# FCC 47 CFR PART 15 SUBPART C

# TEST REPORT

**For**

**RFK200**

**Model: RFA201**

**Trade Name: Westek**

*Prepared for*

**American Tack&Hardware Co., Inc**
**Saddle River Executive Centre One Route 17 South Saddle River , NJ07458 U.S.A**

*Prepared by*

**COMPLIANCE CERTIFICATION SERVICES (SHENZHEN) INC.**
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ACCREDITED
TESTING CERT #2861.01

ilac-MRA

TAF
Testing Laboratory
0363

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# 1. TEST RESULT CERTIFICATION

| | |
|---|---|
| **Applicant:** | American Tack&Hardware Co., Inc.<br>Saddle River Executive Centre One Route 17 South Saddle River, NJ07458 U.S.A |
| **Manufacturer:** | ShenZhen Aodee Electronic Co., Ltd.<br>Weichuang Industrial Park, Ruoma Road, Qingxi Town, Dongguan City, P.R.C. 523662 |
| **Equipment Under Test:** | RFK200 |
| **Trade Name:** | Westek |
| **Model:** | RFA201 |
| **Date of Test:** | November 17- 23, 2009 |

| APPLICABLE STANDARDS | |
|---|---|
| **STANDARD** | **TEST RESULT** |
| FCC 47 CFR Part 15 Subpart C | No non-compliance noted |

## We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. 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 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.207, 15.209 and Part 15.231.

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

***Approved by:*** ***Reviewed by:***

**Clinton Kao/ Manager**
**COMPLIANCE CERTIFICATION SERVICES INC.**

**Vincent Yao/ Assistant manager**
**COMPLIANCE CERTIFICATION SERVICES INC.**

# 2. EUT DESCRIPTION

| | |
|---|---|
| **Product** | RFK200 |
| **Trade Name** | Westek |
| **Model Number** | RFA201 |
| **Model Difference** | N/A |
| **Power Supply** | DC 12V powered by the battery |
| **Frequency Range** | 315.166 MHz |
| **Modulation Technique** | AM |
| **Antenna Designation** | PCB Antenna |

***Remark:*** *This submittal(s) (test report) is intended for FCC ID: XDE-RFA201 filing to comply with Section 15.207, 15.209 and 15.231 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 (2003) and FCC CFR 47 15.207, 15.209 and 15.231.

## 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.

## 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. 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 maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4.

## 3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) 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 |
| [1]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 - | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.52525 | 2655 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 156.7 - 156.9 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 162.0125 - 167.17 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 167.72 - 173.2 | 3345.8 - 3358 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 240 - 285 | 3600 - 4400 | ([2]) |
| 13.36 - 13.41 | 322 - 335.4 | | |

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

(b) 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 engineering test mode condition and the EUT staying in continuous transmitting mode.

# 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
☒ **No10-1, Mingkeda Logistics Park, No.18 Huanguan South RD. Guan lan 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, biconical, 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

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

| | |
|---|---|
| **USA** | **A2LA** |
| **Taiwan** | **TAF** |

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

| | |
|---|---|
| **USA** | **FCC** |
| **Japan** | **VCCI** |
| **Canada** | **INDUSTRY CANADA** |
| **Taiwan** | **BSMI** |
| **Norway** | **Nemko** |

Copies of granted accreditation certificates are available for downloading from our web site, http://www.ccsrf.com

# 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

| Device Type | Brand | Model | FCC ID | Series No. | Data Cable | Power Cord |
|---|---|---|---|---|---|---|
| N/A | | | | | | |

***Remark:***

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

## 6.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in ETR 028:

| Measurement | Frequency | Uncertainty |
|---|---|---|
| Conducted emissions | 9kHz~30MHz | +/- 3.18dB |
| Radiated emissions | 30MHz ~ 200MHz | +/- 3.79dB |
| | 200MHz ~1000MHz | +/- 3.62dB |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
The measured result is above (below) the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95% level of confidence. However, the result indicates that compliance (non-compliance) is more probable than non-compliance) with the specification limit.

# 7. FCC PART 15.231 REQUIREMENTS

## 7.1 20 dB BANDWIDTH

### LIMIT

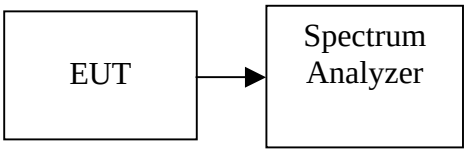
The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

### MEASUREMENT EQUIPMENT USED

| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
|---|---|---|---|---|
| Spectrum Analyzer | Agilent | E4446A | US44300399 | 02/24/2010 |

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

**Test Configuration**




### TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The spectrum analyzer center frequency is set to the transmitter frequency. The RBW is set to 10 kHz and VBW is set 30kHz.

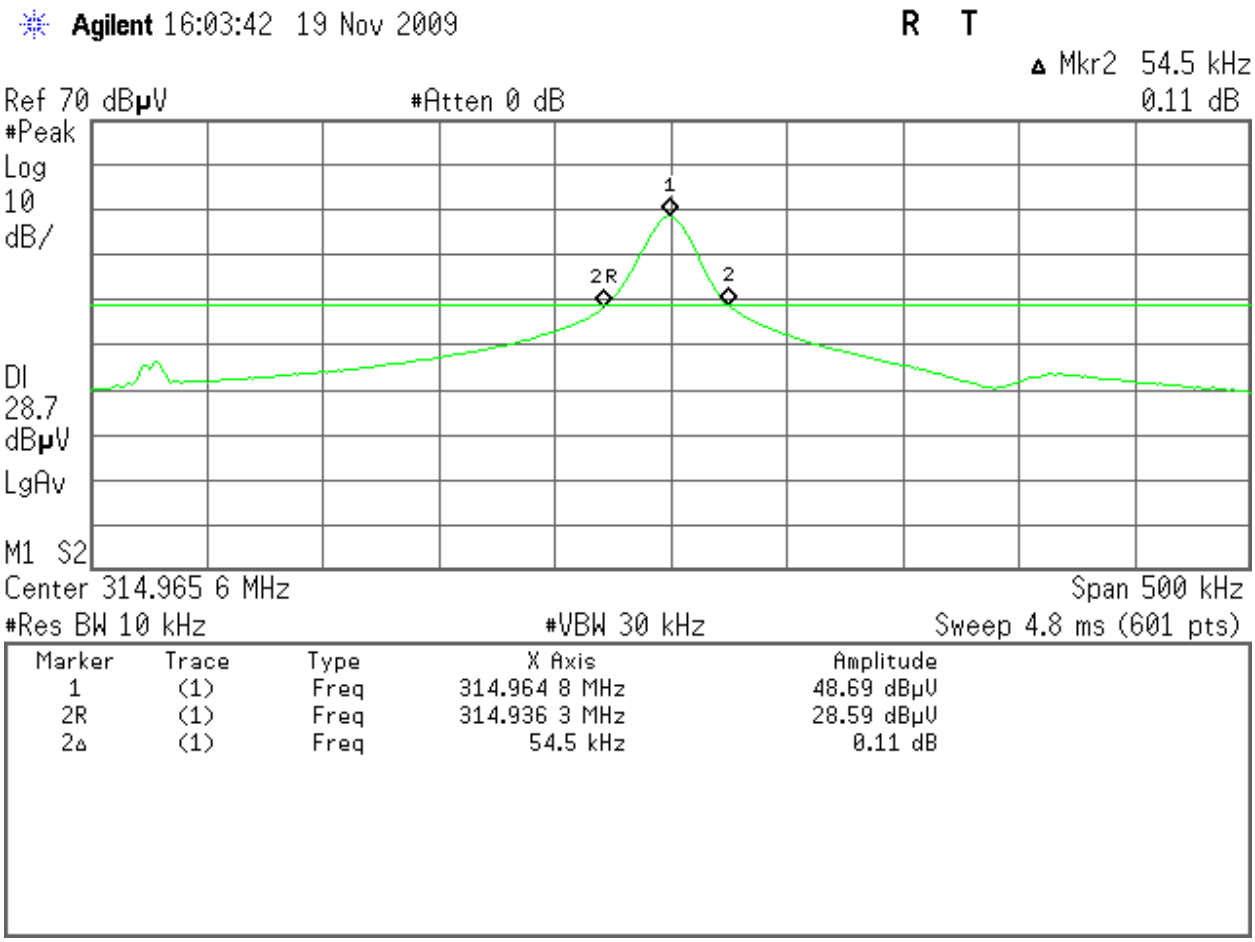
### TEST RESULTS

*No non-compliance noted.*

**Test Data**

| Frequency (MHz) | 20 dB Bandwidth (kHz) | Limit (MHz) | Result |
|---|---|---|---|
| 314.97 | 54.50 | 0.7874 | PASS |

**Test Plot**




| Marker | Trace | Type | X Axis | Amplitude |
|---|---|---|---|---|
| 1 | (1) | Freq | 314.964 8 MHz | 48.69 dBµV |
| 2R | (1) | Freq | 314.936 3 MHz | 28.59 dBµV |
| 2Δ | (1) | Freq | 54.5 kHz | 0.11 dB |

## 7.2 LIMIT OF TRANSMISSION TIME

### LIMIT

According to 15.231 (e) limit for transmission time:
The devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

### Or

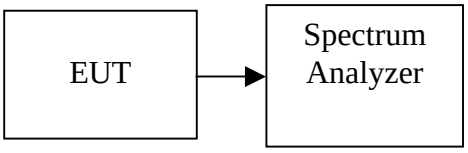
According to 15.231 (a)(1), a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

### MEASUREMENT EQUIPMENT USED

| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
|---|---|---|---|---|
| Spectrum Analyzer | Agilent | E4446A | US44300399 | 02/24/2010 |

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

**Test Configuration**



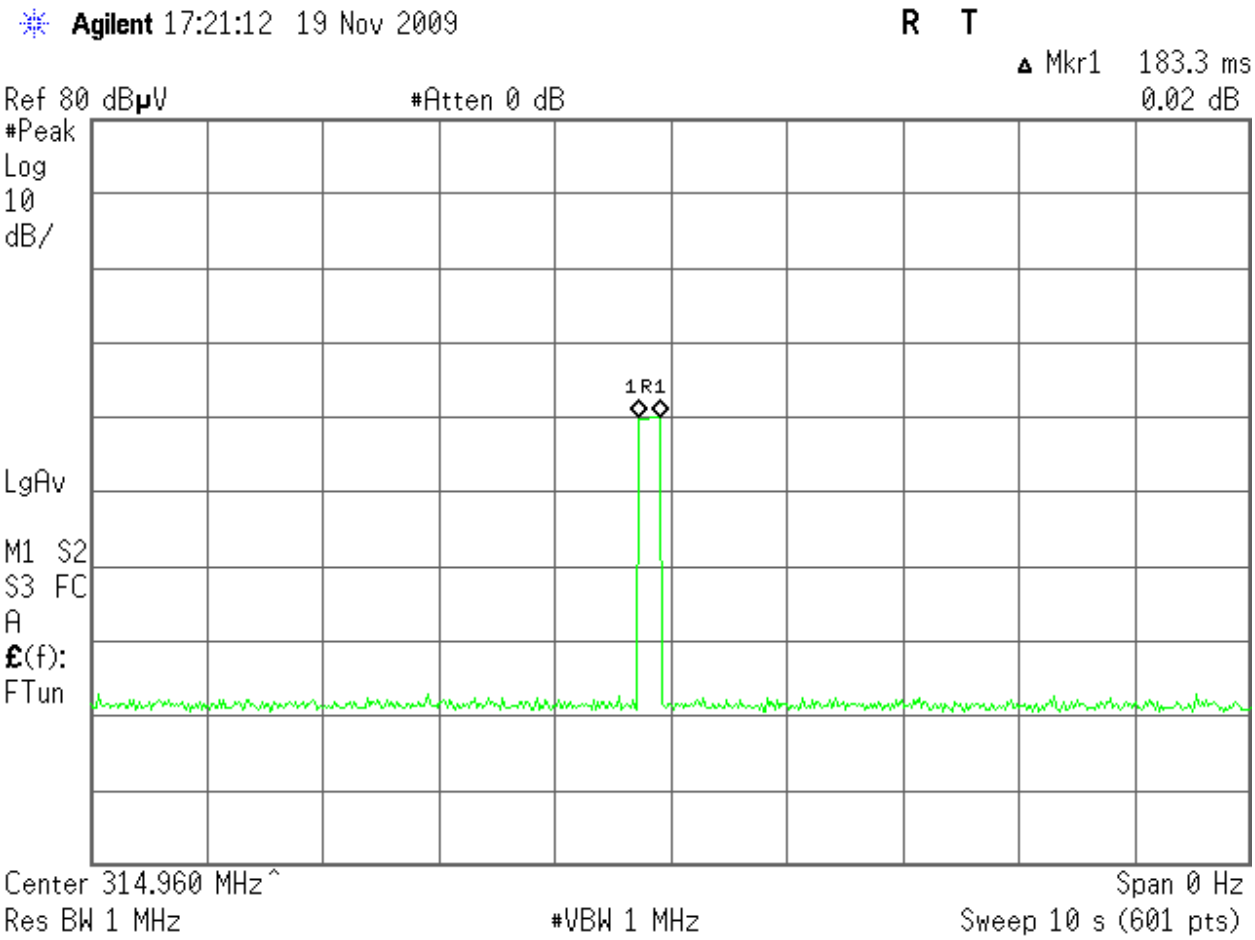

### TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The spectrum analyzer center frequency is set to the transmitter frequency. The RBW and VBW are set to 1MHz.

## TEST RESULTS

*No non-compliance noted*

**Test Plot**




*Note: From above test plot we can know that:*

*The duration of each transmission=183.3ms =0.183s <5second .*
*and meet the 15.231(a).*

## 7.3 DUTY CYCLE

## LIMIT

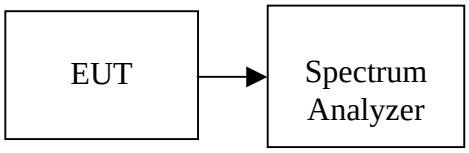
**According to 15.35 (c) limit for duty cycle:**
As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

## MEASUREMENT EQUIPMENT USED

| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
|---|---|---|---|---|
| Spectrum Analyzer | Agilent | E4446A | US44300399 | 02/24/2010 |

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

**Test Configuration**




## TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0Hz, Adjust Sweep = 300ms
5. Repeat above procedures until all frequency measured were complete.

## TEST RESULTS

*No non-compliance noted*

**Test Data**

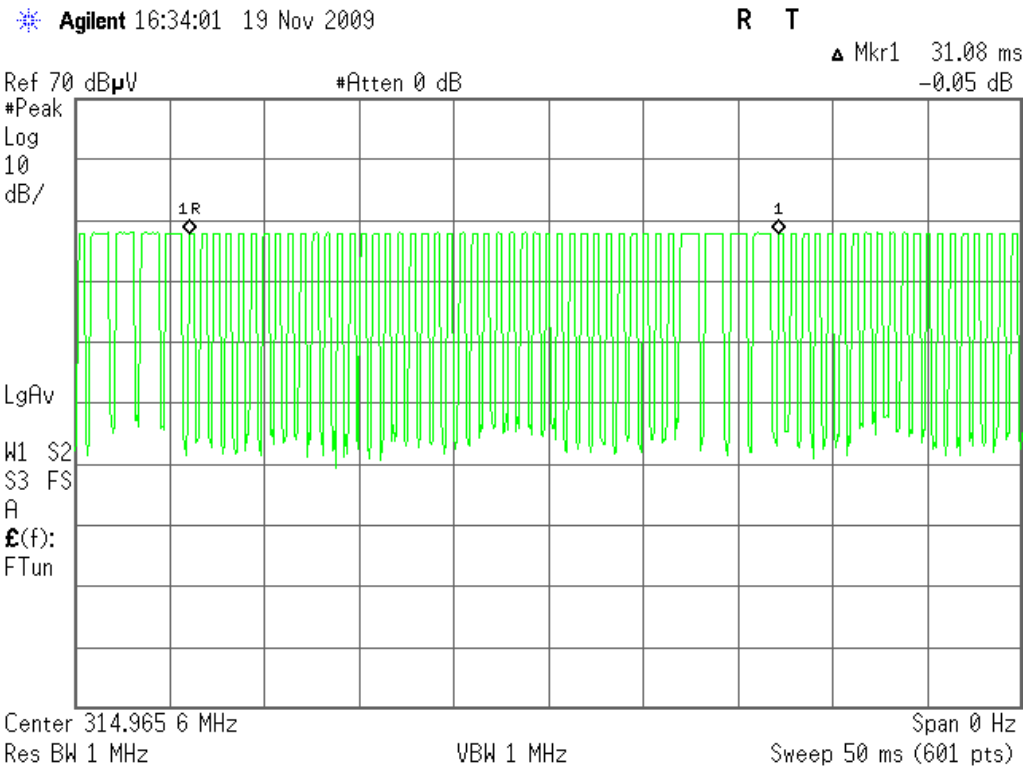
Ton+off =31.08ms(If this time exceeds 0.1seconds, and use the formula Ton/100ms to calculate the duty-cycle correction factor)

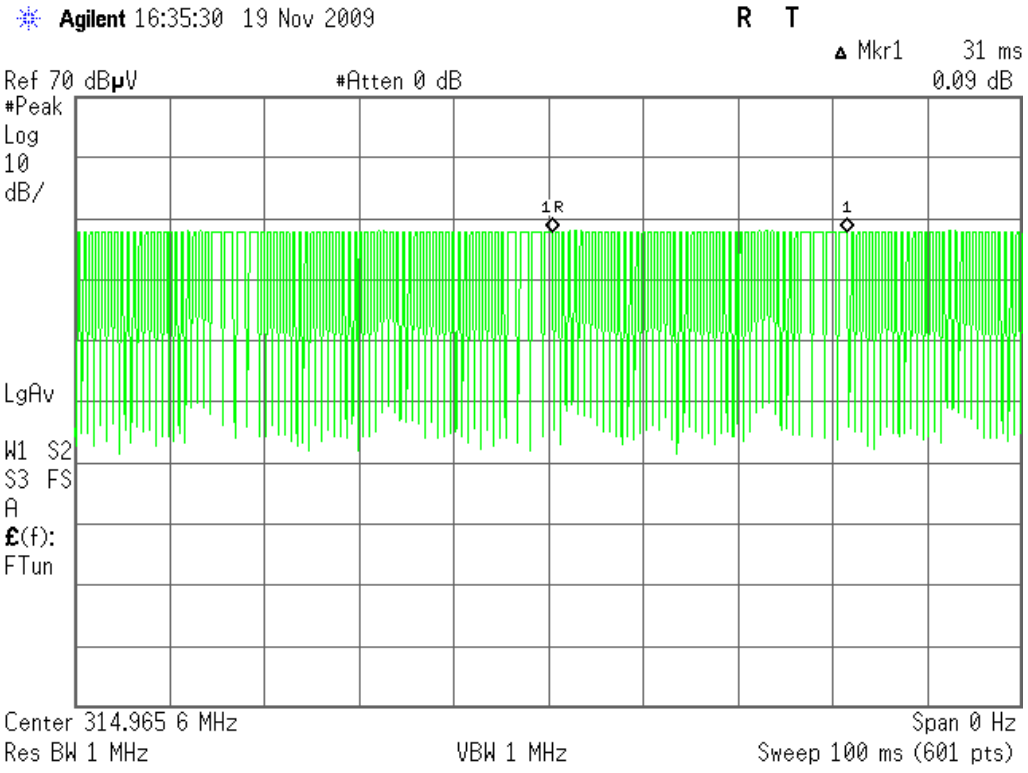
Ton = 0.2567*40 +0.920ms*4= 13.948ms

Duty Cycle Correction Factor = 20* log (Ton / Ton+off) = 20* log (13.948/31.08) = -6.96 dB

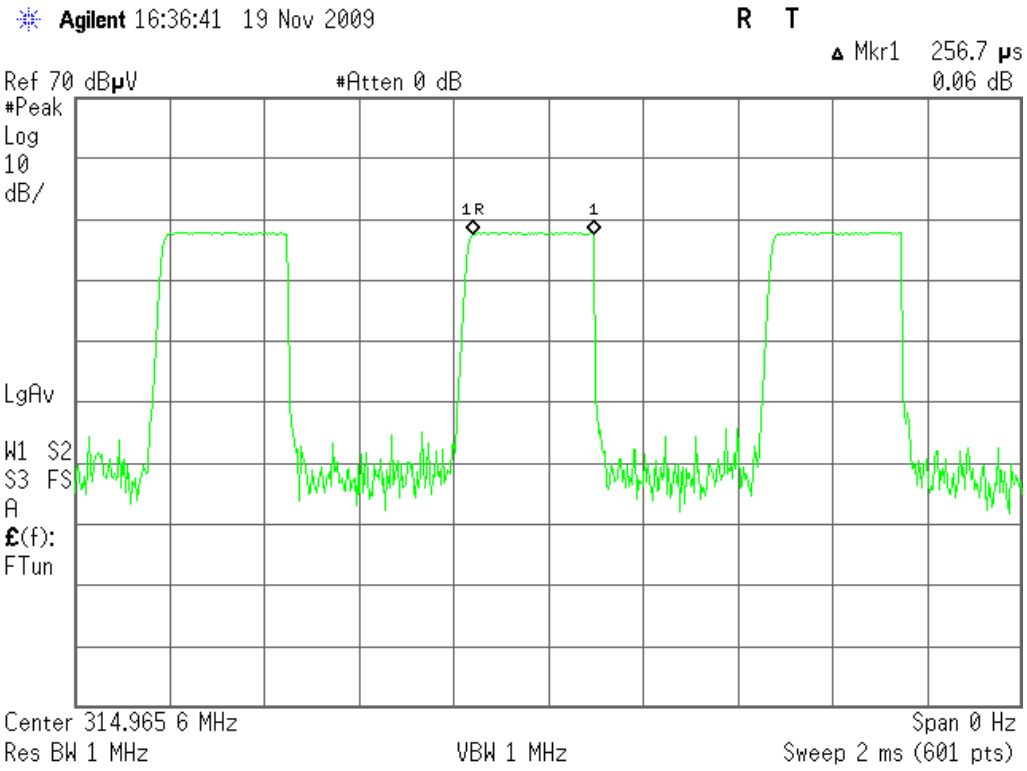
## Test Plot

## Tp

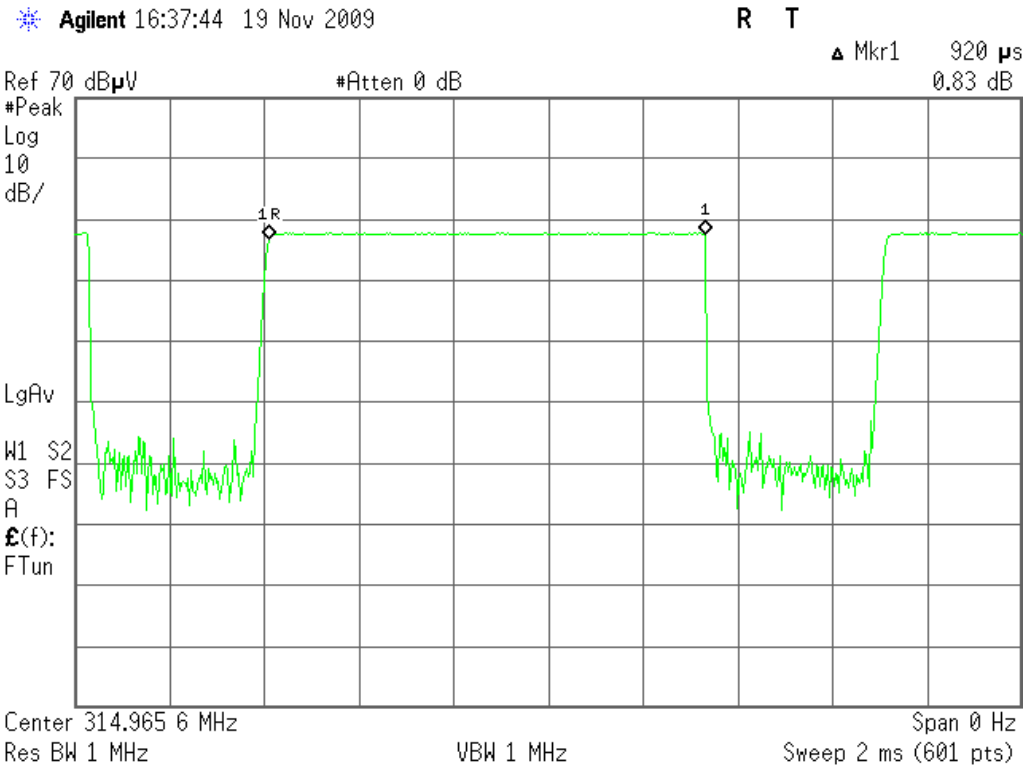

Agilent 16:34:01 19 Nov 2009
R T
Mkr1 31.08 ms
-0.05 dB
Ref 70 dBµV
#Atten 0 dB
#Peak
Log
10
dB/
1R
1
LgAv
W1 S2
S3 FS
A
£(f):
FTun
Center 314.965 6 MHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 50 ms (601 pts)


Agilent 16:35:30 19 Nov 2009
R T
Mkr1 31 ms
0.09 dB
Ref 70 dBµV
#Atten 0 dB
#Peak
Log
10
dB/
1R
1
LgAv
W1 S2
S3 FS
A
£(f):
FTun
Center 314.965 6 MHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 100 ms (601 pts)

## Ton 1


Agilent 16:36:41 19 Nov 2009
R T
Mkr1 256.7 µs
0.06 dB
Ref 70 dBµV
#Atten 0 dB
#Peak
Log
10
dB/
1R
1
LgAv
W1 S2
S3 FS
A
£(f):
FTun
Center 314.965 6 MHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 2 ms (601 pts)

## Ton 2


Agilent 16:37:44 19 Nov 2009
R T
Mkr1 920 µs
0.83 dB
Ref 70 dBµV
#Atten 0 dB
#Peak
Log
10
dB/
1R
1
LgAv
W1 S2
S3 FS
A
£(f):
FTun
Center 314.965 6 MHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 2 ms (601 pts)

## 7.4 RADIATED EMISSIONS

## LIMIT

1. According to §15.231(b), In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following: Fundamental Field Strength of Field Strength of Frequency Fundamental Spurious Emissions (MHz) (microvolts/meter) (microvolts/meter)

| Fundamental Frequency (MHz) | Field Strength of Fundamental (microvolts/meter) | Field Strength of Spurious Emissions (microvolts/meter) |
|---|---|---|
| 40.66 – 40.70 | 2,250 | 225 |
| 70 – 130 | 1,250 | 125 |
| 130 – 174 | 1,250 to 3,750 ** | 125 to 375 ** |
| 174 – 260 | 3,750 | 375 |
| 260 – 470 | 3,750 to 12,500 ** | 375 to 1,250 ** |
| Above 470 | 12,500 | 1,250 |

** linear interpolations

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, uV/m at 3 meters = 56.81818(F) - 6136.3636; for the band 260-470 MHz, uV/m at 3 meters = 41.6667(F) - 7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

2. 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:

| Frequency (MHz) | Field Strength (mV/m) | Measurement Distance (m) |
|---|---|---|
| 30-88 | 100* | 3 |
| 88-216 | 150* | 3 |
| 216-960 | 200* | 3 |
| Above 960 | 500 | 3 |

***Remark:*** *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.*

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

| Frequency (Hz) | Field Strength (μV/m at 3-meter) | Field Strength (dBμV/m at 3-meter) |
|---|---|---|
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43.5 |
| 216-960 | 200 | 46 |
| Above 960 | 500 | 54 |

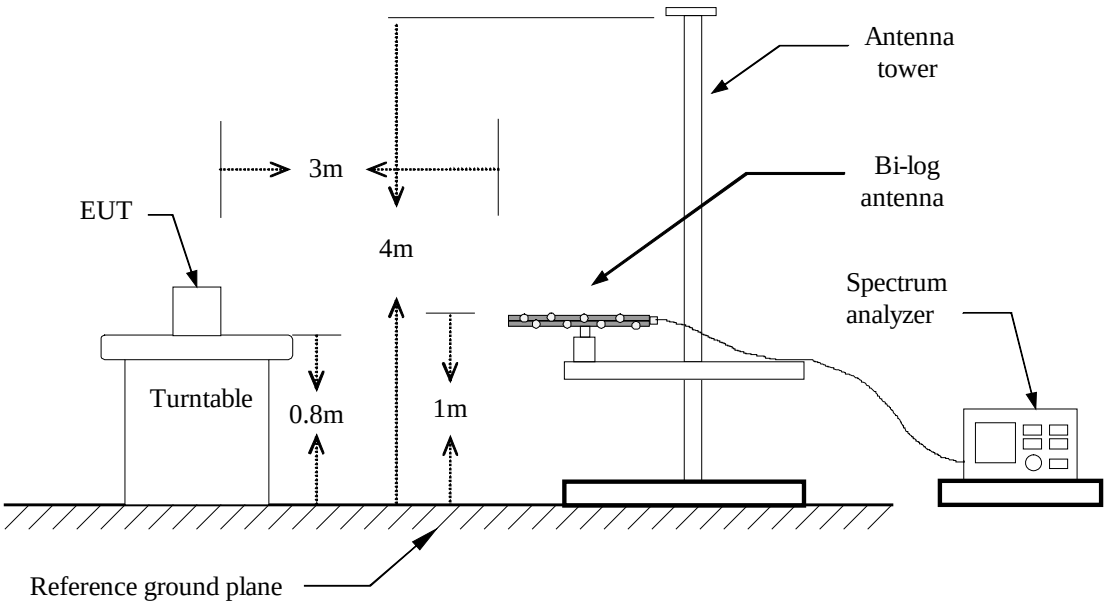
# MEASUREMENT EQUIPMENT USED

| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | CAL. DUE |
|---|---|---|---|---|
| ESCI EMI TEST RECEIVE.ESCI | ROHDE&SCHWARZ | 1166.5950 03 | 100783 | 03/20/2010 |
| Spectrum Analyzer | Agilent | E4446A | US44300399 | 03/01/2010 |
| Low Noise Amplifier | MITEQ | AM-1604-3000 | 1123808 | 02/06/2010 |
| Turn Table | EMCO | 2081-1.21 | N/A | N.C.R |
| Controller | CT | N/A | N/A | N.C.R |
| High Noise Amplifier | Agilent | 8449B | 3008A01838 | 05/29/2010 |
| Site NSA | C&C | N/A | N/A | N.C.R |
| BILOG ANTENNA | SCHAFFNER | CBL6143 | 5082 | 06/09/2010 |
| Horn Antenna | SCHAFFNER | BBHA9120D | 1201 | 03/19/2010 |
| Signal Generator | Anritsu | MG3694A | #050125 | 03/01/2010 |

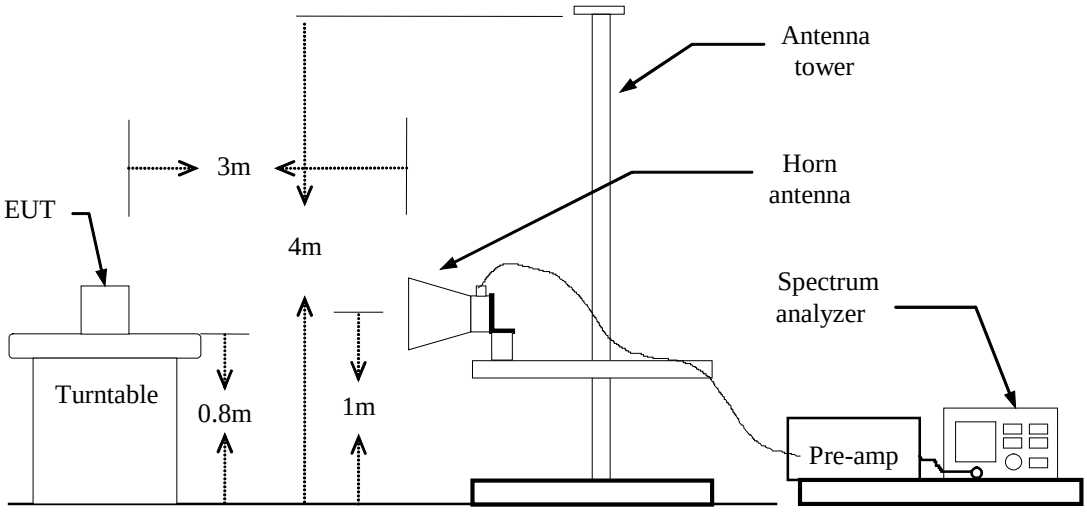
***Remark:*** *Each piece of equipment is scheduled for calibration once a year.*

## Test Configuration

### Below 1 GHz



**Above 1 GHz**




## TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

   Below 1GHz:

   RBW=100kHz / VBW=300kHz / Sweep=AUTO

   Above 1GHz:

   (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO

   (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

## TEST RESULTS

**Operation Mode:** TX **Test Date:** November 20, 2009

**Temperature:** 25°C **Tested by:** Firetree Tian

**Humidity:** 52 % RH **Polarity:** Ver. / Hor.

*Fundamental:*

| Freq. (MHz) | Ant. Pol (H/V) | Reading (Peak) (dBuV) | Correction Factor (dB/m) | Result (Peak) (dBuV/m) | Duty Cycle Correction Factor (dB) | Result (Average/ Quasi-peak) (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 315.166 | V | 76.91 | -13.99 | 62.92 | --- | --- | 95.62 | -32.70 | Peak |
| 315.166 | V | 76.91 | -13.99 | 62.92 | -6.96 | 55.96 | 75.62 | -19.66 | Average |
| | | | | | | | | | |
| 315.166 | V | 89.74 | -13.99 | 75.75 | --- | --- | 95.62 | -19.87 | Peak |
| 315.166 | V | 89.74 | -13.99 | 75.75 | -6.96 | 68.79 | 75.62 | -6.63 | Average |

***Remark:***

*Average =Peak result+Duty cycle correction factor*

*Peak Result=peak reading+ Correction Factor*

*Correction Factor= Cable Loss + Antenna Gain –Amplifier Gain*

| Freq. (MHz) | Ant.Pol. H/V | Detector Mode (PK/QP) | Reading (dBuV) | Factor (dB) | Actual FS (dBuV/m) | Limit 3m (dBuV/m) | Safe Margin (dB) |
|---|---|---|---|---|---|---|---|
| 31.350 | V | QP | 43.43 | -13.17 | 30.26 | 40.00 | -9.74 |
| 32.250 | V | QP | 40.13 | -13.76 | 26.37 | 40.00 | -13.63 |
| 50.250 | V | QP | 44.56 | -19.45 | 25.11 | 40.00 | -14.89 |
| 74.100 | V | QP | 45.12 | -20.16 | 24.96 | 40.00 | -15.04 |
| 630.166 | V | Peak | 53.63 | -5.51 | 48.12 | 55.62 | -7.50 |
| 945.166 | V | Peak | 44.06 | -1.83 | 42.23 | 55.62 | -13.39 |
| | | | | | | | |
| 31.350 | H | QP | 39.13 | -13.17 | 25.96 | 40.00 | -14.04 |
| 33.600 | H | QP | 40.35 | -14.64 | 25.71 | 40.00 | -14.29 |
| 49.800 | H | QP | 44.43 | -19.45 | 24.98 | 40.00 | -15.02 |
| 57.450 | H | QP | 42.05 | -19.46 | 22.59 | 40.00 | -17.41 |
| 630.166 | H | QP | 57.67 | -5.51 | 52.16 | 55.62 | -3.46 |
| 945.166 | H | Peak | 50.51 | -1.83 | 48.68 | 55.62 | -6.94 |

***Note:** No emission found between lowest internal used/generated frequency to 30 MHz.*

*REMARKS:*

1. *Measuring frequencies from 9kHz to the 1GHz.*
2. *Radiated emissions measured in frequency range from 9kHz to 1000MHz were made with an instrument using peak/quasi-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.*
5. *Actual Fs=Peak reading + Ant.CF. , Margin= Actual Fs-Limit*

   *Correction Factor= Cable Loss + Antenna Gain –Amplifier Gain*

**Above 1 GHz**

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX | **Test Date:** | November 20, 2009 |
| **Temperature:** | 25°C | **Humidity:** | 52 % RH |
| **Tested by:** | Firetree Tian | | |

| 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) | | | | |
| 1510.000 | V | 48.30 | --- | -9.34 | 38.96 | --- | 74.00 | 54.00 | -15.04 | Peak |
| 1803.333 | V | 47.61 | --- | -7.02 | 40.59 | --- | 74.00 | 54.00 | -13.41 | Peak |
| 2106.660 | V | 48.46 | --- | -5.04 | 43.42 | --- | 74.00 | 54.00 | -10.58 | Peak |
| 2633.333 | V | 48.41 | --- | -3.11 | 45.30 | --- | 74.00 | 54.00 | -8.70 | Peak |
| N/A | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| 1633.333 | H | 49.81 | --- | -8.36 | 41.45 | --- | 74.00 | 54.00 | -12.55 | Peak |
| 1973.333 | H | 47.95 | --- | -5.67 | 42.28 | --- | 74.00 | 54.00 | -11.72 | Peak |
| 2366.666 | H | 47.48 | --- | -4.01 | 43.47 | --- | 74.00 | 54.00 | -10.53 | Peak |
| 2376.666 | H | 47.90 | --- | -2.82 | 45.08 | --- | 74.00 | 54.00 | -8.92 | Peak |
| N/A | | | | | | | | | | |
| | | | | | | | | | | |

***Remark:***

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. *Spectrum Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.*
   b. *Spectrum AV Setting 1GH z- 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.*
5. *Actual Fs=Peak reading + Ant.CF. , Margin= Actual Fs-Limit*
   *Correction Factor= Cable Loss + Antenna Gain –Amplifier Gain*

## 7.5 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 (dBμV) | |
|---|---|---|
| | 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

| Conducted Emission Test Site | | | | | |
|---|---|---|---|---|---|
| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL. DUE |
| ESCI EMI TEST RECEIVE.ESCI | ROHDE&SCHWARZ | 1166.5950 03 | 100145 | 03/20/2009 | 03/20/2010 |
| LISN | FCC | FCC-LISN-50-50-2-M | 01068 | 03/01/2009 | 03/01/2010 |
| LISN | EMCO | 3825/2 | 8901-1459 | 03/01/2009 | 03/01/2010 |
| CDN | FCC | FCC-TILISN-T4 | 20182 | 03/01/2009 | 03/01/2010 |
| CDN | FCC | FCC-TLISN-T8-02 | 20183 | 03/01/2009 | 03/01/2010 |
| CDN | FCC | FCC-TLISN-T4-02 | 20382 | 03/01/2009 | 03/01/2010 |
| CDN | FCC | FCC-TLISN-T4-02 | 20383 | 03/01/2009 | 03/01/2010 |
| CDN | FCC | FCC-801-T8-RJ45 | 04030 | 03/01/2009 | 03/01/2010 |
| Current Probe | STODDART AIRCRAFT | 91550-1 | 345-73 | 03/01/2009 | 03/01/2010 |

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

## TEST CONFIGURATION

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

## TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

## TEST RESULTS

*Not applicable (Since the EUT is powered by battery)*