



**FCC 47 CFR PART 15 SUBPART C**

**TEST REPORT**

**For**

**EVER SPARKLE TECHNOLOGIES LTD.**

**Motion Onthe Move**

**Model: TVG-23437**

**Trade Name: e.VS**

**Report No. : ST1104011F**

**FCC ID: SQO23437T02**

*Prepared for*

**EVER SPARKLE TECHNOLOGIES LTD.**  
**Unit 403,Nan Fung Commercial Centre, 19 Lam Lok St.,**  
**Kowloon Bay, Kowloon, HONG Kong**

*Prepared by*

**SINTEK LABORATORY CO., LTD.**  
**No. 7, XINSHIDAI INDUSTRIAL, GUANTIAN VILLAGE,**  
**SHIYAN TOWN, BAOAN DISTRICT, SHENZHEN, GUANGDONG, P.R.C.**

**TEL: 86-755-27604866**

**FAX: 86-755-27608359**

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# 1. TEST RESULT CERTIFICATION

**Applicant:** EVER SPARKLE TECHNOLOGIES LTD.  
 Unit 403, Nan Fung Commercial Centre, 19 Lam Lok St.,  
 Kowloon Bay, Kowloon, Hong Kong

**Equipment Under Test:** Motion Onthe Move

**Trade Name:** e.VS

**Model:** TVG-23437

**Date of Test:** July 7~Aug11, 2011

**Report No. :** ST01104011F

**FCC ID :** SQO23437T02

| APPLICABLE STANDARDS  |                         |
|-----------------------|-------------------------|
| STANDARD              | TEST RESULT             |
| FCC Part 15 Subpart C | No non-compliance noted |

| Summary of Measurement |                  |                    |            |
|------------------------|------------------|--------------------|------------|
| Test Item              | Test Requirement | Standard Paragraph | Result     |
| Antenna Requirement    | FCC PART15       | 15. 203            | Compliance |
| Conducted Emission     | FCC PART15       | 15. 207            | Compliance |
| Radiation Emission     | FCC PART15       | 15. 209&15. 249    | Compliance |
| Band edge Requirement  | FCC PART15       | 15. 249            | Compliance |

## We hereby certify that:

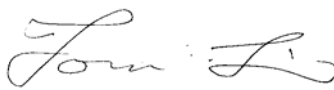
The above equipment was tested by SINTEK LABORATORY CO., LTD.

The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4: 2009 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.249.

The test results of this report relate only to the tested sample identified in this report.

Approved by:

Reviewed by:

  
 \_\_\_\_\_

  
 \_\_\_\_\_



## 2. EUT DESCRIPTION

|                              |  |
|------------------------------|--|
| <b>Product</b>               | Motion Onthe Move  |
| <b>Trade Name</b>            | e.VS   |
| <b>Model Number</b>          | TVG-23437  |
| <b>Model Discrepancy</b>     | N/A  |
| <b>Power Supply</b>          | DC5V by 110/220 AC/DC adapter  |
| <b>Frequency Range</b>       | 2402 ~ 2478.0 MHz  |
| <b>Antenna Specification</b> | The EUT'S antenna is integrated on the main PCB  |
| <b>Number of Channels</b>    | 77 Channels  |
| <b>Antenna Requirement</b>   | <p>Requirement(s): 47 CFR § 15.203<br/>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.<br/>Antenna requirement must meet at least one of the following:</p> <ul style="list-style-type: none"><li>a) Antenna must be permanently attached to the device.</li><li>b) Antenna must use a unique type of connector to attach to the device.</li><li>c) Device must be professionally installed. Installer shall be responsible</li></ul> <p>for ensuring that the correct antenna is employed with the device.</p> <p><b>The EUT'S antenna is fixed on the main PCB / Gain: 0.21dBi</b></p> |

*Note: This submittal(s) (test report) is intended for FCC ID: SQQ23437T02 filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules.*



### **3. TEST METHODOLOGY**

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, and 15.249.

#### **3.1 EUT CONFIGURATION**

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

#### **3.2 EUT EXERCISE**

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.249 under the FCC Rules Part 15 Subpart C.

#### **3.3 GENERAL TEST PROCEDURES**

##### **Conducted Emissions**

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4: 2009, Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

##### **Radiated Emissions**

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max emission, the relative positions of this hand-held transmitter (EUT) were rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4: 2009.

### 3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz                        | MHz                   | MHz             | GHz           |
|----------------------------|-----------------------|-----------------|---------------|
| 0.090 - 0.110              | 16.42 - 16.423        | 399.9 - 410     | 4.5 - 5.15    |
| <sup>1</sup> 0.495 - 0.505 | 16.69475 - 16.69525   | 608 - 614       | 5.35 - 5.46   |
| 2.1735 - 2.1905            | 16.80425 - 16.80475   | 960 - 1240      | 7.25 - 7.75   |
| 4.125 - 4.128              | 25.5 - 25.67          | 1300 - 1427     | 8.025 - 8.5   |
| 4.17725 - 4.17775          | 37.5 - 38.25          | 1435 - 1626.5   | 9.0 - 9.2     |
| 4.20725 - 4.20775          | 73 - 74.6             | 1645.5 - 1646.5 | 9.3 - 9.5     |
| 6.215 - 6.218              | 74.8 - 75.2           | 1660 - 1710     | 10.6 - 12.7   |
| 6.26775 - 6.26825          | 108 - 121.94          | 1718.8 - 1722.2 | 13.25 - 13.4  |
| 6.31175 - 6.31225          | 123 - 138             | 2200 - 2300     | 14.47 - 14.5  |
| 8.291 - 8.294              | 149.9 - 150.05        | 2310 - 2390     | 15.35 - 16.2  |
| 8.362 - 8.366              | 156.52475 - 156.52525 | 2483.5 - 2500   | 17.7 - 21.4   |
| 8.37625 - 8.38675          | 156.7 - 156.9         | 2655 - 2900     | 22.01 - 23.12 |
| 8.41425 - 8.41475          | 162.0125 - 167.17     | 3260 - 3267     | 23.6 - 24.0   |
| 12.29 - 12.293             | 167.72 - 173.2        | 3332 - 3339     | 31.2 - 31.8   |
| 12.51975 - 12.52025        | 240 - 285             | 3345.8 - 3358   | 36.43 - 36.5  |
| 12.57675 - 12.57725        | 322 - 335.4           | 3600 - 4400     | <sup>2</sup>  |
| 13.36 - 13.41              |                       |                 |               |

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

### 3.5 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low (2402MHz), Ch mid (2440MHz), Ch high (2478MHz), , with highest data rate (worst case) are chosen for full testing.



#### **4. INSTRUMENT CALIBRATION**

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.



## **5. FACILITIES AND ACCREDITATIONS**

### **5.1 FACILITIES**

All measurement facilities used to collect the measurement data are located at No. 7, Xinshidai industrial, Guantian Village, Shiyan Town, Baoan District Shenzhen, China.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

### **5.2 EQUIPMENT**

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### **5.3 LABORATORY ACCREDITATIONS AND LISTING**

Site on file with the FCC: The certificate registration number is 963441 for 3&10M OATS

Site listed with the VCCI: The certificate registration number is R-2023 and c-2178 for 3&10M OATS





## 6. SETUP OF EQUIPMENT UNDER TEST

### 6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

### 6.2 SUPPORT EQUIPMENT

| No. | Equipment | Model# | Serial# | Trade Name | Data Cable | Power Cord |
|-----|-----------|--------|---------|------------|------------|------------|
| 1.  |           |        |         |            |            |            |
| 2.  |           |        |         |            |            |            |

**Notes:**

*All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

## 7. FCC PART 15.249 REQUIREMENTS

### 7.1 BAND EDGES MEASUREMENT

#### LIMIT

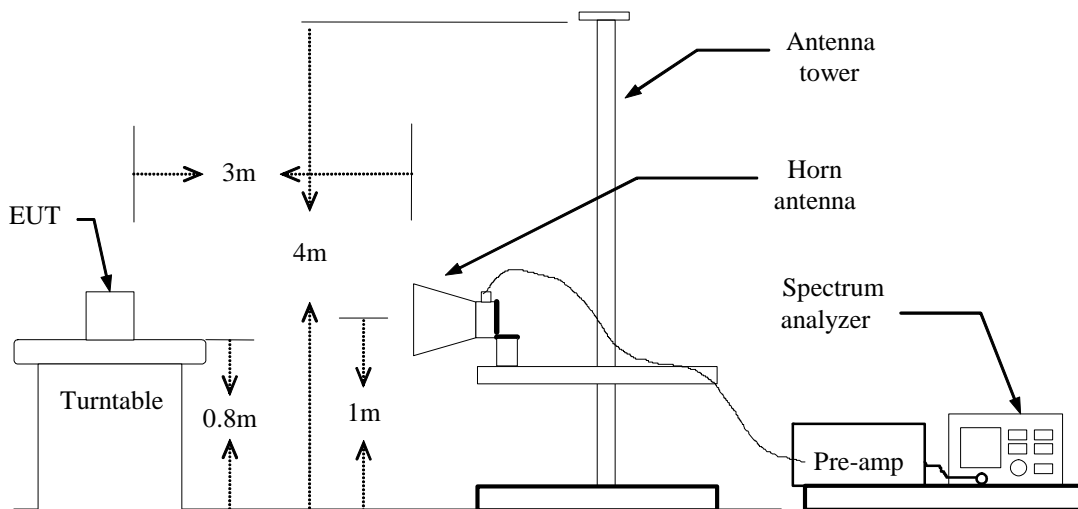
According to §15.249(d), Emissions radiated outside of the specified frequency band, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in section 15.209, whichever is the lesser attenuation.

#### MEASUREMENT EQUIPMENT USED

| Name of Equipment | Manufacturer | Model | Serial Number | LAST CAL.  | Calibration Due |
|-------------------|--------------|-------|---------------|------------|-----------------|
| Spectrum Analyzer | ADVANTEST    | R3132 | 140301570     | 06/12/2011 | 06/12/2012      |
| Turn Table        | SINTEK       | N/A   | N/A           | N.C.R      | N.C.R           |
| Antenna Tower     | SINTEK       | N/A   | N/A           | N.C.R      | N.C.R           |
| Controller        | SINTEK       | N/A   | N/A           | N.C.R      | N.C.R           |
| Horn antenna      | EMCO         | 3115  | 9602-4659     | 06/12/2011 | 06/12/2012      |
| Pre-Amplifier     | HP           | 8449B | 3008B00965    | 06/12/2011 | 06/12/2012      |

*Remark: Each piece of equipment is scheduled for calibration once a year.*

#### Test Configuration



## TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal form an external generator.
2. The EUT is placed on a turntable, which is 0.8m above the ground plane.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
5. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
6. PEAK: RBW/VBW=1MHz / Sweep=AUTO/SPAN=3MHz;  
 AVERAGE: RBW=1MHz/VBW=10Hz/Sweep=AUTO/SPAN=3MHz
7. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured. with highest data rate (worst case) are chosen for full testing.

## TEST RESULTS

| BAND EDGES     |     | BAND EDGES MEASUREMENT |             |              |                   |                    |              |
|----------------|-----|------------------------|-------------|--------------|-------------------|--------------------|--------------|
|                |     | Frequency (GHz)        | Actual FS   |              | PK Limit (dBuV/m) | AVG Limit (dBuV/m) | Test results |
|                |     |                        | PK (dBuV/m) | AVG (dBuV/m) |                   |                    |              |
| Low band edge  | VER | 2.390000               | 47.49       | 35.44        | 74                | 54                 | PASS         |
| High band edge | VER | 2.483500               | 49.05       | 37.02        | 74                | 54                 | PASS         |
| Low band edge  | HOR | 2.390000               | 4678        | 35.44        | 74                | 54                 | PASS         |
| High band edge | HOR | 2.483500               | 48.94       | 37.04        | 74                | 54                 | PASS         |

## 7.2 RADIATED EMISSIONS

### LIMIT

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

**FCC PART 15 subpart C section 15.209 :**

| Frequency (MHz) | Field Strength ( $\mu\text{V}/\text{m}$ ) | Measurement Distance (m) |
|-----------------|---|--------------------------|
| 30-88           | 100*                                      | 3                        |
| 88-216          | 150*                                      | 3                        |
| 216-960         | 200*                                      | 3                        |
| Above 960       | 500                                       | 3                        |

**FCC PART 15 subpart C section 15.249:**

| Frequency (MHz) | Field Strength                      |                                     | Measurement Distance (m) |
|-----------------|-------------------------------------|-------------------------------------|--------------------------|
|                 | Fundamental( $\text{mV}/\text{m}$ ) | Harmonies( $\mu\text{V}/\text{m}$ ) |                          |
| 2400-2483.5     | 50                                  | 500                                 | 3                        |

*Note: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

In the above emission table, the tighter limit applies at the band edges.

| Frequency (Hz) | Field Strength ( $\mu\text{V}/\text{m}$ at 3-meter) | Field Strength ( $\text{dB}\mu\text{V}/\text{m}$ at 3-meter) |
|----------------|---|--|
| 30-88          | 100   | 40   |
| 88-216         | 150   | 43.5   |
| 216-960        | 200   | 46   |
| Above 960      | 500   | 54   |

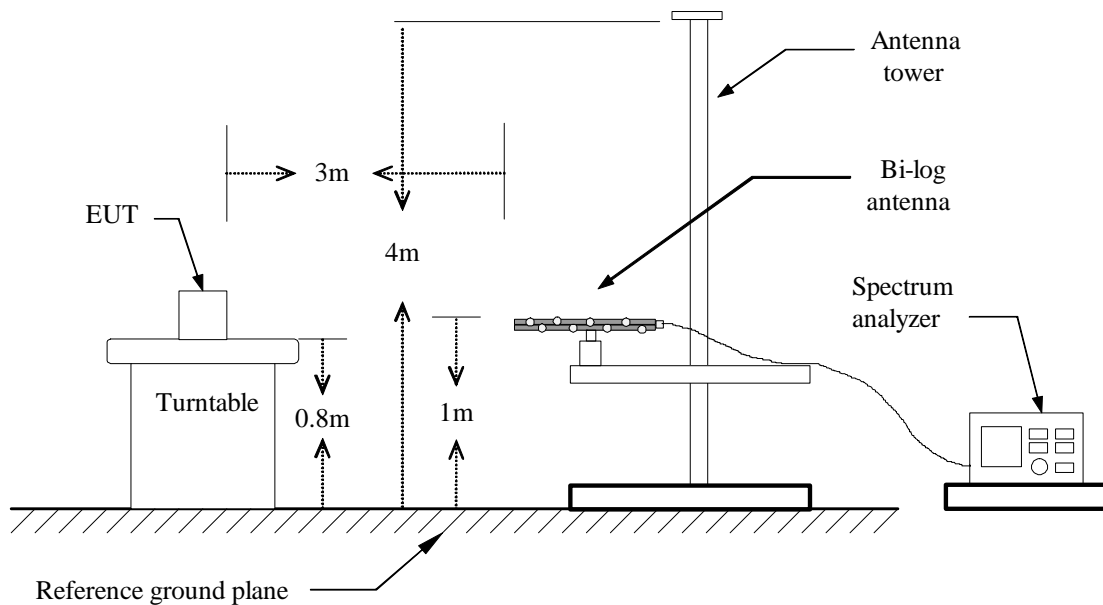
## MEASUREMENT EQUIPMENT USED

| Open Area Test Site |              |          |               |            |                 |
|---------------------|--------------|----------|---------------|------------|-----------------|
| Name of Equipment   | Manufacturer | Model    | Serial Number | LAST CAL.  | Calibration Due |
| Spectrum Analyzer   | ADVANTEST    | R3271A   | 85060231      | 06/12/2011 | 06/12/2012      |
| Spectrum Analyzer   | ADVANTEST    | R3132    | 140301570     | 06/12/2011 | 06/12/2012      |
| EMI Test Receiver   | SCHAFFNER    | SCR3501  | 464           | 06/12/2011 | 06/12/2012      |
| Pre-Amplifier       | COM-POWER    | PA-103   | 161062        | 06/12/2011 | 06/12/2012      |
| Bilog Antenna       | SCHAFFNER    | CBL6111C | 2775          | 06/12/2011 | 06/12/2012      |
| Turn Table          | SINTEK       | N/A      | N/A           | N.C.R      | N.C.R           |
| Antenna Tower       | SINTEK       | N/A      | N/A           | N.C.R      | N.C.R           |
| Controller          | SINTEK       | N/A      | N/A           | N.C.R      | N.C.R           |
| RF Switch           | ANRITSU      | MP59B    | M53867        | N.C.R      | N.C.R           |
| Horn antenna        | EMCO         | 3115     | 9602-4659     | 06/12/2011 | 06/12/2012      |
| Pre-Amplifier       | HP           | 8449B    | 3008B00965    | 06/12/2011 | 06/12/2012      |

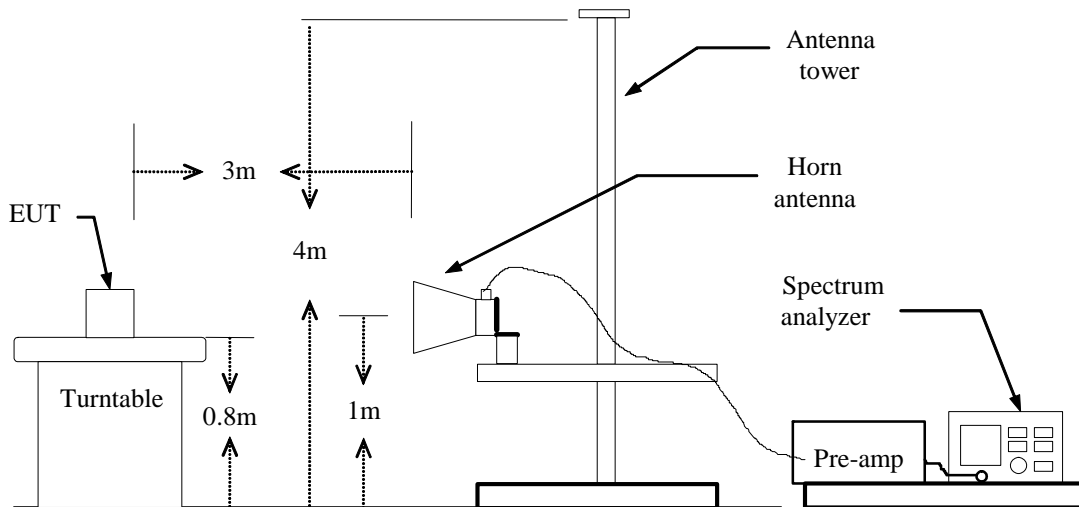
**Remark:** Each piece of equipment is scheduled for calibration once a year.

### Test Configuration

#### Below 1 GHz



### Above 1 GHz



### TEST PROCEDURE

The EUT is placed on a turntable, which is 0.8m above ground plane.

The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.

Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

Repeat above procedures until the measurements for all frequencies are complete.

## TEST RESULTS

### Below 1 GHz

**Operation Mode:** Normal

**Test Date:** July 15, 2011

**Temperature:** 20°C

**Tested by:** Laura

**Humidity:** 70 % RH

**Polarity:** Ver. / Hor.

| Freq. (MHz) | Ant. H/V | Reading (RA) (dBuV) | Corr.Factor (CF) (dB) | Measured (FS) (dBuV/m) | Limits (QP) (dBuV/m) | Safe Margins (dBuV/m) | Detector Mode (PK/QP) |
|-------------|----------|---------------------|-----------------------|------------------------|----------------------|-----------------------|-----------------------|
| 78.50       | V        | 8.45                | 12.37                 | 20.82                  | 40.00                | -19.18                | P                     |
| 92.08       | V        | 7.91                | 12.75                 | 20.66                  | 43.50                | -22.84                | P                     |
| 100.81      | V        | 11.35               | 14.84                 | 26.19                  | 43.50                | -17.31                | P                     |
| 166.77      | V        | 11.27               | 15.75                 | 27.02                  | 43.50                | -16.48                | P                     |
| 212.36      | V        | 8.87                | 16.37                 | 25.24                  | 43.50                | -18.26                | P                     |
| 234.67      | V        | 4.97                | 16.87                 | 21.84                  | 46.00                | -24.16                | P                     |
| 113.42      | H        | 5.58                | 11.74                 | 17.32                  | 43.50                | -26.18                | P                     |
| 123.14      | H        | 9.09                | 12.14                 | 21.23                  | 43.50                | -22.27                | P                     |
| 144.46      | H        | 9.78                | 11.83                 | 21.61                  | 43.50                | -21.89                | P                     |
| 185.20      | H        | 8.67                | 11.62                 | 20.29                  | 43.50                | -23.21                | P                     |
| 208.48      | H        | 9.10                | 11.34                 | 20.44                  | 43.50                | -23.06                | P                     |
| 250.19      | H        | 7.21                | 15.40                 | 22.61                  | 46.00                | -23.39                | P                     |

### **Notes:**

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.



**Above 1 GHz**

**Operation Mode:** Ch low (2402MHz)

**Test Date:** July 15, 2011

**Temperature:** 20°C

**Tested by:** Laura

**Humidity:** 70 % RH

**Polarity:** Ver. / Hor.

| Freq. (MHz) | Ant. Pol H/V | Peak Reading (dBuV) | AV Reading (dBuV) | Ant. / CL CF (dB) | Actual Fs     |             | Peak Limit (dBuV/m) | AV Limit (dBuV/m) | Margin (dB) | Remark |
|-------------|--------------|---------------------|-------------------|-------------------|---------------|-------------|---------------------|-------------------|-------------|--------|
|             |              |                     |                   |                   | Peak (dBuV/m) | AV (dBuV/m) |                     |                   |             |        |
| 2402.00     | V            | 45.24               | ---               | 33.11             | 78.35         | ---         | 114.00              | 94.00             | -15.65      | Peak   |
| 4804.10     | V            | 3.57                | ---               | 35.26             | 38.83         | ---         | 74.00               | 54.00             | -15.17      | Peak   |
| 9608.33     | V            | 1.54                | ---               | 39.81             | 41.35         | ---         | 74.00               | 54.00             | -12.65      | Peak   |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| 2402.00     | H            | 43.51               | ---               | 33.11             | 76.62         |             | 114.00              | 94.00             | -17.38      | Peak   |
| 4804.10     | H            | 2.31                | ---               | 34.75             | 37.06         | ---         | 74.00               | 54.00             | -16.94      | Peak   |
| 9608.33     | H            | 1.25                | ---               | 35.86             | 37.11         | ---         | 74.00               | 54.00             | -16.89      | Peak   |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |

**Notes:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
  - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
  - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.





**Above 1 GHz**

**Operation Mode:** Ch mid (2440MHz)

**Test Date:** July 15, 2011

**Temperature:** 20°C

**Tested by:** Laura

**Humidity:** 70 % RH

**Polarity:** Ver. / Hor.

| Freq. (MHz) | Ant. Pol H/V | Peak Reading (dBuV) | AV Reading (dBuV) | Ant. / CL CF (dB) | Actual Fs     |             | Peak Limit (dBuV/m) | AV Limit (dBuV/m) | Margin (dB) | Remark |
|-------------|--------------|---------------------|-------------------|-------------------|---------------|-------------|---------------------|-------------------|-------------|--------|
|             |              |                     |                   |                   | Peak (dBuV/m) | AV (dBuV/m) |                     |                   |             |        |
| 2440.03     | V            | 45.27               | ---               | 33.45             | 78.72         | ---         | 114.00              | 94.00             | -15.28      | Peak   |
| 4880.06     | V            | 2.31                | ---               | 35.30             | 37.61         | ---         | 74.00               | 54.00             | -16.39      | Peak   |
| 9760.12     | V            | 0.27                | ---               | 39.83             | 40.1          | ---         | 74.00               | 54.00             | -13.90      | Peak   |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| 2440.06     | H            | 44.39               | ---               | 33.49             | 77.88         |             | 114.00              | 94.00             | -16.12      | Peak   |
| 4880.12     | H            | 2.18                | ---               | 34.75             | 36.93         | ---         | 74.00               | 54.00             | -17.07      | Peak   |
| 9760.24     | H            | 0.54                | ---               | 35.86             | 36.4          | ---         | 74.00               | 54.00             | -17.6       | Peak   |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |

**Notes:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
  - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
  - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.



**Above 1 GHz**

**Operation Mode:** Ch high (2478MHz)

**Test Date:** July 15, 2011

**Temperature:** 20°C

**Tested by:** Laura

**Humidity:** 70 % RH

**Polarity:** Ver. / Hor.

| Freq. (MHz) | Ant. Pol H/V | Peak Reading (dBuV) | AV Reading (dBuV) | Ant. / CL CF (dB) | Actual Fs     |             | Peak Limit (dBuV/m) | AV Limit (dBuV/m) | Margin (dB) | Remark |
|-------------|--------------|---------------------|-------------------|-------------------|---------------|-------------|---------------------|-------------------|-------------|--------|
|             |              |                     |                   |                   | Peak (dBuV/m) | AV (dBuV/m) |                     |                   |             |        |
| 2478.15     | V            | 44.36               | ---               | 33.51             | 77.87         | ---         | 114.00              | 94.00             | -16.13      | Peak   |
| 4960.30     | V            | 2.61                | ---               | 35.5              | 38.11         | ---         | 74.00               | 54.00             | -15.89      | Peak   |
| 9920.60     | V            | 1.34                | ---               | 39.83             | 41.17         | ---         | 74.00               | 54.00             | -12.83      | Peak   |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| 2478.12     | H            | 45.31               | ---               | 33.51             | 78.82         |             | 114.00              | 94.00             | -15.18      | Peak   |
| 4960.24     | H            | 2.34                | ---               | 34.75             | 37.09         | ---         | 74.00               | 54.00             | -16.91      | Peak   |
| 9920.48     | H            | 0.35                | ---               | 35.86             | 36.21         | ---         | 74.00               | 54.00             | -17.79      | Peak   |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |

**Notes:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
  - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
  - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.

### 7.3 POWER LINE CONDUCTED EMISSIONS

#### LIMIT

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

| Frequency Range (MHz) | Limits (dB $\mu$ V) |          |
|-----------------------|---------------------|----------|
|                       | Quasi-peak          | Average  |
| 0.15 to 0.50          | 66 to 56            | 56 to 46 |
| 0.50 to 5             | 56                  | 46       |
| 5 to 30               | 60                  | 50       |

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

#### MEASUREMENT EQUIPMENT USED

| Name of Equipment | Manufacturer | Model   | Serial Number | LAST CAL.  | Calibration Due |
|-------------------|--------------|---------|---------------|------------|-----------------|
| EMI Test Receiver | SCHAFFNER    | SCR3501 | 464           | 06/12/2011 | 06/12/2012      |
| Spectrum Analyzer | ADVANTEST    | R3132   | 140301570     | 06/12/2011 | 06/12/2012      |
| LISN              | COM-POWER    | LI115   | 2027          | 06/12/2011 | 06/12/2012      |
| LISN              | COM-POWER    | LI115   | 2029          | 06/12/2011 | 06/12/2012      |

*Remark: Each piece of equipment is scheduled for calibration once a year.*



### **Test Configuration**

The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4: 2009

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

*The EUT is set to transmit in a continuous mode.*

### **TEST PROCEDURE**

The EUT was placed on a table, which is 0.8m above ground plane.

Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

Repeat above procedures until all frequency measured were complete.



## **TEST RESULTS**

***No non-compliance noted***

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

### **Test Data**

N/A DC4.5V(3xAAA Batteries)

## 8. APPENDIX 1 PHOTOGRPHS OF TEST SETUP

### Radiated Emission Set up Photos

