

# Emissions Test Report

**EUT Name:** Single Phase REX2 Meter

**EUT Model:** REX2EA

**FCC ID** QZC-R2EA

FCC Title 47, Part 15, SubpartC, RSS-210 Issue 7

*Prepared for:*

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*Report/Issue Date:* 21 November 2007

*Report Number:* 30762387.001

# Statement of Compliance

*Manufacturer:* Elster Electricity, LLC  
208 South Rogers Lane  
Raleigh, NC 27610  
919 212-4700

*Requester / Applicant:* John Holt

*Name of Equipment:* Single Phase REX2 Meter

*Operation Frequency Range:* 902.4 MHz to 927.6 MHz

*Type of Equipment:* Intentional Radiator

*Application of Regulations:* FCC Title 47, Part 15, SubpartC, RSS-210 Issue 7

*Test Dates:* 07 November 2007 to 13 November 2007

## Guidance Documents:

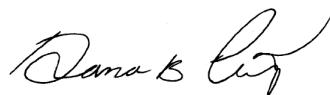
Emissions: FCC 47 CFR Part 15, RSS-210 Issue 7

## Test Methods:

Emissions: ANSI C63.4:2003

The electromagnetic compatibility test and documented data described in this report has been performed and recorded by TUV Rheinland of North America, in accordance with the standards and procedures listed herein. As the responsible authorized agent of the EMC laboratory, I hereby declare that a sample of one, of the equipment described above, has been shown to be compliant with the EMC requirements of the stated regulations and standards based on these results. If any special accessories and/or modifications were required for compliance, they are listed in the Executive Summary of this report.

This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. This report contains data that are not covered by NVLAP accreditation. This report shall not be reproduced except in full, without the written authorization of the laboratory.



14 December  
2007

NVLAP Signatory

Date

 200094-0	 90552 and 100881	Industry Canada IC3755
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## 1 Executive Summary

### 1.1 Scope

This report is intended to document the status of conformance with the requirements of the FCC Title 47, Part 15, SubpartC, RSS-210 Issue 7 based on the results of testing performed on *07 November 2007* through *13 November 2007* on the *Single Phase REX2 Meter* Model No. *REX2EA* manufactured by Elster Electricity, LLC. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

### 1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

### 1.3 Summary of Test Results

Table 1 - Summary of Test Results

Test	Test Method(s)	Test Parameters	Measurement	Result
Channel Separation	FCC Part 15.247(a)(1) RSS-210, Annex 8, Section A8.1 (2)	Greater of 25 kHz or 20 dB bandwidth	397.5 kHz	compliant
Pseudorandom Hopping Algorithm	RSS-210, Annex 8, Section A8.1			compliant
Time of Occupancy	FCC Part 15.247(a)(1)(i) RSS-210, Annex 8, Section A8.1 (3)	=<0.4 sec in 10 sec.	0.400 sec in 10sec	compliant
Occupied Bandwidth	FCC Part 15.247(a)(1)(i) RSS-210, Annex 8, Section A8.1 (3)	=<500kHz	330 kHz	compliant
Peak Output Power	FCC Part 15.247(b)(2) RSS-210, Annex 8, Section A8.4 (1)	0.25 Watts	0.232 Watts	compliant
Spurious Emissions	FCC Part 15.247(C) RSS-210, Annex 8, Section A8.5	Table FCC Part 15.209	51.15 dBuV/m @ 3meters Average @ 7318.40 MHz	compliant
Frequency Hopping Spread Spectrum Systems	FCC Part 15.247(g) RSS-210, Annex 8, Section A8.1			compliant
Incorporation of Intelligence	FCC Part 15.247(h) RSS-210, Annex 8, Section A8.1			compliant

## **1.4 Special Accessories**

No special accessories were necessary in order to achieve compliance.

## **1.5 Equipment Modifications**

No modifications were found to be necessary in order to achieve compliance.

# **2 Laboratory Information**

## **2.1 Accreditations & Endorsements**

### **2.1.1 US Federal Communications Commission**

TUV Rheinland of North America at the 762 Park Ave. Youngsville, N.C 27596 address is accredited by the commission for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Registration No 90552 and 100881). The laboratory scope of accreditation includes: Title 47 CFR Part 15, 18, and 90. The accreditation is updated every 3 years.

### **2.1.2 NIST / NVLAP**

TUV Rheinland of North America is accredited by the National Voluntary Laboratory Accreditation Program, which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Guide 25 and ISO 9002 (Lab code 200094-0). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

### **2.1.3 Canada – Industry Canada**

Registration No. IC3755

### **2.1.4 Japan - VCCI**

The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland of North America at the 762 Park Ave. Youngsville, N.C 27596 address has been assessed and approved in accordance with the Regulations for Voluntary Control Measures. (Registration No. R-1174 and C-1236).

## **2.1.5 Acceptance By Mutual Recognition Arrangement**

The United States has an established agreement with specific countries under the Asia Pacific Laboratory Accreditation Corporation (APLAC) Mutual Recognition Arrangement. Under this agreement, all TUV Rheinland of North America at the 762 Park Ave. Youngsville, N.C 27596 address test results and test reports within the scope of the laboratory NIST / NVLAP accreditation will be accepted by each member country.

## **2.2 Test Facilities**

All of the test facilities are located at 762 Park Ave., Youngsville, North Carolina 27596, USA.

### **2.2.1 Emission Test Facility**

The Open Area Test Site and AC Line Conducted measurement facility used to collect the radiated and conducted data has been constructed in accordance with ANSI C63.7:1992. The site has been measured in accordance with and verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4:2005, at a test distance of 3 and 10 meters. This site has been described in reports dated May 12, 1997, submitted to the FCC, and accepted by letter dated June 25, 1997 (31040/SIT 1300F2). The site is listed with the FCC and accredited by NVLAP (code 200094-0). The 5m semi-anechoic chamber used to collect the radiated data has been verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4:2005, at a test distance of 3 meters. A report detailing this site can be obtained from TUV Rheinland of North America.

### **2.2.2 Immunity Test Facility**

ESD, EFT, Surge, PQF: These tests are performed in an environmentally controlled room with a 3.7m x 3.7m x 3.175mm thick aluminum floor connected to PE ground. For ESD testing, tabletop equipment is placed on an insulated mat with a surface resistivity of  $10^9$  Ohms/square on a 1.6m x 0.8m x 0.8m high non-conductive table with a 3.175mm aluminum top (Horizontal Coupling Plane). The HCP is connected to the main ground plane via a low impedance ground strap through two 470 k $\Omega$  resistors. The Vertical Coupling Plane consists of an aluminum plate 50cm x 50cm x 3.175mm thick. The VCP is connected to the main ground plane via a low impedance ground strap through two 470 k $\Omega$  resistors. For each of the other tests, the HCP is removed.

RF Field Immunity testing is performed in a 7.3m x 3.7m x 3.2m anechoic chamber.

RF Conducted and Magnetic Field Immunity testing is performed on a 4.9m x 3.7m x 3.175mm thick aluminum ground plane which is connected to one end of the anechoic chamber.

All test areas allow a minimum distance of 1 meter from the EUT to walls or conducting objects.

## **2.3 Measurement Uncertainty**

Two types of measurement uncertainty are expressed in this report, per *ISO Guide To The Expression Of Uncertainty In Measurement*, 1<sup>st</sup> addition, 1995.

*The Combined Standard Uncertainty* is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities, equal to the positive square root of a sum of terms, the terms being the variances or co-variances of these other quantities weighted according to how the measurement result varies with changes in these quantities. The term standard uncertainty is the result of a measurement expressed as a standard deviation.

*The Expanded Uncertainty* defines an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurand. The fraction may be viewed as the coverage probability or level of confidence of the interval.

The test system for conducted emissions is defined as the LISN, spectrum analyzer, coaxial cables, and pads. The test system for radiated emissions is defined as the antenna, spectrum analyzer, pre-amplifier, coaxial cables, and pads. The conducted test system has a combined standard uncertainty of  $\pm 1.2$  dB. The radiated test system has a combined standard uncertainty of  $\pm 1.6$  dB. The expanded uncertainty at a level of 95% confidence is obtained by multiplying the combined standard uncertainty by a coverage factor of 2. Compliance criteria are not based on measurement uncertainty.

## **2.4 Calibration Traceability**

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Guide 25.

## 2.5 Product Information



Figure 1: Photo of EUT, Front

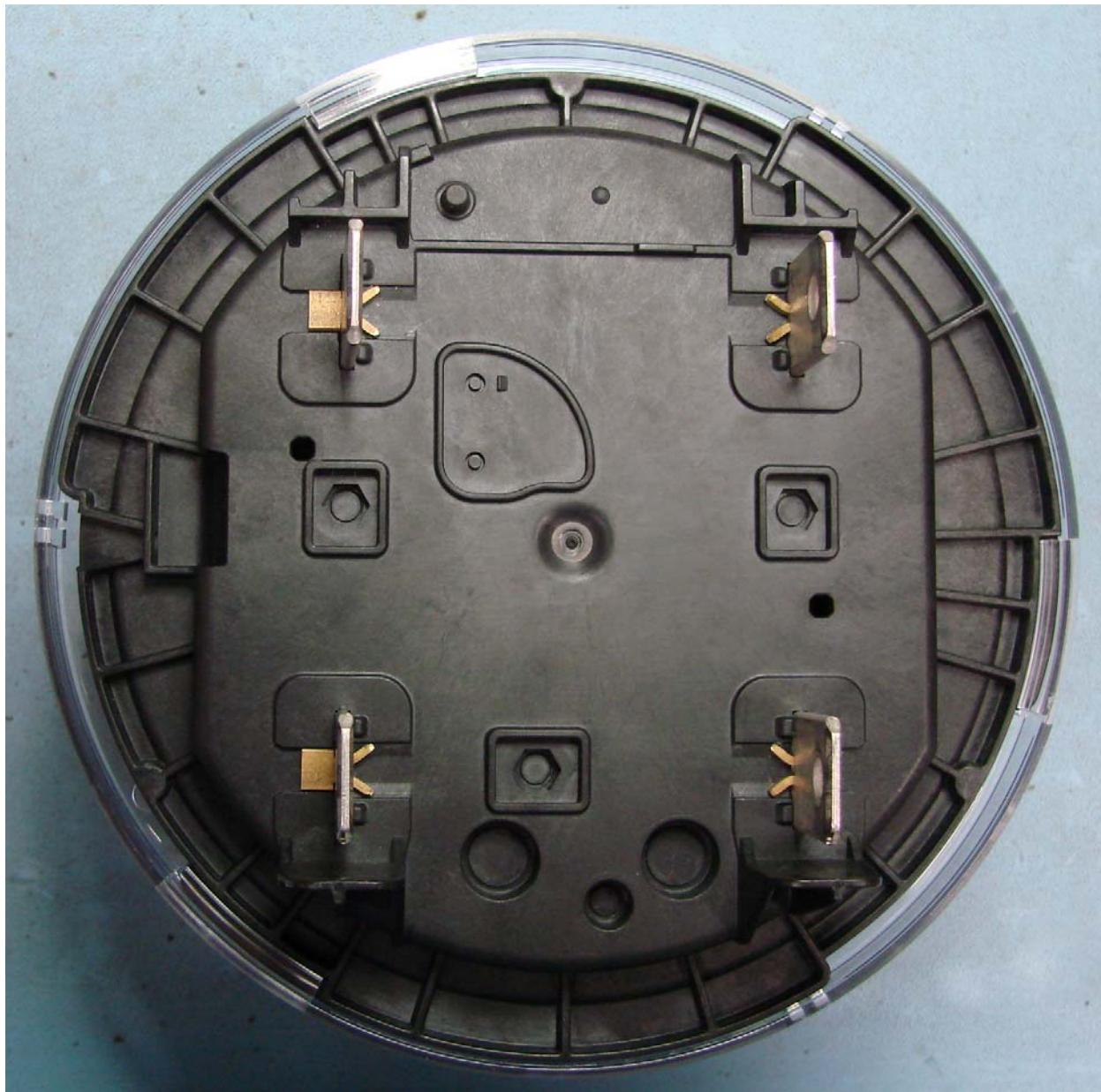


Figure 2: Photo of EUT, Rear



Figure 3: Photo of EUT, Side

## **2.6 Product Description**

The EUT is a single-phase watt-hour meter with an integrated 900 MHz band, frequency hopping radio. A block diagram and schematic showing the major sections of the electronic assembly have been included in a separate test plan document for submission.

## **2.7 Configuration**

Each meter type was installed in turn in a meter socket appropriate for measuring electricity consumption. Preliminary testing was performed on each of the three meter types to determine the configuration that produced maximum radiation. The following meter types were tested:

Meter Form	Test Voltage
Single-phase REX2 meter (Form 2S provided)	240Vac
Single-phase REX2 meter with internal service disconnect switch (Form 2S provided)	240Vac
Single-phase REX2 meter (Form 1S provided)	120Vac

All units have an internal microwave slot antenna printed on the main PCB. There are no other antenna options to be tested. The printed circuit board assembly is connected to line voltage (120 or 240V ac) and to the output of a current transformer. There are no other cables or wires connected to the Single-phase meter. For the service disconnect meter, there is a disconnect option board that connects to the main board via the 10-pin header J5.

The final configuration was selected to produce worse case radiation and place the EUT in the most susceptible state. The Rex2 meter with the internal service disconnect switch was determined to have the worst case emissions and was therefore used for all final testing displayed in this report.

### 3 Antenna Port Conducted Emissions

Testing was performed in accordance with 47 CFR Part 15, ANSI C63.4:2003, RSS-210 Issue 7. These test methods are listed under the laboratory's NVLAP Scope of Accreditation. This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

#### 3.1 Channel Separation Part 15.247(a)(1)

Frequency hopping Systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

**Maximum 20dB Bandwidth = 330.0 kHz**

**Channel Separation = 397.5 kHz**

The channel separation is greater than or equal to the measured maximum 20 dB bandwidth. Therefore the EUT is compliant with this section.

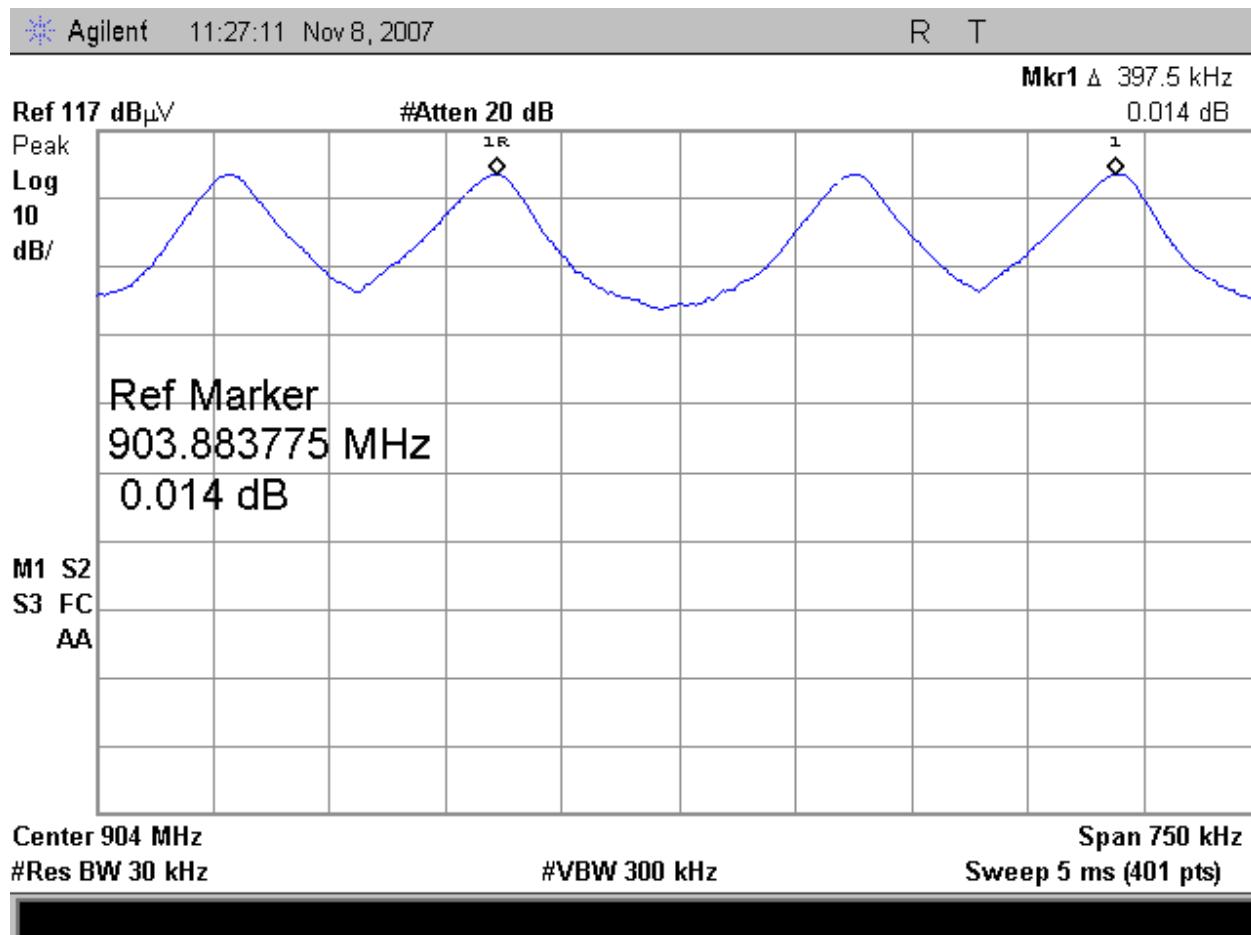


Figure 4: Channel Separation

### **3.2 *Pseudorandom Hopping Algorithm FCC Part 15.247(a)(1)***

The channel bandwidth for this system is greater than 250 kHz. Therefore the system must use at least 25 channels that are selected at the system hopping rate, from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their transmitters and shall shift frequencies in synchronization with the transmitted signals.

In constant transmit mode, the Rex2 Meter would send a packet every 97.3 ms with a delay of 8 to 16 ms between packets. Each packet is sent on the next channel determined by the pseudo-random hop sequence given in the operation description

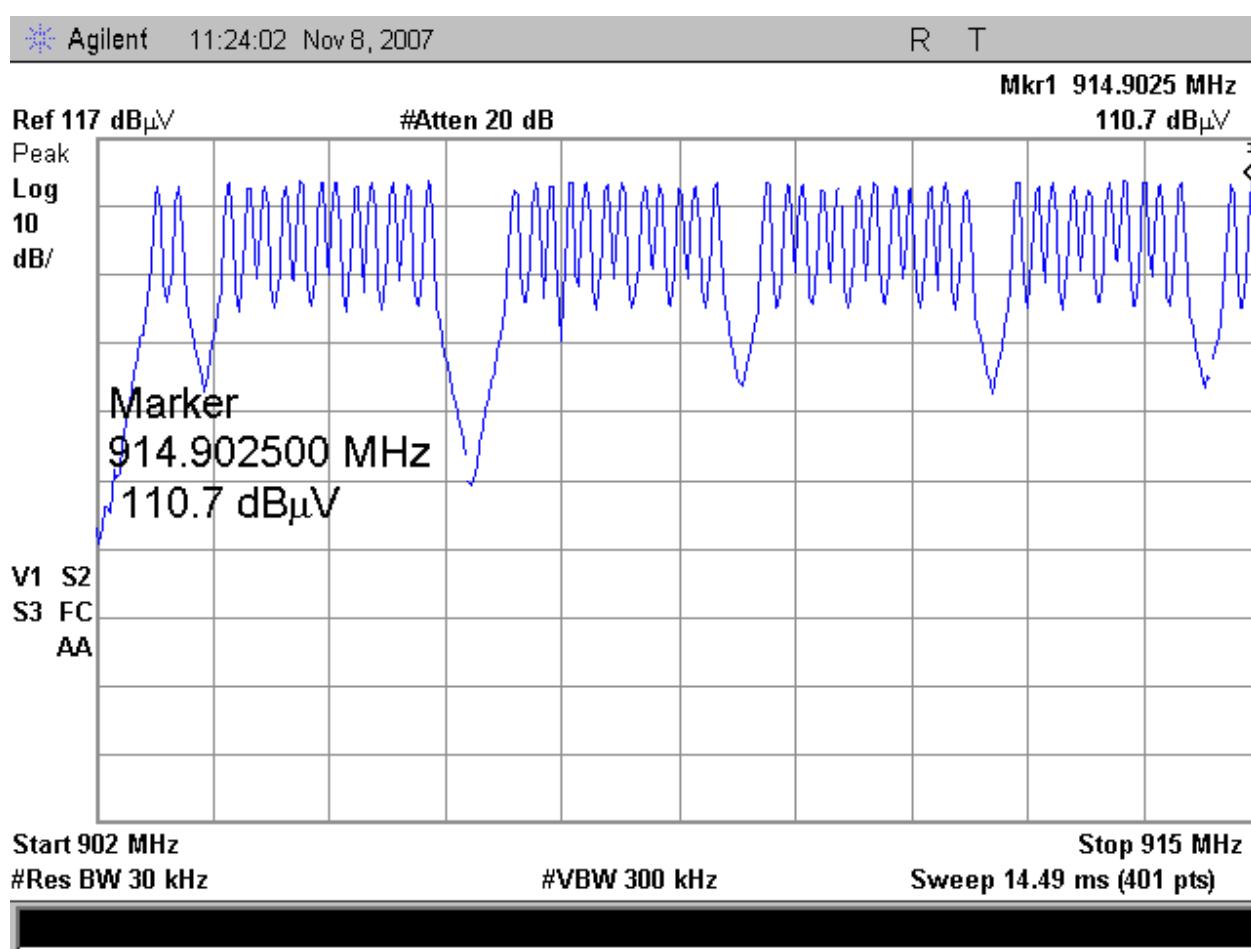


Figure 5: Plot of hopping Channels 902-915 MHz (Low Band)

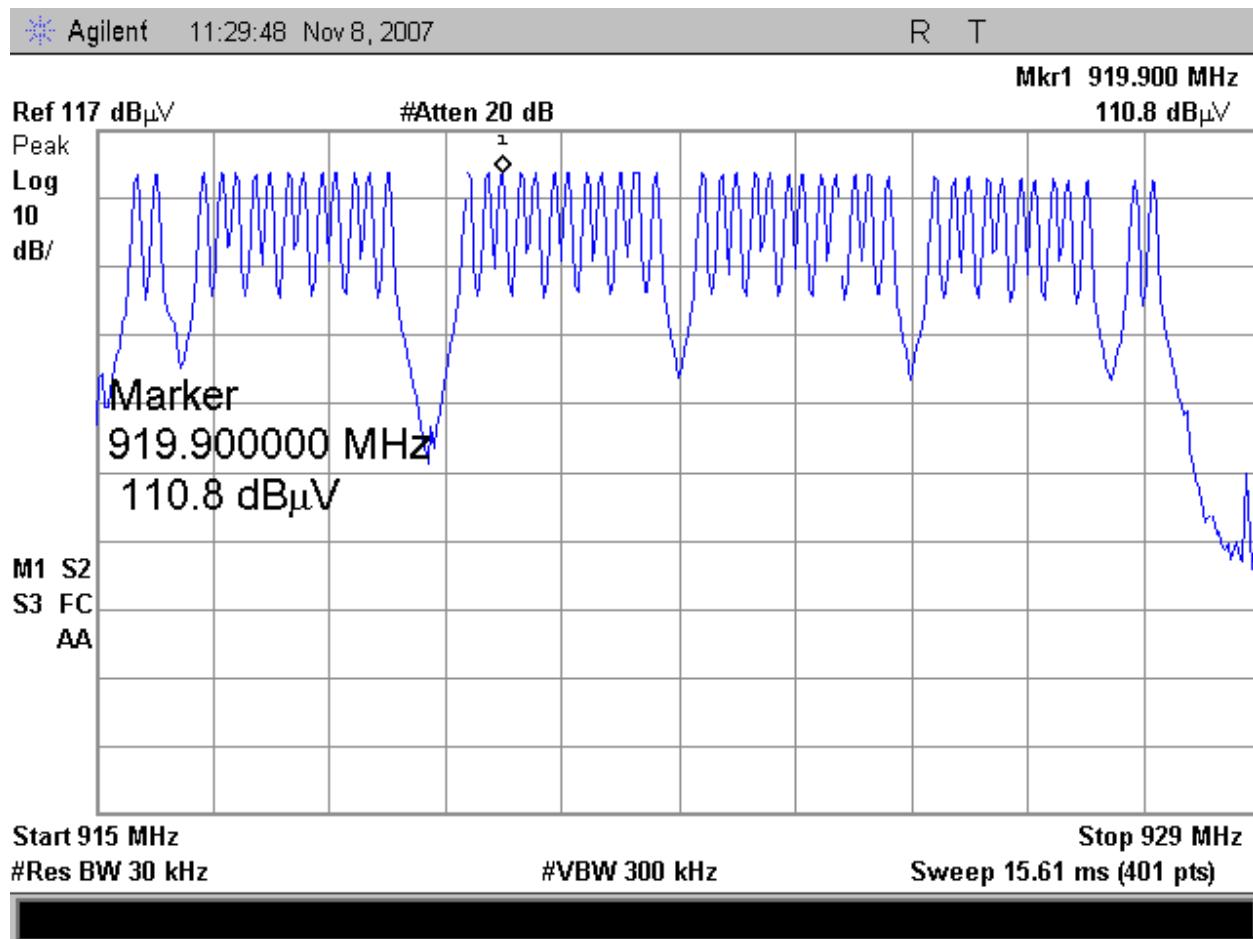


Figure 6: Plot of hopping Channels 915-928 MHz (Upper Band)

Time of Occupancy FCC Part 15.247(a)(1)(i)

Frequency Band (MHz)	20 dB Bandwidth	Number of Hopping Channels	Average Time of Occupancy
902.4-927.6	=>250 kHz	25	=<0.4 sec. In 10 sec.

There were 4 hops at 0.100 seconds per hop for any 10 sec. Period. Time of occupancy equals number of hops multiplied by the duration of one hop.

**Time of Occupancy** = 0.400 seconds in any 10 second period.

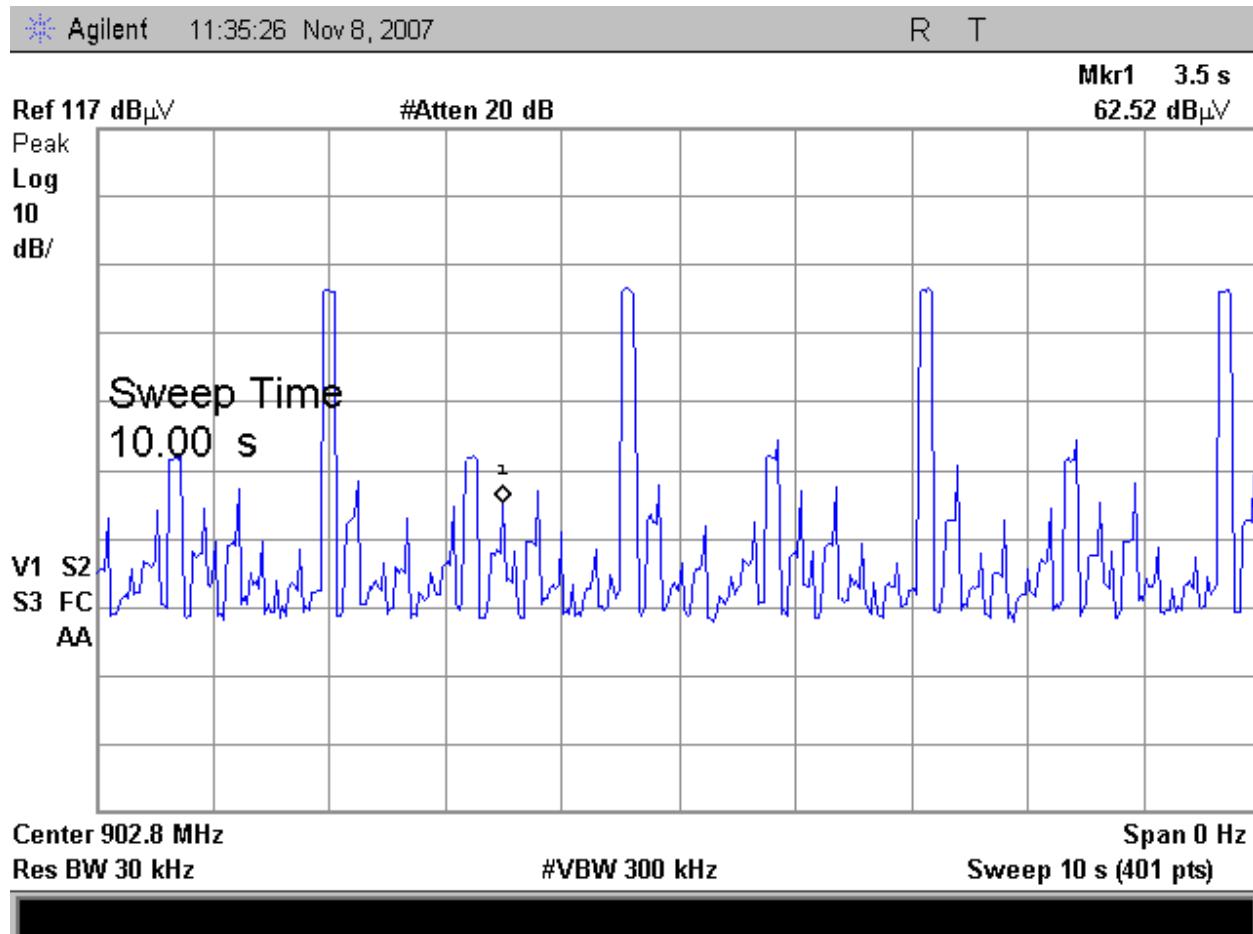


Figure 7: 10 second sweep of 902.8 MHz

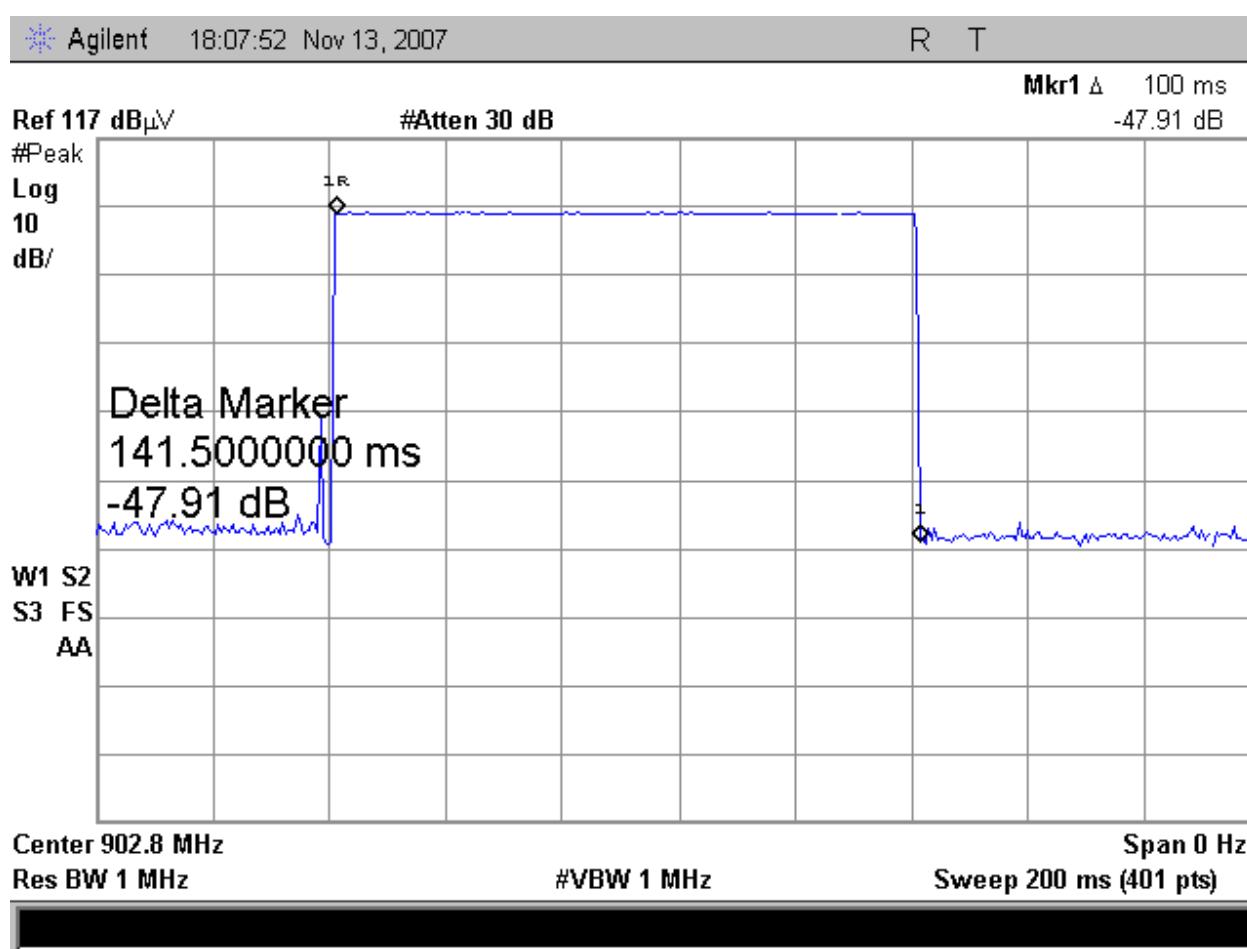


Figure 8: Measurement of 1 hop at 902.8 MHz

### 3.3 Occupied Bandwidth FCC Part 15.247(a)(1)(i)

The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

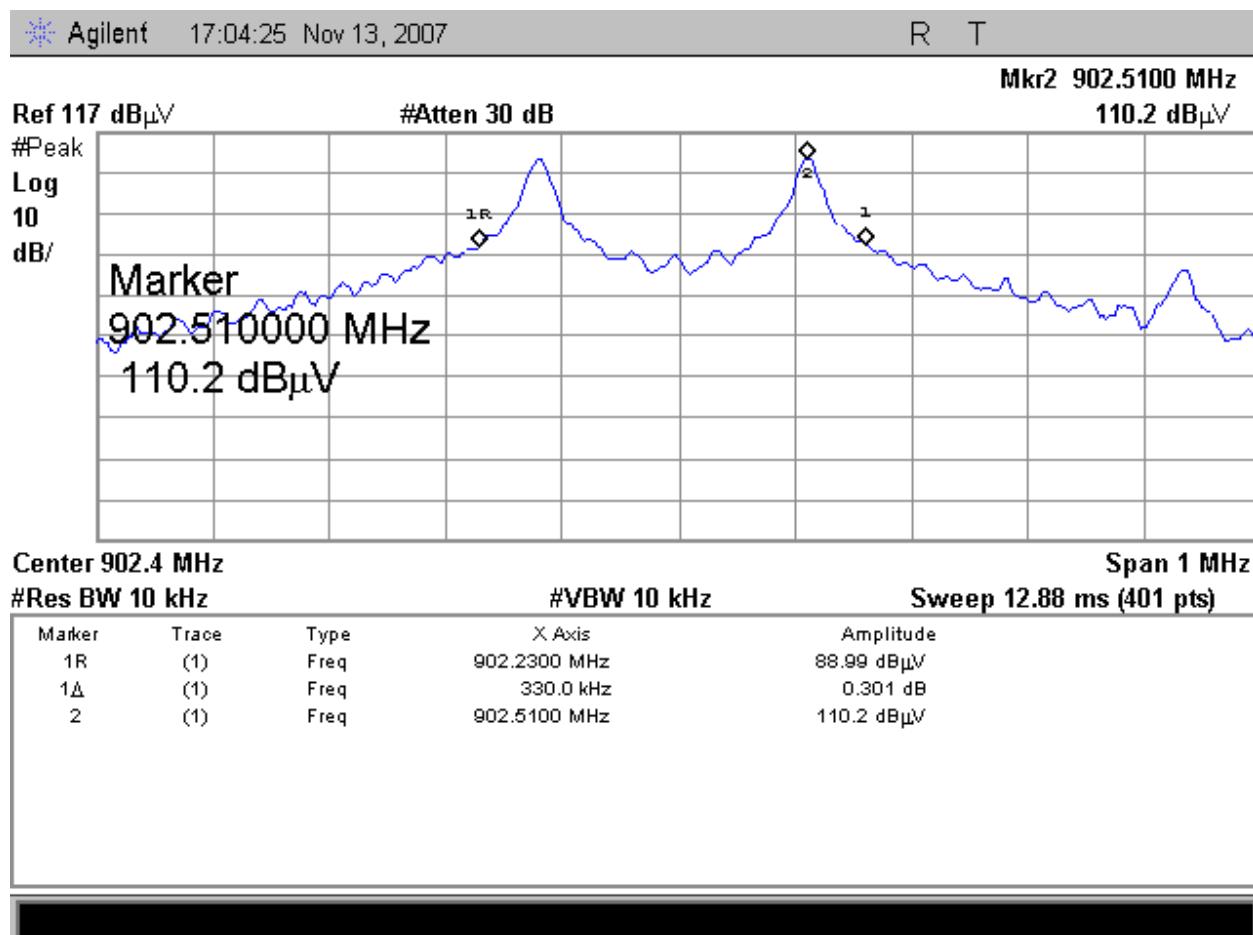
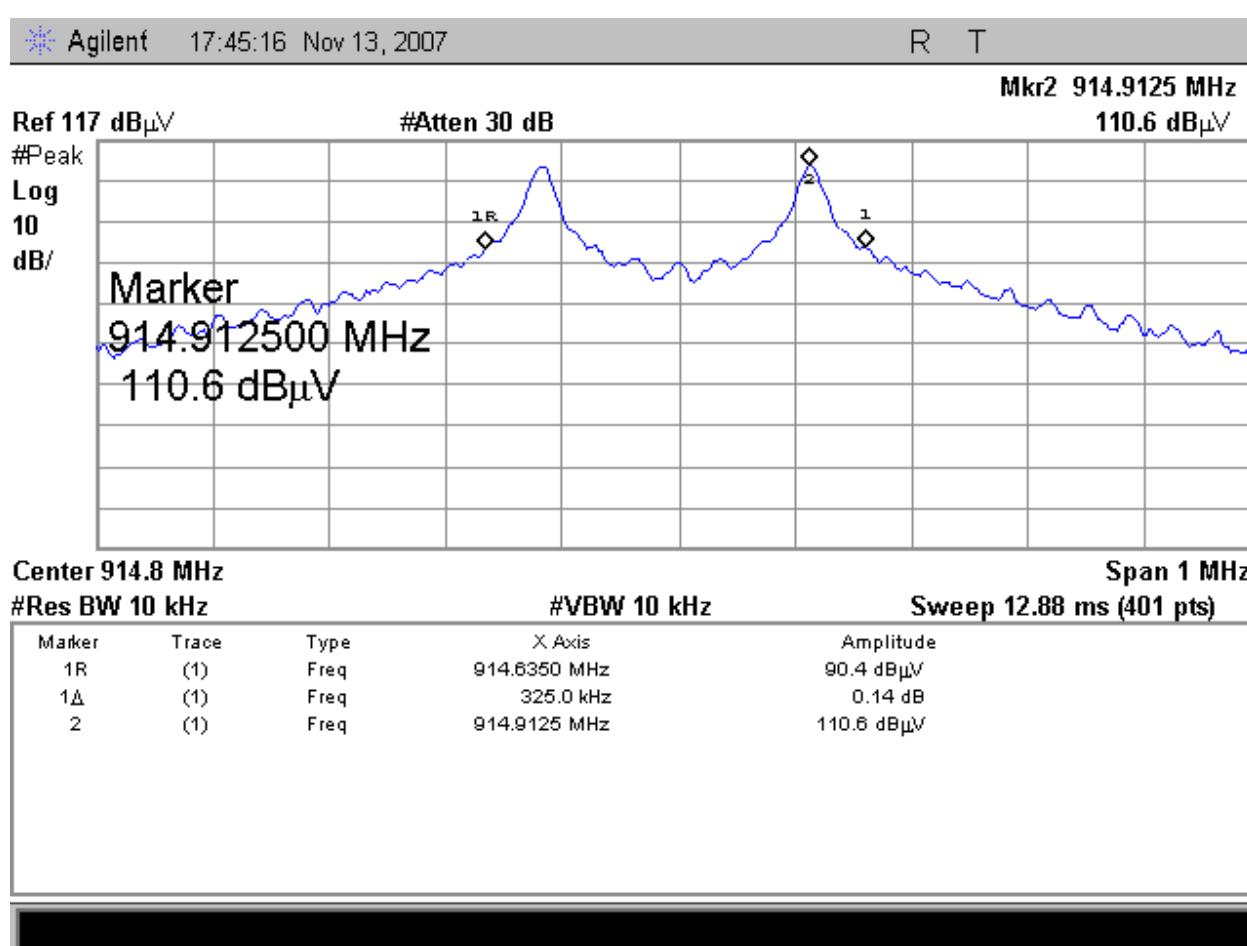
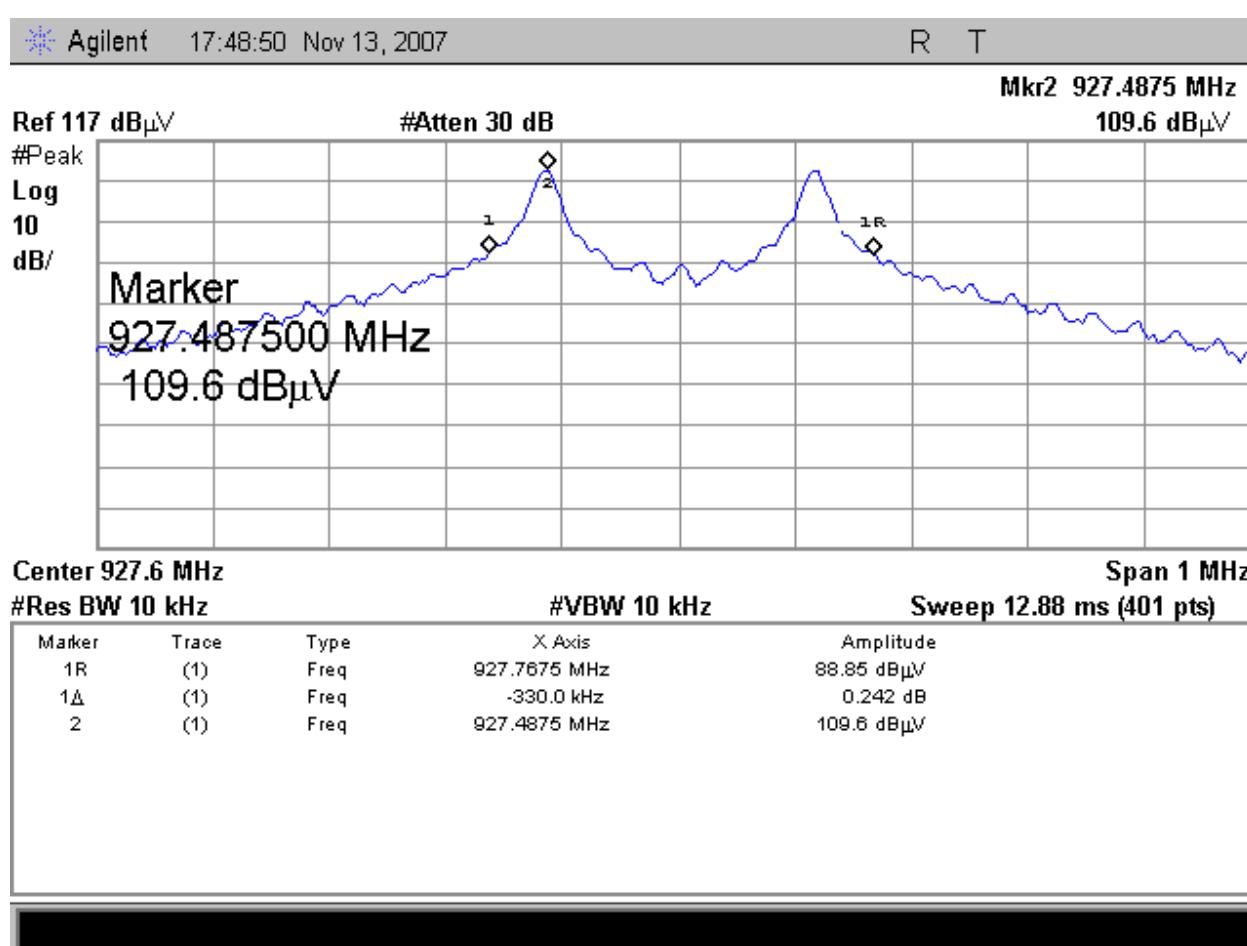


Figure 9: CH 0 (902.4 MHz) Occupied Bandwidth

**\*BW = 330.0 kHz**



**\*BW = 325.0 kHz**



**\*BW = 330.0 kHz**

### **3.4 Peak Output Power FCC Part 15.247(b)(2)**

The maximum peak output power of the intentional radiator shall not exceed 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels. (Conducted Measurement)

The peak output power was measured at CH1, CH15, and at CH31. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. After the measurement was made the cable loss and the attenuator was added to the measurement. The spectrum analyzer's resolution bandwidth was greater than the 20dB bandwidth of the modulated carrier and the video bandwidth was equal to the resolution bandwidth.

Test Setup



**Peak Power Output** Low Band

CH0: 902.4 MHz = 0.224 Watts

CH31: 914.8 MHz = 0.232 Watts

CH63: 927.6 MHz = 0.196 Watts

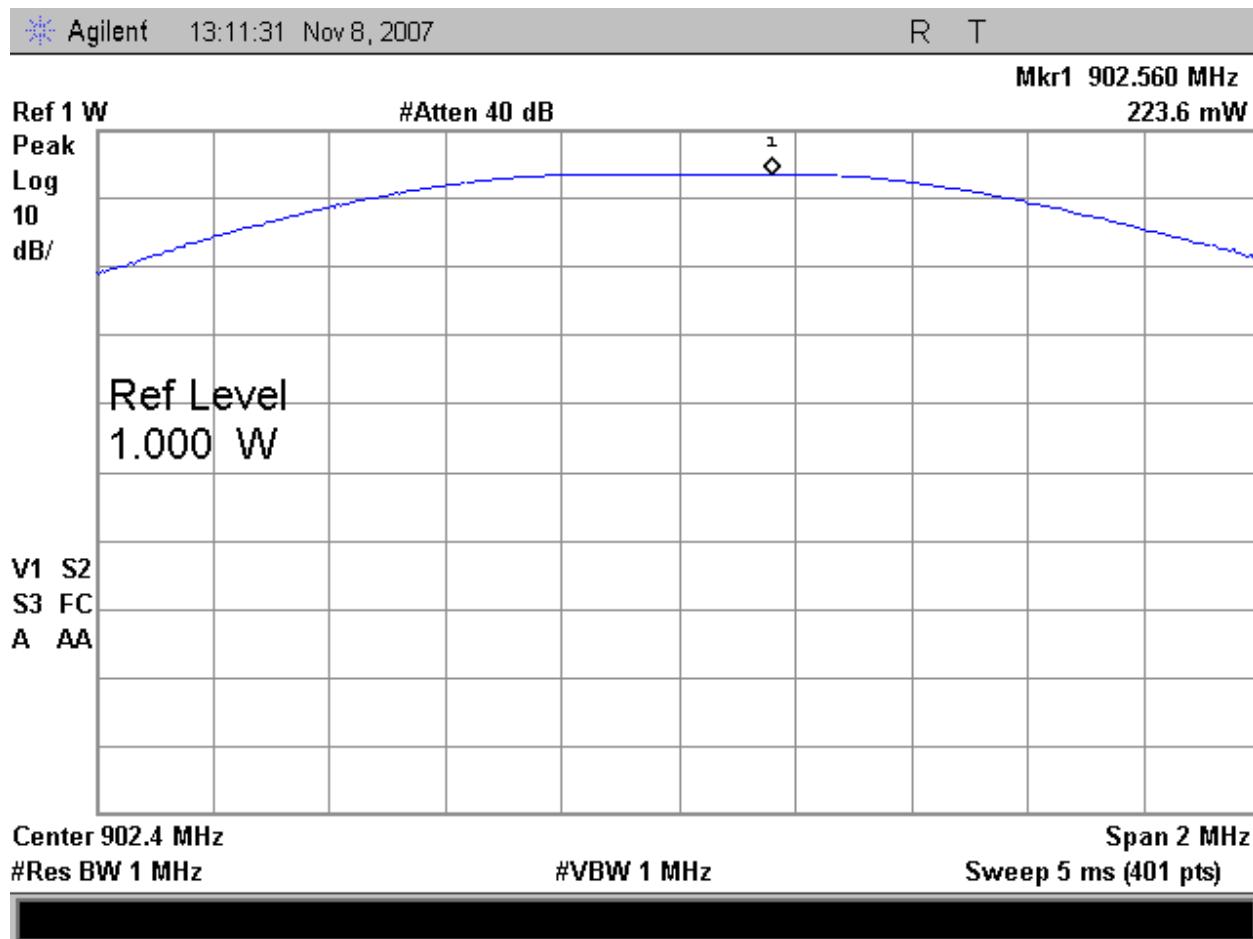


Figure 12: CH 0 (902.4 MHz) Peak Output Power

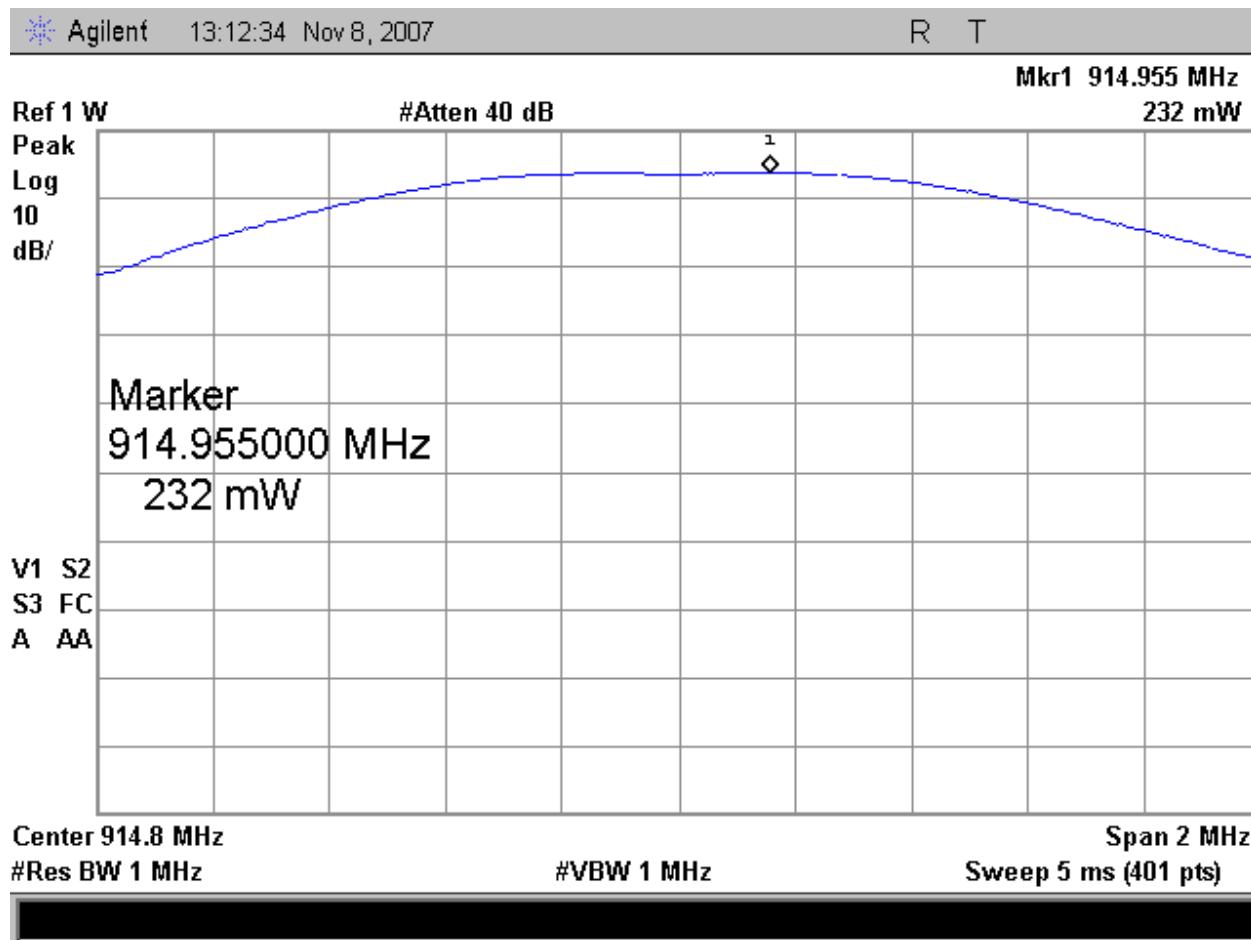


Figure 13: CH 31 (914.8 MHz) Peak Output Power

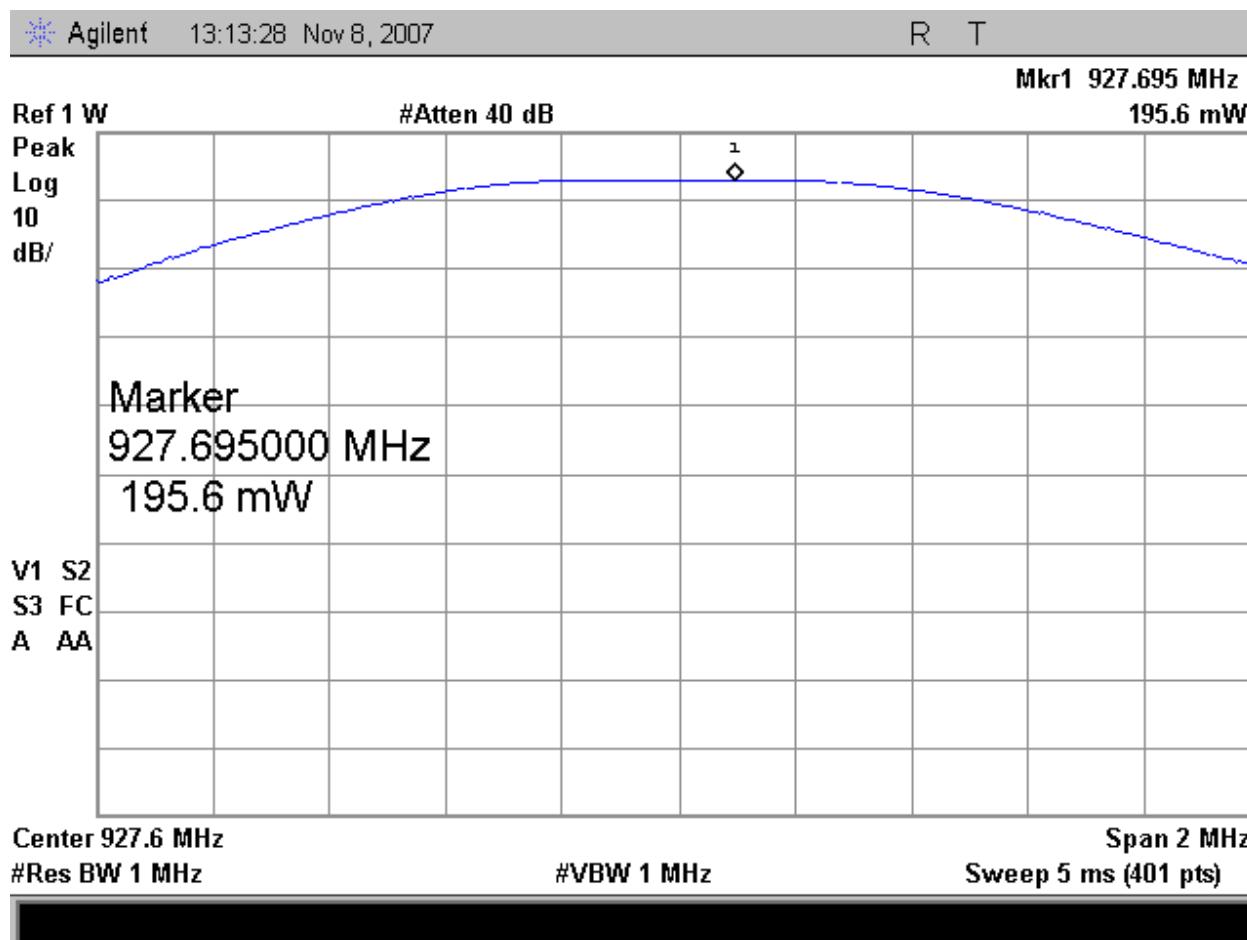


Figure 14: CH 63 (926.7 MHz) Peak Output Power

### 3.4.1 Antenna Gain

The antenna gain data was supplied separately with the following results provided:

#### 3.4.1.1 *Results*

##### Internal Antenna

Freq. (GHz)	Peak (dBi)
0.902 – 0.928	5.64

## 4 Spurious Emissions

### 4.1 Spurious Emissions FCC Part 15.247(c)

#### 4.1.1 Test Methodology

##### 4.1.1.1 Preliminary Test

A test program that controls instrumentation and data logging was used to automate the preliminary RF emission test procedure. The frequency range of interest was divided into sub-ranges to yield a frequency resolution of approximately 300 kHz and provide a reading at each frequency for each 6° of turntable rotation. For each frequency sub-range the turntable was rotated 360° while peak emission data was recorded and plotted over the frequency range of interest in horizontal and vertical antenna polarization's.

Preliminary emission profile testing was performed inside the anechoic chamber. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm above the floor. The EUT was positioned as shown in the setup photographs. The receiving antenna was placed at a distance of 3m at a fixed height of 1m. Measurement equipment was located outside of the chamber. A video camera was placed inside the chamber to view the EUT.

##### 4.1.1.2 Final Test

For each frequency measured, the peak emission was maximized by manipulating the receiving antenna from 1 to 4 meters above the ground plane and placing it at the position that produced the maximum signal strength reading. The turntable was then rotated through 360° while observing the peak signal and placing the EUT at the position that produced maximum radiation.

Final testing was performed on an NSA compliant test site. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane. The placement of EUT and cables were the same as for preliminary testing and is shown in the setup photographs.

##### 4.1.1.3 Deviations

There were no deviations from this test methodology.

#### 4.1.2 Test Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

##### 4.1.2.1 Emissions Outside the Frequency Band

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power, based on either RF conducted or radiated measurements. Conducted antenna port measurements are provided below to show that the EUT meets these requirements at the band edges.

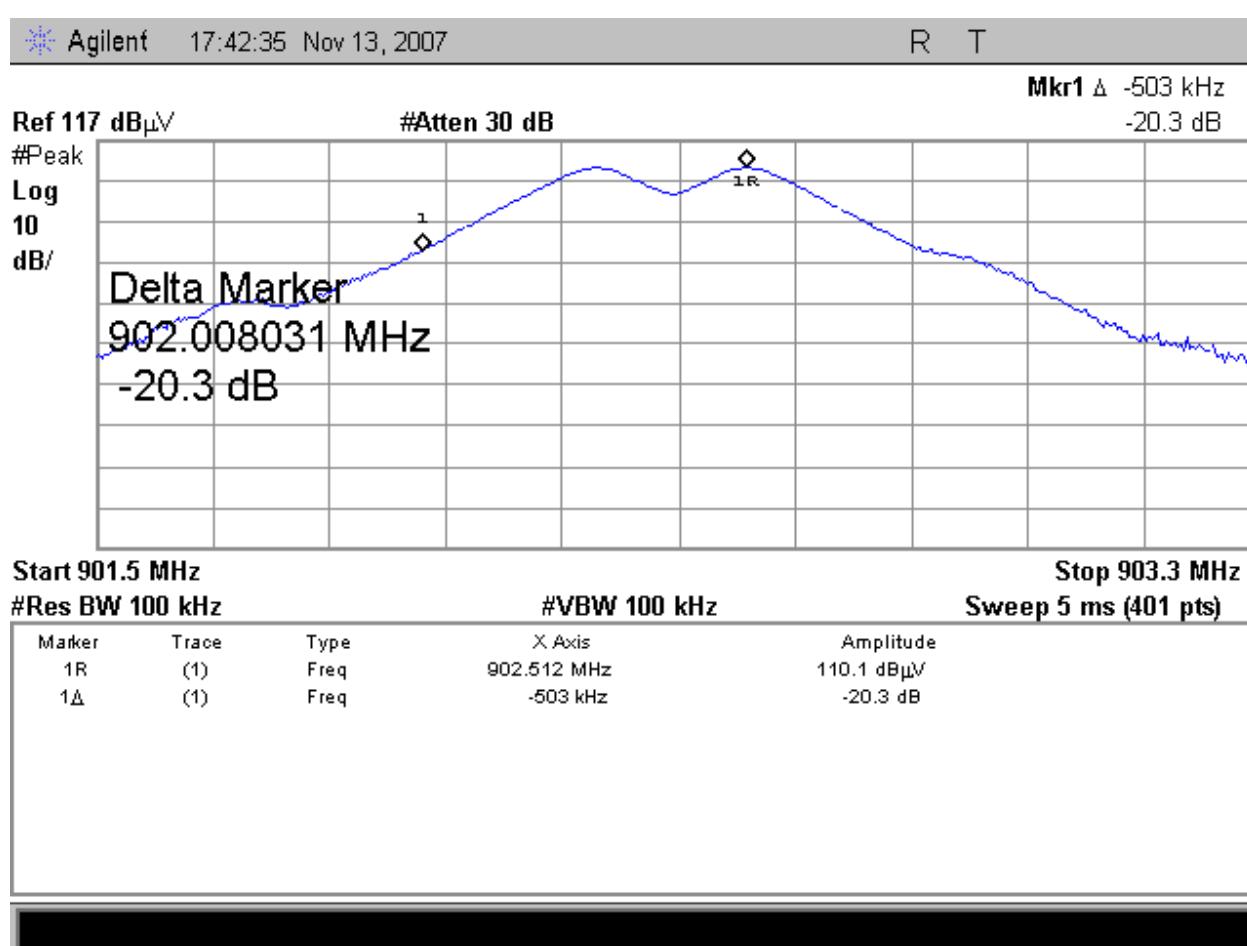


Figure 15: Lower Band Edge Measurement

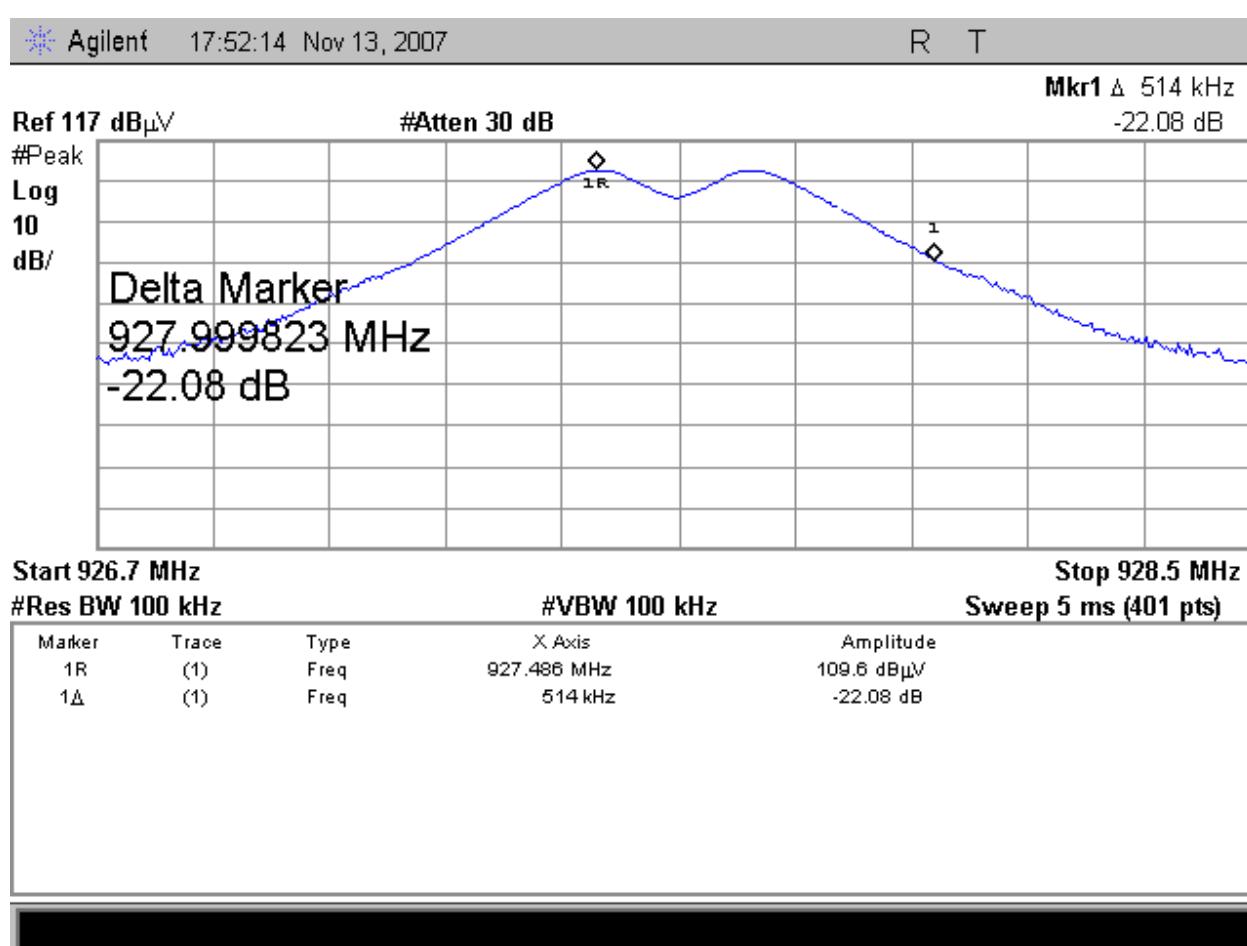


Figure 16: Upper Band Edge Measurement

**SOP 1 Radiated Emissions, 15.247c**

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<b>EUT Name</b>	Single Phase REX2 Meter	<b>Date</b>	07 November, 2007
<b>EUT Model</b>	REX2EA	<b>Temp / Hum in</b>	73.4 deg F / 28% rh
<b>EUT Serial</b>	G07 672 721	<b>Temp / Hum out</b>	N/A
<b>Standard</b>	FCC 47 CFR Part 15, RSS-210 Issue 7	<b>Line AC / Freq.</b>	240 VAC
<b>Deg/sweep</b>	12	<b>RBW / VBW</b>	1 MHz/1MHz
<b>Dist/Ant Used</b>	3 meters / 3115 above 1 GHz	<b>Performed by</b>	Chris Eckert
<b>Configuration</b>	REX2 Meter with internal service disconnect switch, Channel 0, 902.4 MHz		

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dBuV/m)
Channel 0										
902.40	H	1.01	295	78.44	0.00	3.22	23.60	105.26	N/A	
1804.80	H	1.14	32	58.90	35.88	6.99	26.62	56.64	85.26	-28.61
2707.20	H	1.24	330	43.56	36.04	8.93	29.12	45.57	85.26	-39.68
3609.60	H	1.12	314	45.17	35.39	10.40	31.46	51.64	85.26	-33.61
4512.00	H	1.25	5	40.84	35.84	10.39	32.18	47.57	85.26	-37.68
5414.40	H	1.50	11	47.90	35.21	11.23	33.90	57.81	85.26	-27.44
6316.80	H	1.01	244	45.41	34.62	11.89	34.43	57.11	85.26	-28.14
7219.20	H	1.38	311	41.89	35.37	15.21	35.92	57.65	85.26	-27.60
8121.60	H	1.00	0	37.73	35.79	17.97	36.98	56.90	85.26	-28.35
9024.00	H	1.00	0	39.07	35.90	18.46	37.94	59.57	85.26	-25.68
902.40	V	1.02	60	86.53	0.00	3.22	22.70	112.45	N/A	
1804.80	V	1.42	271	61.10	35.88	6.99	26.59	58.80	92.45	-33.65
2707.20	V	1.08	5	43.95	36.04	8.93	29.11	45.95	92.45	-46.50
3609.60	V	1.08	5	43.68	35.39	10.40	31.39	50.07	92.45	-42.38
4512.00	V	1.01	290	39.59	35.84	10.39	32.17	46.31	92.45	-46.14
5414.40	V	1.02	63	45.80	35.21	11.23	33.89	55.70	92.45	-36.75
6316.80	V	1.03	21	45.94	34.62	11.89	34.36	57.57	92.45	-34.88
7219.20	V	1.71	14	43.28	35.37	15.21	35.79	58.91	92.45	-33.54
8121.60	V	1.04	343	40.24	35.79	17.97	36.97	59.40	92.45	-33.05
9024.00	V	1.00	0	38.99	35.90	18.46	37.85	59.40	92.45	-33.05

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor  $\pm$  Uncertainty

Combined Standard Uncertainty  $U_c(y) = \pm 1.6\text{dB}$  Expanded Uncertainty  $U = ku_c(y)$   $k = 2$  for 95% confidence

Notes:

The bandwidth for these measurements was higher than 100 kHz. However, the peak spurious emissions still met the requirements of 15.247(c), even when measured the 1 MHz bandwidth.

SOP 1 Radiated Emissions								Tracking # 30762387.001 Page 2 of 3			
<b>EUT Name</b>	Single Phase REX2 Meter					<b>Date</b>	07 November, 2007				
<b>EUT Model</b>	REX2EA					<b>Temp / Hum in</b>	73.4 deg F / 28% rh				
<b>EUT Serial</b>	G07 672 721					<b>Temp / Hum out</b>	N/A				
<b>Standard</b>	FCC 47 CFR Part 15, RSS-210 Issue 7					<b>Line AC / Freq.</b>	240 VAC				
<b>Deg/sweep</b>	12					<b>RBW / VBW</b>	1 MHz/1MHz				
<b>Dist/Ant Used</b>	3 meters / 3115 above 1 GHz					<b>Performed by</b>	Chris Eckert				
<b>Configuration</b>	REX2 Meter with internal service disconnect switch, Channel 31, 914.8 MHz										
Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dBuV/m)	
914.80	H	1.36	337	80.15	0.00	3.26	23.70	107.11	N/A		
1829.60	H	1.06	281	53.99	35.89	7.07	26.73	51.91	87.11	-35.20	
2744.40	H	1.18	264	45.54	36.23	8.91	29.24	47.47	87.11	-39.64	
3659.20	H	1.31	302	43.56	35.59	10.57	31.59	50.13	87.11	-36.98	
4574.00	H	1.73	22	39.73	35.79	10.62	32.31	46.87	87.11	-40.24	
5488.80	H	1.01	9	46.16	35.16	10.79	34.03	55.81	87.11	-31.30	
6403.60	H	1.02	23	47.12	34.27	12.94	34.47	60.25	87.11	-26.86	
7318.40	H	1.29	55	43.80	35.34	14.91	36.16	59.53	87.11	-27.58	
8233.20	H	1.02	0	39.59	35.77	18.32	37.11	59.25	87.11	-27.86	
9148.00	H	1.30	340	38.99	35.81	18.96	38.01	60.16	87.11	-26.95	
914.80	V	2.18	69	86.86	0.00	3.35	22.70	112.91	N/A		
1829.60	V	1.01	315	54.66	35.89	7.07	26.69	52.54	92.91	-40.37	
2744.40	V	1.06	4	51.91	36.23	8.91	29.24	53.83	92.91	-39.08	
3659.20	V	1.00	0	39.59	35.59	10.57	31.52	46.10	92.91	-46.81	
4574.00	V	1.21	31	39.59	35.79	10.62	32.30	46.73	92.91	-46.18	
5488.80	V	1.12	338	46.06	35.16	10.79	34.00	55.69	92.91	-37.22	
6403.60	V	1.13	22	45.17	34.27	12.94	34.39	58.22	92.91	-34.79	
7318.40	V	1.02	48	45.54	35.34	14.91	36.05	61.16	92.91	-31.75	
8233.20	V	1.01	226	40.10	35.77	18.32	37.10	59.75	92.91	-33.66	
9148.00	V	1.02	152	38.99	35.81	18.96	37.93	60.07	92.91	-32.84	
Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor $\pm$ Uncertainty											
Combined Standard Uncertainty $U_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence											
Notes:											
The bandwidth for these measurements was higher than 100 kHz. However, the peak spurious emissions still met the requirements of 15.247(c), even when measured the 1 MHz bandwidth.											

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<b>EUT Name</b>	Single Phase REX2 Meter					<b>Date</b>	07 November, 2007				
<b>EUT Model</b>	REX2EA					<b>Temp / Hum in</b>	73.4 deg F / 28% rh				
<b>EUT Serial</b>	G07 672 721					<b>Temp / Hum out</b>	N/A				
<b>Standard</b>	FCC 47 CFR Part 15, RSS-210 Issue 7					<b>Line AC / Freq.</b>	240 VAC				
<b>Deg/sweep</b>	12					<b>RBW / VBW</b>	1 MHz/1MHz				
<b>Dist/Ant Used</b>	3 meters / 3115 above 1 GHz					<b>Performed by</b>	Chris Eckert				
<b>Configuration</b>	REX2 Meter with internal service disconnect switch, Channel 63, 927.6 MHz										
Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dBuV/m)	
927.60	H	1.12	49	83.86	0.00	3.25	23.95	111.06	N/A		
1855.20	H	1.10	2	56.57	35.98	7.19	26.84	54.62	91.06	-36.44	
2782.80	H	1.02	317	49.37	36.60	8.95	29.37	51.10	91.06	-39.96	
3710.40	H	1.02	0	41.29	35.46	10.46	31.72	48.01	91.06	-43.05	
4638.00	H	1.26	354	42.53	35.76	10.79	32.43	50.00	91.06	-41.06	
5565.60	H	1.10	0	43.03	35.19	11.43	34.08	53.36	91.06	-37.70	
6493.20	H	1.18	22	46.08	34.58	12.60	34.52	58.62	91.06	-32.44	
7420.80	H	1.39	332	43.56	35.32	15.08	36.40	59.72	91.06	-31.34	
8348.40	H	1.02	0	39.49	35.71	18.06	37.24	59.08	91.06	-31.87	
9276.60	H	1.00	0	39.09	35.81	18.77	38.08	60.13	91.06	-30.93	
927.60	V	1.01	0	86.83	0.00	3.25	22.80	112.88	N/A		
1855.20	V	1.01	30	59.74	35.98	7.19	26.80	57.74	92.88	-35.14	
2782.80	V	1.03	277	49.88	36.60	8.95	29.37	51.60	92.88	-41.28	
3710.40	V	1.06	7	43.41	35.46	10.46	31.66	50.07	92.88	-42.81	
4638.00	V	1.02	94	40.84	35.76	10.79	32.44	48.32	92.88	-44.56	
5565.60	V	1.01	294	45.94	35.19	11.43	34.05	56.24	92.88	-36.64	
6493.20	V	1.02	27	47.38	34.58	12.60	34.42	59.82	92.88	-33.06	
7420.80	V	1.02	336	42.77	35.32	15.08	36.31	58.83	92.88	-34.05	
8348.40	V	1.01	0	39.49	35.71	18.06	37.23	59.07	92.88	-33.81	
9276.60	V	1.02	152	39.34	35.81	18.77	38.00	60.30	92.88	-32.58	
Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor $\pm$ Uncertainty											
Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence											
Notes:											
The bandwidth for these measurements was higher than 100 kHz. However, the peak spurious emissions still met the requirements of 15.247(c), even when measured the 1 MHz bandwidth.											

#### ***4.1.2.2 Restricted band measurements***

Radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see 15.205(c)). In addition, where an average detector is used for determining compliance with the limits in 15.209(a), there is a corresponding peak limit 20 dB above the specified average limit according to 15.35(b)

Measurements demonstrating compliance with these parts are provided in the tables below.

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<b>EUT Name</b>	Single Phase REX2 Meter	<b>Date</b>	07 November, 2007
<b>EUT Model</b>	REX2EA	<b>Temp / Hum in</b>	73.4 deg F / 28% rh
<b>EUT Serial</b>	07 672 721	<b>Temp / Hum out</b>	N/A
<b>Standard</b>	FCC 47 CFR Part 15, RSS-210 Issue 7	<b>Line AC / Freq.</b>	240 VAC
<b>Deg/sweep</b>		<b>RBW / VBW</b>	1 MHz/1MHz
<b>Dist/Ant Used</b>	3 meters / 3115	<b>Performed by</b>	Chris Eckert
<b>Configuration</b>	REX2 Meter with internal service disconnect switch, Channel 0, 902.4 MHz		

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
<b>Peak</b>										
<b>2707.20</b>	<b>H</b>	<b>1.24</b>	<b>330</b>	<b>43.56</b>	<b>36.04</b>	<b>8.93</b>	<b>29.12</b>	<b>45.57</b>	<b>74.00</b>	<b>-28.43</b>
<b>3609.60</b>	<b>H</b>	<b>1.12</b>	<b>314</b>	<b>45.17</b>	<b>35.39</b>	<b>10.40</b>	<b>31.46</b>	<b>51.64</b>	<b>74.00</b>	<b>-22.36</b>
<b>4512.00</b>	<b>H</b>	<b>1.25</b>	<b>5</b>	<b>40.84</b>	<b>35.84</b>	<b>10.39</b>	<b>32.18</b>	<b>47.57</b>	<b>74.00</b>	<b>-26.43</b>
<b>5414.40</b>	<b>H</b>	<b>1.50</b>	<b>11</b>	<b>47.90</b>	<b>35.21</b>	<b>11.23</b>	<b>33.90</b>	<b>57.81</b>	<b>74.00</b>	<b>-16.19</b>
<b>8121.60</b>	<b>H</b>	<b>1.00</b>	<b>0</b>	<b>37.73</b>	<b>35.79</b>	<b>17.97</b>	<b>36.98</b>	<b>56.90</b>	<b>74.00</b>	<b>-17.10</b>
<b>9024.00</b>	<b>H</b>	<b>1.00</b>	<b>0</b>	<b>39.07</b>	<b>35.90</b>	<b>18.46</b>	<b>37.94</b>	<b>59.57</b>	<b>74.00</b>	<b>-14.43</b>
<b>Average</b>										
<b>2707.20</b>	<b>H</b>	<b>1.24</b>	<b>330</b>	<b>32.55</b>	<b>36.04</b>	<b>8.93</b>	<b>29.12</b>	<b>34.56</b>	<b>54.00</b>	<b>-19.44</b>
<b>3609.60</b>	<b>H</b>	<b>1.12</b>	<b>314</b>	<b>25.90</b>	<b>35.39</b>	<b>10.40</b>	<b>31.46</b>	<b>32.37</b>	<b>54.00</b>	<b>-21.63</b>
<b>4512.00</b>	<b>H</b>	<b>1.25</b>	<b>5</b>	<b>27.70</b>	<b>35.84</b>	<b>10.39</b>	<b>32.18</b>	<b>34.43</b>	<b>54.00</b>	<b>-19.57</b>
<b>5414.40</b>	<b>H</b>	<b>1.50</b>	<b>11</b>	<b>38.11</b>	<b>35.21</b>	<b>11.23</b>	<b>33.90</b>	<b>48.02</b>	<b>54.00</b>	<b>-5.98</b>
<b>8121.60</b>	<b>H</b>	<b>1.00</b>	<b>0</b>	<b>25.91</b>	<b>35.79</b>	<b>17.97</b>	<b>36.98</b>	<b>45.08</b>	<b>54.00</b>	<b>-8.92</b>
<b>9024.0</b>	<b>H</b>	<b>1.02</b>	<b>0</b>	<b>16.63</b>	<b>35.90</b>	<b>18.30</b>	<b>37.94</b>	<b>36.97</b>	<b>54.00</b>	<b>-17.03</b>

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor  $\pm$  Uncertainty

Combined Standard Uncertainty  $u_c(y) = \pm 1.6$  dB Expanded Uncertainty  $U = ku_c(y)$   $k = 2$  for 95% confidence

Notes: RBW/VBW = 1MHz/1MHz For frequencies between 1GHz and 10 GHz

Note: Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.

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<b>EUT Name</b>	Single Phase REX2 Meter	<b>Date</b>	07 November, 2007
<b>EUT Model</b>	REX2EA	<b>Temp / Hum in</b>	73.4 deg F / 28% rh
<b>EUT Serial</b>	07 672 721	<b>Temp / Hum out</b>	N/A
<b>Standard</b>	FCC 47 CFR Part 15, RSS-210 Issue 7	<b>Line AC / Freq.</b>	240 VAC
<b>Deg/sweep</b>		<b>RBW / VBW</b>	1 MHz/1MHz
<b>Dist/Ant Used</b>	3 meters / 3115	<b>Performed by</b>	Chris Eckert
<b>Configuration</b>	REX2 Meter with internal service disconnect switch, Channel 0, 902.4 MHz		

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
<b>Peak</b>										
<b>2707.20</b>	<b>V</b>	<b>1.08</b>	<b>5</b>	<b>43.95</b>	<b>36.04</b>	<b>8.93</b>	<b>29.11</b>	<b>45.95</b>	<b>74.00</b>	<b>-28.05</b>
<b>3609.60</b>	<b>V</b>	<b>1.08</b>	<b>5</b>	<b>43.68</b>	<b>35.39</b>	<b>10.40</b>	<b>31.39</b>	<b>50.07</b>	<b>74.00</b>	<b>-23.93</b>
<b>4512.00</b>	<b>V</b>	<b>1.01</b>	<b>290</b>	<b>39.59</b>	<b>35.84</b>	<b>10.39</b>	<b>32.17</b>	<b>46.31</b>	<b>74.00</b>	<b>-27.69</b>
<b>5414.40</b>	<b>V</b>	<b>1.02</b>	<b>63</b>	<b>45.80</b>	<b>35.21</b>	<b>11.23</b>	<b>33.89</b>	<b>55.70</b>	<b>74.00</b>	<b>-18.30</b>
<b>8121.60</b>	<b>V</b>	<b>1.04</b>	<b>343</b>	<b>40.24</b>	<b>35.79</b>	<b>17.97</b>	<b>36.97</b>	<b>59.40</b>	<b>74.00</b>	<b>-14.60</b>
<b>9024.00</b>	<b>V</b>	<b>1.00</b>	<b>0</b>	<b>38.99</b>	<b>35.90</b>	<b>18.46</b>	<b>37.85</b>	<b>59.40</b>	<b>74.00</b>	<b>-14.60</b>
<b>Average</b>										
<b>2707.20</b>	<b>V</b>	<b>1.08</b>	<b>5</b>	<b>33.13</b>	<b>36.04</b>	<b>8.93</b>	<b>29.11</b>	<b>35.13</b>	<b>54.00</b>	<b>-18.87</b>
<b>3609.60</b>	<b>V</b>	<b>1.08</b>	<b>285</b>	<b>33.16</b>	<b>35.39</b>	<b>10.40</b>	<b>31.39</b>	<b>39.55</b>	<b>54.00</b>	<b>-14.45</b>
<b>4512.00</b>	<b>V</b>	<b>1.01</b>	<b>290</b>	<b>26.05</b>	<b>35.84</b>	<b>10.39</b>	<b>32.17</b>	<b>32.77</b>	<b>54.00</b>	<b>-21.23</b>
<b>5414.40</b>	<b>V</b>	<b>1.02</b>	<b>63</b>	<b>34.42</b>	<b>35.21</b>	<b>11.23</b>	<b>33.89</b>	<b>44.32</b>	<b>54.00</b>	<b>-9.68</b>
<b>8121.60</b>	<b>V</b>	<b>1.04</b>	<b>343</b>	<b>26.39</b>	<b>35.79</b>	<b>17.97</b>	<b>36.97</b>	<b>45.55</b>	<b>54.00</b>	<b>-8.45</b>
<b>9024.00</b>	<b>V</b>	<b>1.00</b>	<b>0</b>	<b>25.55</b>	<b>35.90</b>	<b>18.46</b>	<b>37.85</b>	<b>45.96</b>	<b>54.00</b>	<b>-8.04</b>

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor  $\pm$  Uncertainty

Combined Standard Uncertainty  $u_c(y) = \pm 1.6$  dB Expanded Uncertainty  $U = ku_c(y)$   $k = 2$  for 95% confidence

Notes: RBW/VBW = 1MHz/1MHz For frequencies between 1GHz and 10 GHz

Note: Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.

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<b>EUT Name</b>	Single Phase REX2 Meter				<b>Date</b>	07 November, 2007					
<b>EUT Model</b>	REX2EA				<b>Temp / Hum in</b>	73.4 deg F / 28% rh					
<b>EUT Serial</b>	07 672 721				<b>Temp / Hum out</b>	N/A					
<b>Standard</b>	FCC 47 CFR Part 15, RSS-210 Issue 7				<b>Line AC / Freq.</b>	240 VAC					
<b>Deg/sweep</b>					<b>RBW / VBW</b>	1MHz/1MHz					
<b>Dist/Ant Used</b>	3 meters / 3115				<b>Performed by</b>	Chris Eckert					
<b>Configuration</b>	REX2 Meter with internal service disconnect switch, Channel 31, 914.8 MHz										
Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)	
<b>Peak</b>											
2744.40	H	1.18	264	45.54	36.23	8.91	29.24	47.47	74.00	-26.53	
3659.20	H	1.31	302	43.56	35.59	10.57	31.59	50.13	74.00	-23.87	
4574.00	H	1.73	22	39.73	35.79	10.62	32.31	46.87	74.00	-27.13	
7318.40	H	1.29	55	43.80	35.34	14.91	36.16	59.53	74.00	-14.47	
8233.20	H	1.02	0	39.59	35.77	18.32	37.11	59.25	74.00	-14.75	
9148.00	H	1.30	340	38.99	35.81	18.96	38.01	60.16	74.00	-13.84	
<b>Average</b>											
2744.40	H	1.06	264	33.73	36.23	8.91	29.24	35.66	54.00	-18.34	
3659.20	H	1.31	302	33.02	35.59	10.57	31.59	39.59	54.00	-14.41	
4574.00	H	1.73	22	25.89	35.79	10.62	32.31	33.03	54.00	-20.97	
7318.40	H	1.29	55	32.80	35.34	14.91	36.16	48.53	54.00	-5.47	
8233.20	H	1.02	0	26.26	35.77	18.32	37.11	45.92	54.00	-8.08	
9148.00	H	1.30	340	25.54	35.81	18.96	38.01	46.71	54.00	-7.29	
Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor $\pm$ Uncertainty											
Combined Standard Uncertainty $U_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = kU_c(y)$ $k = 2$ for 95% confidence											
Notes: RBW/VBW = 1MHz/1MHz For frequencies between 1GHz and 10 GHz											
Note: Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.											

SOP 1 Radiated Emissions								Tracking # 30762387.001 Page 4 of 6			
<b>EUT Name</b>	Single Phase REX2 Meter				<b>Date</b>	07 November, 2007					
<b>EUT Model</b>	REX2EA				<b>Temp / Hum in</b>	73.4 deg F / 28% rh					
<b>EUT Serial</b>	07 672 721				<b>Temp / Hum out</b>	N/A					
<b>Standard</b>	FCC 47 CFR Part 15, RSS-210 Issue 7				<b>Line AC / Freq.</b>	240 VAC					
<b>Deg/sweep</b>	12				<b>RBW / VBW</b>	1MHz/1MHz					
<b>Dist/Ant Used</b>	3 meters / 3115				<b>Performed by</b>	Chris Eckert					
<b>Configuration</b>	REX2 Meter with internal service disconnect switch, Channel 31, 914.8 MHz										
Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)	
<b>Peak</b>											
2744.40	V	1.06	4	51.91	36.23	8.91	29.24	53.83	74.00	-20.17	
3659.20	V	1.00	0	39.59	35.59	10.57	31.52	46.10	74.00	-27.90	
4574.00	V	1.21	31	39.59	35.79	10.62	32.30	46.73	74.00	-27.27	
7318.40	V	1.02	48	45.54	35.34	14.91	36.05	61.16	74.00	-12.84	
8233.20	V	1.01	226	40.10	35.77	18.32	37.10	59.75	74.00	-14.75	
9148.00	V	1.02	152	38.99	35.81	18.96	37.93	60.07	74.00	-13.93	
<b>Average</b>											
2744.40	V	1.06	4	42.27	36.23	8.91	29.24	44.19	54.00	-9.81	
3659.20	V	1.00	0	25.80	35.59	10.57	31.52	32.31	54.00	-21.69	
4574.00	V	1.21	31	26.23	35.79	10.00	32.30	36.03	54.00	-17.97	
7318.40	V	1.02	48	35.53	35.34	14.91	36.05	51.15	54.00	-2.85	
8233.20	V	1.01	226	26.37	35.77	18.32	37.10	46.02	54.00	-7.98	
9148.00	V	1.02	152	25.52	35.81	18.96	37.93	46.60	54.00	-7.40	
Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor $\pm$ Uncertainty											
Combined Standard Uncertainty $U_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = kU_c(y)$ $k = 2$ for 95% confidence											
Notes: RBW/VBW = 1MHz/1MHz For frequencies between 1GHz and 10 GHz											
Note: Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.											

SOP 1 Radiated Emissions							Tracking # 30762387.001 Page 5 of 6				
<b>EUT Name</b>	Single Phase REX2 Meter					<b>Date</b>	07 November, 2007				
<b>EUT Model</b>	REX2EA					<b>Temp / Hum in</b>	73.4 deg F / 28% rh				
<b>EUT Serial</b>	07 672 721					<b>Temp / Hum out</b>	N/A				
<b>Standard</b>	FCC 47 CFR Part 15, RSS-210 Issue 7					<b>Line AC / Freq.</b>	240 VAC				
<b>Deg/sweep</b>	12					<b>RBW / VBW</b>	1MHz/1MHz				
<b>Dist/Ant Used</b>	3 meters / 3115					<b>Performed by</b>	Chris Eckert				
<b>Configuration</b>	REX2 Meter with internal service disconnect switch, Channel 63, 927.6 MHz										
Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)	
<b>Peak</b>											
2782.80	H	1.02	317	49.37	36.60	8.95	29.37	51.10	74.00	-22.90	
3710.40	H	1.02	0	41.29	35.46	10.46	31.72	48.01	74.00	-25.99	
4638.00	H	1.26	354	42.53	35.76	10.79	32.43	50.00	74.00	-24.00	
7420.80	H	1.39	332	43.56	35.32	15.08	36.40	59.72	74.00	-14.28	
8348.40	H	1.02	0	39.49	35.71	18.06	37.24	59.08	74.00	-14.81	
<b>Average</b>											
2782.80	H	1.02	317	40.09	36.60	8.95	29.37	41.82	54.00	-12.18	
3710.40	H	1.00	360	30.00	35.46	10.46	31.72	36.72	54.00	-17.28	
4638.00	H	1.26	354	31.50	35.76	10.79	32.43	38.97	54.00	-15.03	
7420.80	H	1.39	332	32.55	35.32	15.08	36.40	48.71	54.00	-5.29	
8348.40	H	1.02	0	26.04	35.71	18.06	37.24	45.63	54.00	-8.37	
Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor $\pm$ Uncertainty											
Combined Standard Uncertainty $U_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = kU_c(y)$ $k = 2$ for 95% confidence											
Notes: RBW/VBW = 1MHz/1MHz For frequencies between 1GHz and 10 GHz											
Note: Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.											

SOP 1 Radiated Emissions							Tracking # 30762387.001 Page 6 of 6			
<b>EUT Name</b>	Single Phase REX2 Meter				<b>Date</b>	07 November, 2007				
<b>EUT Model</b>	REX2EA				<b>Temp / Hum in</b>	73.4 deg F / 28% rh				
<b>EUT Serial</b>	07 672 721				<b>Temp / Hum out</b>	N/A				
<b>Standard</b>	FCC 47 CFR Part 15, RSS-210 Issue 7				<b>Line AC / Freq.</b>	240 VAC				
<b>Deg/sweep</b>	12				<b>RBW / VBW</b>	1MHz/1MHz				
<b>Dist/Ant Used</b>	3 meters / 3115				<b>Performed by</b>	Chris Eckert				
<b>Configuration</b>	REX2 Meter with internal service disconnect switch, Channel 63, 927.6 MHz									
Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
<b>Peak</b>										
2782.80	V	1.03	277	49.88	36.60	8.95	29.37	51.60	74.00	-22.40
3710.40	V	1.06	7	43.41	35.46	10.46	31.66	50.07	74.00	-23.93
4638.00	V	1.02	94	40.84	35.76	10.79	32.44	48.32	74.00	-25.68
7420.80	V	1.02	336	42.77	35.32	15.08	36.31	58.83	74.00	-15.17
8348.40	V	1.01	0	39.49	35.71	18.06	37.23	59.07	74.00	-14.93
<b>Average</b>										
2782.80	V	1.03	277	41.38	36.60	8.95	29.37	43.10	54.00	-10.90
3710.40	V	1.06	7	32.10	35.46	10.46	31.66	38.76	54.00	-15.24
4638.00	V	1.02	94	28.07	35.76	10.79	32.44	35.55	54.00	-18.45
7420.80	V	1.00	336	32.12	35.32	15.08	36.31	48.18	54.00	-5.82
8348.40	V	1.01	0	26.84	35.71	18.06	37.23	46.42	54.00	-7.58
Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor $\pm$ Uncertainty										
Combined Standard Uncertainty $U_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = kU_c(y)$ $k = 2$ for 95% confidence										
Notes: RBW/VBW = 1MHz/1MHz For frequencies between 1GHz and 10 GHz										
Note: Peak measurements were made to document compliance with 15.247(c) and compliance with 15.35b. In addition, average measurements were made to document compliance with 15.205(b) for spurious emissions falling in the restricted bands.										

### ***Frequency Hopping Spread Spectrum Systems FCC Part 15.247(g)***

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

In constant transmit mode, the Rex2 Meter sends a packet nominally every 97.3 ms with a delay of 8 to 16 ms between packets. Each packet is sent on the next channel determined by the pseudo-random hop table. When presented with a continuous data stream, the EUT adheres to the 0.4 second dwell time for each 10 second window requirement. The EUT always distributes its transmissions across all 25 channels, and does not re-use a channel again until a transmission has occurred on each of the other 24 channels.

### ***4.2 Incorporation of Intelligence within a Frequency Hopping Spread Spectrum System FCC Part 15.247(h)***

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

The EUT does not incorporate intelligence relating to the hopping pattern as described above. Rather, the EUT always distributes its transmissions across the same 25 channels. A channel is not re-used until a transmission has occurred on each of the other 24 channels.

### **4.3 Conducted Emissions**

Testing was performed in accordance with 47 CFR 15, ANSI C63.4:2003. These test methods are listed under the laboratory's NVLAP Scope of Accreditation.

This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

#### **4.3.1 Test Methodology**

A test program that controls instrumentation and data logging was used to automate the AC Power Line Conducted emission test procedure. The frequency range of interest was divided into sub-ranges such as to yield a frequency resolution of 9 kHz. For each frequency sub-range, each phase and neutral of the AC power line were measured with respect to ground. Measurements were performed using a set of 50 $\mu$ H / 50 $\Omega$  LISNs.

Testing is either performed in the anechoic chamber or on PLC Site 2. The setup photographs clearly identify which site was used. The vertical ground plane used in the anechoic chamber is a 2m x 2m wooden frame that is covered with  $\frac{1}{4}$  inch hardware cloth and is bonded to the horizontal ground plane.

In the case of tabletop equipment, the EUT is placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane and 40cm from a vertical ground reference plane. The rear of the EUT was positioned flush with the backside of the table and directly over the LISNs. The power and I/O cables were routed over the edge of the table and bundled approximately 40cm from the ground plane. Support equipment was powered from a separate LISN. Floor-standing equipment is placed directly on the ground plane.

##### **4.3.1.1 Deviations**

There were no deviations from this test methodology.

#### **4.3.2 Test Results**

Section 4.3.2.1 lists the final measurement data under the worst case operating modes, configurations, and/or cable positions. It also reflects the results including any modifications and/or special accessories listed in Sections 1.4 and 1.5.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Plots of the EUT's AC Line Conducted emissions are contained in the following sections. The plots show peak and/or average emissions and the corresponding peak and/or average limits. If the peak emissions are below the average limit, then the EUT is considered to pass and no average measurements are made. If the peak emissions are below the quasi-peak limit and the average emissions are below the average limit, then the EUT is considered to pass and no further measurements are made. Otherwise, individual frequencies are measured and compared to the corresponding limit for the detector used (quasi-peak or average).

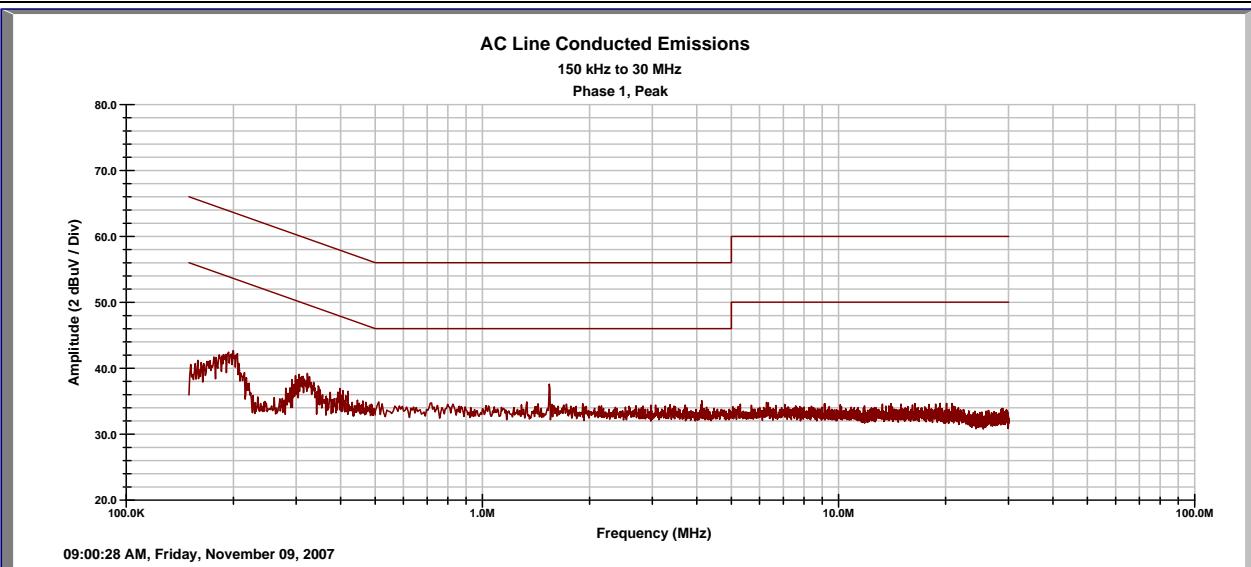
##### **4.3.2.1 Final Data**

The data recorded in this section contains the final results under the worst-case conditions and with any modifications or special accessories implemented as the manufacturer intends.

**SOP 2 Conducted Emissions**

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<b>EUT Name</b>	Single Phase REX2 Meter	<b>Date</b>	09 November, 2007
<b>EUT Model</b>	REX2EA	<b>Temperature</b>	72.5 / 39%
<b>EUT Serial</b>	07 672 721	<b>Humidity</b>	
<b>Standard</b>	FCC 47 CFR Part 15, RSS-210 Issue 7	<b>Line AC /Freq</b>	120 VAC / 60 Hz
<b>LISNs Used</b>	06	<b>Performed by</b>	9 kHz / 30 kHz
<b>Configuration</b>	Single-phase REX2 meter		



Emission Freq (MHz)	Line ID (1,2,3,N)	FIM Quasi (dBuV)	FIM Ave (dBuV)	Cable Loss (dB)	LISN + T Limiter (dB)	Quasi Limit (dBuV)	Ave Limit (dBuV)	Quasi Spec Margin (dB)	Ave Spec Margin (dB)
0.19	1	24.25	11.14	0.02	10.02	64.04	54.04	-29.74	-32.85
0.31	1	19.87	9.81	-0.00	10.10	59.97	49.97	-30.00	-30.06
1.54	1	24.85	22.72	0.04	10.17	56.00	46.00	-20.95	-13.08

Quasi Spec Margin = Quasi FIM + Cable Loss + LISN CF - Quasi Limit  $\pm$  Uncertainty

Ave Spec Margin = Ave FIM + Cable Loss + LISN CF - Ave Limit  $\pm$  Uncertainty

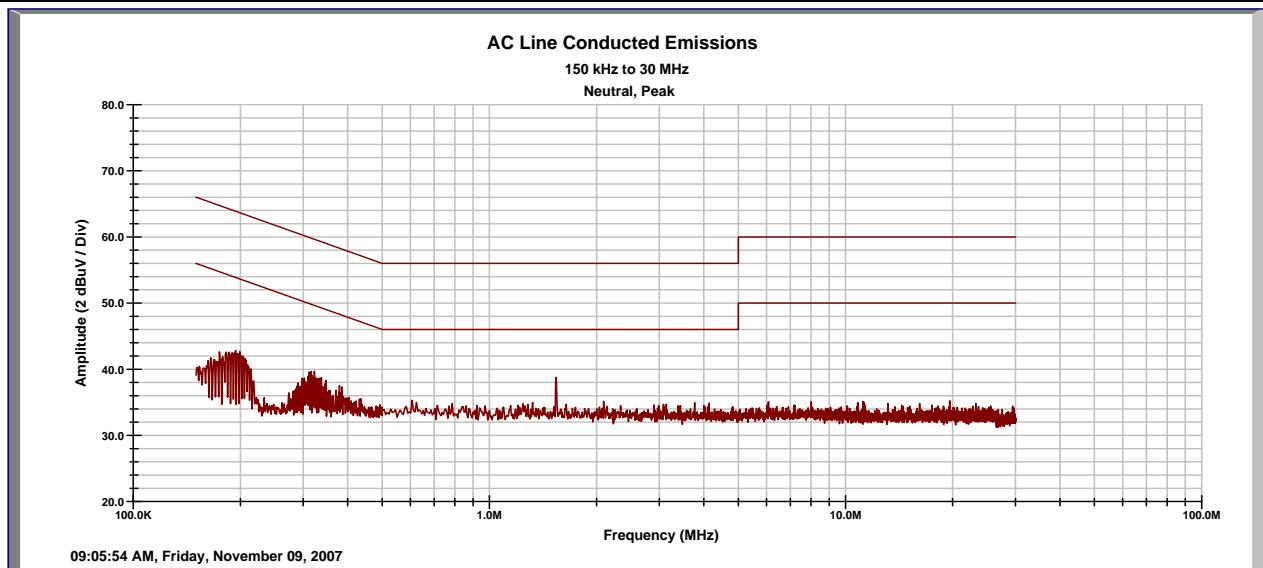
Combined Standard Uncertainty  $u_c(y) = \pm 1.2\text{dB}$  Expanded Uncertainty  $U = ku_c(y)$   $k = 2$  for 95% confidence

Notes:

**SOP 2 Conducted Emissions**

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<b>EUT Name</b>	Single Phase REX2 Meter	<b>Date</b>	09 November, 2007
<b>EUT Model</b>	REX2EA	<b>Temperature</b>	72.5 / 39%
<b>EUT Serial</b>	07 672 721	<b>Humidity</b>	
<b>Standard</b>	FCC 47 CFR Part 15, RSS-210 Issue 7	<b>Line AC /Freq</b>	120 VAC / 60 Hz
<b>LISNs Used</b>	07	<b>Performed by</b>	9 kHz / 30 kHz
<b>Configuration</b>	Single-phase REX2 meter		



Emission Freq (MHz)	Line ID (1,2,3,N)	FIM Quasi (dBuV)	FIM Ave (dBuV)	Cable Loss (dB)	LISN + T Limiter (dB)	Quasi Limit (dBuV)	Ave Limit (dBuV)	Quasi Spec Margin (dB)	Ave Spec Margin (dB)
0.19	N	23.85	11.10	0.02	10.10	64.04	54.04	-30.07	-32.82
0.32	N	19.88	9.70	-0.00	10.19	59.71	49.71	-29.64	-29.82
1.54	N	26.14	24.41	0.04	10.22	56.00	46.00	-19.61	-11.34

Quasi Spec Margin = Quasi FIM + Cable Loss + LISN CF - Quasi Limit  $\pm$  Uncertainty

Ave Spec Margin = Ave FIM + Cable Loss + LISN CF - Ave Limit  $\pm$  Uncertainty

Combined Standard Uncertainty  $u_c(y) = \pm 1.2\text{dB}$  Expanded Uncertainty  $U = k u_c(y)$   $k = 2$  for 95% confidence

Notes:

## 5 Test Equipment Use List

### 5.1 Test Equipment use list

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal dd/mm/yy	Next Cal dd/mm/yy
SOP 1 - Radiated Emissions (5 Meter Chamber)					
Amplifier, preamp	Agilent Technologies	8449B	3008A01480	10-Oct-2007	10-Oct-2008
Amplifier, preamp	Hewlett Packard	8447D	2944A10139	08-Oct-2007	08-Oct-2008
Ant. BiconiLog	EMCO	3142	1006	2-May-2006	2-May-2008
Antenna Horn 1-18GHz	EMCO	3115	2236	25-Jan-2007	25-Jan-2009
Ant. BiconiLog	Chase	CBL6140A	1108	16-May-2006	16-May-2008
Receiver, EMI	Rohde & Schwarz	ESIB40	100043	12-Jul-2007	12-Jul-2008
Spectrum Analyzer	Agilent Tec.	E7405A	US39440161	29-Jun-2007	29-Jun-2008
Cable, Coax	Andrew	FSJ1-50A	036	14-Mar-2007	14-Mar-2008
Cable, Coax	Andrew	FSJ1-50A	030	1-Nov-2007	1-Nov-2008
Cable, Coax	Andrew	FSJ1-50A	045	24-Jan-2007	24-Jan-2008
SOP 2 - Conducted Emissions (AC/DC)					
LISN (6) 50mH/50Ω	Solar Electronics	8028-50-TS-24	990442	08-Oct-2007	08-Oct-2008
LISN (7) 50mH/50Ω	Solar Electronics	8028-50-TS-24	990443	08-Oct-2007	08-Oct-2008
Spectrum Analyzer <sup>1</sup>	Agilent Tec.	E7405A	US39440161	29-Jun-2007	29-Jun-2008
Cable, Coax	Belden	RG-213	004	9-Oct-2007	9-Oct-2008
Antenna Port Conducted Emissions					

- Calibration of equipment past due for re-calibration will be performed expeditiously. If any equipment is found to be out of tolerance at that time, affected customers will be notified accordingly.

- This equipment was also used for antenna port conducted measurements.