

# TEST REPORT

**Application No.:** KSCR2201000046AT  
**FCC ID:** 2AOK9-MDT04  
**Applicant:** 70mai Co.,Ltd.  
**Address of Applicant:** Room 2220, building 2, No.588, Zixing road, MinHang District, Shanghai CHINA  
**Manufacturer:** 70mai Co.,Ltd.  
**Address of Manufacturer:** Room 2220, building 2, No.588, Zixing road, MinHang District, Shanghai CHINA  
**Equipment Under Test (EUT):**  
**EUT Name:** TPMS SENSOR  
**Model No.:** Midrive T04  
**Trade mark:** 70 Mai  
**Standard(s) :** 47 CFR Part 15, Subpart C 15.249  
**Date of Receipt:** 2022-01-05  
**Date of Test:** 2022-01-13 to 2022-01-26  
**Date of Issue:** 2022-01-27

|                     |              |
|---------------------|--------------|
| <b>Test Result:</b> | <b>Pass*</b> |
|---------------------|--------------|

\* In the configuration tested, the EUT complied with the standards specified above.

Eric Lin  
Laboratory Manager



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| Revision Record |             |            |        |
|-----------------|-------------|------------|--------|
| Version         | Description | Date       | Remark |
| 00              | Original    | 2022-01-27 | /      |
|                 |             |            |        |
|                 |             |            |        |

|                          |  |  |  |
|--------------------------|--|--|--|
| Authorized for issue by: |  |  |  |
|                          |  | <br><hr/> Damon Zhou / Project Engineer |  |
|                          |  | <br><hr/> Eric Lin / Reviewer          |  |



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## 2 Test Summary

| Radio Spectrum Technical Requirement |                                  |        |                                  |        |
|--------------------------------------|----------------------------------|--------|----------------------------------|--------|
| Item                                 | Standard                         | Method | Requirement                      | Result |
| Antenna Requirement                  | 47 CFR Part 15, Subpart C 15.249 | N/A    | 47 CFR Part 15, Subpart C 15.203 | Pass   |

N/A: Not applicable

| Radio Spectrum Matter Part                           |                                  |  |   |        |
|--|----------------------------------|--|---|--------|
| Item   | Standard                         | Method                                 | Requirement   | Result |
| 20dB Bandwidth                                       | 47 CFR Part 15, Subpart C 15.249 | ANSI C63.10 (2013) Section 6.9         | 47 CFR Part 15, Subpart C 15.215                      | Pass   |
| Field Strength of the Fundamental Signal (15.249(a)) | 47 CFR Part 15, Subpart C 15.249 | ANSI C63.10 (2013) Section 6.5&6.6     | 47 CFR Part 15, Subpart C 15.249(a)                   | Pass   |
| Restricted Band Around Fundamental Frequency         | 47 CFR Part 15, Subpart C 15.249 | ANSI C63.10 (2013) Section 6.4&6.5&6.6 | 47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209 | Pass   |
| Radiated Emissions                                   | 47 CFR Part 15, Subpart C 15.249 | ANSI C63.10 (2013) Section 6.4&6.5&6.6 | 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)     | Pass   |

N/A: Not applicable



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## 4 General Information

### 4.1 Details of E.U.T.

|                      |                                   |
|----------------------|-----------------------------------|
| Power supply:        | DC 3V by Battery                  |
| Test voltage:        | DC 3V                             |
| Antenna Gain:        | -10dBi (Provided by manufacturer) |
| Channel Spacing:     | Integral Antenna                  |
| Modulation Type:     | GFSK                              |
| Operation Frequency: | 2402-2480MHz                      |
| Channel Number:      | 3                                 |

| Channel Position | Frequency (MHz) |
|------------------|-----------------|
| Low              | 2402            |
| Middle           | 2440            |
| High             | 2480            |

### 4.2 Description of Support Units

The EUT has been tested as an independent unit.

### 4.3 Measurement Uncertainty

| No. | Item                            | Measurement Uncertainty |
|-----|---------------------------------|-------------------------|
| 1   | Radio Frequency                 | 8.4 x 10 <sup>-8</sup>  |
| 2   | Timeout                         | 2s                      |
| 3   | Duty Cycle                      | 0.37%                   |
| 4   | Occupied Bandwidth              | 3%                      |
| 5   | RF Conducted Power              | 0.6dB                   |
| 6   | RF Power Density                | 2.9dB                   |
| 7   | Conducted Spurious Emissions    | 0.75dB                  |
| 8   | RF Radiated Power               | 5.2dB (Below 1GHz)      |
|     |                                 | 5.9dB (Above 1GHz)      |
| 9   | Radiated Spurious Emission Test | 4.2dB (Below 30MHz)     |
|     |                                 | 4.5dB (30MHz-1GHz)      |
|     |                                 | 5.1dB (1GHz-18GHz)      |
|     |                                 | 5.4dB (Above 18GHz)     |
| 10  | Temperature Test                | 1°C                     |
| 11  | Humidity Test                   | 3%                      |
| 12  | Supply Voltages                 | 1.5%                    |
| 13  | Time                            | 3%                      |

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



#### 4.4 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

#### 4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L4354)**

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 2541.01)**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

- **FCC (Designation Number: CN1172)**

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory.

Designation Number: CN1172.

- **ISED (CAB identifier: CN0072)**

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

Company Number: 2324E

- **VCCI (Member No.: 1938)**

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

#### 4.6 Deviation from Standards

None

#### 4.7 Abnormalities from Standard Conditions

None



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## 5 Equipment List

| Item                    | Equipment                  | Manufacturer  | Model       | Serial Number | Cal Date   | Cal. Due Date |
|-------------------------|----------------------------|---------------|-------------|---------------|------------|---------------|
| <b>RF Radiated Test</b> |                            |               |             |               |            |               |
| 1                       | Spectrum Analyzer          | R&S           | FSV40       | 101493        | 10/11/2021 | 10/10/2022    |
| 2                       | Signal Generator           | Agilent       | E8257C      | MY43321570    | 10/18/2021 | 10/17/2022    |
| 3                       | Loop Antenna               | Schwarzbeck   | HXYZ9170    | 9170-108      | 02/22/2021 | 02/21/2022    |
| 4                       | Bilog Antenna              | TESEQ         | CBL 6112D   | 35403         | 06/21/2021 | 06/20/2023    |
| 5                       | Bilog Antenna              | SCHWARZBECK   | VULB9160    | 9160-3342     | 04/13/2021 | 04/12/2023    |
| 6                       | Horn-antenna(1-18GHz)      | Schwarzbeck   | BBHA9120D   | 267           | 10/26/2020 | 10/25/2022    |
| 7                       | Horn-antenna(1-18GHz)      | ETS-LINDGREN  | 3117        | 00143290      | 02/22/2021 | 02/21/2023    |
| 8                       | Horn Antenna(18-40GHz)     | Schwarzbeck   | BBHA9170    | BBHA9170171   | 02/22/2021 | 02/21/2022    |
| 9                       | Pre-Amplifier(30MHz~18GHz) | LNA           | /           | /             | 04/15/2021 | 04/14/2022    |
| 10                      | Amplifier(18~40GHz)        | COM-POWER     | PAM-840A    | 461332        | 10/18/2021 | 10/17/2022    |
| 11                      | Low Pass Filter            | MICRO-TRONICS | VLFX-950    | RV142900829   | N.C.R      | N.C.R         |
| 12                      | High Pass Filter           | Mini-Circuits | VHF-1200    | 15542         | N.C.R      | N.C.R         |
| 13                      | Filter (5450MHz~5770 MHz)  | MICRO-TRONICS | BRC50704-01 | 2             | N.C.R      | N.C.R         |
| 14                      | Filter (5690 MHz~5930 MHz) | MICRO-TRONICS | BRC50705-01 | 4             | N.C.R      | N.C.R         |
| 15                      | Filter (5150 MHz~5350 MHz) | MICRO-TRONICS | BRC50703-01 | 2             | N.C.R      | N.C.R         |
| 16                      | Filter (885 MHz~915 MHz)   | MICRO-TRONICS | BRM14698    | 1             | N.C.R      | N.C.R         |
| 17                      | Filter (815 MHz~860 MHz)   | MICRO-TRONICS | BRM14697    | 1             | N.C.R      | N.C.R         |
| 18                      | Filter (1745 MHz~1910 MHz) | MICRO-TRONICS | BRM14700    | 1             | N.C.R      | N.C.R         |
| 19                      | Filter (1922 MHz~1977 MHz) | MICRO-TRONICS | BRM50715    | 1             | N.C.R      | N.C.R         |
| 20                      | Filter (2550 MHz)          | MICRO-TRONICS | HPM13362    | 5             | N.C.R      | N.C.R         |
| 21                      | Filter (1532 MHz~1845 MHz) | MICRO-TRONICS | BRM50713    | 1             | N.C.R      | N.C.R         |
| 22                      | Filter (2.4GHz)            | MICRO-TRONICS | BRM50701    | 5             | N.C.R      | N.C.R         |
| 23                      | RE test cable              | /             | RE01-RE04   | /             | 04/15/2021 | 04/14/2022    |
| 24                      | Software                   | Faratronic    | EZ_EMV-3A1  | N/A           | N/A        | N/A           |



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## 6 Radio Spectrum Technical Requirement

### 6.1 Antenna Requirement

#### 6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

Limit:

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

#### 6.1.2 Conclusion

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is -10dBi.

Antenna location: Refer to Appendix(internal photo)





## 7 Radio Spectrum Matter Test Results

### 7.1 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.215  
Test Method: ANSI C63.10 (2013) Section 6.9  
Limit: N/A

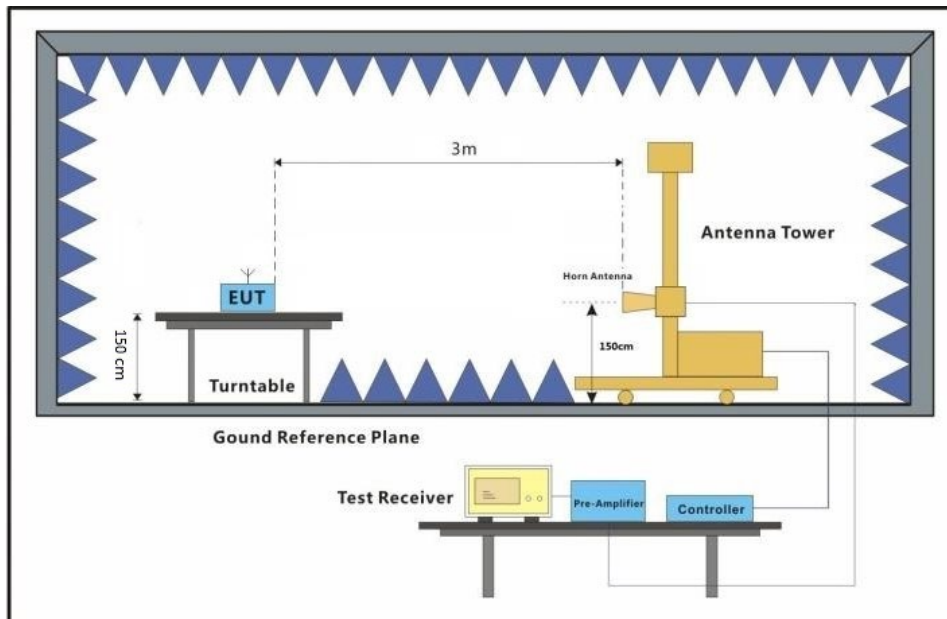
#### 7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Test mode a: TX mode\_Keep the EUT in continuously transmitting mode with GFSK modulation.

#### 7.1.2 Test Setup Diagram



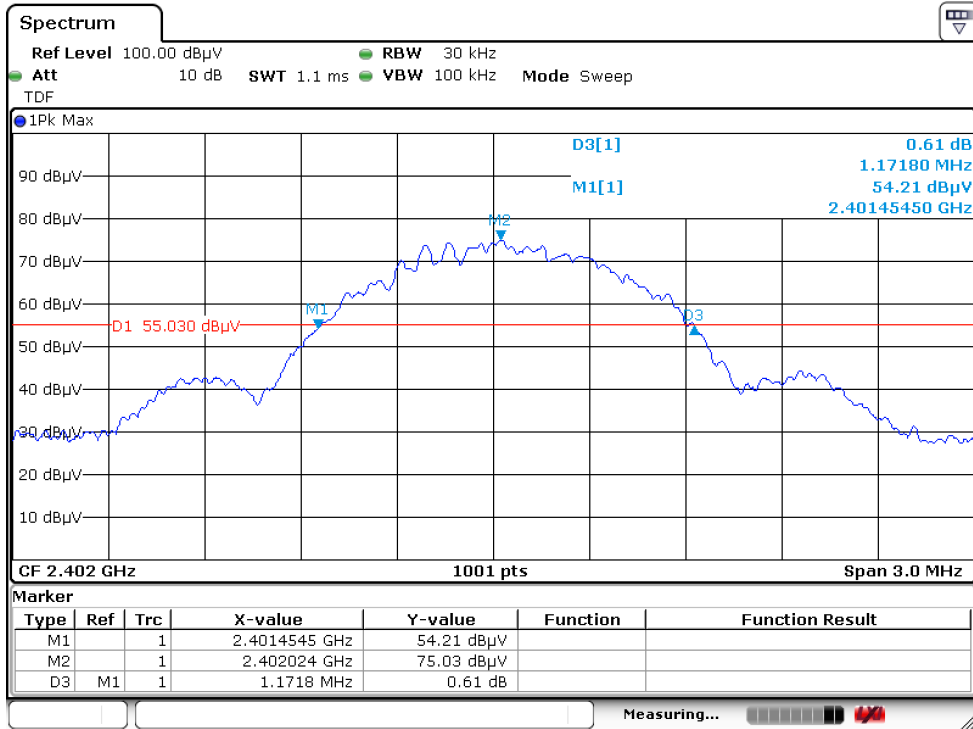
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### 7.1.3 Measurement Procedure and Data

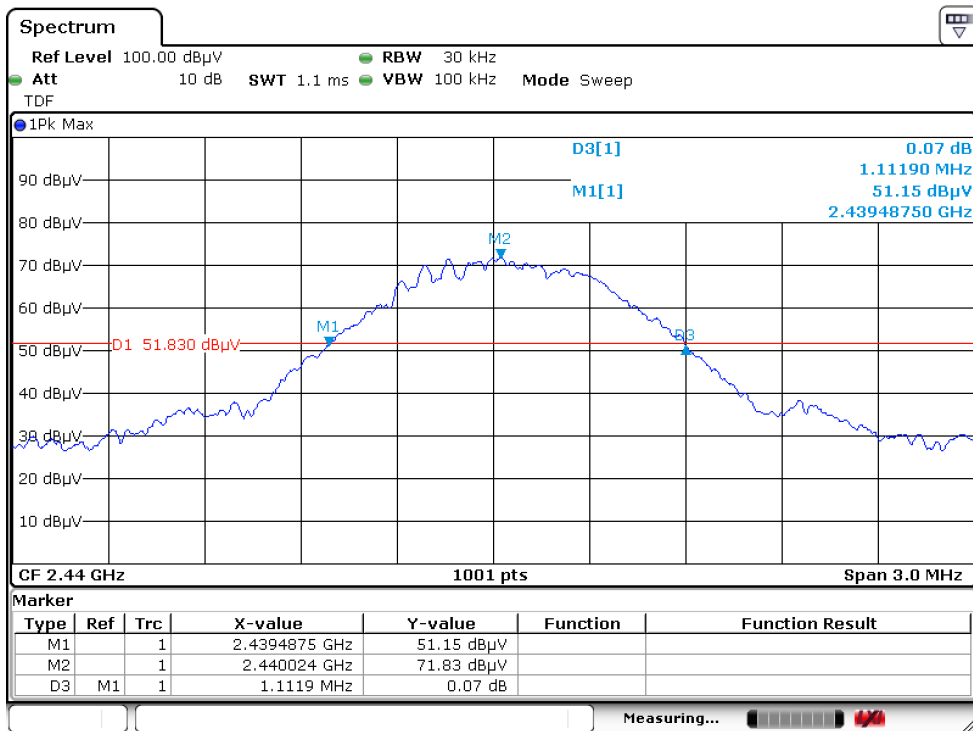
1. Place the EUT on the table and set it in Engineering mode.
2. Set the spectrum analyzer as RBW = approximately 1 % to 5 % of the OBW (set 30 kHz), VBW =3\* RBW, Span=3MHz, Sweep=auto
3. Mark the peak frequency and -20dB (upper and lower) frequency.
4. Repeat above procedures until all frequency measured was complete.



20dB Bandwidth - 2402MHz

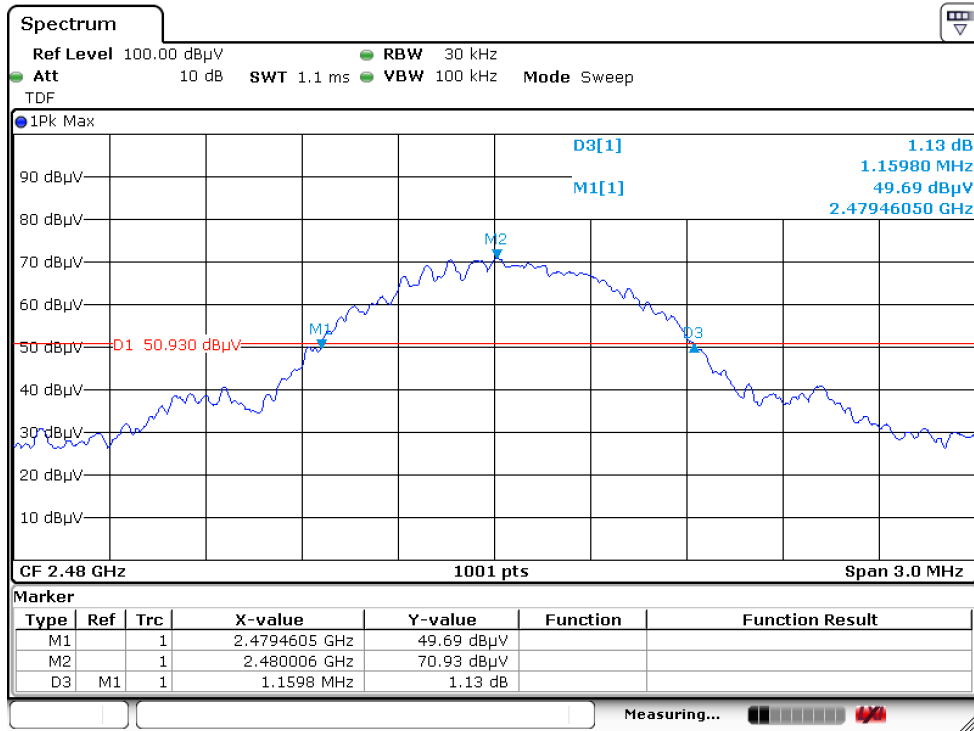


20dB Bandwidth - 2440MHz



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20dB Bandwidth - 2480MHz



| Mode | Frequency (MHz) | 20dB Bandwidth (MHz) | Test Result |
|------|-----------------|----------------------|-------------|
| GFSK | 2402            | 1.172                | Pass        |
|      | 2440            | 1.112                | Pass        |
|      | 2480            | 1.160                | Pass        |



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## 7.2 Field Strength of the Fundamental Signal (15.249(a))

Test Requirement 47 CFR Part 15, Subpart C 15.249(a)  
Test Method: ANSI C63.10 (2013) Section 6.5&6.6  
Limit:

| Fundamental frequency (MHz) | Field strength of fundamental (millivolts/meter) | Field strength of harmonics (microvolts/meter) |
|-----------------------------|--|--|
| 902-928                     | 50   | 500  |
| 2400-2483.5                 | 50   | 500  |
| 5725-5875                   | 50   | 500  |
| 24000-24250                 | 250  | 2500   |

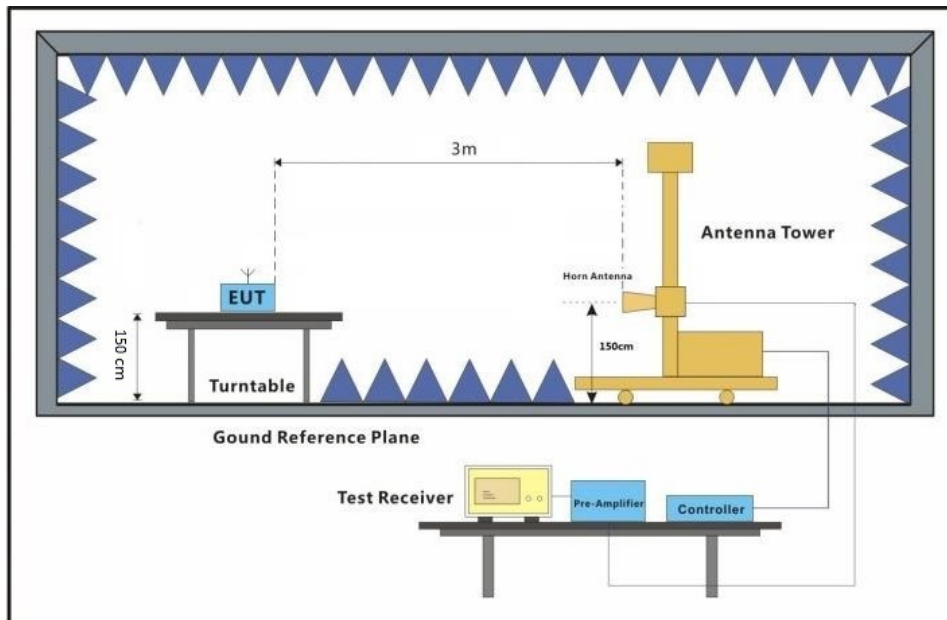
Remark: The frequencies above 1000MHz are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

### 7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar  
Test mode a:TX mode\_Keep the EUT in continuously transmitting mode with GFSK modulation.

### 7.2.2 Test Setup Diagram



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### 7.2.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

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



| Frequency (MHz) | Read Level (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Detector | Polarization |
|-----------------|-------------------|---------------|----------------|---------------------|-----------------|----------|--------------|
| 2402            | 101.03            | -13.97        | 87.06          | 94.00               | -6.94           | Peak     | Horizontal   |
|                 | 88.61             | -13.97        | 74.64          | 94.00               | -19.36          | Peak     | Vertical     |
| 2440            | 100.09            | -13.84        | 86.25          | 94.00               | -7.75           | Peak     | Horizontal   |
|                 | 89.15             | -13.84        | 75.31          | 94.00               | -18.69          | Peak     | Vertical     |
| 2480            | 99.35             | -13.71        | 85.64          | 94.00               | -8.36           | Peak     | Horizontal   |
|                 | 90.31             | -13.71        | 76.60          | 94.00               | -17.40          | Peak     | Vertical     |

Remark:

- The basic equation with a sample calculation is as follows: Level = Read Level + Factor.  
**(The Factor is calculated by adding the Antenna Factor, Cable Loss and Preamp Factor)**
- The peak value of the Fundamental Frequency is below the average limit value, so we haven't read the AV value.



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### 7.3 Restricted Band Around Fundamental Frequency

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209  
 Test Method: ANSI C63.10 (2013) Section 6.4&6.5&6.6  
 Limit:

| Frequency     | Limit (dBuV/m @3m) | Remark           |
|---------------|--------------------|------------------|
| 30MHz-88MHz   | 40.0               | Quasi-peak Value |
| 88MHz-216MHz  | 43.5               | Quasi-peak Value |
| 216MHz-960MHz | 46.0               | Quasi-peak Value |
| 960MHz-1GHz   | 54.0               | Quasi-peak Value |
| Above 1GHz    | 54.0               | Average Value    |
| Above 1GHz    | 74.0               | Peak Value       |

Emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

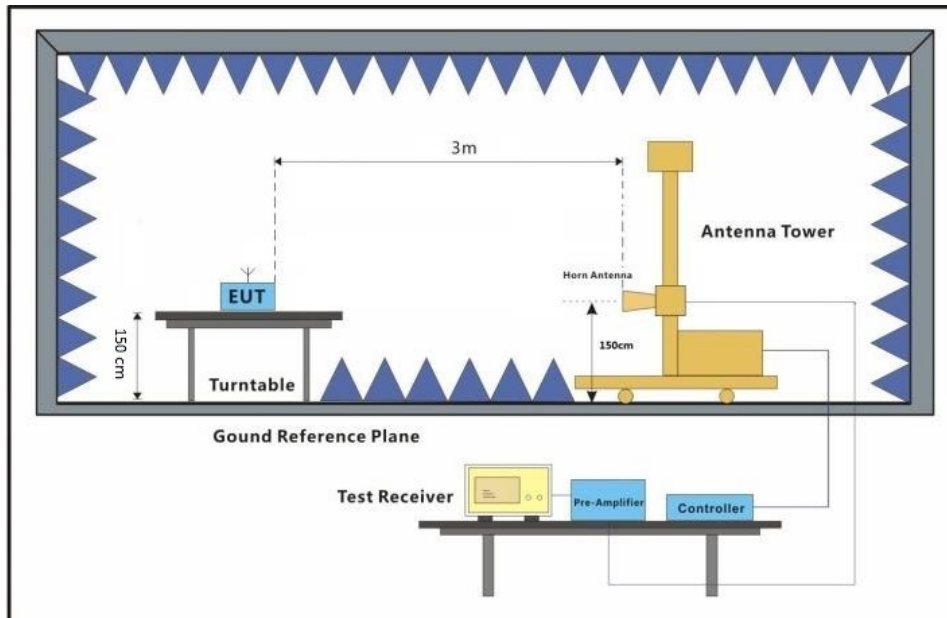
#### 7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Test mode a: TX mode\_Keep the EUT in continuously transmitting mode with GFSK modulation.

#### 7.3.2 Test Setup Diagram



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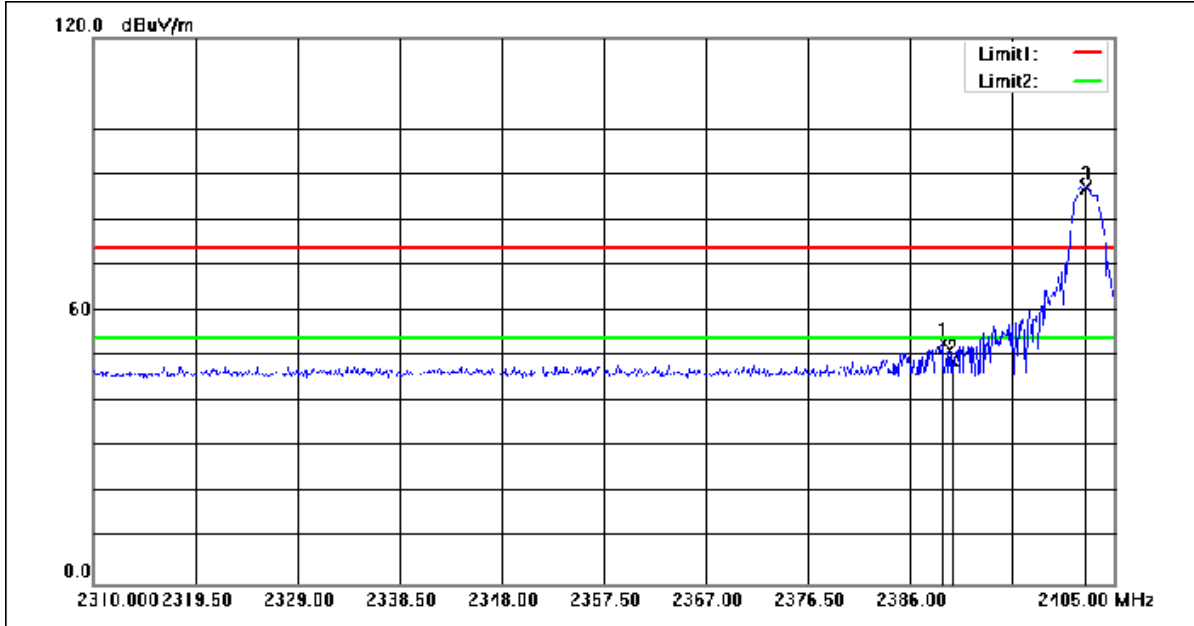
### 7.3.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

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



Mode: a; Polarization: Horizontal; Modulation: GFSK; Channel: Low

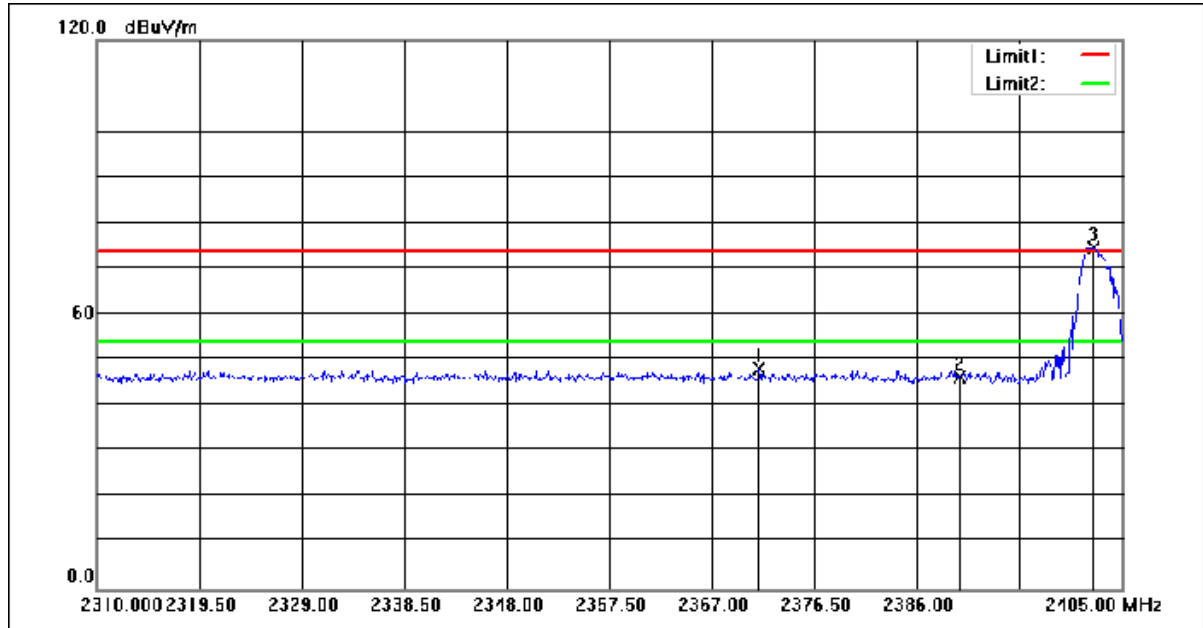


| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|-----------------|----------------|-------------------------|-----------------|----------------|-------------|--------|
| 1   | 2389.040        | 66.85          | -14.01                  | 52.84           | 74.00          | -21.16      | peak   |
| 2   | 2390.000        | 63.07          | -14.01                  | 49.06           | 74.00          | -24.94      | peak   |
| 3   | 2402.435        | 101.03         | -13.97                  | 87.06           | 74.00          | 13.06       | peak   |



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Mode: a; Polarization: Vertical; Modulation: GFSK; Channel: Low

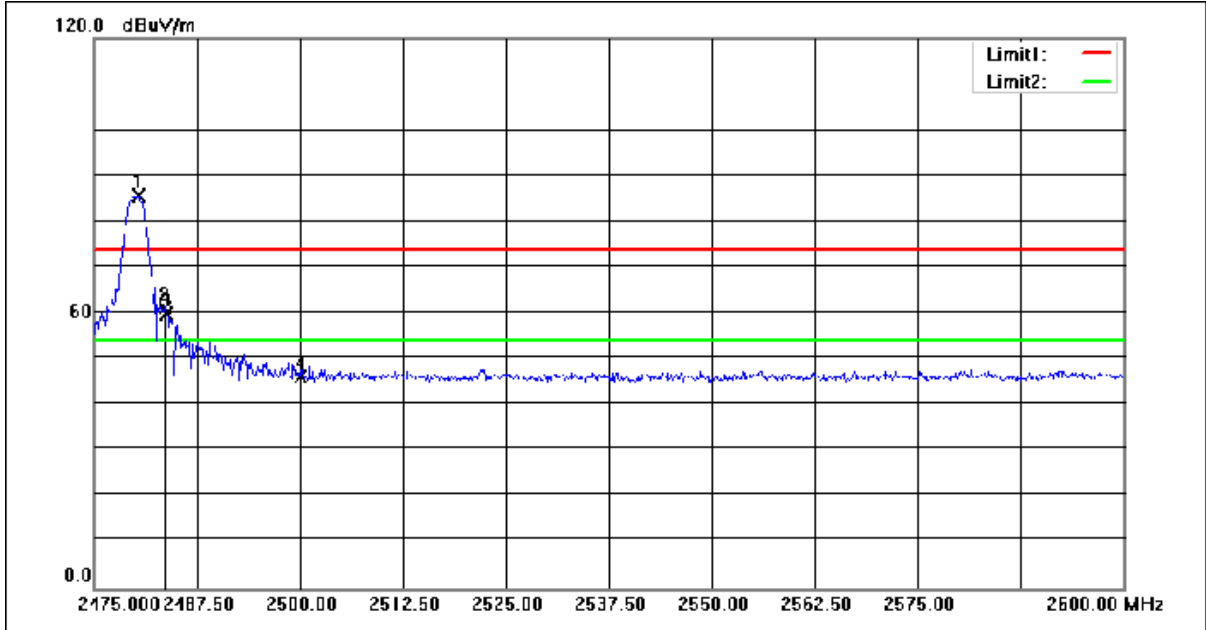


| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|-----------------|----------------|-------------------------|-----------------|----------------|-------------|--------|
| 1   | 2371.370        | 62.08          | -14.07                  | 48.01           | 74.00          | -25.99      | peak   |
| 2   | 2390.000        | 60.28          | -14.01                  | 46.27           | 74.00          | -27.73      | peak   |
| 3   | 2402.340        | 88.61          | -13.97                  | 74.64           | 74.00          | 0.64        | peak   |



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Mode: a; Polarization: Horizontal; Modulation: GFSK; Channel: High

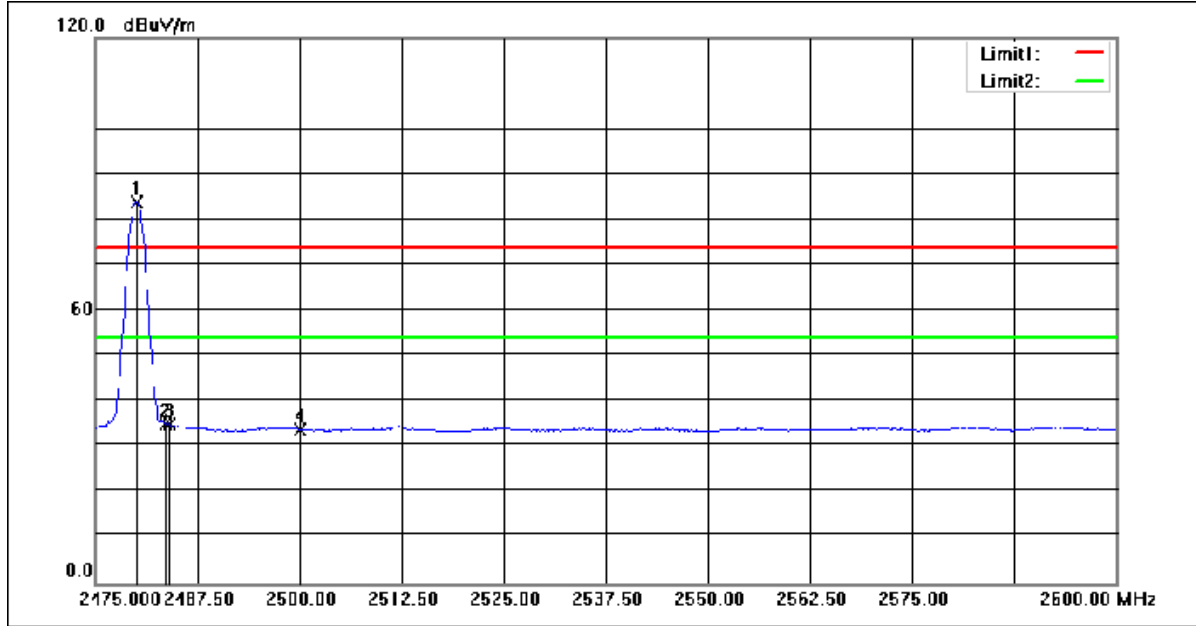


| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|-----------------|----------------|-------------------------|-----------------|----------------|-------------|--------|
| 1   | 2480.375        | 99.35          | -13.71                  | 85.64           | 74.00          | 11.64       | peak   |
| 2   | 2483.500        | 74.90          | -13.71                  | 61.19           | 74.00          | -12.81      | peak   |
| 3   | 2483.750        | 73.57          | -13.70                  | 59.87           | 74.00          | -14.13      | peak   |
| 4   | 2500.000        | 59.65          | -13.64                  | 46.01           | 74.00          | -27.99      | peak   |



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Mode: a; Polarization: Horizontal; Modulation: GFSK; Channel: High

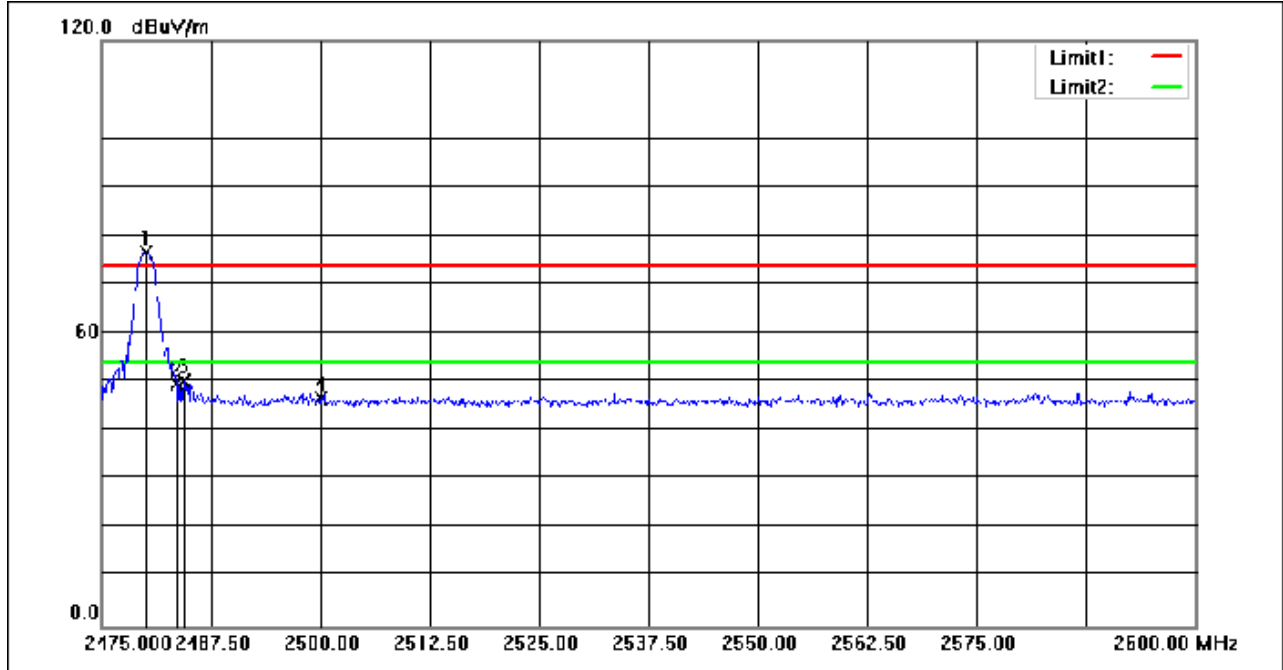


| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|-----------------|----------------|-------------------------|-----------------|----------------|-------------|--------|
| 1   | 2480.000        | 97.69          | -13.71                  | 83.98           | 54.00          | 29.98       | AVG    |
| 2   | 2483.500        | 48.71          | -13.71                  | 35.00           | 54.00          | -19.00      | AVG    |
| 3   | 2484.125        | 48.52          | -13.70                  | 34.82           | 54.00          | -19.18      | AVG    |
| 4   | 2500.000        | 47.51          | -13.64                  | 33.87           | 54.00          | -20.13      | AVG    |



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Mode: a; Polarization: Vertical; Modulation: GFSK; Channel: High



| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|-----------------|----------------|-------------------------|-----------------|----------------|-------------|--------|
| 1   | 2480.000        | 90.31          | -13.71                  | 76.60           | 74.00          | 2.60        | peak   |
| 2   | 2483.500        | 63.28          | -13.71                  | 49.57           | 74.00          | -24.43      | peak   |
| 3   | 2484.375        | 64.02          | -13.70                  | 50.32           | 74.00          | -23.68      | peak   |
| 4   | 2500.000        | 60.32          | -13.64                  | 46.68           | 74.00          | -27.32      | peak   |



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### 7.4 Radiated Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)  
Test Method: ANSI C63.10 (2013) Section 6.4&6.5&6.6  
Limit:

| Frequency (MHz) | Field strength (microvolts/meter) | Limit (dBuV/m) | Detector | Measurement Distance (meters) |
|-----------------|-----------------------------------|----------------|----------|-------------------------------|
| 0.009-0.490     | 2400/F(kHz)                       | -              | -        | 300                           |
| 0.490-1.705     | 24000/F(kHz)                      | -              | -        | 30                            |
| 1.705-30        | 30                                | -              | -        | 30                            |
| 30-88           | 100                               | 40.0           | QP       | 3                             |
| 88-216          | 150                               | 43.5           | QP       | 3                             |
| 216-960         | 200                               | 46.0           | QP       | 3                             |
| 960-1000        | 500                               | 54.0           | QP       | 3                             |
| Above 1000      | 500                               | 54.0           | AV       | 3                             |

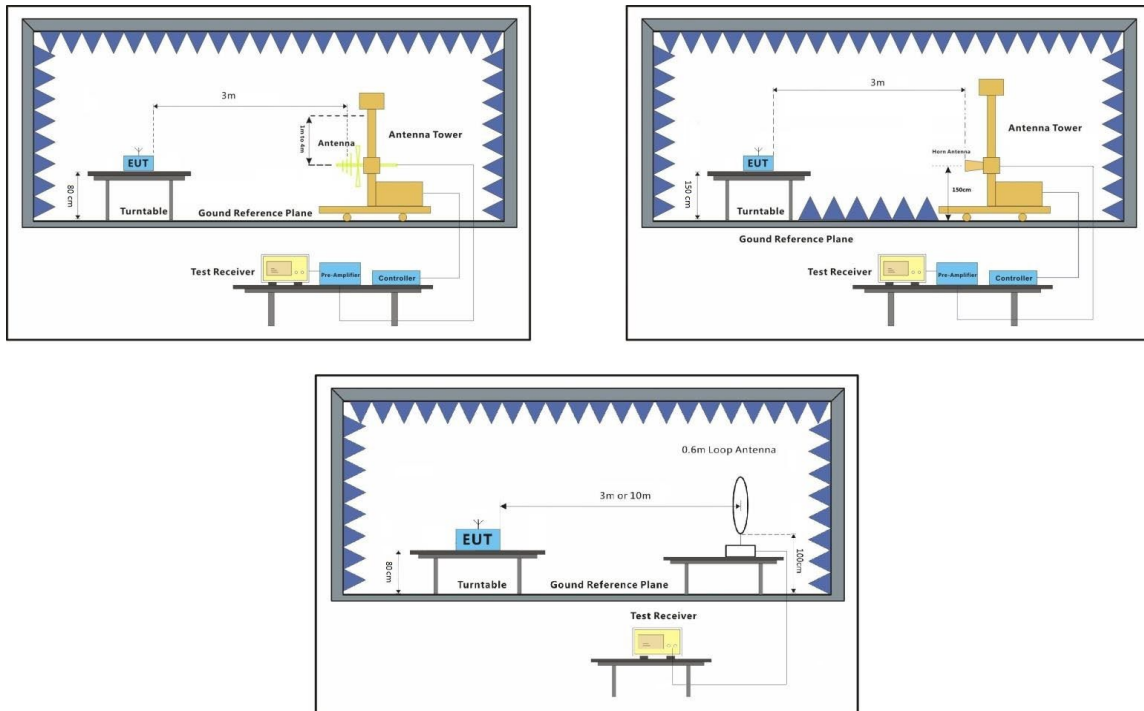
#### 7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Test mode a: TX mode\_Keep the EUT in continuously transmitting mode with GFSK modulation.

#### 7.4.2 Test Setup Diagram



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### 7.4.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

#### Remark:

- 1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:  
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor
- 3) Scan from 9kHz to 25GHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



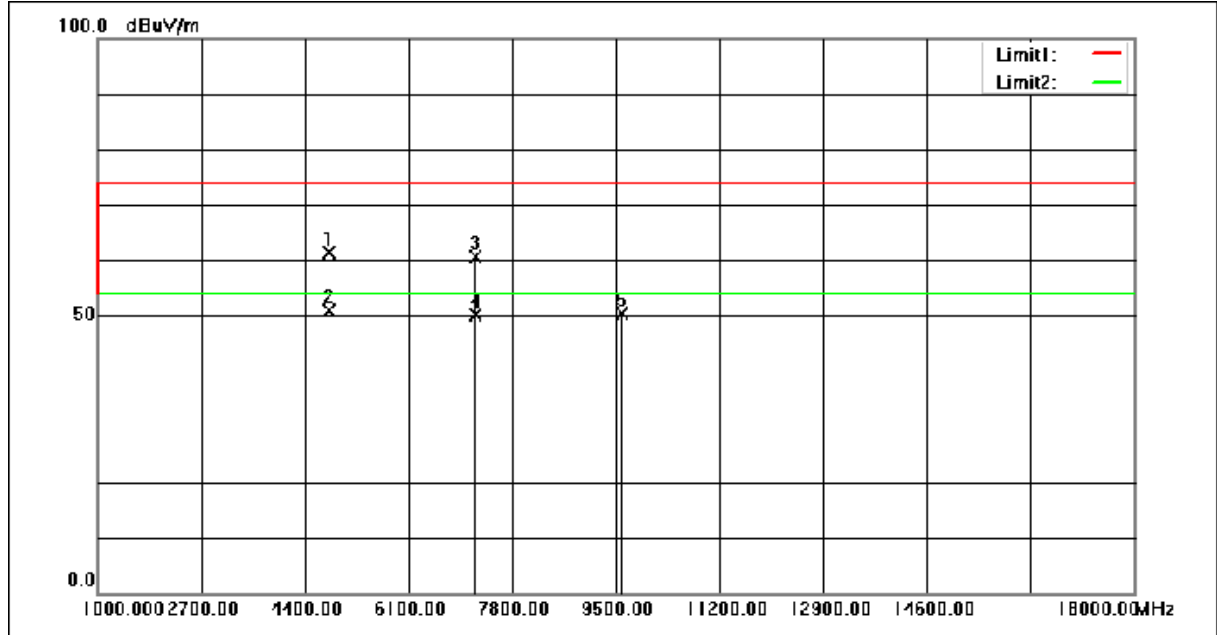
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t(86-512)57355888 f(86-512)57370818 sgs.china@sgs.com



Mode: a; Polarization: Horizontal; Modulation: GFSK; Channel: Low

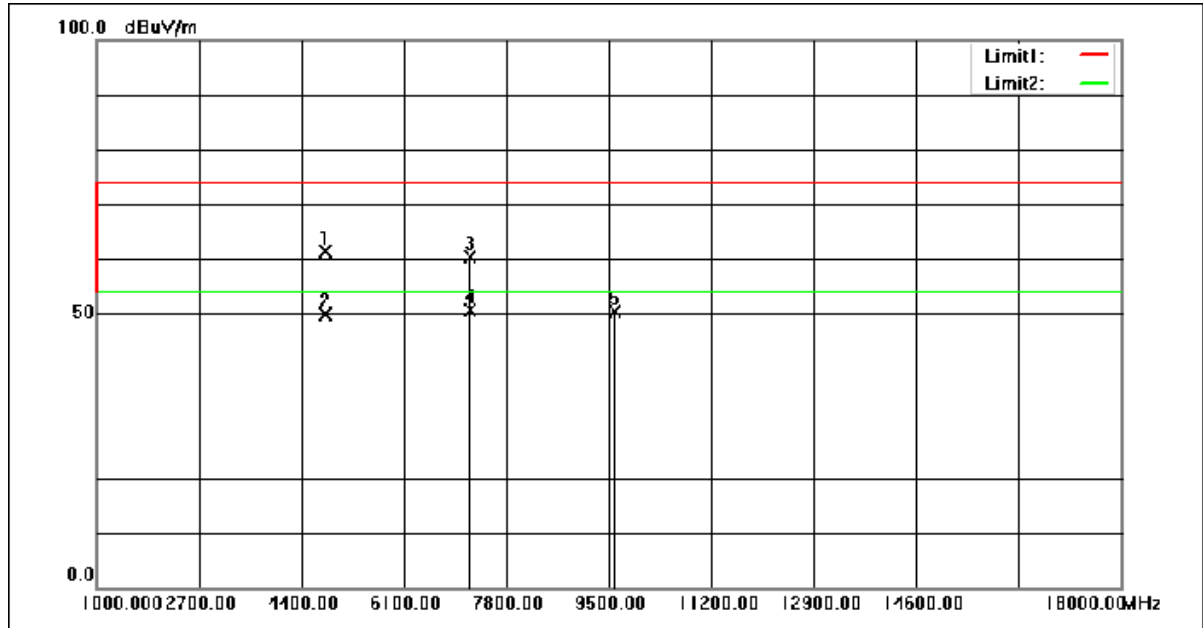


| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|-----------------|----------------|-------------------------|-----------------|----------------|-------------|--------|
| 1   | 4804.000        | 70.20          | -8.86                   | 61.34           | 74.00          | -12.66      | peak   |
| 2   | 4804.000        | 59.67          | -8.86                   | 50.81           | 54.00          | -3.19       | AVG    |
| 3   | 7206.000        | 66.47          | -5.89                   | 60.58           | 74.00          | -13.42      | peak   |
| 4   | 7206.000        | 56.06          | -5.89                   | 50.17           | 54.00          | -3.83       | AVG    |
| 5   | 9608.000        | 51.71          | -1.26                   | 50.45           | 74.00          | -23.55      | peak   |



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Mode: a; Polarization: Vertical; Modulation: GFSK; Channel: Low

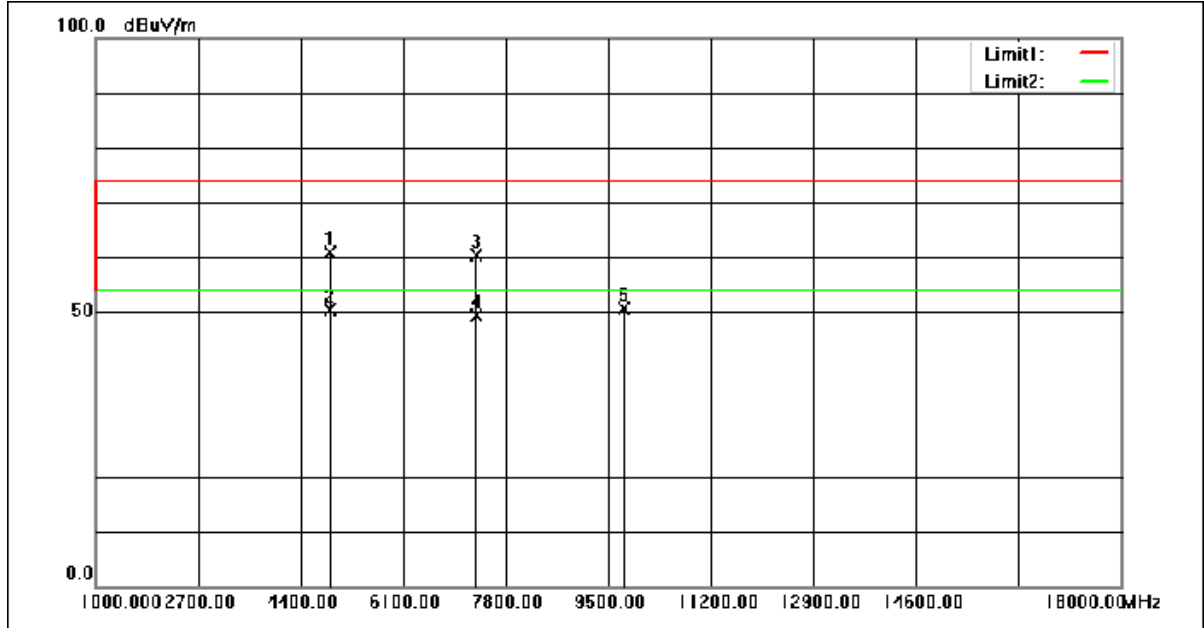


| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|-----------------|----------------|-------------------------|-----------------|----------------|-------------|--------|
| 1   | 4804.000        | 70.18          | -8.86                   | 61.32           | 74.00          | -12.68      | peak   |
| 2   | 4804.000        | 58.64          | -8.86                   | 49.78           | 54.00          | -4.22       | AVG    |
| 3   | 7206.000        | 66.38          | -5.89                   | 60.49           | 74.00          | -13.51      | peak   |
| 4   | 7206.000        | 56.46          | -5.89                   | 50.57           | 54.00          | -3.43       | AVG    |
| 5   | 9608.000        | 51.72          | -1.26                   | 50.46           | 74.00          | -23.54      | peak   |



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Mode: a; Polarization: Horizontal; Modulation: GFSK; Channel: middle

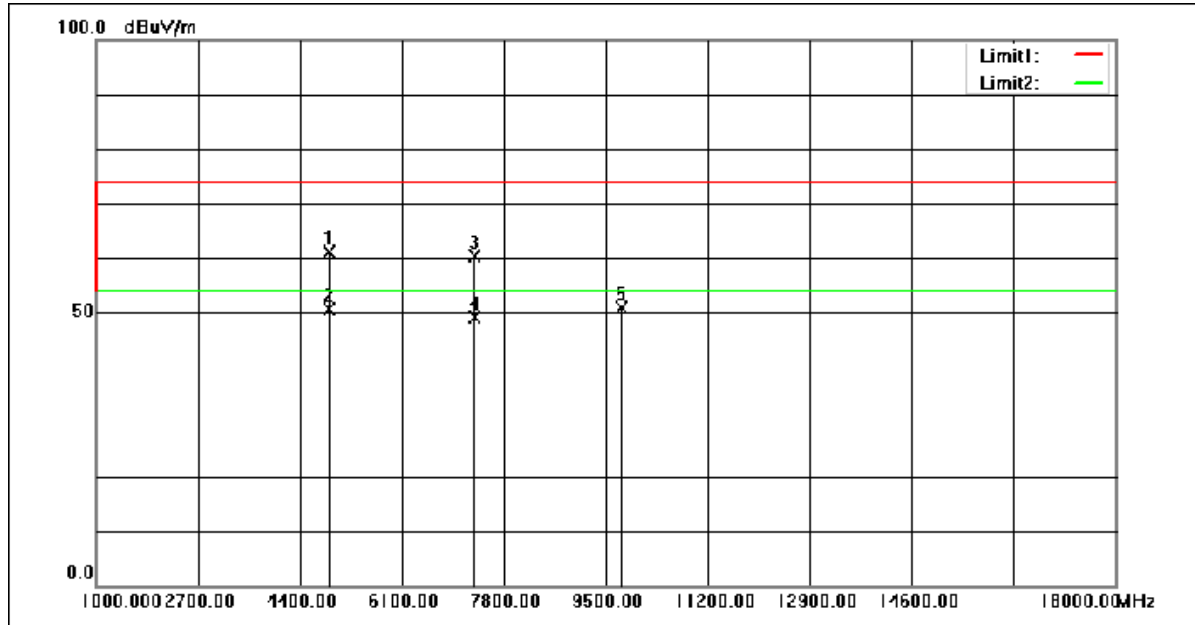


| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|-----------------|----------------|-------------------------|-----------------|----------------|-------------|--------|
| 1   | 4880.000        | 69.54          | -8.60                   | 60.94           | 74.00          | -13.06      | peak   |
| 2   | 4880.000        | 58.97          | -8.60                   | 50.37           | 54.00          | -3.63       | AVG    |
| 3   | 7320.000        | 66.03          | -5.77                   | 60.26           | 74.00          | -13.74      | peak   |
| 4   | 7320.000        | 55.25          | -5.77                   | 49.48           | 54.00          | -4.52       | AVG    |
| 5   | 9760.000        | 52.09          | -1.45                   | 50.64           | 74.00          | -23.36      | peak   |



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Mode: a; Polarization: Vertical; Modulation: GFSK; Channel: middle

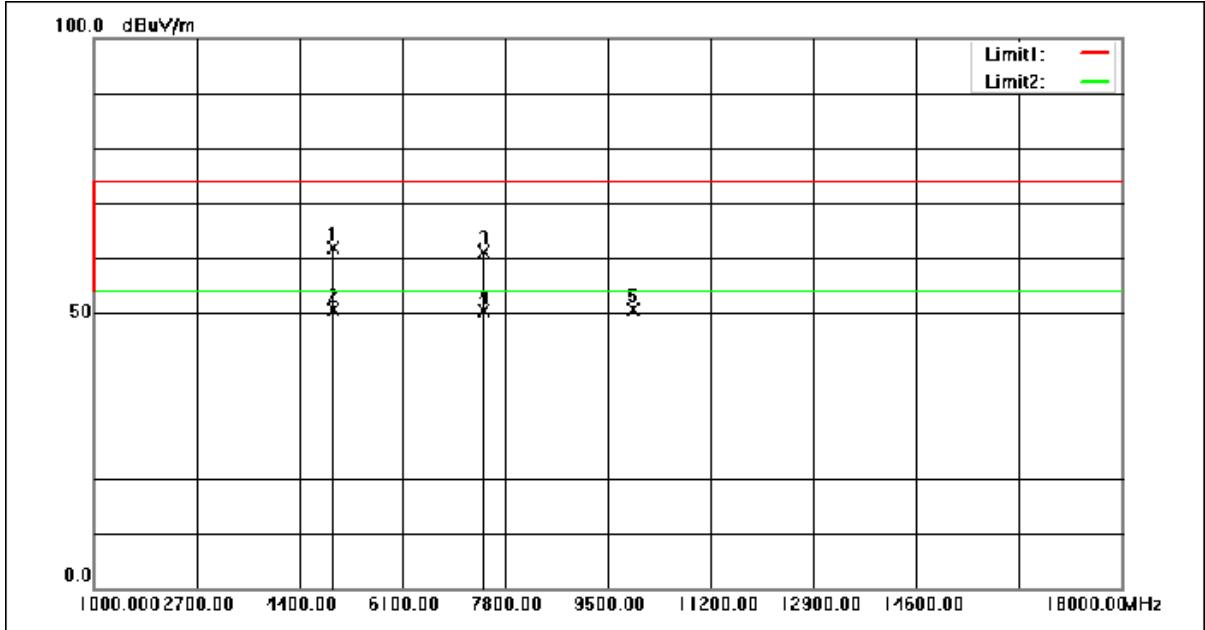


| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|-----------------|----------------|-------------------------|-----------------|----------------|-------------|--------|
| 1   | 4880.000        | 69.62          | -8.60                   | 61.02           | 74.00          | -12.98      | peak   |
| 2   | 4880.000        | 59.16          | -8.60                   | 50.56           | 54.00          | -3.44       | AVG    |
| 3   | 7320.000        | 66.18          | -5.77                   | 60.41           | 74.00          | -13.59      | peak   |
| 4   | 7320.000        | 54.92          | -5.77                   | 49.15           | 54.00          | -4.85       | AVG    |
| 5   | 9760.000        | 52.36          | -1.45                   | 50.91           | 74.00          | -23.09      | peak   |



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Mode: a; Polarization: Horizontal; Modulation: GFSK; Channel: High

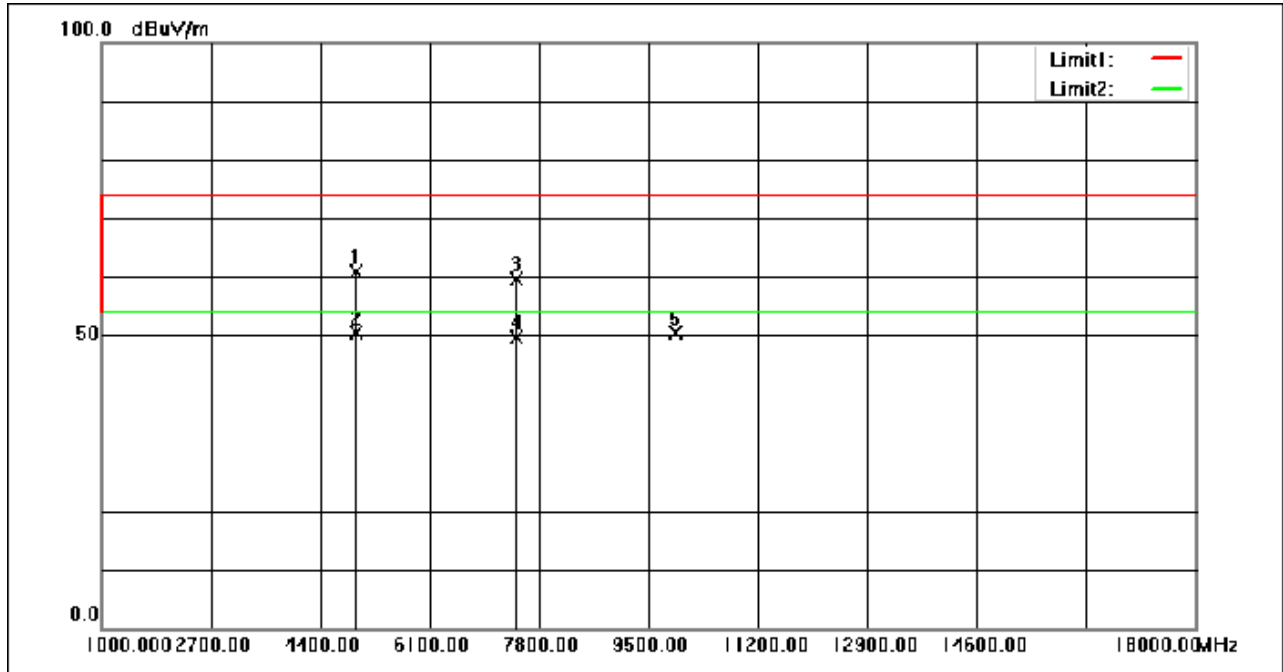


| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|-----------------|----------------|-------------------------|-----------------|----------------|-------------|--------|
| 1   | 4960.000        | 70.28          | -8.32                   | 61.96           | 74.00          | -12.04      | peak   |
| 2   | 4960.000        | 59.07          | -8.32                   | 50.75           | 54.00          | -3.25       | AVG    |
| 3   | 7440.000        | 66.85          | -5.63                   | 61.22           | 74.00          | -12.78      | peak   |
| 4   | 7440.000        | 55.90          | -5.63                   | 50.27           | 54.00          | -3.73       | AVG    |
| 5   | 9920.000        | 51.65          | -0.94                   | 50.71           | 74.00          | -23.29      | peak   |



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Mode: a; Polarization: Vertical; Modulation: GFSK; Channel: High



| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|-----------------|----------------|-------------------------|-----------------|----------------|-------------|--------|
| 1   | 4960.000        | 69.17          | -8.32                   | 60.85           | 74.00          | -13.15      | peak   |
| 2   | 4960.000        | 58.60          | -8.32                   | 50.28           | 54.00          | -3.72       | AVG    |
| 3   | 7440.000        | 65.30          | -5.63                   | 59.67           | 74.00          | -14.33      | peak   |
| 4   | 7440.000        | 55.18          | -5.63                   | 49.55           | 54.00          | -4.45       | AVG    |
| 5   | 9920.000        | 51.29          | -0.94                   | 50.35           | 74.00          | -23.65      | peak   |



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## 8 Test Setup Photographs

Refer to the < Test Setup photos-FCC>.

## 9 EUT Constructional Details

Refer to the < External Photos > & < Internal Photos >.

- End of the Report -

