

# TEST REPORT

**Reference No.** ..... : WTS14S0918283E  
**FCC ID**..... : 2AC9QMLNHB  
**Applicant**..... : Axio Inc  
**Address** ..... : Apt #104, 22 Navy St, Venice, CA State, United State America  
**Manufacturer** ..... : Edu-science (H.K.) Ltd.  
**Address** ..... : Suite 2001-05 Delta House, 3 On Yiu Street, Shatin, N.T., Hong Kong  
**Product Name** ..... : Melon Headband  
**Model No.** ..... : MLNHB  
**Standards**..... : FCC CFR47 Part 15 Section 15.247:2014  
**Date of Receipt sample**..... : Sep. 12, 2014  
**Date of Test**..... : Sep. 12, 2014 ~ Dec. 19, 2014  
**Date of Issue** ..... : Jan. 08, 2015  
**Test Result**..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

**Prepared By:**

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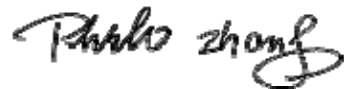
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Compiled by:



Zero Zhou / Project Engineer

Approved by:



Philo Zhong / Manager

## 2 Test Summary

| Test Items                                                        | Test Requirement                 | Result |
|-------------------------------------------------------------------|----------------------------------|--------|
| Radiated Emissions                                                | 15.247<br>15.205(a)<br>15.209(a) | PASS   |
| Conducted Emissions                                               | 15.207(a)                        | PASS   |
| 6dB Bandwidth                                                     | 15.247(a)(2)                     | PASS   |
| Maximum Peak Output Power                                         | 15.247(b)(3),(4)                 | PASS   |
| Power Spectral Density                                            | 15.247(e)                        | PASS   |
| Band Edge                                                         | 15.247(d)                        | PASS   |
| Antenna Requirement                                               | 15.203                           | PASS   |
| Maximum Permissible Exposure<br>(Exposure of Humans to RF Fields) | 1.1307(b)(1)                     | PASS   |

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## 4 General Information

### 4.1 General Description of E.U.T.

|                       |                                                              |
|-----------------------|--------------------------------------------------------------|
| Product Name          | : Melon Headband                                             |
| Model No.             | : MLNHB                                                      |
| Model Description     | : Only the color is different.                               |
| Operation Frequency   | : 2402MHz ~ 2480MHz, separated by 2MHz, 40 channels in total |
| The lowest oscillator | : 16MHz                                                      |
| Type of modulation    | : GFSK(BLE only)                                             |

### 4.2 Details of E.U.T.

|                |                                                   |
|----------------|---------------------------------------------------|
| Technical Data | :: Battery DC 3.7V 110mAh                         |
|                | DC 5V, 1.0A, charging by USB port or wall adaptor |

### 4.3 Channel List

| Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) |
|-------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|-----------------|
| 0           | 2402            | 1           | 2404            | 2           | 2406            | 3           | 2408            |
| 4           | 2410            | 5           | 2412            | 6           | 2414            | 7           | 2416            |
| 8           | 2418            | 9           | 2420            | 10          | 2422            | 11          | 2424            |
| 12          | 2426            | 13          | 2428            | 14          | 2430            | 15          | 2432            |
| 16          | 2434            | 17          | 2436            | 18          | 2438            | 19          | 2440            |
| 20          | 2442            | 21          | 2444            | 22          | 2446            | 23          | 2448            |
| 24          | 2450            | 25          | 2452            | 26          | 2454            | 27          | 2456            |
| 28          | 2458            | 29          | 2460            | 30          | 2462            | 31          | 2464            |
| 32          | 2466            | 33          | 2468            | 34          | 2470            | 35          | 2472            |
| 36          | 2474            | 37          | 2476            | 38          | 2478            | 39          | 2480            |

### 4.4 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Table 1 Tests Carried Out Under FCC part 15.247

| Test mode    | Low channel | Middle channel | High channel |
|--------------|-------------|----------------|--------------|
| Transmitting | 2402MHz     | 2440MHz        | 2480MHz      |

#### 4.5 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A-1**

Waltek Services(Shenzhen) Co., Ltd. Has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files.

Registration number 7760A-1, July 12, 2012.

- **FCC – Registration No.: 880581**

Waltek Services(Shenzhen) Co., Ltd. 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 880581, April 29, 2014.

## 5 Equipment Used during Test

### 5.1 Equipments List

| Conducted Emissions at Mains Terminals Disturbance Voltage |                                      |                      |               |                 |                       |                      |
|------------------------------------------------------------|--------------------------------------|----------------------|---------------|-----------------|-----------------------|----------------------|
| Item                                                       | Equipment                            | Manufacturer         | Model No.     | Serial No.      | Last Calibration Date | Calibration Due Date |
| 1.                                                         | EMI Test Receiver                    | R&S                  | ESCI          | 101155          | Sep.15,2014           | Sep.14,2015          |
| 2.                                                         | LISN                                 | SCHWARZBECK          | NSLK 8128     | 8128-289        | Sep.15,2014           | Sep.14,2015          |
| 3.                                                         | Limiter                              | York                 | MTS-IMP-136   | 261115-001-0024 | Sep.15,2014           | Sep.14,2015          |
| 4.                                                         | Cable                                | LARGE                | RF300         | -               | Sep.15,2014           | Sep.14,2015          |
| 3m Semi-anechoic Chamber for Radiation                     |                                      |                      |               |                 |                       |                      |
| Item                                                       | Equipment                            | Manufacturer         | Model No.     | Serial No.      | Last Calibration Date | Calibration Due Date |
| 1                                                          | EMC Analyzer                         | Agilent              | E7405A        | MY45114943      | Sep.15,2014           | Sep.14,2015          |
| 2                                                          | Active Loop Antenna                  | Beijing Dazhi        | ZN30900A      | -               | Sep.15,2014           | Sep.14,2015          |
| 3                                                          | Trilog Broadband Antenna             | SCHWARZBECK          | VULB9163      | 336             | Apr.19,2014           | Apr.18,2015          |
| 4                                                          | Coaxial Cable (below 1GHz)           | Top                  | TYPE16(13M)   | -               | Sep.15,2014           | Sep.14,2015          |
| 5                                                          | Broad-band Horn Antenna              | SCHWARZBECK          | BBHA 9120 D   | 667             | Apr.19,2014           | Apr.18,2015          |
| 6                                                          | Broad-band Horn Antenna              | SCHWARZBECK          | BBHA 9120 D   | 669             | Apr.19,2014           | Apr.18,2015          |
| 7                                                          | Broadband Preamplifier               | COMPLIANCE DIRECTION | PAP-1G18      | 2004            | Mar.17,2014           | Mar.16,2015          |
| 8                                                          | Coaxial Cable (above 1GHz)           | Top                  | 1000MHz-25GHz | EW02014-7       | Apr.10,2014           | Apr.09,2015          |
| 9                                                          | Broad-band Horn Antenna              | SCHWARZBECK          | BBHA 9170     | 335             | Sep.15,2014           | Sep.14,2015          |
| 10                                                         | Universal Radio Communication Tester | R&S                  | CMU 200       | 112461          | Apr.11,2014           | Apr.10,2015          |
| 11                                                         | Signal Generator                     | R&S                  | SMR20         | 100046          | Sep.15,2014           | Sep.14,2015          |
| RF Conducted Testing                                       |                                      |                      |               |                 |                       |                      |
| Item                                                       | Equipment                            | Manufacturer         | Model No.     | Serial No.      | Last Calibration Date | Calibration Due Date |
| 1.                                                         | EMC Analyzer (9k~26.5GHz)            | Agilent              | E7405A        | MY45114943      | Aug. 15,2014          | Aug.14,2015          |
| 2.                                                         | Spectrum Analyzer (9k-6GHz)          | R&S                  | FSL6          | 100959          | Aug. 15,2014          | Aug.14,2015          |
| 3.                                                         | Humidity Chamber                     | GF                   | GTH-225-40-1P | IAA061213       | Aug. 15,2014          | Aug.14,2015          |

## 5.2 Description of Support Units

| Equipment | Manufacturer | Model No. | Series No. |
|-----------|--------------|-----------|------------|
| Note book | Apple        | N/A       | N/A        |

## 5.3 Measurement Uncertainty

| Parameter                         | Uncertainty                           |
|-----------------------------------|---------------------------------------|
| Radio Frequency                   | $\pm 1 \times 10^{-6}$                |
| RF Power                          | $\pm 1.0$ dB                          |
| RF Power Density                  | $\pm 2.2$ dB                          |
| Radiated Spurious Emissions test  | $\pm 5.03$ dB (30M~1000MHz)           |
|                                   | $\pm 5.47$ dB (1000M~25000MHz)        |
| Conducted Spurious Emissions test | $\pm 3.64$ dB (AC mains 150KHz~30MHz) |

## 5.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

## 6 Conducted Emission

|                   |                                                                                                                        |
|-------------------|------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC CFR 47 Part 15 Section 15.207                                                                                      |
| Test Method:      | ANSI C63.4:2003                                                                                                        |
| Test Result:      | PASS                                                                                                                   |
| Frequency Range:  | 150kHz to 30MHz                                                                                                        |
| Class/Severity:   | Class B                                                                                                                |
| Limit:            | 66-56 dB $\mu$ V between 0.15MHz & 0.5MHz<br>56 dB $\mu$ V between 0.5MHz & 5MHz<br>60 dB $\mu$ V between 5MHz & 30MHz |
| Detector:         | Peak for pre-scan (9kHz Resolution Bandwidth)                                                                          |

### 6.1 E.U.T. Operation

Operating Environment :

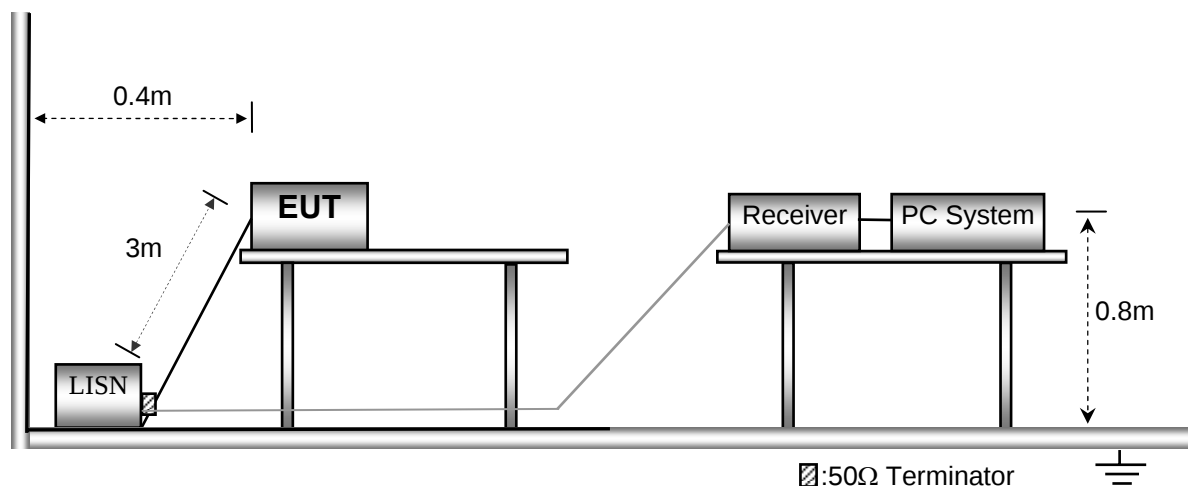
|                       |           |
|-----------------------|-----------|
| Temperature:          | 21.5 °C   |
| Humidity:             | 51.9 % RH |
| Atmospheric Pressure: | 101.2kPa  |

EUT Operation :

The test was performed in transmitting mode(BT BLE).

### 6.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003.



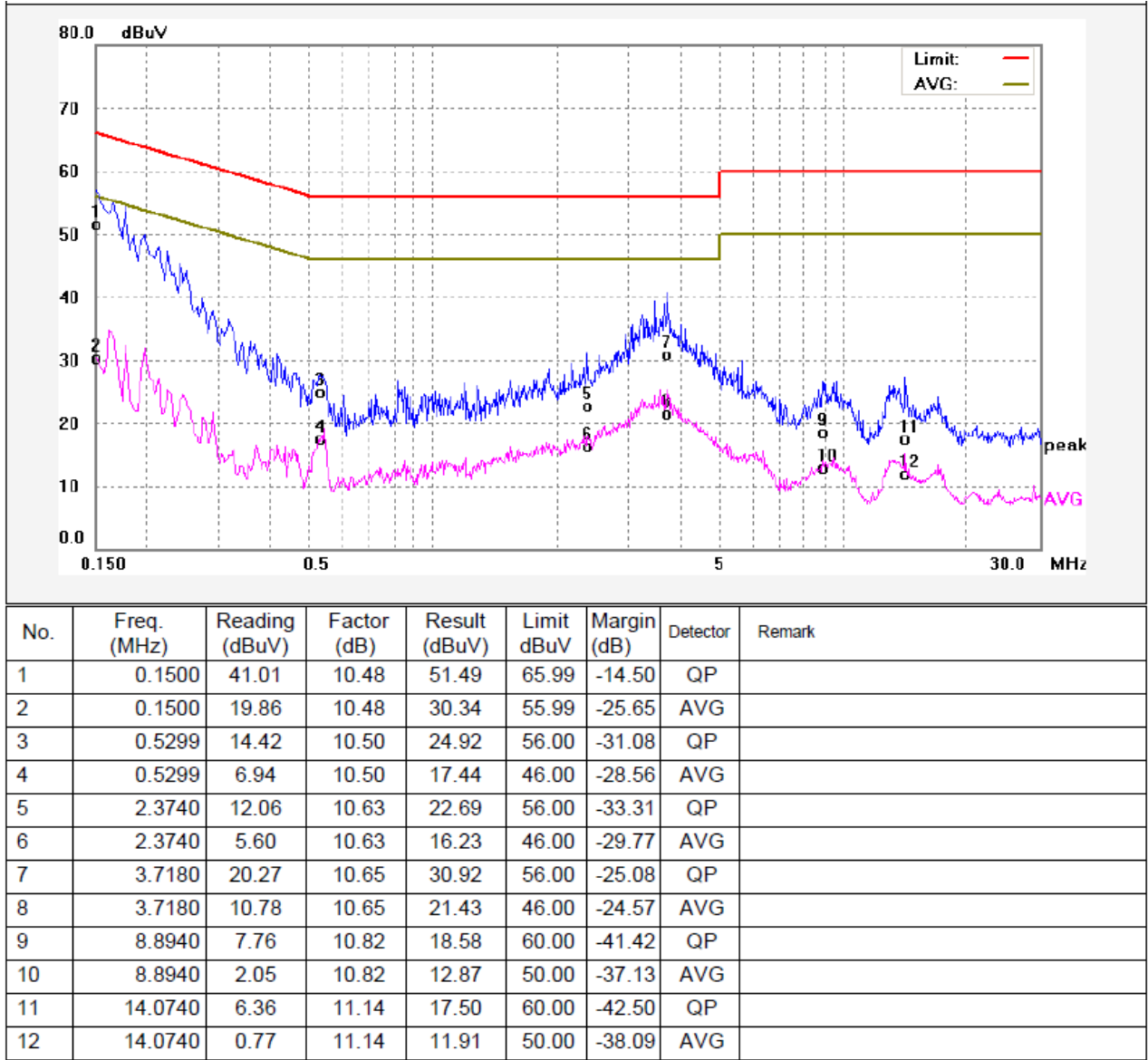
### 6.3 Measurement Description

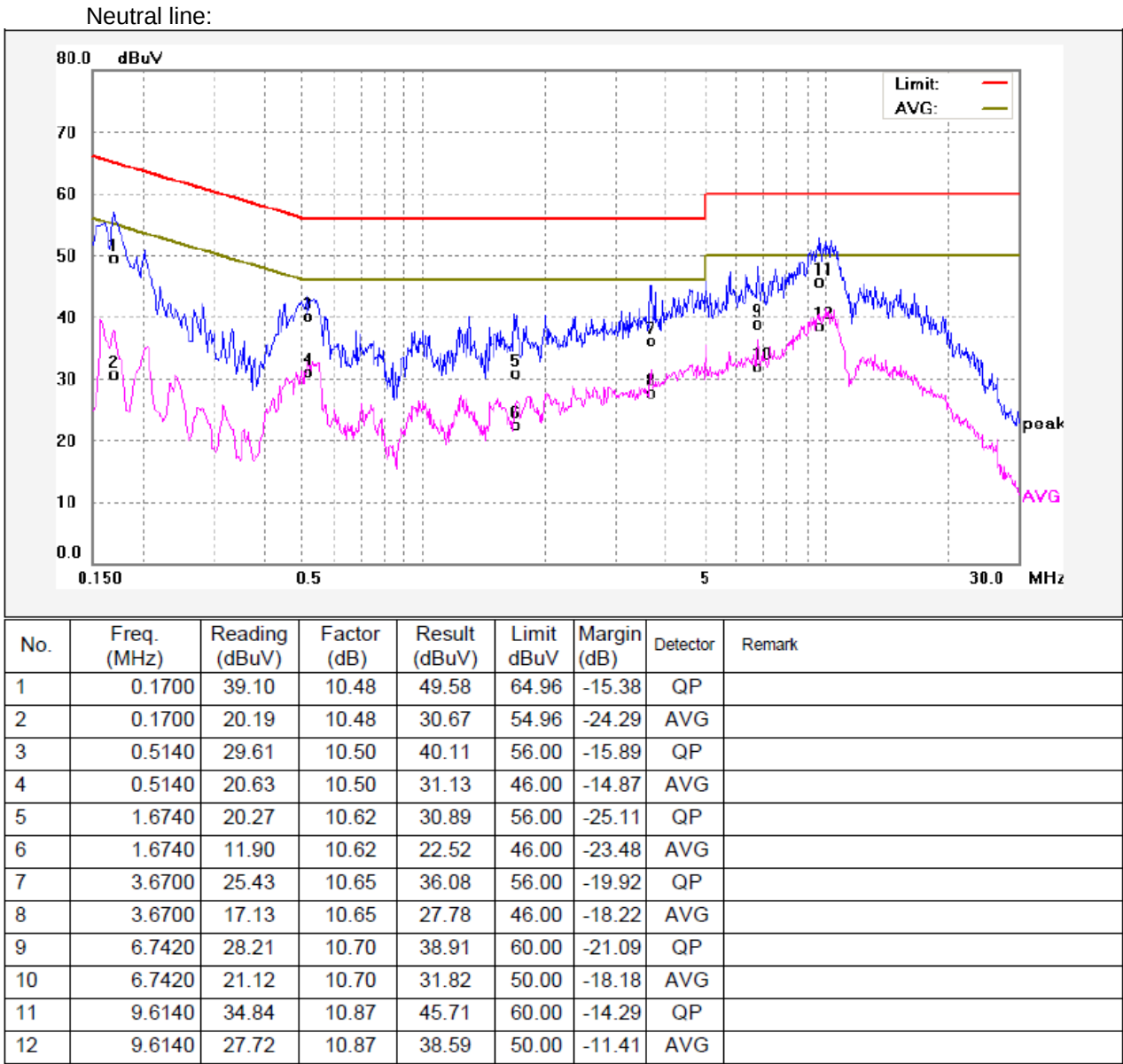
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

6.4 Conducted Emission Test Result

An initial pre-scan was performed on the live and neutral lines.

Live line:





## 7 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: ANSI C63.4:2003

Test Result: PASS

Measurement Distance: 3m

Limit:

| Frequency<br>(MHz) | Field Strength        |                 | Field Strength Limit at 3m Measurement Dist |                                       |
|--------------------|-----------------------|-----------------|---------------------------------------------|---------------------------------------|
|                    | uV/m                  | Distance<br>(m) | uV/m                                        | dBuV/m                                |
| 0.009 ~ 0.490      | $2400/F(\text{kHz})$  | 300             | $10000 * 2400/F(\text{kHz})$                | $20\log^{(2400/F(\text{kHz}))} + 80$  |
| 0.490 ~ 1.705      | $24000/F(\text{kHz})$ | 30              | $100 * 24000/F(\text{kHz})$                 | $20\log^{(24000/F(\text{kHz}))} + 40$ |
| 1.705 ~ 30         | 30                    | 30              | $100 * 30$                                  | $20\log^{(30)} + 40$                  |
| 30 ~ 88            | 100                   | 3               | 100                                         | $20\log^{(100)}$                      |
| 88 ~ 216           | 150                   | 3               | 150                                         | $20\log^{(150)}$                      |
| 216 ~ 960          | 200                   | 3               | 200                                         | $20\log^{(200)}$                      |
| Above 960          | 500                   | 3               | 500                                         | $20\log^{(500)}$                      |

### 7.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

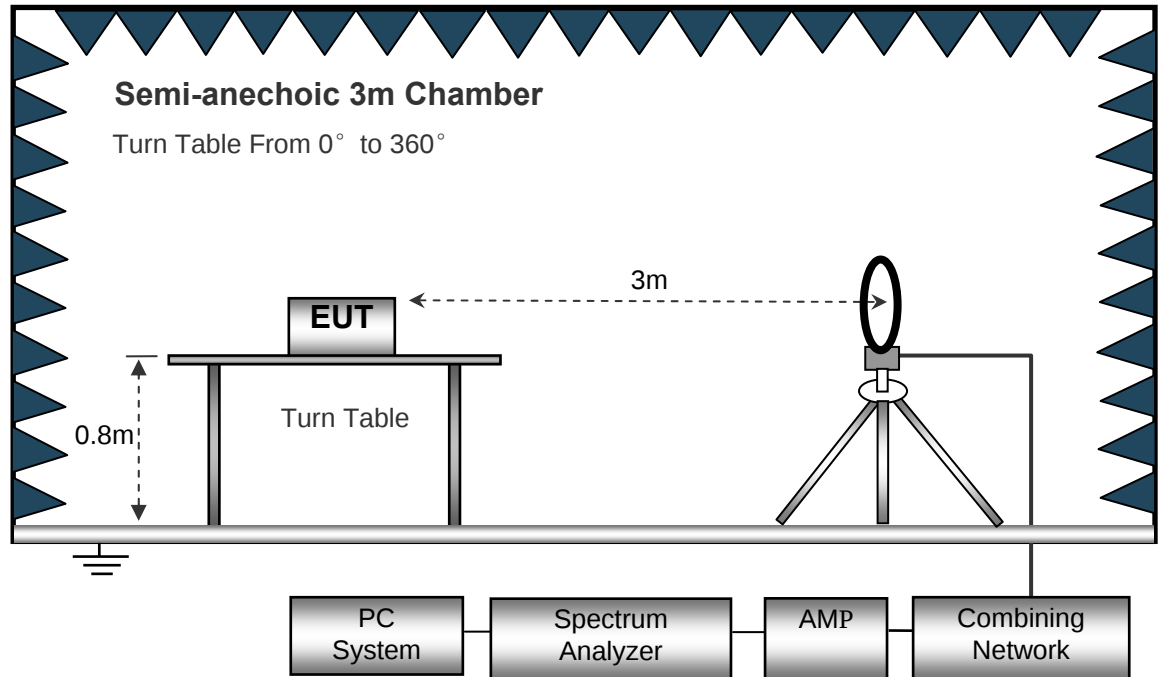
EUT Operation :

The test was performed in transmitting mode.

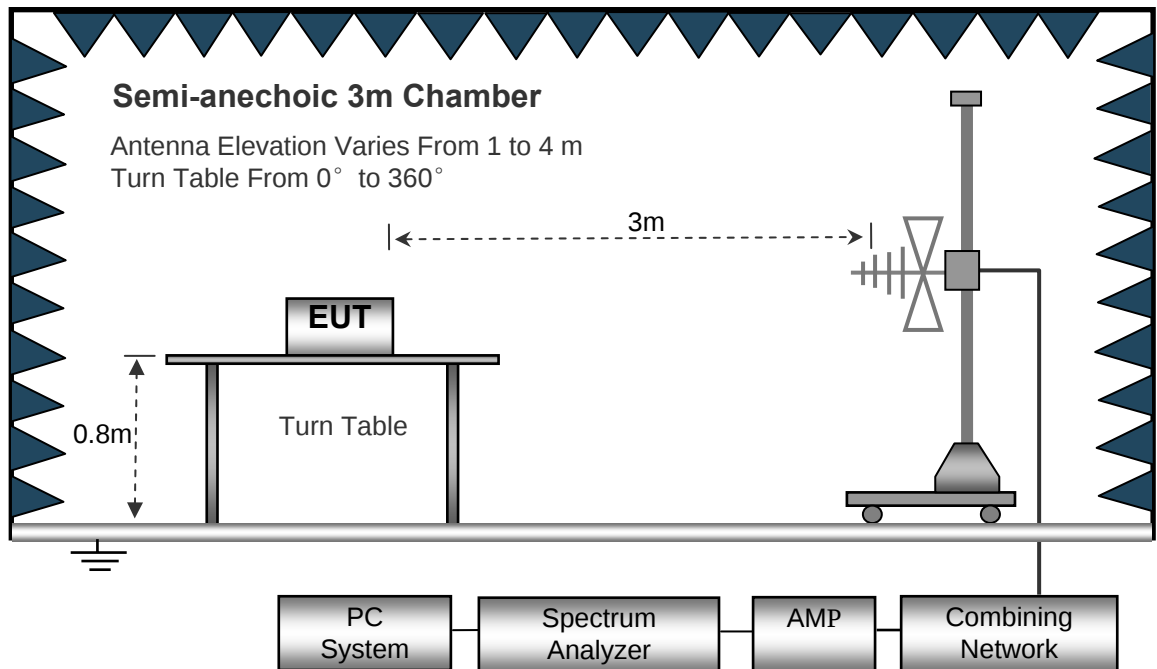
## 7.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4: 2003.

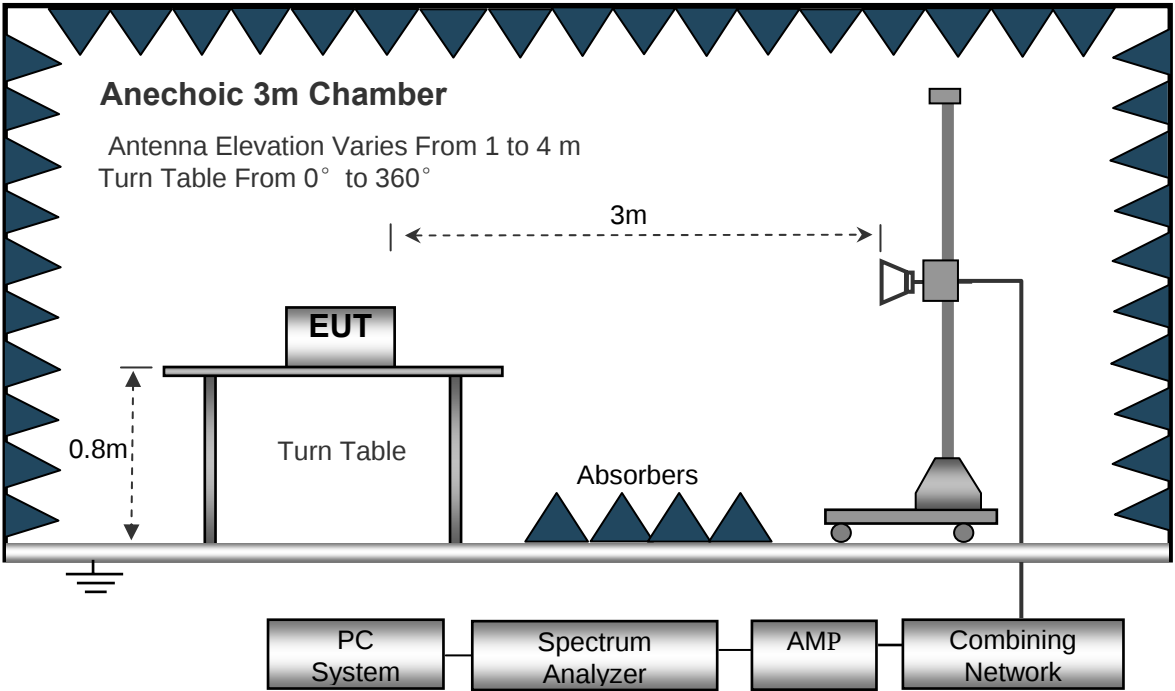
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



7.3 Spectrum Analyzer Setup

Below 30MHz

- Sweep Speed ..... Auto
- IF Bandwidth.....10kHz
- Video Bandwidth.....10kHz
- Resolution Bandwidth.....10kHz

30MHz ~ 1GHz

- Sweep Speed ..... Auto
- Detector .....PK
- Resolution Bandwidth.....100kHz
- Video Bandwidth.....300kHz

Above 1GHz

- Sweep Speed ..... Auto
- Detector .....PK
- Resolution Bandwidth.....1MHz
- Video Bandwidth.....3MHz
- Detector .....Ave.
- Resolution Bandwidth.....1MHz
- Video Bandwidth.....10Hz

## 7.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in X axis,so the worst data were shown as follow.
8. A 2.4GHz high -pass filter is used during radiated emissions above 1GHz measurement.

## 7.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

## 7.6 Summary of Test Results

### Test Frequency : 16MHz ~ 30MHz

The measurements were more than 20 dB below the limit and not reported.

### Test Frequency : 30MHz ~ 18GHz

| Frequency                | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | Limit    | Margin |
|--------------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|----------|--------|
|                          |                  |             |                  | Height     | Polar |                  |                     |          |        |
| (MHz)                    | (dBμV)           | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB/m)           | (dBμV/m)            | (dBμV/m) | (dB)   |
| GFSK Low Channel 2402MHz |                  |             |                  |            |       |                  |                     |          |        |
| 169.67                   | 22.51            | QP          | 223              | 1.2        | H     | 11.13            | 33.64               | 43.50    | -9.86  |
| 169.67                   | 21.12            | QP          | 114              | 1.4        | V     | 11.13            | 32.25               | 43.50    | -11.25 |
| 4804.00                  | 52.98            | PK          | 81               | 1.2        | V     | -1.06            | 51.92               | 74.00    | -22.08 |
| 4804.00                  | 43.63            | Ave         | 81               | 1.2        | V     | -1.06            | 42.57               | 54.00    | -11.43 |
| 7206.00                  | 42.04            | PK          | 242              | 1.8        | H     | 1.33             | 43.37               | 74.00    | -30.63 |
| 7206.00                  | 37.28            | Ave         | 242              | 1.8        | H     | 1.33             | 38.61               | 54.00    | -15.39 |
| 2311.11                  | 46.76            | PK          | 119              | 1.8        | V     | -13.19           | 33.57               | 74.00    | -40.43 |
| 2311.11                  | 37.74            | Ave         | 119              | 1.8        | V     | -13.19           | 24.55               | 54.00    | -29.45 |
| 2376.44                  | 43.37            | PK          | 270              | 1.6        | H     | -13.14           | 30.23               | 74.00    | -43.77 |
| 2376.44                  | 36.32            | Ave         | 270              | 1.6        | H     | -13.14           | 23.18               | 54.00    | -30.82 |
| 2494.29                  | 43.47            | PK          | 343              | 1.2        | V     | -13.08           | 30.39               | 74.00    | -43.61 |
| 2494.29                  | 38.56            | Ave         | 343              | 1.2        | V     | -13.08           | 25.48               | 54.00    | -28.52 |

| Frequency                   | Receiver Reading | Detector    | Turntable Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | Limit    | Margin |
|-----------------------------|------------------|-------------|-----------------|------------|-------|------------------|---------------------|----------|--------|
|                             |                  |             |                 | Height     | Polar |                  |                     |          |        |
| (MHz)                       | (dBμV)           | (PK/QP/Ave) | Degree          | (m)        | (H/V) | (dB/m)           | (dBμV/m)            | (dBμV/m) | (dB)   |
| GFSK Middle Channel 2440MHz |                  |             |                 |            |       |                  |                     |          |        |
| 169.67                      | 22.82            | QP          | 111             | 1.8        | H     | 11.13            | 33.95               | 43.50    | -9.55  |
| 169.67                      | 21.94            | QP          | 197             | 1.6        | V     | 11.13            | 33.07               | 43.50    | -10.43 |
| 4880.00                     | 53.80            | PK          | 272             | 1.0        | V     | -0.62            | 53.18               | 74.00    | -20.82 |
| 4880.00                     | 44.30            | Ave         | 272             | 1.0        | V     | -0.62            | 43.68               | 54.00    | -10.32 |
| 7320.00                     | 42.21            | PK          | 85              | 1.9        | H     | 2.21             | 44.42               | 74.00    | -29.58 |
| 7320.00                     | 37.23            | Ave         | 85              | 1.9        | H     | 2.21             | 39.44               | 54.00    | -14.56 |
| 2316.94                     | 46.60            | PK          | 39              | 1.7        | V     | -13.19           | 33.41               | 74.00    | -40.59 |
| 2316.94                     | 39.10            | Ave         | 39              | 1.7        | V     | -13.19           | 25.91               | 54.00    | -28.09 |
| 2362.93                     | 43.93            | PK          | 45              | 1.4        | H     | -13.14           | 30.79               | 74.00    | -43.21 |
| 2362.93                     | 36.69            | Ave         | 45              | 1.4        | H     | -13.14           | 23.55               | 54.00    | -30.45 |
| 2498.04                     | 42.85            | PK          | 228             | 1.2        | V     | -13.08           | 29.77               | 74.00    | -44.23 |
| 2498.04                     | 36.22            | Ave         | 228             | 1.2        | V     | -13.08           | 23.14               | 54.00    | -30.86 |

| Frequency                        | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | Limit    | Margin |
|----------------------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|----------|--------|
|                                  |                  |             |                  | Height     | Polar |                  |                     |          |        |
| (MHz)                            | (dBμV)           | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB/m)           | (dBμV/m)            | (dBμV/m) | (dB)   |
| <b>GFSK High Channel 2480MHz</b> |                  |             |                  |            |       |                  |                     |          |        |
| 169.67                           | 22.31            | QP          | 157              | 1.3        | H     | 11.13            | 33.44               | 43.50    | -10.06 |
| 169.67                           | 20.40            | QP          | 190              | 1.0        | V     | 11.13            | 31.53               | 43.50    | -11.97 |
| 4960.00                          | 53.64            | PK          | 110              | 1.8        | V     | -0.24            | 53.40               | 74.00    | -20.60 |
| 4960.00                          | 43.55            | Ave         | 110              | 1.8        | V     | -0.24            | 43.31               | 54.00    | -10.69 |
| 7440.00                          | 41.76            | PK          | 230              | 1.6        | H     | 2.84             | 44.60               | 74.00    | -29.40 |
| 7440.00                          | 36.58            | Ave         | 230              | 1.6        | H     | 2.84             | 39.42               | 54.00    | -14.58 |
| 2343.72                          | 46.29            | PK          | 251              | 1.6        | V     | -13.19           | 33.10               | 74.00    | -40.90 |
| 2343.72                          | 38.07            | Ave         | 251              | 1.6        | V     | -13.19           | 24.88               | 54.00    | -29.12 |
| 2358.08                          | 44.95            | PK          | 143              | 1.0        | H     | -13.14           | 31.81               | 74.00    | -42.19 |
| 2358.08                          | 36.79            | Ave         | 143              | 1.0        | H     | -13.14           | 23.65               | 54.00    | -30.35 |
| 2498.11                          | 42.05            | PK          | 272              | 1.3        | V     | -13.08           | 28.97               | 74.00    | -45.03 |
| 2498.11                          | 38.54            | Ave         | 272              | 1.3        | V     | -13.08           | 25.46               | 54.00    | -28.54 |

**Test Frequency: 18GHz~25GHz**

The measurements were more than 20 dB below the limit and not reported.

## 8 Band Edge Measurement

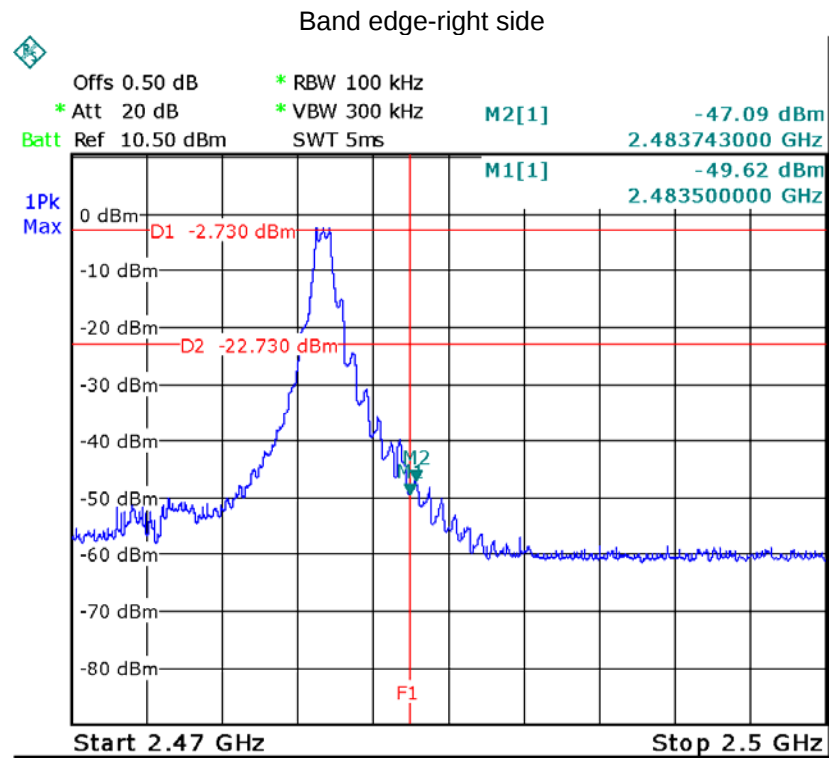
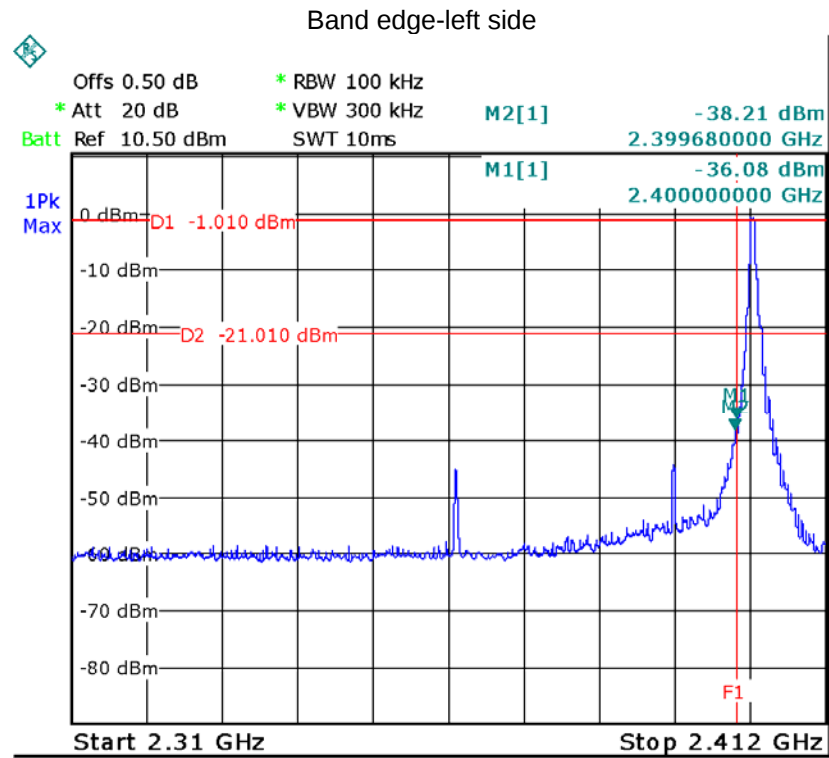
|                   |                                  |
|-------------------|----------------------------------|
| Test Requirement: | FCC CFR47 Part 15 Section 15.247 |
| Test Method:      | KDB 558074 D01 v03r02 06/05/2014 |
| Test Mode:        | Transmitting                     |

### 8.1 Test Produce

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

8.2 Test Result

Test result plots shown as follows:



## 9 6 dB Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 v03r02 06/05/2014

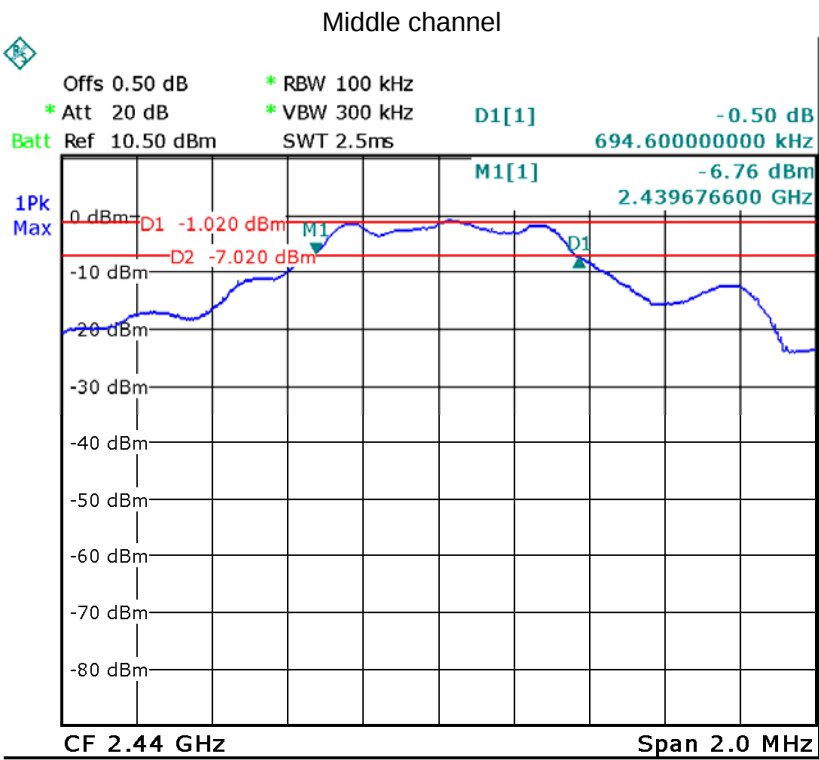
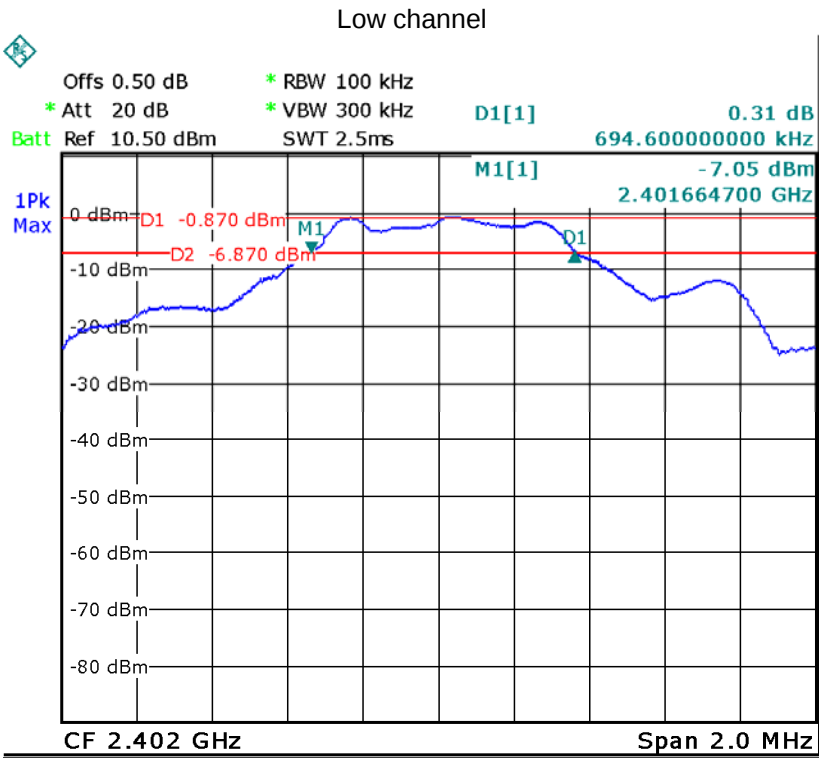
### 9.1 Test Procedure:

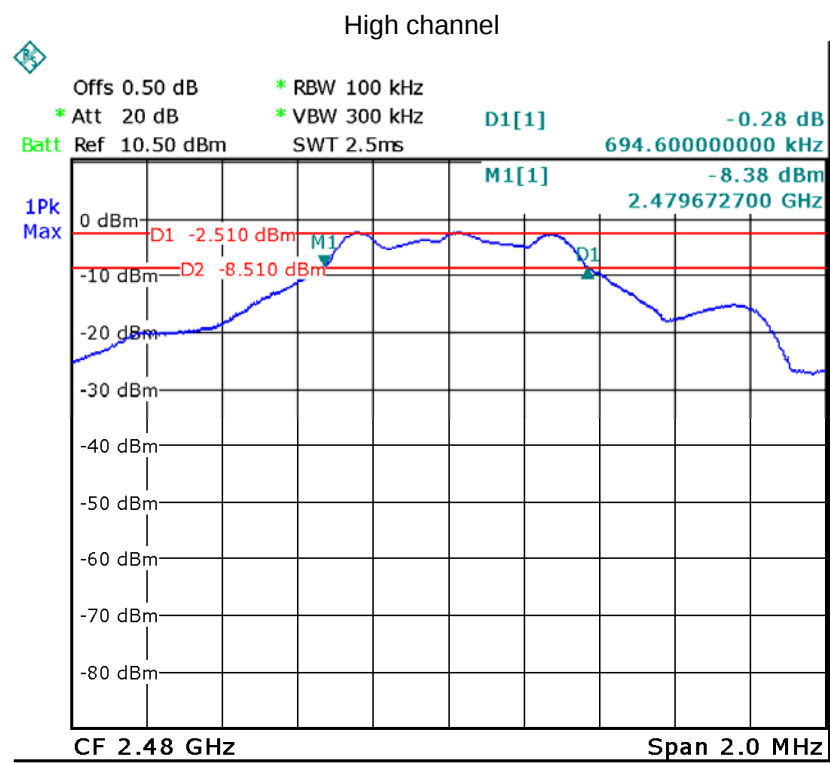
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

### 9.2 Test Result:

| Operation Channel | Bandwidth (MHz) |
|-------------------|-----------------|
| Low channel       | 0.694           |
| Middle channel    | 0.694           |
| High channel      | 0.694           |

Test result plot as follows:





## 10 Maximum Peak Output Power

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

KDB 558074 D01 v03r02 06/05/2014

### 10.1 Test Procedure:

KDB 558074 D01 v03r02 06/05/2014

#### section 9.1.1

This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

- a) Set the  $RBW \geq DTS$  bandwidth.
- b) Set  $VBW \geq 3 \times RBW$ .
- c) Set  $span \geq 3 \times RBW$ .
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

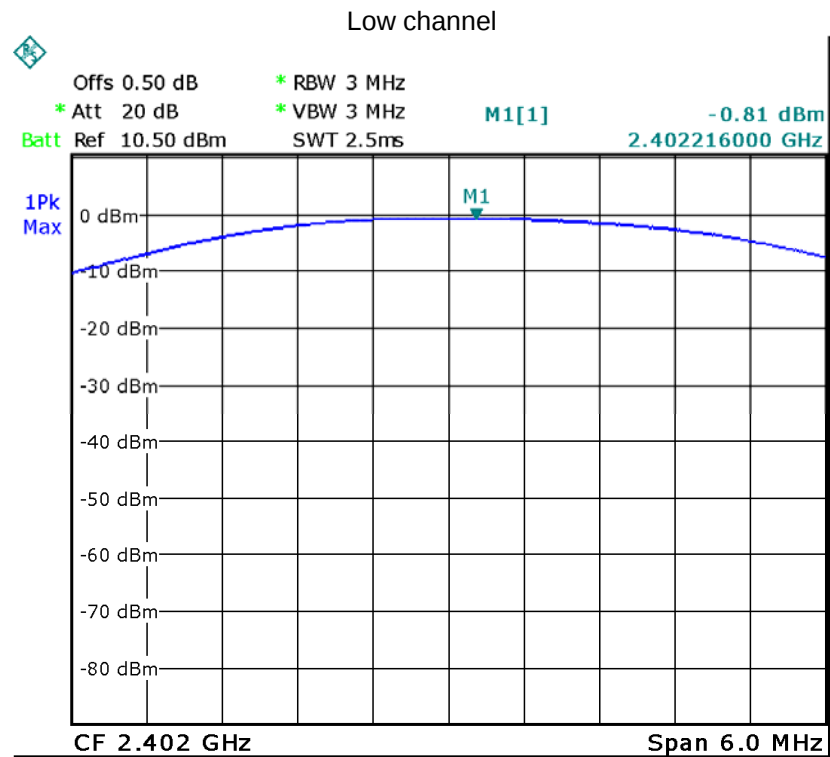
#### section 9.1.2

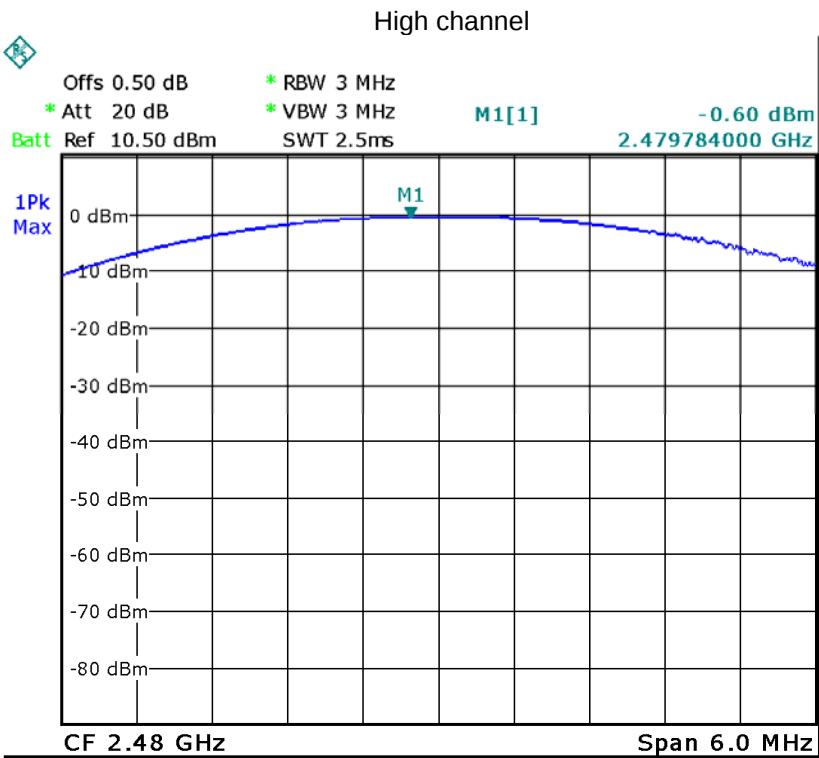
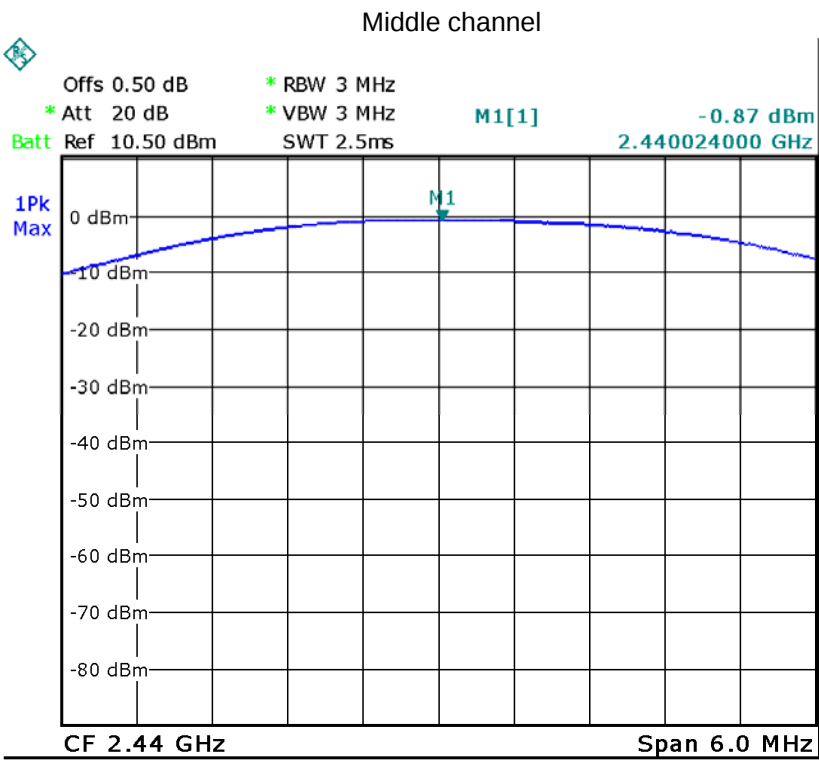
This procedure may be used when the maximum available RBW of the measurement instrument is less than the DTS bandwidth.

- a) Set the  $RBW = 1 \text{ MHz}$ .
- b) Set the  $VBW \geq 3 \times RBW$ .
- c) Set the  $span \geq 1.5 \times DTS$  bandwidth.
- d) Detector = peak.
- e) Sweep time = auto couple.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector). If the instrument does not have a band power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS bandwidth.

10.2 Test Result:

| Maximum Peak Output Power (dBm) |                |              |
|---------------------------------|----------------|--------------|
| Low channel                     | Middle channel | High channel |
| -0.81                           | -0.87          | -0.60        |
| Limit                           |                |              |
| 1W/30dBm                        |                |              |





## 11 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 v03r02 06/05/2014

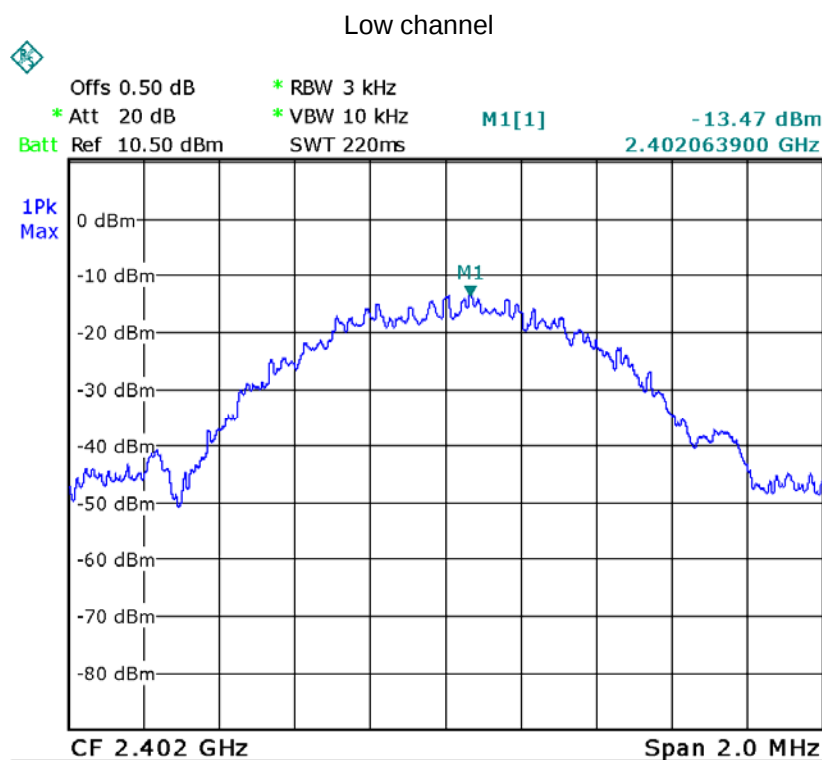
### 11.1 Test Procedure:

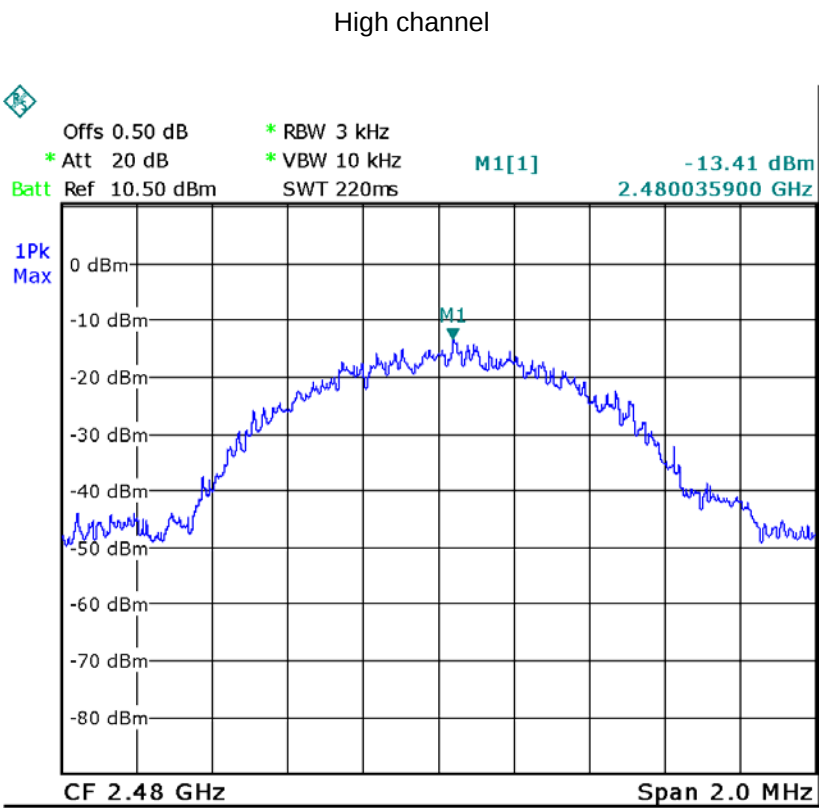
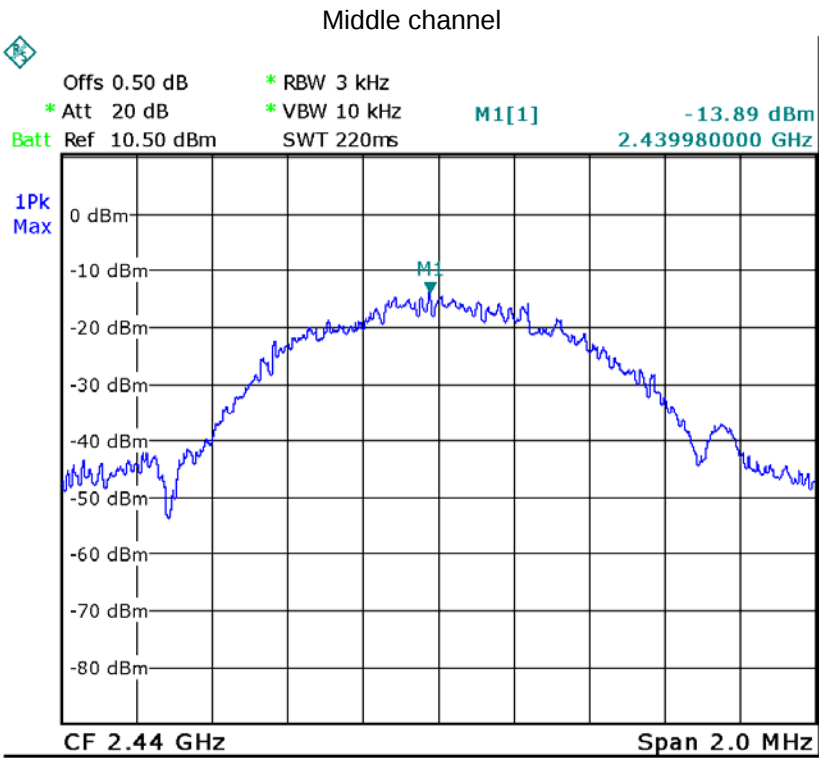
KDB 558074 D01 v03r02 06/05/2014 section 10.2

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section  
Submit this plot.

### 11.2 Test Result:

| Power Spectral Density |                |              |
|------------------------|----------------|--------------|
| Low channel            | Middle channel | High channel |
| -13.47                 | -13.89         | -13.41       |
| Limit                  |                |              |
| 8dBm per 3kHz          |                |              |





## **12 Antenna Requirement**

According to the FCC Part 15 Paragraph 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. This product has an integrated antenna which meet the requirement of this section.

## 13 RF Exposure

Test Requirement: FCC Part 1.1307

Evaluation Method KDB 447498 D01 v05r02 General RF Exposure Guidance v05

### 13.1 Requirements

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq 50$  mm are determined by:

$$\left[ \frac{\text{max. power of channel, including tune-up tolerance, mW}}{\text{min. test separation distance, mm}} \right] \cdot \left[ \sqrt{f(\text{GHz})} \right] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR where}$$

1.  $f(\text{GHz})$  is the RF channel transmit frequency in GHz
2. Power and distance are rounded to the nearest mW and mm before calculation
3. The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm is applied to determine SAR test exclusion.

### 13.2 The procedures / limit

| Conducted Peak power(dBm) | Conducted Peak power(mW) | Source-based time-averaged maximum conducted output power(mW) | Minimum test separation distance required for the exposure conditions (mm) | SAR Test Exclusion Thresholds(mW) |
|---------------------------|--------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------|
| -0.60                     | 0.871                    | 0.871                                                         | 5                                                                          | 10                                |

Remark: Max. duty factor is 100%

Calculation formula: Source-based time-averaged maximum conducted output power(mW) = Conducted peak power(mW) \* Duty factor

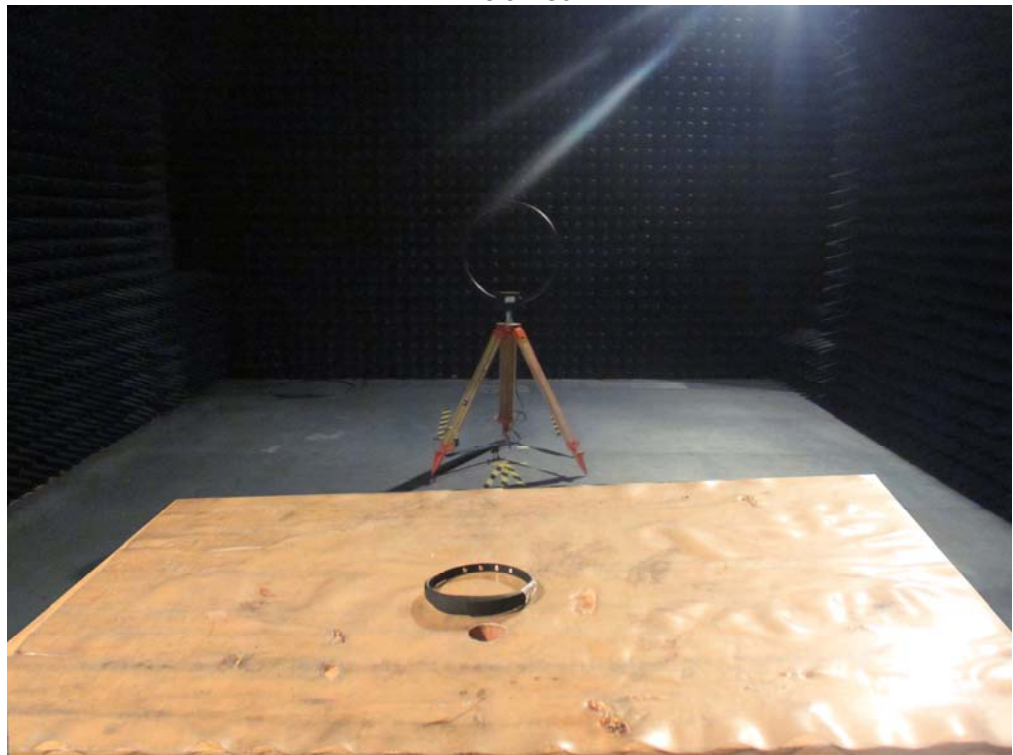
## 14 Photographs –Model MLNHB Test Setup

### 14.1 Photograph – Conducted Emission Test Setup



### 14.2 Photograph – Radiation Spurious Emission Test Setup

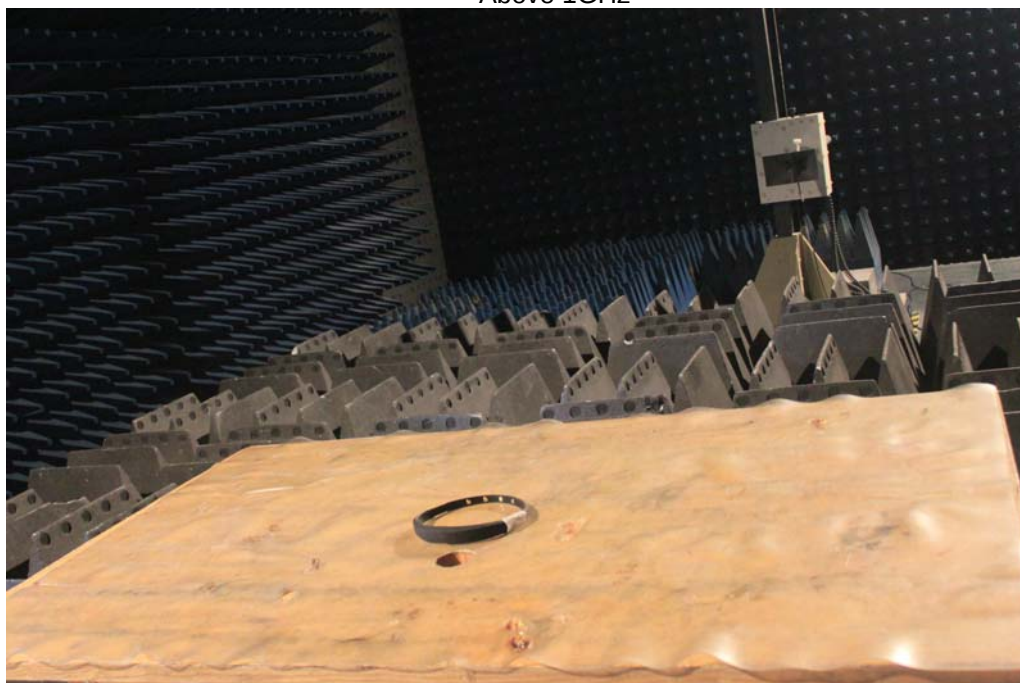
Below 30MHz



30MHz-1GHz



Above 1GHz



## 15 Photographs - Constructional Details

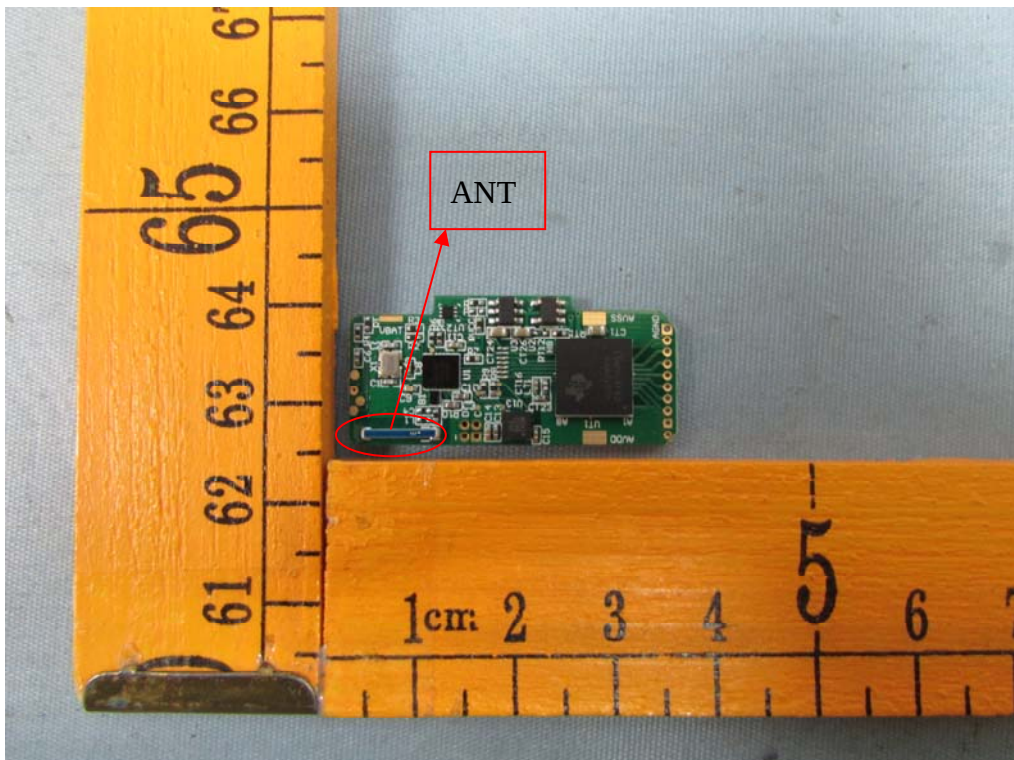
### 15.1 Model MLNHB External View

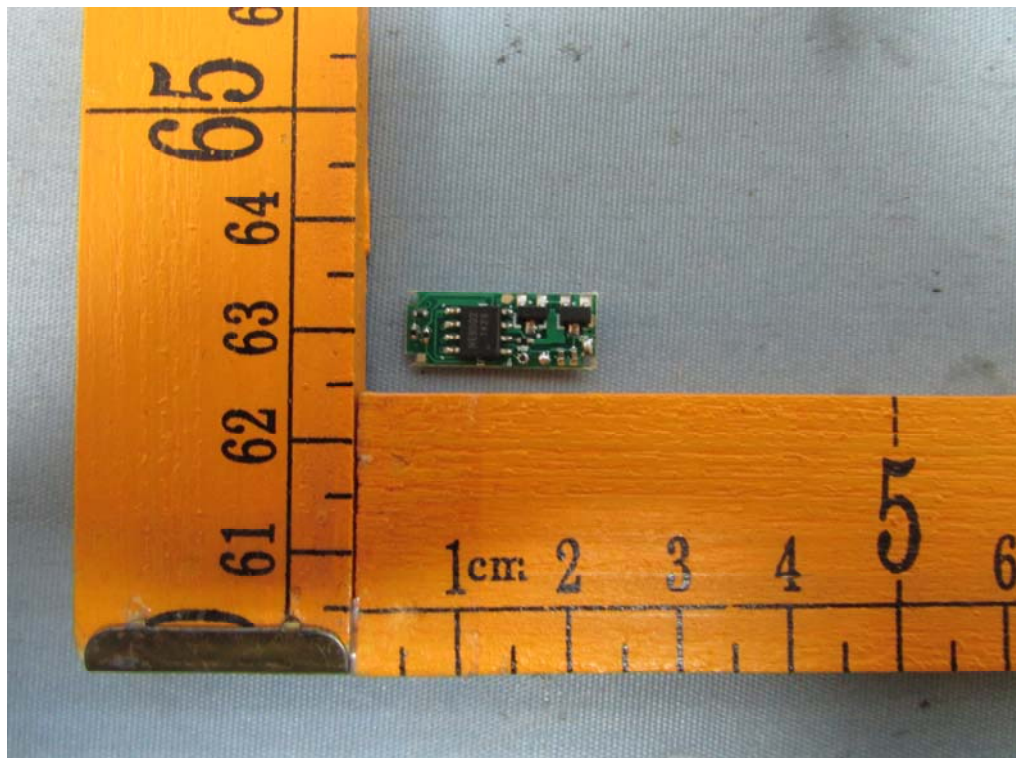
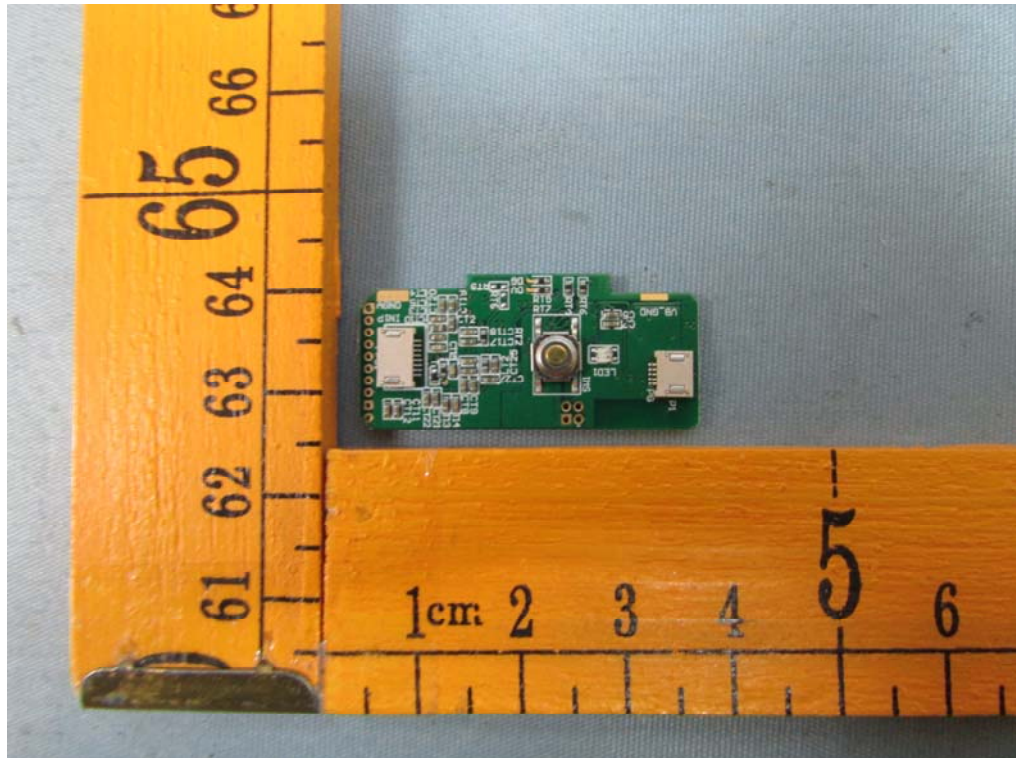


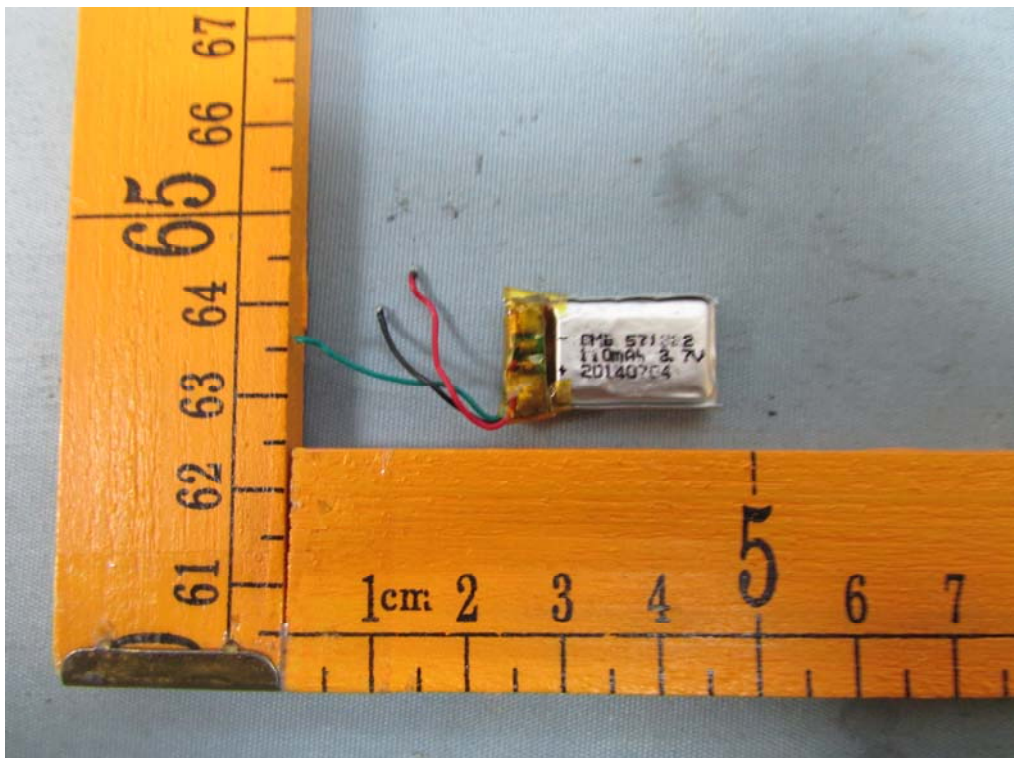
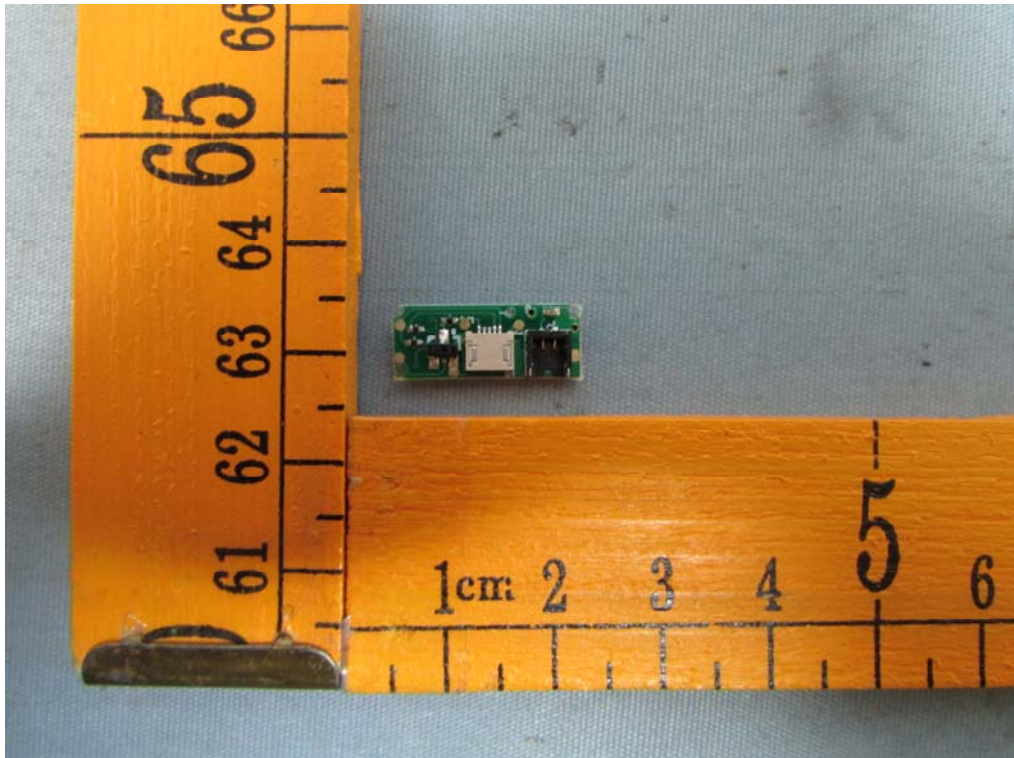




## 15.2 Model MLNHB Internal View







===== End of Report =====