

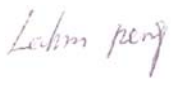

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Gakkiku Technology

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## Test Report

|  |  |
|--|--|
| <b>Applicant</b>                           | HobbyEngine Model Ltd.   |
| <b>Address</b>                             | Room 619, 6/F., Peninsula Centre,<br>67 Mody Road, TsimShaTsui East, Kowloon,<br>Hong Kong   |
| <b>FCC ID Number</b>                       | FCC ID: QW70300  |
| <b>Brand Name(s)</b>                       | None   |
| <b>Model Number(s)/<br/>Item Number(s)</b> | 0300, 0301, 0302, 0303, 0304, 0305, 0306, 0307, 0308, 0309, 0310,<br>0311, 0312, 0313, 0314, 0315, 0316, 0317, 0318, 0319, 0320, 0321, 0322,<br>0323, 0324, 0325, 0326, 0327, 0328, 0329, 0330, 0331, 0332, 0333,<br>0334, 0335, 0336, 0337, 0338, 0339, 0340, 0341, 0342, 0343, 0344,<br>0345, 0346, 0347, 0348, 0349 |
| <b>Product Description</b>                 | 2.402-2.480 GHz Wireless Remote Control Device - TX  |
| <b>Operating Frequency</b>                 | 2.402-2.480 GHz  |
| <b>Rules/Standards</b>                     | Part 15.249 of the FCC Rules   |
| <b>Received Date</b>                       | 6th November, 2013   |
| <b>Tested Date</b>                         | 7th November, 2013   |
| <b>Approved by</b>                         | Dick Chan (Director of Gakkiku)  |
| <b>Tested by</b>                           |  Lahm Peng (Engineer of Shenzhen SEM.Test)  |
| <b>Signed by</b>                           |  Jandy So (Manager of Shenzhen SEM.Test)  |
| <b>Report Number</b>                       | GKK201311060A  |
| <b>Test Results</b>                        | <input checked="" type="checkbox"/> PASSED <input type="checkbox"/> FAILED   |

**GENERAL**

The report is written by Gakkiku Technology Company. The tested device complies with the general approval requirements of the FCC Rules and the Industry Canada as identified in this test report.

**TEST LOCATION**

The tested device was tested at the test site of the Shenzhen SEM.Test Technology Co., Ltd., 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, 518101, Guangdong, China. The FCC Recognized 2.948 Listed Test Firm Registration Number is 934118. The Industry Canada IC OATS Filing Number/Assigned Code is 11464A.

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# 1. GENERAL INFORMATION

## 1.1 Product Description for Equipment Under Test (EUT)

### Client Information

Applicant: HobbyEngine Model Ltd.  
 Address of applicant: Room 619, 6/F., Peninsula Centre, 67 Mody Road,  
 TsimShaTsui East, Kowloon, Hong Kong

Manufacturer: HobbyEngine Model Ltd.  
 Address of manufacturer: Room 619, 6/F., Peninsula Centre, 67 Mody Road,  
 TsimShaTsui East, Kowloon, Hong Kong

### General Description of EUT

| Item  | Description  |
|---|--|
| Product Description:  | 2.402-2.480 GHz Wireless Remote Control Device - TX  |
| Brand Name(s):  | /  |
| Model Number(s)/<br>Item Number(s):   | 0300, 0301, 0302, 0303, 0304, 0305, 0306, 0307, 0308, 0309,<br>0310, 0311, 0312, 0313, 0314, 0315, 0316, 0317, 0318, 0319,<br>0320, 0321, 0322, 0323, 0324, 0325, 0326, 0327, 0328, 0329,<br>0330, 0331, 0332, 0333, 0334, 0335, 0336, 0337, 0338, 0339,<br>0340, 0341, 0342, 0343, 0344, 0345, 0346, 0347, 0348, 0349 |
| Power Source:   | 4 X DC 1.5V AA-Size Batteries  |
| Output Power:   | <0dBm  |
| Frequency Range:  | 2.402-2.480 GHz  |
| No. of Channel:   | /  |
| Channel Separation:   | /  |
| Antenna Type:   | Integral Antenna   |
| Size:   | 9.9x6.1x3.0 cm   |
| For more information refer to the circuit diagram form and the user's manual. |  |

*The test data is gathered from a production sample, provided by the manufacturer.*

## 1.2 Test Standards

The following report is prepared on behalf of the HobbyEngine Model Ltd. in accordance with FCC Part 15, Subpart B, Subpart C, and Part 15.249, 15.107, 15.203, 15.205, 15.207 and 15.209 of the FCC Rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and Part 15.249, 15.107, 15.203, 15.205, 15.207 and 15.209 of the FCC Rules.

**Maintenance of compliance** is the responsibility of the manufacturer. Any modification of the product, which results in lowering the emission, should be checked to ensure compliance has been maintained.

### 1.3 Related Submittal(s)/Grant(s)

No Related Submittal(s).

### 1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard Institute for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the Operating Instructions and let the EUT keep transmitting.

### 1.5 Test Facility

#### **FCC Recognized 2.948 Listed Test Firm Registration Number: 934118**

EMC Laboratory of the Shenzhen SEM.Test Technology Co., Ltd. has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the FCC Recognized 2.948 Listed Test Firm Registration Number is 934118.

#### **Industry Canada IC OATS Filing Number/Assigned Code: 11464A**

The 3 Meter Semi-Anechoic Chamber of the Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Industry Canada IC OATS Filing Number/Assigned Code (11464A).

### 1.6 EUT Exercise Software

The EUT exercise program used during the testing was designed to exercise the system components. The test software is started while the whole system is on.

### 1.7 Accessories Equipment List and Details

| Manufacturer | Description | Model | Serial Number |
|--------------|-------------|-------|---------------|
| /            | /           | /     | /             |

### 1.8 EUT Cable List and Details

| Cable Description | Length (M) | Shielded/<br>Unshielded | With Core/<br>Without Core |
|-------------------|------------|-------------------------|----------------------------|
| /                 | /          | /                       | /                          |

## 2. SUMMARY OF TEST RESULTS

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| FCC RULES      | DESCRIPTION OF TEST          | RESULT    |
|----------------|------------------------------|-----------|
| Part 15.203    | Antenna Requirement          | Compliant |
| Part 15.107(a) | Conducted Emission           | N/A       |
| Part 15.205    | Restricted Band of Operation | Compliant |
| Part 15.209    | Radiated Emission            | Compliant |
| Part 15.249(a) | Field Strength               | Compliant |
| Part 15.249(d) | Out of Band Emission         | Compliant |

### **3. Part 15.203 - ANTENNA REQUIREMENT**

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#### **3.1 Standard Applicable**

According to Part 15.203 of the FCC Rules, 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.

#### **3.2 Test Result**

This product has an integral antenna, fulfill the requirement of this section.

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## 4. Part 15.249(a), 15.205 & 15.209 - RADIATED EMISSION

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### 4.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is  $\pm 3.0$  dB.

### 4.2 Standard Applicable

According to Part 15.249(a) of the FCC Rules, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Fundamental Frequency | Field strength of fundamental<br>(milli-volts/meter) | Field strength of harmonics<br>(micro-volts/meter) |
|-----------------------|--|--|
| 902-928 MHz           | 50   | 500  |
| 2400-2483.5 MHz       | 50   | 500  |
| 5725-5875 MHz         | 50   | 500  |
| 24.0-24.25 GHz        | 250  | 2500   |

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Part 15.35 of the FCC Rules for limiting peak emissions apply.

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 20 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS UNDER PART 15.209 OF THE FCC RULES, WHICHEVER IS THE LESSER ATTENUATION.

Emissions that fall in the restricted bands (Part 15.205 of the FCC Rules) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.



### 4.3 Test Equipment List and Details

| Description              | Manufacturer         | Model     | Serial Number | Cal. Date  | Due. Date  |
|--------------------------|----------------------|-----------|---------------|------------|------------|
| Spectrum Analyzer        | R&S                  | FSP       | 836079/035    | 2013-05-07 | 2014-05-06 |
| EMI Test Receiver        | R&S                  | ESVB      | 825471/005    | 2013-05-07 | 2014-05-06 |
| Pre-amplifier            | Agilent              | 8447F     | 3113A06717    | 2013-05-07 | 2014-05-06 |
| Pre-amplifier            | Compliance Direction | PAP-0118  | 24002         | 2013-05-07 | 2014-05-06 |
| Trilog Broadband Antenna | SCHWARZBECK          | VULB9163  | 9163-333      | 2013-04-20 | 2014-04-19 |
| Horn Antenna             | ETS                  | 3117      | 00086197      | 2013-04-20 | 2014-04-19 |
| Horn Antenna             | ETS                  | 3116B     | 00088203      | 2013-04-20 | 2014-04-19 |
| Loop Antenna             | SCHWARZECK           | HFRA 5165 | 9365          | 2013-04-20 | 2014-04-19 |

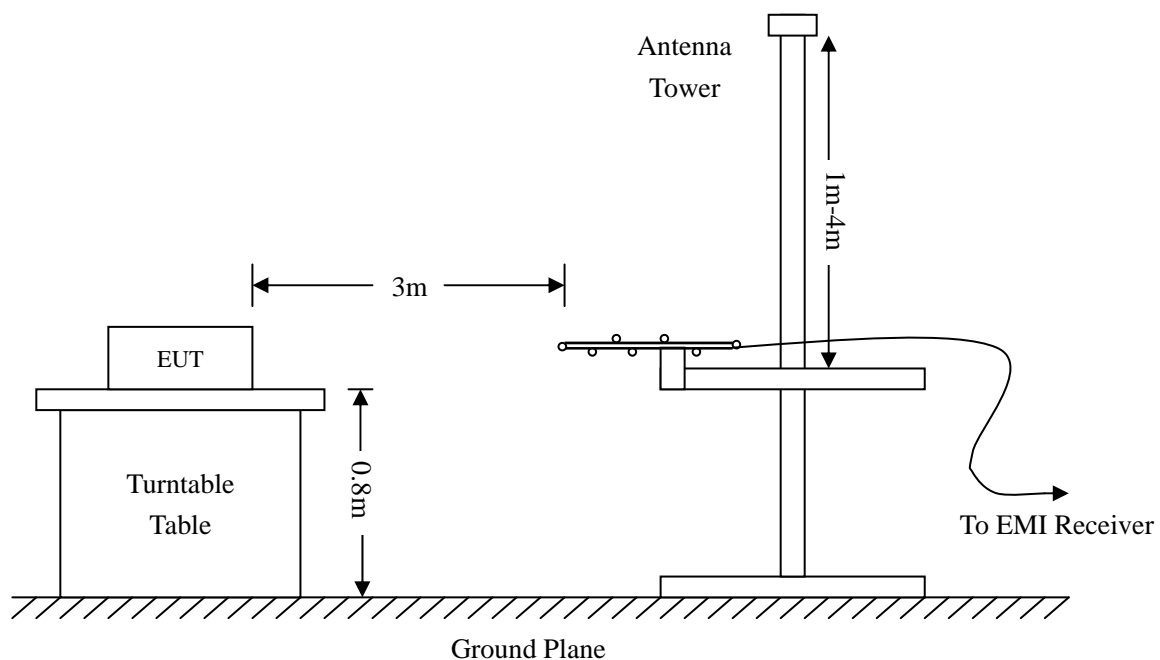
**Statement of Traceability:** All calibrations have been performed per the NVLAP requirements traceable to the NIST.

### 4.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the limits of Part 15.249(a), 15.205 and 15.209 of the FCC Rules. The radiated emissions were investigated by rotating the EUT through the three (3) orthogonal planes as mandated in ANSI C63.4-2003.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm



#### 4.5 Corrected Amplitude & Margin Calculation

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

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

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB $\mu$ V means the emission is 6dB $\mu$ V below the maximum limit for Part 15 of the FCC Rules. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit of Part 15 of the FCC Rules}$$

#### 4.6 Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 26 °C     |
| Relative Humidity: | 52%       |
| ATM Pressure:      | 1012 mbar |

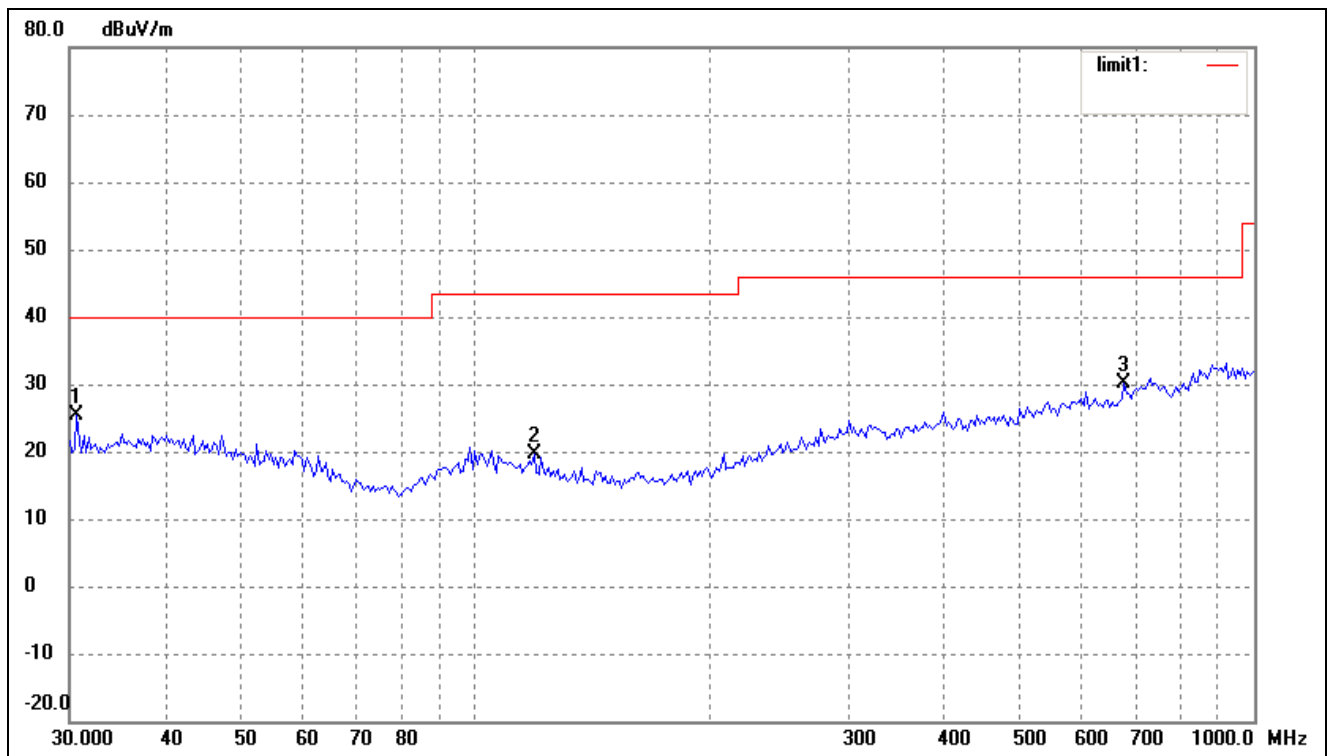
#### 4.7 Summary of Test Results/Plots

According to the data below, the standards of Part 15.249, 15.205 and 15.209 of the FCC Rules, and had the worst margin of:

**-5.24 dB $\mu$ V at 4804 MHz in the Vertical polarization, 30 MHz to 25 GHz, 3 Meters**

**Plot of Radiation Emissions Test***Radiated Disturbance**Product Description: 2.400-2.483 GHz Wireless Remote Control Device - TX*

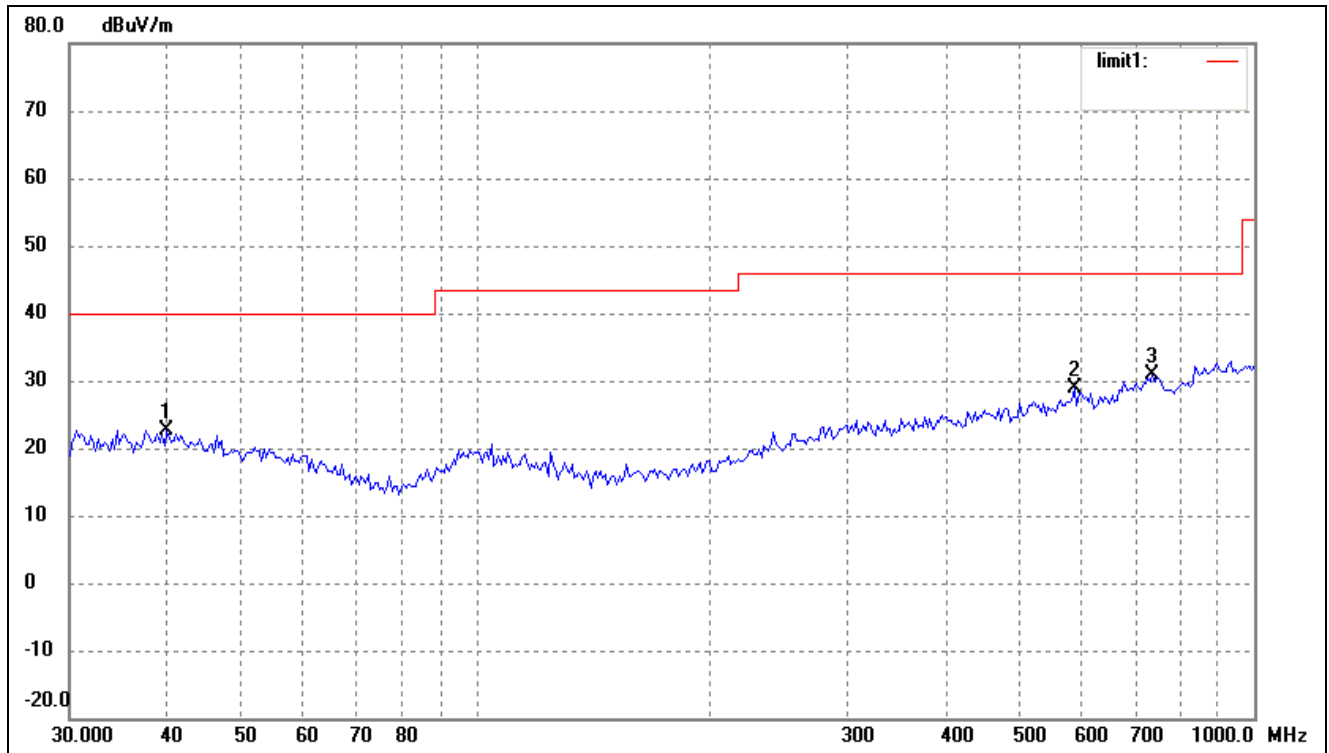
*Model Number(s)/Item Number(s): 0300, 0301, 0302, 0303, 0304, 0305, 0306, 0307, 0308, 0309, 0310, 0311, 0312, 0313, 0314, 0315, 0316, 0317, 0318, 0319, 0320, 0321, 0322, 0323, 0324, 0325, 0326, 0327, 0328, 0329, 0330, 0331, 0332, 0333, 0334, 0335, 0336, 0337, 0338, 0339, 0340, 0341, 0342, 0343, 0344, 0345, 0346, 0347, 0348, 0349*

*Operating Condition: Transmitting below 1 GHz (Lowest Channel: 2402 MHz)**Test Specification: Horizontal & Vertical**Power Source: 4 X DC 1.5V AA-Size Batteries**Horizontal:*

| No. | Frequency<br>(MHz) | Reading<br>(dBuV/m) | Correct<br>Factor(dB) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Degree<br>( ° ) | Height<br>(cm) | Remark |
|-----|--------------------|---------------------|-----------------------|--------------------|-------------------|----------------|-----------------|----------------|--------|
| 1   | 30.6379            | 17.67               | 7.74                  | 25.41              | 40.00             | -14.59         | 136             | 100            | Peak   |
| 2   | 118.6014           | 15.44               | 4.17                  | 19.61              | 43.50             | -23.89         | 54              | 100            | Peak   |
| 3   | 679.9600           | 16.79               | 13.26                 | 30.05              | 46.00             | -15.95         | 244             | 100            | Peak   |

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

Vertical:

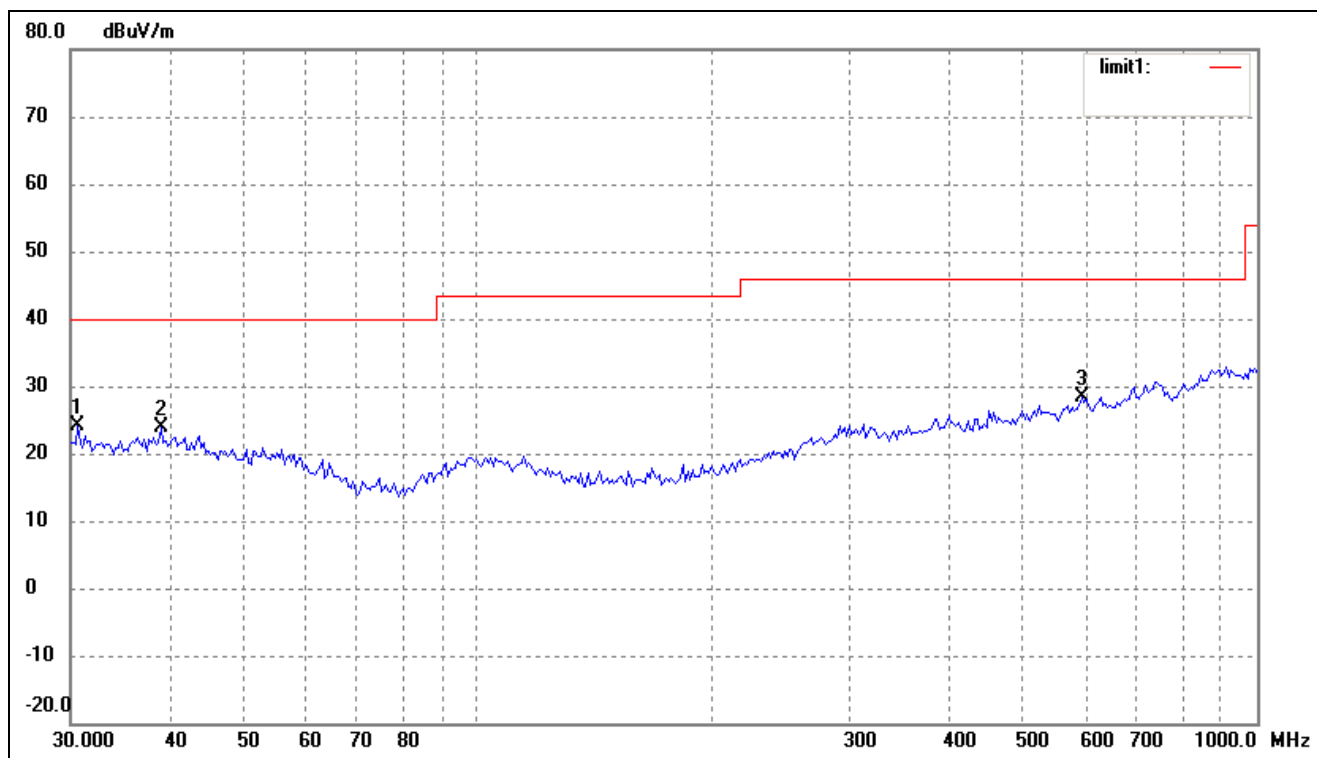


| No. | Frequency<br>(MHz) | Reading<br>(dBuV/m) | Correct<br>Factor(dB) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Degree<br>( ° ) | Height<br>(cm) | Remark |
|-----|--------------------|---------------------|-----------------------|--------------------|-------------------|----------------|-----------------|----------------|--------|
| 1   | 39.9942            | 13.40               | 9.25                  | 22.65              | 40.00             | -17.35         | 324             | 100            | Peak   |
| 2   | 586.8437           | 16.00               | 12.83                 | 28.83              | 46.00             | -17.17         | 57              | 100            | Peak   |
| 3   | 739.6605           | 15.43               | 15.53                 | 30.96              | 46.00             | -15.04         | 115             | 100            | Peak   |

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

**Plot of Radiation Emissions Test***Radiated Disturbance**Product Description: 2.400-2.483 GHz Wireless Remote Control Device - TX*

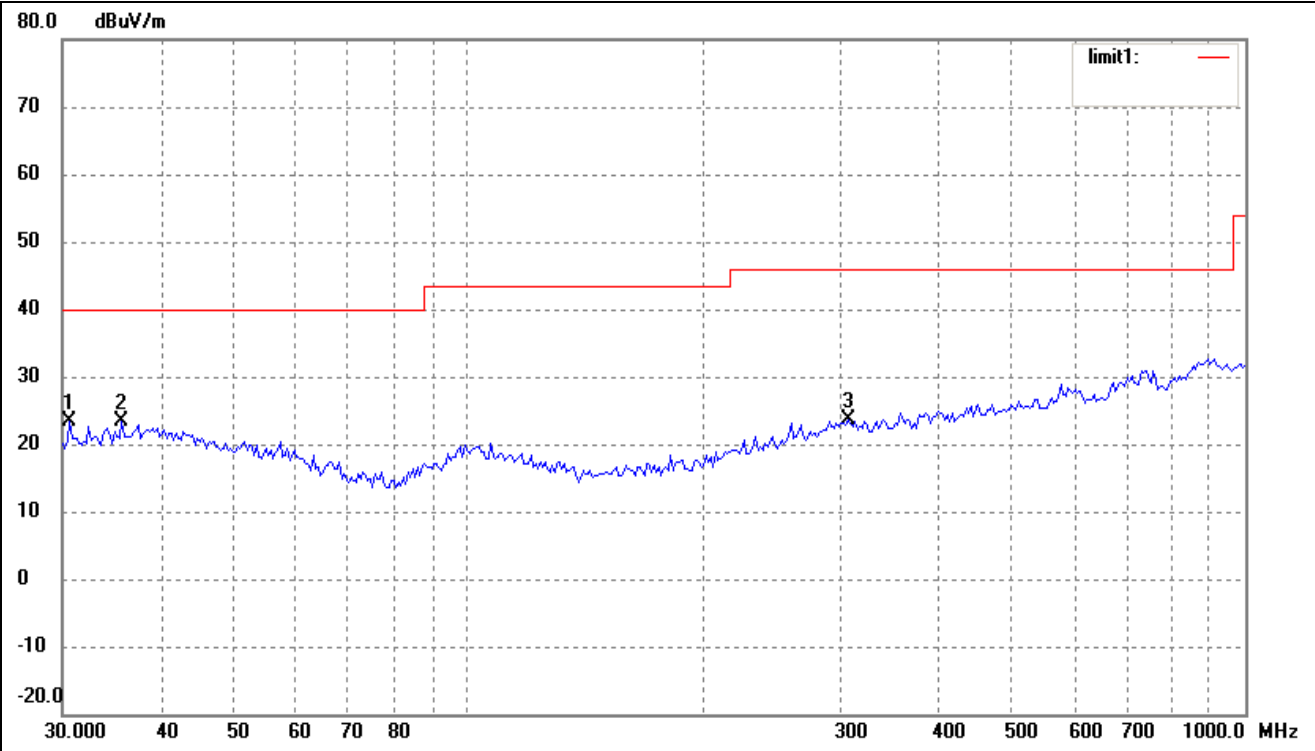
*Model Number(s)/Item Number(s): 0300, 0301, 0302, 0303, 0304, 0305, 0306, 0307, 0308, 0309, 0310, 0311, 0312, 0313, 0314, 0315, 0316, 0317, 0318, 0319, 0320, 0321, 0322, 0323, 0324, 0325, 0326, 0327, 0328, 0329, 0330, 0331, 0332, 0333, 0334, 0335, 0336, 0337, 0338, 0339, 0340, 0341, 0342, 0343, 0344, 0345, 0346, 0347, 0348, 0349*

*Operating Condition: Transmitting below 1 GHz (Middle Channel: 2440 MHz)**Test Specification: Horizontal & Vertical**Power Source: 4 X DC 1.5V AA-Size Batteries**Horizontal:*

| No. | Frequency<br>(MHz) | Reading<br>(dBuV/m) | Correct<br>Factor(dB) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Degree<br>( ° ) | Height<br>(cm) | Remark |
|-----|--------------------|---------------------|-----------------------|--------------------|-------------------|----------------|-----------------|----------------|--------|
| 1   | 30.6379            | 16.29               | 7.74                  | 24.03              | 40.00             | -15.97         | 251             | 100            | Peak   |
| 2   | 39.1616            | 14.69               | 9.10                  | 23.79              | 40.00             | -16.21         | 314             | 100            | Peak   |
| 3   | 595.1329           | 15.13               | 13.14                 | 28.27              | 46.00             | -17.73         | 47              | 100            | Peak   |

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

Vertical:

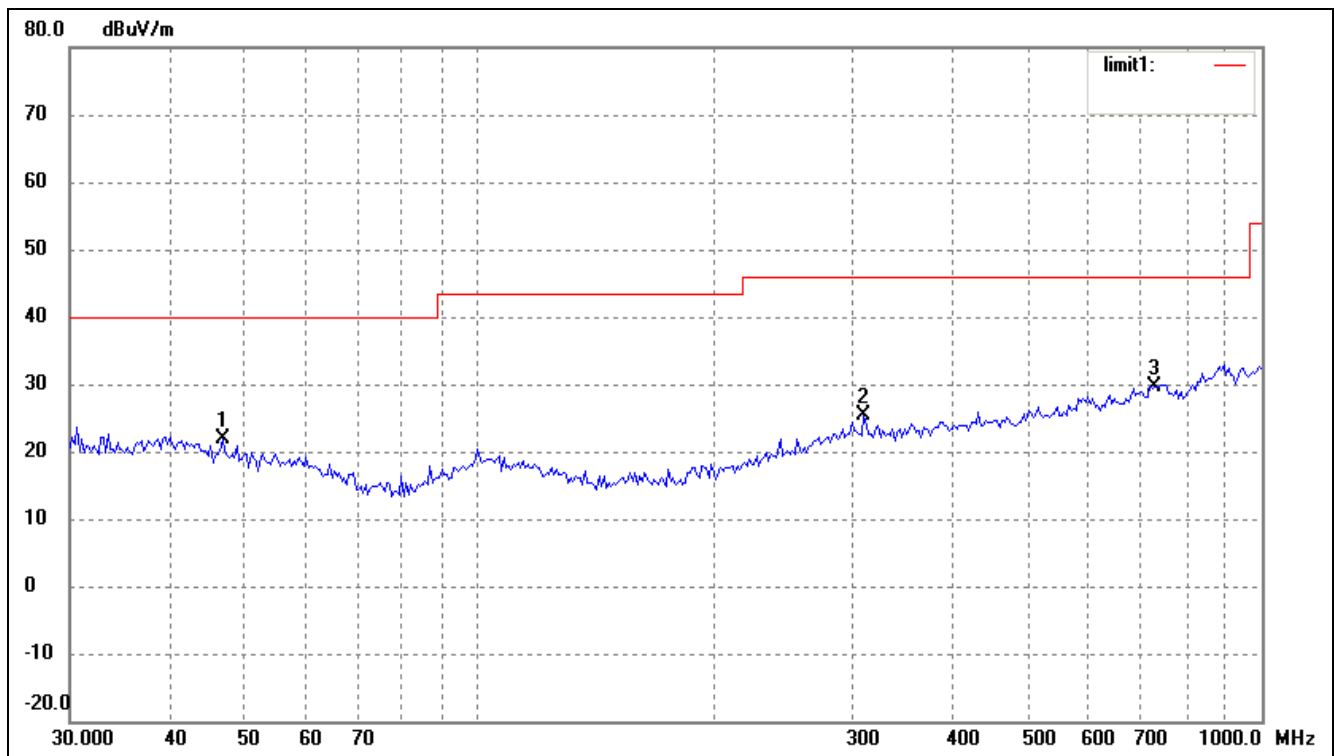


| No. | Frequency | Reading  | Correct    | Result   | Limit    | Margin | Degree | Height | Remark |
|-----|-----------|----------|------------|----------|----------|--------|--------|--------|--------|
|     | (MHz)     | (dBuV/m) | Factor(dB) | (dBuV/m) | (dBuV/m) | (dB)   | ( °)   | (cm)   |        |
| 1   | 30.6379   | 15.57    | 7.74       | 23.31    | 40.00    | -16.69 | 314    | 100    | Peak   |
| 2   | 35.7491   | 14.79    | 8.51       | 23.30    | 40.00    | -16.70 | 75     | 100    | Peak   |
| 3   | 307.8313  | 14.42    | 9.22       | 23.64    | 46.00    | -22.36 | 39     | 100    | Peak   |

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

**Plot of Radiation Emissions Test***Radiated Disturbance**Product Description: 2.400-2.483 GHz Wireless Remote Control Device - TX*

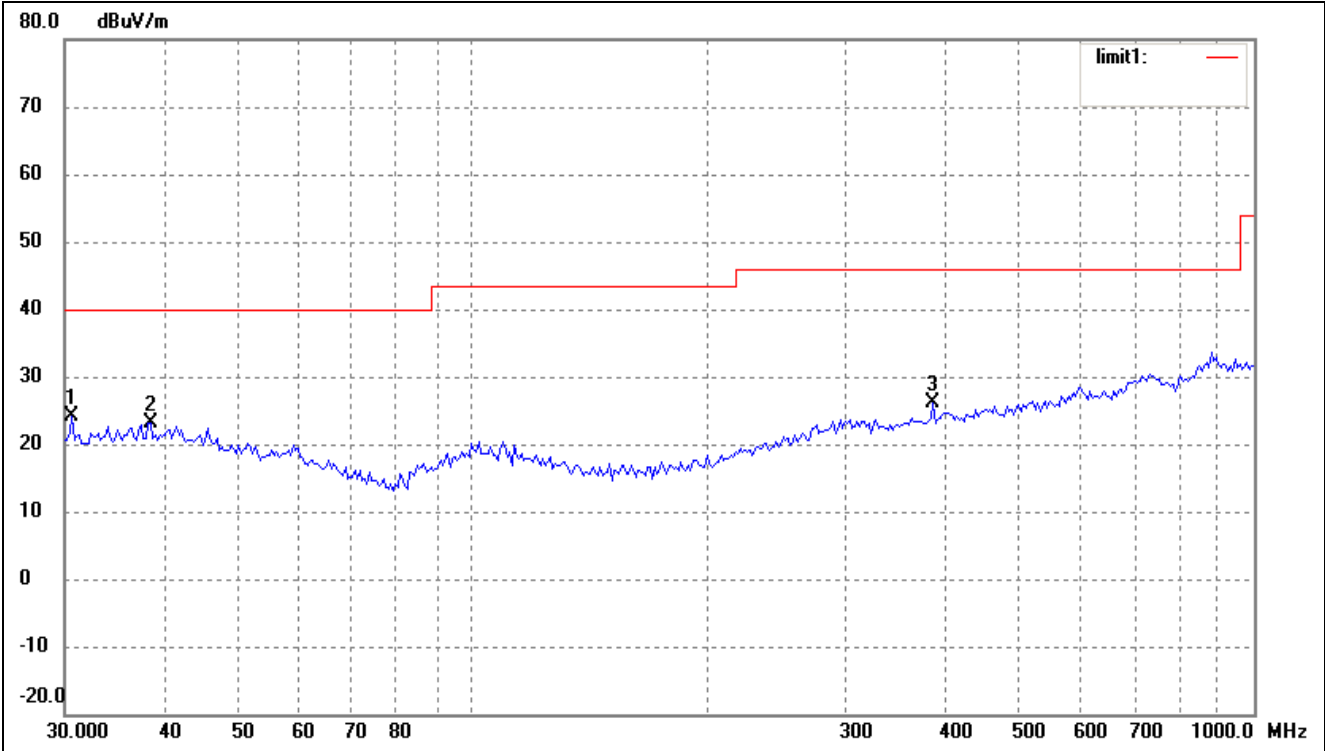
*Model Number(s)/Item Number(s): 0300, 0301, 0302, 0303, 0304, 0305, 0306, 0307, 0308, 0309, 0310, 0311, 0312, 0313, 0314, 0315, 0316, 0317, 0318, 0319, 0320, 0321, 0322, 0323, 0324, 0325, 0326, 0327, 0328, 0329, 0330, 0331, 0332, 0333, 0334, 0335, 0336, 0337, 0338, 0339, 0340, 0341, 0342, 0343, 0344, 0345, 0346, 0347, 0348, 0349*

*Operating Condition: Transmitting below 1 GHz (Highest Channel: 2480 MHz)**Test Specification: Horizontal & Vertical**Power Source: 4 X DC 1.5V AA-Size Batteries**Horizontal:*

| No. | Frequency<br>(MHz) | Reading<br>(dBuV/m) | Correct<br>Factor(dB) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Degree<br>( ° ) | Height<br>(cm) | Remark |
|-----|--------------------|---------------------|-----------------------|--------------------|-------------------|----------------|-----------------|----------------|--------|
| 1   | 46.9948            | 14.71               | 7.16                  | 21.87              | 40.00             | -18.13         | 255             | 100            | Peak   |
| 2   | 309.9977           | 16.14               | 9.23                  | 25.37              | 46.00             | -20.63         | 35              | 100            | Peak   |
| 3   | 729.3583           | 14.73               | 14.92                 | 29.65              | 46.00             | -16.35         | 174             | 100            | Peak   |

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

Vertical:



| No. | Frequency | Reading  | Correct    | Result   | Limit    | Margin | Degree | Height | Remark |
|-----|-----------|----------|------------|----------|----------|--------|--------|--------|--------|
|     | (MHz)     | (dBuV/m) | Factor(dB) | (dBuV/m) | (dBuV/m) | (dB)   | ( ° )  | (cm)   |        |
| 1   | 30.6379   | 16.27    | 7.74       | 24.01    | 40.00    | -15.99 | 214    | 100    | Peak   |
| 2   | 38.6161   | 14.22    | 9.01       | 23.23    | 40.00    | -16.77 | 26     | 100    | Peak   |
| 3   | 387.9920  | 16.59    | 9.57       | 26.16    | 46.00    | -19.84 | 47     | 100    | Peak   |

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



*Spurious Emission above 1 GHz*

| Frequency                | Reading  | Correct | Result   | Limit    | Margin | Polar | Detector |
|--------------------------|----------|---------|----------|----------|--------|-------|----------|
| (MHz)                    | (dBuV/m) | dB/m    | (dBuV/m) | (dBuV/m) | (dB)   | H/V   |          |
| Lowest Channel: 2402 MHz |          |         |          |          |        |       |          |
| 2402                     | 107.38   | -11.75  | 95.63    | 114      | -18.37 | H     | Peak     |
| 2402                     | 94.24    | -11.75  | 82.49    | 94       | -11.51 | H     | Average  |
| 4804                     | 61.24    | -3.59   | 57.65    | 74       | -16.35 | H     | Peak     |
| 4804                     | 47.92    | -3.59   | 44.33    | 54       | -9.67  | H     | Average  |
| 7206                     | 56.00    | -0.52   | 55.48    | 74       | -18.52 | H     | Peak     |
| 7206                     | 43.70    | -0.52   | 43.18    | 54       | -10.82 | H     | Average  |
| 2402                     | 111.54   | -11.75  | 99.79    | 114      | -14.21 | V     | Peak     |
| 2402                     | 98.2     | -11.75  | 86.45    | 94       | -7.55  | V     | Average  |
| 4804                     | 65.36    | -3.59   | 61.77    | 74       | -12.23 | V     | Peak     |
| 4804                     | 52.35    | -3.59   | 48.76    | 54       | -5.24  | V     | Average  |
| 7206                     | 56.53    | -0.52   | 56.01    | 74       | -17.99 | V     | Peak     |
| 7206                     | 45.19    | -0.52   | 44.67    | 54       | -9.33  | V     | Average  |
| Middle Channel: 2440 MHz |          |         |          |          |        |       |          |
| 2440                     | 106.06   | -11.46  | 94.60    | 114      | -19.40 | H     | Peak     |
| 2440                     | 93.03    | -11.46  | 81.57    | 94       | -12.43 | H     | Average  |
| 4880                     | 61.05    | -3.49   | 57.56    | 74       | -16.44 | H     | Peak     |
| 4880                     | 47.77    | -3.49   | 44.28    | 54       | -9.72  | H     | Average  |
| 7320                     | 55.00    | -0.47   | 54.53    | 74       | -19.47 | H     | Peak     |
| 7320                     | 43.55    | -0.47   | 43.08    | 54       | -10.92 | H     | Average  |
| 2440                     | 107.91   | -11.46  | 96.45    | 114      | -17.55 | V     | Peak     |
| 2440                     | 94.78    | -11.46  | 83.32    | 94       | -10.68 | V     | Average  |
| 4880                     | 64.45    | -3.49   | 60.96    | 74       | -13.04 | V     | Peak     |
| 4880                     | 51.75    | -3.49   | 48.26    | 54       | -5.74  | V     | Average  |
| 7320                     | 55.33    | -0.47   | 54.86    | 74       | -19.14 | V     | Peak     |
| 7320                     | 43.31    | -0.47   | 42.84    | 54       | -11.16 | V     | Average  |

| Frequency                 | Reading  | Correct | Result   | Limit    | Margin | Polar | Detector |
|---------------------------|----------|---------|----------|----------|--------|-------|----------|
| (MHz)                     | (dBuV/m) | dB/m    | (dBuV/m) | (dBuV/m) | (dB)   | H/V   |          |
| Highest Channel: 2480 MHz |          |         |          |          |        |       |          |
| 2480                      | 104.37   | -11.14  | 93.23    | 114      | -20.77 | H     | Peak     |
| 2480                      | 92.12    | -11.14  | 80.98    | 94       | -13.02 | H     | Average  |
| 4960                      | 58.10    | -3.41   | 54.69    | 74       | -19.31 | H     | Peak     |
| 4960                      | 46.07    | -3.41   | 42.66    | 54       | -11.34 | H     | Average  |
| 7440                      | 54.43    | -0.42   | 54.01    | 74       | -19.99 | H     | Peak     |
| 7440                      | 42.17    | -0.42   | 41.75    | 54       | -12.25 | H     | Average  |
| 2480                      | 105.86   | -11.14  | 94.72    | 114      | -19.28 | V     | Peak     |
| 2480                      | 93.77    | -11.14  | 82.63    | 94       | -11.37 | V     | Average  |
| 4960                      | 59.57    | -3.41   | 56.16    | 74       | -17.84 | V     | Peak     |
| 4960                      | 48.42    | -3.41   | 45.01    | 54       | -8.99  | V     | Average  |
| 7440                      | 54.8     | -0.42   | 54.38    | 74       | -19.62 | V     | Peak     |
| 7440                      | 42.5     | -0.42   | 42.08    | 54       | -11.92 | V     | Average  |

*Note: Testing is carried out with frequency range 9 kHz to the tenth harmonics, which above 5<sup>th</sup> Harmonics are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.*

*The measurements greater than 20 dB below the limit from 9 kHz to 30 MHz.*

## 5. Part 15.249(b) - OUT OF BAND EMISSIONS

### 5.1 Standard Applicable

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 to the general radiated emission limits under Part 15.209 of the FCC Rules, whichever is the lesser attenuation.

### 5.2 Test Equipment List and Details

| Description              | Manufacturer         | Model       | Serial Number | Cal. Date  | Due. Date  |
|--------------------------|----------------------|-------------|---------------|------------|------------|
| Spectrum Analyzer        | R&S                  | FSP         | 836079/035    | 2013-05-07 | 2014-05-06 |
| EMI Test Receiver        | R&S                  | ESVB        | 825471/005    | 2013-05-07 | 2014-05-06 |
| Pre-amplifier            | Agilent              | 8447F       | 3113A06717    | 2013-05-07 | 2014-05-06 |
| Pre-amplifier            | Compliance Direction | PAP-0118    | 24002         | 2013-05-07 | 2014-05-06 |
| Trilog Broadband Antenna | SCHWARZBECK          | VULB9163    | 9163-333      | 2013-04-20 | 2014-04-19 |
| Horn Antenna             | ETS                  | 3117        | 00086197      | 2013-04-20 | 2014-04-19 |
| Spectrum Analyzer        | Agilent              | E4402B      | US41192821    | 2013-05-07 | 2014-05-06 |
| Attenuator               | ATTEN                | ATS100-4-20 | /             | 2013-05-07 | 2014-05-06 |

**Statement of Traceability:** All calibrations have been performed per the NVLAP requirements traceable to the NIST.

### 5.3 Test Procedure

As the radiation test, set the Lowest and Highest Transmitting Channel, observed the outside band of 2400MHz to 2438.5MHz, than mark the higher-level emission for comparing with the FCC Rules.

### 5.4 Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 25 °C     |
| Relative Humidity: | 54%       |
| ATM Pressure:      | 1012 mbar |

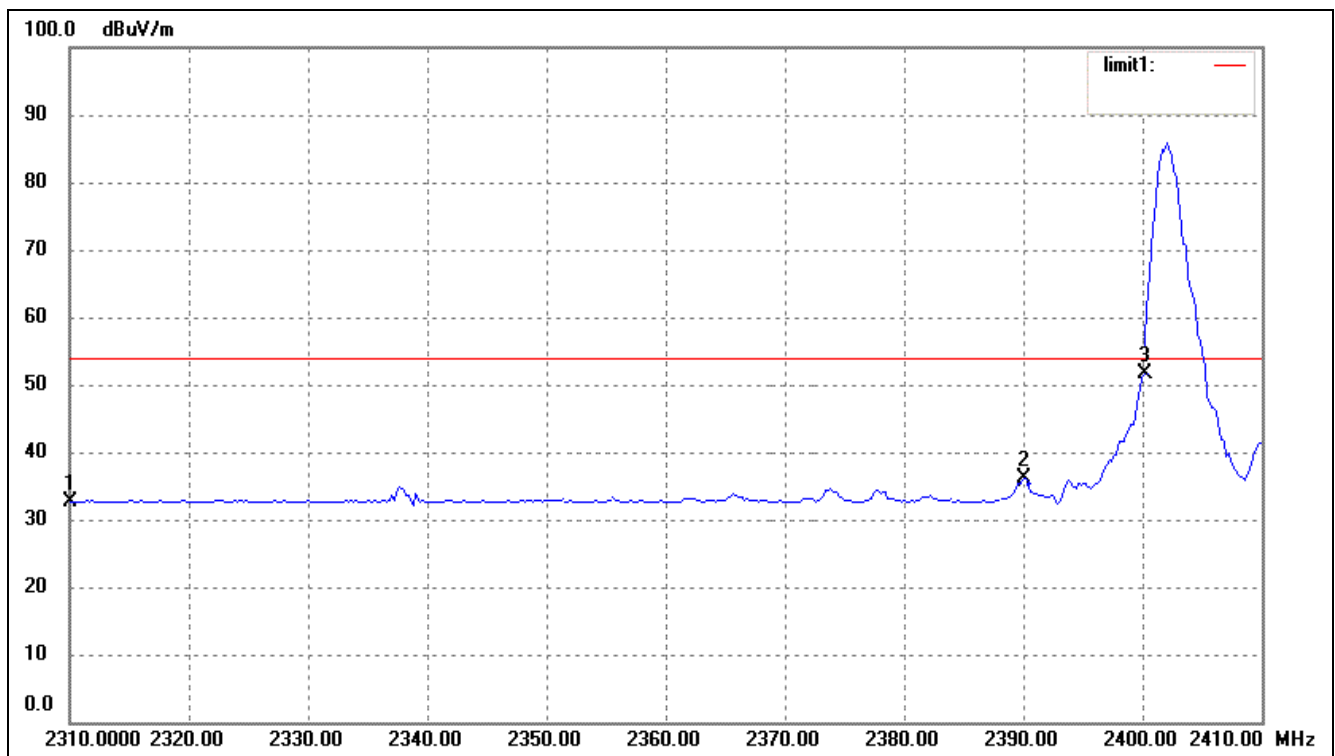
## 5.5 Summary of Test Results/Plots

| Frequency<br>(MHz) | Emission<br>(dB $\mu$ V/m) | Limit<br>(dB $\mu$ V/m) |
|--------------------|----------------------------|-------------------------|
| 2390.0             | 35.60                      | 54                      |
| 2400.0             | 51.75                      | 54                      |
| 2483.5             | 46.89                      | 54                      |

### Test Result Pass

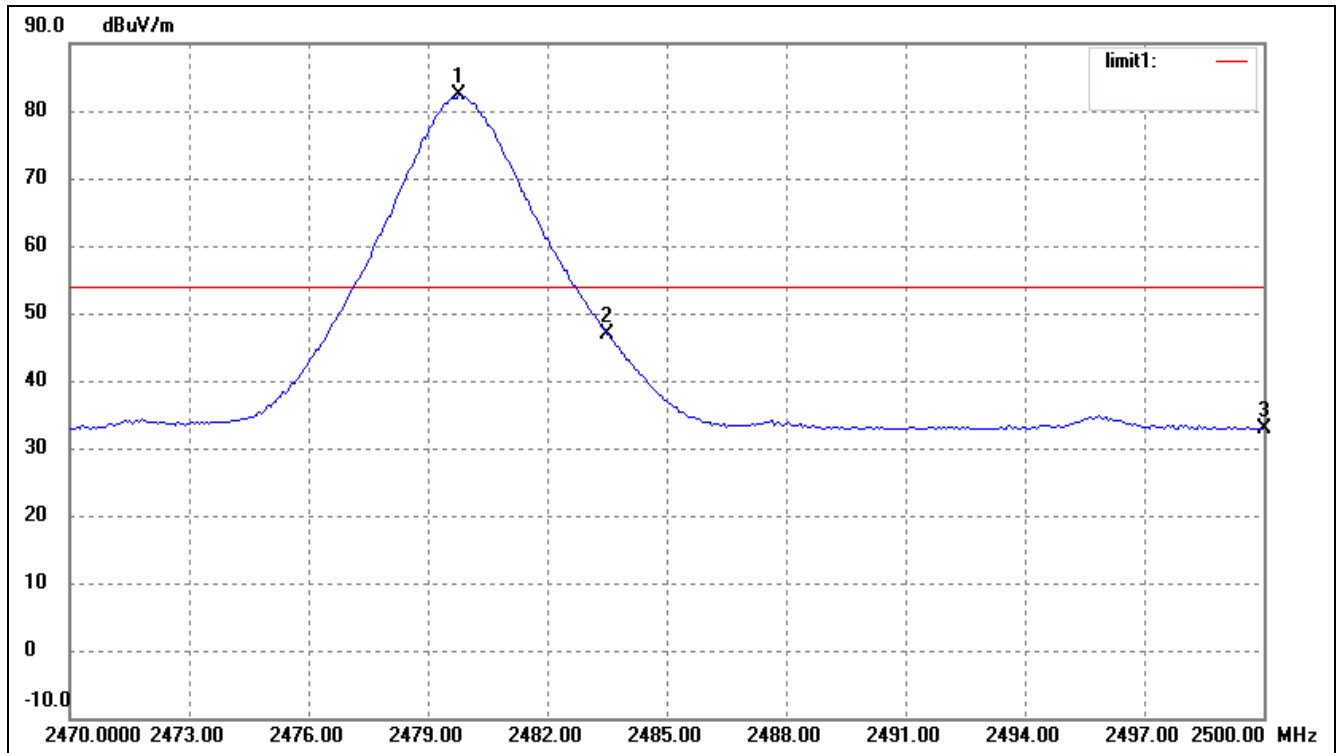
Refer to the attached plots.

#### Lower Bandedge



| No. | Frequency<br>(MHz) | Reading<br>(dBuV/m) | Correct<br>Factor(dB) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark  |
|-----|--------------------|---------------------|-----------------------|--------------------|-------------------|----------------|---------|
| 1   | 2310.000           | 36.38               | -3.71                 | 32.67              | 54.00             | -21.33         | Average |
|     | 2310.000           | 49.28               | -3.71                 | 45.57              | 74.00             | -28.43         | Peak    |
| 2   | 2390.000           | 39.14               | -3.54                 | 35.60              | 54.00             | -18.40         | Average |
|     | 2390.000           | 68.53               | -3.54                 | 64.99              | 74.00             | -9.01          | Peak    |
| 3   | 2400.000           | 55.26               | -3.51                 | 51.75              | 54.00             | -2.25          | Average |
|     | 2400.000           | 85.50               | -3.51                 | 71.99              | 74.00             | -2.01          | Peak    |

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

*Upper Bandedge*

| No. | Frequency<br>(MHz) | Reading<br>(dBuV/m) | Correct<br>Factor(dB) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark  |
|-----|--------------------|---------------------|-----------------------|--------------------|-------------------|----------------|---------|
| 1   | 2479.780           | 85.60               | -3.33                 | 82.27              | /                 | /              | Average |
| 2   | 2483.500           | 50.22               | -3.33                 | 46.89              | 54.00             | -7.11          | Average |
|     | 2483.500           | 74.59               | -3.33                 | 71.26              | 74.00             | -2.74          | Peak    |
| 3   | 2500.000           | 36.23               | -3.28                 | 32.95              | 54.00             | -21.05         | Average |
|     | 2500.000           | 58.26               | -3.28                 | 54.98              | 74.00             | -19.02         | Peak    |

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

**\*\*\*\*\* END OF REPORT \*\*\*\*\***