

# FCC RADIO TEST REPORT

**FCC ID: 2AGSUM001**

**Applicant** : SHENZHEN XIAOXI TECHNOLOGY CO.,LTD  
**Address** : 2F, Wing D, Building 5, Software Industry Base, Haitian 2an Road, Nanshan District, Shenzhen, PR China

## Equipment under Test (EUT):

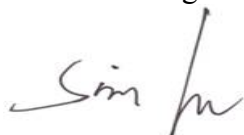
**Name** : miraffe  
**Model** : M001  
**Trademark** : N/A

**Standards** : FCC PART 15, SUBPART C : 2014 (Section 15.247)  
**Report No.** : CTB160321001D  
**Date of Test** : April 01-14, 2016  
**Date of Issue** : April 15, 2016

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

In the configuration tested, the EUT complied with the standards specified above

Authorized Signature



(Simon Lee)  
General Manager

The manufacture should ensure that all the products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of Shenzhen CTB Testing Technology Co., Ltd. Or test done by Shenzhen CTB Testing Technology Co., Ltd. Approvals in connection with, distribution or use of the product described in this report must be approved by Shenzhen CTB Testing Technology Co., Ltd Approvals in writing.

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## 1 General Information

### 1.1 Description of Device (EUT)

|                      |                                                                                                                                                   |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| EUT                  | : miraffe                                                                                                                                         |
| Model No.            | : M001                                                                                                                                            |
| Trade mark           | : N/A                                                                                                                                             |
| Power supply         | : DC 3.7V or DC 5V from adapter with AC 120V/60Hz                                                                                                 |
| Radio Technology     | : IEEE 802.11b, g, n/HT20, n/HT40,                                                                                                                |
| Operation frequency  | : IEEE 802.11b: 2412MHz-2462MHz<br>IEEE 802.11g: 2412MHz-2462MHz<br>IEEE 802.11n HT20: 2412-2462MHz,<br>IEEE 802.11n HT40:2422-2452MHz            |
| Modulation           | : IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK),<br>IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK),<br>IEEE 802.11n :OFDM(64QAM, 16QAM, QPSK, BPSK),          |
| Antenna Type         | : PIFA Antenna, max gain 1.0 dBi                                                                                                                  |
| Applicant Address    | : SHENZHEN XIAOXI TECHNOLOGY CO.,LTD<br>2F, Wing D, Building 5, Software Industry Base, Haitian 2an Road,<br>Nanshan District, Shenzhen, PR China |
| Manufacturer Address | : SHENZHEN XIAOXI TECHNOLOGY CO.,LTD<br>2F, Wing D, Building 5, Software Industry Base, Haitian 2an Road,<br>Nanshan District, Shenzhen, PR China |

### 1.2 Description of Test Facility

Shenzhen CTB Testing Technology Co., Ltd.

10th floor, West Logistics Information Center Building, Fuyong  
Town , Bao'an District, Shenzhen City, P.R.C

FCC Registered No.: 671575

## 2 EMC Equipment List

| Equipment                     | Manufacture        | Model No.     | Serial No.           | Cal. Due day | Cal Interval |
|-------------------------------|--------------------|---------------|----------------------|--------------|--------------|
| 3m Semi-Anechoic Chamber      | Frankonia          | N/A           | N/A                  | 2017.04.07   | 1Year        |
| EMI Test receiver             | Rohde&Schwarz      | ESCS30        | 100085               | 2017.04.07   | 1Year        |
| Signal Analyzer               | Agilent            | N9010A        | MY48030494           | 2016.08.15   | 1 Year       |
| Bilog Antenna                 | SCHAFFNER<br>CHASE | CBL6143       | N/A                  | 2017.04.07   | 1Year        |
| Horn Antenna                  | SCHAFFNER<br>CHASE | BBHA<br>9120D | BBHA 9120<br>D(1206) | 2017.04.07   | 1Year        |
| loop antenna                  | Daze               | ZN30902       | SEL0052              | 2017.04.07   | 1Year        |
| Amplifier                     | EM                 | EM-30180      | 060568               | 2017.04.07   | 1Year        |
| Power Meter                   | Anritsu            | ML2487A       | 6K00001491           | 2016.08.15   | 1Year        |
| Power sensor                  | Anritsu            | ML2491A       | 32516                | 2016.08.15   | 1Year        |
| Coaxial Cable                 | SZHTW              | N/A           | C-01                 | 2017.04.07   | 1Year        |
| Coaxial Cable                 | SZHTW              | N/A           | C-02                 | 2017.04.07   | 1Year        |
| Coaxial Cable                 | SZHTW              | N/A           | C-03                 | 2017.04.07   | 1Year        |
| Test Receiver                 | Rohde&Schwarz      | ESCS30        | 100086               | 2017.04.07   | 1 Year       |
| L.I.S.N.                      | Schwarzbeck        | NSLK8126      | 8126466              | 2017.04.07   | 1 Year       |
| 50 $\Omega$ Coaxial<br>Switch | Anritsu            | MP59B         | 6200264326           | 2017.04.07   | 1 Year       |
| 10dB Attenuator               | Schwarzbeck        | 9516F         | 9620                 | 2017.04.07   | 1 Year       |

### 3 Test Procedure

**POWER LINE CONDUCTED INTERFERENCE:** The test procedure used was ANSI Standard C63.4-2009 using a 50  $\mu$  H LISN. Both Lines were observed. The bandwidth of the receiver was 10kHz with an appropriate sweep speed. The ambient temperature of the EUT was 25°C with a humidity of 58%.

**RADIATION INTERFERENCE:** The test procedure used was ANSI Standard C63.4-2009 using a ANRITSU spectrum analyzer with a pre-selector. The analyzer was calibrated in dB above a micro volt at the output of the antenna. The resolution bandwidth was 100kHz and the video bandwidth was 300 kHz up to 1 GHz and 1 MHz with a video BW of 3MHz above 1 GHz. The ambient temperature of the EUT was 25°C with a humidity of 58%.

**FORMULA OF CONVERSION FACTORS:** The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer and cable loss. The antenna correction factors and cable loss are stated in terms of dB. The gain of the Pre-selector was accounted for in the Spectrum Analyzer Meter Reading.

Example:

Freq (MHz) METER READING + ACF + CABLE = FS

33.20 dBuV + 10.36 dB + 0.9 dB = 44.46 dBuV/m @ 3m

ANSI STANDARD C63.4-2009 10.1.7 MEASUREMENT PROCEDURES: The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation. When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes. The situation was similar for the conducted measurement except that the table did not rotate. The EUT was setup as described in ANSI Standard C63.4-2009 10.1.7 with the EUT 40 cm from the vertical ground wall.

## 4 Summary of Measurement

### 4.1 Summary of test result

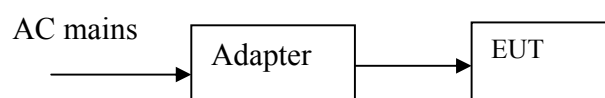
| Test Item           | Test Requirement   | Standards Paragraph   | Result     |
|---------------------|--------------------|-----------------------|------------|
| Spurious Emission   | FCC PART 15: 2013  | Section 15.247&15.209 | Compliance |
| Conduction Emission | FCC PART 15: 2013  | Section 15.207        | Compliance |
| Bandwidth Test      | FCC PART 15:2013   | Section 15.247        | Compliance |
| Peak Power          | FCC PART 15:2013   | Section 15.247        | Compliance |
| Power Density       | FCC PART 15:2013   | Section 15.247        | Compliance |
| Band Edge           | FCC PART 15:2013   | Section 15.247        | Compliance |
| Antenna Requirement | FCC PART 15 : 2013 | Section 15.203        | Compliance |

Note: The EUT has been tested as an independent unit. And Continual Transmitting in maximum power (The Notebook be used during Test). All test are according to ANSI C63.4-2009 and ANSI C63.10-2009

EUT is configured to transmit continuously (Duty cycle) is 100%, average correction factor =  $20 \log 1=0$

### 4.2 Test connection

Link Mode



### 4.3 Assistant equipment used for test

|              |   |                                    |
|--------------|---|------------------------------------|
| Description  | : | AC/DC ADAPTOR                      |
| Manufacturer | : | SHENZHEN XIAOXI TECHNOLOGY CO.,LTD |
| Model No.    | : | XHY050100UCA                       |
| Input        | : | AC 100-240V, 50/60Hz, 0.2A Max     |
| Output       | : | DC 5V/1.0A                         |

### 4.4 Test mode

| Tested mode, channel, and data rate information                                                                                     |                               |             |                    |
|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------|--------------------|
| Mode                                                                                                                                | data rate<br>(Mbps)(see Note) | Channel     | Frequency<br>(MHz) |
| IEEE 802.11b                                                                                                                        | 1                             | Low :CH1    | 2412               |
|                                                                                                                                     | 1                             | Middle: CH6 | 2437               |
|                                                                                                                                     | 1                             | High: CH11  | 2462               |
| IEEE 802.11g                                                                                                                        | 6                             | Low :CH1    | 2412               |
|                                                                                                                                     | 6                             | Middle: CH6 | 2437               |
|                                                                                                                                     | 6                             | High: CH11  | 2462               |
| IEEE 802.11<br>n/HT20                                                                                                               | 6.5                           | Low :CH1    | 2412               |
|                                                                                                                                     | 6.5                           | Middle: CH6 | 2437               |
|                                                                                                                                     | 6.5                           | High: CH11  | 2462               |
| IEEE 802.11<br>n/HT40                                                                                                               | 13.5                          | Low :CH1    | 2422               |
|                                                                                                                                     | 13.5                          | Middle:CH4  | 2437               |
|                                                                                                                                     | 13.5                          | High:CH7    | 2452               |
| Note: According exploratory test, EUT will have maximum output power in those data rate. so those data rate were used for all test. |                               |             |                    |

#### 4.5 Channel list

| For IEEE 802.11b/g and IEEE 802.11n/HT20 |                 |         |                 |         |                 |
|------------------------------------------|-----------------|---------|-----------------|---------|-----------------|
| Channel                                  | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| CH1                                      | 2412            | CH5     | 2432            | CH9     | 2452            |
| CH2                                      | 2417            | CH6     | 2437            | CH10    | 2457            |
| CH3                                      | 2422            | CH7     | 2442            | CH11    | 2462            |
| CH4                                      | 2427            | CH8     | 2447            |         |                 |

| For IEEE 802.11n/HT40 |                 |         |                 |         |                 |
|-----------------------|-----------------|---------|-----------------|---------|-----------------|
| Channel               | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| CH1                   | 2422            | CH5     | 2442            | /       |                 |
| CH2                   | 2427            | CH6     | 2447            | /       |                 |
| CH3                   | 2432            | CH7     | 2452            | /       |                 |
| CH4                   | 2437            | /       |                 | /       |                 |

#### 4.6 Test Conditions

|                   |           |
|-------------------|-----------|
| Temperature range | 21-25°C   |
| Humidity range    | 40-75%    |
| Pressure range    | 86-106kPa |

#### 4.7 Measurement Uncertainty (95% confidence levels, k=2)

| Item                                                                  | MU                 | Remark      |
|-----------------------------------------------------------------------|--------------------|-------------|
| Uncertainty for Power point Conducted Emissions Test                  | 2.40dB             |             |
| Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)   | 2.15 dB            | Polarize: V |
|                                                                       | 2.56dB             | Polarize: H |
| Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz) | 3.54dB             | Polarize: V |
|                                                                       | 4.2dB              | Polarize: H |
| Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz) | 2.12dB             | Polarize: H |
|                                                                       | 2.52dB             | Polarize: V |
| Uncertainty for radio frequency                                       | $1 \times 10^{-9}$ |             |
| Uncertainty for conducted RF Power                                    | 0.66dB             |             |
| Uncertainty for temperature                                           | 0.2°C              |             |
| Uncertainty for humidity                                              | 1%                 |             |
| Uncertainty for DC and low frequency voltages                         | 0.05%              |             |

## 5 Spurious Emission

### 5.1 Radiation Emission

#### 5.1.1 Radiation Emission Limits(15.209)

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

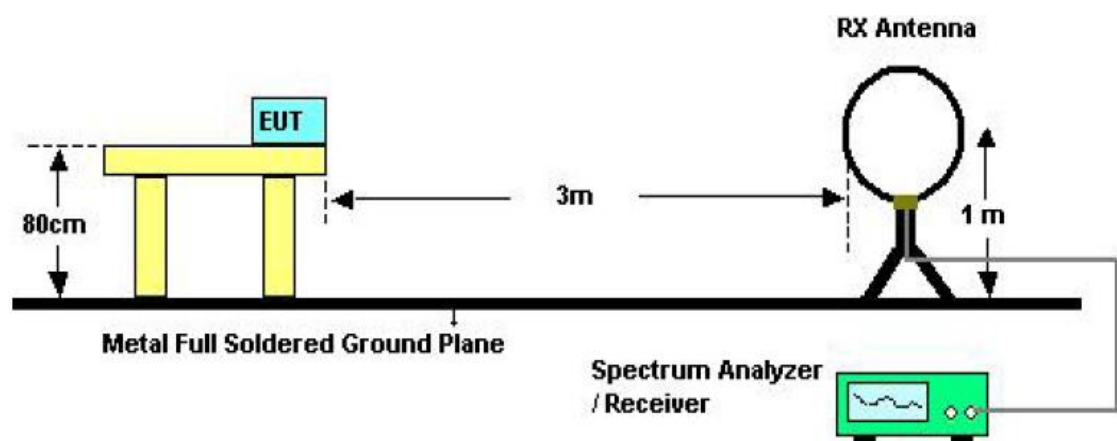
Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

**NOTE:**

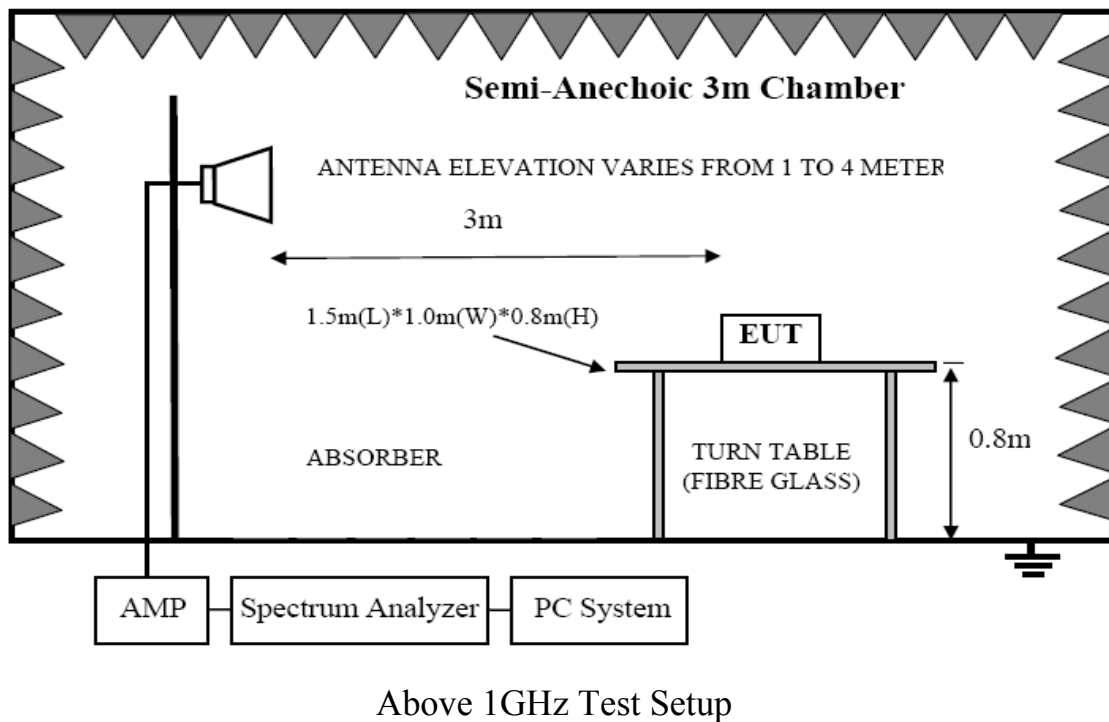
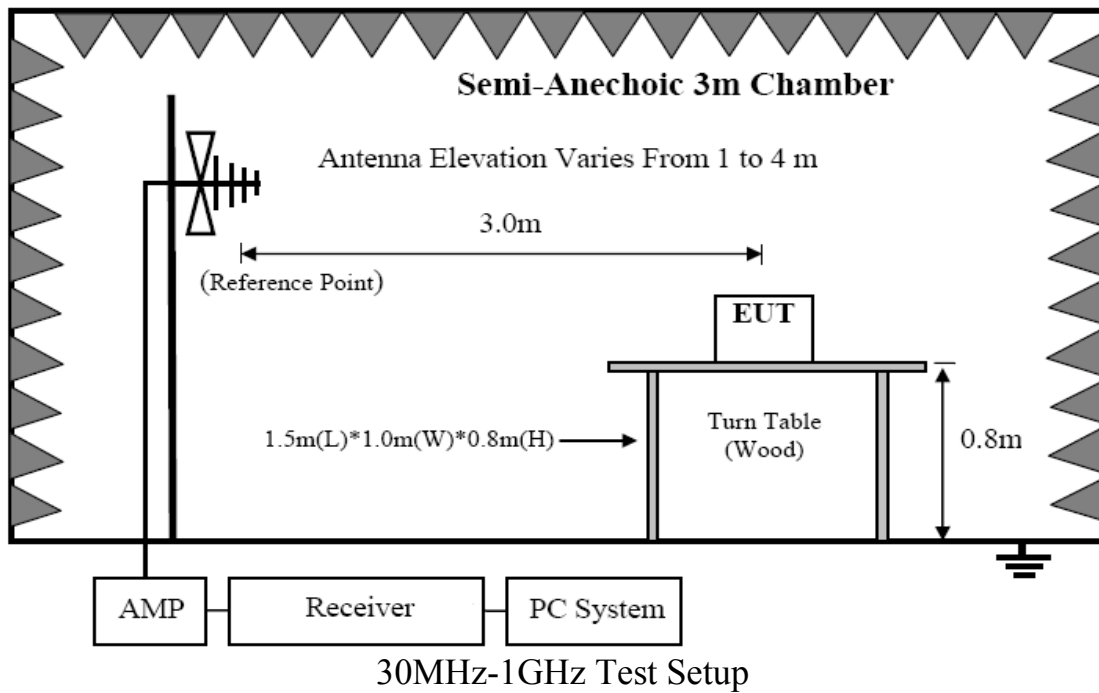
- The tighter limit applies at the band edges.
- Emission Level(dB uV/m)=20log Emission Level(Uv/m)

#### 5.1.2 Test Setup

See the next page



Below 30MHz Test Setup



### 5.1.3 Test Procedure

- a) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1GHz, The EUT was placed on a rotating 0.8 m high above ground, The table was rotated 360 degrees to determine the position of the highest radiation
- b) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set of make measurement.
- c) The initial step in collecting conducted emission data is a spectrum analyzer Peak detector mode pre-scanning the measurement frequency range. Significant Peaks are then marked. and then Qusia Peak Detector mode premeasured
- d) If Peak value comply with QP limit Below 1GHz. The EUT deemed to comply with QP limit. But the Peak value and average value both need to comply with applicable limit above 1GHz.
- e) For the actual test configuration, please see the test setup photo.

Note: 3 axes be tested in the radiated emission test , only the Z axes worst case was recorded in the test report, and the worst case of IEEE 802.11 b mode Low channel 2412MHz.

### 5.1.4 Test Equipment Setting For emission test Result

|              |            |            |
|--------------|------------|------------|
| 9KHz~150KHz  | RBW 200Hz  | VBW 1KHz   |
| 150KHz~30MHz | RBW 9KHz   | VBW 30KHz  |
| 30MHz~1GHz   | RBW 120KHz | VBW 300KHz |
| Above 1GHz   | RBW 1MHz   | VBW 3MHz   |

### 5.1.5 Test Condition

Continual Transmitting in maximum power.

### 5.1.6 Test Result

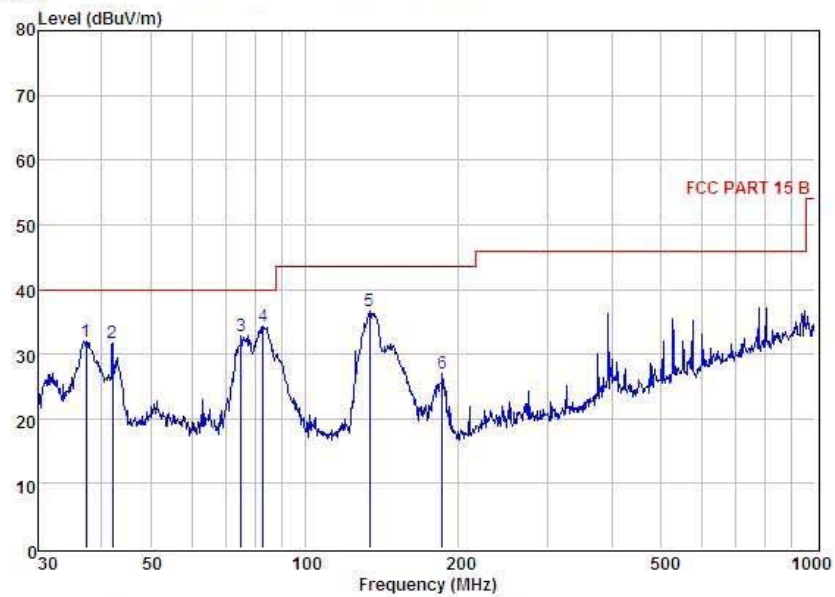
We have scanned the 9KHz from 25GHz to the EUT.

Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

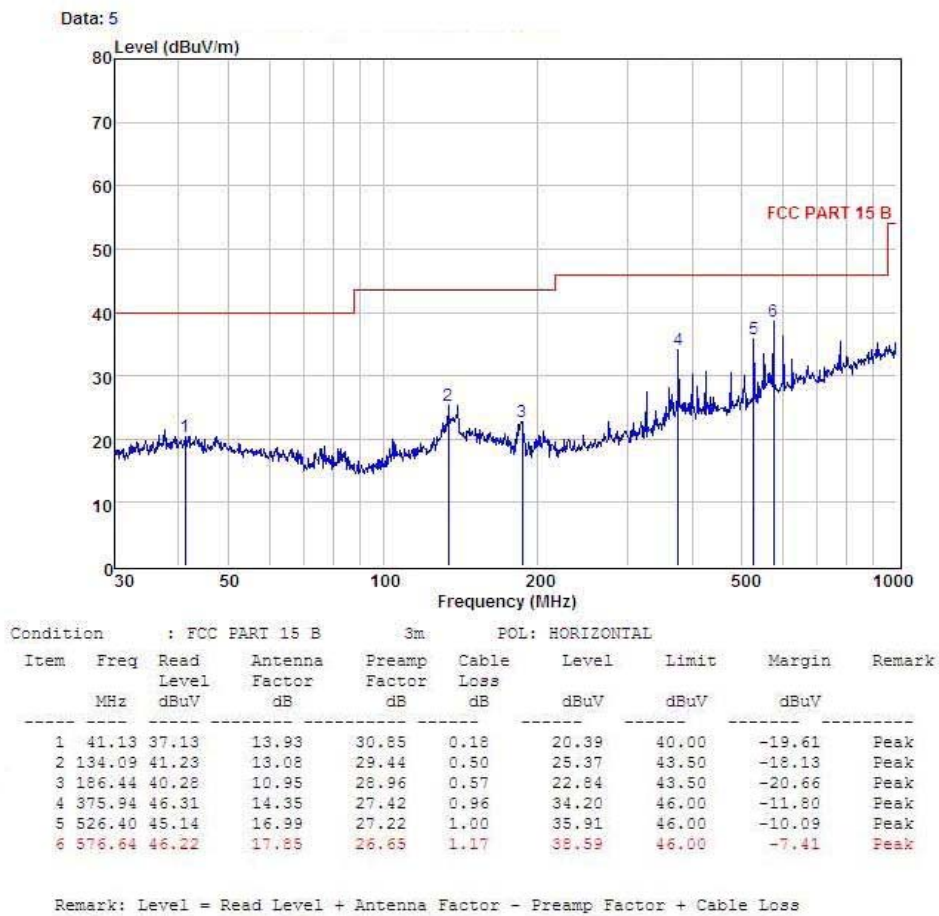
Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Data: 6



| Condition : FCC PART 15 B 3m POL: VERTICAL |             |                       |                         |                              |                     |               |               |                |        |
|--------------------------------------------|-------------|-----------------------|-------------------------|------------------------------|---------------------|---------------|---------------|----------------|--------|
| Item                                       | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Preamplifier<br>Factor<br>dB | Cable<br>Loss<br>dB | Level<br>dBuV | Limit<br>dBuV | Margin<br>dBuV | Remark |
| 1                                          | 37.29       | 48.94                 | 13.73                   | 30.83                        | 0.08                | 31.92         | 40.00         | -8.08          | Peak   |
| 2                                          | 42.01       | 48.08                 | 13.93                   | 30.40                        | 0.19                | 31.80         | 40.00         | -8.20          | Peak   |
| 3                                          | 74.92       | 52.83                 | 9.90                    | 30.09                        | 0.25                | 32.89         | 40.00         | -7.11          | Peak   |
| 4                                          | 82.94       | 54.69                 | 9.35                    | 30.02                        | 0.23                | 34.25         | 40.00         | -5.75          | Peak   |
| 5                                          | 134.09      | 52.45                 | 13.08                   | 29.44                        | 0.50                | 36.59         | 43.50         | -6.91          | Peak   |
| 6                                          | 185.79      | 44.58                 | 10.95                   | 28.98                        | 0.57                | 27.12         | 43.50         | -16.38         | Peak   |

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



From 1G-25GHz : PASS

Remark: All modes have been tested, and only reported worst data of IEEE 802.11 b mode.

|                    |                |                          |                      |
|--------------------|----------------|--------------------------|----------------------|
| <b>EUT</b>         | miraffe        | <b>Model Name</b>        | M001                 |
| <b>Temperature</b> | 24°C           | <b>Relative Humidity</b> | 53%                  |
| <b>Pressure</b>    | 960hPa         | <b>Test voltage</b>      | DC 3.7V From Battery |
| <b>Test Mode</b>   | TX Low 2412MHz |                          |                      |

| Freq.<br>(MHz) | Ant. Pol<br>H/V | Peak<br>Reading<br>(dBuV) | AV<br>Reading<br>(dBuV) | Ant. / CL<br>CF<br>(dB) | Actual Fs        |                | Limit<br>(dBuV/m)         | Margin<br>(dB) | Remark |
|----------------|-----------------|---------------------------|-------------------------|-------------------------|------------------|----------------|---------------------------|----------------|--------|
|                |                 |                           |                         |                         | Peak<br>(dBuV/m) | AV<br>(dBuV/m) |                           |                |        |
| 4824           | V               | 45.70                     | ---                     | 9.92                    | 55.62            | ---            | 74.00                     | -18.38         | Peak   |
| 4824           | V               | 31.91                     | ---                     | 9.92                    | 41.83            | ---            | 54.00                     | -12.17         | AV     |
| 7236           | V               |                           |                         |                         |                  |                |                           |                |        |
| 7236           | V               |                           |                         |                         |                  |                |                           |                |        |
| 9648           | V               |                           |                         |                         |                  |                |                           |                |        |
| 9648           | V               |                           |                         |                         |                  |                |                           |                |        |
| Freq.<br>(MHz) | Ant. Pol<br>H/V | Peak<br>Reading<br>(dBuV) | AV<br>Reading<br>(dBuV) | Ant. / CL<br>CF<br>(dB) | Actual Fs        |                | Peak<br>Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|                |                 |                           |                         |                         | Peak<br>(dBuV/m) | AV<br>(dBuV/m) |                           |                |        |
| 4824           | H               | 46.37                     | ---                     | 9.92                    | 56.29            | ---            | 74.00                     | -17.71         | Peak   |
| 4824           | H               | 32.13                     | ---                     | 9.92                    | 42.05            | ---            | 54.00                     | - 11.95        | AV     |
| 7236           | H               |                           |                         |                         |                  |                |                           |                |        |
| 7236           | H               |                           |                         |                         |                  |                |                           |                |        |
| 9648           | H               |                           |                         |                         |                  |                |                           |                |        |
| 9648           | H               |                           |                         |                         |                  |                |                           |                |        |

**Notes:**

1, Measuring frequency from 1GHz to 25GHz

2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK

3, Spectrum Set for AV measure: RBW=1MHz, VBW=3MHz, Sweep time=Auto, Detector: RMS

4, AV Means AV detector test data, Peak Means Peak detector test data.

Emissions attenuated more than 20 dB below the permissible value are not reported.

|                    |                |                          |                      |
|--------------------|----------------|--------------------------|----------------------|
| <b>EUT</b>         | miraffe        | <b>Model Name</b>        | M001                 |
| <b>Temperature</b> | 24°C           | <b>Relative Humidity</b> | 53%                  |
| <b>Pressure</b>    | 960hPa         | <b>Test voltage</b>      | DC 3.7V From Battery |
| <b>Test Mode</b>   | TX Mid 2437MHz |                          |                      |

| Freq.<br>(MHz) | Ant. Pol<br>H/V | Peak<br>Reading<br>(dBuV) | AV<br>Reading<br>(dBuV) | Ant. / CL<br>CF<br>(dB) | Actual Fs        |                | Limit<br>(dBuV/m)         | Margin<br>(dB) | Remark |
|----------------|-----------------|---------------------------|-------------------------|-------------------------|------------------|----------------|---------------------------|----------------|--------|
|                |                 |                           |                         |                         | Peak<br>(dBuV/m) | AV<br>(dBuV/m) |                           |                |        |
| 4874           | V               | 45.97                     | ---                     | 9.96                    | 55.93            | ---            | 74.00                     | -18.07         | Peak   |
| 4874           | V               | 33.78                     | ---                     | 9.96                    | 43.74            | ---            | 54.00                     | -10.26         | AV     |
| 7311           | V               |                           |                         |                         |                  |                |                           |                |        |
| 7311           | V               |                           |                         |                         |                  |                |                           |                |        |
| 9748           | V               |                           |                         |                         |                  |                |                           |                |        |
| 9748           | V               |                           |                         |                         |                  |                |                           |                |        |
| Freq.<br>(MHz) | Ant. Pol<br>H/V | Peak<br>Reading<br>(dBuV) | AV<br>Reading<br>(dBuV) | Ant. / CL<br>CF<br>(dB) | Actual Fs        |                | Peak<br>Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|                |                 |                           |                         |                         | Peak<br>(dBuV/m) | AV<br>(dBuV/m) |                           |                |        |
| 4874           | H               | 47.21                     | ---                     | 9.96                    | 57.17            | ---            | 74.00                     | -16.83         | Peak   |
| 4874           | H               | 35.22                     | ---                     | 9.96                    | 45.18            | ---            | 54.00                     | - 8.82         | AV     |
| 7311           | H               |                           |                         |                         |                  |                |                           |                |        |
| 7311           | H               |                           |                         |                         |                  |                |                           |                |        |
| 9748           | H               |                           |                         |                         |                  |                |                           |                |        |
| 9748           | H               |                           |                         |                         |                  |                |                           |                |        |

**Notes:**

1, Measuring frequency from 1GHz to 25GHz

2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK

3, Spectrum Set for AV measure: RBW=1MHz, VBW=3MHz, Sweep time=Auto, Detector: RMS

4, AV Means AV detector test data, Peak Means Peak detector test data.

Emissions attenuated more than 20 dB below the permissible value are not reported.

|                    |                 |                          |                      |
|--------------------|-----------------|--------------------------|----------------------|
| <b>EUT</b>         | miraffe         | <b>Model Name</b>        | M001                 |
| <b>Temperature</b> | 24°C            | <b>Relative Humidity</b> | 53%                  |
| <b>Pressure</b>    | 960hPa          | <b>Test voltage</b>      | DC 3.7V From Battery |
| <b>Test Mode</b>   | TX High 2462MHz |                          |                      |

| Freq.<br>(MHz) | Ant. Pol<br>H/V | Peak<br>Reading<br>(dBuV) | AV<br>Reading<br>(dBuV) | Ant. / CL<br>CF<br>(dB) | Actual Fs        |                | Limit<br>(dBuV/m)         | Margin<br>(dB) | Remark |
|----------------|-----------------|---------------------------|-------------------------|-------------------------|------------------|----------------|---------------------------|----------------|--------|
|                |                 |                           |                         |                         | Peak<br>(dBuV/m) | AV<br>(dBuV/m) |                           |                |        |
| 4924           | V               | 46.69                     | ---                     | 10.02                   | 56.71            | ---            | 74.00                     | -17.29         | Peak   |
| 4924           | V               | 33.65                     | ---                     | 10.02                   | 43.67            | ---            | 54.00                     | -10.33         | AV     |
| 7386           | V               |                           |                         |                         |                  |                |                           |                |        |
| 7386           | V               |                           |                         |                         |                  |                |                           |                |        |
| 9848           | V               |                           |                         |                         |                  |                |                           |                |        |
| 9848           | V               |                           |                         |                         |                  |                |                           |                |        |
| Freq.<br>(MHz) | Ant. Pol<br>H/V | Peak<br>Reading<br>(dBuV) | AV<br>Reading<br>(dBuV) | Ant. / CL<br>CF<br>(dB) | Actual Fs        |                | Peak<br>Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|                |                 |                           |                         |                         | Peak<br>(dBuV/m) | AV<br>(dBuV/m) |                           |                |        |
| 4924           | H               | 47.33                     | ---                     | 10.02                   | 57.35            | ---            | 74.00                     | -16.65         | Peak   |
| 4924           | H               | 34.91                     | ---                     | 10.02                   | 44.93            | ---            | 54.00                     | -9.07          | AV     |
| 7386           | H               |                           |                         |                         |                  |                |                           |                |        |
| 7386           | H               |                           |                         |                         |                  |                |                           |                |        |
| 9848           | H               |                           |                         |                         |                  |                |                           |                |        |
| 9848           | H               |                           |                         |                         |                  |                |                           |                |        |

**Notes:**

1, Measuring frequency from 1GHz to 25GHz

2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK

3, Spectrum Set for AV measure: RBW=1MHz, VBW=3MHz, Sweep time=Auto, Detector: RMS

4, AV Means AV detector test data, Peak Means Peak detector test data.

Emissions attenuated more than 20 dB below the permissible value are not reported.

## 6 POWER LINE CONDUCTED EMISSION

### 6.1 Conducted Emission Limits(15.207)

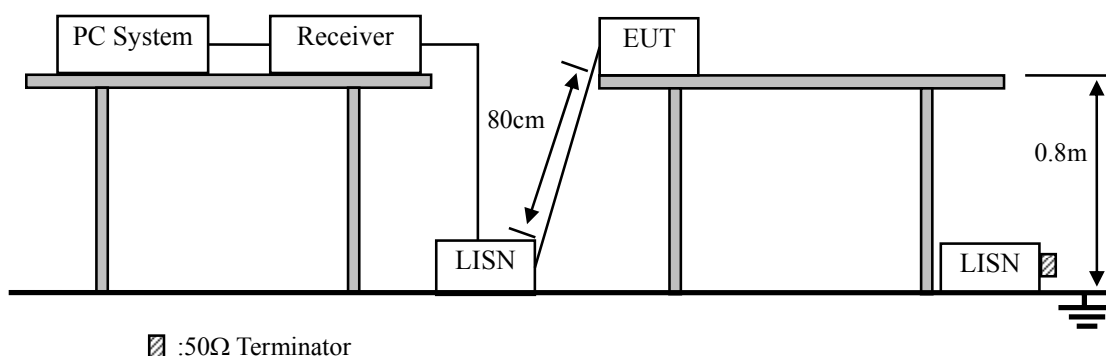
| Frequency<br>MHz | Limits dB( $\mu$ V) |               |
|------------------|---------------------|---------------|
|                  | Quasi-peak Level    | Average Level |
| 0.15 -0.50       | 66 -56*             | 56 - 46*      |
| 0.50 -5.00       | 56                  | 46            |
| 5.00 -30.00      | 60                  | 50            |

Notes: 1. \*Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

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

### 6.2 Test Setup



### 6.3 Test Procedure

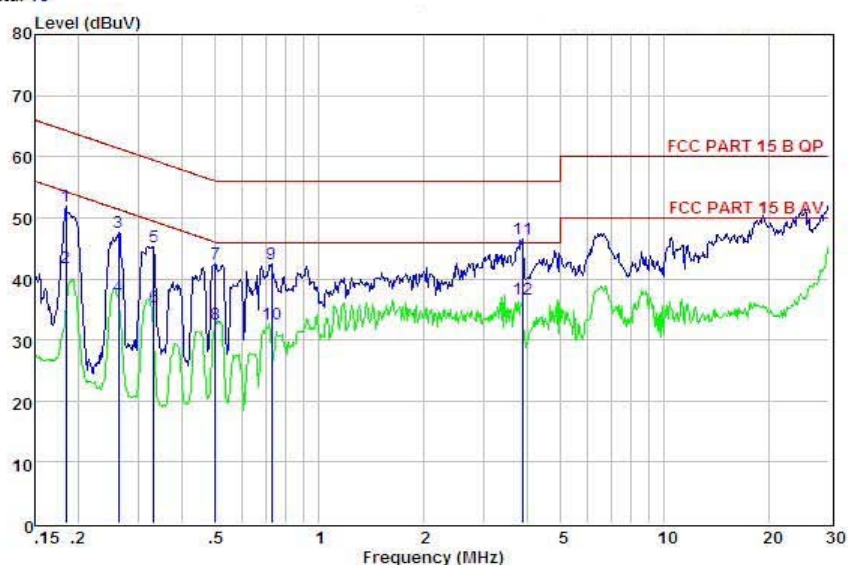
The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines 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 ANSI C63.4-2009 on Conducted Emission Measurement. The bandwidth of test receiver (R & S ESCM0010) is set at 9 kHz.

### 6.4 Test Results

**PASS**

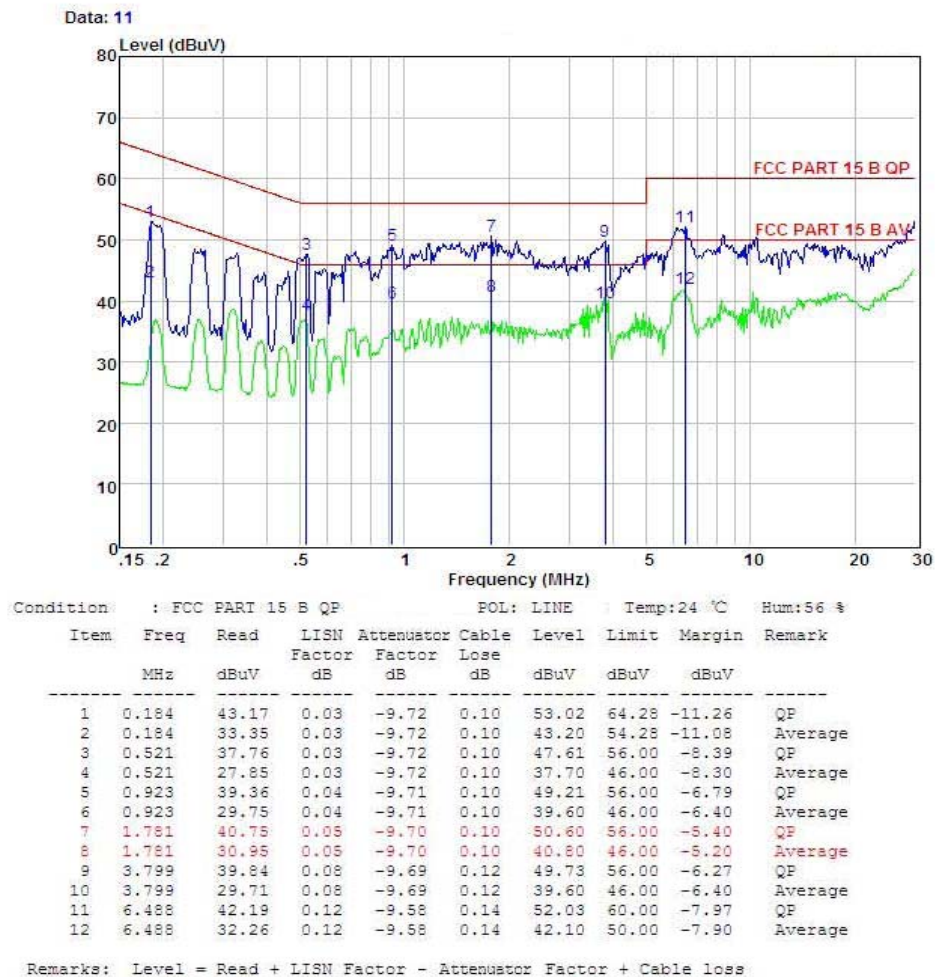
Detailed information please see the following page.

Data: 10



| Condition : FCC PART 15 B QP POL: NEUTRAL Temp:24 °C Hum:56 % |       |       |        |            |       |       |       |        |         |
|---------------------------------------------------------------|-------|-------|--------|------------|-------|-------|-------|--------|---------|
| Item                                                          | Freq  | Read  | LISN   | Attenuator | Cable | Level | Limit | Margin | Remark  |
|                                                               | MHz   | dBuV  | Factor | Factor     | Loss  | dBuV  | dBuV  | dBuV   |         |
| 1                                                             | 0.184 | 42.00 | 0.03   | -9.72      | 0.10  | 51.85 | 64.28 | -12.43 | QP      |
| 2                                                             | 0.184 | 32.05 | 0.03   | -9.72      | 0.10  | 41.90 | 54.28 | -12.38 | Average |
| 3                                                             | 0.262 | 37.75 | 0.03   | -9.72      | 0.10  | 47.60 | 61.38 | -13.78 | QP      |
| 4                                                             | 0.262 | 27.35 | 0.03   | -9.72      | 0.10  | 37.20 | 51.38 | -14.18 | Average |
| 5                                                             | 0.332 | 35.36 | 0.03   | -9.72      | 0.10  | 45.21 | 59.40 | -14.19 | QP      |
| 6                                                             | 0.332 | 25.55 | 0.03   | -9.72      | 0.10  | 35.40 | 49.40 | -14.00 | Average |
| 7                                                             | 0.499 | 32.58 | 0.03   | -9.72      | 0.10  | 42.43 | 56.01 | -13.58 | QP      |
| 8                                                             | 0.499 | 22.65 | 0.03   | -9.72      | 0.10  | 32.50 | 46.01 | -13.51 | Average |
| 9                                                             | 0.727 | 32.59 | 0.04   | -9.72      | 0.10  | 42.45 | 56.00 | -13.55 | QP      |
| 10                                                            | 0.727 | 22.74 | 0.04   | -9.72      | 0.10  | 32.60 | 46.00 | -13.40 | Average |
| 11                                                            | 3.881 | 36.63 | 0.08   | -9.69      | 0.12  | 46.52 | 56.00 | -9.48  | QP      |
| 12                                                            | 3.881 | 26.71 | 0.08   | -9.69      | 0.12  | 36.60 | 46.00 | -9.40  | Average |

Remarks: Level = Read + LISN Factor - Attenuator Factor + Cable loss



## 7 Conducted Maximum Output Power

### 7.1 Test limit

Please refer section 15.247.

Regulation 15.247(b) The limit of Maximum Peak Output Power Measurement is 1W(30dBm)

### 7.2 Test Procedure

Details see the KDB558074 Meas Guidance V03r02

7.2.1 Place the EUT on the table and set it in transmitting mode.

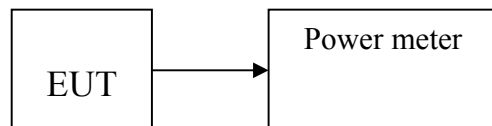
7.2.2 Connected the EUT's antenna port to peak power meter by 20dB attenuator.

7.2.3 Measure out each mode and each bands peak output power of EUT.

Note: The cable loss and attenuator loss were offset into measure device as amplitude offset.

Details see the KDB558074 DTS Meas Guidance V03r02

### 7.3 Test Setup



### 7.4 Test Results

**PASS**

Detailed information please see the following page.

| EUT: miraffe          |                 |                       | M/N: M001        |             |
|-----------------------|-----------------|-----------------------|------------------|-------------|
| Test date: 2016-04-06 |                 | Test site: RF site    | Tested by: Mason |             |
| Mode                  | Frequency (MHz) | PK Output power (dBm) | Limit (dBm)      | Margin (dB) |
| IEEE 802.11 b         | CH1: 2412       | 9.59                  | 30               | 20.41       |
|                       | CH6: 2437       | 9.68                  | 30               | 20.32       |
|                       | CH11: 2462      | 9.37                  | 30               | 20.63       |
| IEEE 802.11 g         | CH1: 2412       | 9.02                  | 30               | 20.98       |
|                       | CH6: 2437       | 8.97                  | 30               | 21.03       |
|                       | CH11: 2462      | 8.92                  | 30               | 21.08       |
| IEEE 802.11 n/HT20    | CH1: 2412       | 8.69                  | 30               | 21.31       |
|                       | CH6: 2437       | 8.57                  | 30               | 21.43       |
|                       | CH11: 2462      | 8.71                  | 30               | 21.29       |
| IEEE 802.11 n/HT40    | CH1: 2422       | 8.32                  | 30               | 21.68       |
|                       | CH4: 2437       | 8.26                  | 30               | 21.74       |
|                       | CH7: 2452       | 8.40                  | 30               | 21.60       |
| Conclusion: PASS      |                 |                       |                  |             |

## 8 PEAK POWER SPECTRAL DENSITY

### 8.1 Test limit

8.1.1 Please refer section 15.247.

8.1.2 For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

8.1.3 The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

### 8.2 Method of measurement

Details see the KDB558074 D01 DTS Meas Guidance v03r02.

8.2.1 Place the EUT on the table and set it in transmitting mode.

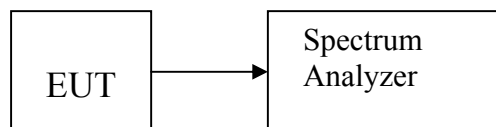
8.2.2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

8.2.3 Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, span=5-30%EBW, detail see the test plot.

8.2.4 Record the max reading.

8.2.5 Repeat the above procedure until the measurements for all frequencies are completed.

### 8.3 Test Setup



## 8.4 Test Results

PASS.

Detailed information please see the following page.

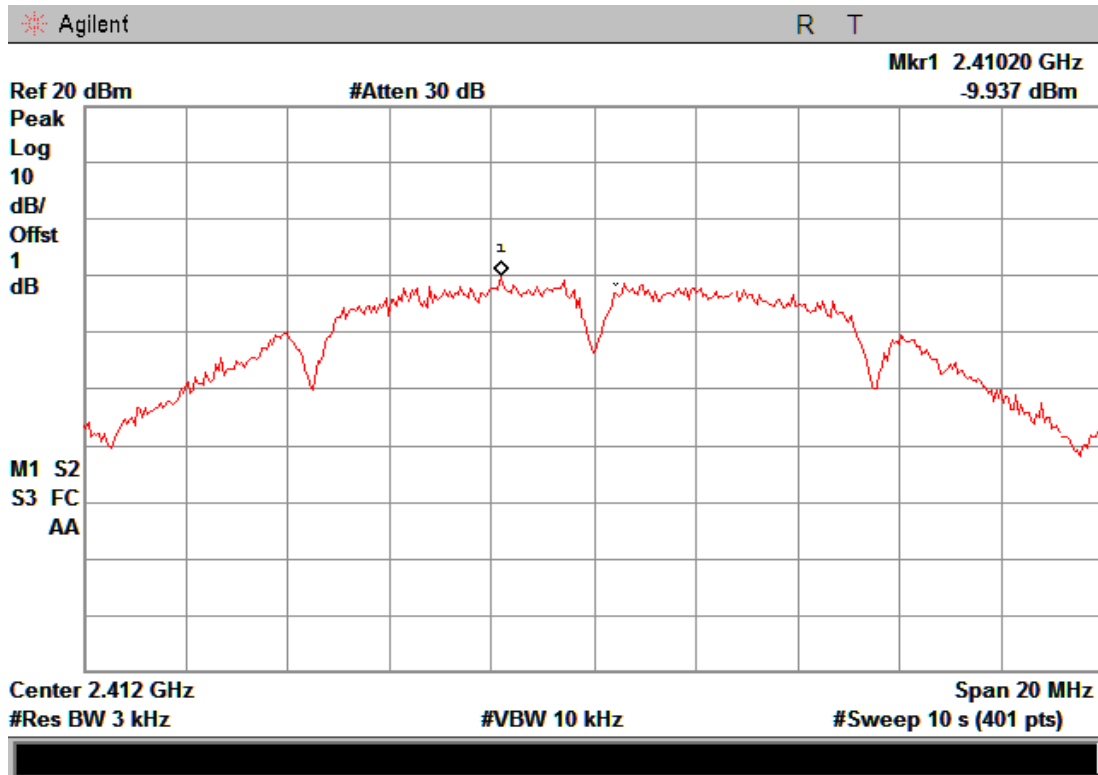
| Channel           | Frequency (MHz) | Power Spectral Density (dBm) | Limit (dBm) | Result |
|-------------------|-----------------|------------------------------|-------------|--------|
| IEEE 802.11b:     |                 |                              |             |        |
| Low               | 2412            | -9.937                       | 8           | PASS   |
| Mid               | 2437            | -11.30                       | 8           | PASS   |
| High              | 2462            | -11.85                       | 8           | PASS   |
| IEEE 802.11g:     |                 |                              |             |        |
| Low               | 2412            | -14.218                      | 8           | PASS   |
| Mid               | 2437            | -13.185                      | 8           | PASS   |
| High              | 2462            | -13.626                      | 8           | PASS   |
| IEEE 802.11n/HT20 |                 |                              |             |        |
| Low               | 2412            | -14.947                      | 8           | PASS   |
| Mid               | 2437            | -13.603                      | 8           | PASS   |
| High              | 2462            | -13.738                      | 8           | PASS   |
| IEEE 802.11n/HT40 |                 |                              |             |        |
| Low               | 2422            | -19.116                      | 8           | PASS   |
| Mid               | 2437            | -17.614                      | 8           | PASS   |
| High              | 2452            | -18.148                      | 8           | PASS   |

Test plot as follows:

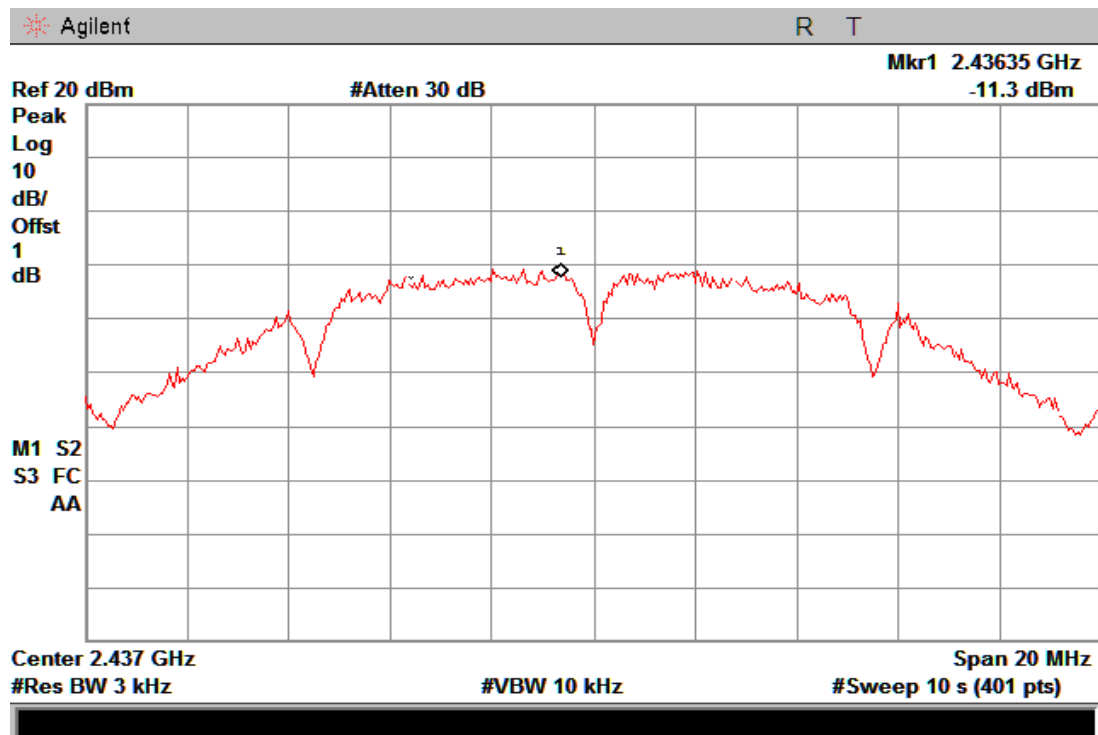
All modes have been tested, the test plot only show the worst mode.

IEEE 802.11b:

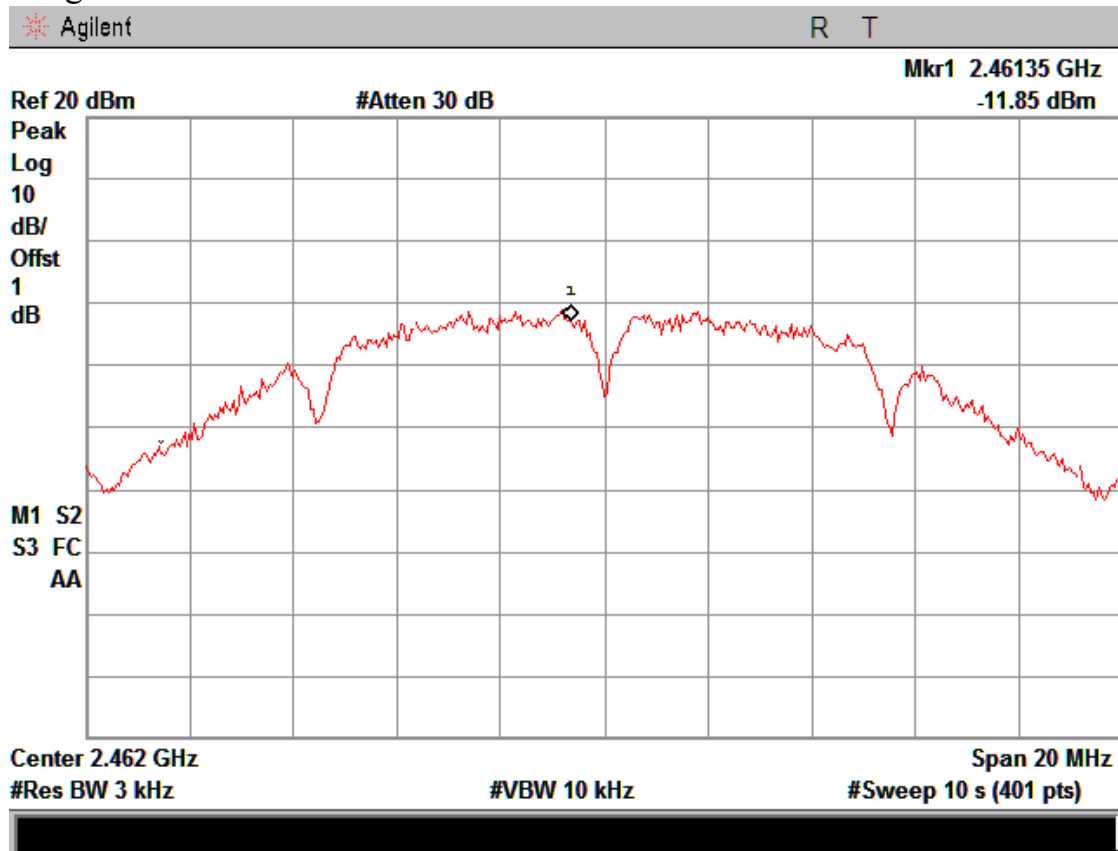
CH Low :



CH Mid :



CH High :



## 9 Bandwidth

### 9.1 Test limit

Please refer section 15.247

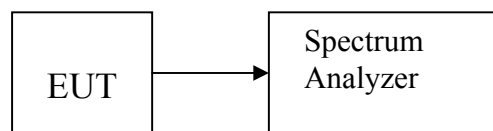
For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

### 9.2 Method of measurement

Details see the KDB558074 D01 DTS Meas Guidance v03r02.

- a) The bandwidth is measured at an amplitude level reduced 20dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.
- b) The test receiver set  $RBW = 100\text{kHz}$ ,  $VBW \geq 3RBW$ , Sweep time set auto, detail see the test plot, Peak detector is used.

### 9.3 Test Setup



### 9.4 Test Results

PASS.

Detailed information please see the following page.

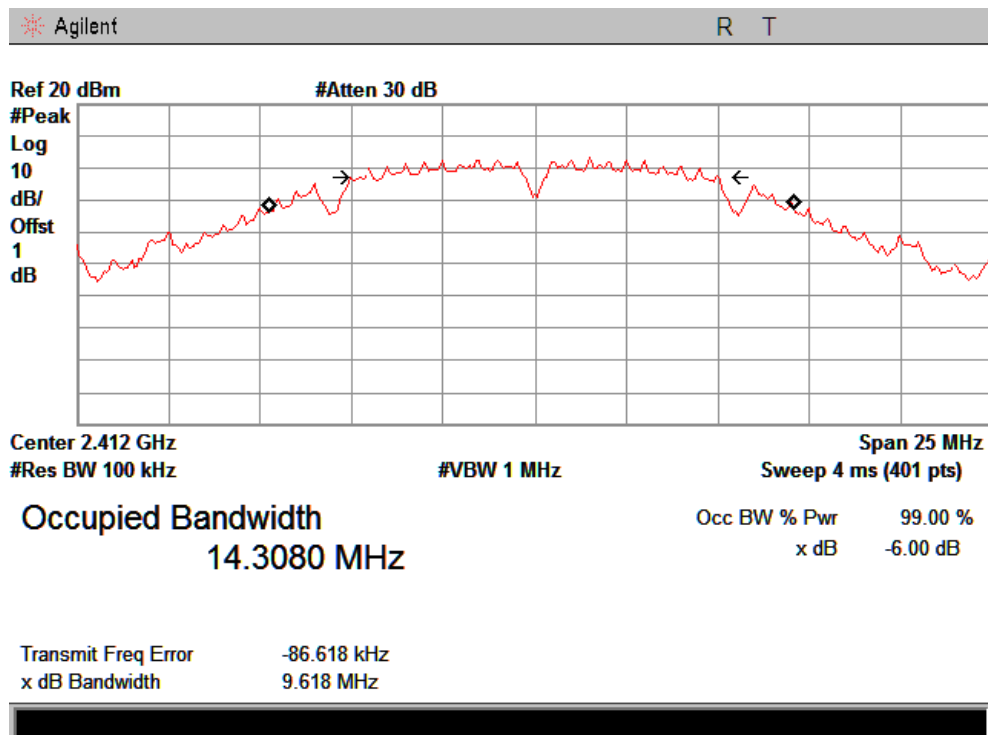
| Channel            | Frequency (MHz) | 6dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) | Limit (MHz) | Result |
|--------------------|-----------------|---------------------|------------------------------|-------------|--------|
| IEEE 802.11b:      |                 |                     |                              |             |        |
| Low                | 2412            | 9.618               | 14.308                       | 0.5         | PASS   |
| Mid                | 2437            | 9.629               | 14.199                       | 0.5         | PASS   |
| High               | 2462            | 10.09               | 14.066                       | 0.5         | PASS   |
| IEEE 802.11g:      |                 |                     |                              |             |        |
| Low                | 2412            | 15.65               | 16.864                       | 0.5         | PASS   |
| Mid                | 2437            | 15.26               | 16.893                       | 0.5         | PASS   |
| High               | 2462            | 15.72               | 16.904                       | 0.5         | PASS   |
| IEEE 802.11n/HT20: |                 |                     |                              |             |        |
| Low                | 2412            | 16.82               | 17.714                       | 0.5         | PASS   |
| Mid                | 2437            | 16.62               | 17.401                       | 0.5         | PASS   |
| High               | 2462            | 16.56               | 17.740                       | 0.5         | PASS   |
| IEEE 802.11n/HT40: |                 |                     |                              |             |        |
| Low                | 2422            | 35.54               | 35.771                       | 0.5         | PASS   |
| Mid                | 2437            | 35.25               | 35.785                       | 0.5         | PASS   |
| High               | 2452            | 35.32               | 35.759                       | 0.5         | PASS   |

Test plot as follows:

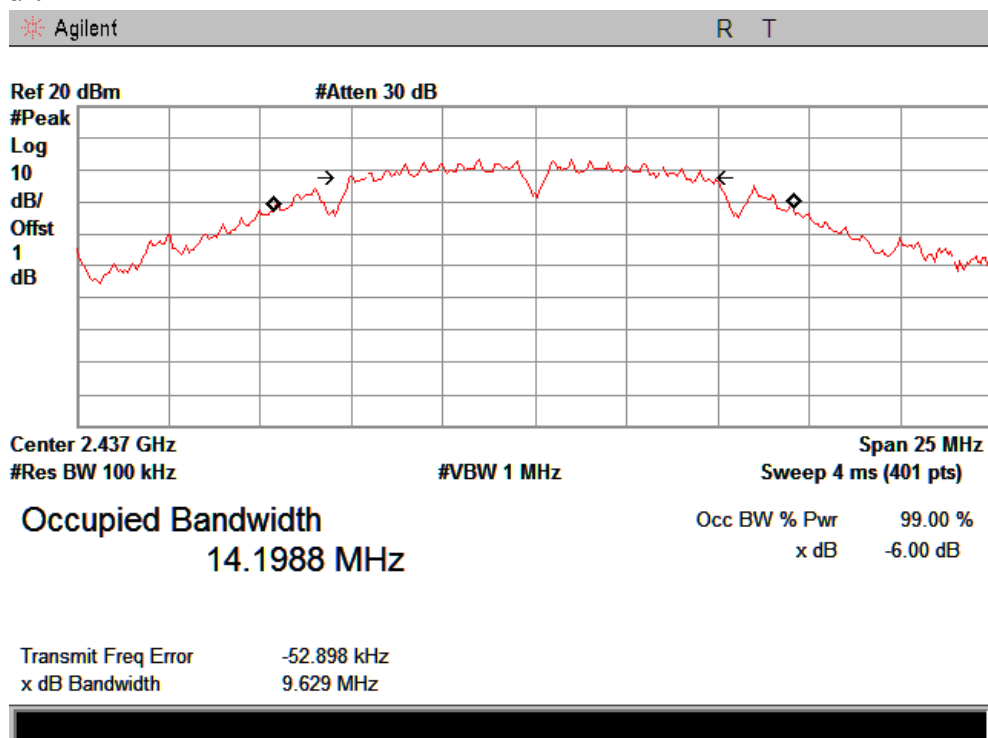
All modes have been tested, the test plot only show the worst mode.

IEEE 802.11b:

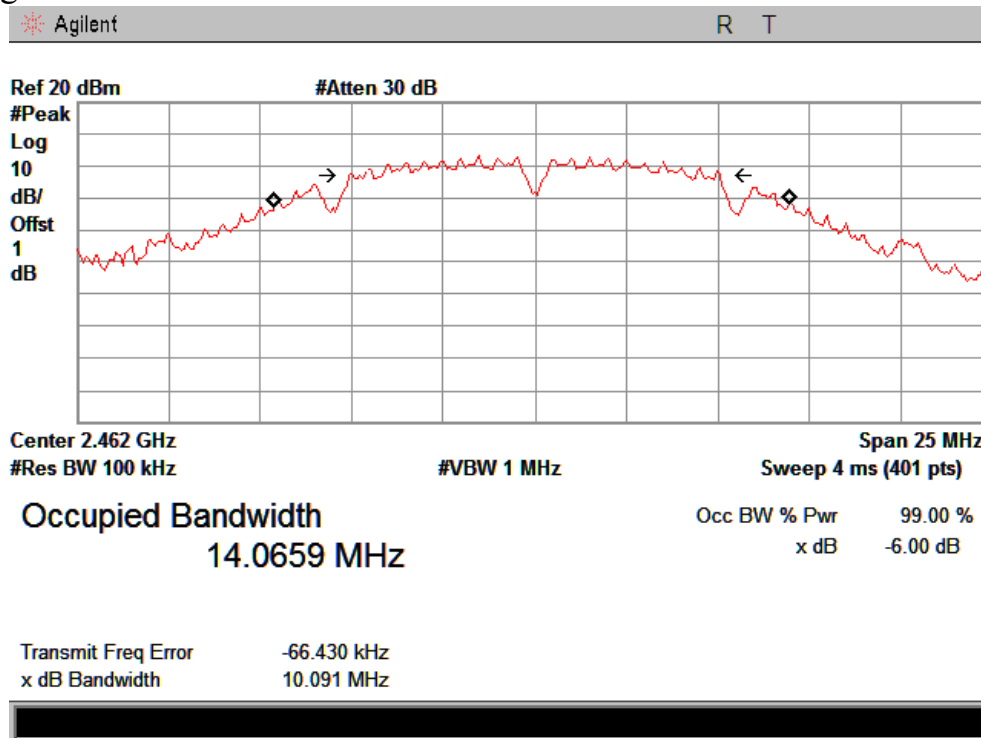
CH Low :



CH Mid :



CH High :



## 10 Band Edge Check

### 10.1 Test limit

Please refer section 15.247

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz and 5725MHz to 5850MHz shall be at least 30dB below the fundamental emissions, or comply with 15.209 limits.

### 10.2 Test Procedure

12.2.1 Put the EUT on a 0.8m high table, power on the EUT. Emissions were scanned and measured rotating the EUT to 360 degrees, Find the maximum Emission

12.2.2 Check the spurious emissions out of band.

12.2.3 RBW,VBW Setting, please see the following test plot.

### 10.3 Test Setup

Same as 5.2.2.

### 10.4 Test Result

PASS.

Detailed information please see the following page.

| Band Edge Test result                                                                             |                     |                       |                       |                 |                 |                  |             |        |
|---------------------------------------------------------------------------------------------------|---------------------|-----------------------|-----------------------|-----------------|-----------------|------------------|-------------|--------|
| EUT: miraffe                                                                                      |                     |                       |                       |                 | M/N: M001       |                  |             |        |
| Power: DC 3.7V From Battery                                                                       |                     |                       |                       |                 |                 |                  |             |        |
| Test date: 2016-04-08                                                                             |                     |                       | Test site: 3m Chamber |                 |                 | Tested by: Mason |             |        |
| Test mode: Tx CH Low 2412MHz                                                                      |                     |                       |                       |                 |                 |                  |             |        |
| Antenna polarity: Vertical                                                                        |                     |                       |                       |                 |                 |                  |             |        |
| Freq (MHz)                                                                                        | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB)        | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m)   | Margin (dB) | Remark |
| 2390                                                                                              | 46.07               | 27.62                 | 3.92                  | 34.97           | 42.64           | 74               | 31.36       | PK     |
| 2390                                                                                              | /                   | 27.62                 | 3.92                  | 34.97           | /               | 54               | /           | AV     |
| 2400                                                                                              | 55.38               | 27.62                 | 3.94                  | 34.97           | 51.97           | 74               | 22.03       | PK     |
| 2400                                                                                              | /                   | 27.62                 | 3.94                  | 34.97           | /               | 54               | /           | AV     |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
| Antenna Polarity: Horizontal                                                                      |                     |                       |                       |                 |                 |                  |             |        |
| 2390                                                                                              | 47.86               | 27.62                 | 3.92                  | 34.97           | 44.43           | 74               | 29.57       | PK     |
| 2390                                                                                              | /                   | 27.62                 | 3.92                  | 34.97           | /               | 54               | /           | AV     |
| 2400                                                                                              | 57.03               | 27.62                 | 3.94                  | 34.97           | 53.62           | 74               | 20.38       | PK     |
| 2400                                                                                              | /                   | 27.62                 | 3.94                  | 34.97           | /               | 54               | /           | AV     |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
| Note:                                                                                             |                     |                       |                       |                 |                 |                  |             |        |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                  |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                  |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                       |                 |                 |                  |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                       |                 |                 |                  |             |        |

| Band Edge Test result                                                                             |                     |                       |                       |                 |                 |                  |             |        |
|---------------------------------------------------------------------------------------------------|---------------------|-----------------------|-----------------------|-----------------|-----------------|------------------|-------------|--------|
| EUT: miraffe                                                                                      |                     |                       |                       |                 | M/N: M001       |                  |             |        |
| Power: DC 3.7V From Battery                                                                       |                     |                       |                       |                 |                 |                  |             |        |
| Test date: 2016-04-08                                                                             |                     |                       | Test site: 3m Chamber |                 |                 | Tested by: Mason |             |        |
| Test mode: Tx CH High 2462MHz                                                                     |                     |                       |                       |                 |                 |                  |             |        |
| Antenna polarity: Vertical                                                                        |                     |                       |                       |                 |                 |                  |             |        |
| Freq (MHz)                                                                                        | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB)        | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m)   | Margin (dB) | Remark |
| 2483.5                                                                                            | 47.16               | 27.59                 | 4.00                  | 34.97           | 43.78           | 74               | 30.22       | PK     |
| 2483.5                                                                                            | /                   | 27.59                 | 4.00                  | 34.97           | /               | 54               | /           | AV     |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
| Antenna Polarity: Horizontal                                                                      |                     |                       |                       |                 |                 |                  |             |        |
| 2483.5                                                                                            | 47.72               | 27.59                 | 4.00                  | 34.97           | 44.34           | 74               | 29.66       | PK     |
| 2483.5                                                                                            | /                   | 27.59                 | 4.00                  | 34.97           | /               | 54               | /           | AV     |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
| Note:                                                                                             |                     |                       |                       |                 |                 |                  |             |        |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                  |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                  |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                       |                 |                 |                  |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                       |                 |                 |                  |             |        |

| Band Edge Test result        |                     |                       |                       |                 |                 |                  |             |        |
|------------------------------|---------------------|-----------------------|-----------------------|-----------------|-----------------|------------------|-------------|--------|
| EUT: miraffe                 |                     |                       |                       |                 | M/N: M001       |                  |             |        |
| Power: DC 3.7V From Battery  |                     |                       |                       |                 |                 |                  |             |        |
| Test date: 2016-04-08        |                     |                       | Test site: 3m Chamber |                 |                 | Tested by: Mason |             |        |
| Test mode: Tx CH Low 2412MHz |                     |                       |                       |                 |                 |                  |             |        |
| Antenna polarity: Vertical   |                     |                       |                       |                 |                 |                  |             |        |
| Freq (MHz)                   | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(d B)       | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m)   | Margin (dB) | Remark |
| 2390                         | 45.60               | 27.62                 | 3.92                  | 34.97           | 42.17           | 74               | 31.83       | PK     |
| 2390                         | /                   | 27.62                 | 3.92                  | 34.97           | /               | 54               | /           | AV     |
| 2400                         | 53.11               | 27.62                 | 3.94                  | 34.97           | 49.70           | 74               | 24.30       | PK     |
| 2400                         | /                   | 27.62                 | 3.94                  | 34.97           | /               | 54               | /           | AV     |
|                              |                     |                       |                       |                 |                 |                  |             |        |
| Antenna Polarity: Horizontal |                     |                       |                       |                 |                 |                  |             |        |
| 2390                         | 45.97               | 27.62                 | 3.92                  | 34.97           | 42.54           | 74               | 31.46       | PK     |
| 2390                         | /                   | 27.62                 | 3.92                  | 34.97           | /               | 54               | /           | AV     |
| 2400                         | 54.12               | 27.62                 | 3.94                  | 34.97           | 50.71           | 74               | 23.29       | PK     |
| 2400                         | /                   | 27.62                 | 3.94                  | 34.97           | /               | 54               | /           | AV     |
|                              |                     |                       |                       |                 |                 |                  |             |        |

Note:

- 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
- 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
- 3, Result = Read level + Antenna factor + cable loss-Amp factor
- 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

| Band Edge Test result                                                                             |                     |                       |                       |                 |                 |                  |             |        |
|---------------------------------------------------------------------------------------------------|---------------------|-----------------------|-----------------------|-----------------|-----------------|------------------|-------------|--------|
| EUT: miraffe                                                                                      |                     |                       |                       |                 | M/N: M001       |                  |             |        |
| Power: DC 3.7V From Battery                                                                       |                     |                       |                       |                 |                 |                  |             |        |
| Test date: 2016-04-08                                                                             |                     |                       | Test site: 3m Chamber |                 |                 | Tested by: Mason |             |        |
| Test mode: Tx CH High 2462MHz                                                                     |                     |                       |                       |                 |                 |                  |             |        |
| Antenna polarity: Vertical                                                                        |                     |                       |                       |                 |                 |                  |             |        |
| Freq (MHz)                                                                                        | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB)        | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m)   | Margin (dB) | Remark |
| 2483.5                                                                                            | 45.74               | 27.59                 | 4.00                  | 34.97           | 42.36           | 74               | 31.64       | PK     |
| 2483.5                                                                                            | /                   | 27.59                 | 4.00                  | 34.97           | /               | 54               | /           | AV     |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
| Antenna Polarity: Horizontal                                                                      |                     |                       |                       |                 |                 |                  |             |        |
| 2483.5                                                                                            | 46.62               | 27.59                 | 4.00                  | 34.97           | 43.24           | 74               | 30.76       | PK     |
| 2483.5                                                                                            | /                   | 27.59                 | 4.00                  | 34.97           | /               | 54               | /           | AV     |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
| Note:                                                                                             |                     |                       |                       |                 |                 |                  |             |        |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                  |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                  |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                       |                 |                 |                  |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                       |                 |                 |                  |             |        |

| Band Edge Test result                                                                             |                     |                       |                       |                 |                 |                  |             |        |
|---------------------------------------------------------------------------------------------------|---------------------|-----------------------|-----------------------|-----------------|-----------------|------------------|-------------|--------|
| EUT: miraffe                                                                                      |                     |                       |                       |                 | M/N: M001       |                  |             |        |
| Power: DC 3.7V From Battery                                                                       |                     |                       |                       |                 |                 |                  |             |        |
| Test date: 2016-04-08                                                                             |                     |                       | Test site: 3m Chamber |                 |                 | Tested by: Mason |             |        |
| Test mode: Tx CH Low 2412MHz                                                                      |                     |                       |                       |                 |                 |                  |             |        |
| Antenna polarity: Vertical                                                                        |                     |                       |                       |                 |                 |                  |             |        |
| Freq (MHz)                                                                                        | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB)        | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m)   | Margin (dB) | Remark |
| 2390                                                                                              | 45.28               | 27.62                 | 3.92                  | 34.97           | 41.85           | 74               | 32.15       | PK     |
| 2390                                                                                              | /                   | 27.62                 | 3.92                  | 34.97           | /               | 54               | /           | AV     |
| 2400                                                                                              | 52.87               | 27.62                 | 3.94                  | 34.97           | 49.46           | 74               | 24.54       | PK     |
| 2400                                                                                              | /                   | 27.62                 | 3.94                  | 34.97           | /               | 54               | /           | AV     |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
| Antenna Polarity: Horizontal                                                                      |                     |                       |                       |                 |                 |                  |             |        |
| 2390                                                                                              | 45.71               | 27.62                 | 3.92                  | 34.97           | 42.28           | 74               | 31.72       | PK     |
| 2390                                                                                              | /                   | 27.62                 | 3.92                  | 34.97           | /               | 54               | /           | AV     |
| 2400                                                                                              | 53.62               | 27.62                 | 3.94                  | 34.97           | 50.21           | 74               | 23.79       | PK     |
| 2400                                                                                              | /                   | 27.62                 | 3.94                  | 34.97           | /               | 54               | /           | AV     |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
| Note:                                                                                             |                     |                       |                       |                 |                 |                  |             |        |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                  |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                  |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                       |                 |                 |                  |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                       |                 |                 |                  |             |        |

| Band Edge Test result                                                                             |                     |                       |                       |                 |                 |                  |             |        |
|---------------------------------------------------------------------------------------------------|---------------------|-----------------------|-----------------------|-----------------|-----------------|------------------|-------------|--------|
| EUT: miraffe                                                                                      |                     |                       |                       |                 | M/N: M001       |                  |             |        |
| Power: DC 3.7V From Battery                                                                       |                     |                       |                       |                 |                 |                  |             |        |
| Test date: 2016-04-08                                                                             |                     |                       | Test site: 3m Chamber |                 |                 | Tested by: Mason |             |        |
| Test mode: Tx CH High 2462MHz                                                                     |                     |                       |                       |                 |                 |                  |             |        |
| Antenna polarity: Vertical                                                                        |                     |                       |                       |                 |                 |                  |             |        |
| Freq (MHz)                                                                                        | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB)        | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m)   | Margin (dB) | Remark |
| 2483.5                                                                                            | 45.26               | 27.59                 | 4.00                  | 34.97           | 41.88           | 74               | 32.12       | PK     |
| 2483.5                                                                                            | /                   | 27.59                 | 4.00                  | 34.97           | /               | 54               | /           | AV     |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
| Antenna Polarity: Horizontal                                                                      |                     |                       |                       |                 |                 |                  |             |        |
| 2483.5                                                                                            | 46.13               | 27.59                 | 4.00                  | 34.97           | 42.75           | 74               | 31.25       | PK     |
| 2483.5                                                                                            | /                   | 27.59                 | 4.00                  | 34.97           | /               | 54               | /           | AV     |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
| Note:                                                                                             |                     |                       |                       |                 |                 |                  |             |        |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                  |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                  |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                       |                 |                 |                  |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                       |                 |                 |                  |             |        |

| Band Edge Test result                                                                             |                     |                       |                       |                 |                 |                  |             |        |
|---------------------------------------------------------------------------------------------------|---------------------|-----------------------|-----------------------|-----------------|-----------------|------------------|-------------|--------|
| EUT: miraffe                                                                                      |                     |                       |                       |                 | M/N: M001       |                  |             |        |
| Power: DC 3.7V From Battery                                                                       |                     |                       |                       |                 |                 |                  |             |        |
| Test date: 2016-04-08                                                                             |                     |                       | Test site: 3m Chamber |                 |                 | Tested by: Mason |             |        |
| Test mode: Tx CH Low 2412MHz                                                                      |                     |                       |                       |                 |                 |                  |             |        |
| Antenna polarity: Vertical                                                                        |                     |                       |                       |                 |                 |                  |             |        |
| Freq (MHz)                                                                                        | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB)        | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m)   | Margin (dB) | Remark |
| 2390                                                                                              | 44.37               | 27.62                 | 3.92                  | 34.97           | 40.94           | 74               | 33.06       | PK     |
| 2390                                                                                              | /                   | 27.62                 | 3.92                  | 34.97           | /               | 54               | /           | AV     |
| 2400                                                                                              | 53.15               | 27.62                 | 3.94                  | 34.97           | 49.74           | 74               | 24.26       | PK     |
| 2400                                                                                              | /                   | 27.62                 | 3.94                  | 34.97           | /               | 54               | /           | AV     |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
| Antenna Polarity: Horizontal                                                                      |                     |                       |                       |                 |                 |                  |             |        |
| 2390                                                                                              | 45.98               | 27.62                 | 3.92                  | 34.97           | 42.55           | 74               | 31.45       | PK     |
| 2390                                                                                              | /                   | 27.62                 | 3.92                  | 34.97           | /               | 54               | /           | AV     |
| 2400                                                                                              | 54.79               | 27.62                 | 3.94                  | 34.97           | 51.38           | 74               | 22.62       | PK     |
| 2400                                                                                              | /                   | 27.62                 | 3.94                  | 34.97           | /               | 54               | /           | AV     |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
| Note:                                                                                             |                     |                       |                       |                 |                 |                  |             |        |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                  |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                  |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                       |                 |                 |                  |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                       |                 |                 |                  |             |        |

| Band Edge Test result                                                                             |                     |                       |                       |                 |                 |                  |             |        |
|---------------------------------------------------------------------------------------------------|---------------------|-----------------------|-----------------------|-----------------|-----------------|------------------|-------------|--------|
| EUT: miraffe                                                                                      |                     |                       |                       |                 | M/N: M001       |                  |             |        |
| Power: DC 3.7V From Battery                                                                       |                     |                       |                       |                 |                 |                  |             |        |
| Test date: 2016-04-08                                                                             |                     |                       | Test site: 3m Chamber |                 |                 | Tested by: Mason |             |        |
| Test mode: Tx CH High 2462MHz                                                                     |                     |                       |                       |                 |                 |                  |             |        |
| Antenna polarity: Vertical                                                                        |                     |                       |                       |                 |                 |                  |             |        |
| Freq (MHz)                                                                                        | Read Level (dBuV/m) | Antenna Factor (dB/m) | Cable loss(dB)        | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m)   | Margin (dB) | Remark |
| 2483.5                                                                                            | 44.19               | 27.59                 | 4.00                  | 34.97           | 40.81           | 74               | 33.19       | PK     |
| 2483.5                                                                                            | /                   | 27.59                 | 4.00                  | 34.97           | /               | 54               | /           | AV     |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
| Antenna Polarity: Horizontal                                                                      |                     |                       |                       |                 |                 |                  |             |        |
| 2483.5                                                                                            | 45.56               | 27.59                 | 4.00                  | 34.97           | 42.18           | 74               | 31.82       | PK     |
| 2483.5                                                                                            | /                   | 27.59                 | 4.00                  | 34.97           | /               | 54               | /           | AV     |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
|                                                                                                   |                     |                       |                       |                 |                 |                  |             |        |
| Note:                                                                                             |                     |                       |                       |                 |                 |                  |             |        |
| 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                  |             |        |
| 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK                 |                     |                       |                       |                 |                 |                  |             |        |
| 3, Result = Read level + Antenna factor + cable loss-Amp factor                                   |                     |                       |                       |                 |                 |                  |             |        |
| 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit. |                     |                       |                       |                 |                 |                  |             |        |

IEEE 802.11b :

**Agilent Spectrum Analyzer - Sweep SA**

Marker 1 2.412520000000 GHz  
 PNO: Fast IFGain: Low Trig: Periodic Atten: 20 dB  
 Avg Type: Log-Pwr Avg/Hold: >100/100

TRACE 1 2 3 4 5 6  
 TYPE M N N N N N  
 DET P N N N N N

Peak Search  
 Next Peak  
 Next Pk Right  
 Next Pk Left  
 Marker Delta  
 Mkr→CF  
 Mkr→Ref Lvl  
 More  
 1 of 2

10 dB/div Ref 10.00 dBm

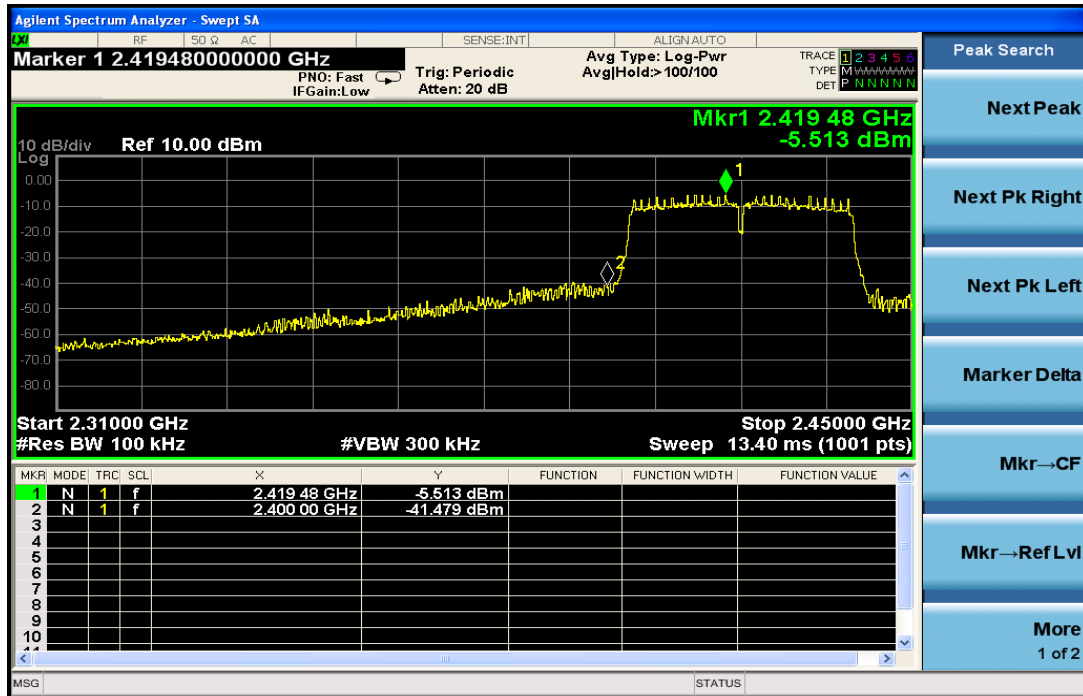
Mkr1 2.412 52 GHz  
 6.215 dBm

| MKR | MODE | TRC | SCL | X            | Y           | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|-----|------|-----|-----|--------------|-------------|----------|----------------|----------------|
| 1   | N    | 1   | f   | 2.412 52 GHz | 6.215 dBm   |          |                |                |
| 2   | N    | 1   | f   | 2.400 00 GHz | -32.952 dBm |          |                |                |
| 3   |      |     |     |              |             |          |                |                |
| 4   |      |     |     |              |             |          |                |                |
| 5   |      |     |     |              |             |          |                |                |
| 6   |      |     |     |              |             |          |                |                |
| 7   |      |     |     |              |             |          |                |                |
| 8   |      |     |     |              |             |          |                |                |
| 9   |      |     |     |              |             |          |                |                |
| 10  |      |     |     |              |             |          |                |                |

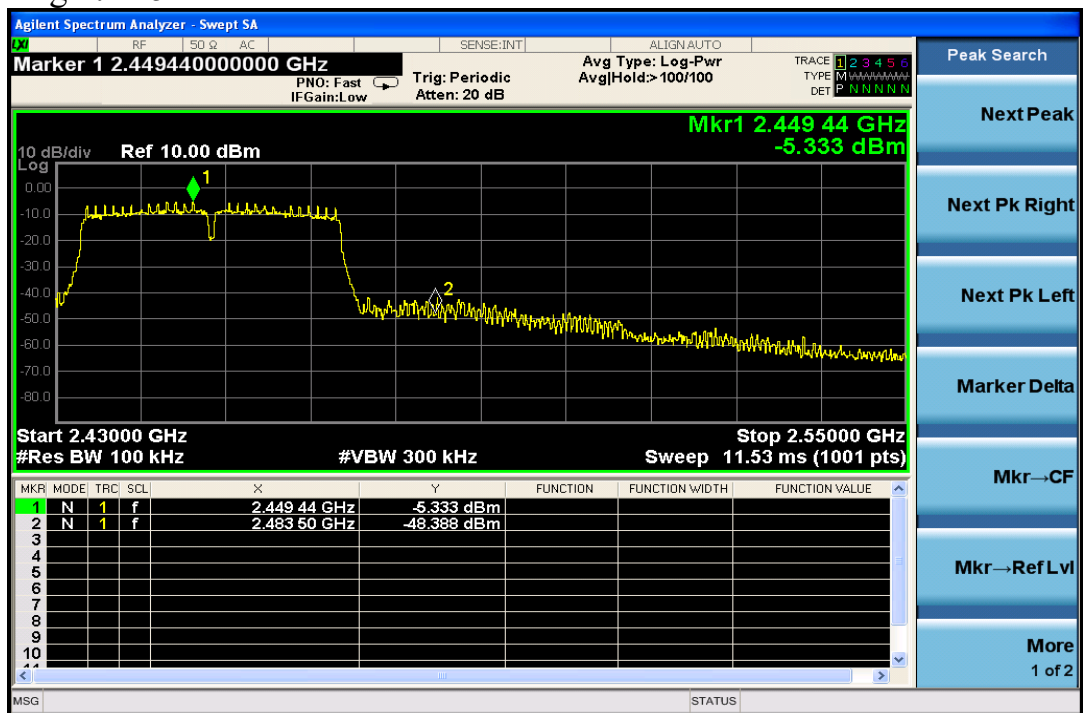
Start 2.31000 GHz Stop 2.42000 GHz  
 #Res BW 100 kHz #VBW 300 kHz Sweep 10.53 ms (1001 pts)

[illegible]

IEEE 802.11n H40 :  
CH LOW : 2422MHz



CH High : 2452MHz



## 11 Antenna Requirement

### 11.1 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 shall be considered sufficient to comply with the provisions of this Section. 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.

### 11.2 Antenna Connected Construction

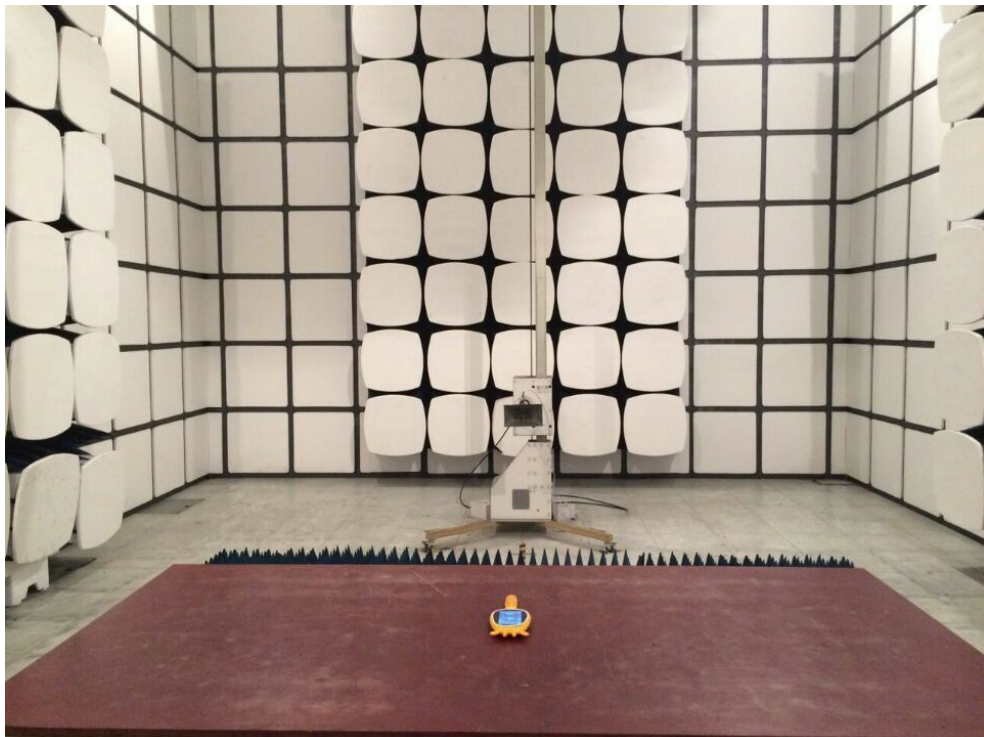
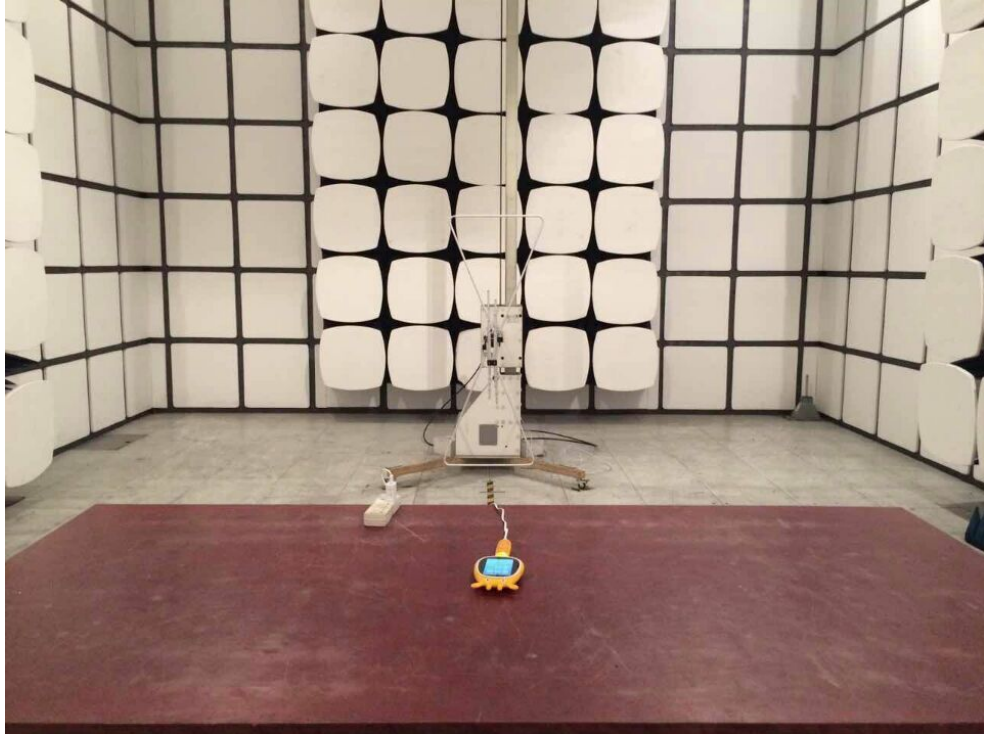
The directional gains of antenna used for transmitting is 1.0 dBi, and the antenna is de-signed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

### 11.3 Result

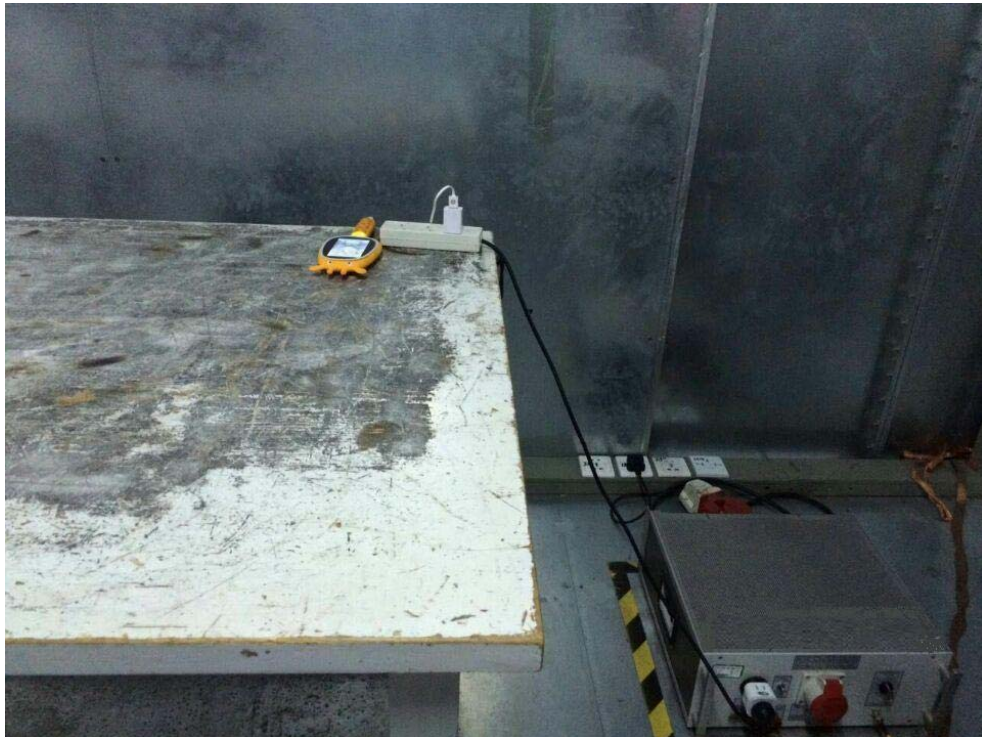
The antennas used for this product are PIFA Antenna for WIFI, no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 1.0dBi for WIFI.

## 12 Photographs of Test Setup

### 12.1 Photos of Radiated emission



## 12.2 Photos of Conducted Emission test

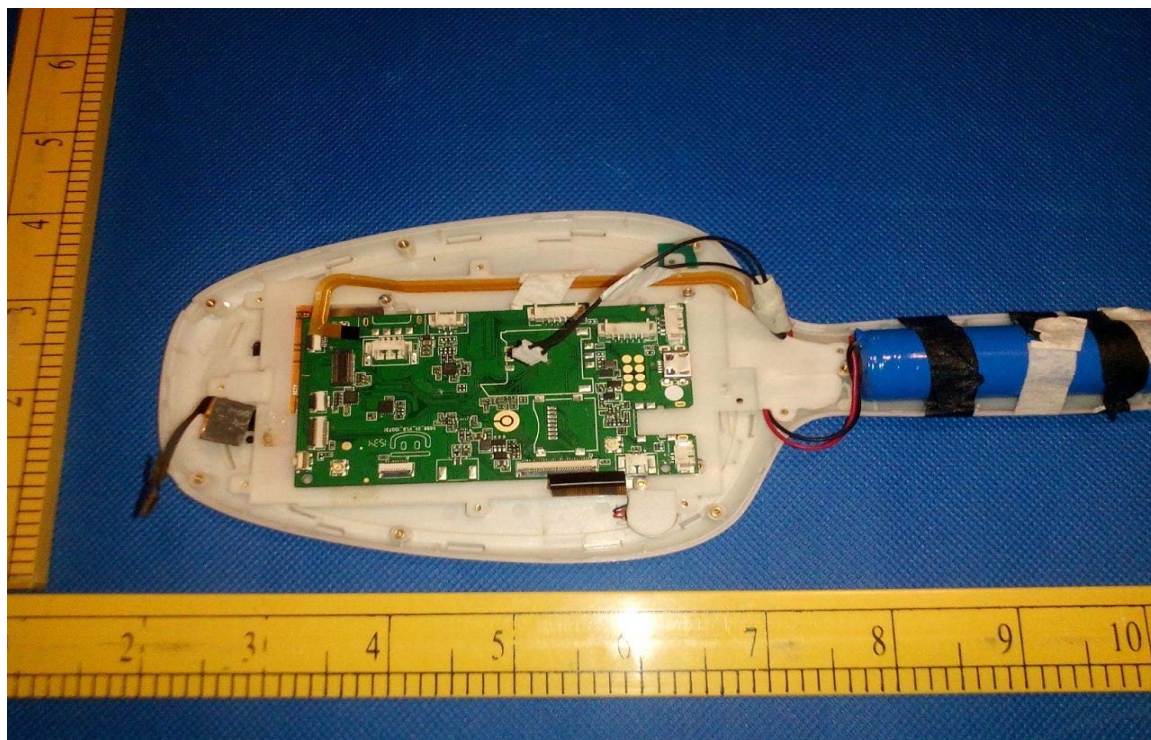


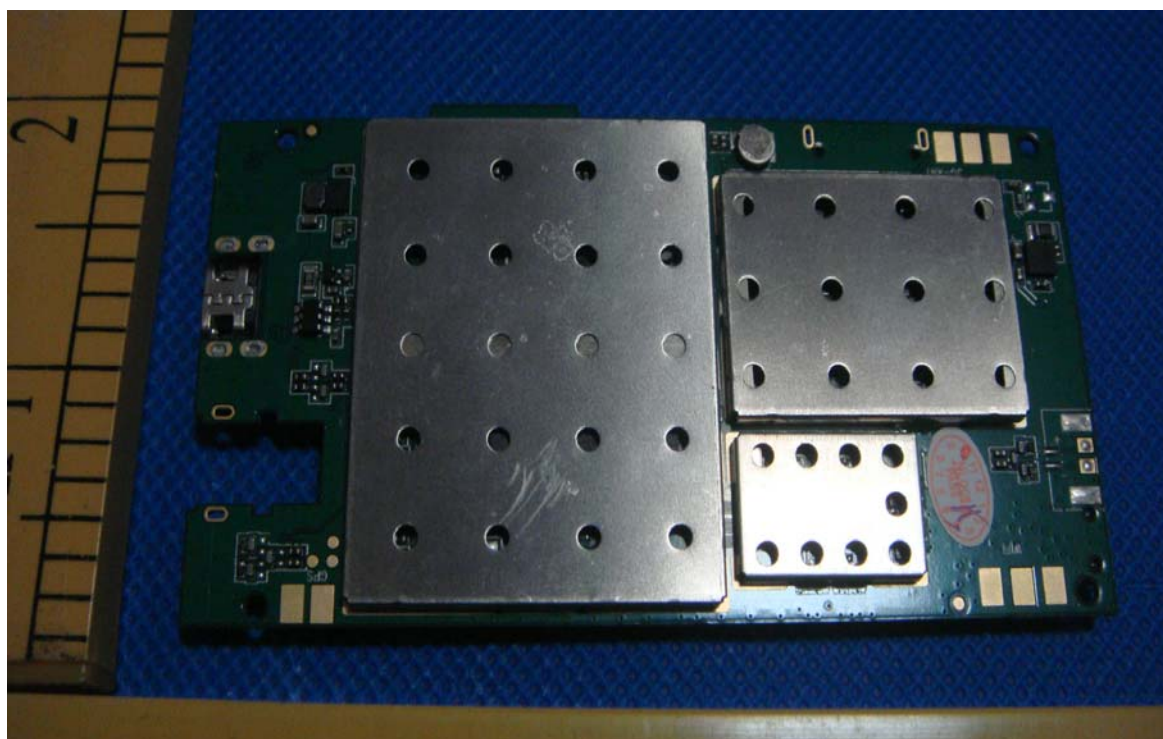
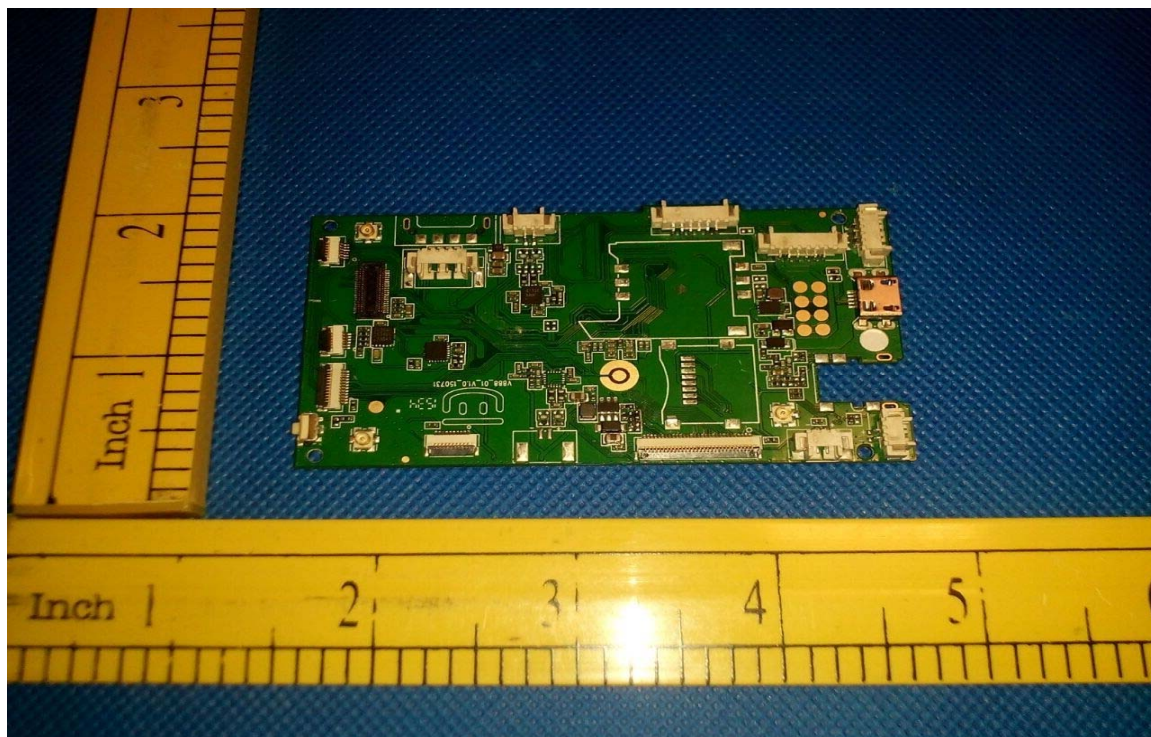
### 13 Photographs of EUT

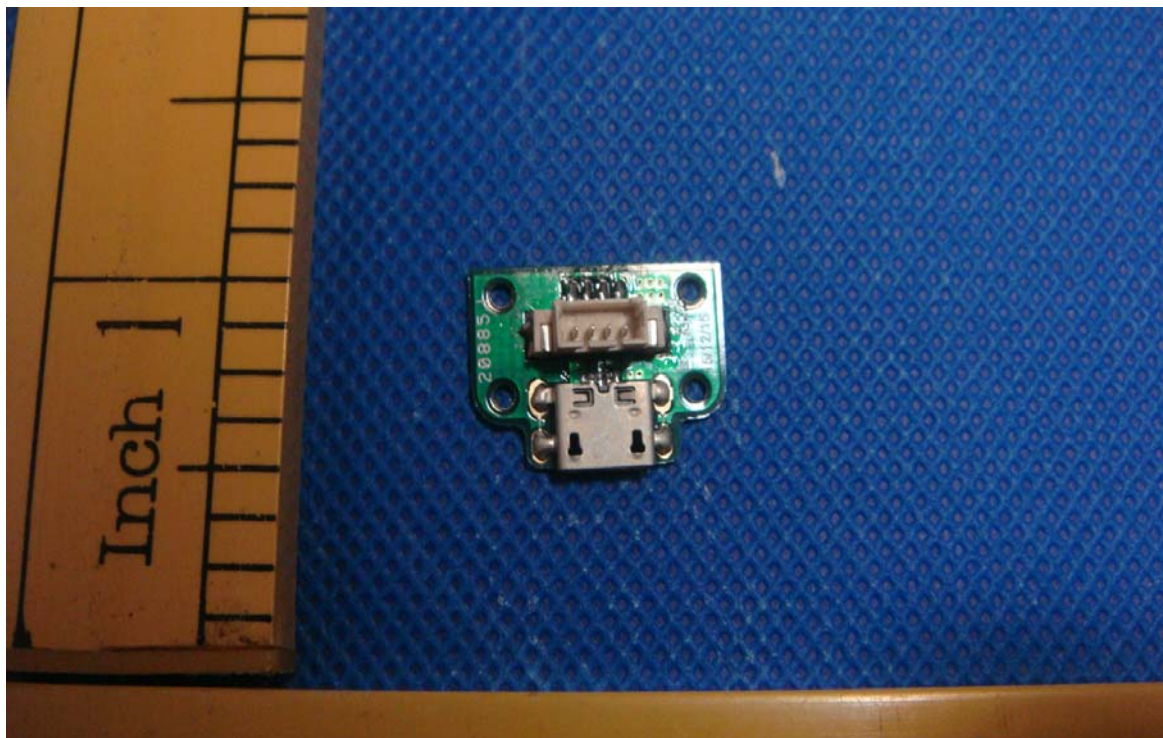
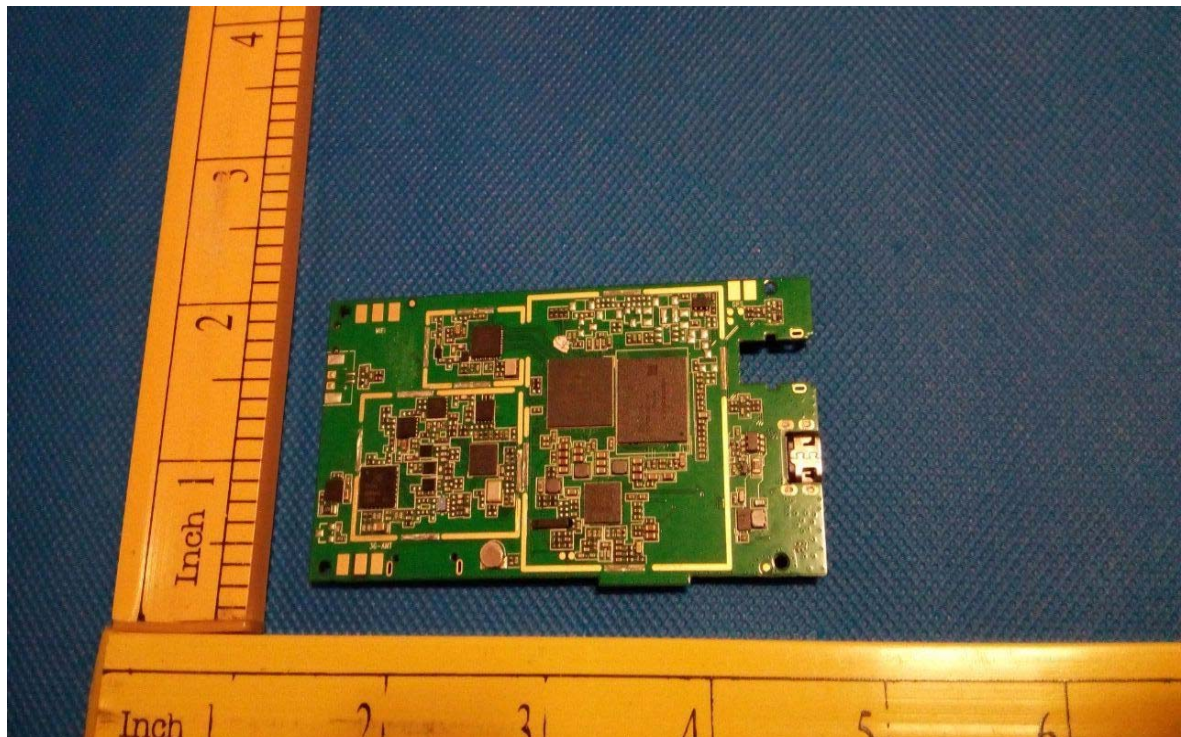


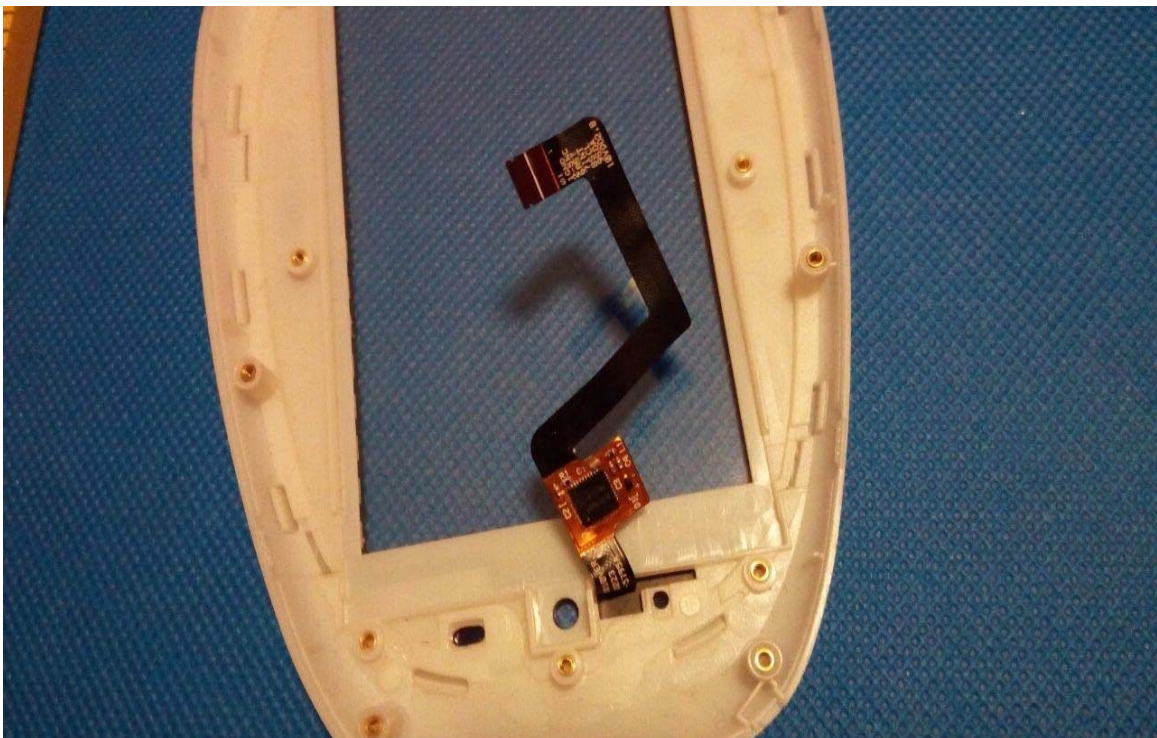
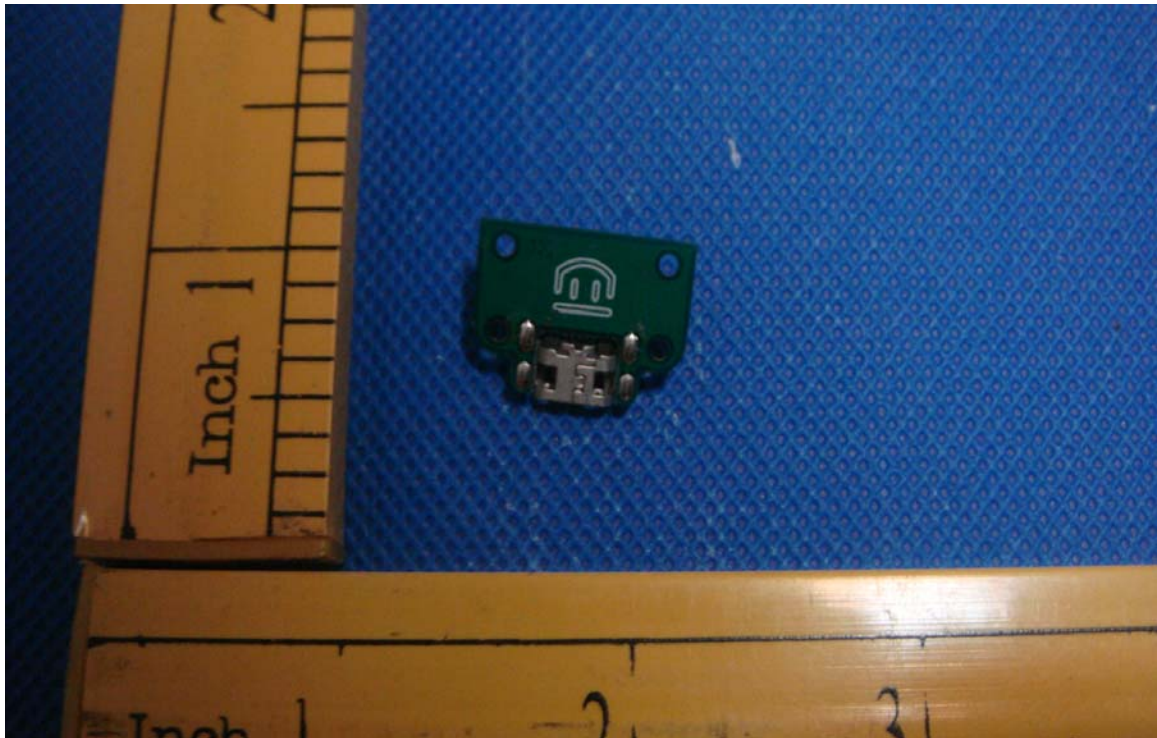


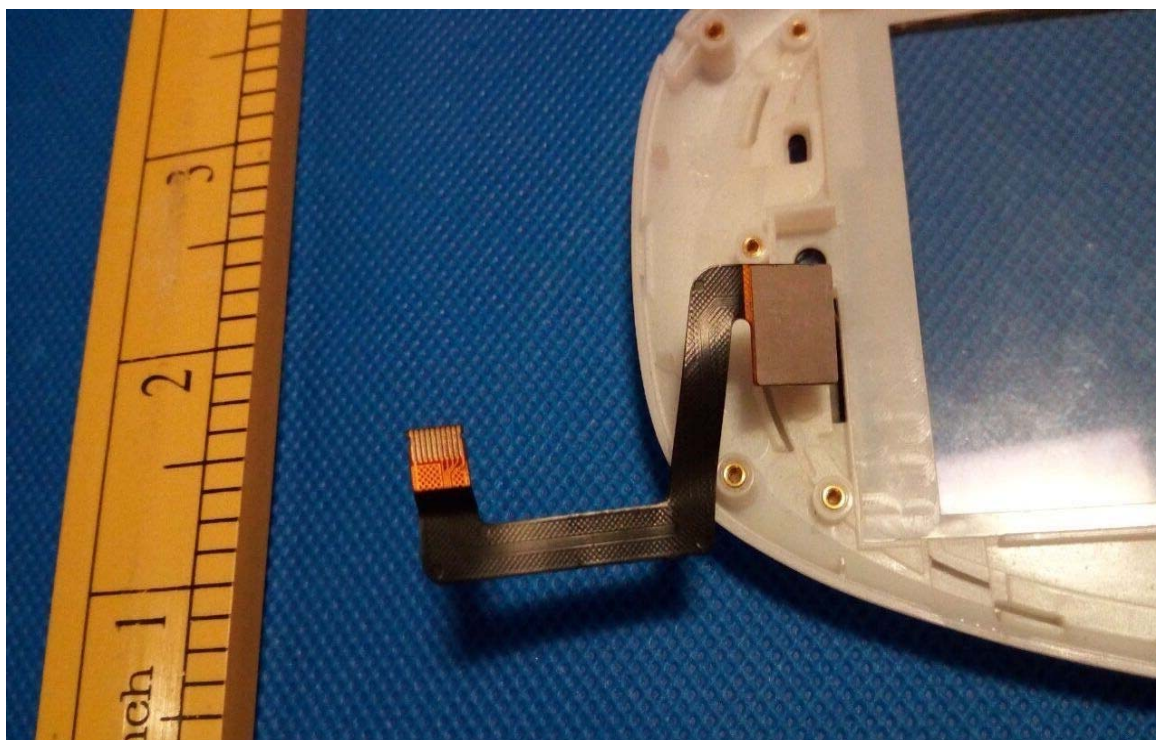












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