# FCC Part 15.247
# Transmitter Certification
**Class II Permissive Change**

## Frequency Hopping Spread Spectrum Transmitter

# Test Report

## FCC ID: P2SNTGR900G

## FCC Rule Part: 15.247

## ACS Report Number: 07-0029

Manufacturer: Neptune Technology Group, Inc.
Model: R900G

Test Begin Date: January 30, 2007
Test End Date: January 30, 2007

Report Issue Date: February 22, 2007

FOR THE SCOPE OF ACCREDITATION UNDER LAB Code 200612-0

This report is not be used to claim certification, approval, or endorsement by NVLAP, NIST or any government agency.


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**This report contains 17 pages**

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**Additional Exhibits Included In Filing**

**Test Setup Photographs**
**BOM (Parts List)**
**Schematics**

## 1.0 GENERAL

### 1.1 Purpose
The purpose of this report is to demonstrate compliance with Part 15, Subpart C of the FCC's Code of Federal Regulations.

### 1.2 Product Description

#### 1.2.1 General
The R900G is a one-way RF module that operates in the unlicensed 902-928MHz bandwidth. The data is transmitted via a high power signal to an enhanced data collection device, boosting range and meter reading success rates, while reducing meter reading time.

The R900G will attach to new or existing meters, and encodes consumption and tamper information from the meter to a handheld, mobile, or a targeted fixed network reading device.

Manufacturer Information:
Neptune Technology Group, Inc.
1600 Alabama Highway 229
Tallassee, AL 36078

Detailed photographs of the EUT are included separately in this filing.

#### 1.2.2 Intended Use
The R900G will be a transmit-only meter module that collects and transmits metering data utilizing the 902 - 928 MHz frequency band for collection by Gas utility companies.

### 1.3 Test Methodology and Justifications
Modifications to the originally certified device fall under the permissive change equipment authorization procedure. The device was evaluated to those characteristics which could be affected by the changes. Characteristics evaluated include output power, bandwidth, and both intentional and unintentional radiated emissions. Test results are provided in this report and indicate a Class II Permissive Change is appropriate.

Modifications to the originally certified device are described in a cover letter accompanying this report.

## 2.0 TEST FACILITIES

### 2.1 Location

The radiated and conducted emissions test sites are located at the following address:

Advanced Compliance Solutions
5015 B.U. Bowman Drive
Buford, GA 30518
Phone: (770) 831-8048
Fax: (770) 831-8598

### 2.2 Laboratory Accreditations/Recognitions/Certifications

The Semi-Anechoic Chamber Test Site, Open Area Test Site (OATS) and Conducted Emissions Site have been fully described, submitted to, and accepted by the FCC, Industry Canada and the Japanese Voluntary Control Council for Interference by information technology equipment. In addition, ACS is compliant to ISO 17025 as certified by the National Institute of Standards and Technology under their National Voluntary Laboratory Accreditation Program. The following certification numbers have been issued in recognition of these accreditations and certifications:

FCC Registration Number: 89450
Industry Canada Lab Code: IC 4175
VCCI Member Number: 1831

- VCCI OATS Registration Number R-1526
- VCCI Conducted Emissions Site Registration Number: C-1608

NVLAP Lab Code: 200612-0

## 2.3 Radiated Emissions Test Site Description

### 2.3.1 Semi-Anechoic Chamber Test Site

The Semi-Anechoic Chamber Test Site consists of a 20' x 30' x 18' shielded enclosure. The chamber is lined with Toyo Ferrite Grid Absorber, model number FFG-1000. The ferrite tile grid is 101 x 101 x 19mm thick and weighs approximately 550 grams. These tiles are mounted on steel panels and installed directly on the inner walls of the chamber.

The turntable is 150cm in diameter and is located 160cm from the back wall of the chamber. The chamber is grounded via 1 - 8' copper ground rod, installed at the center of the back wall, it is bound to the ground plane using 3/4" stainless steel braided cable.

The turntable is all steel, flush mounted table installed in an all steel frame. The table is remotely operated from inside the control room located 25' from the range. The turntable is electrically bonded to the surrounding ground plane via steel fingers installed on the edge of the turn table. The steel fingers make constant contact with the ground plane during operation.

Behind the turntable is a 3' x 6' x 4' deep shielded pit used for support equipment if necessary. The pit is equipped with 1 - 4" PVC chases from the turntable to the pit that allow for cabling to the EUT if necessary. The underside of the turntable can be accessed from the pit so cables can be supplied to the EUT from the pit.

A diagram of the Semi-Anechoic Chamber Test Site is shown in Figure 2.3-1 below:

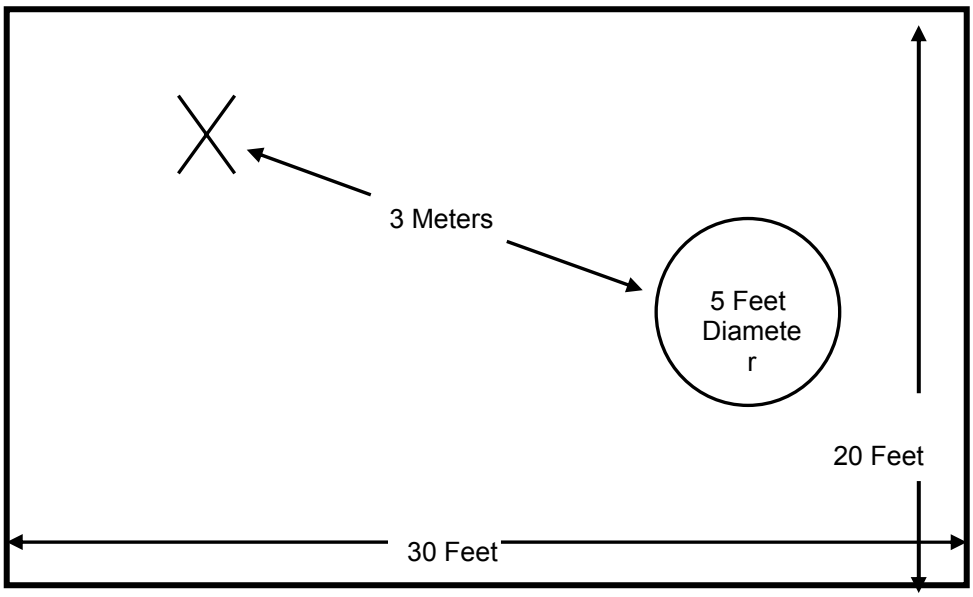


**Figure 2.3-1: Semi-Anechoic Chamber Test Site**

### 2.3.2 Open Area Tests Site (OATS)

The open area test site consists of a 40' x 66' concrete pad covered with a perforated electro-plated galvanized sheet metal. The perforations in the sheet metal are 1/8" holes that are staggered every 3/16". The individual sheets are placed to overlap each other by 1/4" and are riveted together to provide a continuous seam. Rivets are spaced every 3" in a 3 x 20 meter perimeter around the antenna mast and EUT area. Rivets in the remaining area are spaced as necessary to properly secure the ground plane and maintain the electrical continuity.

The entire ground plane extends 12' beyond the turntable edge and 16' beyond the antenna mast when set to a 10 meter measurement distance. The ground plane is grounded via 4 - 8' copper ground rods, each installed at a corner of the ground plane and bound to the ground plane using 3/4" stainless steel braided cable.

The turntable is an all aluminum 10' flush mounted table installed in an all aluminum frame. The table is remotely operated from inside the control room located 40' from the range. The turntable is electrically bonded to the surrounding ground plane via steel fingers installed on the edge of the turn table. The steel fingers make constant contact with the ground plane during operation.

Adjacent to the turntable is a 7' x 7' square and 4' deep concrete pit used for support equipment if necessary. The pit is equipped with 5 - 4" PVC chases from the pit to the control room that allow for cabling to the EUT if necessary. The underside of the turntable can be accessed from the pit so cables can be supplied to the EUT from the pit. The pit is covered with 2 sheets of 1/4" diamond style re-enforced steel sheets. The sheets are painted to match the perforated steel ground plane; however the underside edges have been masked off to maintain the electrical continuity of the ground plane. All reflecting objects are located outside of the ellipse defined in ANSI C63.4.

A diagram of the Open Area Test Site is shown in Figure 2.3-2 below:

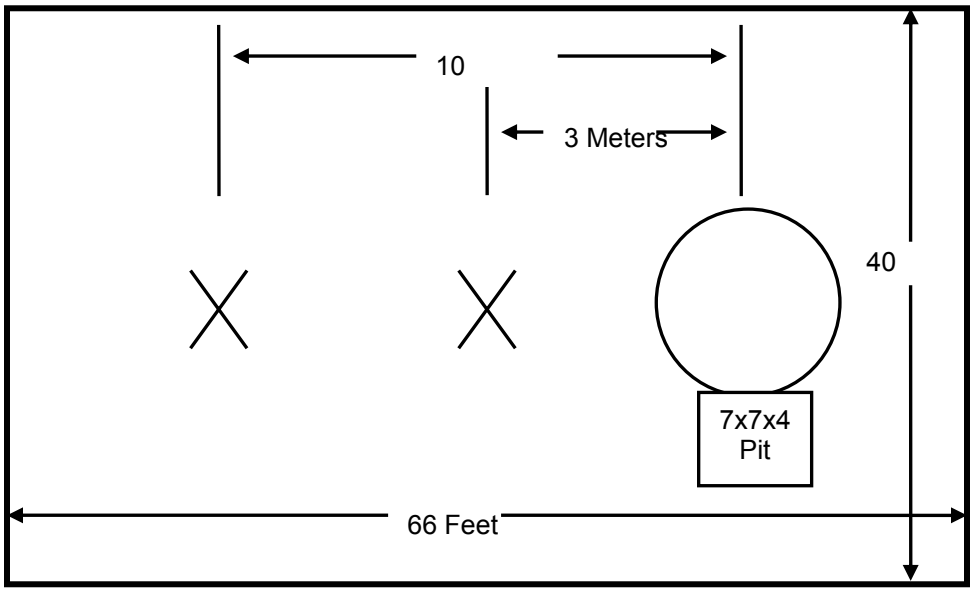


**Figure 2.3-2: Open Area Test Site**

### 2.4 Conducted Emissions Test Site Description

The AC mains conducted EMI site is located in the main EMC lab. It consists of an 8' x 8' solid aluminum horizontal group reference plane (GRP) bonded every 3" to an 8' X 8' vertical ground plane.

The site is of sufficient size to test table top and floor standing equipment in accordance with section 6.1.4 of ANSI C63.4.

A diagram of the room is shown below in figure 4.1.3-1:

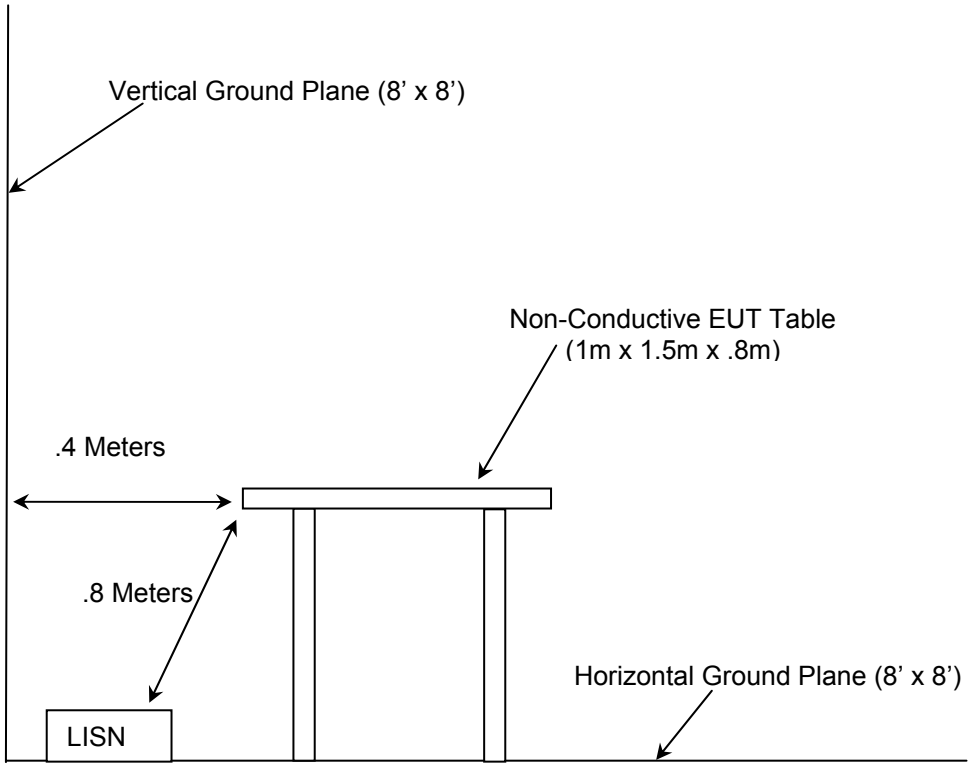


**Figure 2.4-1: AC Mains Conducted EMI Site**

### 3.0 APPLICABLE STANDARD REFERENCES

The following standards were used:

- ANSI C63.4-2003: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9KHz to 40GHz
- US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2006
- US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2006
- FCC OET Bulletin 65 Appendix C - Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields, 2001
- FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems, March 30, 2000

## 4.0 LIST OF TEST EQUIPMENT

All test equipment used for regulatory testing is calibrated yearly or according to manufacturer's specifications.

**Table 4.0-1: Test Equipment**

| Equipment Calibration Information | | | | | |
|---|---|---|---|---|---|
| **ACS #** | **Mfg.** | **Model** | **S/N** | **Equipment Type** | **Cal. Due** |
| 1 | Rohde & Schwarz | ESMI - Display | 833771/007 | Spectrum Analyzers | 01-Mar-07 |
| 2 | Rohde & Schwarz | ESMI-Receiver | 839587/003 | Spectrum Analyzers | 01-Mar-07 |
| 22 | Agilent | 8449B | 3008A00526 | Amplifiers | 07-Apr-07 |
| 25 | Chase | CBL6111 | 1043 | Antennas | 30-May-07 |
| 30 | Spectrum Technologies | DRH-0118 | 970102 | Antennas | 09-May-07 |
| 40 | EMCO | 3104 | 3211 | Antennas | 02-Jan-08 |
| 41 | Electro-Metrics | BIA-25 | 2925 | Antennas | 16-May-07 |
| 73 | Agilent | 8447D | 2727A05624 | Amplifiers | 10-May-07 |
| 78 | EMCO | 6502 | 9104-2608 | Antennas | 15-Jan-08 |
| 90 | Electro-Metrics | LPA25 | 1476 | Antennas | 17-May-07 |
| 167 | ACS | Chamber EMI Cable Set | 167 | Cables | 05-Jan-08 |
| 193 | ACS | OATS cable Set | 0193 | Cable Set | 16-Feb-08 |
| 211 | Eagle | C7RFM3NFNM | HLC-700 | Filters | 08-Jan-08 |
| 213 | TEC | PA 102 | 44927 | Amplifiers | 28-Feb-07 |
| 253 | Florid RF Labs | Lab-Flex 290 | 253 | Cables | 01-Aug-07 |
| 283 | Rohde & Schwarz | FSP40 | 1000033 | Spectrum Analyzers | 24-Mar-07 |
| 290 | Florida RF Cables | SMSE-200-72.0-SMRE | None | Cables | 03-May-07 |
| 291 | Florida RF Cables | SMRE-200W-12.0-SMRE | None | Cables | 03-May-07 |
| 292 | Florida RF Cables | SMR-290AW-480.0-SMR | None | Cables | 24-May-07 |
| 329 | A.H.Systems | SAS-571 | 721 | Antennas | 24-Aug-07 |
| 331 | Microwave Circuits | H1G513G1 | 31417 | Filters | 29-Aug-07 |
| 338 | Hewlett Packard | 8449B | 3008A01111 | Amplifiers | 26-Sep-07 |
| 343 | Florida RF Cables | SMRE-200W-12.0-SMRE | N/A | Cables | 01-Sep-07 |
| 344 | Florida RF Cables | SMS-290AW-480.0-SMR | N/A | Cables | 01-Sep-07 |

## 5.0 SUPPORT EQUIPMENT

**Table 5.0-1: Support Equipment**

| Item | Manufacturer | Equipment Type | Model | Serial Number | FCC ID |
|---|---|---|---|---|---|
| 1 | GW Instek | DC Power Supply | GPS-4303 | EG815267 | NA |

## 6.0 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

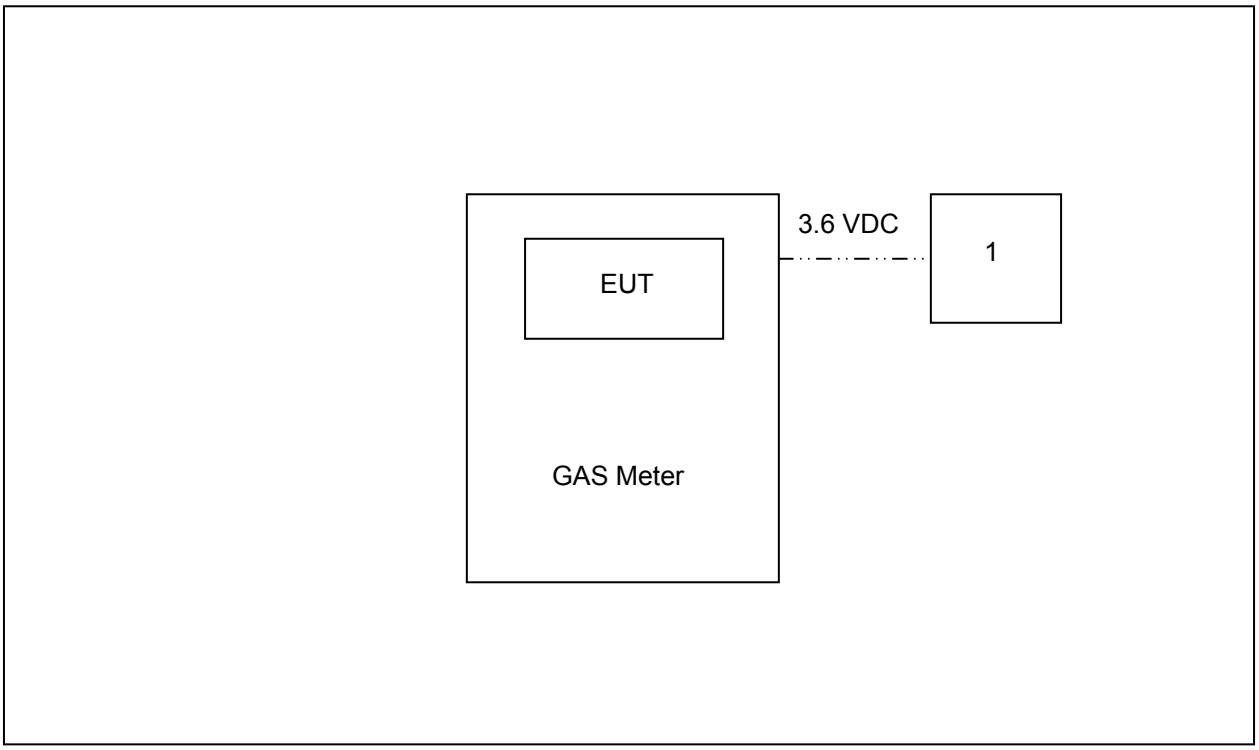


**Figure 6.0-1: EUT Test Setup**

The EUT is a battery powered device. For the purpose of testing the battery was bypassed with a DC power supply as indicated above.

*See Test Setup photographs for additional detail.

## 7.0 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

### 7.1 Radiated Emissions - FCC Section 15.109(Unintentional Radiation)

#### 7.1.1 Test Methodology

Radiated emissions tests were performed over the frequency range of 30MHz to 5 GHz. Measurements of the radiated field strength were made at a distance of 3m from the boundary of the equipment under test (EUT) and the receiving antenna. The antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. Radiated measurements were made with the Spectrum Analyzer's resolution bandwidth set to 120 KHz for measurements above 30MHz. Average measurements are taken with the RBW and VBW were set to 1MHz and 10 Hz respectively for measurements above 1000MHz.

#### 7.1.2 Test Results

Results of the test are given in Table 7.1-1 below:

**Table 7.1-1: Radiated Emissions Tabulated Data**

| Frequency MHz | Level dBµV/m | Transducer dB | Limit dBµV/m | Margin dB | Height cm | Azimuth deg |
|---|---|---|---|---|---|---|
| 30.00 | 18.50 | -8.40 | 40.0 | 21.50 | 300 | 0 |
| 267.30 | 23.44 | -11.17 | 46.0 | 22.57 | 100 | 89 |
| 276.72 | 23.85 | -10.96 | 46.0 | 22.15 | 100 | 0 |
| 682.08 | 23.78 | -1.88 | 46.0 | 22.22 | 100 | 0 |
| 868.89 | 29.92 | 0.29 | 46.0 | 16.08 | 100 | 270 |
| 887.97 | 35.09 | 0.74 | 46.0 | 10.91 | 100 | 126 |
| 906.66 | 34.33 | 1.53 | 46.0 | 11.67 | 100 | 274 |
| 945.19 | 36.67 | 3.26 | 46.0 | 9.33 | 100 | 0 |
| 964.17 | 36.82 | 3.56 | 54.0 | 17.18 | 100 | 45 |
| 983.11 | 38.10 | 3.40 | 54.0 | 15.90 | 100 | 0 |

* Note: All emissions above 983.11 MHz were attenuated below the permissible limit.

## 7.2 Peak Output Power – FCC Section 15.247(b)(2)

### 7.2.1 Test Methodology

Antenna conducted measurements could not be performed on this device, therefore radiated tests were performed to show compliance with the peak output power limit specified in Section 15.247(b) according to the alternative test methods in the FCC publication DA 00-705.

The procedures set forth in ANSI C63.4 were followed with respect to maximizing the peak emission. The resolution bandwidth of the spectrum analyzer was set to 1 MHz which was greater the 20 dB bandwidth measured in section 7.5.4. The video bandwidth was set to 3 MHz and a peak detector using the Max Hold function was utilized.

The power was calculated using the following equation:

$$P = (E * d)^2 \Big/ 30 * G$$

Where: G = Numeric Gain of the transmitting antenna with reference to an isotropic radiator
d = The distance in meters from which the field strength was measured
E = The measured maximum fundamental field strength in V/m

### 7.2.2 Test Results

Results are shown below in table 7.2.2-1 and 7.2.2-2 below:

**Table 7.2.2-1: Fundamental Field Strength**

| Frequency (MHz) | Uncorrected Reading (dBµV/m) | Antenna Polarity (H/V) | Total Correction Factor (dB) | Corrected Reading (dBµV/m) |
|---|---|---|---|---|
| 911.08 | 83.54 | H | 28.33 | 111.87 |
| 915.01 | 82.89 | H | 28.45 | 111.34 |
| 919.08 | 84.38 | H | 28.57 | 112.95 |

**Table 7.2.2-2: Peak Output Power**

| Frequency (MHz) | Numeric Gain | Distance (m) | Max. Fund. Field Strength (V/m) | Output Power (dBm) |
|---|---|---|---|---|
| 911.08 | 1 | 3 | 0.3923 | 16.64 |
| 915.01 | 1 | 3 | 0.3690 | 16.11 |
| 919.08 | 1 | 3 | 0.4442 | 17.72 |

### 7.3.4 20dB Bandwidth

#### 7.3.4.1 Test Methodology

The spectrum analyzer span was set to 2 to 3 times the estimated 20 dB bandwidth of the emission. The RBW was to ≥ 1% of the estimated 20 dB bandwidth. The trace was set to max hold with a peak detector active. The Delta function of the analyzer was utilized to determine the 20 dB bandwidth of the emission. The span and RBW were examined and re-adjusted if necessary to meet the requirements of 2 to 3 times the 20 bandwidth for the span and ≥ 1% of the 20 dB bandwidth for the RBW.

#### 7.3.4.2 Test Results

The maximum 20dB bandwidth was found to be approximately 96.0kHz. Results are shown below in Table 7.3.4-1 and Figures 7.3.4-1 through 7.3.4-3.

**Table 7.3.4-1**

| Channel | Frequency (MHz) | 20dB Bandwidth (kHz) |
|---|---|---|
| Low | 911.08 | 87.0 |
| Mid | 915.01 | 96.0 |
| High | 919.08 | 90.6 |

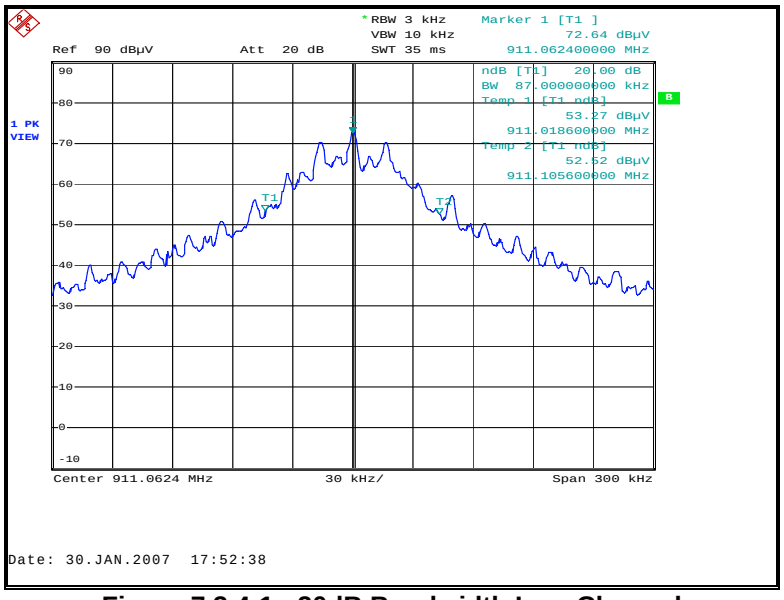


**Figure 7.3.4-1: 20dB Bandwidth Low Channel**

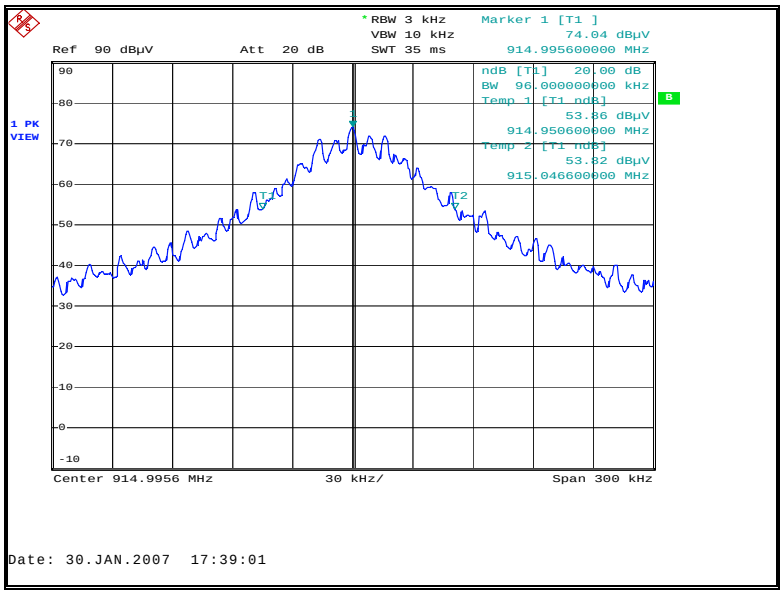


**Figure 7.3.4-2: 20dB Bandwidth Mid Channel**

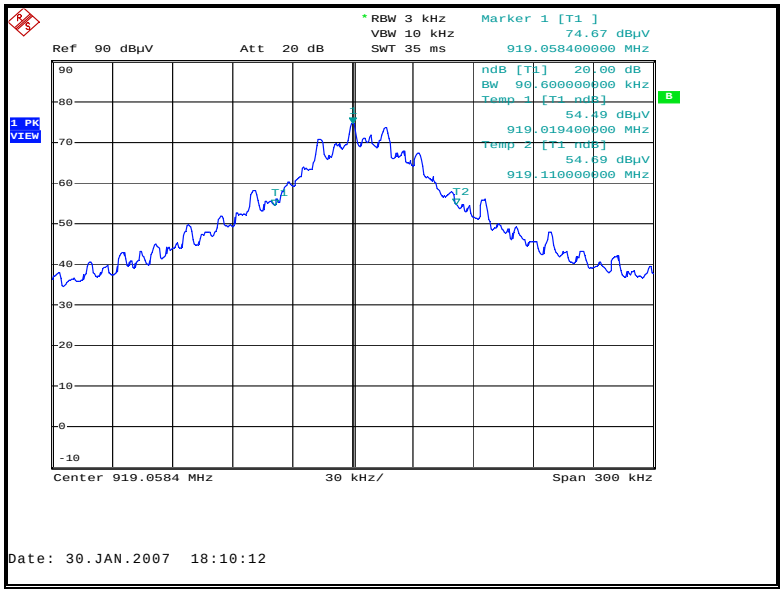


**Figure 7.3.4-3: 20dB Bandwidth High Channel**

## 7.4 Band-Edge Compliance and Spurious Emissions - FCC Section 15.247(c)

### 7.4.1 Band-Edge Compliance of RF Emissions

#### 7.4.1.1 Test Methodology

The EUT was investigated at the lowest and highest channel available to determine band-edge compliance. For each measurement the spectrum analyzer's RBW was set to 100 kHz, which is ≥ 1% of the span.

#### 7.4.1.2 Test Results

In a 100 kHz bandwidth at the lower and upper band-edge, the radio frequency power that was produced by the EUT is at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power. Band-edge compliance is displayed in Figures 7.4.1-1 and 7.4.2-2

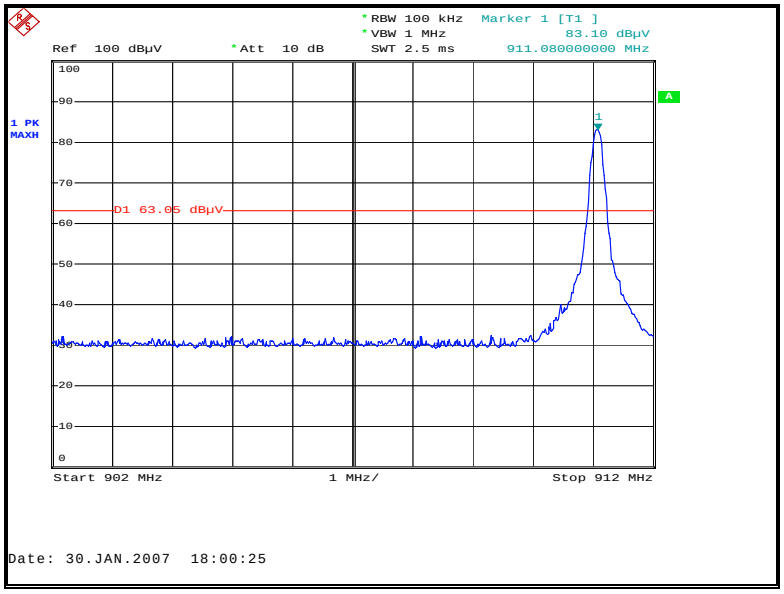


**Figure 7.4.1-1: Lower Band-edge**

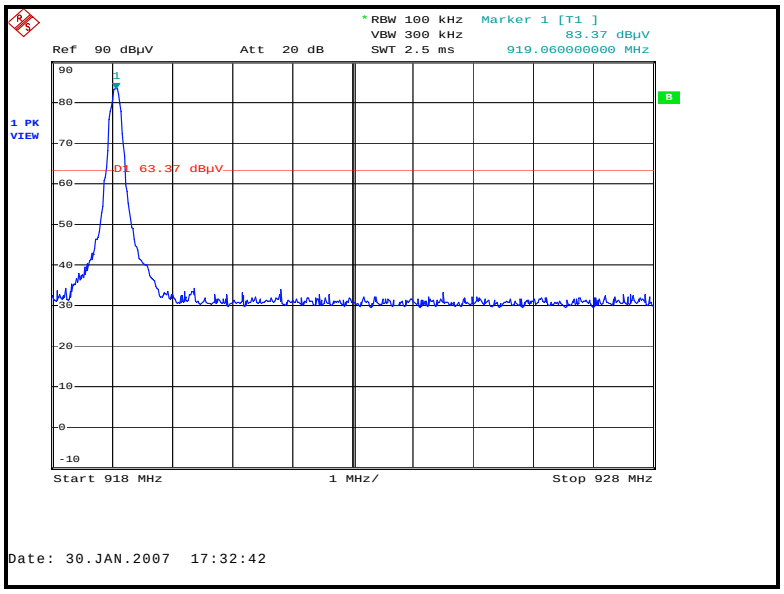


**Figure 7.4.1-2: Upper Band-edge**

### 7.4.2 RF Conducted Spurious Emissions

#### 7.4.2.1 Test Methodology

Antenna conducted measurements could not be performed on this device, therefore radiated tests were performed to show compliance with the spurious RF conducted limit specified in Section 15.247(d) according to FCC publication DA 00-705.

For each measurement, the spectrum analyzer's RBW was set to 100 kHz and the VBW was set to 300 kHz. The peak detector and Max Hold function of the analyzer were utilized. The field strength of both the fundamental emission and all spurious emissions were measured with these settings. Procedures in ANSI C63.4 with respect to maximizing the emissions were followed. The measured field strength of all spurious emissions must be below the measured field strength of the fundamental emission by the amount specified in Section 15.247(d).

#### 7.4.2.2 Test Results

The magnitude of all emissions are reported in section 7.4.3 with the appropriate limit as referenced to 20 dB below the fundamental frequency field strength. Emissions that fell within the restricted bands were referenced to the radiated emissions limit set forth in Section 15.209.

### 7.4.3 Radiated Spurious Emissions - FCC Section 15.205

#### 7.4.3.1 Test Methodology

Radiated emissions tests were made over the frequency range of 30MHz to 10GHz, 10 times the highest fundamental frequency.

The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. For frequencies below 1000MHz, quasi-peak measurements were made using a resolution bandwidth (RBW) of 120 kHz and a video bandwidth (VBW) of 300 kHz. For frequencies above 1000MHz, peak measurements were made using an RBW of 1 MHz and a VBW of 3 MHz and for the average emissions a VBW of 10Hz. For those frequencies that fell outside the restricted bands as defined in 15.205, the alternative test methods in the FCC publication DA 00-705 was followed using a RBW of 100kHz and VBW of 300kHz and peak detector.

The EUT was caused to generate a continuous carrier signal on the hopping channel.

#### 7.4.3.2 Duty Cycle Correction

For average radiated measurements, the measured level was reduced by a factor 23.1dB to account for the duty cycle of the EUT. The EUT transmits for 7.00mS on a channel followed by a minimum 10 second rest period before hopping to the next channel. The EUT does not return to the same channel for over 500 seconds. Therefore the duty cycle is 7.00%. The duty cycle correction factor is determined using the formula: 20log (0.07) = -23.1dB.

#### 7.4.3.3 Test Results

Radiated spurious emissions found in the band of 30MHz to 10GHz are reported in Table 7.4.3-1 to 7.4.3-3. Each emission found to be in a restricted band as defined by section 15.205, was compared to the radiated emission limits as defined in section 15.209.

### Table 7.4.3-1: Radiated Spurious Emissions – Low Channel

| Frequency (MHz) | Level (dBuV) | | Antenna Polarity | Correction Factors | Corrected Level (dBuV/m) | | Limit (dBuV/m) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | pk | Qpk/Avg | (H/V) | (dB) | pk | Qpk/Avg | pk | Qpk/Avg | pk | Qpk/Avg |
| ***Fundamental Frequency*** | | | | | | | | | | |
| **911.08** | 83.43 | | H | 28.33 | 111.76 | --------- | -------- | -------- | --------- | --------- |
| **911.08** | 80.94 | | V | 28.44 | 109.38 | --------- | -------- | -------- | --------- | --------- |
| ***Spurious Emissions*** | | | | | | | | | | |
| **1822.16** | 75.32 | | H | -1.71 | 73.61 | --------- | 91.8 | --------- | 18.15 | --------- |
| **1822.16** | 72.53 | | V | -1.81 | 70.72 | --------- | 91.8 | --------- | 21.04 | --------- |
| **2733.24** | 68.98 | 56.43 | H | 1.81 | 70.79 | 35.14 | 74.0 | 54.0 | 3.21 | 18.86 |
| **2733.24** | 65.01 | 47.49 | V | 1.90 | 66.91 | 26.29 | 74.0 | 54.0 | 7.09 | 27.71 |
| **3644.32** | 66.59 | 47.70 | H | 3.62 | 70.21 | 28.22 | 74.0 | 54.0 | 3.79 | 25.78 |
| **3644.32** | 59.86 | 42.13 | V | 3.57 | 63.43 | 22.61 | 74.0 | 54.0 | 10.57 | 31.39 |
| **4555.4** | 56.96 | 40.99 | H | 6.00 | 62.96 | 23.89 | 74.0 | 54.0 | 11.04 | 30.11 |
| **4555.4** | 57.12 | 39.82 | V | 6.30 | 63.42 | 23.02 | 74.0 | 54.0 | 10.58 | 30.98 |
| **5466.48** | 42.19 | | H | 8.27 | 50.46 | --------- | 91.8 | --------- | 41.30 | --------- |
| **5466.48** | 45.31 | | V | 8.39 | 53.70 | --------- | 91.8 | --------- | 38.07 | --------- |
| **6377.56** | 41.05 | | H | 10.49 | 51.54 | --------- | 91.8 | --------- | 40.22 | --------- |
| **6377.56** | 45.44 | | V | 10.41 | 55.85 | --------- | 91.8 | --------- | 35.91 | --------- |
| **8199.72** | 46.91 | 32.46 | H | 12.97 | 59.88 | 22.33 | 74.0 | 54.0 | 14.12 | 31.67 |
| **8199.72** | 46.91 | 32.72 | V | 12.97 | 59.88 | 22.59 | 74.0 | 54.0 | 14.12 | 31.41 |

### Table 7.4.3-2: Radiated Spurious Emissions – Mid Channel

| Frequency (MHz) | Level (dBuV) | | Antenna Polarity | Correction Factors | Corrected Level (dBuV/m) | | Limit (dBuV/m) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | pk | Qpk/Avg | (H/V) | (dB) | pk | Qpk/Avg | pk | Qpk/Avg | pk | Qpk/Avg |
| ***Fundamental Frequency*** | | | | | | | | | | |
| **915.01** | 82.39 | | H | 28.45 | 110.84 | --------- | -------- | -------- | --------- | --------- |
| **915.01** | 82.09 | | V | 28.60 | 110.69 | --------- | -------- | -------- | --------- | --------- |
| ***Spurious Emissions*** | | | | | | | | | | |
| **1830.02** | 73.01 | | H | -1.64 | 71.37 | --------- | 90.8 | --------- | 19.48 | --------- |
| **1830.02** | 70.32 | | V | -1.74 | 68.58 | --------- | 90.8 | --------- | 22.27 | --------- |
| **2745.03** | 69.03 | 56.81 | H | 1.84 | 70.87 | 35.55 | 74.0 | 54.0 | 3.13 | 18.45 |
| **2745.03** | 69.33 | 48.53 | V | 1.94 | 71.27 | 27.37 | 74.0 | 54.0 | 2.73 | 26.63 |
| **3660.04** | 66.00 | 46.63 | H | 3.69 | 69.69 | 27.22 | 74.0 | 54.0 | 4.31 | 26.78 |
| **3660.04** | 60.34 | 42.72 | V | 3.65 | 63.99 | 23.27 | 74.0 | 54.0 | 10.01 | 30.73 |
| **4575.05** | 57.75 | 42.54 | H | 6.07 | 63.82 | 25.51 | 74.0 | 54.0 | 10.18 | 28.49 |
| **4575.05** | 58.77 | 42.52 | V | 6.37 | 65.14 | 25.79 | 74.0 | 54.0 | 8.86 | 28.21 |
| **5490.06** | 44.75 | | H | 8.31 | 53.06 | --------- | 90.8 | --------- | 37.78 | --------- |
| **5490.06** | 47.45 | | V | 8.41 | 55.86 | --------- | 90.8 | --------- | 34.98 | --------- |
| **6405.07** | 43.84 | | H | 10.55 | 54.39 | --------- | 90.8 | --------- | 36.45 | --------- |
| **6405.07** | 47.24 | | V | 10.47 | 57.71 | --------- | 90.8 | --------- | 33.13 | --------- |
| **7320.08** | 46.91 | 32.87 | V | 12.50 | 59.41 | 22.27 | 74.0 | 54.0 | 14.59 | 31.73 |
| **8235.09** | 48.28 | 32.97 | V | 13.01 | 61.29 | 22.88 | 74.0 | 54.0 | 12.71 | 31.12 |

### Table 7.4.3-3: Radiated Spurious Emissions – High Channel

| Frequency (MHz) | Level (dBuV) | | Antenna Polarity | Correction Factors | Corrected Level (dBuV/m) | | Limit (dBuV/m) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | pk | Qpk/Avg | (H/V) | (dB) | pk | Qpk/Avg | pk | Qpk/Avg | pk | Qpk/Avg |
| ***Fundamental Frequency*** | | | | | | | | | | |
| **919.08** | 83.53 | | H | 28.57 | 112.10 | --------- | -------- | -------- | --------- | --------- |
| **919.08** | 83.10 | | V | 28.76 | 111.86 | --------- | -------- | -------- | --------- | --------- |
| ***Spurious Emissions*** | | | | | | | | | | |
| **1838.16** | 72.58 | | H | -1.58 | 71.00 | --------- | 92.1 | --------- | 21.10 | --------- |
| **1838.16** | 67.50 | | V | -1.68 | 65.82 | --------- | 92.1 | --------- | 26.28 | --------- |
| **2757.24** | 67.45 | 55.75 | H | 1.87 | 69.32 | 34.52 | 74.0 | 54.0 | 4.68 | 19.48 |
| **2757.24** | 68.65 | 48.76 | V | 1.97 | 70.62 | 27.63 | 74.0 | 54.0 | 3.38 | 26.37 |
| **3676.32** | 65.90 | 45.94 | H | 3.76 | 69.66 | 26.60 | 74.0 | 54.0 | 4.34 | 27.40 |
| **3676.32** | 64.25 | 44.14 | V | 3.73 | 67.98 | 24.78 | 74.0 | 54.0 | 6.02 | 29.22 |
| **4595.4** | 59.10 | 43.84 | H | 6.14 | 65.24 | 26.89 | 74.0 | 54.0 | 8.76 | 27.11 |
| **4595.4** | 57.19 | 41.30 | V | 6.44 | 63.63 | 24.65 | 74.0 | 54.0 | 10.37 | 29.35 |
| **5514.48** | 45.11 | | H | 8.36 | 53.47 | --------- | 92.1 | --------- | 38.63 | --------- |
| **5514.48** | 46.98 | | V | 8.46 | 55.44 | --------- | 92.1 | --------- | 36.67 | --------- |
| **6433.56** | 47.09 | | H | 10.61 | 57.70 | --------- | 92.1 | --------- | 34.40 | --------- |
| **6433.56** | 48.97 | | V | 10.53 | 59.50 | --------- | 92.1 | --------- | 32.61 | --------- |
| **7352.64** | 46.35 | 32.06 | H | 12.65 | 59.00 | 21.61 | 74.0 | 54.0 | 15.00 | 32.39 |
| **7352.64** | 48.10 | 32.97 | V | 12.52 | 60.62 | 22.39 | 74.0 | 54.0 | 13.38 | 31.61 |
| **8271.72** | 46.38 | 31.77 | H | 13.05 | 59.43 | 21.72 | 74.0 | 54.0 | 14.57 | 32.28 |
| **8271.72** | 48.00 | 33.09 | V | 13.05 | 61.05 | 23.04 | 74.0 | 54.0 | 12.95 | 30.96 |

#### 7.4.3.4 Sample Calculation: (Low Channel 3rd Harmonic)

$R_C = R_U + CF_T$

Where:

| | | |
|---|---|---|
| $CF_T$ | = | Total Correction Factor (AF+CA+AG)-DC (Average Measurements Only) |
| $R_U$ | = | Uncorrected Reading |
| $R_C$ | = | Corrected Level |
| AF | = | Antenna Factor |
| CA | = | Cable Attenuation |
| AG | = | Amplifier Gain |
| DC | = | Duty Cycle Correction Factor |

**Example Calculation**

PEAK:
Corrected Level: 68.98+ 1.81= 70.79dBuV
Margin: 74dBuV – 70.79dBuV = 3.21dB

AVERAGE:
Corrected Level: 56.43+ 1.81-23.1= 35.14dBuV
Margin: 54dBuV – 18.86dBuV = 18.86dB

**8.0 CONCLUSION**
In the opinion of ACS, Inc. the R900G, manufactured by Neptune Technology Group, Inc.meets the requirements of FCC Part 15 subpart C as applicable to a Class II Permissive Change.

# END REPORT