



Shenzhen Certification Technology Service Co., Ltd.  
2F, Building B, East Area of Nanchang Second Industrial  
Zone, Gushu 2<sup>nd</sup> Road, Bao'an District, Shenzhen  
518126, P.R. China

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# TEST REPORT

**FCC ID: 2ADMF-HC06**

Applicant : Shenzhen KEYES DIY Robot Co.,Ltd  
Address : Room1601 Jingxing Building, Changyong Road, Long Hua  
Xin Qu District, Shenzhen, China.

Equipment Under Test (EUT):

Name : bluetooth module  
Model : keyes HC-06, keyes hc-05,  
FUNDUINO HC-06, FUNDUINO hc-05

In Accordance with: FCC PART 15, SUBPART C: 2013 (Section 15.247)

Report No : CST-TCB141028057  
Date of Test : November 05- 14, 2014  
Date of Issue : November 17, 2014  
Test Result: **PASS**

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

Authorized Signature

A handwritten signature in black ink that reads "Mark Zhu". The signature is written in a cursive style and is positioned above a horizontal line.

(Mark Zhu)

General 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 Certification Technology Service Co., Ltd. Or test done by Shenzhen Certification Technology Service Co., Ltd. Approvals in connection with, distribution or use of the product described in this report must be approved by Shenzhen Certification Technology Service Co., Ltd. Approvals in writing.

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## 1. General Information

### 1.1. Description of Device (EUT)

|                     |   |
|---------------------|---|
| EUT                 | : bluetooth module  |
| Model No.           | : keyes HC-06, keyes hc-05,<br>FUNDUINO HC-06, FUNDUINO hc-05   |
| DIFF                | All model's the function, software and electric circuit are the same , only with the product model named different, so all the test were performed on the model keyes HC-06 |
| Trade mark          | : N/A   |
| Power supply        | : DC 3.3V   |
| Radio Technology    | : Bluetooth 2.1+EDR   |
| Operation frequency | : 2402-2480MHz  |
| Modulation          | : GFSK, $\pi/4$ DQPSK, 8-DPSK,  |
| Channel No.         | 79  |
| Antenna Type        | : PCB Antenna, max gain 0 dBi   |
| Applicant           | : Shenzhen KEYES DIY Robot Co.,Ltd  |
| Address             | : Room1601 Jingxing Building, Changyong Road, Long Hua<br>Xin Qu District, Shenzhen, China.   |
| Manufacturer        | : Shenzhen KEYES DIY Robot Co.,Ltd  |
| Address             | : Room1601 Jingxing Building, Changyong Road, Long Hua<br>Xin Qu District, Shenzhen, China.   |

### 1.2. Accessories of device (EUT)

N/A

### 1.3. Test Lab information

Shenzhen Certification Technology Service Co., Ltd.  
2F, Building B, East Area of Nanchang Second Industrial Zone,  
Gushu 2<sup>nd</sup> Road, Bao'an District, Shenzhen 518126, P.R. China

FCC Registered No.:197647

IC Registered No.: 8528B

## 2. Summary of test

### 2.1. Summary of test result

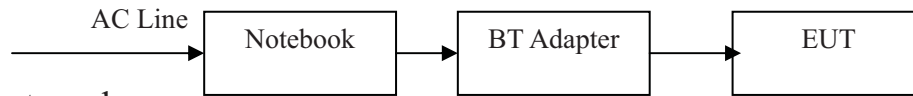
| Description of Test Item       | Standard                                      | Results |
|--------------------------------|---|---------|
| Maximum Peak Output Power      | FCC Part 15: 15.247(b)(1)                     | PASS    |
| Bandwidth                      | FCC Part 15: 15.215           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

### 2.2. Assistant equipment used for test

|   |   |          |
|---|---|----------|
| Description                                       | : | Notebook |
| Manufacturer                                      | : | ACER     |
| Model No.   | : | ZQT      |
| Note: This Notebook has been approved By FCC Doc. |   |          |

### 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 TX mode



### 2.4. Test mode

Keep the EUT work in Continuous TX mode, and select test channel, wireless mode

| Tested mode, channel, and data rate information |              |                 |
|---|--------------|-----------------|
| Mode  | Channel      | Frequency (MHz) |
| BDR:GFSK  | Low :CH0     | 2402            |
|   | Middle: CH39 | 2441            |
|   | High: CH78   | 2480            |
| EDR: $\pi/4$ DQPSK                              | Low :CH0     | 2402            |
|   | Middle: CH39 | 2441            |
|   | High: CH78   | 2480            |
| EDR:8-DPSK                                      | Low :CH0     | 2402            |
|   | Middle: CH39 | 2441            |
|   | High: CH78   | 2480            |

### 2.5. Test Conditions

|                   |           |
|-------------------|-----------|
| Temperature range | 22-25°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 (below 30MHz)   | 2.13 dB            | Polarize: V |
|   | 2.57dB             | Polarize: H |
| Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz) | 3.54dB             | Polarize: V |
|   | 4.1dB              | Polarize: H |
| Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz) | 2.08dB             | Polarize: H |
|   | 2.56dB             | Polarize: V |
| Uncertainty for radio frequency                                       | $1 \times 10^{-9}$ |             |
| 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           | 2015.01.19   | 1Year        |
| Spectrum analyzer   | Agilent      | E4407B       | MY49510055        | 2015.01.19   | 1Year        |
| Receiver            | R&S          | ESCI         | 101165            | 2015.01.19   | 1Year        |
| Receiver            | R&S          | ESCI         | 101202            | 2015.01.19   | 1Year        |
| Bilog Antenna       | SCHWARZBECK  | VULB 9168    | 9168-438          | 2015.01.21   | 1Year        |
| Horn Antenna        | SCHWARZBECK  | BBHA 9120 D  | BBHA 9120 D(1201) | 2015.01.21   | 1Year        |
| Horn Antenna        | SCHWARZBECK  | BBHA 9170    | BBHA 9170 D(1432) | 2015.01.21   | 1Year        |
| Active Loop Antenna | Beijing Daze | ZN30900A     | SEL0097           | 2015.01.19   | 1Year        |
| L.I.S.N.            | SCHWARZBECK  | NSLK8126     | 8126466           | 2015.01.19   | 1Year        |
| Cable               | Resenberger  | SUCOFLEX 104 | MY6562/4          | 2015.01.19   | 1Year        |
| Cable               | Resenberger  | SUCOFLEX 104 | 309972/4          | 2015.01.19   | 1Year        |
| Cable               | Resenberger  | SUCOFLEX 104 | 329112/4          | 2015.01.19   | 1Year        |
| Power Meter         | Anritsu      | ML2487A      | 6K00001491        | 2015.01.19   | 1Year        |
| Power sensor        | Anritsu      | ML2491A      | 32516             | 2015.01.19   | 1Year        |
| Pre-amplifier       | SCHWARZBECK  | BBV9743      | 9743-019          | 2015.01.19   | 1Year        |
| Pre-amplifier       | Quietek      | AP-180C      | CHM-0602012       | 2015.01.19   | 1Year        |

### 3. Maximum Peak Output power

#### 3.1. Limit

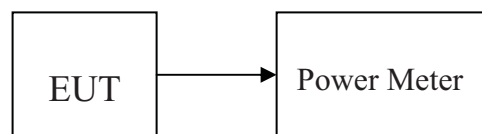
Please refer section 15.247.

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 module |            | M/N: keyes HC-06      |                      |                  |             |
|-----------------------|------------|-----------------------|----------------------|------------------|-------------|
| Test date: 2014-11-12 |            | Test site: RF site    |                      | Tested by: Store |             |
| Mode                  | Freq (MHz) | PK Output Power (dBm) | PK Output Power (mW) | Limit (dBm)      | Test result |
| GFSK                  | 2402       | 2.13                  | 1.63                 | 21.00            | PASS        |
|                       | 2441       | 2.28                  | 1.69                 | 21.00            |             |
|                       | 2480       | 2.07                  | 1.61                 | 21.00            |             |
| $\pi/4$ -DQPSK        | 2402       | 1.53                  | 1.42                 | 21.00            |             |
|                       | 2441       | 1.36                  | 1.37                 | 21.00            |             |
|                       | 2480       | 1.57                  | 1.44                 | 21.00            |             |
| 8-DPSK                | 2402       | 1.48                  | 1.41                 | 21.00            |             |
|                       | 2441       | 1.21                  | 1.32                 | 21.00            |             |
|                       | 2480       | 1.52                  | 1.42                 | 21.00            |             |



## 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

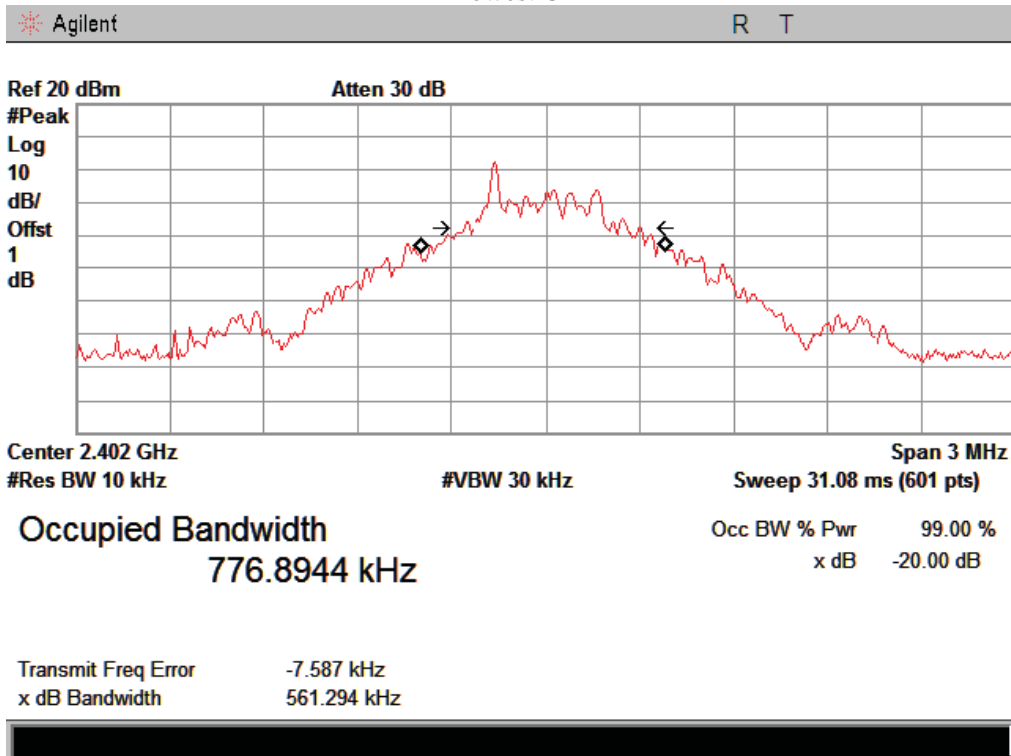
The transmitter output was coupled to a spectrum analyzer via a antenna. The bandwidth of the fundamental frequency was measured by spectrum analyzer with  $RBW \geq 1\%$  of the 20dB bandwidth and  $VBW \geq RBW$ . The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

### 4.3. Test Result

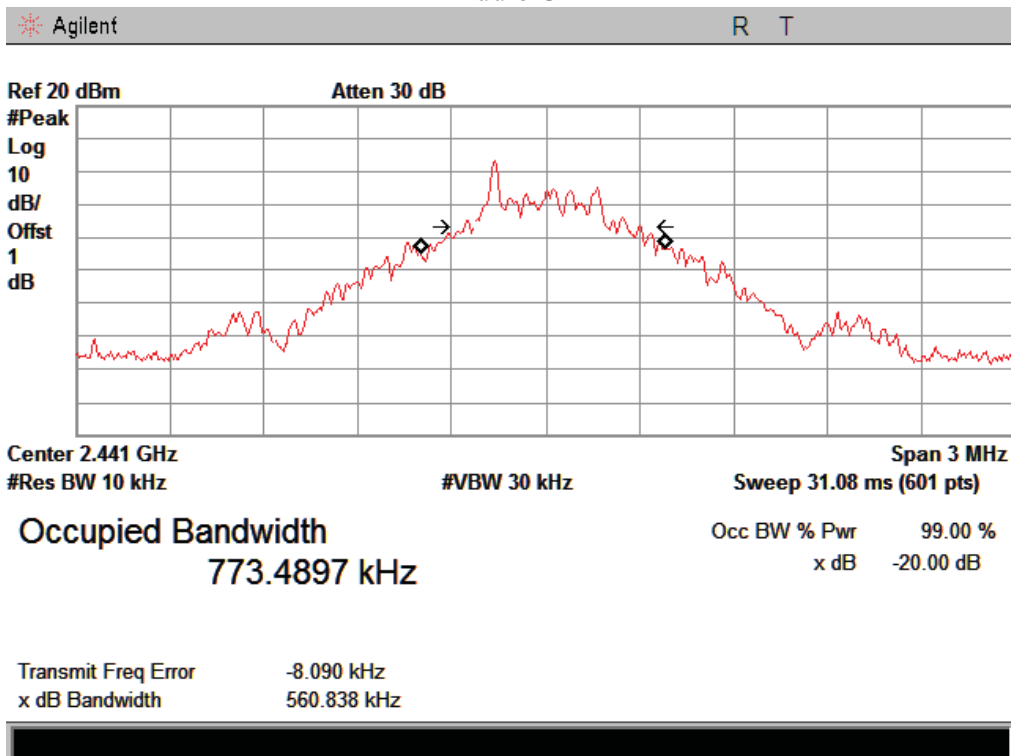
| EUT: bluetooth module |            | M/N: keyes HC-06     |             |                  |
|-----------------------|------------|----------------------|-------------|------------------|
| Test date: 2014-11-14 |            | Test site: RF site   |             | Tested by: Store |
| Mode                  | Freq (MHz) | 20dB Bandwidth (MHz) | Limit (kHz) | Conclusion       |
| GFSK                  | 2402       | 0.561                | N/A         | PASS             |
|                       | 2441       | 0.561                |             |                  |
|                       | 2480       | 0.562                |             |                  |
| 8-DPSK                | 2402       | 0.917                |             |                  |
|                       | 2441       | 0.915                |             |                  |
|                       | 2480       | 0.931                |             |                  |

Original Test data For 20dB bandwidth  
GFSK

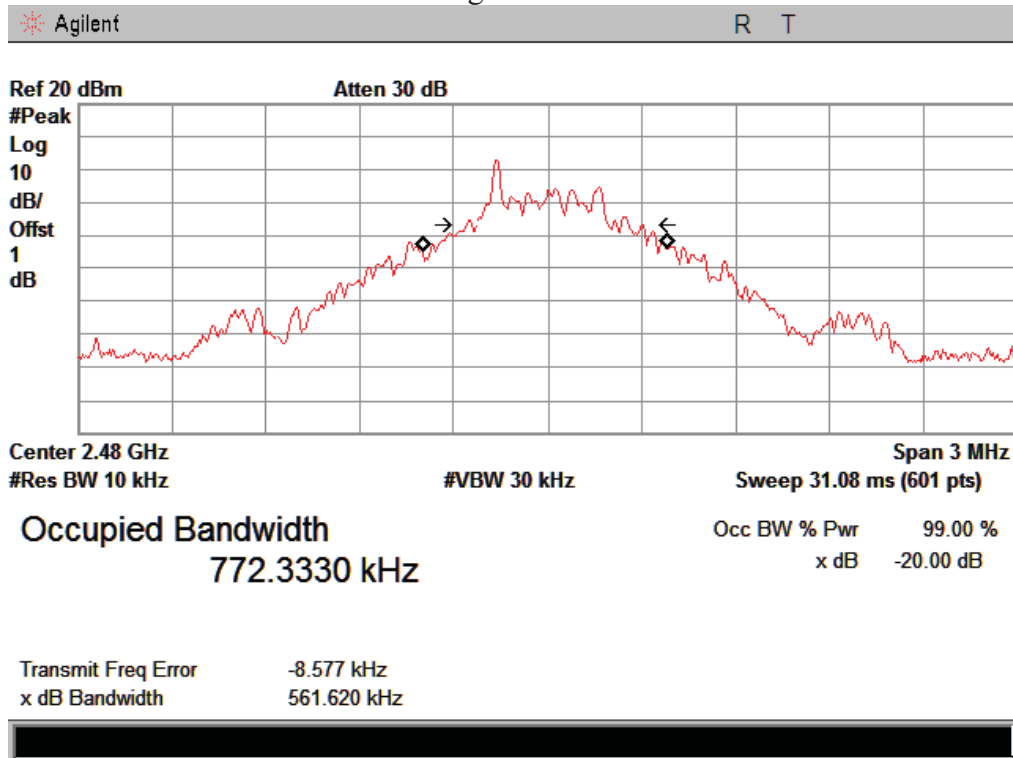
Lowest CH



Middle CH

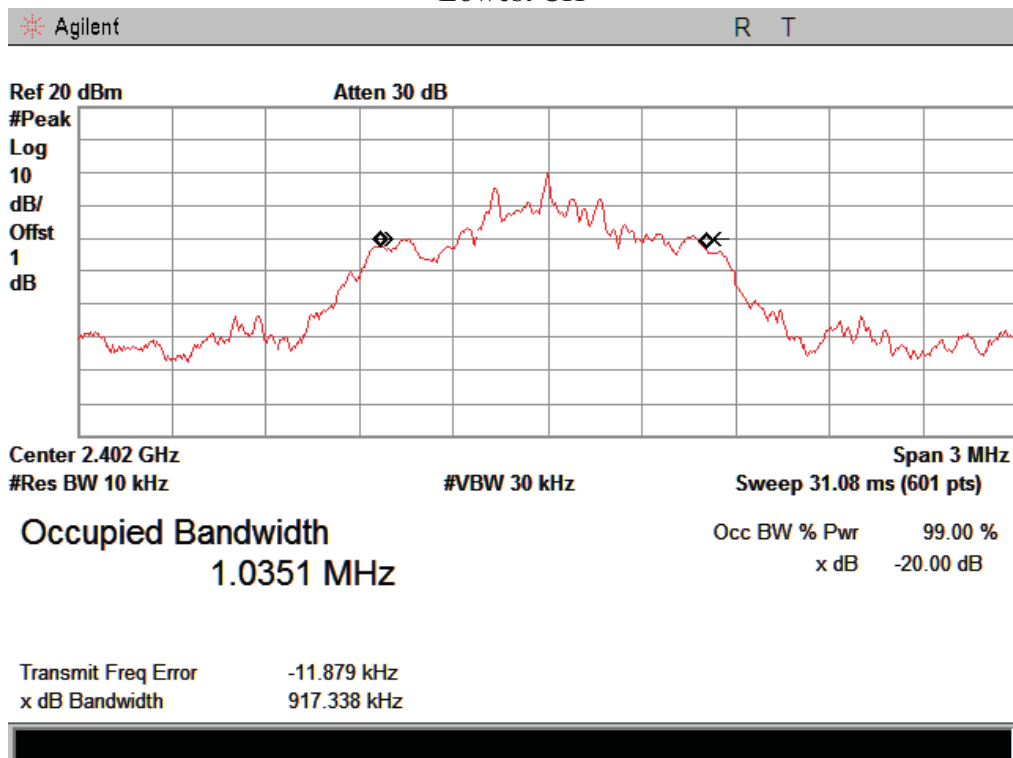


Highest CH

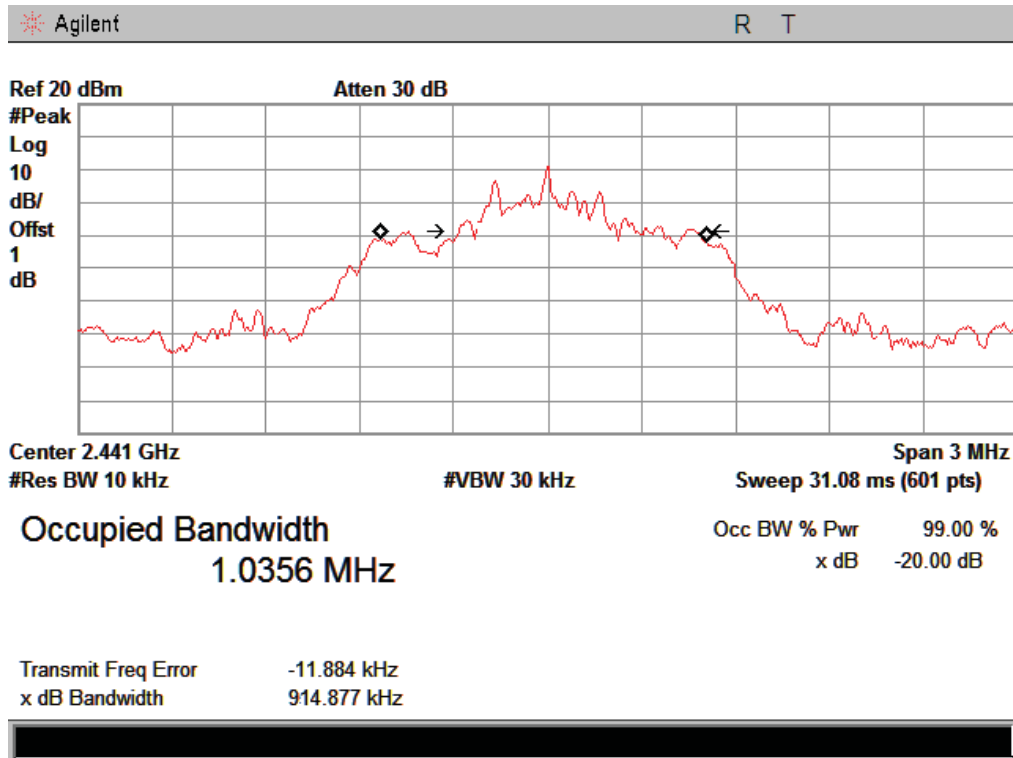


8-DPSK

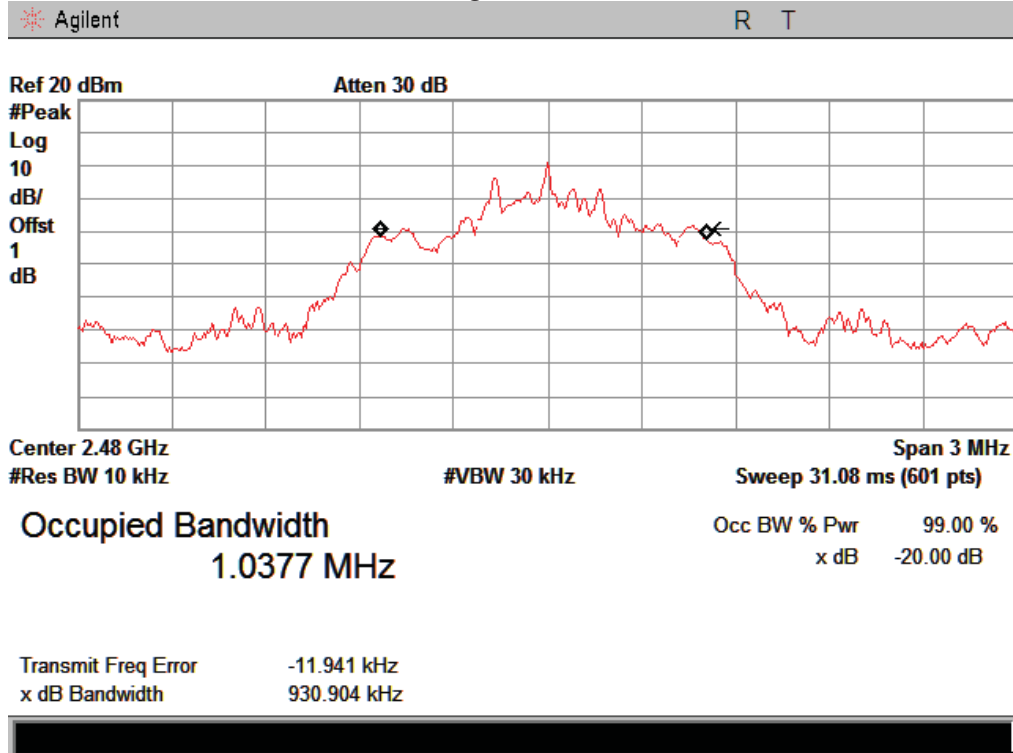
Lowest CH



Middle CH



Highest CH



## 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 100 kHz RBW and 300 kHz VBW.

### 5.3. Test Result

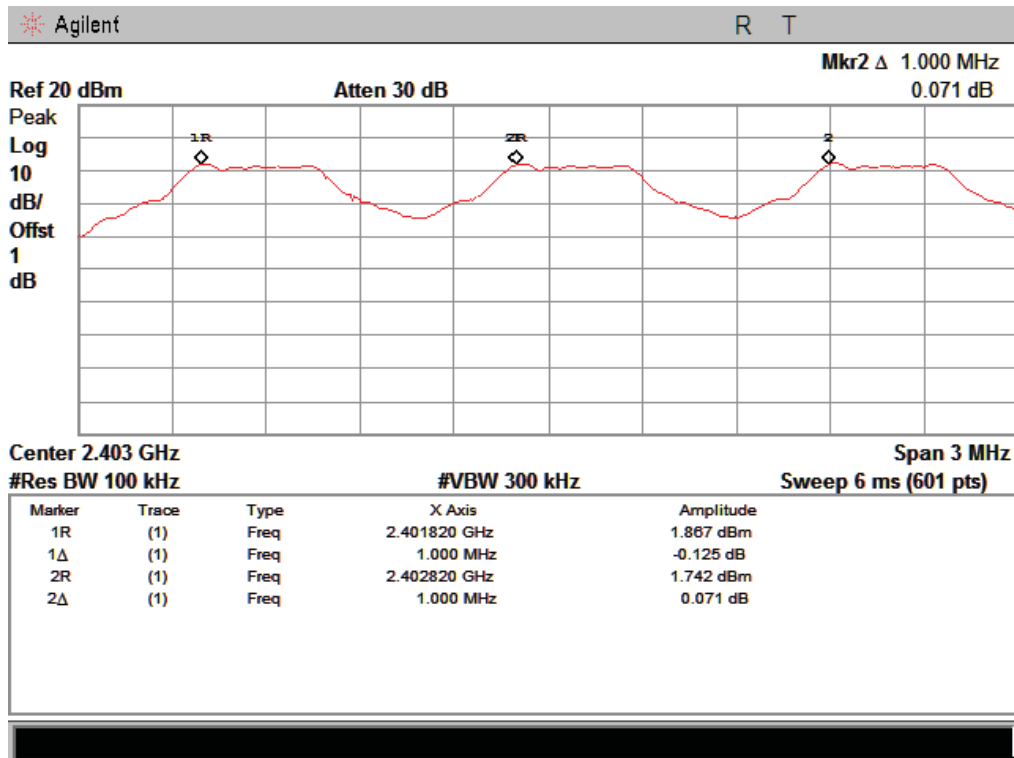
GFSK:

| EUT: bluetooth module M/N: keyes HC-06 |                          |                      |                             |                  |
|--|--------------------------|----------------------|-----------------------------|------------------|
| Test date: 2014-11-14                  |                          | Test site: RF site   |                             | Tested by: Store |
| Mode                                   | Channel separation (MHz) | 20dB Bandwidth (MHz) | Limit (MHz)                 | Conclusion       |
| Lowest                                 | 1.000                    | 0.561                | 2/3 20dB bandwidth or 25kHz | PASS             |
| Middle                                 | 1.000                    | 0.560                |                             |                  |
| Highest                                | 1.000                    | 0.562                |                             |                  |

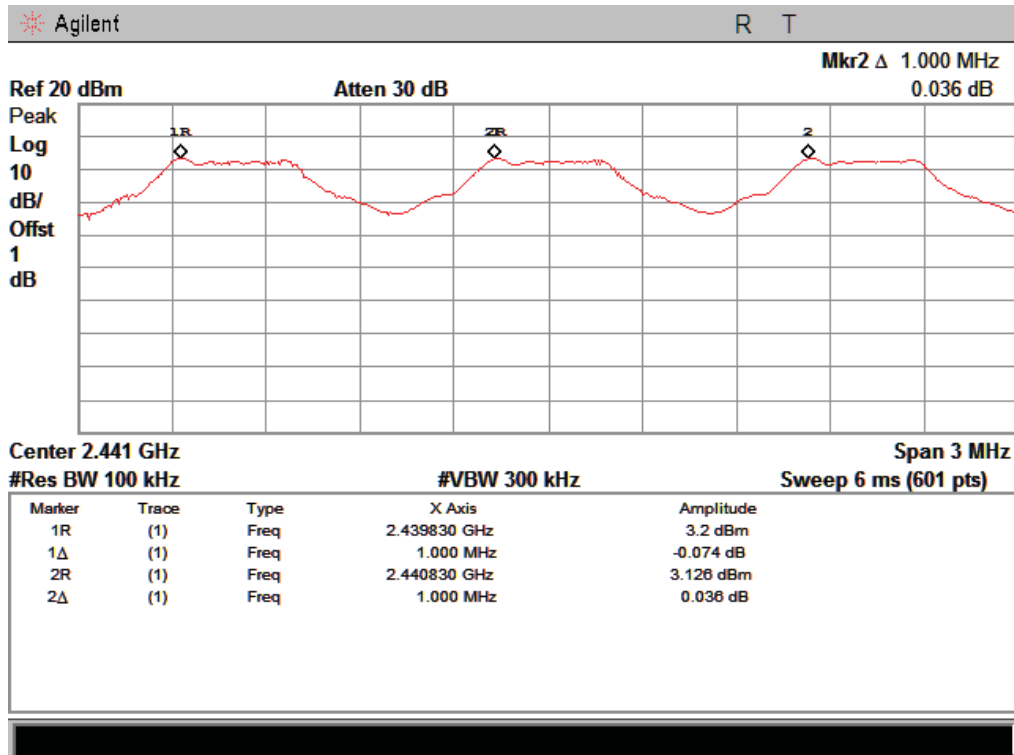
8-DPSK

| EUT: bluetooth module M/N: keyes HC-06 |                          |                      |                             |                  |
|--|--------------------------|----------------------|-----------------------------|------------------|
| Test date: 2014-11-12                  |                          | Test site: RF site   |                             | Tested by: Store |
| Mode                                   | Channel separation (MHz) | 20dB Bandwidth (MHz) | Limit (MHz)                 | Conclusion       |
| Lowest                                 | 1.000                    | 0.917                | 2/3 20dB bandwidth or 25kHz | PASS             |
| Middle                                 | 1.000                    | 0.915                |                             |                  |
| Highest                                | 1.000                    | 0.931                |                             |                  |

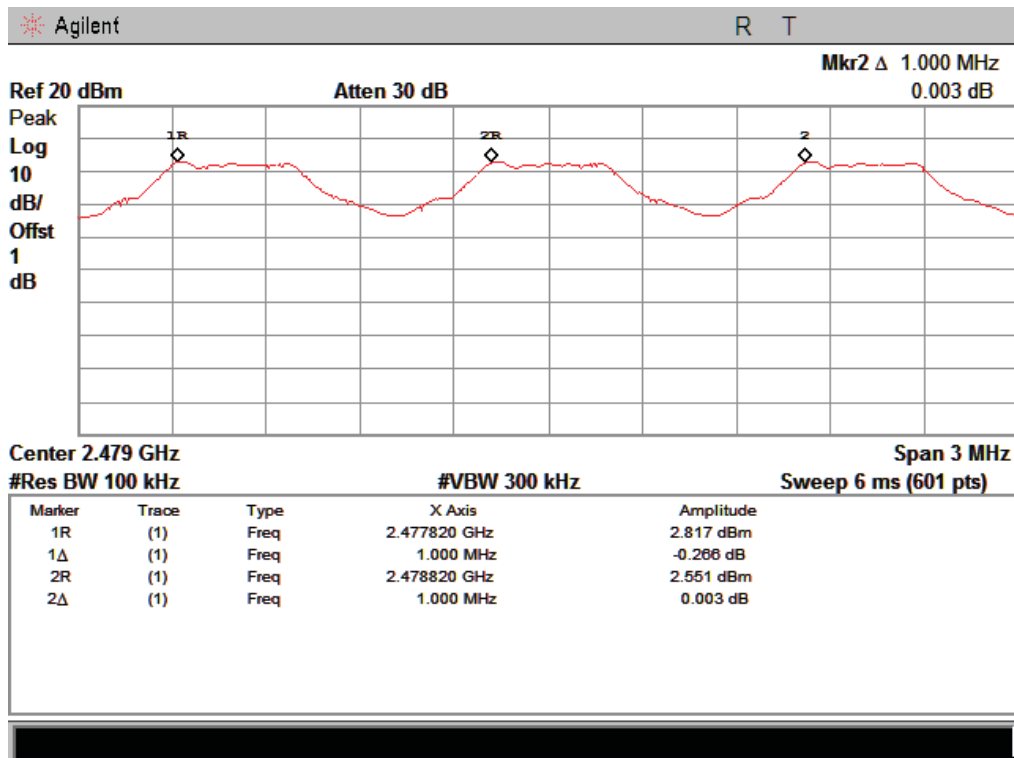
Original test data for channel separation  
GFSK



Lowest

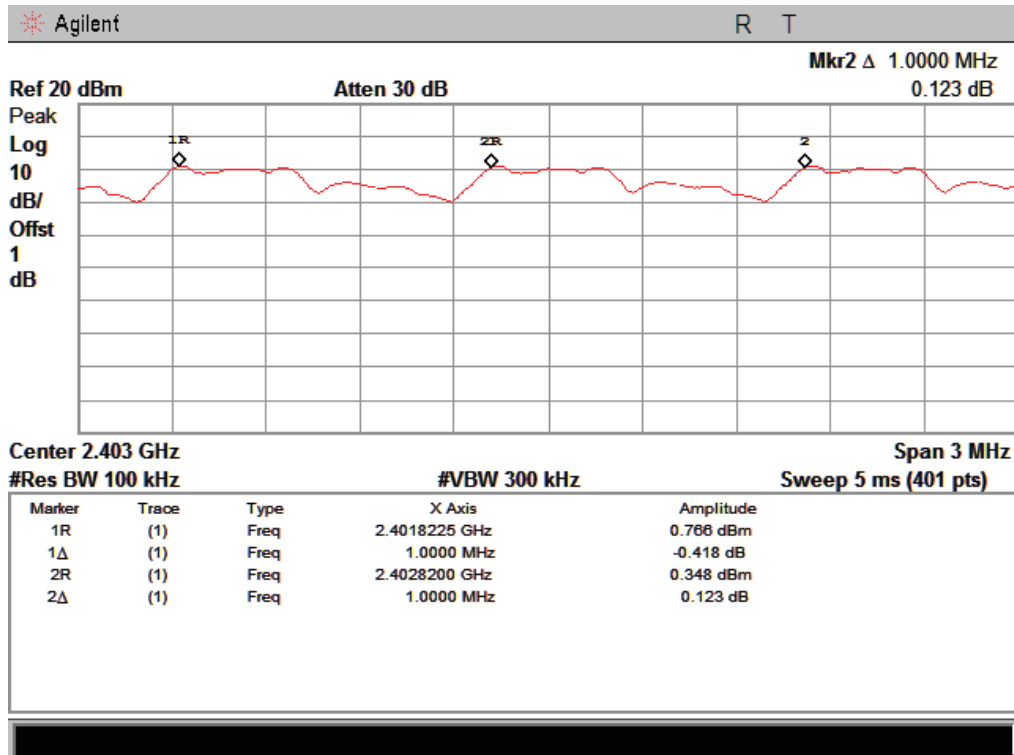


Middle

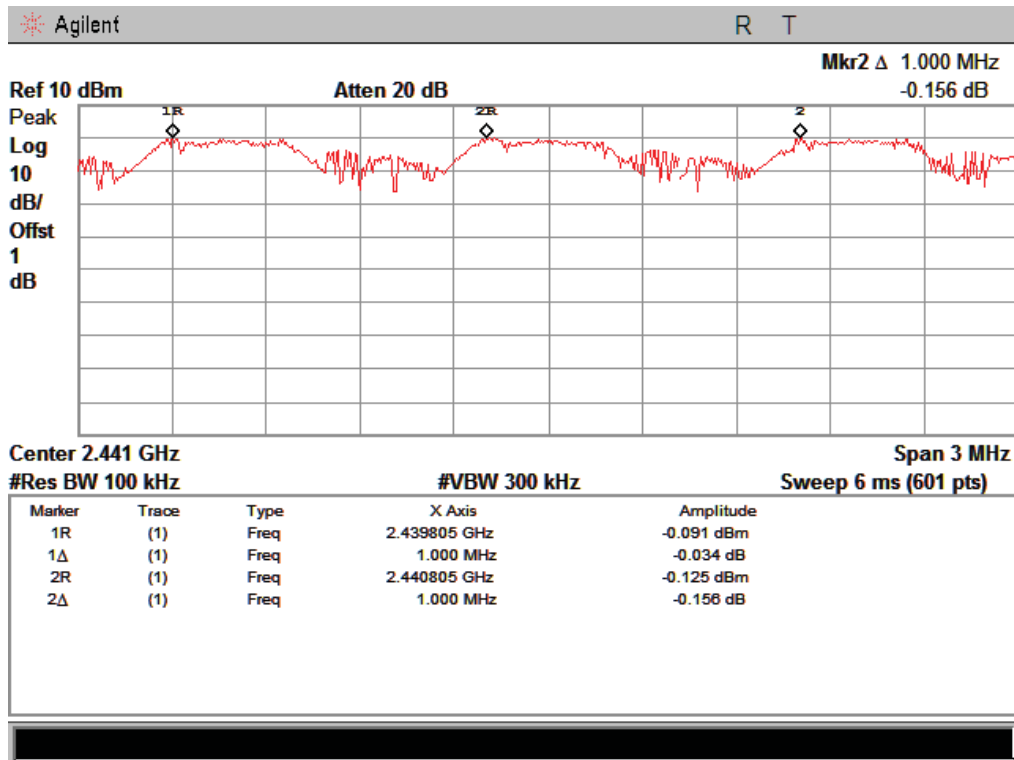


Highest

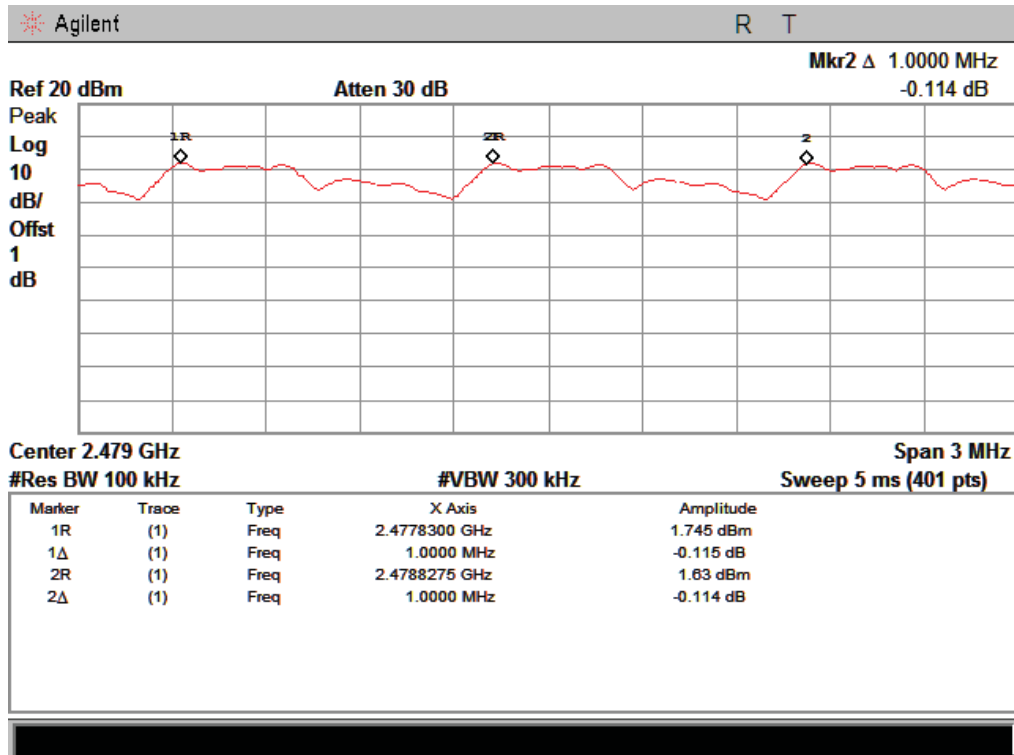
8-DPSK



Lowest



Middle



Highest



## 6. Number Of Hopping Channel

### 6.1. Limit

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

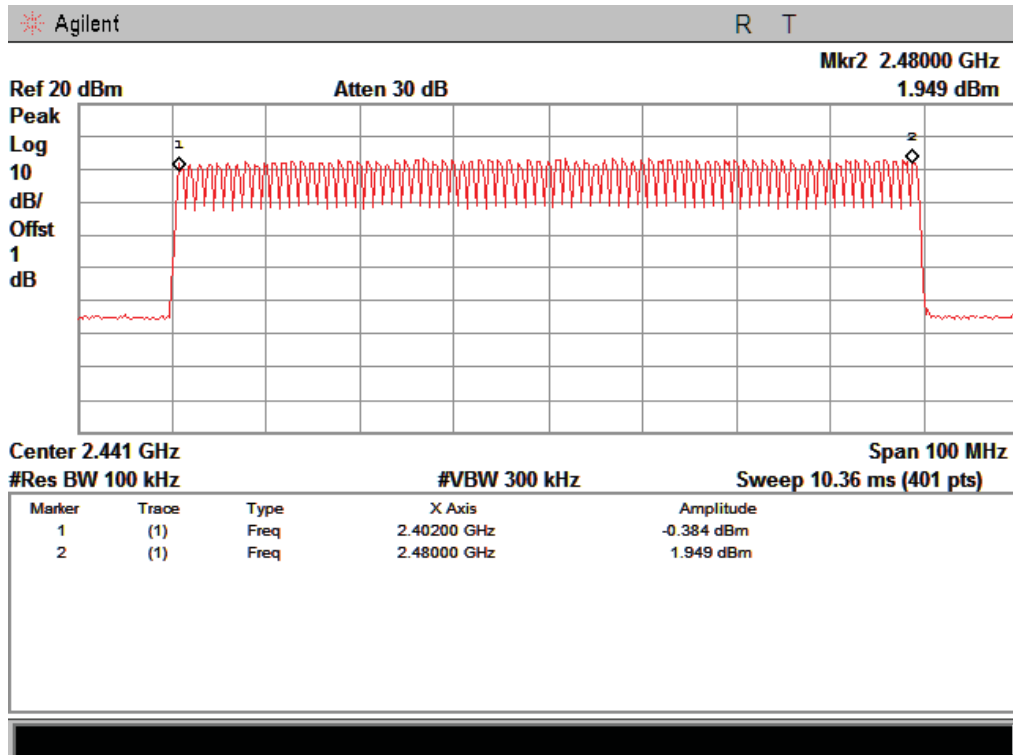
### 6.2. Test Procedure

The transmitter output was coupled to a spectrum analyzer via a antenna. The number of hopping channel was measured by spectrum analyzer with 100kHz RBW and 300kHz VBW.

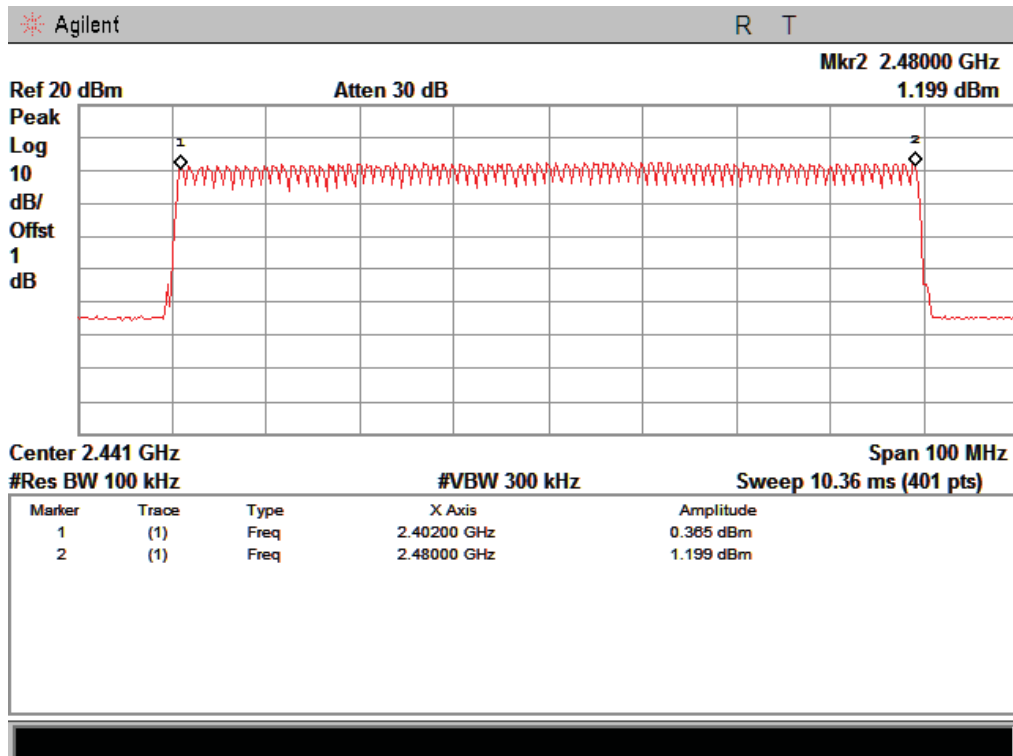
### 6.3. Test Result

| EUT: bluetooth module |                           | M/N: keyes HC-06   |                  |
|-----------------------|---------------------------|--------------------|------------------|
| Test date: 2014-10-14 |                           | Test site: RF site | Tested by: Store |
| Mode                  | Number of hopping channel | Limit              | Conclusion       |
| GFSK                  | 79                        | >15                | PASS             |
| Pi/4-DQPSK            | 79                        |                    |                  |
| 8-DPSK                | 79                        |                    |                  |

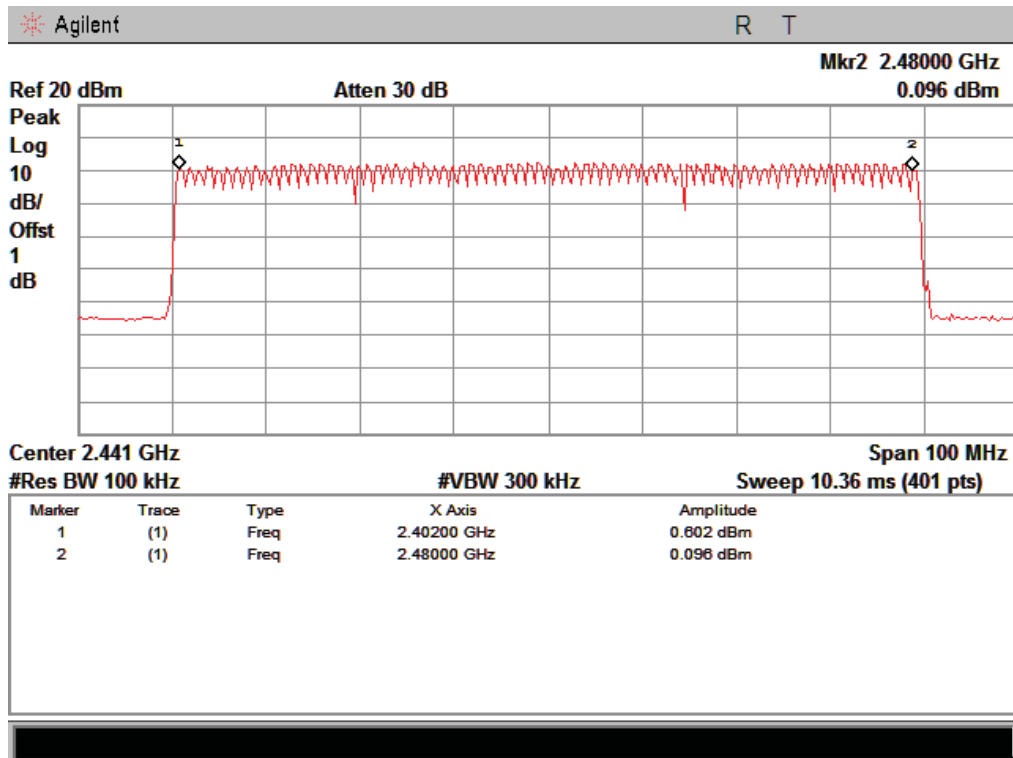
Original test data for hopping channel number  
GFSK



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.

| Mode      | Packet | Pulse Duration<br>(ms) | Dwell time<br>(second) | Limit (second)<br>(s) | Result |
|-----------|--------|------------------------|------------------------|-----------------------|--------|
| GFSK      | DH1    | 0.41                   | 0.131                  | 0.4                   | Pass   |
|           | DH3    | 1.66                   | 0.266                  |                       |        |
|           | DH5    | 2.89                   | 0.308                  |                       |        |
| Pi/4DQPSK | 2-DH1  | 0.42                   | 0.134                  | 0.4                   | Pass   |
|           | 2-DH3  | 1.67                   | 0.267                  |                       |        |
|           | 2-DH5  | 2.95                   | 0.315                  |                       |        |
| 8-DPSK    | 3-DH1  | 0.42                   | 0.134                  | 0.4                   | Pass   |
|           | 3-DH3  | 1.66                   | 0.266                  |                       |        |
|           | 3-DH5  | 2.92                   | 0.312                  |                       |        |

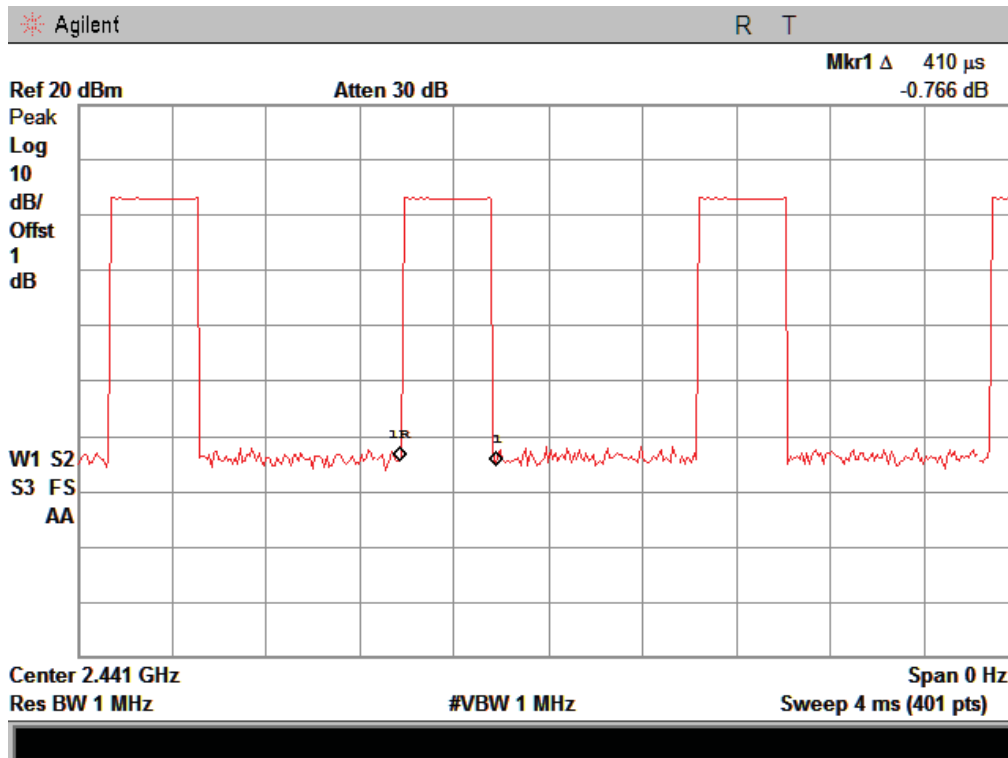
Note: 1 A period time = 0.4 (s) \* 79 = 31.6(s)

2 DH1 time slot = Pulse Duration \* (1600/(2\*79)) \* A period time

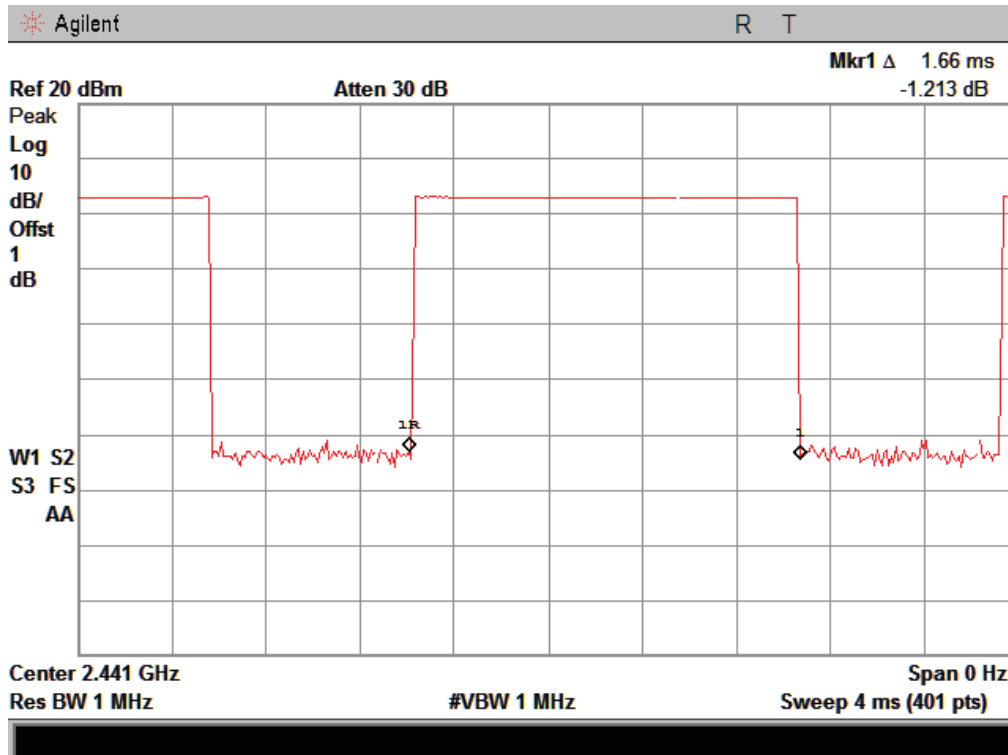
DH3 time slot = Pulse Duration \* (1600/(4\*79)) \* A period time

DH5 time slot = Pulse Duration \* (1600/(6\*79)) \* A period time

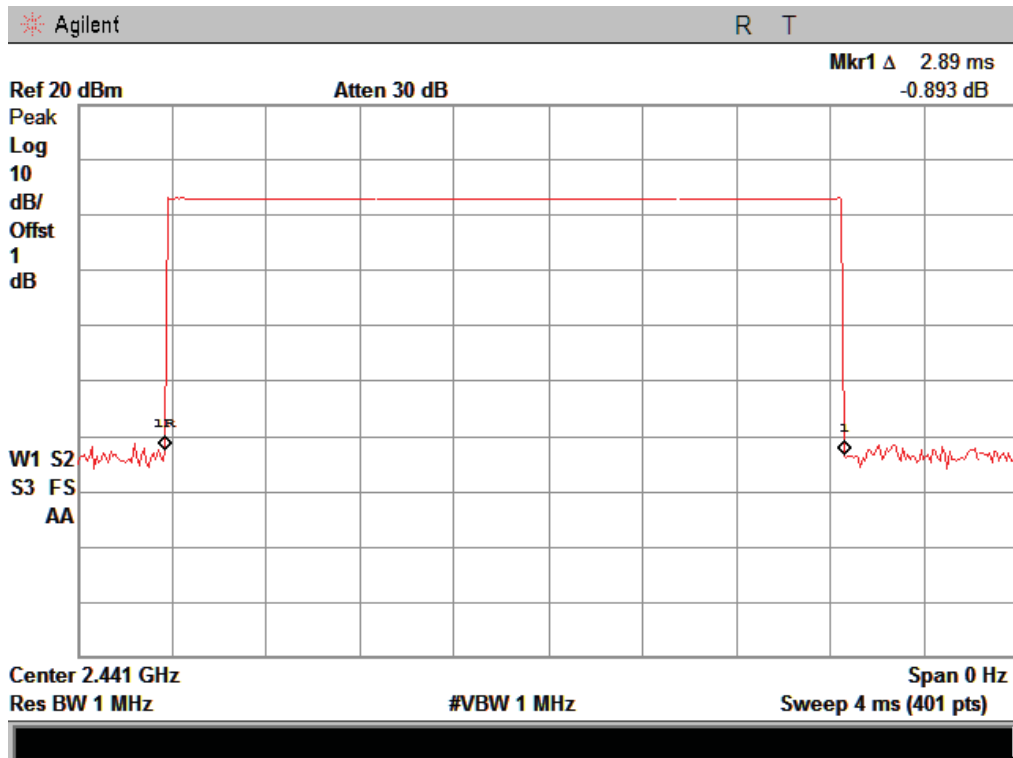
DH1:



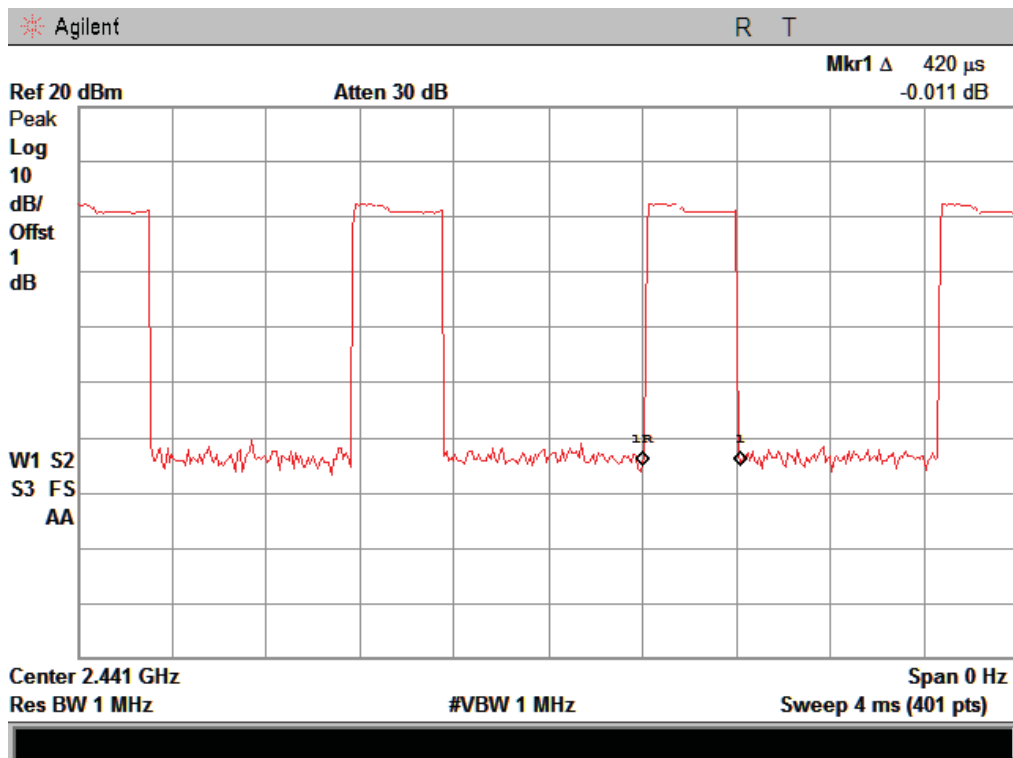
DH3:



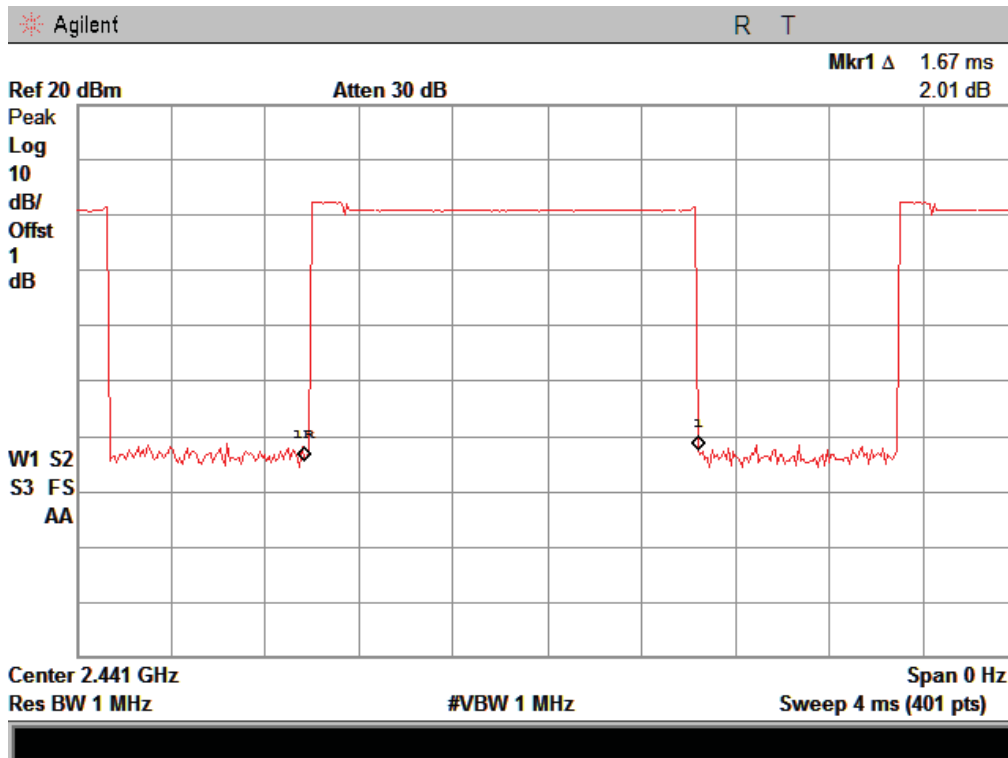
DH5:



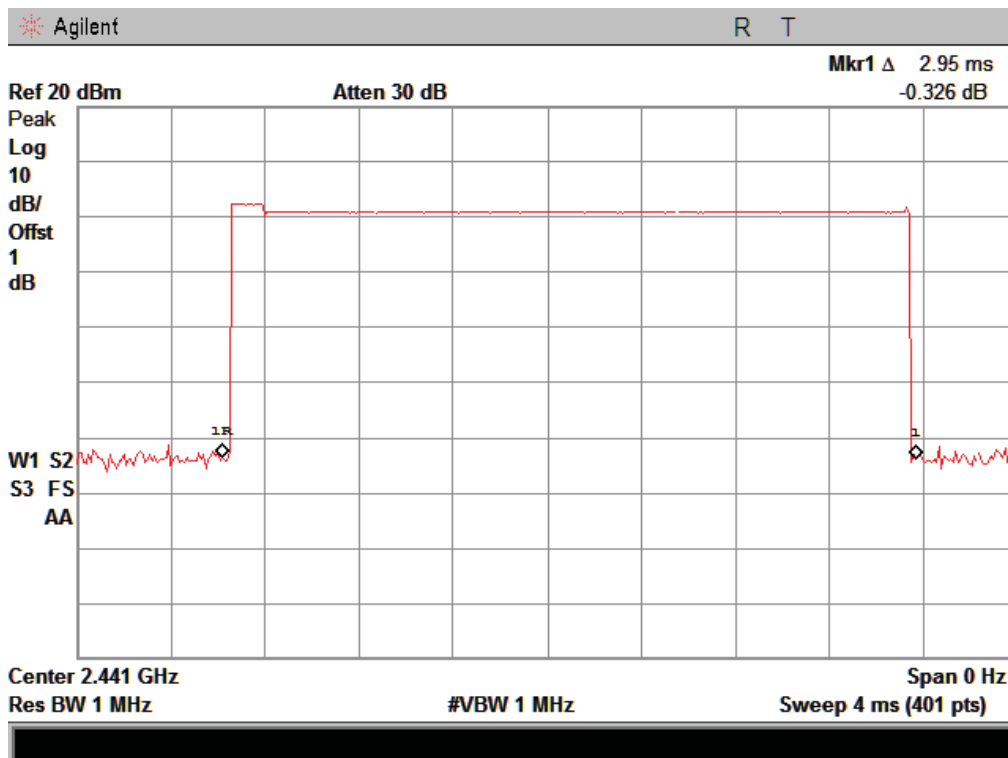
2DH1:



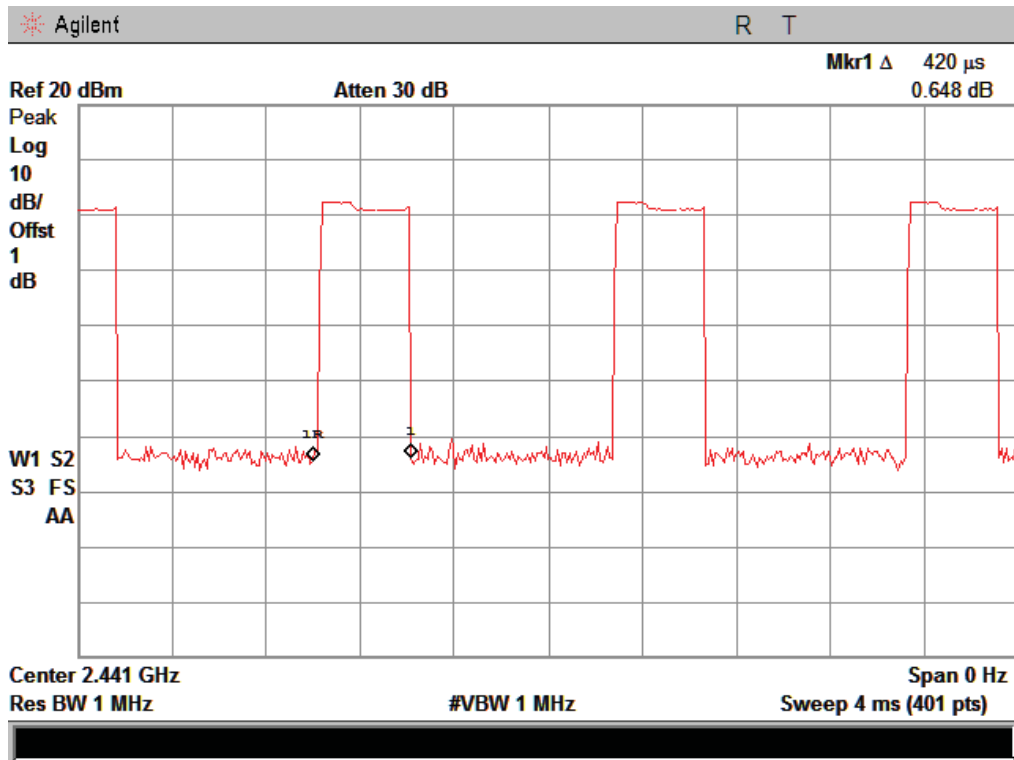
2DH3:



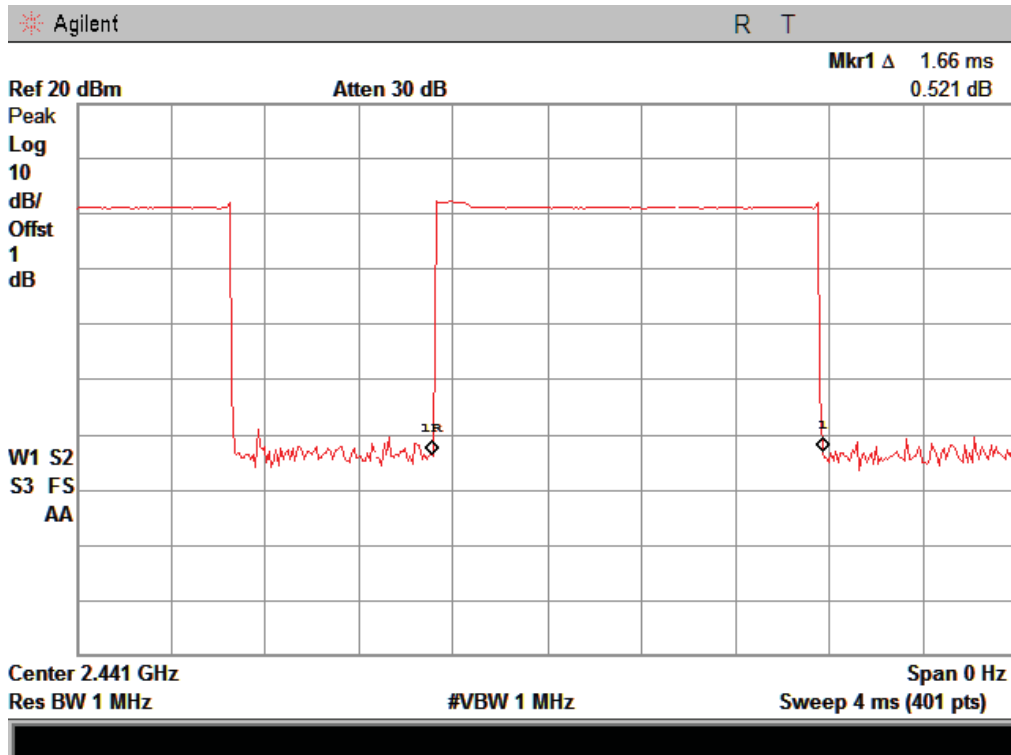
2DH5:



3DH1:

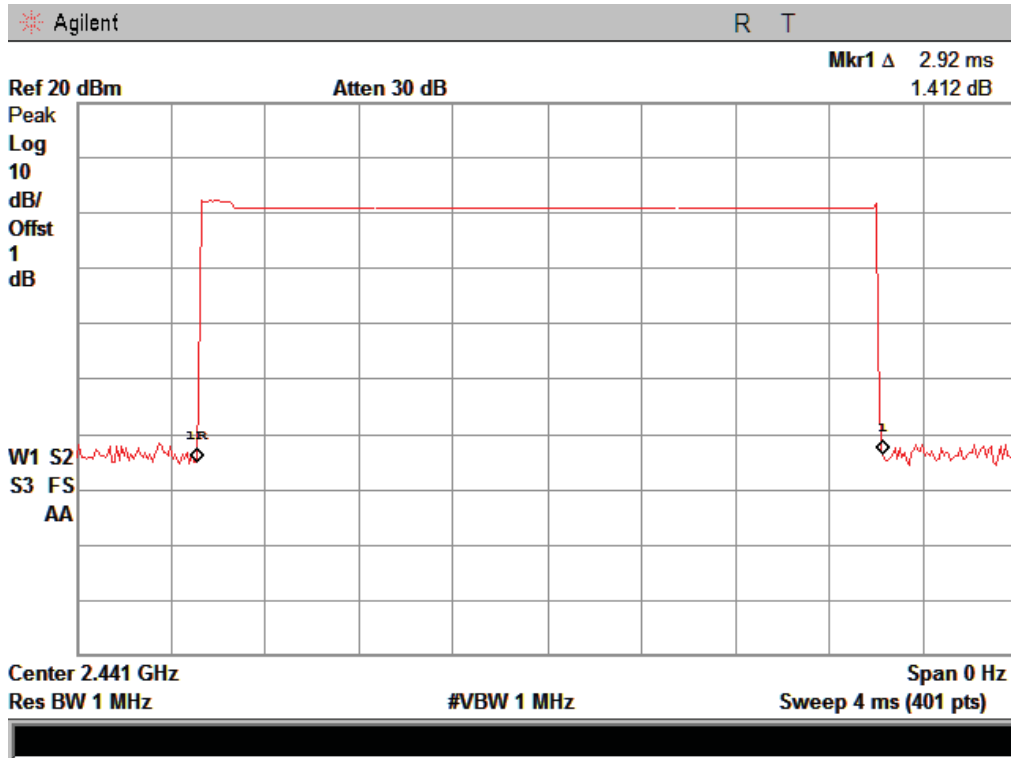


3DH3:





3DH5:



## 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

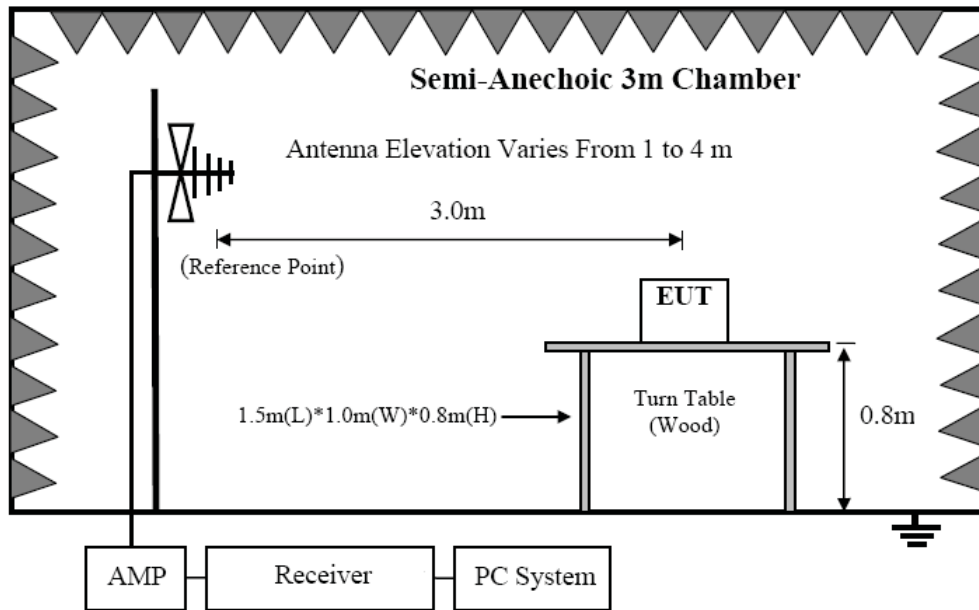
| MHz                        | MHz                   | MHz             | GHz              |
|----------------------------|-----------------------|-----------------|------------------|
| 0.090 - 0.110              | 16.42 - 16.423        | 399.9 - 410     | 4.5 - 5.15       |
| <sup>1</sup> 0.495 - 0.505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

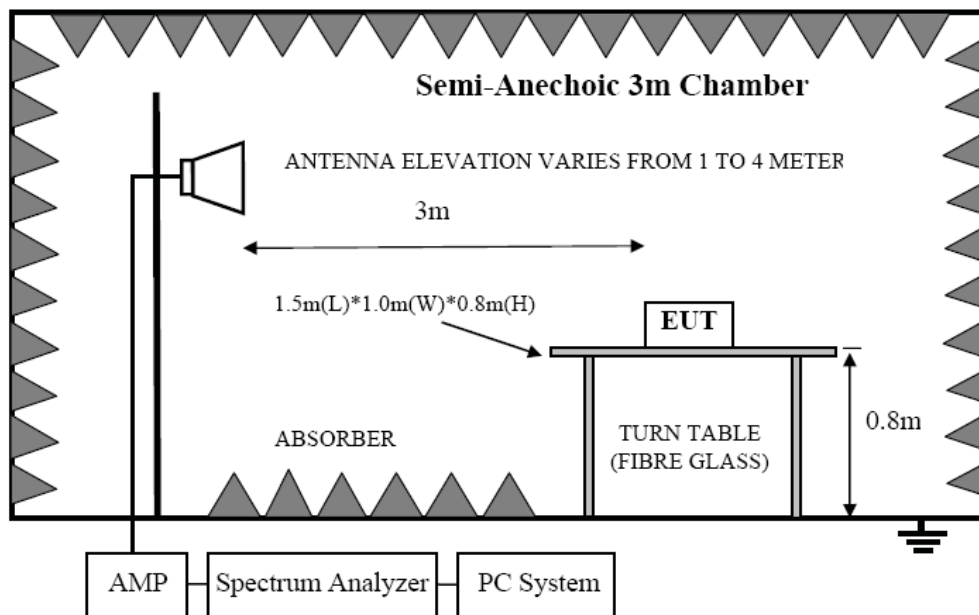
| FREQUENCY<br>MHz | DISTANCE<br>Meters | FIELD STRENGTHS LIMIT   |                                   |
|------------------|--------------------|---|-----------------------------------|
|                  |                    | $\mu\text{V}/\text{m}$  | $\text{dB}(\mu\text{V})/\text{m}$ |
| 0.009-0.490      | 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 $\text{dB}(\mu\text{V})/\text{m}$ (Peak)<br>54.0 $\text{dB}(\mu\text{V})/\text{m}$ (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) Power supplied by DC 5V From PC AC120V/60Hz or DC 3.7V from battery.
  - (d) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produce highest emissions
- (4) Spectrum frequency from 9 kHz 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 2003 on 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 9 kHz to the EUT.  
Detailed information please see the following page.

From 9 kHz to 30 MHz: 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.

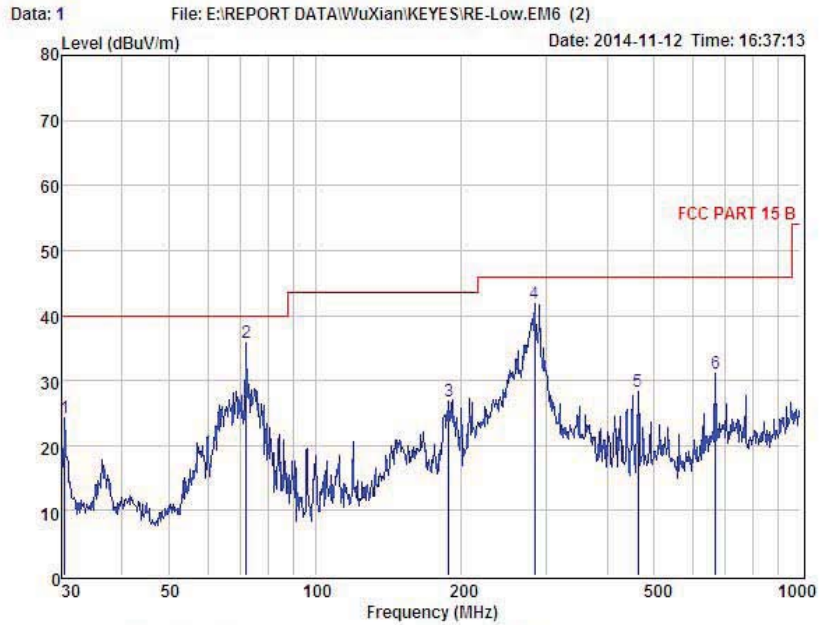
Remark: All three modulations of EUT have been tested, only show the test data of the worst modulation (GFSK) in this report, And GFSK low channel is worse case for 30MHz-1GHz test .

From 30MHz to 1000MHz: Conclusion: PASS

Horizontal:



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Condition : FCC PART 15 B 3m POL: HORIZONTAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : GFSK TX 2402MHz  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 25.2°C  
 Hum : 56%

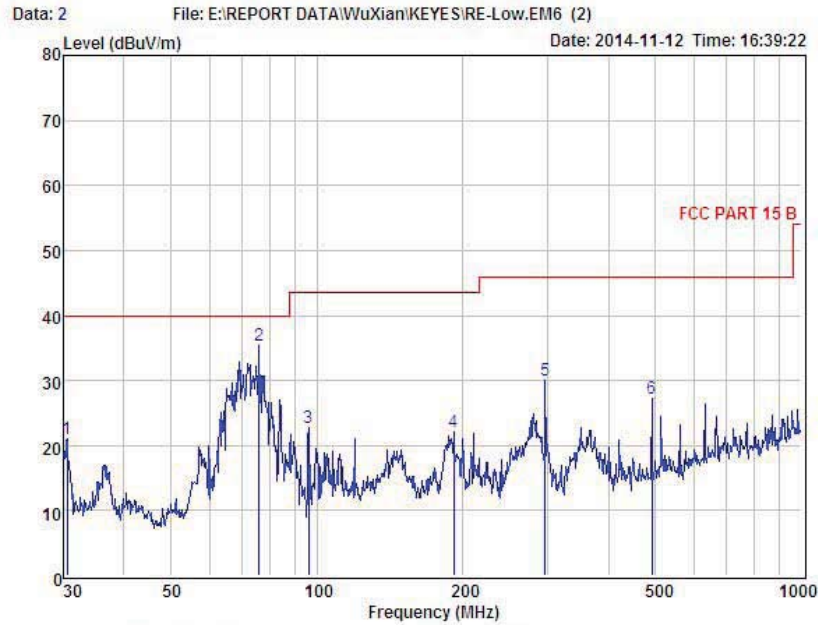
| Item | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Preamp<br>Factor<br>dB | Cable<br>Loss<br>dB | Level<br>dBuV | Limit<br>dBuV | Margin<br>dBuV | Remark |
|------|-------------|-----------------------|-------------------------|------------------------|---------------------|---------------|---------------|----------------|--------|
| 1    | 30.42       | 41.90                 | 13.22                   | 30.91                  | 0.03                | 24.24         | 40.00         | -15.76         | QP     |
| 2    | 72.08       | 56.43                 | 10.51                   | 31.41                  | 0.19                | 35.72         | 40.00         | -4.28          | QP     |
| 3    | 188.41      | 46.85                 | 10.71                   | 31.25                  | 0.55                | 26.86         | 43.50         | -16.64         | QP     |
| 4    | 282.99      | 59.89                 | 12.45                   | 31.00                  | 0.56                | 41.90         | 46.00         | -4.10          | QP     |
| 5    | 462.35      | 41.93                 | 16.08                   | 30.66                  | 0.98                | 28.33         | 46.00         | -17.67         | QP     |
| 6    | 668.14      | 41.06                 | 19.30                   | 30.31                  | 1.01                | 31.06         | 46.00         | -14.94         | QP     |

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

Vertical:



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 Website: http://www.cessz.com Email: Service@cessz.com



Condition : FCC PART 15 B 3m POL: VERTICAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : GFSK TX 2402MHz  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 25.2°C  
 Hum : 56%

| 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    | 30.53       | 38.64                 | 13.22                   | 30.95                  | 0.07                | 20.98         | 40.00         | -19.02         | QP     |
| 2    | 75.98       | 56.63                 | 9.90                    | 31.45                  | 0.25                | 35.33         | 40.00         | -4.67          | QP     |
| 3    | 96.10       | 43.97                 | 9.87                    | 31.57                  | 0.41                | 22.68         | 43.50         | -20.82         | QP     |
| 4    | 191.75      | 42.47                 | 10.36                   | 31.35                  | 0.58                | 22.06         | 43.50         | -21.44         | QP     |
| 5    | 296.18      | 47.25                 | 12.71                   | 30.89                  | 0.87                | 29.94         | 46.00         | -16.06         | QP     |
| 6    | 490.74      | 40.23                 | 16.41                   | 30.57                  | 1.08                | 27.15         | 46.00         | -18.85         | QP     |

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

| 1GHz—25GHz Radiated emission Test result  |            |                     |                       |                |                  |                 |                |             |        |
|---|------------|---------------------|-----------------------|----------------|------------------|-----------------|----------------|-------------|--------|
| EUT: bluetooth module   |            |                     |                       |                | M/N: keyes HC-06 |                 |                |             |        |
| Power: DC 3.3V  |            |                     |                       |                |                  |                 |                |             |        |
| Test date: 2014-11-12 Test site: 3m Chamber Tested by: Store                                      |            |                     |                       |                |                  |                 |                |             |        |
| Test mode: GFSK Tx CH0 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       | 51.65               | 33.95                 | 10.18          | 34.26            | 61.52           | 74             | 12.48       | PK     |
| 2   | 4804       | 36.83               | 33.95                 | 10.18          | 34.26            | 46.70           | 54             | 7.30        | AV     |
| 3   | 7206       | /                   |                       |                |                  |                 |                |             |        |
| 4   | 9608       | /                   |                       |                |                  |                 |                |             |        |
| 5   | 12010      | /                   |                       |                |                  |                 |                |             |        |
| Antenna Polarity: Horizontal  |            |                     |                       |                |                  |                 |                |             |        |
| 1   | 4804       | 52.56               | 33.95                 | 10.18          | 34.26            | 62.43           | 74             | 11.57       | PK     |
| 2   | 4804       | 38.20               | 33.95                 | 10.18          | 34.26            | 48.07           | 54             | 5.93        | 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. |            |                     |                       |                |                  |                 |                |             |        |

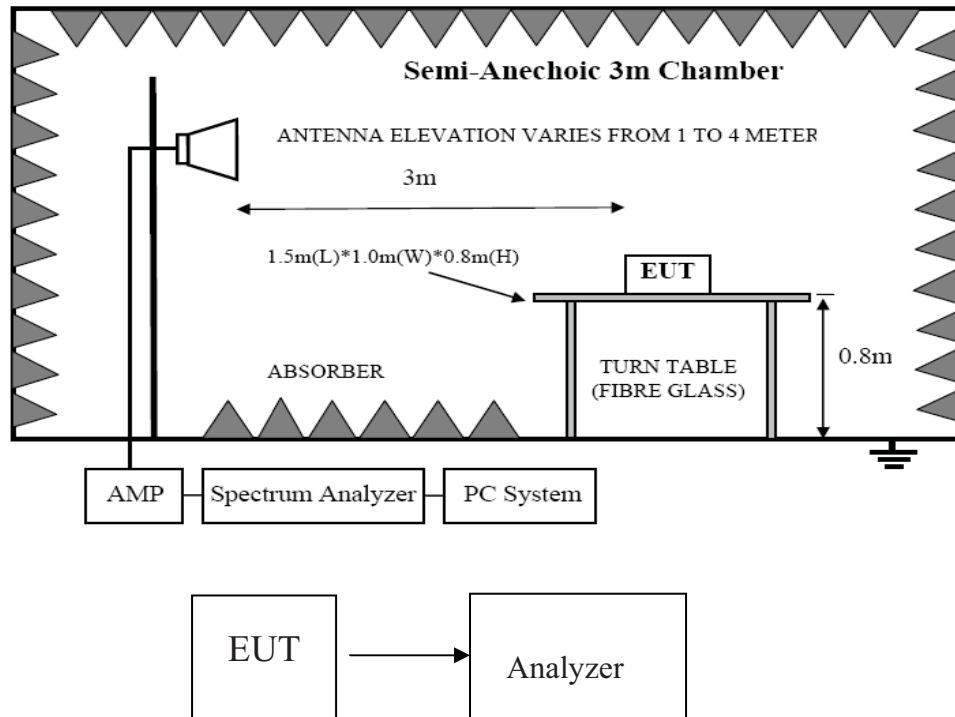
| 1GHz—25GHz Radiated emission Test result  |            |                     |                       |                |                  |                 |                |             |        |
|---|------------|---------------------|-----------------------|----------------|------------------|-----------------|----------------|-------------|--------|
| EUT: bluetooth module   |            |                     |                       |                | M/N: keyes HC-06 |                 |                |             |        |
| Power: DC 3.3V  |            |                     |                       |                |                  |                 |                |             |        |
| Test date: 2014-11-12 Test site: 3m Chamber Tested by: Store                                      |            |                     |                       |                |                  |                 |                |             |        |
| Test mode: GFSK Tx CH39 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       | 52.79               | 33.93                 | 10.2           | 34.29            | 62.63           | 74             | 11.37       | PK     |
| 2   | 4882       | 38.71               | 33.93                 | 10.2           | 34.29            | 48.55           | 54             | 5.45        | AV     |
| 3   | 7323       | /                   |                       |                |                  |                 |                |             |        |
| 4   | 9764       | /                   |                       |                |                  |                 |                |             |        |
| 5   | 12205      | /                   |                       |                |                  |                 |                |             |        |
| Antenna Polarity: Horizontal  |            |                     |                       |                |                  |                 |                |             |        |
| 1   | 4882       | 51.24               | 33.93                 | 10.2           | 34.29            | 61.08           | 74             | 12.92       | PK     |
| 2   | 4882       | 39.25               | 33.93                 | 10.2           | 34.29            | 49.09           | 54             | 4.91        | 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 modules  |            |                     |                       |                | M/N: keyes HC-06 |                 |                |             |        |
| Power: DC 3.3V  |            |                     |                       |                |                  |                 |                |             |        |
| Test date: 2014-11-12 Test site: 3m Chamber Tested by: Store                                      |            |                     |                       |                |                  |                 |                |             |        |
| Test mode: GFSK Tx CH78 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       | 50.14               | 33.98                 | 10.22          | 34.25            | 60.09           | 74             | 13.91       | PK     |
| 2   | 4960       | 39.28               | 33.98                 | 10.22          | 34.25            | 49.23           | 54             | 4.77        | AV     |
| 3   | 7440       | /                   |                       |                |                  |                 |                |             |        |
| 4   | 9920       | /                   |                       |                |                  |                 |                |             |        |
| 5   | 12400      | /                   |                       |                |                  |                 |                |             |        |
| Antenna Polarity: Horizontal  |            |                     |                       |                |                  |                 |                |             |        |
| 1   | 4960       | 51.32               | 33.98                 | 10.22          | 34.25            | 61.27           | 74             | 12.73       | PK     |
| 2   | 4960       | 38.16               | 33.98                 | 10.22          | 34.25            | 48.11           | 54             | 5.89        | 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. |            |                     |                       |                |                  |                 |                |             |        |

## 9. Band Edge Compliance

### 9.1. Block Diagram of Test Setup



### 9.2. Limit

Please refer section 15.247

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

- 9.3.1 Put the EUT on a 0.8m high table, power on the EUT. Emissions were scanned and measured rotating the EUT to 360 degrees, Find the maximum Emission
- 9.3.2 Check the spurious emissions out of band.
- 9.3.3 RBW, VBW Setting, please see the following test plot.

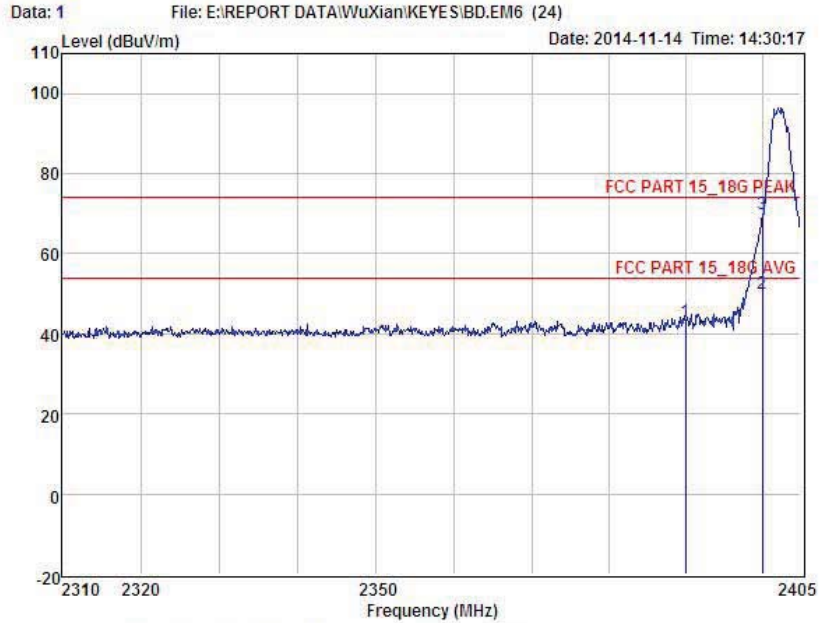
### 9.4. Test Result

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

Radiated Method  
GFSK: CH LOW :



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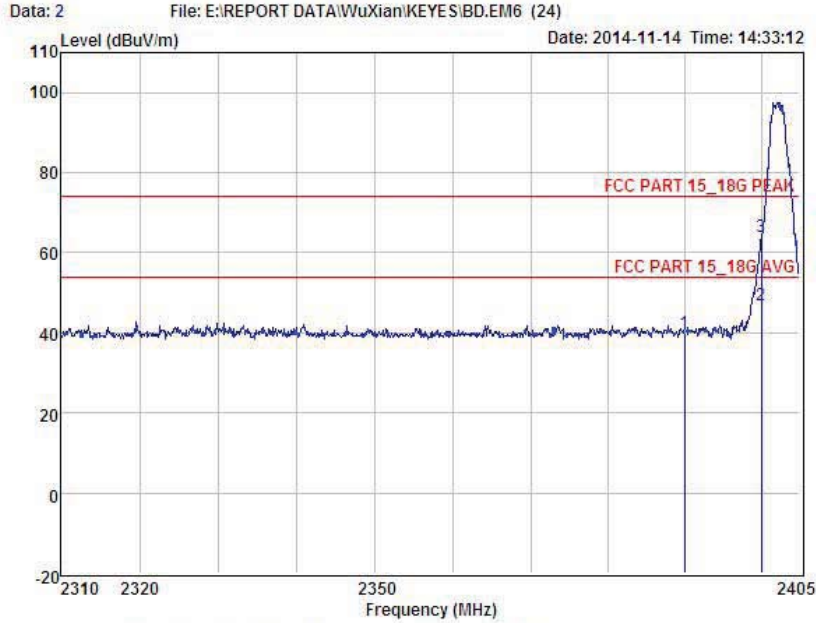
Condition : FCC PART 15\_18G PEAK 3m POL: VERTICAL  
EUT : bluetooth module  
Model No : keyes HC-06  
Test Mode : GFSK TX Low CH0  
Power : DC 3.3V From Bluetooth Adapter  
Test Engineer : Store  
Remark :  
Temp : 24.2°C  
Hum : 54%

| 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    | 2390.00     | 46.43                 | 27.62                   | 34.97                  | 3.92                | 43.00         | 74.00         | -31.00         | Peak    |
| 2    | 2400.00     | 53.52                 | 27.62                   | 34.97                  | 3.94                | 50.11         | 54.00         | -3.89          | Average |
| 3    | 2400.00     | 73.32                 | 27.62                   | 34.97                  | 3.94                | 69.91         | 74.00         | -4.09          | Peak    |

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



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 Website: http://www.cessz.com Email: Service@cessz.com



Condition : FCC PART 15\_18G PEAK 3m POL: HORIZONTAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : GFSK TX Low CH0  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 24.2°C  
 Hum : 54%

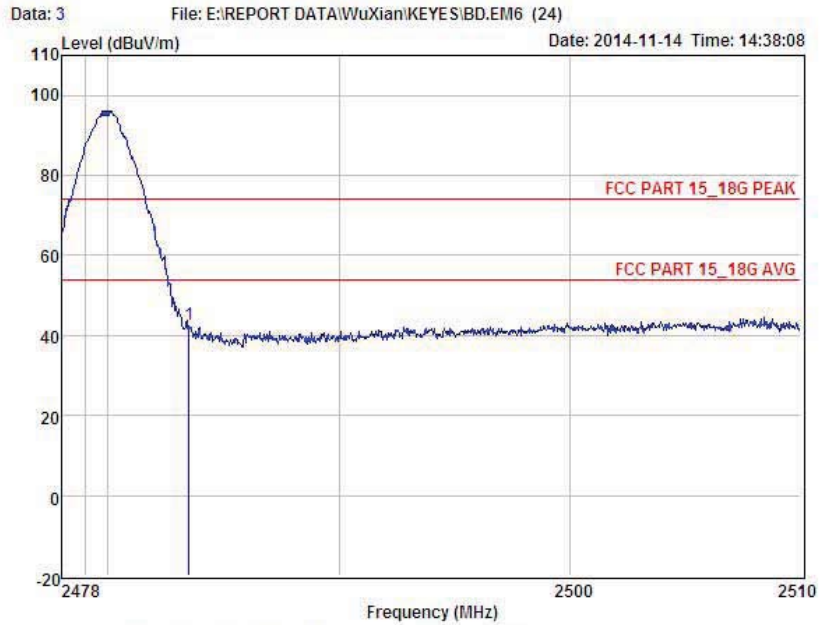
| Item | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Preamp<br>Factor<br>dB | Cable<br>Loss<br>dB | Level<br>dBuV | Limit<br>dBuV | Margin<br>dBuV | Remark  |
|------|-------------|-----------------------|-------------------------|------------------------|---------------------|---------------|---------------|----------------|---------|
| 1    | 2390.00     | 43.53                 | 27.62                   | 34.97                  | 3.92                | 40.10         | 74.00         | -33.90         | Peak    |
| 2    | 2400.00     | 50.42                 | 27.62                   | 34.97                  | 3.94                | 47.01         | 54.00         | -6.99          | Average |
| 3    | 2400.00     | 67.27                 | 27.62                   | 34.97                  | 3.94                | 63.86         | 74.00         | -10.14         | Peak    |

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

CH High :



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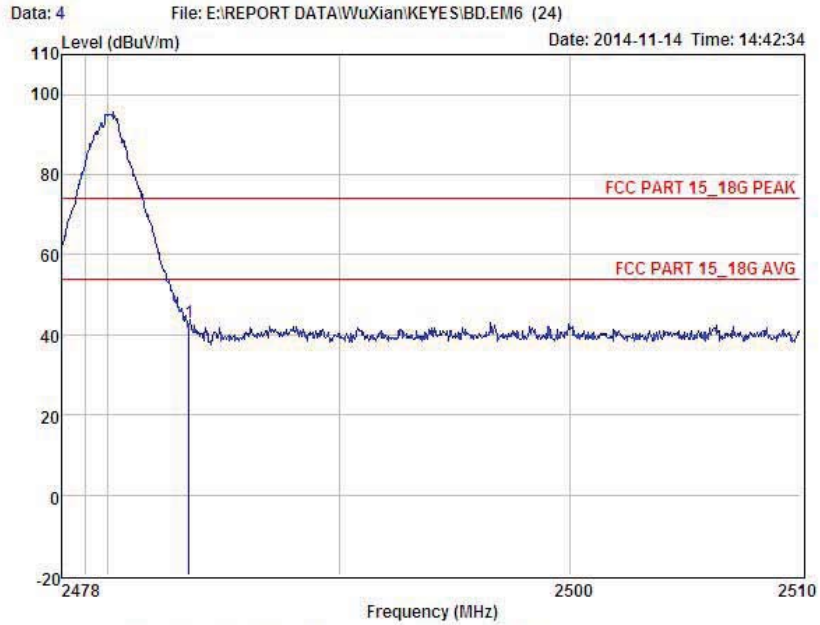
Condition : FCC PART 15\_18G PEAK 3m POL: VERTICAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : GFSK TX High CH78  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 24.2°C  
 Hum : 54%

| 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    | 2483.50     | 46.15                 | 27.59                   | 34.97                  | 4.00                | 42.77         | 74.00         | -31.23         | Peak   |

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



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 Website: <http://www.cessz.com> Email: [Service@cessz.com](mailto:Service@cessz.com)



Condition : FCC PART 15\_18G PEAK 3m POL: HORIZONTAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : GFSK TX High CH78  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 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    | 2483.80     | 46.66                 | 27.69                   | 34.97                  | 4.00                | 43.17         | 74.00         | -30.83         | Peak   |

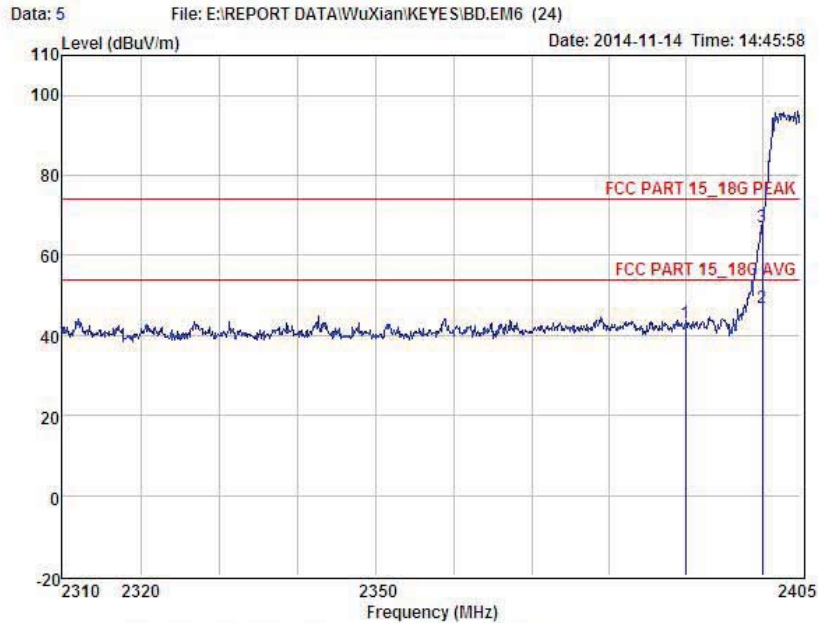
Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

# Hopping

## Lowest CH:



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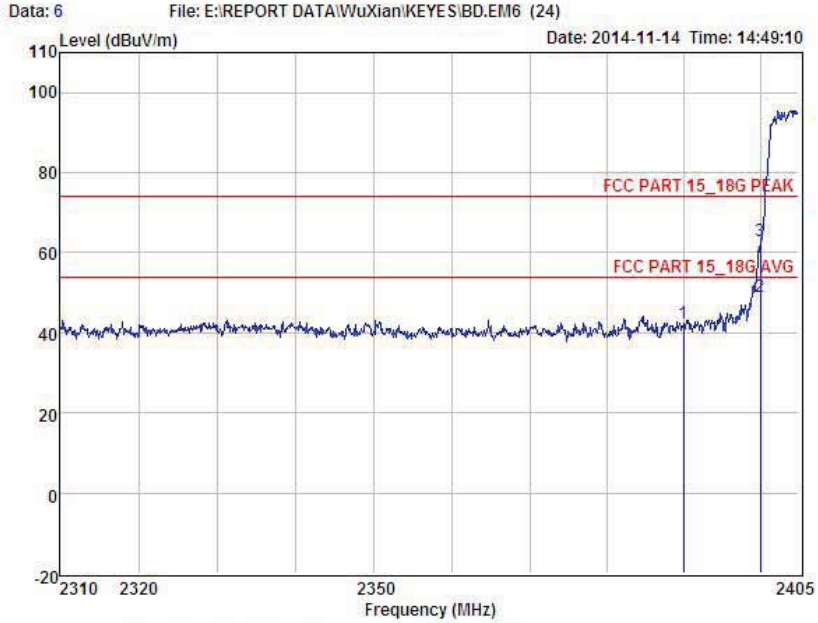
Condition : FCC PART 15\_18G PEAK 3m POL: HORIZONTAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : Hopping mode (GFSK) CH0  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 24.2°C  
 Hum : 54%

| 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    | 2390.00     | 46.39                 | 27.62                   | 34.97                  | 3.92                | 42.96         | 74.00         | -31.04         | Peak    |
| 2    | 2400.00     | 50.33                 | 27.62                   | 34.97                  | 3.94                | 46.92         | 54.00         | -7.08          | Average |
| 3    | 2400.00     | 70.64                 | 27.62                   | 34.97                  | 3.94                | 67.23         | 74.00         | -6.77          | Peak    |

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



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Condition : FCC PART 15\_18G PEAK 3m POL: VERTICAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : Hopping mode (GFSK) CH0  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 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    | 2390.00     | 45.71                 | 27.62                   | 34.97                  | 3.92                | 42.28         | 74.00         | -31.72         | Peak    |
| 2    | 2400.00     | 52.58                 | 27.62                   | 34.97                  | 3.94                | 49.17         | 54.00         | -4.83          | Average |
| 3    | 2400.00     | 66.31                 | 27.62                   | 34.97                  | 3.94                | 62.90         | 74.00         | -11.10         | Peak    |

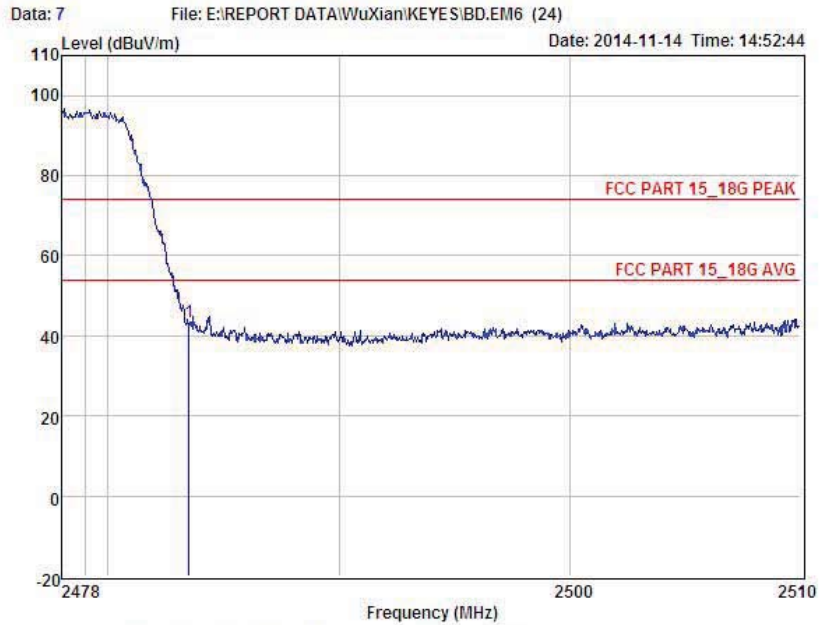
Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss



Highest CH:



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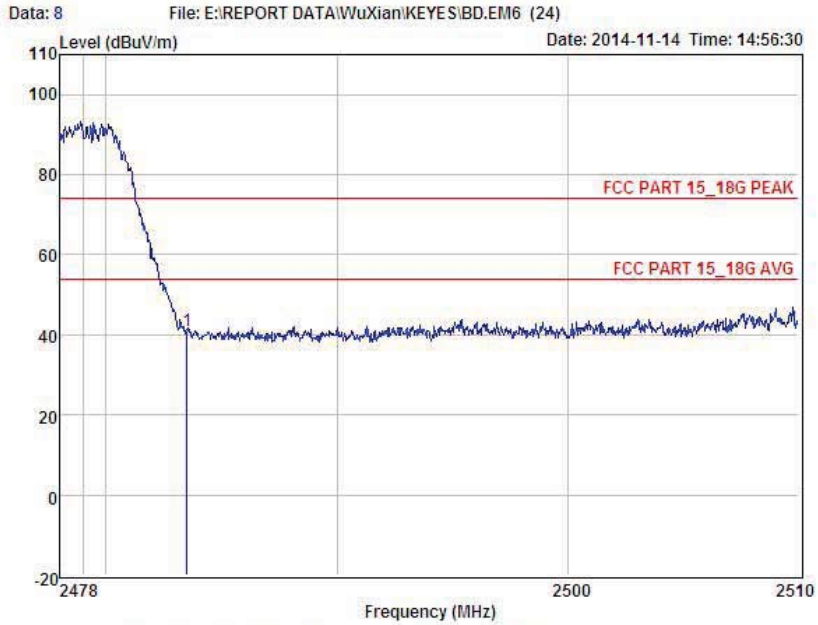
Condition : FCC PART 15\_18G PEAK 3m POL: VERTICAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : Hopping mode (GFSK) CH78  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 24.2°C  
 Hum : 54%

| 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    | 2483.50     | 46.79                 | 27.69                   | 34.97                  | 4.00                | 43.41         | 74.00         | -30.59         | Peak   |

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



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Condition : FCC PART 15\_18G PEAK 3m POL: HORIZONTAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : Hopping mode (GFSK) CH78  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 24.2°C  
 Hum : 54%

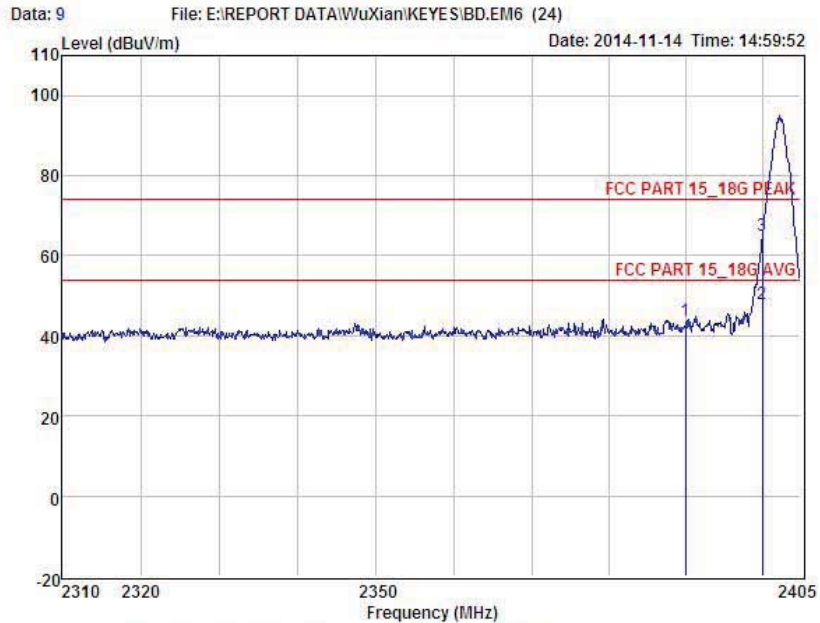
| Item | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Preamp<br>Factor<br>dB | Cable<br>Loss<br>dB | Level<br>dBuV | Limit<br>dBuV | Margin<br>dBuV | Remark |
|------|-------------|-----------------------|-------------------------|------------------------|---------------------|---------------|---------------|----------------|--------|
| 1    | 2483.80     | 44.27                 | 27.69                   | 34.97                  | 4.00                | 40.89         | 74.00         | -33.11         | Peak   |

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

Pi/4-DQPSK  
Lowest CH :



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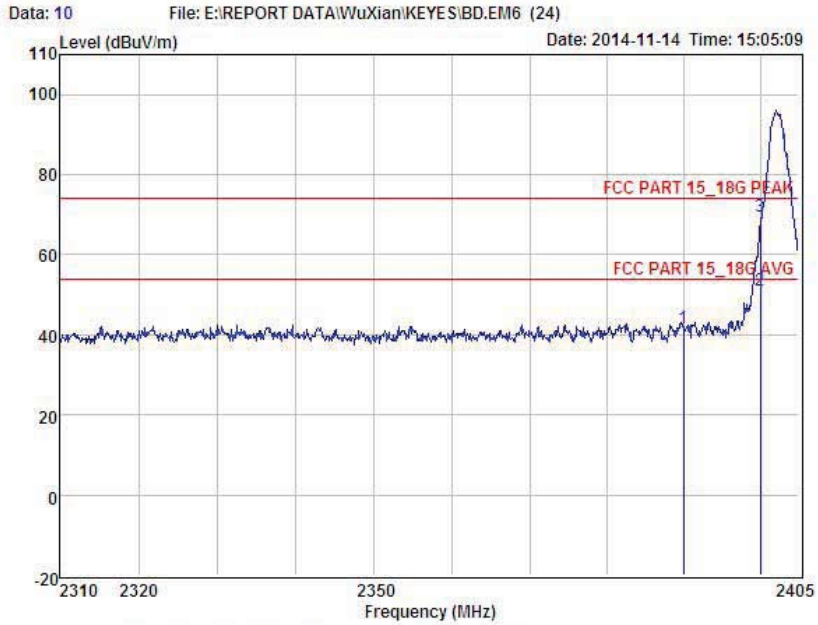
Condition : FCC PART 15\_18G PEAK 3m POL: HORIZONTAL  
EUT : bluetooth module  
Model No : keyes HC-06  
Test Mode : pi/4DQPSK TX Low CH0  
Power : DC 3.3V From Bluetooth Adapter  
Test Engineer : Store  
Remark :  
Temp : 24.2°C  
Hum : 54%

| 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    | 2390.00     | 47.17                 | 27.62                   | 34.97                  | 3.92                | 43.74         | 74.00         | -30.26         | Peak    |
| 2    | 2400.00     | 51.54                 | 27.62                   | 34.97                  | 3.94                | 49.13         | 54.00         | -5.87          | Average |
| 3    | 2400.00     | 68.35                 | 27.62                   | 34.97                  | 3.94                | 64.94         | 74.00         | -9.06          | Peak    |

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



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Condition : FCC PART 15\_18G PEAK 3m POL: VERTICAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : n/4DQPSK TX Low CH0  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 24.2°C  
 Hum : 54%

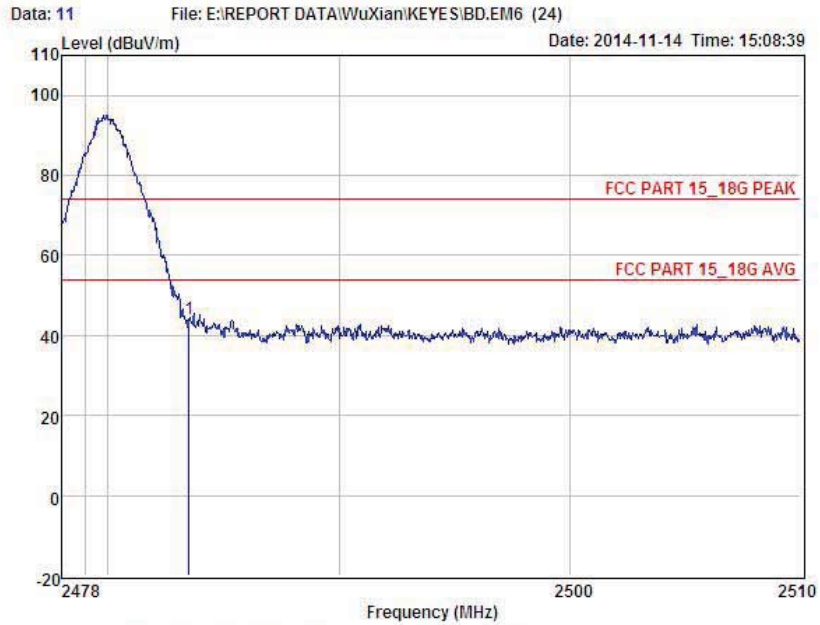
| Item | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Preamp<br>Factor<br>dB | Cable<br>Loss<br>dB | Level<br>dBuV | Limit<br>dBuV | Margin<br>dBuV | Remark  |
|------|-------------|-----------------------|-------------------------|------------------------|---------------------|---------------|---------------|----------------|---------|
| 1    | 2390.00     | 45.12                 | 27.62                   | 34.97                  | 3.92                | 41.69         | 74.00         | -32.31         | Peak    |
| 2    | 2400.00     | 54.68                 | 27.62                   | 34.97                  | 3.94                | 51.27         | 54.00         | -2.73          | Average |
| 3    | 2400.00     | 72.91                 | 27.62                   | 34.97                  | 3.94                | 69.50         | 74.00         | -4.50          | Peak    |

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

Highest CH:



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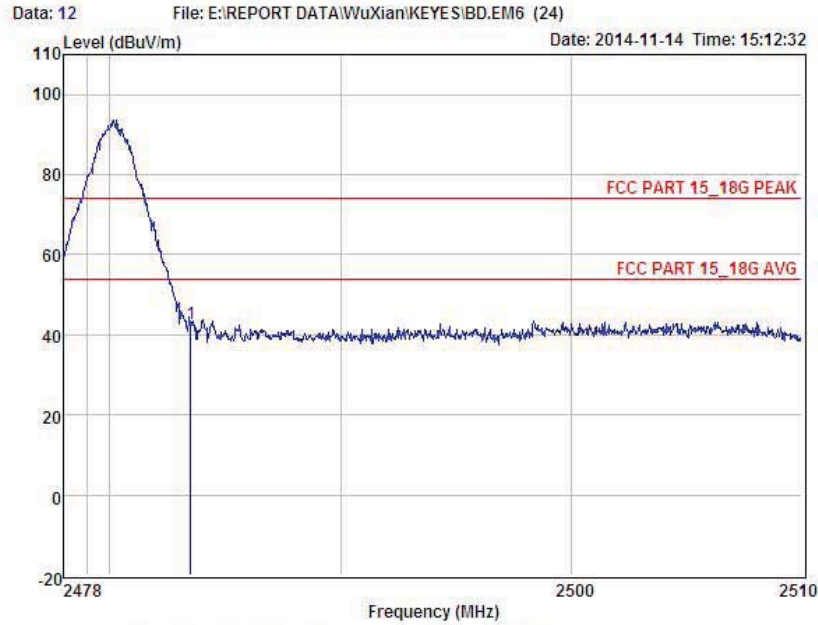
Condition : FCC PART 15\_18G PEAK 3m POL: VERTICAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : n/4DQPSK IX High CH78  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 24.2°C  
 Hum : 54%

| 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    | 2483.50     | 47.36                 | 27.59                   | 34.97                  | 4.00                | 43.98         | 74.00         | -30.02         | Peak   |

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



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Condition : FCC PART 15\_18G PEAK 3m POL: HORIZONTAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : π/4QPSK TX High CH78  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 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    | 2483.50     | 46.26                 | 27.69                   | 34.97                  | 4.00                | 42.88         | 74.00         | -31.12         | Peak   |

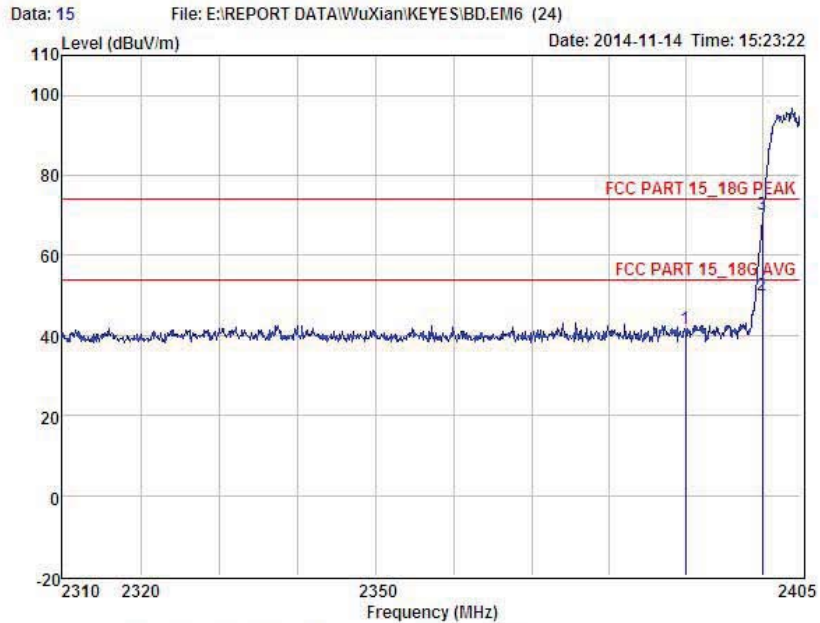
Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

Hopping mode:

Lowest CH :



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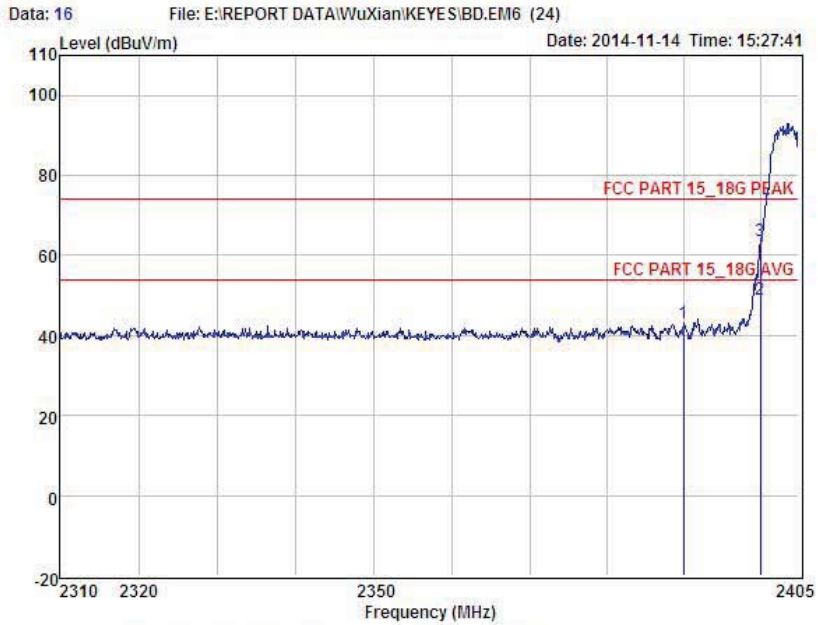
Condition : FCC PART 15\_18G PEAK 3m POL: VERTICAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : Hopping mode (π/4DQPSK) CH0  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 24.2°C  
 Hum : 54%

| 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    | 2390.00     | 45.14                 | 27.62                   | 34.97                  | 3.92                | 41.71         | 74.00         | -32.29         | Peak    |
| 2    | 2400.00     | 53.38                 | 27.62                   | 34.97                  | 3.94                | 49.97         | 54.00         | -4.03          | Average |
| 3    | 2400.00     | 73.66                 | 27.62                   | 34.97                  | 3.94                | 70.25         | 74.00         | -3.75          | Peak    |

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



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Condition : FCC PART 15\_18G PEAK 3m POL: HORIZONTAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : Hopping mode (π/4DQPSK) CH0  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 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    | 2390.00     | 46.38                 | 27.62                   | 34.97                  | 3.92                | 42.95         | 74.00         | -31.05         | Peak    |
| 2    | 2400.00     | 52.30                 | 27.62                   | 34.97                  | 3.94                | 48.89         | 54.00         | -5.11          | Average |
| 3    | 2400.00     | 67.18                 | 27.62                   | 34.97                  | 3.94                | 63.77         | 74.00         | -10.23         | Peak    |

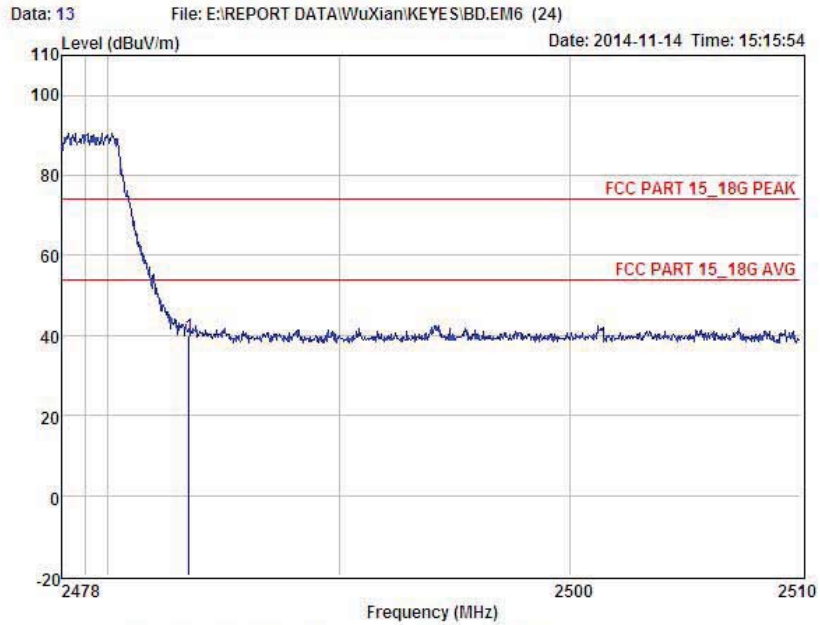
Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss



Highest CH:



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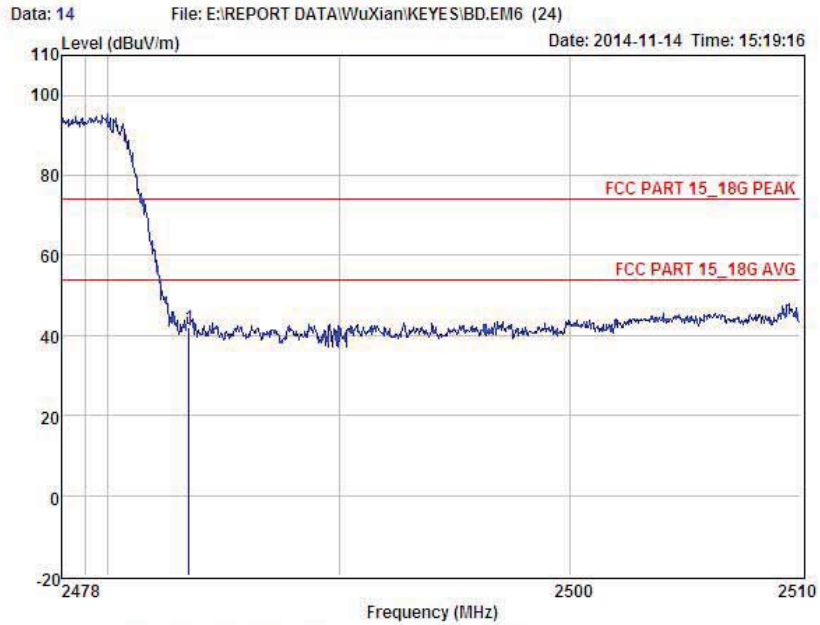
Condition : FCC PART 15\_18G PEAK 3m POL: HORIZONTAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : Hopping mode (π/4QPSK) CH78  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 24.2°C  
 Hum : 54%

| 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    | 2483.50     | 43.41                 | 27.59                   | 34.97                  | 4.00                | 40.03         | 74.00         | -33.97         | Peak   |

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



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Condition : FCC PART 15\_18G PEAK 3m POL: VERTICAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : Hopping mode (π/4DQPSK) CH78  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 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    | 2488.50     | 45.53                 | 27.59                   | 34.97                  | 4.00                | 42.15         | 74.00         | -31.85         | Peak   |

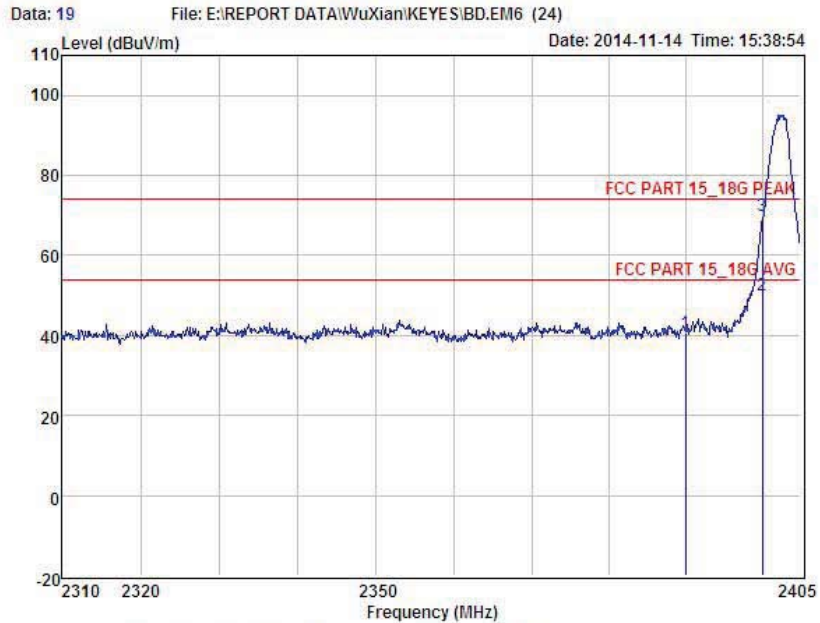
Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

8-DPSK

Lowest CH:



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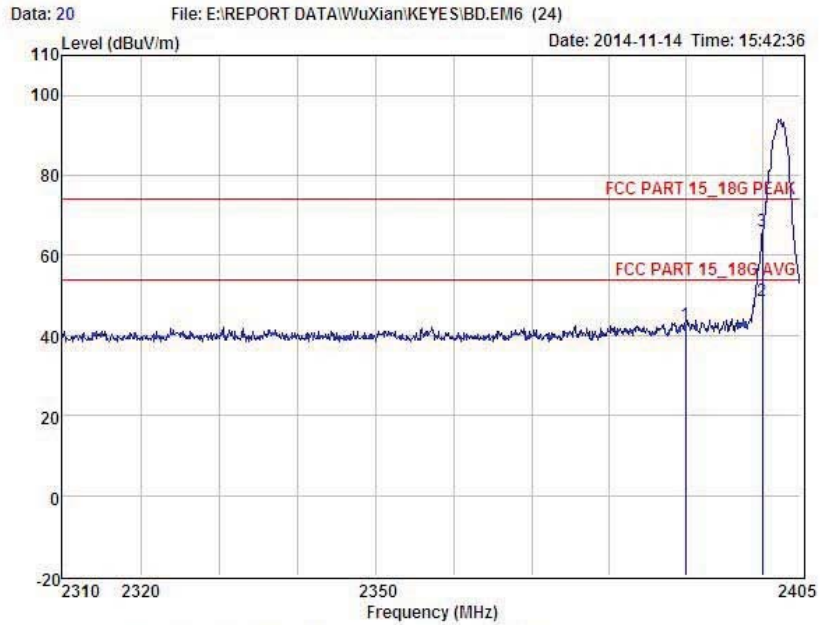
Condition : FCC PART 15\_18G PEAK 3m POL: HORIZONTAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : 8-DPSK TX Low CH0  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 24.2°C  
 Hum : 54%

| 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    | 2390.00     | 44.15                 | 27.62                   | 34.97                  | 3.92                | 40.72         | 74.00         | -33.28         | Peak    |
| 2    | 2400.00     | 53.40                 | 27.62                   | 34.97                  | 3.94                | 49.99         | 54.00         | -4.01          | Average |
| 3    | 2400.00     | 73.24                 | 27.62                   | 34.97                  | 3.94                | 69.83         | 74.00         | -4.17          | Peak    |

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



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Condition : FCC PART 15\_18G PEAK 3m POL: VERTICAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : 8-DPSK TX Low CH0  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 24.2°C  
 Hum : 54%

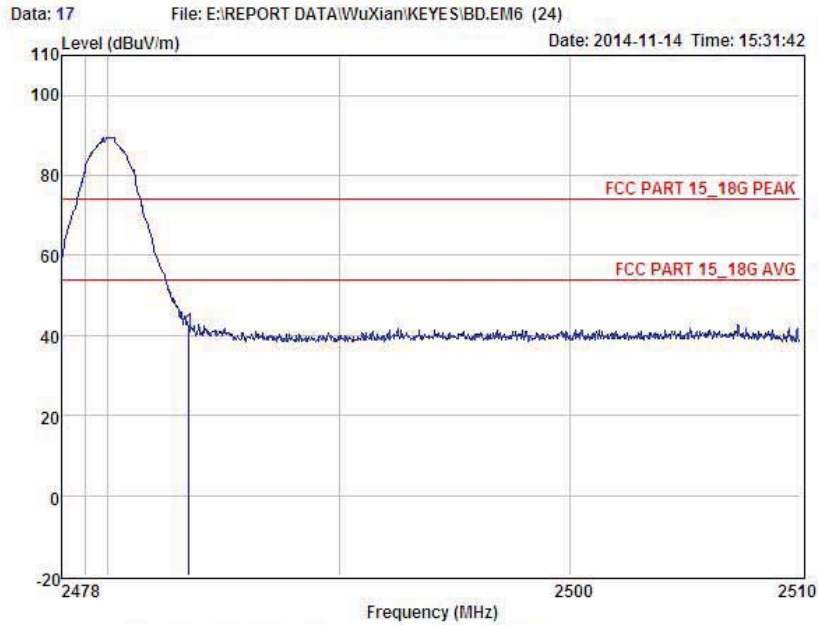
| Item | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Preamp<br>Factor<br>dB | Cable<br>Loss<br>dB | Level<br>dBuV | Limit<br>dBuV | Margin<br>dBuV | Remark  |
|------|-------------|-----------------------|-------------------------|------------------------|---------------------|---------------|---------------|----------------|---------|
| 1    | 2390.00     | 46.06                 | 27.62                   | 34.97                  | 3.92                | 42.63         | 74.00         | -31.37         | Peak    |
| 2    | 2400.00     | 52.13                 | 27.62                   | 34.97                  | 3.94                | 48.72         | 54.00         | -5.28          | Average |
| 3    | 2400.00     | 69.32                 | 27.62                   | 34.97                  | 3.94                | 65.91         | 74.00         | -8.09          | Peak    |

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

Highest CH:



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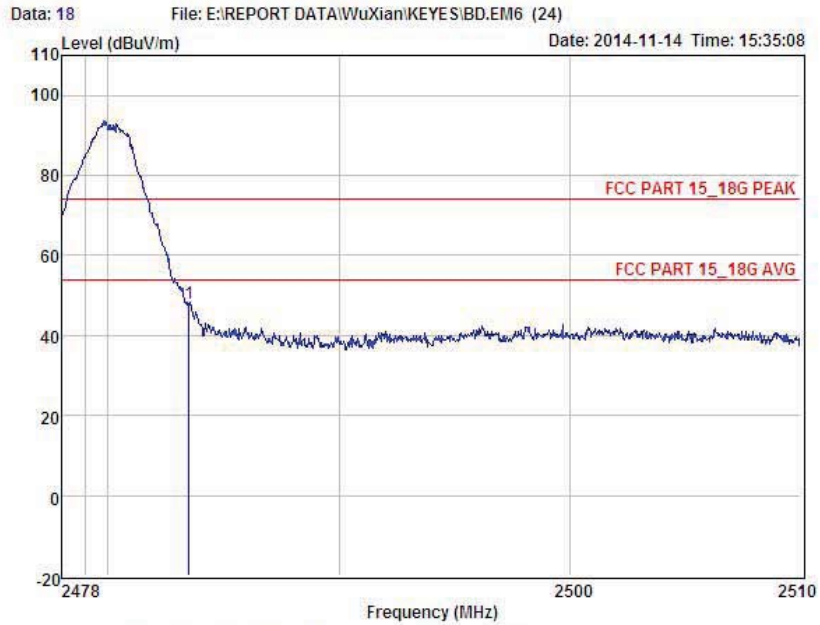
Condition : FCC PART 15\_18G PEAK 3m POL: HORIZONTAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : 8-DPSK TX High CH78  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 24.2°C  
 Hum : 54%

| 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    | 2483.50     | 44.75                 | 27.59                   | 34.97                  | 4.00                | 41.37         | 74.00         | -32.63         | Peak   |

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



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Condition : FCC PART 15\_18G PEAK 3m POL: VERTICAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : 8-DPSK TX High CH78  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 24.2°C  
 Hum : 54%

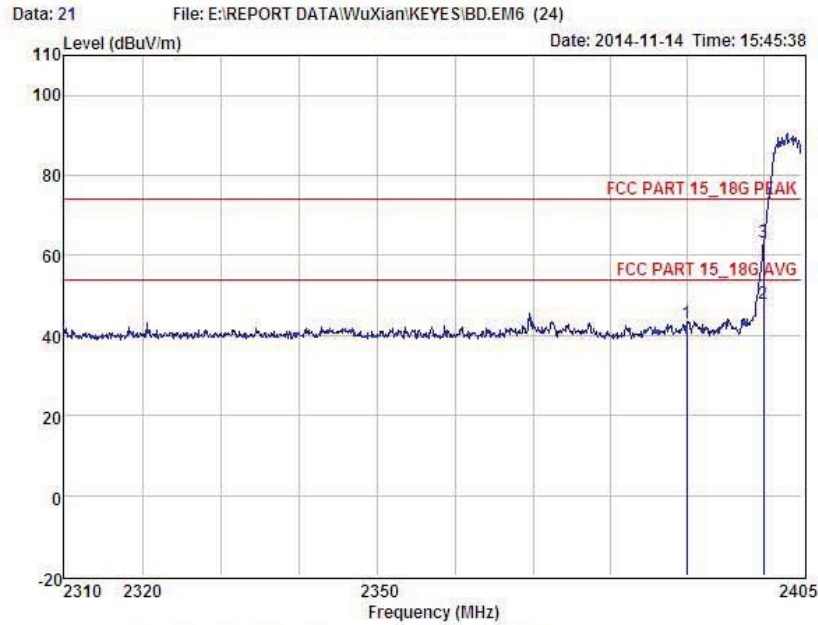
| Item | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Preamp<br>Factor<br>dB | Cable<br>Loss<br>dB | Level<br>dBuV | Limit<br>dBuV | Margin<br>dBuV | Remark |
|------|-------------|-----------------------|-------------------------|------------------------|---------------------|---------------|---------------|----------------|--------|
| 1    | 2483.50     | 81.84                 | 27.59                   | 34.97                  | 4.00                | 47.96         | 74.00         | -26.04         | Peak   |

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

Hopping mode:



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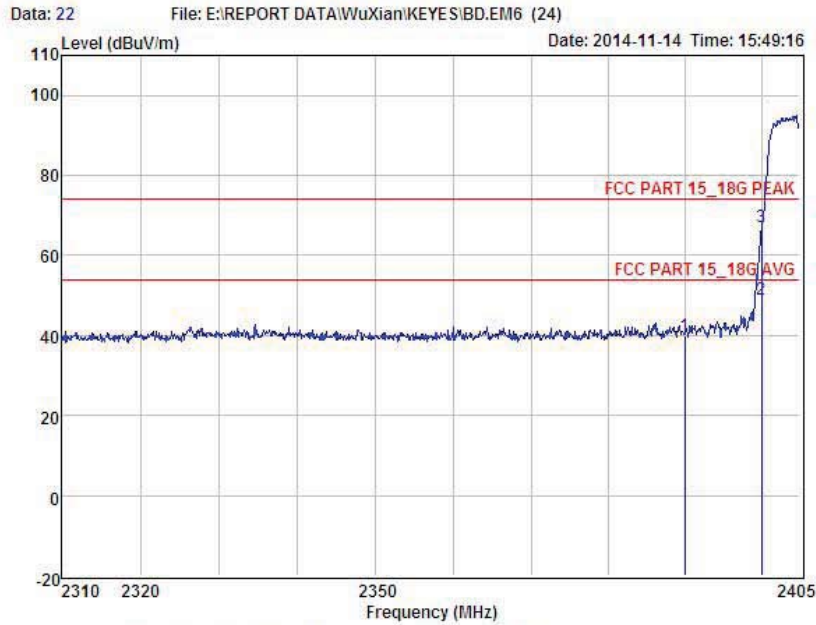
Condition : FCC PART 15\_18G PEAK 3m POL: VERTICAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : Hopping mode (8-DPSK) CH0  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 24.2°C  
 Hum : 54%

| 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    | 2390.00     | 46.55                 | 27.62                   | 34.97                  | 3.92                | 43.12         | 74.00         | -30.88         | Peak    |
| 2    | 2400.00     | 51.32                 | 27.62                   | 34.97                  | 3.94                | 47.91         | 54.00         | -6.09          | Average |
| 3    | 2400.00     | 66.54                 | 27.62                   | 34.97                  | 3.94                | 63.13         | 74.00         | -10.87         | Peak    |

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



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Condition : FCC PART 15\_18G PEAK 3m POL: HORIZONTAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : Hopping mode (8-DPSK) CH0  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 24.2°C  
 Hum : 54%

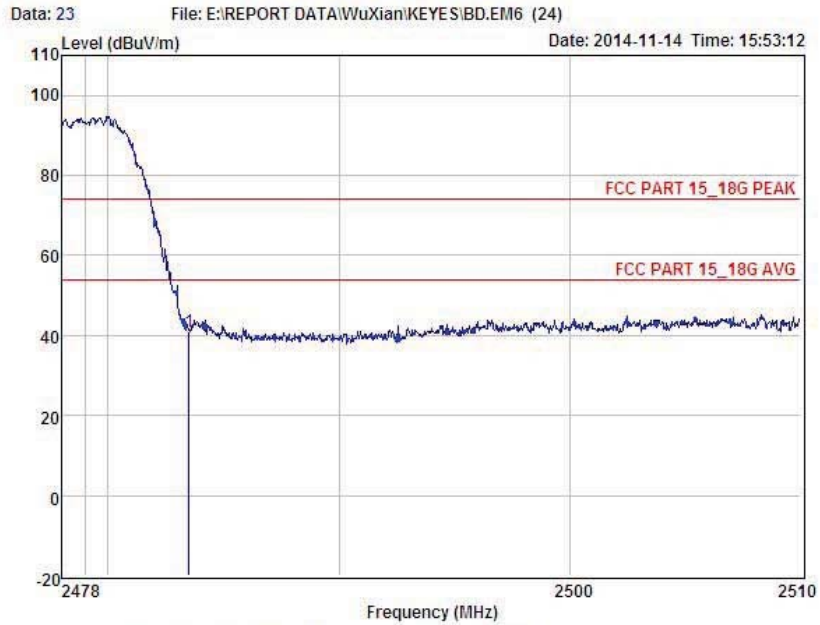
| Item | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Preamp<br>Factor<br>dB | Cable<br>Loss<br>dB | Level<br>dBuV | Limit<br>dBuV | Margin<br>dBuV | Remark  |
|------|-------------|-----------------------|-------------------------|------------------------|---------------------|---------------|---------------|----------------|---------|
| 1    | 2390.00     | 43.46                 | 27.62                   | 34.97                  | 3.92                | 40.03         | 74.00         | -33.97         | Peak    |
| 2    | 2400.00     | 52.39                 | 27.62                   | 34.97                  | 3.94                | 48.98         | 54.00         | -5.02          | Average |
| 3    | 2400.00     | 70.52                 | 27.62                   | 34.97                  | 3.94                | 67.11         | 74.00         | -6.89          | Peak    |

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





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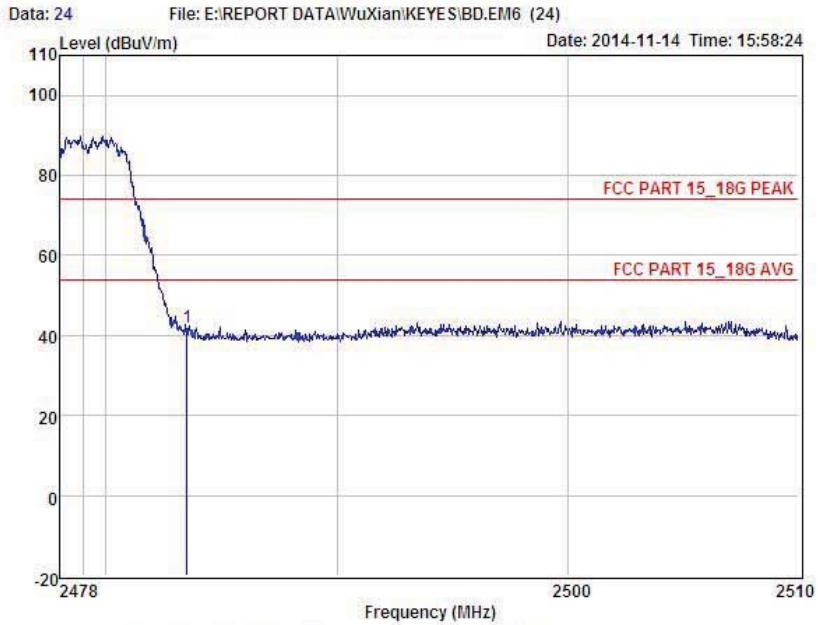
Condition : FCC PART 15\_18G PEAK 3m POL: HORIZONTAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : Hopping mode (8-DPSK) CH78  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 24.2°C  
 Hum : 54%

| 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    | 2488.50     | 44.42                 | 27.59                   | 34.97                  | 4.00                | 41.04         | 74.00         | -32.96         | Peak   |

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



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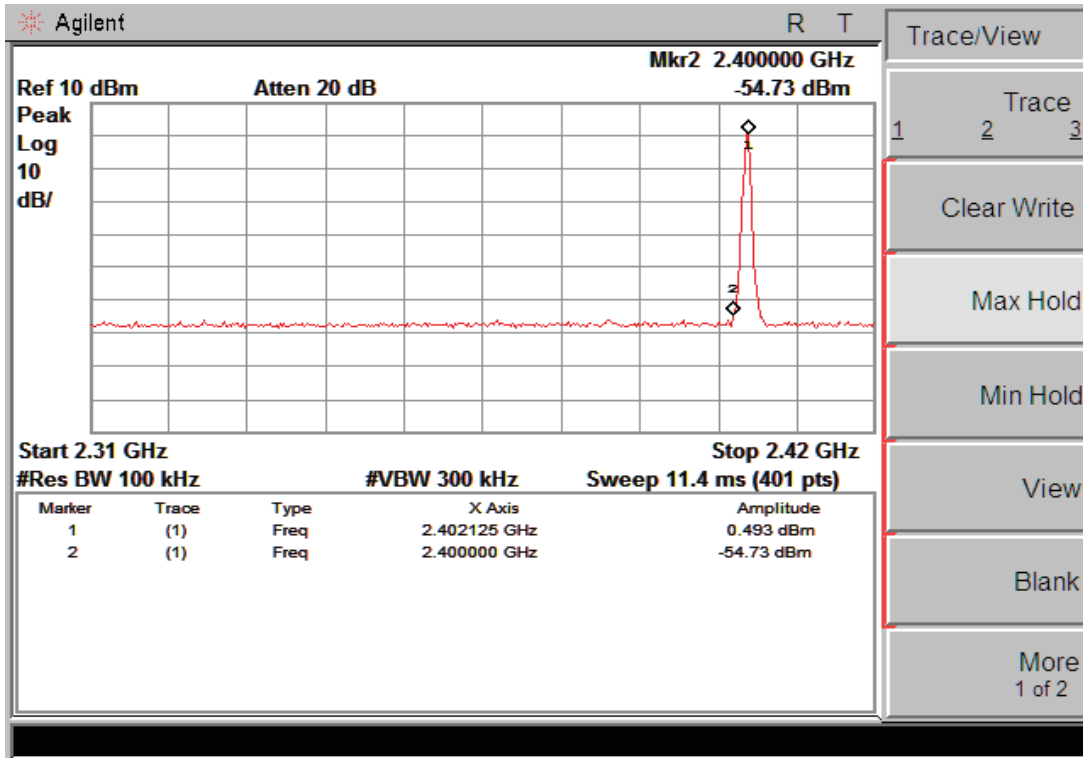
Condition : FCC PART 15\_18G PEAK 3m POL: VERTICAL  
 EUT : bluetooth module  
 Model No : keyes HC-06  
 Test Mode : Hopping mode (8-DPSK) CH78  
 Power : DC 3.3V From Bluetooth Adapter  
 Test Engineer : Store  
 Remark :  
 Temp : 24.2°C  
 Hum : 54%

| 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    | 2483.50     | 45.43                 | 27.59                   | 34.97                  | 4.00                | 42.05         | 74.00         | -31.95         | Peak   |

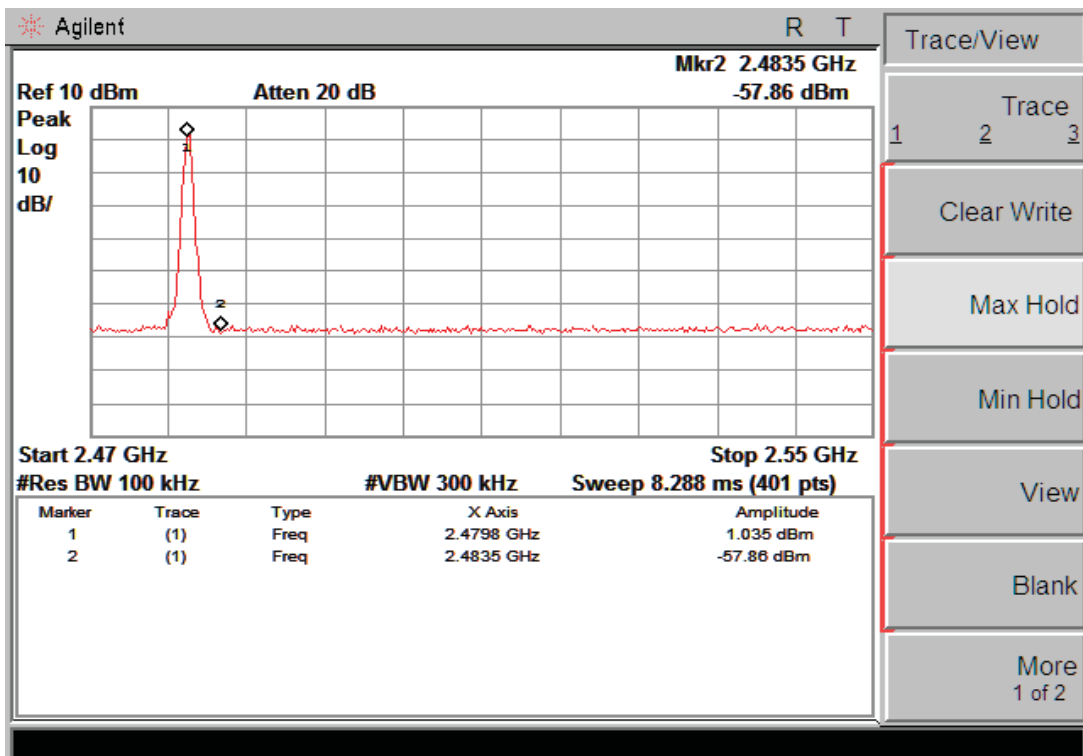
Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

Conducted Method

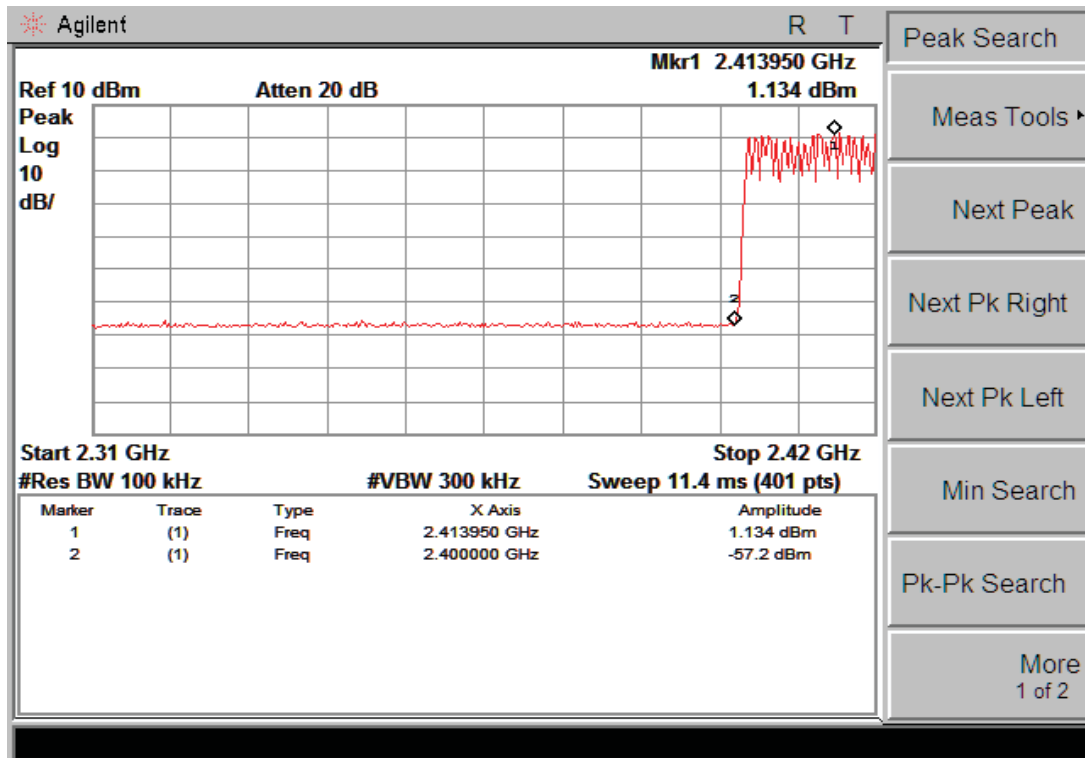
GFSK: CH Low



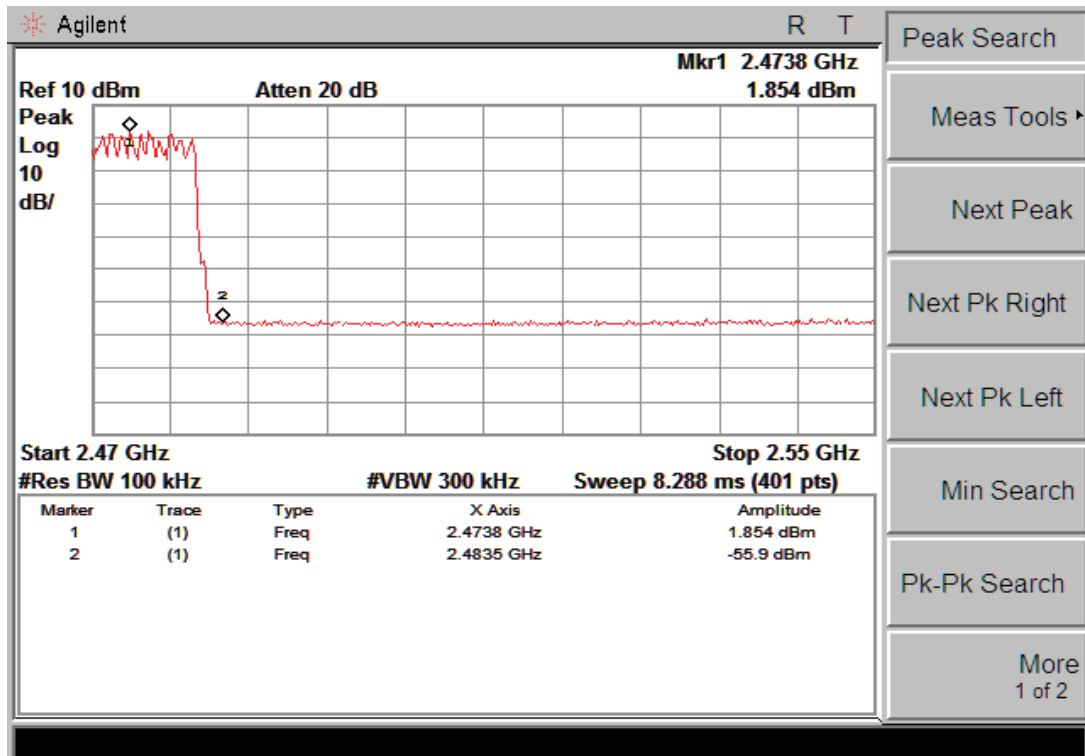
GFSK: CH High



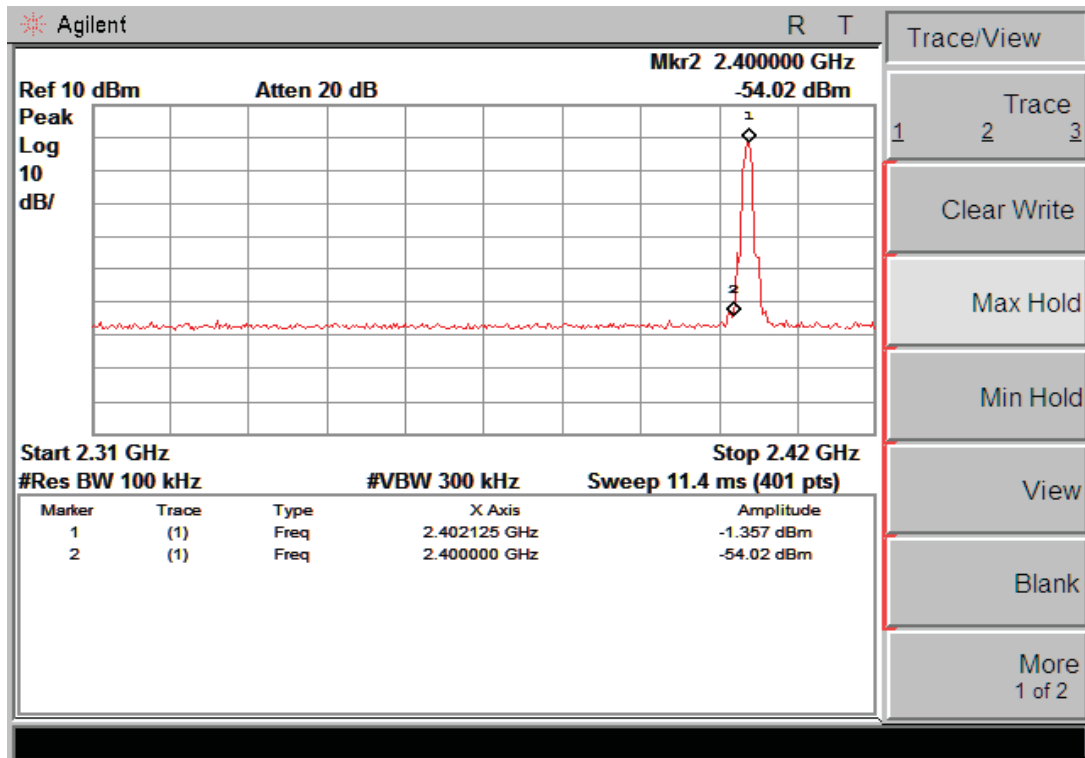
GFSK: CH Low Hopping



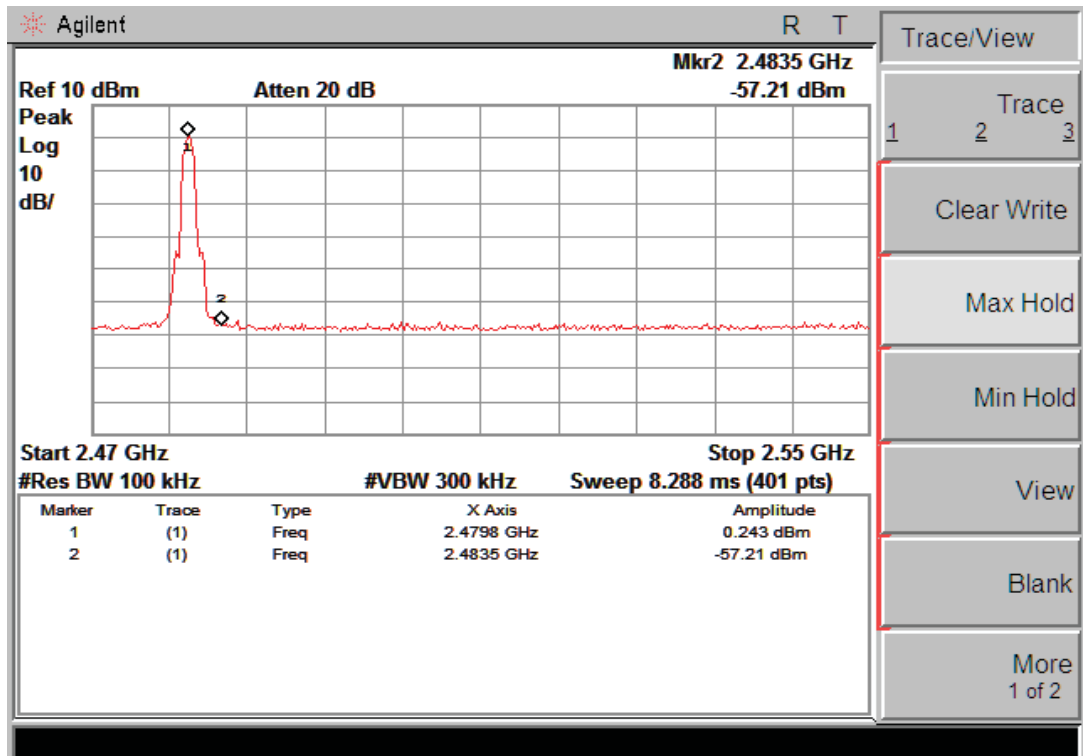
GFSK: CH High Hopping



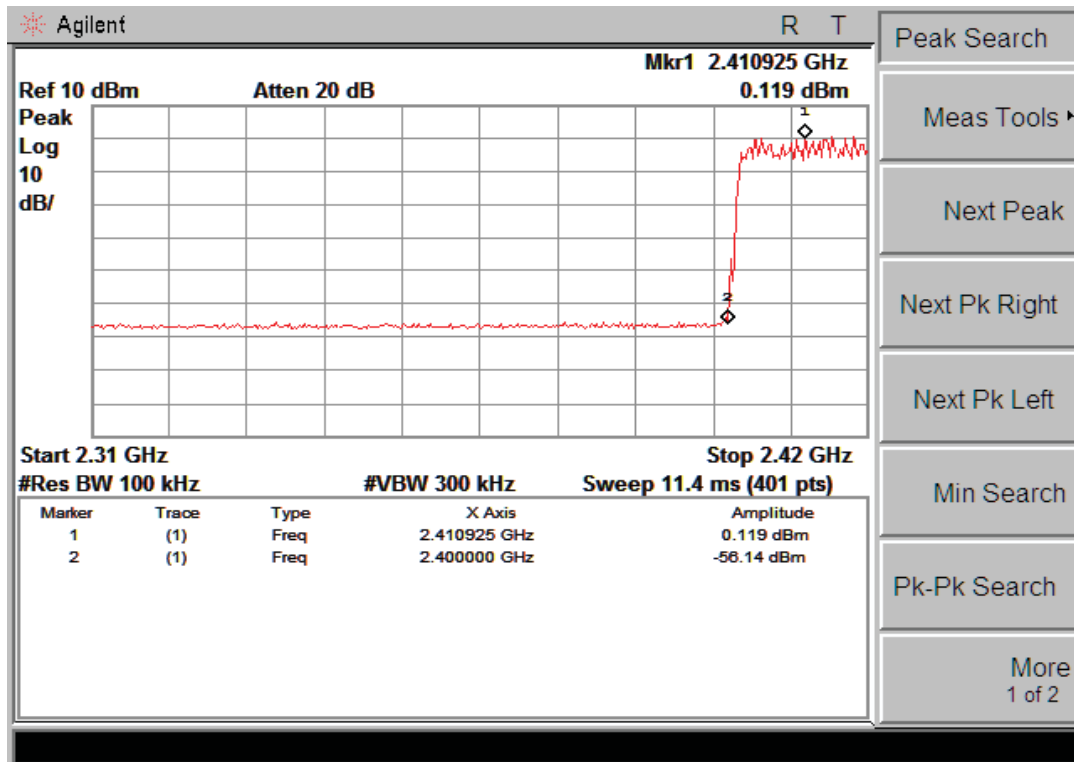
$\pi/4$  DQPSK: CH Low



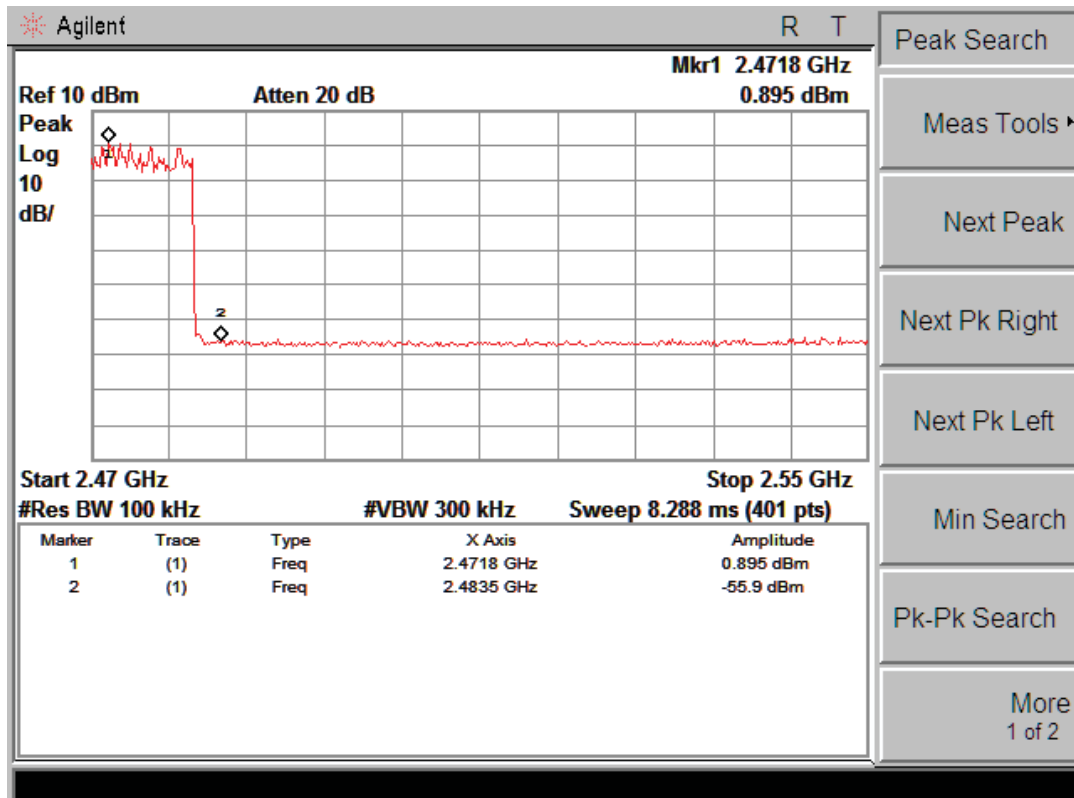
$\pi/4$  DQPSK: CH High



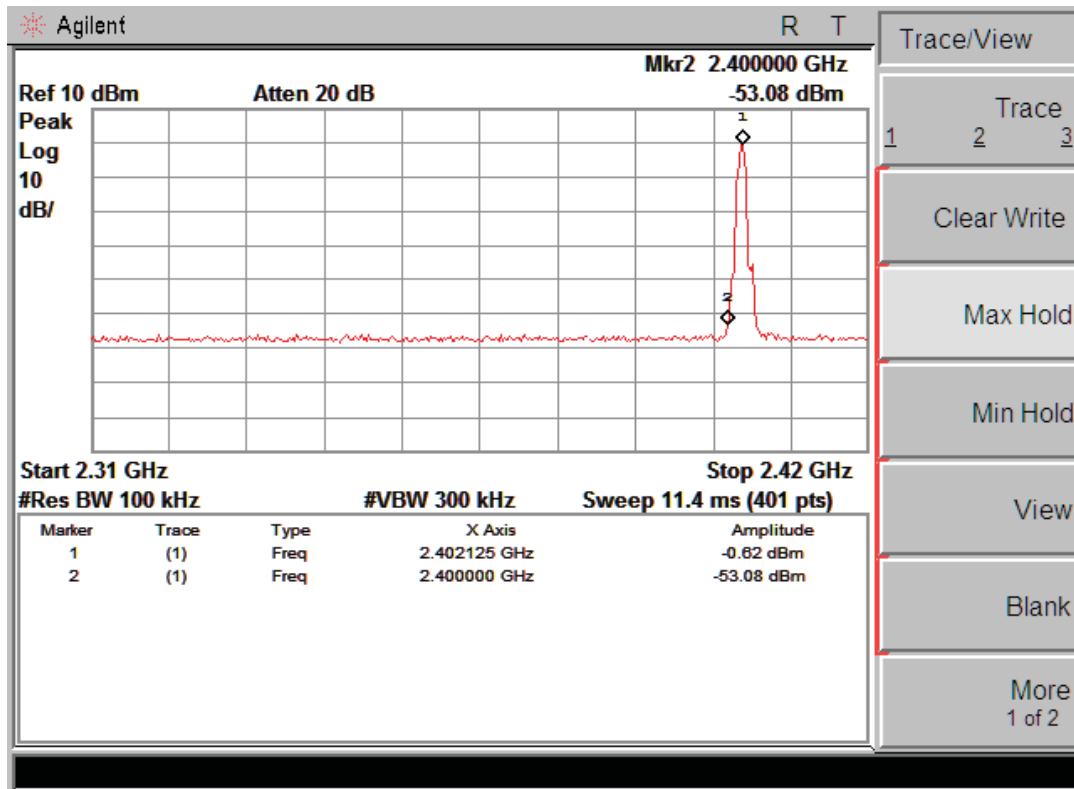
$\pi/4$  DQPSK: CH Low Hopping



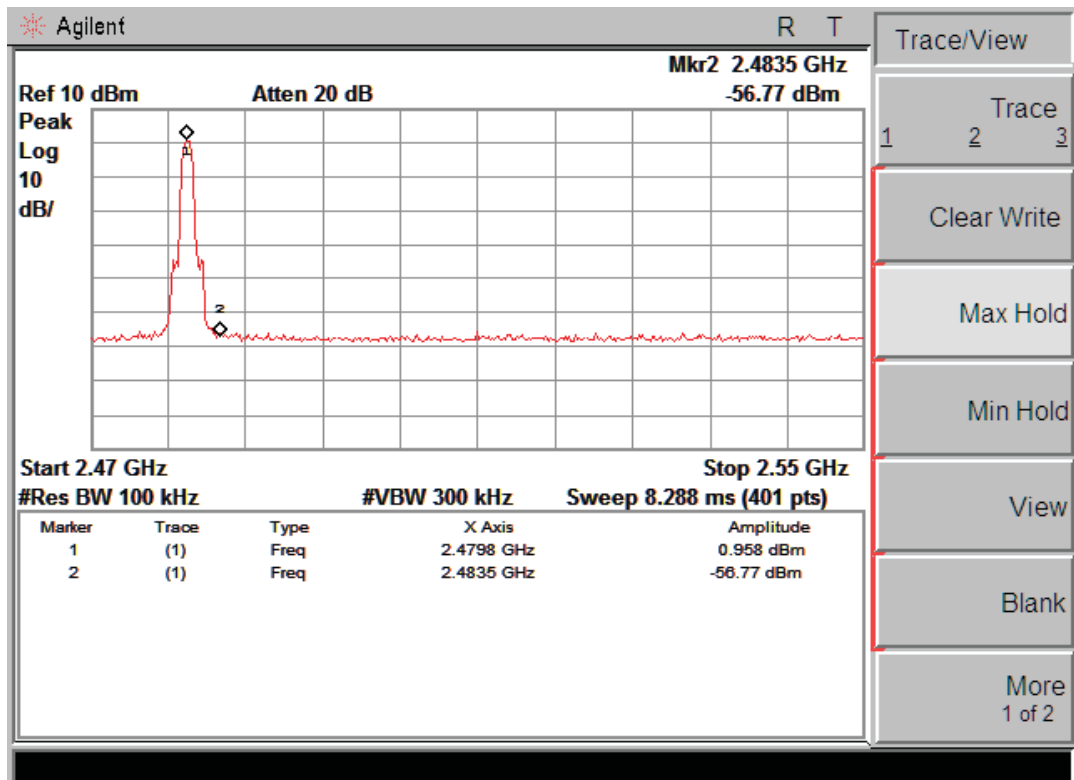
$\pi/4$  DQPSK: CH High Hopping



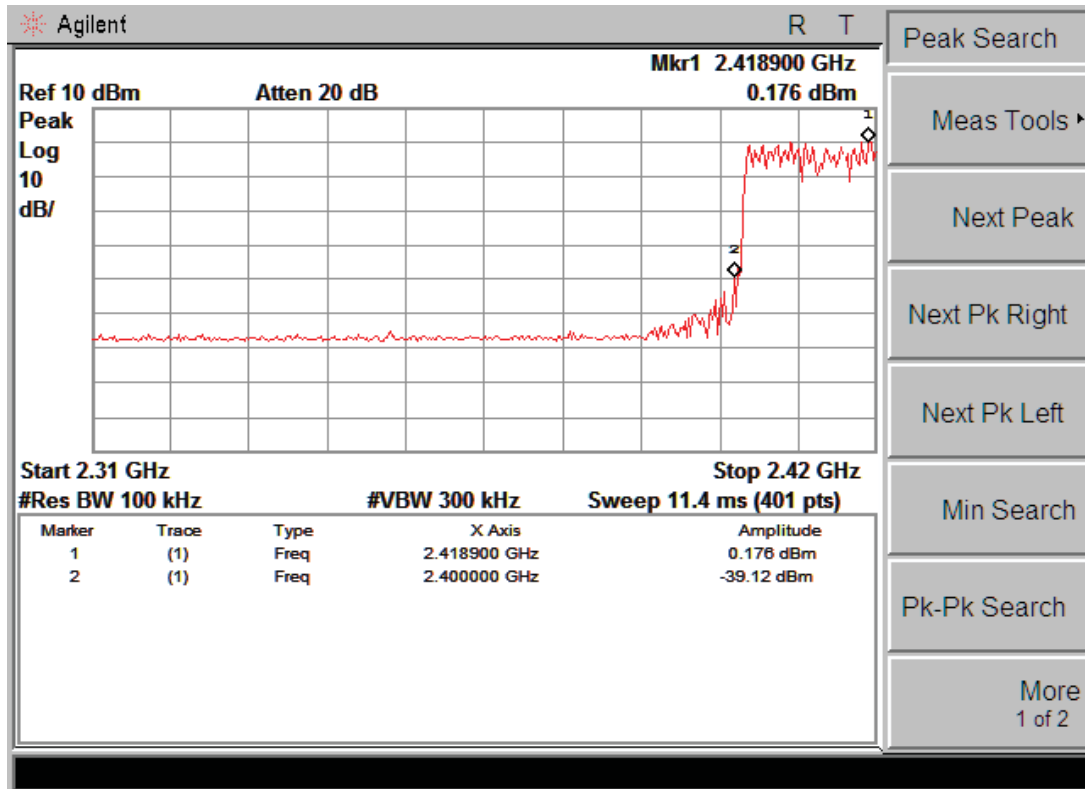
8- DPSK: CH Low



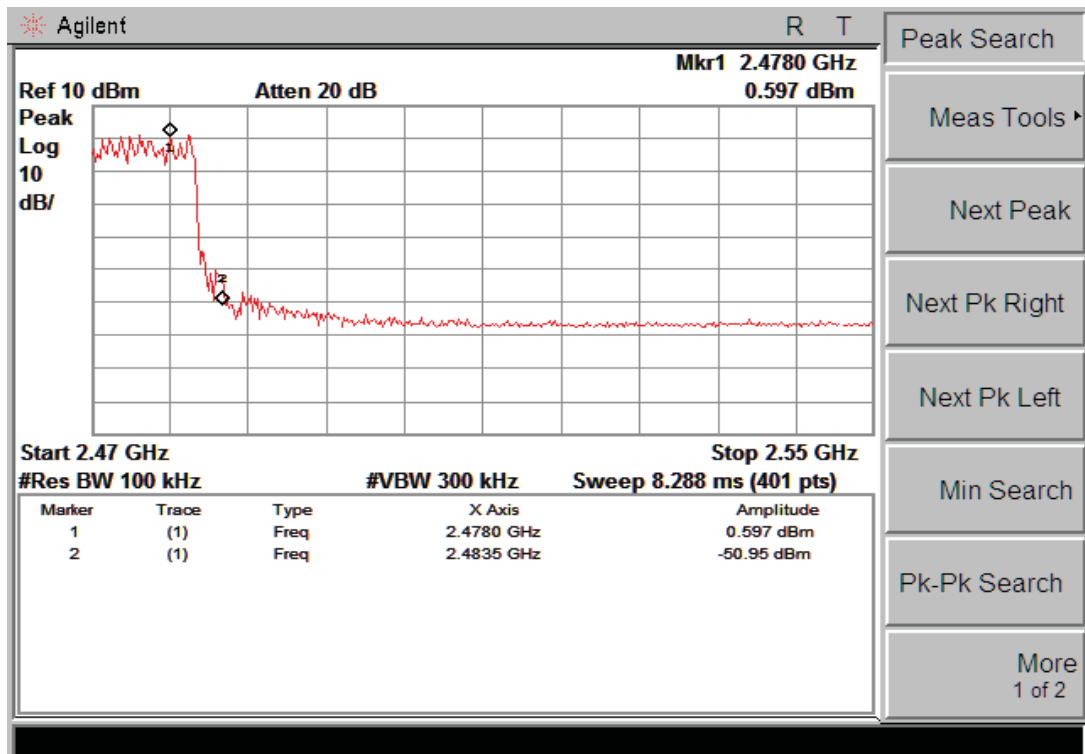
8- DPSK: CH High



### 8- DPSK: CH Low Hopping



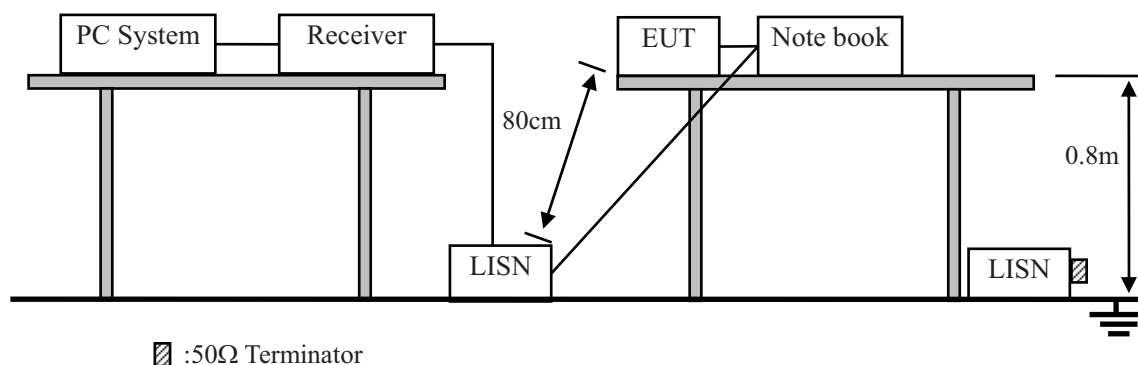
### 8- DPSK: CH High Hopping





## 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                            |

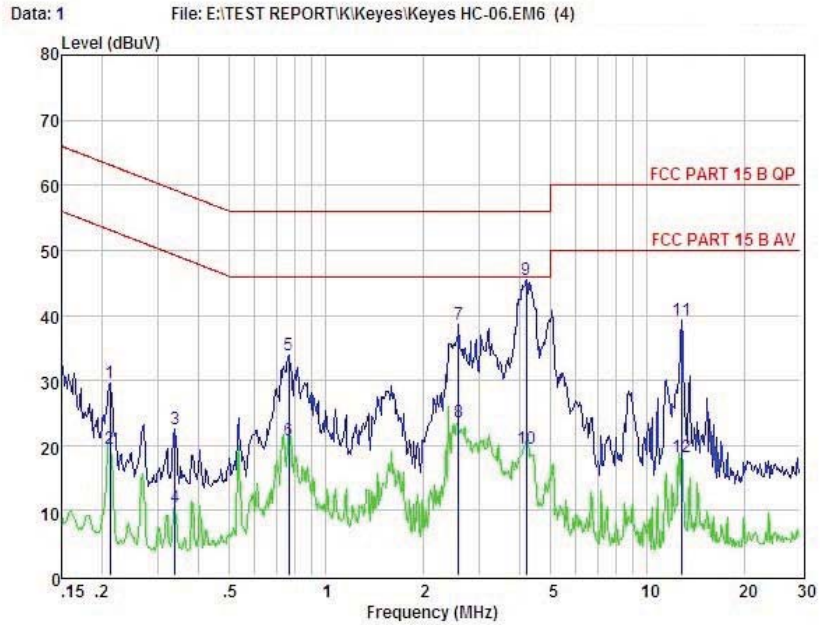
- Notes: 1. \* Decreasing linearly with logarithm of frequency.  
 2. The lower limit shall apply at the transition frequencies.

### 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 2003 on conducted Emission test.
- (4) The bandwidth of test receiver is set at 10 kHz.
- (5) The frequency range from 150 KHz to 30MHz is checked.

### 10.4. Test Result

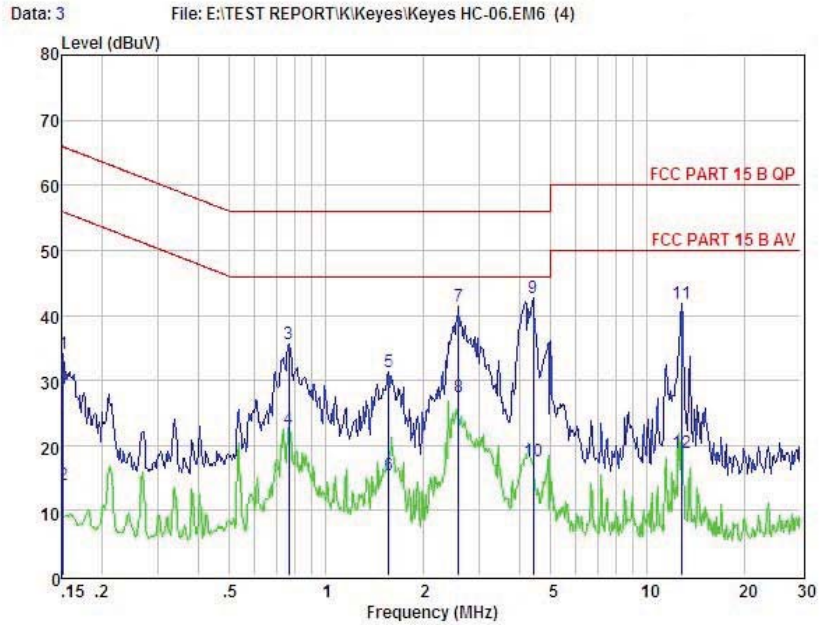
**PASS. (See below detailed test data)**



Condition : FCC PART 15 B QP POL: NEUTRAL Temp:24°C Hum:56%  
 EUT : bluetooth module  
 Model No : Keyes HC-06  
 Test Mode : Charging and Link mode  
 Power : DC 3.3V From Bluetooth Adapter With PC  
 Test Engineer: Store  
 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    | 0.213       | 19.66        | 0.03                 | -9.72                  | 0.10                | 29.51         | 63.10         | -33.59         | QP      |
| 2    | 0.213       | 9.66         | 0.03                 | -9.72                  | 0.10                | 19.51         | 53.10         | -33.59         | Average |
| 3    | 0.339       | 12.68        | 0.03                 | -9.72                  | 0.10                | 22.53         | 59.22         | -36.69         | QP      |
| 4    | 0.339       | 0.68         | 0.03                 | -9.72                  | 0.10                | 10.53         | 49.22         | -38.69         | Average |
| 5    | 0.767       | 23.96        | 0.04                 | -9.71                  | 0.10                | 33.81         | 56.00         | -22.19         | QP      |
| 6    | 0.767       | 10.96        | 0.04                 | -9.71                  | 0.10                | 20.81         | 46.00         | -25.19         | Average |
| 7    | 2.581       | 28.76        | 0.06                 | -9.70                  | 0.11                | 38.63         | 56.00         | -17.37         | QP      |
| 8    | 2.581       | 13.76        | 0.06                 | -9.70                  | 0.11                | 23.63         | 46.00         | -22.37         | Average |
| 9    | 4.202       | 35.65        | 0.08                 | -9.69                  | 0.12                | 45.54         | 56.00         | -10.46         | QP      |
| 10   | 4.202       | 9.65         | 0.08                 | -9.69                  | 0.12                | 19.54         | 46.00         | -26.46         | Average |
| 11   | 12.784      | 29.30        | 0.24                 | -9.44                  | 0.22                | 39.20         | 60.00         | -20.80         | QP      |
| 12   | 12.784      | 8.30         | 0.24                 | -9.44                  | 0.22                | 18.20         | 50.00         | -31.80         | Average |

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



Condition : FCC PART 15 B QP POL: LINE Temp:24°C Hum:56%

EUT : bluetooth module

Model No : Keyes HC-06

Test Mode : Charging and Link mode

Power : DC 3.3V From Bluetooth Adapter With PC

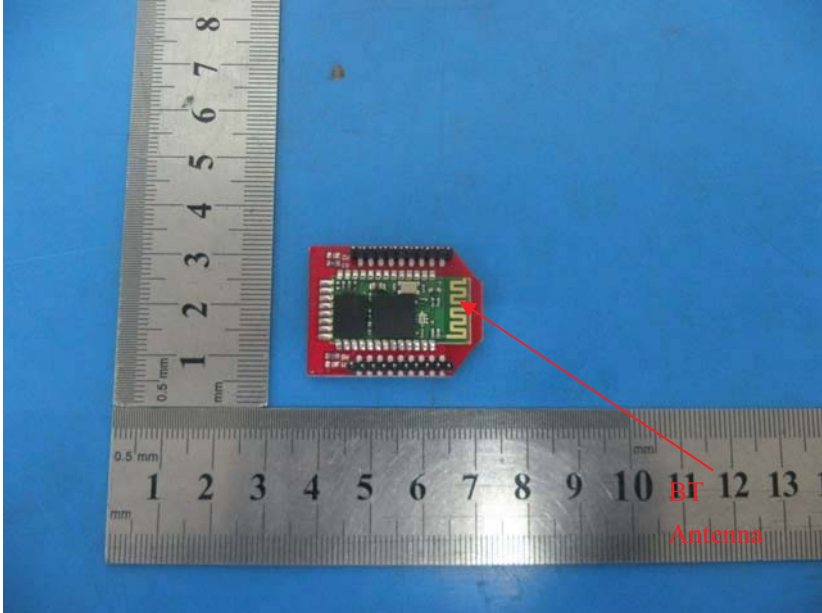
Test Engineer: Store

Remark :

| Item | Freq   | Read  | LISN   | Preamp | Cable | Level | Limit | Margin | Remark  |
|------|--------|-------|--------|--------|-------|-------|-------|--------|---------|
|      | MHz    | dBuV  | Factor | Factor | Loss  | dBuV  | dBuV  | dBuV   |         |
|      |        |       | dB     | dB     | dB    |       |       |        |         |
| 1    | 0.152  | 24.16 | 0.03   | -9.72  | 0.10  | 34.01 | 65.91 | -31.90 | QP      |
| 2    | 0.152  | 4.16  | 0.03   | -9.72  | 0.10  | 14.01 | 55.91 | -41.90 | Average |
| 3    | 0.767  | 25.65 | 0.04   | -9.71  | 0.10  | 35.50 | 56.00 | -20.50 | QP      |
| 4    | 0.767  | 12.65 | 0.04   | -9.71  | 0.10  | 22.50 | 46.00 | -23.50 | Average |
| 5    | 1.568  | 21.48 | 0.05   | -9.71  | 0.10  | 31.34 | 56.00 | -24.66 | QP      |
| 6    | 1.568  | 5.48  | 0.05   | -9.71  | 0.10  | 15.34 | 46.00 | -30.66 | Average |
| 7    | 2.581  | 31.59 | 0.06   | -9.70  | 0.11  | 41.46 | 56.00 | -14.54 | QP      |
| 8    | 2.581  | 17.59 | 0.06   | -9.70  | 0.11  | 27.46 | 46.00 | -18.54 | Average |
| 9    | 4.407  | 32.74 | 0.09   | -9.68  | 0.12  | 42.63 | 56.00 | -13.37 | QP      |
| 10   | 4.407  | 7.74  | 0.09   | -9.68  | 0.12  | 17.63 | 46.00 | -28.37 | Average |
| 11   | 12.784 | 31.89 | 0.24   | -9.44  | 0.22  | 41.79 | 60.00 | -18.21 | QP      |
| 12   | 12.784 | 8.89  | 0.24   | -9.44  | 0.22  | 18.79 | 50.00 | -31.21 | Average |

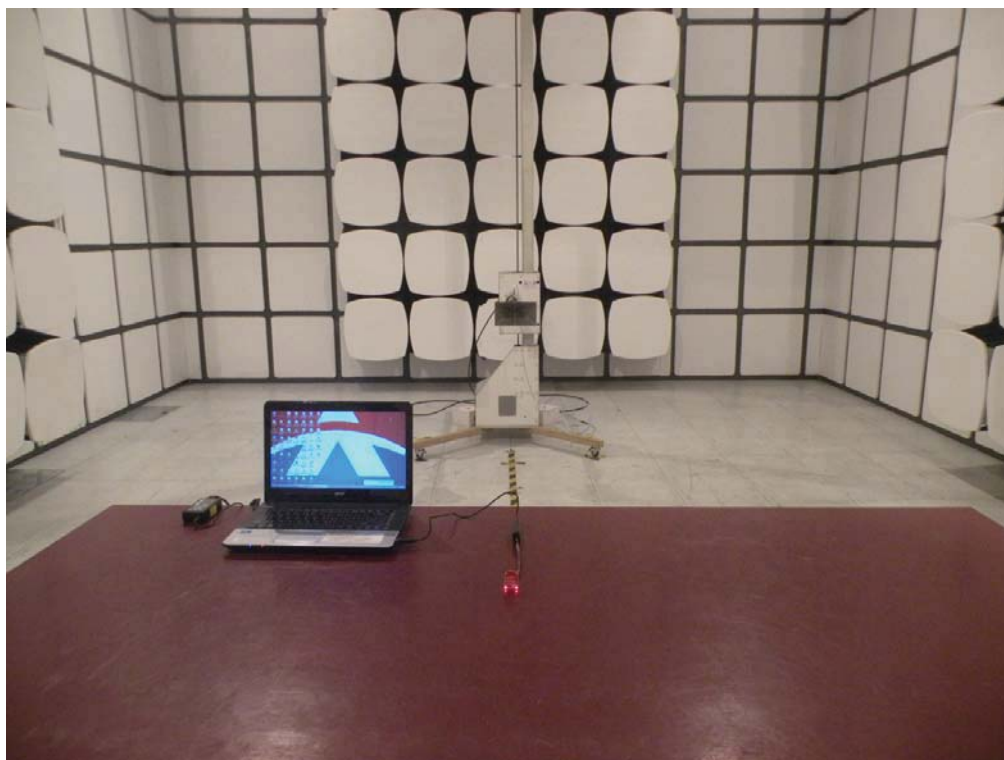
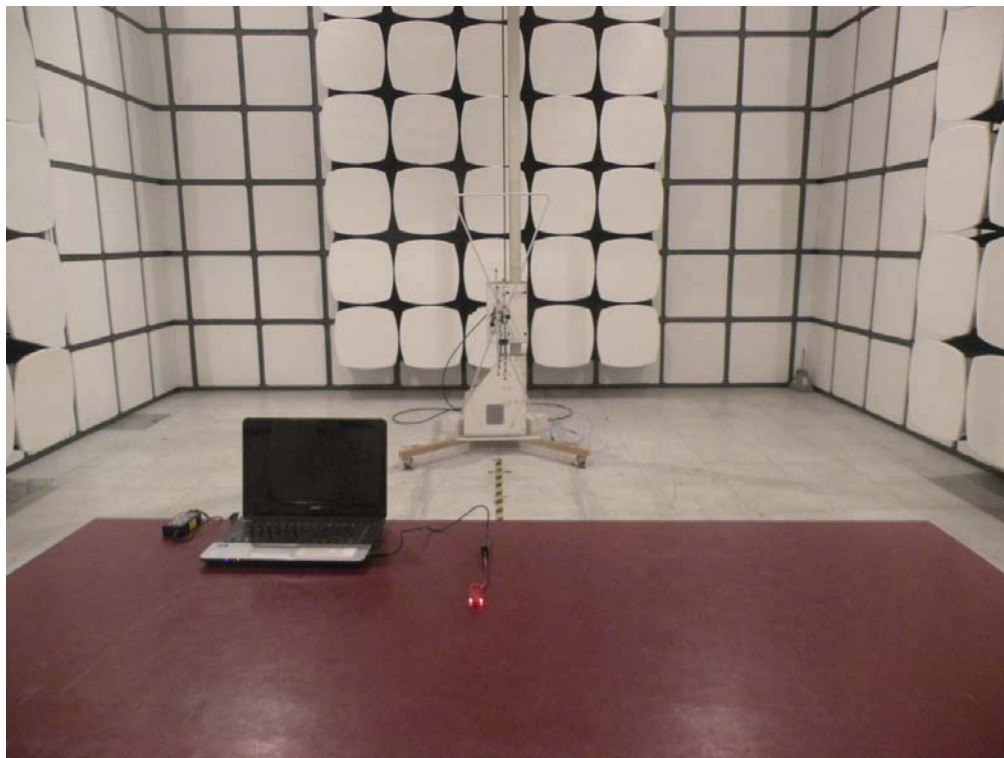
Remarks: Level = Read + LISN Factor - Preamp Factor + Cable loss

## 11. Antenna Requirements

|  |                                     |
|--|-------------------------------------|
| <b>Standard requirement:</b>   | FCC Part15 C Section 15.203 /247(c) |
| <p>15.203 requirement:<br/>           An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> <p>15.247(c) (1)(i) requirement:<br/>           (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.</p> |                                     |
| <b>E.U.T Antenna:</b>  |                                     |
| <p>The antenna is PCB antenna, which permanently attached, and the best case gain of the antenna is 0 dBi.</p>   |                                     |
|    |                                     |

## 12. Test setup photo

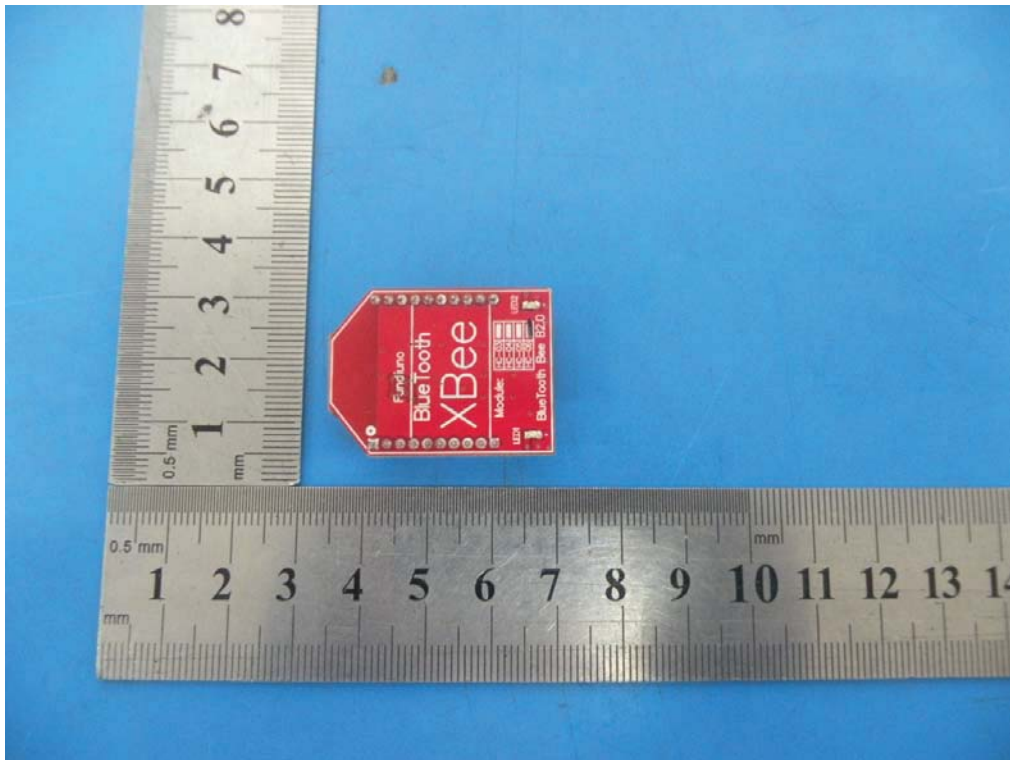
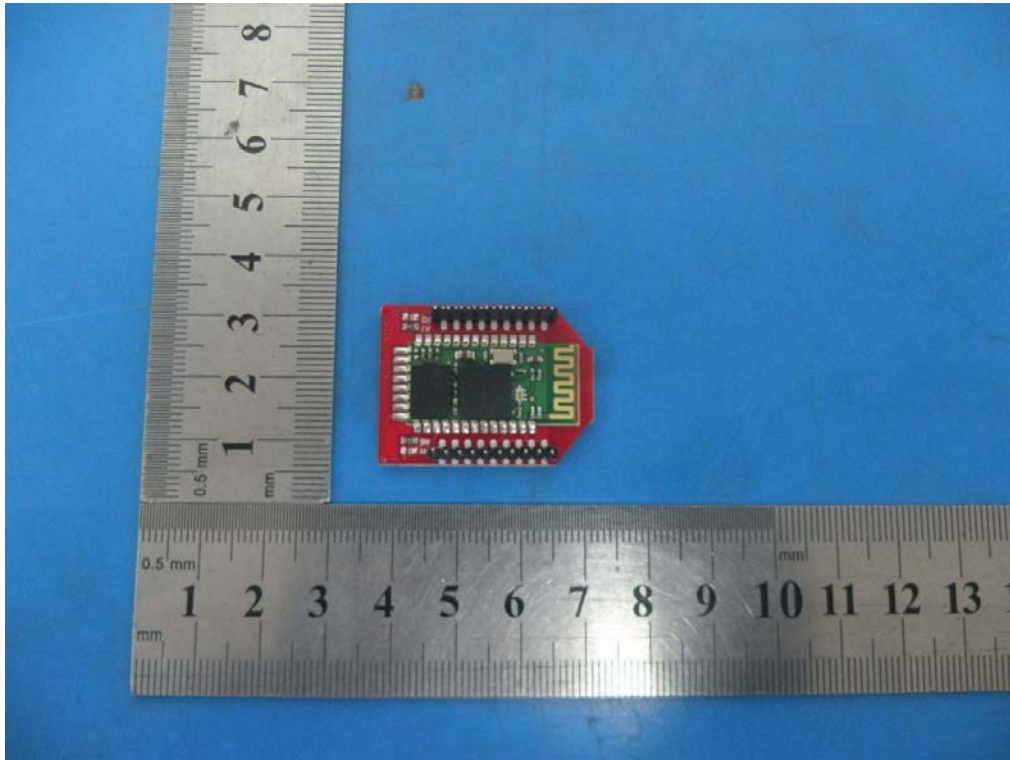
### 12.1. Photos of Radiated emission



## 12.2.Photos of Conducted Emission test



### 13.Photos of EUT



-----END OF THE REPORT-----