



# TEST REPORT

**FCC ID: 2ABHA0005**

**Applicant** : NINGBO CSTAR IMP&EXP CO., LTD  
**Address** : Floor 4, Building E, No. 655-90, Qiming Road, Yinzhou Investment & Innovation Center, Ningbo, China

**Equipment Under Test (EUT):**

**Name** : Bluetooth speaker  
**Model** : SPB818, TEK180BK  
**Trade Name** : Cstar

**Standards** : FCC PART 15, SUBPART C: 2015 (Section 15.247)

**Report No** : T1851556 01

**Date of Test** : October 26-30, 2015

**Date of Issue** : October 30, 2015

**Tset Result** : **PASS**

In the configuration tested, the EUT complied with the standards specified above

Authorized Signature



(Mark Zhu)  
Manager

The manufacture should ensure that all the products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of Shenzhen Alpha Product Testing Co., Ltd. Or test done by Shenzhen Alpha Product Testing Co., Ltd. Approvals in connection with, distribution or use of the product described in this report must be approved by Shenzhen Alpha Product Testing Co., Ltd. Approvals in writing.

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## 1. General Information

### 1.1. Description of Device (EUT)

|                     |   |  |
|---------------------|---|--|
| EUT                 | : | Bluetooth speaker  |
| Model No.           | : | SPB818, TEK180BK   |
| DIFF                | : | All model's the function, software and electric circuit are the same, only different in Model Name.                  |
| Trade mark          | : | Cstar  |
| Power supply        | : | DC 3.7V from internal battery or DC 5V From USB port   |
| Radio Technology    | : | Bluetooth 2.1+EDR  |
| Operation frequency | : | 2402-2480MHz   |
| Modulation          | : | GFSK, $\pi/4$ DQPSK, 8- DPSK   |
| Antenna Type        | : | Integrated Antenna, max gain 0dBi.   |
| Adapter             | : | N/A  |
| Applicant           | : | NINGBO CSTAR IMP&EXP CO., LTD  |
| Address             | : | Floor 4, Building E, No. 655-90, Qiming Road, Yinzhou Investment & Innovation Center, Ningbo, China                  |
| Manufacturer        | : | Shenzhen C-Star Electronic Tech. co., Ltd  |
| Address             | : | 2, 3/F, building B, No. 2 Bada Industrial Park, Yongfu Road, Heping Community, Fuyong Town, Baoan District, Shenzhen |

## 1.2. Accessories of device (EUT)

Accessories : NIL

Type : NIL

## 1.3. Test Lab information

Shenzhen Alpha Product Testing Co., Ltd.

2F, Building B, East Area of Nanchang Second Industrial Zone,  
Gushu 2nd Road, Bao'an District, Shenzhen 518126, P.R. China

FCC Registered No.: 203110

## 2. Summary of test

### 2.1. Summary of test result

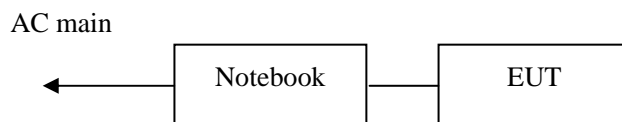
| Description of Test Item                     | Standard  | Results |
|--|---|---------|
| Maximum Peak Output Power                    | FCC Part 15: 15.247(b)(1)<br>ANSI C63.4 :2014                     | PASS    |
| Bandwidth                                    | FCC Part 15: 15.215<br>ANSI C63.4 :2014                           | PASS    |
| Carrier Frequency Separation                 | FCC Part 15: 15.247(a)(1)<br>ANSI C63.4 :2014                     | PASS    |
| Number Of Hopping Channel                    | FCC Part 15: 15.247(a)(1)(iii)<br>ANSI C63.4 :2014                | PASS    |
| Dwell Time                                   | FCC Part 15: 15.247(a)(1)(iii)<br>ANSI C63.4 :2014                | PASS    |
| Radiated Emission                            | FCC Part 15: 15.209<br>FCC Part 15: 15.247(d)<br>ANSI C63.4 :2014 | PASS    |
| Band Edge Compliance                         | FCC Part 15: 15.247(d)<br>ANSI C63.4 :2014                        | PASS    |
| Power Line Conducted Emissions               | FCC Part 15: 15.207<br>ANSI C63.4 :2014                           | PASS    |
| Antenna requirement                          | FCC Part 15: 15.203   | PASS    |
| Note: Test with the test procedure Bluetool. |   |         |

### 2.2. Assistant equipment used for test

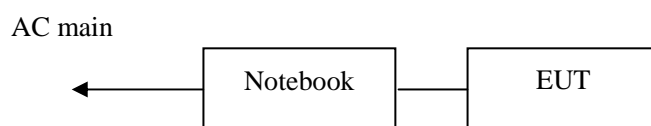
|                          |   |          |
|--------------------------|---|----------|
| Description              | : | Notebook |
| Manufacturer             | : | ACER     |
| Model No.                | : | ZQT      |
| Remark: FCC DOC approved |   |          |

### 2.3. Block Diagram

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



2, For Power Line Conducted Emissions Test: EUT was connected to notebook by 0.6m USB line



### 2.4. Test mode

The test software “Bluetool.exe” was used to control EUT work in Continuous TX mode, and select test channel, wireless mode.

| Tested mode, channel, and data rate information |              |                 |
|---|--------------|-----------------|
| Mode  | Channel      | Frequency (MHz) |
| GFSK  | Low :CH1     | 2402            |
|   | Middle: CH40 | 2441            |
|   | High: CH79   | 2480            |

| Tested mode, channel, and data rate information |              |                 |
|---|--------------|-----------------|
| Mode  | Channel      | Frequency (MHz) |
| $\pi/4$ DQPSK                                   | Low :CH1     | 2402            |
|   | Middle: CH40 | 2441            |
|   | High: CH79   | 2480            |

| Tested mode, channel, and data rate information |              |                 |
|---|--------------|-----------------|
| Mode  | Channel      | Frequency (MHz) |
| 8- DPSK   | Low :CH1     | 2402            |
|   | Middle: CH40 | 2441            |
|   | High: CH79   | 2480            |

## 2.5. Test Conditions

|                   |           |
|-------------------|-----------|
| Temperature range | 21-25°C   |
| Humidity range    | 40-75%    |
| Pressure range    | 86-106kPa |

## 2.6. Measurement Uncertainty (95% confidence levels, k=2)

| Item   | MU                 | Remark      |
|--|--------------------|-------------|
| Uncertainty for Power point Conducted Emissions Test                     | 2.42dB             |             |
| Uncertainty for Radiation Emission test in 3m chamber<br>(below 30MHz)   | 2.13 dB            | Polarize: V |
|  | 2.57dB             | Polarize: H |
| Uncertainty for Radiation Emission test in 3m chamber<br>(30MHz to 1GHz) | 3.54dB             | Polarize: V |
|  | 4.1dB              | Polarize: H |
| Uncertainty for Radiation Emission test in 3m chamber<br>(1GHz to 25GHz) | 2.08dB             | Polarize: H |
|  | 2.56dB             | Polarize: V |
| Uncertainty for radio frequency  | 1×10 <sup>-9</sup> |             |
| Uncertainty for conducted RF Power                                       | 0.65dB             |             |
| Uncertainty for temperature  | 0.2°C              |             |
| Uncertainty for humidity   | 1%                 |             |
| Uncertainty for DC and low frequency voltages                            | 0.06%              |             |



## 2.7. Test Equipment

| Equipment           | Manufacture   | Model No.    | Serial No.        | Cal. Due day | Cal Interval |
|---------------------|---------------|--------------|-------------------|--------------|--------------|
| 3m Semi-Anechoic    | ETS-LINDGREN  | N/A          | SEL0017           | 2016.01.19   | 1 Year       |
| Spectrum analyzer   | Agilent       | E4407B       | MY49510055        | 2016.01.19   | 1 Year       |
| Receiver            | R&S           | ESCI         | 101165            | 2016.01.19   | 1 Year       |
| Bilog Antenna       | SCHWARZBECK   | VULB 9168    | 9168-438          | 2016.01.21   | 2 Year       |
| Horn Antenna        | SCHWARZBECK   | BBHA 9120 D  | BBHA 9120 D(1201) | 2016.01.21   | 2 Year       |
| Horn Antenna        | SCHWARZBECK   | BBHA 9170    | BBHA 9170 D(1432) | 2016.01.21   | 2 Year       |
| Active Loop Antenna | Beijing Daze  | ZN30900A     | SEL0097           | 2016.01.19   | 1 Year       |
| Cable               | Resenberger   | SUCOFLEX 104 | MY6562/4          | 2016.01.19   | 1 Year       |
| Cable               | Resenberger   | SUCOFLEX 104 | 309972/4          | 2016.01.19   | 1 Year       |
| Cable               | Resenberger   | SUCOFLEX 104 | 329112/4          | 2016.01.19   | 1 Year       |
| L.I.S.N.#1          | Schwarzbeck   | NSLK8126     | 8126466           | 2016.01.19   | 1 Year       |
| L.I.S.N.#2          | ROHDE&SCHWARZ | ENV216       | 101043            | 2016.01.19   | 1 Year       |
| Power Meter         | Anritsu       | ML2487A      | 6K00001491        | 2016.01.19   | 1 Year       |
| Power sensor        | Anritsu       | ML2491A      | 32516             | 2016.01.19   | 1 Year       |
| Pre-amplifier       | SCHWARZBECK   | BBV9743      | 9743-019          | 2016.01.19   | 1 Year       |
| Pre-amplifier       | Quietek       | AP-180C      | CHM-0602012       | 2016.01.19   | 1 Year       |

### 3. Maximum Peak Output power

#### 3.1. Limit

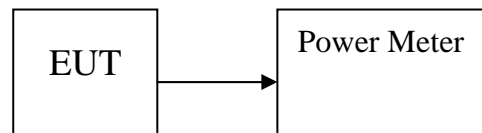
Please refer section 15.247.

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts, the e.i.r.p shall not exceed 4W

#### 3.2. Test Procedure

The transmitter output is connected to the RF Power Meter. The RF Power Meter is set to the peak power detection.

#### 3.3. Test Setup



#### 3.4. Test Result

| EUT: Bluetooth speaker |            | M/N: SPB818           |                      |                 |             |
|------------------------|------------|-----------------------|----------------------|-----------------|-------------|
| Test date: 2015-10-28  |            | Test site: RF site    |                      | Tested by: Eric |             |
| Mode                   | Freq (MHz) | PK Output Power (dBm) | PK Output Power (mW) | Limit (dBm)     | Margin (dB) |
| GFSK                   | 2402       | -1.807                | 0.660                | 21              | 22.807      |
|                        | 2441       | -2.846                | 0.519                | 21              | 23.846      |
|                        | 2480       | -2.322                | 0.586                | 21              | 23.322      |
| $\pi/4$ DQPSK,         | 2402       | -1.246                | 0.751                | 21              | 22.246      |
|                        | 2441       | -2.251                | 0.596                | 21              | 23.251      |
|                        | 2480       | -2.257                | 0.595                | 21              | 23.257      |
| 8- DPSK                | 2402       | -1.012                | 0.792                | 21              | 22.012      |
|                        | 2441       | -2.147                | 0.610                | 21              | 23.147      |
|                        | 2480       | -2.011                | 0.629                | 21              | 23.011      |

Conclusion: PASS

## 4. Bandwidth

### 4.1. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

### 4.2. Test Procedure

The transmitter output was coupled to a spectrum analyzer via a antenna. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB. Peak detector is used, Peak detector is used.

### 4.3. Test Result

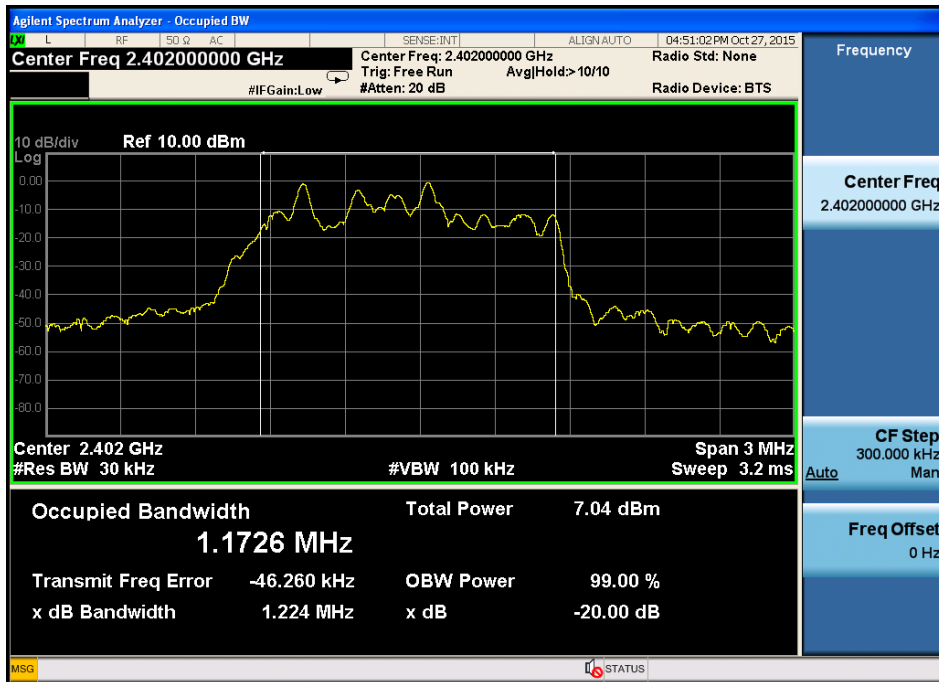
| EUT: Bluetooth speaker |            | M/N: SPB818          |             |                 |
|------------------------|------------|----------------------|-------------|-----------------|
| Test date: 2015-10-28  |            | Test site: RF site   |             | Tested by: Eric |
| Mode                   | Freq (MHz) | 20dB Bandwidth (KHz) | Limit (kHz) | Conclusion      |
| GFSK                   | 2402       | 759.5                | /           | PASS            |
|                        | 2441       | 758.0                | /           | PASS            |
|                        | 2480       | 757.1                | /           | PASS            |
| $\pi/4$ DQPSK          | 2402       | 1224                 | /           | PASS            |
|                        | 2441       | 1208                 | /           | PASS            |
|                        | 2480       | 1221                 | /           | PASS            |
| 8- DPSK                | 2402       | 1207                 | /           | PASS            |
|                        | 2441       | 1206                 | /           | PASS            |
|                        | 2480       | 1206                 | /           | PASS            |

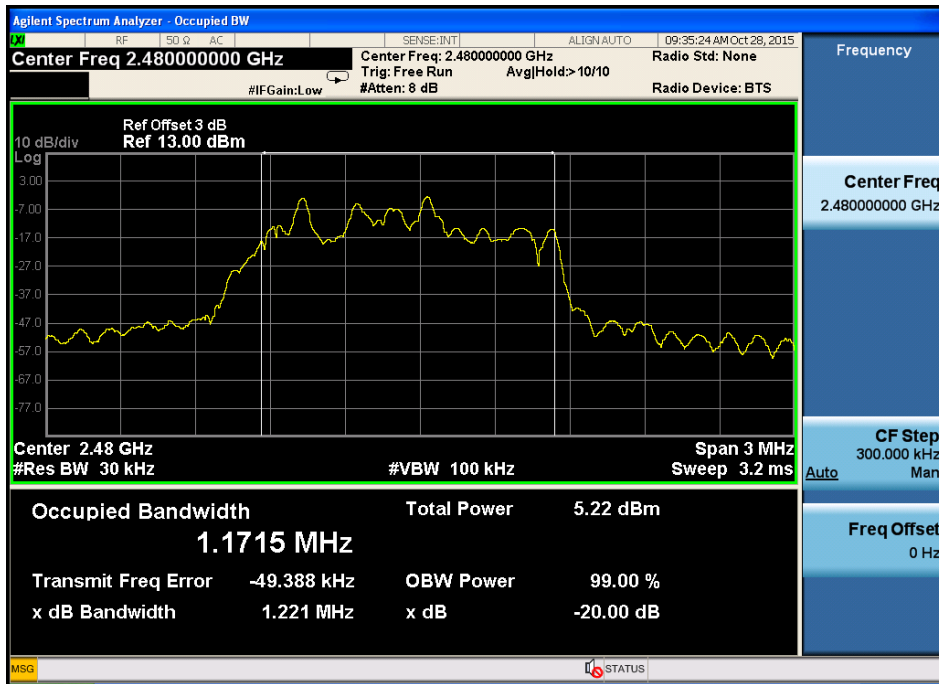
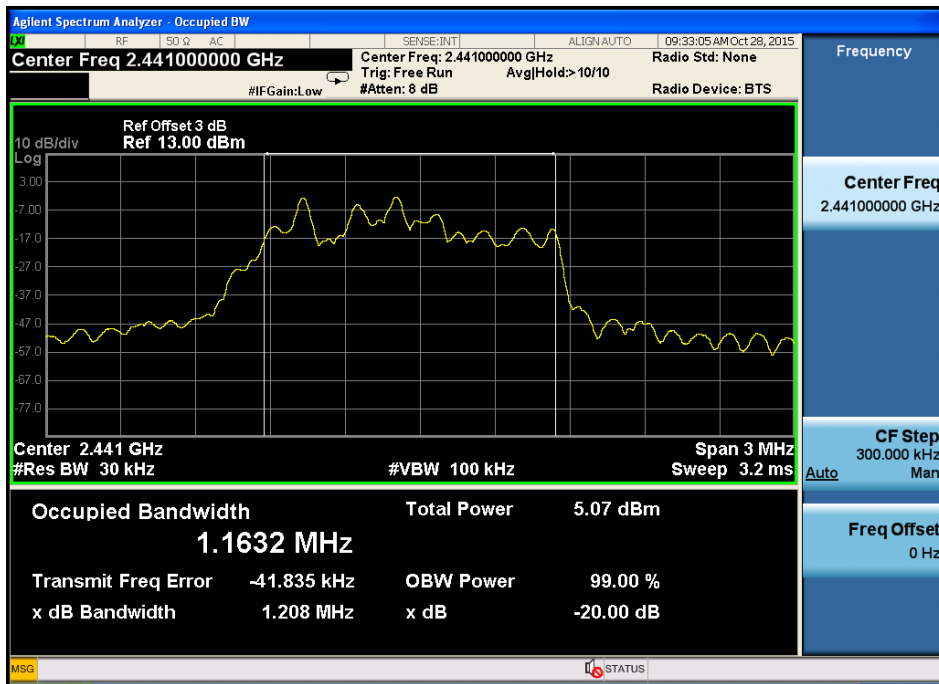
Original Test data For 20dB bandwidth  
GFSK:



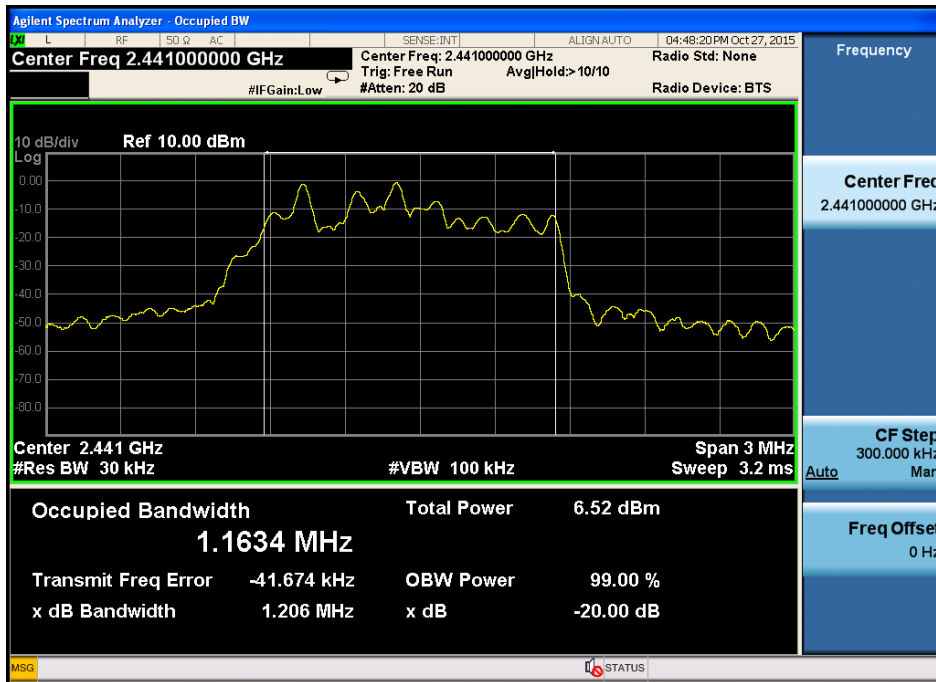
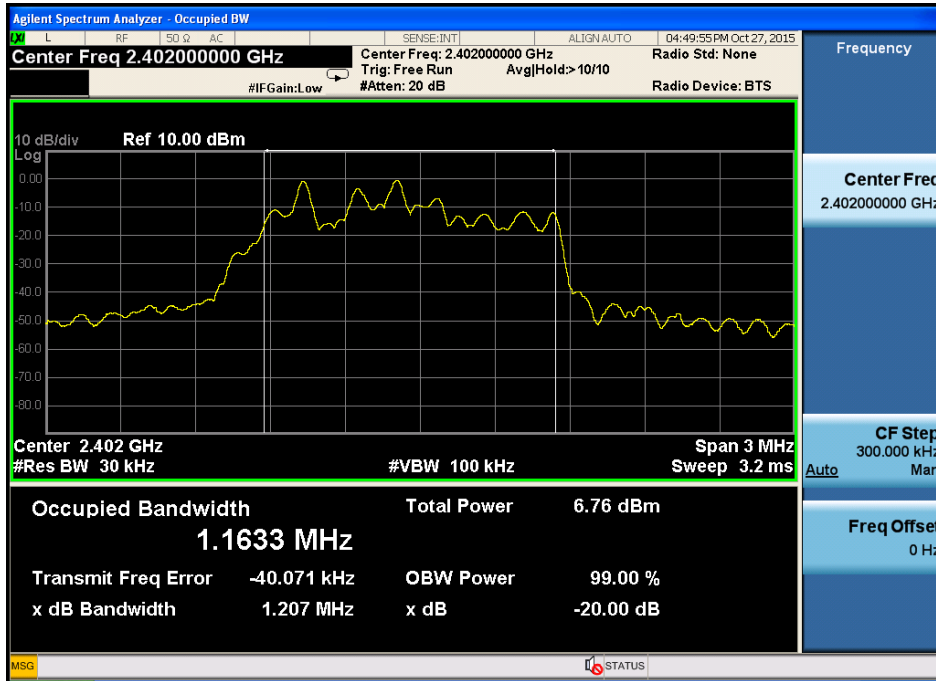


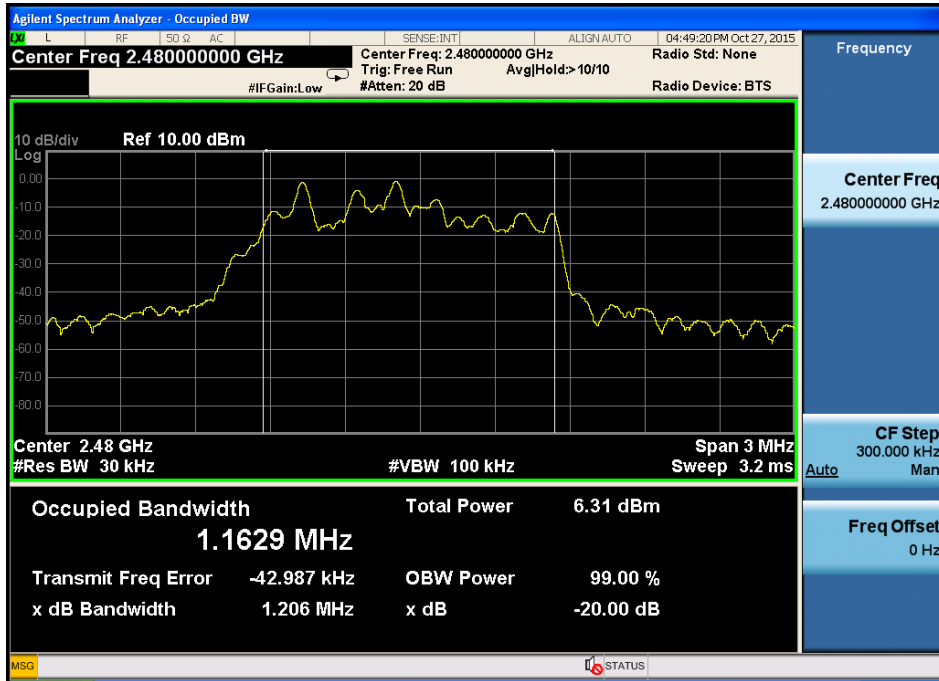
$\pi/4$  DQPSK:





8- DPSK:







## 5. Carrier Frequency Separation

### 5.1. Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW

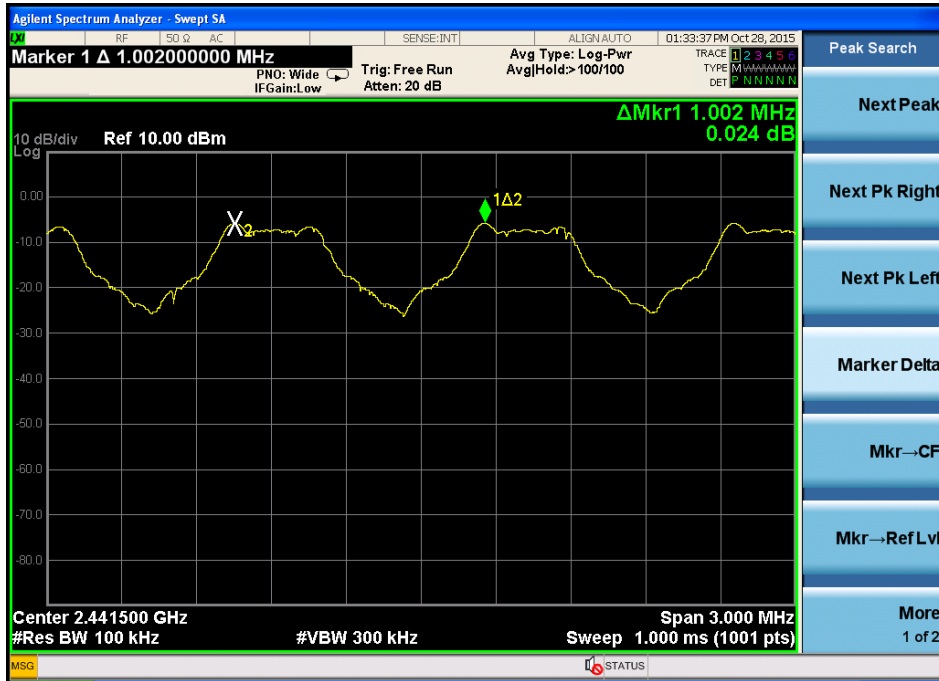
### 5.2. Test Procedure

The transmitter output was coupled to a spectrum analyzer via a antenna. The carrier frequency was measured by spectrum analyzer with 100kHz RBW and 300kHz VBW.

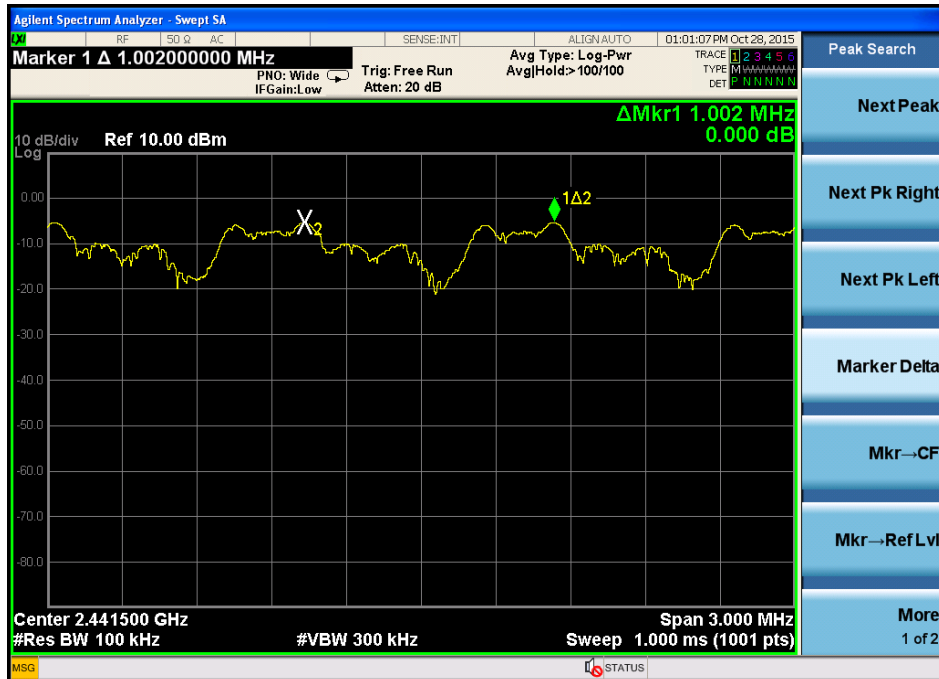
### 5.3. Test Result

| EUT: Bluetooth speaker M/N: SPB818 |                          |                      |                                      |                 |
|------------------------------------|--------------------------|----------------------|--------------------------------------|-----------------|
| Test date: 2015-10-28              |                          | Test site: RF site   |                                      | Tested by: Eric |
| Mode/Channel                       | Channel separation (MHz) | 20dB Bandwidth (KHz) | Limit (KHz)<br>2/3 20dB<br>bandwidth | Conclusion      |
| GFSK                               | 1.002                    | 759.5                | 506.333                              | PASS            |
| $\pi/4$ DQPSK                      | 1.002                    | 1224                 | 816                                  | PASS            |
| 8- DPSK                            | 1.005                    | 1207                 | 804.667                              | PASS            |

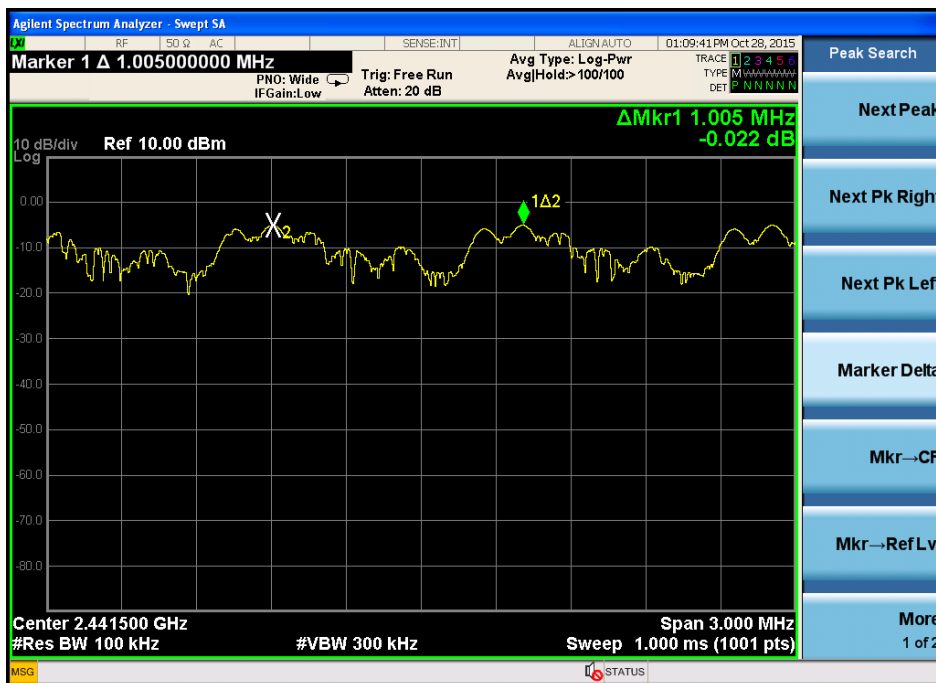
Original test data for channel separation  
GFSK



$\pi/4$  DQPSK



8- DPSK:



## 6. Number Of Hopping Channel

### 6.1. Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

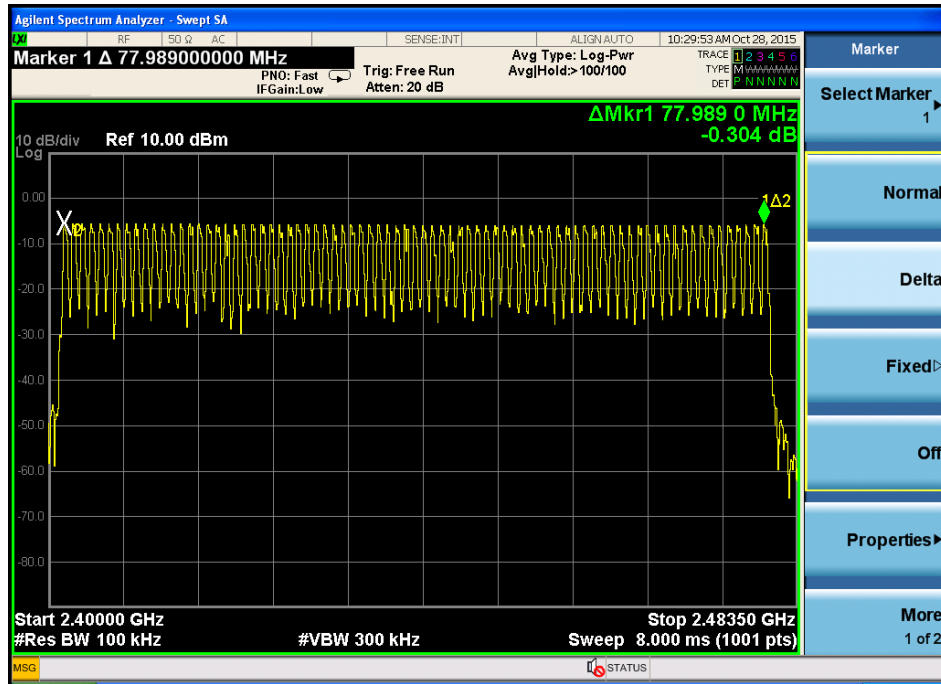
### 6.2. Test Procedure

The transmitter output was coupled to a spectrum analyzer via a antenna. The number of hopping channel was measured by spectrum analyzer with 300kHz RBW and 1MHz VBW.

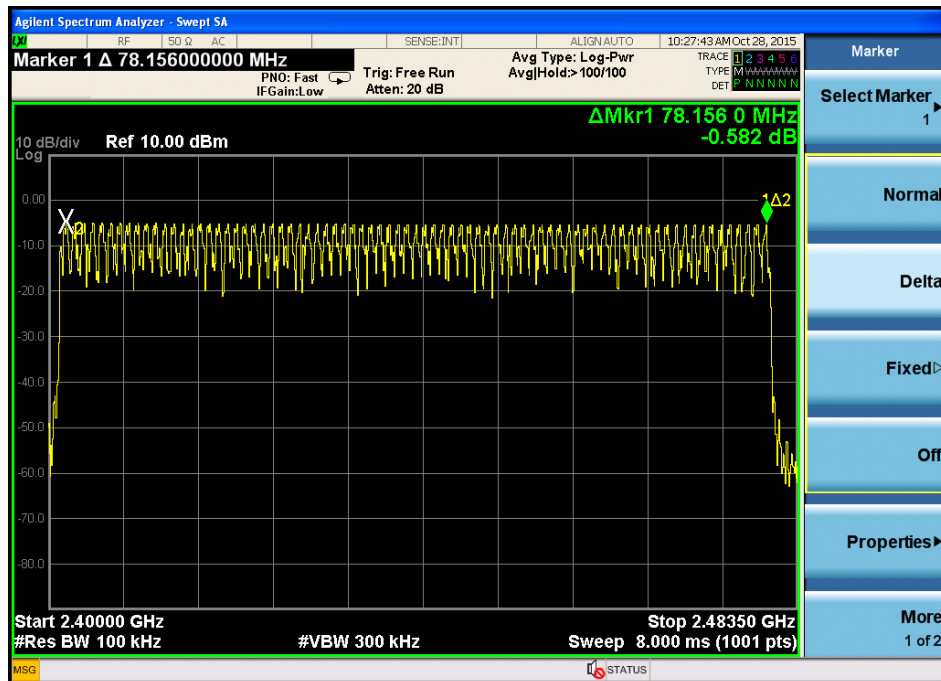
### 6.3. Test Result

| EUT: Bluetooth speaker M/N: SPB818 |                           |                    |                 |
|------------------------------------|---------------------------|--------------------|-----------------|
| Test date: 2015-10-28              |                           | Test site: RF site | Tested by: Eric |
| Mode                               | Number of hopping channel | Limit              | Conclusion      |
| GFSK                               | 79                        | >15                | PASS            |
| $\pi/4$ DQPSK                      | 79                        | >15                | PASS            |
| 8- DPSK                            | 79                        | >15                | PASS            |

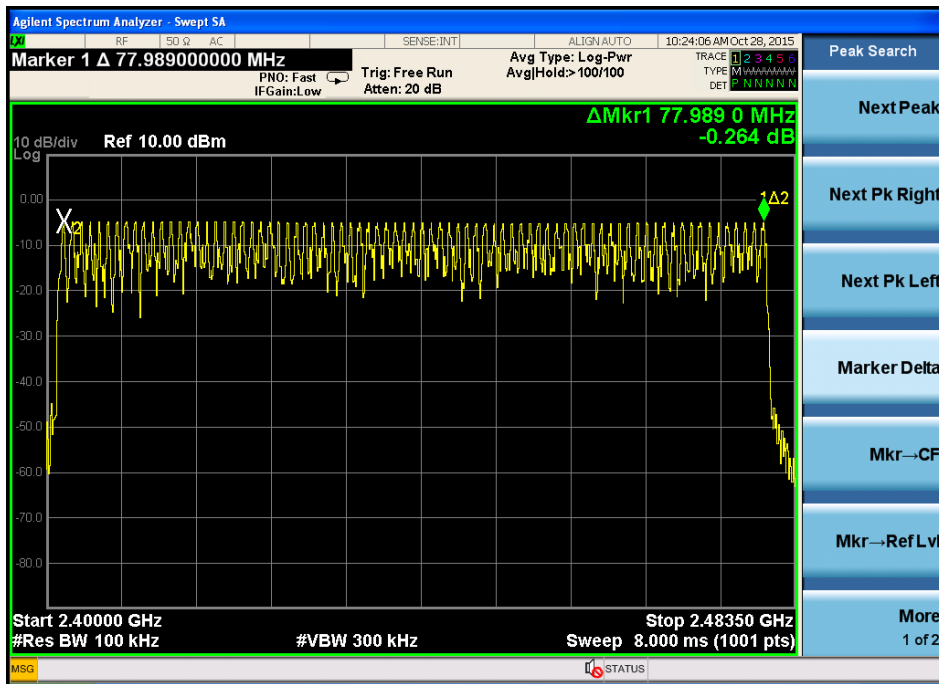
Original test data for hopping channel number  
GFSK



$\pi/4$  DQPSK



8- DPSK:



## 7. Dwell Time

### 7.1. Test limit

Please refer section 15.247

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz. The average time of occupancy on any frequency shall not greater than 0.4 s within period of 0.4 seconds multiplied by the number of hopping channel employed.

### 7.2. Test Procedure

7.2.1. Place the EUT on the table and set it in transmitting mode.

7.2.2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

7.2.3. Set center frequency of spectrum analyzer = operating frequency.

7.2.4. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0Hz, Sweep = auto.

7.2.5. Repeat above procedures until all frequency measured were complete.

### 7.3. Test Results

PASS.

Detailed information please see the following page.

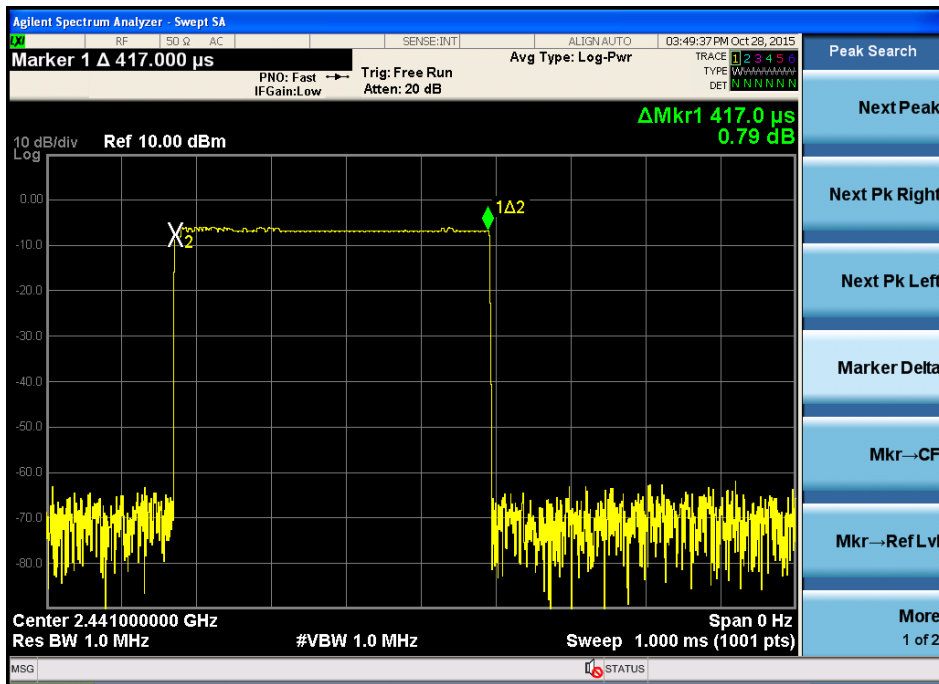
| EUT: Bluetooth speaker M/N: SPB818 |             |                    |                     |                 |           |            |
|------------------------------------|-------------|--------------------|---------------------|-----------------|-----------|------------|
| Test date: 2015-10-28              |             | Test site: RF site |                     | Tested by: Eric |           |            |
| Mode                               | Data Packet | Frequency (MHz)    | Pulse Duration (ms) | Dwell Time (s)  | Limit (s) | Conclusion |
| GFSK                               | DH1         | 2441               | 0.417               | 0.267           | <0.4      | PASS       |
|                                    | DH3         | 2441               | 1.670               | 0.356           | <0.4      | PASS       |
|                                    | DH5         | 2441               | 2.916               | 0.373           | <0.4      | PASS       |
| $\pi/4$ DQPSK                      | DH1         | 2441               | 0.418               | 0.268           | <0.4      | PASS       |
|                                    | DH3         | 2441               | 1.664               | 0.355           | <0.4      | PASS       |
|                                    | DH5         | 2441               | 2.916               | 0.373           | <0.4      | PASS       |
| 8- DPSK                            | DH1         | 2441               | 0.417               | 0.267           | <0.4      | PASS       |
|                                    | DH3         | 2441               | 1.672               | 0.357           | <0.4      | PASS       |
|                                    | DH5         | 2441               | 2.916               | 0.373           | <0.4      | PASS       |

Note: 1 A period time =  $0.4 \text{ (s)} * 79 = 31.6 \text{ (s)}$   
2 DH1 time slot = Pulse Duration \*  $(1600/(1*79)) * \text{A period time}$   
DH3 time slot = Pulse Duration \*  $(1600/(3*79)) * \text{A period time}$   
DH5 time slot = Pulse Duration \*  $(1600/(5*79)) * \text{A period time}$

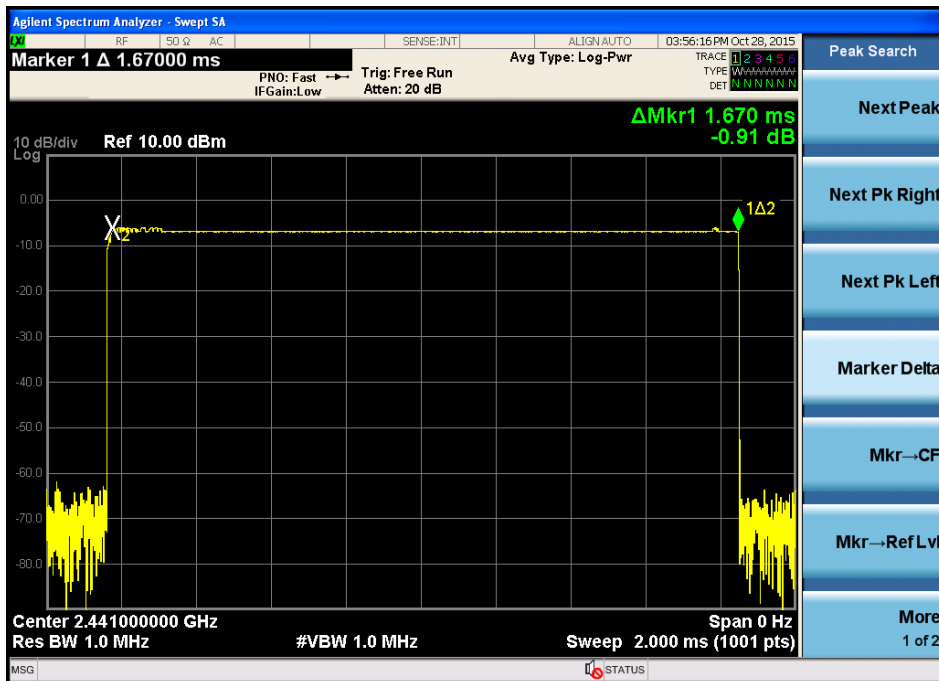


GFSK

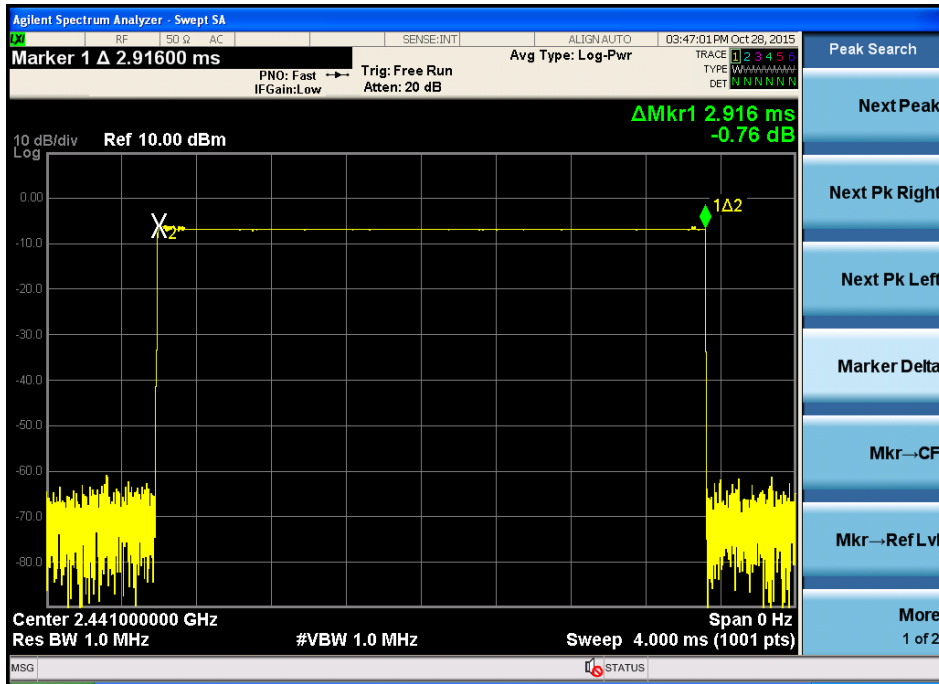
DH1:



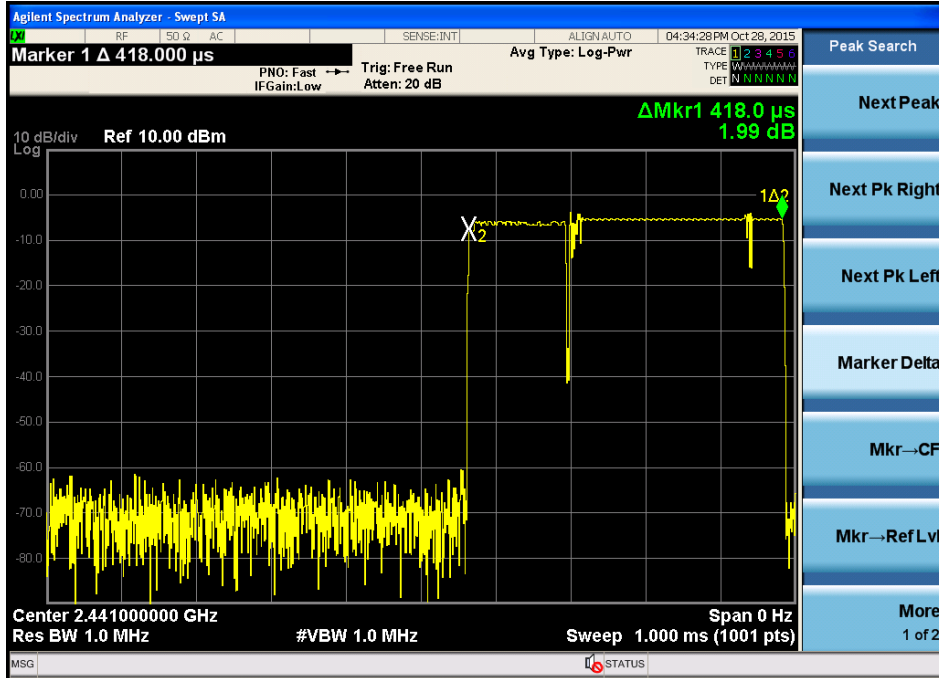
DH3:



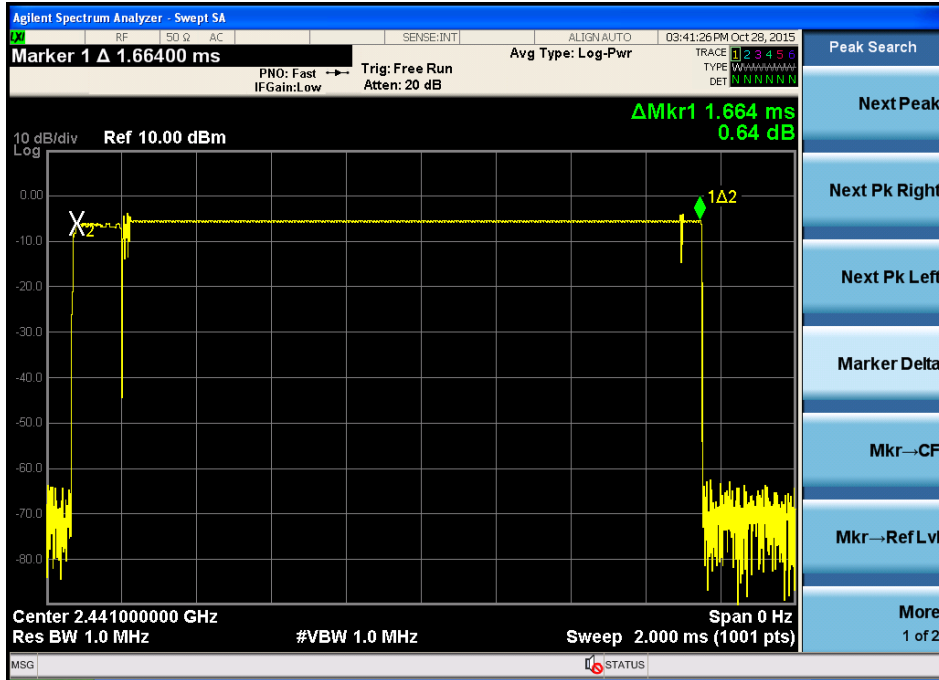
DH5



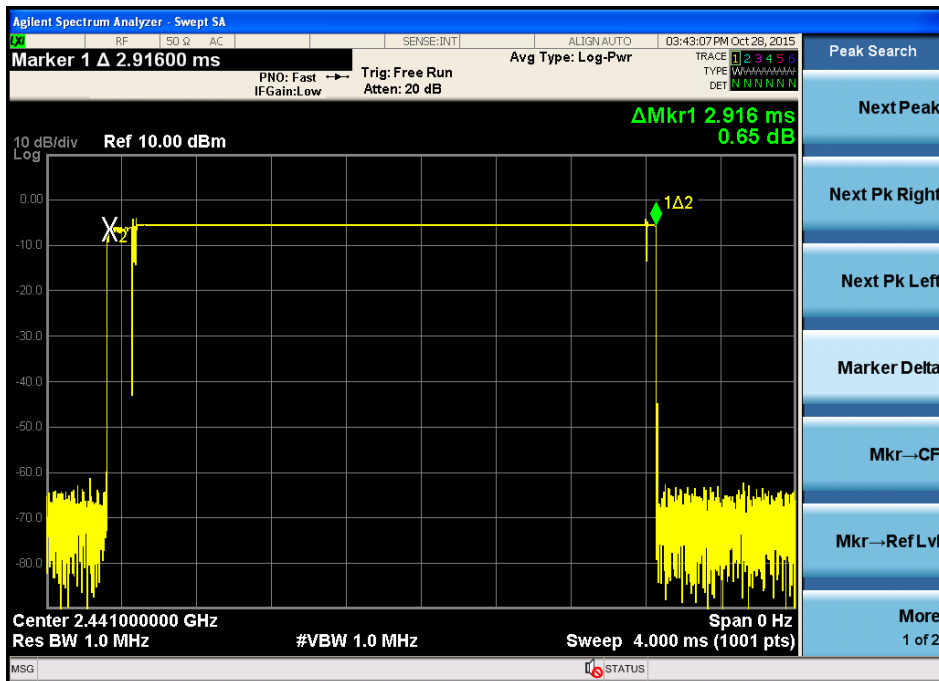
$\pi/4$  DQPSK  
DH1



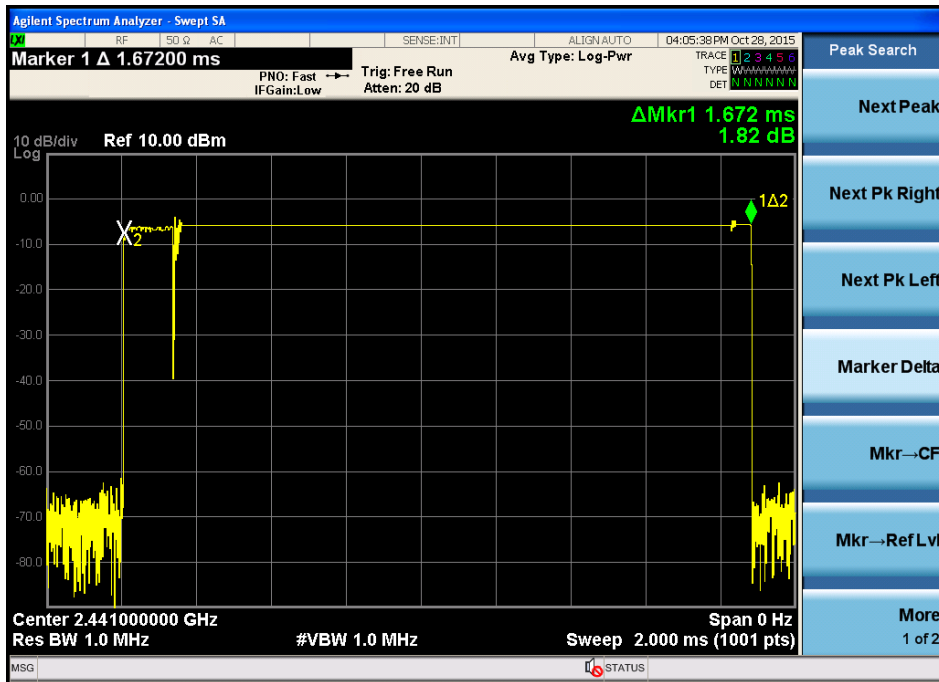
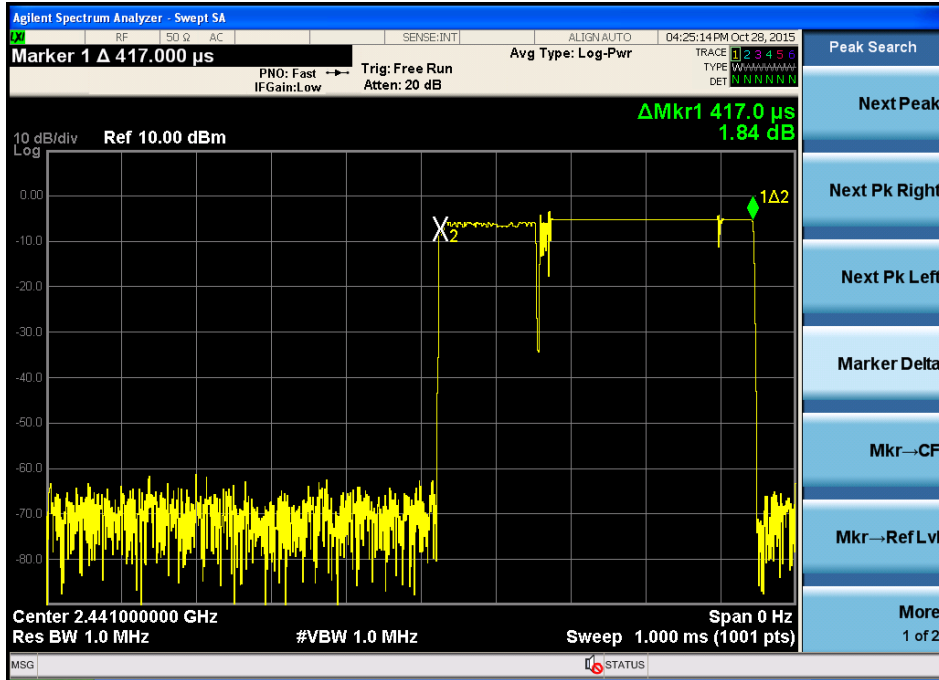
DH3

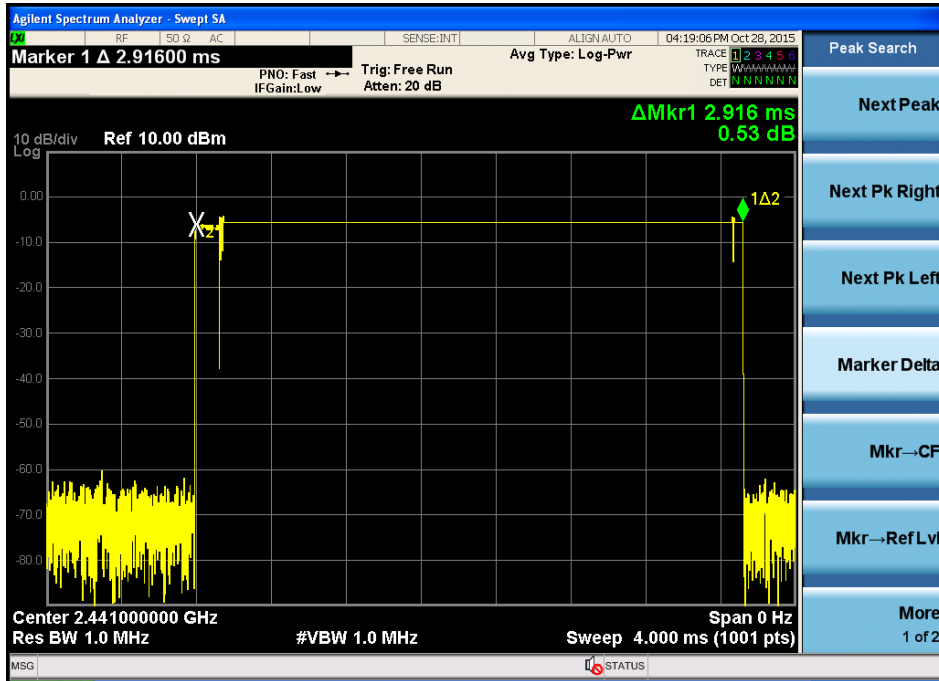


DH5



8- DPSK:





## 8. Radiated emissions

### 8.1. Limit

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.

#### 15.205 Restricted frequency band

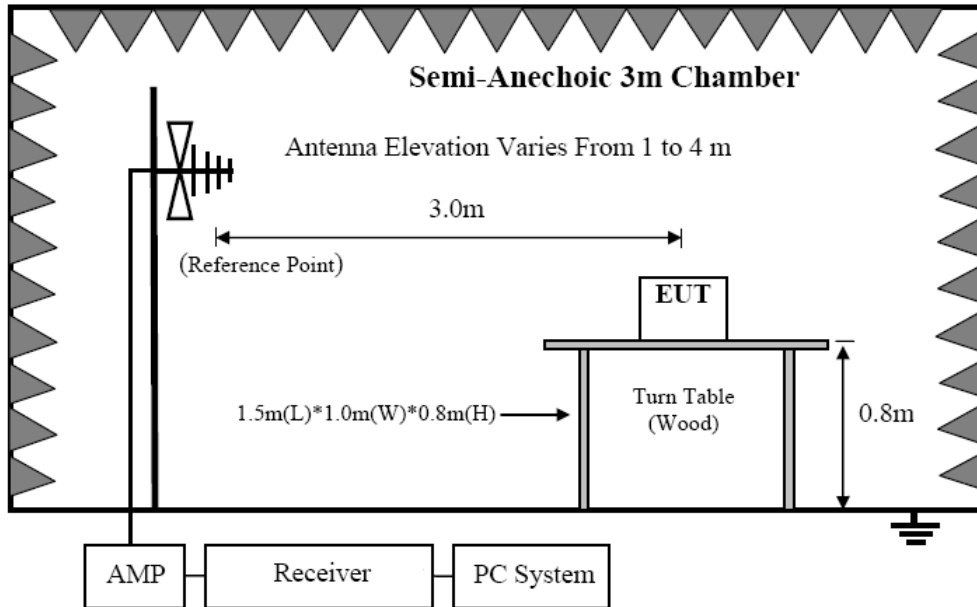
| MHz                        | MHz                   | MHz             | GHz              |
|----------------------------|-----------------------|-----------------|------------------|
| 0.090 - 0.110              | 16.42 - 16.423        | 399.9 - 410     | 4.5 - 5.15       |
| <sup>1</sup> 0.495 - 0.505 | 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> ) |

#### 15.209 Limit

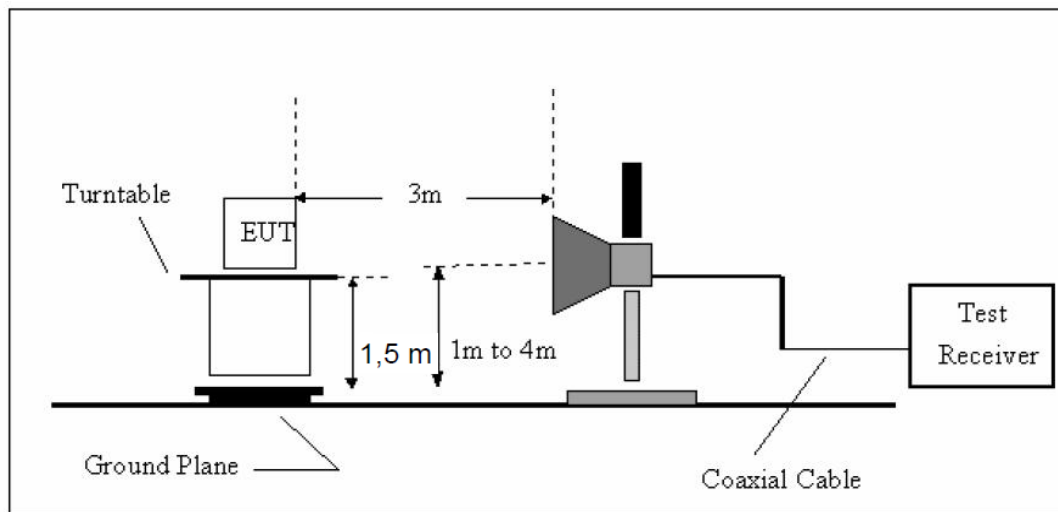
| FREQUENCY<br>MHz | DISTANCE<br>Meters | FIELD STRENGTHS LIMIT   |                                   |
|------------------|--------------------|---|-----------------------------------|
|                  |                    | $\mu\text{V}/\text{m}$  | $\text{dB}(\mu\text{V})/\text{m}$ |
| 0.009-0.490      | 300                | 2400/F(KHz)   | /                                 |
| 0.490-1.705      | 30                 | 24000/F(KHz)  | /                                 |
| 1.705-30         | 30                 | 30  | 29.5                              |
| 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 dB( $\mu\text{V}$ )/m (Peak)<br>54.0 dB( $\mu\text{V}$ )/m (Average) |                                   |

## 8.2. Block Diagram of Test setup

### 8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



### 8.2.2 In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

### 8.3. Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
- (2) Setup EUT and simulator as shown in section 1.4 and 6.1
- (3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
  - (a) Change work frequency or channel of device if practicable.
  - (b) Change modulation type of device if practicable.
  - (c) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
- (4) Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated
- (5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4 :2014on Radiated Emission test.
- (6) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure.

### 8.4. Test Result

We have scanned the 10th harmonic from 9KHz to the EUT.  
Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

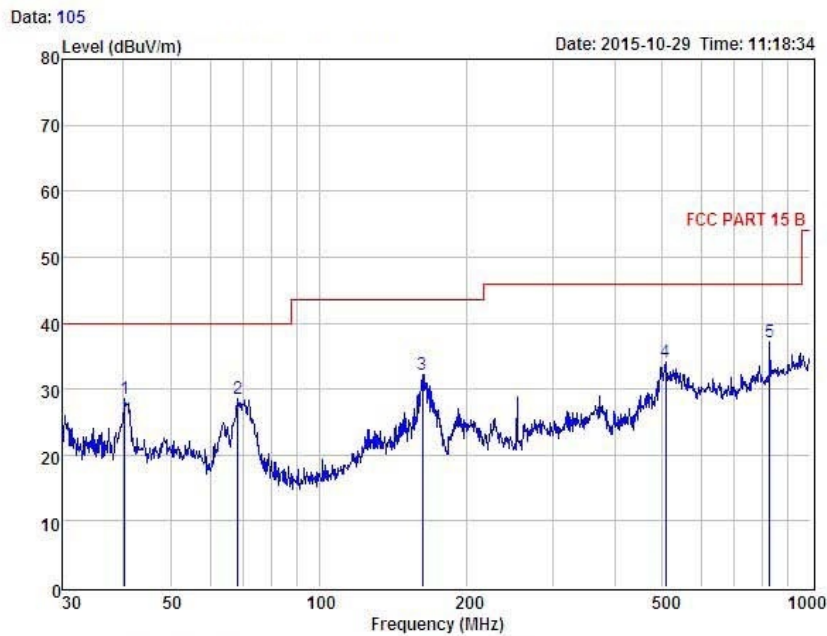
Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



From 30MHz to 1000MHz: Conclusion: PASS



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```

Condition      : FCC PART 15 B      3m      POL: VERTICAL
EUT           : Bluetooth speaker
Model No      : SPB818
Test Mode     : TX mode
Power         : DC 5V
Test Engineer :
Remark        :
Temp          : 24.2°C
Hum           : 54%
    
```

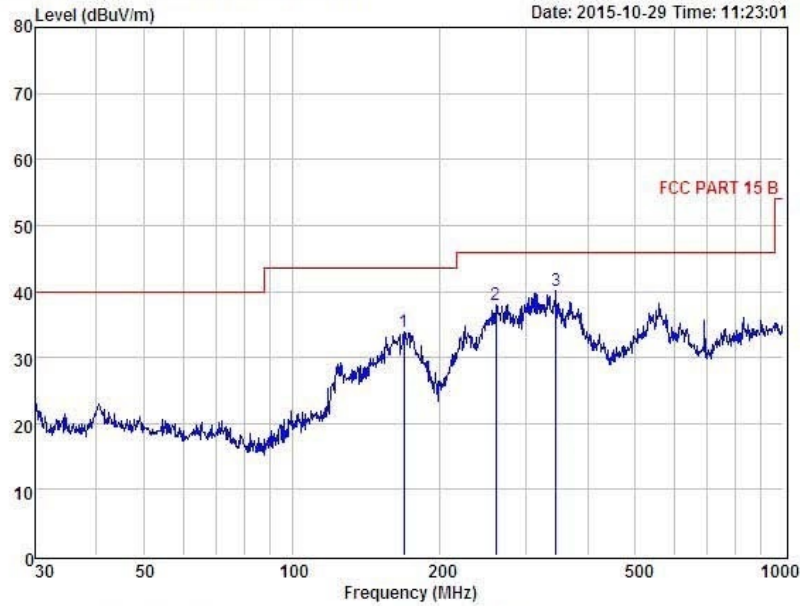
| Item | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Preamp<br>Factor<br>dB | Cable<br>Loss<br>dB | Level<br>dBuV | Limit<br>dBuV | Margin<br>dBuV | Remark |
|------|-------------|-----------------------|-------------------------|------------------------|---------------------|---------------|---------------|----------------|--------|
| 1    | 40.28       | 45.19                 | 14.07                   | 30.85                  | 0.18                | 28.59         | 40.00         | -11.41         | Peak   |
| 2    | 68.39       | 47.19                 | 11.21                   | 30.26                  | 0.30                | 28.44         | 40.00         | -11.56         | Peak   |
| 3    | 162.61      | 46.93                 | 13.95                   | 29.15                  | 0.45                | 32.18         | 43.50         | -11.32         | Peak   |
| 4    | 508.26      | 43.84                 | 16.68                   | 27.20                  | 0.80                | 34.12         | 46.00         | -11.88         | Peak   |
| 5    | 827.49      | 40.34                 | 20.88                   | 25.03                  | 0.85                | 37.04         | 46.00         | -8.96          | Peak   |

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss



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Data: 106



Condition : FCC PART 15 B 3m POL: HORIZONTAL  
 EUT : Bluetooth speaker  
 Model No : SP8818  
 Test Mode : TX mode  
 Power : DC 5V  
 Test Engineer :  
 Remark :  
 Temp : 24.2°C  
 Hum : 54%

| Item | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Preamp<br>Factor<br>dB | Cable<br>Loss<br>dB | Level<br>dBuV | Limit<br>dBuV | Margin<br>dBuV | Remark |
|------|-------------|-----------------------|-------------------------|------------------------|---------------------|---------------|---------------|----------------|--------|
| 1    | 169.01      | 49.13                 | 13.37                   | 29.12                  | 0.50                | 33.88         | 43.50         | -9.62          | Peak   |
| 2    | 260.14      | 53.87                 | 11.77                   | 28.18                  | 0.57                | 38.03         | 46.00         | -7.97          | Peak   |
| 3    | 344.39      | 53.38                 | 13.74                   | 27.81                  | 0.82                | 40.13         | 46.00         | -5.87          | Peak   |

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

Remark: All modes have been tested, and only worst data of GFSK mode, Channel 2402MHz was listed in this report.

| 1GHz—25GHz Radiated emission Test result  |            |                     |                       |                |                 |                 |                |             |        |
|---|------------|---------------------|-----------------------|----------------|-----------------|-----------------|----------------|-------------|--------|
| EUT: Bluetooth speaker  |            |                     |                       |                | M/N: SPB818     |                 |                |             |        |
| Power: DC 3.7V From PC AC 120V/60Hz   |            |                     |                       |                |                 |                 |                |             |        |
| Test date: 2015-10-29 Test site: 3m Chamber Tested by: Eric                                       |            |                     |                       |                |                 |                 |                |             |        |
| Test mode: GFSK Tx CH1 2402MHz  |            |                     |                       |                |                 |                 |                |             |        |
| Antenna polarity: Vertical  |            |                     |                       |                |                 |                 |                |             |        |
| No  | Freq (MHz) | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
| 1   | 4804       | 42.15               | 33.98                 | 10.22          | 34.25           | 52.1            | 74             | 21.9        | PK     |
| 2   | 4804       | 32.64               | 33.98                 | 10.22          | 34.25           | 42.59           | 54             | 11.41       | AV     |
| 3   | 7206       | /                   |                       |                |                 |                 |                |             |        |
| 4   | 9608       | /                   |                       |                |                 |                 |                |             |        |
| 5   | 12010      | /                   |                       |                |                 |                 |                |             |        |
| Antenna Polarity: Horizontal  |            |                     |                       |                |                 |                 |                |             |        |
| 1   | 4804       | 40.72               | 33.98                 | 10.22          | 34.25           | 50.67           | 74             | 23.33       | PK     |
| 2   | 4804       | 33.19               | 33.98                 | 10.22          | 34.25           | 43.14           | 54             | 10.86       | AV     |
| 3   | 7206       | /                   |                       |                |                 |                 |                |             |        |
| 4   | 9608       | /                   |                       |                |                 |                 |                |             |        |
| 5   | 12010      | /                   |                       |                |                 |                 |                |             |        |
| Note:   |            |                     |                       |                |                 |                 |                |             |        |
| 1, Measuring frequency from 1GHz to 25GHz   |            |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |            |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |            |                     |                       |                |                 |                 |                |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |            |                     |                       |                |                 |                 |                |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |            |                     |                       |                |                 |                 |                |             |        |

| 1GHz—25GHz Radiated emission Test result  |            |                     |                       |                |                 |                 |                |             |        |
|---|------------|---------------------|-----------------------|----------------|-----------------|-----------------|----------------|-------------|--------|
| EUT: Bluetooth speaker  |            |                     |                       |                | M/N: SPB818     |                 |                |             |        |
| Power: DC 3.7V From PC AC 120V/60Hz   |            |                     |                       |                |                 |                 |                |             |        |
| Test date: 2015-10-29 Test site: 3m Chamber Tested by: Eric                                       |            |                     |                       |                |                 |                 |                |             |        |
| Test mode: GFSK Tx CH40 2441MHz   |            |                     |                       |                |                 |                 |                |             |        |
| Antenna polarity: Vertical  |            |                     |                       |                |                 |                 |                |             |        |
| No  | Freq (MHz) | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
| 1   | 4882       | 41.53               | 33.93                 | 10.2           | 34.29           | 51.37           | 74             | 22.63       | PK     |
| 2   | 4882       | 33.29               | 33.93                 | 10.2           | 34.29           | 43.13           | 54             | 10.87       | AV     |
| 3   | 7323       | /                   |                       |                |                 |                 |                |             |        |
| 4   | 9764       | /                   |                       |                |                 |                 |                |             |        |
| 5   | 12205      | /                   |                       |                |                 |                 |                |             |        |
| Antenna Polarity: Horizontal  |            |                     |                       |                |                 |                 |                |             |        |
| 1   | 4882       | 43.48               | 33.93                 | 10.2           | 34.29           | 53.32           | 74             | 20.68       | PK     |
| 2   | 4882       | 31.64               | 33.93                 | 10.2           | 34.29           | 41.48           | 54             | 12.52       | AV     |
| 3   | 7323       | /                   |                       |                |                 |                 |                |             |        |
| 4   | 9764       | /                   |                       |                |                 |                 |                |             |        |
| 5   | 12205      | /                   |                       |                |                 |                 |                |             |        |
| Note:   |            |                     |                       |                |                 |                 |                |             |        |
| 1, Measuring frequency from 1GHz to 25GHz   |            |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |            |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |            |                     |                       |                |                 |                 |                |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |            |                     |                       |                |                 |                 |                |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |            |                     |                       |                |                 |                 |                |             |        |

| 1GHz—25GHz Radiated emission Test result  |            |                     |                       |                |                 |                 |                |             |        |
|---|------------|---------------------|-----------------------|----------------|-----------------|-----------------|----------------|-------------|--------|
| EUT: Bluetooth speaker  |            |                     |                       |                | M/N: SPB818     |                 |                |             |        |
| Power: DC 3.7V From PC AC 120V/60Hz   |            |                     |                       |                |                 |                 |                |             |        |
| Test date: 2015-10-29 Test site: 3m Chamber Tested by: Eric                                       |            |                     |                       |                |                 |                 |                |             |        |
| Test mode: GFSK Tx CH79 2480MHz   |            |                     |                       |                |                 |                 |                |             |        |
| Antenna polarity: Vertical  |            |                     |                       |                |                 |                 |                |             |        |
| No  | Freq (MHz) | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
| 1   | 4960       | 41.03               | 33.95                 | 10.18          | 34.26           | 50.9            | 74             | 23.1        | PK     |
| 2   | 4960       | 32.54               | 33.95                 | 10.18          | 34.26           | 42.41           | 54             | 11.59       | AV     |
| 3   | 7440       | /                   |                       |                |                 |                 |                |             |        |
| 4   | 9920       | /                   |                       |                |                 |                 |                |             |        |
| 5   | 12400      | /                   |                       |                |                 |                 |                |             |        |
| Antenna Polarity: Horizontal  |            |                     |                       |                |                 |                 |                |             |        |
| 1   | 4960       | 42.84               | 33.95                 | 10.18          | 34.26           | 52.71           | 74             | 21.29       | PK     |
| 2   | 4960       | 32.63               | 33.95                 | 10.18          | 34.26           | 42.5            | 54             | 11.5        | AV     |
| 3   | 7440       | /                   |                       |                |                 |                 |                |             |        |
| 4   | 9920       | /                   |                       |                |                 |                 |                |             |        |
| 5   | 12400      | /                   |                       |                |                 |                 |                |             |        |
| Note:   |            |                     |                       |                |                 |                 |                |             |        |
| 1, Measuring frequency from 1GHz to 25GHz   |            |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |            |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |            |                     |                       |                |                 |                 |                |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |            |                     |                       |                |                 |                 |                |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |            |                     |                       |                |                 |                 |                |             |        |

| 1GHz—25GHz Radiated emission Test result  |            |                     |                       |                |                 |                 |                |             |        |
|---|------------|---------------------|-----------------------|----------------|-----------------|-----------------|----------------|-------------|--------|
| EUT: Bluetooth speaker  |            |                     |                       |                | M/N: SPB818     |                 |                |             |        |
| Power: DC 3.7V From PC AC 120V/60Hz   |            |                     |                       |                |                 |                 |                |             |        |
| Test date: 2015-10-29 Test site: 3m Chamber Tested by: Eric                                       |            |                     |                       |                |                 |                 |                |             |        |
| Test mode: $\pi/4$ DQPSK Tx CH1 2402MHz   |            |                     |                       |                |                 |                 |                |             |        |
| Antenna polarity: Vertical  |            |                     |                       |                |                 |                 |                |             |        |
| No  | Freq (MHz) | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
| 1   | 4804       | 41.45               | 33.98                 | 10.22          | 34.25           | 51.4            | 74             | 22.6        | PK     |
| 2   | 4804       | 32.84               | 33.98                 | 10.22          | 34.25           | 42.79           | 54             | 11.21       | AV     |
| 3   | 7206       | /                   |                       |                |                 |                 |                |             |        |
| 4   | 9608       | /                   |                       |                |                 |                 |                |             |        |
| 5   | 12010      | /                   |                       |                |                 |                 |                |             |        |
| Antenna Polarity: Horizontal  |            |                     |                       |                |                 |                 |                |             |        |
| 1   | 4804       | 40.88               | 33.98                 | 10.22          | 34.25           | 50.83           | 74             | 23.17       | PK     |
| 2   | 4804       | 32.47               | 33.98                 | 10.22          | 34.25           | 42.42           | 54             | 11.58       | AV     |
| 3   | 7206       | /                   |                       |                |                 |                 |                |             |        |
| 4   | 9608       | /                   |                       |                |                 |                 |                |             |        |
| 5   | 12010      | /                   |                       |                |                 |                 |                |             |        |
| Note:   |            |                     |                       |                |                 |                 |                |             |        |
| 1, Measuring frequency from 1GHz to 25GHz   |            |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |            |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |            |                     |                       |                |                 |                 |                |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |            |                     |                       |                |                 |                 |                |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |            |                     |                       |                |                 |                 |                |             |        |

| 1GHz—25GHz Radiated emission Test result  |            |                     |                       |                |                 |                 |                |             |        |
|---|------------|---------------------|-----------------------|----------------|-----------------|-----------------|----------------|-------------|--------|
| EUT: Bluetooth speaker  |            |                     |                       |                | M/N: SPB818     |                 |                |             |        |
| Power: DC 3.7V From PC AC 120V/60Hz   |            |                     |                       |                |                 |                 |                |             |        |
| Test date: 2015-10-29 Test site: 3m Chamber Tested by: Eric                                       |            |                     |                       |                |                 |                 |                |             |        |
| Test mode: $\pi/4$ DQPSK Tx CH40 2441MHz  |            |                     |                       |                |                 |                 |                |             |        |
| Antenna polarity: Vertical  |            |                     |                       |                |                 |                 |                |             |        |
| No  | Freq (MHz) | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
| 1   | 4882       | 41.76               | 33.93                 | 10.2           | 34.29           | 51.6            | 74             | 22.4        | PK     |
| 2   | 4882       | 34.57               | 33.93                 | 10.2           | 34.29           | 44.41           | 54             | 9.59        | AV     |
| 3   | 7323       | /                   |                       |                |                 |                 |                |             |        |
| 4   | 9764       | /                   |                       |                |                 |                 |                |             |        |
| 5   | 12205      | /                   |                       |                |                 |                 |                |             |        |
| Antenna Polarity: Horizontal  |            |                     |                       |                |                 |                 |                |             |        |
| 1   | 4882       | 43.09               | 33.93                 | 10.2           | 34.29           | 52.93           | 74             | 21.07       | PK     |
| 2   | 4882       | 32.57               | 33.93                 | 10.2           | 34.29           | 42.41           | 54             | 11.59       | AV     |
| 3   | 7323       | /                   |                       |                |                 |                 |                |             |        |
| 4   | 9764       | /                   |                       |                |                 |                 |                |             |        |
| 5   | 12205      | /                   |                       |                |                 |                 |                |             |        |
| Note:   |            |                     |                       |                |                 |                 |                |             |        |
| 1, Measuring frequency from 1GHz to 25GHz   |            |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |            |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |            |                     |                       |                |                 |                 |                |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |            |                     |                       |                |                 |                 |                |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |            |                     |                       |                |                 |                 |                |             |        |

| 1GHz—25GHz Radiated emission Test result  |            |                     |                       |                |                 |                 |                |             |        |
|---|------------|---------------------|-----------------------|----------------|-----------------|-----------------|----------------|-------------|--------|
| EUT: Bluetooth speaker  |            |                     |                       |                | M/N: SPB818     |                 |                |             |        |
| Power: DC 3.7V From PC AC 120V/60Hz   |            |                     |                       |                |                 |                 |                |             |        |
| Test date: 2015-10-29 Test site: 3m Chamber Tested by: Eric                                       |            |                     |                       |                |                 |                 |                |             |        |
| Test mode: $\pi/4$ DQPSK Tx CH79 2480MHz  |            |                     |                       |                |                 |                 |                |             |        |
| Antenna polarity: Vertical  |            |                     |                       |                |                 |                 |                |             |        |
| No  | Freq (MHz) | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
| 1   | 4960       | 41.45               | 33.95                 | 10.18          | 34.26           | 51.32           | 74             | 22.68       | PK     |
| 2   | 4960       | 31.86               | 33.95                 | 10.18          | 34.26           | 41.73           | 54             | 12.27       | AV     |
| 3   | 7440       | /                   |                       |                |                 |                 |                |             |        |
| 4   | 9920       | /                   |                       |                |                 |                 |                |             |        |
| 5   | 12400      | /                   |                       |                |                 |                 |                |             |        |
| Antenna Polarity: Horizontal  |            |                     |                       |                |                 |                 |                |             |        |
| 1   | 4960       | 41.07               | 33.95                 | 10.18          | 34.26           | 50.94           | 74             | 23.06       | PK     |
| 2   | 4960       | 32.24               | 33.95                 | 10.18          | 34.26           | 42.11           | 54             | 11.89       | AV     |
| 3   | 7440       | /                   |                       |                |                 |                 |                |             |        |
| 4   | 9920       | /                   |                       |                |                 |                 |                |             |        |
| 5   | 12400      | /                   |                       |                |                 |                 |                |             |        |
| Note:   |            |                     |                       |                |                 |                 |                |             |        |
| 1, Measuring frequency from 1GHz to 25GHz   |            |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |            |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |            |                     |                       |                |                 |                 |                |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |            |                     |                       |                |                 |                 |                |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |            |                     |                       |                |                 |                 |                |             |        |



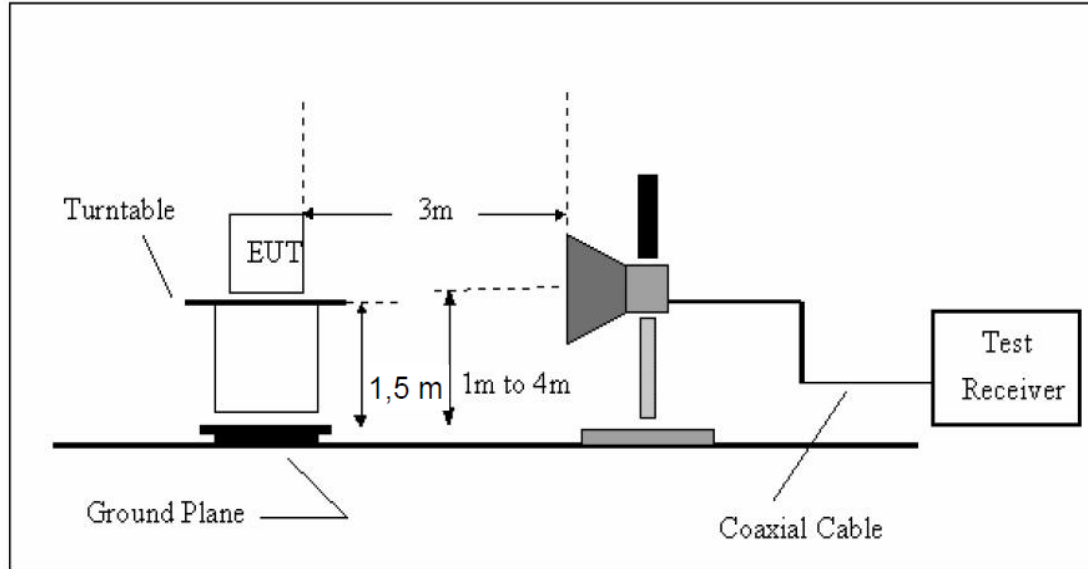
| 1GHz—25GHz Radiated emission Test result  |            |                     |                       |                |                 |                 |                |             |        |
|---|------------|---------------------|-----------------------|----------------|-----------------|-----------------|----------------|-------------|--------|
| EUT: Bluetooth speaker  |            |                     |                       |                | M/N: SPB818     |                 |                |             |        |
| Power: DC 3.7V From PC AC 120V/60Hz   |            |                     |                       |                |                 |                 |                |             |        |
| Test date: 2015-10-29 Test site: 3m Chamber Tested by: Eric                                       |            |                     |                       |                |                 |                 |                |             |        |
| Test mode: 8- DQPSK Tx CH1 2402MHz  |            |                     |                       |                |                 |                 |                |             |        |
| Antenna polarity: Vertical  |            |                     |                       |                |                 |                 |                |             |        |
| No  | Freq (MHz) | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
| 1   | 4804       | 42.09               | 33.98                 | 10.22          | 34.25           | 52.04           | 74             | 21.96       | PK     |
| 2   | 4804       | 31.44               | 33.98                 | 10.22          | 34.25           | 41.39           | 54             | 12.61       | AV     |
| 3   | 7206       | /                   |                       |                |                 |                 |                |             |        |
| 4   | 9608       | /                   |                       |                |                 |                 |                |             |        |
| 5   | 12010      | /                   |                       |                |                 |                 |                |             |        |
| Antenna Polarity: Horizontal  |            |                     |                       |                |                 |                 |                |             |        |
| 1   | 4804       | 41.17               | 33.98                 | 10.22          | 34.25           | 51.12           | 74             | 22.88       | PK     |
| 2   | 4804       | 31.81               | 33.98                 | 10.22          | 34.25           | 41.76           | 54             | 12.24       | AV     |
| 3   | 7206       | /                   |                       |                |                 |                 |                |             |        |
| 4   | 9608       | /                   |                       |                |                 |                 |                |             |        |
| 5   | 12010      | /                   |                       |                |                 |                 |                |             |        |
| Note:   |            |                     |                       |                |                 |                 |                |             |        |
| 1, Measuring frequency from 1GHz to 25GHz   |            |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |            |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |            |                     |                       |                |                 |                 |                |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |            |                     |                       |                |                 |                 |                |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |            |                     |                       |                |                 |                 |                |             |        |

| 1GHz—25GHz Radiated emission Test result  |            |                     |                       |                |                 |                 |                |             |        |
|---|------------|---------------------|-----------------------|----------------|-----------------|-----------------|----------------|-------------|--------|
| EUT: Bluetooth speaker  |            |                     |                       |                | M/N: SPB818     |                 |                |             |        |
| Power: DC 3.7V From PC AC 120V/60Hz   |            |                     |                       |                |                 |                 |                |             |        |
| Test date: 2015-10-29 Test site: 3m Chamber Tested by: Eric                                       |            |                     |                       |                |                 |                 |                |             |        |
| Test mode: 8- DQPSK Tx CH40 2441MHz   |            |                     |                       |                |                 |                 |                |             |        |
| Antenna polarity: Vertical  |            |                     |                       |                |                 |                 |                |             |        |
| No  | Freq (MHz) | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
| 1   | 4882       | 41.53               | 33.93                 | 10.2           | 34.29           | 51.37           | 74             | 22.63       | PK     |
| 2   | 4882       | 34.04               | 33.93                 | 10.2           | 34.29           | 43.88           | 54             | 10.12       | AV     |
| 3   | 7323       | /                   |                       |                |                 |                 |                |             |        |
| 4   | 9764       | /                   |                       |                |                 |                 |                |             |        |
| 5   | 12205      | /                   |                       |                |                 |                 |                |             |        |
| Antenna Polarity: Horizontal  |            |                     |                       |                |                 |                 |                |             |        |
| 1   | 4882       | 43.31               | 33.93                 | 10.2           | 34.29           | 53.15           | 74             | 20.85       | PK     |
| 2   | 4882       | 31.24               | 33.93                 | 10.2           | 34.29           | 41.08           | 54             | 12.92       | AV     |
| 3   | 7323       | /                   |                       |                |                 |                 |                |             |        |
| 4   | 9764       | /                   |                       |                |                 |                 |                |             |        |
| 5   | 12205      | /                   |                       |                |                 |                 |                |             |        |
| Note:   |            |                     |                       |                |                 |                 |                |             |        |
| 1, Measuring frequency from 1GHz to 25GHz   |            |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |            |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |            |                     |                       |                |                 |                 |                |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |            |                     |                       |                |                 |                 |                |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |            |                     |                       |                |                 |                 |                |             |        |

| 1GHz—25GHz Radiated emission Test result  |            |                     |                       |                |                 |                 |                |             |        |
|---|------------|---------------------|-----------------------|----------------|-----------------|-----------------|----------------|-------------|--------|
| EUT: Bluetooth speaker  |            |                     |                       |                | M/N: SPB818     |                 |                |             |        |
| Power: DC 3.7V From PC AC 120V/60Hz   |            |                     |                       |                |                 |                 |                |             |        |
| Test date: 2015-10-29 Test site: 3m Chamber Tested by: Eric                                       |            |                     |                       |                |                 |                 |                |             |        |
| Test mode: 8- DQPSK Tx CH79 2480MHz   |            |                     |                       |                |                 |                 |                |             |        |
| Antenna polarity: Vertical  |            |                     |                       |                |                 |                 |                |             |        |
| No  | Freq (MHz) | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
| 1   | 4960       | 42.53               | 33.95                 | 10.18          | 34.26           | 52.4            | 74             | 21.6        | PK     |
| 2   | 4960       | 30.91               | 33.95                 | 10.18          | 34.26           | 40.78           | 54             | 13.22       | AV     |
| 3   | 7440       | /                   |                       |                |                 |                 |                |             |        |
| 4   | 9920       | /                   |                       |                |                 |                 |                |             |        |
| 5   | 12400      | /                   |                       |                |                 |                 |                |             |        |
| Antenna Polarity: Horizontal  |            |                     |                       |                |                 |                 |                |             |        |
| 1   | 4960       | 42.15               | 33.95                 | 10.18          | 34.26           | 52.02           | 74             | 21.98       | PK     |
| 2   | 4960       | 32.78               | 33.95                 | 10.18          | 34.26           | 42.65           | 54             | 11.35       | AV     |
| 3   | 7440       | /                   |                       |                |                 |                 |                |             |        |
| 4   | 9920       | /                   |                       |                |                 |                 |                |             |        |
| 5   | 12400      | /                   |                       |                |                 |                 |                |             |        |
| Note:   |            |                     |                       |                |                 |                 |                |             |        |
| 1, Measuring frequency from 1GHz to 25GHz   |            |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |            |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |            |                     |                       |                |                 |                 |                |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |            |                     |                       |                |                 |                 |                |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |            |                     |                       |                |                 |                 |                |             |        |

## 9. Band Edge Compliance

### 9.1. Block Diagram of Test Setup



### 9.2. Limit

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

### 9.3. Test Procedure

All restriction band and non- restriction band have been tested , only worse case is reported.

### 9.4. Test Result

**PASS. (See below detailed test data)**

## Radiated Method

GFSK ( CH Low )

| Band Edge Test result   |                     |                       |                |                 |                 |                |             |           |
|---|---------------------|-----------------------|----------------|-----------------|-----------------|----------------|-------------|-----------|
| EUT: Bluetooth speaker  |                     |                       |                | M/N: SPB818     |                 |                |             |           |
| Power: DC 3.7V From battery   |                     |                       |                |                 |                 |                |             |           |
| Test date: 2015-10-29 Test site: 3m Chamber Tested by: Eric                                       |                     |                       |                |                 |                 |                |             |           |
| Test mode: Tx CH Low 2402MHz  |                     |                       |                |                 |                 |                |             |           |
| Antenna polarity: Vertical  |                     |                       |                |                 |                 |                |             |           |
| Freq (MHz)  | Read Level (dBUV/m) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBUV/m) | Limit (dBUV/m) | Margin (dB) | Remark    |
| 2390  | 43.88               | 27.62                 | 3.92           | 34.97           | 40.45           | 74             | 33.55       | <b>PK</b> |
| 2390  | --                  | 27.62                 | 3.92           | 34.97           | --              | 54             | --          | AV        |
| 2400  | 42.54               | 27.62                 | 3.94           | 34.97           | 39.13           | 74             | 34.87       | <b>PK</b> |
| 2400  | --                  | 27.62                 | 3.94           | 34.97           | --              | 54             | --          | AV        |
|   |                     |                       |                |                 |                 |                |             |           |
| Antenna Polarity: Horizontal  |                     |                       |                |                 |                 |                |             |           |
| 2390  | 42.13               | 27.62                 | 3.92           | 34.97           | 38.7            | 74             | 35.3        | <b>PK</b> |
| 2390  | --                  | 27.62                 | 3.92           | 34.97           | --              | 54             | --          | AV        |
| 2400  | 43.67               | 27.62                 | 3.94           | 34.97           | 40.26           | 74             | 33.74       | <b>PK</b> |
| 2400  | --                  | 27.62                 | 3.94           | 34.97           | --              | 54             | --          | AV        |
|   |                     |                       |                |                 |                 |                |             |           |
| Note:   |                     |                       |                |                 |                 |                |             |           |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                |                 |                 |                |             |           |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                |                 |                 |                |             |           |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                |                 |                 |                |             |           |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                |                 |                 |                |             |           |

## GFSK (CH High)

| Band Edge Test result   |                     |                       |                |                 |                 |                |             |           |
|---|---------------------|-----------------------|----------------|-----------------|-----------------|----------------|-------------|-----------|
| EUT: Bluetooth speaker  |                     |                       |                | M/N: SPB818     |                 |                |             |           |
| Power: DC 3.7V From battery   |                     |                       |                |                 |                 |                |             |           |
| Test date: 2015-10-29 Test site: 3m Chamber Tested by: Eric                                       |                     |                       |                |                 |                 |                |             |           |
| Test mode: Tx CH High 2480MHz   |                     |                       |                |                 |                 |                |             |           |
| Antenna polarity: Vertical  |                     |                       |                |                 |                 |                |             |           |
| Freq (MHz)  | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark    |
| 2483.5  | 41.96               | 27.89                 | 4              | 34.97           | 38.88           | 74             | 35.12       | <b>PK</b> |
| 2483.5  | --                  | 27.89                 | 4              | 34.97           | --              | 54             | --          | AV        |
|   |                     |                       |                |                 |                 |                |             |           |
|   |                     |                       |                |                 |                 |                |             |           |
|   |                     |                       |                |                 |                 |                |             |           |
| Antenna Polarity: Horizontal  |                     |                       |                |                 |                 |                |             |           |
| 2483.5  | 42.18               | 27.89                 | 4              | 34.97           | 39.1            | 74             | 34.9        | <b>PK</b> |
| 2483.5  | --                  | 27.89                 | 4              | 34.97           | --              | 54             | --          | AV        |
|   |                     |                       |                |                 |                 |                |             |           |
|   |                     |                       |                |                 |                 |                |             |           |
|   |                     |                       |                |                 |                 |                |             |           |
| Note:   |                     |                       |                |                 |                 |                |             |           |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                |                 |                 |                |             |           |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                |                 |                 |                |             |           |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                |                 |                 |                |             |           |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                |                 |                 |                |             |           |

## GFSK ( Hopping Low)

| Band Edge Test result   |                     |                       |                       |                 |                 |                |             |           |
|---|---------------------|-----------------------|-----------------------|-----------------|-----------------|----------------|-------------|-----------|
| EUT: Bluetooth speaker  |                     |                       |                       | M/N: SPB818     |                 |                |             |           |
| Power: DC 3.7V From battery   |                     |                       |                       |                 |                 |                |             |           |
| Test date: 2015-10-29   |                     |                       | Test site: 3m Chamber |                 | Tested by: Eric |                |             |           |
| Test mode: Tx   |                     |                       |                       |                 |                 |                |             |           |
| Antenna polarity: Vertical  |                     |                       |                       |                 |                 |                |             |           |
| Freq (MHz)  | Read Level (dBUV/m) | Antenna Factor (dB/m) | Cable loss(dB)        | Amp Factor (dB) | Result (dBUV/m) | Limit (dBUV/m) | Margin (dB) | Remark    |
| 2390  | 41.31               | 27.62                 | 3.92                  | 34.97           | 37.88           | 74             | 36.12       | <b>PK</b> |
| 2390  | --                  | 27.62                 | 3.92                  | 34.97           | --              | 54             | --          | AV        |
| 2400  | 43.75               | 27.62                 | 3.94                  | 34.97           | 40.34           | 74             | 33.66       | <b>PK</b> |
| 2400  | --                  | 27.62                 | 3.94                  | 34.97           | --              | 54             | --          | AV        |
|   |                     |                       |                       |                 |                 |                |             |           |
| Antenna Polarity: Horizontal  |                     |                       |                       |                 |                 |                |             |           |
| 2390  | 42.65               | 27.62                 | 3.92                  | 34.97           | 39.22           | 74             | 34.78       | <b>PK</b> |
| 2390  | --                  | 27.62                 | 3.92                  | 34.97           | --              | 54             | --          | AV        |
| 2400  | 44.05               | 27.62                 | 3.94                  | 34.97           | 40.64           | 74             | 33.36       | <b>PK</b> |
| 2400  | --                  | 27.62                 | 3.94                  | 34.97           | --              | 54             | --          | AV        |
|   |                     |                       |                       |                 |                 |                |             |           |
| Note:   |                     |                       |                       |                 |                 |                |             |           |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                |             |           |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                |             |           |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                       |                 |                 |                |             |           |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                       |                 |                 |                |             |           |

## GFSK ( Hopping High)

| Band Edge Test result   |                     |                       |                |                 |                 |                |             |           |
|---|---------------------|-----------------------|----------------|-----------------|-----------------|----------------|-------------|-----------|
| EUT: Bluetooth speaker  |                     |                       |                | M/N: SPB818     |                 |                |             |           |
| Power: DC 3.7V From battery   |                     |                       |                |                 |                 |                |             |           |
| Test date: 2015-10-29 Test site: 3m Chamber Tested by: Eric                                       |                     |                       |                |                 |                 |                |             |           |
| Test mode: Tx   |                     |                       |                |                 |                 |                |             |           |
| Antenna polarity: Vertical  |                     |                       |                |                 |                 |                |             |           |
| Freq (MHz)  | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark    |
| 2483.5  | 43.73               | 27.89                 | 4              | 34.97           | 40.65           | 74             | 33.35       | <b>PK</b> |
| 2483.5  | --                  | 27.89                 | 4              | 34.97           | --              | 54             | --          | AV        |
|   |                     |                       |                |                 |                 |                |             |           |
|   |                     |                       |                |                 |                 |                |             |           |
|   |                     |                       |                |                 |                 |                |             |           |
| Antenna Polarity: Horizontal  |                     |                       |                |                 |                 |                |             |           |
| 2483.5  | 42.41               | 27.89                 | 4              | 34.97           | 39.33           | 74             | 34.67       | <b>PK</b> |
| 2483.5  | --                  | 27.89                 | 4              | 34.97           | --              | 54             | --          | AV        |
|   |                     |                       |                |                 |                 |                |             |           |
|   |                     |                       |                |                 |                 |                |             |           |
|   |                     |                       |                |                 |                 |                |             |           |
| Note:   |                     |                       |                |                 |                 |                |             |           |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                |                 |                 |                |             |           |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                |                 |                 |                |             |           |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                |                 |                 |                |             |           |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                |                 |                 |                |             |           |



$\pi/4$  DQPSK ( CH Low )

| Band Edge Test result   |                     |                       |                |                 |                 |                |             |           |
|---|---------------------|-----------------------|----------------|-----------------|-----------------|----------------|-------------|-----------|
| EUT: Bluetooth speaker  |                     |                       |                | M/N: SPB818     |                 |                |             |           |
| Power: DC 3.7V From battery   |                     |                       |                |                 |                 |                |             |           |
| Test date: 2015-10-29 Test site: 3m Chamber Tested by: Eric                                       |                     |                       |                |                 |                 |                |             |           |
| Test mode: Tx CH Low 2402MHz  |                     |                       |                |                 |                 |                |             |           |
| Antenna polarity: Vertical  |                     |                       |                |                 |                 |                |             |           |
| Freq (MHz)  | Read Level (dBUV/m) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBUV/m) | Limit (dBUV/m) | Margin (dB) | Remark    |
| 2390  | 41.95               | 27.62                 | 3.92           | 34.97           | 38.52           | 74             | 35.48       | <b>PK</b> |
| 2390  | --                  | 27.62                 | 3.92           | 34.97           | --              | 54             | --          | AV        |
| 2400  | 41.86               | 27.62                 | 3.94           | 34.97           | 38.45           | 74             | 35.55       | <b>PK</b> |
| 2400  | --                  | 27.62                 | 3.94           | 34.97           | --              | 54             | --          | AV        |
|   |                     |                       |                |                 |                 |                |             |           |
| Antenna Polarity: Horizontal  |                     |                       |                |                 |                 |                |             |           |
| 2390  | 42.23               | 27.62                 | 3.92           | 34.97           | 38.8            | 74             | 35.2        | <b>PK</b> |
| 2390  | --                  | 27.62                 | 3.92           | 34.97           | --              | 54             | --          | AV        |
| 2400  | 42.27               | 27.62                 | 3.94           | 34.97           | 38.86           | 74             | 35.14       | <b>PK</b> |
| 2400  | --                  | 27.62                 | 3.94           | 34.97           | --              | 54             | --          | AV        |
|   |                     |                       |                |                 |                 |                |             |           |
| Note:   |                     |                       |                |                 |                 |                |             |           |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                |                 |                 |                |             |           |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                |                 |                 |                |             |           |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                |                 |                 |                |             |           |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                |                 |                 |                |             |           |

$\pi/4$  DQPSK ( CH High )

| Band Edge Test result   |                     |                       |                |                 |                 |                |             |        |
|---|---------------------|-----------------------|----------------|-----------------|-----------------|----------------|-------------|--------|
| EUT: Bluetooth speaker  |                     |                       |                | M/N: SPB818     |                 |                |             |        |
| Power: DC 3.7V From battery   |                     |                       |                |                 |                 |                |             |        |
| Test date: 2015-10-29 Test site: 3m Chamber Tested by: Eric                                       |                     |                       |                |                 |                 |                |             |        |
| Test mode: Tx CH High 2480MHz   |                     |                       |                |                 |                 |                |             |        |
| Antenna polarity: Vertical  |                     |                       |                |                 |                 |                |             |        |
| Freq (MHz)  | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
| 2483.5  | 42.9                | 27.89                 | 4              | 34.97           | 39.82           | 74             | 34.18       | PK     |
| 2483.5  | --                  | 27.89                 | 4              | 34.97           | --              | 54             | --          | AV     |
|   |                     |                       |                |                 |                 |                |             |        |
|   |                     |                       |                |                 |                 |                |             |        |
|   |                     |                       |                |                 |                 |                |             |        |
| Antenna Polarity: Horizontal  |                     |                       |                |                 |                 |                |             |        |
| 2483.5  | 43.63               | 27.89                 | 4              | 34.97           | 40.55           | 74             | 33.45       | PK     |
| 2483.5  | --                  | 27.89                 | 4              | 34.97           | --              | 54             | --          | AV     |
|   |                     |                       |                |                 |                 |                |             |        |
|   |                     |                       |                |                 |                 |                |             |        |
|   |                     |                       |                |                 |                 |                |             |        |
| Note:   |                     |                       |                |                 |                 |                |             |        |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                |                 |                 |                |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                |                 |                 |                |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                |                 |                 |                |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                |                 |                 |                |             |        |

$\pi/4$  DQPSK (Hopping Low)

| Band Edge Test result   |                     |                       |                |                 |                 |                |             |           |
|---|---------------------|-----------------------|----------------|-----------------|-----------------|----------------|-------------|-----------|
| EUT: Bluetooth speaker  |                     |                       |                | M/N: SPB818     |                 |                |             |           |
| Power: DC 3.7V From battery   |                     |                       |                |                 |                 |                |             |           |
| Test date: 2015-10-29 Test site: 3m Chamber Tested by: Eric                                       |                     |                       |                |                 |                 |                |             |           |
| Test mode: Tx   |                     |                       |                |                 |                 |                |             |           |
| Antenna polarity: Vertical  |                     |                       |                |                 |                 |                |             |           |
| Freq (MHz)  | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark    |
| 2390  | 42.48               | 27.62                 | 3.92           | 34.97           | 39.05           | 74             | 34.95       | <b>PK</b> |
| 2390  | --                  | 27.62                 | 3.92           | 34.97           | --              | 54             | --          | AV        |
| 2400  | 40.89               | 27.62                 | 3.94           | 34.97           | 37.48           | 74             | 36.52       | <b>PK</b> |
| 2400  | --                  | 27.62                 | 3.94           | 34.97           | --              | 54             | --          | AV        |
| Antenna Polarity: Horizontal  |                     |                       |                |                 |                 |                |             |           |
| 2390  | 43.33               | 27.62                 | 3.92           | 34.97           | 39.9            | 74             | 34.1        | <b>PK</b> |
| 2390  | --                  | 27.62                 | 3.92           | 34.97           | --              | 54             | --          | AV        |
| 2400  | 42.62               | 27.62                 | 3.94           | 34.97           | 39.21           | 74             | 34.79       | <b>PK</b> |
| 2400  | --                  | 27.62                 | 3.94           | 34.97           | --              | 54             | --          | AV        |
| Note:   |                     |                       |                |                 |                 |                |             |           |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                |                 |                 |                |             |           |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                |                 |                 |                |             |           |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                |                 |                 |                |             |           |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                |                 |                 |                |             |           |

$\pi/4$  DQPSK (Hopping High )

| Band Edge Test result   |                     |                       |                       |                 |                 |                 |             |        |
|---|---------------------|-----------------------|-----------------------|-----------------|-----------------|-----------------|-------------|--------|
| EUT: Bluetooth speaker  |                     |                       |                       | M/N: SPB818     |                 |                 |             |        |
| Power: DC 3.7V From battery   |                     |                       |                       |                 |                 |                 |             |        |
| Test date: 2015-10-29   |                     |                       | Test site: 3m Chamber |                 |                 | Tested by: Eric |             |        |
| Test mode: Tx   |                     |                       |                       |                 |                 |                 |             |        |
| Antenna polarity: Vertical  |                     |                       |                       |                 |                 |                 |             |        |
| Freq (MHz)  | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB)        | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m)  | Margin (dB) | Remark |
| 2483.5  | 43.5                | 27.89                 | 4                     | 34.97           | 40.42           | 74              | 33.58       | PK     |
| 2483.5  | --                  | 27.89                 | 4                     | 34.97           | --              | 54              | --          | AV     |
|   |                     |                       |                       |                 |                 |                 |             |        |
|   |                     |                       |                       |                 |                 |                 |             |        |
|   |                     |                       |                       |                 |                 |                 |             |        |
| Antenna Polarity: Horizontal  |                     |                       |                       |                 |                 |                 |             |        |
| 2483.5  | 42.67               | 27.89                 | 4                     | 34.97           | 39.59           | 74              | 34.41       | PK     |
| 2483.5  | --                  | 27.89                 | 4                     | 34.97           | --              | 54              | --          | AV     |
|   |                     |                       |                       |                 |                 |                 |             |        |
|   |                     |                       |                       |                 |                 |                 |             |        |
|   |                     |                       |                       |                 |                 |                 |             |        |
| Note:   |                     |                       |                       |                 |                 |                 |             |        |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                 |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                 |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                       |                 |                 |                 |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                       |                 |                 |                 |             |        |

## 8- DPSK ( CH Low )

| Band Edge Test result   |                     |                       |                |                 |                 |                |             |           |
|---|---------------------|-----------------------|----------------|-----------------|-----------------|----------------|-------------|-----------|
| EUT: Bluetooth speaker  |                     |                       |                | M/N: SPB818     |                 |                |             |           |
| Power: DC 3.7V From battery   |                     |                       |                |                 |                 |                |             |           |
| Test date: 2015-10-29 Test site: 3m Chamber Tested by: Eric                                       |                     |                       |                |                 |                 |                |             |           |
| Test mode: Tx CH Low 2402MHz  |                     |                       |                |                 |                 |                |             |           |
| Antenna polarity: Vertical  |                     |                       |                |                 |                 |                |             |           |
| Freq (MHz)  | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark    |
| 2390  | 42.41               | 27.62                 | 3.92           | 34.97           | 38.98           | 74             | 35.02       | <b>PK</b> |
| 2390  | --                  | 27.62                 | 3.92           | 34.97           | --              | 54             | --          | AV        |
| 2400  | 43.6                | 27.62                 | 3.94           | 34.97           | 40.19           | 74             | 33.81       | <b>PK</b> |
| 2400  | --                  | 27.62                 | 3.94           | 34.97           | --              | 54             | --          | AV        |
|   |                     |                       |                |                 |                 |                |             |           |
| Antenna Polarity: Horizontal  |                     |                       |                |                 |                 |                |             |           |
| 2390  | 45.36               | 27.62                 | 3.92           | 34.97           | 41.93           | 74             | 32.07       | <b>PK</b> |
| 2390  | --                  | 27.62                 | 3.92           | 34.97           | --              | 54             | --          | AV        |
| 2400  | 43.92               | 27.62                 | 3.94           | 34.97           | 40.51           | 74             | 33.49       | <b>PK</b> |
| 2400  | --                  | 27.62                 | 3.94           | 34.97           | --              | 54             | --          | AV        |
|   |                     |                       |                |                 |                 |                |             |           |
| Note:   |                     |                       |                |                 |                 |                |             |           |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                |                 |                 |                |             |           |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                |                 |                 |                |             |           |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                |                 |                 |                |             |           |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                |                 |                 |                |             |           |

## 8- DPSK ( CH High )

| Band Edge Test result   |                     |                       |                |                 |                 |                |             |           |
|---|---------------------|-----------------------|----------------|-----------------|-----------------|----------------|-------------|-----------|
| EUT: Bluetooth speaker  |                     |                       |                | M/N: SPB818     |                 |                |             |           |
| Power: DC 3.7V From battery   |                     |                       |                |                 |                 |                |             |           |
| Test date: 2015-10-29 Test site: 3m Chamber Tested by: Eric                                       |                     |                       |                |                 |                 |                |             |           |
| Test mode: Tx CH High 2480MHz   |                     |                       |                |                 |                 |                |             |           |
| Antenna polarity: Vertical  |                     |                       |                |                 |                 |                |             |           |
| Freq (MHz)  | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark    |
| 2483.5  | 44.58               | 27.89                 | 4              | 34.97           | 41.5            | 74             | 32.5        | <b>PK</b> |
| 2483.5  | --                  | 27.89                 | 4              | 34.97           | --              | 54             | --          | AV        |
|   |                     |                       |                |                 |                 |                |             |           |
|   |                     |                       |                |                 |                 |                |             |           |
|   |                     |                       |                |                 |                 |                |             |           |
| Antenna Polarity: Horizontal  |                     |                       |                |                 |                 |                |             |           |
| 2483.5  | 43.36               | 27.89                 | 4              | 34.97           | 40.28           | 74             | 33.72       | <b>PK</b> |
| 2483.5  | --                  | 27.89                 | 4              | 34.97           | --              | 54             | --          | AV        |
|   |                     |                       |                |                 |                 |                |             |           |
|   |                     |                       |                |                 |                 |                |             |           |
|   |                     |                       |                |                 |                 |                |             |           |
| Note:   |                     |                       |                |                 |                 |                |             |           |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                |                 |                 |                |             |           |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                |                 |                 |                |             |           |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                |                 |                 |                |             |           |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                |                 |                 |                |             |           |

## 8- DPSK (Hopping Low)

| Band Edge Test result   |                     |                       |                |                 |                 |                |             |           |
|---|---------------------|-----------------------|----------------|-----------------|-----------------|----------------|-------------|-----------|
| EUT: Bluetooth speaker  |                     |                       |                | M/N: SPB818     |                 |                |             |           |
| Power: DC 3.7V From battery   |                     |                       |                |                 |                 |                |             |           |
| Test date: 2015-10-29 Test site: 3m Chamber Tested by: Eric                                       |                     |                       |                |                 |                 |                |             |           |
| Test mode: Tx   |                     |                       |                |                 |                 |                |             |           |
| Antenna polarity: Vertical  |                     |                       |                |                 |                 |                |             |           |
| Freq (MHz)  | Read Level (dBUV/m) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBUV/m) | Limit (dBUV/m) | Margin (dB) | Remark    |
| 2390  | 42.47               | 27.62                 | 3.92           | 34.97           | 39.04           | 74             | 34.96       | <b>PK</b> |
| 2390  | --                  | 27.62                 | 3.92           | 34.97           | --              | 54             | --          | AV        |
| 2400  | 41.78               | 27.62                 | 3.94           | 34.97           | 38.37           | 74             | 35.63       | <b>PK</b> |
| 2400  | --                  | 27.62                 | 3.94           | 34.97           | --              | 54             | --          | AV        |
| Antenna Polarity: Horizontal  |                     |                       |                |                 |                 |                |             |           |
| 2390  | 42.36               | 27.62                 | 3.92           | 34.97           | 38.93           | 74             | 35.07       | <b>PK</b> |
| 2390  | --                  | 27.62                 | 3.92           | 34.97           | --              | 54             | --          | AV        |
| 2400  | 41.48               | 27.62                 | 3.94           | 34.97           | 38.07           | 74             | 35.93       | <b>PK</b> |
| 2400  | --                  | 27.62                 | 3.94           | 34.97           | --              | 54             | --          | AV        |
| Note:   |                     |                       |                |                 |                 |                |             |           |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                |                 |                 |                |             |           |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                |                 |                 |                |             |           |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                |                 |                 |                |             |           |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                |                 |                 |                |             |           |

## 8- DPSK (Hopping High )

| Band Edge Test result   |                     |                       |                       |                 |                 |                 |             |        |
|---|---------------------|-----------------------|-----------------------|-----------------|-----------------|-----------------|-------------|--------|
| EUT: Bluetooth speaker  |                     |                       |                       | M/N: SPB818     |                 |                 |             |        |
| Power: DC 3.7V From battery   |                     |                       |                       |                 |                 |                 |             |        |
| Test date: 2015-10-29   |                     |                       | Test site: 3m Chamber |                 |                 | Tested by: Eric |             |        |
| Test mode: Tx   |                     |                       |                       |                 |                 |                 |             |        |
| Antenna polarity: Vertical  |                     |                       |                       |                 |                 |                 |             |        |
| Freq (MHz)  | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB)        | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m)  | Margin (dB) | Remark |
| 2483.5  | 42.13               | 27.89                 | 4                     | 34.97           | 39.05           | 74              | 34.95       | PK     |
| 2483.5  | --                  | 27.89                 | 4                     | 34.97           | --              | 54              | --          | AV     |
|   |                     |                       |                       |                 |                 |                 |             |        |
|   |                     |                       |                       |                 |                 |                 |             |        |
|   |                     |                       |                       |                 |                 |                 |             |        |
| Antenna Polarity: Horizontal  |                     |                       |                       |                 |                 |                 |             |        |
| 2483.5  | 42.4                | 27.89                 | 4                     | 34.97           | 39.32           | 74              | 34.68       | PK     |
| 2483.5  | --                  | 27.89                 | 4                     | 34.97           | --              | 54              | --          | AV     |
|   |                     |                       |                       |                 |                 |                 |             |        |
|   |                     |                       |                       |                 |                 |                 |             |        |
|   |                     |                       |                       |                 |                 |                 |             |        |
| Note:   |                     |                       |                       |                 |                 |                 |             |        |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                 |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                 |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                       |                 |                 |                 |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                       |                 |                 |                 |             |        |

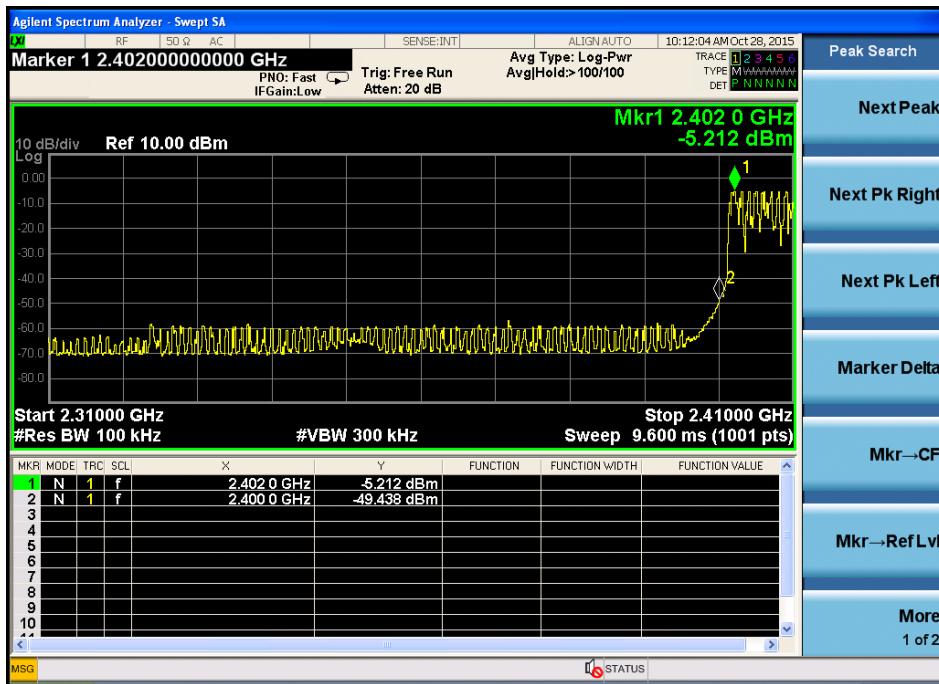




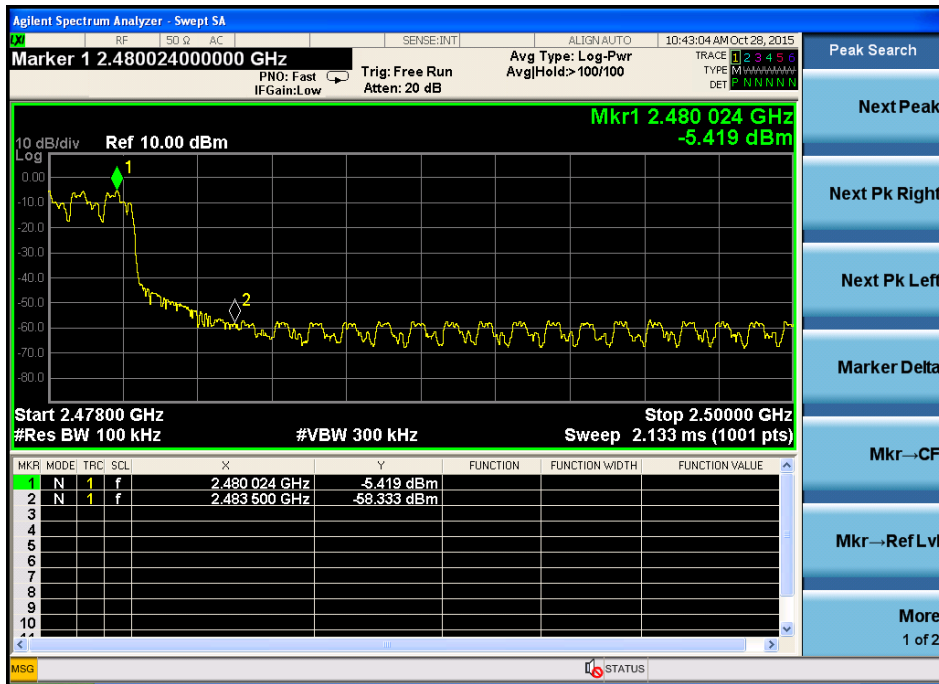




Hopping  
Low

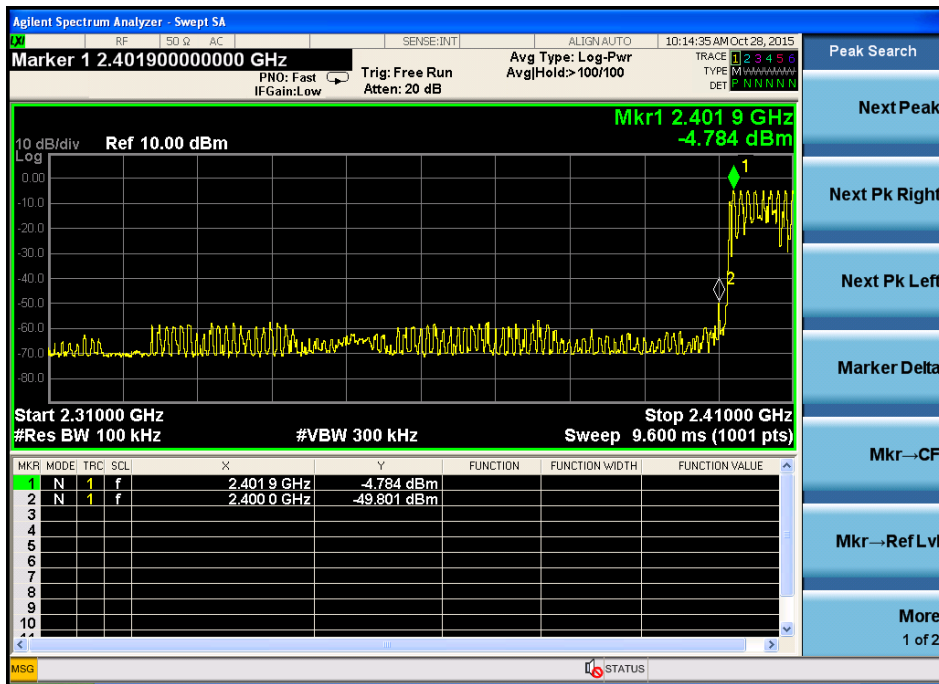


High

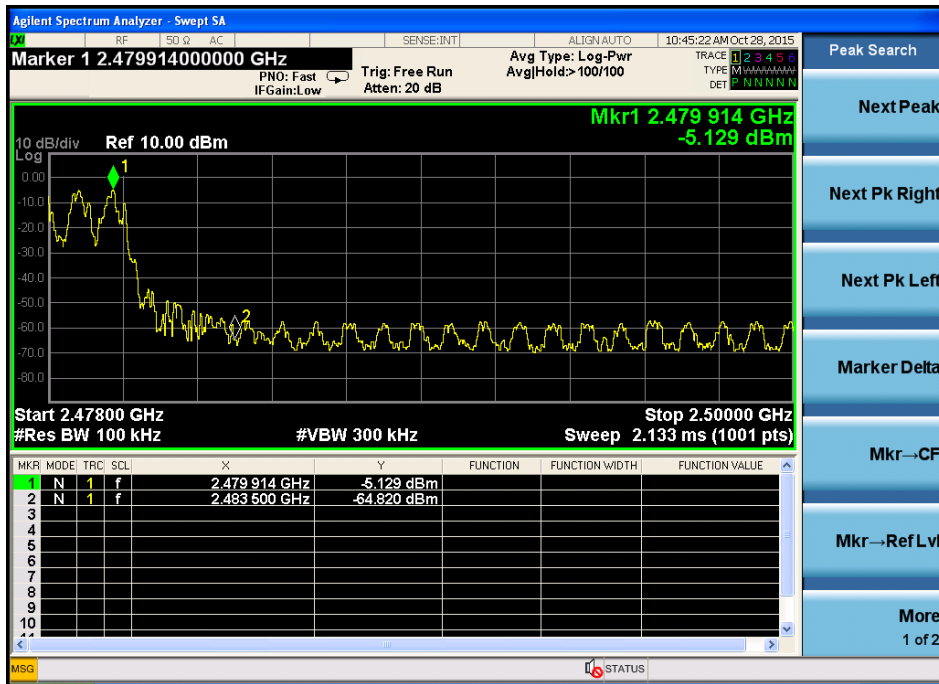




Hopping  
Low

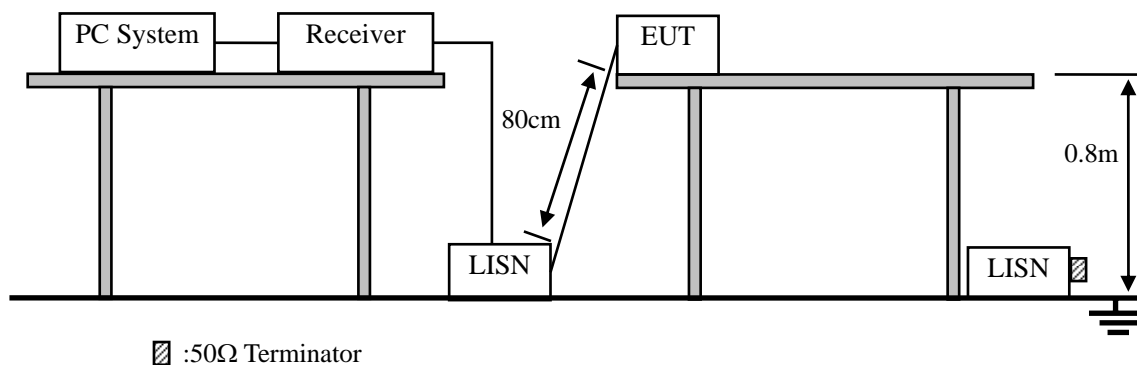


High



## 10. Power Line Conducted Emissions

### 10.1. Block Diagram of Test Setup



### 10.2. 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.

### 10.3. Test Procedure

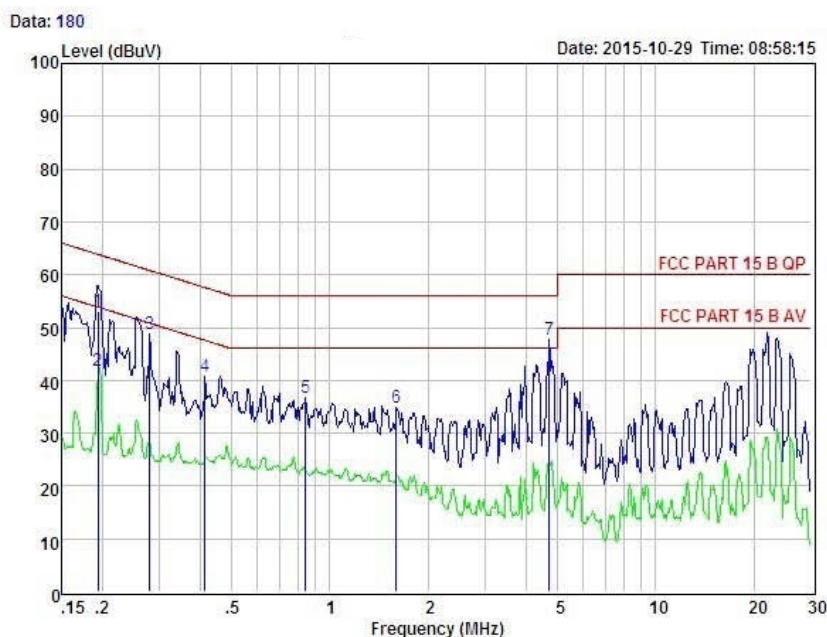
- (1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
- (2) Setup the EUT and simulator as shown in 10.1
- (3) The EUT Power connected to the power mains through a power adapter and a line impedance stabilization network (L.I.S.N1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N2), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4 :2014on conducted Emission test.
- (4) The bandwidth of test receiver is set at 10KHz.
- (5) The frequency range from 150 KHz to 30MHz is checked.

### 10.4. Test Result

PASS. (See below detailed test data)



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Data: 180  
 Date: 2015-10-29 Time: 08:58:15

Condition : FCC PART 15 B QP POL: LINE Temp:24 °C Hum:56 %  
 EUT : Bluetooth speaker  
 Model No : SPB818  
 Test Mode : TX mode  
 Power : DC 5V  
 Test Engineer:  
 Remark :

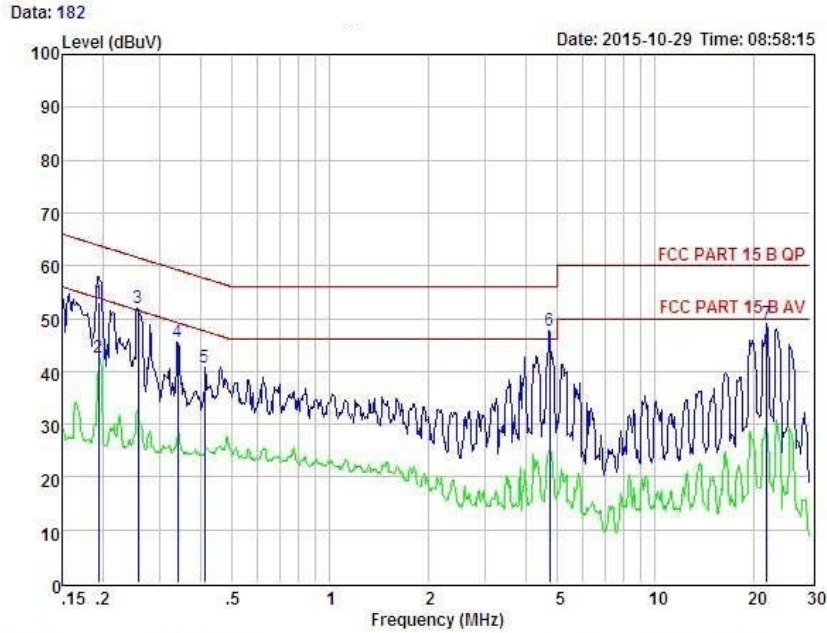
| Item | Freq<br>MHz | Read<br>dBuV | LISN<br>Factor<br>dB | Preamp<br>Factor<br>dB | Cable<br>Loss<br>dB | Level<br>dBuV | Limit<br>dBuV | Margin<br>dBuV | Remark  |
|------|-------------|--------------|----------------------|------------------------|---------------------|---------------|---------------|----------------|---------|
| 1    | 0.194       | 43.50        | 0.03                 | -9.52                  | 0.10                | 53.15         | 63.84         | -10.69         | QP      |
| 2    | 0.194       | 32.30        | 0.03                 | -9.52                  | 0.10                | 41.95         | 53.84         | -11.89         | Average |
| 3    | 0.280       | 39.18        | 0.03                 | -9.56                  | 0.10                | 48.87         | 60.81         | -11.94         | Peak    |
| 4    | 0.413       | 31.10        | 0.03                 | -9.57                  | 0.10                | 40.80         | 57.59         | -16.79         | Peak    |
| 5    | 0.844       | 27.06        | 0.04                 | -9.60                  | 0.10                | 36.80         | 56.00         | -19.20         | Peak    |
| 6    | 1.602       | 24.98        | 0.05                 | -9.69                  | 0.10                | 34.82         | 56.00         | -21.18         | Peak    |
| 7    | 4.721       | 37.51        | 0.10                 | -9.91                  | 0.12                | 47.64         | 56.00         | -8.36          | Peak    |

Remarks: Level = Read + LISN Factor - Preamp Factor + Cable loss





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Condition : FCC PART 15 B QP                      POL: NEUTRAL    Temp:24 °C    Hum:56 %  
 EUI : Bluetooth speaker  
 Model No : SPB818  
 Test Mode : TX mode  
 Power : DC 5V  
 Test Engineer:  
 Remark :

| Item | Freq<br>MHz | Read<br>dBuV | LISN<br>Factor<br>dB | Preamp<br>Factor<br>dB | Cable<br>Loss<br>dB | Level<br>dBuV | Limit<br>dBuV | Margin<br>dBuV | Remark  |
|------|-------------|--------------|----------------------|------------------------|---------------------|---------------|---------------|----------------|---------|
| 1    | 0.194       | 43.50        | 0.03                 | -9.52                  | 0.10                | 53.15         | 63.88         | -10.73         | QP      |
| 2    | 0.194       | 32.91        | 0.03                 | -9.52                  | 0.10                | 42.56         | 53.88         | -11.32         | Average |
| 3    | 0.257       | 42.20        | 0.03                 | -9.56                  | 0.10                | 51.89         | 61.54         | -9.65          | Peak    |
| 4    | 0.340       | 35.86        | 0.03                 | -9.56                  | 0.10                | 45.55         | 59.20         | -13.65         | Peak    |
| 5    | 0.412       | 31.10        | 0.03                 | -9.57                  | 0.10                | 40.80         | 57.60         | -16.80         | Peak    |
| 6    | 4.743       | 37.51        | 0.10                 | -9.91                  | 0.12                | 47.64         | 56.00         | -8.36          | Peak    |
| 7    | 22.047      | 38.50        | 0.39                 | -9.81                  | 0.39                | 49.09         | 60.00         | -10.91         | Peak    |

Remarks: Level = Read + LISN Factor - Preamp Factor + Cable loss

Note: If QP Result comply with AV limit, AV Result is deemed to comply with AV limit

## **11. Antenna Requirements**

### **11.1. Limit**

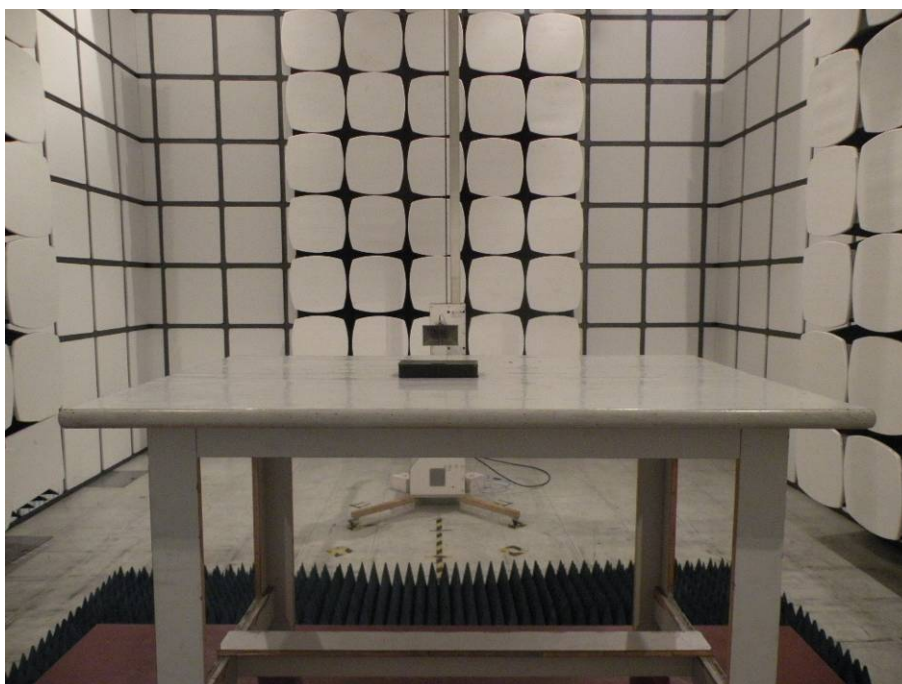
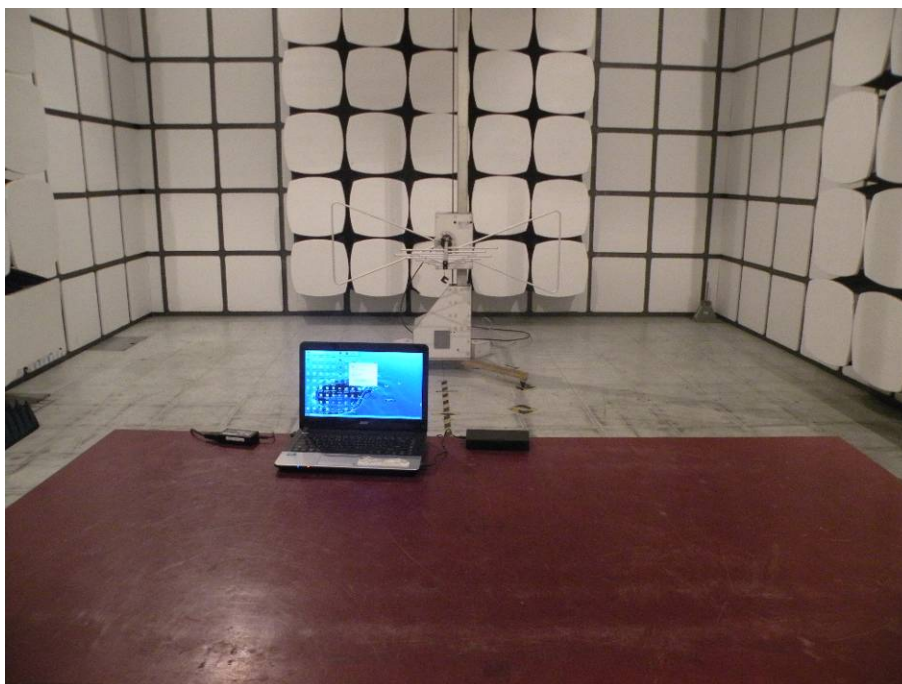
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional 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.

### **11.2. Result**

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

## 12. Test setup photo

### 12.1. Photos of Radiated emission

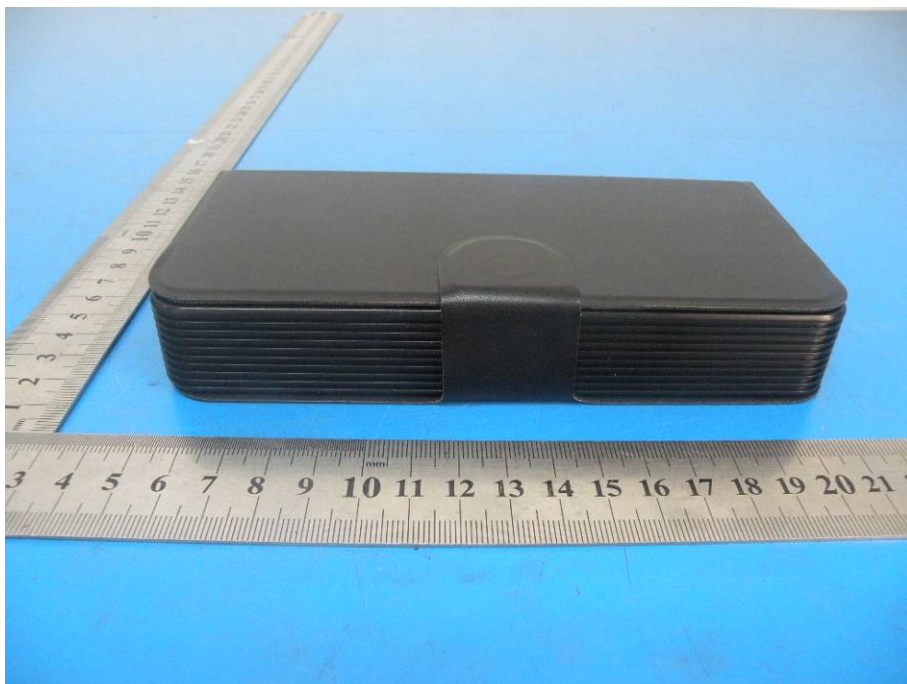


## 12.2.Photos of Conducted Emission test



### 13. Photos of EUT

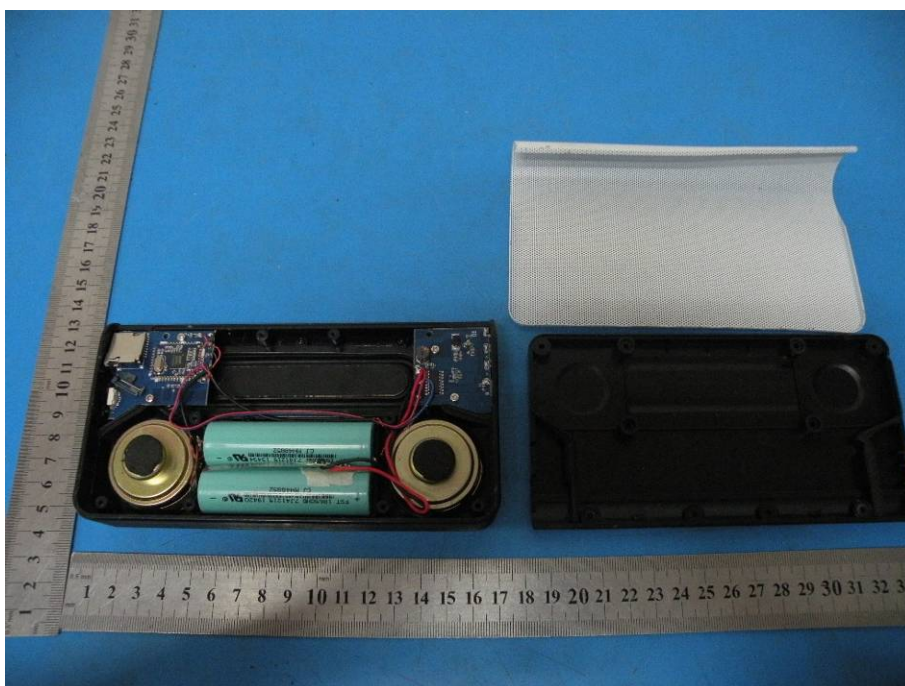


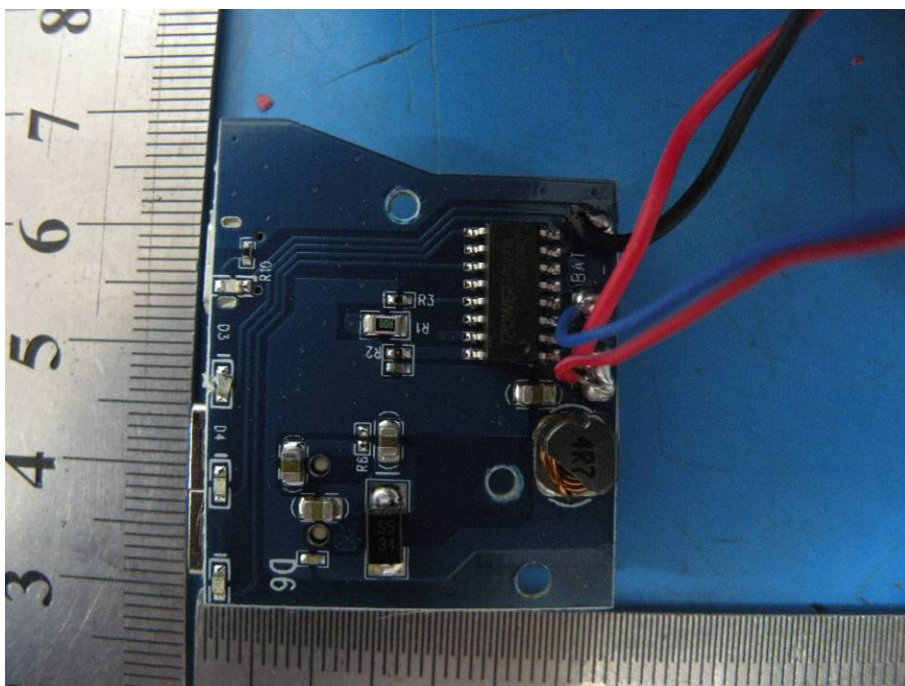
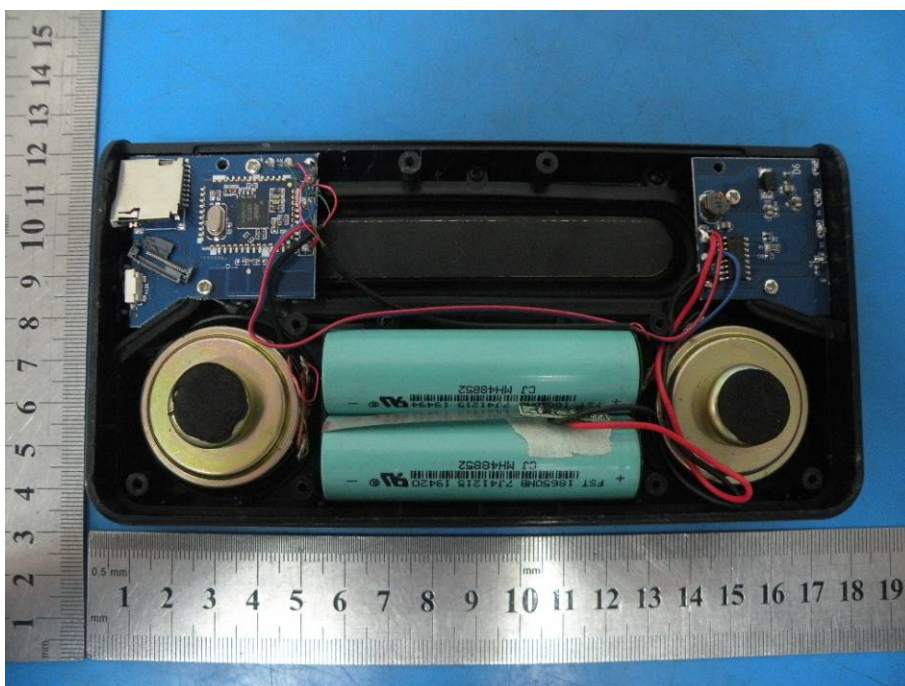


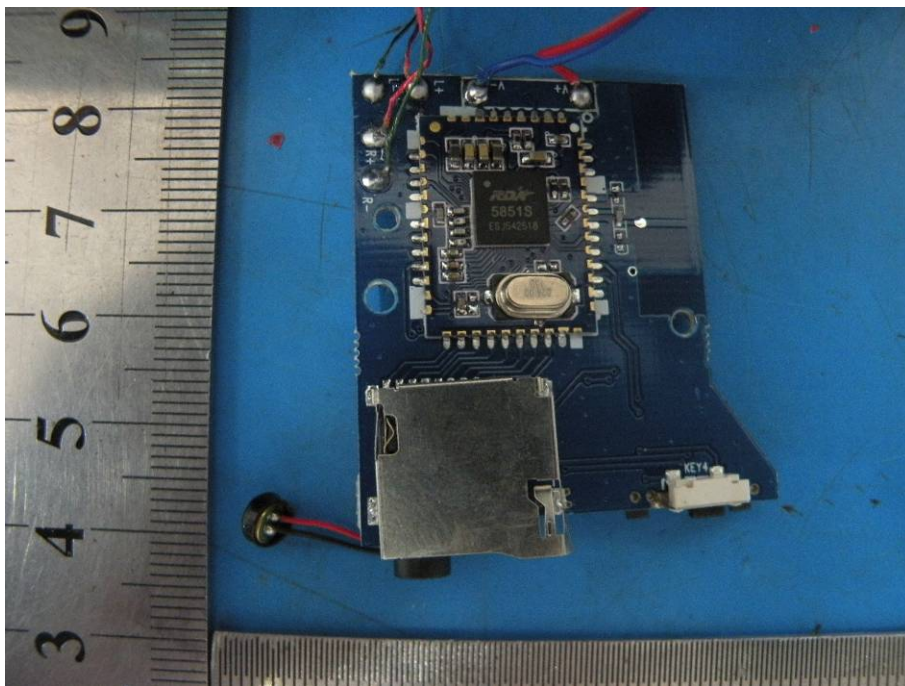
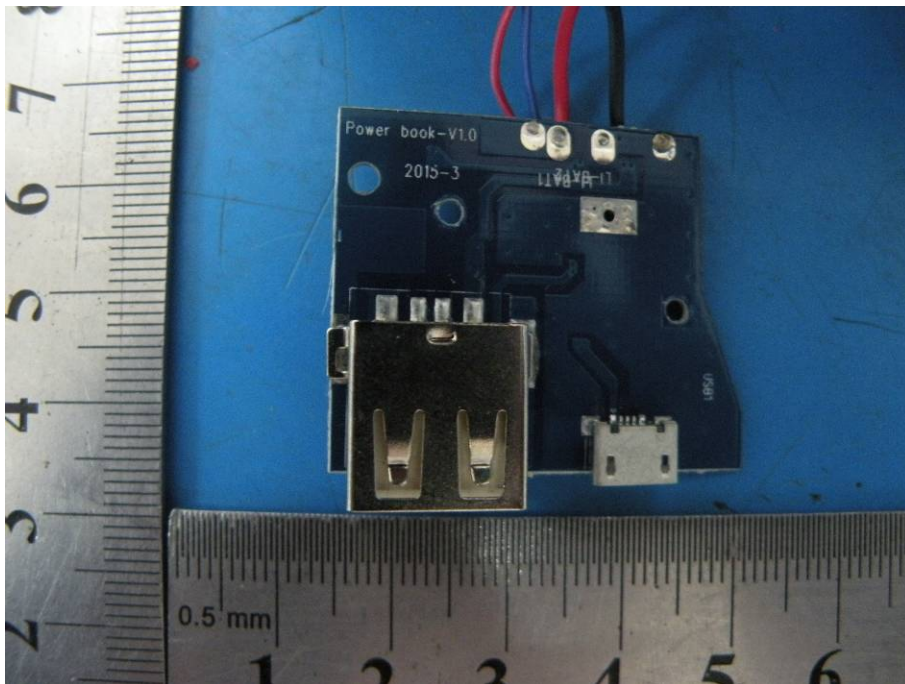


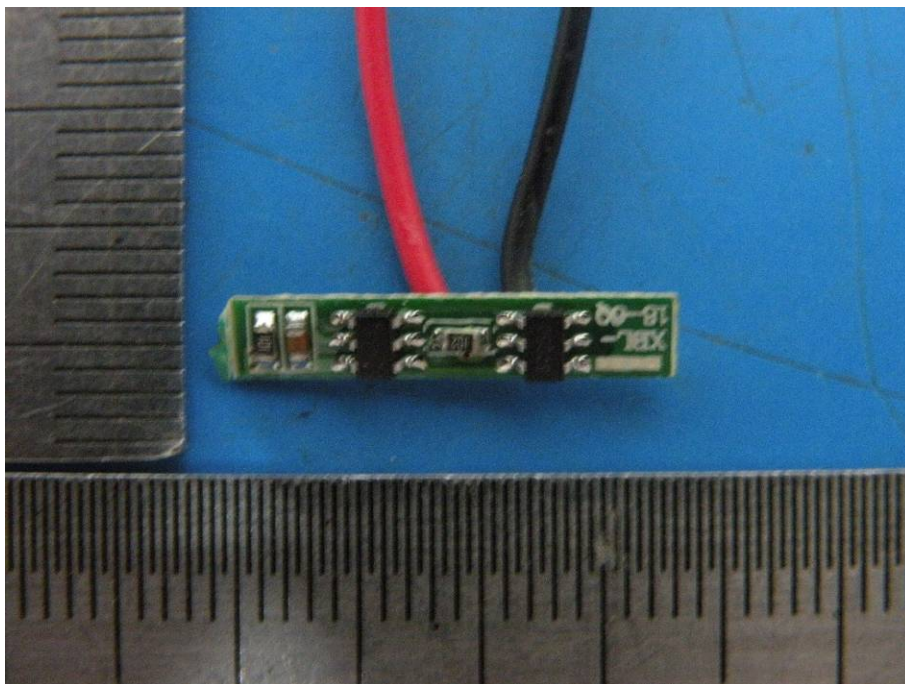
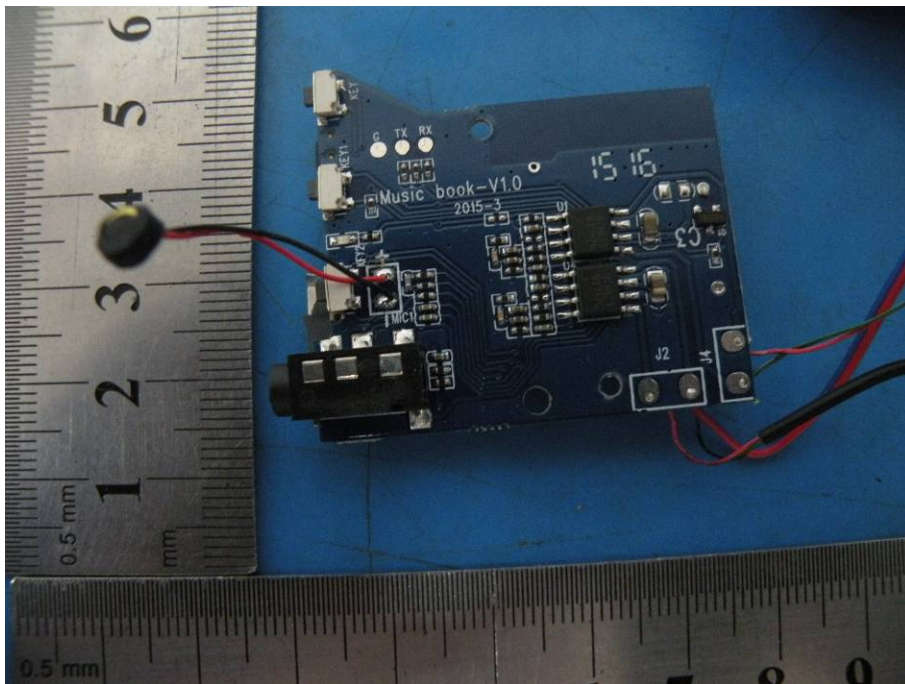


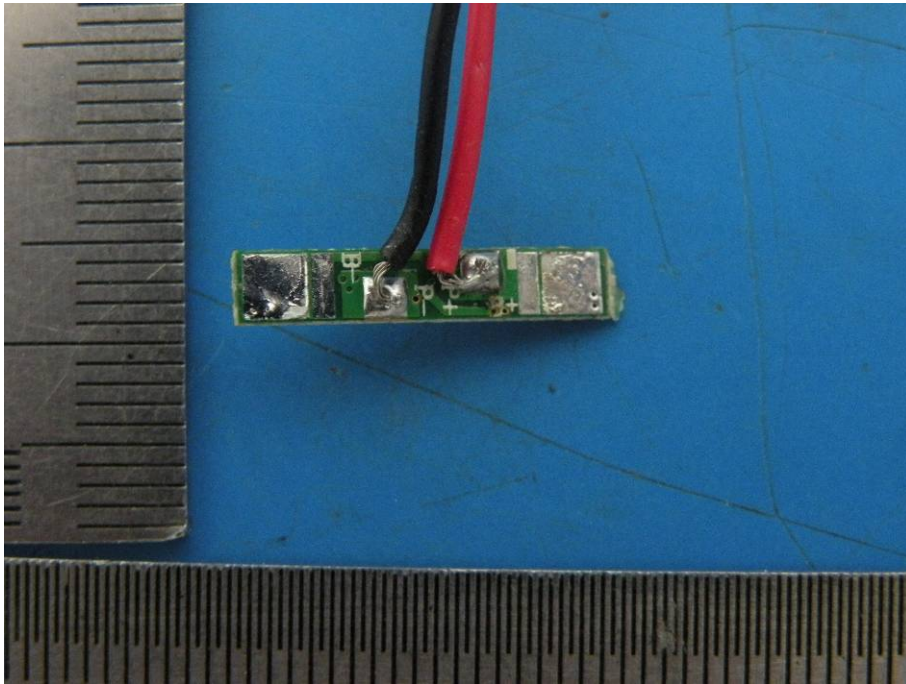












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