

FCC PART 15C TEST REPORT FOR CERTIFICATION  
On Behalf of

BONFIRE ACOUSTIC

Multi media Bluetooth Speaker system

Model Number: MM2B

FCC ID: 2AECWMM2B

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Date of Test : February 12,2015~ April 22, 2015  
Date of Report : April 27, 2015

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## Test Report Verification

|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                      |                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>Applicant:</b>                                                                                                                                                                                        | BONFIRE ACOUSTIC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                      |                                    |
| <b>Address:</b>                                                                                                                                                                                          | 302 222 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                      |                                    |
| <b>Manufacturer</b>                                                                                                                                                                                      | SHENZHEN DONGYUAN ELECTRONICS CO.,LTD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                      |                                    |
| <b>Address:</b>                                                                                                                                                                                          | Dongyuan Industry Park, No.28, west of Beihuan Road, Shiyan, Shenzhen 518108                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                      |                                    |
| <b>E.U.T:</b>                                                                                                                                                                                            | Multi media Bluetooth Speaker system                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                      |                                    |
| <b>Model Number:</b>                                                                                                                                                                                     | MM2B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                      |                                    |
| <b>Power Supply:</b>                                                                                                                                                                                     | DC 12V From Adapter Input AC 120V/60Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                      |                                    |
| <b>Test Voltage:</b>                                                                                                                                                                                     | DC 12V From Adapter Input AC 120V/60Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                      |                                    |
| <b>Trade Name:</b>                                                                                                                                                                                       | BF&A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Serial No.:</b>                                                                                                                   | -----                              |
| <b>Date of Receipt:</b>                                                                                                                                                                                  | February 12, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Date of Test:</b>                                                                                                                 | February 12, 2015 ~ April 22, 2015 |
| <b>Test Specification:</b>                                                                                                                                                                               | FCC Rules and Regulations Part 15 Subpart C:2014<br>ANSI C63.10:2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                      |                                    |
| <b>Test Result:</b>                                                                                                                                                                                      | <p>The device described above is tested by EST Technology Co., Ltd.. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the FCC Rules and Regulations Part 15 Subpart C requirements.</p> <p style="text-align: right;">This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd.<br/>Date: April 27, 2015</p> |                                                                                                                                      |                                    |
| Prepared by:                                                                                                                                                                                             | Tested by:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Approved by:                                                                                                                         |                                    |
| <br><hr style="width: 100px; margin: 0 auto;"/>                                                                       | <br><hr style="width: 100px; margin: 0 auto;"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <br><hr style="width: 100px; margin: 0 auto;"/> |                                    |
| Ada / Assistant                                                                                                                                                                                          | Tony.Tang/ Engineer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | IcemanHu / Manager                                                                                                                   |                                    |
| <b>Other Aspects:</b>                                                                                                                                                                                    | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                      |                                    |
| <i>Abbreviations: OK/P=passed    fail/F=failed    n.a/N=not applicable    E.U.T=equipment under tested</i>                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                      |                                    |
| <i>This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd.</i> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                      |                                    |

## 1. GENERAL INFORMATION

### 1.1. Description of Device (EUT)

|                             |   |                                           |               |
|-----------------------------|---|-------------------------------------------|---------------|
| Product Name                | : | Multi media Bluetooth Speaker system      |               |
| Model Number                | : | MM2B                                      |               |
| FCC ID                      | : | 2AECWMM2B                                 |               |
| Operation frequency         | : | 2402MHz~2480MHz                           |               |
| Number of channel           | : | 79                                        | 40            |
| Antenna                     | : | Internal antenna, -0.61 dBi gain          |               |
| Modulation                  | : | FHSS<br>(GFSK, $\pi/4$ -DQPSK,<br>8-DPSK) | BLE<br>(GFSK) |
| Product SW/HW version       | : | V1                                        |               |
| Radio SW/HW version         | : | V01                                       |               |
| Test SW Version             | : | BlueSuite 2.5                             |               |
| RF power setting in TEST SW | : | 3                                         |               |

## 2. SUMMARY OF TEST

### 2.1. Summary of test result

| Description of Test Item      | Standard                                              | Results |
|-------------------------------|-------------------------------------------------------|---------|
| Power Line Conducted Emission | FCC Part 15: 15.207<br>ANSI C63.10:2013               | PASS    |
| Radiated Emission             | FCC Part 15: 15.209<br>ANSI C63.10:2013<br>KDB 558074 | PASS    |
| Band Edge Compliance          | FCC Part 15: 15.247<br>ANSI C63.10:2013<br>KDB 558074 | PASS    |
| Conducted spurious emissions  | FCC Part 15: 15.247<br>ANSI C63.10:2013<br>KDB 558074 | PASS    |
| 6dB Bandwidth                 | FCC Part 15: 15.247<br>ANSI C63.10:2013<br>KDB 558074 | PASS    |
| Peak Output Power             | FCC Part 15: 15.247<br>ANSI C63.10:2013<br>KDB 558074 | PASS    |
| Power Spectral Density        | FCC Part 15: 15.247<br>ANSI C63.10:2013<br>KDB 558074 | PASS    |
| Antenna requirement           | FCC Part 15: 15.203                                   | PASS    |

## 2.2. Test Facilities

EMC Lab :      Certificated by CNAL, CHINA  
                            Registration No.: L5288  
                            Date of registration: Nov 23, 2014

                            Certificated by FCC, USA  
                            Registration No.: 989591  
                            Date of registration: November 20, 2013

                            Certificated by Industry Canada  
                            Registration No.: 9405A-1  
                            Date of registration: January 03, 2013

                            Certificated by VCCI, Japan  
                            Registration No.: R-3663 & C-4103  
                            Date of registration: July 25, 2011

                            Certificated by TUV Rheinland, Germany  
                            Registration No.: UA 50195514 0001  
                            Date of registration: January 07, 2011

                            Certificated by TUV/PS, Shenzhen  
                            Registration No.: SCN1017  
                            Date of registration: January 27, 2011

                            Certificated by Intertek ETL SEMKO  
                            Registration No.: 2011-RTL-L1-18  
                            Date of registration: April 28, 2011

                            Certificated by Siemic, Inc.  
                            Registration No.: SLCN021  
                            Date of registration: November 8, 2011

                            Certificated by Nemko, Hong Kong  
                            Registration No.: 175193  
                            Date of registration: May 4, 2011

Name of Firm :      EST Technology Co., Ltd.

Site Location :      San Tun Management Zone, Houjie Town, Dongguan,  
Guangdong, China

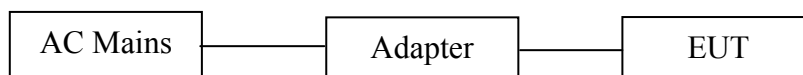
## 2.3. Assistant equipment used for test

### 2.3.1. Adapter

|         |                       |
|---------|-----------------------|
| M/N:    | FD 10K-15120-1500     |
| Input:  | 100-240V;50/60Hz 0.6A |
| Output: | 12V/1.5A              |

## 2.4. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 meter high above ground. EUT was set into BT test mode by Bluesuite software before test.



(EUT: Multi media Bluetooth Speaker system)

## 2.5. Test mode

A special test software was used to control EUT work in Continuous TX mode(100% duty cycle), and select test channel, wireless mode and data rate.

| Mode            | Channel | Frequency |
|-----------------|---------|-----------|
| BT 4.0-BLE GFSK | Low     | 2402MHz   |
|                 | Middle  | 2440MHz   |
|                 | High    | 2480MHz   |

## 2.6. Channel List for Bluetooth

| Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) |
|-------------|-----------------|-------------|-----------------|
| 1           | 2402            | 2           | 2404            |
| 3           | 2406            | 4           | 2408            |
| 5           | 2410            | 6           | 2412            |
| 7           | 2414            | 8           | 2416            |
| 9           | 2418            | 10          | 2420            |
| 11          | 2422            | 12          | 2424            |
| 13          | 2426            | 14          | 2428            |
| 15          | 2430            | 16          | 2432            |
| 17          | 2434            | 18          | 2436            |
| 19          | 2438            | 20          | 2440            |
| 21          | 2442            | 22          | 2444            |
| 23          | 2446            | 24          | 2448            |
| 25          | 2450            | 26          | 2452            |
| 27          | 2454            | 28          | 2456            |
| 29          | 2458            | 30          | 2460            |
| 31          | 2462            | 32          | 2464            |
| 33          | 2466            | 34          | 2468            |
| 35          | 2470            | 36          | 2472            |
| 37          | 2474            | 38          | 2476            |
| 39          | 2478            | 40          | 2480            |

## 2.7. Test Equipment

### 2.7.1. For conducted emission test

| Equipment               | Manufacturer    | Model No. | Serial No. | Last Cal.  | Next Cal. |
|-------------------------|-----------------|-----------|------------|------------|-----------|
| EMI Test Receiver       | Rohde & Schwarz | ESHS30    | 832354     | June,28,14 | 1 Year    |
| Artificial Mains Networ | Rohde & Schwarz | ENV216    | 101260     | June,28,14 | 1 Year    |
| Pulse Limiter           | Rohde & Schwarz | ESMM2B-Z2 | 101100     | June,28,14 | 1 Year    |

### 2.7.2. For radiated emission test(30-1000MHz)

| Equipment         | Manufacturer    | Model No. | Serial No. | Last Cal.  | Next Cal. |
|-------------------|-----------------|-----------|------------|------------|-----------|
| EMI Test Receiver | Rohde & Schwarz | ESVS10    | 100004     | June,28,14 | 1 Year    |
| Spectrum Analyzer | Agilent         | E4411B    | MY50140697 | June,28,14 | 1 Year    |
| Bilog Antenna     | Teseq           | CBL 6111D | 27090      | June,28,14 | 1 Year    |
| Signal Amplifier  | Agilent         | 310N      | 187037     | June,28,14 | 1 Year    |
| RF Cable          | Hubersuhner     | W10.02    | 534123     | June,28,14 | 1 Year    |

### 2.7.3. For radiated emission test(above 1GHz)

| Equipment         | Manufacturer    | Model No.   | Serial No.        | Last Cal.  | Next Cal. |
|-------------------|-----------------|-------------|-------------------|------------|-----------|
| Horn Antenna      | SCHWARZB<br>ECK | BBHA 9120 D | BBHA9120D1<br>002 | June,28,14 | 1 Year    |
| Signal Amplifier  | SCHWARZB<br>ECK | BBV9718     | 9718-212          | June,28,14 | 1 Year    |
| Spectrum Analyzer | Agilent         | E4408B      | MY44211139        | June,28,14 | 1 Year    |
| RF Cable          | Hubersuhner     | RG 214/U    | 513423            | June,28,14 | 1 Year    |

### 3 POWER LINE CONDUCTED EMISSION TEST

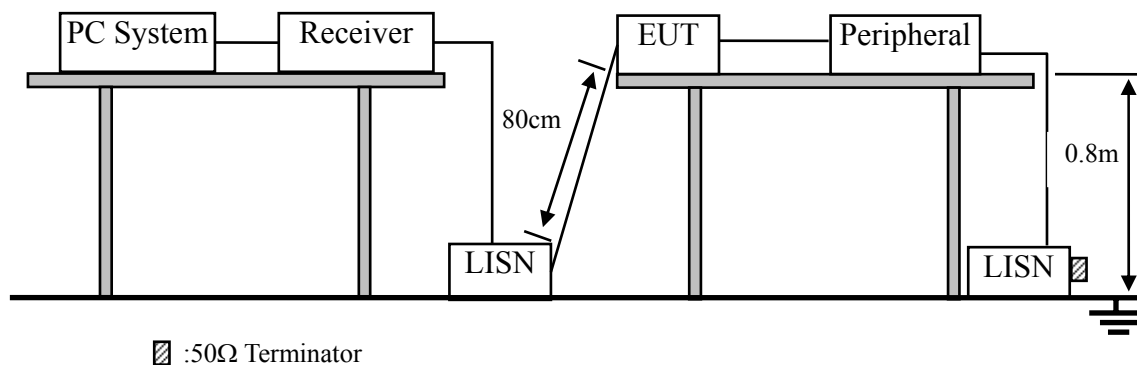
#### 3.1. Limit

| Frequency       | Maximum RF Line Voltage          |                               |
|-----------------|----------------------------------|-------------------------------|
|                 | Quasi-Peak Level<br>dB( $\mu$ V) | Average Level<br>dB( $\mu$ V) |
| 150kHz ~ 500kHz | 66 ~ 56*                         | 56 ~ 46*                      |
| 500kHz ~ 5MHz   | 56                               | 46                            |
| 5MHz ~ 30MHz    | 60                               | 50                            |

Notes: 1. \* Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

#### 3.2. Block Diagram of Test Setup



#### 3.3 Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). This provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs). The AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2009 on Conducted Emission Test.

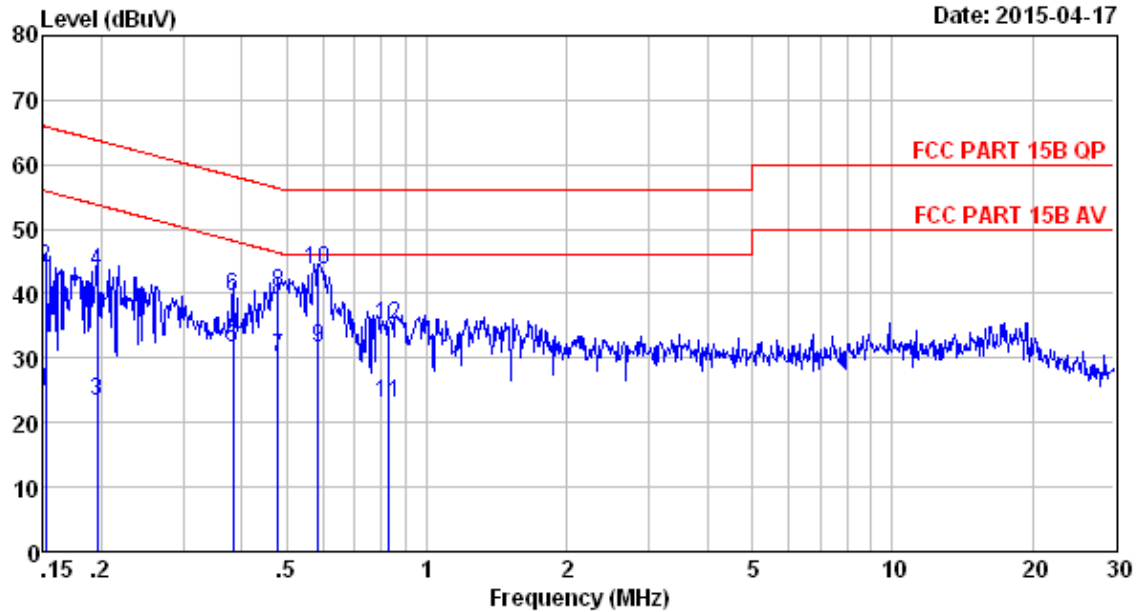
The bandwidth of test receiver (R & S ESHS30) is set at 10kHz.

The frequency range from 150kHz to 30MHz is checked.

#### 3.4. Test Result

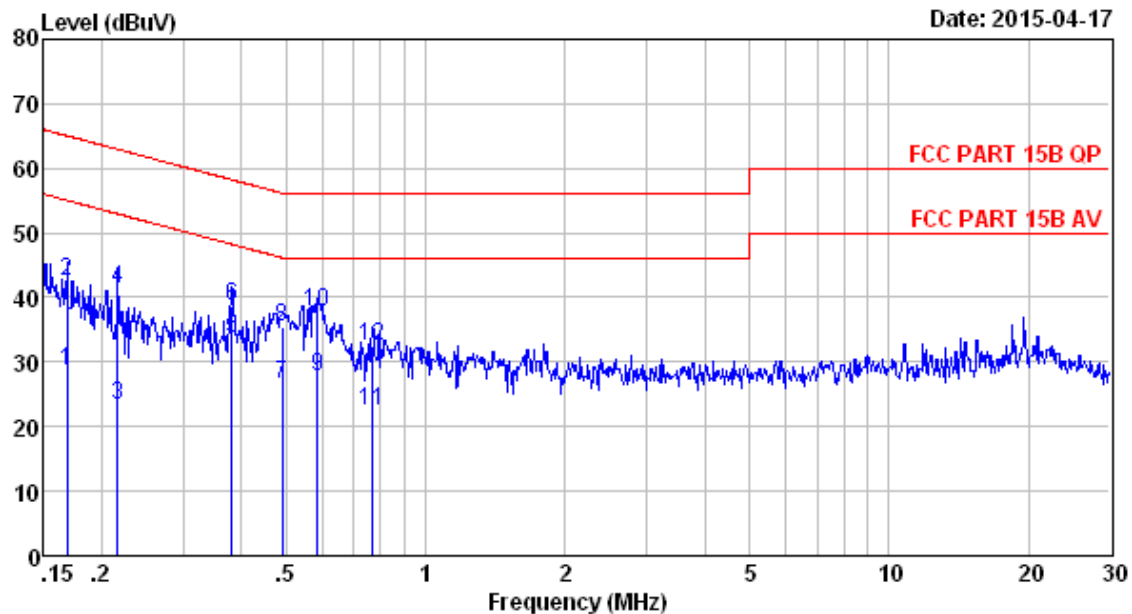
**PASS.** (All emissions not reported below are too low against the prescribed limits.)

## 3.5. Test data



Site no : 844 Shield Room Data no. : 1  
 Env. / Ins. : Temp:25.3'C Humi:58% Press:101.50kPa LINE Phase : LINE  
 Limit : FCC PART 15B QP  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker System  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : TX Mode

|    | Freq.<br>(MHz) | Lisn<br>Factor<br>(db) | Cable<br>Loss<br>(db) | Reading<br>dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark  |
|----|----------------|------------------------|-----------------------|------------------|-------------------------------|--------------------|----------------|---------|
| 1  | 0.15           | 9.61                   | 9.81                  | 5.46             | 24.88                         | 55.91              | 31.03          | Average |
| 2  | 0.15           | 9.61                   | 9.81                  | 24.46            | 43.88                         | 65.91              | 22.03          | QP      |
| 3  | 0.20           | 9.61                   | 9.80                  | 3.94             | 23.35                         | 53.80              | 30.45          | Average |
| 4  | 0.20           | 9.61                   | 9.80                  | 23.94            | 43.35                         | 63.80              | 20.45          | QP      |
| 5  | 0.38           | 9.61                   | 9.82                  | 12.26            | 31.69                         | 48.21              | 16.52          | Average |
| 6  | 0.38           | 9.61                   | 9.82                  | 20.26            | 39.69                         | 58.21              | 18.52          | QP      |
| 7  | 0.48           | 9.61                   | 9.81                  | 10.74            | 30.16                         | 46.36              | 16.20          | Average |
| 8  | 0.48           | 9.61                   | 9.81                  | 20.74            | 40.16                         | 56.36              | 16.20          | QP      |
| 9  | 0.59           | 9.60                   | 9.82                  | 12.20            | 31.62                         | 46.00              | 14.38          | Average |
| 10 | 0.59           | 9.60                   | 9.82                  | 24.20            | 43.62                         | 56.00              | 12.38          | QP      |
| 11 | 0.83           | 9.61                   | 9.81                  | 3.57             | 22.99                         | 46.00              | 23.01          | Average |
| 12 | 0.83           | 9.61                   | 9.81                  | 15.57            | 34.99                         | 56.00              | 21.01          | QP      |



Site no : 844 Shield Room Data no. : 3  
 Env. / Ins. : Temp:25.3'C Humi:58% Press:101.50kPa LINE Phase : NEUTRAL  
 Limit : FCC PART 15B QP  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker System  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : TX Mode

|    | Freq.<br>(MHz) | Lisn<br>Factor<br>(db) | Cable<br>Loss<br>(db) | Reading<br>dBuV | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark  |
|----|----------------|------------------------|-----------------------|-----------------|-------------------------------|--------------------|----------------|---------|
| 1  | 0.17           | 9.52                   | 9.81                  | 9.16            | 28.49                         | 55.03              | 26.54          | Average |
| 2  | 0.17           | 9.52                   | 9.81                  | 23.16           | 42.49                         | 65.03              | 22.54          | QP      |
| 3  | 0.22           | 9.60                   | 9.80                  | 3.89            | 23.29                         | 52.96              | 29.67          | Average |
| 4  | 0.22           | 9.60                   | 9.80                  | 21.89           | 41.29                         | 62.96              | 21.67          | QP      |
| 5  | 0.38           | 9.59                   | 9.82                  | 14.30           | 33.71                         | 48.25              | 14.54          | Average |
| 6  | 0.38           | 9.59                   | 9.82                  | 19.30           | 38.71                         | 58.25              | 19.54          | QP      |
| 7  | 0.49           | 9.59                   | 9.81                  | 7.14            | 26.54                         | 46.14              | 19.60          | Average |
| 8  | 0.49           | 9.59                   | 9.81                  | 16.14           | 35.54                         | 56.14              | 20.60          | QP      |
| 9  | 0.59           | 9.61                   | 9.82                  | 8.44            | 27.87                         | 46.00              | 18.13          | Average |
| 10 | 0.59           | 9.61                   | 9.82                  | 18.44           | 37.87                         | 56.00              | 18.13          | QP      |
| 11 | 0.77           | 9.62                   | 9.81                  | 2.93            | 22.36                         | 46.00              | 23.64          | Average |
| 12 | 0.77           | 9.62                   | 9.81                  | 12.93           | 32.36                         | 56.00              | 23.64          | QP      |

## 4 RADIATED EMISSION TEST

### 4.1 Limit

#### 4.1.1 15.209 limits

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

- Remark : (1) Emission level  $\text{dB}\mu\text{V} = 20 \log$  Emission level  $\mu\text{V/m}$   
 (2) The smaller limit shall apply at the cross point between two frequency bands.  
 (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

#### 4.1.2 15.205 Restricted bands of operation

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

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

## 4.2. Test Procedure

EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it working in test mode, then test it. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna are set on test.

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

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

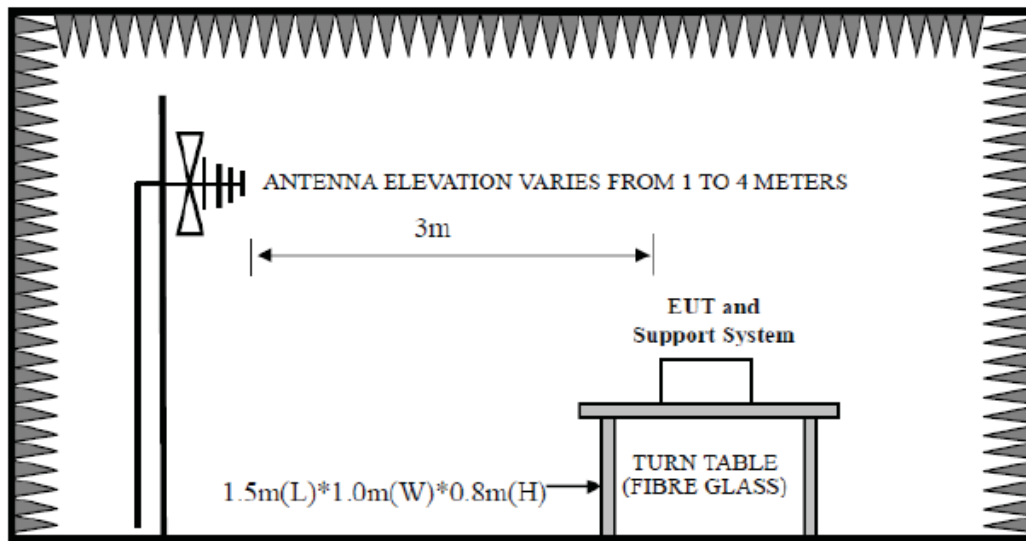
PEAK detector, 1MHz/1MHz for PAEK measurement,

PEAK detector, 1MHz/10Hz for Average measurement

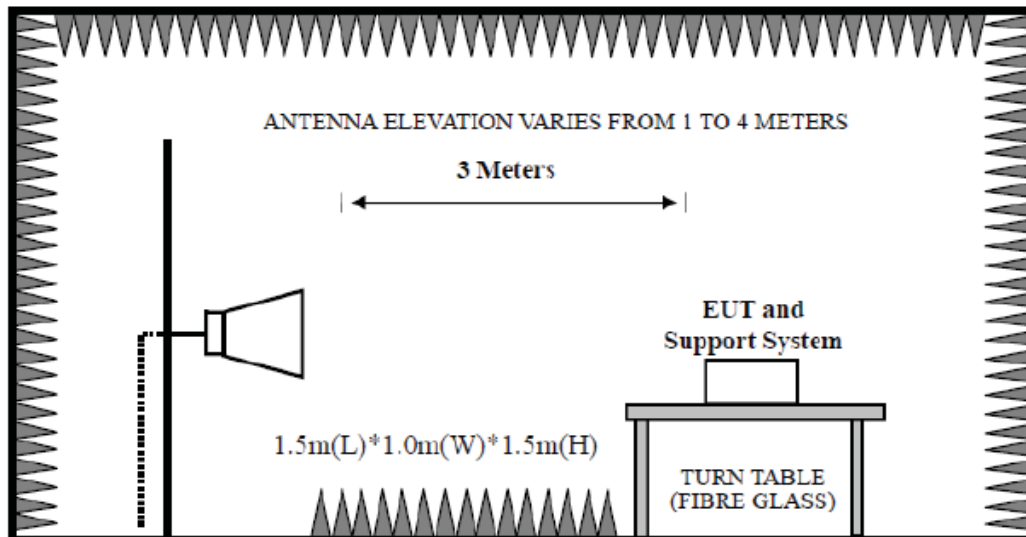
The frequency range from 30MHz to 10<sup>th</sup> harmonic (25GHz) are checked. and no any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.

### 4.3 Block Diagram of Test setup

30~1000MHz



Above 1GHz



### 4.4 Test Result

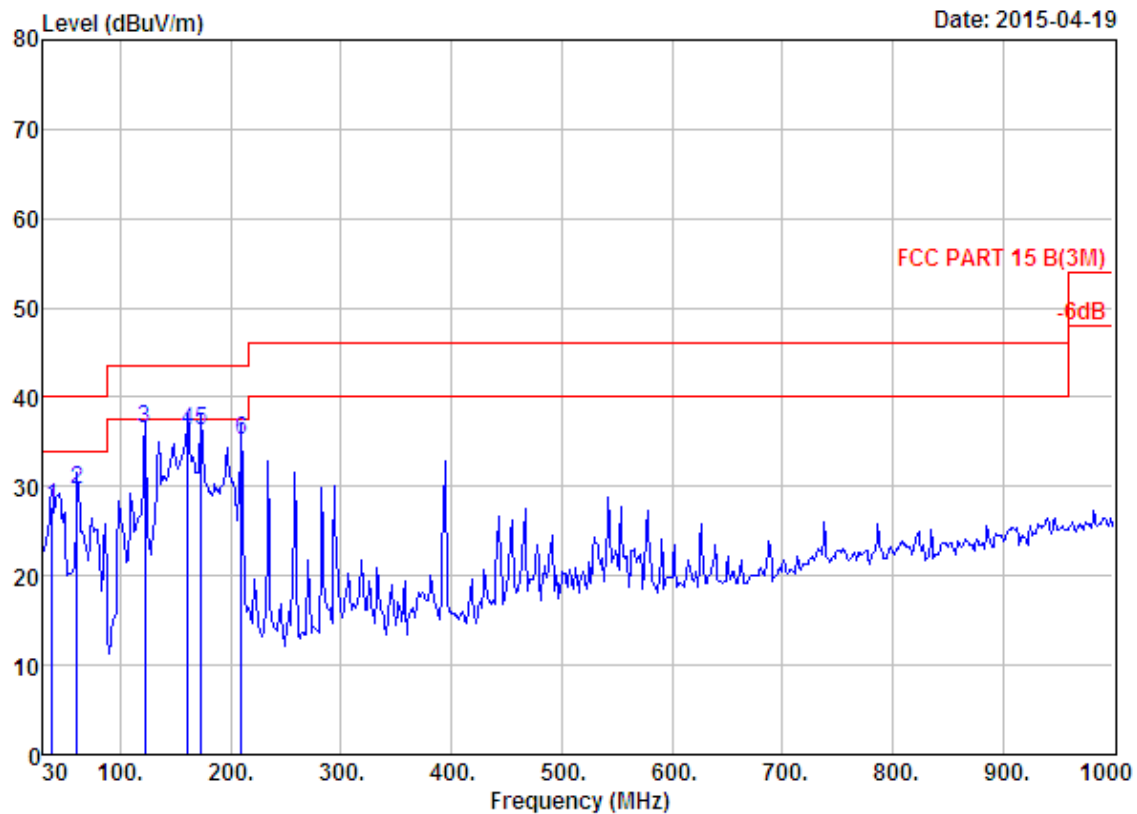
**PASS.**

All the emissions from 30MHz to 25 GHz were comply with 15.209 limits.

- Note: 1、 For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.
- 2、 The frequency 2402MHz 、 2440MHz and 2480 MHz is fundamental frequency which no limit, the limit on plots is automatically generated by the software, it's not fundamental limit, we can't remove it.

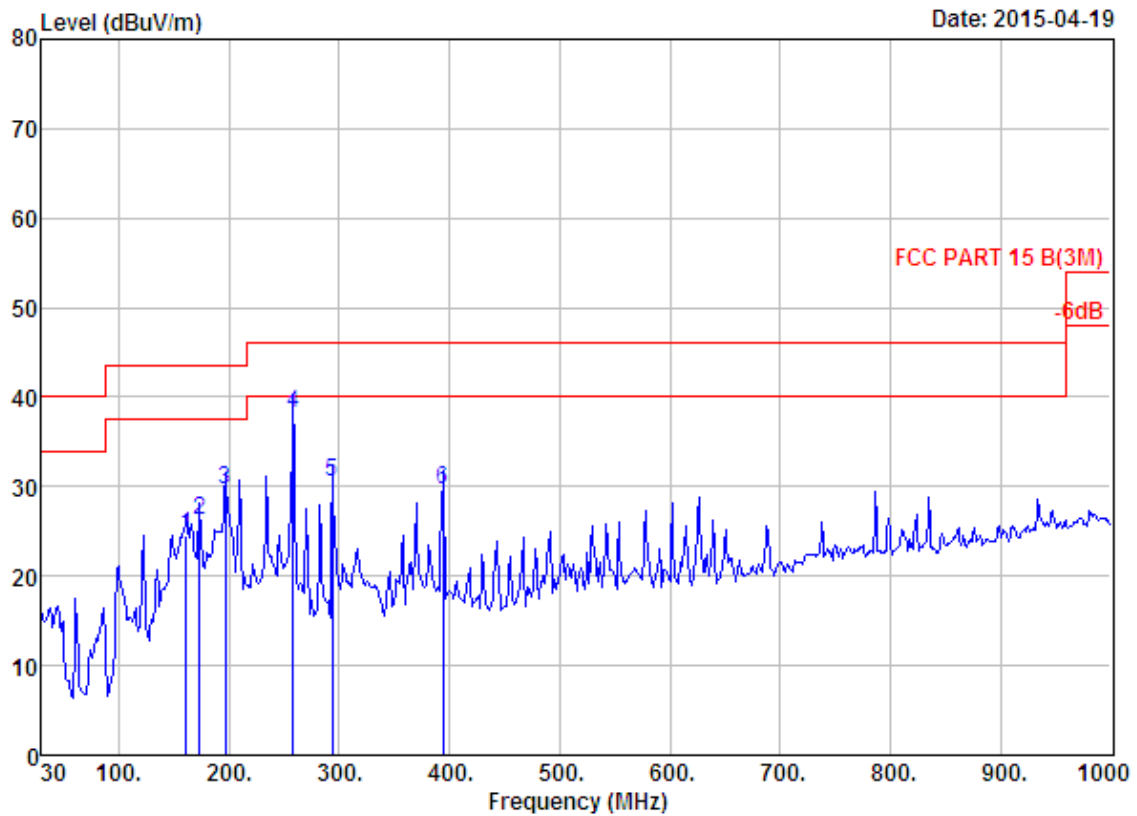
## 4.5 Test Data

30-1000 MHz



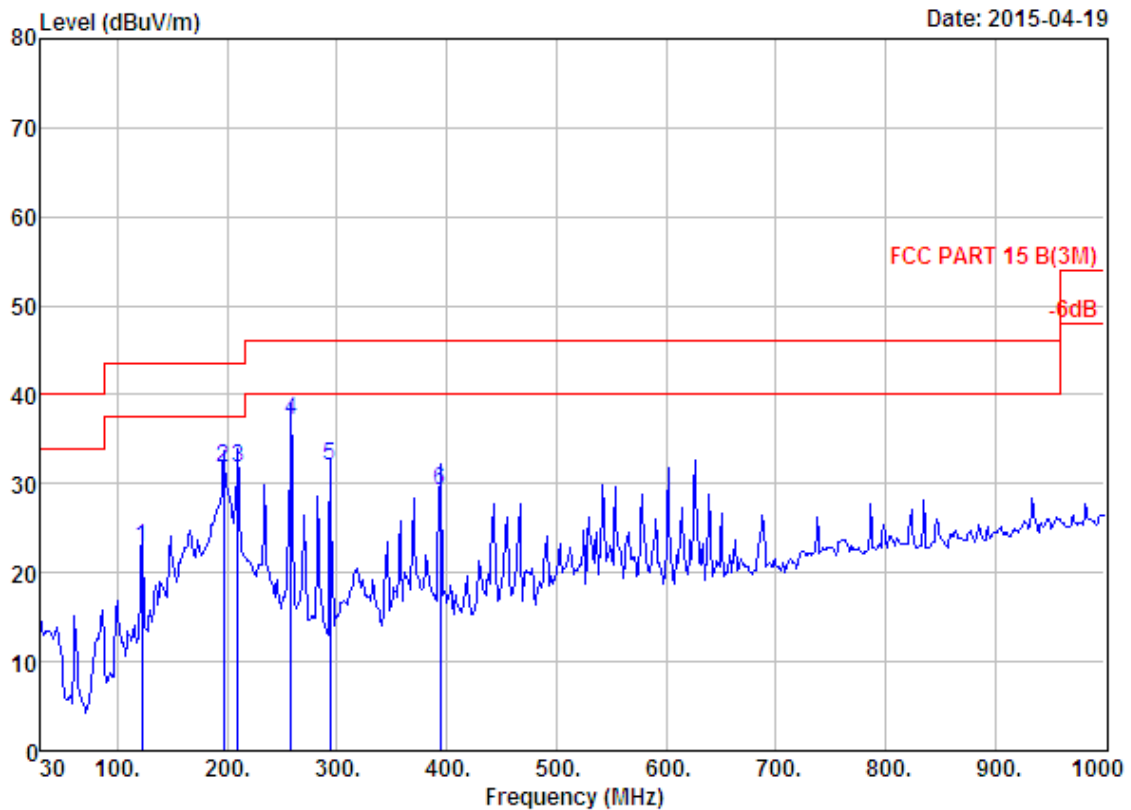
Site no. : 1# 966 chamber                      Data no. : 97  
 Dis. / Ant. : 3m 27137                      Ant. pol. : VERTICAL  
 Limit : FCC PART 15 B(3M)  
 Env. / Ins. : Temp:23.6°;Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2402MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 37.76          | 14.05                    | 0.79                  | 12.81             | 27.65                         | 40.00              | 12.35          | QP     |
| 2 | 61.04          | 4.74                     | 0.94                  | 23.90             | 29.58                         | 40.00              | 10.42          | QP     |
| 3 | 122.15         | 11.24                    | 1.45                  | 23.72             | 36.41                         | 43.50              | 7.09           | QP     |
| 4 | 160.95         | 10.24                    | 1.70                  | 24.30             | 36.24                         | 43.50              | 7.26           | QP     |
| 5 | 173.56         | 9.03                     | 1.68                  | 25.56             | 36.27                         | 43.50              | 7.23           | QP     |
| 6 | 209.45         | 8.37                     | 1.91                  | 24.93             | 35.21                         | 43.50              | 8.29           | QP     |



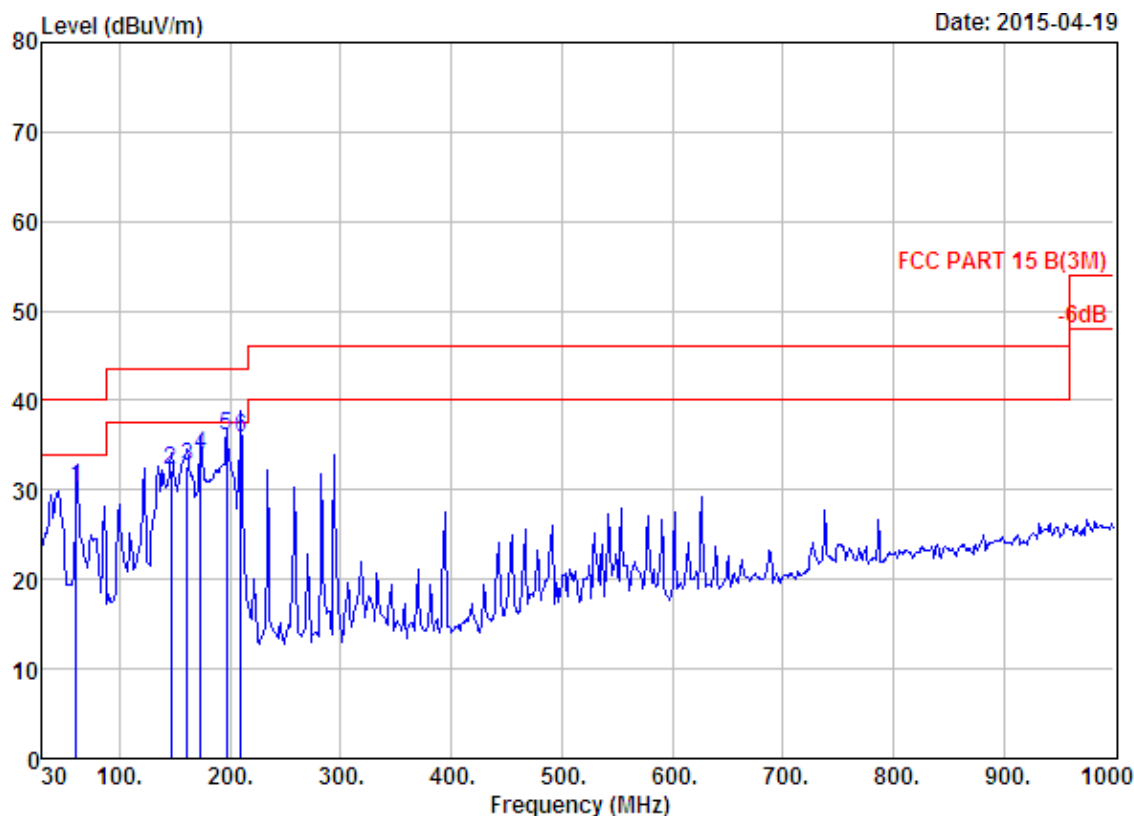
Site no. : 1# 966 chamber      Data no. : 98  
 Dis. / Ant. : 3m 27137      Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2402MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 160.95         | 10.24                    | 1.70                  | 12.62             | 24.56                         | 43.50              | 18.94          | QP     |
| 2 | 173.56         | 9.03                     | 1.68                  | 15.46             | 26.17                         | 43.50              | 17.33          | QP     |
| 3 | 196.84         | 7.72                     | 1.81                  | 20.04             | 29.57                         | 43.50              | 13.93          | QP     |
| 4 | 257.95         | 12.75                    | 2.19                  | 23.33             | 38.27                         | 46.00              | 7.73           | QP     |
| 5 | 293.84         | 12.92                    | 2.33                  | 15.25             | 30.50                         | 46.00              | 15.50          | QP     |
| 6 | 393.75         | 15.78                    | 2.58                  | 11.34             | 29.70                         | 46.00              | 16.30          | QP     |



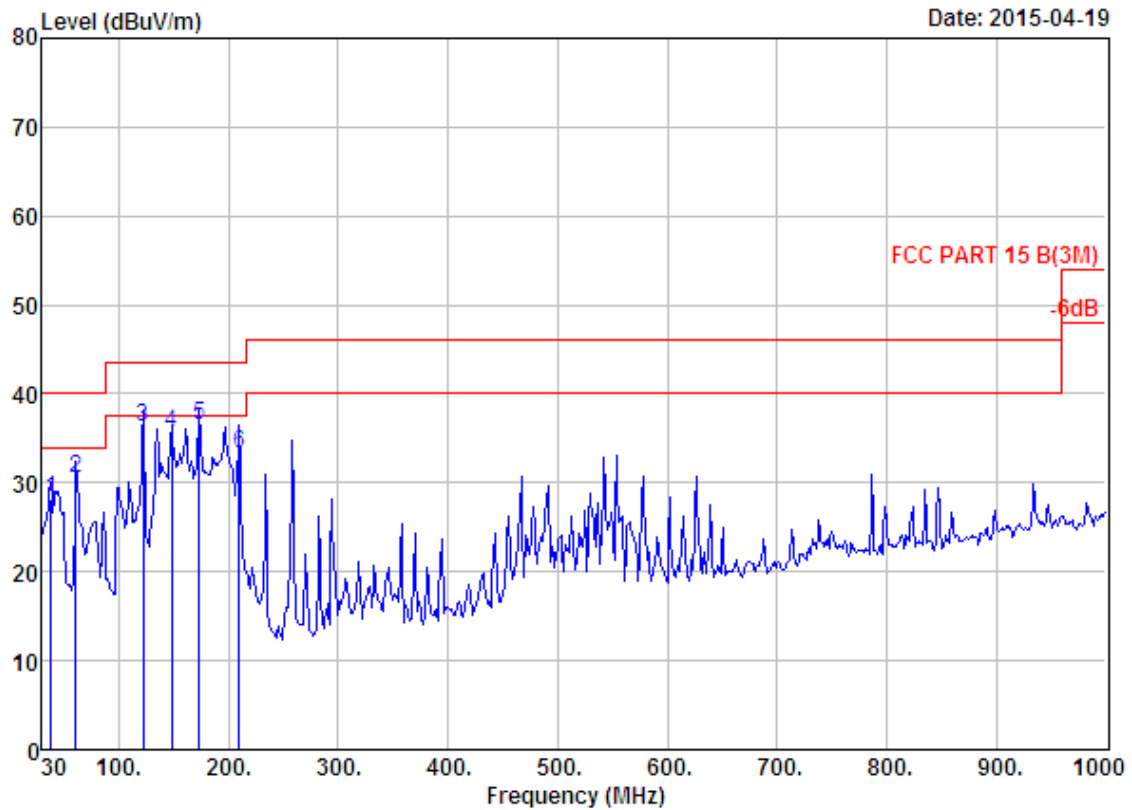
Site no. : 1# 966 chamber      Data no. : 99  
 Dis. / Ant. : 3m 27137      Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2440MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 122.15         | 11.24                    | 1.45                  | 10.17             | 22.86                         | 43.50              | 20.64          | QP     |
| 2 | 196.84         | 7.72                     | 1.81                  | 22.20             | 31.73                         | 43.50              | 11.77          | QP     |
| 3 | 209.45         | 8.37                     | 1.91                  | 21.58             | 31.86                         | 43.50              | 11.64          | QP     |
| 4 | 257.95         | 12.75                    | 2.19                  | 22.19             | 37.13                         | 46.00              | 8.87           | QP     |
| 5 | 293.84         | 12.92                    | 2.33                  | 16.66             | 31.91                         | 46.00              | 14.09          | QP     |
| 6 | 393.75         | 15.78                    | 2.58                  | 10.91             | 29.27                         | 46.00              | 16.73          | QP     |



Site no. : 1# 966 chamber Data no. : 100  
 Dis. / Ant. : 3m 27137 Ant. pol. : VERTICAL  
 Limit : FCC PART 15 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2440MHz

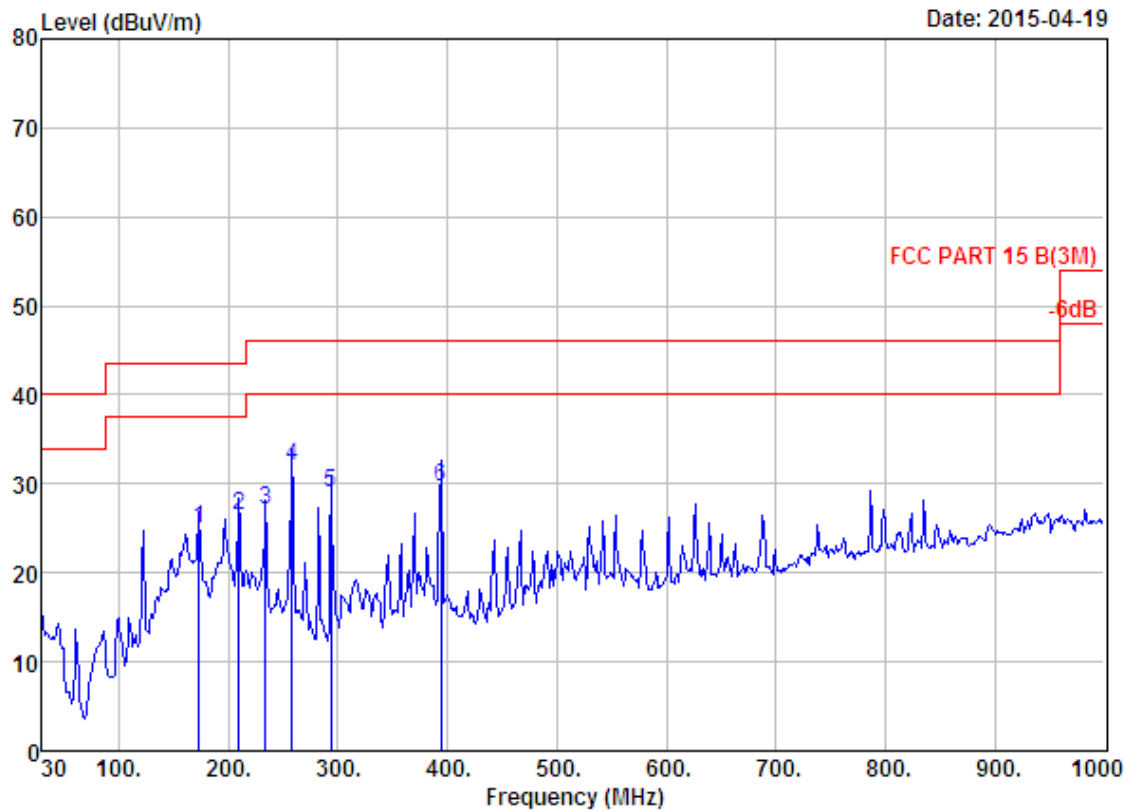
|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 61.04          | 4.74                     | 0.94                  | 24.70             | 30.38                         | 40.00              | 9.62           | QP     |
| 2 | 146.40         | 11.15                    | 1.58                  | 19.38             | 32.11                         | 43.50              | 11.39          | QP     |
| 3 | 160.95         | 10.24                    | 1.70                  | 20.67             | 32.61                         | 43.50              | 10.89          | QP     |
| 4 | 173.56         | 9.03                     | 1.68                  | 23.30             | 34.01                         | 43.50              | 9.49           | QP     |
| 5 | 196.84         | 7.72                     | 1.81                  | 26.47             | 36.00                         | 43.50              | 7.50           | QP     |
| 6 | 209.45         | 8.37                     | 1.91                  | 25.53             | 35.81                         | 43.50              | 7.69           | QP     |



Site no. : 1# 966 chamber  
 Dis. / Ant. : 3m 27137  
 Limit : FCC PART 15 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2480MHz

Data no. : 101  
Ant. pol. : VERTICAL

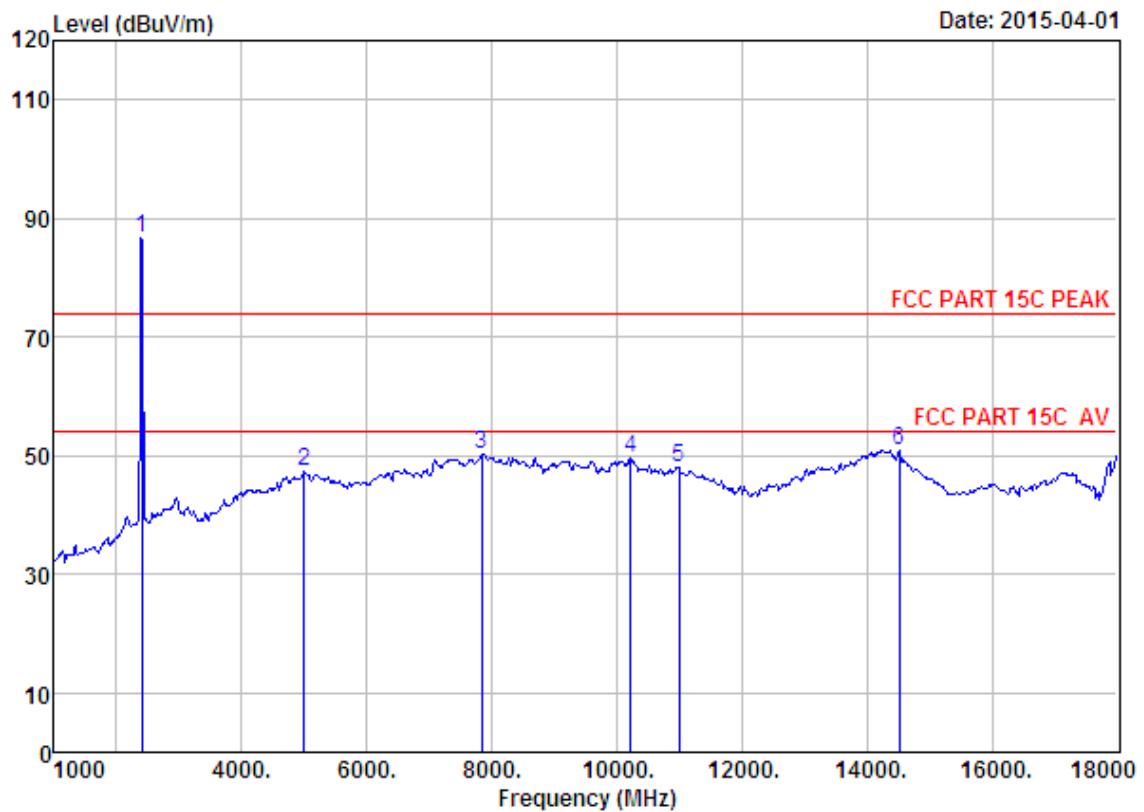
|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 37.76          | 14.05                    | 0.79                  | 13.29             | 28.13                         | 40.00              | 11.87          | QP     |
| 2 | 61.04          | 4.74                     | 0.94                  | 24.79             | 30.47                         | 40.00              | 9.53           | QP     |
| 3 | 122.15         | 11.24                    | 1.45                  | 23.58             | 36.27                         | 43.50              | 7.23           | QP     |
| 4 | 148.34         | 11.00                    | 1.69                  | 22.88             | 35.57                         | 43.50              | 7.93           | QP     |
| 5 | 173.56         | 9.03                     | 1.68                  | 25.76             | 36.47                         | 43.50              | 7.03           | QP     |
| 6 | 209.45         | 8.37                     | 1.91                  | 23.10             | 33.38                         | 43.50              | 10.12          | QP     |



Site no. : 1# 966 chamber                      Data no. : 102  
 Dis. / Ant. : 3m 27137                      Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2480MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 173.56         | 9.03                     | 1.68                  | 14.21             | 24.92                         | 43.50              | 18.58          | QP     |
| 2 | 209.45         | 8.37                     | 1.91                  | 16.14             | 26.42                         | 43.50              | 17.08          | QP     |
| 3 | 233.70         | 9.64                     | 2.09                  | 15.43             | 27.16                         | 46.00              | 18.84          | QP     |
| 4 | 257.95         | 12.75                    | 2.19                  | 17.06             | 32.00                         | 46.00              | 14.00          | QP     |
| 5 | 293.84         | 12.92                    | 2.33                  | 13.72             | 28.97                         | 46.00              | 17.03          | QP     |
| 6 | 393.75         | 15.78                    | 2.58                  | 11.35             | 29.71                         | 46.00              | 16.29          | QP     |

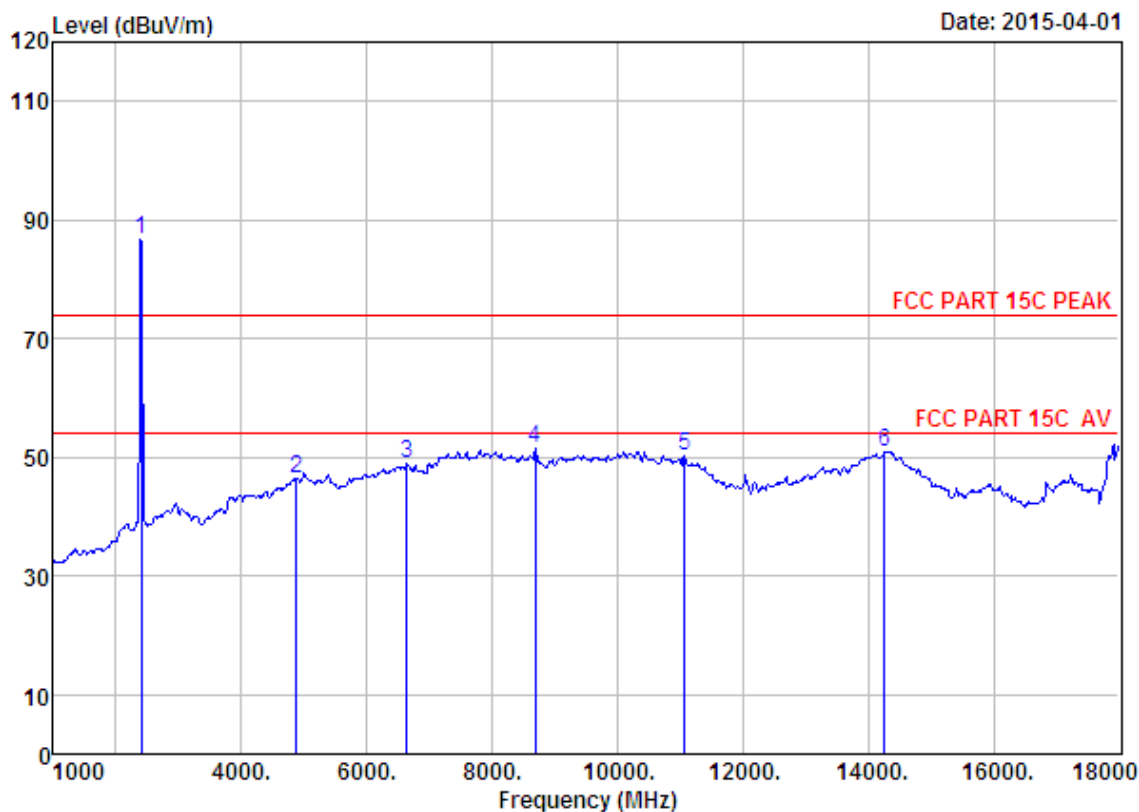
1000-18000 MHz



Site no. : 1# 966 chamber                      Data no. : 69  
 Dis. / Ant. : 3m ANT 1-18G                      Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2402MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBUV) | Emission<br>Level<br>(dBUV/m) | Limits<br>(dBUV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2402.00        | 27.61                    | 6.62                  | 34.18                 | 86.65             | 86.70                         | 74.00              | -12.70         | Peak   |
| 2 | 4995.00        | 31.54                    | 12.59                 | 32.00                 | 35.16             | 47.29                         | 74.00              | 26.71          | Peak   |
| 3 | 7834.00        | 36.68                    | 11.47                 | 31.40                 | 33.58             | 50.33                         | 74.00              | 23.67          | Peak   |
| 4 | 10214.00       | 38.48                    | 11.47                 | 32.17                 | 31.74             | 49.52                         | 74.00              | 24.48          | Peak   |
| 5 | 10996.00       | 39.52                    | 11.29                 | 33.65                 | 30.93             | 48.09                         | 74.00              | 25.91          | Peak   |
| 6 | 14515.00       | 41.89                    | 10.93                 | 33.14                 | 31.32             | 51.00                         | 74.00              | 23.00          | Peak   |

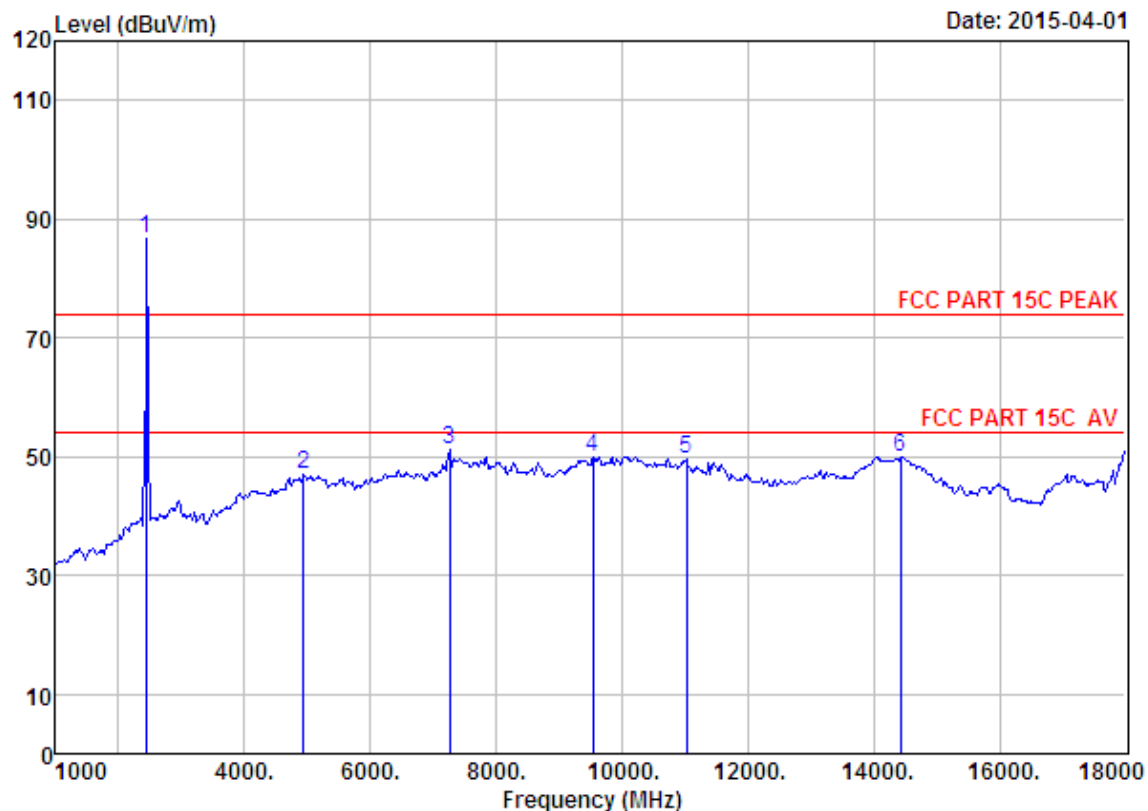
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official  
 limit are not reported.



Site no. : 1# 966 chamber Data no. : 70  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2402MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2402.00        | 27.61                    | 6.62                  | 34.18                 | 86.74             | 86.79                         | 74.00              | -12.79         | Peak   |
| 2 | 4876.00        | 31.37                    | 12.07                 | 31.90                 | 34.93             | 46.47                         | 74.00              | 27.53          | Peak   |
| 3 | 6644.00        | 34.48                    | 12.02                 | 32.20                 | 34.79             | 49.09                         | 74.00              | 24.91          | Peak   |
| 4 | 8684.00        | 37.32                    | 11.45                 | 32.43                 | 35.24             | 51.58                         | 74.00              | 22.42          | Peak   |
| 5 | 11064.00       | 39.48                    | 11.24                 | 33.78                 | 33.35             | 50.29                         | 74.00              | 23.71          | Peak   |
| 6 | 14260.00       | 41.68                    | 10.92                 | 33.19                 | 31.47             | 50.88                         | 74.00              | 23.12          | Peak   |

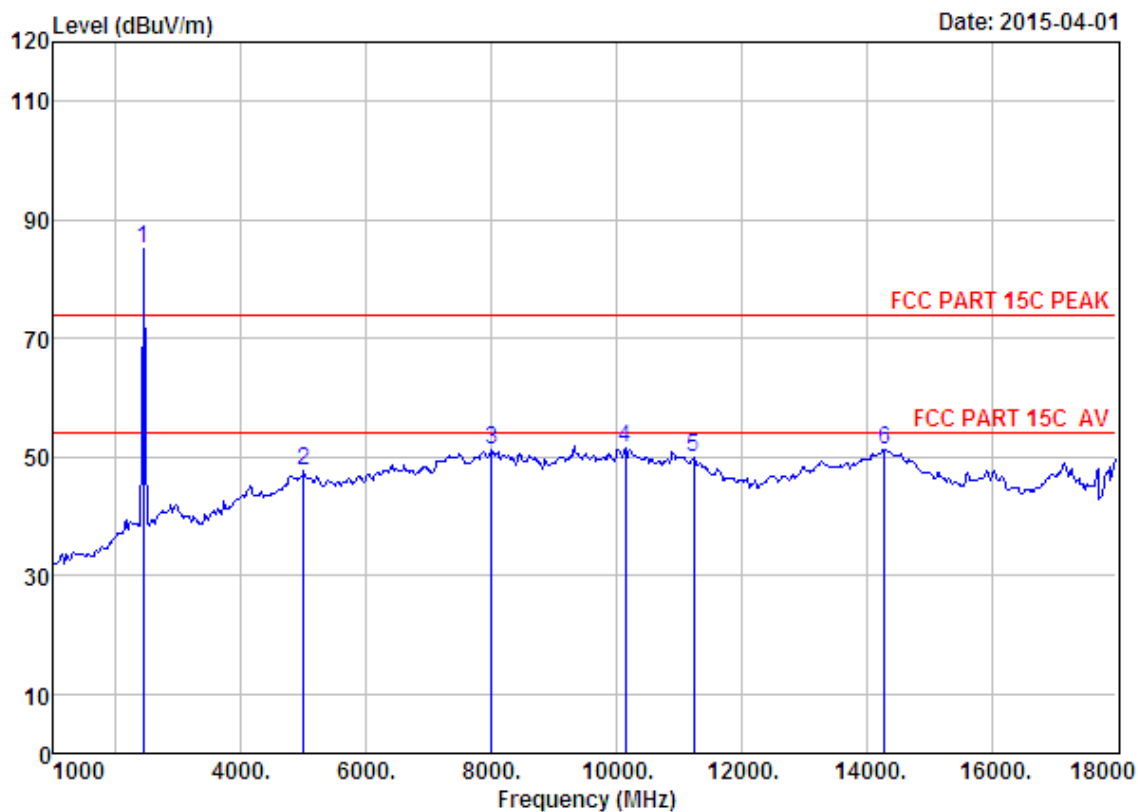
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 chamber Data no. : 73  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2440MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2440.00        | 27.60                    | 6.67                  | 34.12                 | 86.52             | 86.67                         | 74.00              | -12.67         | Peak   |
| 2 | 4944.00        | 31.47                    | 12.37                 | 31.96                 | 35.18             | 47.06                         | 74.00              | 26.94          | Peak   |
| 3 | 7256.00        | 36.53                    | 11.55                 | 32.06                 | 35.17             | 51.19                         | 74.00              | 22.81          | Peak   |
| 4 | 9534.00        | 37.97                    | 11.70                 | 31.92                 | 32.22             | 49.97                         | 74.00              | 24.03          | Peak   |
| 5 | 11030.00       | 39.50                    | 11.27                 | 33.71                 | 32.44             | 49.50                         | 74.00              | 24.50          | Peak   |
| 6 | 14430.00       | 41.82                    | 10.93                 | 32.84                 | 30.01             | 49.92                         | 74.00              | 24.08          | Peak   |

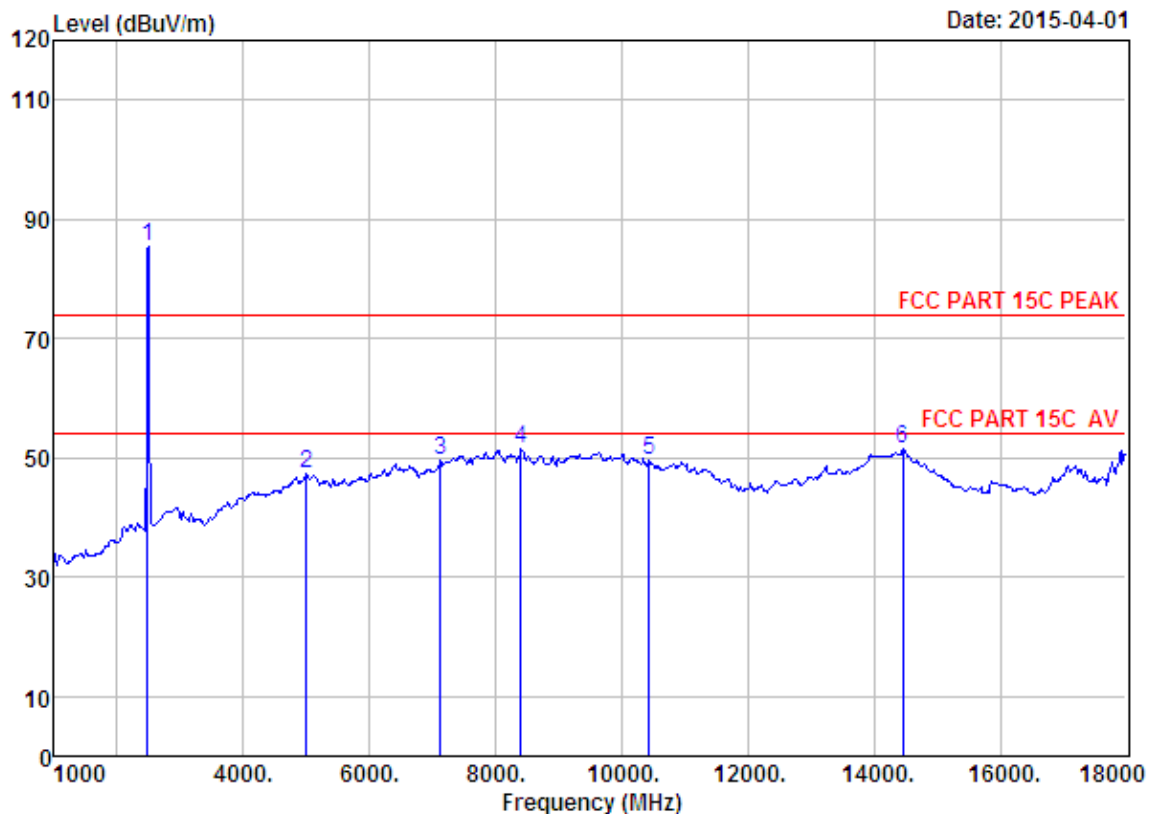
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 chamber Data no. : 74  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2440MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2440.00        | 27.60                    | 6.67                  | 34.12                 | 85.01             | 85.16                         | 74.00              | -11.16         | Peak   |
| 2 | 4995.00        | 31.54                    | 12.59                 | 32.00                 | 35.52             | 47.65                         | 74.00              | 26.35          | Peak   |
| 3 | 8004.00        | 37.01                    | 11.40                 | 31.22                 | 34.08             | 51.27                         | 74.00              | 22.73          | Peak   |
| 4 | 10146.00       | 38.36                    | 11.51                 | 32.05                 | 33.59             | 51.41                         | 74.00              | 22.59          | Peak   |
| 5 | 11234.00       | 39.37                    | 11.12                 | 34.10                 | 33.63             | 50.02                         | 74.00              | 23.98          | Peak   |
| 6 | 14294.00       | 41.71                    | 10.92                 | 33.08                 | 31.69             | 51.24                         | 74.00              | 22.76          | Peak   |

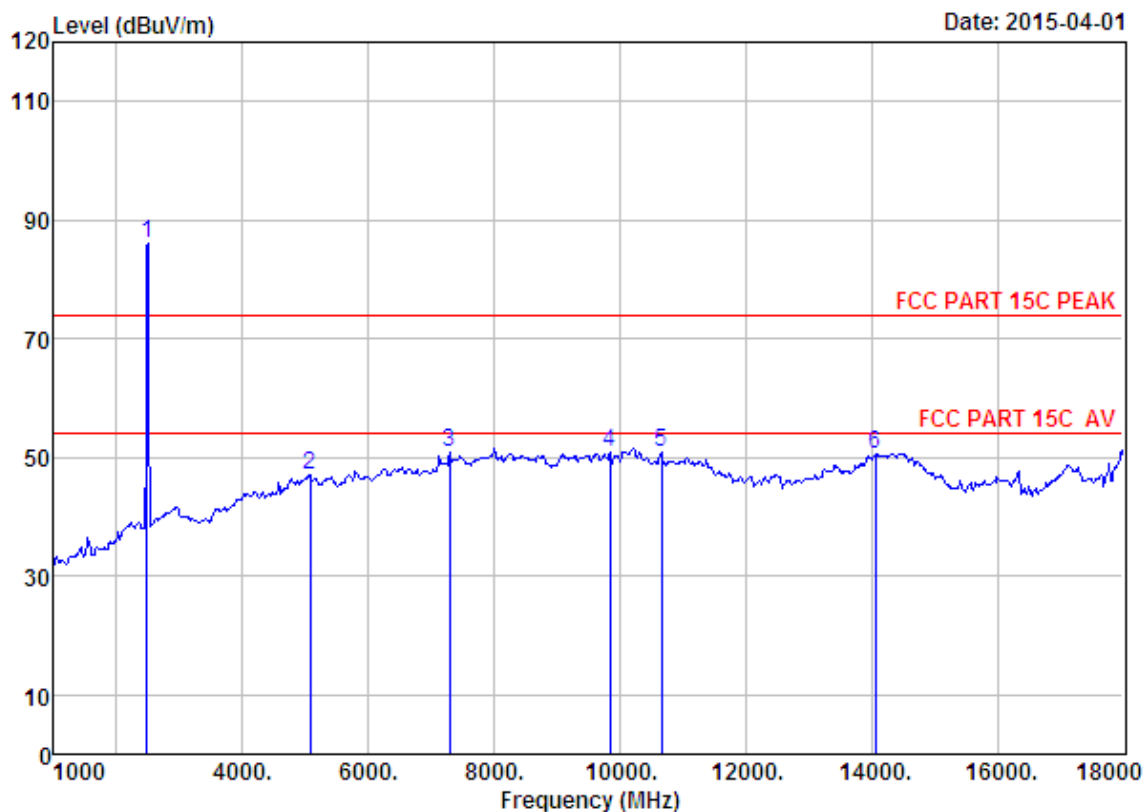
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 chamber Data no. : 75  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2480MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2480.00        | 27.58                    | 6.71                  | 34.03                 | 85.26             | 85.52                         | 74.00              | -11.52         | Peak   |
| 2 | 4995.00        | 31.54                    | 12.59                 | 32.00                 | 35.16             | 47.29                         | 74.00              | 26.71          | Peak   |
| 3 | 7120.00        | 36.08                    | 11.51                 | 32.28                 | 34.19             | 49.50                         | 74.00              | 24.50          | Peak   |
| 4 | 8395.00        | 36.68                    | 11.44                 | 31.76                 | 35.10             | 51.46                         | 74.00              | 22.54          | Peak   |
| 5 | 10435.00       | 38.86                    | 11.35                 | 32.59                 | 31.89             | 49.51                         | 74.00              | 24.49          | Peak   |
| 6 | 14464.00       | 41.85                    | 10.93                 | 32.96                 | 31.79             | 51.61                         | 74.00              | 22.39          | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

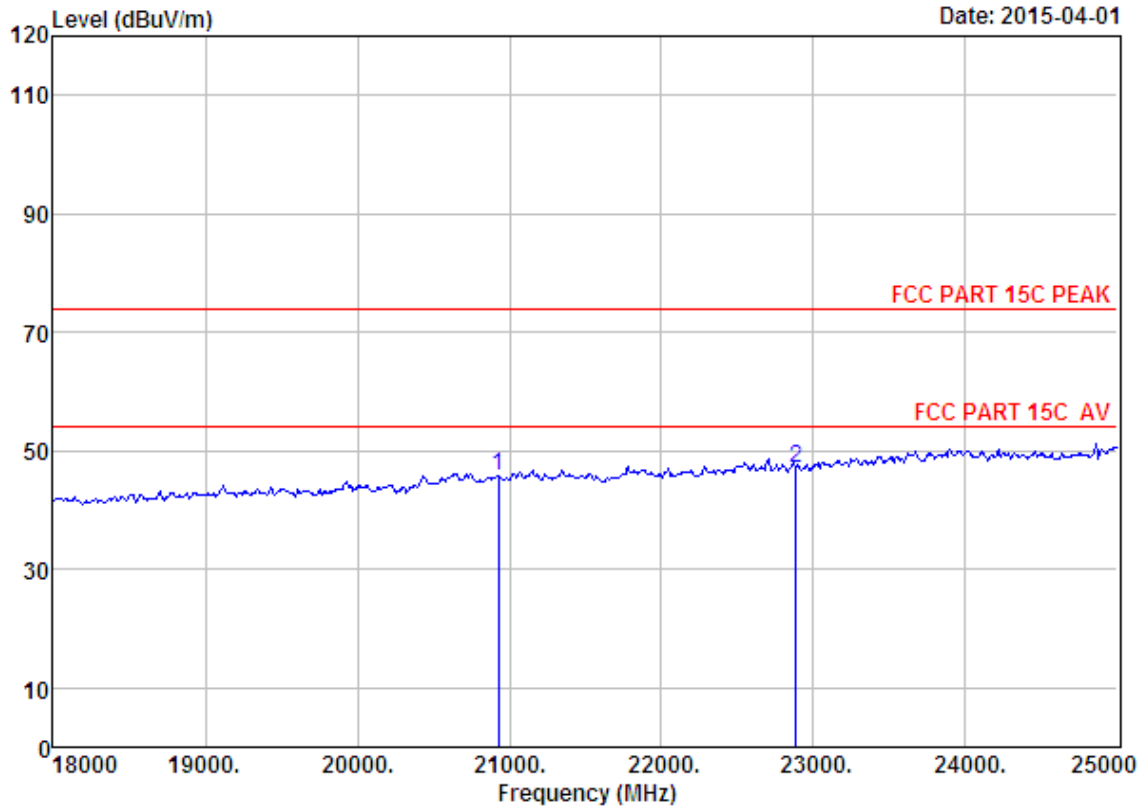


Site no. : 1# 966 chamber Data no. : 76  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2480MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2480.00        | 27.58                    | 6.71                  | 34.03                 | 85.68             | 85.94                         | 74.00              | -11.94         | Peak   |
| 2 | 5080.00        | 31.59                    | 12.49                 | 32.14                 | 35.19             | 47.13                         | 74.00              | 26.87          | Peak   |
| 3 | 7290.00        | 36.54                    | 11.56                 | 32.02                 | 34.69             | 50.77                         | 74.00              | 23.23          | Peak   |
| 4 | 9840.00        | 38.16                    | 11.63                 | 31.81                 | 32.77             | 50.75                         | 74.00              | 23.25          | Peak   |
| 5 | 10656.00       | 39.15                    | 11.30                 | 33.01                 | 33.37             | 50.81                         | 74.00              | 23.19          | Peak   |
| 6 | 14056.00       | 41.51                    | 10.90                 | 33.80                 | 32.09             | 50.70                         | 74.00              | 23.30          | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

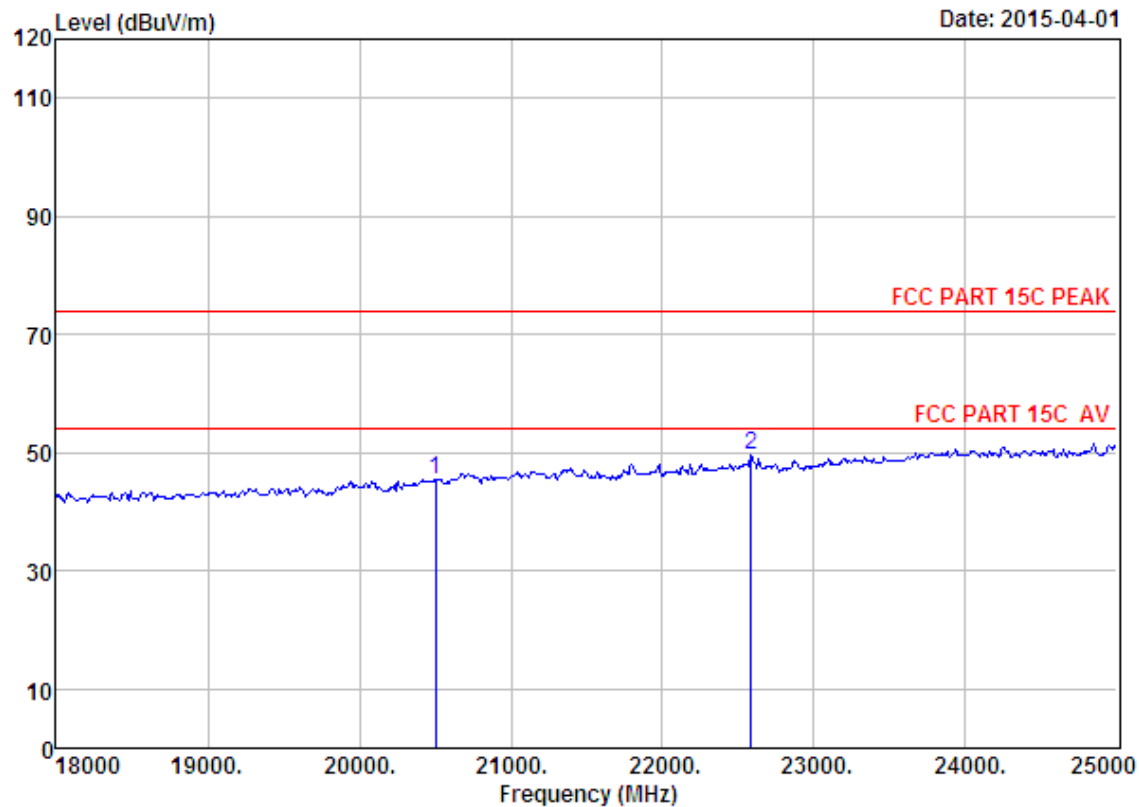
18000-25000 MHz



Site no. : 1# 966 chamber      Data no. : 79  
 Dis. / Ant. : 3m ANT ABVOE 18G      Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2402MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 20926.00       | 46.26                    | 20.10                 | 35.87                 | 15.28             | 45.77                         | 74.00              | 28.23          | Peak   |
| 2 | 22886.00       | 45.65                    | 21.08                 | 33.98                 | 14.25             | 47.00                         | 74.00              | 27.00          | Peak   |

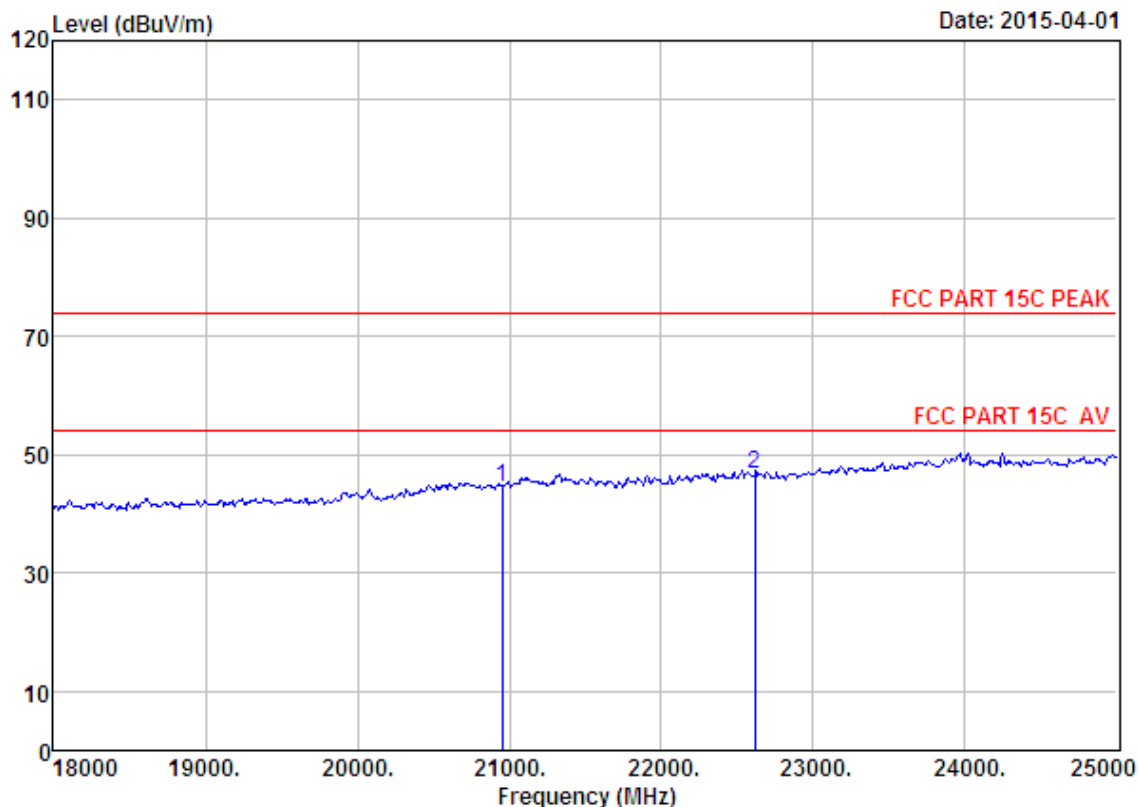
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 chamber Data no. : 80  
Dis. / Ant. : 3m ANT ABOVE 18G Ant. pol. : VERTICAL  
Limit : FCC PART 15C PEAK  
Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
Engineer : Dick  
EUT : Multi media Bluetooth Speaker system  
Power : DC 12V From Adapter Input AC 120V/60Hz  
M/N : MM2B  
Test Mode : GFSK TX 2402MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 20506.00       | 46.00                    | 19.91                 | 36.25                 | 15.82             | 45.48                         | 74.00              | 28.52          | Peak   |
| 2 | 22585.00       | 45.77                    | 20.90                 | 34.30                 | 17.28             | 49.65                         | 74.00              | 24.35          | Peak   |

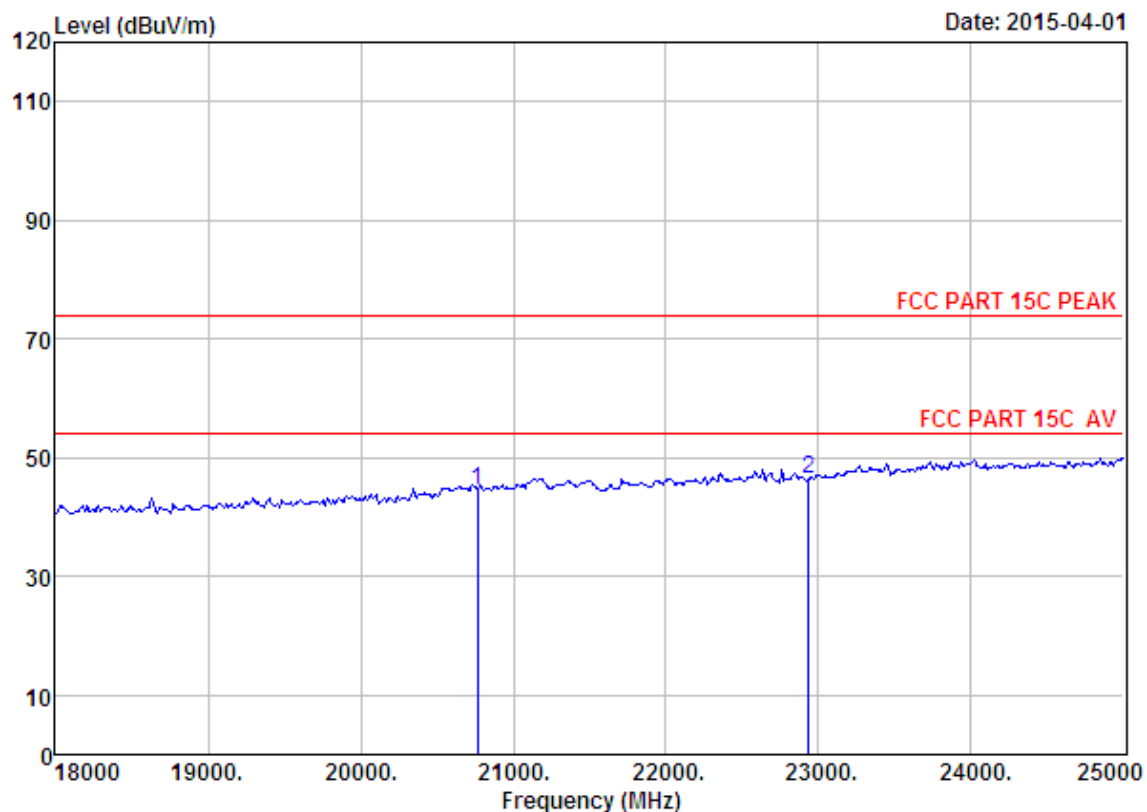
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 chamber      Data no. : 81  
 Dis. / Ant. : 3m ANT ABOVE 18G      Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2440MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 20954.00       | 46.27                    | 20.11                 | 35.85                 | 14.01             | 44.54                         | 74.00              | 29.46          | Peak   |
| 2 | 22613.00       | 45.75                    | 20.92                 | 34.24                 | 14.42             | 46.85                         | 74.00              | 27.15          | Peak   |

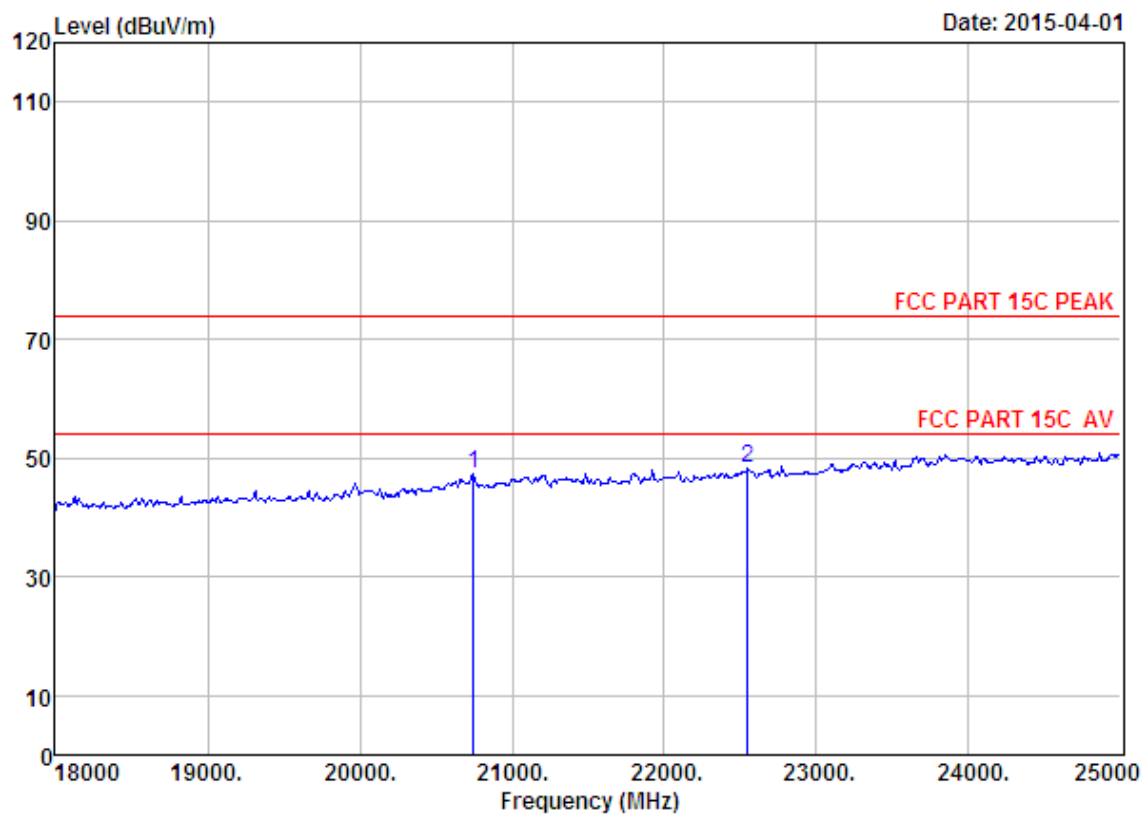
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 chamber                      Data no. : 82  
 Dis. / Ant. : 3m ANT ABVOE 18G              Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2440MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 20765.00       | 46.16                    | 20.02                 | 36.00                 | 14.39             | 44.57                         | 74.00              | 29.43          | Peak   |
| 2 | 22935.00       | 45.63                    | 21.11                 | 33.93                 | 13.55             | 46.36                         | 74.00              | 27.64          | Peak   |

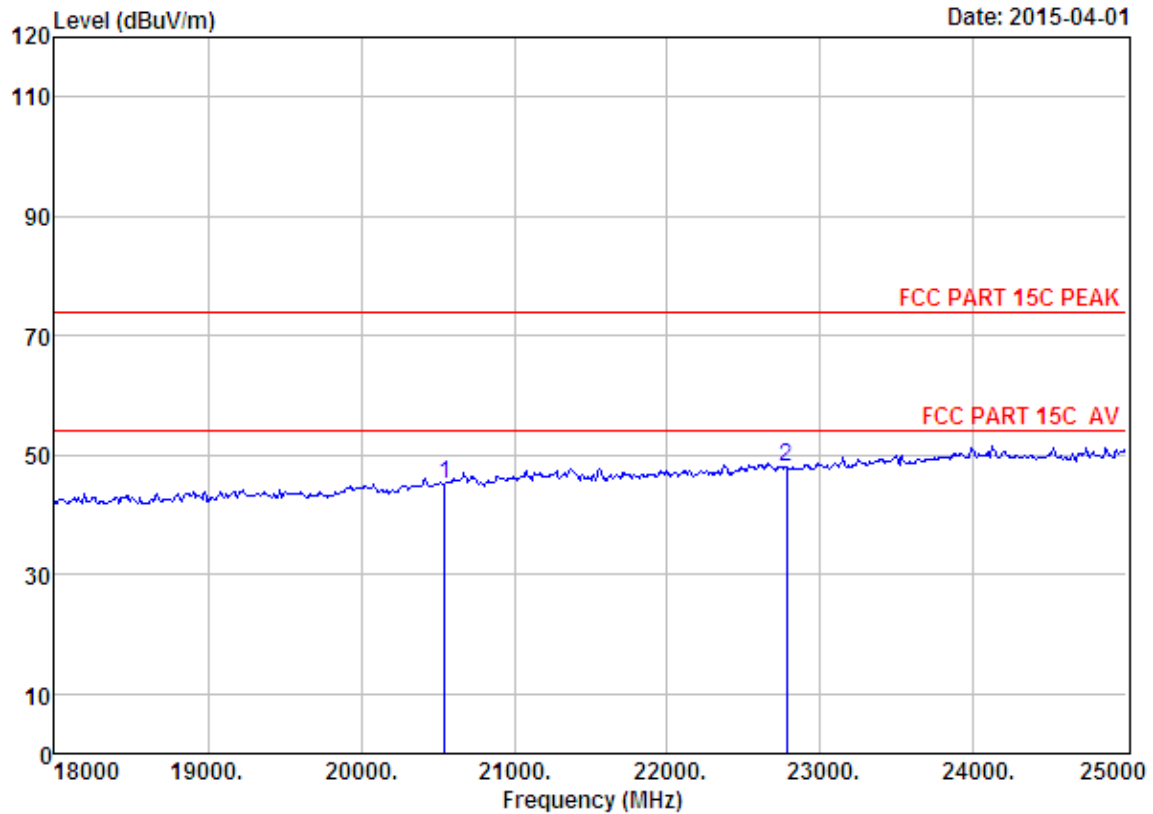
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 chamber                      Data no. : 83  
 Dis. / Ant. : 3m ANT ABVOE 18G              Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2480MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 20744.00       | 46.15                    | 20.02                 | 36.03                 | 17.15             | 47.29                         | 74.00              | 26.71          | Peak   |
| 2 | 22550.00       | 45.78                    | 20.89                 | 34.32                 | 15.93             | 48.28                         | 74.00              | 25.72          | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 chamber Data no. : 84  
 Dis. / Ant. : 3m ANT ABOVE 18G Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2480MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 20548.00       | 46.03                    | 19.93                 | 36.21                 | 15.48             | 45.23                         | 74.00              | 28.77          | Peak   |
| 2 | 22781.00       | 45.69                    | 21.02                 | 34.09                 | 15.23             | 47.85                         | 74.00              | 26.15          | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

## 5 CONDUCTED SPURIOUS EMISSION

### 5.1 Limit

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

### 5.2 Test Procedure

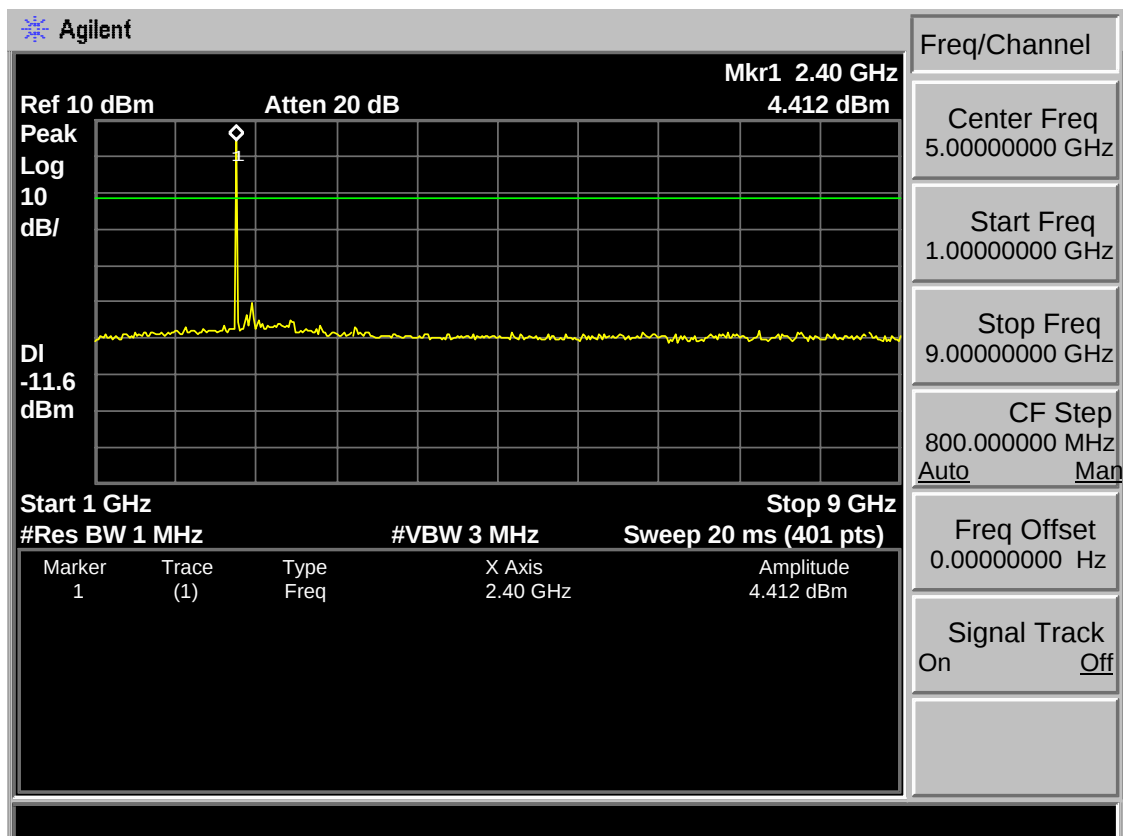
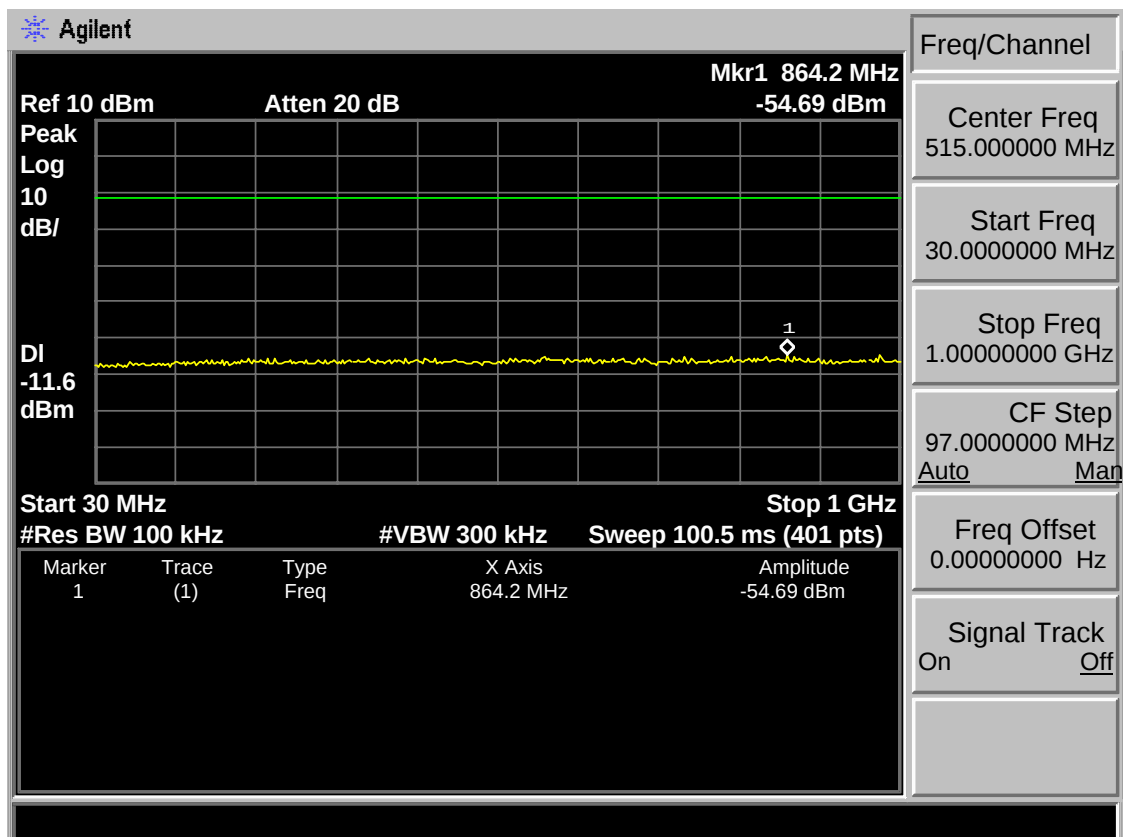
The transmitter output was connected to a spectrum analyzer, The resolution bandwidth is set to 100 kHz, The video bandwidth is set to 300 kHz for frequency range from 30MHz to 1000 MHz; The resolution bandwidth is set to 1 MHz, The video bandwidth is set to 3 MHz for frequency range from 1000MHz to 25000 MHz..

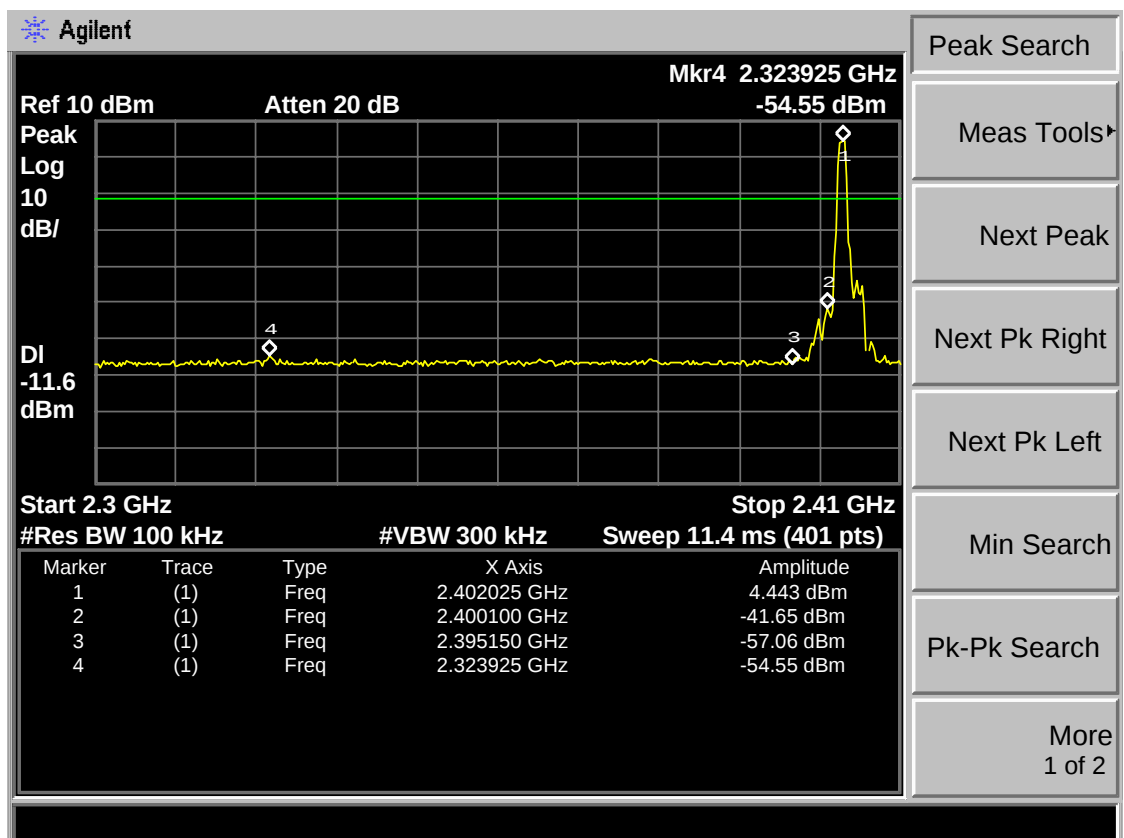
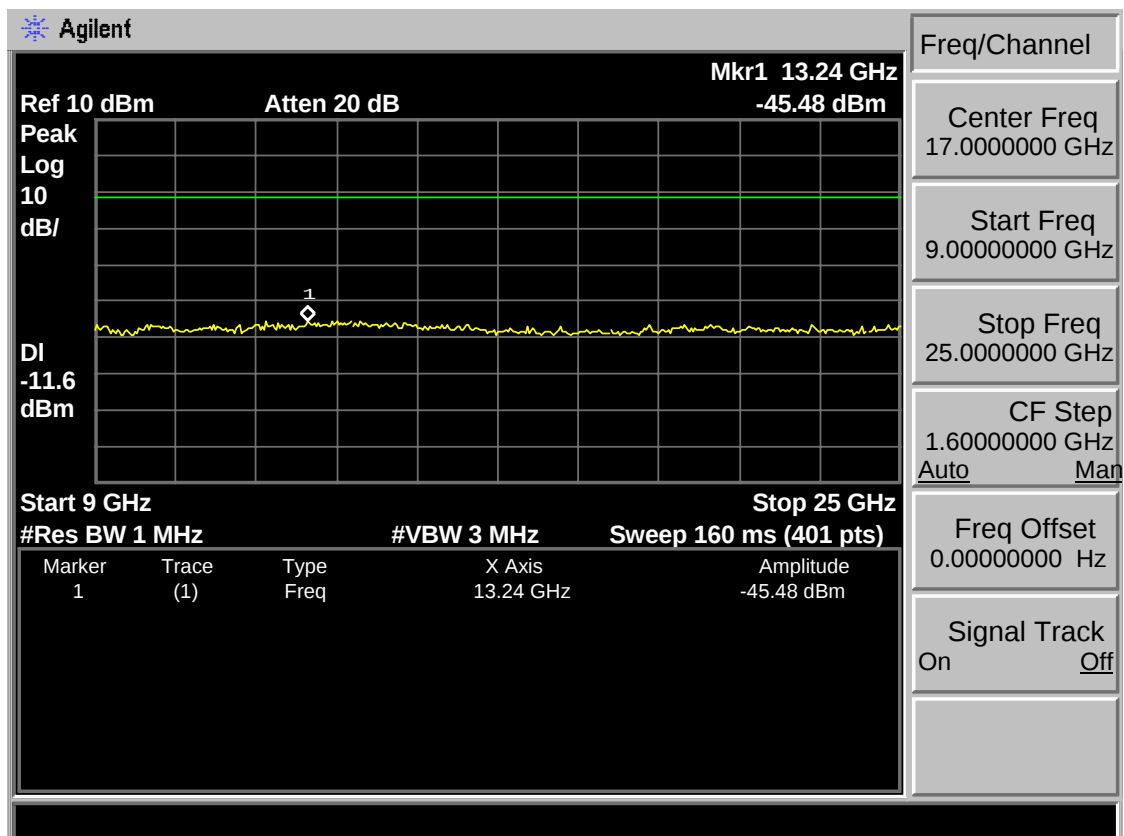
### 5.3 Test Result

**PASS** (The testing data was attached in the next pages.)

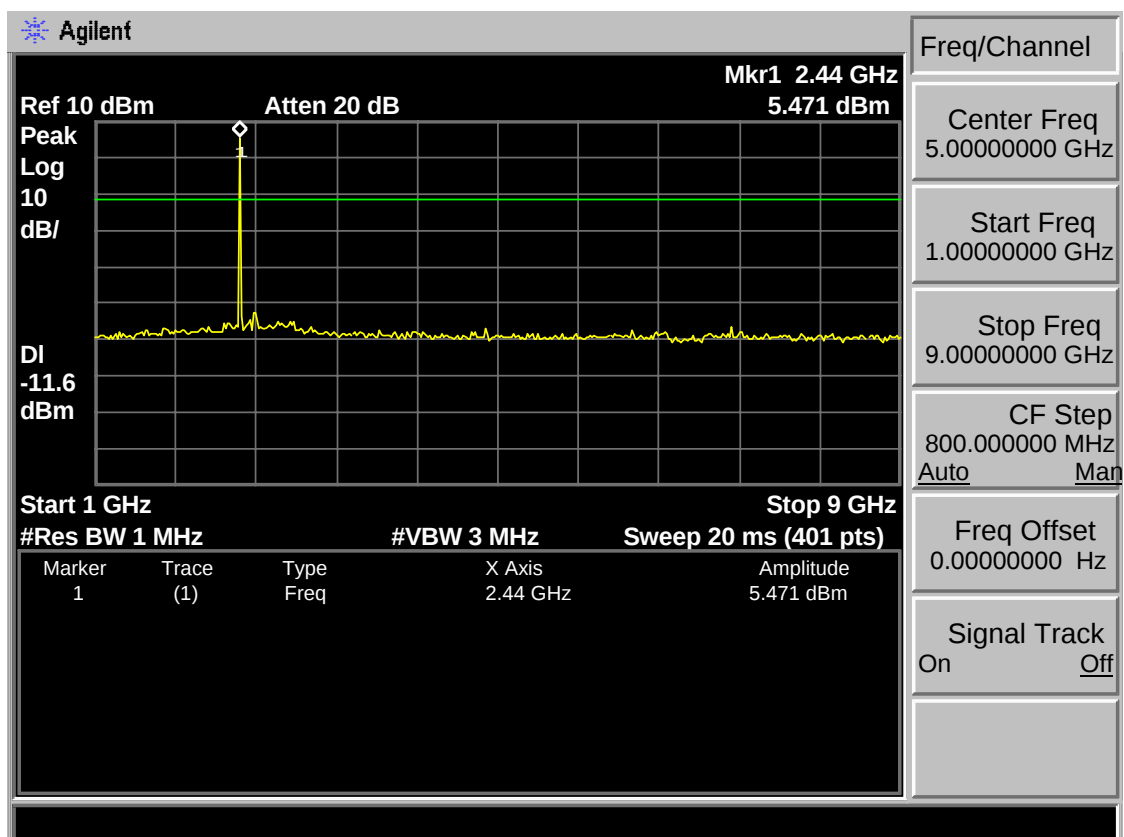
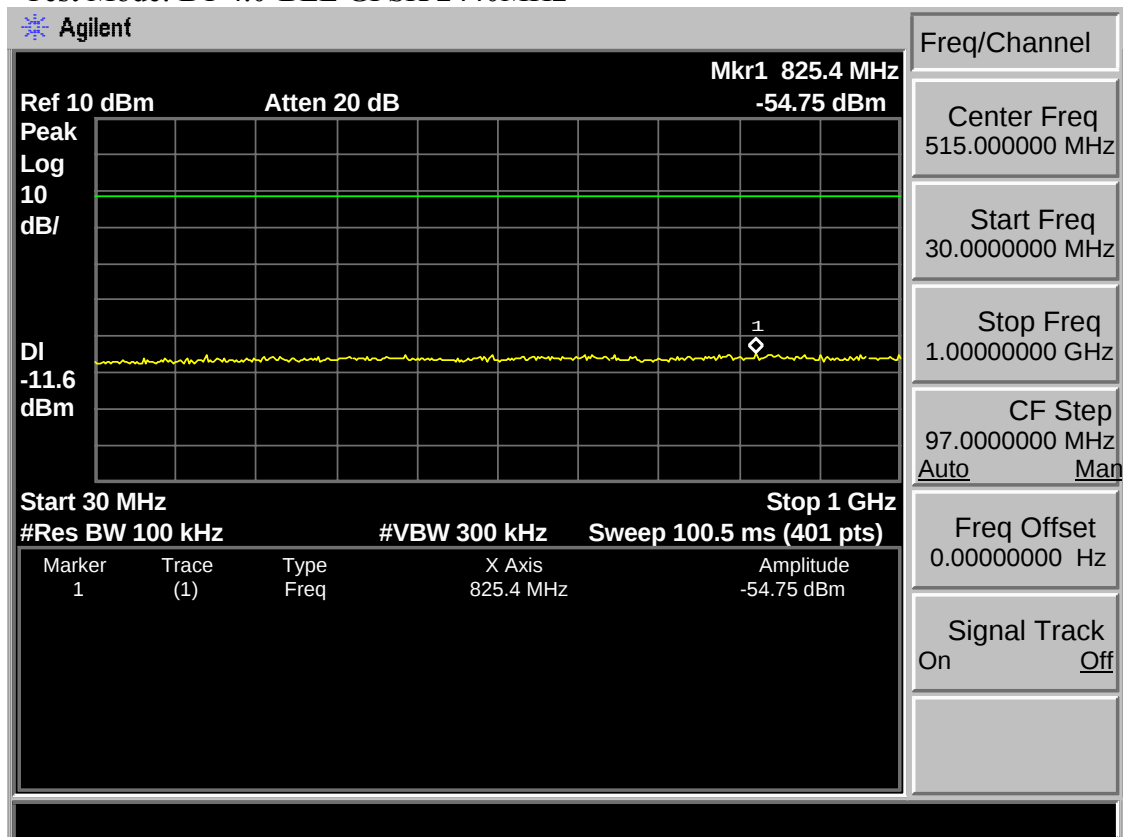
## 5.4 Test Data

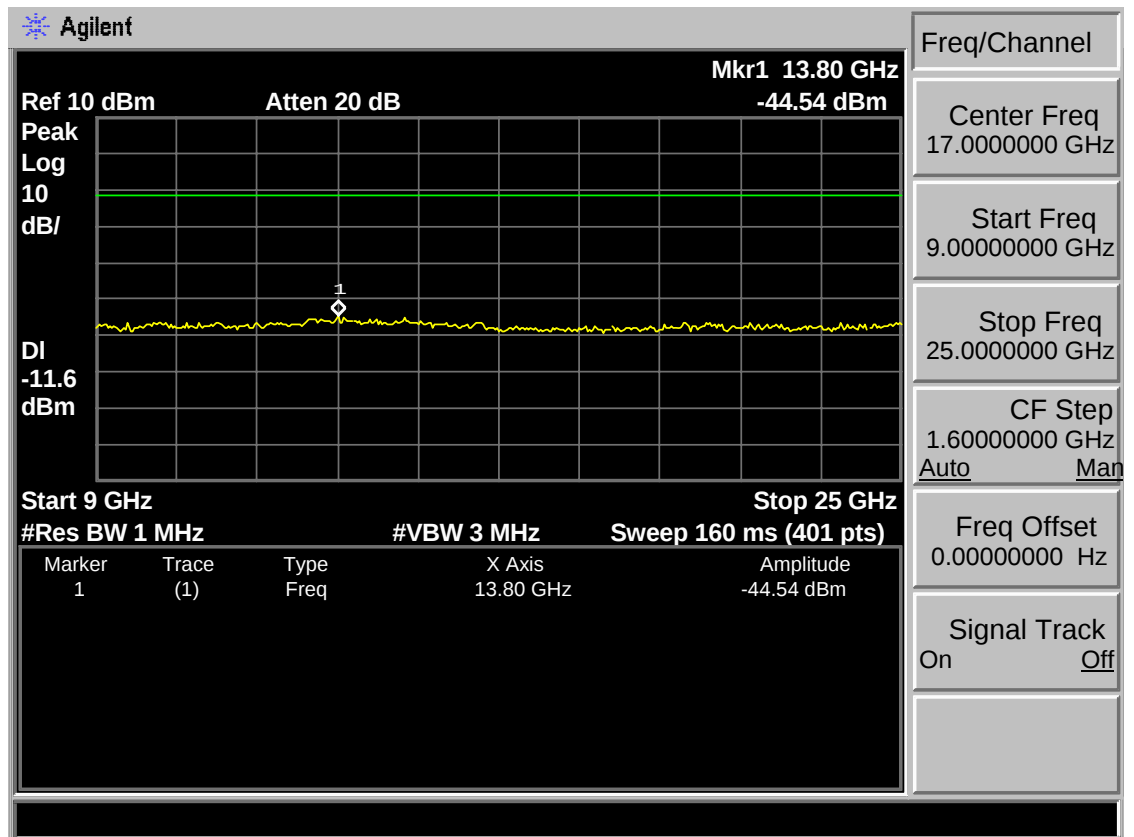
Test Mode: BT 4.0-BLE GFSK 2402MHz



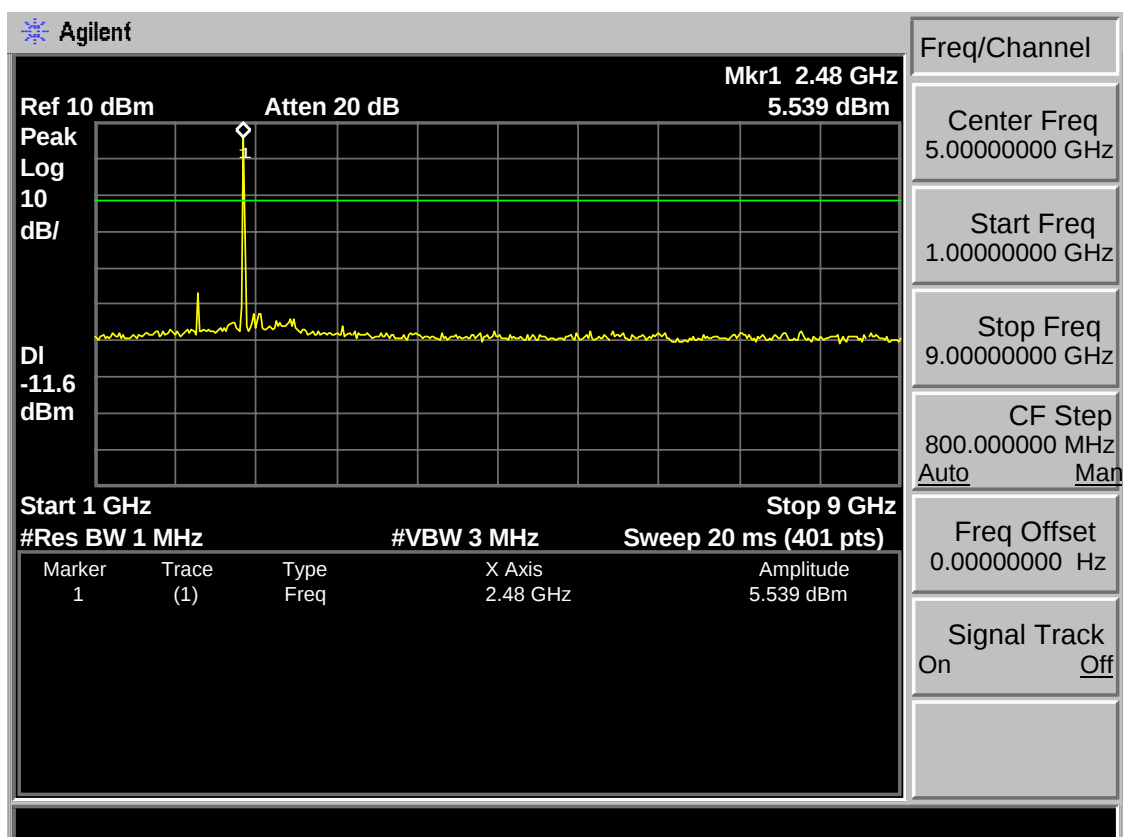
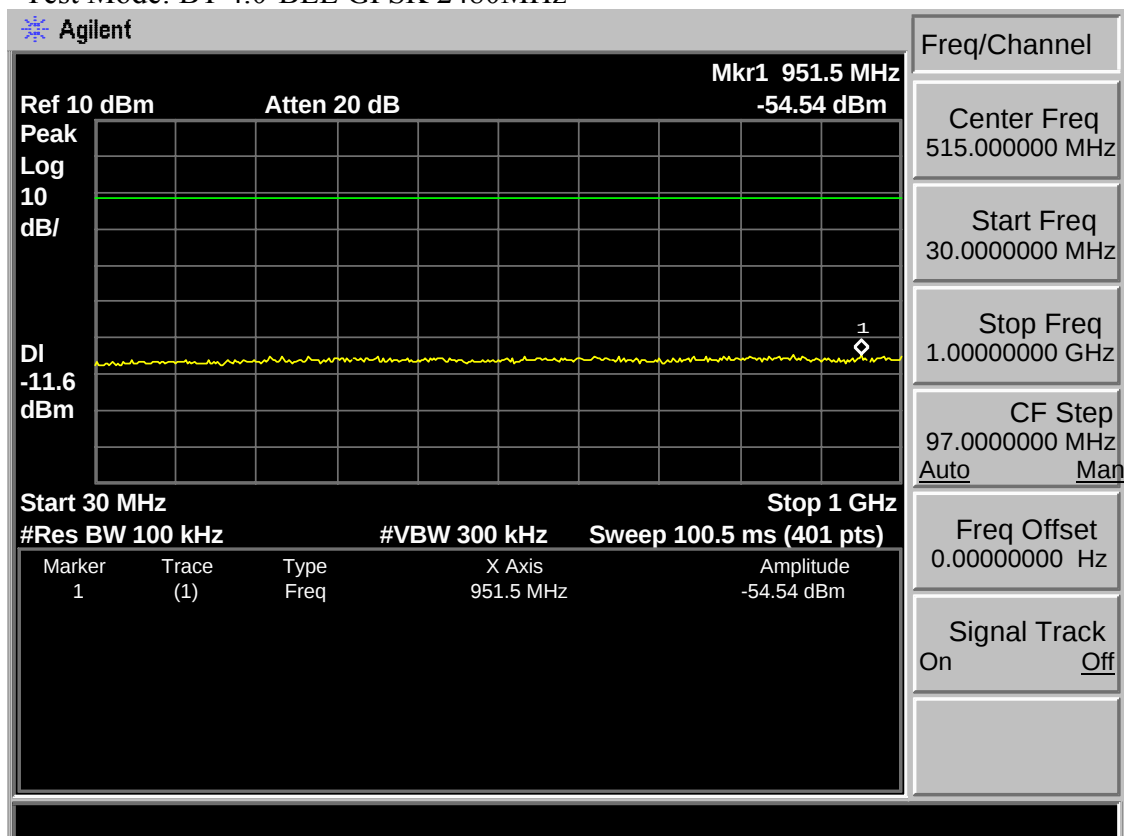


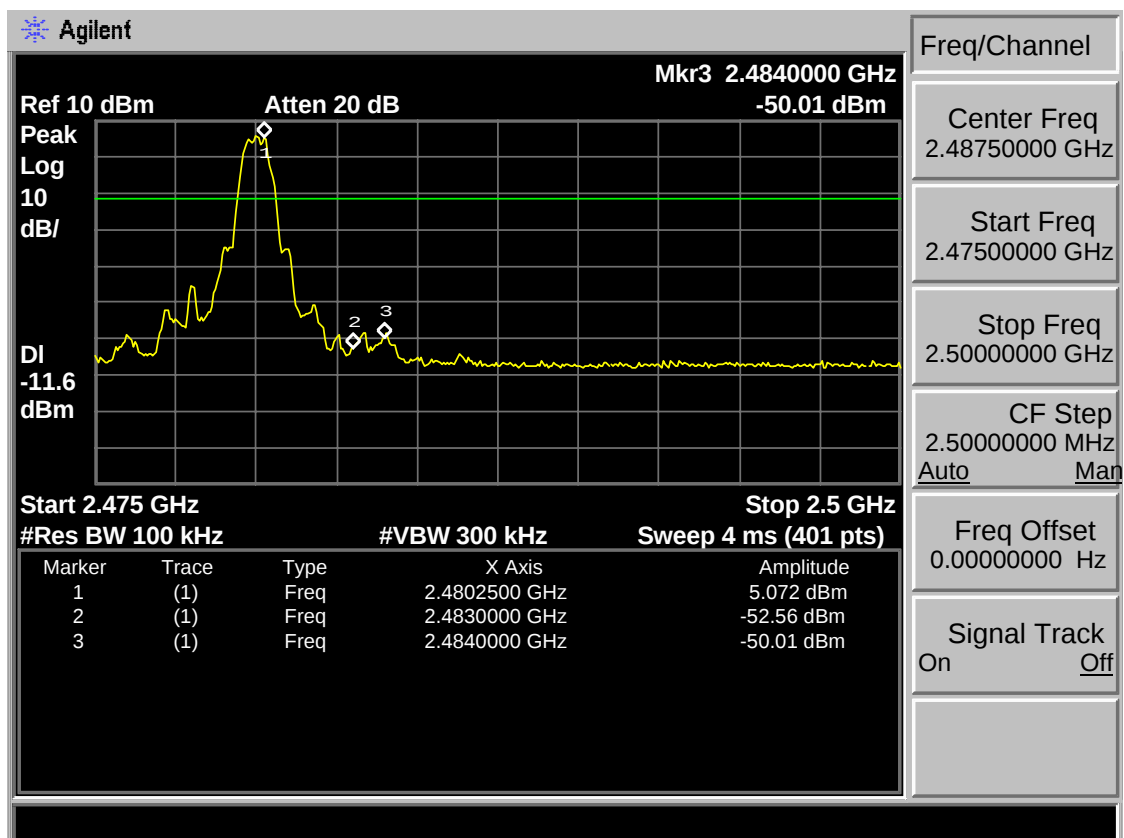
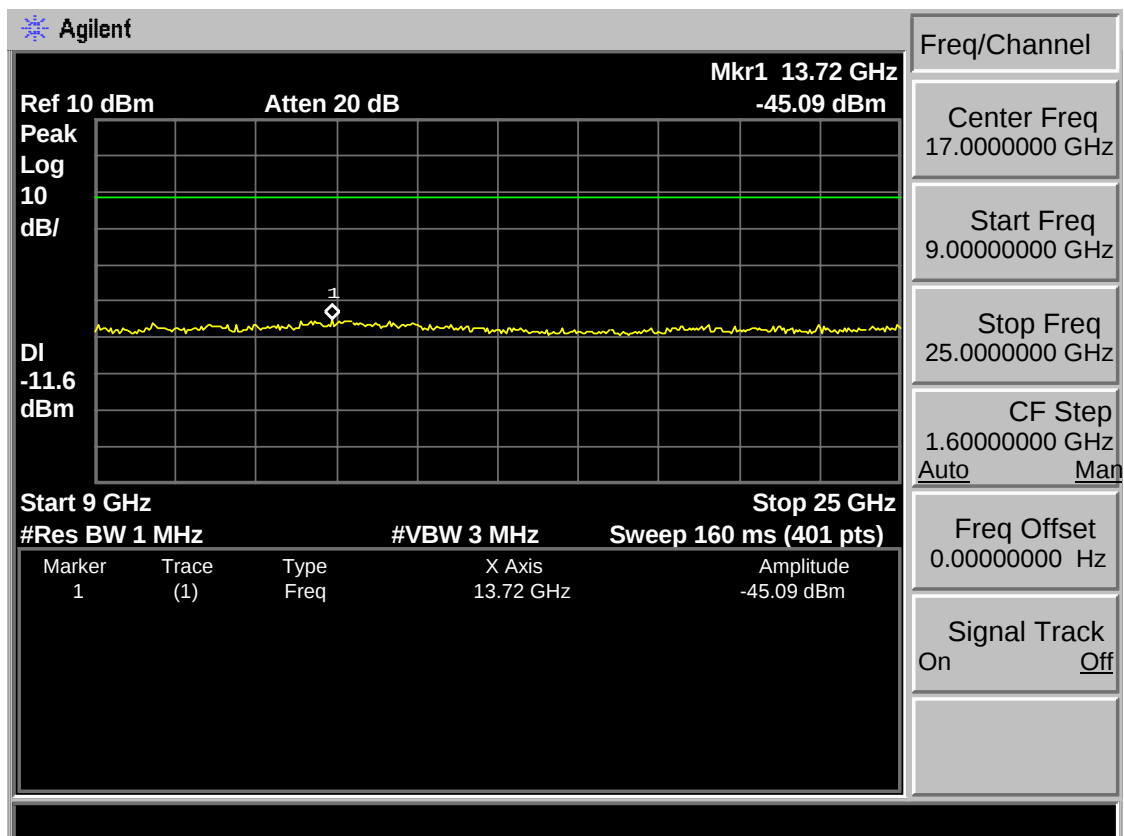
Test Mode: BT 4.0-BLE GFSK 2440MHz





Test Mode: BT 4.0-BLE GFSK 2480MHz



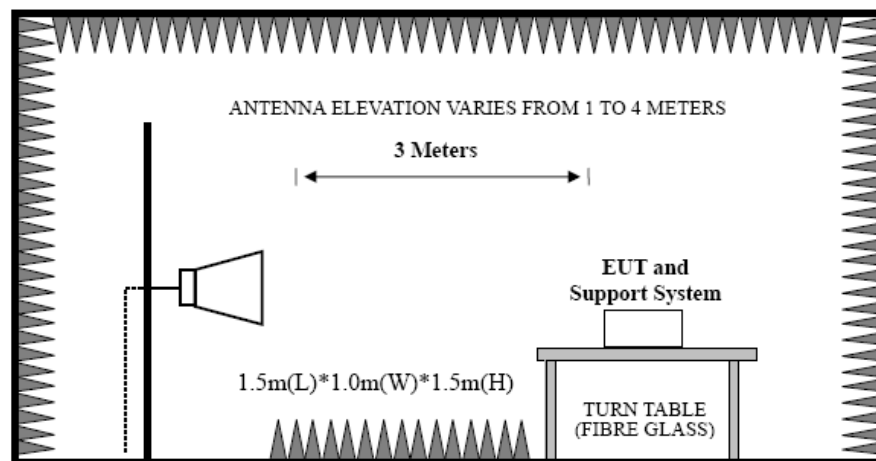


## 6 BAND EDGE COMPLIANCE TEST

### 6.1 Limit

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits

### 6.2 Block Diagram of Test setup



### 6.3 Test Procedure

1. The EUT is placed on a turntable, which is 1.5m above the ground plane and worked at highest radiated power.
2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

Peak : RBW = 1MHz, VBW = 1MHz, Detector=PEAK detector, Sweep time = auto.

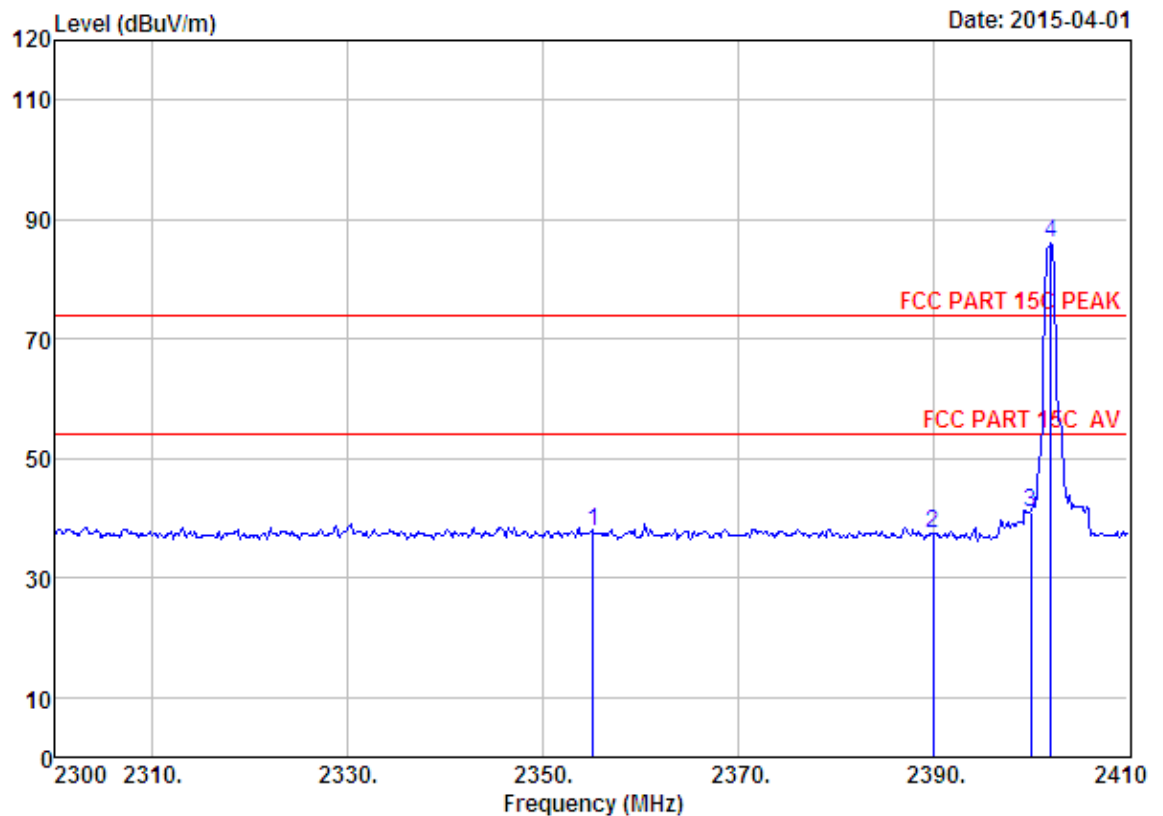
AV : RBW = 1MHz, VBW = 10Hz, Detector=PEAK detector, Sweep time = auto.

### 6.4 Test Result

Pass (The testing data was attached in the next pages.)

- Note:
- 1、 For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.
  - 2、 The frequency 2402MHz and 2480 MHz is fundamental frequency which no limit, the limit on plots is automatically generated by the software, it's not fundamental limit, we can't remove it.

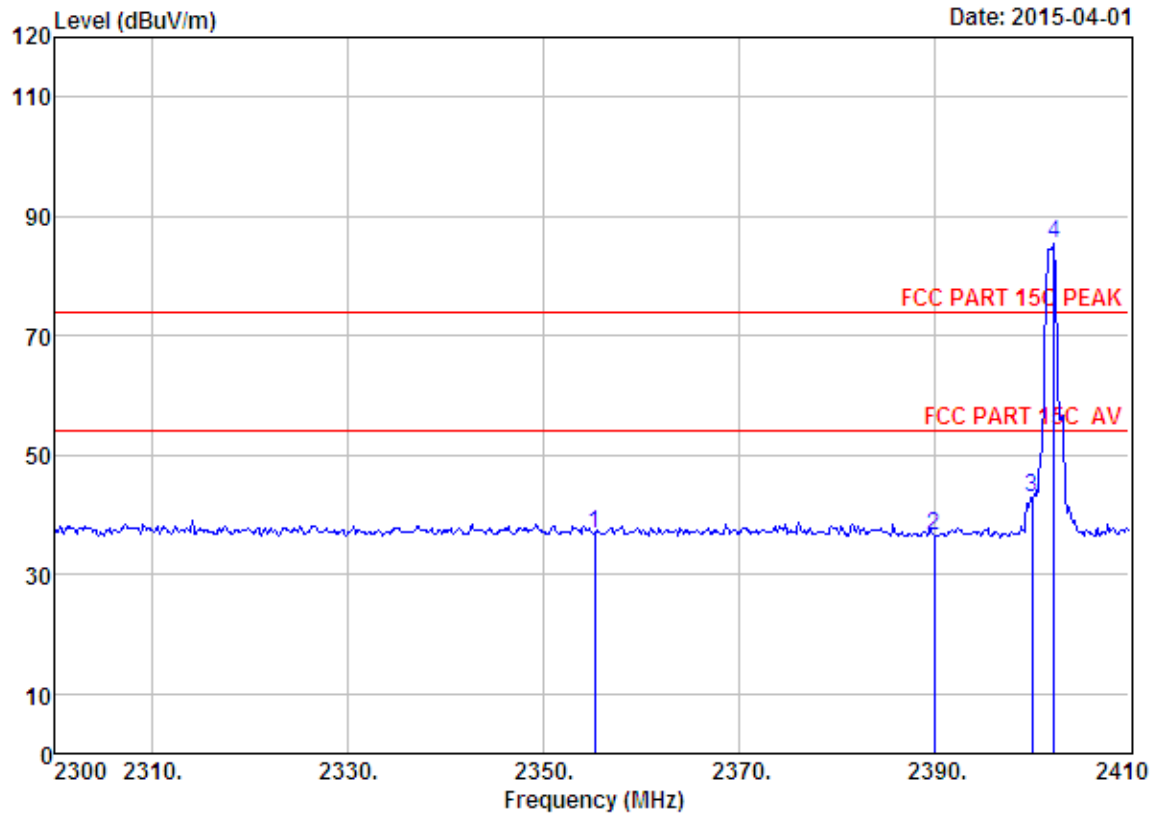
## 6.5 Test Data



Site no. : 1# 966 chamber                      Data no. : 71  
 Dis. / Ant. : 3m ANT 1-18G                      Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2402MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2355.11        | 27.70                    | 6.58                  | 34.22                 | 37.58             | 37.64                         | 74.00              | 36.36          | Peak   |
| 2 | 2390.00        | 27.64                    | 6.62                  | 34.19                 | 37.33             | 37.40                         | 74.00              | 36.60          | Peak   |
| 3 | 2400.00        | 27.61                    | 6.62                  | 34.18                 | 41.03             | 41.08                         | 74.00              | 32.92          | Peak   |
| 4 | 2402.08        | 27.61                    | 6.62                  | 34.18                 | 86.05             | 86.10                         | 74.00              | -12.10         | Peak   |

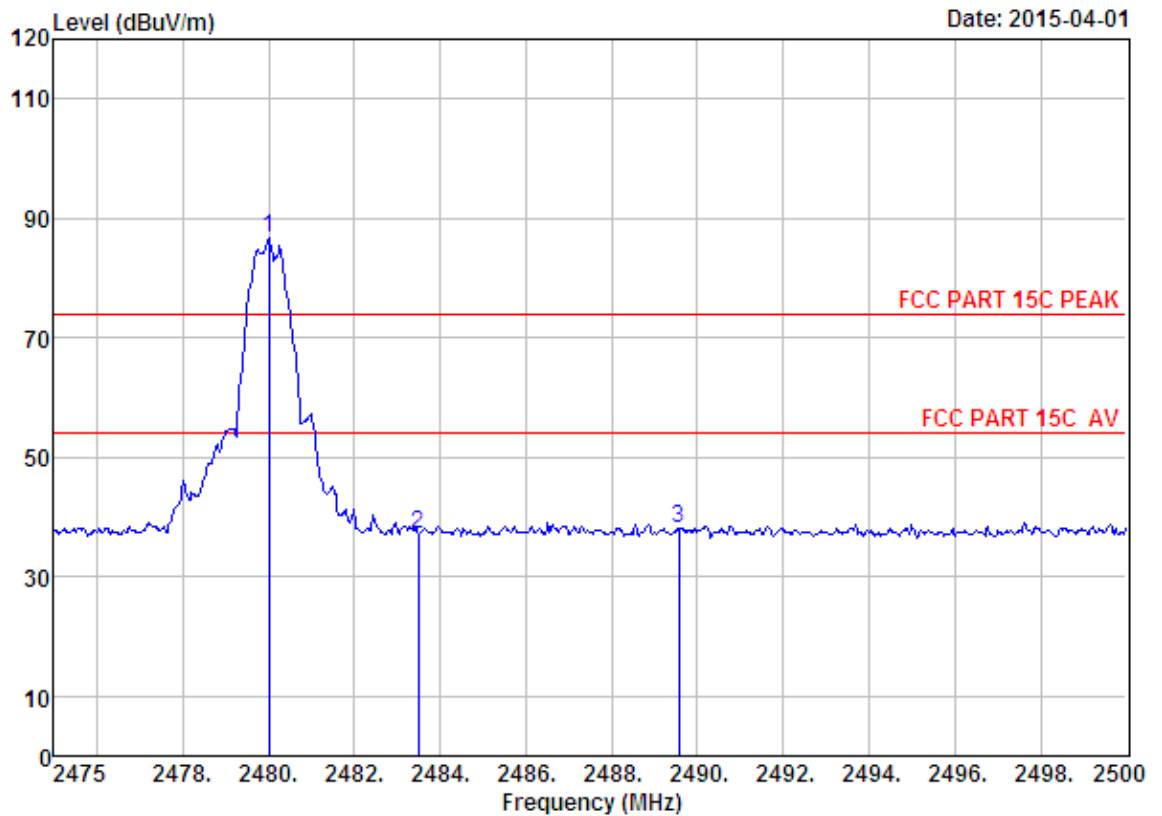
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 chamber Data no. : 72  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2402MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2355.22        | 27.70                    | 6.58                  | 34.22                 | 36.82             | 36.88                         | 74.00              | 37.12          | Peak   |
| 2 | 2390.00        | 27.64                    | 6.62                  | 34.19                 | 36.40             | 36.47                         | 74.00              | 37.53          | Peak   |
| 3 | 2400.00        | 27.61                    | 6.62                  | 34.18                 | 42.93             | 42.98                         | 74.00              | 31.02          | Peak   |
| 4 | 2402.30        | 27.61                    | 6.62                  | 34.18                 | 85.23             | 85.28                         | 74.00              | -11.28         | Peak   |

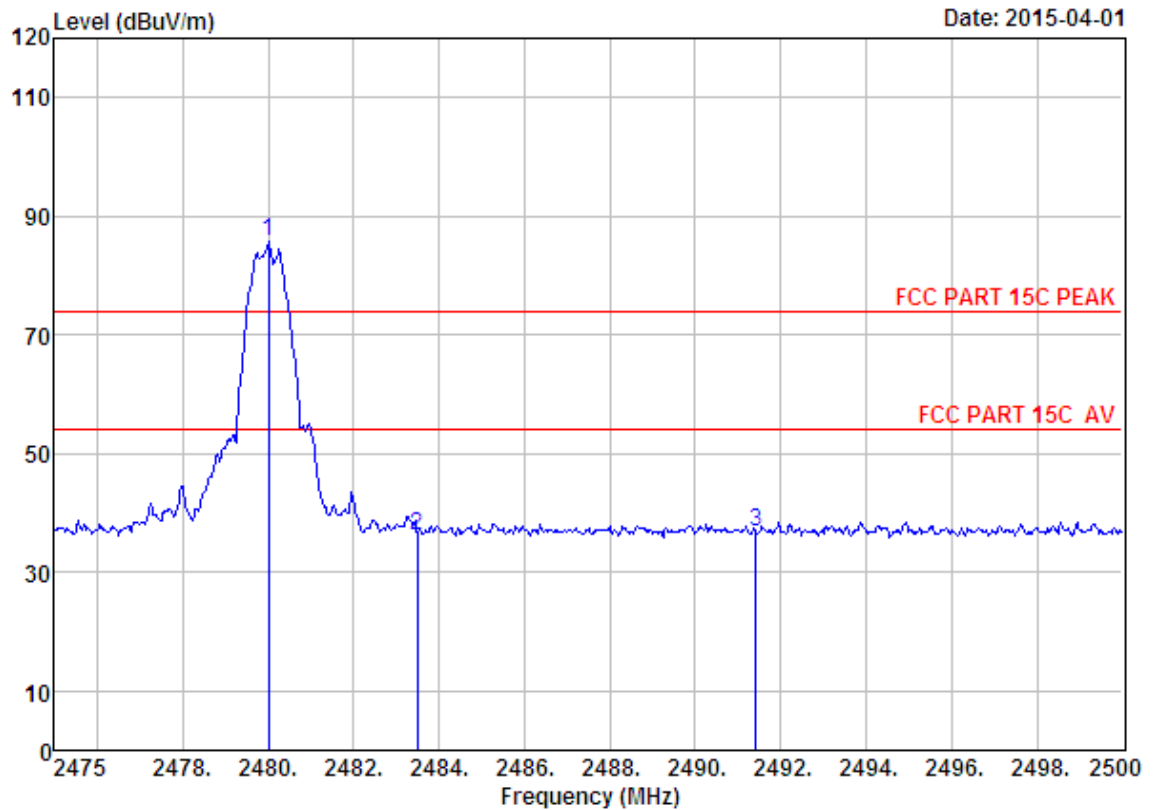
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 chamber Data no. : 77  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2480MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2480.00        | 27.58                    | 6.71                  | 34.03                 | 86.50             | 86.76                         | 74.00              | -12.76         | Peak   |
| 2 | 2483.50        | 27.58                    | 6.71                  | 34.03                 | 36.71             | 36.97                         | 74.00              | 37.03          | Peak   |
| 3 | 2489.58        | 27.58                    | 6.73                  | 34.03                 | 37.83             | 38.11                         | 74.00              | 35.89          | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 chamber  
 Dis. / Ant. : 3m ANT 1-18G  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Dick  
 EUT : Multi media Bluetooth Speaker system  
 Power : DC 12V From Adapter Input AC 120V/60Hz  
 M/N : MM2B  
 Test Mode : GFSK TX 2480MHz

Data no. : 78  
Ant. pol. : HORIZONTAL

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2480.00        | 27.58                    | 6.71                  | 34.03                 | 85.45             | 85.71                         | 74.00              | -11.71         | Peak   |
| 2 | 2483.50        | 27.58                    | 6.71                  | 34.03                 | 36.02             | 36.28                         | 74.00              | 37.72          | Peak   |
| 3 | 2491.43        | 27.58                    | 6.73                  | 34.03                 | 36.60             | 36.88                         | 74.00              | 37.12          | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

## 7 6dB Bandwidth Test

### 7.1 Limit

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

### 7.2 Test Procedure

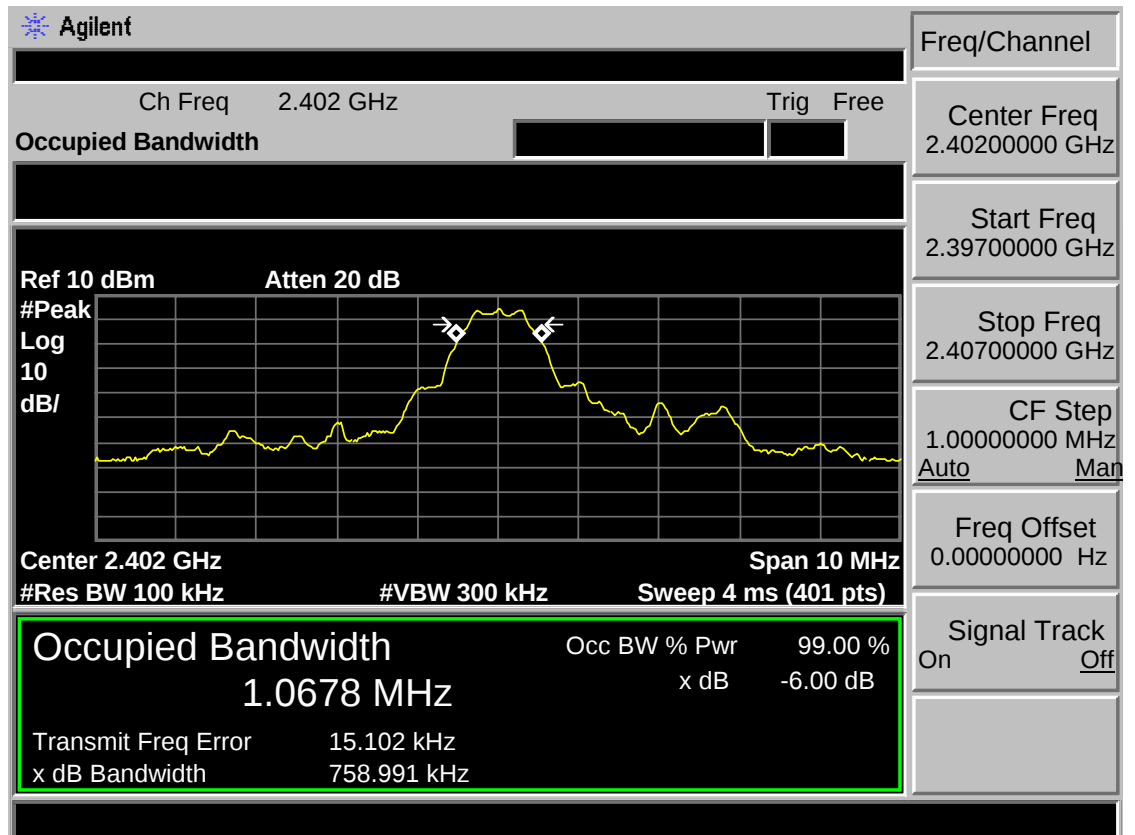
- 1, Connected the EUT's antenna port to spectrum analyzer device.
- 2, Follow the test procedure as described in KDB 558074
  - (1). Set resolution bandwidth (RBW) = 100 kHz.
  - (2). Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
  - (3). Detector = Peak.
  - (4). Trace mode = max hold.
  - (5). Sweep = auto couple.
  - (6). Allow the trace to stabilize.
  - (7). Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 7.3 Test Result

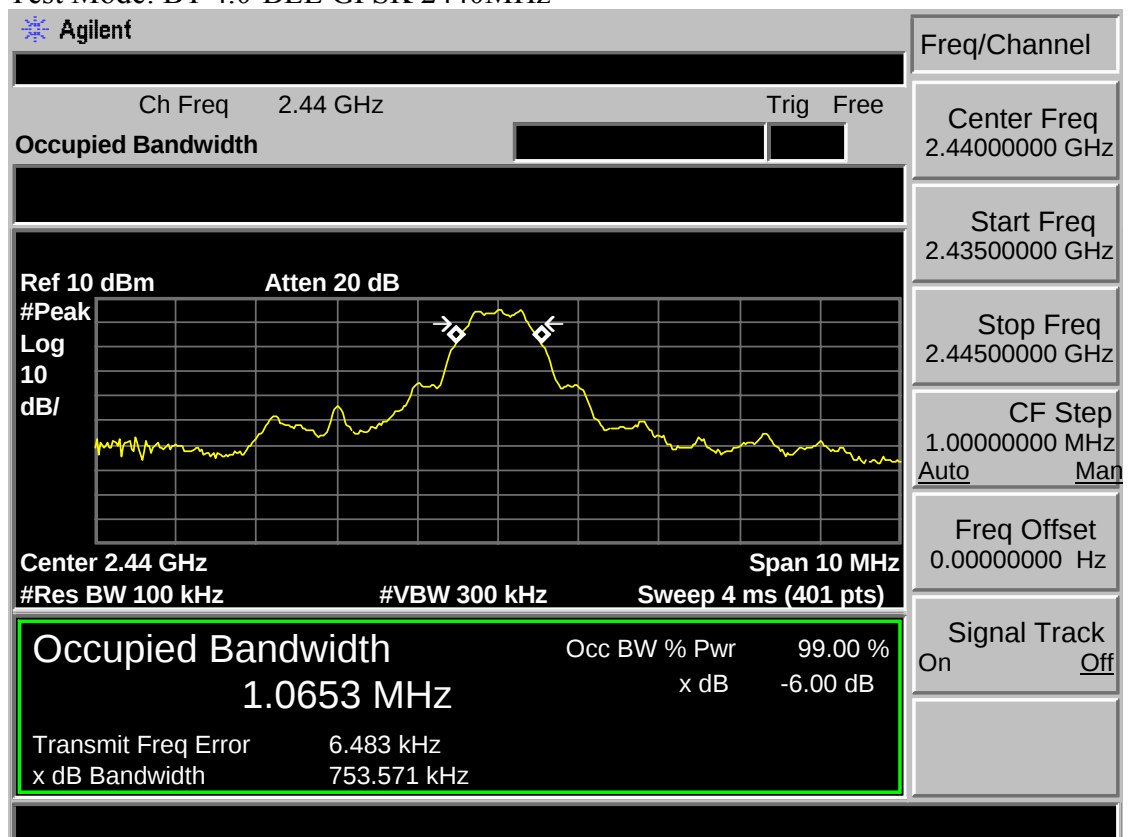
|                                           |      |                          |                    |
|-------------------------------------------|------|--------------------------|--------------------|
| EUT: Multi media Bluetooth Speaker system |      |                          |                    |
| M/N: MM2B                                 |      |                          |                    |
| Test date: 2015-04-07                     |      | Tested by: Tony.Tang     | Test site: RF Site |
| Test Mode                                 | CH   | 6dB bandwidth<br>( MHz ) | Limit<br>(KHz)     |
| BT 4.0-BLE<br>GFSK                        | CH1  | 0.759                    | >500               |
|                                           | CH20 | 0.754                    | >500               |
|                                           | CH40 | 0.761                    | >500               |
| Conclusion : PASS                         |      |                          |                    |

## 7.4 Test Data

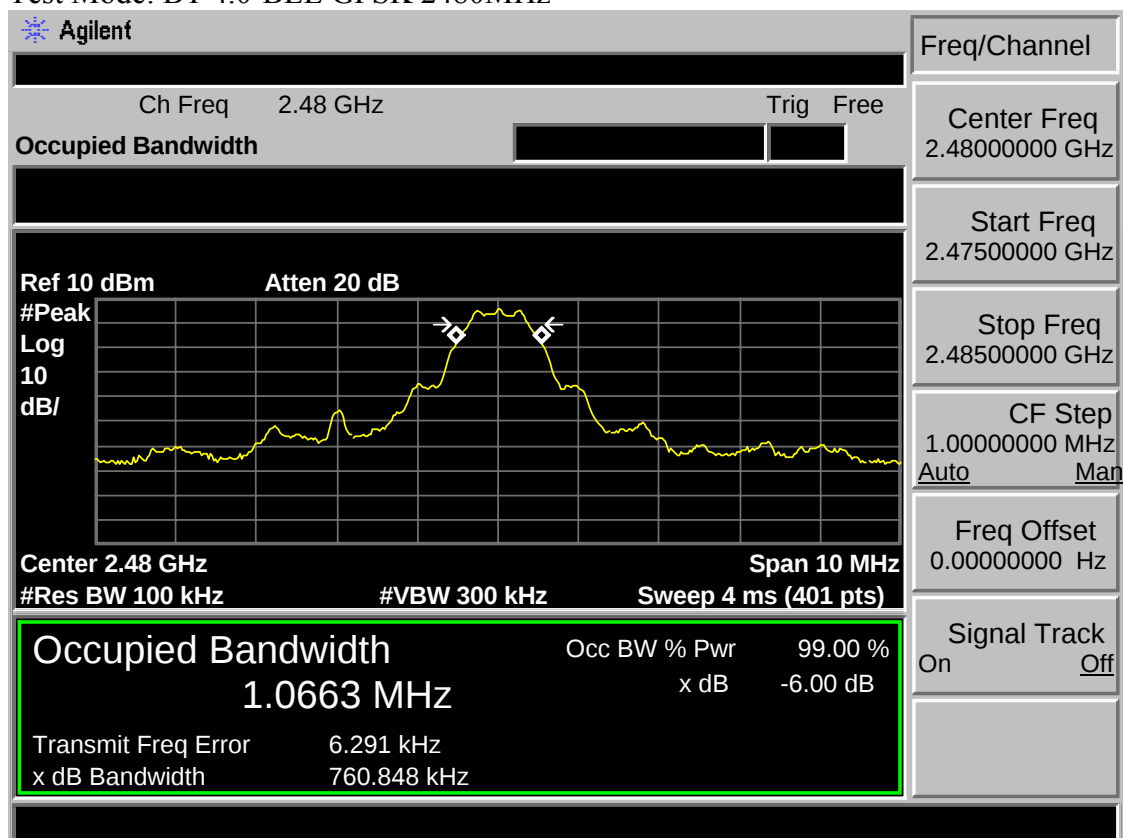
Test Mode: BT 4.0-BLE GFSK 2402MHz



Test Mode: BT 4.0-BLE GFSK 2440MHz



Test Mode: BT 4.0-BLE GFSK 2480MHz



## 8 OUTPUT POWER TEST

### 8.1 Limit

For systems using digital modulation in the 2400—2483.5MHz, The Peak out put Power shall not exceed 1W(30dBm)

### 8.2 Test Procedure

#### 8.3 Test Procedure

- 1, Connected the EUT's antenna port to spectrum analyzer device.
- 2, Follow the test procedure as described in KDB 558074
  - (1). Set the RBW  $\geq$  DTS bandwidth.
  - (2). Set VBW  $\geq$  3 x RBW.
  - (3). Set span  $\geq$  3 x RBW.
  - (4). Sweep time = auto couple.
  - (5). Detector = peak.
  - (6). Trace mode = max hold.
  - (7). Allow trace to fully stabilize.
  - (8). Use peak marker function to determine the peak amplitude level.

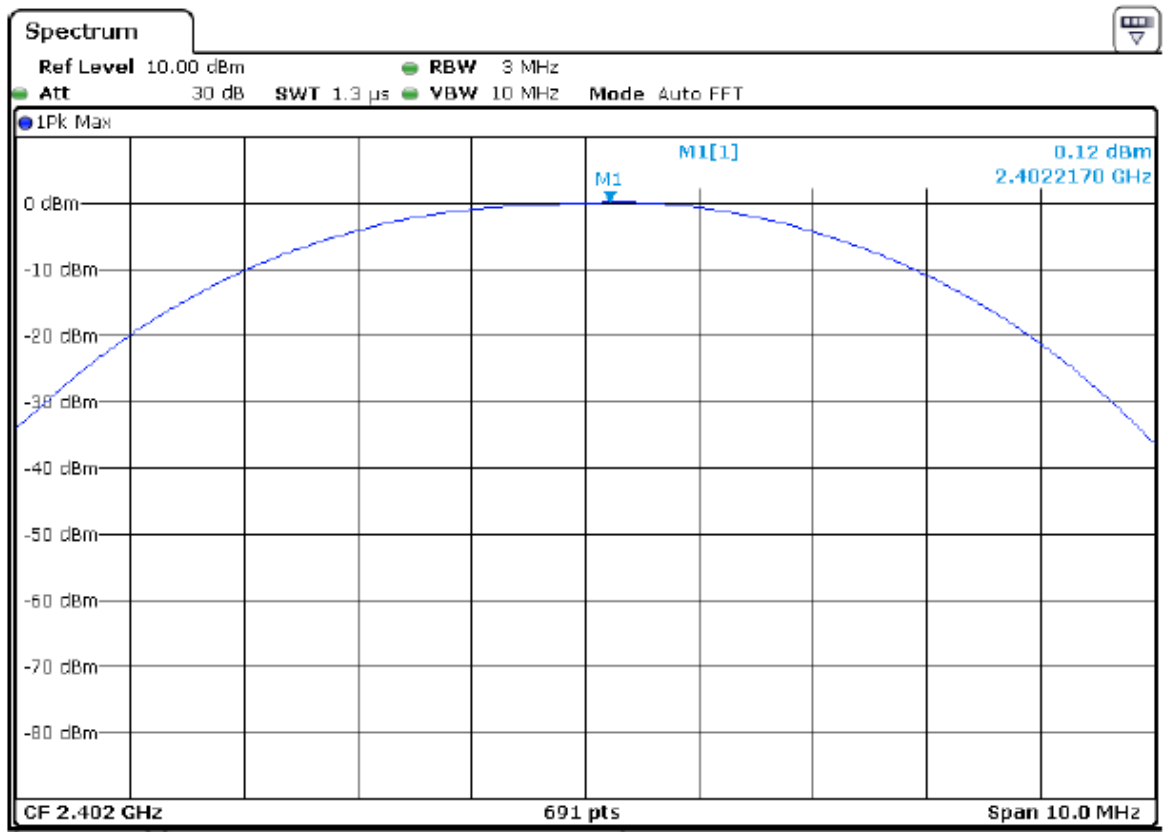
Note: The cable loss and attenuator loss were offset into measure device as an amplitude offs

## 8.4 Test Result

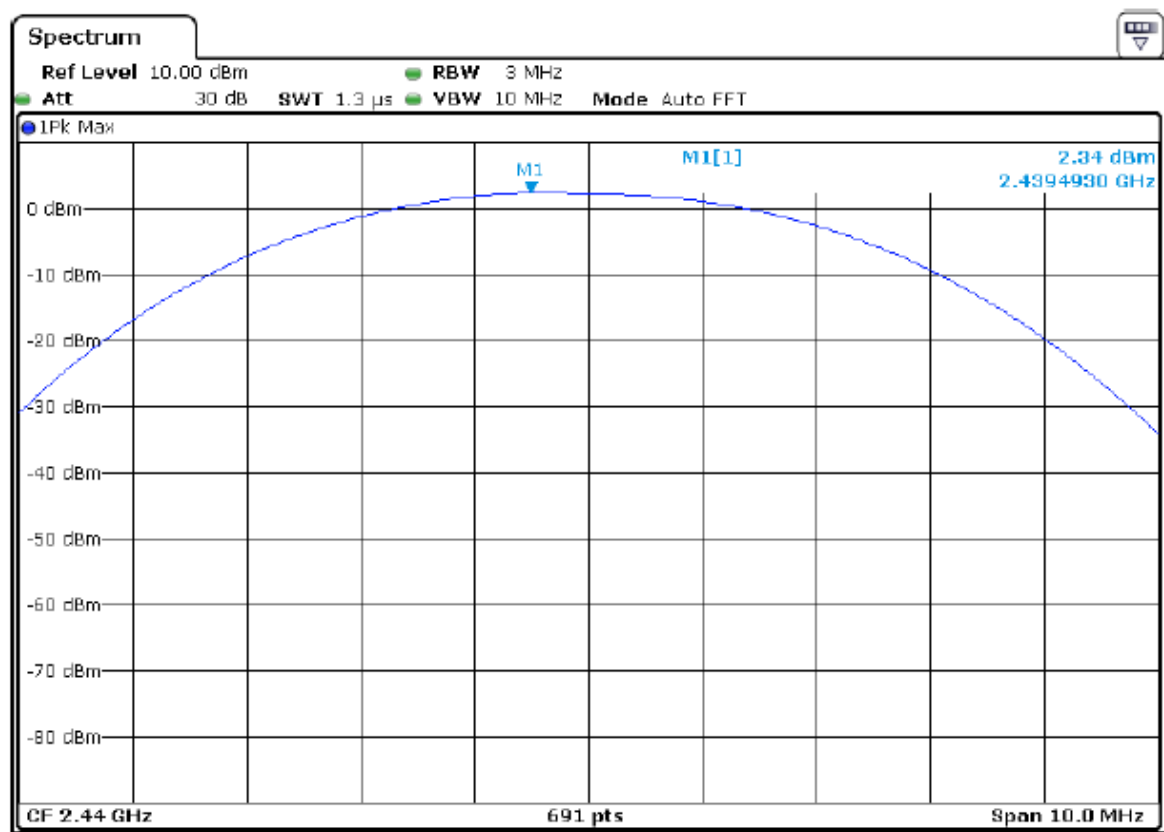
| EUT: Multi media Bluetooth Speaker system |      |                              |                      |
|-------------------------------------------|------|------------------------------|----------------------|
| M/N:MM2B                                  |      |                              |                      |
| Test date: 2015-04-07                     |      | Test site: 3m Chamber        | Tested by: Tony Tang |
| Pass                                      |      |                              |                      |
| Test Mode                                 | CH   | Peak output Power<br>( dBm ) | Limit<br>(dBm)       |
| BT 4.0-BLE<br>GFSK                        | CH1  | 0.12                         | 30                   |
|                                           | CH20 | 2.34                         | 30                   |
|                                           | CH40 | 2.95                         | 30                   |
| Conclusion : PASS                         |      |                              |                      |

8.5 Test Data

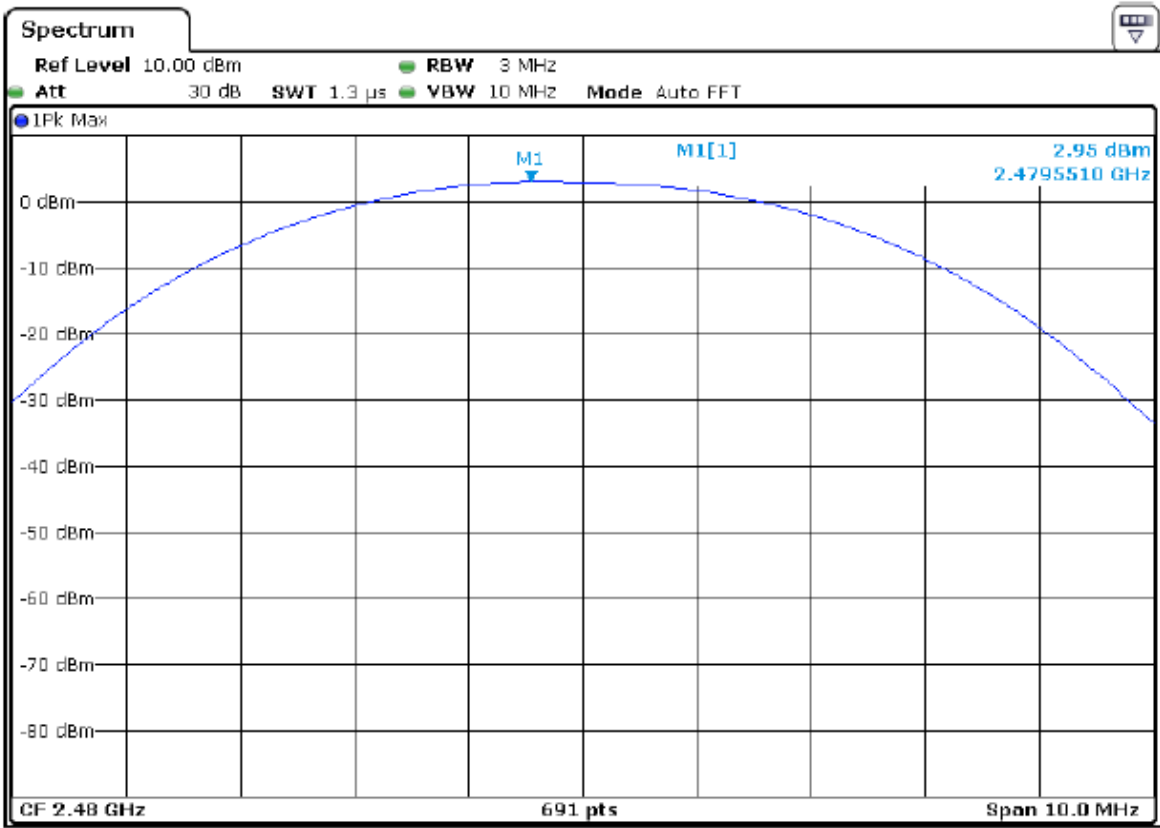
Test Mode: BT 4.0-BLE GFSK 2402MHz



Test Mode: BT 4.0-BLE GFSK 2440MHz



Test Mode: BT 4.0-BLE GFSK 2480MHz



## 9 POWER SPECTRAL DENSITY TEST

### 9.1 Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

### 9.2 Test Procedure

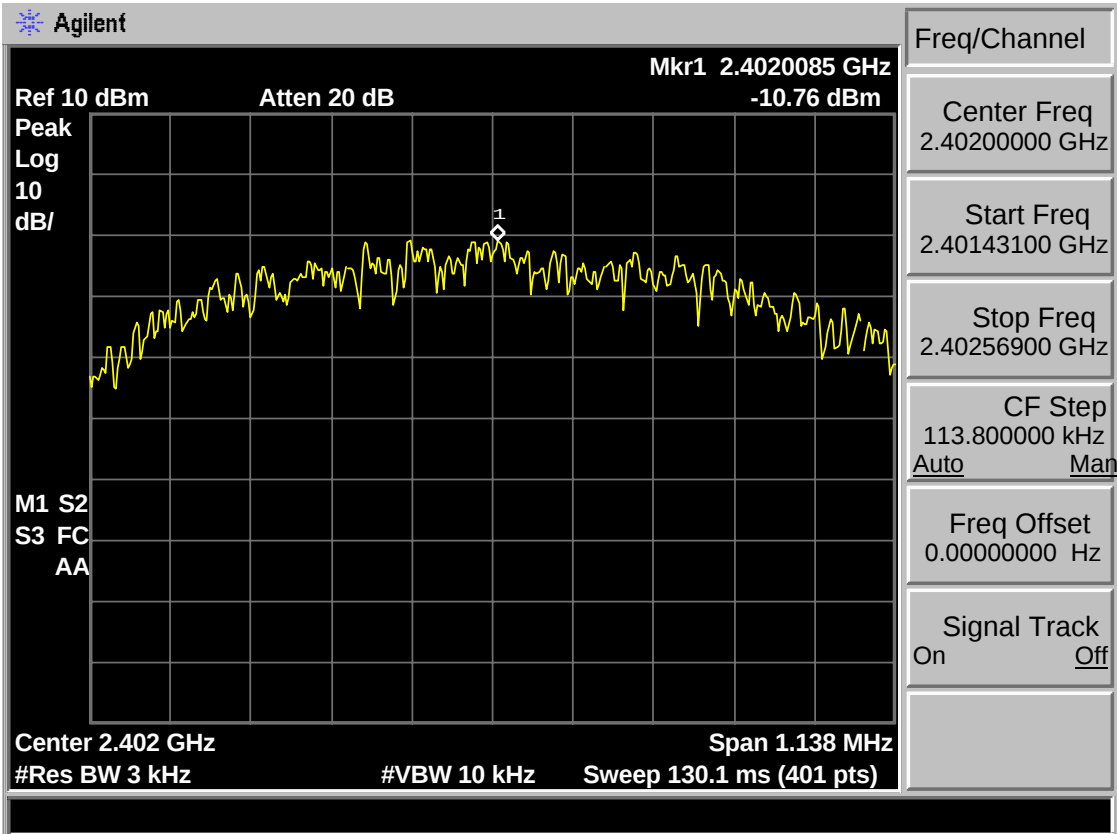
- 1, Connected the EUT's antenna port to spectrum analyzer device.
- 2, Follow the test procedure as described in KDB 558074
  - (1). Set analyzer center frequency to DTS channel center frequency.
  - (2). Set the span to 1.5 times the DTS bandwidth.
  - (3). Set the RBW to:  $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$ .
  - (4). Set the VBW  $\geq 3\text{ RBW}$ .
  - (5). Detector = peak.
  - (6). Sweep time = auto couple.
  - (7). Trace mode = max hold.
  - (8). Allow trace to fully stabilize.
  - (9). Use the peak marker function to determine the maximum amplitude level.
  - (10). If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

## 9.3 Test Result

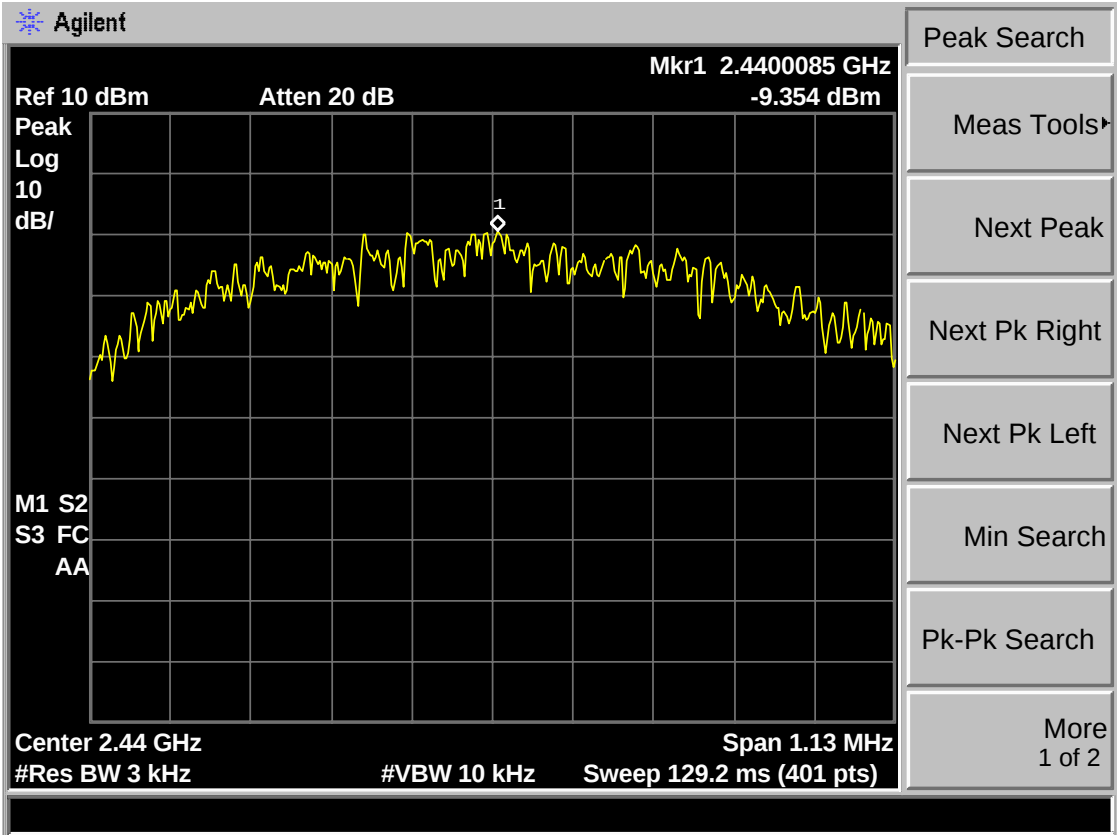
| EUT: Multi media Bluetooth Speaker system |      |                              |                      |
|-------------------------------------------|------|------------------------------|----------------------|
| M/N: MM2B                                 |      |                              |                      |
| Test date: 2015-04-07                     |      | Test site: 3m Chamber        | Tested by: Tony Tang |
| Pass                                      |      |                              |                      |
| Test Mode                                 | CH   | Power density<br>(dBm/3kHz ) | Limit<br>(dBm/3kHz)  |
| BT 4.0-BLE<br>GFSK                        | CH1  | -10.760                      | 8                    |
|                                           | CH20 | -9.354                       | 8                    |
|                                           | CH40 | -9.328                       | 8                    |
| Conclusion : PASS                         |      |                              |                      |

9.4 Test Data

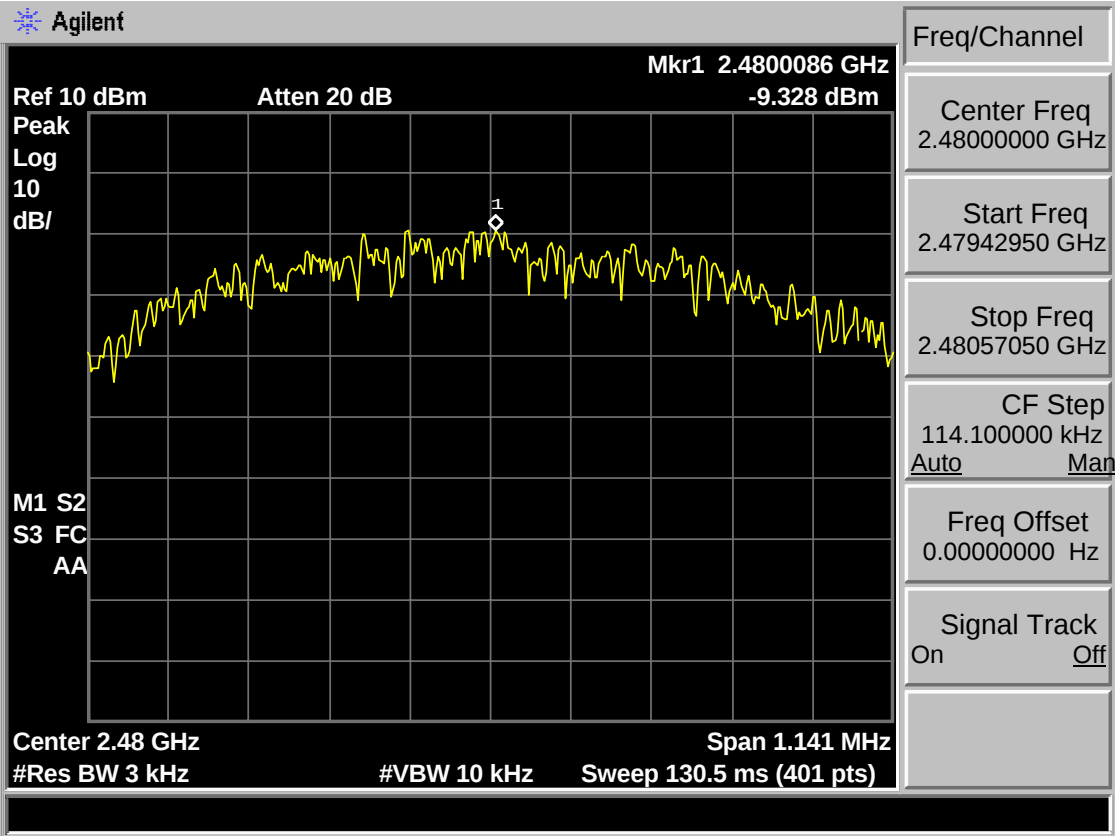
Test Mode: BT 4.0-BLE GFSK 2402MHz



Test Mode: BT 4.0-BLE GFSK 2440MHz



Test Mode: BT 4.0-BLE GFSK 2480MHz



## 10 ANTENNA REQUIREMENTS

### 10.1 Limit

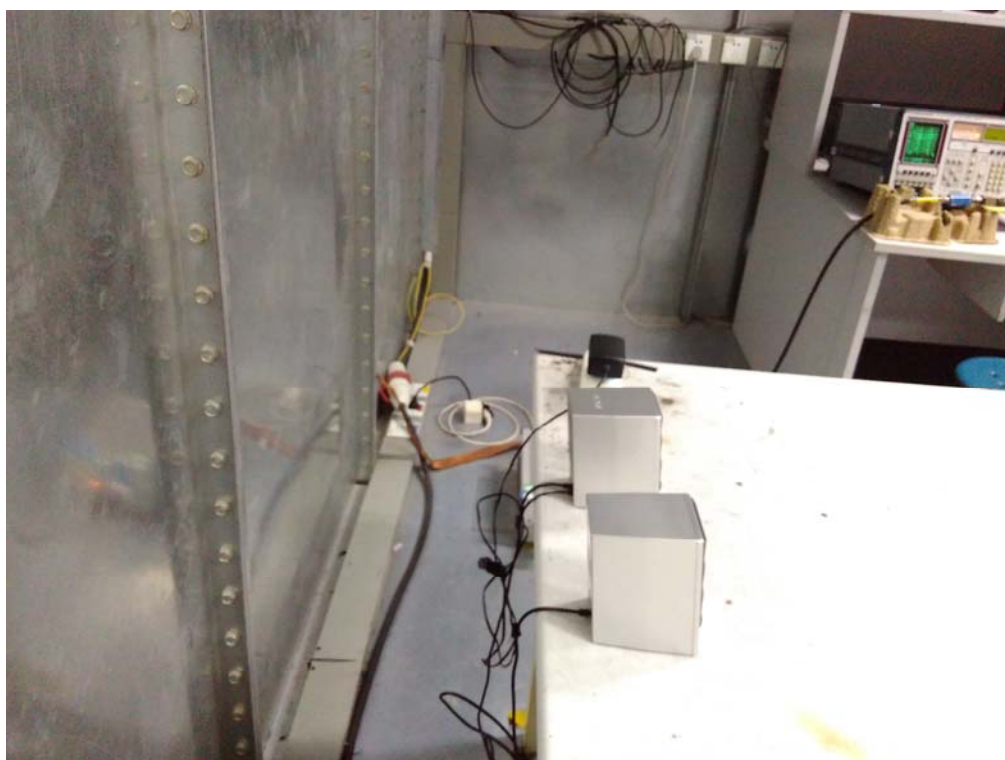
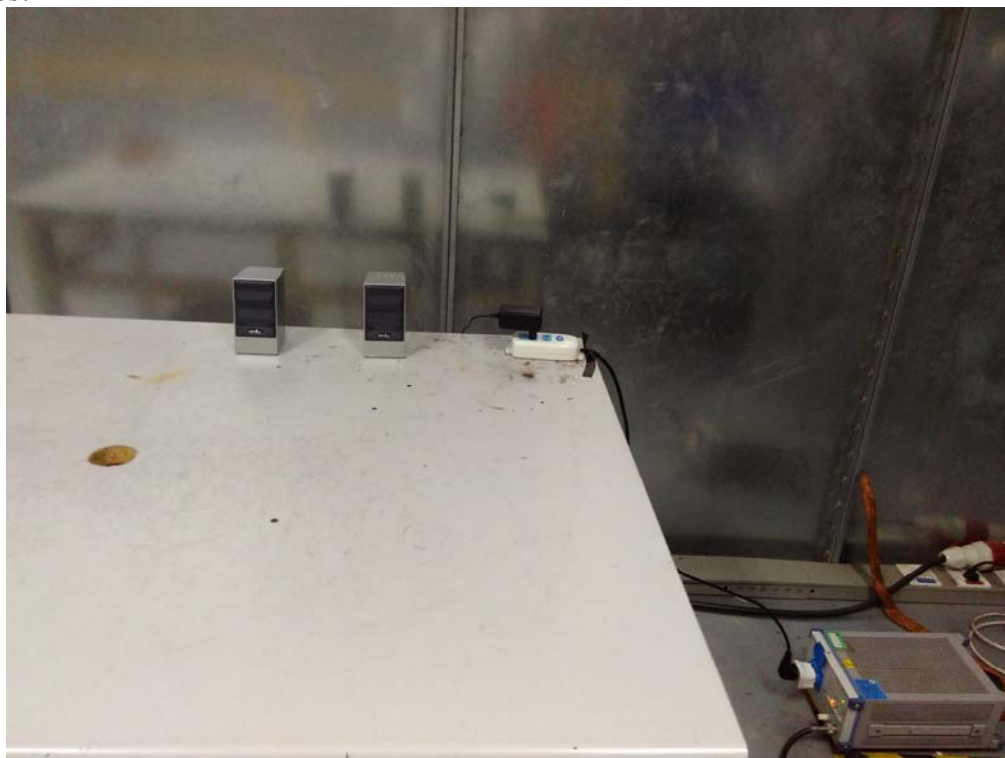
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### 10.2 Result

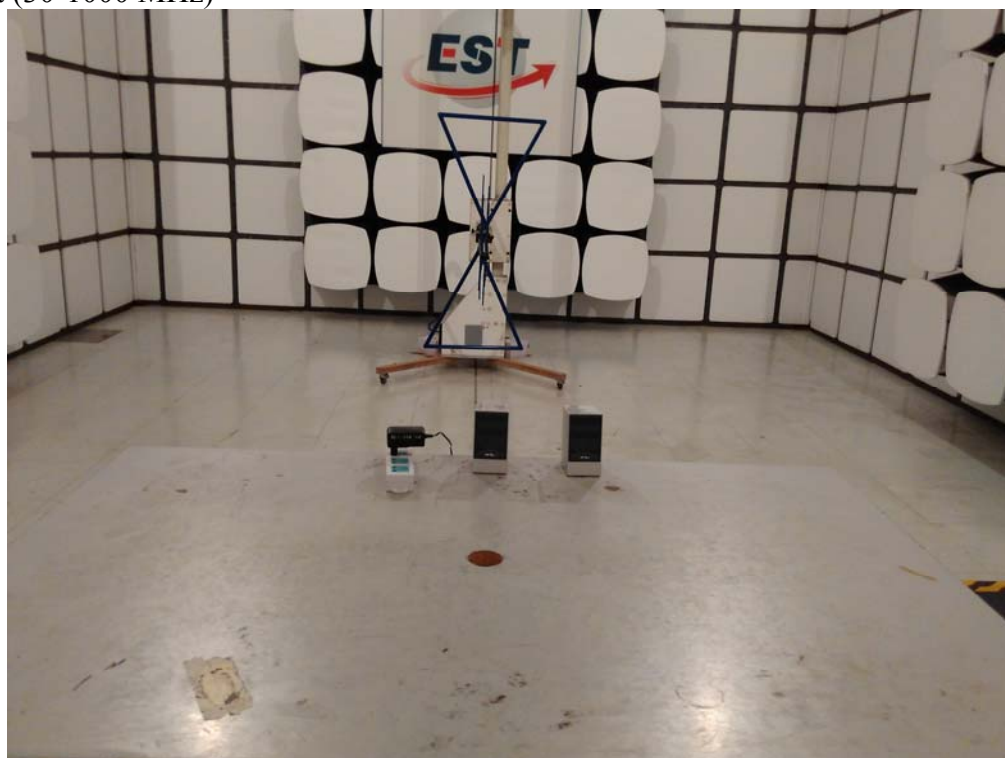
The antennas used for this product are integral Patch Antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only -0.61dBi.

## 11 TEST SETUP PHOTO

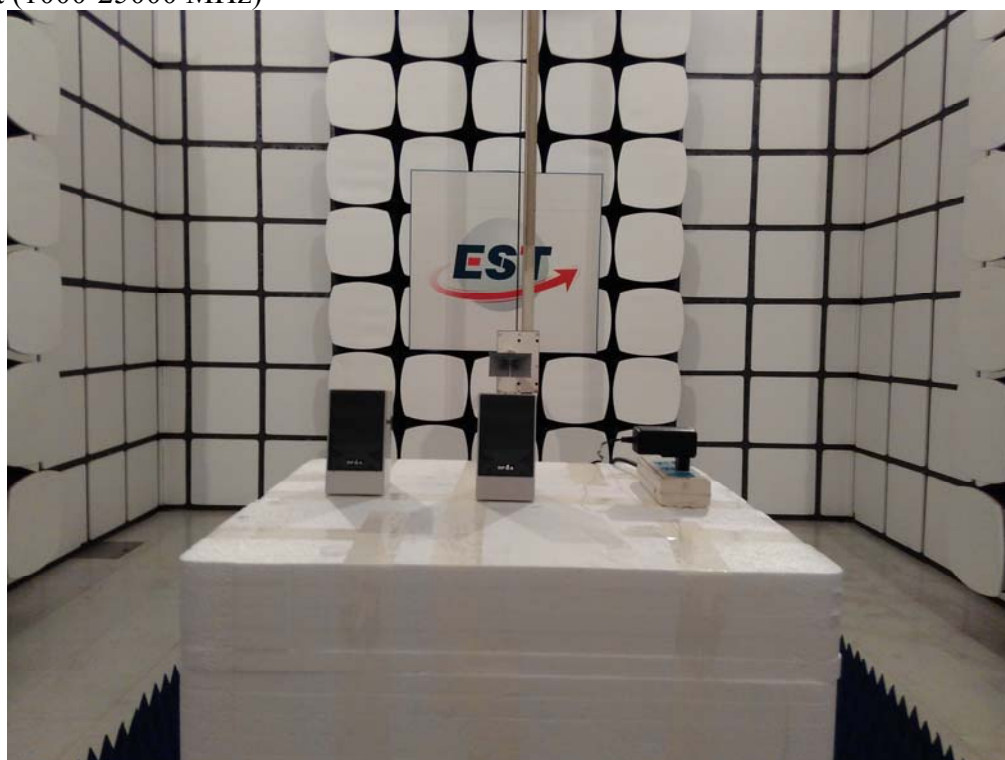
Conducted Test



Radiated Test (30-1000 MHz)



Radiated Test (1000-25000 MHz)

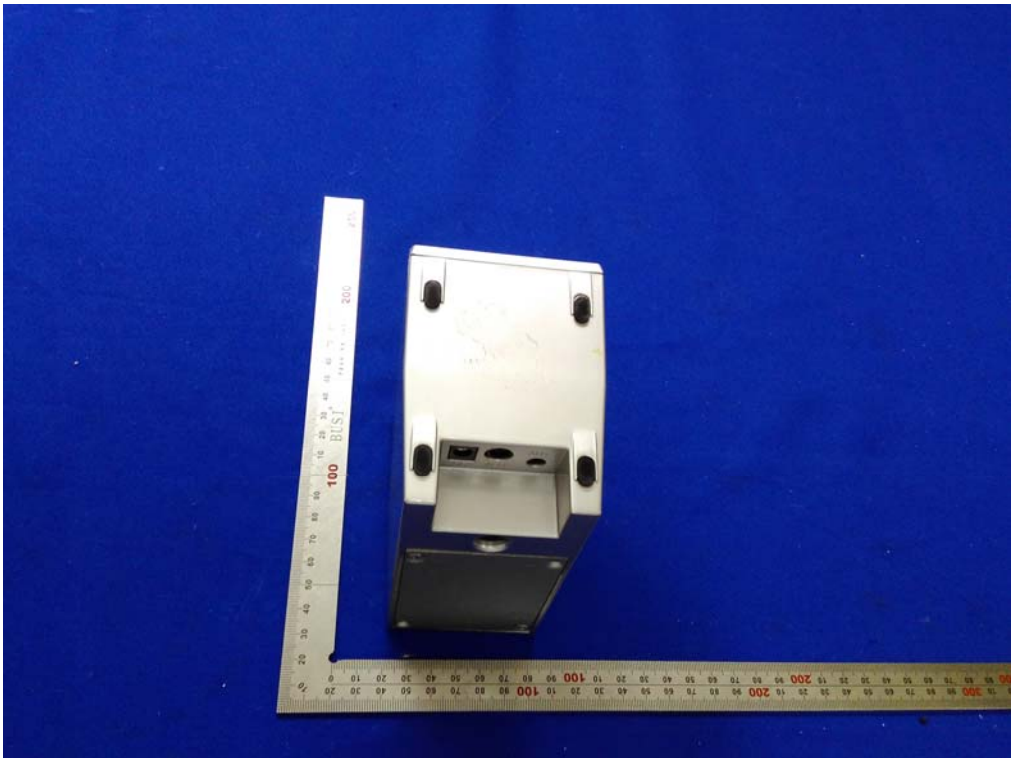


12PHOTOS OF EUT

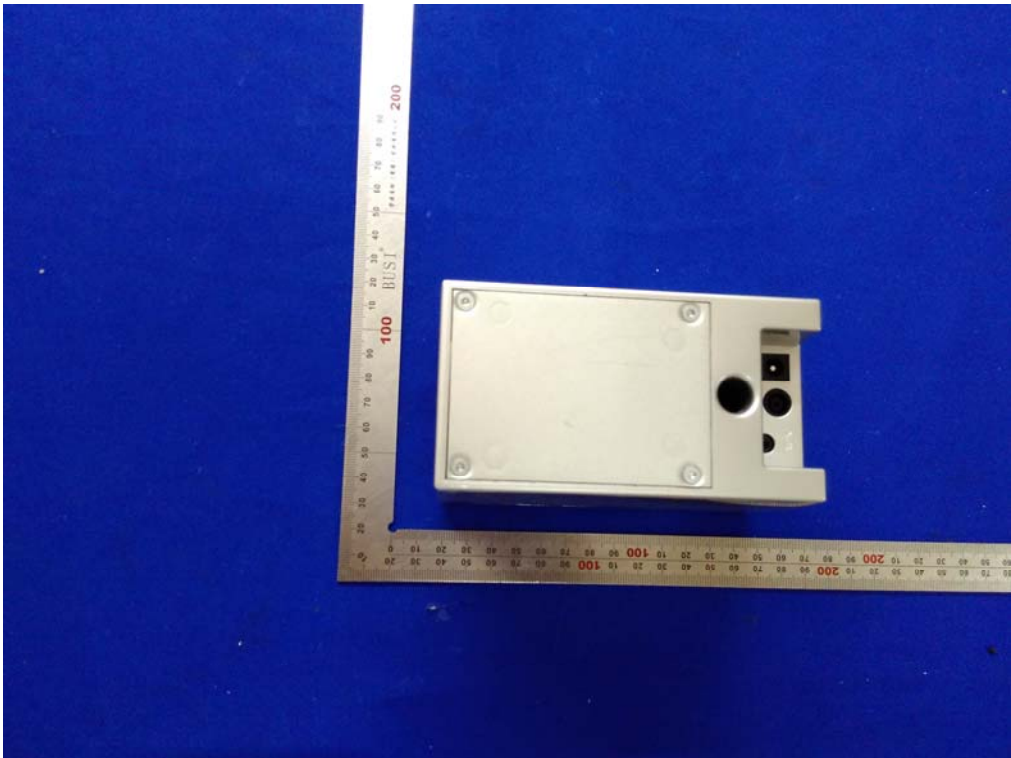
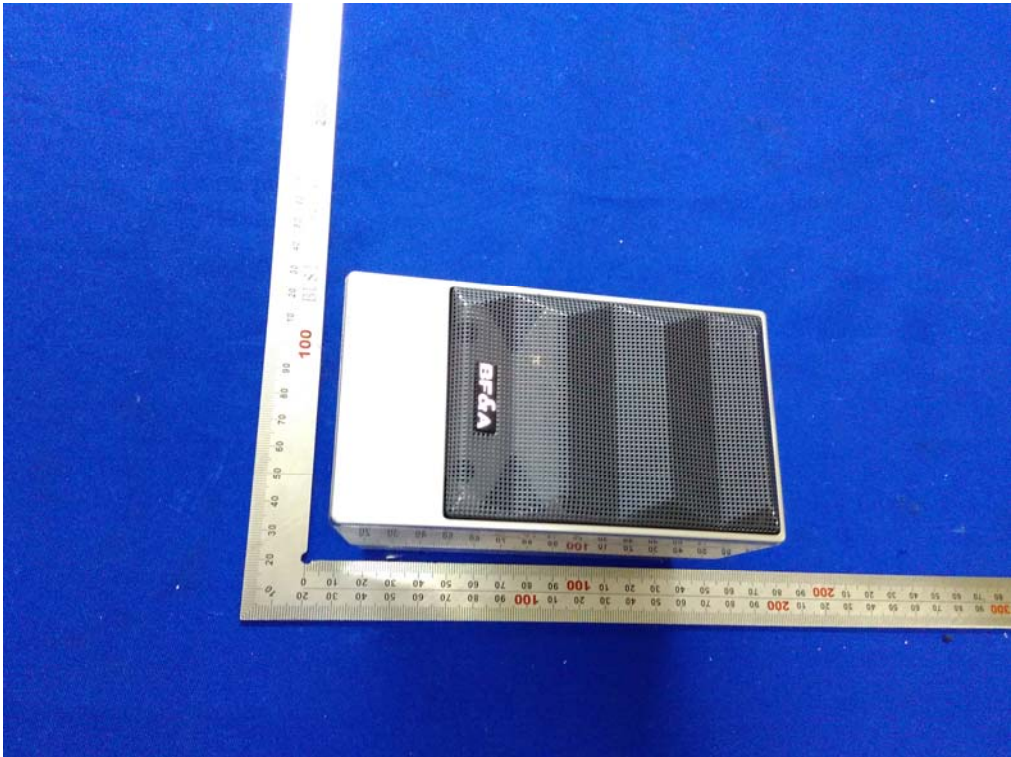
External Photos  
M/N: MM2B



External Photos  
M/N: MM2B

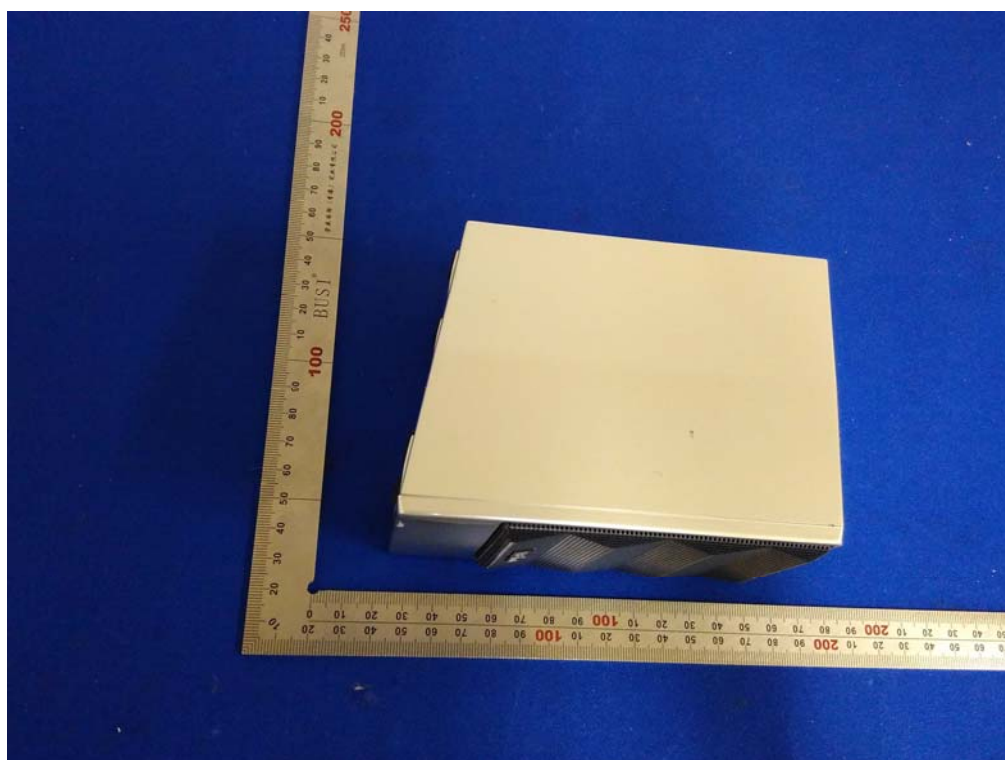
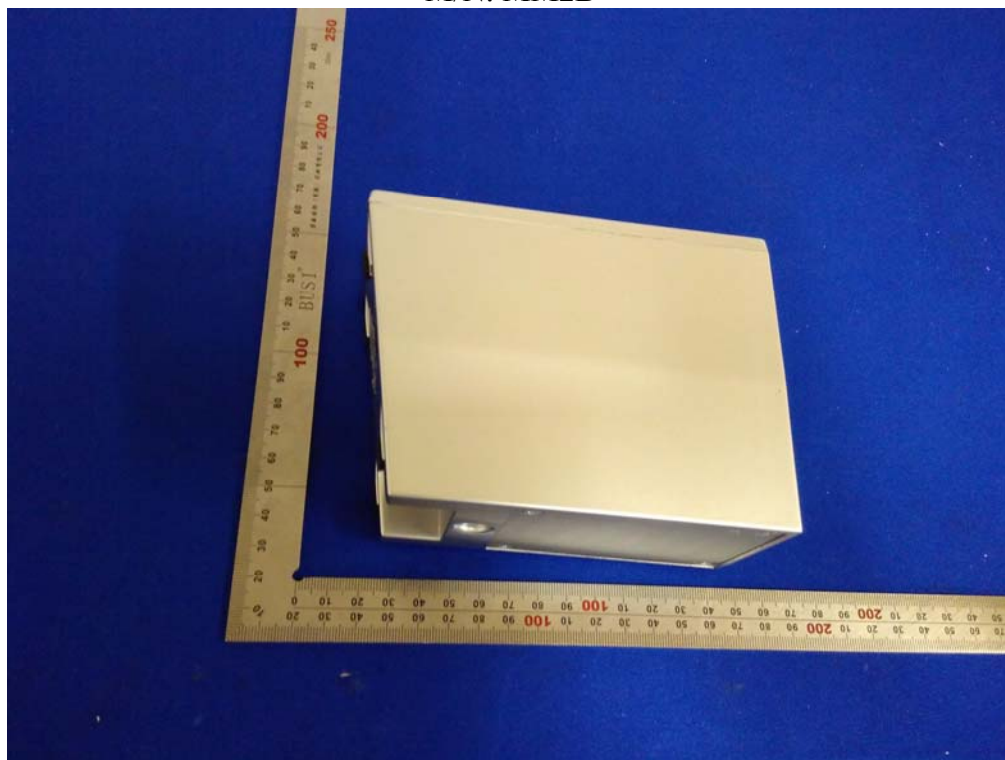


External Photos  
M/N: MM2B

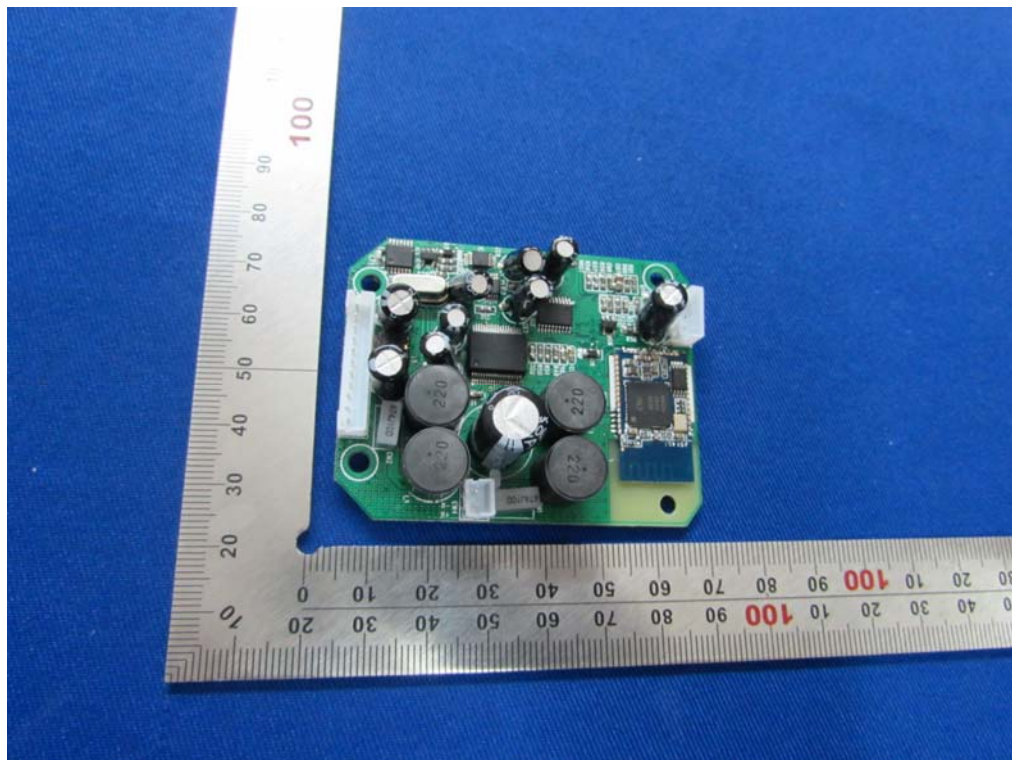
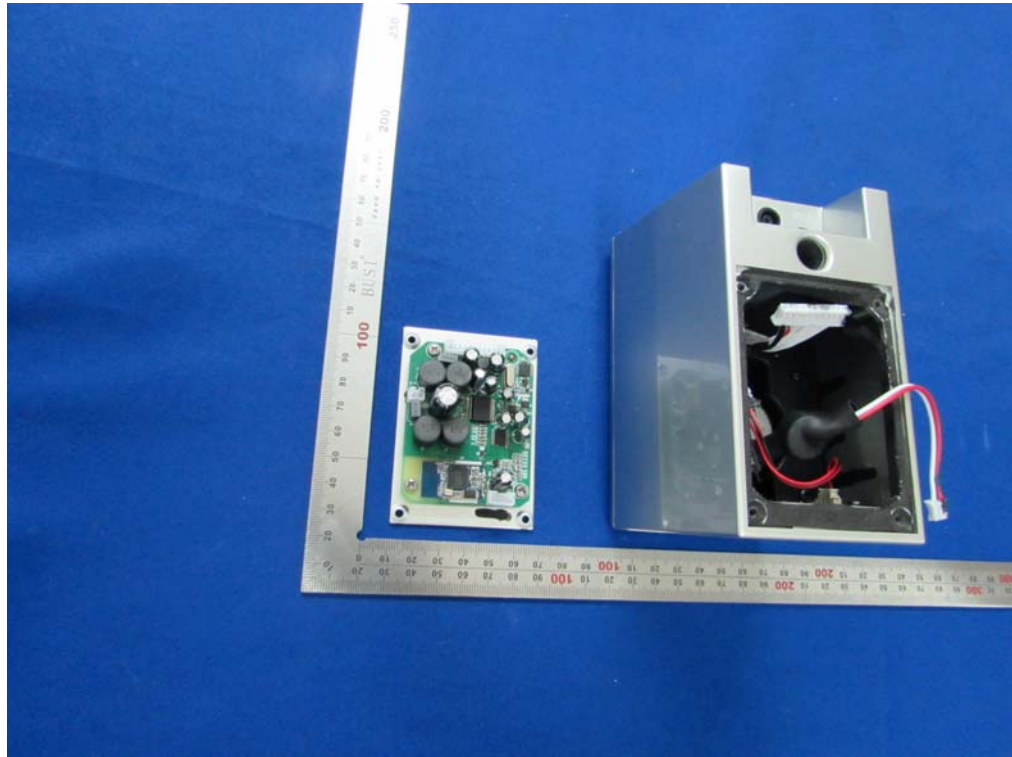


## External Photos

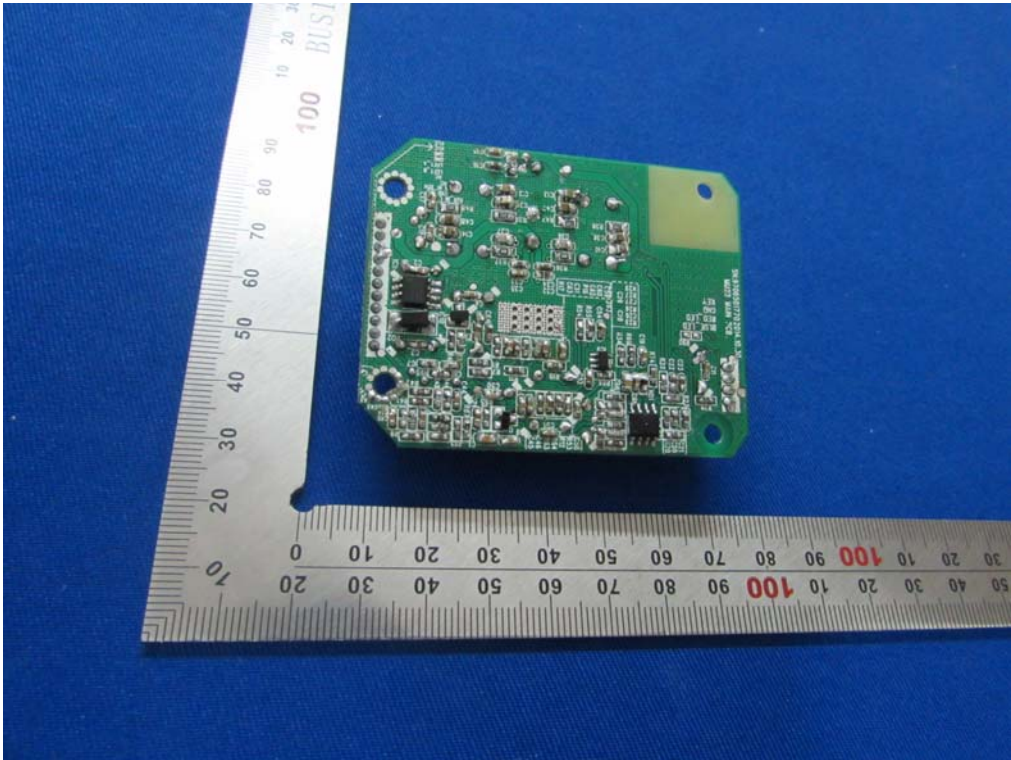
M/N: MM2B



**Internal Photos**  
M/N: MM2B



Internal Photos  
M/N: MM2B



Bluetooth  
Antenna

