

# FCC Test Report

**Applicant** : SHENZHEN ELECTRON TECHNOLOGY CO.,LTD.

**Address** : Bld.2,Yingfeng Industrial Zone,Tantou  
Community, Songgang Street,Baoan,  
Shenzhen, China

**Product Name** : Wireless microphone

**Report Date** : Aug. 30, 2024



**Shenzhen Anbotech Compliance Laboratory Limited**

**Shenzhen Anbotech Compliance Laboratory Limited**

Address:1/F.,Building D,Sogood Science and Technology Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.  
Tel:(86) 0755-26066440 Fax:(86) 0755-26014772 Email:service@anbotech.com

Code:AB-RF-05-b



Hotline  
400-003-0500

www.anbotech.com.cn



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## TEST REPORT

Applicant : SHENZHEN ELECTRON TECHNOLOGY CO.,LTD.  
Manufacturer : SHENZHEN ELECTRON TECHNOLOGY CO.,LTD.  
Product Name : Wireless microphone  
Model No. : MM-15  
Trade Mark : N/A  
Rating(s) : Input: 5V=  
Battery Capacity: DC 3.7V, 1200mAh

Test Standard(s) : 47 CFR Part 15.236

Test Method(s) : ANSI C63.10: 2020

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the 47 CFR Part 15.236 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of receipt

Jun. 24, 2024

Date of Test

Jun. 24, 2024 to Aug. 30, 2024

Prepared By

Tu Tu Hong

(TuTu Hong)

Approved & Authorized Signer

Edward Pan

(Edward Pan)

**Shenzhen Anbotek Compliance Laboratory Limited**

Address: 1/F., Building D, Sogood Science and Technology Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.  
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Revision History

| Report Version | Description     | Issued Date   |
|----------------|-----------------|---------------|
| R00            | Original Issue. | Aug. 22, 2024 |
|                |                 |               |
|                |                 |               |



## 1. General Information

### 1.1. Client Information

|              |   |                                                                                         |
|--------------|---|-----------------------------------------------------------------------------------------|
| Applicant    | : | SHENZHEN ELECTRON TECHNOLOGY CO.,LTD.                                                   |
| Address      | : | Bld.2,Yingfeng Industrial Zone,Tantou Community, Songgang Street,Baoan, Shenzhen, China |
| Manufacturer | : | SHENZHEN ELECTRON TECHNOLOGY CO.,LTD.                                                   |
| Address      | : | Bld.2,Yingfeng Industrial Zone,Tantou Community, Songgang Street,Baoan, Shenzhen, China |

### 1.2. Description of Device (EUT)

|                   |   |                                                      |
|-------------------|---|------------------------------------------------------|
| Product Name      | : | Wireless microphone                                  |
| Model No.         | : | MM-15                                                |
| Trade Mark        | : | N/A                                                  |
| Test Power Supply | : | AC 120V, 60Hz for Adapter/ DC 3.7V Battery inside    |
| Test Sample No.   | : | 1-2-1(Engineering Sample), 1-2-2(Engineering Sample) |
| Adapter           | : | N/A                                                  |

#### RF Specification

|                     |   |                                           |
|---------------------|---|-------------------------------------------|
| Operation Frequency | : | Group A:658.256MHz<br>Group B: 662.256MHz |
| Number of Channel   | : | Group A: 1 Channel<br>Group B: 1 Channel  |
| Modulation Type     | : | DQPSK                                     |
| Antenna Type        | : | PCB Antenna                               |
| Antenna Gain(Peak)  | : | -2.97dBi                                  |

**Remark:** 1) All of the RF specification are provided by customer. 2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.  
3)The manufacturer declares that the bandwidth is 200kHz



1.3. Auxiliary Equipment Used During Test

| Title              | Manufacturer | Model No. | Serial No.      |
|--------------------|--------------|-----------|-----------------|
| Xiaomi 33W adapter | Xiaomi       | MDY-11-EX | SA62212LA04358J |

1.4. Description of Test Configuration

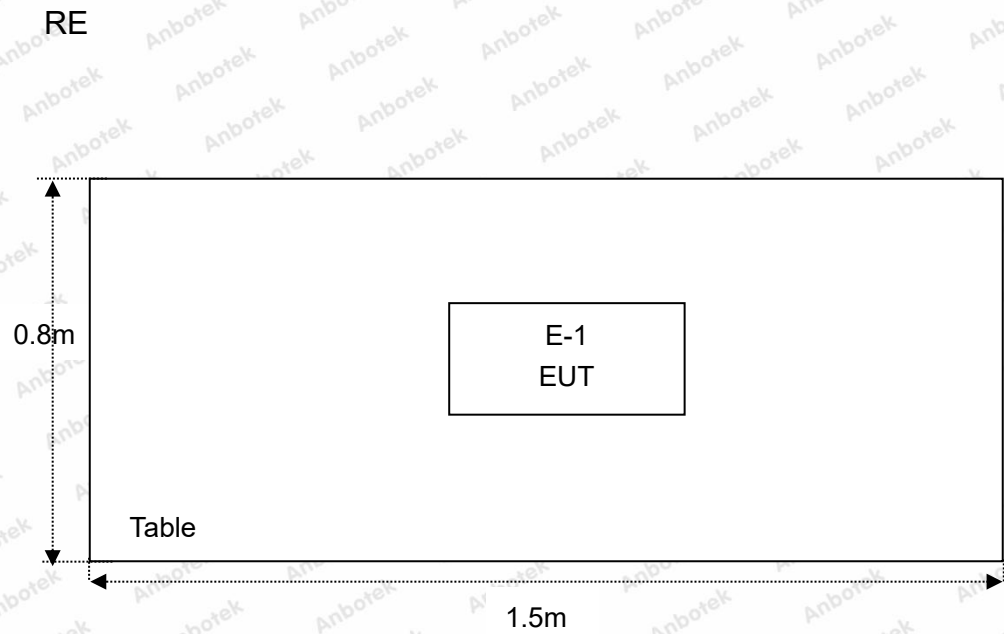
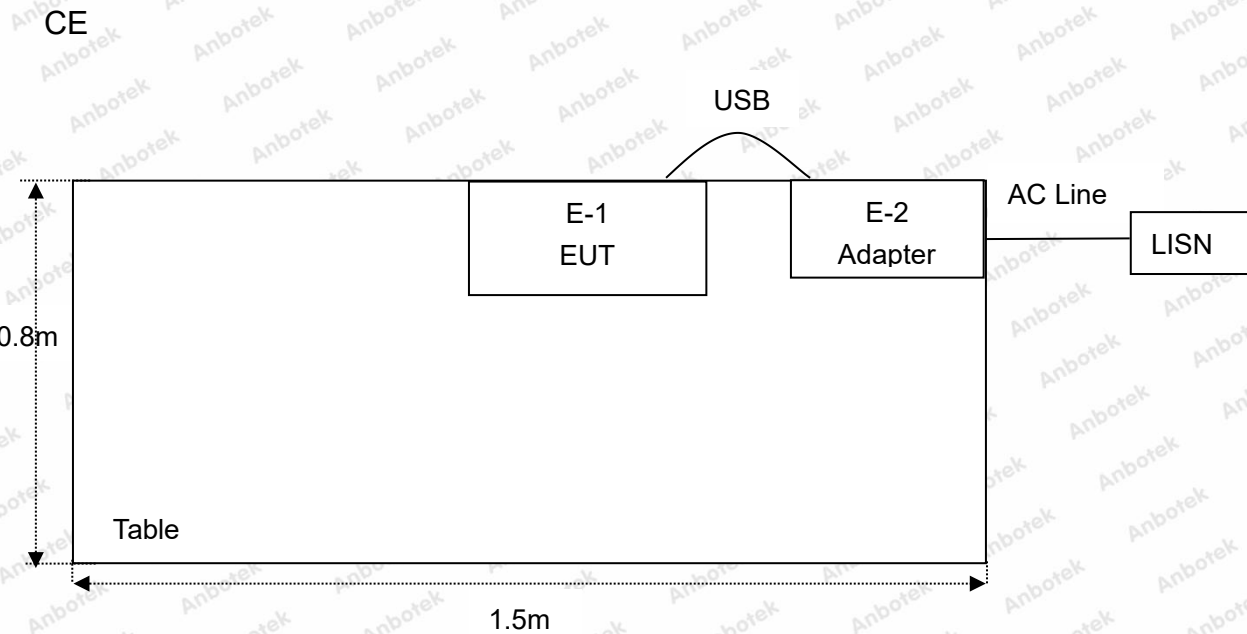
| Group A |                | Group B |                |
|---------|----------------|---------|----------------|
| Channel | Freq.<br>(MHz) | Channel | Freq.<br>(MHz) |
| 1       | 658.256        | 1       | 662.256        |

Note:

1. The engineering test program was provided and the EUT was programmed to be in continuously transmitting mode.



**1.5. Description Of Test Setup**



**1.6. Test Equipment List**

| Item | Equipment                                         | Manufacturer    | Model No.         | Serial No.   | Last Cal.     | Cal. Interval |
|------|---------------------------------------------------|-----------------|-------------------|--------------|---------------|---------------|
| 1.   | L.I.S.N.<br>Artificial Mains<br>Network           | Rohde & Schwarz | ENV216            | 100055       | Jan. 18, 2024 | 1 Year        |
| 2.   | Three Phase V-type<br>Artificial Power<br>Network | CYBERTEK        | EM5040DT          | E215040DT001 | Jan. 18, 2024 | 1 Year        |
| 3.   | EMI Test Receiver                                 | Rohde & Schwarz | ESCI              | 100627       | Oct. 12, 2023 | 1 Year        |
| 4.   | EMI Test Receiver                                 | Rohde & Schwarz | ESR26             | 101481       | Jan. 23, 2024 | 1 Year        |
| 5.   | MXA Spectrum<br>Analysis                          | Agilent         | N9020A            | MY51170037   | Oct. 12, 2023 | 1 Year        |
| 6.   | EMI Preamplifier                                  | SKET Electronic | LNPA-0118G<br>-45 | SKET-PA-002  | Jan. 17, 2024 | 1 Year        |
| 7.   | Double Ridged Horn<br>Antenna                     | SCHWARZBECK     | BBHA<br>9120D     | 02555        | Oct. 16, 2022 | 3 Year        |
| 8.   | Bilog Broadband<br>Antenna                        | Schwarzbeck     | VULB9163          | 345          | Oct. 23, 2022 | 3 Year        |
| 9.   | Loop Antenna                                      | Schwarzbeck     | FMZB1519B         | 00053        | Oct. 12, 2023 | 1 Year        |
| 10.  | Horn Antenna                                      | A-INFO          | LB-180400-<br>KF  | J211060628   | Oct. 12, 2023 | 1 Year        |
| 11.  | Pre-amplifier                                     | SONOMA          | 310N              | 186860       | Jan. 17, 2024 | 1 Year        |
| 12.  | EMI Test Software<br>EZ-EMC                       | SHURPLE         | N/A               | N/A          | N/A           | N/A           |
| 13.  | MXA Spectrum<br>Analysis                          | KEYSIGHT        | N9020A            | MY53280032   | Oct. 12, 2023 | 1 Year        |
| 14.  | MXG RF Vector<br>Signal Generator                 | Agilent         | N5182A            | MY48180656   | Oct. 12, 2023 | 1 Year        |
| 15.  | Signal Generator                                  | Agilent         | E4421B            | MY41000743   | Oct. 12, 2023 | 1 Year        |
| 16.  | DC Power Supply                                   | IVYTECH         | IV3605            | 1804D360510  | Oct. 20, 2023 | 1 Year        |
| 17.  | Constant<br>Temperature<br>Humidity Chamber       | ZHONGJIAN       | ZJ-KHWS80<br>B    | N/A          | Oct. 16, 2023 | 1 Year        |
| 18.  | Spectrum Analyzer                                 | Rohde & Schwarz | FSV40-N           | 102150       | May. 06, 2024 | 1 Year        |
| 19.  | Wideband Radio<br>Communication<br>Tester         | Rohde & Schwarz | CMW500            | 104209       | Oct. 12, 2023 | 1 Year        |



### 1.7. Measurement Uncertainty

| Parameter                                                                                                                                                                                                                       | Uncertainty                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| Conducted emissions (AMN 150kHz~30MHz)                                                                                                                                                                                          | 3.8dB                                                     |
| Occupied Bandwidth                                                                                                                                                                                                              | 925Hz                                                     |
| Conducted Output Power                                                                                                                                                                                                          | 0.76dB                                                    |
| Conducted Spurious Emission                                                                                                                                                                                                     | 1.24dB                                                    |
| Radiated spurious emissions (Below 30MHz)                                                                                                                                                                                       | 3.53dB                                                    |
| Radiated spurious emissions (30MHz~1GHz)                                                                                                                                                                                        | Horizontal: 3.92dB; Vertical: 4.52dB                      |
| Radiated spurious emissions (above 1GHz)                                                                                                                                                                                        | 1G-6GHz: 4.78dB;<br>6G-18GHz: 4.88dB<br>18G-40GHz: 5.68dB |
| Frequency tolerance                                                                                                                                                                                                             | 74.60Hz                                                   |
| The measurement uncertainty and decision risk evaluated according to AB/WI-RF-F-032.<br>This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2. |                                                           |

### 1.8. Description of Test Facility

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

#### FCC-Registration No.: 434132

Shenzhen Anbotech Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 434132.

#### ISED-Registration No.: 8058A

Shenzhen Anbotech Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A.

#### Test Location

Shenzhen Anbotech Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.



**1.9. Disclaimer**

1. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
2. The test report is invalid if there is any evidence and/or falsification.
3. The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
4. This document may not be altered or revised in any way unless done so by Anbotek and all revisions are duly noted in the revisions section.
5. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
6. The authenticity of the information provided by the customer is the responsibility of the customer and the laboratory is not responsible for its authenticity.

The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.



2. Summary of Test Results

| Standard Section                                     | Test Item                           | Result |
|------------------------------------------------------|-------------------------------------|--------|
| 15.207                                               | Conducted Emission                  | PASS   |
| 15.236(d)                                            | RF Output Power                     | PASS   |
| 15.236(f)(3)                                         | Frequency Stability                 | PASS   |
| 15.236(f)(g)                                         | Operating Bandwidth & Emission Mask | PASS   |
| 15.236(g)                                            | Radiated Spurious Emissions         | PASS   |
| Remark: "N/A" is an abbreviation for Not Applicable. |                                     |        |

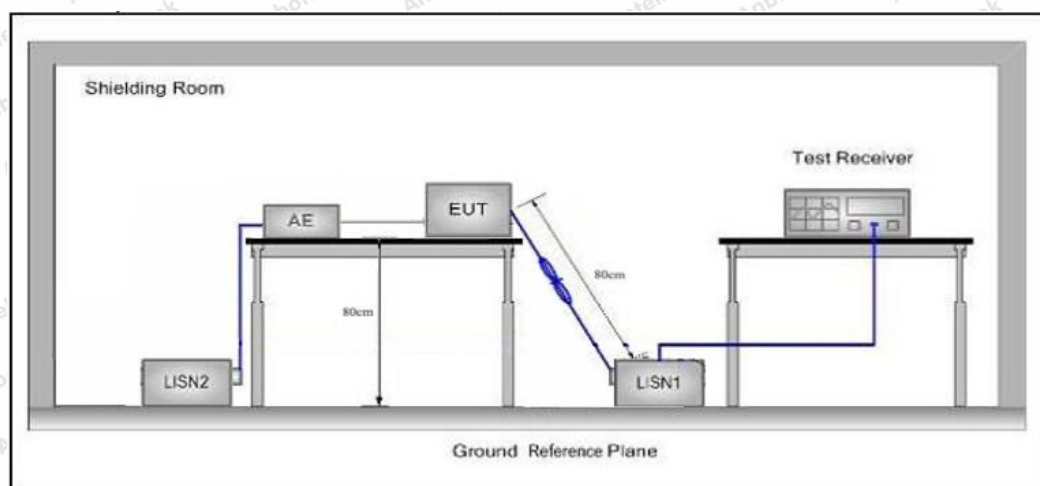


### 3. Conducted Emission Test

#### 3.1. Test Standard and Limit

| Test Standard                                                                                                                            | FCC Part15 Section 15.207 |                                |               |
|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------------------------|---------------|
| Test Limit                                                                                                                               | Frequency                 | Maximum RF Line Voltage (dBuV) |               |
|                                                                                                                                          |                           | Quasi-peak Level               | Average Level |
|                                                                                                                                          | 150kHz~500kHz             | 66 ~ 56 *                      | 56 ~ 46 *     |
|                                                                                                                                          | 500kHz~5MHz               | 56                             | 46            |
|                                                                                                                                          | 5MHz~30MHz                | 60                             | 50            |
| <b>Remark:</b> (1) *Decreasing linearly with logarithm of the frequency.<br>(2) The lower limit shall apply at the transition frequency. |                           |                                |               |

#### 3.2. Test Setup



#### 3.3. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10: 2020 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

#### 3.4. Test Data

##### PASS

During the test, pre-scan all modes, only the worst case is recorded in the report.

AC conducted emission pre-test at both at AC 120V/60Hz and AC 240V/60Hz modes, recorded worst case AC 120V/60Hz.

Please to see the following pages.



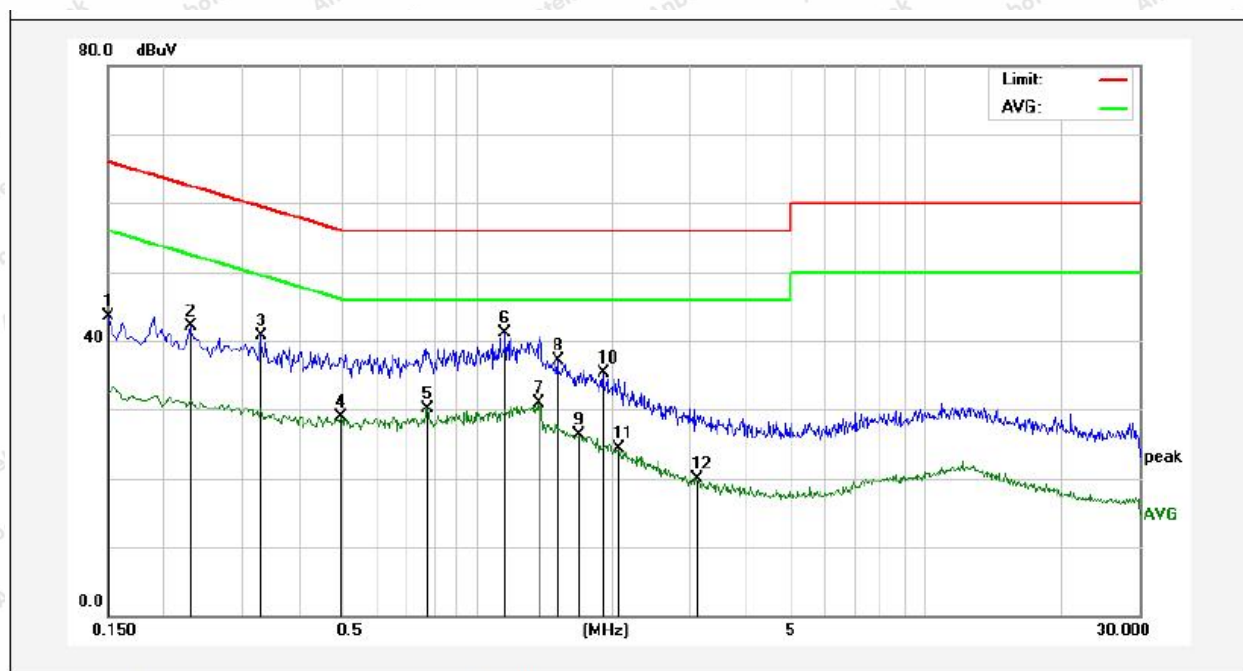
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**Conducted Emission Test Data**

Test Site: 1# Shielded Room  
Operating Condition: 658.256MHz  
Test Specification: AC 120V, 60Hz for Adapter  
Comment: Live Line  
Temp.(°C)/Hum.(%RH): 23.9°C/45%RH



| No. | Freq. (MHz) | Reading (dBuV) | Factor (dB) | Result (dBuV) | Limit (dBuV) | Over Limit (dB) | Detector | Remark |
|-----|-------------|----------------|-------------|---------------|--------------|-----------------|----------|--------|
| 1   | 0.1500      | 25.75          | 17.82       | 43.57         | 65.99        | -22.42          | QP       |        |
| 2   | 0.2300      | 24.23          | 17.82       | 42.05         | 62.45        | -20.40          | QP       |        |
| 3   | 0.3300      | 22.80          | 17.83       | 40.63         | 59.45        | -18.82          | QP       |        |
| 4   | 0.4980      | 11.03          | 17.86       | 28.89         | 46.03        | -17.14          | AVG      |        |
| 5   | 0.7780      | 12.31          | 17.87       | 30.18         | 46.00        | -15.82          | AVG      |        |
| 6   | 1.1580      | 23.26          | 17.86       | 41.12         | 56.00        | -14.88          | QP       |        |
| 7   | 1.3740      | 13.07          | 17.86       | 30.93         | 46.00        | -15.07          | AVG      |        |
| 8   | 1.5180      | 19.33          | 17.85       | 37.18         | 56.00        | -18.82          | QP       |        |
| 9   | 1.6820      | 8.55           | 17.85       | 26.40         | 46.00        | -19.60          | AVG      |        |
| 10  | 1.9100      | 17.50          | 17.85       | 35.35         | 56.00        | -20.65          | QP       |        |
| 11  | 2.0660      | 6.43           | 17.85       | 24.28         | 46.00        | -21.72          | AVG      |        |
| 12  | 3.0780      | 2.11           | 17.85       | 19.96         | 46.00        | -26.04          | AVG      |        |

Note: Result = Reading + Factor      Over Limit = Result - Limit



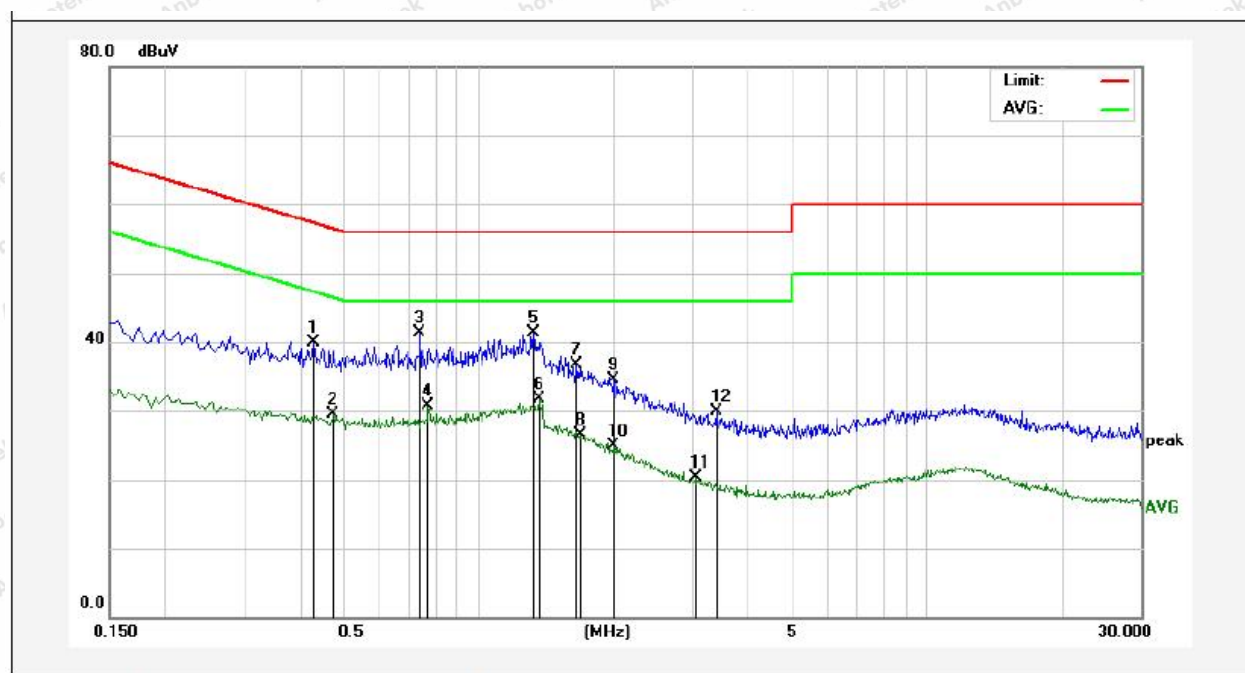
Report No.: 182512C400299101

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**Conducted Emission Test Data**

Test Site: 1# Shielded Room  
Operating Condition: 658.256MHz  
Test Specification: AC 120V, 60Hz for Adapter  
Comment: Neutral Line  
Temp.(°C)/Hum.(%RH): 23.9°C/45%RH



| No. | Freq. (MHz) | Reading (dBuV) | Factor (dB) | Result (dBuV) | Limit (dBuV) | Over Limit (dB) | Detector | Remark |
|-----|-------------|----------------|-------------|---------------|--------------|-----------------|----------|--------|
| 1   | 0.4300      | 22.18          | 17.82       | 40.00         | 57.25        | -17.25          | QP       |        |
| 2   | 0.4740      | 11.58          | 17.85       | 29.43         | 46.44        | -17.01          | AVG      |        |
| 3   | 0.7420      | 23.36          | 17.87       | 41.23         | 56.00        | -14.77          | QP       |        |
| 4   | 0.7740      | 12.78          | 17.87       | 30.65         | 46.00        | -15.35          | AVG      |        |
| 5   | 1.3260      | 23.41          | 17.86       | 41.27         | 56.00        | -14.73          | QP       |        |
| 6   | 1.3619      | 13.93          | 17.86       | 31.79         | 46.00        | -14.21          | AVG      |        |
| 7   | 1.6620      | 18.86          | 17.85       | 36.71         | 56.00        | -19.29          | QP       |        |
| 8   | 1.6820      | 8.60           | 17.85       | 26.45         | 46.00        | -19.55          | AVG      |        |
| 9   | 2.0059      | 16.64          | 17.85       | 34.49         | 56.00        | -21.51          | QP       |        |
| 10  | 2.0059      | 7.15           | 17.85       | 25.00         | 46.00        | -21.00          | AVG      |        |
| 11  | 3.0420      | 2.38           | 17.85       | 20.23         | 46.00        | -25.77          | AVG      |        |
| 12  | 3.3900      | 12.03          | 17.85       | 29.88         | 56.00        | -26.12          | QP       |        |

Note: Result = Reading + Factor    Over Limit = Result - Limit

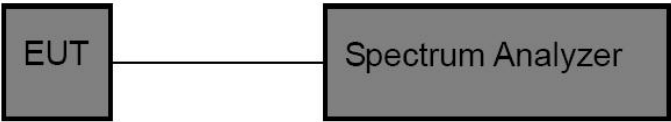


4. RF Output Power Test

4.1. Test Standard and Limit

|               |                                                                                                                                                                                                |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Standard | FCC Part15 Subpart C, §15.236(d)                                                                                                                                                               |
| Test Limit    | In the bands allocated and assigned for broadcast television and in the 600 MHz service band: 50 mW (17dBm) EIRP.<br>In the 600 MHz guard band and the 600 MHz duplex gap: 20 mW (13dBm) EIRP. |

4.2. Test Setup



4.3. Test Procedure

1. The EUT was connected to a spectrum analyzer for the output power test.
2. The output power was set to 20 mW.
3. The output power was measured at the low, middle, and high frequencies of the passband.
4. The cable loss from the EUT output to the spectrum analyzer input were input to the spectrum analyzer as correction factor before recording the output power.
5. RBW = 300 kHz, VBW = 1 MHz, Detector = Peak



4.4. Test Data

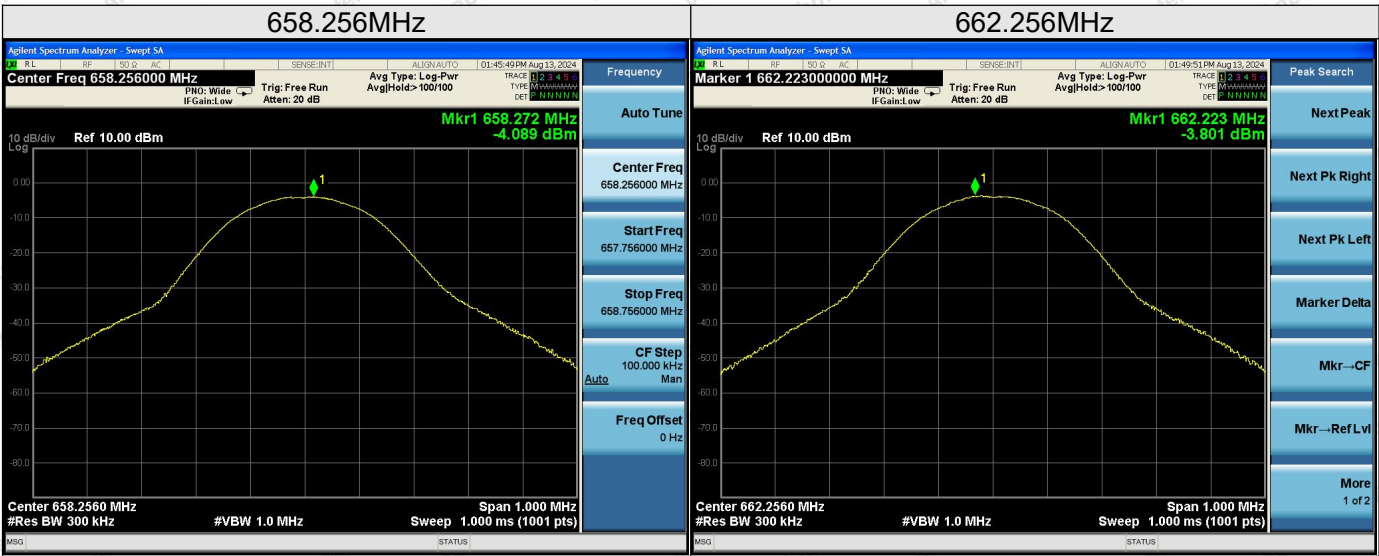
|              |   |                        |             |   |       |
|--------------|---|------------------------|-------------|---|-------|
| Test Voltage | : | DC 3.7V Battery inside | Temperature | : | 23.6℃ |
| Test Result  | : | PASS                   | Humidity    | : | 53 %  |

| Group A      |                         |            |                  |         |
|--------------|-------------------------|------------|------------------|---------|
| Test Channel | Peak Power output (dBm) | EIRP (dBm) | EIRP Limit (dBm) | Results |
| 658.256      | -4.089                  | -6.589     | 13               | PASS    |

Note: EIRP=Peak Power+ Antenna gain (dBi)

| Group B         |                         |            |                  |         |
|-----------------|-------------------------|------------|------------------|---------|
| Frequency (MHz) | Peak Power output (dBm) | EIRP (dBm) | EIRP Limit (dBm) | Results |
| 662.256         | -3.801                  | -6.301     | 13               | PASS    |

Note: EIRP=Peak Power+ Antenna gain (dBi)

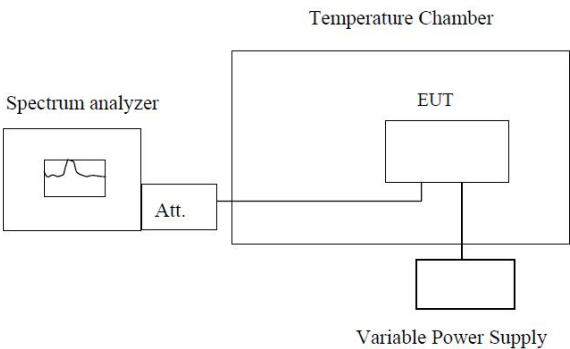


## 5. Frequency Stability Test

### 5.1. Test Standard and Limit

|               |                                                                          |
|---------------|--------------------------------------------------------------------------|
| Test Standard | FCC Part15 Subpart C, 15.236(f)(3)                                       |
| Test Limit    | The frequency tolerance of the transmitter shall be $\pm 0.005$ percent. |

### 5.2. Test Setup



**Note :** Measurement setup for testing on Antenna connector

### 5.3. Test Procedure

1. The EUT was placed in an environmental test chamber and the RF output was connected to a spectrum analyzer.
2. The temperature was varied from -20°C to 50°C in 10°C increments. After a sufficient time for temperature stabilization the RF output frequency was measured.
3. At 20°C the power supply voltage to the EUT was varied from 85% to 115% of the nominal value and the RF output was measured.

### 5.4. Test Data

|              |   |                        |             |   |        |
|--------------|---|------------------------|-------------|---|--------|
| Test Voltage | : | DC 3.7V Battery inside | Temperature | : | 23.6°C |
| Test Result  | : | PASS                   | Humidity    | : | 53 %   |



| Group A                       |                          |                             |                |                      |
|-------------------------------|--------------------------|-----------------------------|----------------|----------------------|
| Carrier Frequency: 658.256MHz |                          |                             |                |                      |
| Temperature<br>(°C)           | Power Supplied<br>( VDC) | Measured frequency<br>(MHz) | Error<br>(ppm) | Limit<br>(ppm)<br>50 |
| -30                           | 3.7                      | 658.262962                  | 10.58          | 50                   |
| -20                           |                          | 658.262443                  | 9.79           | 50                   |
| -10                           |                          | 658.262112                  | 9.29           | 50                   |
| 0                             |                          | 658.262986                  | 10.61          | 50                   |
| 10                            |                          | 658.262632                  | 10.07          | 50                   |
| 20                            |                          | 658.261546                  | 8.43           | 50                   |
| 30                            |                          | 658.261404                  | 8.21           | 50                   |
| 40                            |                          | 658.261853                  | 8.89           | 50                   |
| 50                            |                          | 658.261522                  | 8.39           | 50                   |
| 20                            | 3.3                      | 658.260366                  | 6.63           | 50                   |
| 20                            | 4.1                      | 658.262679                  | 10.15          | 50                   |

| Group B                       |                          |                             |                |                      |
|-------------------------------|--------------------------|-----------------------------|----------------|----------------------|
| Carrier Frequency: 662.256MHz |                          |                             |                |                      |
| Temperature<br>(°C)           | Power Supplied<br>( VDC) | Measured frequency<br>(MHz) | Error<br>(ppm) | Limit<br>(ppm)<br>50 |
| -30                           | 3.7                      | 662.262992                  | 10.56          | 50                   |
| -20                           |                          | 662.262470                  | 9.77           | 50                   |
| -10                           |                          | 662.262138                  | 9.27           | 50                   |
| 0                             |                          | 662.263015                  | 10.59          | 50                   |
| 10                            |                          | 662.262660                  | 10.06          | 50                   |
| 20                            |                          | 662.261570                  | 8.41           | 50                   |
| 30                            |                          | 662.261427                  | 8.20           | 50                   |
| 40                            |                          | 662.261878                  | 8.88           | 50                   |
| 50                            |                          | 662.261546                  | 8.37           | 50                   |
| 20                            | 3.3                      | 662.260385                  | 6.62           | 50                   |
| 20                            | 4.1                      | 662.262707                  | 10.13          | 50                   |

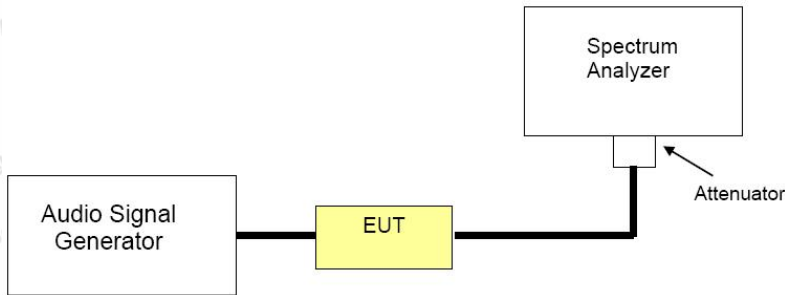


**6. Operating Bandwidth & Emission Mask Test**

**6.1. Test Standard and Limit**

|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Standard | FCC Part15 Subpart C, §15.236 (f)(g)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Test Limit    | The operating bandwidth shall not exceed 200 kHz.<br>Emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in § 8.3 of ETSI EN 300 422-1 V1.4.2 (2011-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement. Emissions outside of this band shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1 V1.4.2 (2011-08). |

**6.2. Test Setup**



**6.3. Test Procedure**

The OBW is according to ANSI C63.10: 2020

The Emission Mask is according to section 8.3 of ETSI EN 300 422-1 V1.4.2 (2011-08).

**6.4. Test Data**

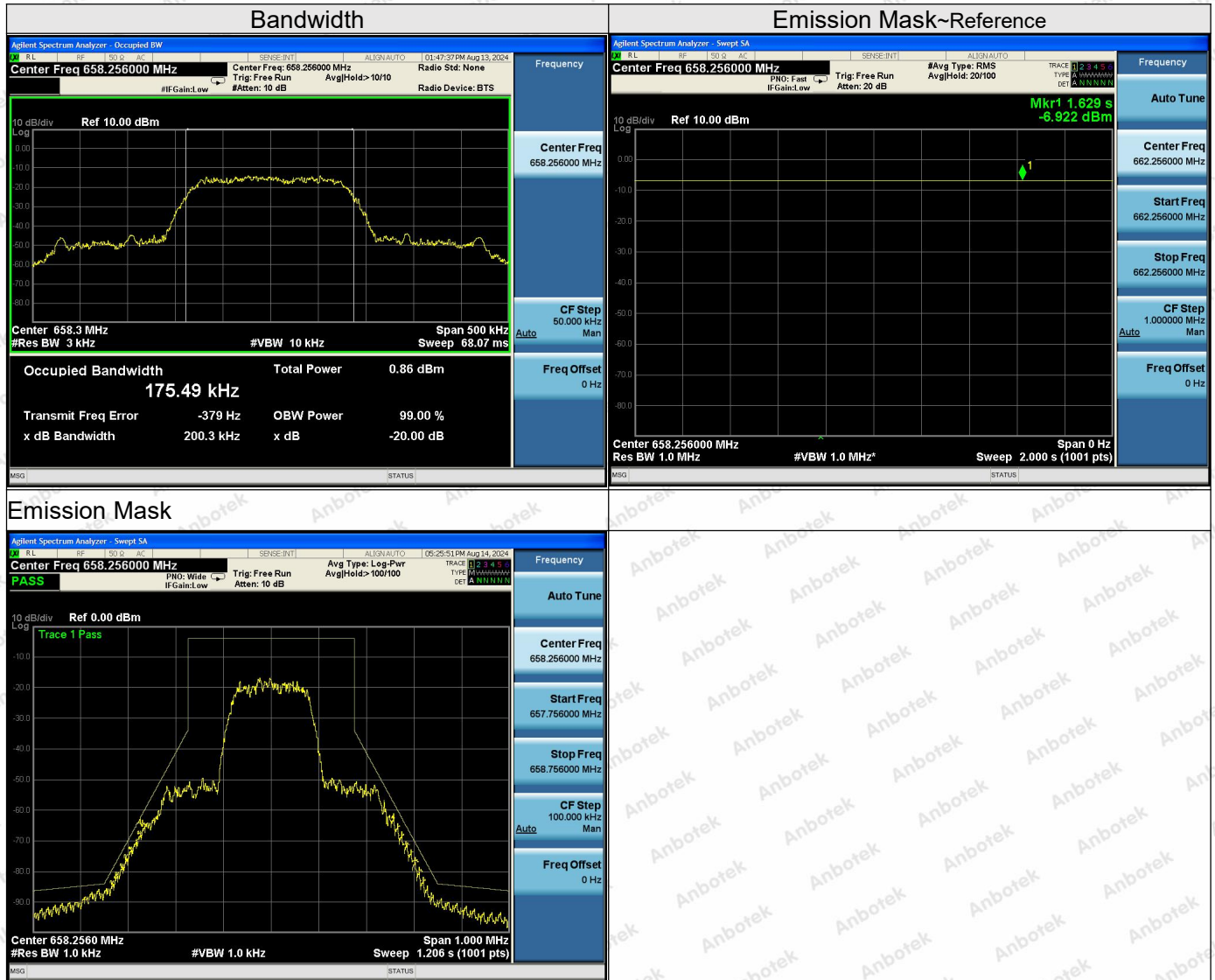
|              |   |                        |             |   |       |
|--------------|---|------------------------|-------------|---|-------|
| Test Voltage | : | DC 3.7V Battery inside | Temperature | : | 23.6℃ |
| Test Result  | : | PASS                   | Humidity    | : | 53 %  |

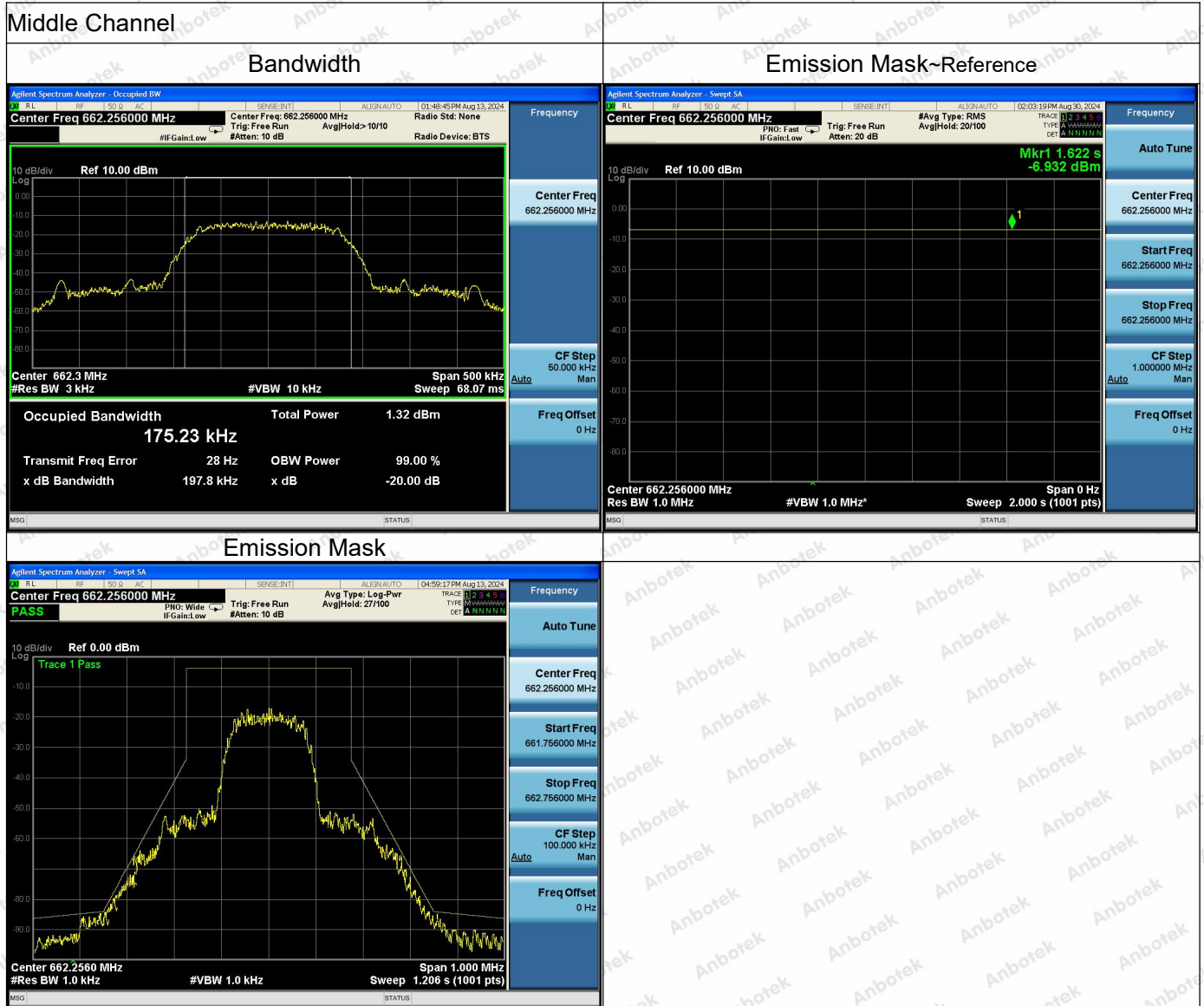
| Group A      |                 |             |             |
|--------------|-----------------|-------------|-------------|
| Test Channel | Bandwidth (kHz) | Limit (kHz) | Test Result |
| 658.256      | 175.49          | 200         | Pass        |

| Group B      |                 |             |             |
|--------------|-----------------|-------------|-------------|
| Test Channel | Bandwidth (kHz) | Limit (kHz) | Test Result |
| 662.256      | 175.23          | 200         | Pass        |



## Low Channel





## 7. Radiation Spurious Emission Test

### 7.1. Test Standard and Limit

|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Standard | FCC Part15 Subpart C, §15.236(g)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Test Limit    | <p>The operating bandwidth shall not exceed 200 kHz.</p> <p>Emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in § 8.3 of ETSI EN 300 422-1 V1.4.2 (2011-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement. Emissions outside of this band shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1 V1.4.2 (2011-08).</p> |

### 7.2. Test Setup

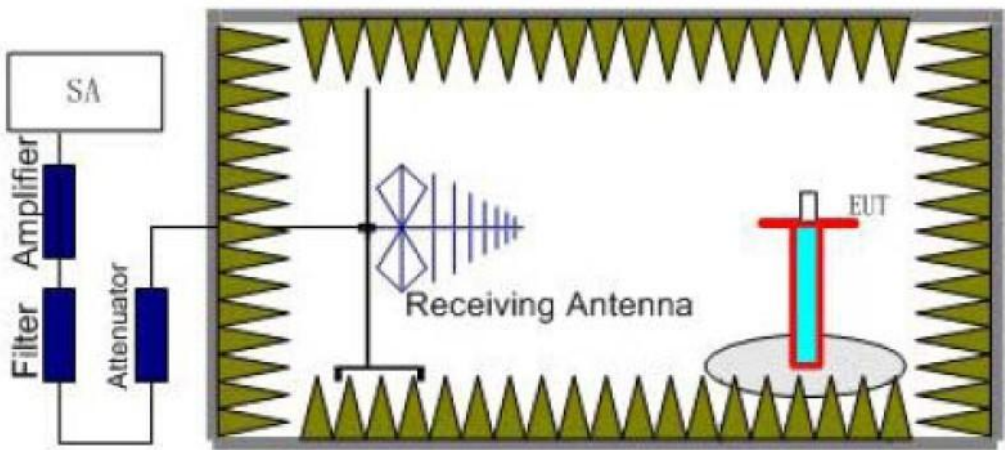


Figure 1

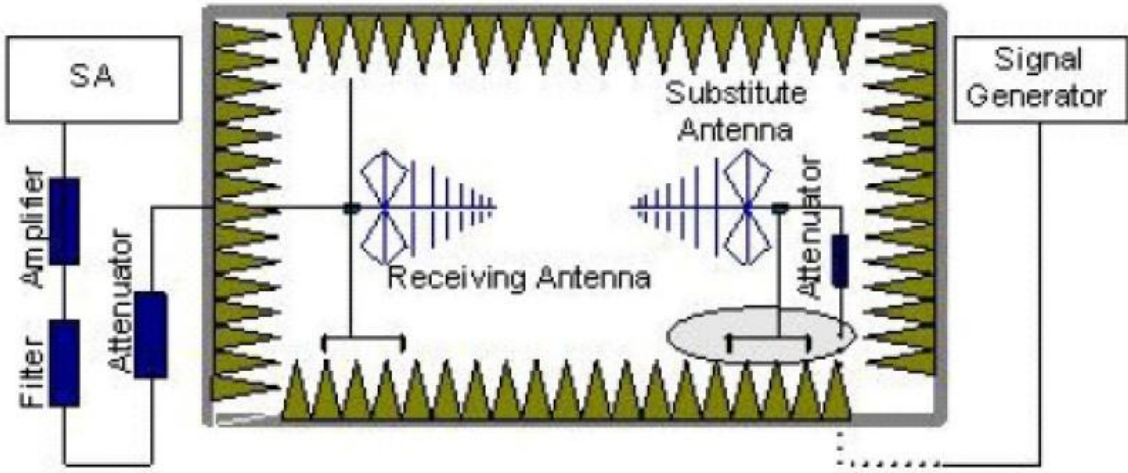


Figure 2



### 7.3. Test Procedure

1. EUT was placed on a 0.8 meter for below 1GHz and 1.5 meter for above 1GHz high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.0m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz for above 1GHz and RBW=100kHz, VBW=300kHz for 30MHz to 1GHz, And the maximum value of the receiver should be recorded as (Pr).
4. The EUT shall be replaced by a substitution antenna. In the chamber, a substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl), the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
6. The measurement results are obtained as described below:
7.  $\text{Power(EIRP)} = \text{PMea} - \text{PAg} - \text{Pcl} + \text{Ga}$
8. We used SMF100A microwave signal generator which signal level can up to 33dBm, so we not used power Amplifier for substitution test; The measurement results are amend as described below:
9.  $\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$
10. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
11. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $\text{ERP} = \text{EIRP} - 2.15\text{dBi}$ .

### 7.4. Test Data

#### PASS

The test data are shown in the following pages.



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## Test Results:

Test Site: 2# Shielded Room  
Operating Condition: 662.256MHz  
Test Specification: DC 3.7V Battery inside  
Polarization: Horizontal  
Temp.(°C)/Hum.(%RH): 23.5°C/50%RH

Fundamental signal



| No. | Freq. (MHz) | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Over Limit (dB) | Detector | Height (cm) | degree (deg) | Remark |
|-----|-------------|---------------|-------------|--------------|-------------|-----------------|----------|-------------|--------------|--------|
| 1   | 480.5276    | -63.64        | -3.64       | -67.28       | -54.00      | -13.28          | QP       |             |              |        |
| 2   | 513.6331    | -64.75        | -2.83       | -67.58       | -54.00      | -13.58          | QP       |             |              |        |
| 3   | 586.8437    | -69.84        | 0.76        | -69.08       | -54.00      | -15.08          | QP       |             |              |        |
| 4   | 662.2560    | -9.30         | 0.55        | -8.75        | /           | /               | peak     |             |              |        |
| 5   | 818.8341    | -73.59        | 2.30        | -71.29       | -54.00      | -17.29          | QP       |             |              |        |
| 6   | 851.0353    | -73.92        | 2.62        | -71.30       | -54.00      | -17.30          | QP       |             |              |        |

Note: Result = Reading + Factor      Over Limit = Result - Limit



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Test Site: 2# Shielded Room

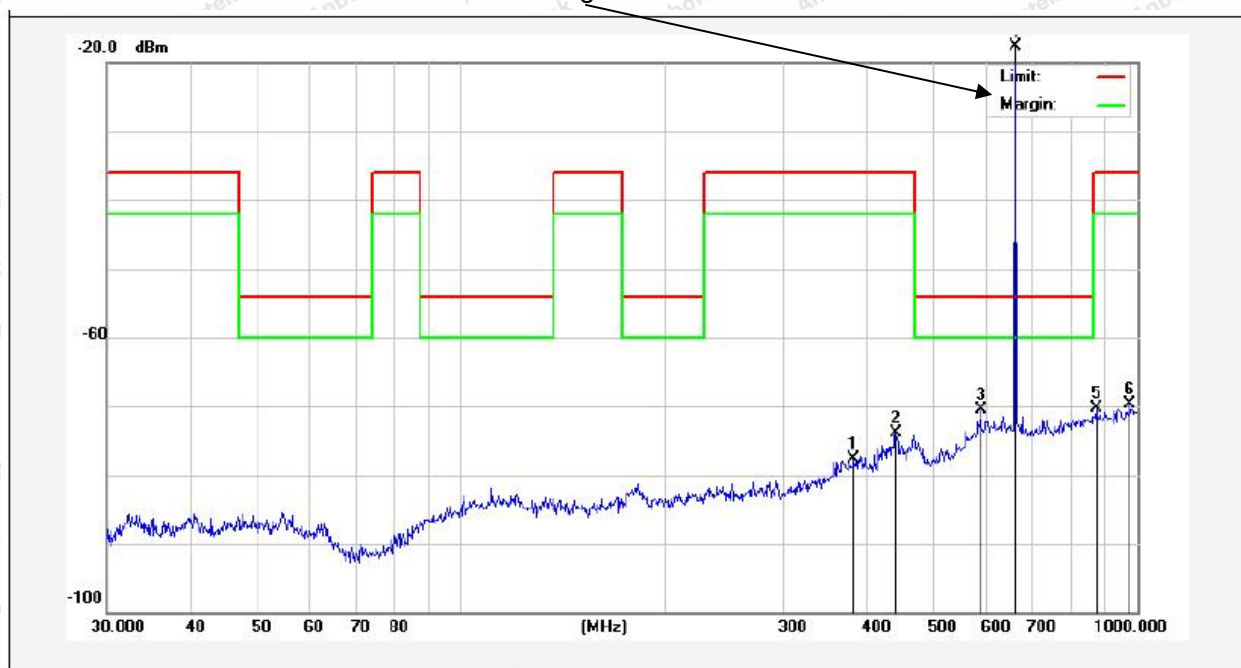
Operating Condition: 662.256MHz

Test Specification: DC 3.7V

Polarization Vertical

Temp.(°C)/Hum.(%RH): 23.5°C/50%RH

Fundamental signal



| No. | Freq. (MHz) | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Over Limit (dB) | Detector | Height (cm) | degree (deg) | Remark |
|-----|-------------|---------------|-------------|--------------|-------------|-----------------|----------|-------------|--------------|--------|
| 1   | 381.2485    | -72.80        | -4.83       | -77.63       | -36.00      | -41.63          | QP       |             |              |        |
| 2   | 440.1963    | -69.92        | -4.06       | -73.98       | -36.00      | -37.98          | QP       |             |              |        |
| 3   | 586.8437    | -71.29        | 0.76        | -70.53       | -54.00      | -16.53          | QP       |             |              |        |
| 4   | 662.2560    | -18.03        | 0.55        | -17.48       | /           | /               | peak     |             |              |        |
| 5   | 869.1301    | -72.94        | 2.60        | -70.34       | -36.00      | -34.34          | QP       |             |              |        |
| 6   | 975.7528    | -73.30        | 3.69        | -69.61       | -36.00      | -33.61          | QP       |             |              |        |

Note: Result = Reading + Factor      Over Limit = Result - Limit



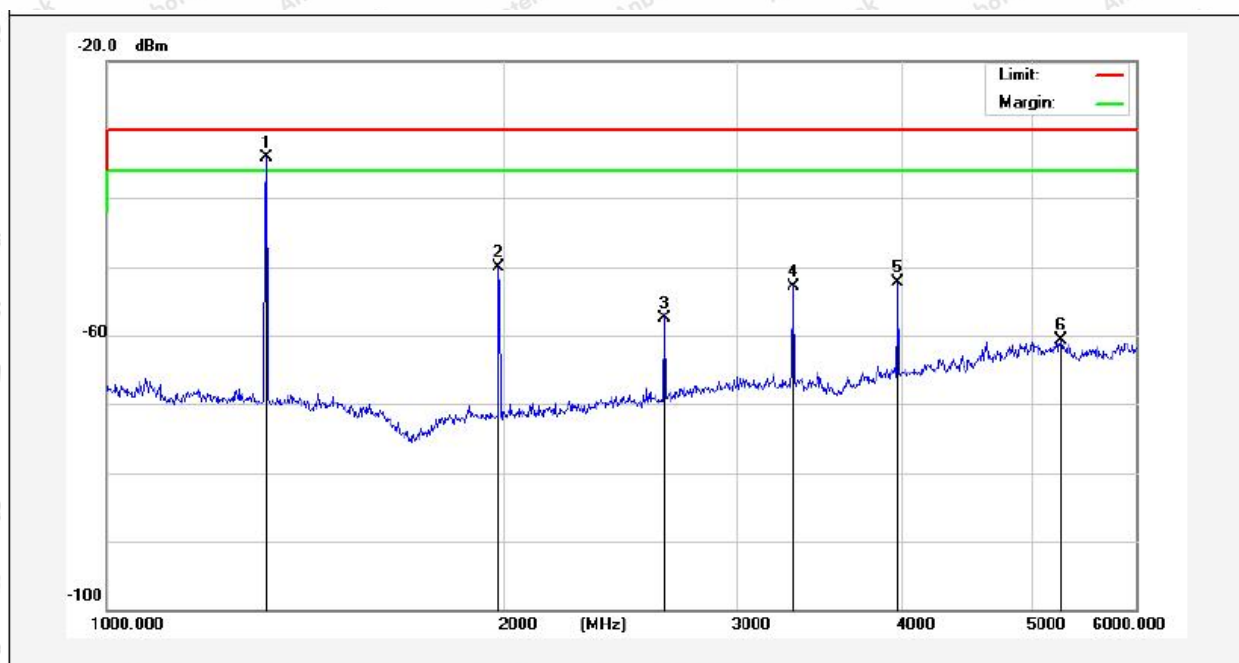
Report No.: 182512C400299101

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**Above 1GHz:**

Test Site: 2# Shielded Room  
Operating Condition: 658.256MHz  
Test Specification: DC 3.7V Battery inside  
Polarization: Horizontal  
Temp.(°C)/Hum.(%RH): 23.5°C/50%RH



| No. | Freq. (MHz) | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Over Limit (dB) | Detector | Height (cm) | degree (deg) | Remark |
|-----|-------------|---------------|-------------|--------------|-------------|-----------------|----------|-------------|--------------|--------|
| 1   | 1320.120    | -13.20        | -20.92      | -34.12       | -30.00      | -4.12           | peak     |             |              |        |
| 2   | 1979.136    | -27.46        | -22.71      | -50.17       | -30.00      | -20.17          | peak     |             |              |        |
| 3   | 2640.937    | -37.07        | -20.33      | -57.40       | -30.00      | -27.40          | peak     |             |              |        |
| 4   | 3303.900    | -34.88        | -17.92      | -52.80       | -30.00      | -22.80          | peak     |             |              |        |
| 5   | 3966.416    | -36.46        | -15.83      | -52.29       | -30.00      | -22.29          | peak     |             |              |        |
| 6   | 5264.368    | -50.19        | -10.52      | -60.71       | -30.00      | -30.71          | peak     |             |              |        |

Note: Result = Reading + Factor      Over Limit = Result - Limit



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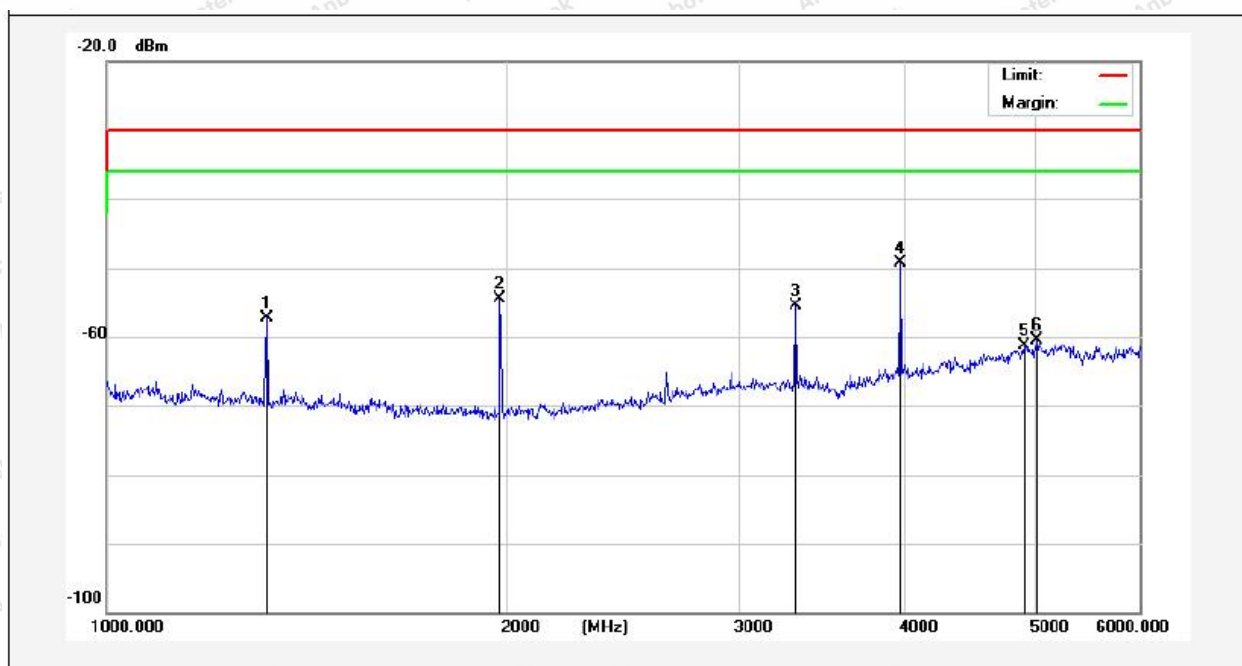
Test Site: 2# Shielded Room

Operating Condition: 658.256MHz

Test Specification: DC 3.7V

Polarization Vertical

Temp.(°C)/Hum.(%RH): 23.5°C/50%RH



| No. | Freq. (MHz) | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Over Limit (dB) | Detector | Height (cm) | degree (deg) | Remark |
|-----|-------------|---------------|-------------|--------------|-------------|-----------------|----------|-------------|--------------|--------|
| 1   | 1320.120    | -36.30        | -20.92      | -57.22       | -30.00      | -27.22          | peak     |             |              |        |
| 2   | 1979.136    | -31.70        | -22.71      | -54.41       | -30.00      | -24.41          | peak     |             |              |        |
| 3   | 3303.900    | -37.49        | -17.92      | -55.41       | -30.00      | -25.41          | peak     |             |              |        |
| 4   | 3966.416    | -33.50        | -15.83      | -49.33       | -30.00      | -19.33          | peak     |             |              |        |
| 5   | 4909.060    | -50.29        | -10.94      | -61.23       | -30.00      | -31.23          | peak     |             |              |        |
| 6   | 5024.748    | -50.23        | -10.34      | -60.57       | -30.00      | -30.57          | peak     |             |              |        |

Note: Result = Reading + Factor      Over Limit = Result - Limit



## **APPENDIX I -- TEST SETUP PHOTOGRAPH**

Please refer to separated files Appendix I -- Test Setup Photograph\_RF

## **APPENDIX II -- EXTERNAL PHOTOGRAPH**

Please refer to separated files Appendix II -- External Photograph

## **APPENDIX III -- INTERNAL PHOTOGRAPH**

Please refer to separated files Appendix III -- Internal Photograph

----- End of Report -----

