



# FCC TEST REPORT

According to

## FCC Rules and Regulations Part 15 Subpart C

|            |                                                                                      |
|------------|--------------------------------------------------------------------------------------|
| Applicant  | : Sonostar Inc.                                                                      |
| Address    | : 7F-1., No. 26, Lane 583, Rueiguang Rd.,<br>Neihu District, Taipei City 114, Taiwan |
| Equipment  | : SmartFit                                                                           |
| Model No.  | : F01                                                                                |
| FCC ID     | : 2ABYH-F01                                                                          |
| Trade Name | : Sonostar                                                                           |

- The test result refers exclusively to the test presented test model / sample.,
- Without written approval of **Cerpass Technology Corp.**, the test report shall not be reproduced except in full.
- The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.



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## History of this test report

■ ORIGINAL.

☐ Additional attachment as following record:

| Attachment No. | Issue Date | Description |
|----------------|------------|-------------|
|                |            |             |
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## CERTIFICATE OF COMPLIANCE

According to

### FCC Rules and Regulations Part 15 Subpart C

|           |                                                                                      |
|-----------|--------------------------------------------------------------------------------------|
| Applicant | : Sonostar Inc.                                                                      |
| Address   | : 7F-1., No. 26, Lane 583, Rueiguang Rd.,<br>Neihu District, Taipei City 114, Taiwan |
| Equipment | : SmartFit                                                                           |
| Model No. | : F01                                                                                |
| FCC ID    | : 2ABYH-F01                                                                          |

#### I HEREBY CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 2009, KDB558074 & KDB662911**. The equipment was ***passed*** the test performed according to **FCC Rules and Regulations Part 15 Subpart C (2010)**.

The test was carried out on May 12, 2014 at Cerpass Technology Corp.

Approved by:

Tested by:

  
Hill Chen  
EMC/RF B.U. Assistant Manager

  
Aiden Lu  
Engineer



## 1. Report of Measurements and Examinations

### 1.1 List of Measurements and Examinations

| FCC Rule                             | Description of Test                      | Result |
|--------------------------------------|------------------------------------------|--------|
| 15.203                               | Antenna Requirement                      | Pass   |
| 15.207                               | Conducted Emission                       | Pass   |
| 15.209<br>15.247(d)                  | Radiated Emission                        | Pass   |
| 15.247(a)(2)                         | 6dB Bandwidth                            | Pass   |
| 15.247(b)                            | Maximum Peak Output Power                | Pass   |
| 15.247(d)                            | 100kHz Bandwidth of Frequency Band Edges | Pass   |
| 15.247(e)                            | Power Spectral Density                   | Pass   |
| 1.1307<br>1.1310<br>2.1091<br>2.1093 | RF Exposure Compliance                   | Pass   |



## 2. Test Configuration of Equipment under Test

### 2.1 Feature of Equipment under Test

|                    |                                                                                                   |
|--------------------|---------------------------------------------------------------------------------------------------|
| Hardware Spec.     |                                                                                                   |
| PCBA Size          | 20mm diameter circle                                                                              |
| Bluetooth Type     | 2.4GHz BLE 4.0                                                                                    |
| G-sensor           | 3-axis electronic G sensor                                                                        |
| Battery Type       | CR2032 coin battery                                                                               |
| Battery Life       | 6 months                                                                                          |
| Button             | One button<br>(1) The first time use of APP and pairing with the device automatically             |
| LED light          | Green: Click button                                                                               |
| Serial number      | Each device must have a unique serial number                                                      |
| I/O interface      | Device via Bluetooth transmit to APP                                                              |
| Wear position      | (1) Wrist<br>(2) Waist<br>(3) Foot                                                                |
| Software Spec.     |                                                                                                   |
| G sensor measuring | Anytime                                                                                           |
| Stored Data Format | - Walk (Sum of the Steps) / Hour<br>- Sleep (Sum of the Steps) / 10 minute (default 23:00 ~ 7:00) |
| Stored Data Size   | 6 months                                                                                          |

### 2.2 Carrier Frequency of Channels

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

### 2.3 Test Mode and Test Software

- During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
- The following test mode was performed for RF test:
  - GFSK: CH 00: 2402MHz, CH 19: 2440MHz, CH 39: 2480MHz.



## 2.4 General Information of Test

|                                    |                                                                                                                                                            |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Site :                        | Cerpass Technology Corp.<br>2F-11, No. 3, Yuan Qu St., (Nankang Software Park),<br>Taipei, Taiwan 115, R.O.C.                                              |
| Test Site Location<br>(OATS2-SD) : | No.68-1, Shihbachongsi, Shihding Township,<br>Taipei City 223, Taiwan, R.O.C.                                                                              |
| FCC Registration Number:           | TW1049, TW1061, 390316, 488071                                                                                                                             |
| IC Registration Number :           | 4934B-1, 4934D-1                                                                                                                                           |
| VCCI Registration Number:          | T-1173 for Telecommunication Test<br>C-4139 for Conducted emission test<br>R-3428 for Radiated emission test<br>G-97 for Radiated emission test above 1GHz |
| Frequency Range Investigated:      | Conducted: from 150kHz to 30 MHz<br>Radiation: from 30 MHz to 25000MHz                                                                                     |
| Test Distance:                     | The test distance of radiated emission from antenna to<br>EUT is 3 M.                                                                                      |
| Laboratory Accreditation :         | <br>NVLAP LAB CODE: 200954-0                                           |

## 2.5 Measurement Uncertainty

| Measurement Item             | Uncertainty         |
|------------------------------|---------------------|
| Radiated emission            | $\pm 4.11\text{dB}$ |
| Peak Output Power(conducted) | $\pm 1.38\text{dB}$ |
| Peak Output Power(Radiated)  | $\pm 1.70\text{dB}$ |
| Power Spectral Density       | $\pm 1.39\text{dB}$ |
| Radiated emission(3m)        | $\pm 4.11\text{dB}$ |
| Radiated emission(10m)       | $\pm 3.89\text{dB}$ |



### 3. Antenna Requirements

#### 3.1 Standard Applicable

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.

#### 3.2 Antenna Construction and Directional Gain

Antenna Type: Chip Antenna

Antenna Gain: 1.5 dBi



## 4. Test of Conducted Emission

### 4.1 Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-2009 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

| Frequency<br>(MHz) | Quasi Peak<br>(dB $\mu$ V) | Average<br>(dB $\mu$ V) |
|--------------------|----------------------------|-------------------------|
| 0.15 – 0.5         | 66-56*                     | 56-46*                  |
| 0.5 – 5.0          | 56                         | 46                      |
| 5.0 – 30.0         | 60                         | 50                      |

\*Decreases with the logarithm of the frequency.

### 4.2 Test Procedures

- The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connecting to the other LISN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

### 4.3 Test Result and Data

The EUT is powered from battery. This test item is not applicable.



## 5. Test of Radiated Emission

### 5.1 Test Limit

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter measurement is based on the maximum conducted output power, the attenuation required under this paragraph shall be 30dB instead of 20dB. In addition, radiated emissions which fall in section 15.205(a) the restricted bands must also comply with the radiated emission limit specified in section 15.209(a).

| Frequency (MHz) | Field Strength (microvolt/meter) | Measurement Distance (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                             |

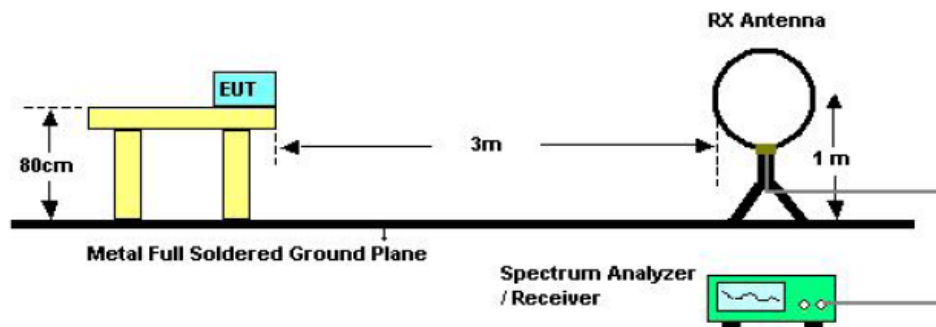
### 5.2 Test Procedures

- The EUT was placed on a rotatable table top 0.8 meter above ground.
- The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- "Cone of radiation" has been considered to be 3dB bandwidth of the measurement antenna.

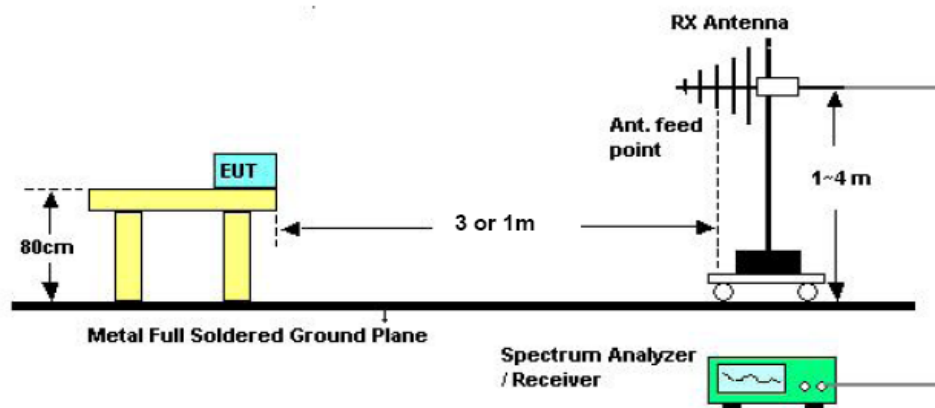


### 5.3 Typical Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor =  $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$  (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

### 5.4 Measurement Equipment

| Instrument/Ancillary | Manufacturer | Model No.                  | Serial No. | Calibration Date | Valid Date |
|----------------------|--------------|----------------------------|------------|------------------|------------|
| Bilog Antenna        | Schwarzbeck  | VULB 9168                  | 275        | 2013/10/01       | 2014/09/30 |
| Amplifier            | QuieTek      | AP/0100A                   | CHM0906075 | 2013/09/30       | 2014/09/29 |
| SPECTRUM ANALYZER    | R&S          | FSP40                      | 100219     | 2013/09/14       | 2014/09/13 |
| HORN ANTENNA         | EMCO         | 3115                       | 31601      | 2013/09/18       | 2014/09/17 |
| PREAMPLIFIER         | MITEQ        | AMF-7D-001018<br>00-30-10P | 1835099    | 2013/12/10       | 2014/12/09 |

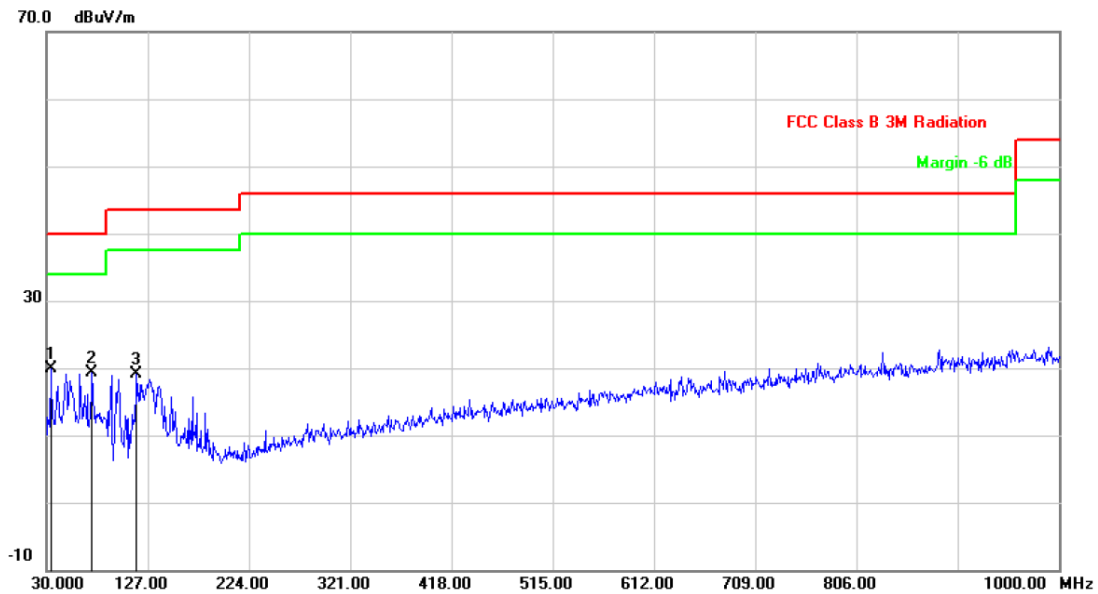
### 5.5 Test Result and Data (9kHz ~ 30MHz)

The 9kHz - 30MHz spurious emission is under limit 20dB more.



## 5.6 Test Result and Data (30MHz ~ 1GHz)

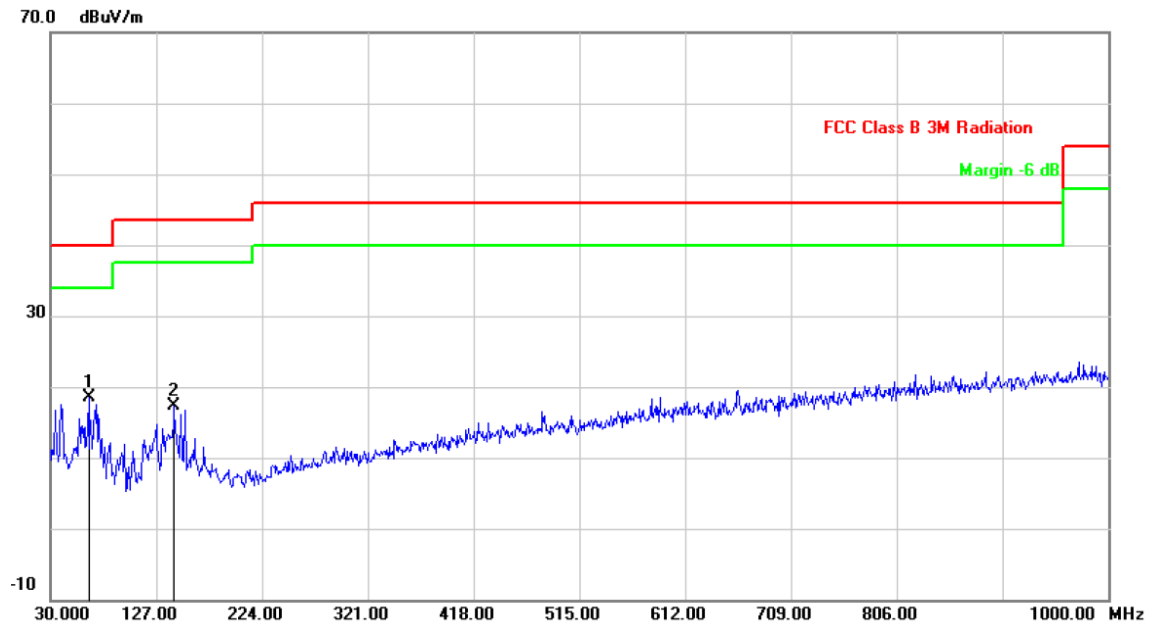
|                   |                 |                      |            |
|-------------------|-----------------|----------------------|------------|
| Power             | : DC 3V         | Pol/Phase            | : VERTICAL |
| Test Mode         | : Transmit      | Temperature          | : 25 °C    |
| Operation Channel | : 0             | Humidity             | : 60 %     |
| Modulation Type   | : GFSK (1 Mbps) | Atmospheric Pressure | : 1014 hPa |
| Test Date         | : May 09, 2014  |                      |            |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Height (cm) | Azimuth (deg) |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|-------------|---------------|
| 1   | 33.8800         | -18.38        | 38.25          | 19.87          | 40.00          | -20.13      | peak | 100         | 163           |
| 2   | 73.6500         | -21.74        | 41.02          | 19.28          | 40.00          | -20.72      | peak | 100         | 177           |
| 3   | 116.3298        | -21.40        | 40.53          | 19.13          | 43.50          | -24.37      | peak | 100         | 204           |



|                   |                 |                      |              |
|-------------------|-----------------|----------------------|--------------|
| Power             | : DC 3V         | Pol/Phase            | : HORIZONTAL |
| Test Mode         | : Transmit      | Temperature          | : 25 °C      |
| Operation Channel | : 0             | Humidity             | : 60 %       |
| Modulation Type   | : GFSK (1 Mbps) | Atmospheric Pressure | : 1014 hPa   |
| Test Date         | : May 09, 2014  |                      |              |

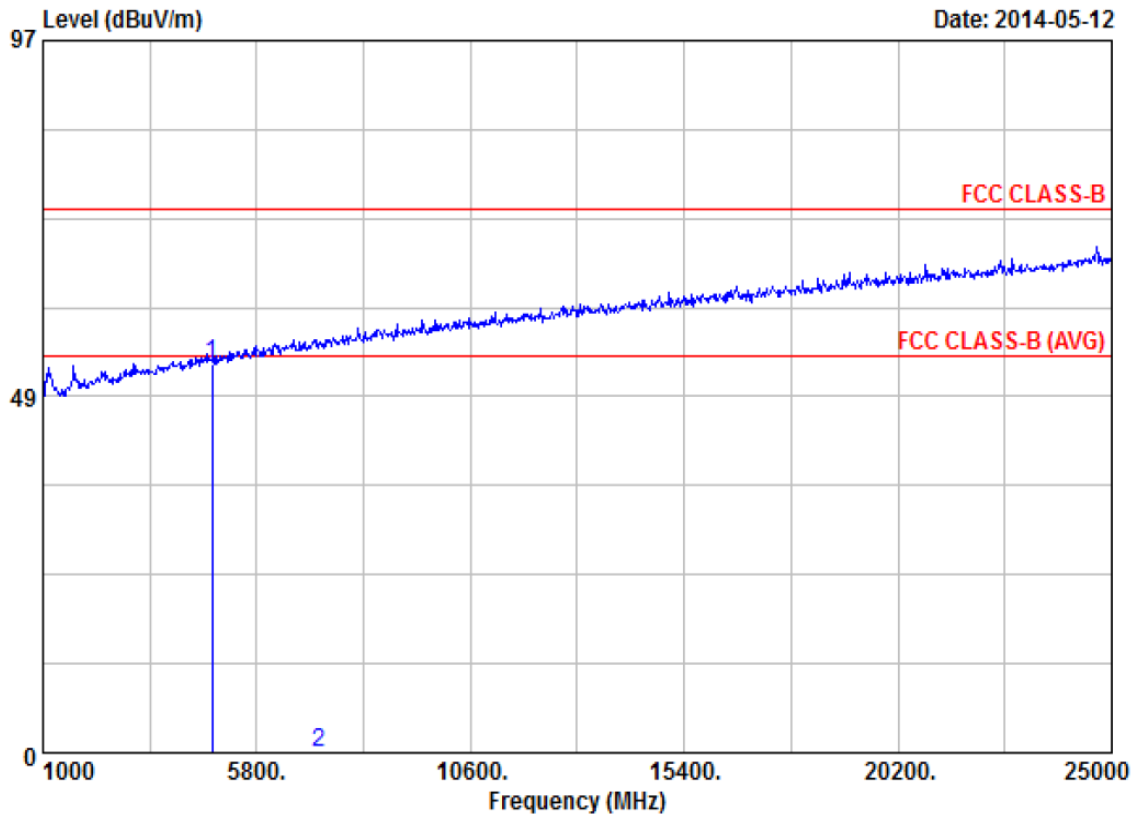


| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Height (cm) | Azimuth (deg) |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|-------------|---------------|
| 1   | 64.9200         | -19.70        | 38.22          | 18.52          | 40.00          | -21.48      | peak | 100         | 165           |
| 2   | 143.4900        | -19.00        | 36.21          | 17.21          | 43.50          | -26.29      | peak | 100         | 196           |



## 5.7 Test Result and Data (1GHz ~ 25GHz)

|                   |                 |                      |            |
|-------------------|-----------------|----------------------|------------|
| Power             | : DC 3V         | Pol/Phase            | : VERTICAL |
| Test Mode         | : Transmit      | Temperature          | : 24 °C    |
| Operation Channel | : 0             | Humidity             | : 52 %     |
| Modulation Type   | : GFSK (1 Mbps) | Atmospheric Pressure | : 1075 hPa |



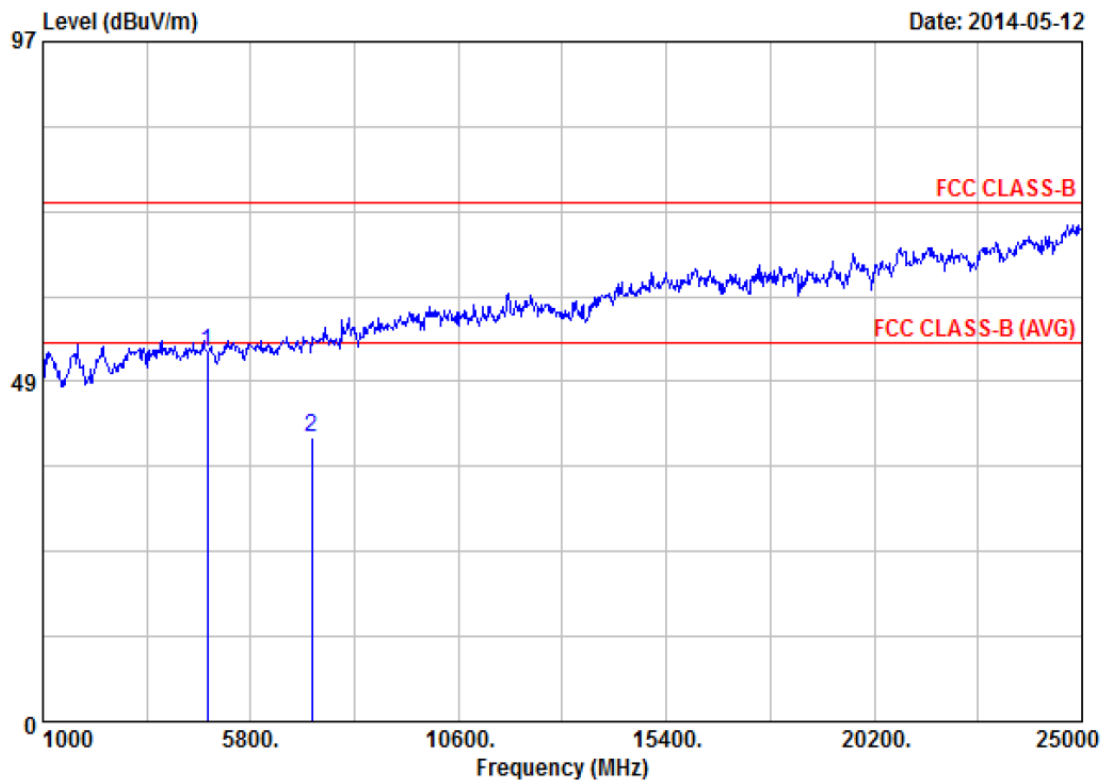
| Item | Freq    | Read Value | factor | result | limit  | Margin | Remark  | Ant Pos | Tab Pos |
|------|---------|------------|--------|--------|--------|--------|---------|---------|---------|
|      | MHz     | dBuV       | dB/m   | dBuV/m | dBuV/m | dB     |         | cm      | Deg     |
| 1    | 4804.00 | 43.51      | 9.42   | 52.93  | 74.00  | -21.07 | Peak    | 100     | 211     |
| 2    | 7206.00 | -11.52     | 11.52  | 0.00   | 54.00  | -54.00 | Average | 100     | 206     |

Remarks: 1. Result = Read Value + Factor

2. Factor = Antenna factor + Cable loss - Amplifier factor



|                   |                 |                      |              |
|-------------------|-----------------|----------------------|--------------|
| Power             | : DC 3V         | Pol/Phase            | : HORIZONTAL |
| Test Mode         | : Transmit      | Temperature          | : 24 °C      |
| Operation Channel | : 0             | Humidity             | : 52 %       |
| Modulation Type   | : GFSK (1 Mbps) | Atmospheric Pressure | : 1075 hPa   |



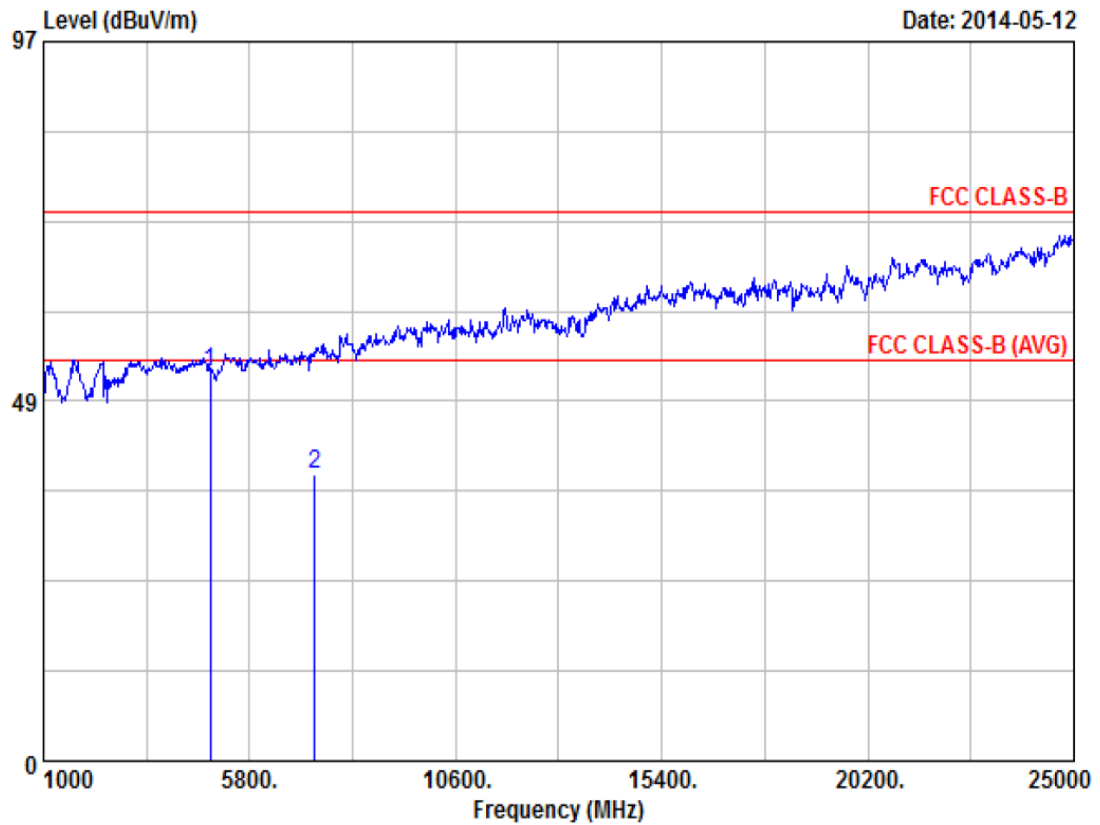
| Item | Freq    | Read Value | facter | result | limit  | Margin | Remark  | Ant Pos | Tab Pos |
|------|---------|------------|--------|--------|--------|--------|---------|---------|---------|
|      | MHz     | dBuV       | dB/m   | dBuV/m | dBuV/m | dB     |         | cm      | Deg     |
| 1    | 4804.00 | 43.37      | 9.42   | 52.79  | 74.00  | -21.21 | Peak    | 100     | 161     |
| 2    | 7206.00 | 29.00      | 11.52  | 40.52  | 54.00  | -13.48 | Average | 100     | 174     |

Remarks: 1. Result = Read Value + Factor

2. Factor = Antenna factor + Cable loss - Amplifier factor



|                   |                 |                      |            |
|-------------------|-----------------|----------------------|------------|
| Power             | : DC 3V         | Pol/Phase            | : VERTICAL |
| Test Mode         | : Transmit      | Temperature          | : 24 °C    |
| Operation Channel | : 19            | Humidity             | : 52 %     |
| Modulation Type   | : GFSK (1 Mbps) | Atmospheric Pressure | : 1075 hPa |



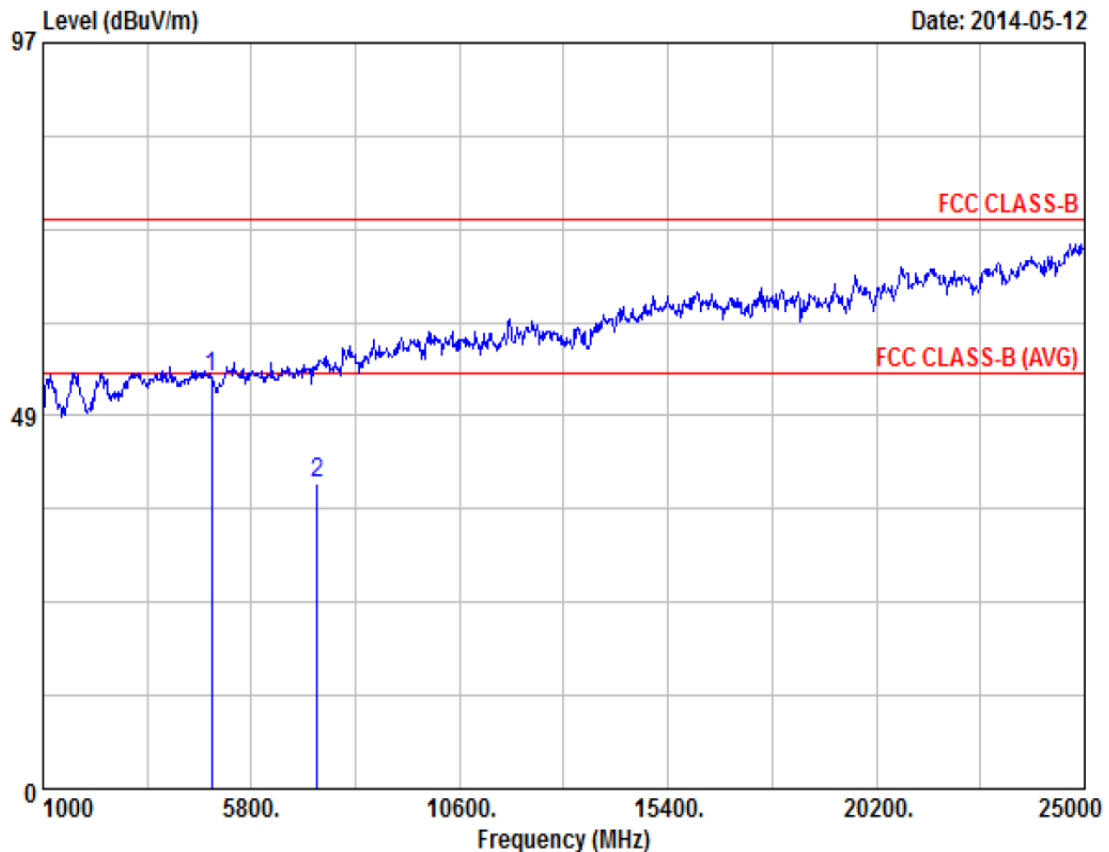
| Item | Freq    | Read Value | facter | result | limit  | Margin | Remark  | Ant Pos | Tab Pos |
|------|---------|------------|--------|--------|--------|--------|---------|---------|---------|
|      | MHz     | dBuV       | dB/m   | dBuV/m | dBuV/m | dB     |         | cm      | Deg     |
| 1    | 4880.00 | 42.96      | 9.50   | 52.46  | 74.00  | -21.54 | Peak    | 100     | 201     |
| 2    | 7320.00 | 27.00      | 11.69  | 38.69  | 54.00  | -15.31 | Average | 100     | 186     |

Remarks: 1. Result = Read Value + Factor

2. Factor = Antenna factor + Cable loss - Amplifier factor



|                   |                 |                      |              |
|-------------------|-----------------|----------------------|--------------|
| Power             | : DC 3V         | Pol/Phase            | : HORIZONTAL |
| Test Mode         | : Transmit      | Temperature          | : 24 °C      |
| Operation Channel | : 19            | Humidity             | : 52 %       |
| Modulation Type   | : GFSK (1 Mbps) | Atmospheric Pressure | : 1075 hPa   |



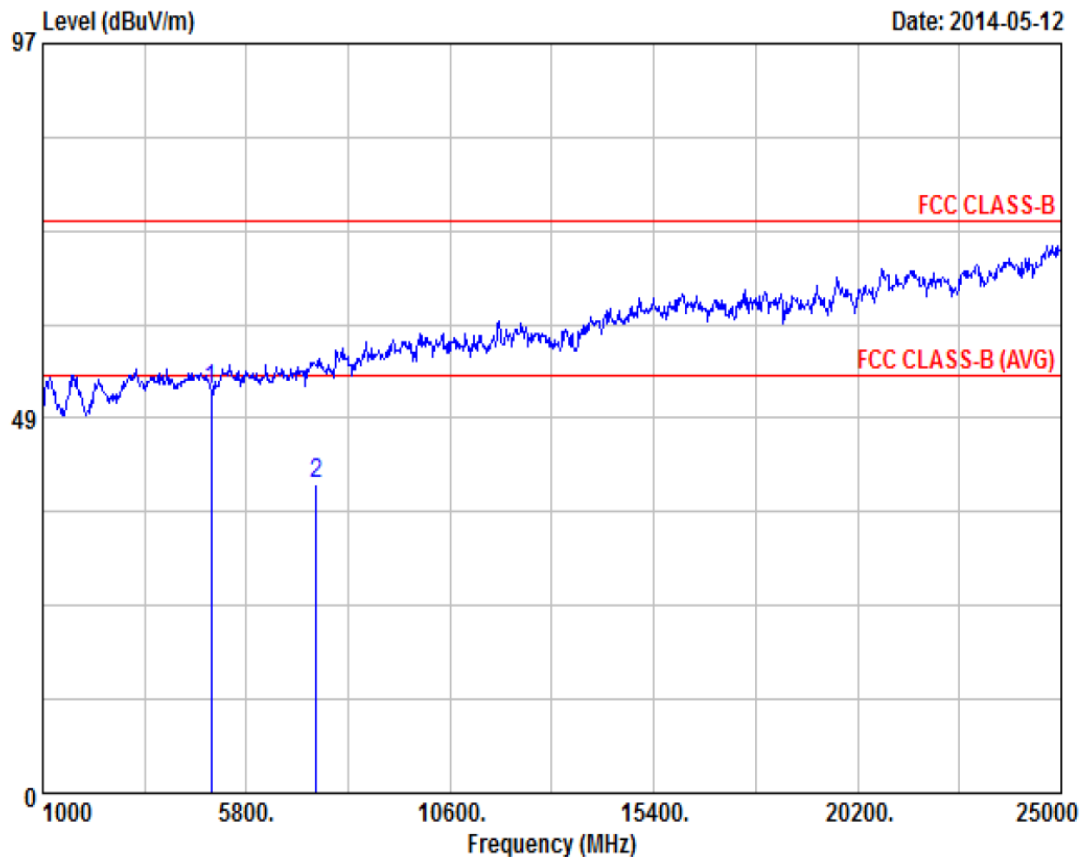
| Item | Freq    | Read Value | facter | result | limit  | Margin | Remark  | Ant Pos | Tab Pos |
|------|---------|------------|--------|--------|--------|--------|---------|---------|---------|
|      | MHz     | dBuV       | dB/m   | dBuV/m | dBuV/m | dB     |         | cm      | Deg     |
| 1    | 4880.00 | 43.96      | 9.50   | 53.46  | 74.00  | -20.54 | Peak    | 100     | 193     |
| 2    | 7320.00 | 28.00      | 11.69  | 39.69  | 54.00  | -14.31 | Average | 100     | 177     |

Remarks: 1. Result = Read Value + Factor

2. Factor = Antenna factor + Cable loss - Amplifier factor



|                   |                 |                      |            |
|-------------------|-----------------|----------------------|------------|
| Power             | : DC 3V         | Pol/Phase            | : VERTICAL |
| Test Mode         | : Transmit      | Temperature          | : 24 °C    |
| Operation Channel | : 39            | Humidity             | : 52 %     |
| Modulation Type   | : GFSK (1 Mbps) | Atmospheric Pressure | : 1075 hPa |



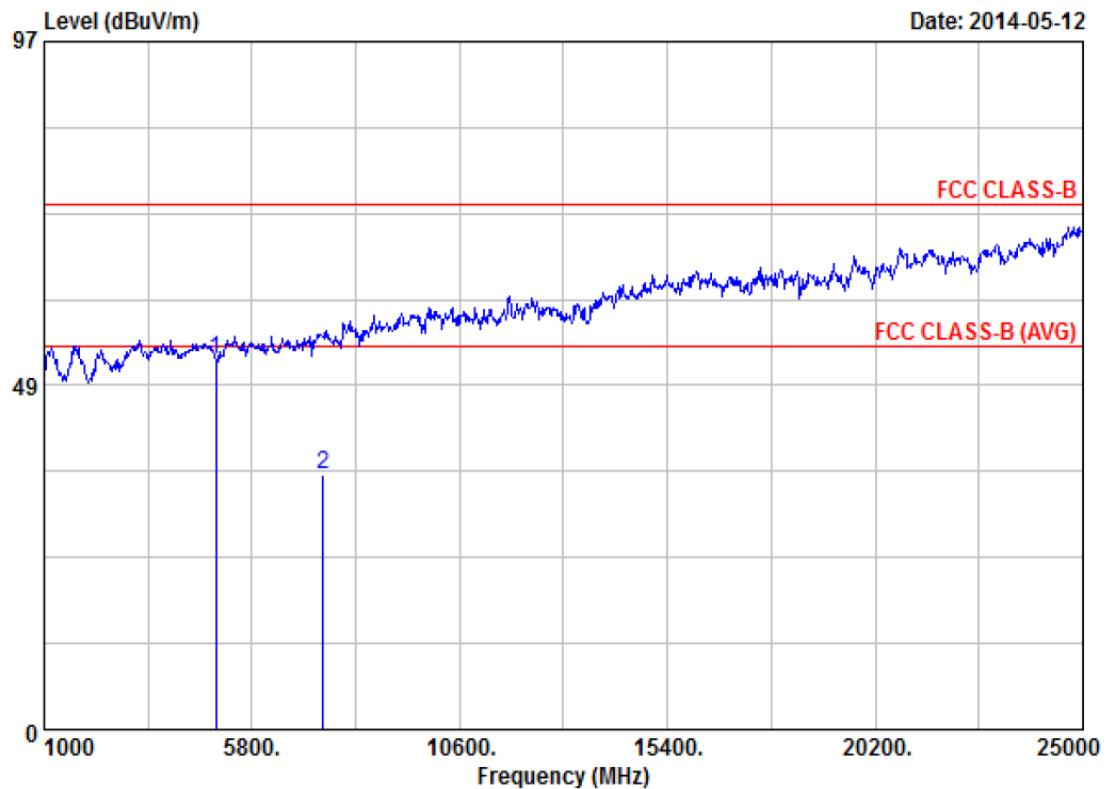
| Item | Freq    | Read Value | facter | result | limit  | Margin | Remark  | Ant Pos | Tab Pos |
|------|---------|------------|--------|--------|--------|--------|---------|---------|---------|
|      | MHz     | dBuV       | dB/m   | dBuV/m | dBuV/m | dB     |         | cm      | Deg     |
| 1    | 4960.00 | 42.68      | 9.59   | 52.27  | 74.00  | -21.73 | Peak    | 100     | 181     |
| 2    | 7440.00 | 28.00      | 11.88  | 39.88  | 54.00  | -14.12 | Average | 100     | 168     |

Remarks: 1. Result = Read Value + Factor

2. Factor = Antenna factor + Cable loss - Amplifier factor



|                   |                 |                      |              |
|-------------------|-----------------|----------------------|--------------|
| Power             | : DC 3V         | Pol/Phase            | : HORIZONTAL |
| Test Mode         | : Transmit      | Temperature          | : 24 °C      |
| Operation Channel | : 39            | Humidity             | : 52 %       |
| Modulation Type   | : GFSK (1 Mbps) | Atmospheric Pressure | : 1075 hPa   |



| Item | Freq    | Read Value | facter | result | limit  | Margin | Remark  | Ant Pos | Tab Pos |
|------|---------|------------|--------|--------|--------|--------|---------|---------|---------|
|      | MHz     | dBuV       | dB/m   | dBuV/m | dBuV/m | dB     |         | cm      | Deg     |
| 1    | 4960.00 | 42.68      | 9.59   | 52.27  | 74.00  | -21.73 | Peak    | 100     | 165     |
| 2    | 7440.00 | 24.00      | 11.88  | 35.88  | 54.00  | -18.12 | Average | 100     | 173     |

Remarks: 1. Result = Read Value + Factor

2. Factor = Antenna factor + Cable loss - Amplifier factor



## 6. 6dB Bandwidth Measurement Data

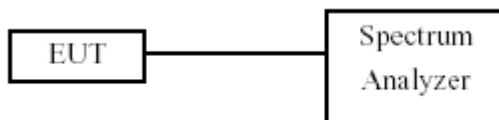
### 6.1 Test Limit

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

### 6.2 Test Procedures

- The transmitter output was connected to the spectrum analyzer.
- Set RBW of spectrum analyzer to 1~5% of the emission bandwidth and VBW  $\geq 3 \times$  RBW.
- The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.
- The 6dB Bandwidth was measured and recorded.

### 6.3 Test Setup Layout



### 6.4 Measurement Equipment

| Instrument/Ancillary | Manufacturer | Model No. | Serial No. | Calibration Date | Valid Date |
|----------------------|--------------|-----------|------------|------------------|------------|
| Spectrum Analyzer    | R&S          | FSP40     | 100047     | 2014/03/27       | 2015/03/26 |

### 6.5 Test Result and Data

Test Date: May 09, 2014

Temperature: 23 °C

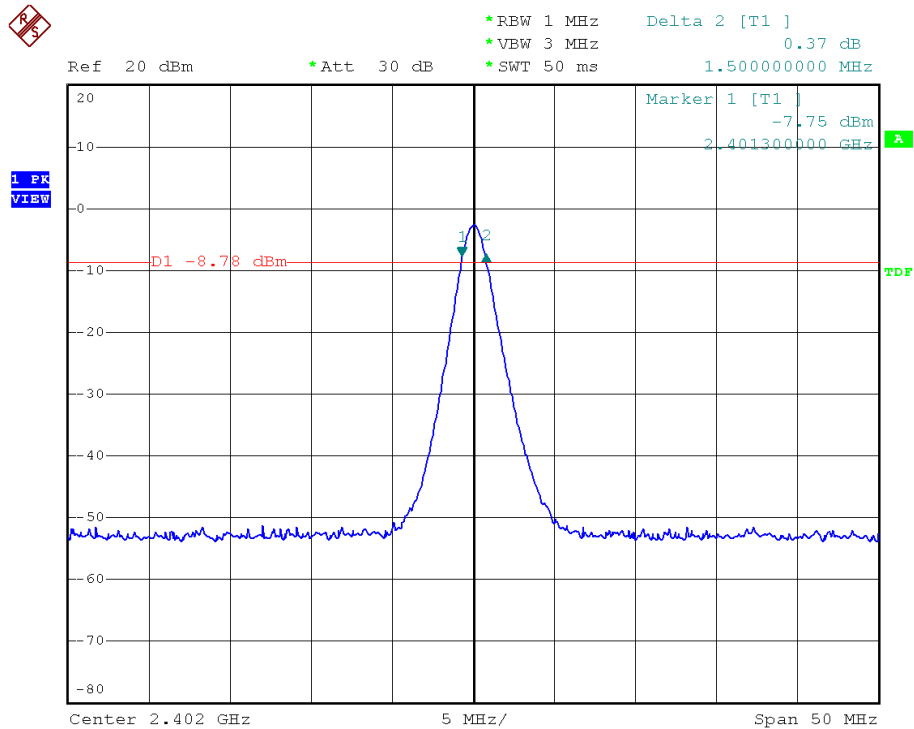
Atmospheric pressure: 1027 hPa

Humidity: 47 %

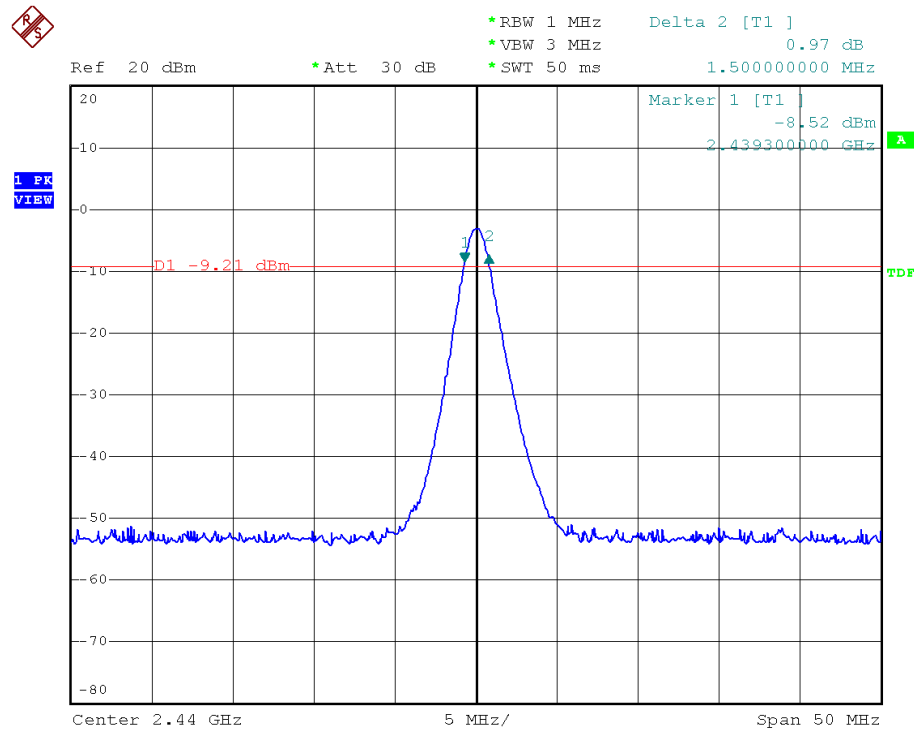
| Modulation Type | Channel | Frequency (MHz) | 6dB Bandwidth (KHz) | 2/3 20dB Bandwidth (KHz) |
|-----------------|---------|-----------------|---------------------|--------------------------|
| GFSK (1Mbps)    | 00      | 2402            | 1.5                 | 3.8                      |
|                 | 19      | 2441            | 1.5                 | 4.0                      |
|                 | 39      | 2480            | 1.5                 | 4.2                      |



Modulation Standard: GFSK (1Mbps)  
Channel: 00

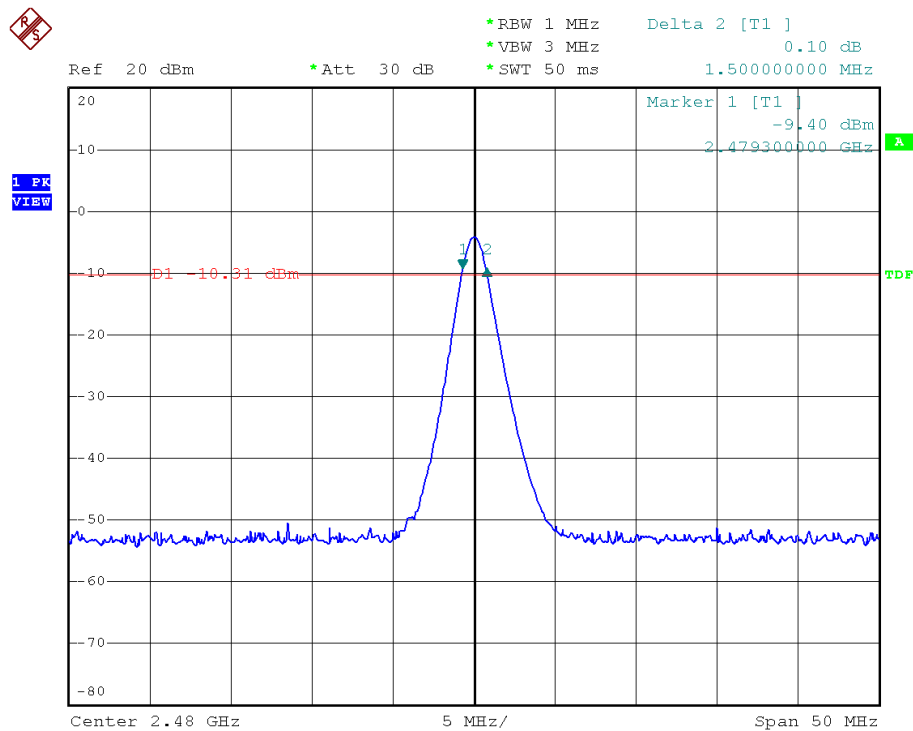


Modulation Standard: GFSK (1Mbps)  
Channel: 19





Modulation Standard: GFSK (1Mbps)  
Channel: 39





## 7. Maximum Peak and Average Output Power

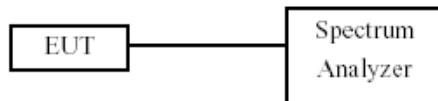
### 7.1 Test Limit

The Maximum Peak Output Power Measurement is 30dBm.

### 7.2 Test Procedures

The antenna port (RF output) of the EUT was connected to the input (RF input) of a power meter. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

### 7.3 Test Setup Layout



### 7.4 Measurement Equipment

| Instrument/Ancillary | Manufacturer | Model No. | Serial No. | Calibration Date | Valid Date |
|----------------------|--------------|-----------|------------|------------------|------------|
| Spectrum Analyzer    | R&S          | FSP40     | 100047     | 2014/03/27       | 2015/03/26 |

### 7.5 Test Result and Data

Test Date: May 09, 2014

Temperature: 23°C

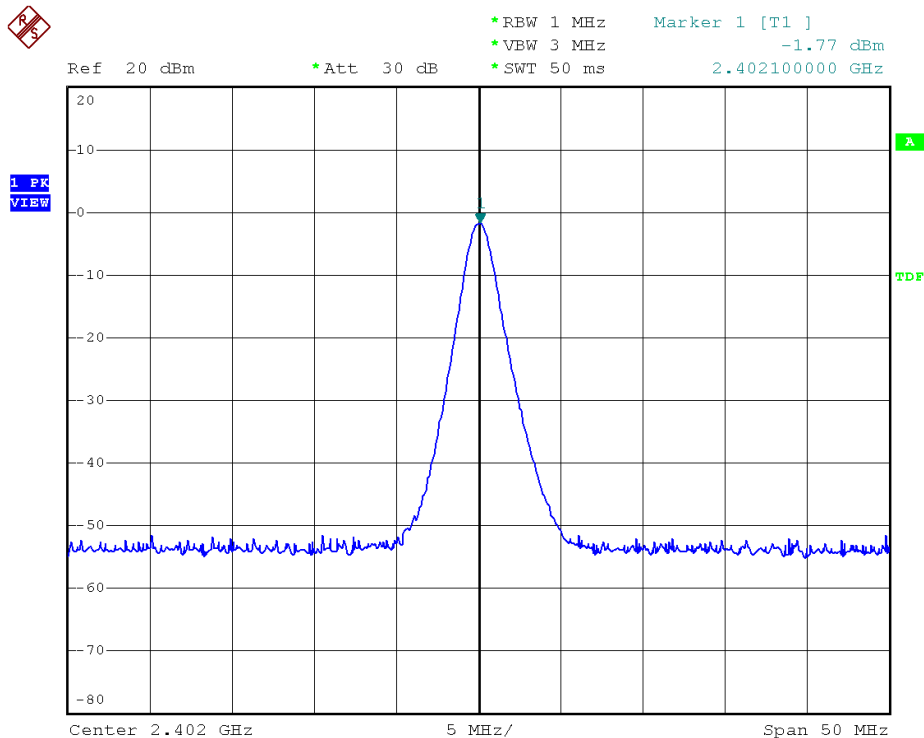
Atmospheric pressure: 1027 hPa

Humidity: 47%

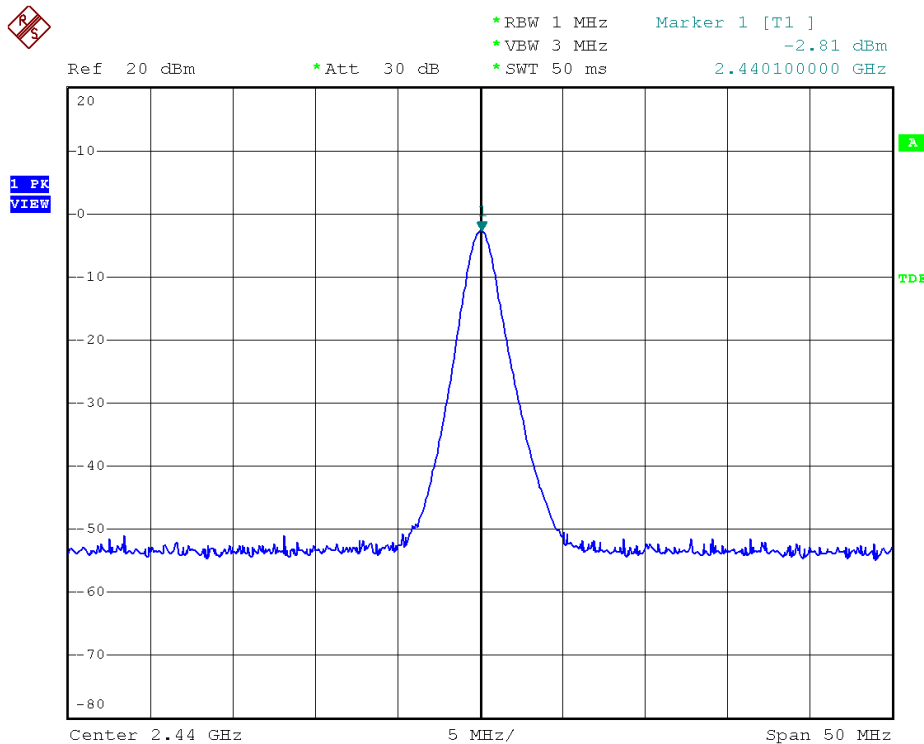
| Modulation Standard | Channel | Frequency (MHz) | Power Output (dBm) | Peak Power Output (mW) |
|---------------------|---------|-----------------|--------------------|------------------------|
| GFSK (1Mbps)        | 00      | 2402            | -1.77              | 0.665                  |
|                     | 19      | 2440            | -2.81              | 0.524                  |
|                     | 39      | 2480            | -4.20              | 0.380                  |



Modulation Standard: GFSK (1Mbps)  
Channel: 00

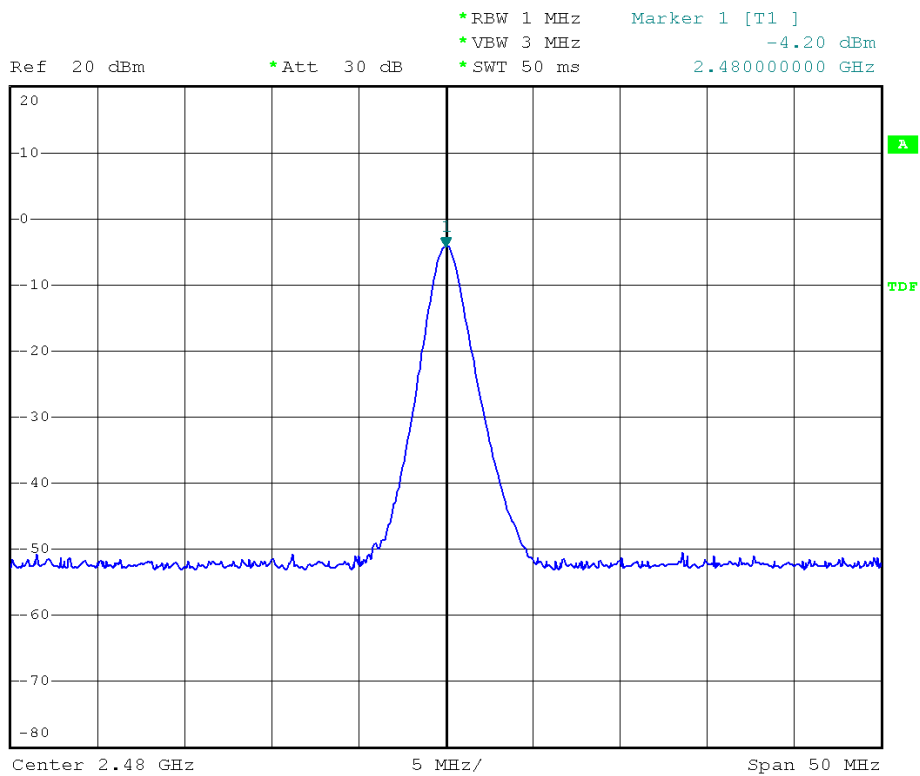


Modulation Standard: GFSK (1Mbps)  
Channel: 19





Modulation Standard: GFSK (1Mbps)  
Channel: 39





## 8. Power Spectral Density

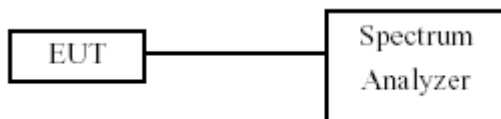
### 8.1 Test Limit

The Maximum of Power Spectral Density Measurement is 8dBm.

### 8.2 Test Procedures

- The transmitter output was connected to spectrum analyzer.
- The spectrum analyzer's resolution bandwidth were set at 3KHz RBW and 30KHz VBW as that of the fundamental frequency. Set the sweep time=auto couple.
- The power spectral density was measured and recorded.

### 8.3 Test Setup Layout



### 8.4 Measurement Equipment

| Instrument/Ancillary | Manufacturer | Model No. | Serial No. | Calibration Date | Valid Date |
|----------------------|--------------|-----------|------------|------------------|------------|
| Spectrum Analyzer    | R&S          | FSP40     | 100047     | 2014/03/27       | 2015/03/26 |

### 8.5 Test Result and Data

Test Date: May 09, 2014

Temperature: 23°C

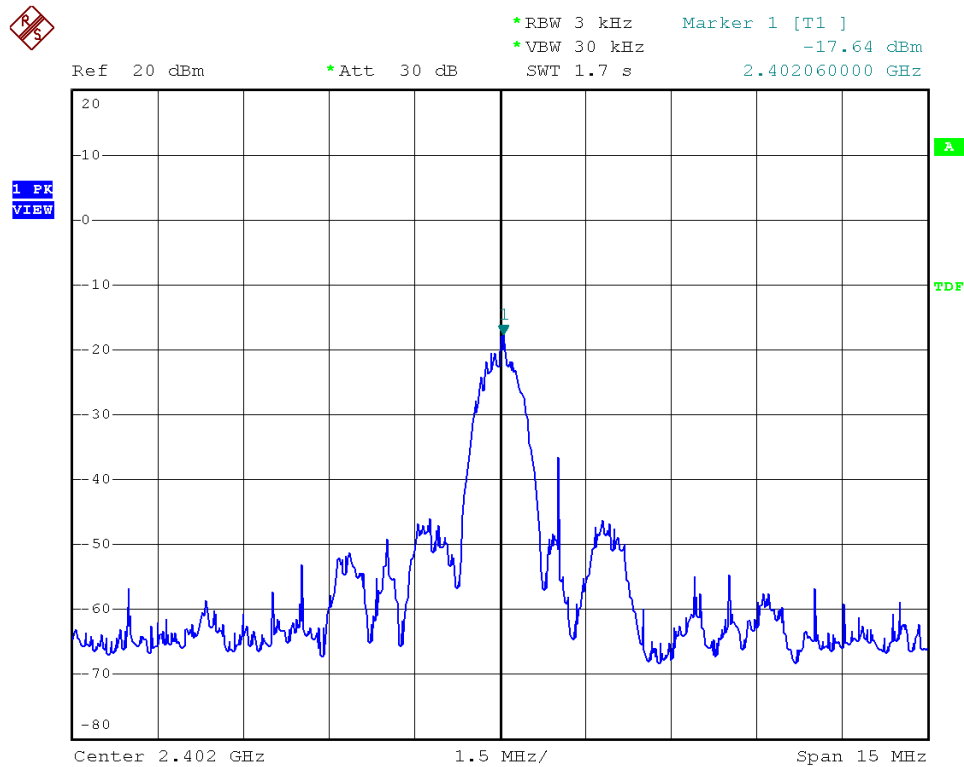
Atmospheric pressure: 1027 hPa

Humidity: 47%

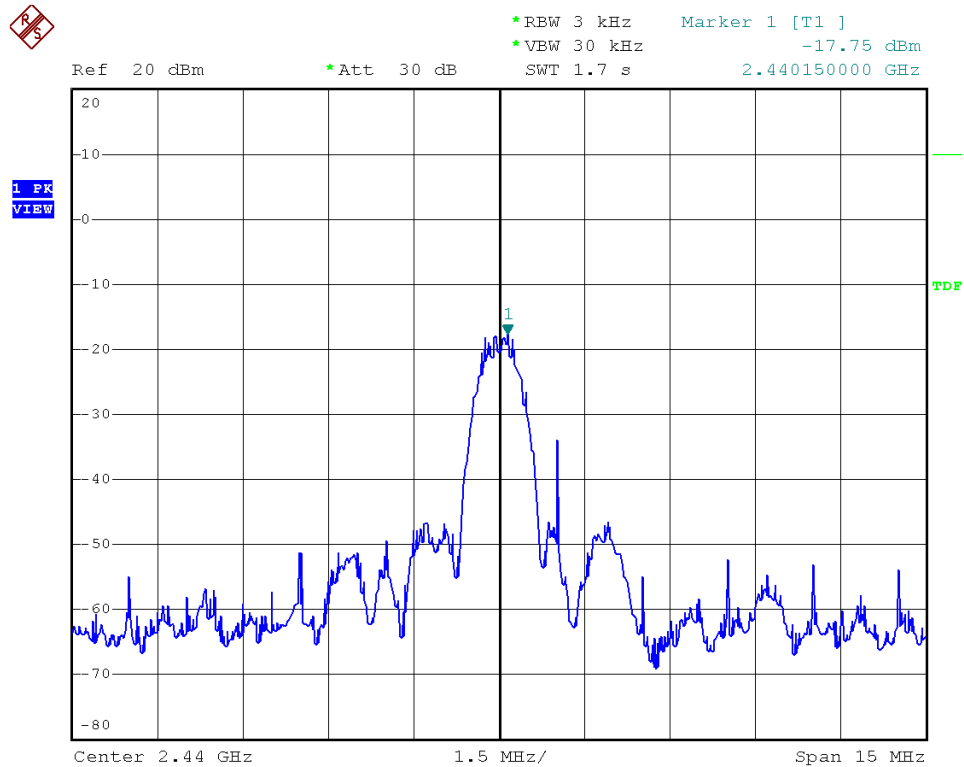
| Modulation Standard | Channel | Frequency (MHz) | Maximum Power Density of 3 kHz Bandwidth (dBm) |
|---------------------|---------|-----------------|------------------------------------------------|
| GFSK (1Mbps)        | 00      | 2402            | -17.64                                         |
|                     | 19      | 2440            | -17.75                                         |
|                     | 39      | 2480            | -17.70                                         |



Modulation Standard: GFSK (1Mbps)  
Channel: 00

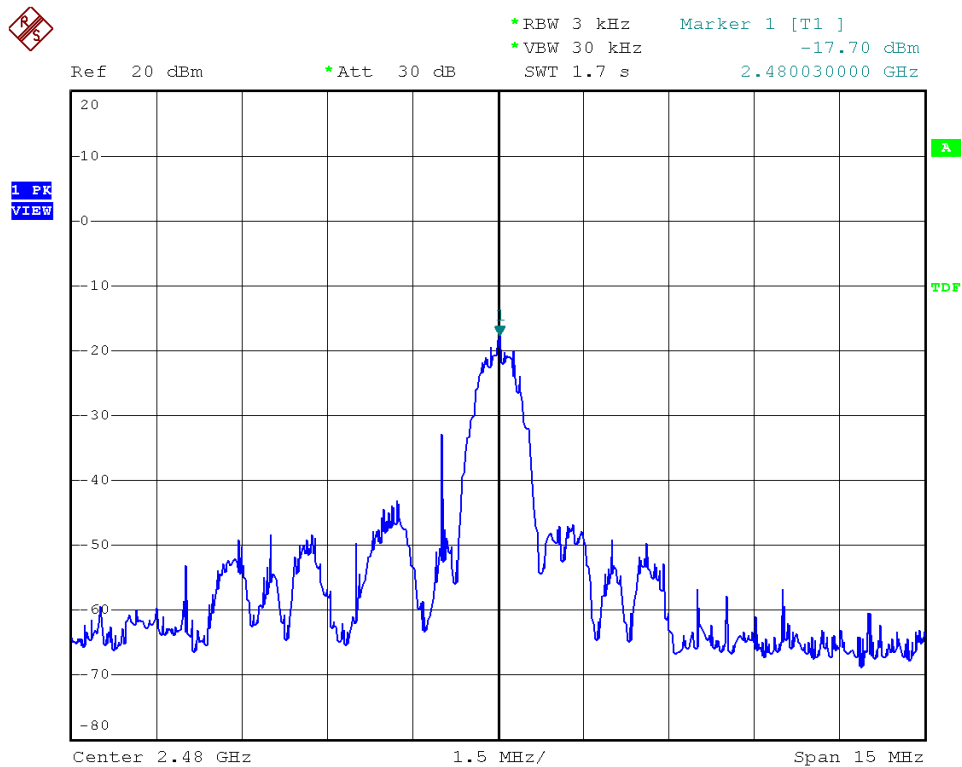


Modulation Standard: GFSK (1Mbps)  
Channel: 19





Modulation Standard: GFSK (1Mbps)  
Channel: 39





## 9. Band Edges Measurement

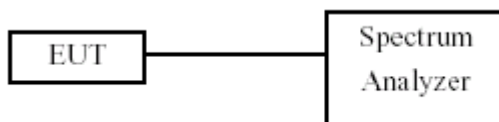
### 9.1 Test Limit

Below -20dB of the highest emission level of operating band (In 100 kHz Resolution Bandwidth)

### 9.2 Test Procedure

- The transmitter output was connected to the spectrum analyzer via a low lose cable.
- Set RBW of spectrum analyzer to 100 KHz and VBW of spectrum analyzer to 300 KHz with convenient frequency span including 100 KHz bandwidth from band edge.
- Peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20dB relative to the maximum measured in-band peak PSD level.
- The band edges was measured and recorded.

### 9.3 Test Setup Layout



### 9.4 Measurement Equipment

| Instrument/Ancillary | Manufacturer | Model No. | Serial No. | Calibration Date | Valid Date |
|----------------------|--------------|-----------|------------|------------------|------------|
| Spectrum Analyzer    | R&S          | FSP40     | 100047     | 2014/03/27       | 2015/03/26 |

### 9.5 Test Result and Data

Test Date: May 09, 2014

Temperature: 23°C

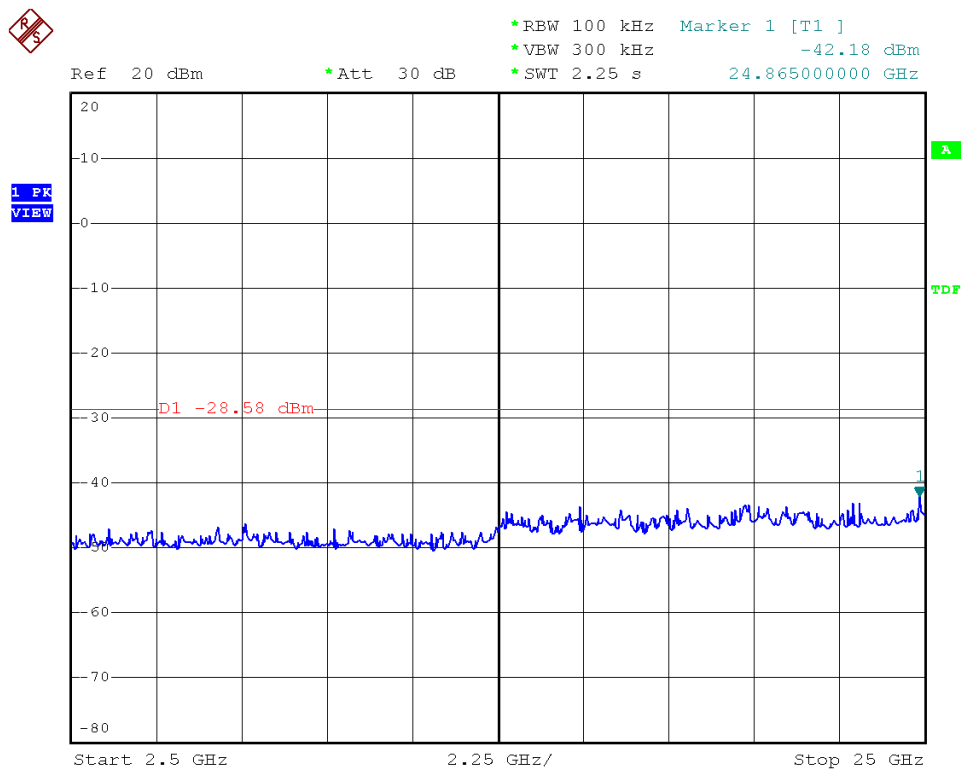
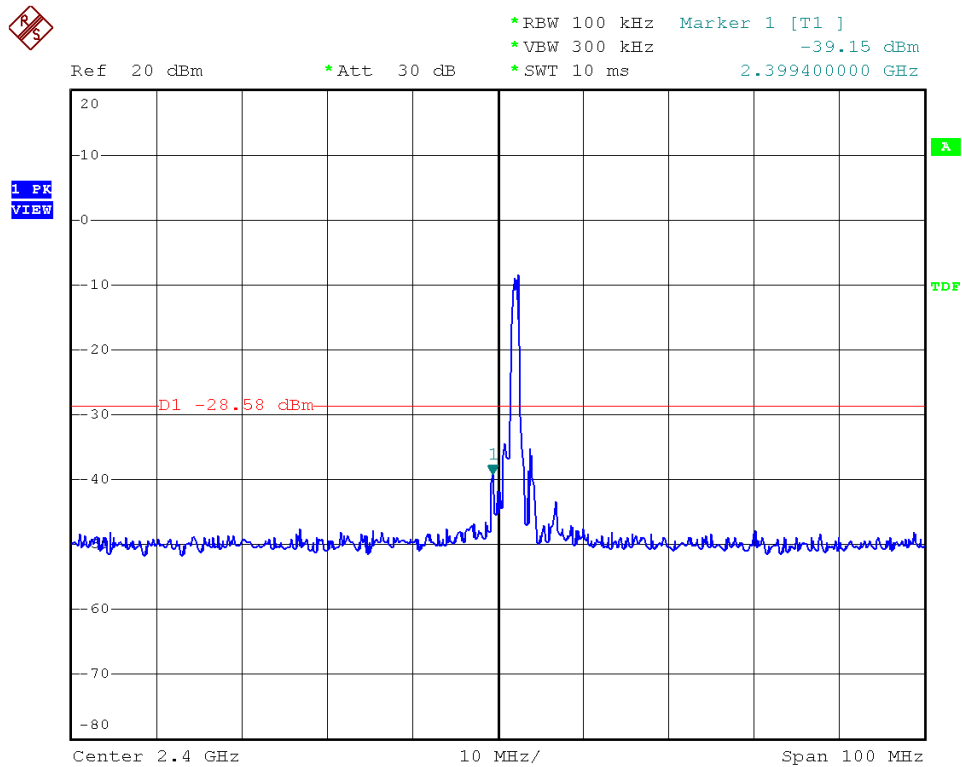
Atmospheric pressure: 1027hPa

Humidity: 47%

| Modulation Standard | Channel | Frequency (MHz) | maximum value in frequency(MHz) | maximum value (dBm) | Limit (dBm) |
|---------------------|---------|-----------------|---------------------------------|---------------------|-------------|
| GFSK (1Mbps)        | 0       | 2402            | 2399.40                         | -39.15              | -28.58      |
|                     | 39      | 2480            | 2059.00                         | -41.98              | -24.97      |

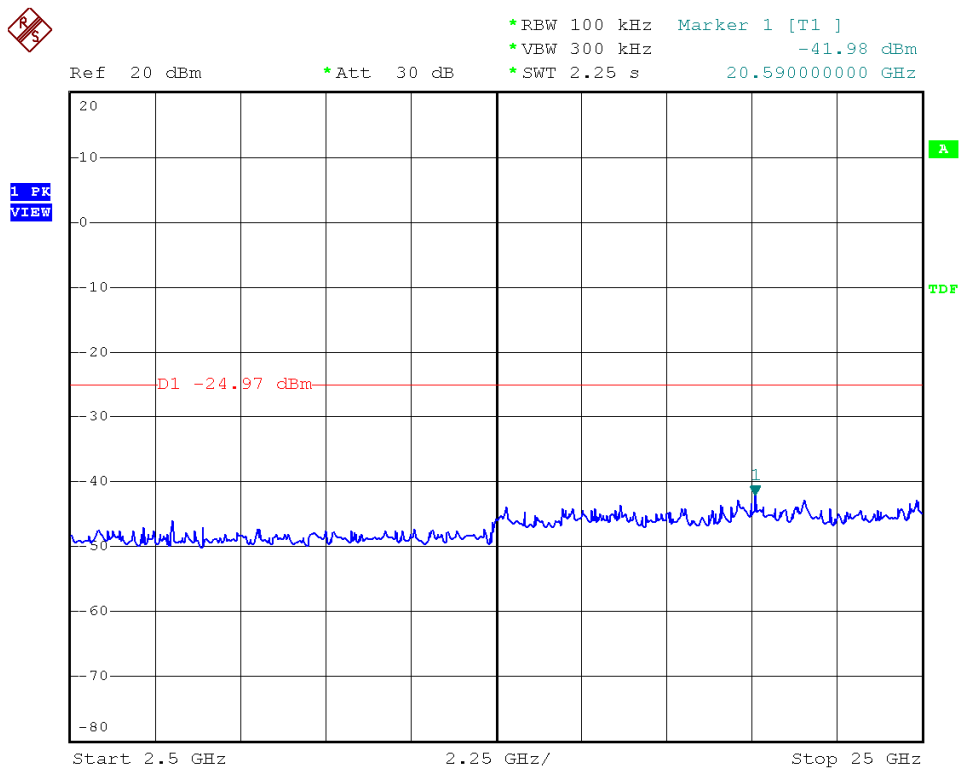
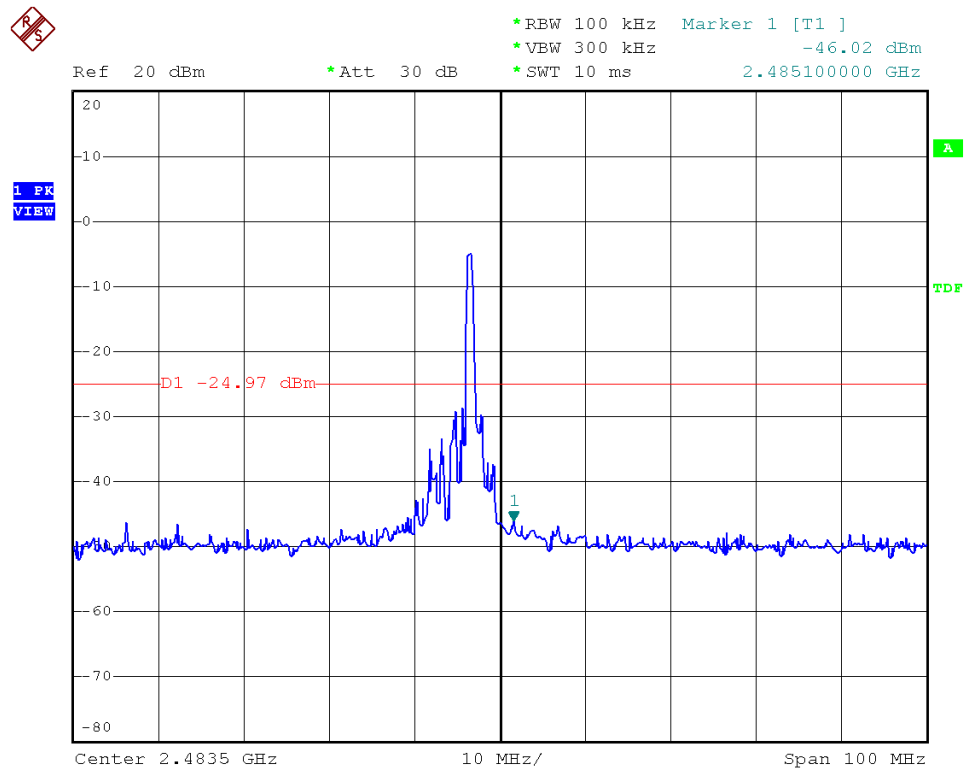


Modulation Standard: GFSK (1Mbps)  
Channel: 00





Modulation Standard: GFSK (1Mbps)  
Channel: 39





## 9.6 Restrict Band Emission Measurement Data

Test Date: May 09, 2014

Temperature: 23 °C

Atmospheric pressure: 1027 hPa

Humidity: 47 %

Antenna Gain: 1.5dBi

Modulation Standard: GFSK

| Channel 1       |             |                      |                       |                 |        | Fundamental Frequency: 2412 MHz |     |             |            |              |
|-----------------|-------------|----------------------|-----------------------|-----------------|--------|---------------------------------|-----|-------------|------------|--------------|
| Frequency (MHz) | Ant-Pol H/V | Meter Reading (dBuV) | Corrected Factor (dB) | Result (dBuV/m) | Remark | Limit (dBuV/m)                  |     | Margin (dB) | Table Deg. | Ant High (m) |
|                 |             |                      |                       |                 |        | Peak                            | Ave |             |            |              |
| 2389.52         | H           | 47.14                | 6.50                  | 53.64           | Peak   | 74                              | 54  | -20.36      | 184        | 1.00         |
| -----           | H           | -----                | -----                 | -----           | Ave    | 74                              | 54  | -----       | -----      | -----        |
| 2322.75         | V           | 49.43                | 3.67                  | 53.10           | Peak   | 74                              | 54  | -20.90      | 259        | 1.00         |
| -----           | V           | -----                | -----                 | -----           | Ave    | 74                              | 54  | -----       | -----      | -----        |
| Channel 11      |             |                      |                       |                 |        | Fundamental Frequency: 2462 MHz |     |             |            |              |
| Frequency (MHz) | Ant-Pol H/V | Meter Reading (dBuV) | Corrected Factor (dB) | Result (dBuV/m) | Remark | Limit (dBuV/m)                  |     | Margin (dB) | Table Deg. | Ant High (m) |
|                 |             |                      |                       |                 |        | Peak                            | Ave |             |            |              |
| 2484.64         | H           | 45.39                | 6.64                  | 52.03           | Peak   | 74                              | 54  | -21.97      | 178        | 1.00         |
| -----           | H           | -----                | -----                 | -----           | Ave    | 74                              | 54  | -----       | -----      | -----        |
| 2489.33         | V           | 46.62                | 6.50                  | 53.12           | Peak   | 74                              | 54  | -20.88      | 213        | 1.00         |
| -----           | V           | -----                | -----                 | -----           | Ave    | 74                              | 54  | -----       | -----      | -----        |

### Notes:

1. Result = Meter Reading + Factor
2. Factor = Antenna Factor + Cable Loss – Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3 MHz (detector peak mode) for Peak detection at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3 MHz (detector sample mode) for Average detection at frequency above 1GHz.



## 10. Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

| MHz                 | MHz                   | MHz             | GHz             |
|---------------------|-----------------------|-----------------|-----------------|
| 0.09000 – 0.11000   | 16.42000 – 16.42300   | 399.9 – 410.0   | 4.500 – 5.250   |
| 0.49500 – 0.505**   | 16.69475 – 16.69525   | 608.0 – 614.0   | 5.350 – 5.460   |
| 2.17350 – 2.19050   | 16.80425 – 16.80475   | 960.0 – 1240.0  | 7.250 – 7.750   |
| 4.12500 – 4.12800   | 25.50000 – 25.67000   | 1300.0 – 1427.0 | 8.025 – 8.500   |
| 4.17725 – 4.17775   | 37.50000 – 38.25000   | 1435.0 – 1626.5 | 9.000 – 9.200   |
| 4.20725 – 4.20775   | 73.00000 – 74.60000   | 1645.5 – 1646.5 | 9.300 – 9.500   |
| 6.21500 – 6.21800   | 74.80000 – 75.20000   | 1660.0 – 1710.0 | 10.600 – 12.700 |
| 6.26775 – 6.26825   | 108.00000 – 121.94000 | 1718.8 – 1722.2 | 13.250 – 13.400 |
| 6.31175 – 6.31225   | 123.00000 – 138.00000 | 2200.0 – 2300.0 | 14.470 – 14.500 |
| 8.29100 – 8.29400   | 149.90000 – 150.05000 | 2310.0 – 2390.0 | 15.350 – 16.200 |
| 8.36200 – 8.36600   | 156.52475 – 156.52525 | 2483.5 – 2500.0 | 17.700 – 21.400 |
| 8.37625 – 8.38675   | 156.70000 – 156.90000 | 2655.0 – 2900.0 | 22.010 – 23.120 |
| 8.41425 – 8.41475   | 162.01250 – 167.17000 | 3260.0 – 3267.0 | 23.600 – 24.000 |
| 12.29000 – 12.29300 | 167.72000 – 173.20000 | 3332.0 – 3339.0 | 31.200 – 31.800 |
| 12.51975 – 12.52025 | 240.00000 – 285.00000 | 3345.8 – 3358.0 | 36.430 – 36.500 |
| 12.57675 – 12.57725 | 322.00000 – 335.40000 | 3600.0 – 4400.0 | Above 38.6      |
| 13.36000 – 13.41000 |                       |                 |                 |

\*\* : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

### 10.1 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.