

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT  
INTENTIONAL RADIATOR CERTIFICATION TO  
FCC PART 15 SUBPART C AND CANADIAN RSS 210 ISSUE 8  
REQUIREMENTS**

*OF*

**SOUNDBAR**

**MODEL No.: A844, A600, A1094, B1027, B1197, B1397**

**FCC ID: 2ACPUA844**

**IC: 12178A-SBA844**

**Trademark: N/A**

**REPORT NO.: ES140430278E**

**ISSUE DATE: August 8, 2014**

*Prepared for*

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*Prepared by*

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## VERIFICATION OF COMPLIANCE

|                      |  |
|----------------------|--|
| Applicant:           | NINGBO SOMLE AUDIO-VISUAL TECHNOLOGY CO., LTD.<br>No.39, Lane150, Beihai Road, Jiangbei, Ningbo, China.  |
| Manufacturer:        | NINGBO SOMLE AUDIO-VISUAL TECHNOLOGY CO., LTD.<br>No.39, Lane150, Beihai Road, Jiangbei, Ningbo, China.  |
| Product Description: | SOUNDBAR   |
| Model Number:        | A844, A600, A1094, B1027, B1197, B1397<br>(Note:<br>Series A: A844, A600, A1094; Series B: B1027, B1197, B1397<br>For Series A and series B:<br>the only differences are the exterior designs and model numbers;<br>For Model Number:<br>all the model numbers are identical in circuitry and electrical,<br>mechanical, internal construction, PCB layout, material; the only<br>differences are the exterior designs and model no..) |
| Trademark:           | N/A  |
| File Number:         | ES140430278E   |
| Date of Test:        | April 30, 2014 to June 28, 2014  |

### We hereby certify that:


The above equipment was tested by SHENZHEN EMTEK CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2009) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247 and Canadian RSS 210 ISSUE 8 REQUIREMENTS.

The test results of this report relate only to the tested sample identified in this report.

Date of Test : April 30, 2014 to June 28, 2014

Prepared by : Jack Li  
Jack Li/Editor

Reviewer : Joe Xia  
Joe Xia/Supervisor

Approve & Authorized Signer :   
Lisa Wang/Manager

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## 1. General Information

### 1.1 Product Description

A major technical descriptions of EUT is described as following:

- A). Operation Frequency: 2402-2480MHz
- B). Modulation: GFSK ,1/4Π-DQPSK, 8DPSK for Bluetooth4.0 DSS;  
GFSK for Bluetooth4.0 DTS
- C). Number of Channel: 79 Channels for Bluetooth4.0 DSS;  
40 Channels for Bluetooth4.0 DTS
- D). Channel space: 1MHz for Bluetooth4.0 DSS, 2MHz for Bluetooth4.0 DTS
- E). RF Output Power: BT4.0 DSS: 4.42dBm Max; BT4.0 DTS:1.04dBm Max
- F). Antenna Type: PCB antenna
- G). Antenna GAIN: 1dBi
- H). Power Supply: AC 120V/60Hz

Note:

1. This device is Bluetooth portable speaker included BT4.0 DSS and BT4.0 DTS transceiver function.
2. Test of channel was included the lowest middle and highest frequency in lowest data rate and to perform the test, then record on this report.

### 1.2 Related Submittal(s) / Grant(s)

This submittal(s) (test report) is intended for FCC ID: 2ACPUA844 filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules and also intended for IC: 12178A-SBA844 filing to comply with Canadian RSS 210 Issue 8.0.  
The composite system is compliance with Subpart B is authorized under a DOC procedure.

### 1.3 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (2009) and FCC Public Notice DA 00-705. Radiated testing was performed at an antenna to EUT distance 3 meters.

### 1.4 Special Accessories

Not available for this EUT intended for grant.

### 1.5 Equipment Modifications

Not available for this EUT intended for grant.

### 1.6 Test Facility

#### Site Description

EMC Lab. : Accredited by CNAS, 2013.10.29  
The certificate is valid until 2016.10.28  
The Laboratory has been assessed and proved to be in compliance with CNAS/CL01: 2006(identical to ISO/IEC17025: 2005)  
The Certificate Registration Number is L2291

Accredited by TUV Rheinland Shenzhen 2010.5.25  
The Laboratory has been assessed according to the requirements ISO/IEC 17025

Accredited by FCC, April 17, 2013  
The Certificate Registration Number is 406365.

Accredited by Industry Canada, March 05, 2010  
The Certificate Registration Number is 46405-4480.

Name of Firm : SHENZHEN EMTEK CO., LTD.  
Site Location : Bldg 69, Majialong Industry Zone,  
Nanshan District, Shenzhen, Guangdong, China

## 2. System Test Configuration

### 2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

### 2.3 Test Procedure

#### 2.3.1 Conducted Emissions

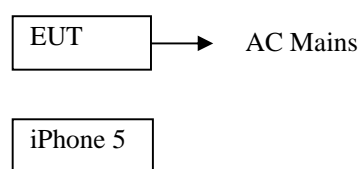
The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements of ANSI C63.4-2009 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.

#### 2.3.2 Radiated Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. Emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4-2009.

### 2.4 Configuration of Tested System

**Fig. 2-1 Configuration of Tested System**



**Table 2-1 Equipment Used in Tested System**

| Equipment | Mfr/Brand | Model/Type No. | FCC ID    | Series No. | Note |
|-----------|-----------|----------------|-----------|------------|------|
| SOUNDBAR  | N/A       | A844           | 2ACPUA844 | N/A        | EUT  |
| IPhone 5  | apple     | A1324          | N/A       | N/A        |      |

**Note:**

- (1) Unless otherwise denoted as EUT in 『Remark』 column, device(s) used in tested system is a support equipment.



### 3. Description of Test Modes

these is Digital Transmission system (DTS) and with modulation GFSK.  
EUT is a composite System, this Report Records BT4.0 DTS function test data

Two different series were tested the data of the Worse result(B1027) are recorded in the following pages and the others do not exceed the limits.

The mode is used: **Transmitting mode**

1. For lowest channel : 2402MHz (Channel 01)
2. For middle channel : 2440MHz (Channel 20)
3. For highest channel: 2480MHz (Channel 40)

#### 4. Summary of Test Results

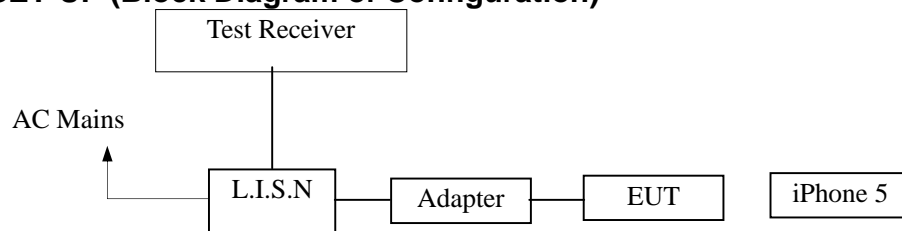
| FCC Rules           | IC Rule                | Description Of Test         | Result |
|---------------------|------------------------|-----------------------------|--------|
| §15.247(a)(2)       | RSS-210, A8.2(a)       | 6dB bandwidth               | Pass   |
| §15.247(b)(3)       | RSS-210, A8.4(2)       | Max Peak output Power test  | Pass   |
| §15.247(e)          | RSS-210, A8.2(b)       | Power density               | Pass   |
| §15.247(d)          | RSS-210, A2.9, A8.5    | Band edge test              | Pass   |
| §15.207             | RSS-GEN, Section 7.2.4 | AC Power Conducted Emission | Pass   |
| §15.247(d), §15.209 | RSS-210, A2.9, A8.5    | Radiated Emission           | Pass   |
| §15.247(d)          | RSS-GEN, Section 7.2.5 | Antenna Port Emission       | Pass   |
| §15.247(b)&§15.203  | RSS-210, A8.5          | Antenna Application         | Pass   |

## 5. Conducted Emissions Test

### 5.1 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

### 5.2 Test SET-UP (Block Diagram of Configuration)



### 5.3 Measurement Equipment Used

| Conducted Emission Test Site |                 |              |               |            |            |
|------------------------------|-----------------|--------------|---------------|------------|------------|
| EQUIPMENT TYPE               | MFR             | MODEL NUMBER | SERIAL NUMBER | LAST CAL.  | CAL DUE.   |
| Test Receiver                | Rohde & Schwarz | ESCS30       | 828985/018    | 05/17/2014 | 05/16/2015 |
| L.I.S.N.                     | Schwarzbeck     | NNLK8129     | 8129203       | 05/17/2014 | 05/16/2015 |
| 50Ω Coaxial Switch           | Anritsu         | MP59B        | M20531        | 05/17/2014 | 05/16/2015 |

### 5.4 Conducted Emission Limit

#### Conducted Emission

#### Frequency(MHz)

#### Quasi-peak

#### Average

0.15-0.5

66-56

56-46

0.5-5.0

56

46

5.0-30.0

60

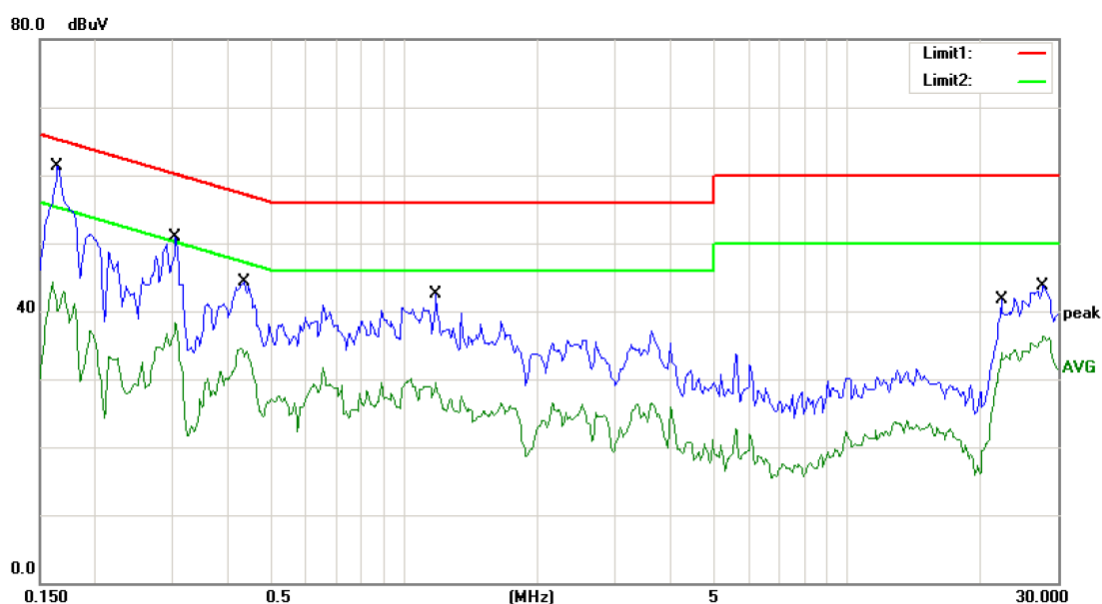
50

**Note:** 1. The lower limit shall apply at the transition frequencies

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

### 5.5 Measurement Result

PASS



Site Conduction #1

Phase: **L1**

Temperature: 24

Limit: (CE)FCC PART 15 class B\_QP

Power: AC 120V/60Hz

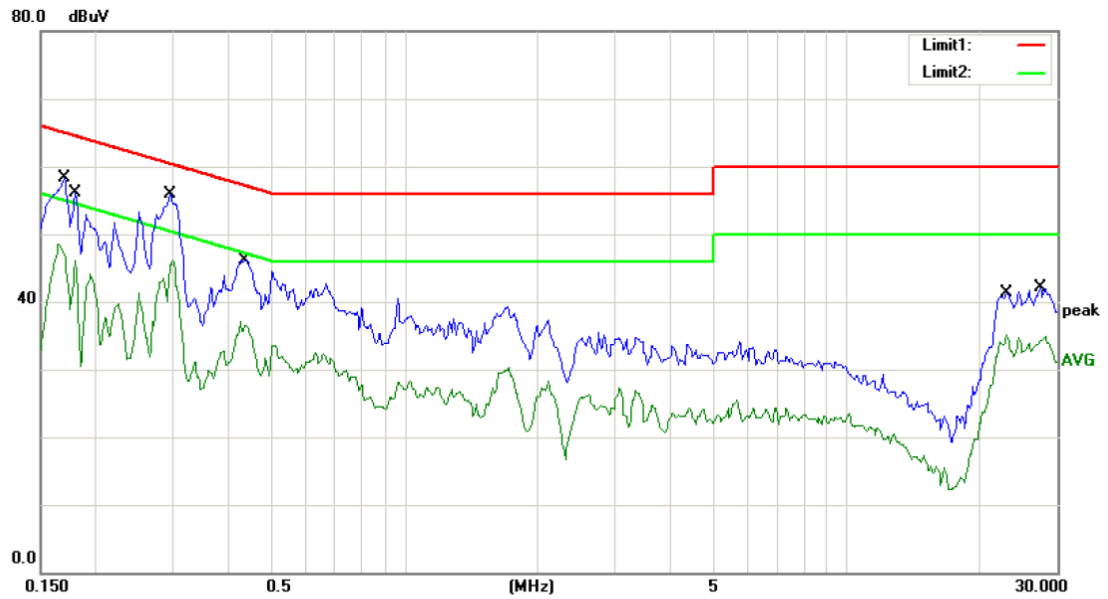
Humidity: 53 %

Mode: Bluetooth ON

Note:

| No. | Mk. | Freq.   | Reading Level | Correct Factor | Measure-ment | Limit | Over   | Detector | Comment |
|-----|-----|---------|---------------|----------------|--------------|-------|--------|----------|---------|
|     |     | MHz     | dBuV          | dB             | dBuV         | dBuV  | dB     |          |         |
| 1   | *   | 0.1650  | 58.60         | 0.00           | 58.60        | 65.21 | -6.61  | QP       |         |
| 2   |     | 0.1650  | 44.28         | 0.00           | 44.28        | 55.21 | -10.93 | AVG      |         |
| 3   |     | 0.3050  | 50.83         | 0.00           | 50.83        | 60.11 | -9.28  | QP       |         |
| 4   |     | 0.3050  | 38.24         | 0.00           | 38.24        | 50.11 | -11.87 | AVG      |         |
| 5   |     | 0.4350  | 44.21         | 0.00           | 44.21        | 57.16 | -12.95 | QP       |         |
| 6   |     | 0.4350  | 34.52         | 0.00           | 34.52        | 47.16 | -12.64 | AVG      |         |
| 7   |     | 1.1800  | 42.46         | 0.00           | 42.46        | 56.00 | -13.54 | QP       |         |
| 8   |     | 1.1800  | 29.58         | 0.00           | 29.58        | 46.00 | -16.42 | AVG      |         |
| 9   |     | 22.4000 | 41.61         | 0.00           | 41.61        | 60.00 | -18.39 | QP       |         |
| 10  |     | 22.4000 | 32.06         | 0.00           | 32.06        | 50.00 | -17.94 | AVG      |         |
| 11  |     | 27.8500 | 43.64         | 0.00           | 43.64        | 60.00 | -16.36 | QP       |         |
| 12  |     | 27.8500 | 36.32         | 0.00           | 36.32        | 50.00 | -13.68 | AVG      |         |

\*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: CSL



Site Conduction #1

Phase: **N**

Temperature: 24

Limit: (CE)FCC PART 15 class B\_QP

Power: AC 120V/60Hz

Humidity: 53 %

Mode: Bluetooth ON

Note:

| No. Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV | Limit<br>dBuV | Over<br>dB | Detector | Comment |
|---------|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|---------|
| 1       | 0.1700       | 58.26                    | 0.00                    | 58.26                    | 64.96         | -6.70      | QP       |         |
| 2       | 0.1700       | 48.47                    | 0.00                    | 48.47                    | 54.96         | -6.49      | AVG      |         |
| 3       | 0.1800       | 56.08                    | 0.00                    | 56.08                    | 64.49         | -8.41      | QP       |         |
| 4       | 0.1800       | 46.13                    | 0.00                    | 46.13                    | 54.49         | -8.36      | AVG      |         |
| 5       | 0.2950       | 54.20                    | 0.00                    | 54.20                    | 60.38         | -6.18      | QP       |         |
| 6 *     | 0.2950       | 46.10                    | 0.00                    | 46.10                    | 50.38         | -4.28      | AVG      |         |
| 7       | 0.4350       | 46.19                    | 0.00                    | 46.19                    | 57.16         | -10.97     | QP       |         |
| 8       | 0.4350       | 37.16                    | 0.00                    | 37.16                    | 47.16         | -10.00     | AVG      |         |
| 9       | 23.0750      | 41.34                    | 0.00                    | 41.34                    | 60.00         | -18.66     | QP       |         |
| 10      | 23.0750      | 35.05                    | 0.00                    | 35.05                    | 50.00         | -14.95     | AVG      |         |
| 11      | 27.5250      | 42.02                    | 0.00                    | 42.02                    | 60.00         | -17.98     | QP       |         |
| 12      | 27.5250      | 34.86                    | 0.00                    | 34.86                    | 50.00         | -15.14     | AVG      |         |

\*:Maximum data    x:Over limit    !:over margin    Comment: Factor build in receiver.    Operator: CSL

## 6. Radiated Emission Test

### 6.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured was complete.

When spectrum scanned from 30 MHz to 1GHz setting resolution bandwidth 120 kHz and video bandwidth 300kHz.

| EMI Test Receiver | Setting  |
|-------------------|----------|
| Attenuation       | Auto     |
| RB                | 120kHz   |
| VB                | 300kHz   |
| Detector          | QP       |
| Trace             | Max hold |

When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 3MHz.

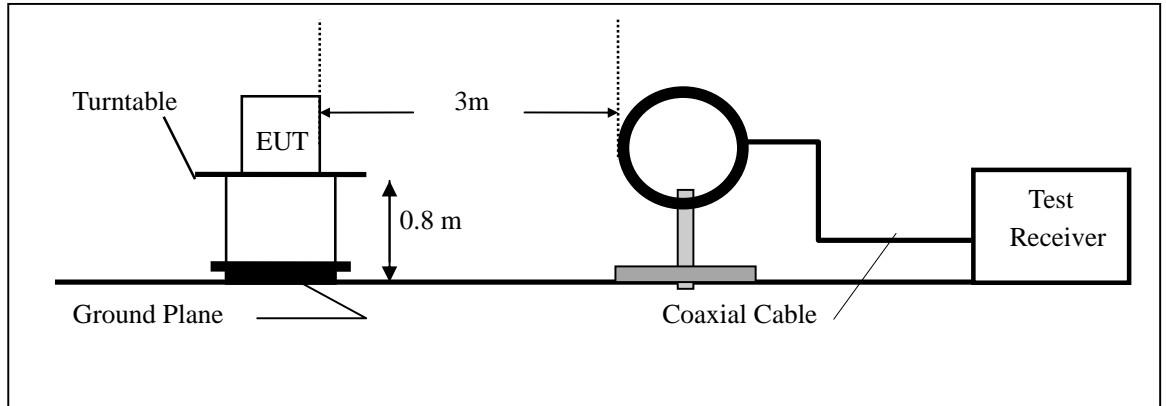
| EMI Test Receiver | Setting  |
|-------------------|----------|
| Attenuation       | Auto     |
| RB                | 1MHz     |
| VB                | 3MHz     |
| Detector          | Peak     |
| Trace             | Max hold |

When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 10Hz.

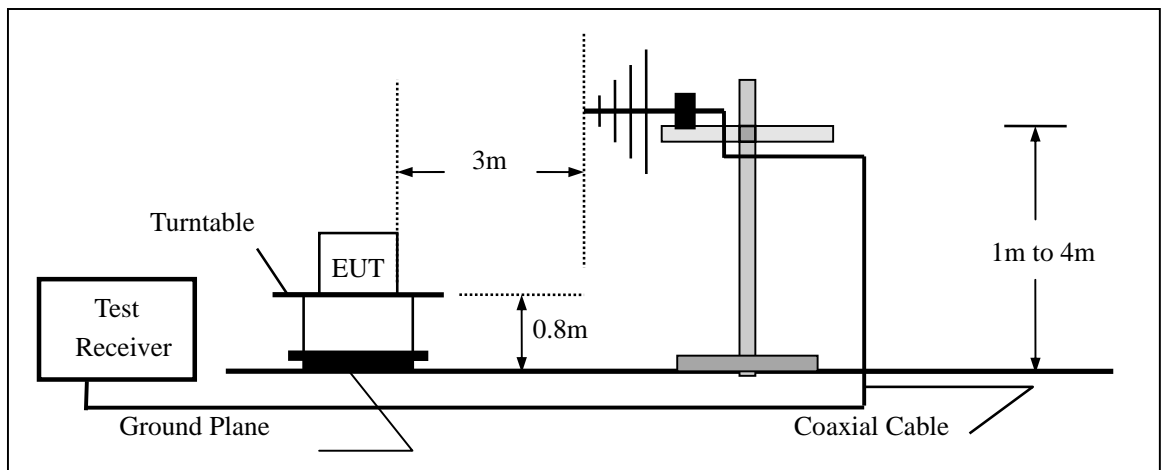
| EMI Test Receiver | Setting  |
|-------------------|----------|
| Attenuation       | Auto     |
| RB                | 1MHz     |
| VB                | 10Hz     |
| Detector          | AVG      |
| Trace             | Max hold |

## 6.2 Test SET-UP (Block Diagram of Configuration)

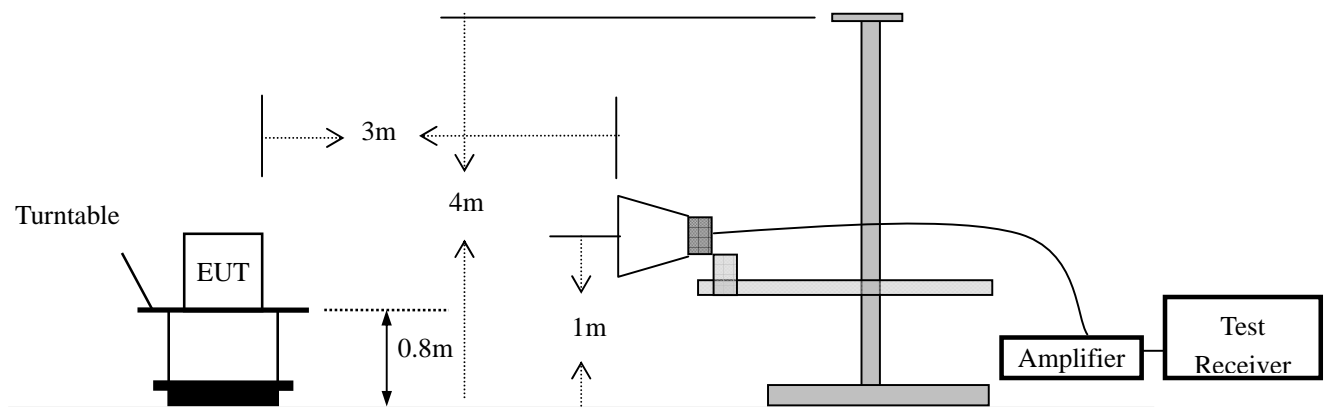
### (A) Radiated Emission Test Set-Up, Frequency Below 30MHz



### (B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



### (C) Radiated Emission Test Set-Up, Frequency above 1000MHz



### 6.3 Measurement Equipment Used

| EQUIPMENT TYPE    | MFR             | MODEL NUMBER | SERIAL NUMBER | LAST CAL.  | CAL DUE.   |
|-------------------|-----------------|--------------|---------------|------------|------------|
| EMI Test Receiver | Rohde & Schwarz | ESU          | 1302.6005.26  | 05/17/2014 | 05/16/2015 |
| Pre-Amplifier     | HP              | 8447D        | 2944A07999    | 05/17/2014 | 05/16/2015 |
| Bilog Antenna     | Schwarzbeck     | VULB9163     | 142           | 05/17/2014 | 05/16/2015 |
| Loop Antenna      | ARA             | PLA-1030/B   | 1029          | 05/17/2014 | 05/16/2015 |
| Horn Antenna      | Schwarzbeck     | BBHA 9170    | BBHA9170399   | 05/17/2014 | 05/16/2015 |
| Horn Antenna      | Schwarzbeck     | BBHA 9120    | D143          | 05/17/2014 | 05/16/2015 |
| Cable             | Schwarzbeck     | AK9513       | ACRX1         | 05/17/2014 | 05/16/2015 |
| Cable             | Rosenberger     | N/A          | FP2RX2        | 05/17/2014 | 05/16/2015 |
| Cable             | Schwarzbeck     | AK9513       | CRPX1         | 05/17/2014 | 05/16/2015 |
| Cable             | Schwarzbeck     | AK9513       | CRRX2         | 05/17/2014 | 05/16/2015 |

### 6.4 Radiated Emission Limit

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table 15.209(a):

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

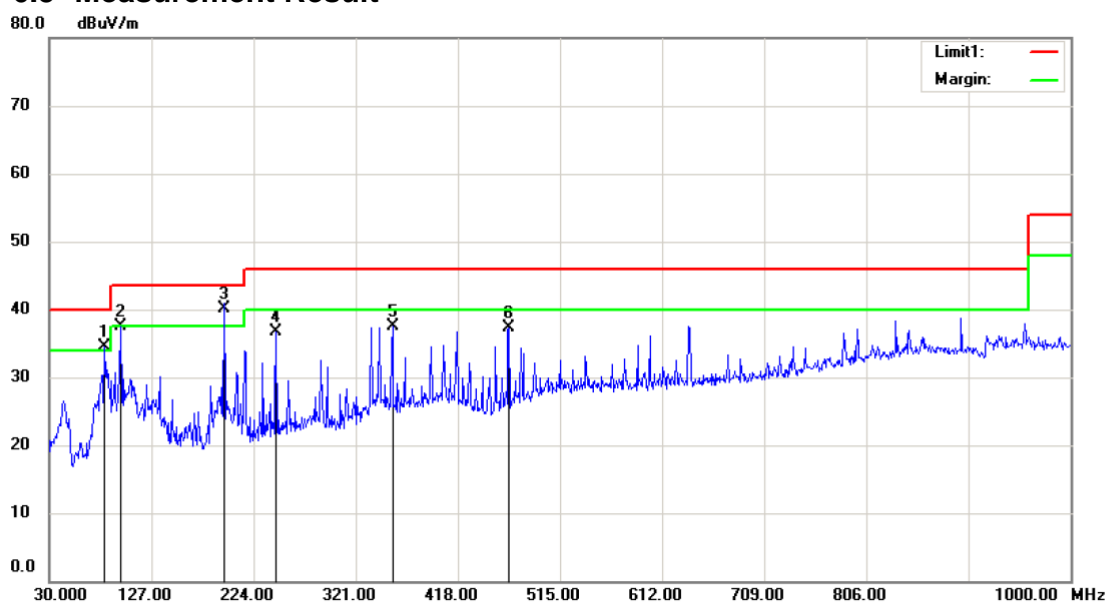


### 15.205 Restricted bands of operation

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

- Remark 1. Emission level in dBuV/m=20 log (uV/m)  
:  
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.  
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205, and the emissions located in restricted bands also comply with 15.209 limit.

## 6.5 Measurement Result

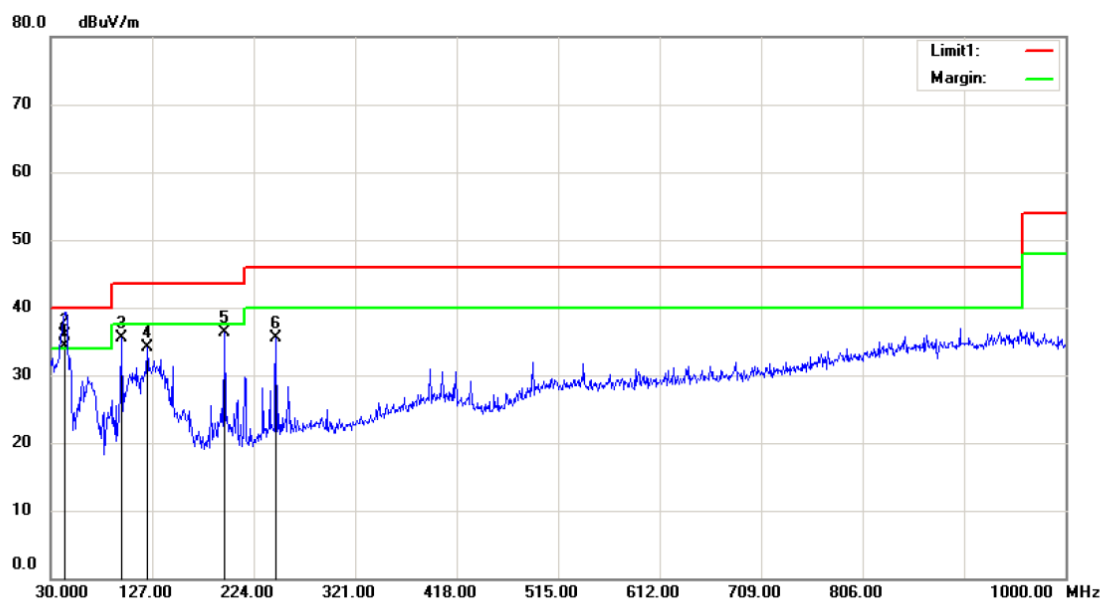


Site site #1  
Limit: FCC Class B 3M Radiation  
Mode:GFSK TX CH00  
Note:  
Polarization: **Horizontal**  
Power: AC 120V/60Hz  
Temperature: 24  
Humidity: 53 %

| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Antenna<br>Height<br>cm | Table<br>Degree<br>degree | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|-------------------------|---------------------------|---------|
| 1   | !   | 82.3800      | 46.72                    | -12.28                  | 34.44                      | 40.00           | -5.56      | QP                      |                           |         |
| 2   |     | 97.9000      | 44.92                    | -7.49                   | 37.43                      | 43.50           | -6.07      | QP                      |                           |         |
| 3   | *   | 195.8700     | 49.97                    | -9.77                   | 40.20                      | 43.50           | -3.30      | QP                      |                           |         |
| 4   |     | 245.3400     | 43.11                    | -6.35                   | 36.76                      | 46.00           | -9.24      | QP                      |                           |         |
| 5   |     | 355.9200     | 41.06                    | -3.56                   | 37.50                      | 46.00           | -8.50      | QP                      |                           |         |
| 6   |     | 466.5000     | 39.64                    | -2.32                   | 37.32                      | 46.00           | -8.68      | QP                      |                           |         |

\*:Maximum data x:Over limit !:over margin

Operator: Wang



Site site #1

Polarization: **Vertical**

Temperature: 24

Limit: FCC Class B 3M Radiation

Power: AC 120V/60Hz

Humidity: 53 %

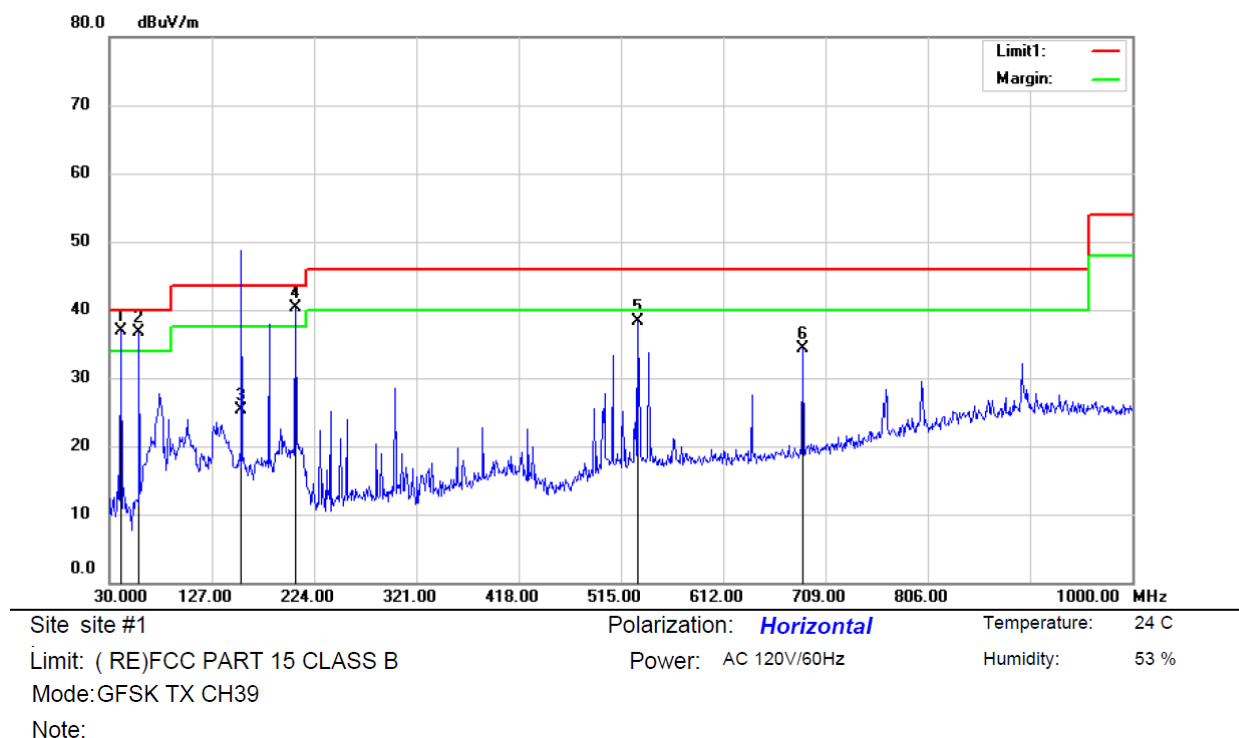
Mode:GFSK TX CH00

Note:

| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measure-ment | Limit  | Over   | Antenna Height | Table Degree |         |
|-----|-----|----------|---------------|----------------|--------------|--------|--------|----------------|--------------|---------|
|     |     | MHz      | dBuV          | dB             | dBuV/m       | dBuV/m | dB     | cm             | degree       | Comment |
| 1   | !   | 43.5800  | 37.76         | -3.36          | 34.40        | 40.00  | -5.60  | QP             |              |         |
| 2   | *   | 43.5800  | 39.26         | -3.36          | 35.90        | 40.00  | -4.10  | QP             |              |         |
| 3   |     | 97.9000  | 43.05         | -7.49          | 35.56        | 43.50  | -7.94  | QP             |              |         |
| 4   |     | 122.1500 | 43.86         | -9.78          | 34.08        | 43.50  | -9.42  | QP             |              |         |
| 5   |     | 195.8700 | 45.98         | -9.77          | 36.21        | 43.50  | -7.29  | QP             |              |         |
| 6   |     | 245.3400 | 41.82         | -6.35          | 35.47        | 46.00  | -10.53 | QP             |              |         |

\*:Maximum data x:Over limit !:over margin

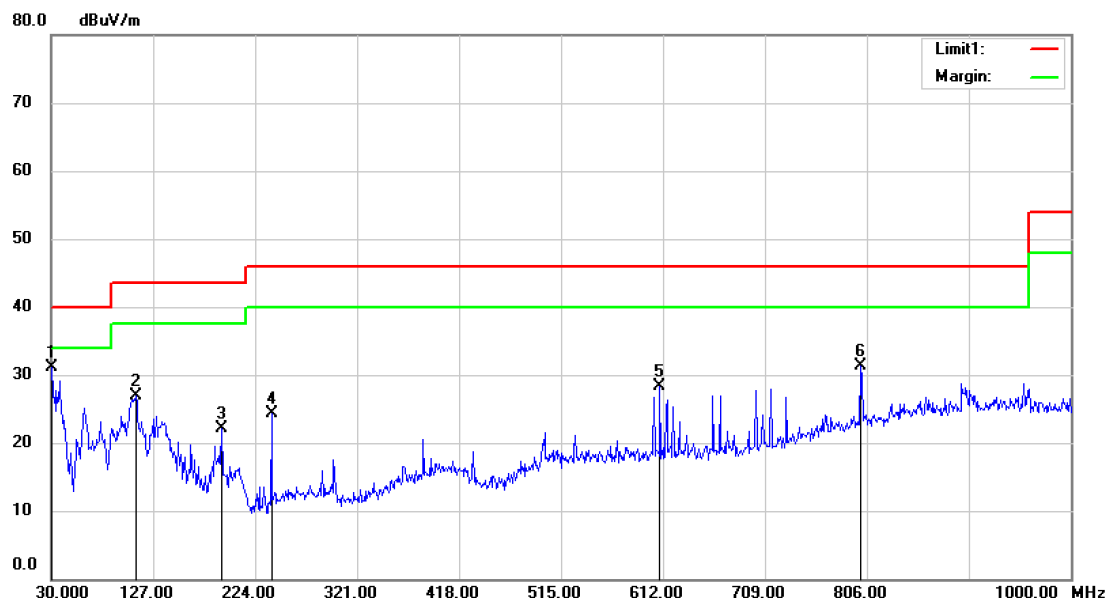
Operator: Wang



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Antenna<br>Height<br>cm | Table<br>Degree<br>degree | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|-------------------------|---------------------------|---------|
| 1   | *   | 40.6700      | 57.52                    | -20.59                  | 36.93                      | 40.00           | -3.07      | QP                      |                           |         |
| 2   | !   | 58.1300      | 59.75                    | -22.98                  | 36.77                      | 40.00           | -3.23      | QP                      |                           |         |
| 3   |     | 155.1300     | 51.12                    | -25.72                  | 25.40                      | 43.50           | -18.10     | QP                      |                           |         |
| 4   | !   | 206.5400     | 63.39                    | -23.18                  | 40.21                      | 43.50           | -3.29      | QP                      |                           |         |
| 5   |     | 530.5200     | 51.12                    | -12.88                  | 38.24                      | 46.00           | -7.76      | QP                      |                           |         |
| 6   |     | 687.6600     | 45.38                    | -10.99                  | 34.39                      | 46.00           | -11.61     | QP                      |                           |         |

\*:Maximum data x:Over limit !:over margin

Operator: KK

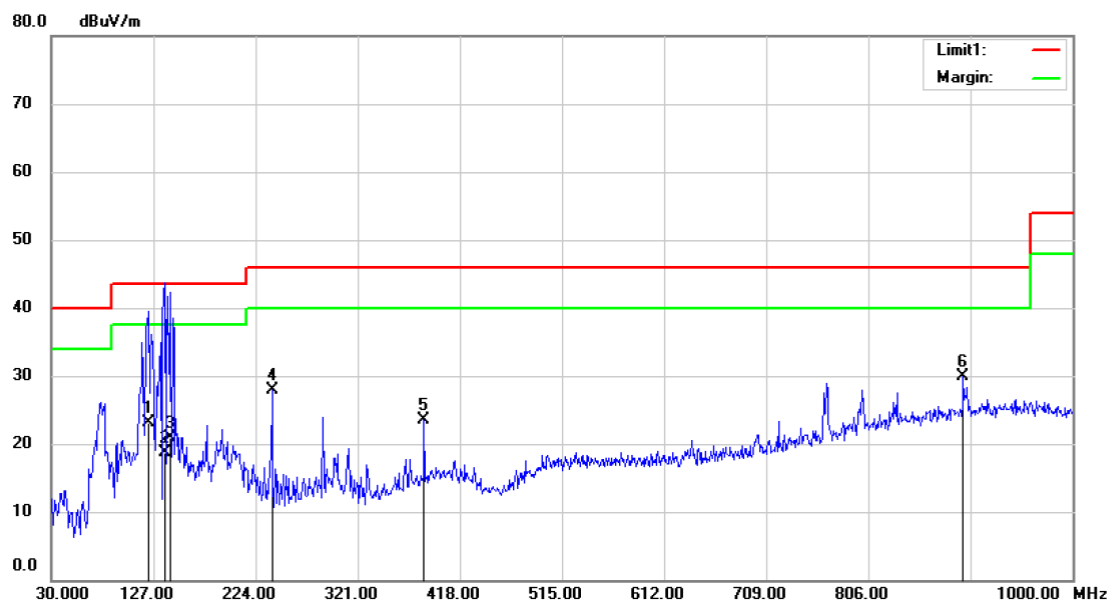


Site site #1 Polarization: **Vertical** Temperature: 24 C  
Limit: (RE)FCC PART 15 CLASS B Power: AC 120V/60Hz Humidity: 53 %  
Mode:GFSK TX CH39  
Note:

| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Antenna<br>Height<br>cm | Table<br>Degree<br>degree | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|-------------------------|---------------------------|---------|
| 1   | *   | 30.9700      | 55.04                    | -23.86                  | 31.18                      | 40.00           | -8.82      | QP                      |                           |         |
| 2   |     | 110.5100     | 48.79                    | -21.92                  | 26.87                      | 43.50           | -16.63     | QP                      |                           |         |
| 3   |     | 191.9900     | 46.16                    | -24.02                  | 22.14                      | 43.50           | -21.36     | QP                      |                           |         |
| 4   |     | 239.5200     | 44.86                    | -20.48                  | 24.38                      | 46.00           | -21.62     | QP                      |                           |         |
| 5   |     | 609.0900     | 40.56                    | -12.20                  | 28.36                      | 46.00           | -17.64     | QP                      |                           |         |
| 6   |     | 800.1800     | 38.44                    | -7.16                   | 31.28                      | 46.00           | -14.72     | QP                      |                           |         |

\*:Maximum data x:Over limit !:over margin

Operator: KK

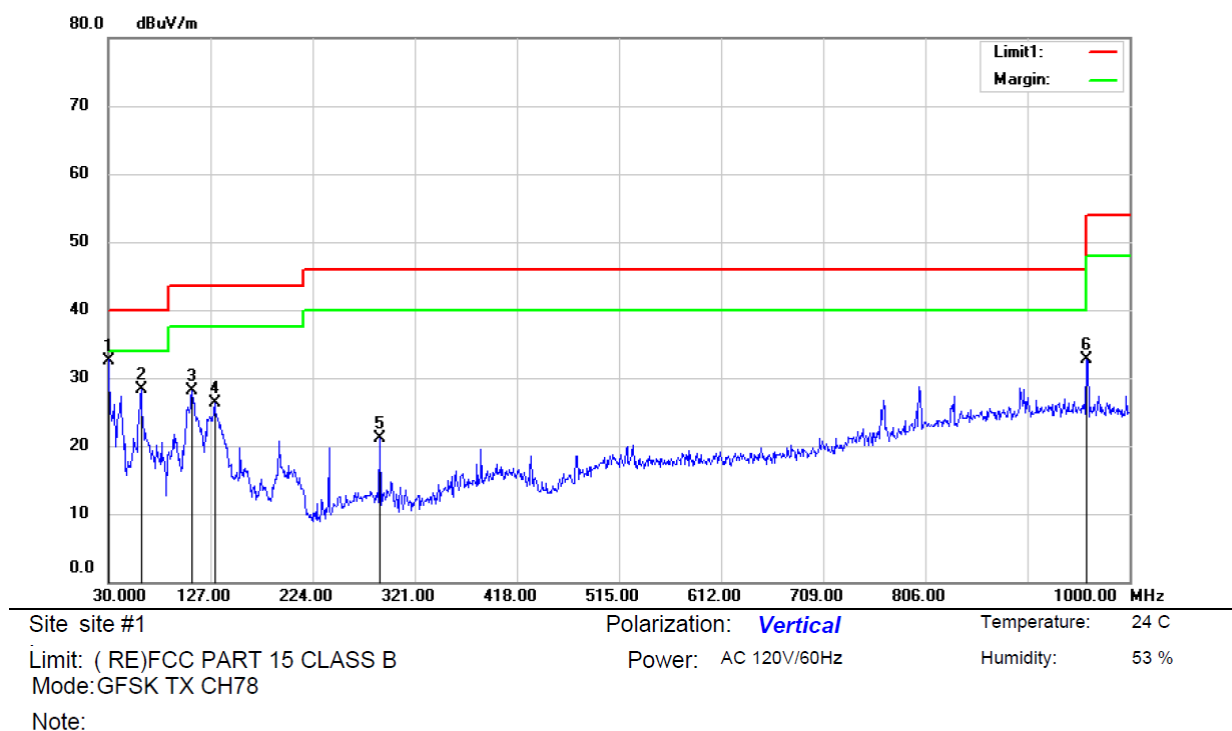


Site site #1 Polarization: **Horizontal** Temperature: 24 C  
Limit: ( RE)FCC PART 15 CLASS B Power: AC 120V/60Hz Humidity: 53 %  
Mode:GFSK TX CH78  
Note:

| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measure-ment | Limit  | Over   | Antenna Height | Table Degree |         |
|-----|-----|----------|---------------|----------------|--------------|--------|--------|----------------|--------------|---------|
|     |     | MHz      | dBuV          | dB             | dBuV/m       | dBuV/m | dB     | cm             | degree       | Comment |
| 1   |     | 122.1500 | 47.25         | -24.05         | 23.20        | 43.50  | -20.30 | QP             |              |         |
| 2   |     | 137.6700 | 43.79         | -25.09         | 18.70        | 43.50  | -24.80 | QP             |              |         |
| 3   |     | 142.5200 | 46.16         | -25.26         | 20.90        | 43.50  | -22.60 | QP             |              |         |
| 4   |     | 239.5200 | 48.32         | -20.48         | 27.84        | 46.00  | -18.16 | QP             |              |         |
| 5   |     | 384.0500 | 39.18         | -15.66         | 23.52        | 46.00  | -22.48 | QP             |              |         |
| 6   | *   | 896.2100 | 34.60         | -4.72          | 29.88        | 46.00  | -16.12 | QP             |              |         |

\*:Maximum data x:Over limit !:over margin

Operator: KK



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Antenna<br>Height<br>cm | Table<br>Degree<br>degree | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|-------------------------|---------------------------|---------|
| 1   | *   | 30.0000      | 56.83                    | -24.23                  | 32.60                      | 40.00           | -7.40      | QP                      |                           |         |
| 2   |     | 61.0400      | 51.45                    | -23.24                  | 28.21                      | 40.00           | -11.79     | QP                      |                           |         |
| 3   |     | 109.5400     | 49.98                    | -21.81                  | 28.17                      | 43.50           | -15.33     | QP                      |                           |         |
| 4   |     | 130.8800     | 51.05                    | -24.77                  | 26.28                      | 43.50           | -17.22     | QP                      |                           |         |
| 5   |     | 288.0200     | 40.56                    | -19.36                  | 21.20                      | 46.00           | -24.80     | QP                      |                           |         |
| 6   |     | 959.2600     | 37.41                    | -4.74                   | 32.67                      | 46.00           | -13.33     | QP                      |                           |         |

\*:Maximum data x:Over limit !:over margin

Operator: KK

Operation Mode: TX Channel 01      Test Date : June 28, 2014  
Frequency Range: 1GHz~25GHz      Temperature : 24℃  
Test Result: PASS      Humidity : 53 %  
Measured Distance: 3m      Test By: KK

| Freq.<br>(MHz) | Ant.Pol<br>H/V | Emission<br>Level(dBuV/m) |       | Limit<br>3m(dBuV/m) |       | Over(dB) |        |
|----------------|----------------|---------------------------|-------|---------------------|-------|----------|--------|
|                |                | PK                        | AV    | PK                  | AV    | PK       | AV     |
| 4804.00        | V              | 51.84                     | 30.25 | 74.00               | 54.00 | -22.16   | -23.75 |
| 7206.00        | V              | 48.91                     | 35.77 | 74.00               | 54.00 | -25.09   | -18.23 |
| 9608.00        | V              | 59.84                     | 44.94 | 74.00               | 54.00 | -14.16   | -9.06  |
| 12010.00       | V              | 49.55                     | 42.15 | 74.00               | 54.00 | -24.45   | -11.85 |
| 14412.00       | V              | 55.29                     | 37.19 | 74.00               | 54.00 | -18.71   | -16.81 |
| 16814.00       | V              | 58.52                     | 37.35 | 74.00               | 54.00 | -15.48   | -16.65 |
| 4804.00        | H              | 52.55                     | 31.87 | 74.00               | 54.00 | -21.45   | -22.13 |
| 7206.00        | H              | 70.35                     | 33.65 | 74.00               | 54.00 | -3.65    | -20.35 |
| 9608.00        | H              | 68.30                     | 38.16 | 74.00               | 54.00 | -5.70    | -15.84 |
| 12010.00       | H              | 49.27                     | 49.81 | 74.00               | 54.00 | -24.73   | -4.19  |
| 14412.00       | H              | 53.42                     | 48.82 | 74.00               | 54.00 | -20.58   | -5.18  |
| 16814.00       | H              | 58.39                     | 37.22 | 74.00               | 54.00 | -15.61   | -16.78 |

**All emissions not reported were more than 20dB below the specified limit or in the noise floor.**

**Note:** (1) All Readings are Peak Value and AV.  
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.  
(3) Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.



Operation Mode: TX Channel 20      Test Date : June 28, 2014  
 Frequency Range: 1GHz~25GHz      Temperature : 24℃  
 Test Result: PASS      Humidity : 53 %  
 Measured Distance: 3m      Test By: KK

| Freq.<br>(MHz) | Ant.Pol<br>H/V | Emission<br>Level(dBuV/m) |       | Limit<br>3m(dBuV/m) |       | Over(dB) |        |
|----------------|----------------|---------------------------|-------|---------------------|-------|----------|--------|
|                |                | PK                        | AV    | PK                  | AV    | PK       | AV     |
| 4880.00        | V              | 53.00                     | 30.98 | 74.00               | 54.00 | -21.00   | -23.02 |
| 7320.00        | V              | 50.07                     | 36.50 | 74.00               | 54.00 | -23.93   | -17.50 |
| 9760.00        | V              | 61.00                     | 45.67 | 74.00               | 54.00 | -13.00   | -8.33  |
| 12200.00       | V              | 50.71                     | 42.88 | 74.00               | 54.00 | -23.29   | -11.12 |
| 14640.00       | V              | 56.45                     | 37.71 | 74.00               | 54.00 | -17.55   | -16.29 |
| 17080.00       | V              | 59.68                     | 38.08 | 74.00               | 54.00 | -14.32   | -15.92 |
| 4880.00        | H              | 53.71                     | 32.60 | 74.00               | 54.00 | -20.29   | -21.40 |
| 7320.00        | H              | 70.95                     | 34.38 | 74.00               | 54.00 | -3.05    | -19.62 |
| 9760.00        | H              | 69.46                     | 38.39 | 74.00               | 54.00 | -4.54    | -15.61 |
| 12200.00       | H              | 50.43                     | 50.04 | 74.00               | 54.00 | -23.57   | -3.96  |
| 14640.00       | H              | 54.58                     | 48.85 | 74.00               | 54.00 | -19.42   | -5.15  |
| 17080.00       | H              | 59.55                     | 37.95 | 74.00               | 54.00 | -14.45   | -16.05 |

**All emissions not reported were more than 20dB below the specified limit or in the noise floor.**

**Note:** (1) All Readings are Peak Value and AV.  
 (2) Emission Level= Reading Level+Probe Factor +Cable Loss.  
 (3) Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Operation Mode: TX Channel 40 Test Date : June 28, 2014  
Frequency Range: 1GHz~25GHz Temperatur: 24℃  
Test Result: PASS Humidity : 53 %  
Measured Distance: 3m Test By: KK

| Freq.<br>(MHz) | Ant.Pol<br>H/V | Emission<br>Level(dBuV/m) |       | Limit<br>3m(dBuV/m) |       | Over(dB) |        |
|----------------|----------------|---------------------------|-------|---------------------|-------|----------|--------|
|                |                | PK                        | AV    | PK                  | AV    | PK       | AV     |
| 4960.00        | V              | 52.57                     | 29.77 | 74.00               | 54.00 | -21.43   | -24.23 |
| 7440.00        | V              | 49.64                     | 35.29 | 74.00               | 54.00 | -24.36   | -18.71 |
| 9920.00        | V              | 60.57                     | 44.46 | 74.00               | 54.00 | -13.43   | -9.54  |
| 12400.00       | V              | 50.28                     | 41.67 | 74.00               | 54.00 | -23.72   | -12.33 |
| 14880.00       | V              | 56.02                     | 36.71 | 74.00               | 54.00 | -17.98   | -17.29 |
| 17360.00       | V              | 59.25                     | 36.87 | 74.00               | 54.00 | -14.75   | -17.13 |
| 4960.00        | H              | 53.28                     | 31.39 | 74.00               | 54.00 | -20.72   | -22.61 |
| 7440.00        | H              | 70.58                     | 33.17 | 74.00               | 54.00 | -3.42    | -20.83 |
| 9920.00        | H              | 69.03                     | 37.68 | 74.00               | 54.00 | -4.97    | -16.32 |
| 12400.00       | H              | 50.00                     | 49.33 | 74.00               | 54.00 | -24.00   | -4.67  |
| 14880.00       | H              | 54.15                     | 48.34 | 74.00               | 54.00 | -19.85   | -5.66  |
| 17360.00       | H              | 59.12                     | 36.74 | 74.00               | 54.00 | -14.88   | -17.26 |

**All emissions not reported were more than 20dB below the specified limit or in the noise floor.**

**Note:** (1) All Readings are Peak Value and AV.  
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.  
(3) Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

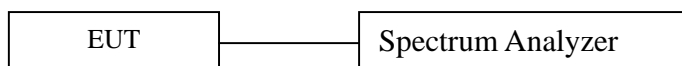
## 7. 6dB Bandwidth Test

### 7.1 Measurement Procedure

The EUT was operating in BLE mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

1. Set resolution bandwidth (RBW) = 100 kHz.
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequency) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 7.2 Test SET-UP (Block Diagram of Configuration)



### 7.3 Measurement Equipment Used

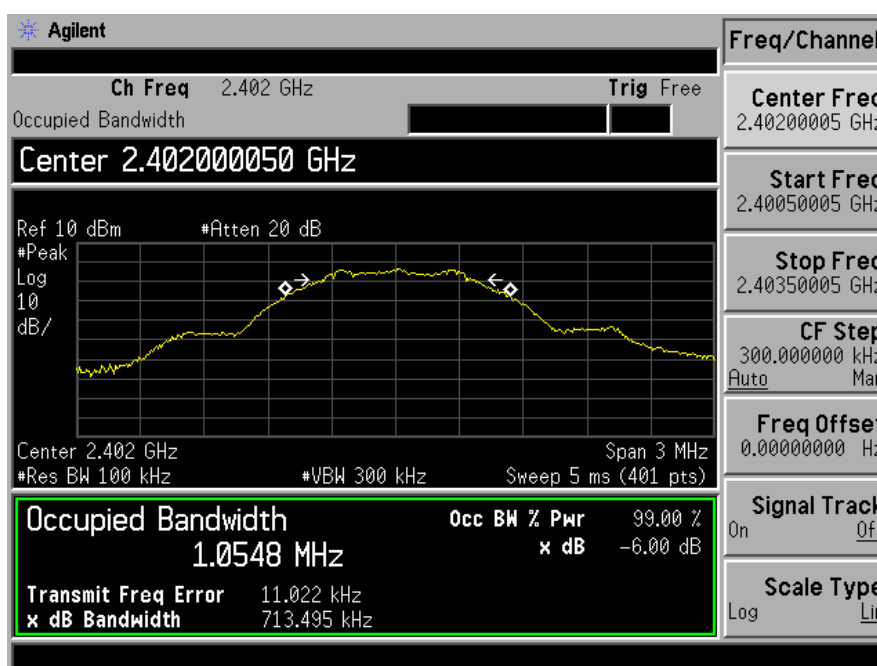
| EQUIPMENT TYPE    | MFR     | MODEL NUMBER | SERIAL NUMBER | LAST CAL.  | CAL DUE.   |
|-------------------|---------|--------------|---------------|------------|------------|
| Spectrum Analyzer | Agilent | E4407B       | 88156318      | 05/17/2014 | 05/16/2015 |

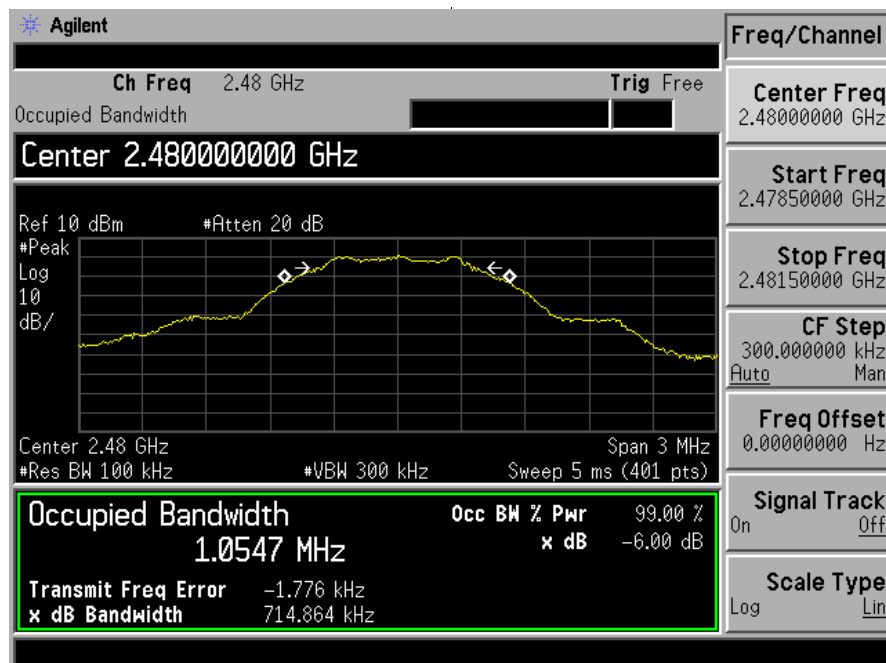
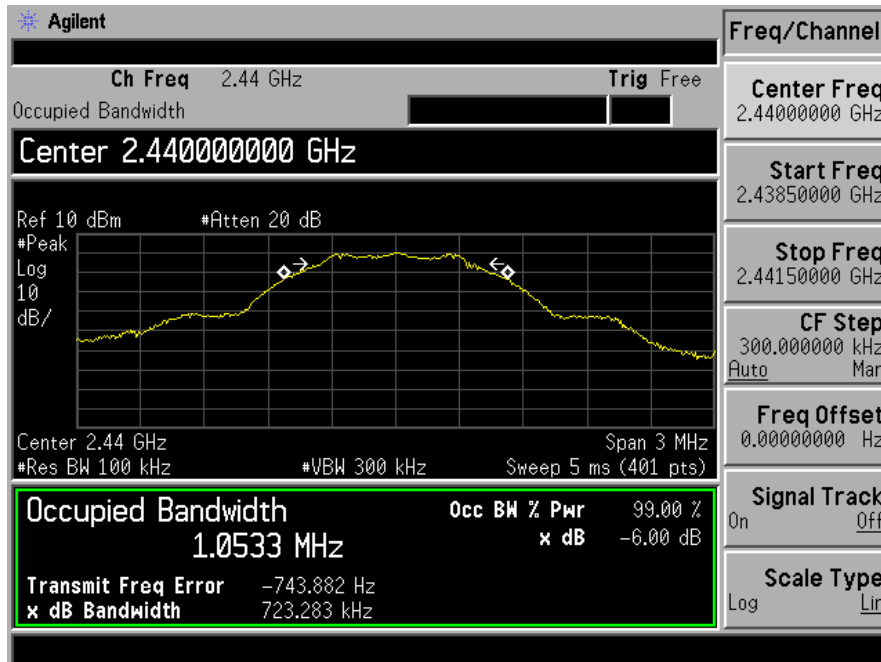
### 7.4 Measurement Results

6 Bandwidth Test Data Chart:  
Refer to attached data chart.

Spectrum Detector: PK Test Date : June 28, 2014  
Test By: DK Temperature : 24 °C  
Test Result: PASS Humidity : 53 %

| Channel number | Channel frequency (MHz) | 6dB Down BW(kHz) | 99% BW (kHz) | Required Limit (kHz) |
|----------------|-------------------------|------------------|--------------|----------------------|
| 01             | 2402                    | 713.495          | 1054.8       | >500                 |
| 20             | 2440                    | 723.283          | 1053.3       | >500                 |
| 40             | 2480                    | 714.864          | 1054.7       | >500                 |





## 8. Maximum Peak Output Power Test

### 8.1 Measurement Procedure

- The testing follows FCC public Notice DA 00-705 Measurement Guidelines.
- The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- Set to the maximum output power setting and enable the EUT transmit continuously.
- Measure the conducted output power with cable loss and record the results in the test report.
- Measure and record the results in the report.

### 8.2 Test SET-UP (Block Diagram of Configuration)



### 8.3 Measurement Equipment Used

| EQUIPMENT TYPE | MODEL NUMBER | SERIAL NUMBER | LAST CAL.  | CAL DUE.   |
|----------------|--------------|---------------|------------|------------|
| Power meter    | ML2495A      | 0824006       | 05/17/2014 | 05/16/2015 |
| Power sensor   | MA2411B      | 0738172       | 05/17/2014 | 05/16/2015 |

### 8.4 Peak Power output limit

The maximum peak power shall be less 1Watt.

### 8.5 Measurement Results

|                    |      |               |               |
|--------------------|------|---------------|---------------|
| Spectrum Detector: | PK   | Test Date :   | June 28, 2014 |
| Test By:           | DK   | Temperature : | 24℃           |
| Test Result:       | PASS | Humidity :    | 53 %          |

| Channel number | Channel Frequency(MHz) | Peak Power output(dBm) | Peak Power Limit(W) | Pass/Fail |
|----------------|------------------------|------------------------|---------------------|-----------|
| 01             | 2402                   | -2.99                  | 1W(30dBm)           | PASS      |
| 20             | 2440                   | 0.65                   | 1W(30dBm)           | PASS      |
| 40             | 2480                   | 1.04                   | 1W(30dBm)           | PASS      |

## 9. Band Edge Test

### 9.1 Measurement Procedure

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
6. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 kHz for  $f < 1$  GHz;  $VBW \geq RBW$ ; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW= 3MHz for  $f \geq 1$  GHz for peak measurement.For average measurement:  
VBW = 10 Hz, when duty cycle is no less than 98 percent.  
 $VBW \geq 1/T$ , when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

### 9.2 Test SET-UP (Block Diagram of Configuration)

As 6.2 Test set up (B) and (C)

### 9.3 Measurement Equipment Used

Same as 6.3 Radiated Emission Measurement.

### 9.4 Measurement Results

Spectrum Detector: PK/AV      Test Date : June 28, 2014  
 Test By: KK      Temperature : 24℃  
 Test channel: 01      Humidity : 53 %

| Frequency<br>(MHz) | Polarity | Level<br>(dBuV/m) |       | Limited<br>(dBuV/m) |    |
|--------------------|----------|-------------------|-------|---------------------|----|
|                    |          | PK                | AV    | PK                  | AV |
| 2372.05            | H        | 47.81             | 33.30 | 74                  | 54 |
| 2336.32            | V        | 46.47             | 31.96 | 74                  | 54 |

Spectrum Detector: PK/AV      Test Date : June 28, 2014  
 Test By: KK      Temperature : 24℃  
 Test channel: 40      Humidity : 53 %

| Frequency<br>(MHz) | Polarity | Level<br>(dBuV/m) |       | Limited<br>(dBuV/m) |    |
|--------------------|----------|-------------------|-------|---------------------|----|
|                    |          | PK                | AV    | PK                  | AV |
| 2485.91            | H        | 48.57             | 34.06 | 74                  | 54 |
| 2487.72            | V        | 47.23             | 32.72 | 74                  | 54 |



## 10. Power Density

### 10.1 Test Equipment

| EQUIPMENT TYPE    | MFR     | MODEL NUMBER | SERIAL NUMBER | LAST CAL.  | CAL DUE.   |
|-------------------|---------|--------------|---------------|------------|------------|
| Spectrum Analyzer | Agilent | E4407B       | 88156318      | 05/17/2014 | 05/16/2015 |

### 10.2 Measuring Instruments and Setting

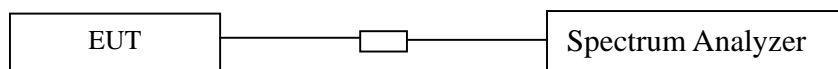
The following table is the setting of spectrum analyzer.

| Spectrum analyzer | Setting  |
|-------------------|--|
| Attenuation       | Auto   |
| Span Frequency    | Set the span to 1.5 times the DTS bandwidth.     |
| RB                | $3\text{kHz} \leq \text{RBW} \leq 100\text{KHz}$ |
| VB                | $\geq 3 \times \text{RBW}$                       |
| Detector          | Peak   |
| Trace             | Max hold   |
| Sweep Time        | Automatic  |

### 10.3 Test Procedures

- a. The transmitter output (antenna port) was connected to the spectrum analyzer.
- b. Set analyzer center frequency to DTS channel center frequency.
- c. Set the analyzer span to a minimum of 1.5 times the DTS bandwidth.
- d. Set the RBW  $\geq 3$  kHz. Set the VBW  $\geq 3 \times \text{RBW}$ .
- e. Detector = peak.
- f. Sweep time = auto couple.
- g. Trace mode = max hold.
- h. Allow trace to fully stabilize.
- i. Use the peak marker function to determine the maximum amplitude level.

### 10.4 Block Diagram of Test Setup



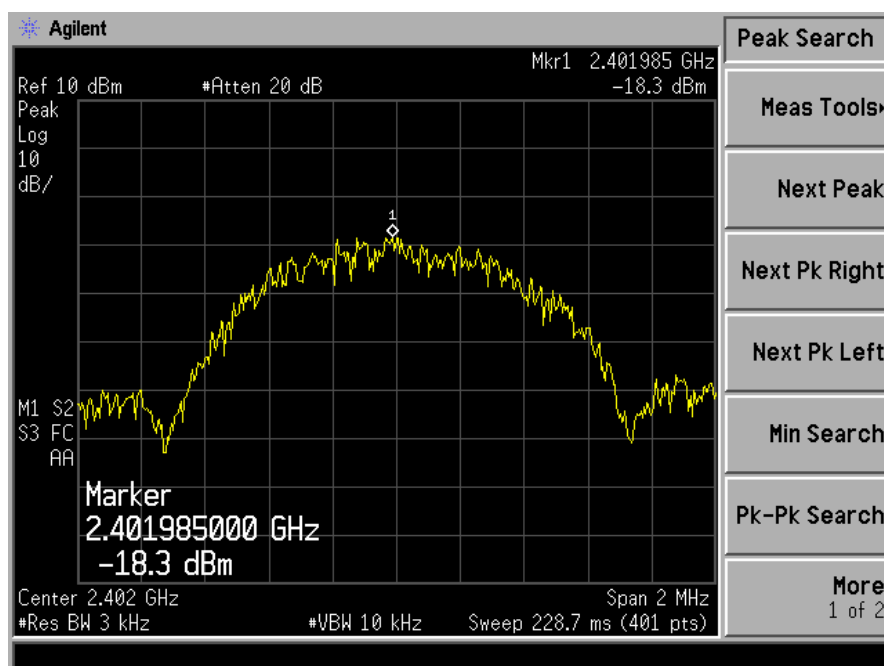
### 10.5 Limit

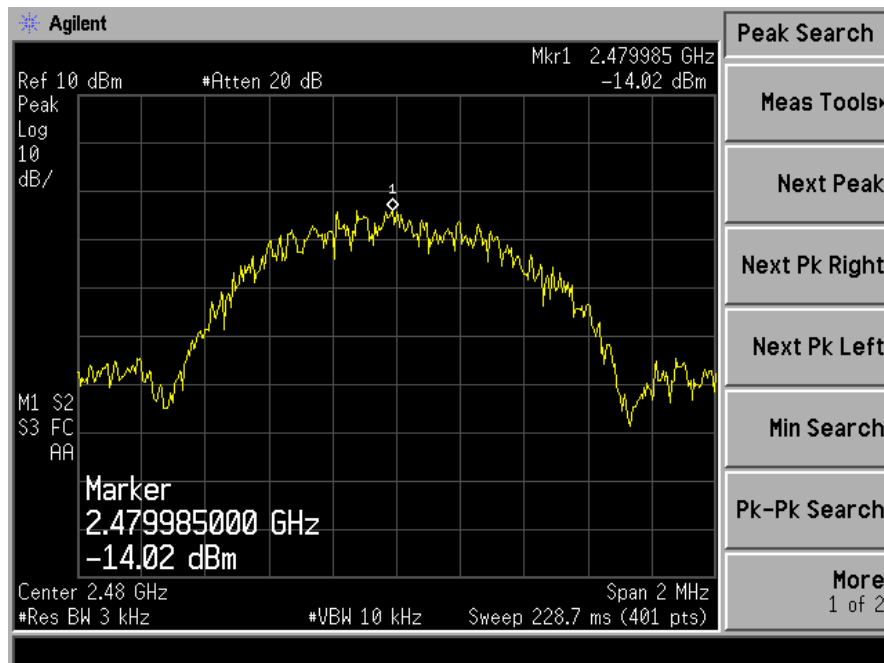
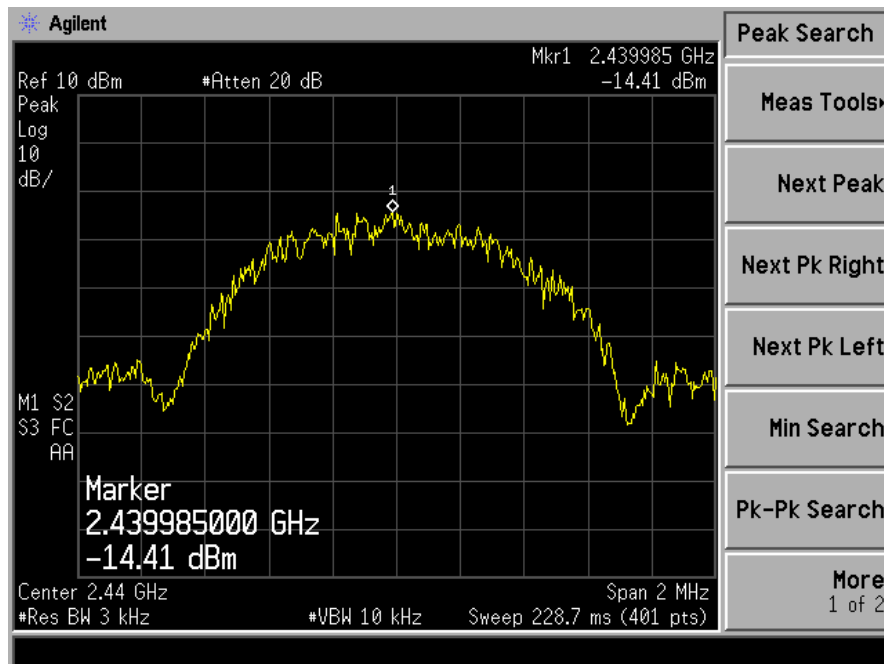
The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3 kHz bandwidth.

## 10.6 Test Result

|                    |      |               |               |
|--------------------|------|---------------|---------------|
| Spectrum Detector: | PK   | Test Date :   | June 28, 2014 |
| Test By:           | DK   | Temperature : | 24℃           |
| Test Result:       | PASS | Humidity :    | 53 %          |
| Operation Mode:    | BLE  |               |               |

| Channel | Measurement Level (dBm) | Required Limit (dBm) | Result |
|---------|-------------------------|----------------------|--------|
| 01      | -18.30                  | <8dBm                | PASS   |
| 20      | -14.41                  | <8dBm                | PASS   |
| 40      | -14.02                  | <8dBm                | PASS   |





## 11 Antenna Port Emission

### 11.1 Test Equipment

| EQUIPMENT TYPE    | MFR     | MODEL NUMBER | SERIAL NUMBER | LAST CAL.  | CAL DUE.   |
|-------------------|---------|--------------|---------------|------------|------------|
| Spectrum Analyzer | Agilent | E4407B       | 88156318      | 05/17/2014 | 05/16/2015 |

### 11.2 Measuring Instruments and Setting

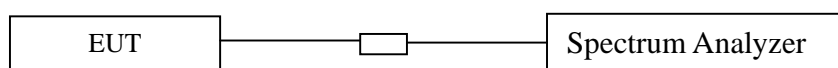
The following table is the setting of spectrum analyzer.

|                   |                              |
|-------------------|------------------------------|
| Spectrum analyzer | Setting                      |
| Attenuation       | Auto                         |
| RB                | 100kHz(Above 1GHz VRB≥ 1MHz) |
| VB                | 300kHz(Above 1GHz RRB≥ 3VBW) |
| Detector          | Peak                         |
| Trace             | Max hold                     |

### 11.3 Test Procedures

The conducted spurious emissions were measured conducted using a spectrum analyzer at low, Middle, and high channels, the limit was determined by attenuation 20dB of the RF peak power output.

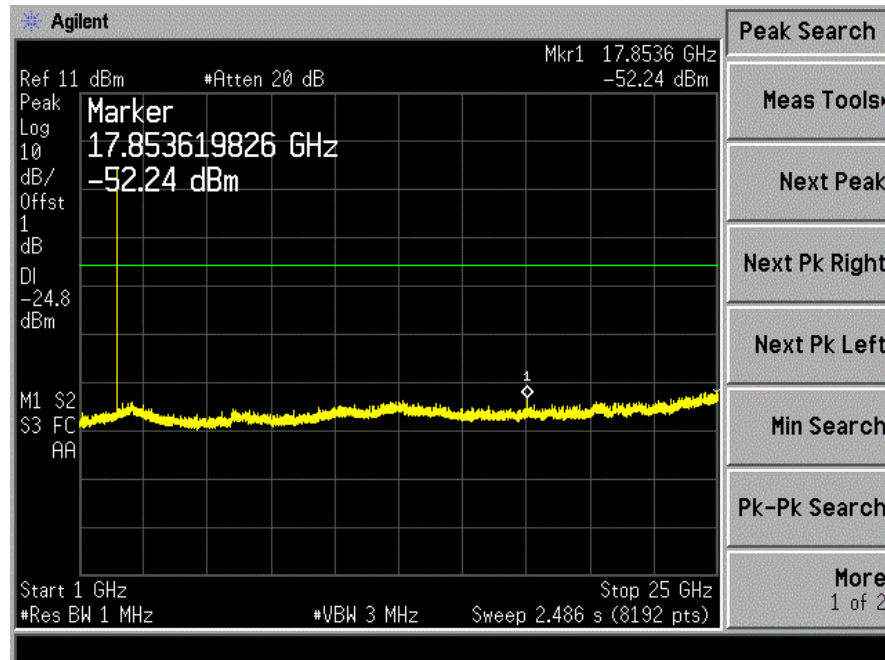
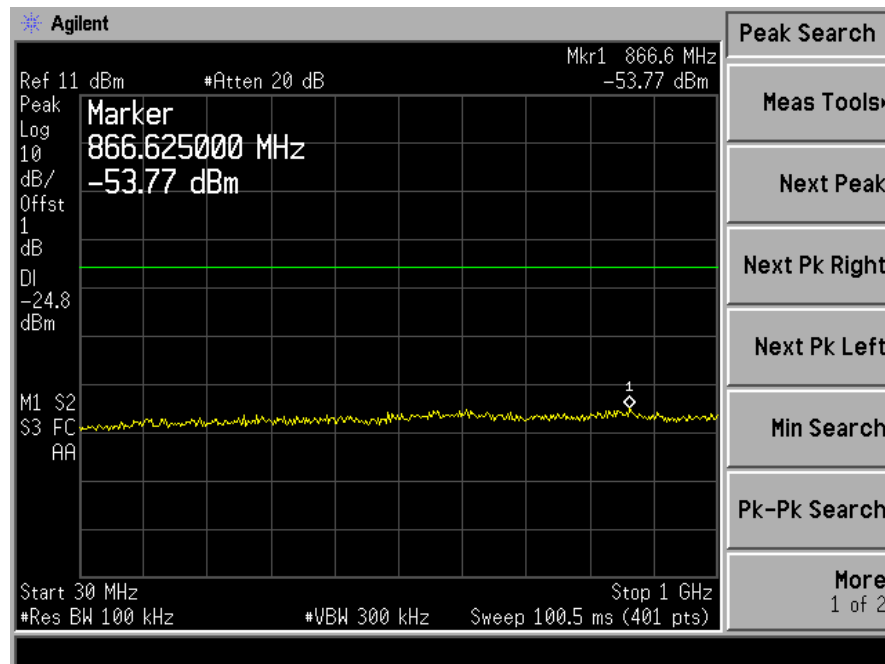
### 11.4 Block Diagram of Test setup



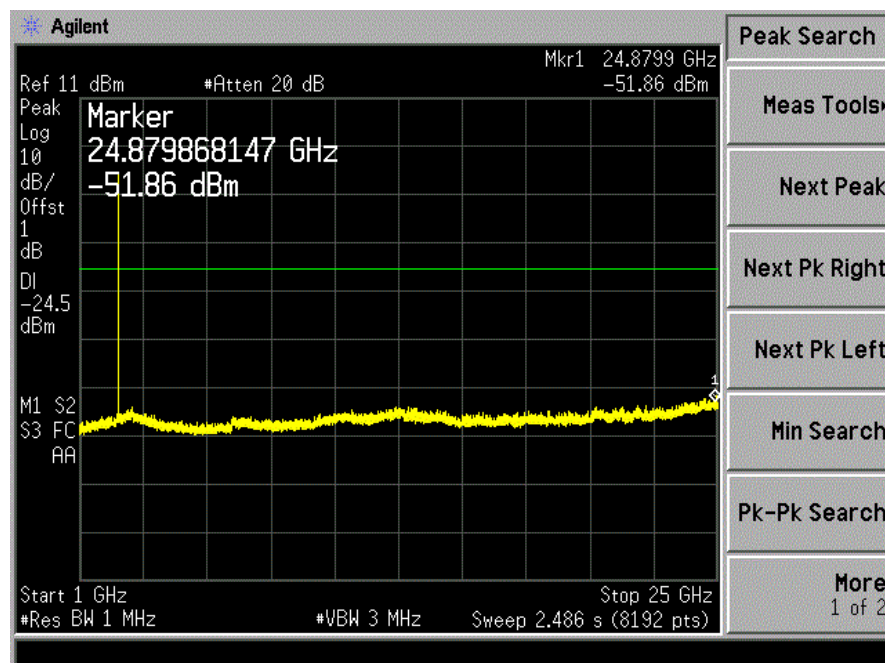
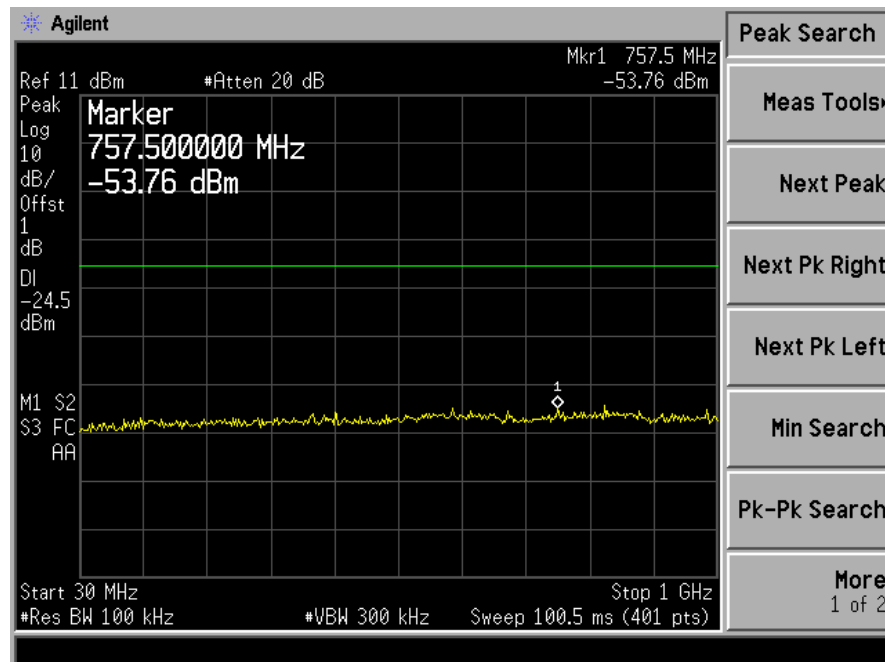
### 11.5 Test Result

**PASS.**

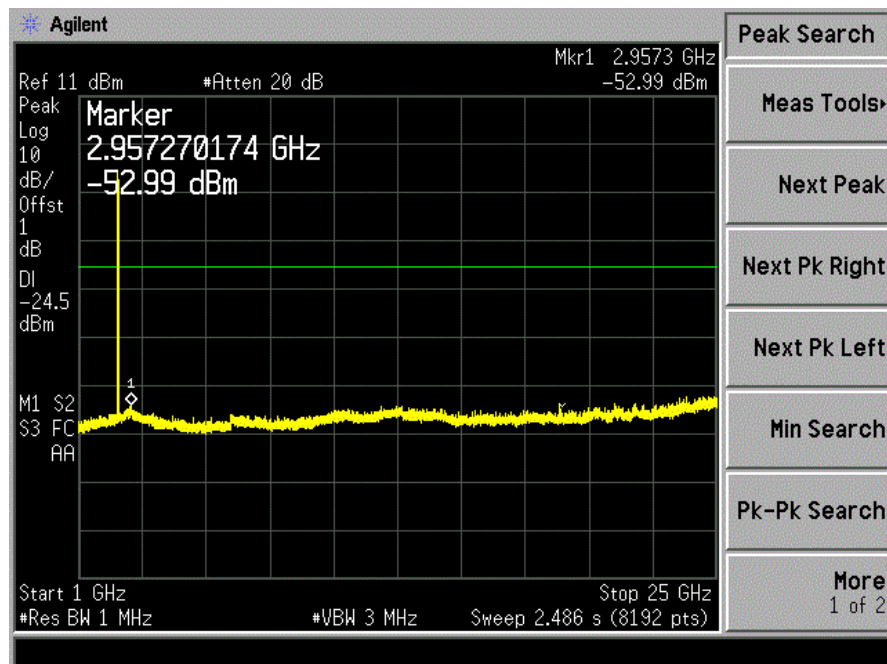
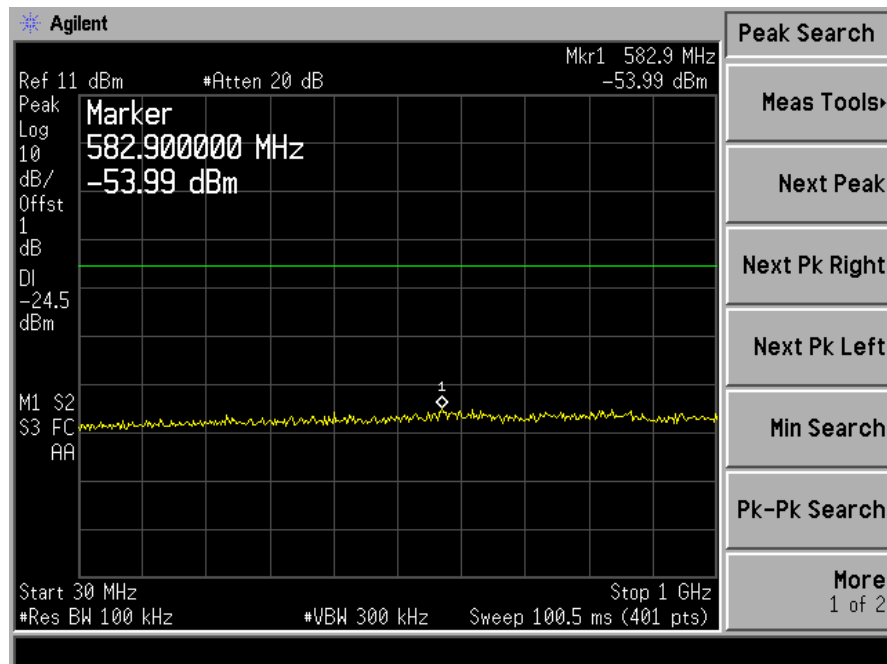
## Low Channel 01



## Mid Channel 20



## High Channel 40



## **12 Antenna Application**

### **12.1 Antenna Requirement**

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

### **12.2 Result**

The EUT'S antenna is PCB Antenna. The antenna's gain is 1dBi and meets the requirement.