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### Test Report

|   |  |
|---|--|
| <b>Applicant</b>                              | Scientific Toys Ltd.   |
| <b>Address</b>                                | Rm. 1108, 11/F., Block B, New Mandarin Plaza,<br>14 Science Museum Road,<br>TST East, Kowloon,<br>Hong Kong                      |
| <b>FCC ID Number</b>                          | FCC ID: BY33548-24GT   |
| <b>Brand Name(s)</b>                          | None   |
| <b>Model Number(s)/<br/>Catalog Number(s)</b> | 21882, 6001056, 6001071, BY33548-24GT  |
| <b>Product Description</b>                    | 2.408-2.460 GHz Wireless Remote Control Device - TX  |
| <b>Operating Frequency</b>                    | 2.408-2.460 GHz  |
| <b>Rules/Standards</b>                        | Part 15.249 of the FCC Rules   |
| <b>Received Date</b>                          | 24th June, 2014  |
| <b>Tested Date</b>                            | 25th June, 2014  |
| <b>Approved by</b>                            | Dick Chan (Director of Gakkiku)  |
| <b>Tested by</b>                              | <br>Lahm Peng (Engineer of Shenzhen SEM.Test) |
| <b>Signed by</b>                              | <br>Jandy So (Manager of Shenzhen SEM.Test)   |
| <b>Report Number</b>                          | GKK201406240A  |
| <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: Scientific Toys Ltd.  
 Address of applicant: Rm. 1108, 11/F., Block B, New Mandarin Plaza,  
 14 Science Museum Road, TST East, Kowloon, Hong Kong

Manufacturer: Scientific Toys Ltd.  
 Address of manufacturer: Rm. 1108, 11/F., Block B, New Mandarin Plaza,  
 14 Science Museum Road, TST East, Kowloon, Hong Kong

### General Description of EUT

| Item  | Description   |
|---|---|
| Product Description:  | 2.408-2.460 GHz Wireless Remote Control Device - TX |
| Brand Name(s):  | /   |
| Model Number(s)/<br>Catalog Number(s):  | 21882, 6001056, 6001071, BY33548-24GT               |
| Power Source:   | DC 9V Battery                                       |
| Output Power:   | <0dBm   |
| Frequency Range:  | 2.408-2.460 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 Scientific Toys Ltd. in accordance with Part 15 Subpart B and Subpart C of the FCC Rules, 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 Part 15 Subpart C of the FCC Rules, 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 Standards 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 |
|--------------|--|-------|---------------|
| N/A          | Tact switch  | N/A   | N/A           |
| N/A          | 2 units of 5 cm-long wires (unshielded and without core) which connect between GND and 4th pin of U2 | N/A   | N/A           |

### 1.8 EUT Cable List and Details

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

## 2. SUMMARY OF TEST RESULTS

| 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.

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

### 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 (milli-volts/meter) | Field strength of harmonics (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    | 2014-05-28 | 2015-05-27 |
| EMI Test Receiver        | R&S                  | ESVB      | 825471/005    | 2014-05-28 | 2015-05-27 |
| Pre-amplifier            | Agilent              | 8447F     | 3113A06717    | 2014-05-28 | 2015-05-27 |
| Pre-amplifier            | Compliance Direction | PAP-0118  | 24002         | 2014-05-28 | 2015-05-27 |
| Trilog Broadband Antenna | SCHWARZBECK          | VULB9163  | 9163-333      | 2014-05-24 | 2015-05-23 |
| Horn Antenna             | ETS                  | 3117      | 00086197      | 2014-05-24 | 2015-05-23 |
| Horn Antenna             | ETS                  | 3116B     | 00088203      | 2014-05-24 | 2015-05-23 |
| Loop Antenna             | SCHWARZECK           | HFRA 5165 | 9365          | 2014-05-24 | 2015-05-23 |

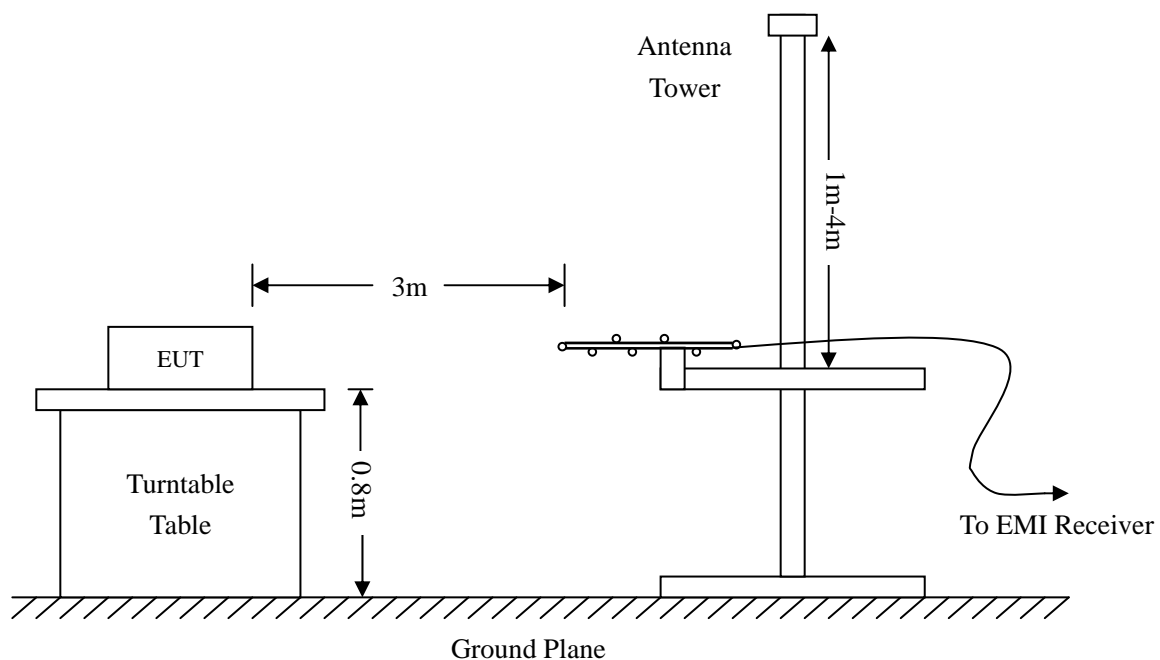
**Statement of Traceability:** All calibrations have been performed per the NVLAP requirements traceable to the NIST.

### 4.4 Test Procedure

The setup of EUT is according with per ANSI Standards 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 Standards 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:

*Note: This EUT was tested in 3 orthogonal positions and the worst case position data was reported.*

**Plot of Radiation Emissions Test**

*Radiated Disturbance*

*Product Description: 2.408-2.460 GHz Wireless Remote Control Device - TX*

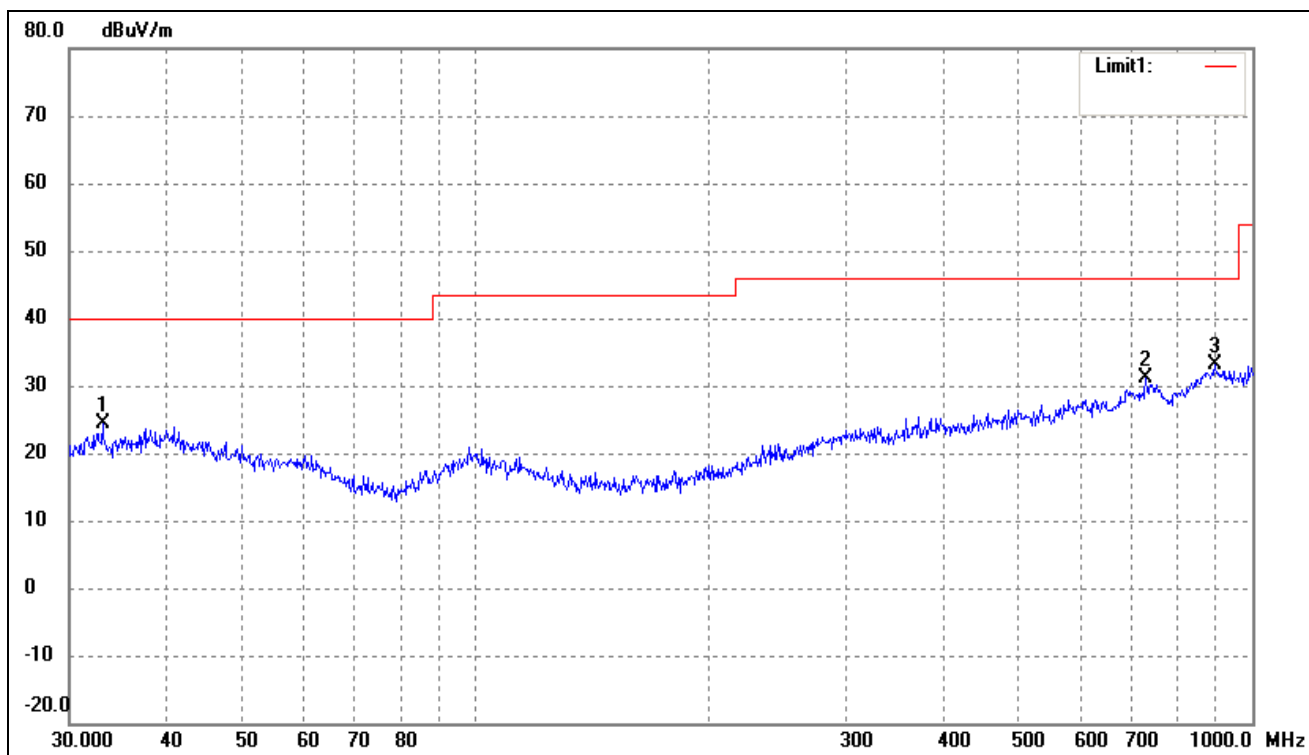
*Model Number(s)/Catalog Number(s): 21882, 6001056, 6001071, BY33548-24GT*

*Operating Condition: Transmitting below 1 GHz (Lowest Channel: 2408 MHz)*

*Test Specification: Horizontal & Vertical*

*Power Source: DC 9V Battery*

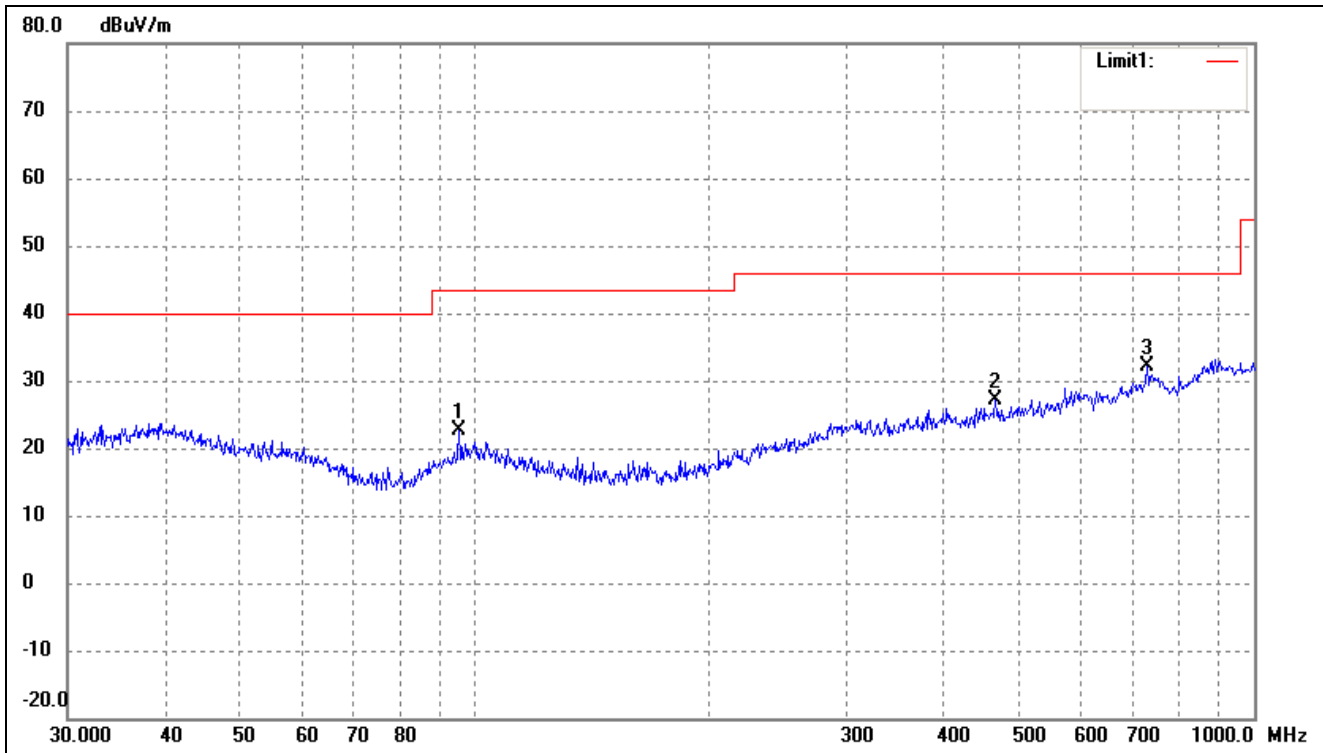
*Horizontal:*



| No. | Frequency (MHz) | Reading (dBuV/m) | Correct Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Degree (°) | Height (cm) | Remark |
|-----|-----------------|------------------|---------------------|-----------------|----------------|-------------|------------|-------------|--------|
| 1   | 33.0950         | 19.07            | 5.41                | 24.48           | 40.00          | -15.52      | 324        | 100         | Peak   |
| 2   | 729.3583        | 18.18            | 12.92               | 31.10           | 46.00          | -14.90      | 57         | 100         | Peak   |
| 3   | 893.8567        | 16.26            | 16.85               | 33.11           | 46.00          | -12.89      | 115        | 100         | Peak   |

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

Vertical:



| No. | Frequency (MHz) | Reading (dBuV/m) | Correct Factor(dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Degree (°) | Height (cm) | Remark |
|-----|-----------------|------------------|--------------------|-----------------|----------------|-------------|------------|-------------|--------|
| 1   | 95.4270         | 17.70            | 4.98               | 22.68           | 43.50          | -20.82      | 251        | 100         | Peak   |
| 2   | 465.5994        | 16.67            | 10.44              | 27.11           | 46.00          | -18.89      | 314        | 100         | Peak   |
| 3   | 729.3583        | 17.09            | 14.92              | 32.01           | 46.00          | -13.99      | 47         | 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: 2.408-2.460 GHz Wireless Remote Control Device - TX*

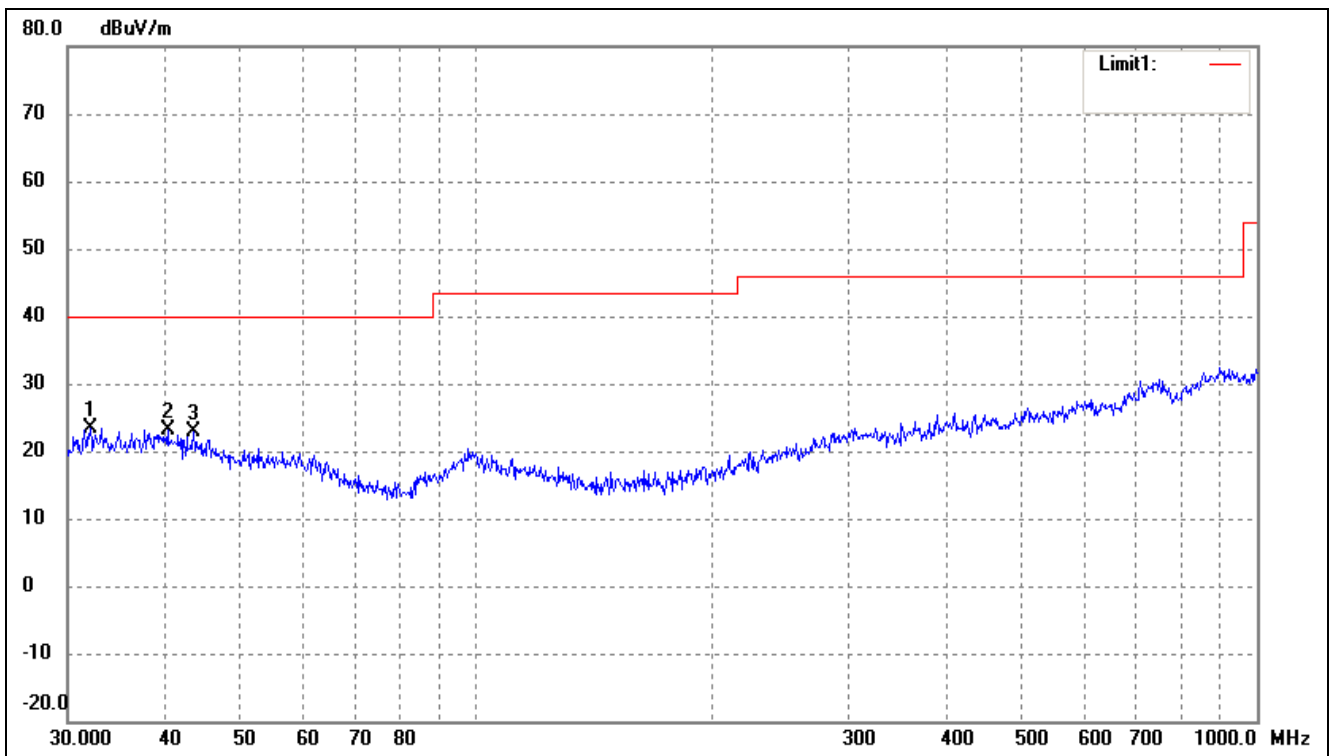
*Model Number(s)/Catalog Number(s): 21882, 6001056, 6001071, BY33548-24GT*

*Operating Condition: Transmitting below 1 GHz (Near Middle Channel: 2442 MHz)*

*Test Specification: Horizontal & Vertical*

*Power Source: DC 9V Battery*

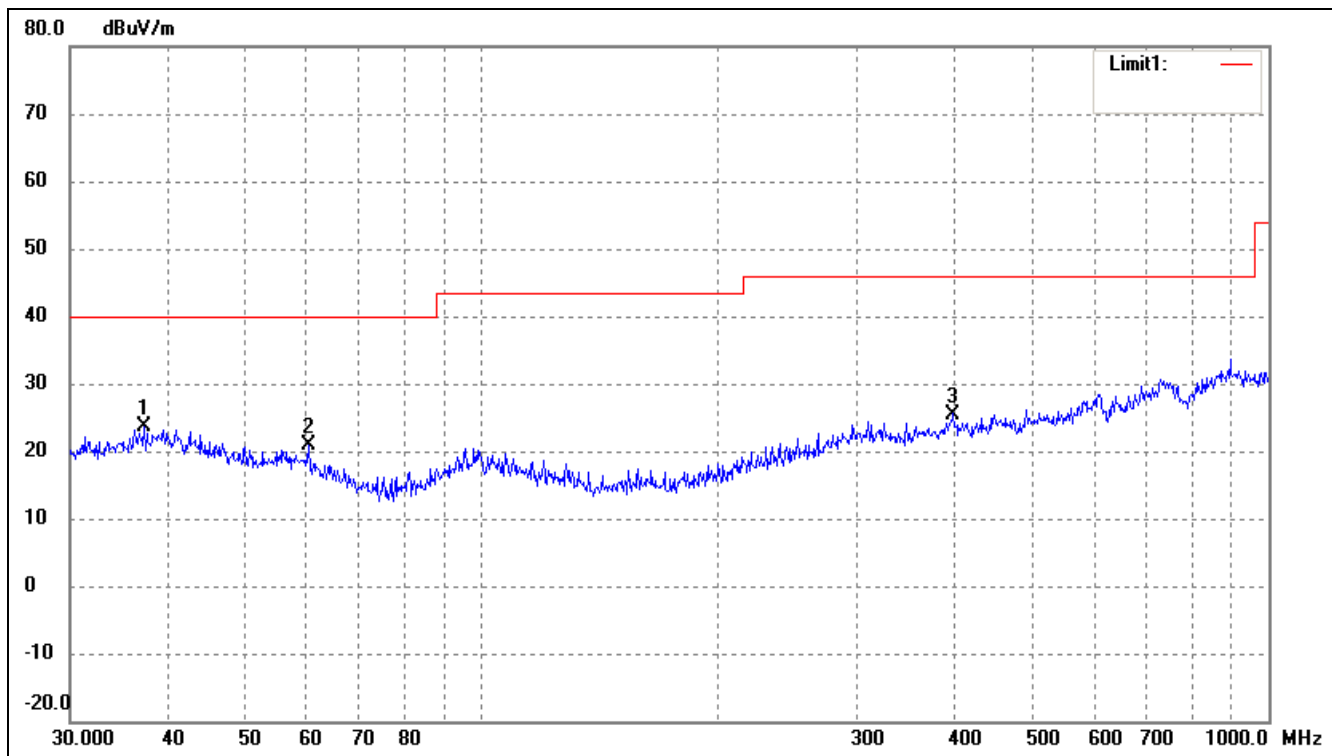
*Horizontal:*



| No. | Frequency (MHz) | Reading (dBuV/m) | Correct Factor(dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Degree (°) | Height (cm) | Remark |
|-----|-----------------|------------------|--------------------|-----------------|----------------|-------------|------------|-------------|--------|
| 1   | 32.0668         | 18.24            | 5.16               | 23.40           | 40.00          | -16.60      | 314        | 100         | Peak   |
| 2   | 40.2757         | 15.99            | 7.22               | 23.21           | 40.00          | -16.79      | 75         | 100         | Peak   |
| 3   | 43.5057         | 15.92            | 6.90               | 22.82           | 40.00          | -17.18      | 39         | 100         | Peak   |

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

Vertical:



| No. | Frequency (MHz) | Reading (dBuV/m) | Correct Factor(dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Degree (°) | Height (cm) | Remark |
|-----|-----------------|------------------|--------------------|-----------------|----------------|-------------|------------|-------------|--------|
| 1   | 37.2855         | 14.79            | 8.79               | 23.58           | 40.00          | -16.42      | 255        | 100         | Peak   |
| 2   | 60.2801         | 15.61            | 5.29               | 20.90           | 40.00          | -19.10      | 35         | 100         | Peak   |
| 3   | 397.6334        | 15.47            | 10.03              | 25.50           | 46.00          | -20.50      | 174        | 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: 2.408-2.460 GHz Wireless Remote Control Device - TX*

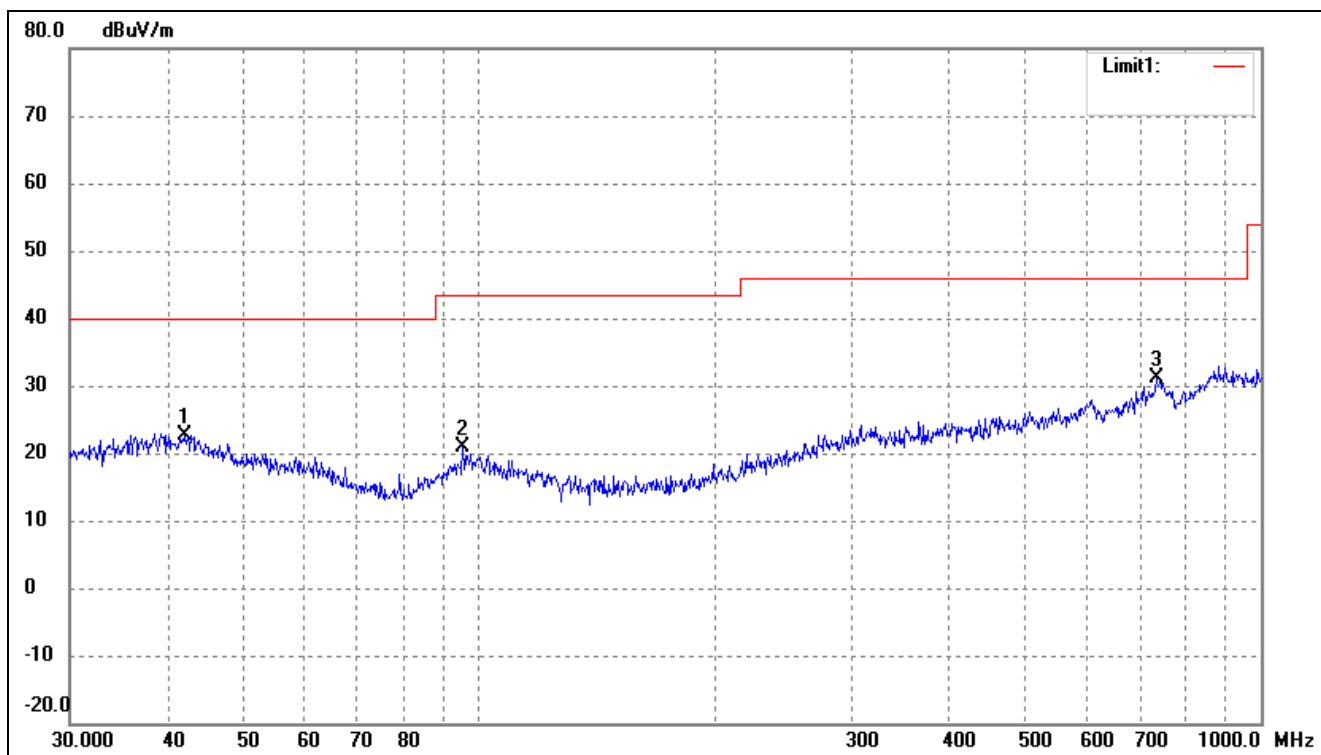
*Model Number(s)/Catalog Number(s): 21882, 6001056, 6001071, BY33548-24GT*

*Operating Condition: Transmitting below 1 GHz (Highest Channel: 2460 MHz)*

*Test Specification: Horizontal & Vertical*

*Power Source: DC 9V Battery*

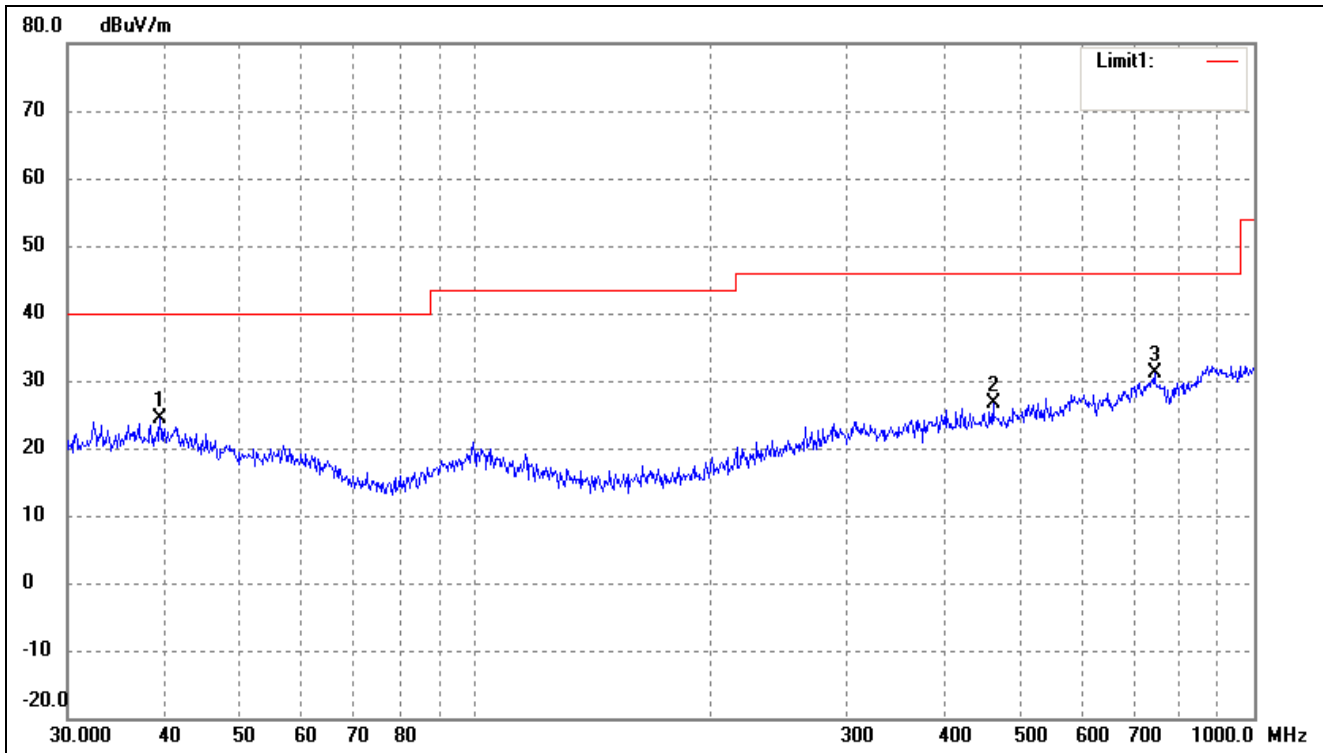
*Horizontal:*



| No. | Frequency (MHz) | Reading (dBuV/m) | Correct Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Degree (°) | Height (cm) | Remark |
|-----|-----------------|------------------|---------------------|-----------------|----------------|-------------|------------|-------------|--------|
| 1   | 42.0066         | 14.03            | 8.65                | 22.68           | 40.00          | -17.32      | 214        | 100         | Peak   |
| 2   | 95.4270         | 15.84            | 4.98                | 20.82           | 43.50          | -22.68      | 26         | 100         | Peak   |
| 3   | 734.4913        | 15.85            | 15.22               | 31.07           | 46.00          | -14.93      | 47         | 100         | Peak   |

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

Vertical:



| No. | Frequency (MHz) | Reading (dBuV/m) | Correct Factor(dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Degree (°) | Height (cm) | Remark |
|-----|-----------------|------------------|--------------------|-----------------|----------------|-------------|------------|-------------|--------|
| 1   | 39.4372         | 17.34            | 7.10               | 24.44           | 40.00          | -15.56      | 154        | 100         | Peak   |
| 2   | 462.3455        | 16.17            | 10.50              | 26.67           | 46.00          | -19.33      | 39         | 100         | Peak   |
| 3   | 744.8661        | 17.43            | 13.82              | 31.25           | 46.00          | -14.75      | 54         | 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: 2408 MHz      |          |         |          |          |        |       |          |
| 2408                          | 89.13    | -3.50   | 85.63    | 114      | -28.37 | H     | Peak     |
| 2408                          | 65.99    | -3.50   | 62.49    | 94       | -31.51 | H     | Average  |
| 4816                          | 52.81    | 0.55    | 53.36    | 74       | -20.64 | H     | Peak     |
| 4816                          | 33.78    | 0.55    | 34.33    | 54       | -19.67 | H     | Average  |
| 7224                          | 48.8     | 3.68    | 52.48    | 74       | -21.52 | H     | Peak     |
| 7224                          | 29.5     | 3.68    | 33.18    | 54       | -20.82 | H     | Average  |
| 2408                          | 79.29    | -3.50   | 75.79    | 114      | -38.21 | V     | Peak     |
| 2408                          | 59.95    | -3.50   | 56.45    | 94       | -37.55 | V     | Average  |
| 4816                          | 50.22    | 0.55    | 50.77    | 74       | -23.23 | V     | Peak     |
| 4816                          | 30.21    | 0.55    | 30.76    | 54       | -23.24 | V     | Average  |
| 7224                          | 48.33    | 3.68    | 52.01    | 74       | -21.99 | V     | Peak     |
| 7224                          | 27.99    | 3.68    | 31.67    | 54       | -22.33 | V     | Average  |
| Near Middle Channel: 2442 MHz |          |         |          |          |        |       |          |
| 2442                          | 88.21    | -3.41   | 84.80    | 114      | -29.2  | H     | Peak     |
| 2442                          | 67.98    | -3.41   | 64.57    | 94       | -29.43 | H     | Average  |
| 4884                          | 54.9     | 0.66    | 55.56    | 74       | -18.44 | H     | Peak     |
| 4884                          | 34.22    | 0.66    | 34.88    | 54       | -19.12 | H     | Average  |
| 7326                          | 48.77    | 3.76    | 52.53    | 74       | -21.47 | H     | Peak     |
| 7326                          | 29.32    | 3.76    | 33.08    | 54       | -20.92 | H     | Average  |
| 2442                          | 78.86    | -3.41   | 75.45    | 114      | -38.55 | V     | Peak     |
| 2442                          | 59.73    | -3.41   | 56.32    | 94       | -37.68 | V     | Average  |
| 4884                          | 55.3     | 0.66    | 55.96    | 74       | -18.04 | V     | Peak     |
| 4884                          | 35.6     | 0.66    | 36.26    | 54       | -17.74 | V     | Average  |
| 7326                          | 47.1     | 3.76    | 50.86    | 74       | -23.14 | V     | Peak     |
| 7326                          | 27.08    | 3.76    | 30.84    | 54       | -23.16 | V     | Average  |

| Frequency<br>(MHz)               | Reading<br>(dBuV/m) | Correct<br>dB/m | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Polar<br>H/V | Detector |
|----------------------------------|---------------------|-----------------|--------------------|-------------------|----------------|--------------|----------|
| <b>Highest Channel: 2460 MHz</b> |                     |                 |                    |                   |                |              |          |
| 2460                             | 88.6                | -3.37           | 85.23              | 114               | -28.77         | H            | Peak     |
| 2460                             | 68.35               | -3.37           | 64.98              | 94                | -29.02         | H            | Average  |
| 4920                             | 51.98               | 0.71            | 52.69              | 74                | -21.31         | H            | Peak     |
| 4920                             | 31.95               | 0.71            | 32.66              | 54                | -21.34         | H            | Average  |
| 7380                             | 53.2                | 3.81            | 57.01              | 74                | -16.99         | H            | Peak     |
| 7380                             | 32.94               | 3.81            | 36.75              | 54                | -17.25         | H            | Average  |
| 2460                             | 78.09               | -3.37           | 74.72              | 114               | -39.28         | V            | Peak     |
| 2460                             | 57                  | -3.37           | 53.63              | 94                | -40.37         | V            | Average  |
| 4920                             | 49.45               | 0.71            | 50.16              | 74                | -23.84         | V            | Peak     |
| 4920                             | 31.3                | 0.71            | 32.01              | 54                | -21.99         | V            | Average  |
| 7380                             | 49.57               | 3.81            | 53.38              | 74                | -20.62         | V            | Peak     |
| 7380                             | 30.27               | 3.81            | 34.08              | 54                | -19.92         | 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    | 2014-05-28 | 2015-05-27 |
| EMI Test Receiver        | R&S                  | ESVB        | 825471/005    | 2014-05-28 | 2015-05-27 |
| Pre-amplifier            | Agilent              | 8447F       | 3113A06717    | 2014-05-28 | 2015-05-27 |
| Pre-amplifier            | Compliance Direction | PAP-0118    | 24002         | 2014-05-28 | 2015-05-27 |
| Trilog Broadband Antenna | SCHWARZBECK          | VULB9163    | 9163-333      | 2014-05-24 | 2015-05-23 |
| Horn Antenna             | ETS                  | 3117        | 00086197      | 2014-05-24 | 2015-05-23 |
| Spectrum Analyzer        | Agilent              | E4402B      | US41192821    | 2014-05-24 | 2015-05-23 |
| Attenuator               | ATTEN                | ATS100-4-20 | /             | 2014-05-24 | 2015-05-23 |

**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 |

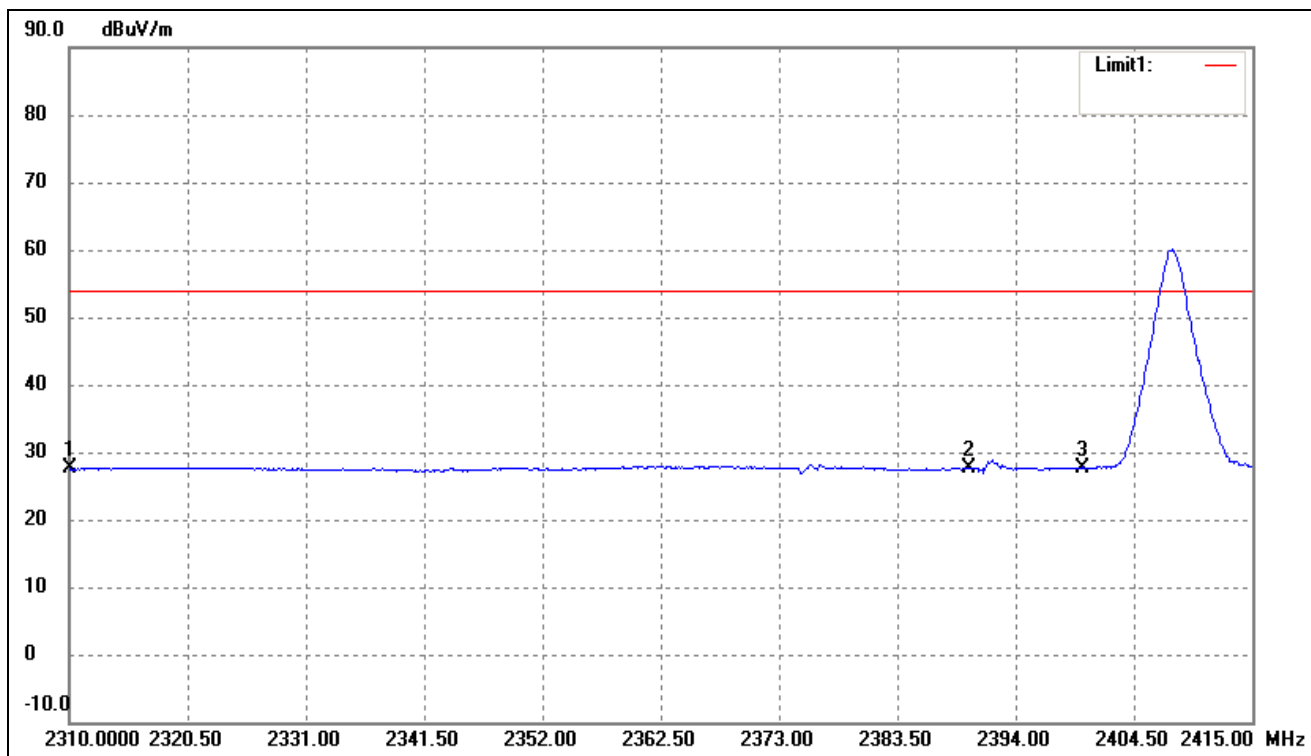
### 5.5 Summary of Test Results/Plots

| Frequency (MHz) | Emission (dB $\mu$ V/m) | Limit (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.

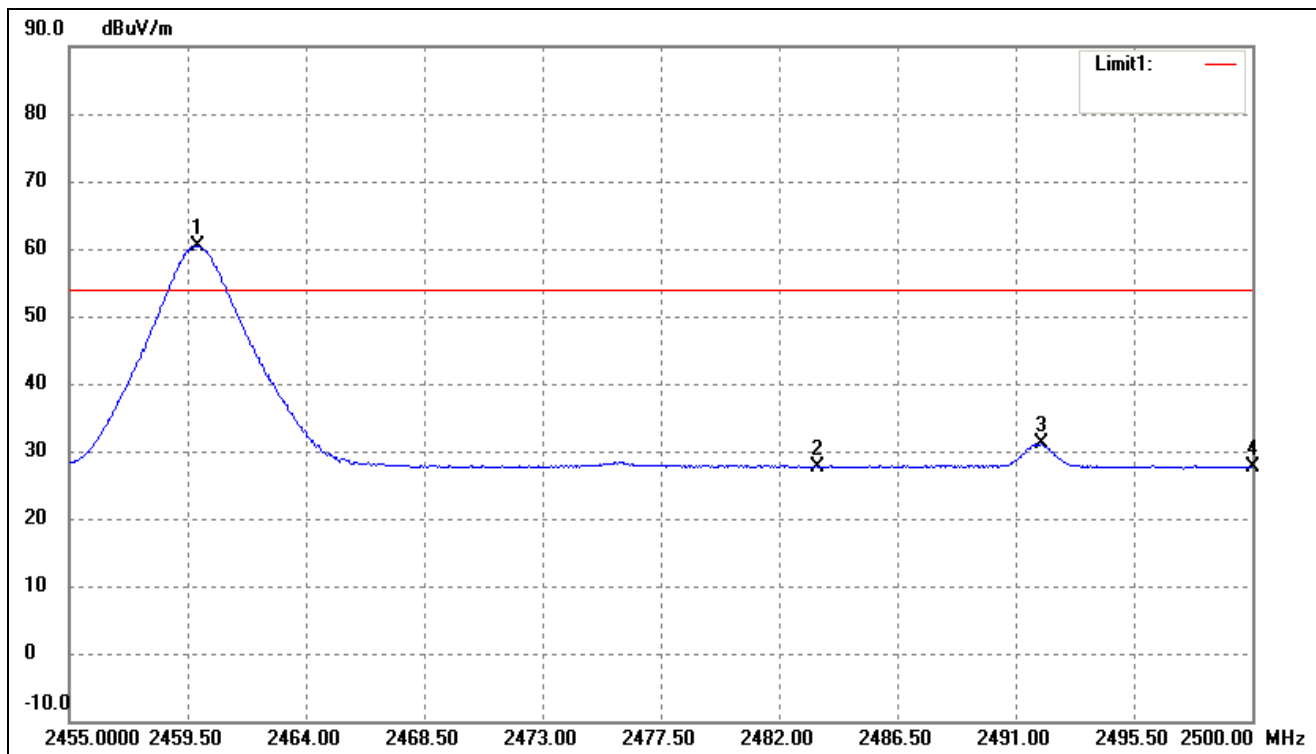
#### Lower Bandedge



| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|----------------|-----------------|----------------|-------------|----------|
| 1   | 2310.000        | 31.22          | -3.71          | 27.51           | 54.00          | -26.49      | Average  |
|     | 2310.000        | 44.12          | -3.71          | 40.41           | 74.00          | -33.59      | Peak     |
| 2   | 2390.000        | 31.07          | -3.54          | 27.53           | 54.00          | -26.47      | Average  |
|     | 2390.000        | 52.07          | -3.54          | 48.53           | 74.00          | -25.47      | Peak     |
| 3   | 2400.000        | 31.22          | -3.51          | 27.71           | 54.00          | -26.29      | Average  |
|     | 2400.000        | 58.05          | -3.51          | 54.54           | 74.00          | -19.46      | Peak     |

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

Upper Bandedge



| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|----------------|-----------------|----------------|-------------|----------|
| 1   | 2460.000        | 63.83          | -3.37          | 60.46           | /              | /           | Average  |
| 2   | 2483.500        | 30.95          | -3.33          | 27.62           | 54.00          | -26.38      | Average  |
|     | 2483.500        | 47.73          | -3.33          | 44.40           | 74.00          | -29.60      | Peak     |
| 3   | 2491.990        | 34.33          | -3.30          | 31.03           | 54.00          | -22.97      | Average  |
|     | 2491.990        | 45.60          | -3.30          | 42.30           | 74.00          | -31.70      | Peak     |
| 4   | 2500.000        | 30.92          | -3.28          | 27.64           | 54.00          | -26.36      | Average  |
|     | 2500.000        | 47.56          | -3.28          | 44.28           | 74.00          | -29.72      | Peak     |

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

## 6. Emission Bandwidth

### 6.1 Standard Applicable

According to Part 15.215 (c) of the FCC Rules, intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

### 6.2 Test Equipment List and Details

| Description       | Manufacturer | Model           | Serial Number | Cal. Date  | Due. Date  |
|-------------------|--------------|-----------------|---------------|------------|------------|
| Spectrum Analyzer | Agilent      | E4402B          | US41192821    | 2014-05-28 | 2015-05-27 |
| Attenuator        | ATTEN        | ATS100-4-2<br>0 | /             | 2014-05-28 | 2015-05-27 |

### 6.3 Test Procedure

According to the ANSI Standards C63.4-2003, the emission bandwidth test method as follows:

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

Set span = 1 MHz, centered on a transmitting channel

RBW  $\geq$  1% 20 dB Bandwidth, VBW  $\geq$  RBW

Sweep = auto

Detector function = Peak

Trace = max hold

All the trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission, use the marker-delta function to measure and record the 20dB down and 99% bandwidth of the emission.

### 6.4 Environmental Conditions

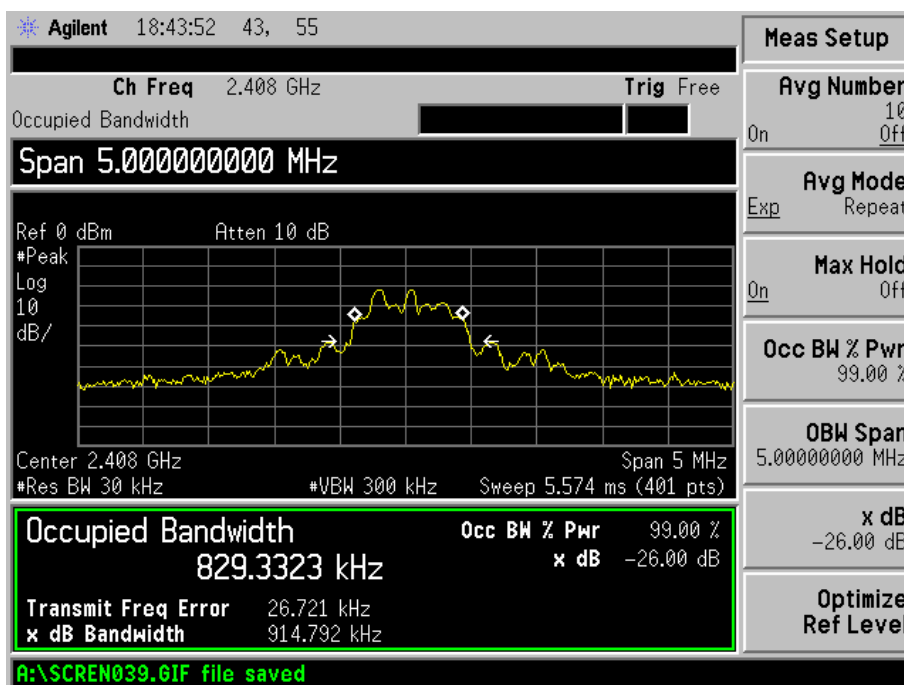
|                    |           |
|--------------------|-----------|
| Temperature:       | 25 °C     |
| Relative Humidity: | 53%       |
| ATM Pressure:      | 1018 mbar |

### 6.5 Summary of Test Results/Plots

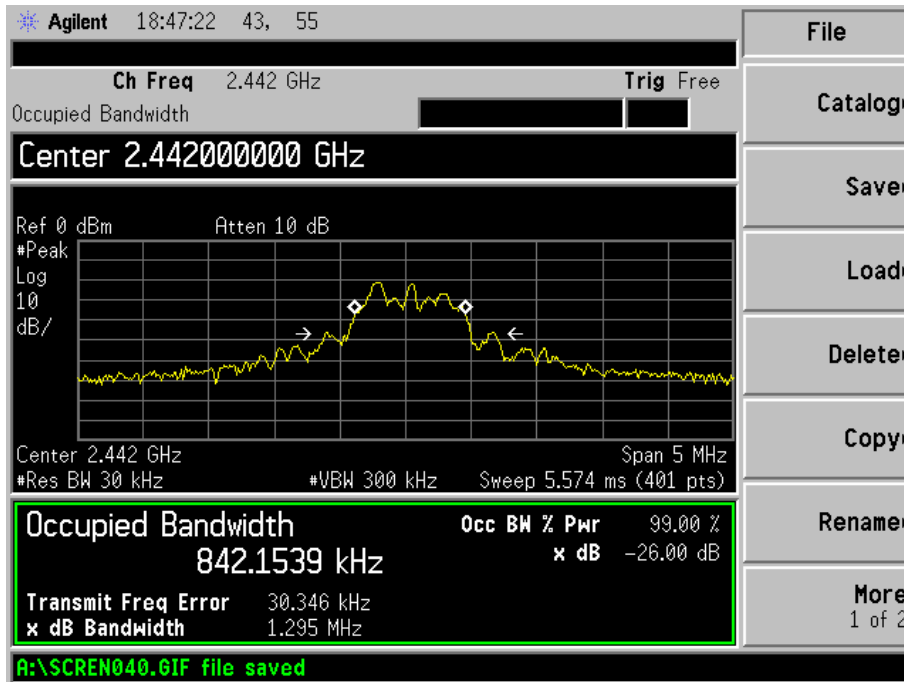
| Channel             | Frequency MHz | 26dB Bandwidth kHz | 99% Bandwidth kHz |
|---------------------|---------------|--------------------|-------------------|
| Lowest Channel      | 2408          | 914.792            | 829.3323          |
| Near Middle Channel | 2442          | 1295               | 842.1539          |
| Highest Channel     | 2460          | 1299               | 848.6551          |

Please refer to the following test plots

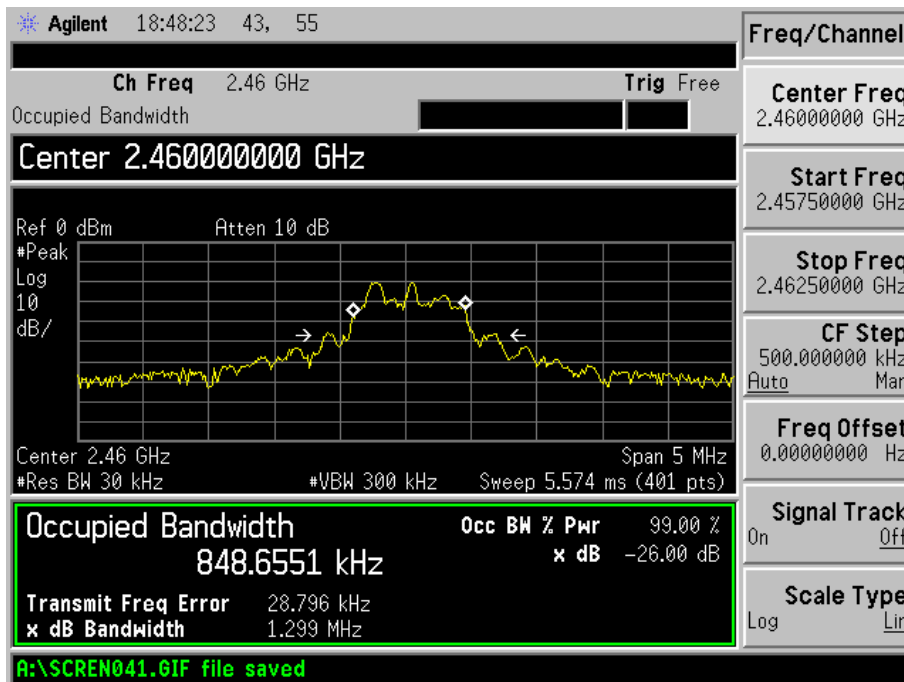
Lowest Channel:



Near Middle Channel:



Highest Channel:



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