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

5.2. TEST RESULT

This product has a permanent antenna, fulfill the requirement of this section.

6. TEST FACILITY

Site	Compliance Certification Service(Shenzhen) Inc.
Location	No.10-1 Mingkeda Logistics Park, No.18 Huanguan South RD. Guan lan Town,Baoan Distr
FCC Registration No.	441872
Description	The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2009.

ALL TEST EQUIPMENT LIST

Radiated Emission Test Site 966(2)					
Name of Equipment	**Manufacturer**	**Model Number**	**Serial Number**	**Last Calibration**	**Due Calibration**
PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	03/01/2015	03/01/2016
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	03/09/2015	03/08/2016
Amplifier	MITEQ	AM-1604-3000	1123808	03/18/2015	03/17/2016
High Noise Amplifier	Agilent	8449B	3008A01838	03/18/2015	03/17/2016
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	07/10/2015	07/09/2016
Bilog Antenna	SCHAFFNER	CBL6143	5082	03/01/2015	03/01/2016
Horn Antenna	SCHWARZBECK	BBHA9120	D286	03/01/2015	03/01/2016
Loop Antenna	COM-POWER	AL-130	121044	09/27/2014	09/26/2015
Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Temp. / Humidity Meter	Anymetre	JR913	N/A	02/28/2015	02/27/2016
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

Conducted Emission Test Site					
Name of Equipment	**Manufacturer**	**Model Number**	**Serial Number**	**Last Calibration**	**Due Calibration**
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	03/09/2015	03/08/2016
LISN(EUT)	ROHDE&SCHWARZ	ENV216	101543-WX	03/09/2015	03/08/2016
LISN	EMCO	3825/2	8901-1459	03/09/2015	03/08/2016
Temp. / Humidity Meter	VICTOR	HTC-1	N/A	03/04/2015	03/03/2016
Test S/W	FARAD	EZ-EMC/ CCS-3A1-CE			

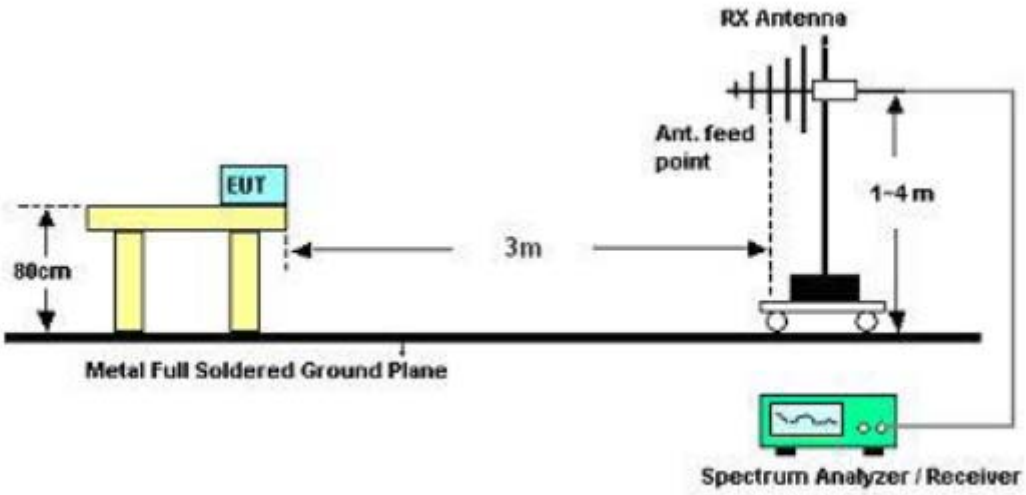
7. RADIATED EMISSION

7.1 MEASUREMENT PROCEDURE

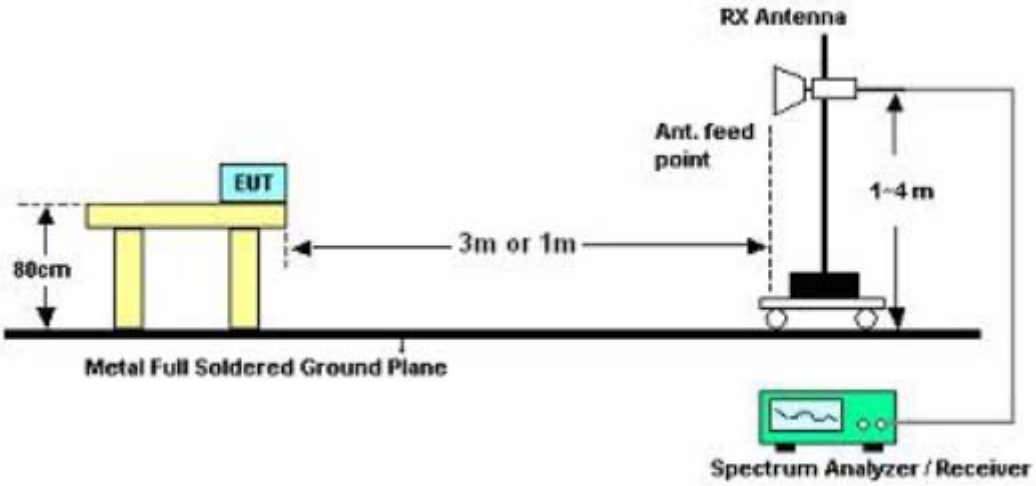
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

7.2 TEST SETUP

RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



7.3 LIMITS AND MEASUREMENT RESULT

15.209 Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: All modes were tested For restricted band radiated emission,
the test records reported below are the worst result compared to other modes.

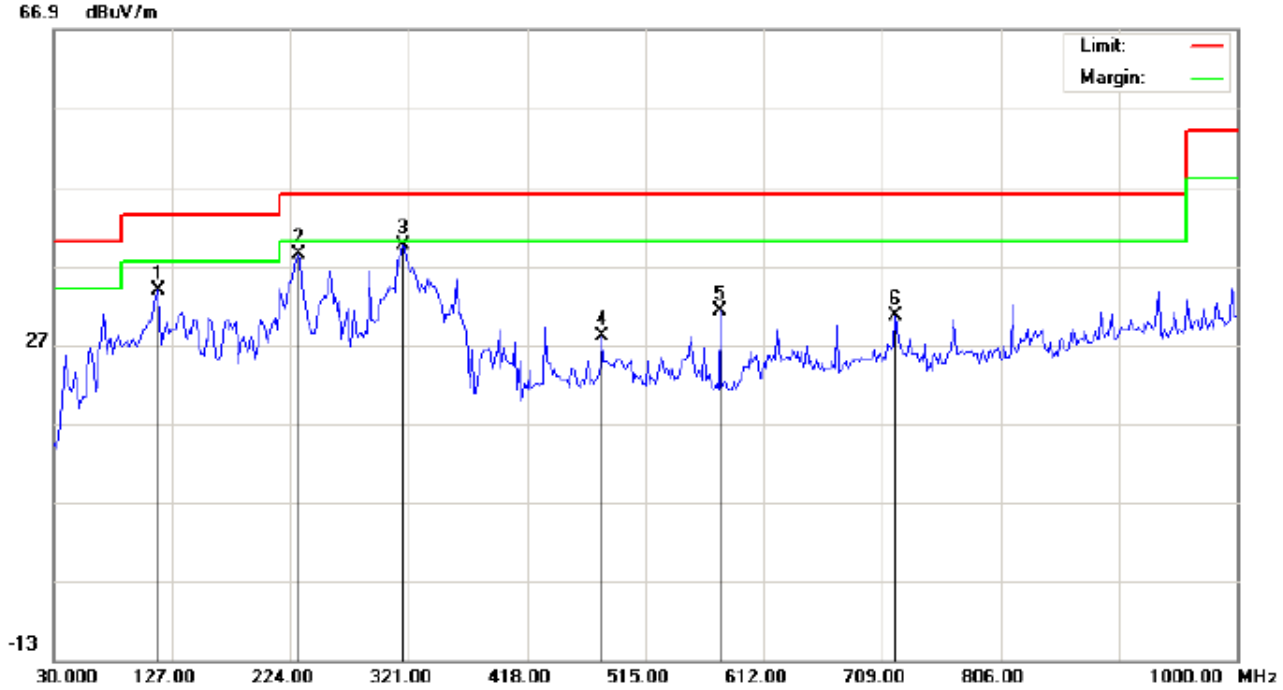
7.4 TEST RESULT (Worst Modulation: GFSK)

RADIATED EMISSION BELOW 30MHZ

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

RADIATED EMISSION BELOW 1GHZ

RADIATED EMISSION TEST- (30MHZ-1GHZ)-LOW CHANNEL-HORIZONTAL



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Freedom Bluetooth Speaker
M/N: 750-910-JHE
Mode: Low Channel TX
Note:

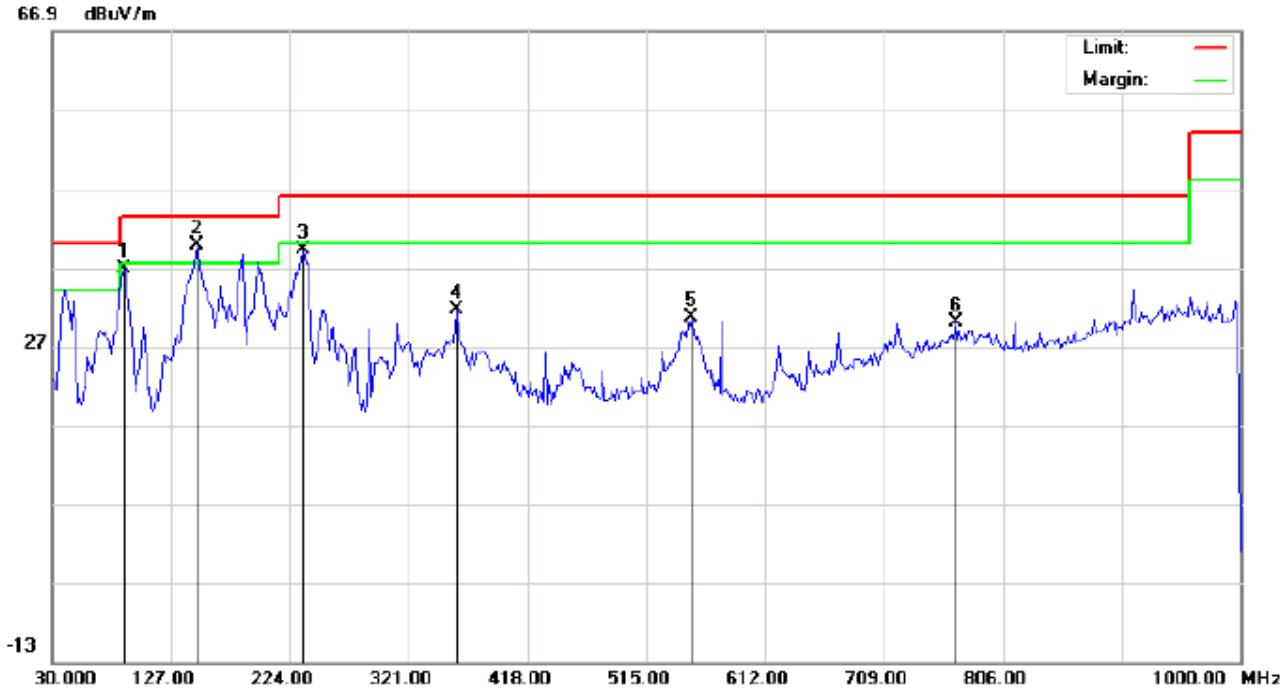
Polarization: ***Horizontal***
Power:
Distance: 3m

Temperature: 24.6
Humidity: 57.5 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		115.6833	22.23	11.56	33.79	43.50	-9.71	peak			
2		230.4667	25.22	13.16	38.38	46.00	-7.62	peak			
3	*	316.1499	23.10	16.49	39.59	46.00	-6.41	peak			
4		479.4331	7.00	20.91	27.91	46.00	-18.09	peak			
5		576.4333	8.01	23.14	31.15	46.00	-14.85	peak			
6		720.3165	4.90	25.78	30.68	46.00	-15.32	peak			

RESULT: PASS

RADIATED EMISSION TEST- (30MHZ-1GHZ)-LOW CHANNEL -VERTICAL



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Freedom Bluetooth Speaker
M/N: 750-910-JHE
Mode: Low Channel TX
Note:

Polarization: *Vertical*
Power:
Distance: 3m

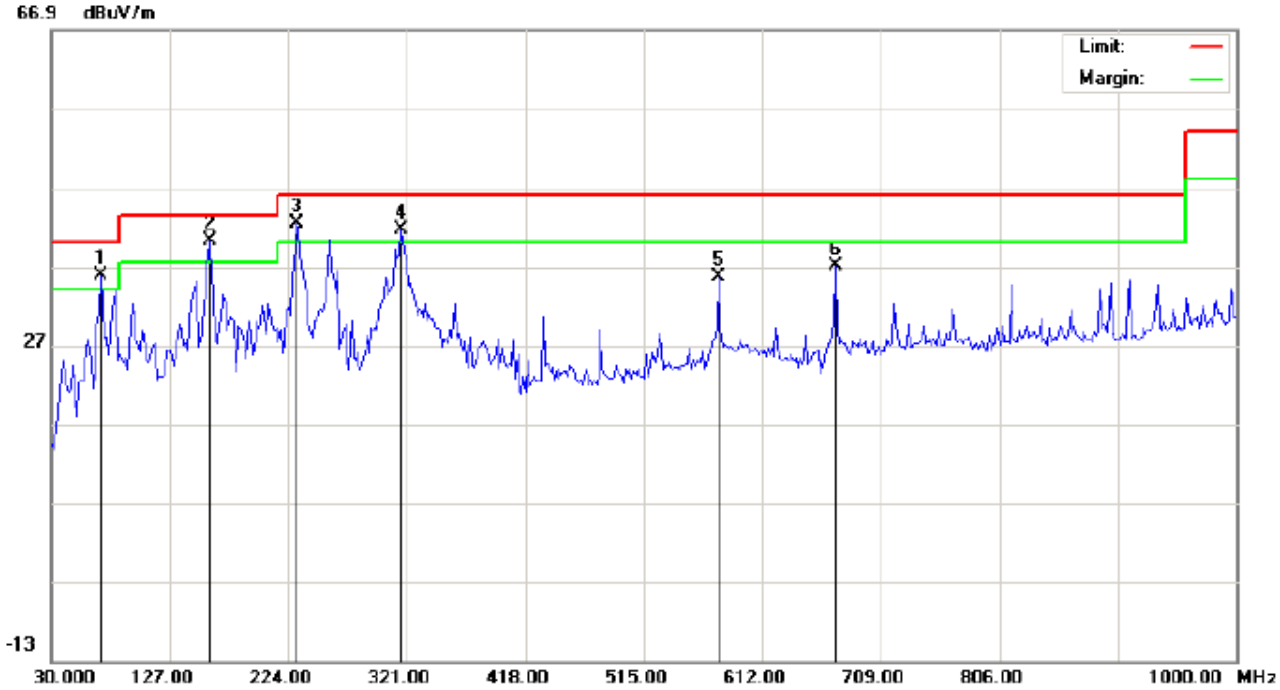
Temperature: 24.6
Humidity: 57.5 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	.	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		88.2000	32.09	4.74	36.83	43.50	-6.67	peak			
2	*	148.0166	24.57	15.25	39.82	43.50	-3.68	peak			
3		235.3164	26.68	12.46	39.14	46.00	-6.86	peak			
4		359.8000	12.76	18.80	31.56	46.00	-14.44	peak			
5		552.1833	8.03	22.49	30.52	46.00	-15.48	peak			
6		767.2000	3.15	26.87	30.02	46.00	-15.98	peak			

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.
2. The “Factor” value can be calculated automatically by software of measurement system.

RADIATED EMISSION TEST- (30MHZ-1GHZ)-MIDDLE CHANNEL-HORIZONTAL



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Freedom Bluetooth Speaker
M/N: 750-910-JHE
Mode: Middle Channel TX
Note:

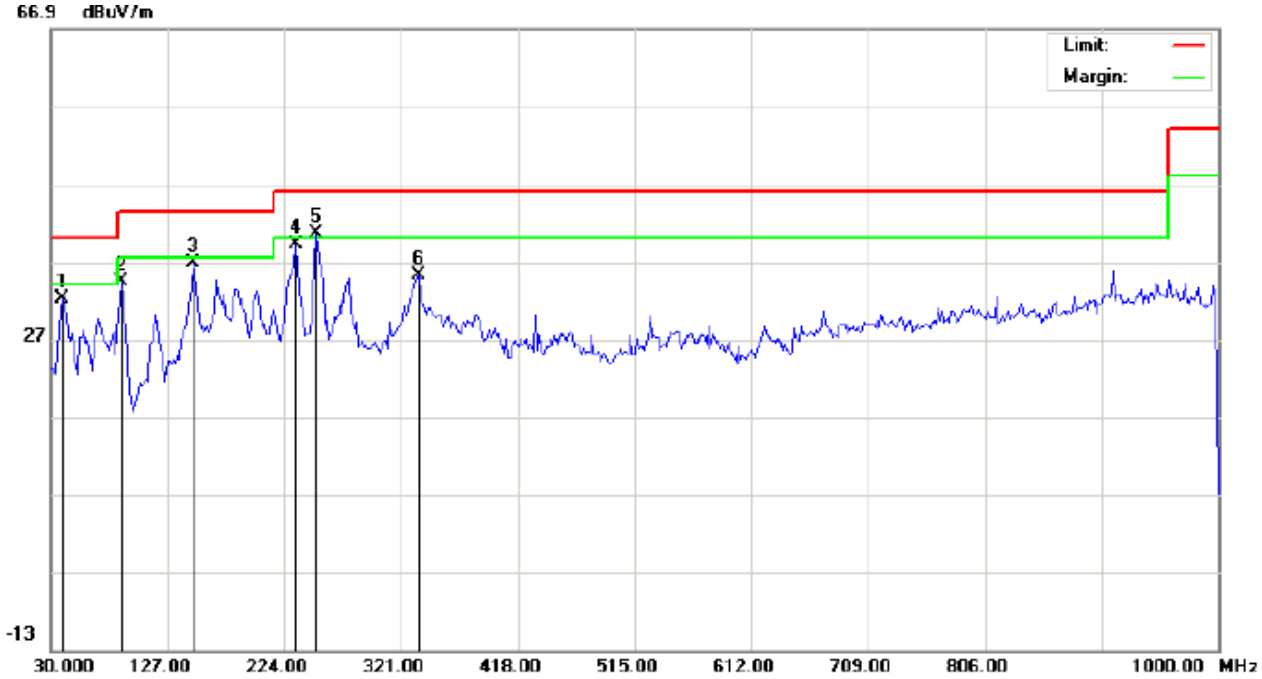
Polarization: *Horizontal*
Power:
Distance: 3m

Temperature: 24.6
Humidity: 57.5 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	!	70.4167	25.53	10.24	35.77	40.00	-4.23	peak			
2	*	159.3333	24.96	15.33	40.29	43.50	-3.21	peak			
3	!	230.4667	29.22	13.16	42.38	46.00	-3.62	peak			
4	!	316.1499	25.10	16.49	41.59	46.00	-4.41	peak			
5		576.4333	12.51	23.14	35.65	46.00	-10.35	peak			
6		671.8165	12.49	24.43	36.92	46.00	-9.08	peak			

RESULT: PASS

RADIATED EMISSION TEST- (30MHZ-1GHZ)- MIDDLE CHANNEL -VERTICAL



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Freedom Bluetooth Speaker
M/N: 750-910-JHE
Mode: Middle Channel TX
Note:

Polarization: *Vertical*
Power:
Distance: 3m

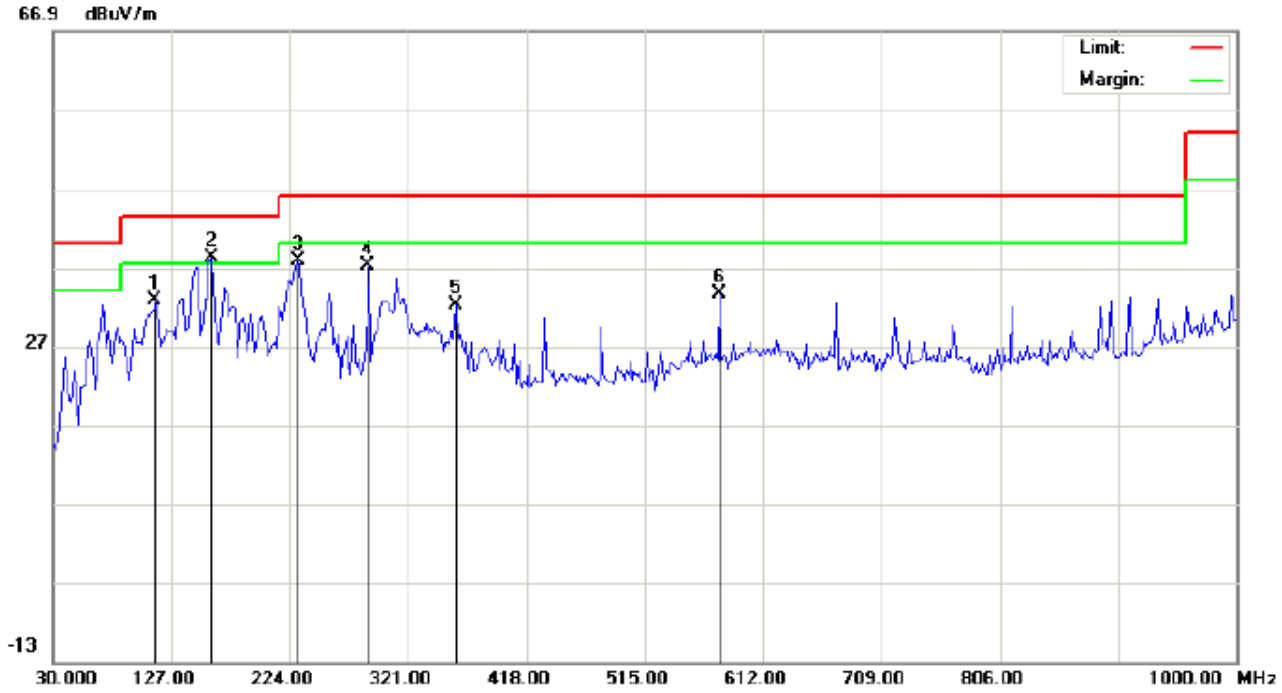
Temperature: 24.6
Humidity: 57.5 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		39.7000	23.67	8.51	32.18	40.00	-7.82	peak			
2		88.2000	29.59	4.74	34.33	43.50	-9.17	peak			
3		148.0166	21.57	15.25	36.82	43.50	-6.68	peak			
4		233.6999	26.89	12.30	39.19	46.00	-6.81	peak			
5	*	249.8667	26.73	13.89	40.62	46.00	-5.38	peak			
6		335.5500	17.37	17.78	35.15	46.00	-10.85	peak			

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.
2. The “Factor” value can be calculated automatically by software of measurement system.

RADIATED EMISSION TEST- (30MHZ-1GHZ)-HIGH CHANNEL-HORIZONTAL



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Freedom Bluetooth Speaker
M/N: 750-910-JHE
Mode: High Channel TX
Note:

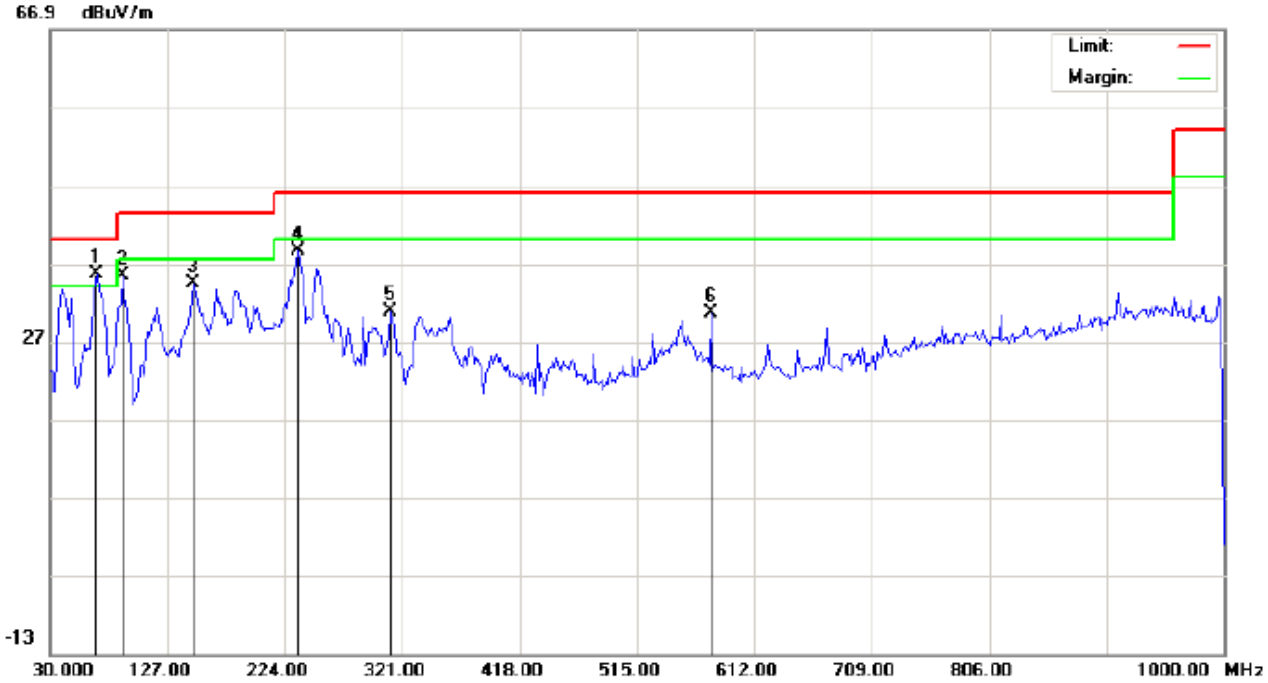
Polarization: *Horizontal*
Power:
Distance: 3m

Temperature: 24.6
Humidity: 57.5 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		114.0665	21.29	11.45	32.74	43.50	-10.76	peak			
2	*	159.3333	22.96	15.33	38.29	43.50	-5.21	peak			
3		230.4667	24.72	13.16	37.88	46.00	-8.12	peak			
4		288.6666	22.04	15.07	37.11	46.00	-8.89	peak			
5		359.8000	13.34	18.80	32.14	46.00	-13.86	peak			
6		576.4333	10.51	23.14	33.65	46.00	-12.35	peak			

RESULT: PASS

RADIATED EMISSION TEST- (30MHZ-1GHZ)-HIGH CHANNEL -VERTICAL



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Freedom Bluetooth Speaker
M/N: 750-910-JHE
Mode: High Channel TX
Note:

Polarization: *Vertical*
Power:
Distance: 3m

Temperature: 24.6
Humidity: 57.5 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	68.7998	30.82	4.73	35.55	40.00	-4.45	peak			
2		89.8165	30.09	5.31	35.40	43.50	-8.10	peak			
3		148.0166	19.07	15.25	34.32	43.50	-9.18	peak			
4		235.3164	26.18	12.46	38.64	46.00	-7.36	peak			
5		311.3000	14.56	16.16	30.72	46.00	-15.28	peak			
6		576.4333	8.00	22.61	30.61	46.00	-15.39	peak			

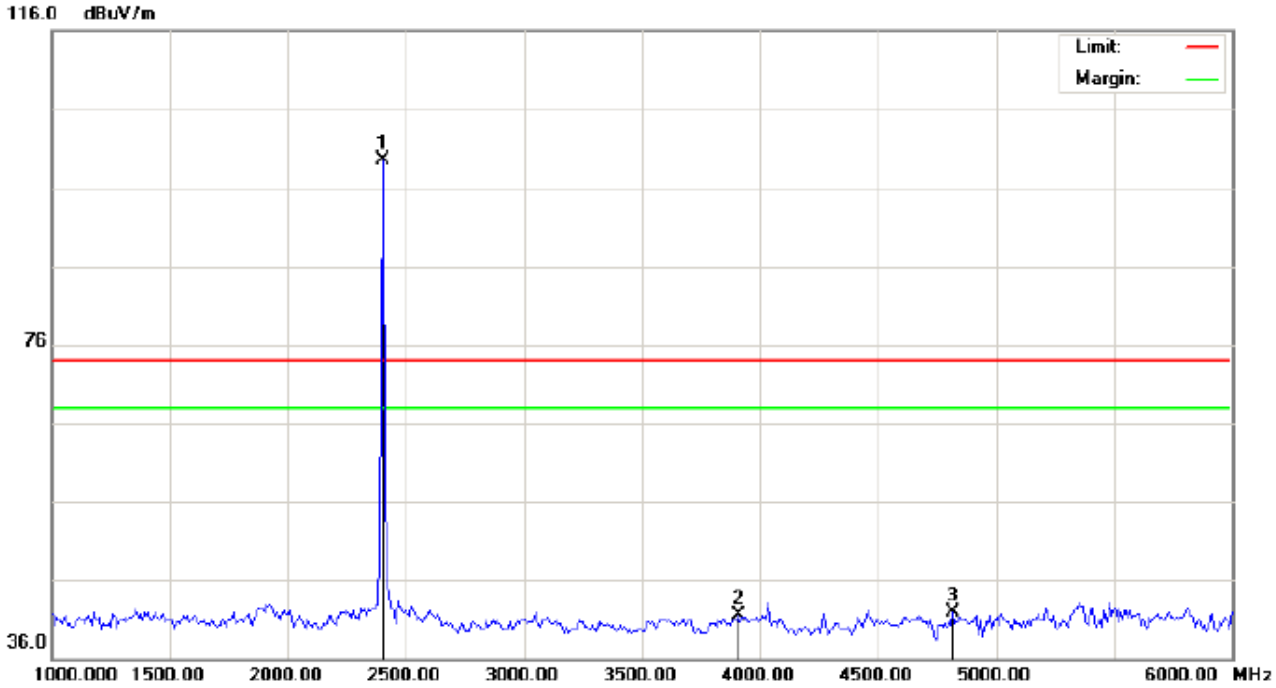
RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The “Factor” value can be calculated automatically by software of measurement system.

RADIATED EMISSION ABOVE 1GHZ

RADIATED EMISSION TEST- (ABOVE 1GHZ)-LOW CHANNEL-HORIZONTAL

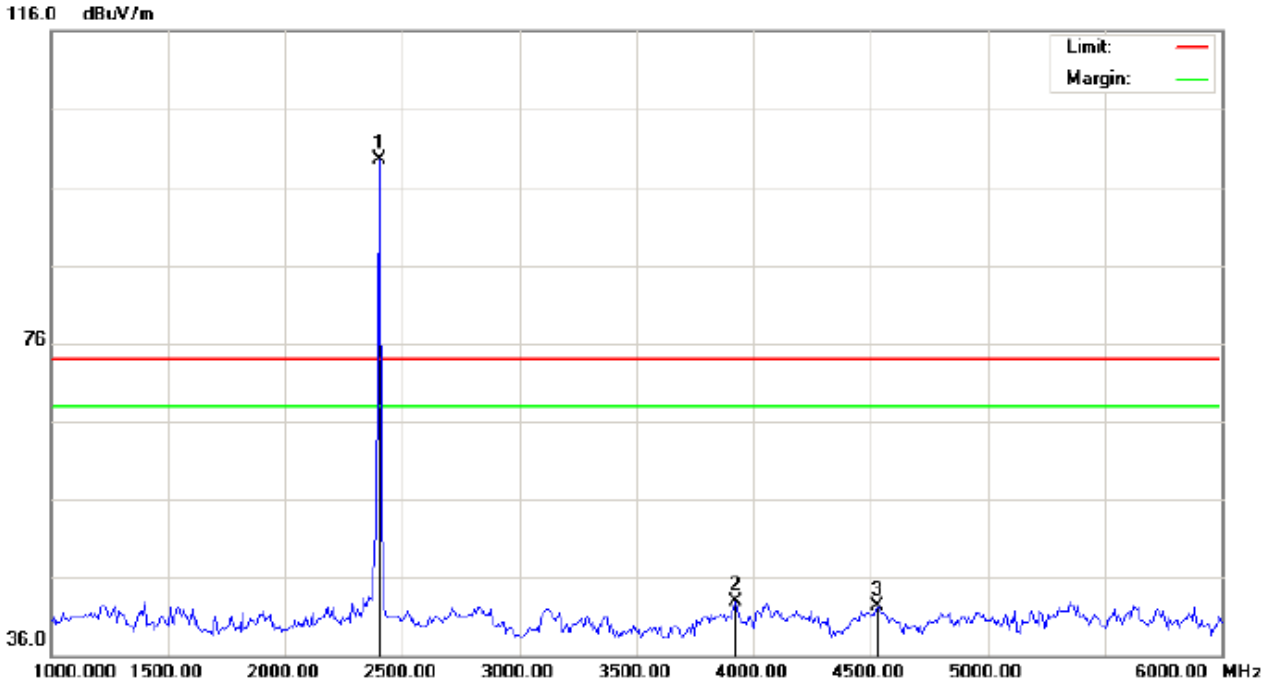


Site: site #1 Polarization: *Horizontal* Temperature: 26
Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %
EUT: Freedom Bluetooth Speaker Distance:
M/N: 750-910-JHE
Mode: Low Channel TX
Note:

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2402.000	89.11	10.32	99.43	74.00	25.43	peak			
2		3908.333	26.85	14.63	41.48	74.00	-32.52	peak			
3		4816.667	34.20	7.72	41.92	74.00	-32.08	peak			

RESULT: PASS

RADIATED EMISSION TEST-(ABOVE 1GHZ)-LOW CHANNEL-VERTICAL



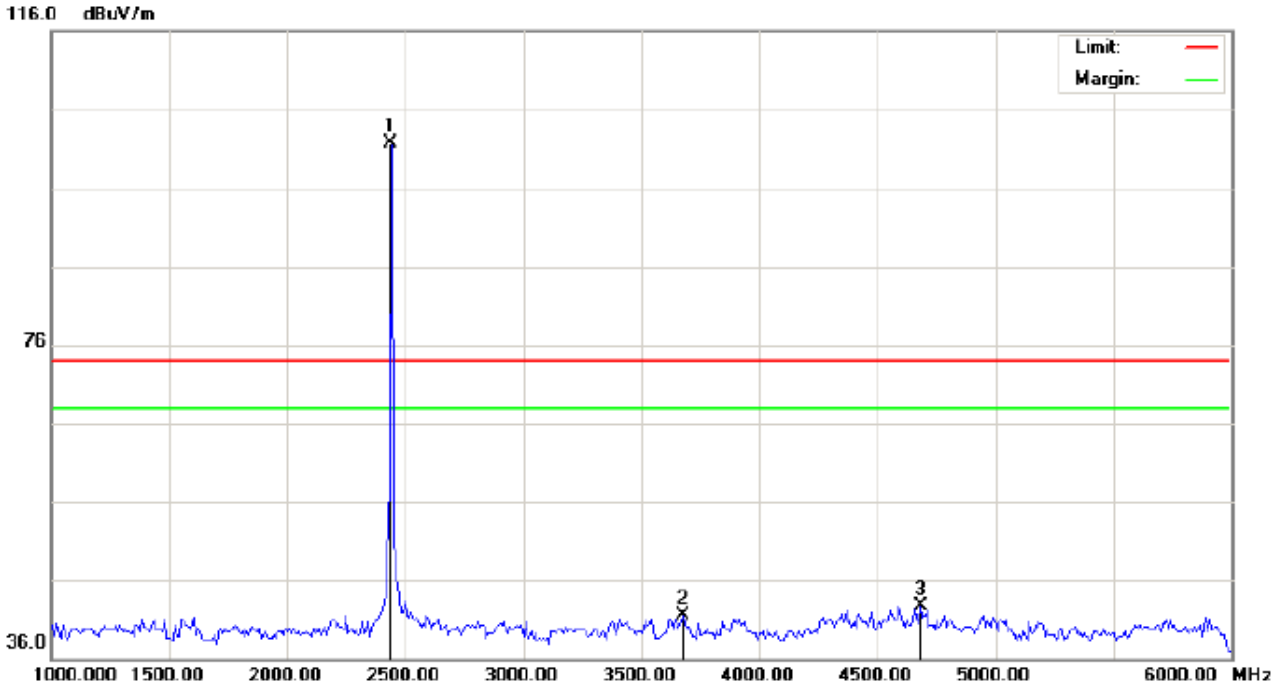
Site: site #1 Polarization: *Vertical* Temperature: 26
Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %
EUT: Freedom Bluetooth Speaker Distance:
M/N: 750-910-JHE
Mode: Low Channel TX
Note:

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2402.000	89.17	10.32	99.49	74.00	25.49	peak			
2		3925.000	28.17	14.73	42.90	74.00	-31.10	peak			
3		4533.333	35.25	6.98	42.23	74.00	-31.77	peak			

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.
2. The “Factor” value can be calculated automatically by software of measurement system.

RADIATED EMISSION TEST-(ABOVE 1GHZ)-MIDDLE CHANNEL-HORIZONTAL



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Freedom Bluetooth Speaker
M/N: 750-910-JHE
Mode: Middle Channel TX
Note:

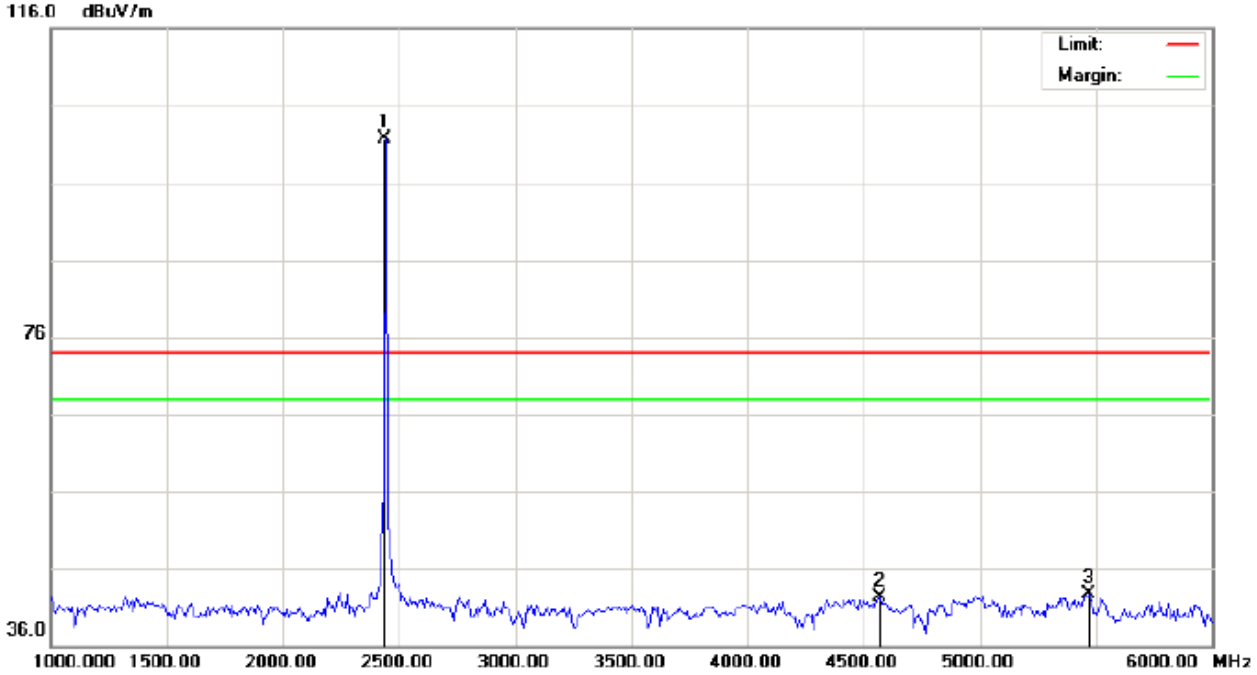
Polarization: *Horizontal*
Power:
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2440.000	91.29	10.36	101.65	74.00	27.65	peak			
2		3675.000	28.25	13.19	41.44	74.00	-32.56	peak			
3		4683.333	35.28	7.37	42.65	74.00	-31.35	peak			

RESULT: PASS

RADIATED EMISSION TEST-(ABOVE 1GHZ)-MIDDLE CHANNEL-VERTICAL



Site: site #1	Polarization: *Vertical*	Temperature: 26
Limit: FCC Class B 3M Radiation above 1GHZ(PK)	Power:	Humidity: 60 %
EUT: Freedom Bluetooth Speaker	Distance:	
M/N: 750-910-JHE		
Mode: Middle Channel TX		
Note:		

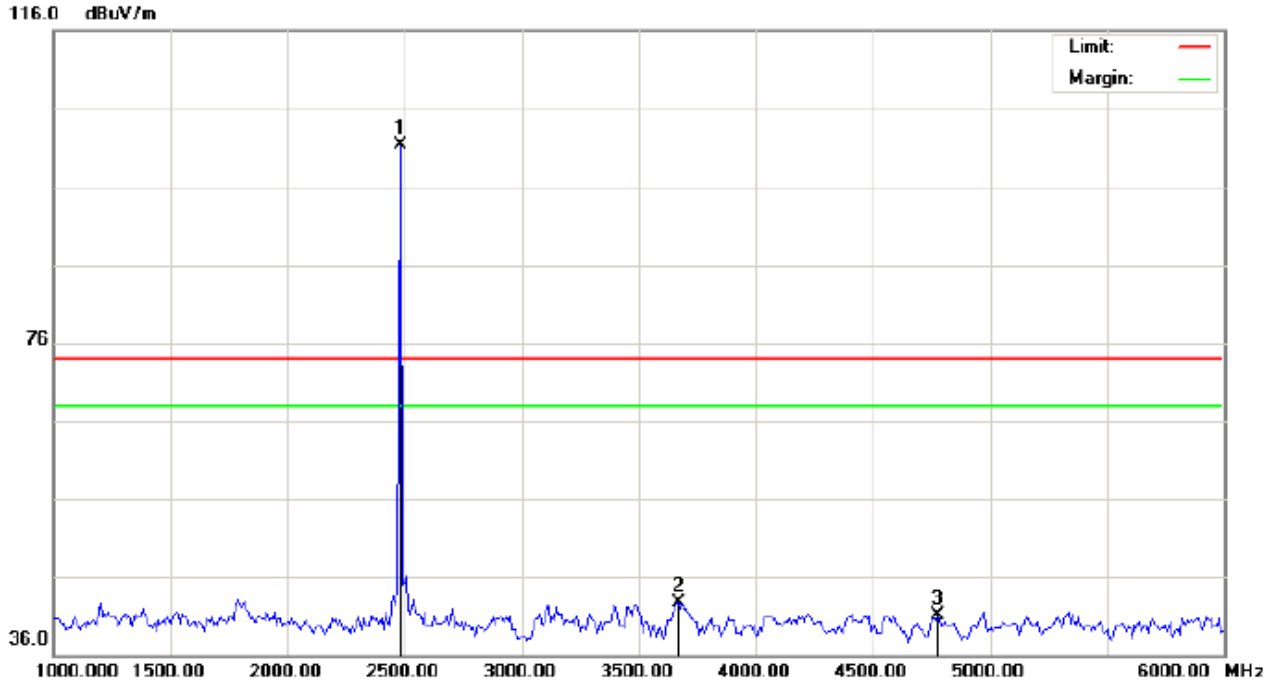
No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2440.000	91.39	10.36	101.75	74.00	27.75	peak			
2		4566.667	35.20	7.06	42.26	74.00	-31.74	peak			
3		5466.667	43.78	-1.14	42.64	74.00	-31.36	peak			

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The “Factor” value can be calculated automatically by software of measurement system.

RADIATED EMISSION TEST-(ABOVE 1GHZ)-HIGH CHANNEL-HORIZONTAL



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Freedom Bluetooth Speaker
M/N: 750-910-JHE
Mode: High Channel TX
Note:

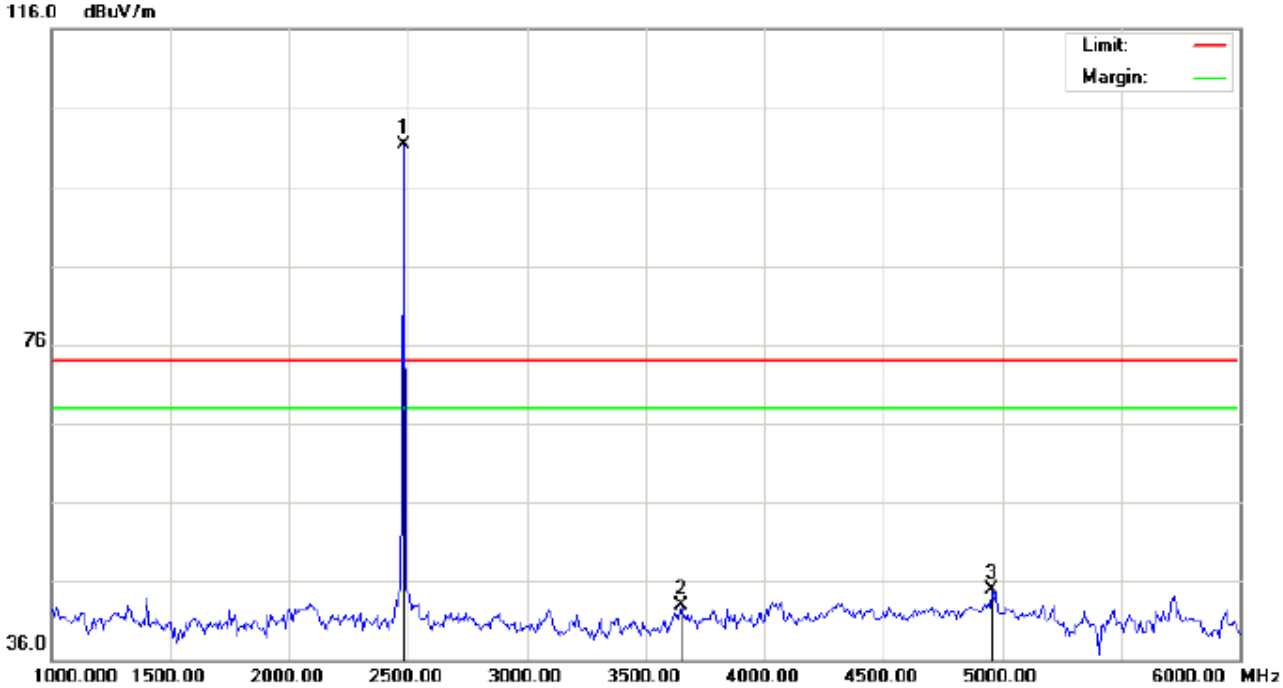
Polarization: *Horizontal*
Power:
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	.	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2480.000	90.93	10.41	101.34	74.00	27.34	peak			
2		3666.667	29.62	13.14	42.76	74.00	-31.24	peak			
3		4775.000	33.44	7.61	41.05	74.00	-32.95	peak			

RESULT: PASS

RADIATED EMISSION TEST-(ABOVE 1GHZ)-HIGH CHANNEL-VERTICAL



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Freedom Bluetooth Speaker
M/N: 750-910-JHE
Mode: High Channel TX
Note:

Polarization: *Vertical*
Power:
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	.	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2480.000	90.97	10.41	101.38	74.00	27.38	peak			
2		3650.000	29.84	13.03	42.87	74.00	-31.13	peak			
3		4958.333	36.75	8.09	44.84	74.00	-29.16	peak			

RESULT: PASS

Note: 6~25GHz at least have 20dB margin. No recording in the test report.

Factor=Antenna Factor+ Cable loss-Amplifier gain,

Margin=Measurement-Limit.

The “Factor” value can be calculated automatically by software of measurement system.

8. BAND EDGE EMISSION

8.1. MEASUREMENT PROCEDURE

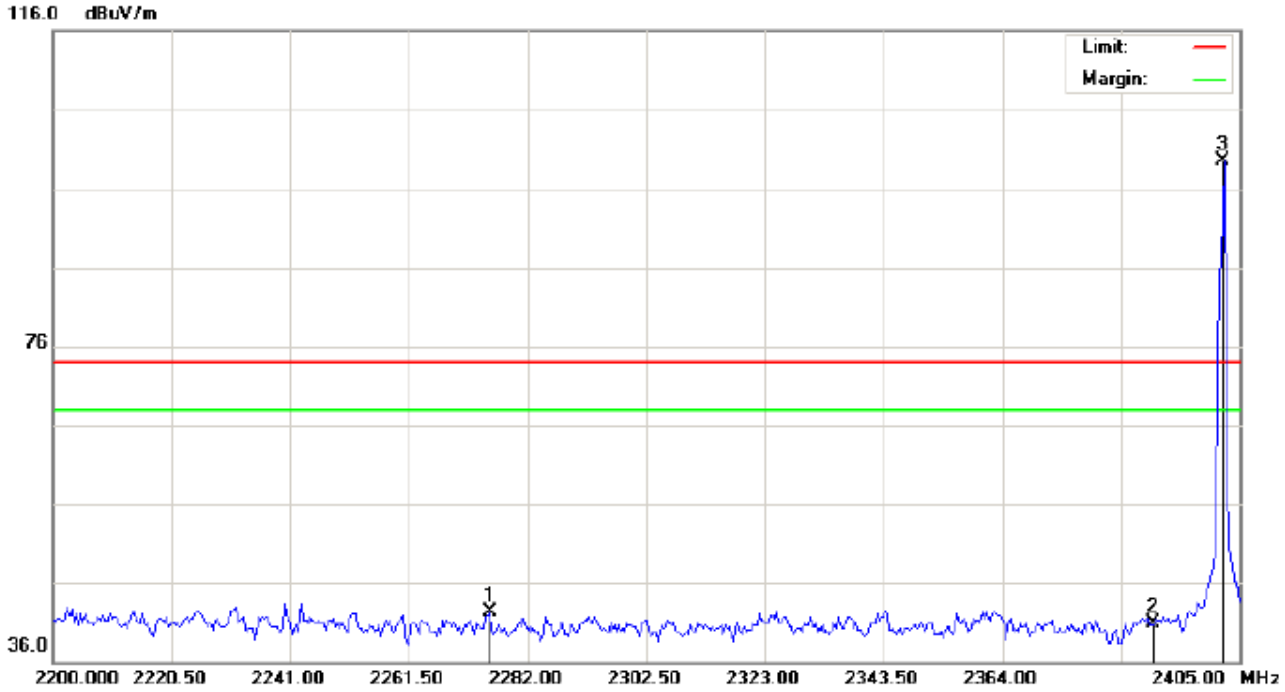
1. Set the EUT Work on the top, the bottom operation frequency individually.
2. Set SPA Start or Stop Frequency=Operation Frequency, RBW>=100kHz, VBW>=3*RBW, Center frequency =Operation frequency
3. The band edges was measured and recorded.

8.2. TEST SET-UP

Radiated same as 7.2

8.3. TEST RESULT

TEST PLOT OF BAND EDGE FOR LOW CHANNEL -Horizontal



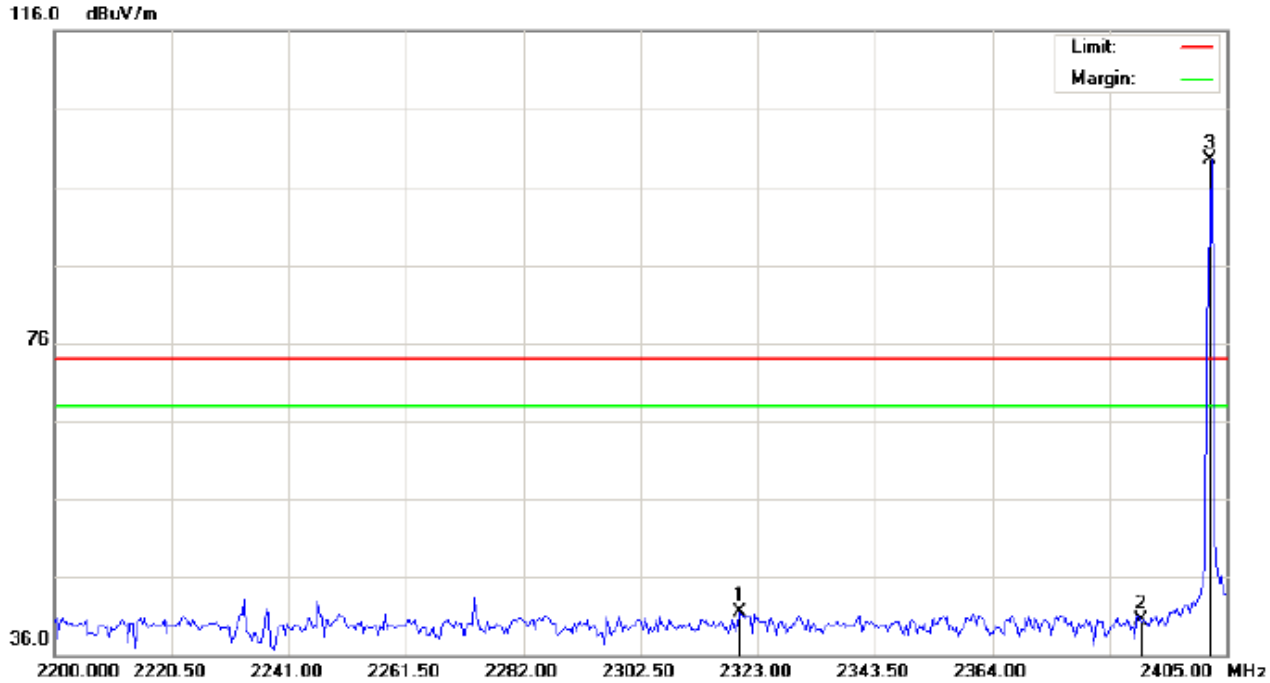
Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Freedom Bluetooth Speaker
M/N: 750-910-JHE
Mode: Low Channel TX
Note:

Polarization: ***Horizontal***
Power:
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2275.508	32.16	10.18	42.34	74.00	-31.66	peak			
2		2390.000	30.50	10.31	40.81	74.00	-33.19	peak			
3	*	2402.000	89.22	10.32	99.54	74.00	25.54	peak			

TEST PLOT OF BAND EDGE FOR LOW CHANNEL - Vertical



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Freedom Bluetooth Speaker
M/N: 750-910-JHE
Mode: Low Channel TX
Note:

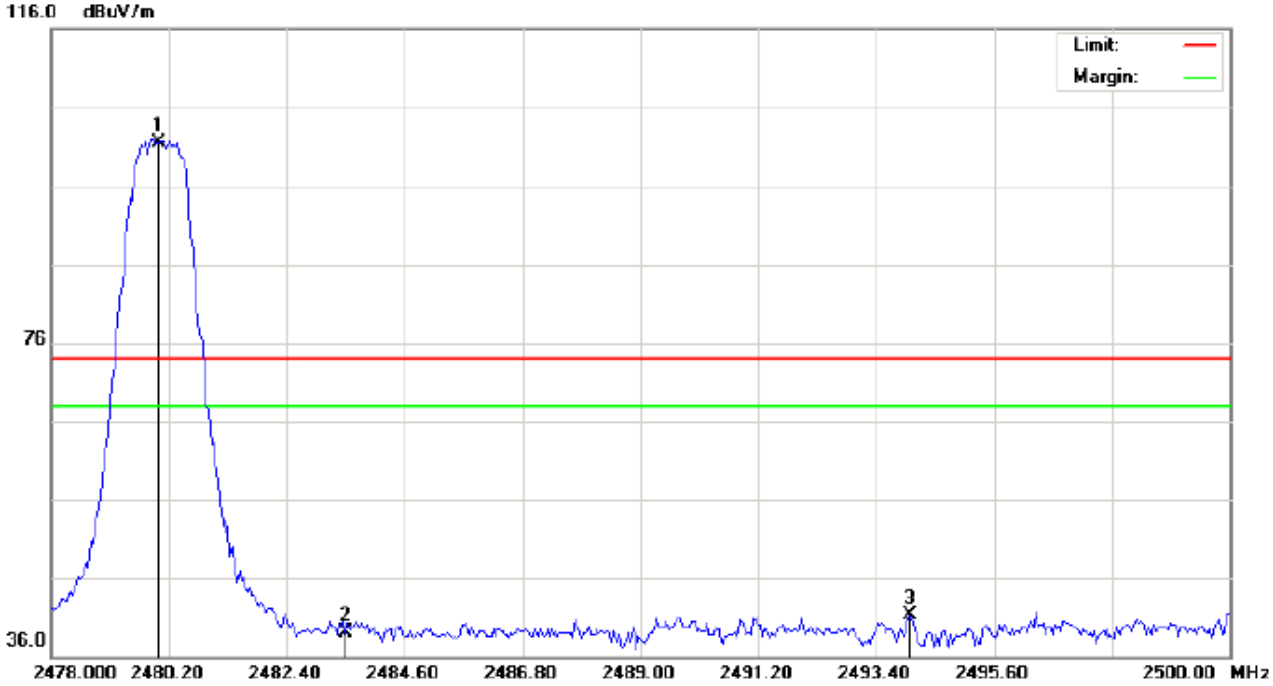
Polarization: *Vertical*
Power:
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2319.925	31.30	10.23	41.53	74.00	-32.47	peak			
2		2390.000	30.21	10.31	40.52	74.00	-33.48	peak			
3	*	2402.000	89.09	10.32	99.41	74.00	25.41	peak			

RESULT: PASS

TEST PLOT OF BAND EDGE FOR HIGH CHANNEL –Horizontal



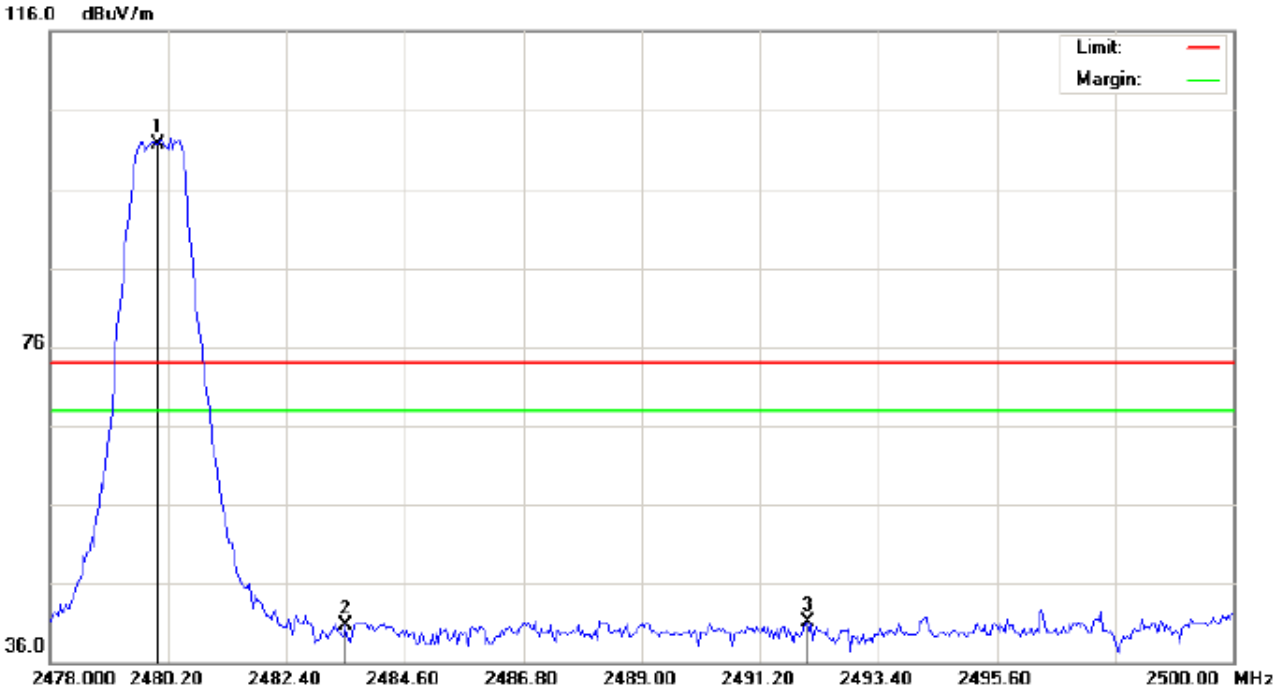
Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Freedom Bluetooth Speaker
M/N: 750-910-JHE
Mode: High Channel TX
Note:

Polarization: ***Horizontal***
Power:
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	.	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2480.000	91.05	10.41	101.46	74.00	27.46	peak			
2		2483.500	28.69	10.41	39.10	74.00	-34.90	peak			
3		2494.023	30.85	10.42	41.27	74.00	-32.73	peak			

TEST PLOT OF BAND EDGE FOR HIGH CHANNEL -Vertical



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Freedom Bluetooth Speaker
M/N: 750-910-JHE
Mode: High Channel TX
Note:

Polarization: *Vertical*
Power:
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2480.000	91.28	10.41	101.69	74.00	27.69	peak			
2		2483.500	30.26	10.41	40.67	74.00	-33.33	peak			
3		2492.080	30.61	10.42	41.03	74.00	-32.97	peak			

RESULT: PASS

9. 6DB BANDWIDTH

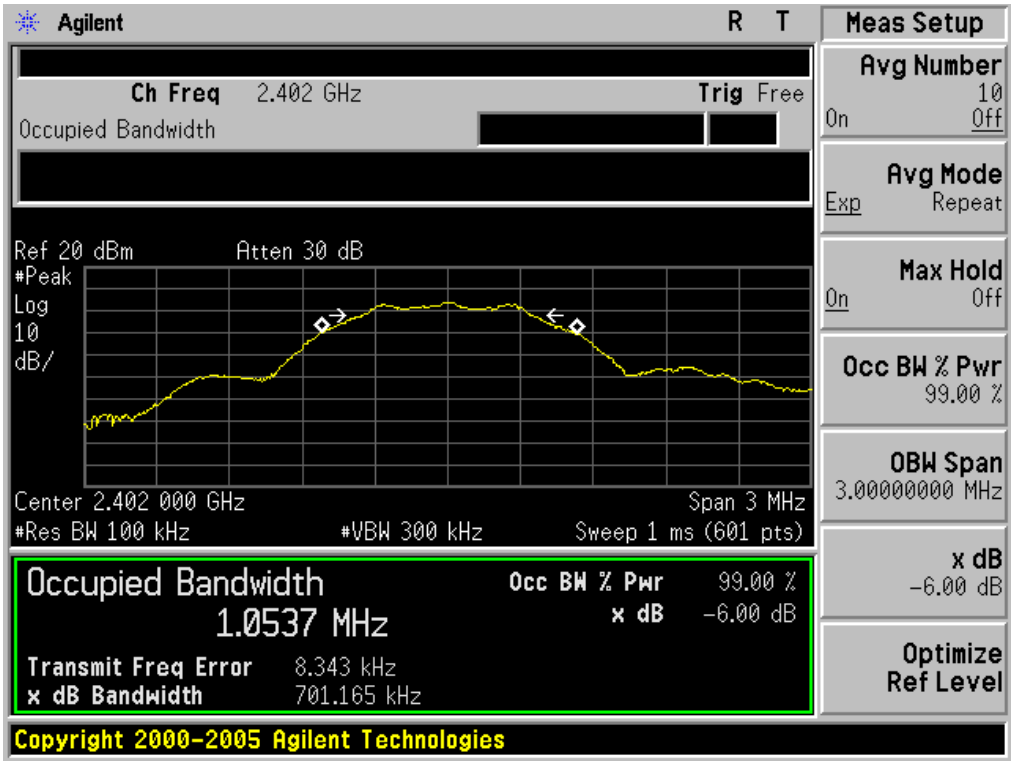
9.1. TEST PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 KHz, VBW⩾3*RBW.
4. Set SPA Trace 1 Max hold, then View.

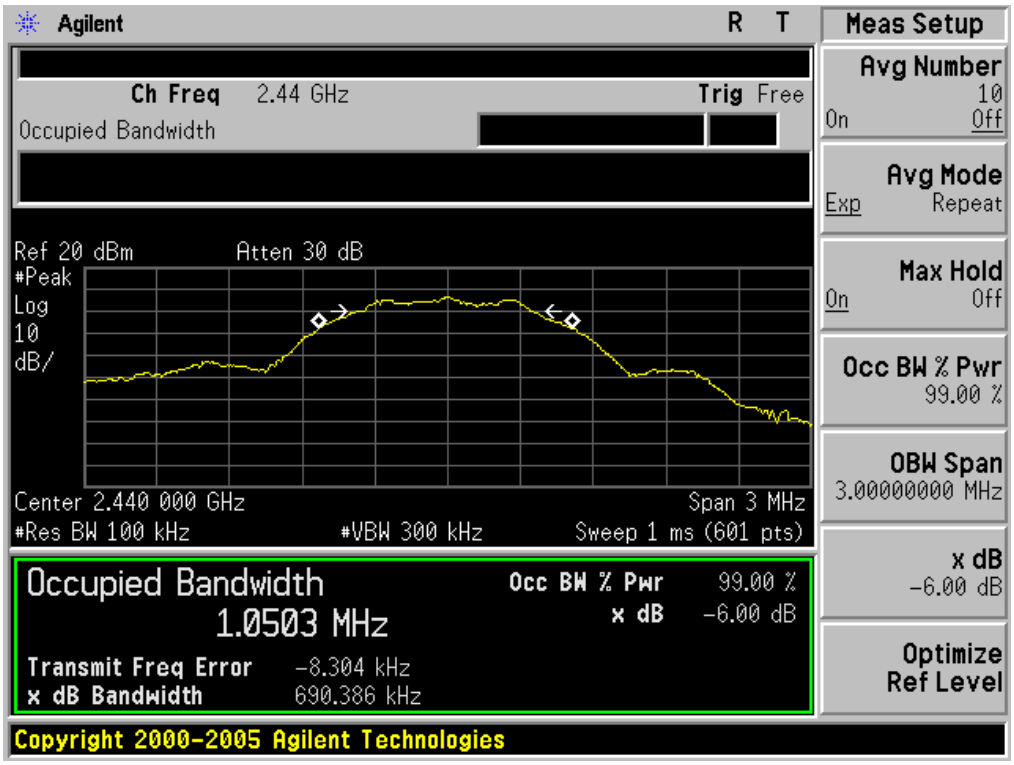
9.2. SUMMARY OF TEST RESULTS/PLOTS

Channel	6dB Bandwidth (KHz)	Minimum Limit (KHz)	Pass/Fail
Low	701.165	500KHz	Pass
Middle	690.386		Pass
High	693.330		Pass

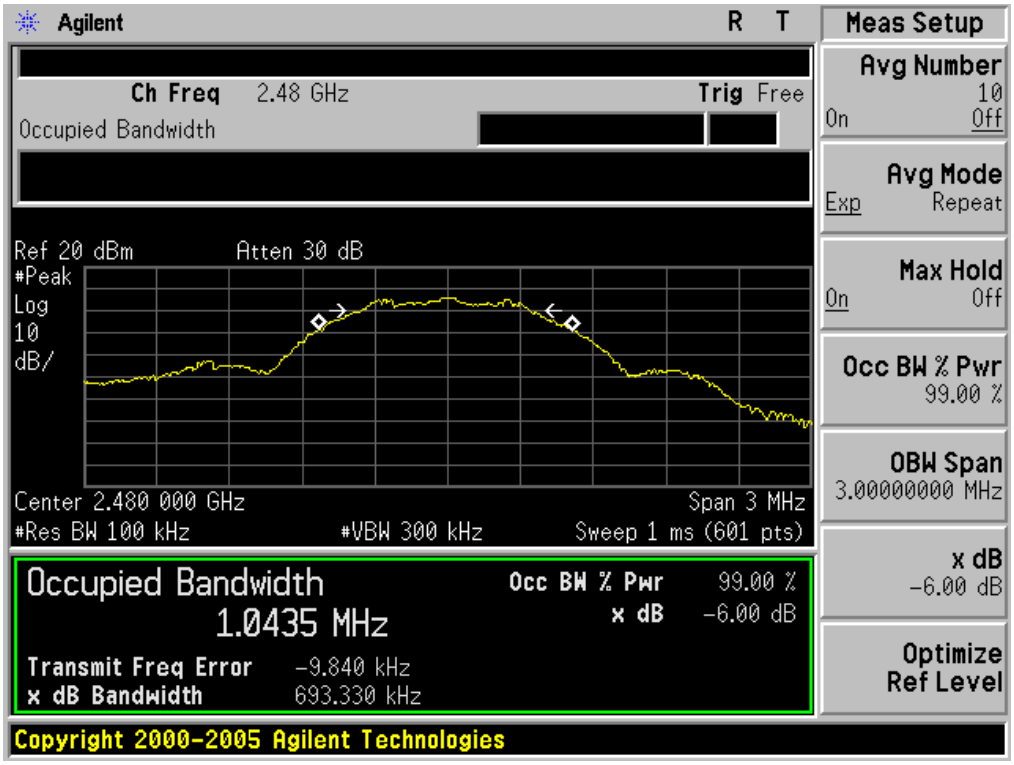
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



10. CONDUCTED OUTPUT POWER

10.1. MEASUREMENT PROCEDURE

For peak power test:

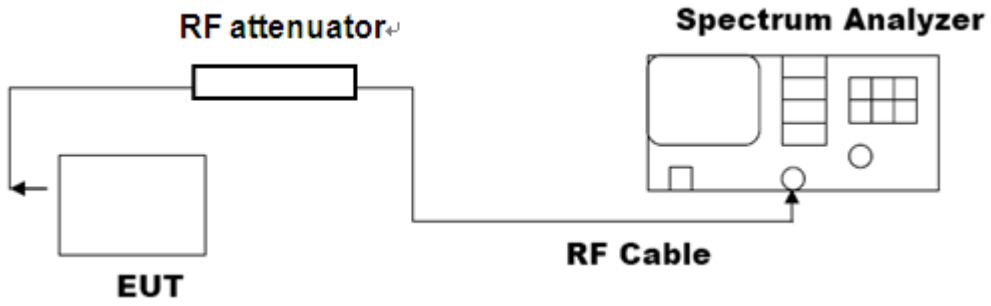
1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, middle and the bottom operation frequency individually.
3. Use the following spectrum analyzer settings:
   a) Set the RBW ≥ DTS bandwidth.
   b) Set VBW ≥ 3 RBW.
   c) Set span ≥ 3 x RBW
   d) Sweep time = auto couple.
   e) Detector = peak.
   f) Trace mode = max hold.
   g) Allow trace to fully stabilize.
   h) Use peak marker function to determine the peak amplitude level.

4. Allow the trace to stabilize.
5. Record the result form the Spectrum Analyzer.

Note： The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements

10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

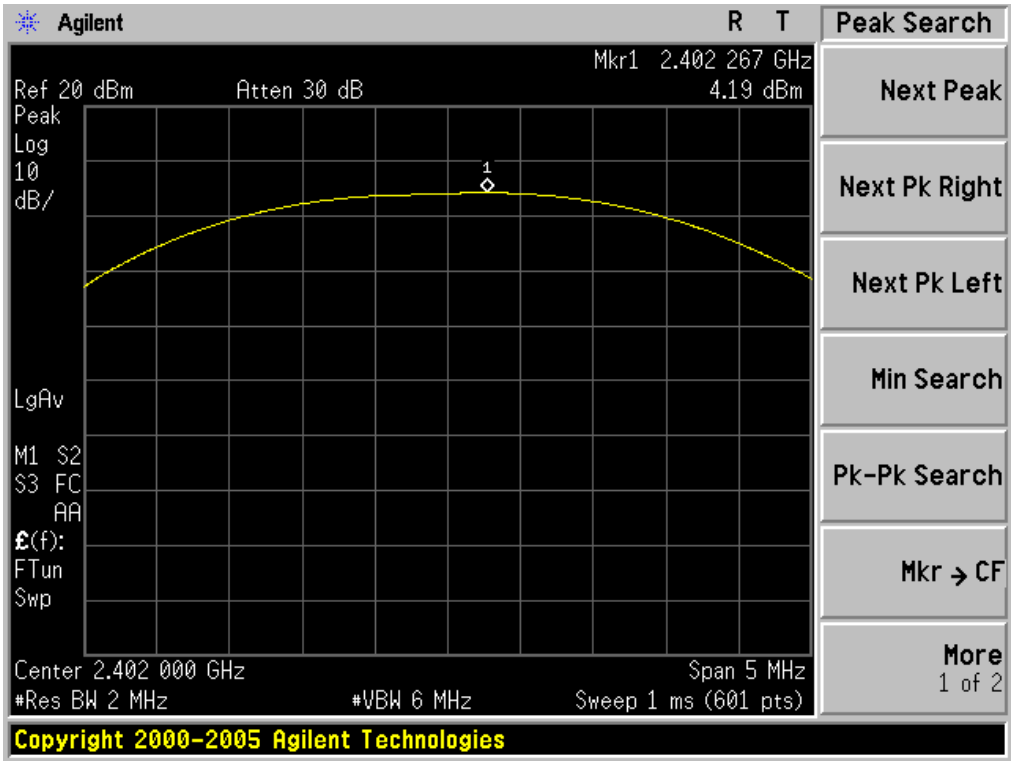
Setup Diagram for Peak Power



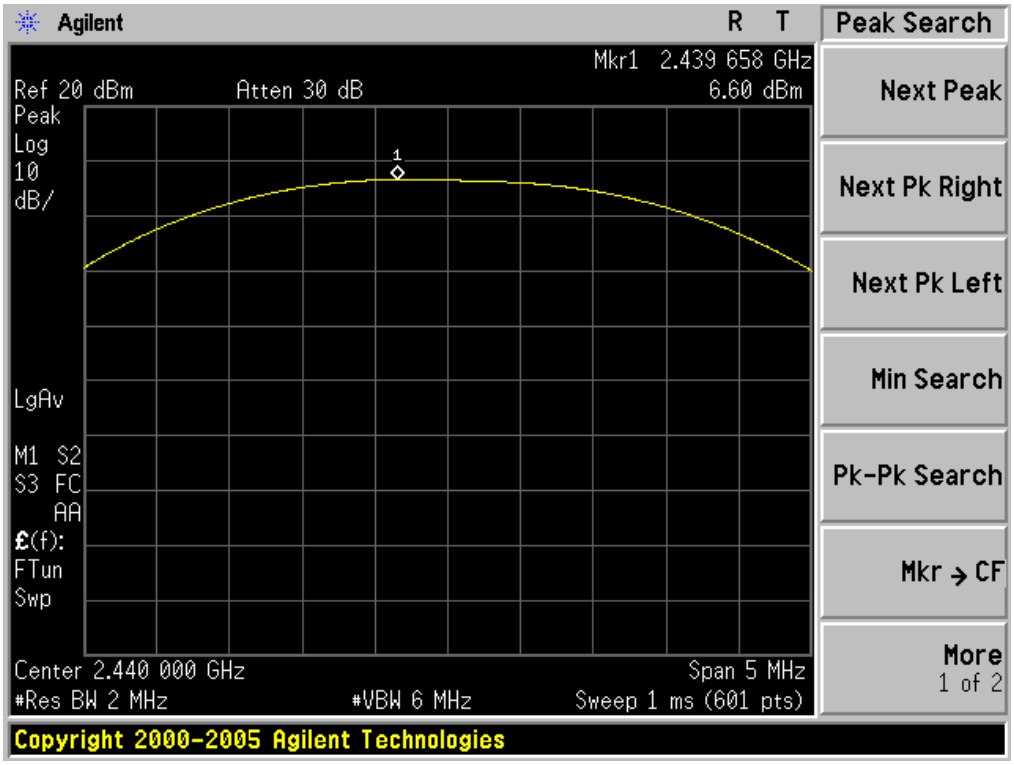
10.3. LIMITS AND MEASUREMENT RESULT

Channel	Peak Power (dBm)	Applicable Limits (dBm)	Pass/Fail
Low Channel	4.19	30	Pass
Middle Channel	6.60	30	Pass
High Channel	6.33	30	Pass

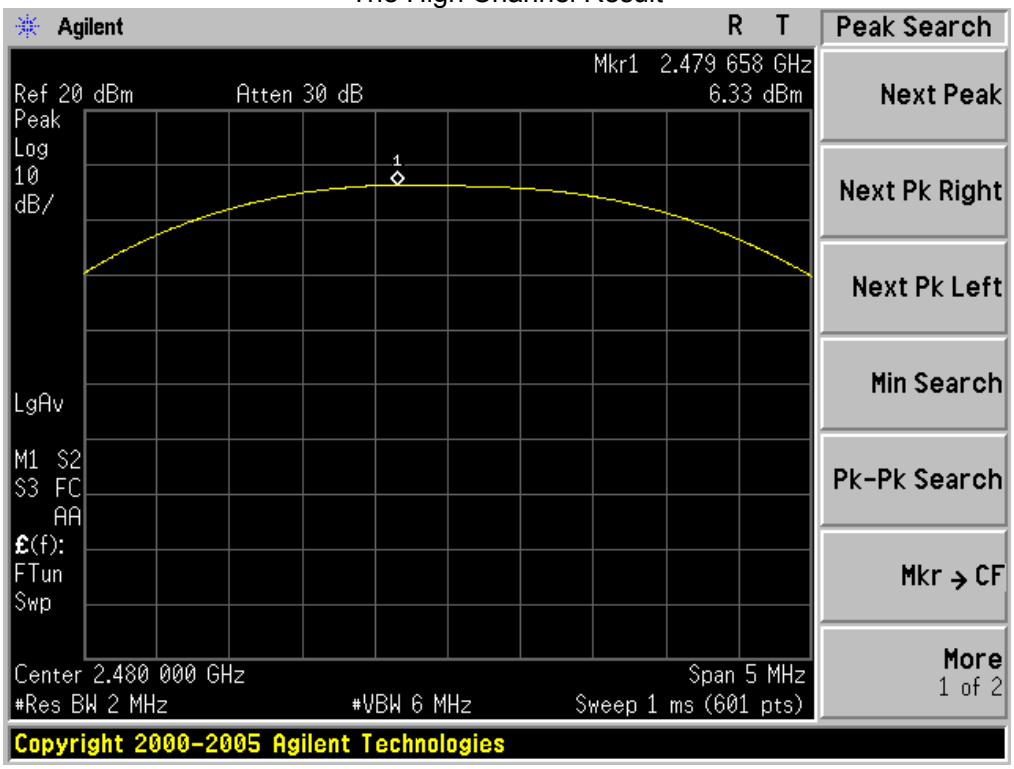
The Low Channel Result



The Middle Channel Result



The High Channel Result



11. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY

11.1 MEASUREMENT PROCEDURE

(1). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator

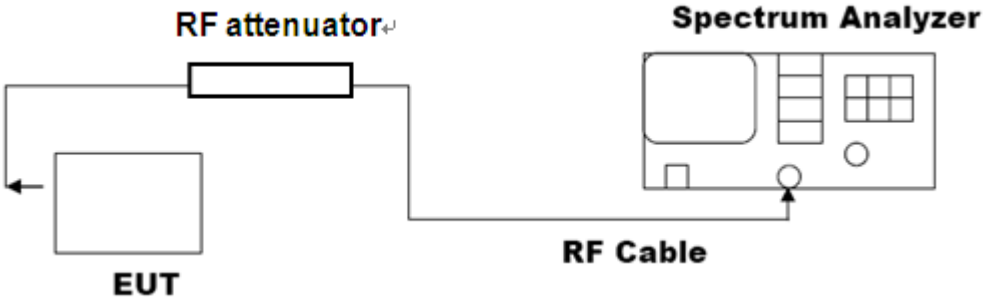
(2). Set the EUT Work on the top, the middle and the bottom operation frequency individually.

(3). Set the span to 1.5times the DTS bandwidth, RBW: 3kHz<=RBW<=100KHz, VBW>=3*RBW

4). Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

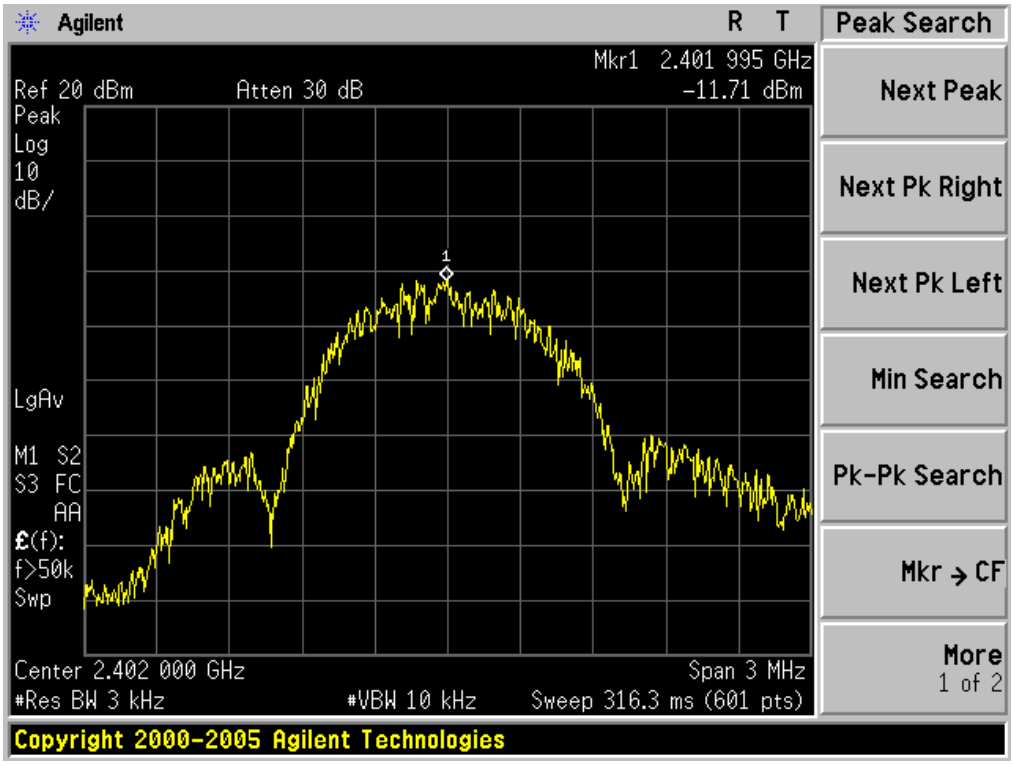
11.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



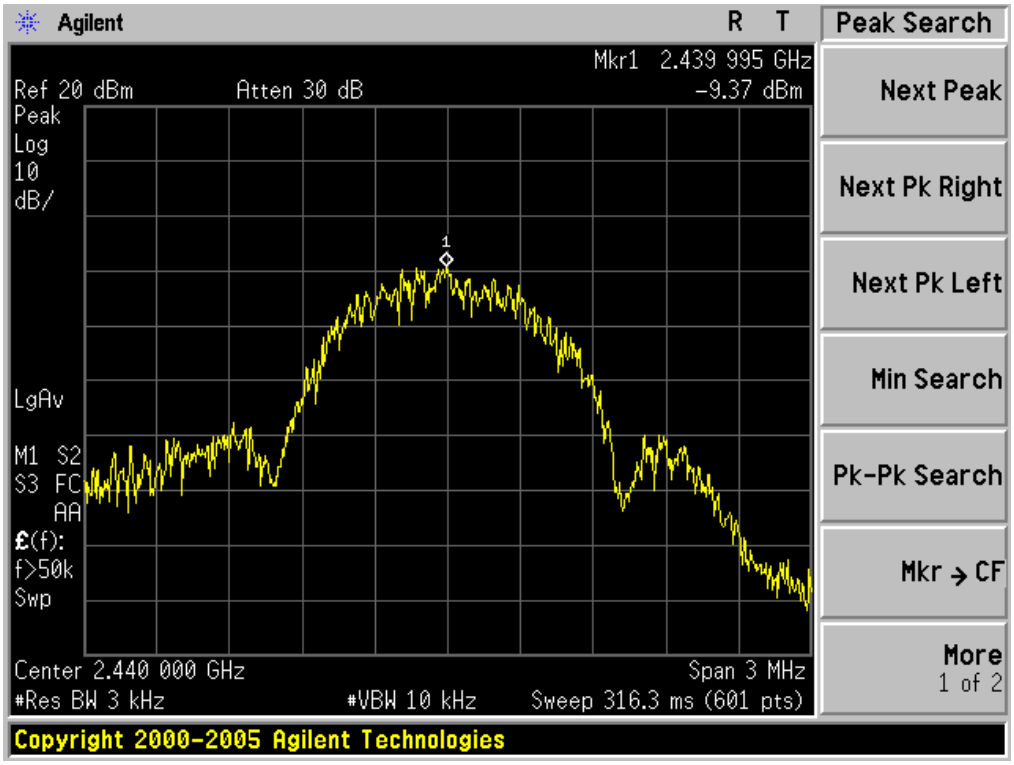
11.3 LIMITS AND MEASUREMENT RESULT

Channel No.	PSD (dBm/3KHz)	Limit (dBm/3KHz)	Result
Low Channel	-11.71	8	Pass
Middle Channel	-9.37	8	Pass
High Channel	-9.46	8	Pass

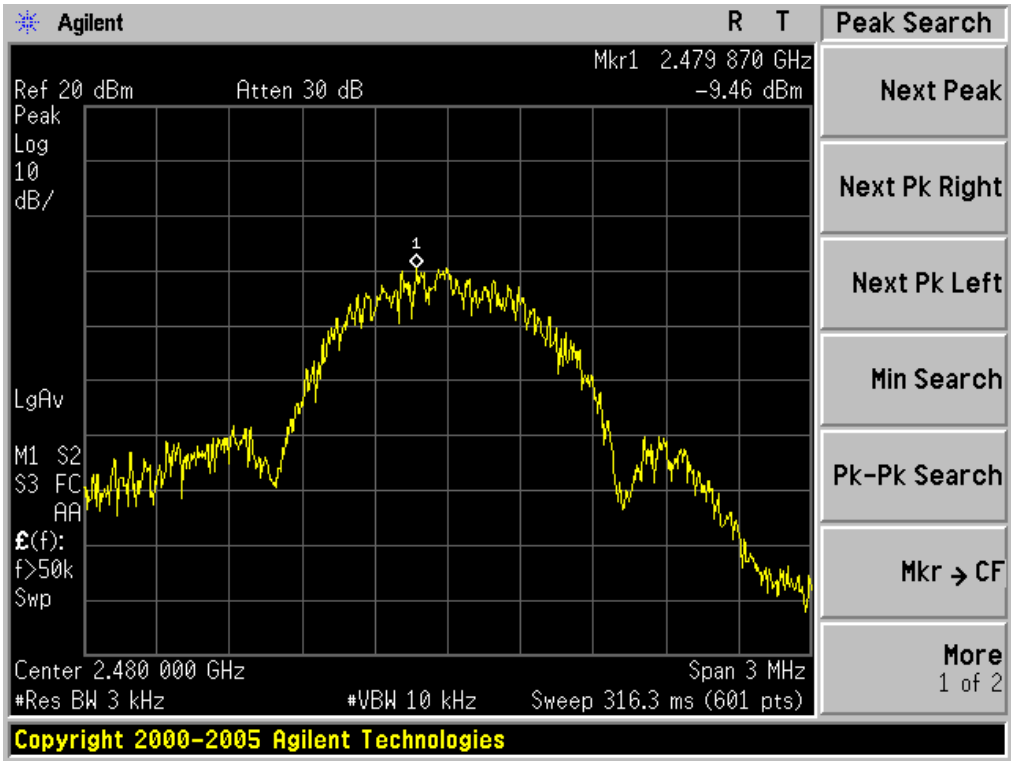
TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL



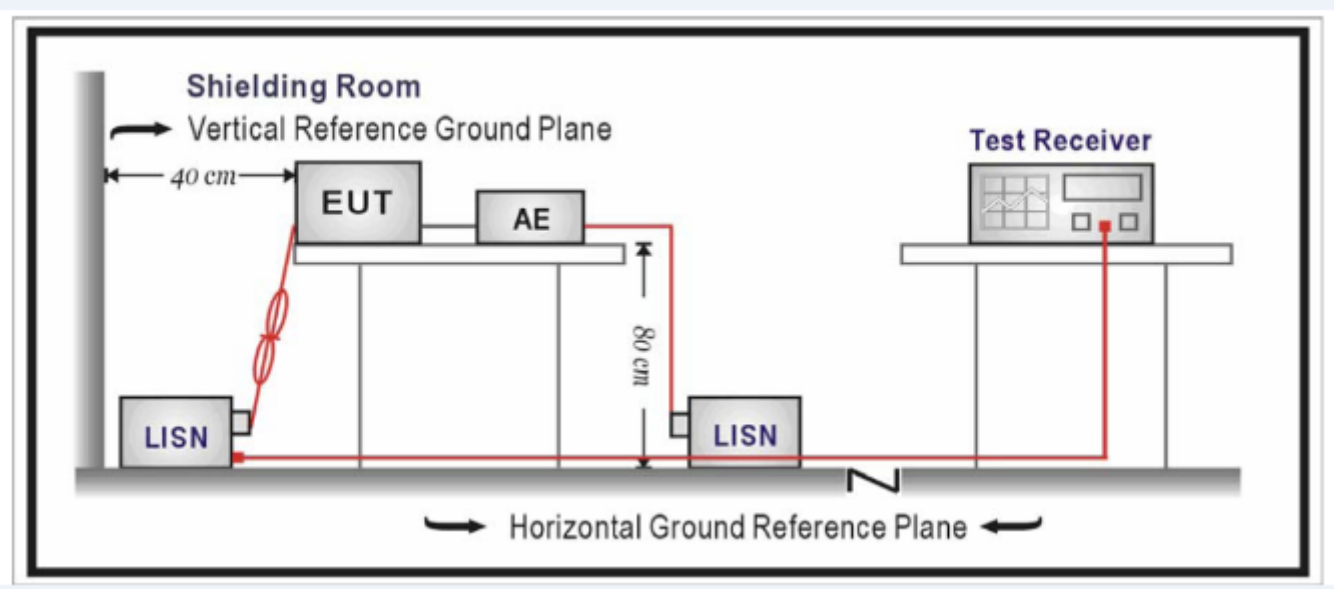
12. FCC LINE CONDUCTED EMISSION TEST

12.1 LIMITS

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

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

12.2 TEST SETUP



12.3 PRELIMINARY PROCEDURE

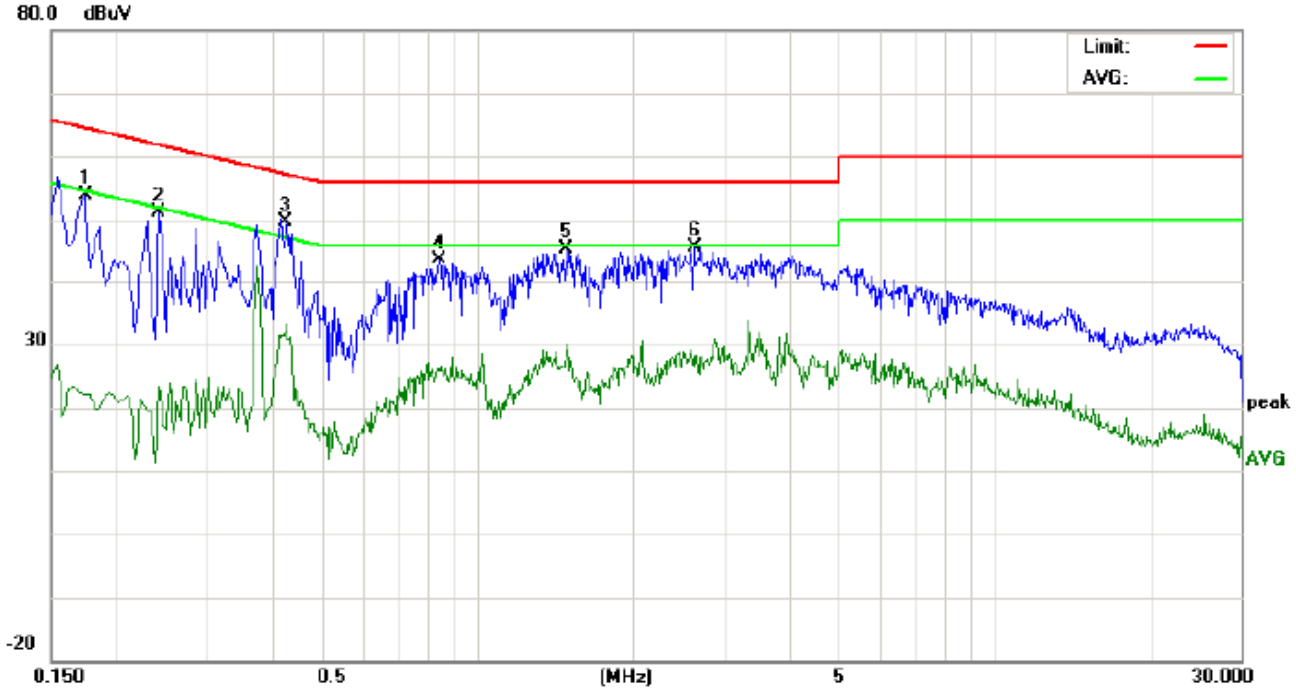
1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2) Support equipment, if needed, was placed as per ANSI C63.4.
3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4) All support equipments received AC120V/60Hz power from a LISN, if any.
5) The EUT received power by adapter which received power by a LISN.
6) The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7) Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8) During the above scans, the emissions were maximized by cable manipulation.
9) The following test mode(s) were scanned during the preliminary test.
   Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

12.4 FINAL TEST PROCEDURE

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

12.5 TEST RESULT OF POWER LINE

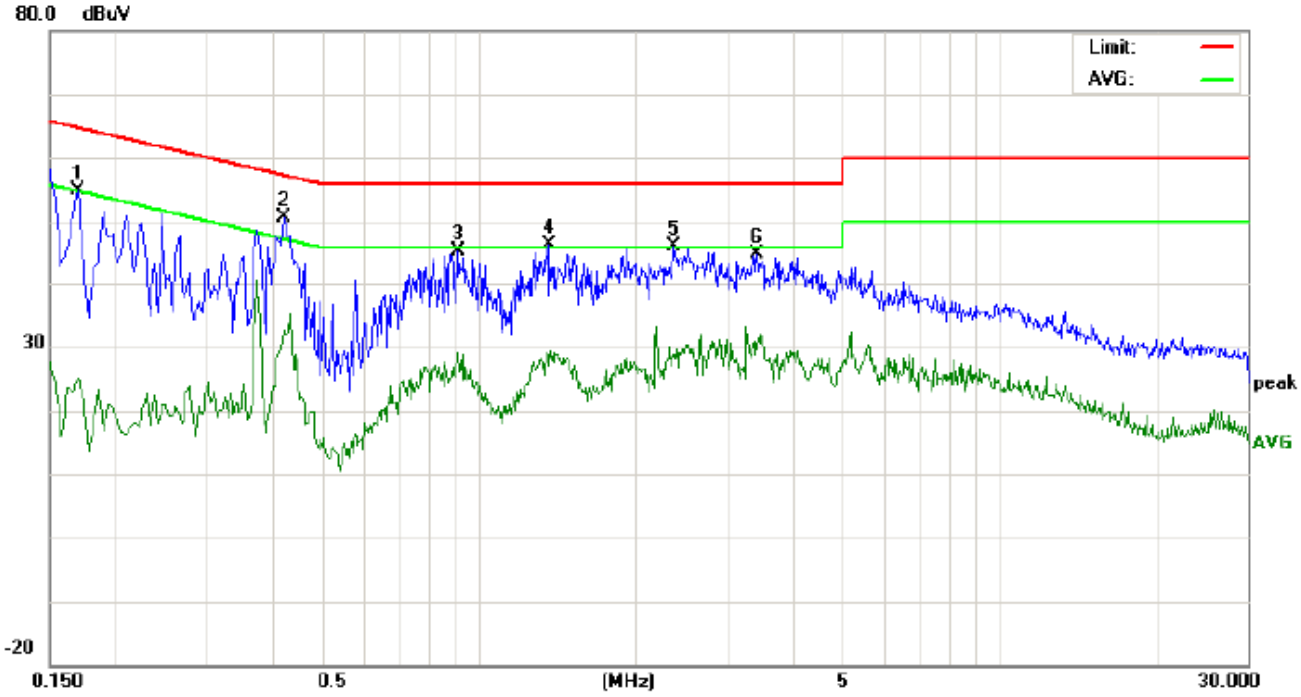
Line Conducted Emission Test Line 1-L



Site: Conduction | Phase: *L1* | Temperature: 23.3
Limit: FCC Class B Conduction(QP) | Power: | Humidity: 54.1 %
EUT: Freedom Bluetooth Speaker
M/N: 750-910-JHE
Mode: BT Link
Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1740	43.77		11.86	10.19	53.96		22.05	64.76	54.76	-10.80	-32.71	P	
2	0.2420	40.77		13.22	10.26	51.03		23.48	62.02	52.02	-10.99	-28.54	P	
3	0.4260	40.53		14.19	10.35	50.88		24.54	57.33	47.33	-6.45	-22.79	P	
4	0.8460	33.23		15.53	10.34	43.57		25.87	56.00	46.00	-12.43	-20.13	P	
5	1.4940	34.91		17.96	10.38	45.29		28.34	56.00	46.00	-10.71	-17.66	P	
6	2.6300	35.18		17.56	10.46	45.64		28.02	56.00	46.00	-10.36	-17.98	P	

Line Conducted Emission Test Line 2-N



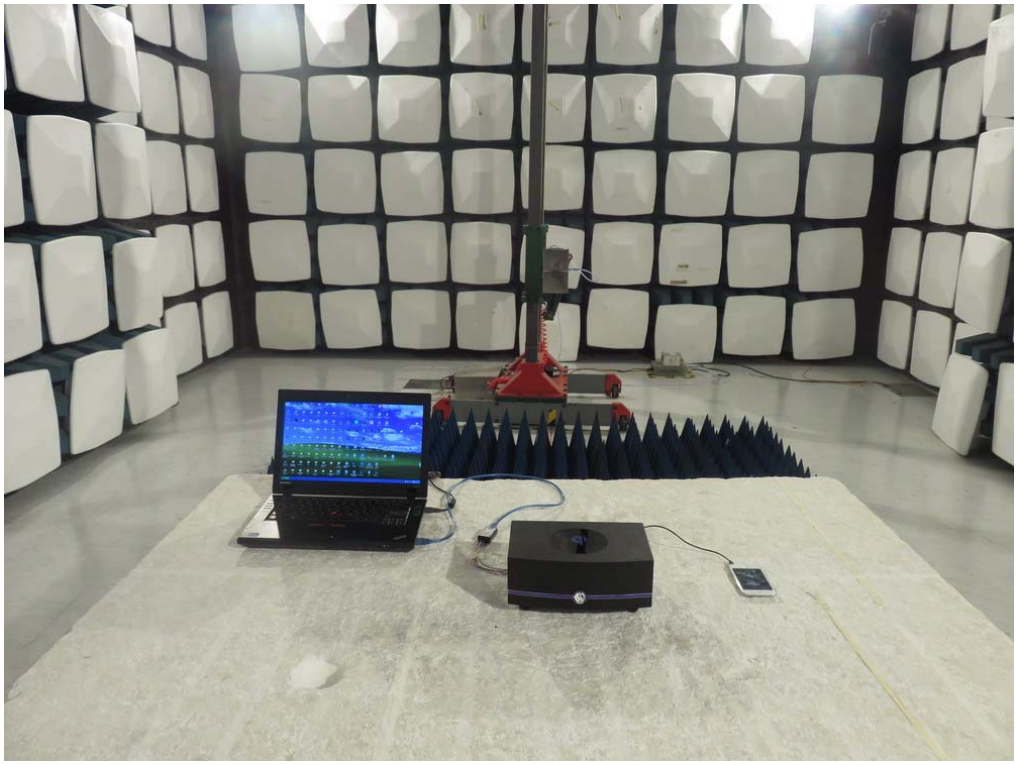
Site: Conduction
Phase: N
Temperature: 23.3
Limit: FCC Class B Conduction(QP)
Power:
Humidity: 54.1 %
EUT: Freedom Bluetooth Speaker
M/N: 750-910-JHE
Mode: BT Link
Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1700	44.76		15.00	10.18	54.94		25.18	64.96	54.96	-10.02	-29.78	P	
2	0.4220	40.26		22.22	10.35	50.61		32.57	57.41	47.41	-6.80	-14.84	P	
3	0.9140	34.99		18.81	10.40	45.39		29.21	56.00	46.00	-10.61	-16.79	P	
4	1.3619	35.90		18.59	10.38	46.28		28.97	56.00	46.00	-9.72	-17.03	P	
5	2.3699	35.86		18.56	10.38	46.24		28.94	56.00	46.00	-9.76	-17.06	P	
6	3.4180	34.43		19.53	10.52	44.95		30.05	56.00	46.00	-11.05	-15.95	P	

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC LINE CONDUCTED EMISSION TEST SETUP

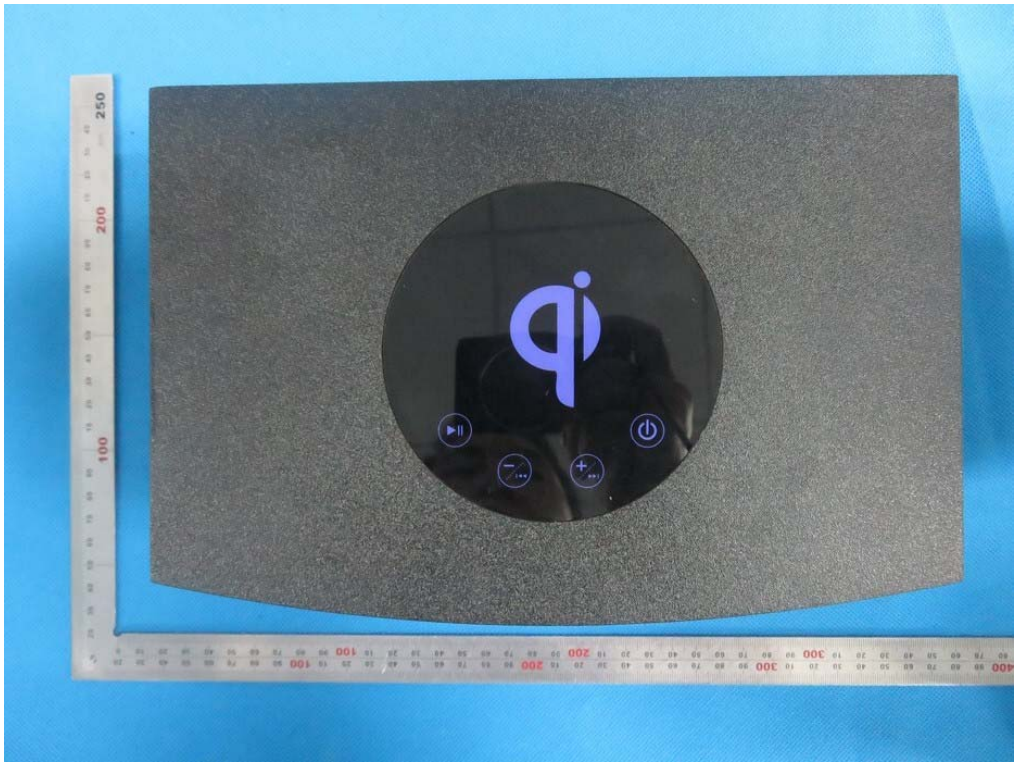
FCC RADIATED EMISSION TEST SETUP



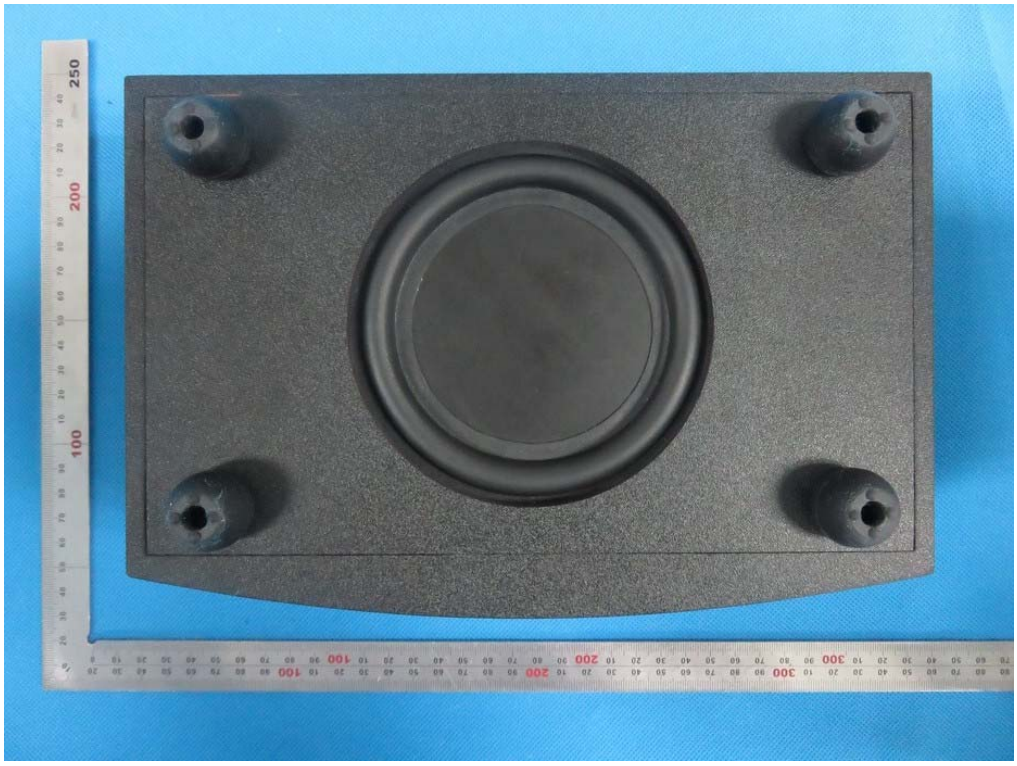
APPENDIX B: PHOTOGRAPHS OF EUT

TOTAL VIEW OF EUT

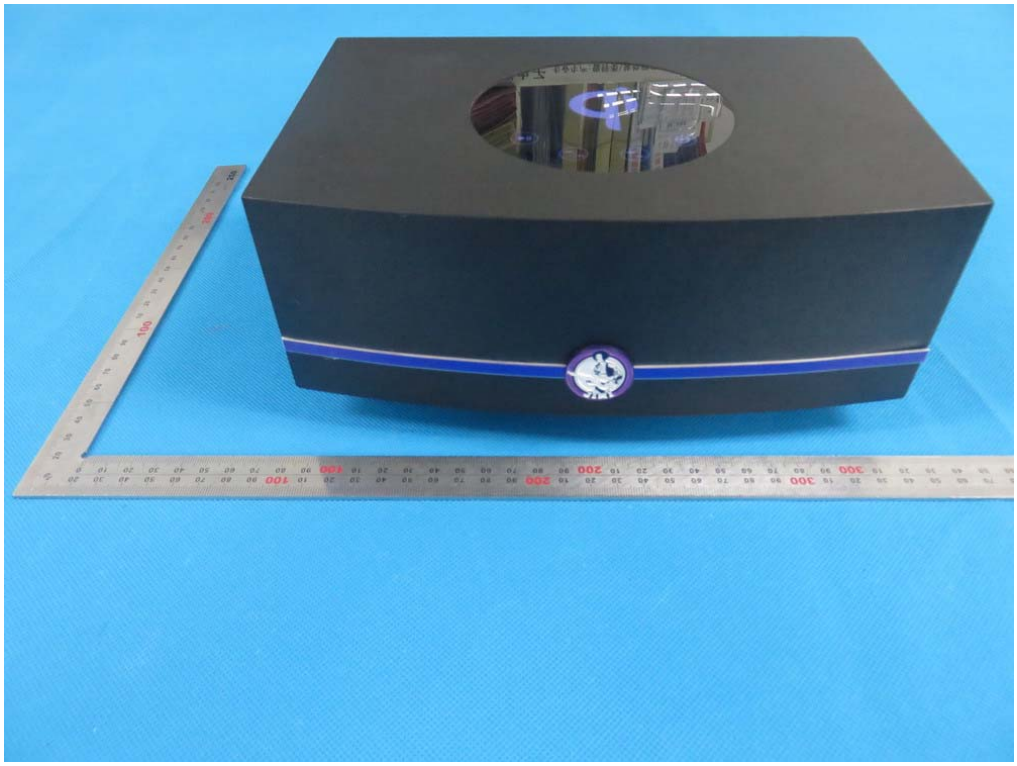
TOP VIEW OF EUT



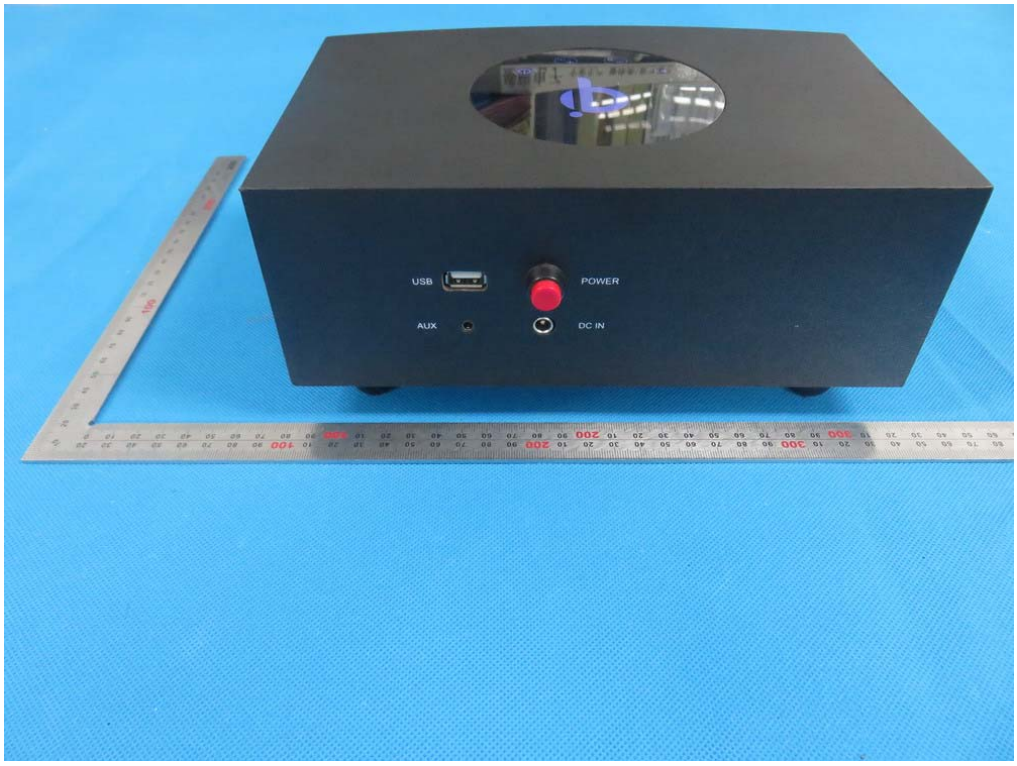
BOTTOM VIEW OF EUT



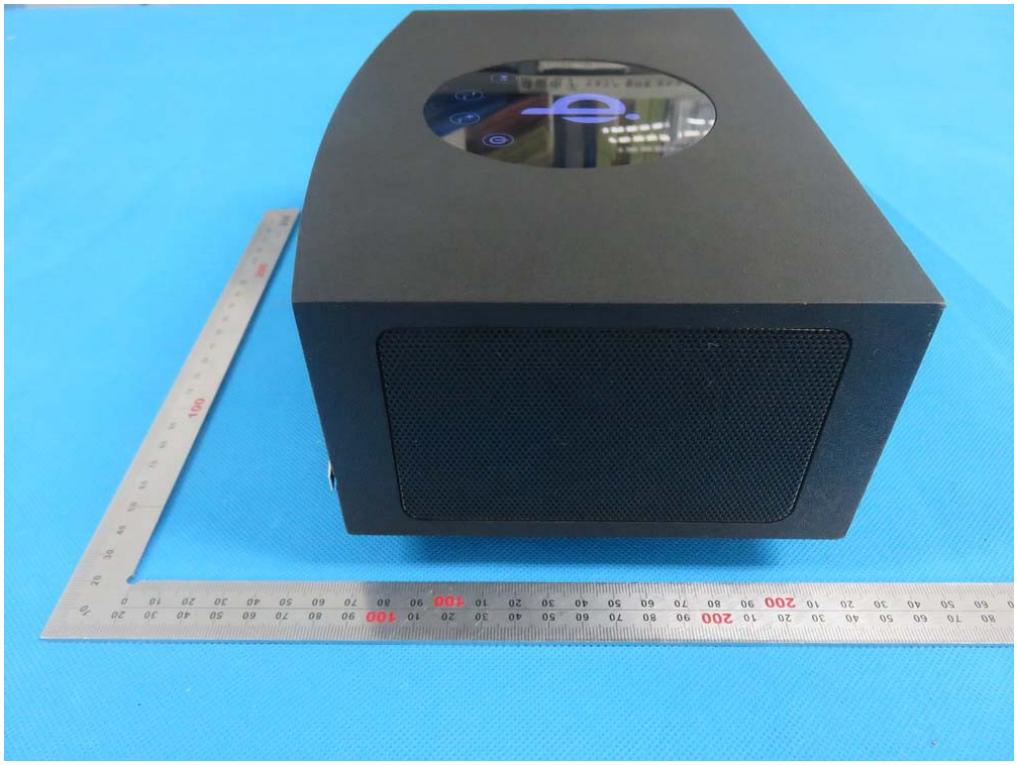
FRONT VIEW OF EUT



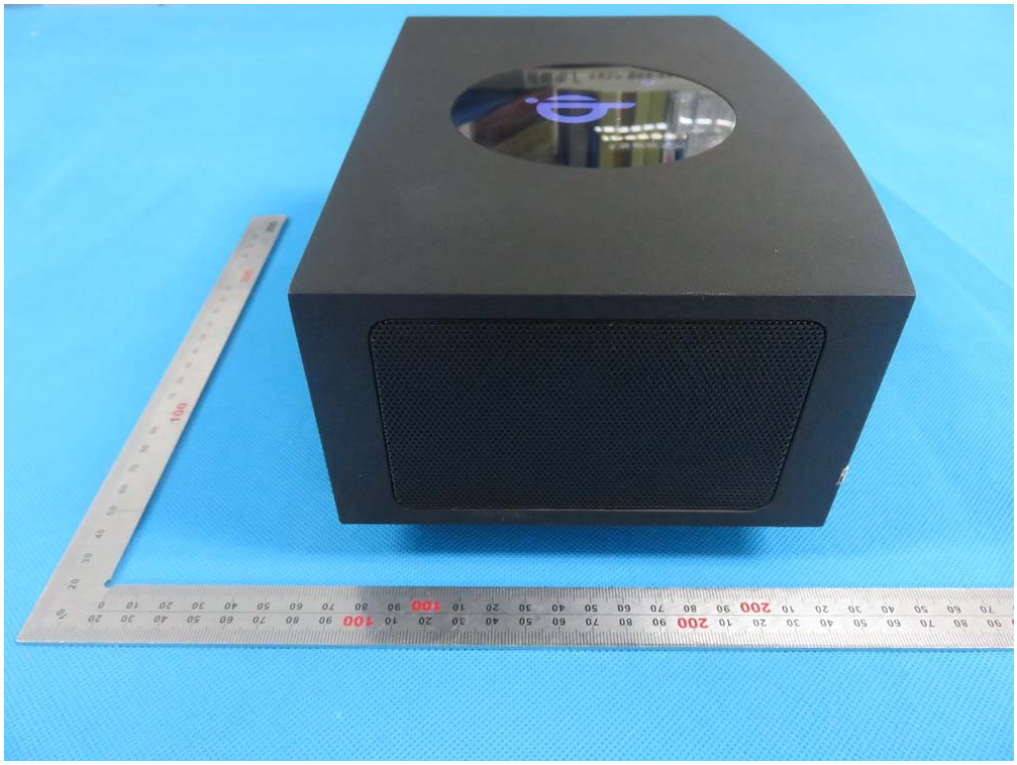
BACK VIEW OF EUT



LEFT VIEW OF EUT



RIGHT VIEW OF EUT

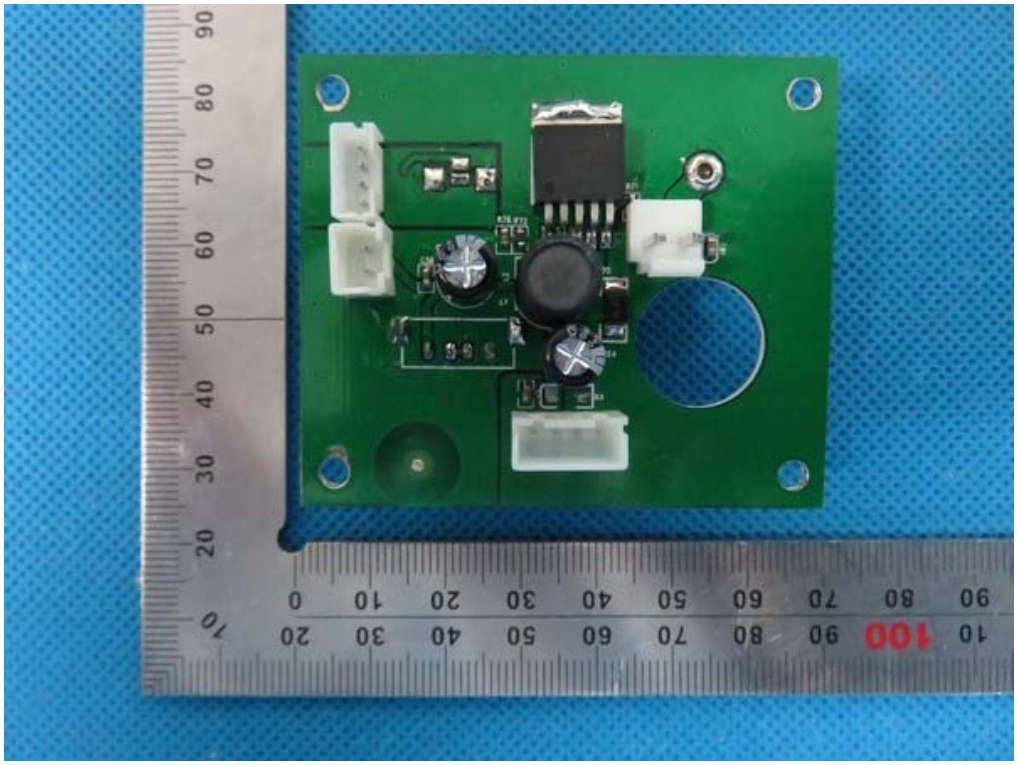


VIEW OF EUT (Port)

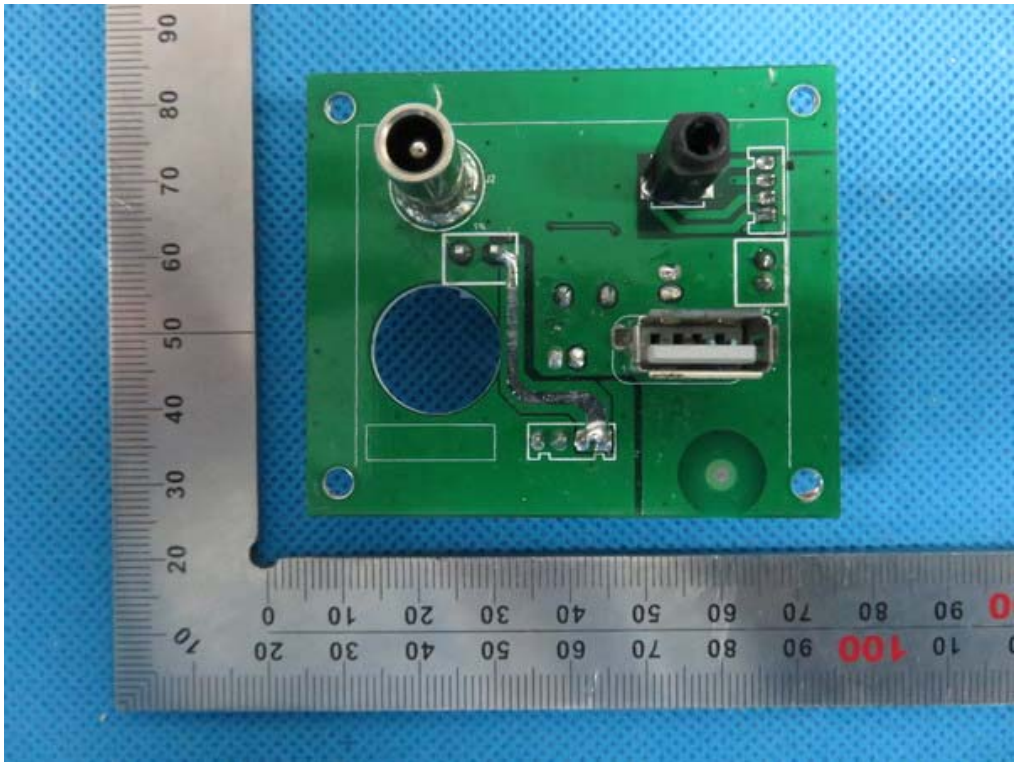
VIEW OF EUT (Adapter)

OPEN VIEW OF EUT

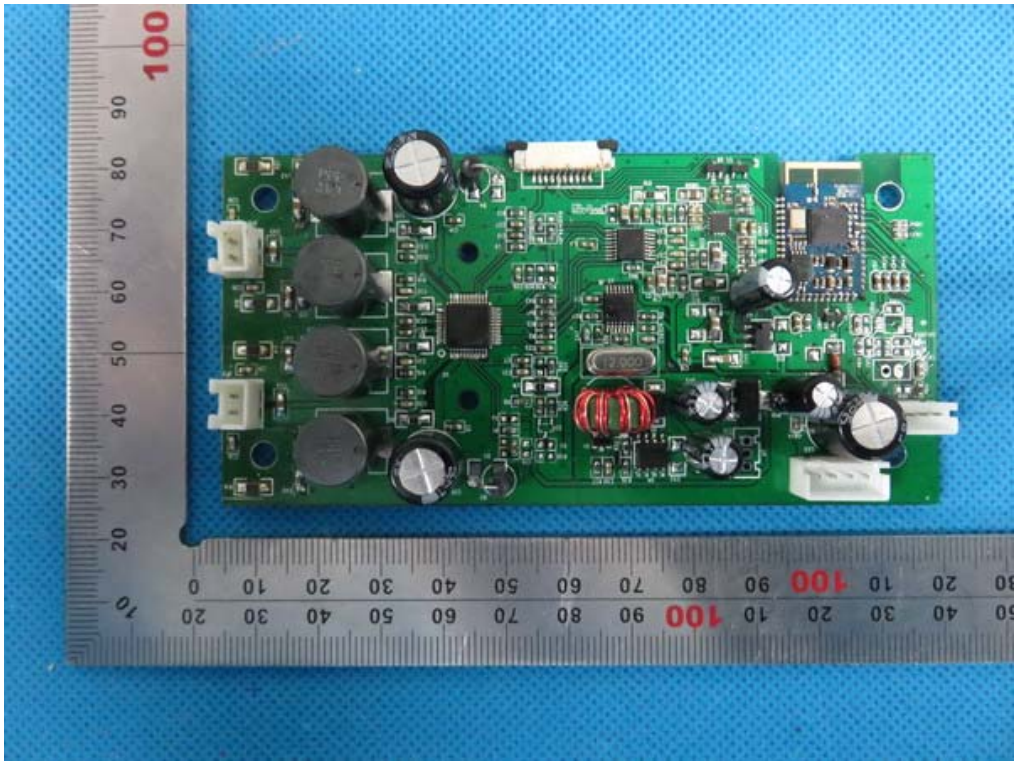
INTERNAL VIEW OF EUT-1



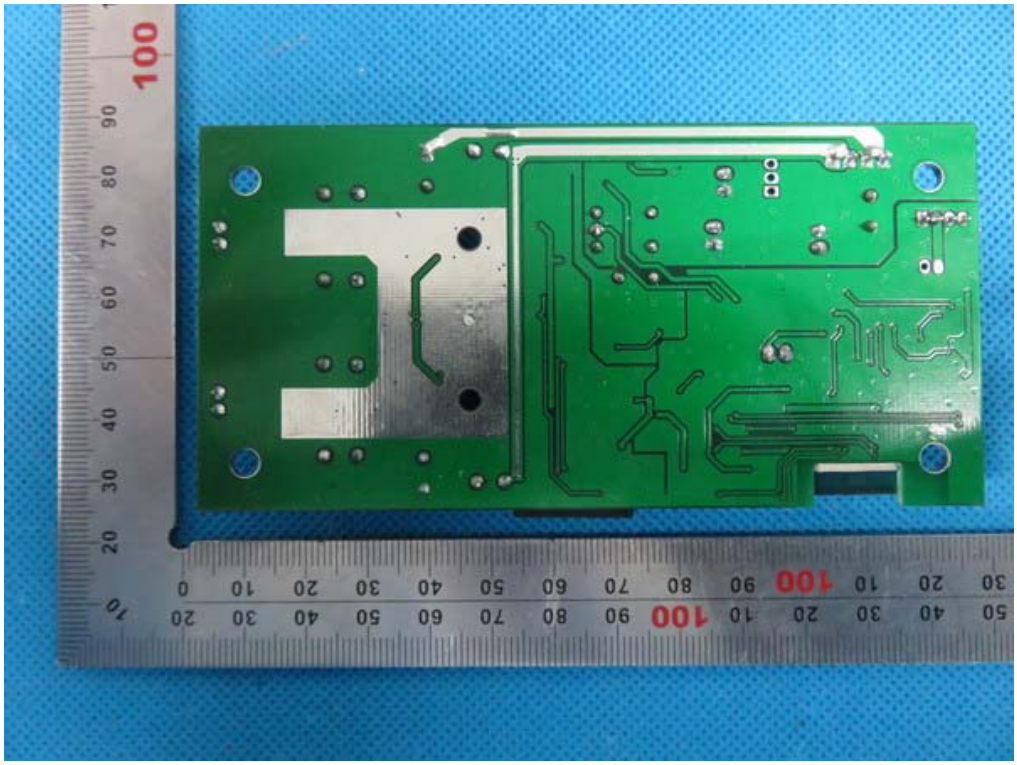
INTERNAL VIEW OF EUT-2



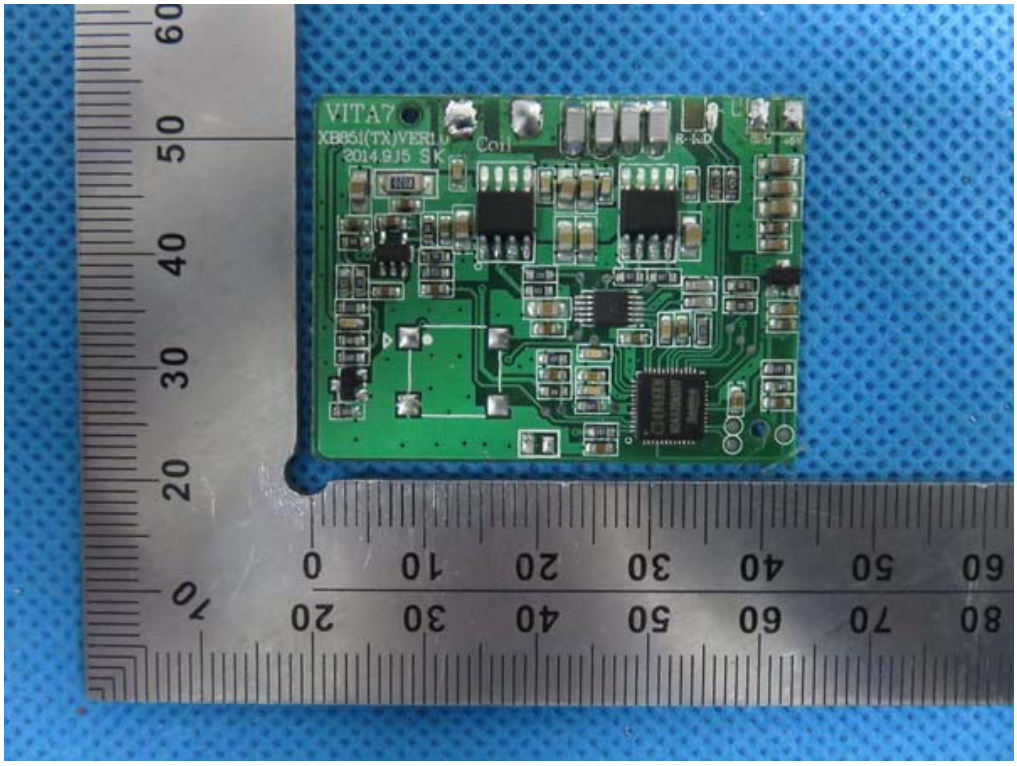
INTERNAL VIEW OF EUT-3



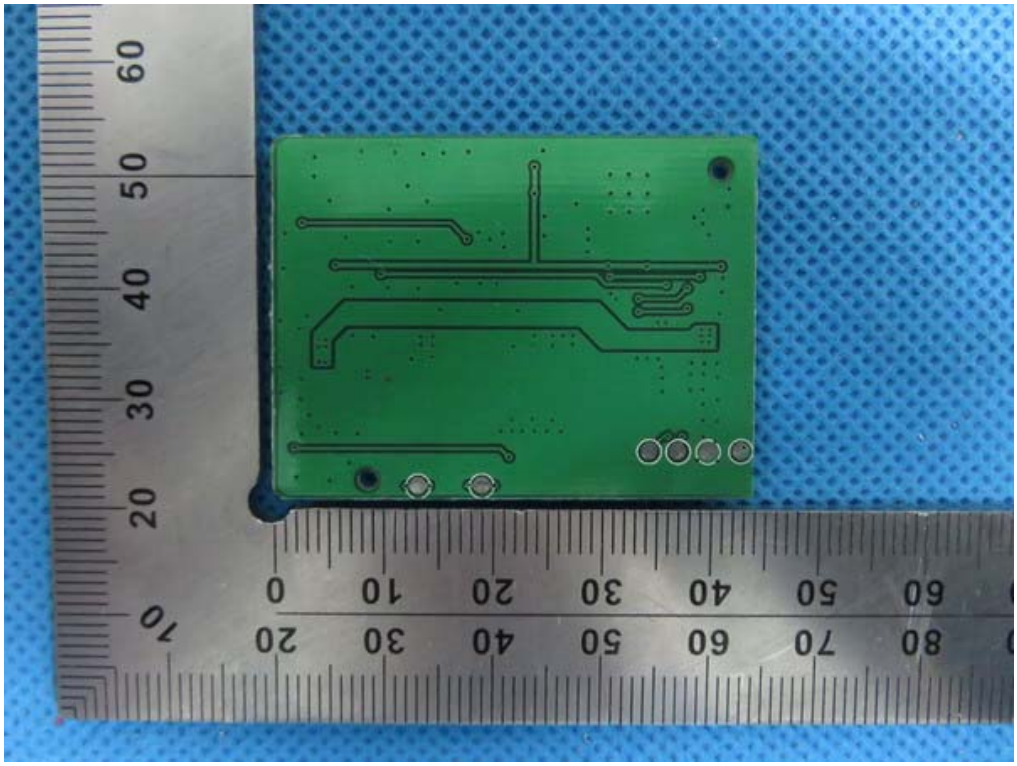
INTERNAL VIEW OF EUT-4



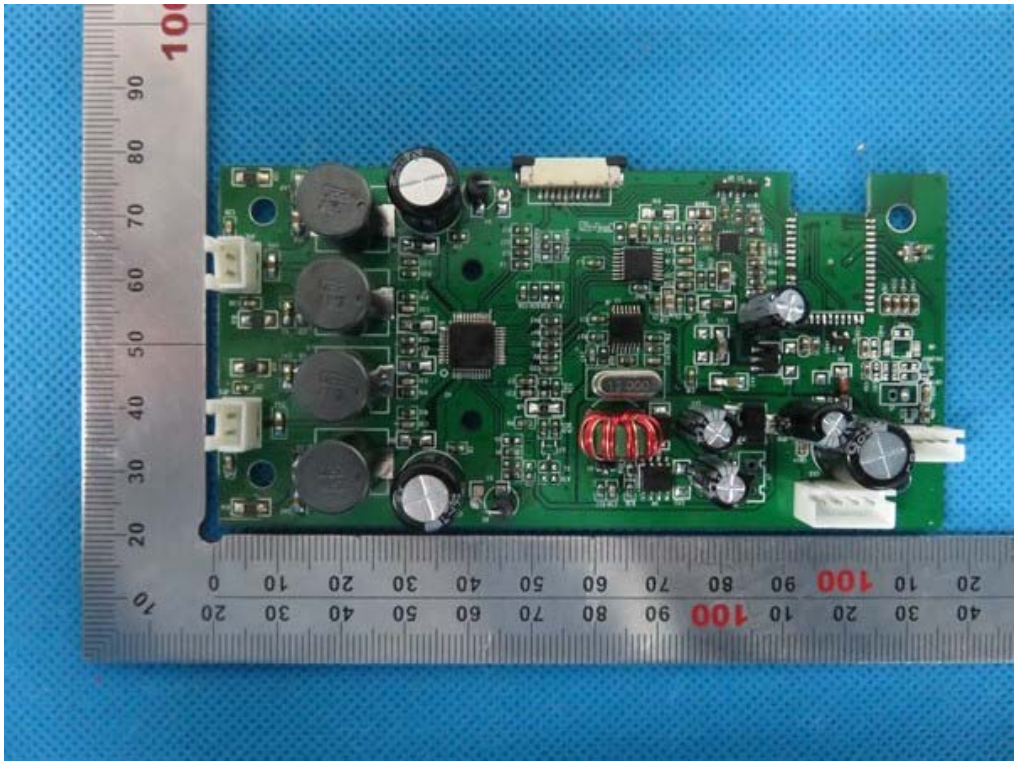
INTERNAL VIEW OF EUT-5



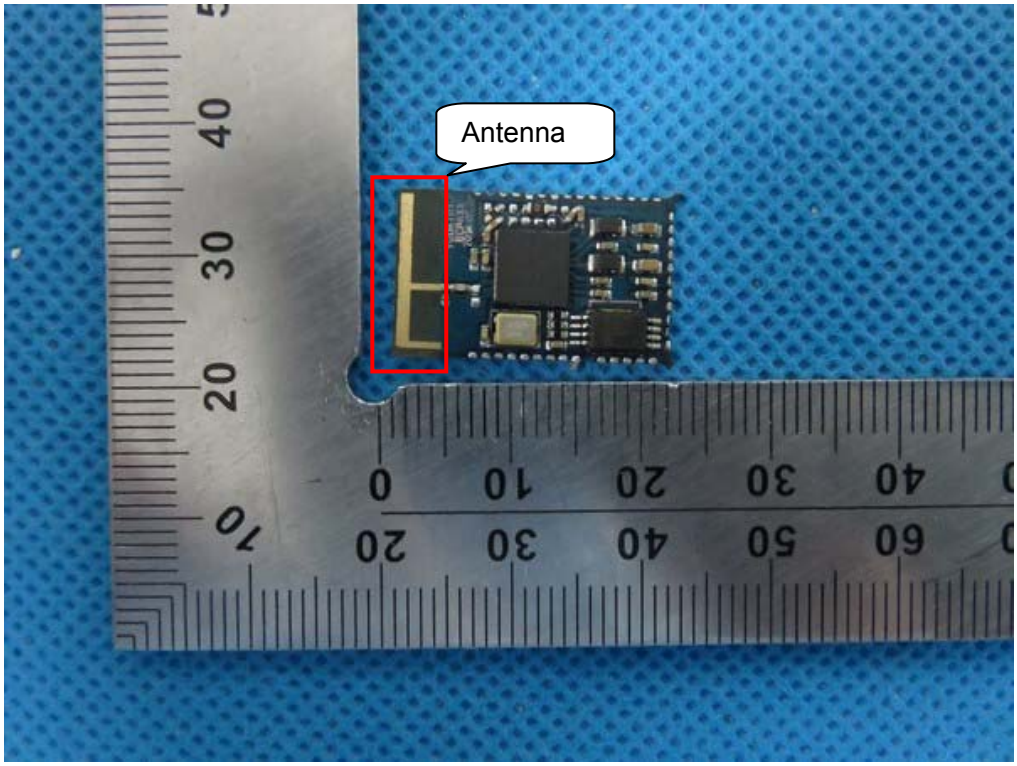
INTERNAL VIEW OF EUT-6



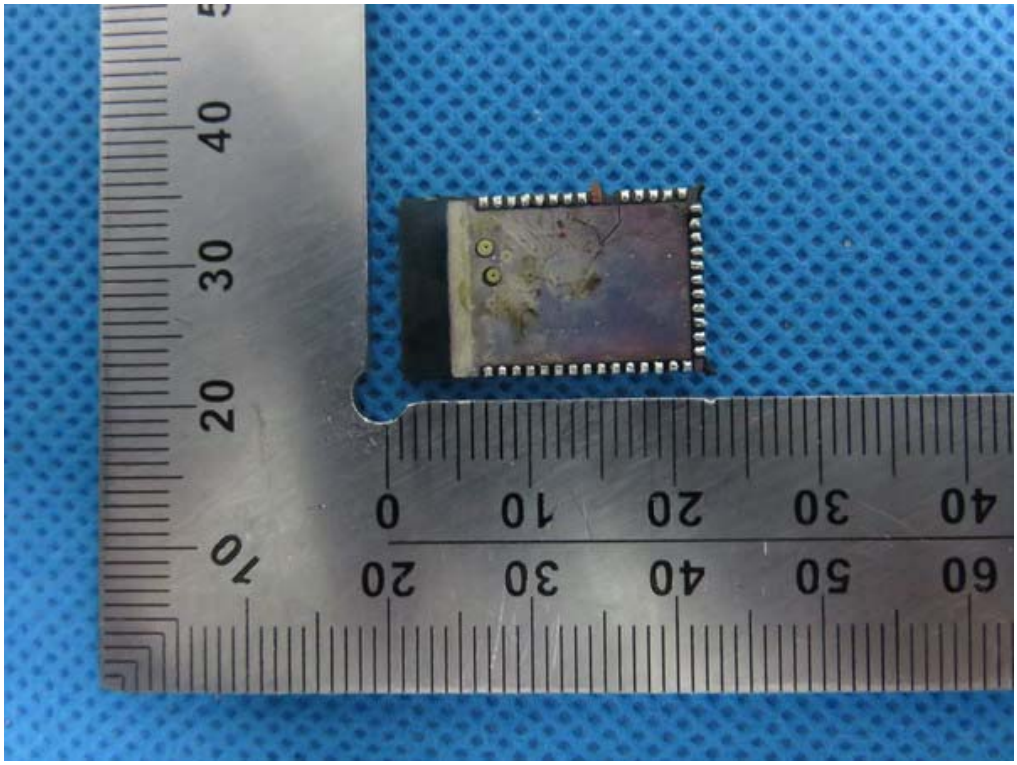
INTERNAL VIEW OF EUT-7



INTERNAL VIEW OF EUT-8



INTERNAL VIEW OF EUT-9



----END OF REPORT----