

FCC Test Report

Product Name : ST1 wireless speaker

Trade Name : TOPMORE

Model No. : ST1

FCC ID. : 2ANH6-ST1-SPKR

Applicant : TOPMORE TECHNOLOGY INC.

Address : 1F., No.101, Sec. 2, Jiafeng S. Rd., Zhubei City,
Hsinchu County 30272, Taiwan (R.O.C.)

Date of Receipt : Aug. 22, 2017

Issued Date : Oct. 06, 2017

Report No. : 1780396R-RFUSP01V00-A

Report Version : V1.0



The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of DEKRA Testing and Certification Co., Ltd.

Test Report Certification

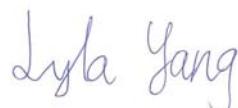
Issued Date : Oct. 06, 2017

Report No. : 1780396R-RFUSP01V00-A



Product Name : ST1 wireless speaker
Applicant : TOPMORE TECHNOLOGY INC.
Address : 1F., No.101, Sec. 2, Jiafeng S. Rd., Zhubei City, Hsinchu County 30272, Taiwan (R.O.C.)
Manufacturer : TOPMORE TECHNOLOGY INC.
Model No. : ST1
FCC ID. : 2ANH6-ST1-SPKR
EUT Voltage : DC 5V (Power by Notebook PC)
Testing Voltage : DC 5V (Power by Notebook PC)
Trade Name : TOPMORE
Applicable Standard : FCC CFR Title 47 Part 15 Subpart C Section 15.247: 2016
Laboratory Name : Hsin Chu Laboratory
Address : No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.
TEL: +886-3-582-8001 / FAX: +886-3-582-8958
Test Result : Complied

Documented By :



(Lyla Yang / Engineering Adm. Specialist)

Tested By :



(Scott Chang / Engineer)

Approved By :



(Roy Wang / Director)

Revision History

Report No.	Version	Description	Issued Date
1780396R-RFUSP01V00-A	V1.0	Initial issue of report	Oct. 06, 2017

TABLE OF CONTENTS

Description	Page
1. General Information.....	6
1.1. EUT Description	6
1.2. Test Mode	7
1.3. Tested System Details	8
1.4. Configuration of tested System	8
1.5. EUT Exercise Software	8
1.6. Test Facility.....	9
1.7. Duty cycle.....	11
2. Conducted Emission	13
2.1. Test Equipment.....	13
2.2. Test Setup	13
2.3. Limits	14
2.4. Test Procedure	14
2.5. Test Specification.....	14
2.6. Uncertainty	14
2.7. Test Result.....	15
3. Peak Power Output	17
3.1. Test Equipment.....	17
3.2. Test Setup	17
3.3. Test procedures	17
3.4. Limits	17
3.5. Test Specification.....	17
3.6. Test Result.....	18
4. Radiated Emission	19
4.1. Test Equipment.....	19
4.2. Test Setup	19
4.3. Limits	20
4.4. Test Procedure	20
4.5. Test Specification.....	20
4.6. Test Result.....	21
5. RF antenna conducted test	35
5.1. Test Equipment.....	35
5.2. Test Setup	35
5.3. Limits	36
5.4. Test Procedure	36
5.5. Test Specification.....	36
5.6. Test Result.....	37
6. Band Edge.....	41
6.1. Test Equipment.....	41
6.2. Test Setup	41
6.3. Limits	41

6.4.	Test Procedure	42
6.5.	Test Specification.....	42
6.6.	Test Result.....	43
7.	Occupied Bandwidth	47
7.1.	Test Equipment.....	47
7.2.	Test Setup	47
7.3.	Limits	47
7.4.	Test Procedures	47
7.5.	Test Specification.....	47
7.6.	Test Result.....	48
8.	Power Density	50
8.1.	Test Equipment.....	50
8.2.	Test Setup	50
8.3.	Limits	50
8.4.	Test Procedures	50
8.5.	Test Specification.....	50
8.6.	Uncertainty	50
8.7.	Test Result.....	51
Attachment 1.....	53
	Test Setup Photograph.....	53
Attachment 2.....	56
	EUT External Photograph.....	56
Attachment 3.....	61
	EUT Internal Photograph.....	61

1. General Information

1.1. EUT Description

Product Name	ST1 wireless speaker
Trade Name	TOPMORE
Model No.	ST1
Frequency Range/Channel Number	2402~2480MHz / 40 Channels
Type of Modulation	Bluetooth 4.0 (GFSK)

Antenna Information	
MFR. / Model	Boomtech Industry Co.,Ltd / 2.4G ANT1
Antenna Type	PCB Antenna
Antenna Gain	-0.615596 dBi

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00	2402 MHz	Channel 10	2422 MHz	Channel 20	2442 MHz	Channel 30	2462 MHz
Channel 01	2404 MHz	Channel 11	2424 MHz	Channel 21	2444 MHz	Channel 31	2464 MHz
Channel 02	2406 MHz	Channel 12	2426 MHz	Channel 22	2446 MHz	Channel 32	2466 MHz
Channel 03	2408 MHz	Channel 13	2428 MHz	Channel 23	2448 MHz	Channel 33	2468 MHz
Channel 04	2410 MHz	Channel 14	2430 MHz	Channel 24	2450 MHz	Channel 34	2470 MHz
Channel 05	2412 MHz	Channel 15	2432 MHz	Channel 25	2452 MHz	Channel 35	2472 MHz
Channel 06	2414 MHz	Channel 16	2434 MHz	Channel 26	2454 MHz	Channel 36	2474 MHz
Channel 07	2416MHz	Channel 17	2436 MHz	Channel 27	2456 MHz	Channel 37	2476 MHz
Channel 08	2418 MHz	Channel 18	2438 MHz	Channel 28	2458 MHz	Channel 38	2478 MHz
Channel 09	2420 MHz	Channel 19	2440 MHz	Channel 29	2460 MHz	Channel 39	2480 MHz

Note:

1. This device is a ST1 wireless speaker including BT4.0 transmitting and receiving function.
2. Regards to the frequency band operation; the lowest、middle and highest frequency of channel were selected to perform the test, and then shown on this report.

1.2. Test Mode

DEKRA has verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Test Mode	Mode 1: Transmit Mode
-----------	-----------------------

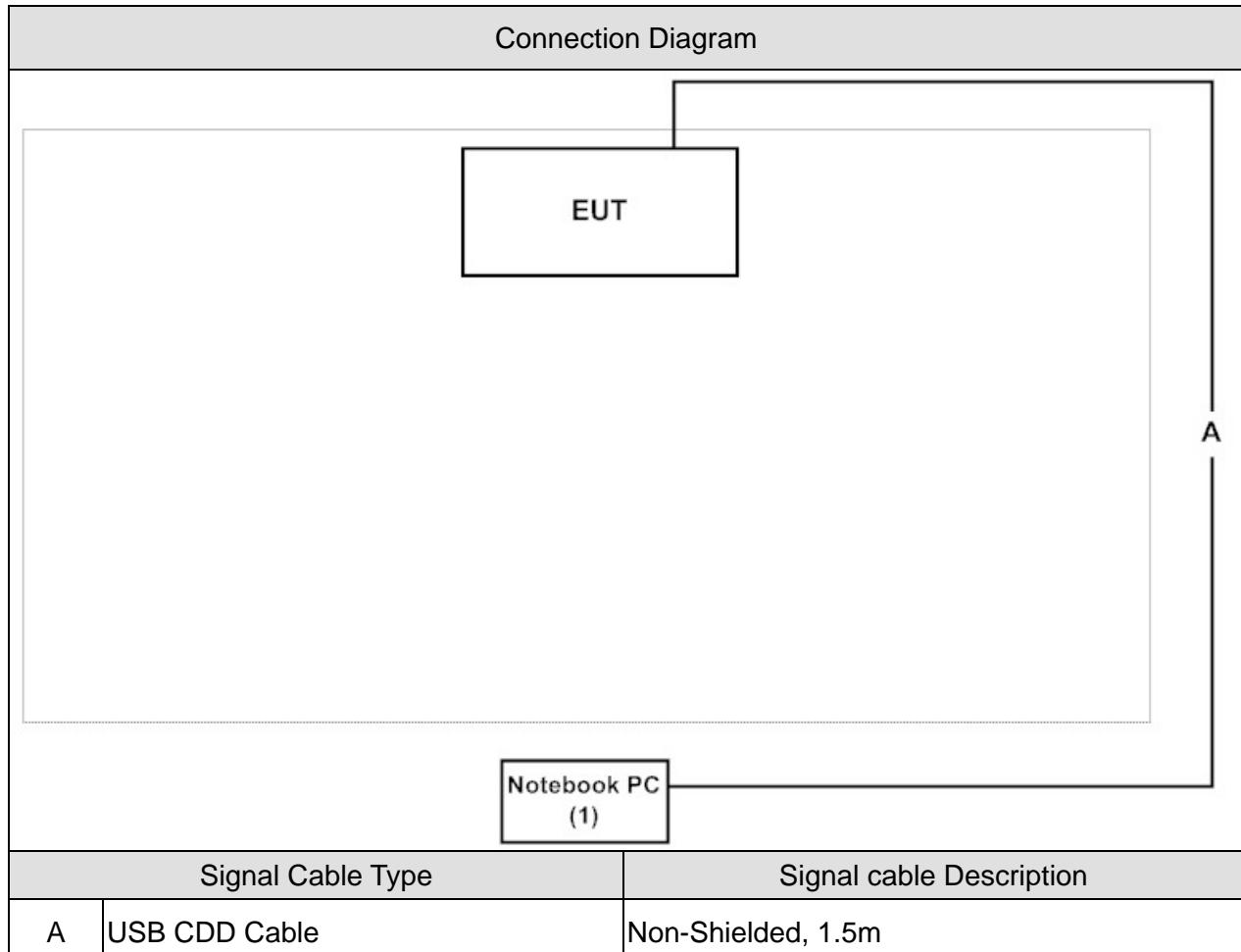
Test Items	Modulation	Channel	Antenna	Result
Conducted Emission	GFSK	19	0	Complies
Peak Power Output	GFSK	00/19/39	0	Complies
Radiated Emission	GFSK	00/19/39	0	Complies
RF antenna conducted test	GFSK	00/19/39	0	Complies
Radiated Emission Band Edge	GFSK	00/19/39	0	Complies
Occupied Bandwidth	GFSK	00/19/39	0	Complies
Power Density	GFSK	00/19/39	0	Complies

1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1 Notebook PC	Lenovo	B590	WB15330077	DoC	Non-Shielded, 1.8m, one ferrite core bonded

1.4. Configuration of tested System



1.5. EUT Exercise Software

1	Setup the EUT as shown in Section 1.4.
2	Execute the “CSR Blue suite 2.5.8” on the EUT.
3	Configure the test mode, the test channel, and the data rate.
4	Press “Start TX” to start the continuous Transmitter.
5	Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual	Test Site
Temperature (°C)	FCC PART 15 C 15.207 Conducted Emission	15 - 35	20	3
Humidity (%RH)		25 - 75	50	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Peak Power Output	15 - 35	24	3
Humidity (%RH)		25 - 75	45	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Radiated Emission	15 - 35	25	2
Humidity (%RH)		25 - 75	54	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 RF antenna conducted test	15 - 35	24	3
Humidity (%RH)		25 - 75	45	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Band Edge	15 - 35	25	2
Humidity (%RH)		25 - 75	50	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Occupied Bandwidth	15 - 35	24	3
Humidity (%RH)		25 - 75	45	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Power Density	15 - 35	24	3
Humidity (%RH)		25 - 75	45	
Barometric pressure (mbar)		860 - 1060	950-1000	

Note: Test site information refers to Laboratory Information.

The related certificate for our laboratories about the test site and management system can be downloaded from DEKRA Testing and Certification Co., Ltd. Web Site :

<http://www.dekra.com.tw/english/about/certificates.aspx?bval=5>

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site : http://www.dekra.com.tw/index_en.aspx

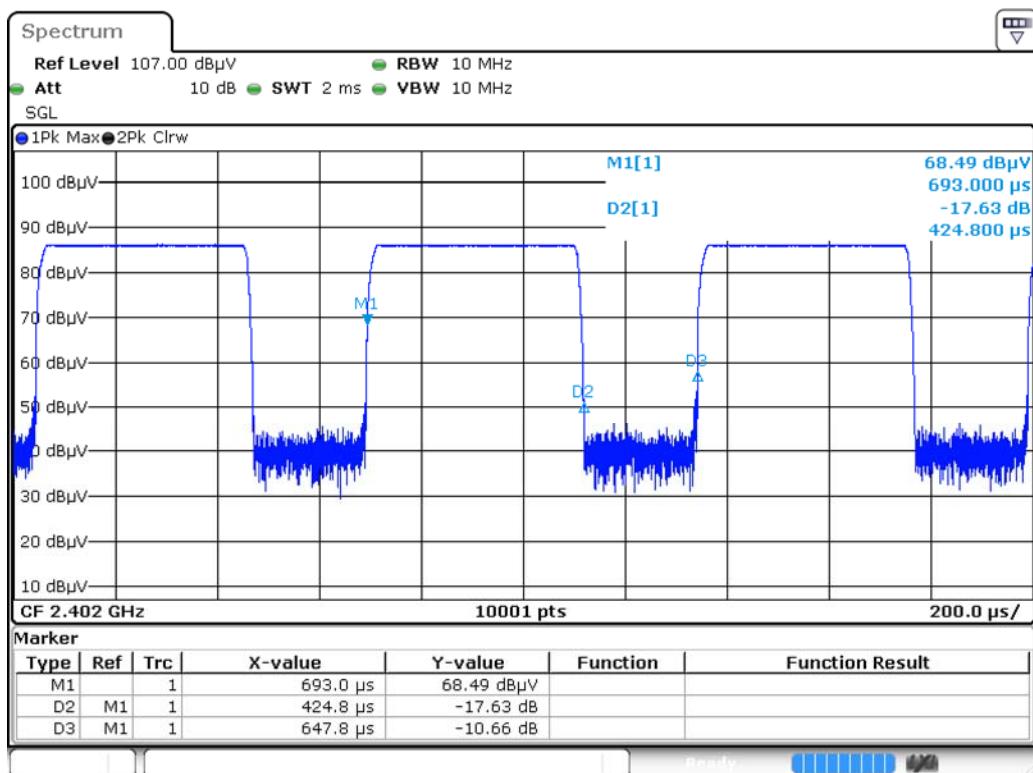
If you have any comments, Please don't hesitate to contact us. Our test sites as below:

- 1 No. 75-2, 3rd Lin, WangYe Keng, Yonghxing Tsuen, Qionglin Shiang, Hsinchu County 307, Taiwan (R.O.C.)
TEL:+886-3-592-8858 / FAX:+886-3-592-8859 E-Mail : info.tw@dekra.com
- 2 No.372, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.
TEL: +886-3-582-8001 / FAX: +886-3-582-8958 E-Mail : info.tw@dekra.com
- 3 No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.
TEL: +886-3-582-8001 / FAX: +886-3-582-8958 E-Mail : info.tw@dekra.com

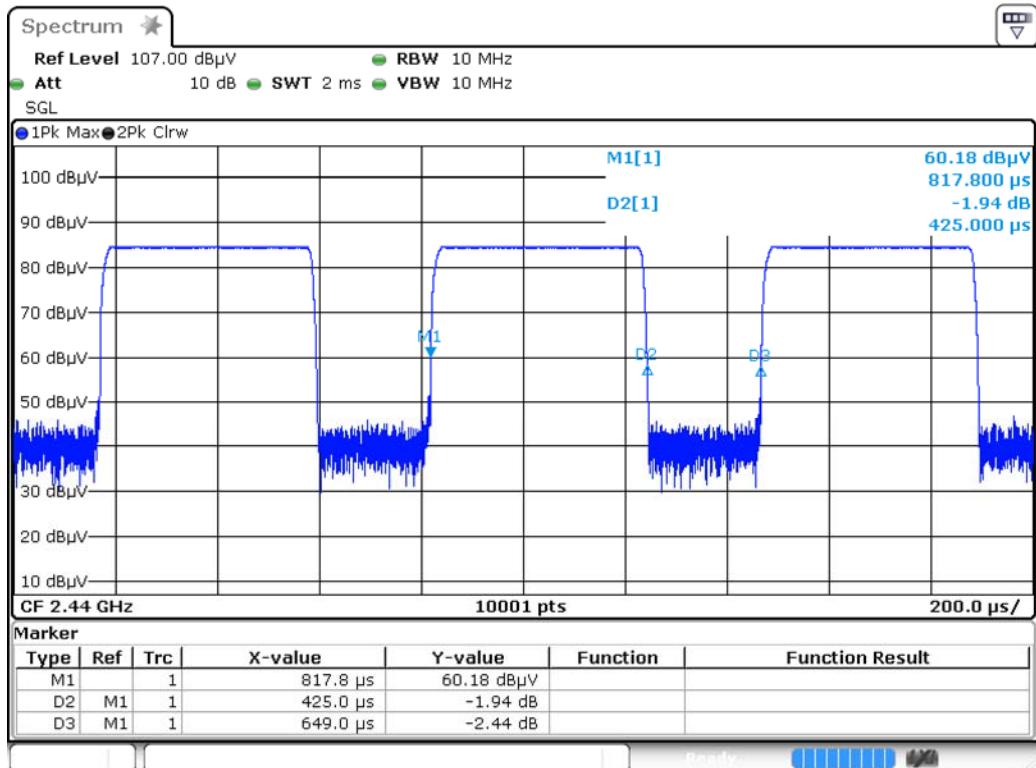
1.7. Duty cycle

Mode	On Time(ms)	On+Off Time(ms)	Duty Cycle(%)	Duty Factor(dB)
2402MHz	0.425	0.647	65.66%	3.654395
2440MHz	0.425	0.649	65.49%	3.677115
2480MHz	0.426	0.650	65.58%	3.664595

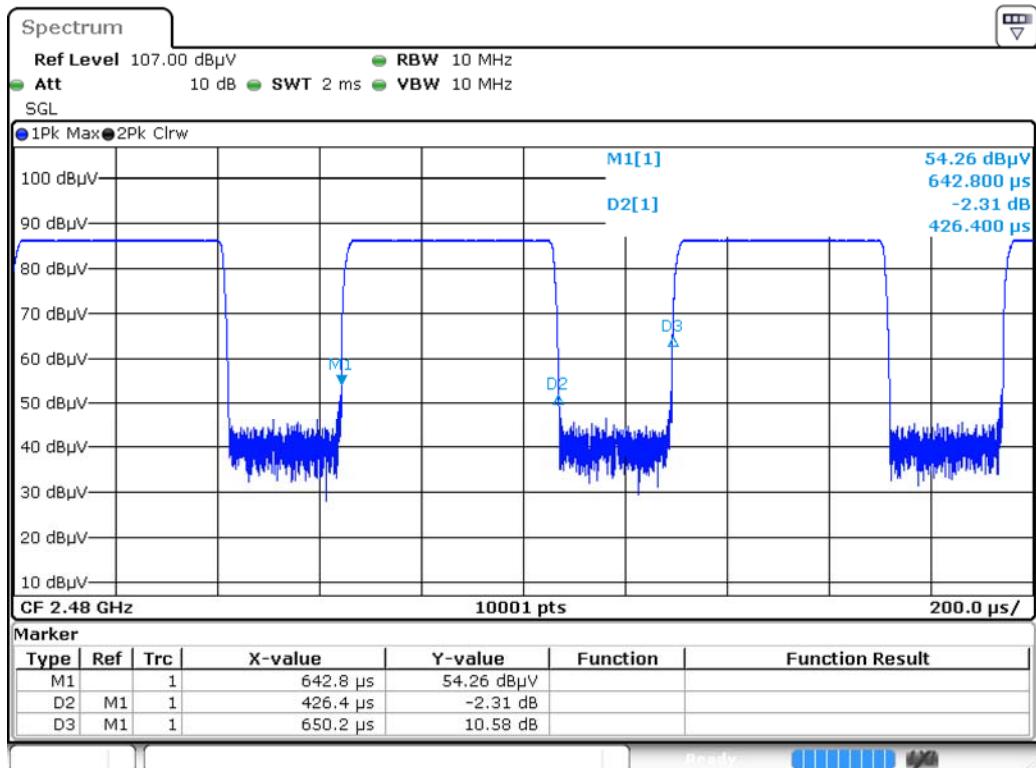
2402MHz



Date: 28.AUG.2017 19:40:52

2440MHz

Date: 28.AUG.2017 19:39:34

2480MHz

Date: 28.AUG.2017 19:41:58

2. Conducted Emission

2.1. Test Equipment

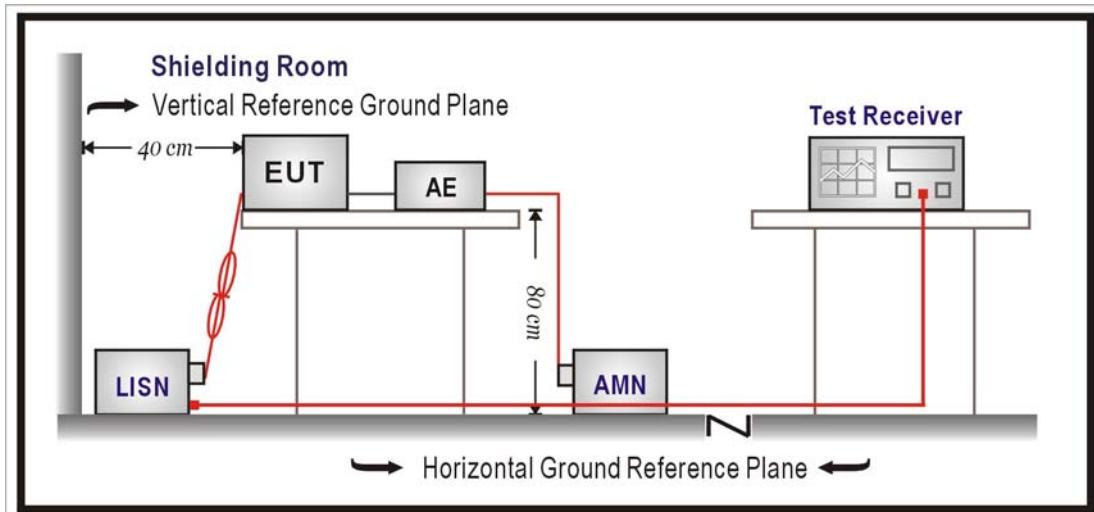
The following test equipment are used during the test:

Conducted Emission / SR2-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Artificial Mains Network	R&S	ENV4200	848411/010	2017/02/06	2018/02/05
Test Receiver	R&S	ESCS 30	836858/022	2017/04/12	2018/04/11
LISN	R&S	ENV216	100092	2017/07/31	2018/07/30

Note: All equipment that need to calibrate are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 Limits (dBuV)		
Frequency MHz	QP	AV
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs.)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

2.5. Test Specification

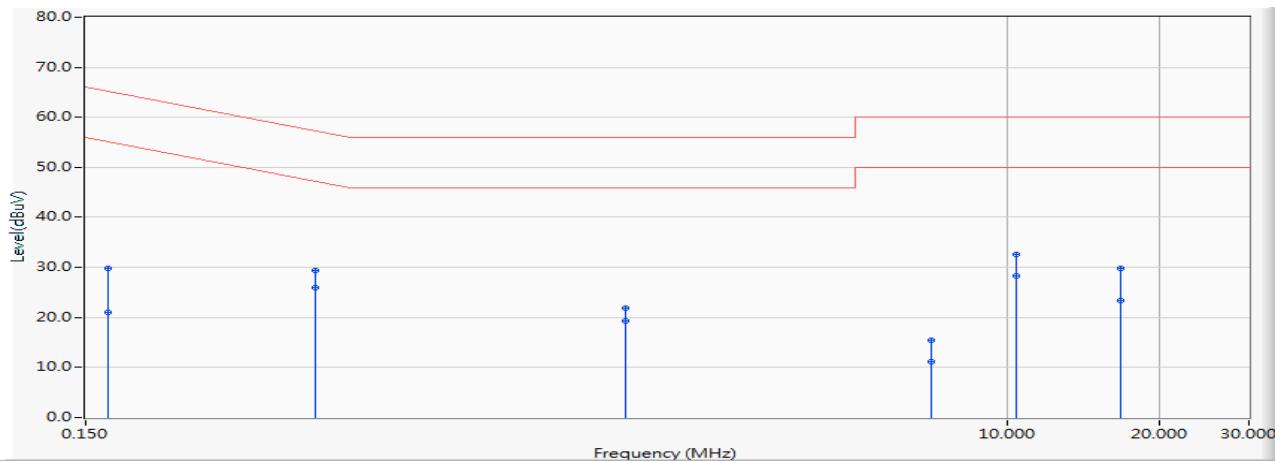
According to FCC Part 15 Subpart C Paragraph 15.207: 2015

2.6. Uncertainty

The measurement uncertainty is defined as ± 2.26 dB.

2.7. Test Result

Site : SR2-H	Time : 2017/09/26
Limit : CISPR_B_00M_QP	Margin : 10
Probe : SR2_LISN(16A)-6_0712 - Line1	Power : DC 5V (Power by Notebook PC) (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2440MHz

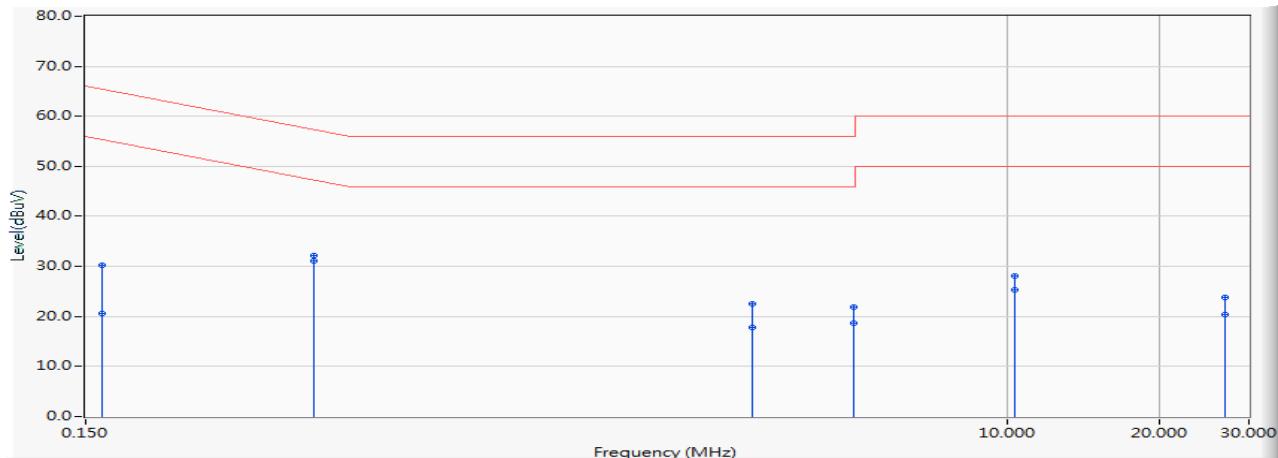


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.166	9.753	20.060	29.813	-35.364	65.177	QUASIPEAK
2		0.166	9.753	11.250	21.003	-34.174	55.177	AVERAGE
3		0.427	9.730	19.640	29.370	-27.935	57.304	QUASIPEAK
4	*	0.427	9.730	16.180	25.910	-21.395	47.304	AVERAGE
5		1.759	9.850	12.120	21.970	-34.030	56.000	QUASIPEAK
6		1.759	9.850	9.500	19.350	-26.650	46.000	AVERAGE
7		7.052	10.007	5.540	15.547	-44.453	60.000	QUASIPEAK
8		7.052	10.007	1.240	11.247	-38.753	50.000	AVERAGE
9		10.400	10.137	22.450	32.587	-27.413	60.000	QUASIPEAK
10		10.400	10.137	18.160	28.297	-21.703	50.000	AVERAGE
11		16.767	10.262	19.480	29.742	-30.258	60.000	QUASIPEAK
12		16.767	10.262	13.220	23.482	-26.518	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : SR2-H	Time : 2017/09/26
Limit : CISPR_B_00M_QP	Margin : 10
Probe : SR2_LISN(16A)-6_0712 - Line2	Power : DC 5V (Power by Notebook PC) (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2440MHz



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.162	9.754	20.520	30.274	-35.101	65.375	QUASIPEAK
2		0.162	9.754	10.760	20.514	-34.861	55.375	AVERAGE
3		0.423	9.749	22.420	32.169	-25.212	57.380	QUASIPEAK
4	*	0.423	9.749	21.450	31.199	-16.182	47.380	AVERAGE
5		3.134	9.844	12.680	22.524	-33.476	56.000	QUASIPEAK
6		3.134	9.844	8.060	17.904	-28.096	46.000	AVERAGE
7		4.970	9.858	11.980	21.838	-34.162	56.000	QUASIPEAK
8		4.970	9.858	8.870	18.728	-27.272	46.000	AVERAGE
9		10.298	10.160	17.850	28.010	-31.990	60.000	QUASIPEAK
10		10.298	10.160	15.220	25.380	-24.620	50.000	AVERAGE
11		26.982	10.598	13.110	23.707	-36.293	60.000	QUASIPEAK
12		26.982	10.598	9.720	20.317	-29.683	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

3. Peak Power Output

3.1. Test Equipment

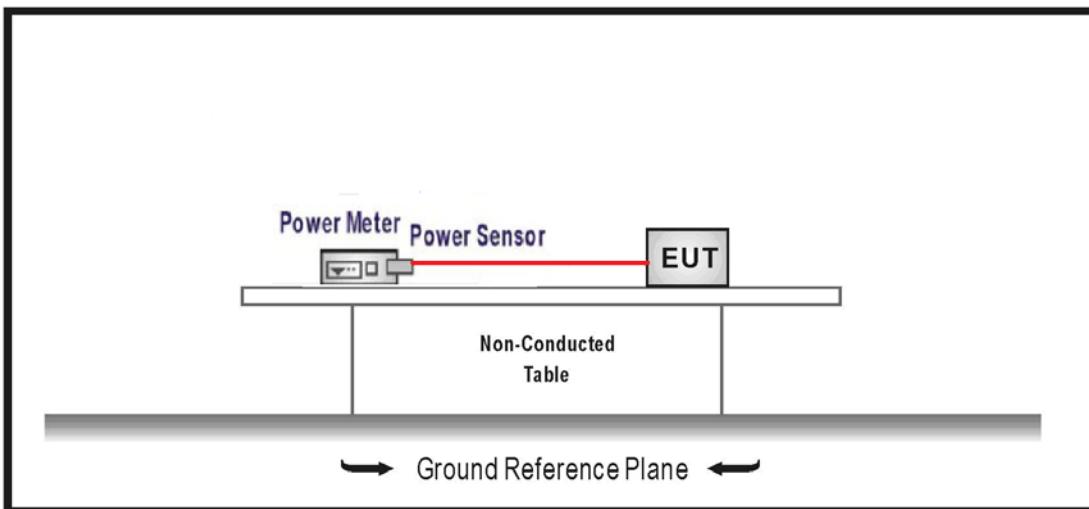
The following test equipment is used during the test:

Peak Power Output / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	2017/01/20	2018/01/19
Pulse Power Sensor	Anritsu	MA2411B	1531043	2017/01/20	2018/01/19
Pulse Power Sensor	Anritsu	MA2411B	1531044	2017/01/20	2018/01/19

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

3.2. Test Setup



3.3. Test procedures

The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB558074 V03R02 for compliance to FCC 47CFR 15.247 requirements.

3.4. Limits

The maximum peak power shall be less 1 Watt.

3.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247

3.6. Test Result

Product	ST1 wireless speaker		
Test Item	Peak Power Output		
Test Mode	Mode 1: Transmit Mode		
Date of Test	2017/09/15	Test Site	SR10-H

GFSK

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
00	2402	1.120	≤30	Pass
19	2440	4.160	≤30	Pass
39	2480	3.490	≤30	Pass

4. Radiated Emission

4.1. Test Equipment

The following test equipment are used during the test:

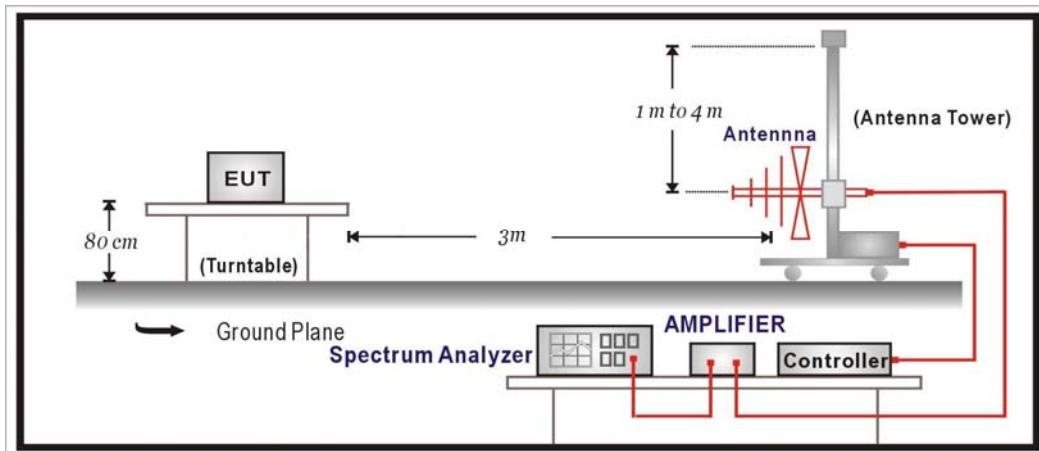
Radiated Emission / CB4-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2016/11/28	2017/11/27
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12
Bilog Antenna	Teseq	CBL6112D	23191	2017/06/28	2018/06/27
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2017/06/14	2018/06/13
Horn Antenna	Schwarzbeck	BBHA 9170	202	2017/02/15	2018/02/14
Pre-Amplifier	RF Bay Inc.	LNA-1330	12162511	2017/03/09	2018/03/08
Pre-Amplifier	EMCI	EMCI 1830I	980366	2017/01/23	2018/01/22
Pre-Amplifier	MITEQ	JS44-45-8P	2014754	2016/12/26	2017/12/25
Magnetic Loop Antenna	Teseq	HLA 6121	44287	2017/10/13	2018/10/12

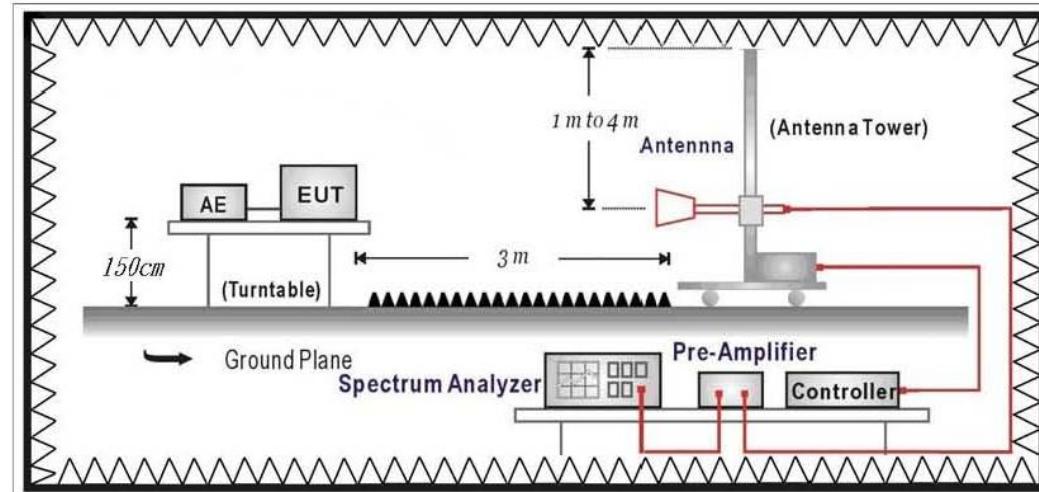
Note: All equipment that need to calibrate are with calibration period of 1 year.

4.2. Test Setup

Under 1GHz Test Setup:



Above 1GHz Test Setup:



4.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	uV/m	dBuV/m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

Remarks : 1. RF Voltage (dBuV) = $20 \log \frac{RF\ Voltage\ (uV)}{100}$
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

4.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 V03R02 for compliance to FCC 47CFR 15.247 requirements.

The EUT and its simulators are placed on a turn table which is 0.8 or 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

On any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit. The bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

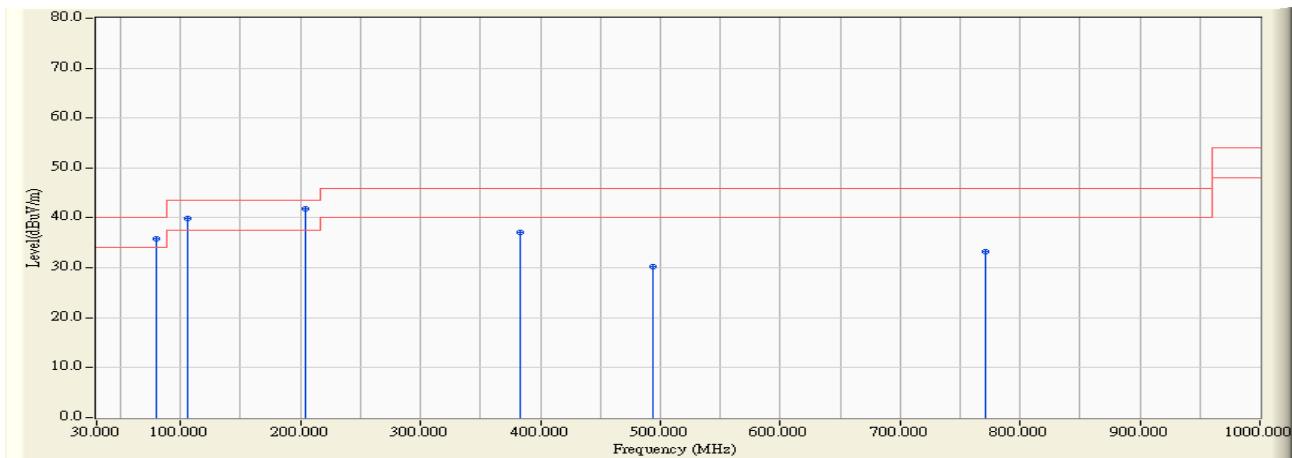
4.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247

4.6. Test Result

30MHz-1GHz Spurious

Site : CB4-H	Time : 2017/09/15
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	Power : DC 5V (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2440MHz

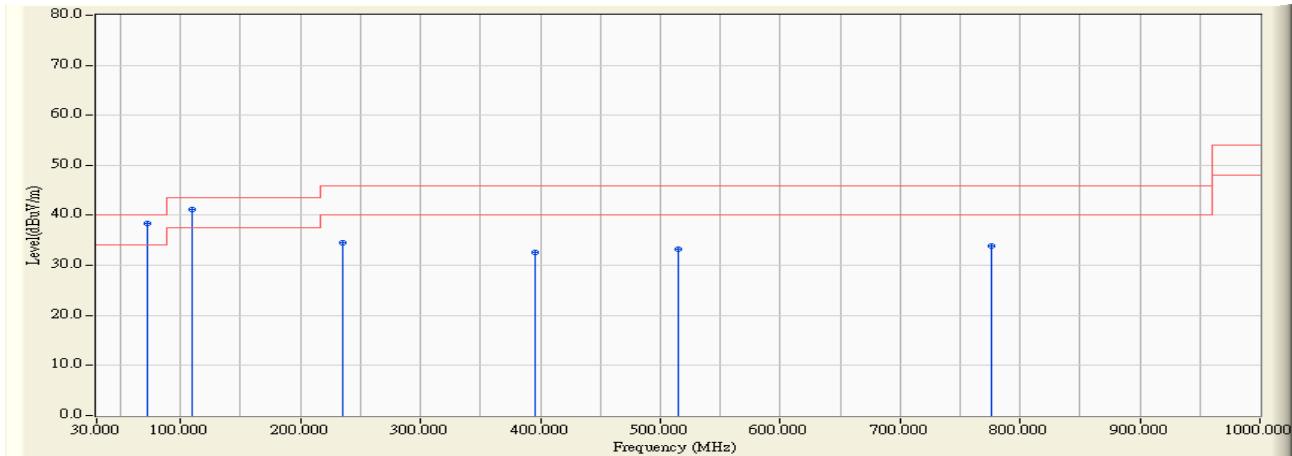


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	79.955	-27.244	63.150	35.906	-4.094	40.000	QUASIPEAK
2	105.660	-22.941	62.923	39.983	-3.517	43.500	QUASIPEAK
3	* 203.630	-23.035	64.772	41.736	-1.764	43.500	QUASIPEAK
4	383.080	-16.214	53.336	37.122	-8.878	46.000	QUASIPEAK
5	493.660	-14.201	44.542	30.340	-15.660	46.000	QUASIPEAK
6	771.565	-10.945	44.161	33.216	-12.784	46.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The Emission under 30MHz were not included is because their levels are too low.

Site : CB4-H	Time : 2017/09/15
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	Power : DC 5V (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2440MHz



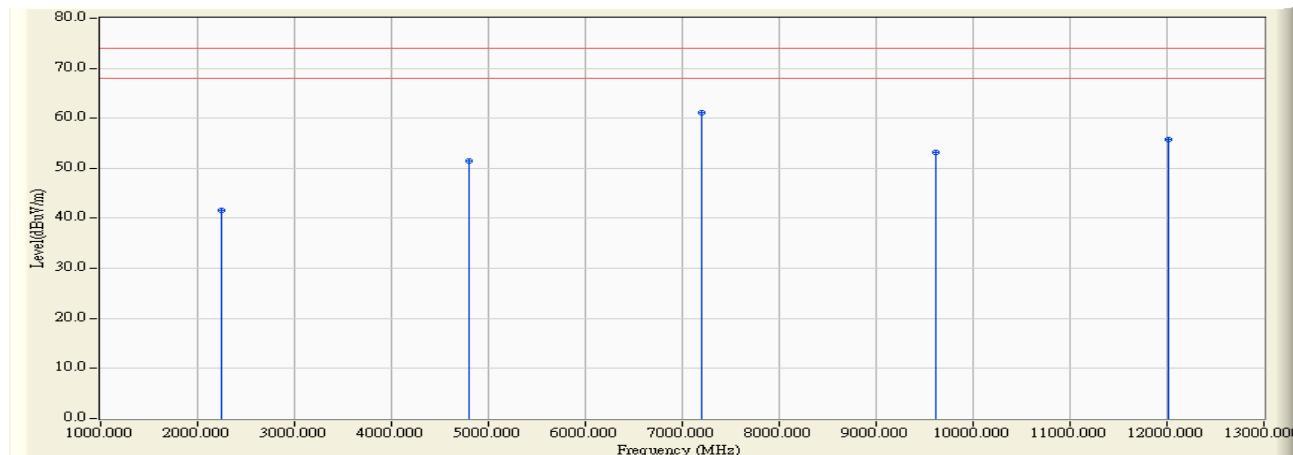
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	71.710	-28.140	66.478	38.338	-1.662	40.000	QUASIPEAK
2		109.055	-22.582	63.836	41.255	-2.245	43.500	QUASIPEAK
3		235.640	-21.001	55.440	34.439	-11.561	46.000	QUASIPEAK
4		395.690	-15.812	48.368	32.557	-13.443	46.000	QUASIPEAK
5		515.000	-13.908	47.252	33.344	-12.656	46.000	QUASIPEAK
6		776.415	-10.886	44.779	33.892	-12.108	46.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The Emission under 30MHz were not included is because their levels are too low.

Harmonic & Spurious:

Site : CB4-H	Time : 2017/09/15
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4_FCC_A115_EFS_1-18GHz_1116 - HORIZONTAL	Power : DC 5V (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2402MHz

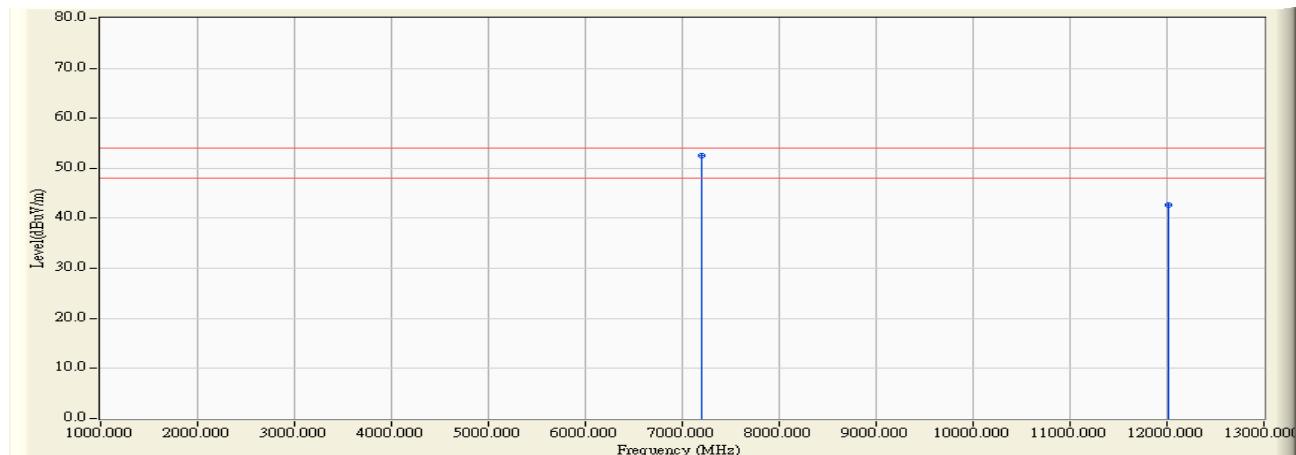


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2246.500	-1.252	42.950	41.698	-32.302	74.000	PEAK
2		4804.525	8.277	43.100	51.378	-22.622	74.000	PEAK
3	*	7206.700	17.860	43.260	61.120	-12.880	74.000	PEAK
4		9612.560	22.480	30.650	53.130	-20.870	74.000	PEAK
5		12012.300	25.361	30.440	55.801	-18.199	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are lower than limit 20dB.

Site : CB4-H	Time : 2017/09/15
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB4_FCC_A115_EFS_1-18GHz_1116 - HORIZONTAL	Power : DC 5V (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2402MHz

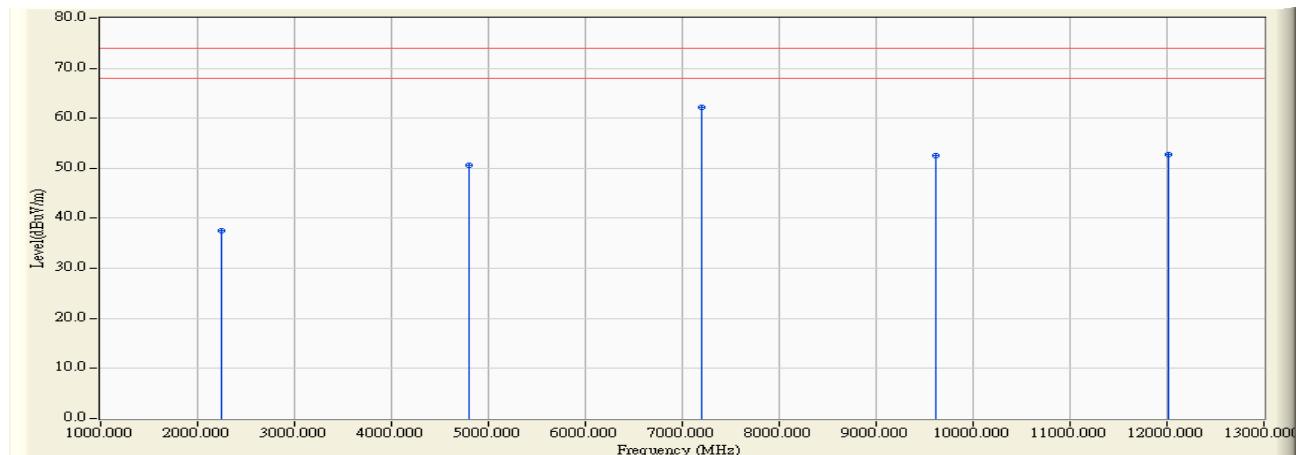


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	7206.700	17.857	34.650	52.508	-1.492	54.000	AVERAGE
2		12012.300	25.359	17.340	42.699	-11.301	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are lower than limit 20dB.

Site : CB4-H	Time : 2017/09/15
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4_FCC_A115_EFS_1-18GHz_1116 - VERTICAL	Power : DC 5V (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2402MHz

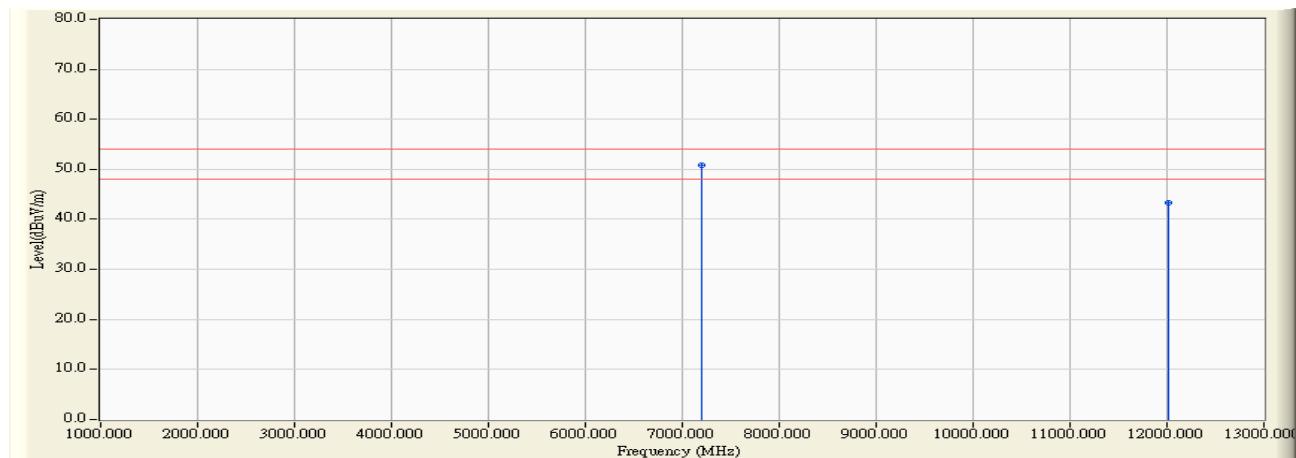


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2246.500	-1.252	38.760	37.508	-36.492	74.000	PEAK
2		4803.155	8.271	42.310	50.581	-23.419	74.000	PEAK
3	*	7206.830	17.860	44.390	62.250	-11.750	74.000	PEAK
4		9608.600	22.464	30.180	52.644	-21.356	74.000	PEAK
5		12010.620	25.359	27.360	52.720	-21.280	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are lower than limit 20dB.

Site : CB4-H	Time : 2017/09/15
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB4_FCC_A115_EFS_1-18GHz_1116 - VERTICAL	Power : DC 5V (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2402MHz

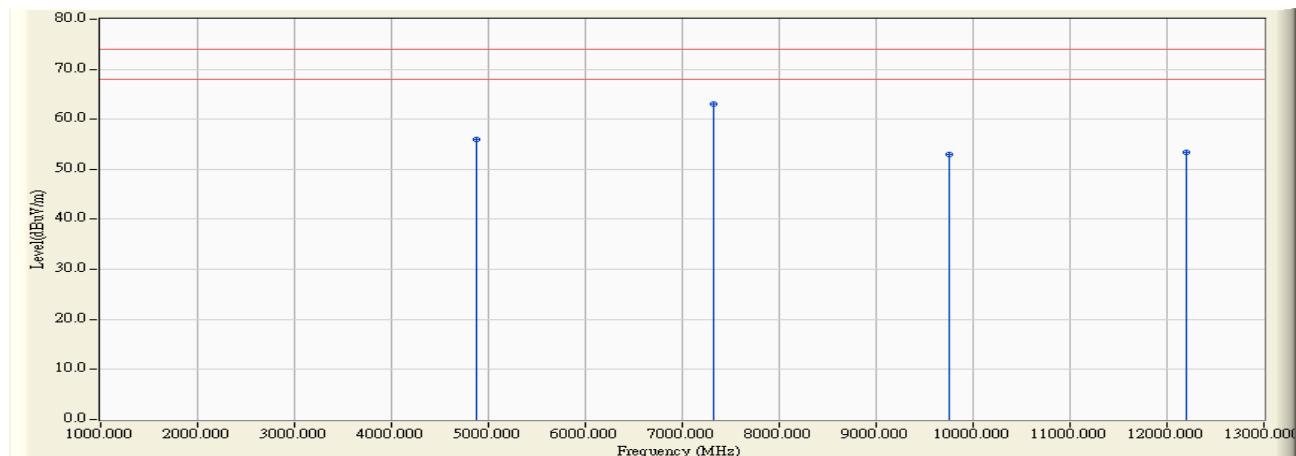


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	7206.830	17.860	33.030	50.889	-3.111	54.000	AVERAGE
2		12014.900	25.362	17.880	43.243	-30.757	74.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are lower than limit 20dB.

Site : CB4-H	Time : 2017/09/15
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4_FCC_A115_EFS_1-18GHz_1116 - HORIZONTAL	Power : DC 5V (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2440MHz

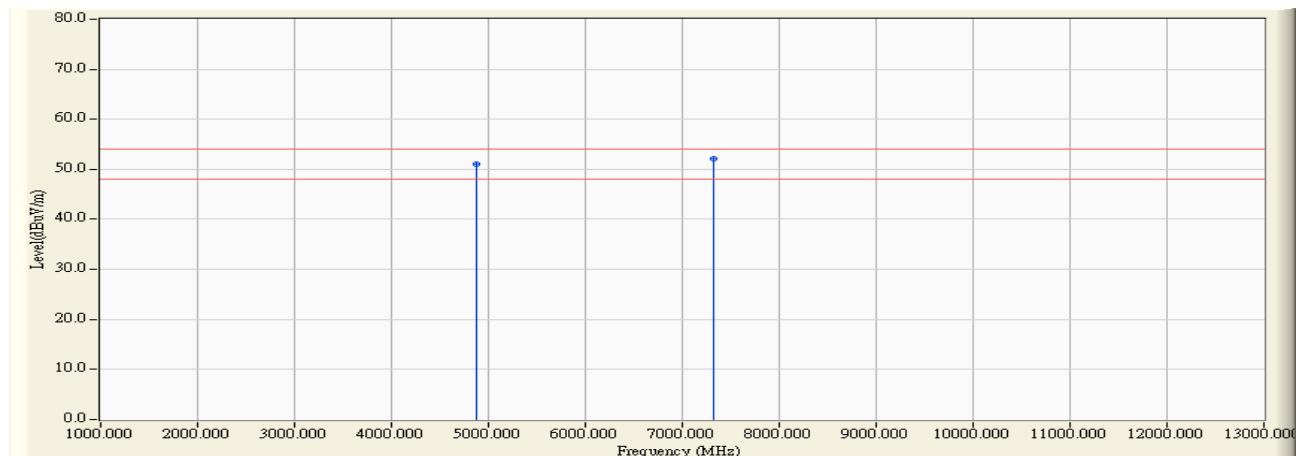


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	4879.470	8.658	47.290	55.948	-18.052	74.000	PEAK
2	* 7319.080	18.121	44.860	62.981	-11.019	74.000	PEAK
3	9760.600	23.072	29.910	52.983	-21.017	74.000	PEAK
4	12200.600	25.496	27.860	53.356	-20.644	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are lower than limit 20dB.

Site : CB4-H	Time : 2017/09/15
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB4_FCC_A115_EFS_1-18GHz_1116 - HORIZONTAL	Power : DC 5V (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2440MHz

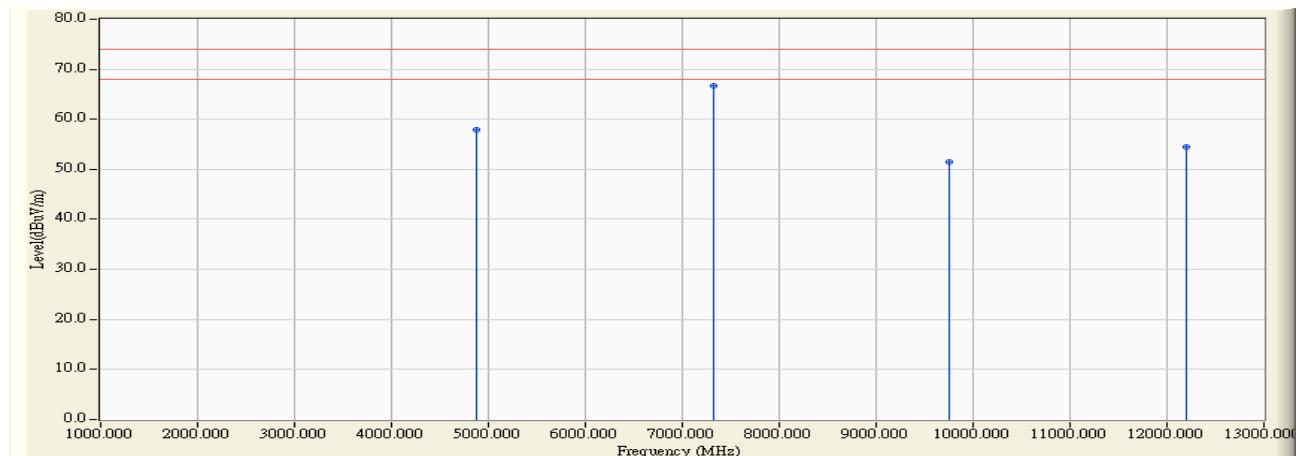


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4879.970	8.661	42.460	51.121	-2.879	54.000	AVERAGE
2	*	7319.970	18.122	33.900	52.022	-1.978	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are lower than limit 20dB.

Site : CB4-H	Time : 2017/09/15
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4_FCC_A115_EFS_1-18GHz_1116 - VERTICAL	Power : DC 5V (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2440MHz

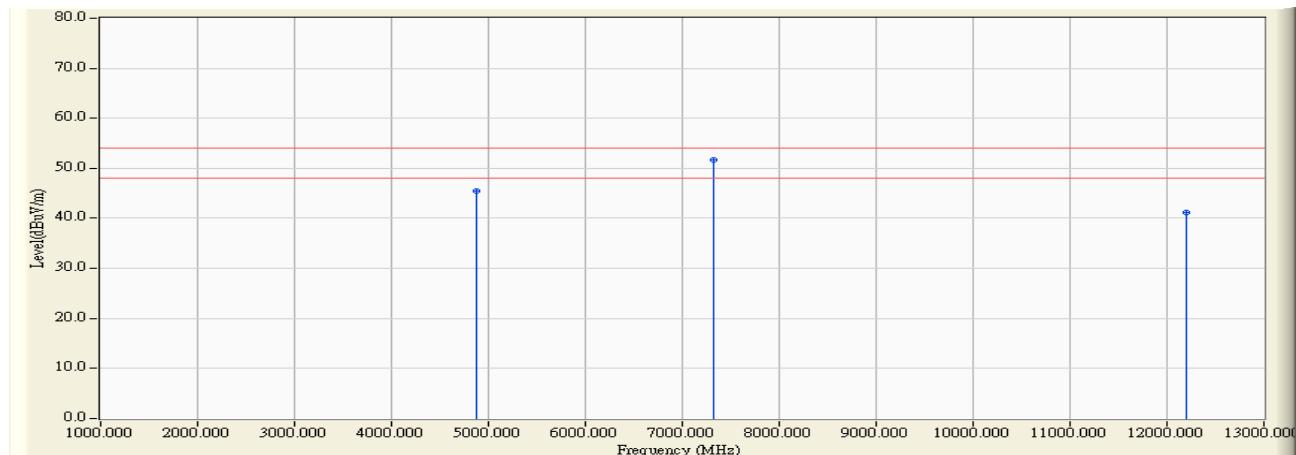


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	4879.620	8.659	49.350	58.009	-15.991	74.000	PEAK
2	* 7319.135	18.121	48.590	66.711	-7.289	74.000	PEAK
3	9760.740	23.073	28.410	51.484	-22.516	74.000	PEAK
4	12197.730	25.493	28.930	54.424	-19.576	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are lower than limit 20dB.

Site : CB4-H	Time : 2017/09/15
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB4_FCC_A115_EFS_1-18GHz_1116 - VERTICAL	Power : DC 5V (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2440MHz

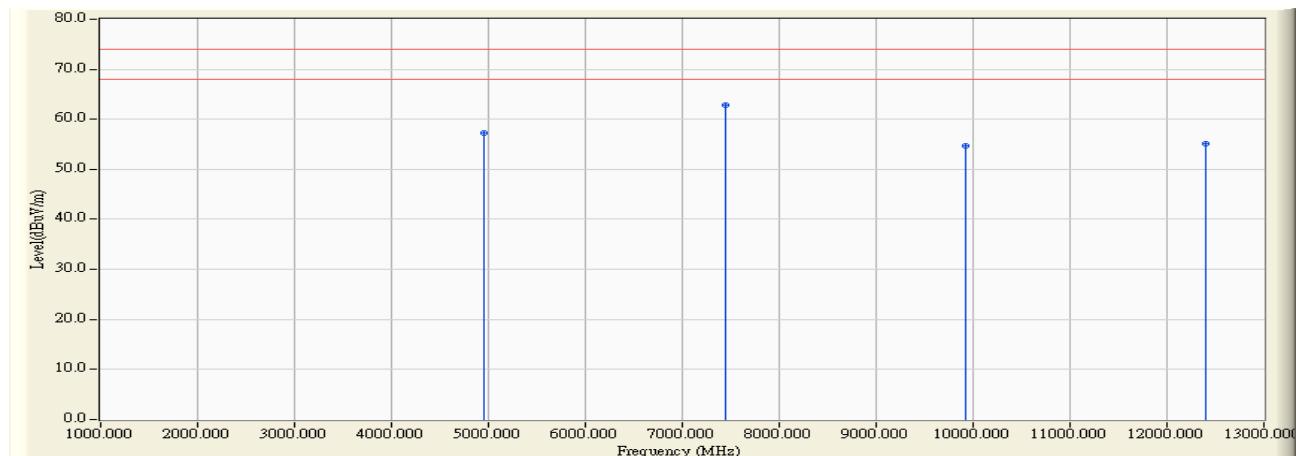


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4879.900	8.661	36.910	45.570	-8.430	54.000	AVERAGE
2	*	7319.965	18.122	33.650	51.772	-2.228	54.000	AVERAGE
3		12201.090	25.496	15.580	41.076	-12.924	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are lower than limit 20dB.

Site : CB4-H	Time : 2017/09/15
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4_FCC_A115_EFS_1-18GHz_1116 - HORIZONTAL	Power : DC 5V (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2480MHz

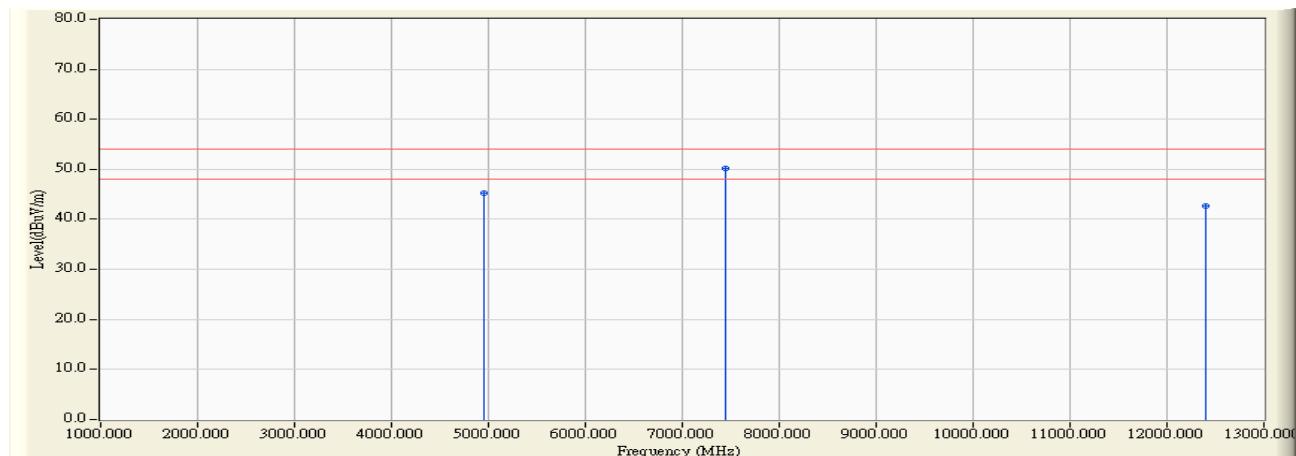


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	4959.445	9.064	48.110	57.174	-16.826	74.000	PEAK
2	* 7439.160	18.378	44.420	62.798	-11.202	74.000	PEAK
3	9919.380	23.615	31.110	54.724	-19.276	74.000	PEAK
4	12400.360	25.648	29.490	55.138	-18.862	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are lower than limit 20dB.

Site : CB4-H	Time : 2017/09/15
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB4_FCC_A115_EFS_1-18GHz_1116 - HORIZONTAL	Power : DC 5V (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2480MHz

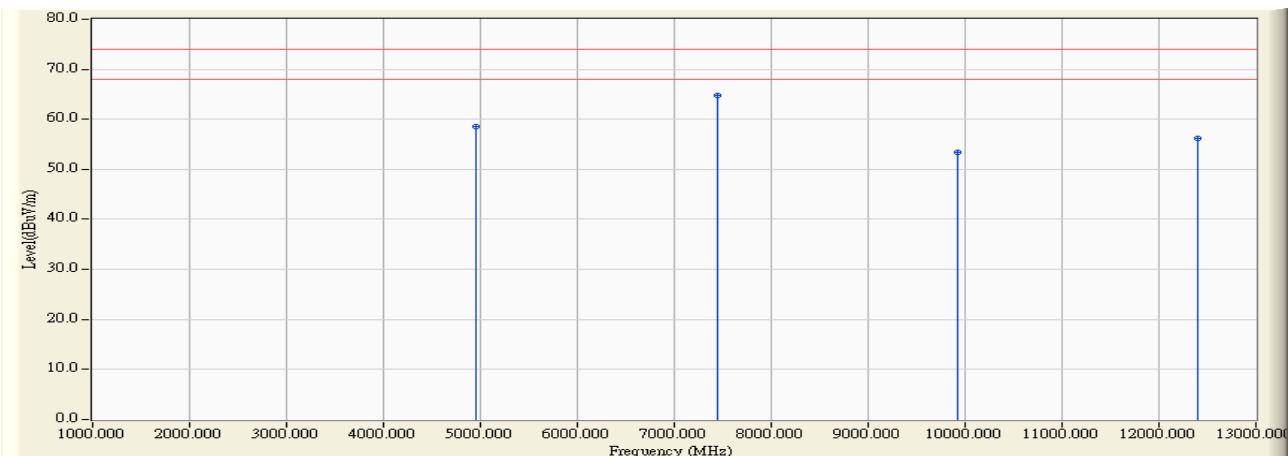


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	4960.000	9.067	36.110	45.177	-8.823	54.000	AVERAGE
2	* 7439.885	18.380	31.780	50.160	-3.840	54.000	AVERAGE
3	12402.100	25.650	17.110	42.759	-11.241	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are lower than limit 20dB.

Site : CB4-H	Time : 2017/09/15
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4_FCC_A115_EFS_1-18GHz_1116 - VERTICAL	Power : DC 5V (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2480MHz

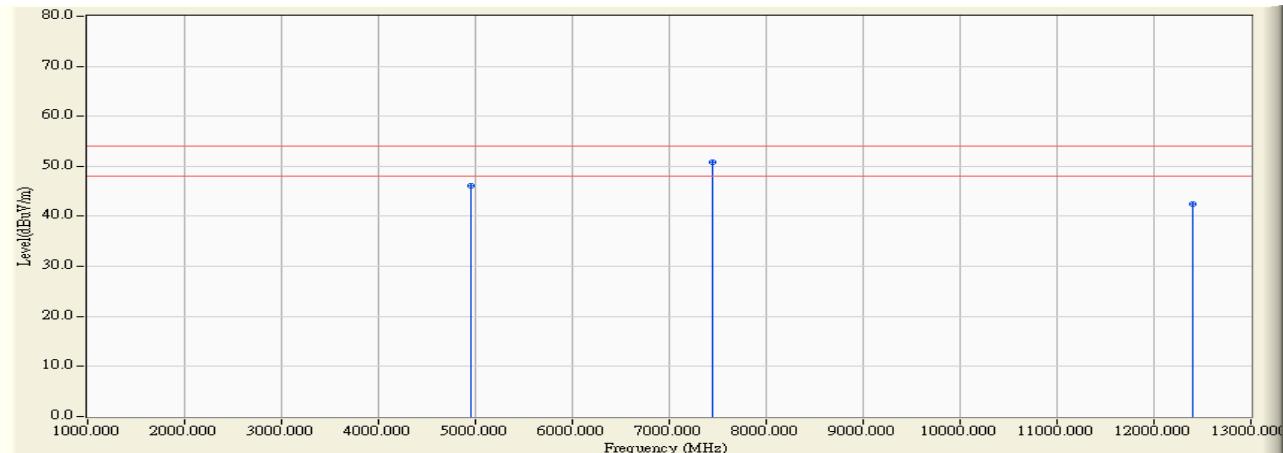


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	4959.375	9.064	49.550	58.613	-15.387	74.000	PEAK
2	* 7439.115	18.378	46.410	64.788	-9.212	74.000	PEAK
3	9916.210	23.603	29.750	53.353	-20.647	74.000	PEAK
4	12404.310	25.651	30.610	56.261	-17.739	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are lower than limit 20dB.

Site : CB4-H	Time : 2017/09/15
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB4_FCC_A115_EFS_1-18GHz_1116 - VERTICAL	Power : DC 5V (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2480MHz



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	4960.015	9.067	37.130	46.197	-7.803	54.000	AVERAGE
2	* 7439.920	18.380	32.350	50.730	-3.270	54.000	AVERAGE
3	12401.000	25.648	16.850	42.499	-11.501	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are lower than limit 20dB.

5. RF antenna conducted test

5.1. Test Equipment

The following test equipment is used during the test:

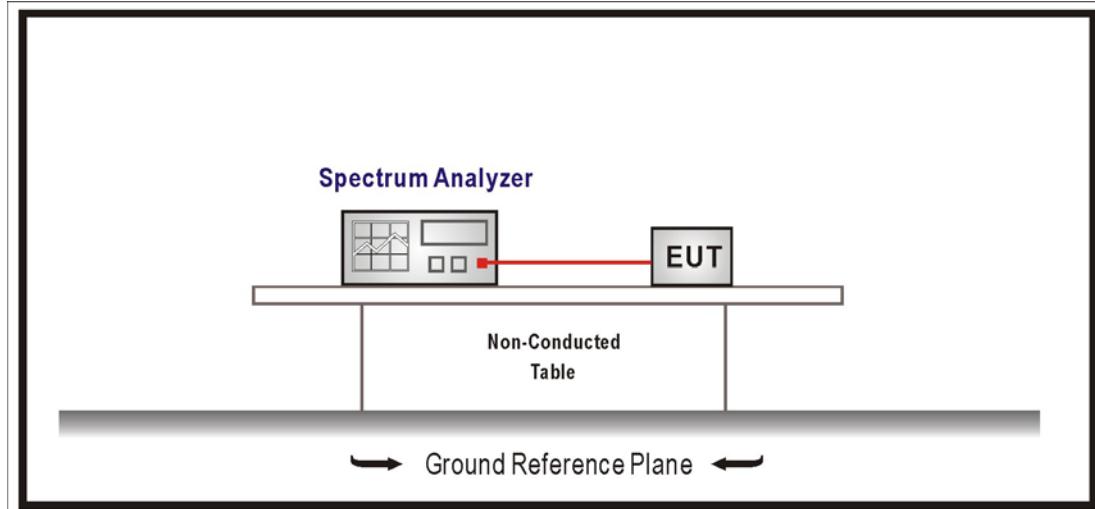
RF antenna conducted test / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12

Note: All equipment that need to calibrate are with calibration period of 1 year.

5.2. Test Setup

RF Conducted Measurement:



5.3. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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 an RF conducted or radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

5.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 V03R02 for compliance to FCC 47CFR 15.247 requirements. Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

5.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247

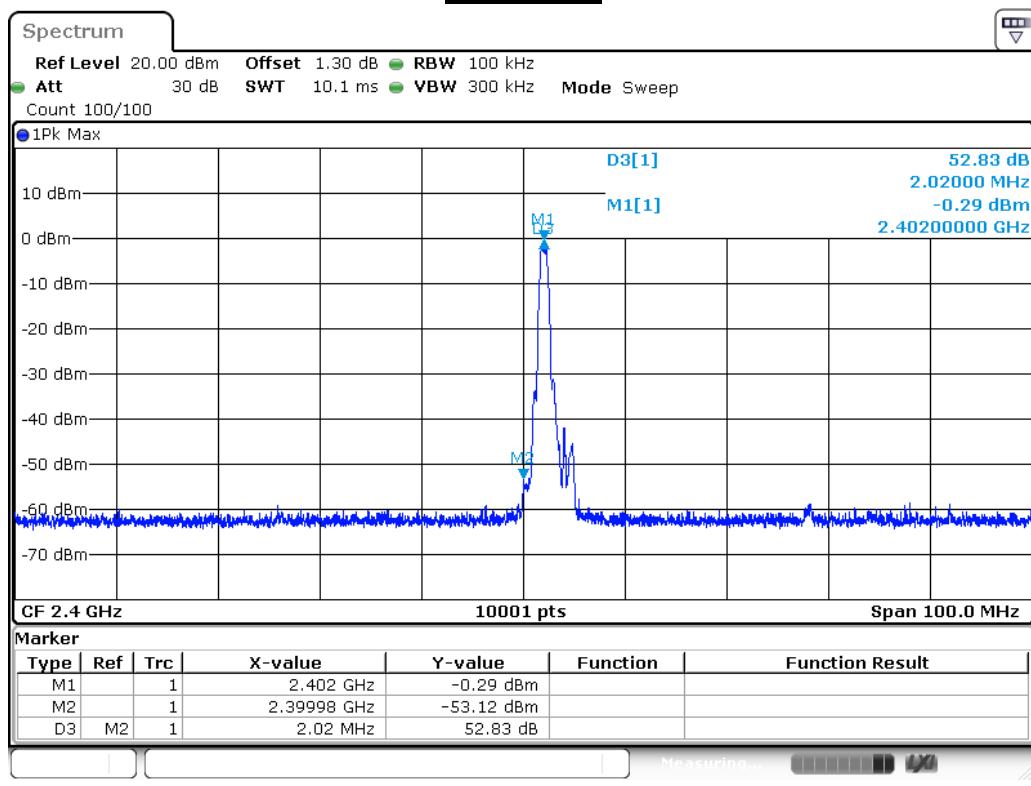
5.6. Test Result

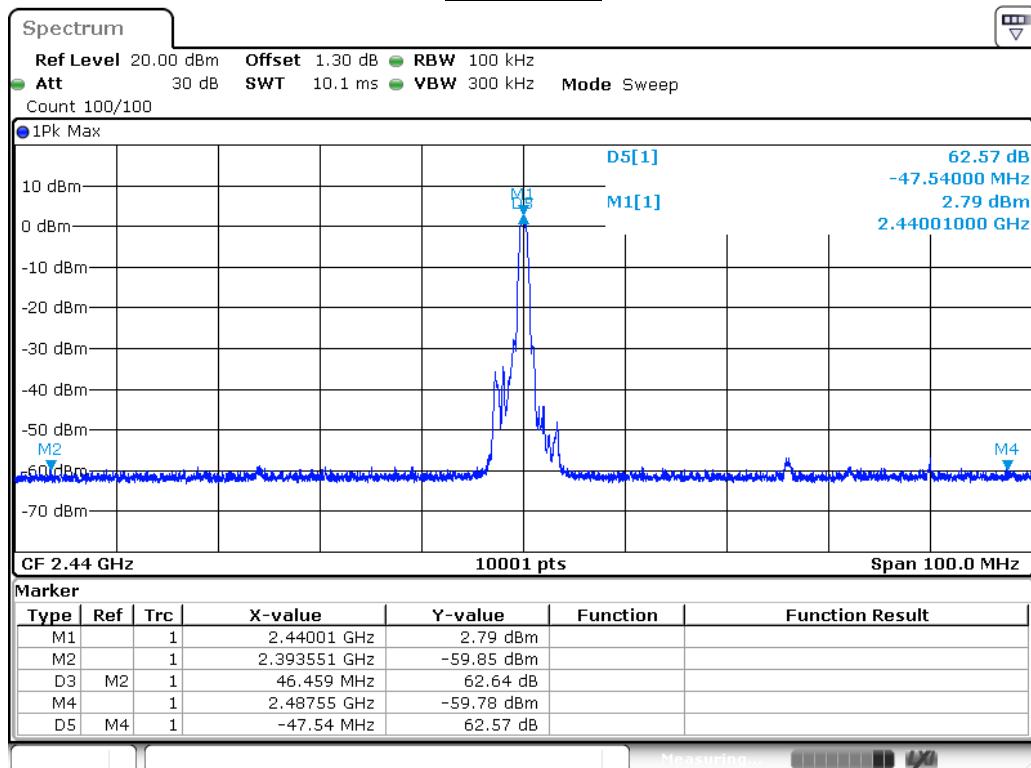
Product	ST1 wireless speaker		
Test Item	RF antenna conducted test		
Test Mode	Mode 1: Transmit Mode		
Date of Test	2017/09/15	Test Site	SR10-H

GFSK

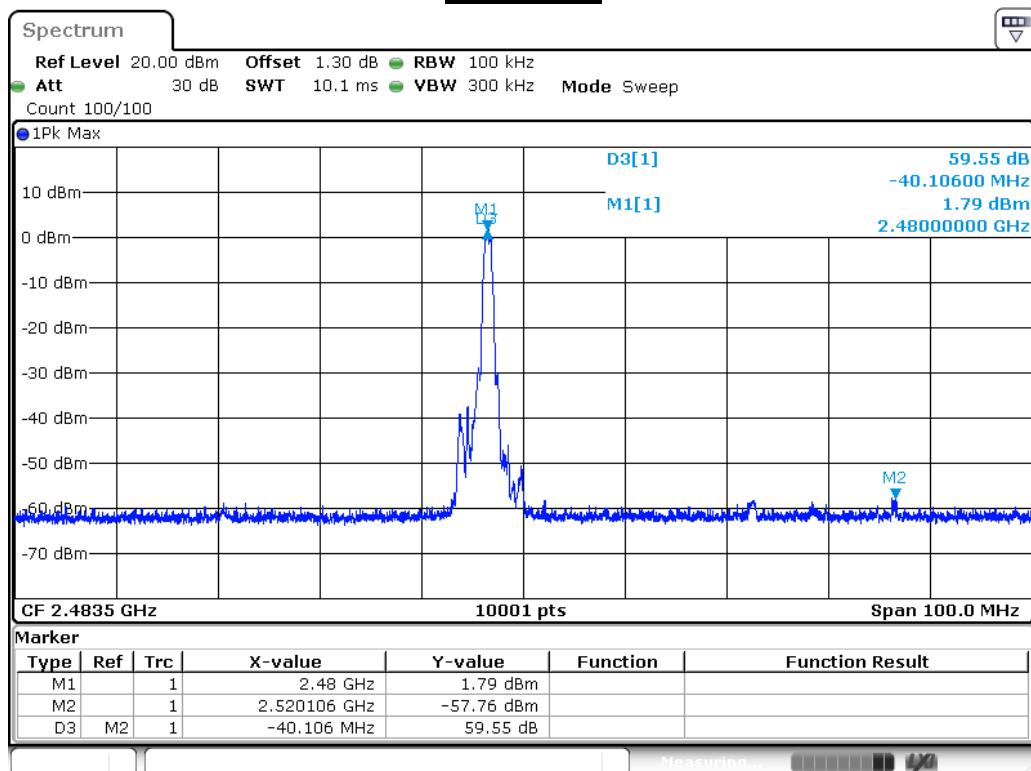
Channel	Frequency (MHz)	Measure Level (dBc)	Limit (dBc)	Result
00	2402	52.830	≥20	Pass
19	2440	62.570	≥20	Pass
39	2480	59.550	≥20	Pass

Channel 00



Channel 19

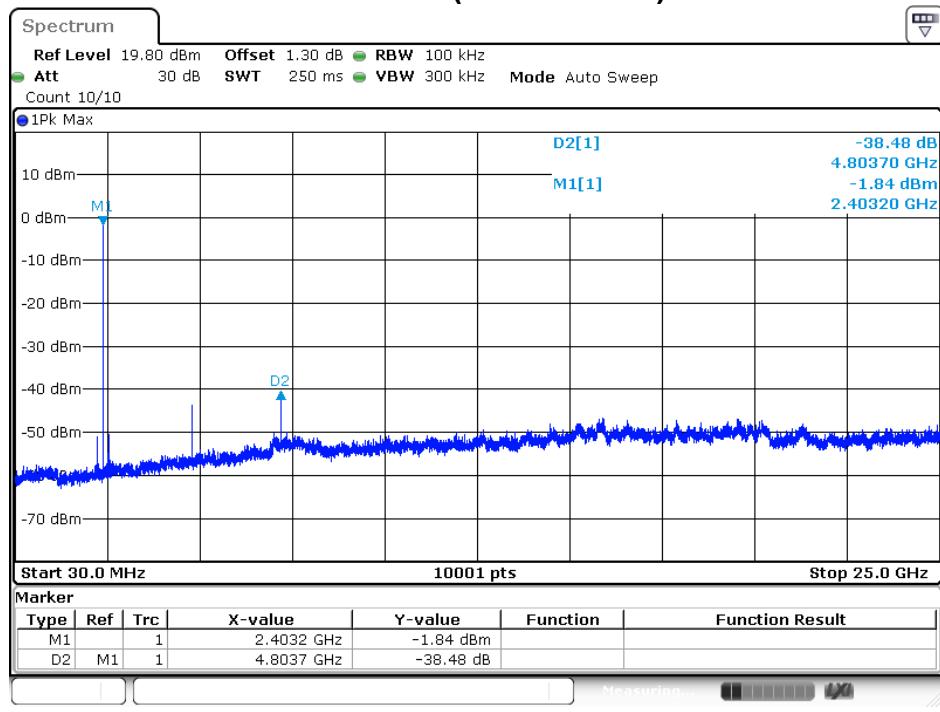
Date: 15 SEP 2017 16:16:16

Channel 39

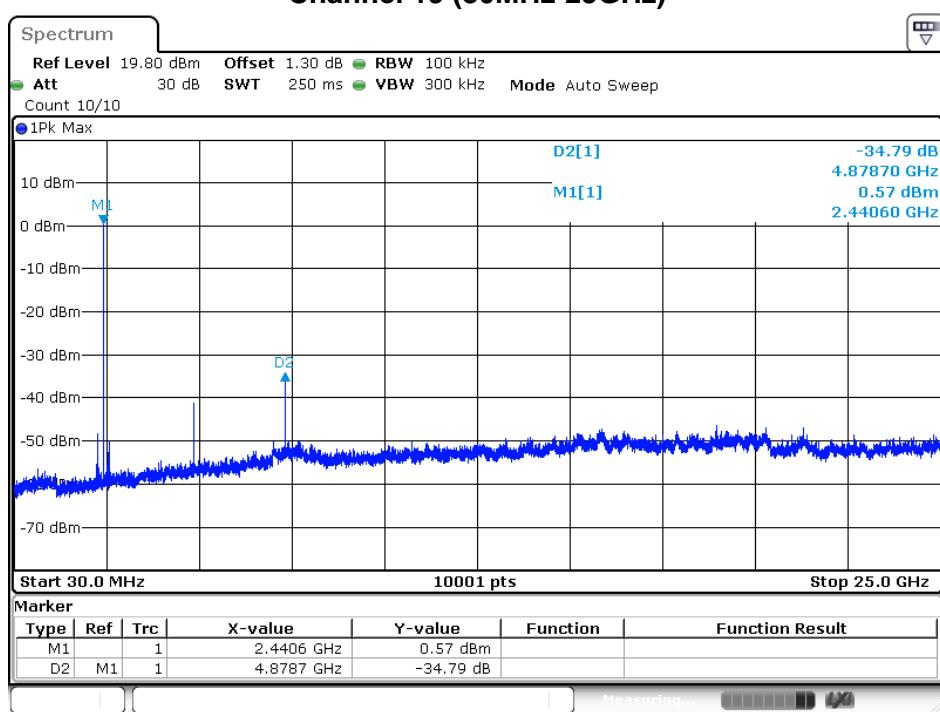
Date: 15 SEP 2017 16:13:09

Product	ST1 wireless speaker		
Test Item	RF antenna conducted test		
Test Mode	Mode 1: Transmit Mode		
Date of Test	2017/09/15	Test Site	SR10-H

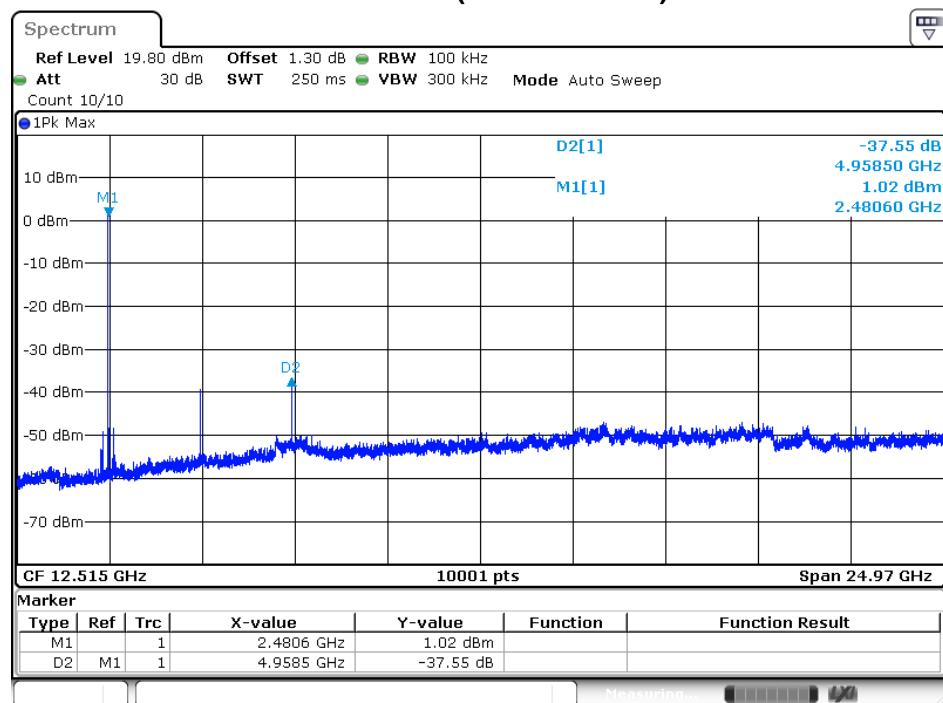
Channel 00 (30MHz-25GHz)



Channel 19 (30MHz-25GHz)



Channel 39 (30MHz-25GHz)



Date: 15 SEP 2017 17:47:21

6. Band Edge

6.1. Test Equipment

The following test equipment are used during the test:

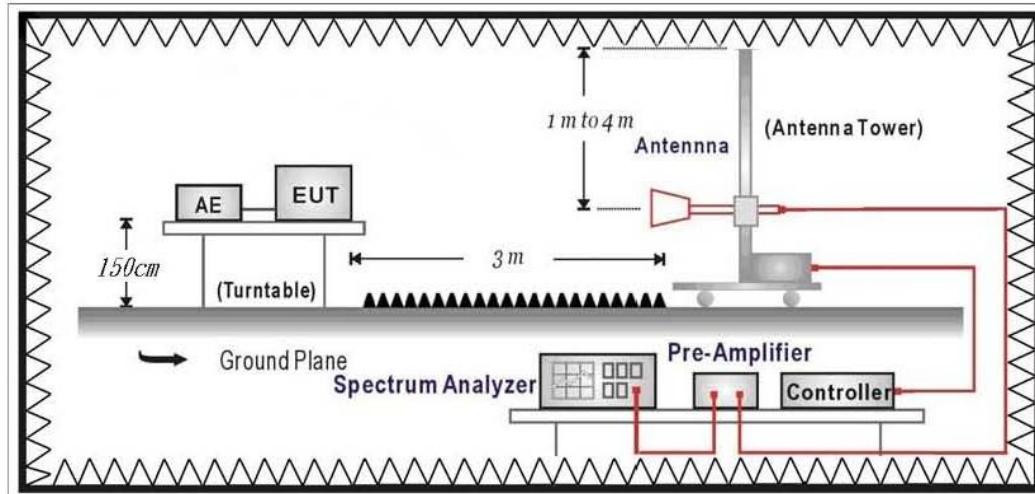
Band Edge / CB4-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2016/11/28	2017/11/27
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12
Bilog Antenna	Teseq	CBL6112D	23191	2017/06/28	2018/06/27
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2017/06/14	2018/06/13
Horn Antenna	Schwarzbeck	BBHA 9170	202	2017/02/15	2018/02/14
Pre-Amplifier	RF Bay Inc.	LNA-1330	12162511	2017/03/09	2018/03/08
Pre-Amplifier	EMCI	EMCI 1830I	980366	2017/01/23	2018/01/22
Pre-Amplifier	MITEQ	JS44-45-8P	2014754	2016/12/26	2017/12/25

Note: All equipment that need to calibrate are with calibration period of 1 year.

6.2. Test Setup

RF Radiated Measurement:



6.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

6.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 V03R02 for compliance to FCC 47CFR 15.247 requirements.

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

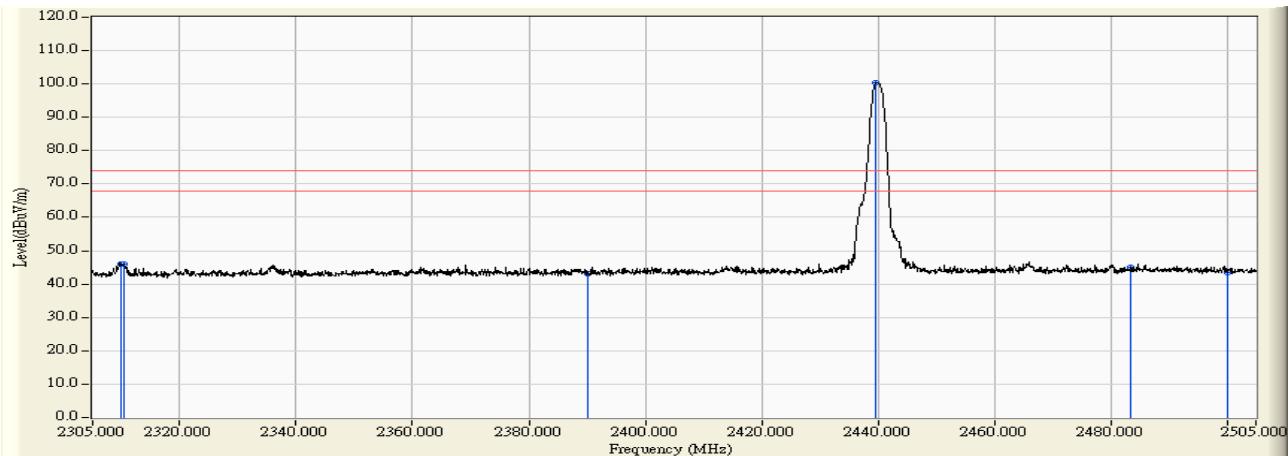
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10:2013 on radiated measurement.

6.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247

6.6. Test Result

Site : CB4-H	Time : 2017/09/15
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4_FCC_A115_EFS_1-18GHz_1116 - HORIZONTAL	Power : DC 5V (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2440MHz

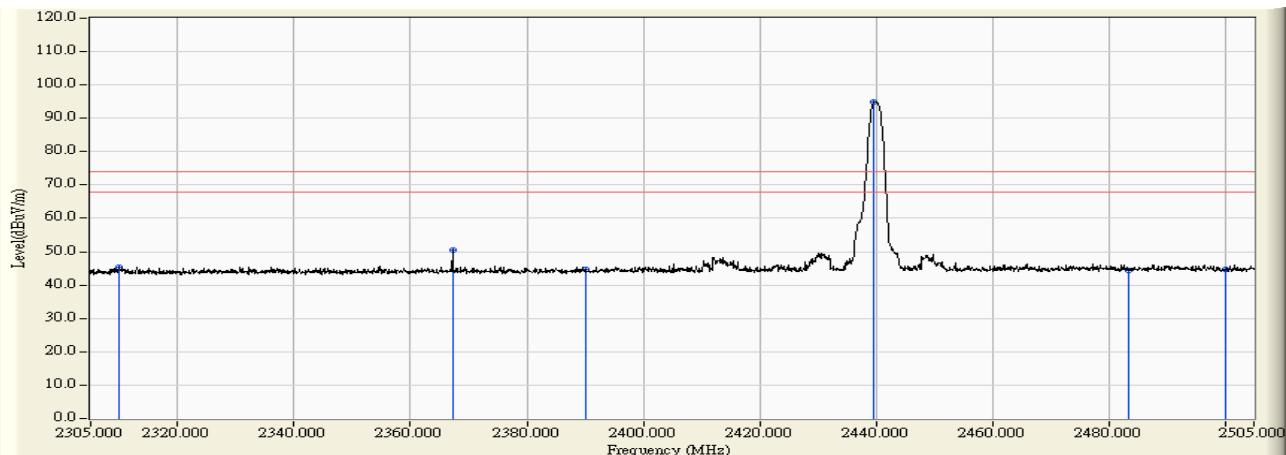


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2310.000	13.539	32.483	46.022	-27.978	74.000	PEAK
2	2310.300	13.541	32.377	45.918	-28.082	74.000	PEAK
3	2390.000	14.096	29.119	43.215	-30.785	74.000	PEAK
4	* 2439.700	14.438	85.921	100.359	26.359	74.000	AVERAGE
5	2483.500	14.739	30.209	44.948	-29.052	74.000	PEAK
6	2500.000	14.848	28.534	43.382	-30.618	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB4-H	Time : 2017/09/15
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4_FCC_A115_EFS_1-18GHz_1116 - VERTICAL	Power : DC 5V (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2440MHz

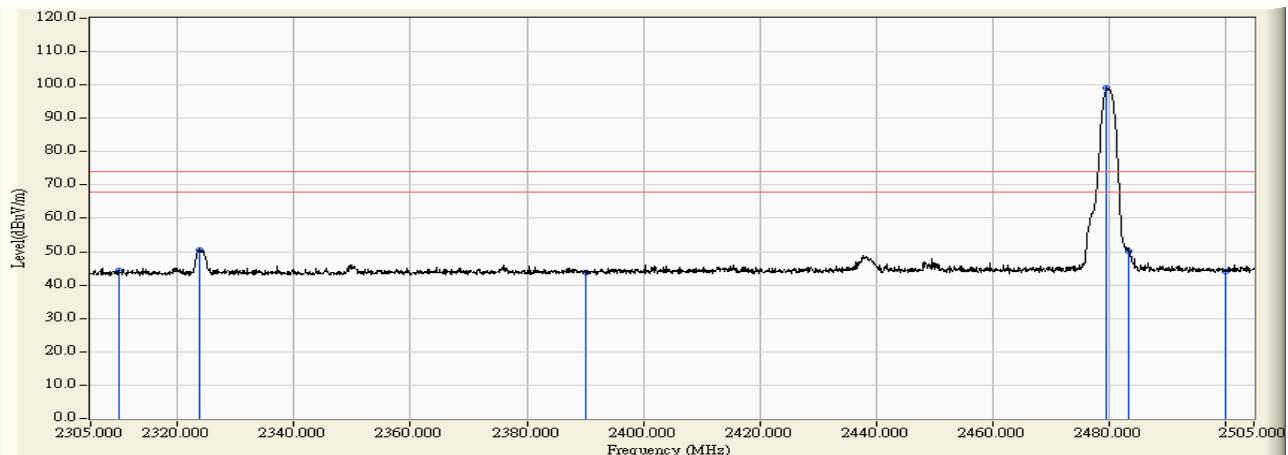


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	13.539	31.722	45.261	-28.739	74.000	PEAK
2		2367.200	13.938	36.509	50.446	-23.554	74.000	PEAK
3		2390.000	14.096	30.497	44.593	-29.407	74.000	PEAK
4	*	2439.700	14.438	80.580	95.018	21.018	74.000	PEAK
5		2483.500	14.739	29.766	44.505	-29.495	74.000	PEAK
6		2500.000	14.848	29.798	44.646	-29.354	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB4-H	Time : 2017/09/15
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4_FCC_A115_EFS_1-18GHz_1116 - HORIZONTAL	Power : DC 5V (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2480MHz

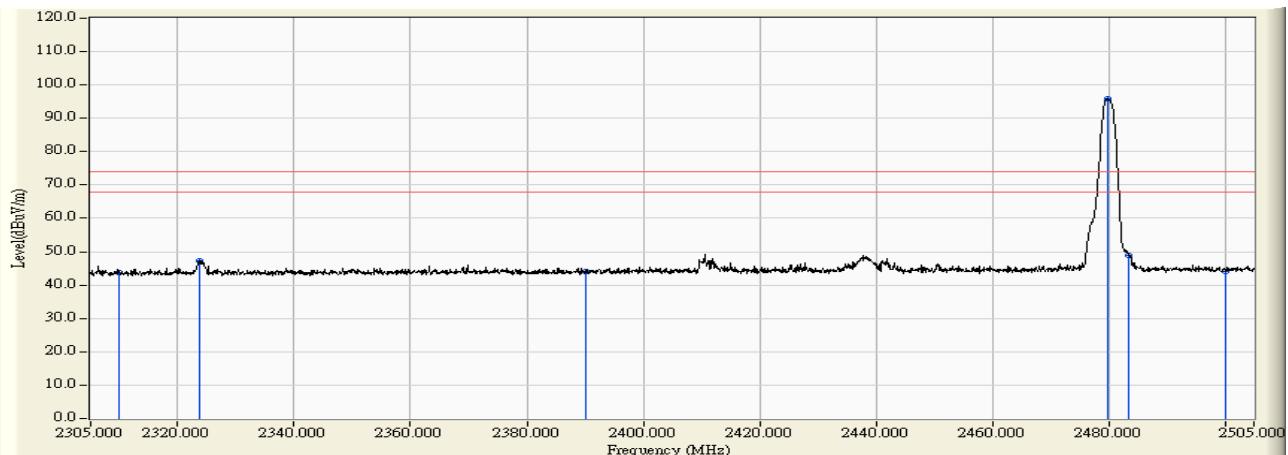


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	13.539	30.793	44.332	-29.668	74.000	PEAK
2		2323.600	13.634	36.961	50.595	-23.405	74.000	PEAK
3		2390.000	14.096	29.790	43.886	-30.114	74.000	PEAK
4	*	2479.700	14.712	84.263	98.976	24.976	74.000	PEAK
5		2483.500	14.739	35.429	50.168	-23.832	74.000	PEAK
6		2500.000	14.848	29.072	43.920	-30.080	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB4-H	Time : 2017/09/15
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB4_FCC_A115_EFS_1-18GHz_1116 - VERTICAL	Power : DC 5V (Power by Notebook PC)
EUT : ST1 wireless speaker	Note : 802.15.1_BLE_2480MHz



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	13.539	30.079	43.618	-30.382	74.000	PEAK
2		2323.800	13.635	33.649	47.284	-26.716	74.000	PEAK
3		2390.000	14.096	30.028	44.124	-29.876	74.000	PEAK
4	*	2479.800	14.714	81.156	95.869	21.869	74.000	PEAK
5		2483.500	14.739	34.278	49.017	-24.983	74.000	PEAK
6		2500.000	14.848	29.325	44.173	-29.827	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

7. Occupied Bandwidth

7.1. Test Equipment

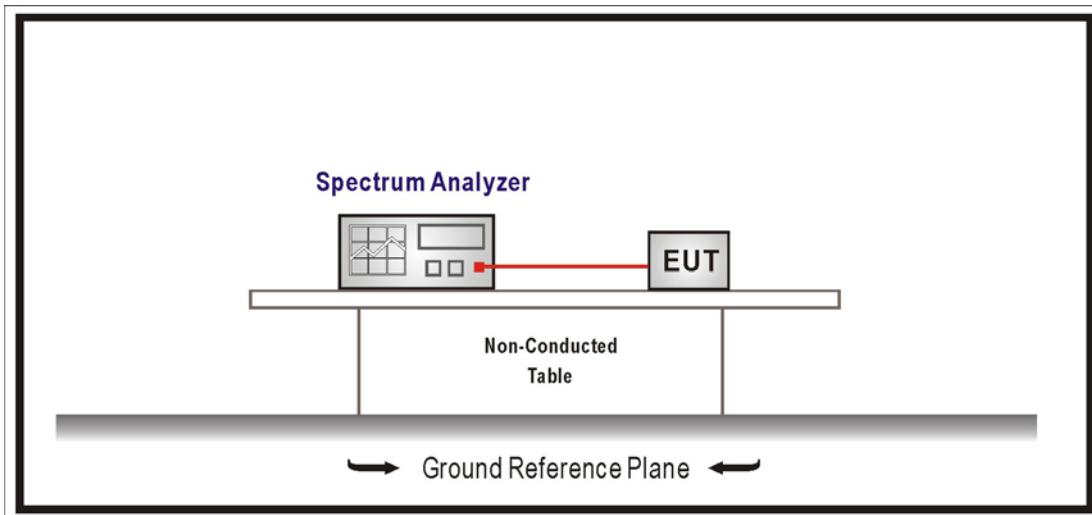
The following test equipment is used during the test:

Occupied Bandwidth / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12

Note: All equipment that need to calibrate are with calibration period of 1 year.

7.2. Test Setup



7.3. Limits

The 6 dB bandwidth must be greater than 500 kHz.

7.4. Test Procedures

The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB558074 V03R02 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 1% of EBW, Span greater than RBW.

7.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247

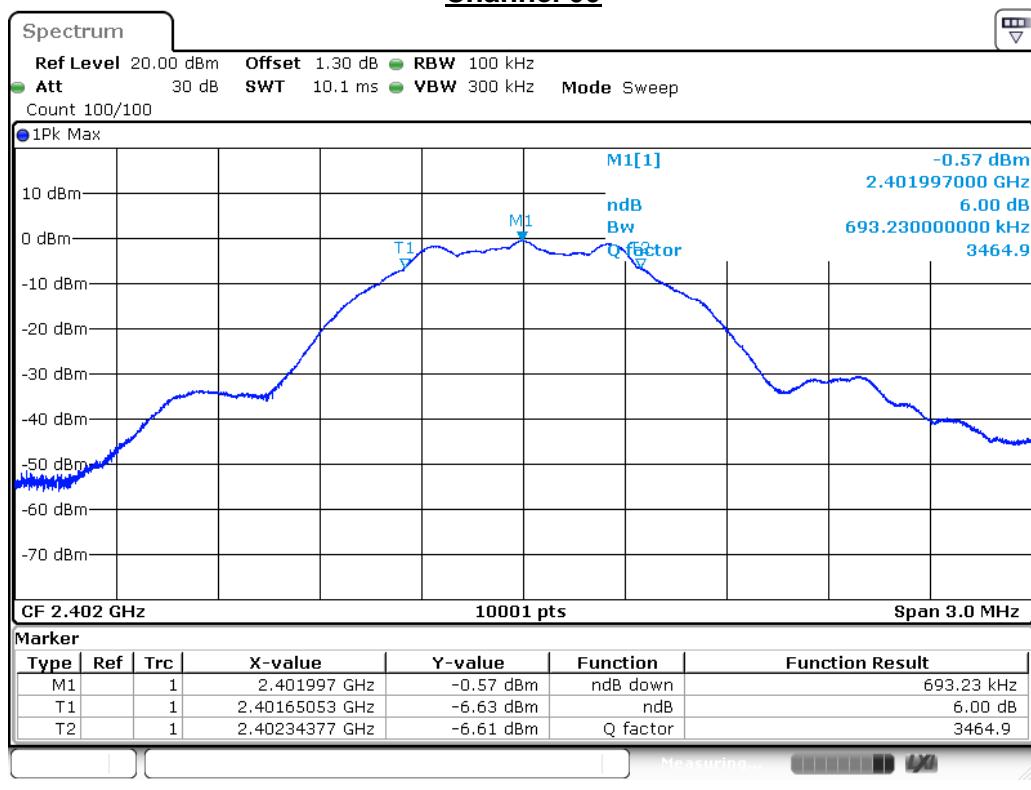
7.6. Test Result

Product	ST1 wireless speaker		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1: Transmit Mode		
Date of Test	2017/09/15	Test Site	SR10-H

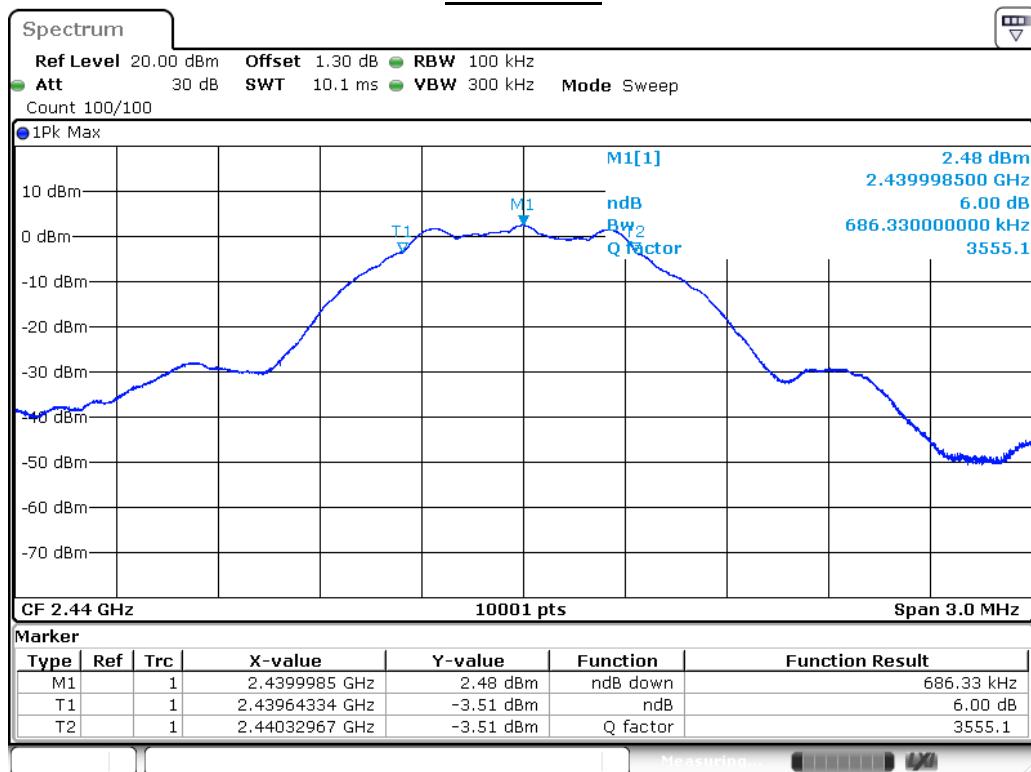
GFSK

Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
00	2402	0.693	≥ 0.5	Pass
19	2440	0.686	≥ 0.5	Pass
39	2480	0.686	≥ 0.5	Pass

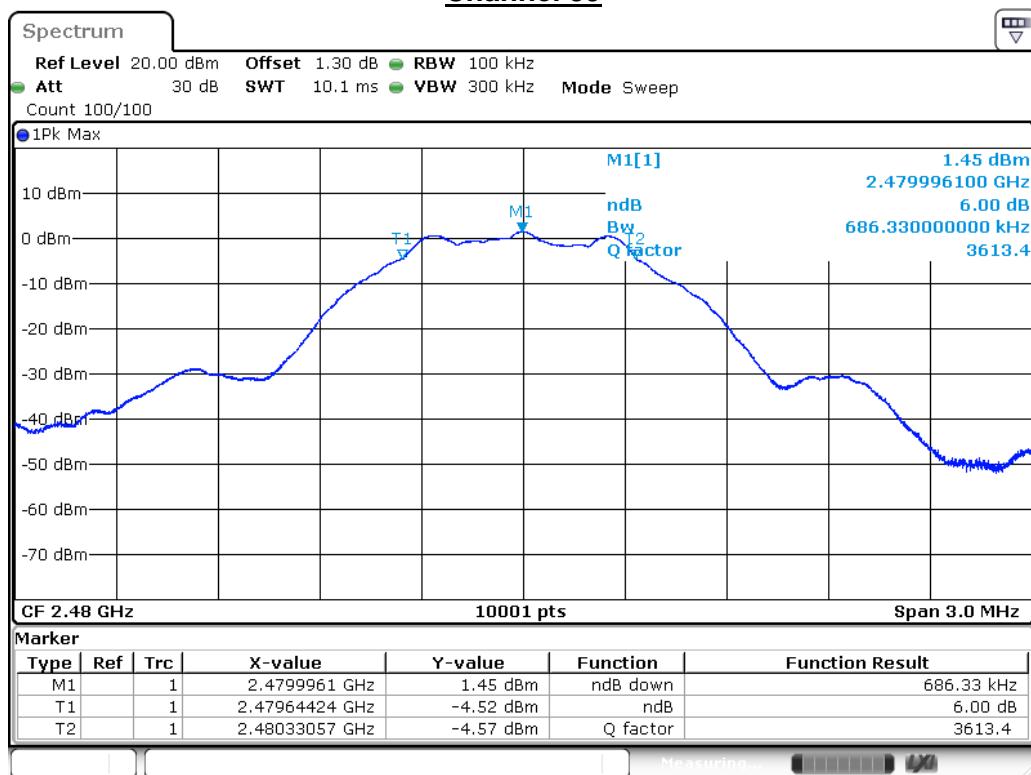
Channel 00



Date: 15 SEP 2017 16:04:40

Channel 19

Date: 15 SEP 2017 16:05:52

Channel 39

Date: 15 SEP 2017 16:03:47

8. Power Density

8.1. Test Equipment

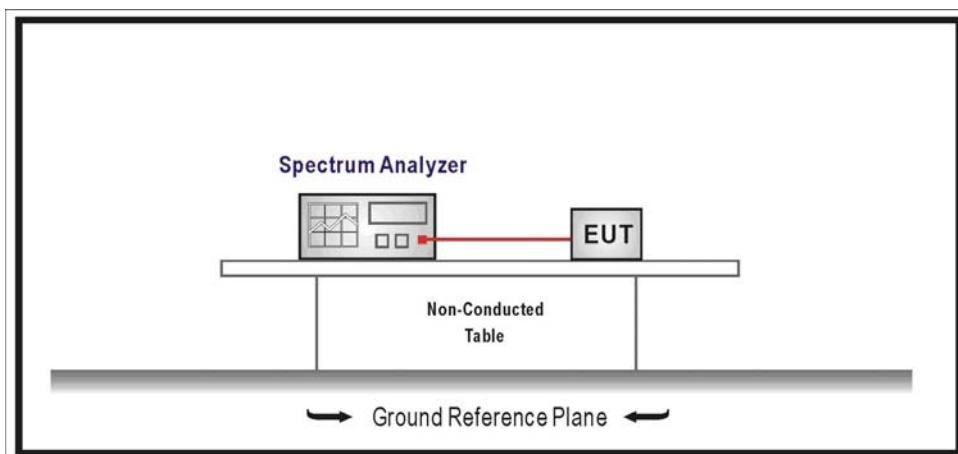
The following test equipment is used during the test:

Power Density / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12

Note: All equipment that need to calibrate are with calibration period of 1 year.

8.2. Test Setup



8.3. Limits

The peak power spectral density conducted from the intentional radiated to the antenna shall not be greater than +8dBm in any 3kHz band during any time interval of continuous transmission.

8.4. Test Procedures

The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB558074 V03R02 for compliance to FCC 47CFR 15.247 requirements.

8.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247

8.6. Uncertainty

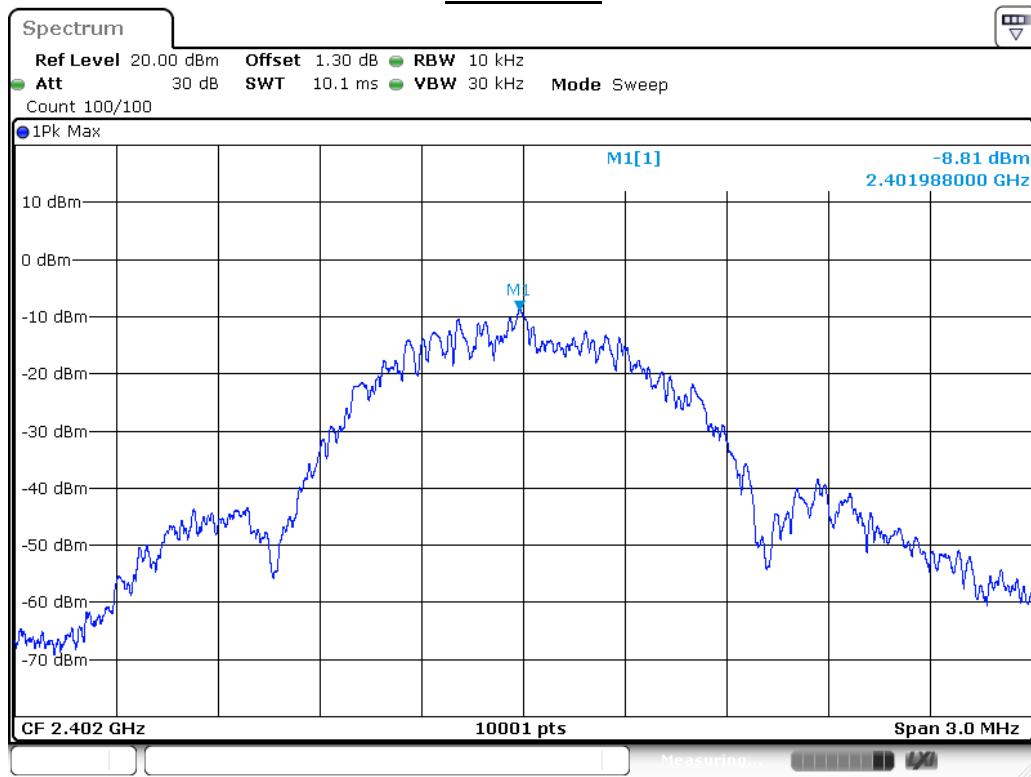
The measurement uncertainty is defined as $\pm 1.27\text{dB}$.

8.7. Test Result

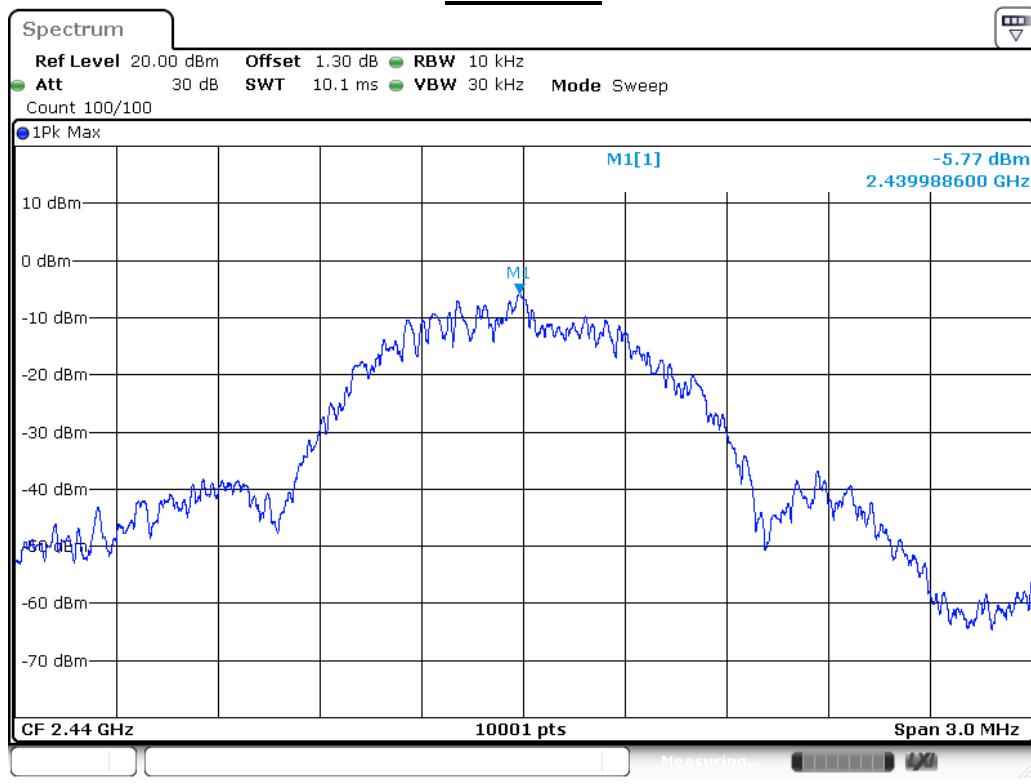
Product	ST1 wireless speaker		
Test Item	Power Density		
Test Mode	Mode 1: Transmit Mode		
Date of Test	2017/09/15	Test Site	SR10-H

Channel No.	Frequency (MHz)	Measure Values (dBm)	Limit (dBm)	Result
00	2402	-8.810	≤8	Pass
19	2440	-5.770	≤8	Pass
39	2480	-6.840	≤8	Pass

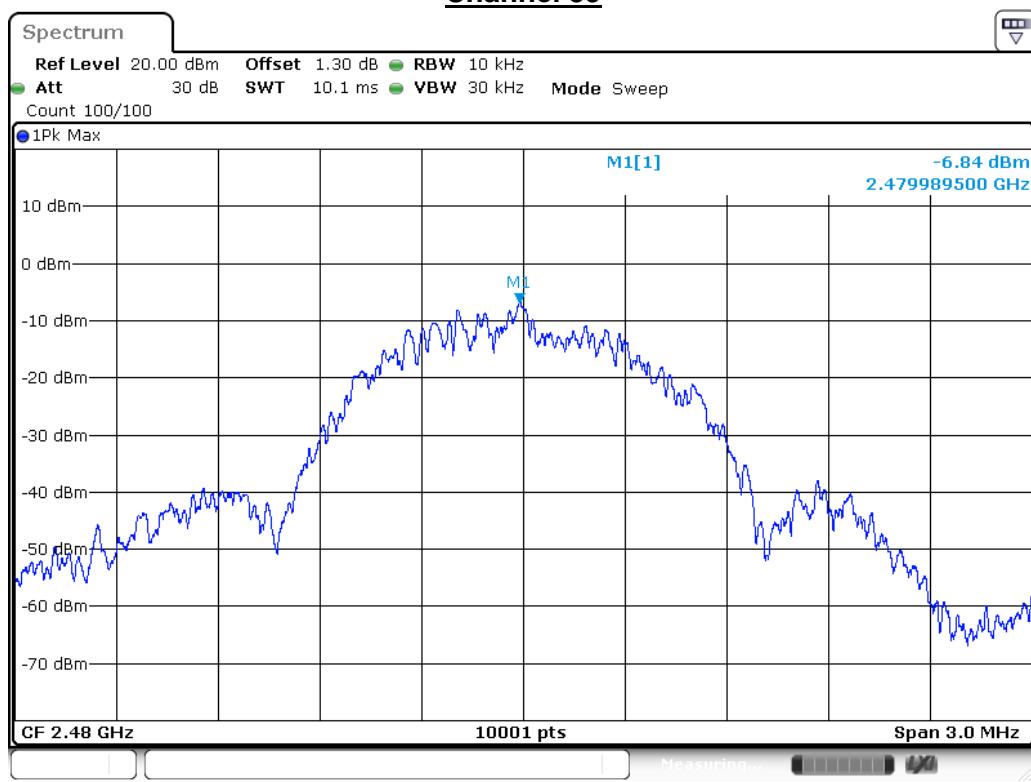
Channel 00



Channel 19



Channel 39



Attachment 1

➤ Test Setup Photograph

<Conducted Emission>

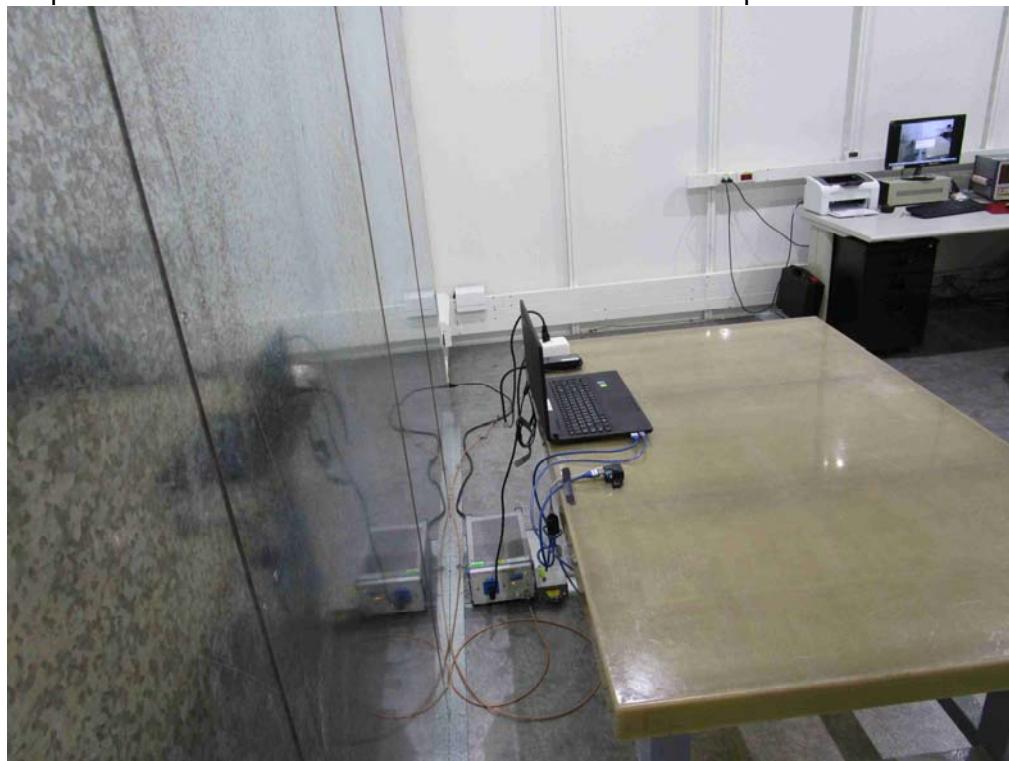
Test Mode : Mode 1: Transmit Mode

Description : Front View of Conducted Emission Test Setup



Test Mode : Mode 1: Transmit Mode

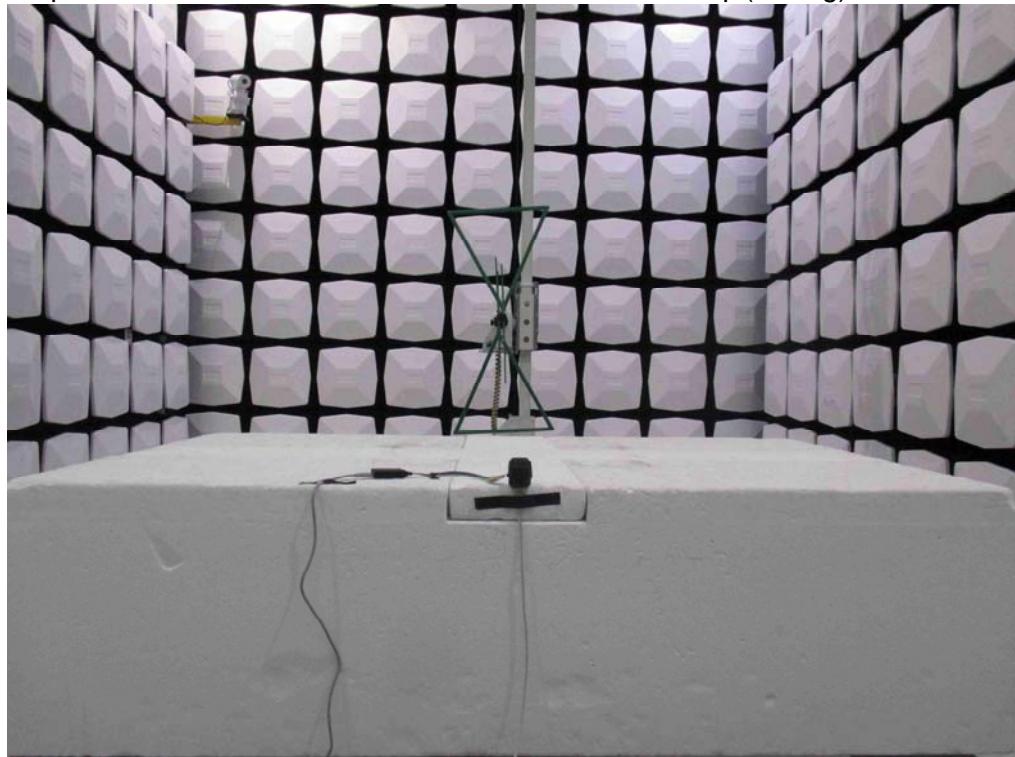
Description : Back View of Conducted Emission Test Setup



<Radiated Emission>

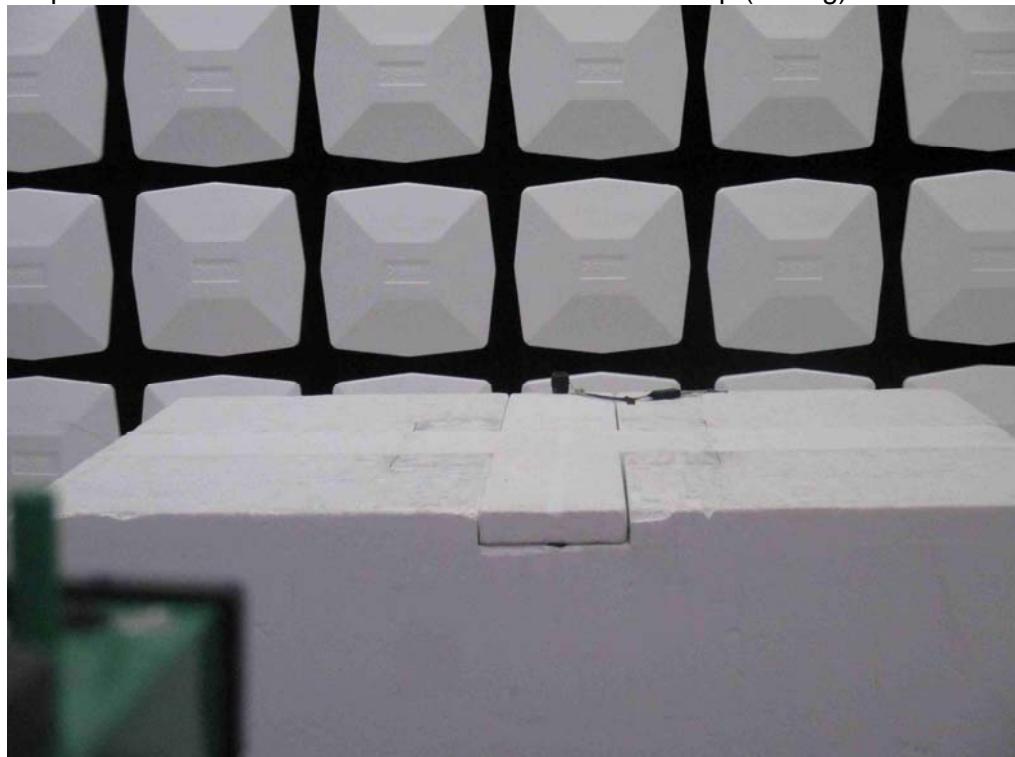
Test Mode : Mode 1: Transmit Mode

Description : Front View of Radiated Emission Test Setup (Bi-Log)



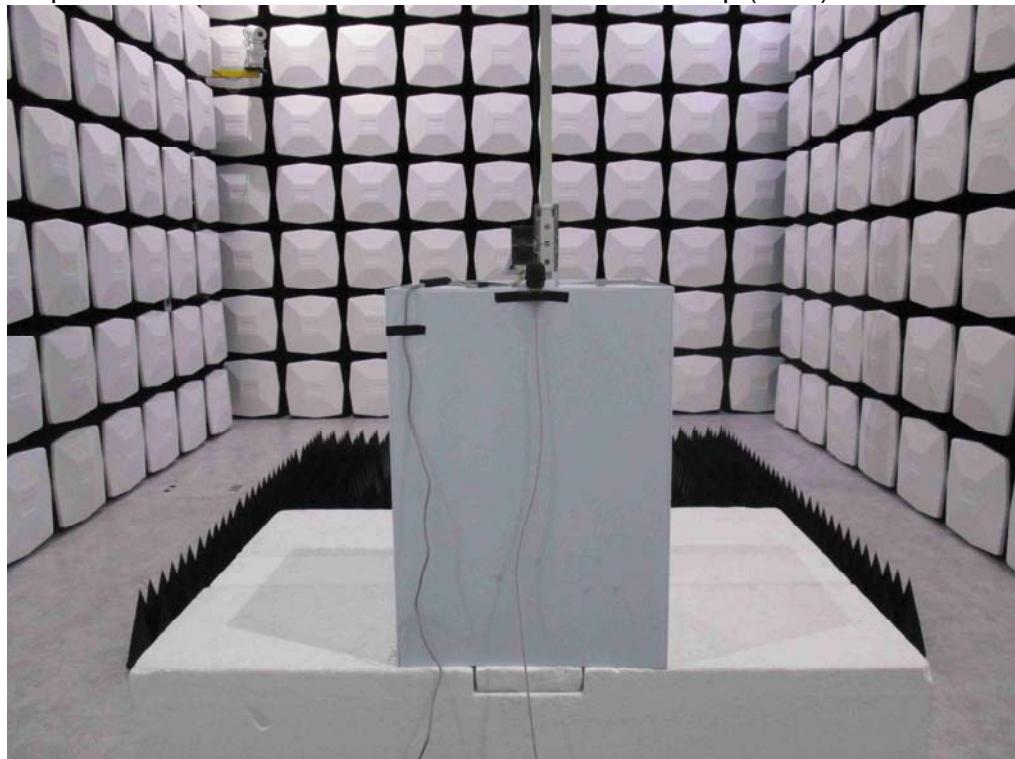
Test Mode : Mode 1: Transmit Mode

Description : Back View of Radiated Emission Test Setup (Bi-Log)



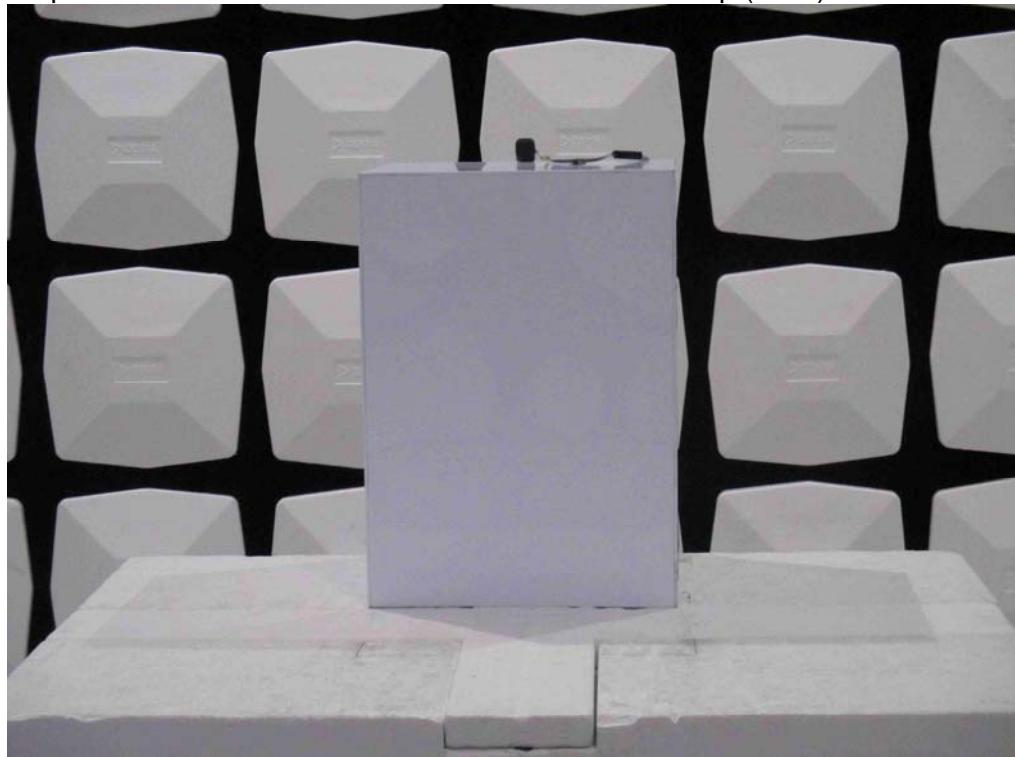
Test Mode : Mode 1: Transmit Mode

Description : Front View of Radiated Emission Test Setup (Horn)



Test Mode : Mode 1: Transmit Mode

Description : Back View of Radiated Emission Test Setup (Horn)



Attachment 2

➤ EUT External Photograph

(1) EUT Photo (White)



(2) EUT Photo



(3) EUT Photo (Gray)



(4) EUT Photo



(5) EUT Photo



(6) EUT Photo



(7) EUT Photo



(8) EUT Photo



(9) EUT Photo



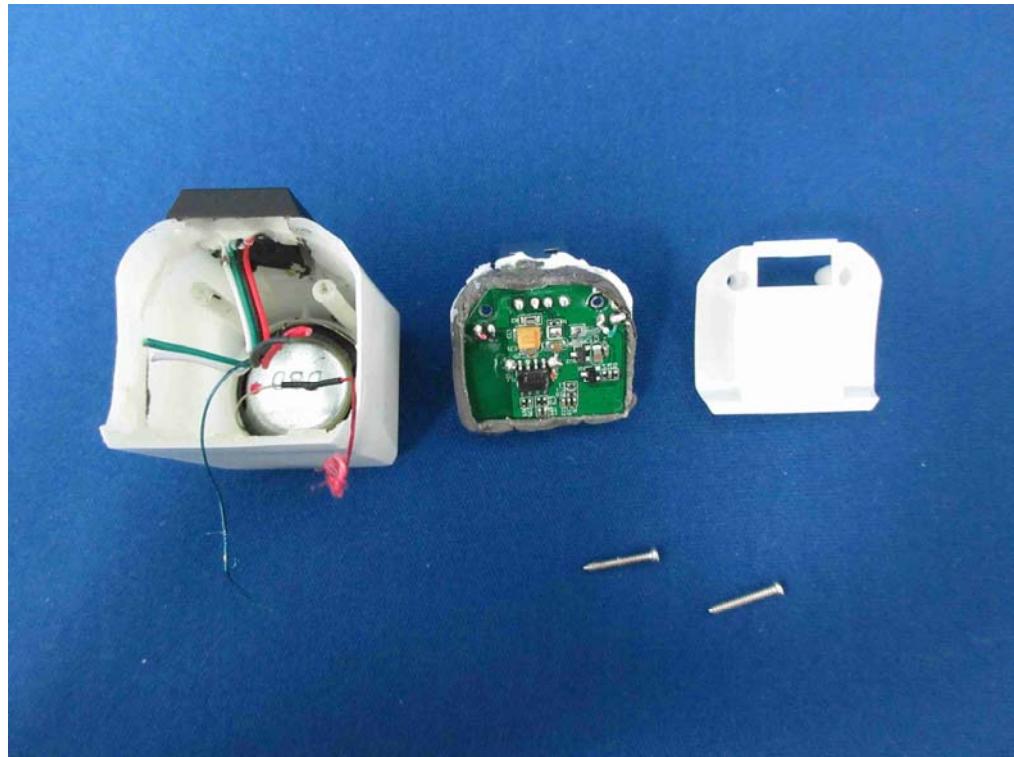
(10) EUT Photo



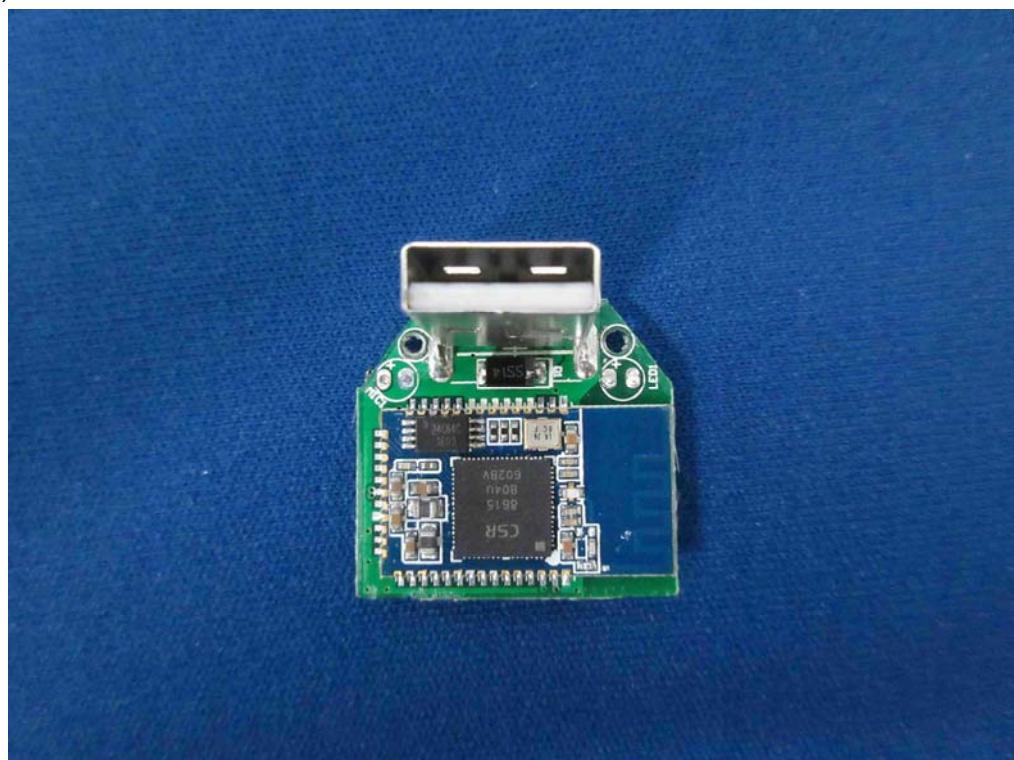
Attachment 3

➤ **EUT Internal Photograph**

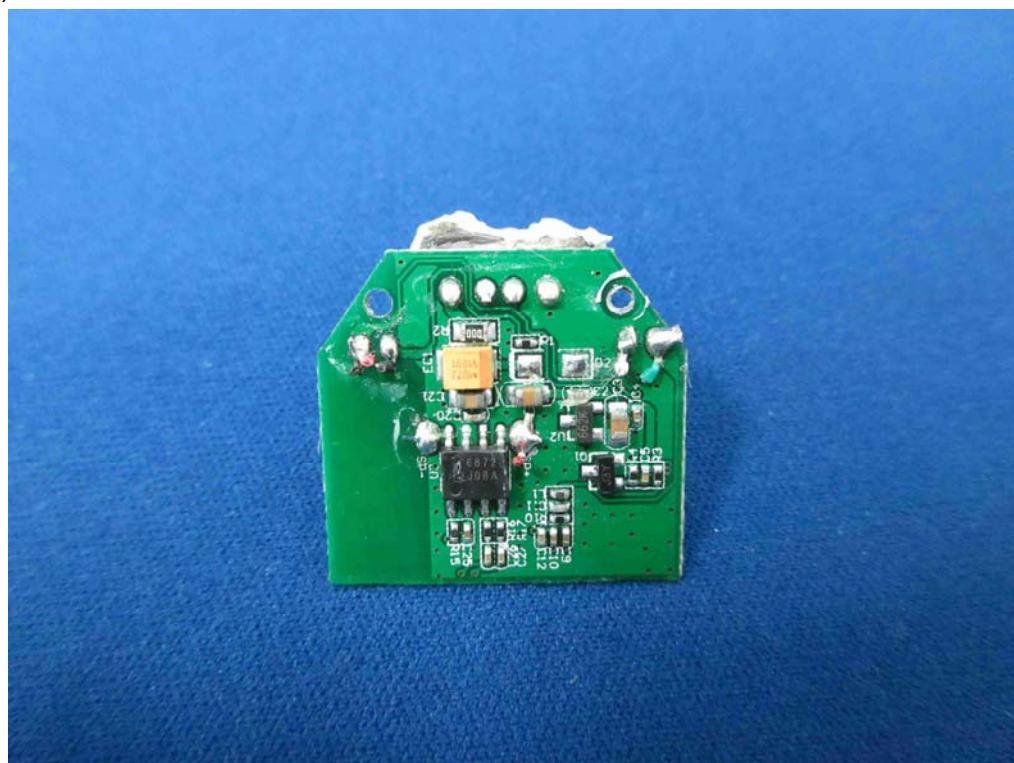
(1) EUT Photo



(2) EUT Photo



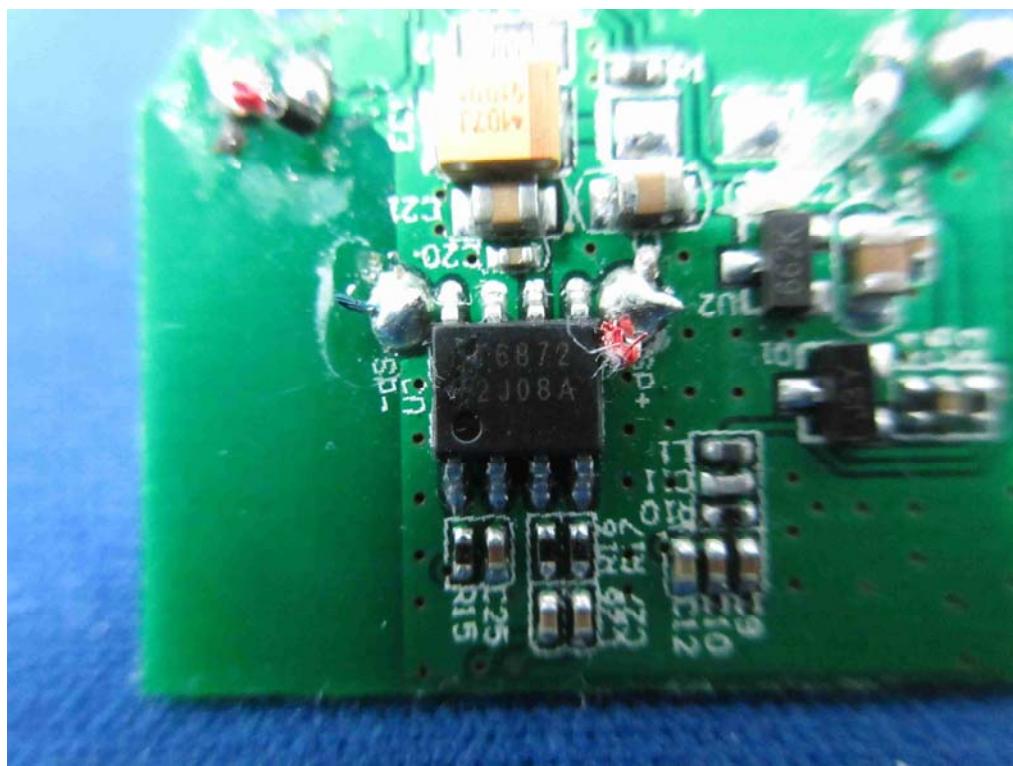
(3) EUT Photo



(4) EUT Photo



(5) EUT Photo



(6) EUT Photo (Antenna Location)

