Engineering and Testing for EMC and Safety Compliance

Certification Application Report
FCC Part 15.247 & Industry Canada RSS-210

Test Lab:	Applicant:
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FCC ID/ IC:	UJX-SSG-REN91812/ 6715A-SSG91812	**Test Report Date:**	June 26, 2006
Platform:	N/A	**RTL Work Order #:**	2006070
Model Name/ Model Number:	ROAM Enabled Endpoint/ REN91812	**RTL Quote #:**	QRTL06-240

American National Standard Institute:	ANSI C63.4-2003: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
FCC Classification:	DSS – Part 15 Spread Spectrum Transmitter
FCC Rule Part(s):	FCC Rules Part 15.247: Operation within the bands 920-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz Direct Sequence System October 1, 2005
Industry Canada:	RSS-210: Low Power License-Exempt Communications Devices
Digital Interface Information	Digital Interface was found to be compliant

Frequency Range (MHz)	Output Power (W)	Frequency Tolerance	Emission Designator
903 – 927	0.063	N/A	128KFXD

I, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this test report. No modifications were made to the equipment during testing in order to achieve compliance with these standards. Furthermore, there was no deviation from, additions to, or exclusions from, the applicable parts of FCC Part 2, FCC Part 15, FCC 97-114, ANSI C63.4, and Industry Canada RSS-210.

Signature: _____ Date: June 26, 2006

Typed/Printed Name: Desmond A. Fraser Position: President

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The test results relate only to the item(s) tested.

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1 General Information

1.1 Scope

Applicable Standards:

- FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz.
- Industry Canada RSS-210: Low Power License-Exempt Communications Devices

1.2 Description of EUT

Equipment Under Test	ROAM Enabled Endpoint
Model	REN 91812
Power Supply	AC powered
Modulation Type	FHSS
Frequency Range	903–927 MHz
Antenna Connector Type	Internal
Antenna Types	Internal

1.3 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report and approved by the Federal Communications Commission to perform AC line conducted and radiated emissions testing (ANSI C63.4-2003).

1.4 Related Submittal(s)/Grant(s)

This is an original application for certification for Strategic Services Group, Inc. Model: ROAM Enabled Endpoint, Model # REN 91812; FCC ID: UJX-SSG-REN91812, IC: 6715A-SSG91812.

1.5 Modifications

No modifications were required for compliance.

2 Test Information

2.1 Description of Test Modes

In accordance with FCC 15.31(m), and because the EUT utilizes an operating band greater than 10 MHz, the following frequencies were tested:

Table 2-1: Channels Tested

Channel	Frequency
Low	903
Middle	915
High	927

2.2 Exercising the EUT

Three EUT's were provided to perform various functions while testing. One was set to continuously transmit on a low, middle and high channel (channels were changed with a push button), the second was set to normal hopping operation, and the third was set to receive only.

There were no deviations from the test standard(s) and/or methods. The test results reported relate only to the item tested.

2.3 Test Result Summary

Table 2-2: Test Result Summary– FCC Part 15, Subpart C (Section 15.247) – FHSS

Standard	Test	Pass/Fail or N/A
FCC 15.207	AC Power Conducted Emissions	Pass
FCC 15.209	Radiated Emissions	Pass
FCC 15.247(b)	Maximum Peak Power Output	Pass
FCC 15.247(d)	Antenna Conducted Spurious Emissions	Pass
FCC 15.247(d)	Band Edge Measurement	Pass
FCC 15.247(a)(1)	Carrier Frequency Separation	Pass
FCC 15.247(a)(1)(ii)	20 dB Bandwidth	Pass
FCC 15.247(a)(1)(iii)	Hopping Characteristics	Pass
FCC 15.247(a)(1)(iii)	Average Time of Occupancy	Pass

2.4 Test System Details

The test sample was received on June 1, 2006. The FCC identifiers for all applicable equipment, plus descriptions of all cables used in the tested system, are identified in the following table.

Table 2-3: Equipment Under Test

Part	Manufacturer	Model	Serial Number	FCC ID	Cable Description	RTL Bar Code
ROAM Enabled Equipment	Innovative Wireless Technologies	REN91812	N/A	UJX-SSG-REN91812	N/A	17272
AC Supply	Innovative Wireless Technologies	N/A	N/A	N/A	N/A	17273

2.5 Configuration of Tested System

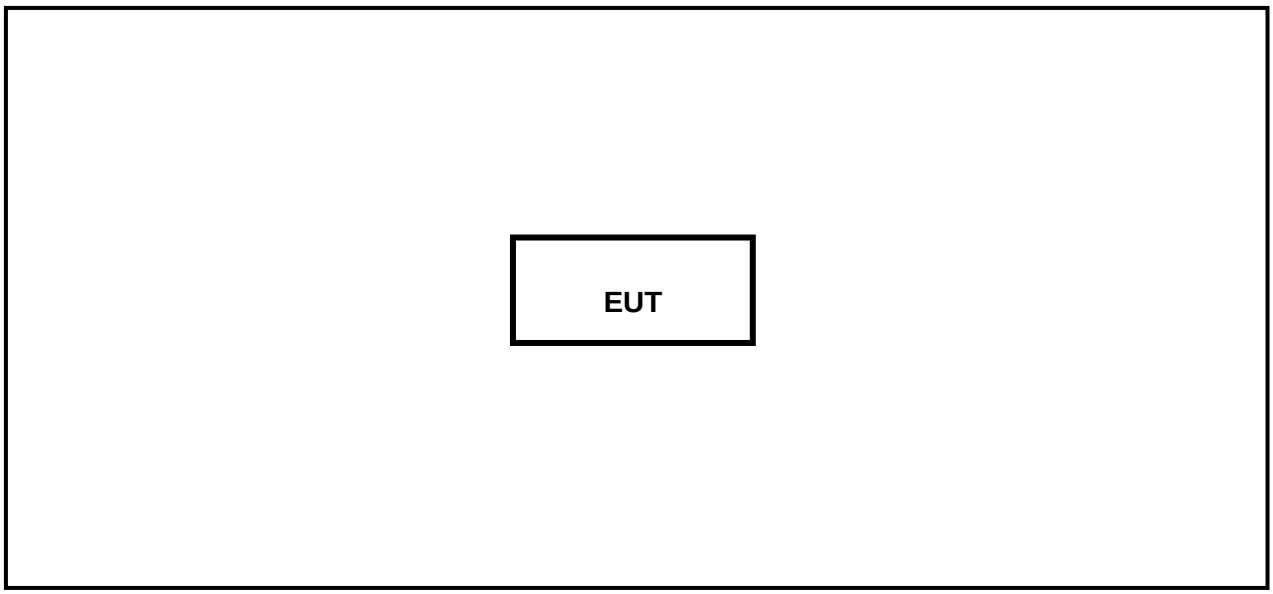


Figure 2-1: Configuration of System Under Test

3 Peak Output Power - §15.247(b)(1) ; RSS-210 §A8.4(4)

3.1 Power Output Test Procedure

A conducted power measurement of the EUT was taken using an Agilent power meter.

Table 3-1: Power Output Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901104	Agilent Technologies	E4416A	EPM-P Series Power Meter	GB41050573	9/21/2006
901356	Agilent Technologies	E9232A	Power Sensor	US40410920	9/21/2006

3.2 Power Output Test Data

Table 3-2: Power Output Test Data

Channel	Frequency (MHz)	Peak Power Conducted Output (dBm)
Low	903	17.8
Middle	915	17.9
High	927	18.0

Test Personnel:

Richard B. McMurray	Richard B. McMurray	June 1, 2006
EMC Test Engineer	Signature	Date Of Test

4 Compliance with the Band Edge – FCC §15.247(d); RSS-210 §2.2

4.1 Band Edge Test Procedure

The transmitter output was connected to its appropriate antenna. Peak (1 MHz RBW/VBW) and average (1 MHz RBW/10 Hz VBW) radiated measurements were taken with a suitable span to encompass the peak of the fundamental. A delta measurement was performed from the highest peak in the restricted band to the peak of the fundamental, and subtracted from the field strength; the result was compared to the limit in the restricted band (54 dBuV/m).

Table 4-1: Band Edge Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	9/14/06
900878	Rhein Tech Labs	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	Not Required
901231	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	9/1/06
901232	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	9/1/06
901235	IW Microwave Products	KPS-1503-360-KPS	High frequency RF cables	36"	9/1/06
901242	Rhein Tech Labs	WRT-000-0003	Wood rotating table	N/A	Not Required
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	5/20/07

4.2 Band Edge Test Results

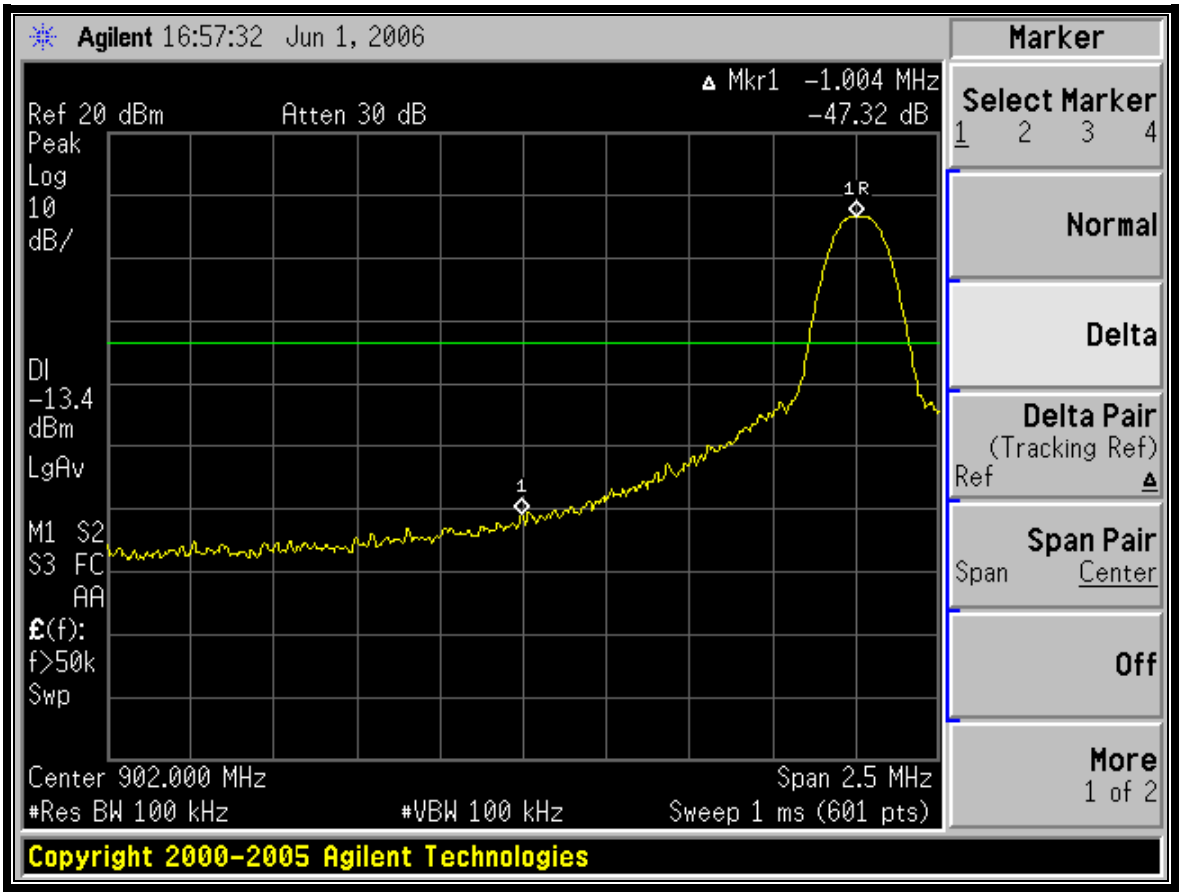
4.2.1 Calculation of Lower Band Edge

105.4 dBuV/m is the field strength measurement, from which the delta measurement of 38.5 dB is subtracted (reference hopping plot), resulting in a level of 66.9 dB. This level has a margin of 18.5 dB below the limit of 85.4 dBuV/m.

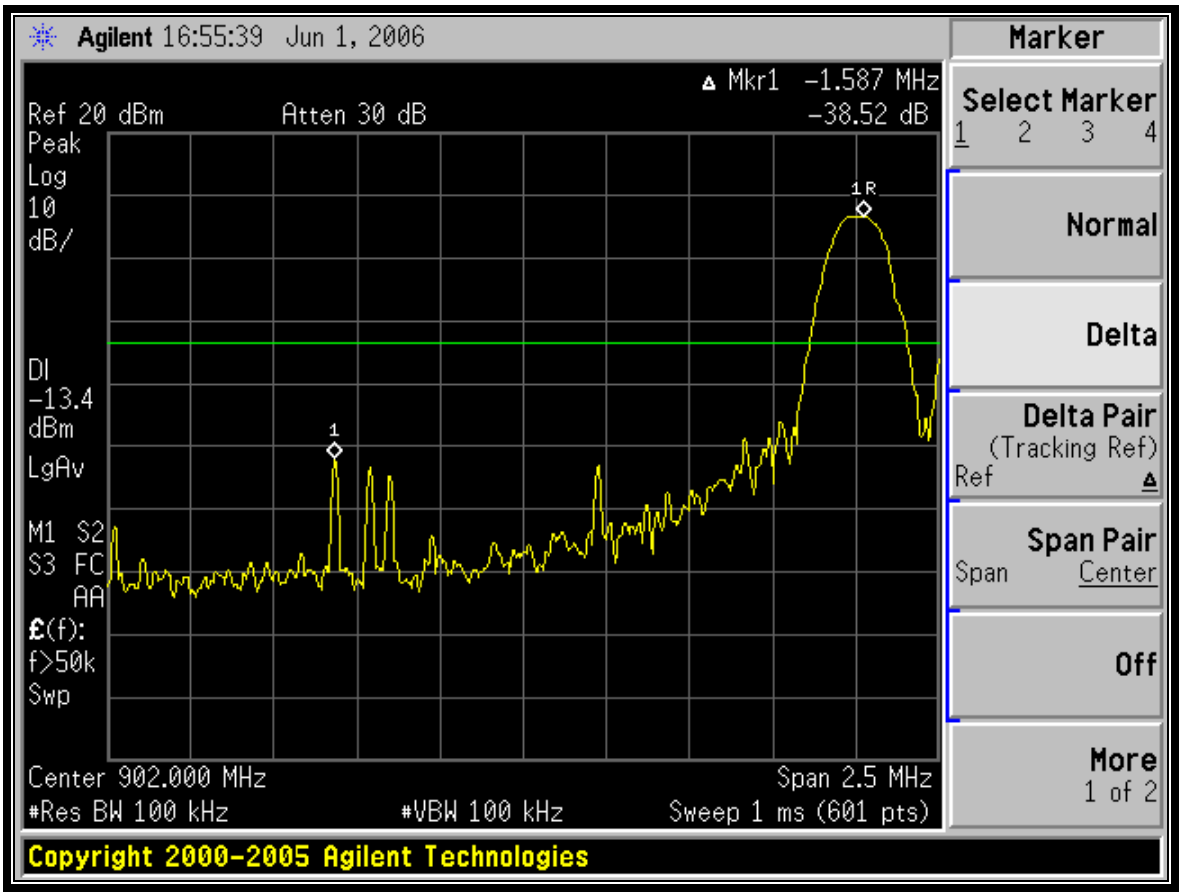
Calculation: 105.4 dBuV/m – 38.5 dB – 85.4 dBuV/m = -18.5 dB

Peak Field Strength of Lower Band Edge (1 MHz RBW/1 MHz VBW) = 105.6 dBuV/m
Average Field Strength of Lower Band Edge (1 MHz RBW/10 Hz VBW) = 105.4 dBuV/m
Delta measurement = 38.5 dB

Plot 4-1: Conducted Lower Band Edge – Fixed Low Channel Operation



Plot 4-2: Conducted Lower Band Edge - Hopping



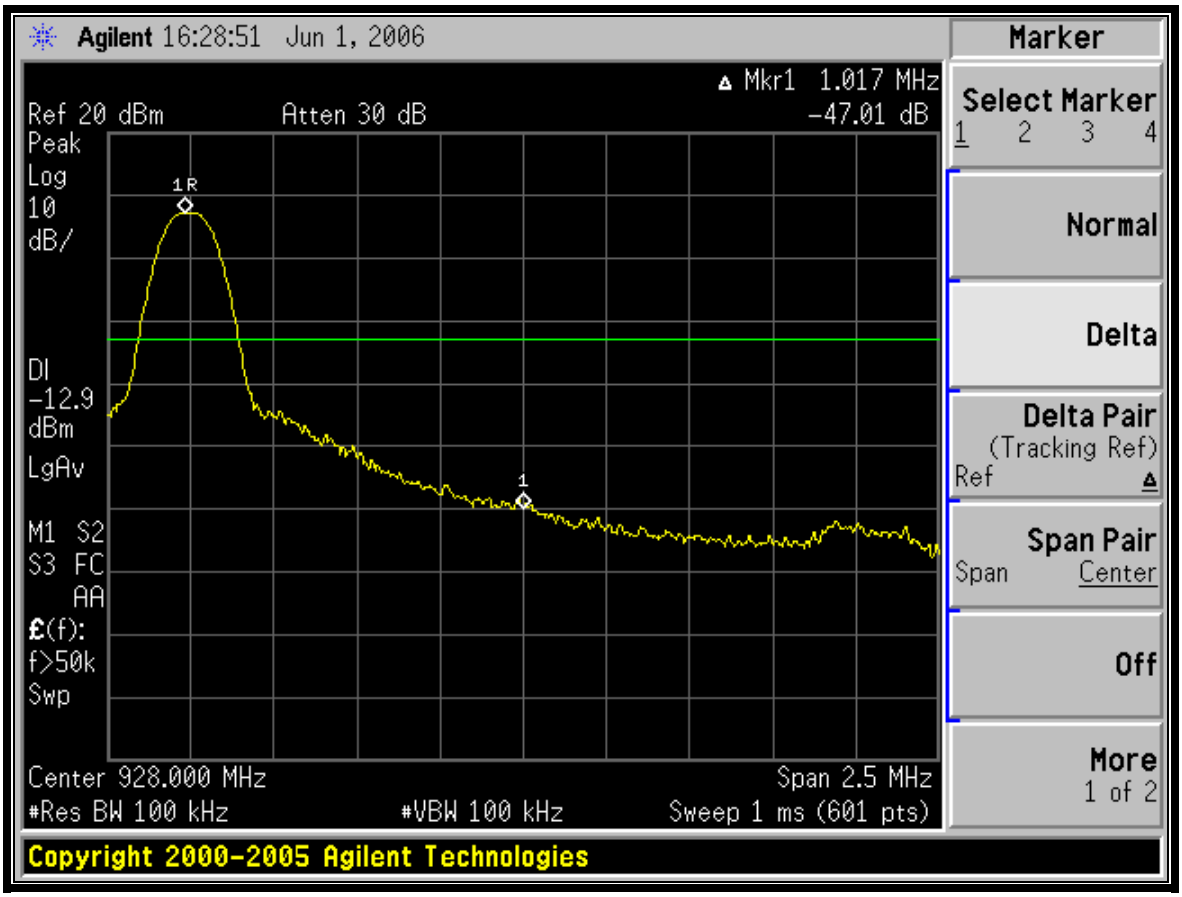
4.2.2 Calculation of Upper Band Edge

109.3 dBuV/m is the average field strength measurement, from which the delta measurement of 40.6 dB is subtracted (reference plots), resulting in a level of 68.7 dB. This level has a margin of 20.6 dB below the limit of 89.3 dBuV/m.

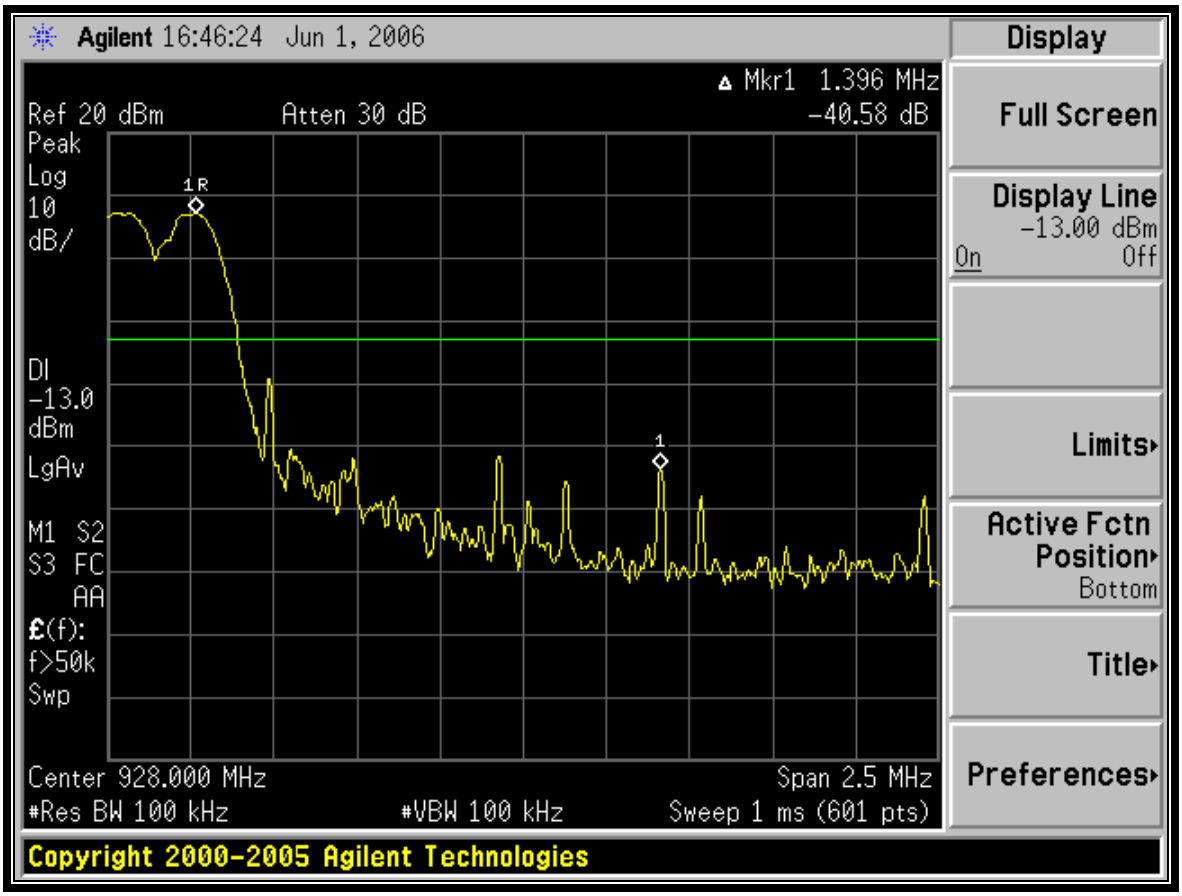
Calculation: 109.3 dBuV/m – 40.6 dB – 89.3 dBuV/m = -20.6 dB

Peak Field Strength of Lower Band Edge (1 MHz RBW/1 MHz VBW) = 109.5 dBuV/m
Average Field Strength of Lower Band Edge (1 MHz RBW/10 Hz VBW) = 109.3 dBuV/m
Delta measurement = 40.6 dB

Plot 4-3: Conducted Upper Band Edge – Fixed High Channel Operation



Plot 4-4: Conducted Upper Band Edge - Hopping



Test Personnel:

Richard B. McMurray	Richard B. McMurray	June 1, 2006
EMC Test Engineer	Signature	Date Of Test

5 Antenna Conducted Spurious Emissions - §15.247(d); RSS-Gen

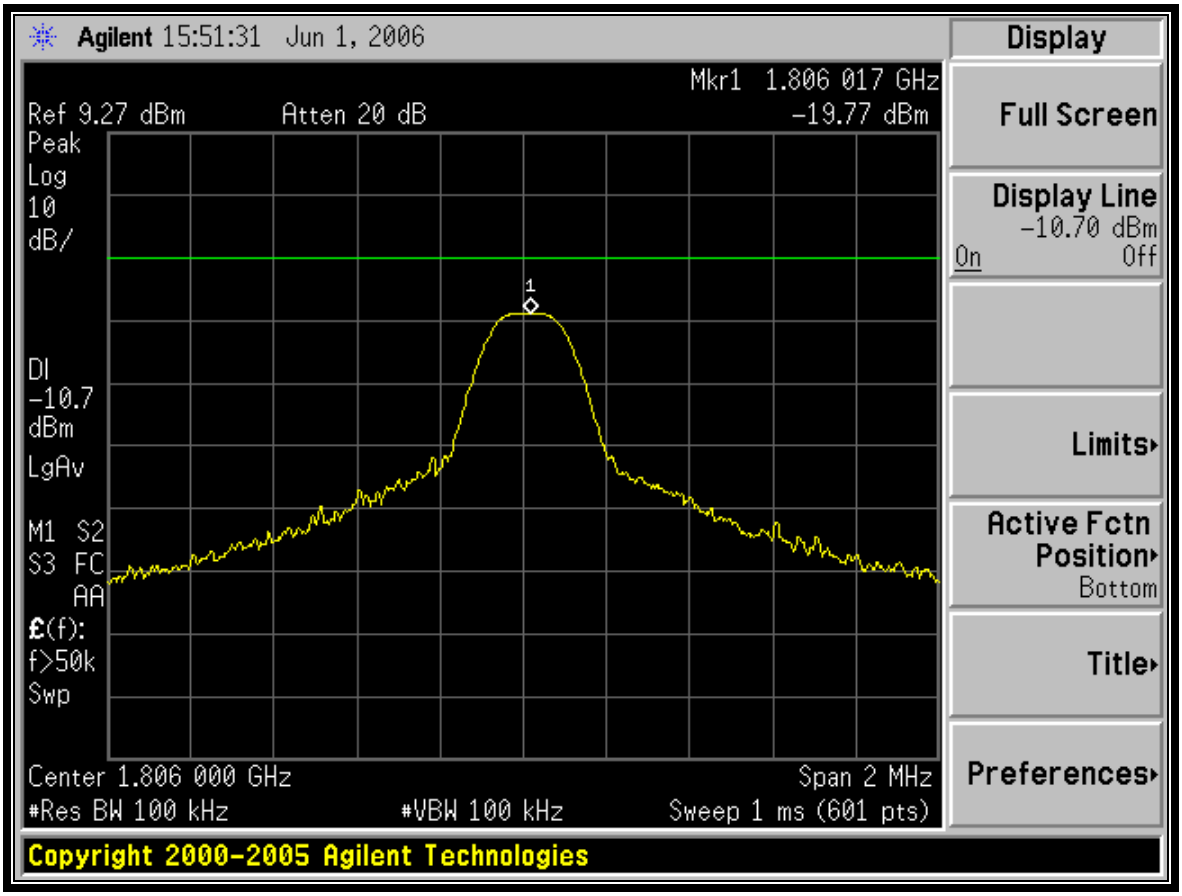
5.1 Antenna Conducted Spurious Emissions Test Procedures

Antenna spurious emissions per FCC 15.247(c) was measured from the EUT antenna port using a 50 ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 100 kHz. The modulated carrier was identified at the following frequencies: 903 MHz, 915 MHz and 927 MHz.

Note: No harmonics or spurs were found within 20 dB of the limit from the carrier to the 10th harmonic of the carrier frequency other than the one shown below (note that we are reporting power as peak). Per FCC 15.31(o), no other data is being reported.

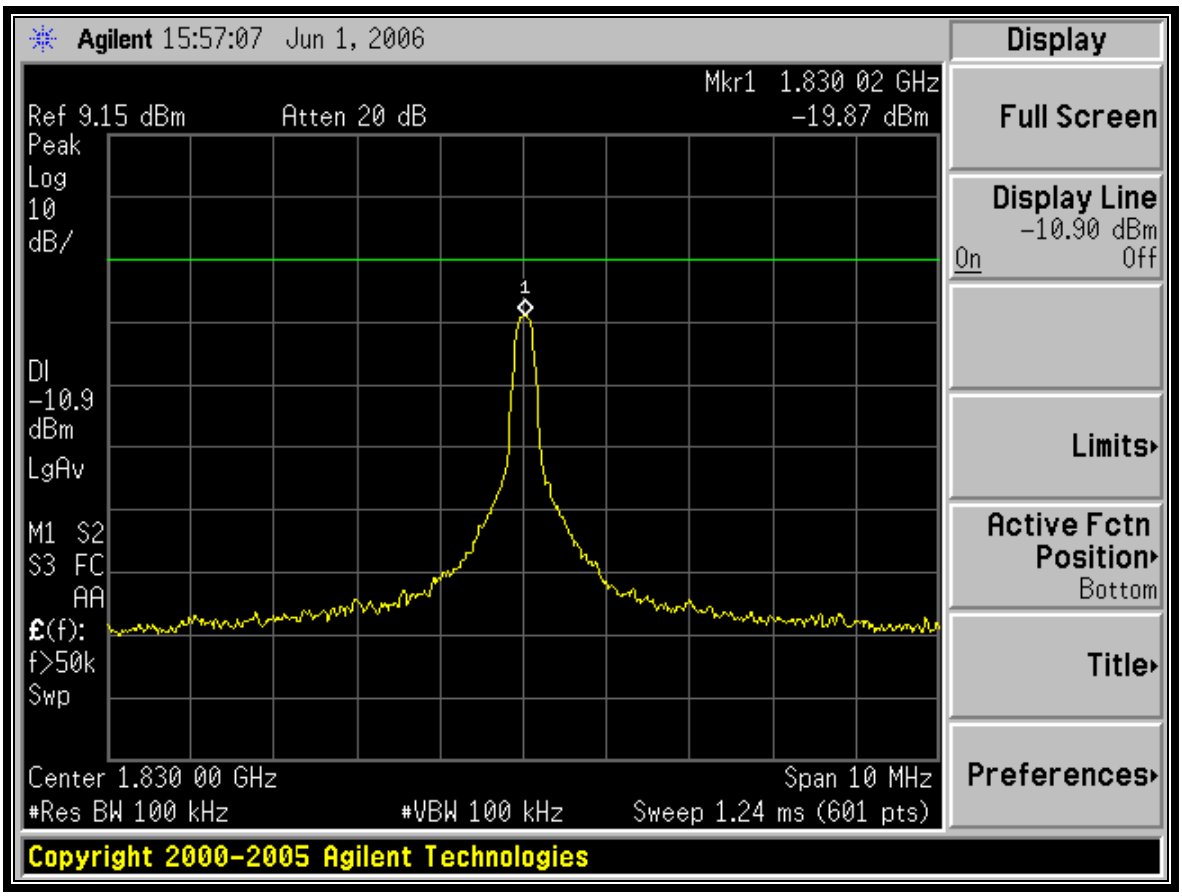
5.2 Antenna Conducted Spurious Emissions Test Results

Plot 5-1: Carrier Frequency 903 MHz – Conducted Spurious



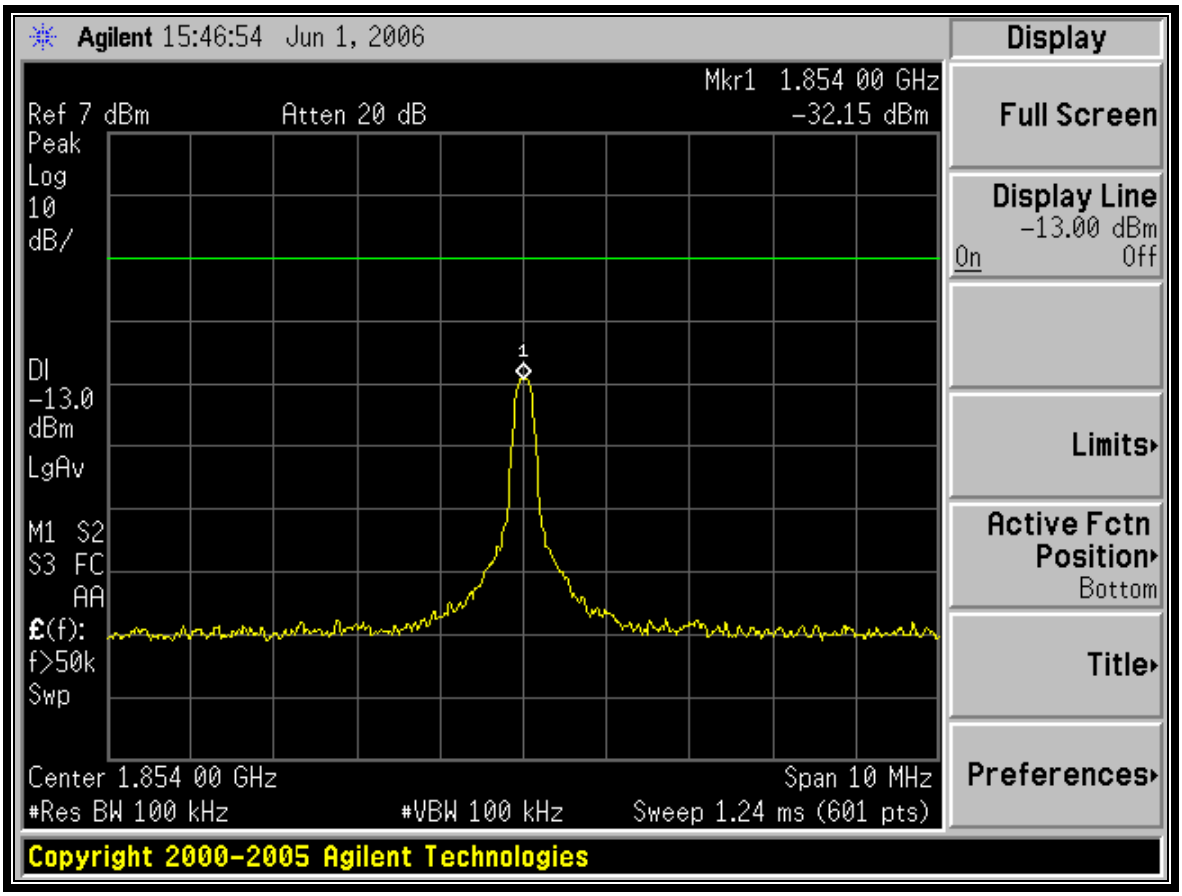
Note: Reference level is set to fundamental peak, display line is at limit.

Plot 5-2: Carrier Frequency 915 MHz – Conducted Spurious



Note: Reference level is set to fundamental peak, display line is at limit.

Plot 5-3: Carrier Frequency 927 MHz – Conducted Spurious



Note: Reference level is set to fundamental peak, display line is at limit.

Table 5-1: Antenna Conducted Spurious Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	PSA Series Spectrum Analyzer	US44020346	11/02/2006

Test Personnel:

Richard B. McMurray	Richard B. McMurray	June 1, 2006
EMC Test Engineer	Signature	Date Of Test

6 20 dB Bandwidth – FCC §15.247(a)(1)(i); RSS-210 §A8.1(1)

6.1 20 dB Bandwidth Test Procedure

The minimum 20 dB bandwidths were measured using a 50 ohm spectrum analyzer. The carrier was adjusted on the analyzer so that it was displayed entirely on the spectrum analyzer. The sweep time was set to auto and allowed through several sweeps with the max hold function used in peak detector mode. The resolution bandwidth was set to 30 kHz, and the video bandwidth set at 300 kHz. The minimum 20 dB bandwidths were measured using the spectrum analyzer delta marker set 20 dB down from the peak of the carrier. The table below contains the bandwidth measurement results.

Table 6-1 20 dB Bandwidth Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	PSA Series Spectrum Analyzer	US44020346	11/02/2006

6.2 20 dB Modulated Bandwidth Test Data

Table 6-2 20 dB Modulated Bandwidth Test Data

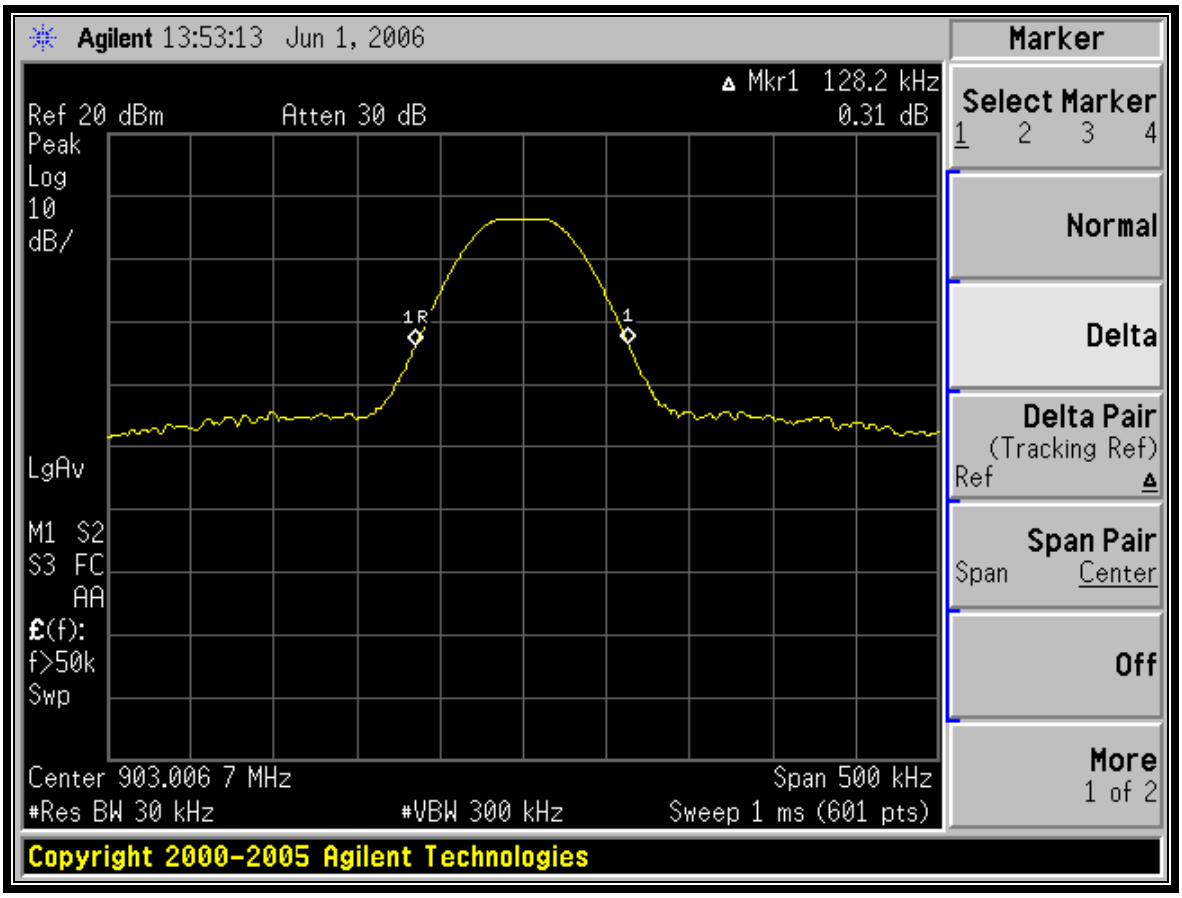
Minimum 20 dB Bandwidths

Channel	20 dB Bandwidth (kHz)
Low	128
Mid	127
High	126

6.3 20 dB Bandwidth Plots

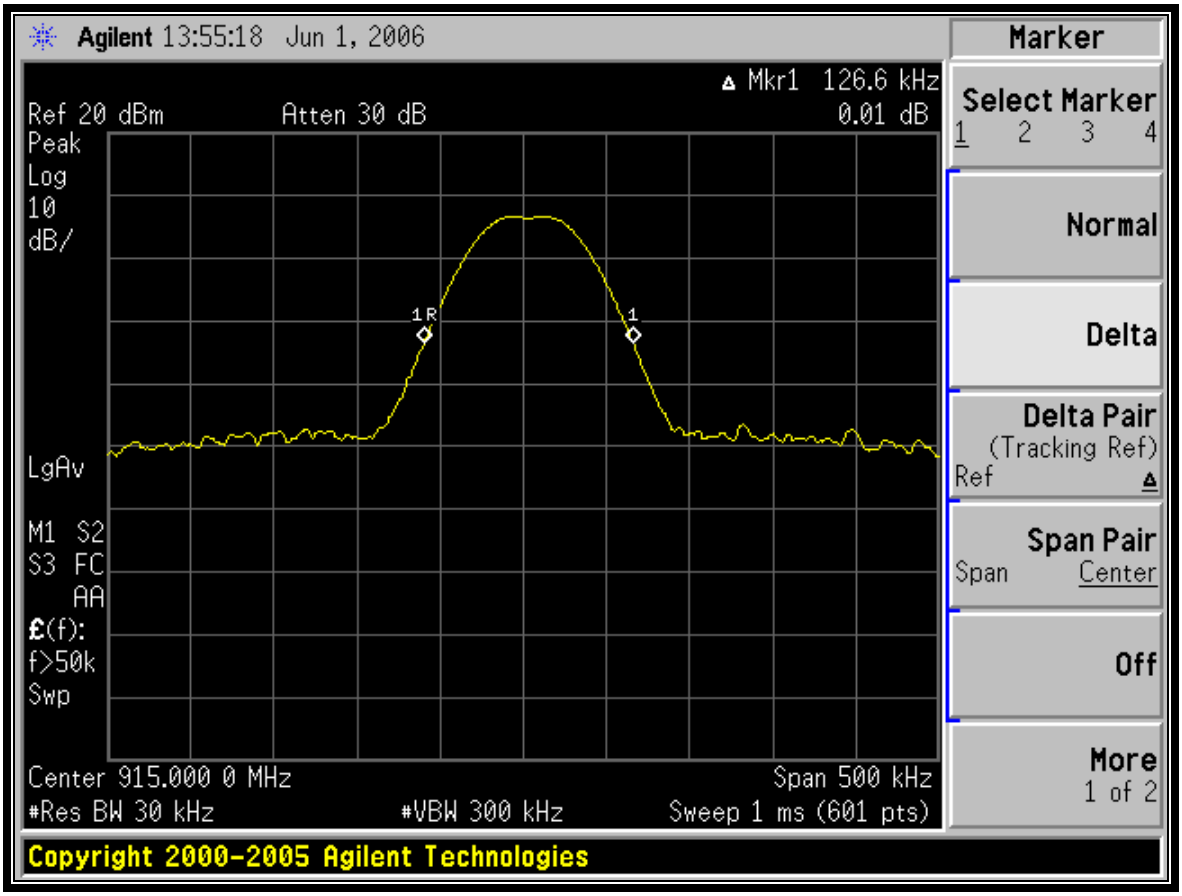
Channel:	Low
Channel Frequency (MHz):	903
Resolution Bandwidth (kHz):	30
Video Bandwidth (kHz):	300
Span (MHz):	0.5

Plot 6-1: 20 dB Bandwidth 903 MHz



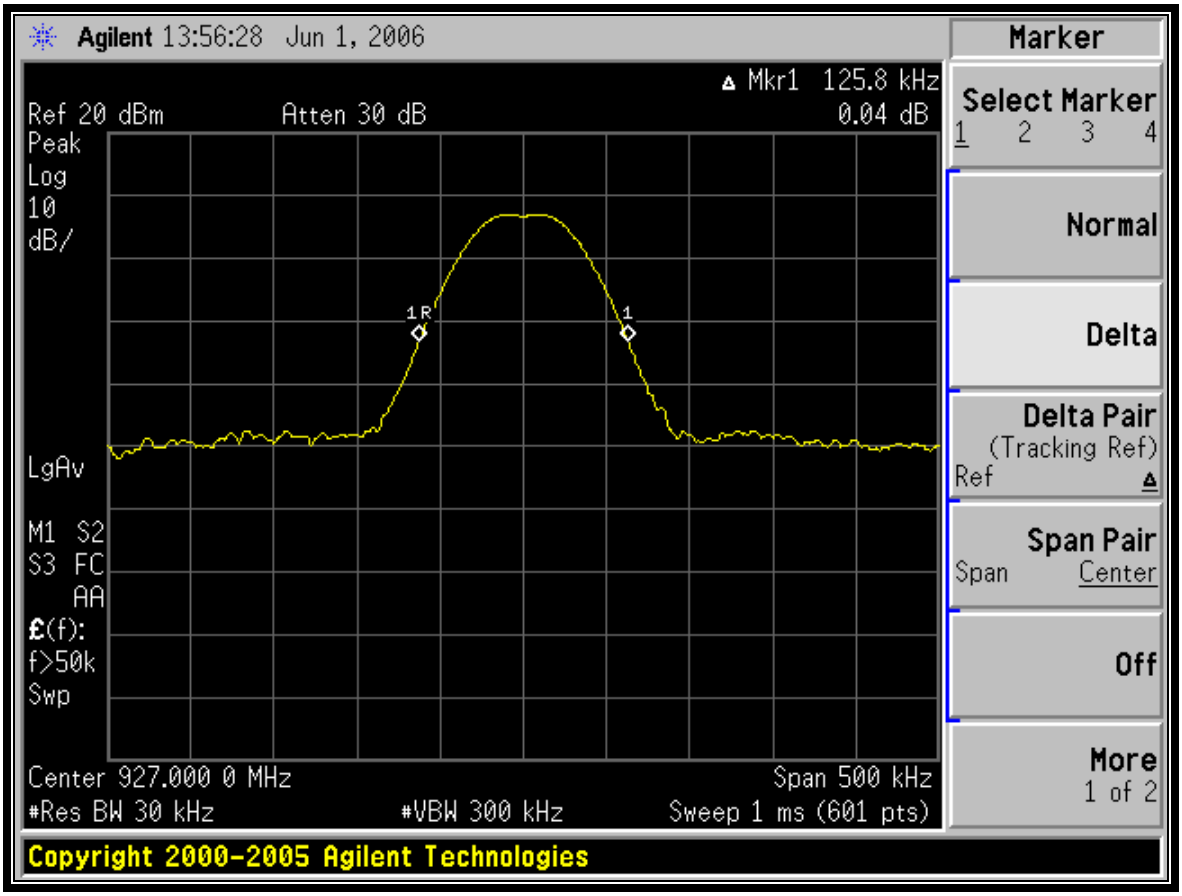
Channel: Middle
Channel Frequency (MHz): 915
Resolution Bandwidth (kHz): 30
Video Bandwidth (kHz): 300
Span (MHz): 0.5

Plot 6-2: 20 dB Bandwidth 915 MHz



Channel: High
Channel Frequency (MHz): 927
Resolution Bandwidth (kHz): 30
Video Bandwidth (kHz): 300
Span (MHz): 0.5

Plot 6-3: 20 dB Bandwidth 927 MHz



Test Personnel:

Richard B. McMurray	Richard B. McMurray	June 1, 2006
EMC Test Engineer	Signature	Date Of Test

7 Carrier Frequency Separation - §15.247(a)(1); IC RSS-210 A8.1(2)

7.1 Carrier Frequency Separation Test Procedure

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.

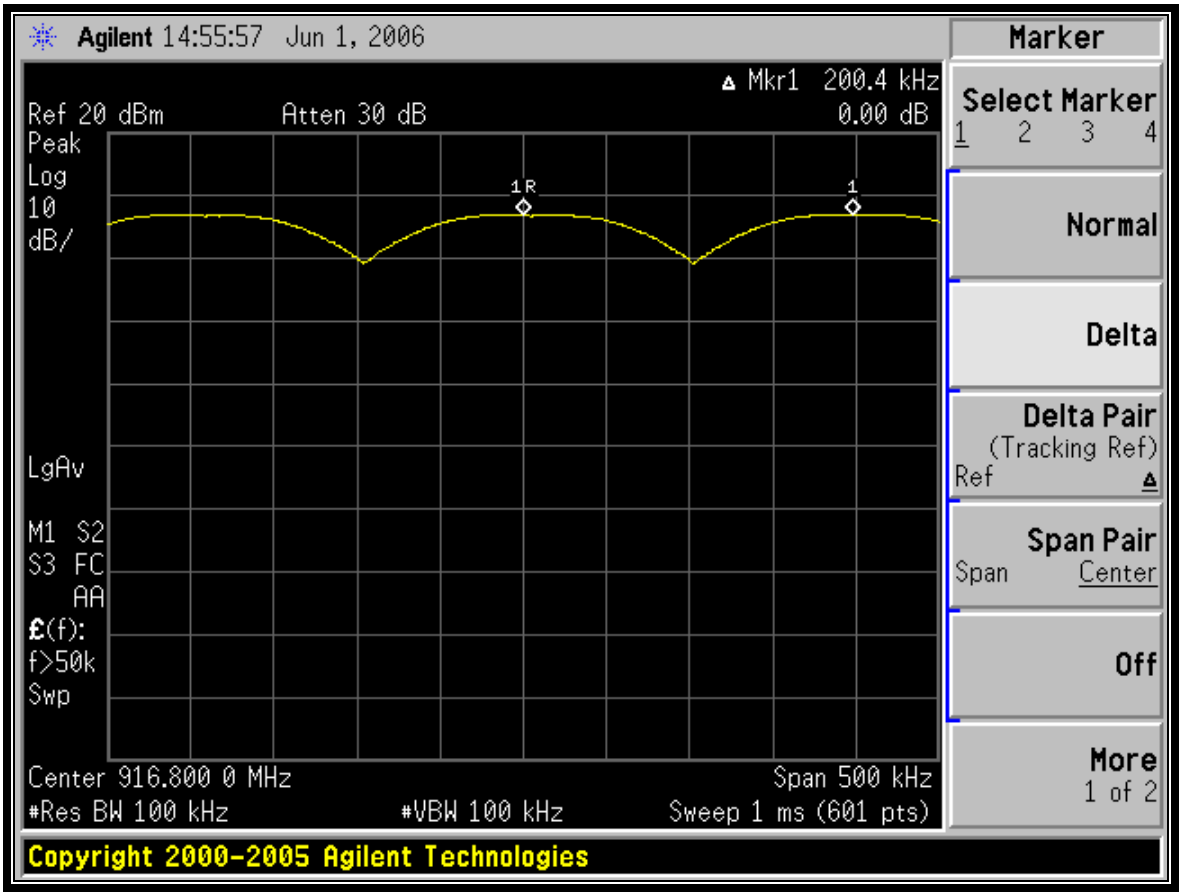
Measured frequency separation = 200.4 kHz

Table 7-1: Carrier Frequency Separation Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	PSA Series Spectrum Analyzer	US44020346	11/02/2006

7.2 Carrier Frequency Separation Test Data

Plot 7-1: Carrier Frequency Separation



Test Personnel:

Richard B. McMurray	Richard B. McMurray	June 1, 2006
EMC Test Engineer	Signature	Date Of Test

8 Hopping Characteristics – FCC §15.247 (a)(1)(iii); IC RSS-210 A8.1(3)

8.1 Hopping Characteristics Test Procedure

For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

Table 8-1: Hopping Frequency Test Equipment

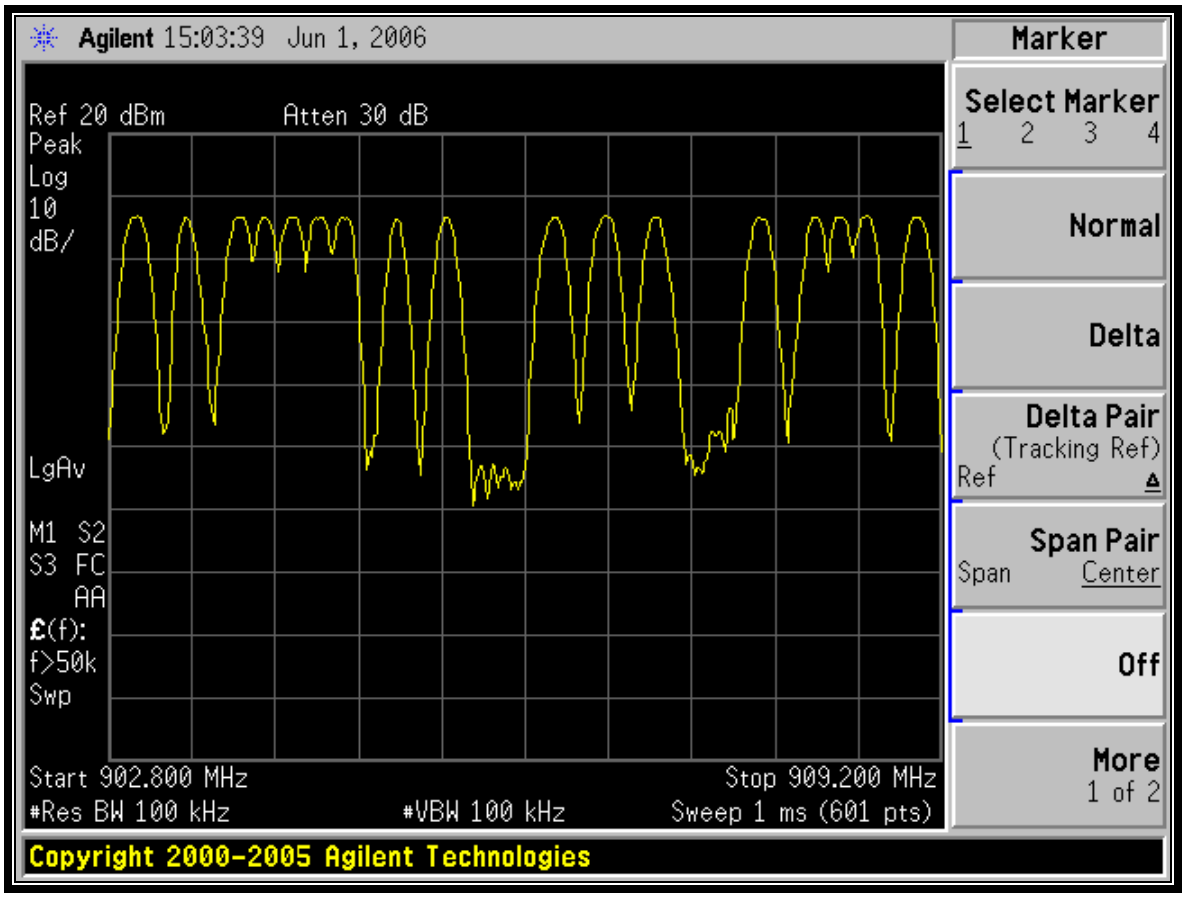
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	PSA Series Spectrum Analyzer	US44020346	11/02/2006

8.2 Number of Hopping Frequencies

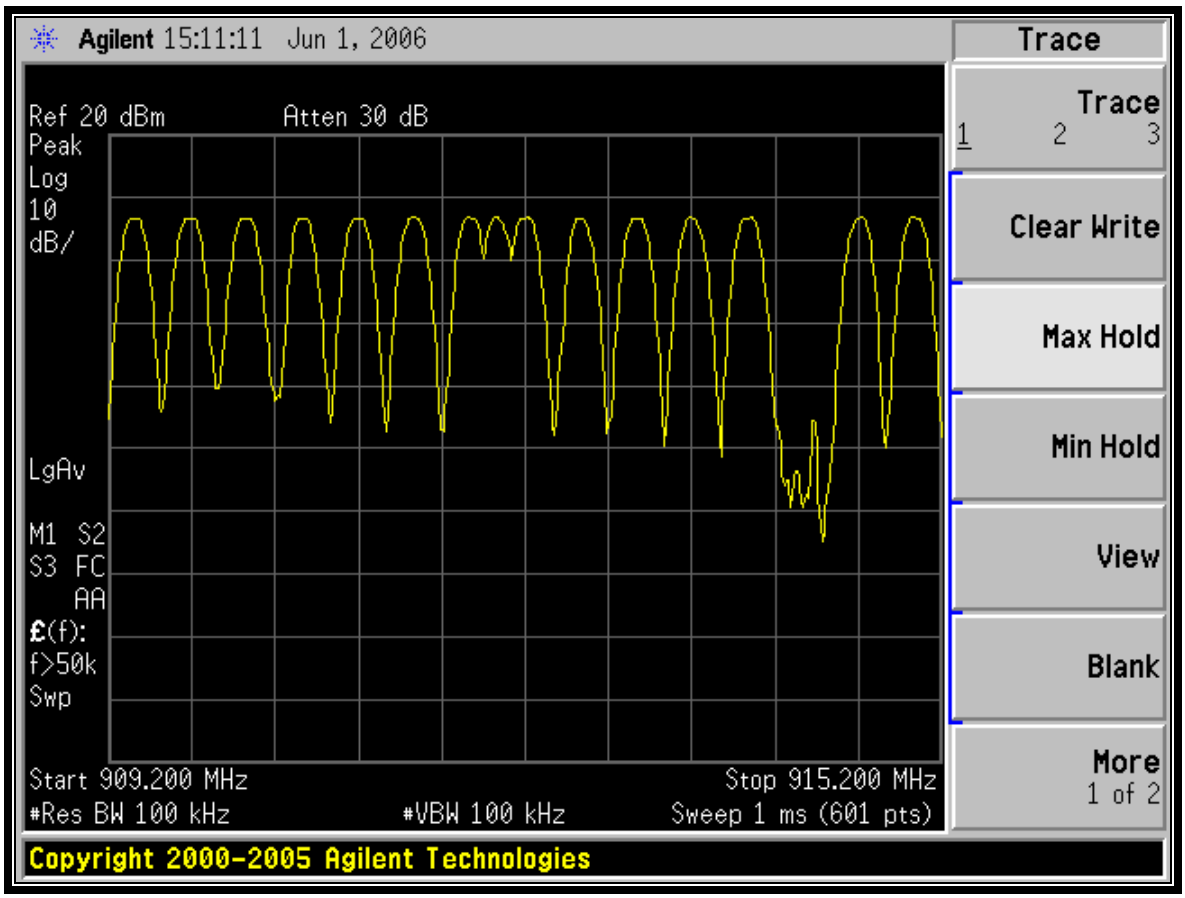
The number of hopping frequencies is shown over the following four screen captures.

Measured number of hopping frequencies = 17 + 15 + 17 + 15 = 64

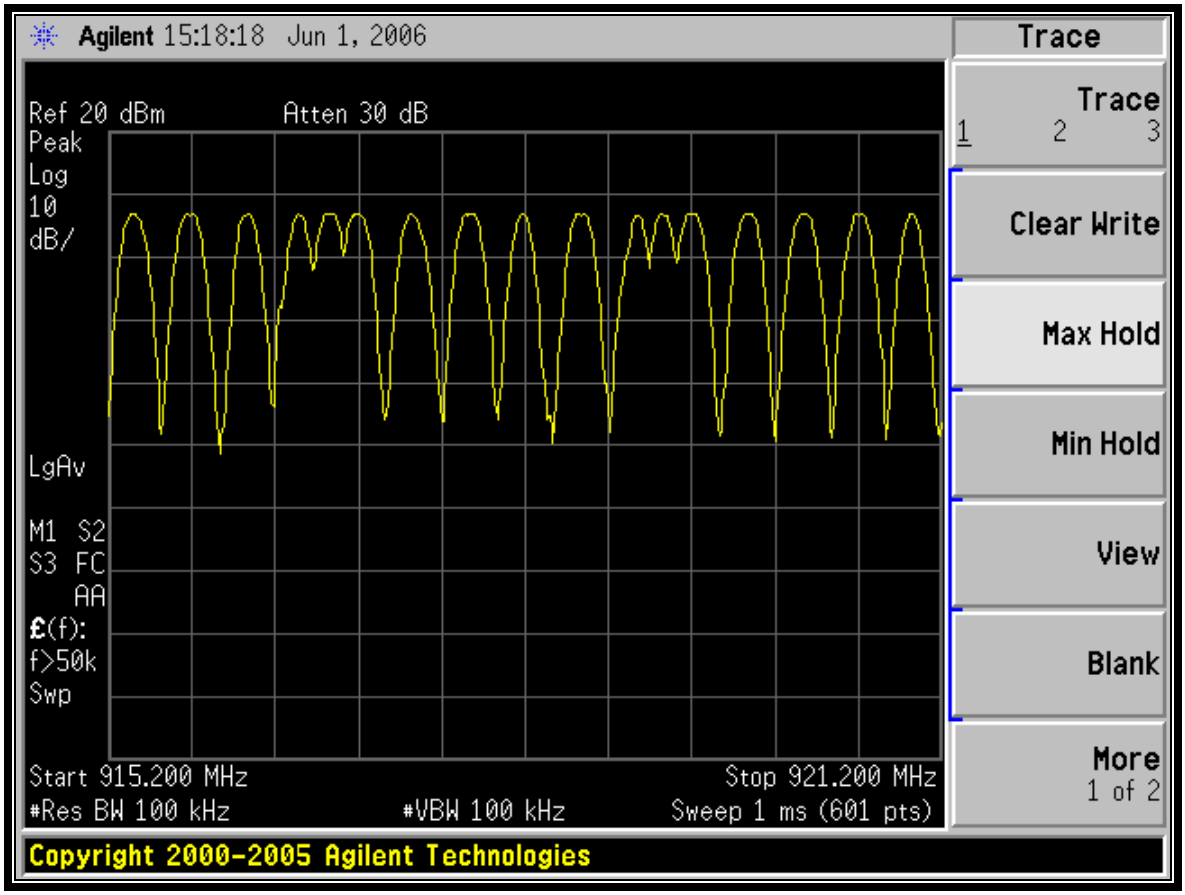
Plot 8-1: Number of Hopping Frequencies: 902.8–909.2 MHz – 17 Frequencies



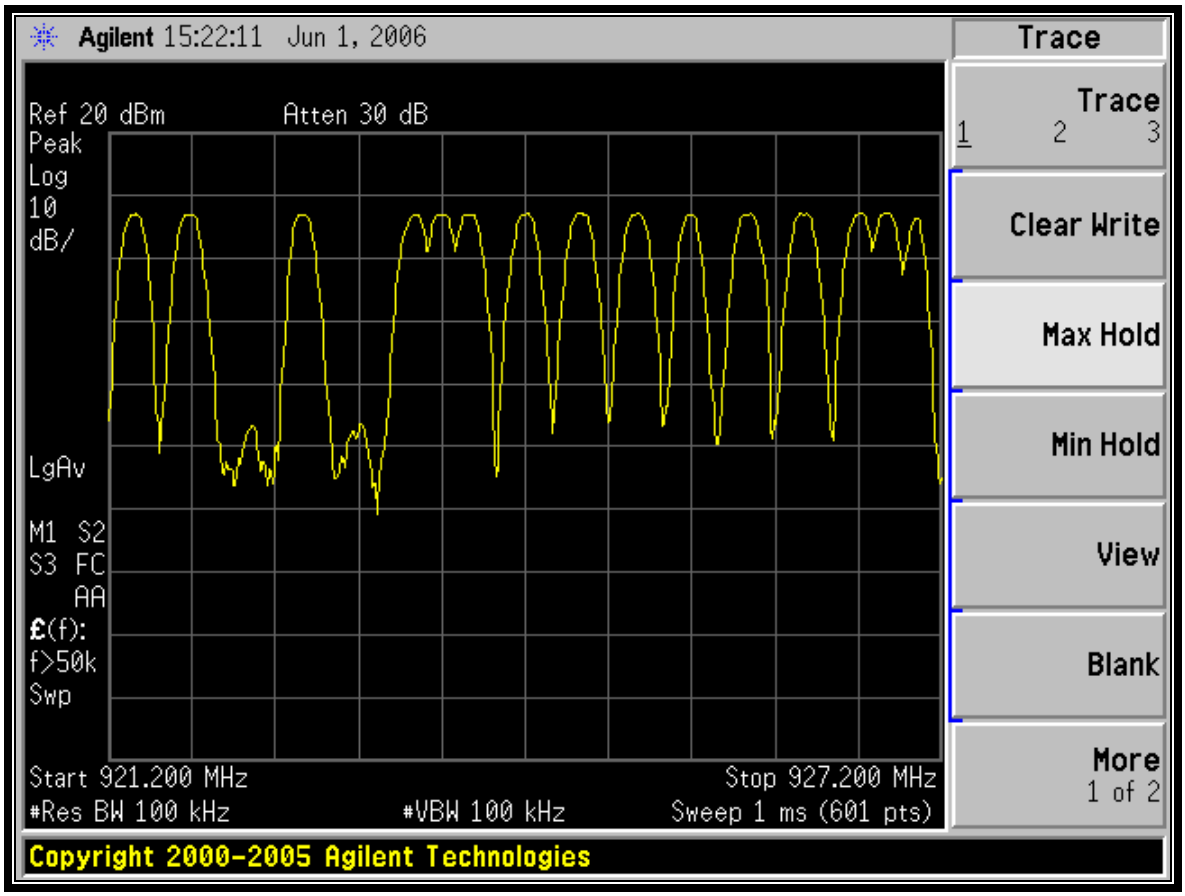
Plot 8-2: Number of Hopping Frequencies: 909.2–915.2 MHz – 15 Frequencies



Plot 8-3: Number of Hopping Frequencies: 915.2–921.2 MHz – 17 Frequencies



Plot 8-4: Number of Hopping Frequencies: 921.2–927.2 MHz – 15 Frequencies



Test Personnel:

Richard B. McMurray	Richard B. McMurray	June 1, 2006
EMC Test Engineer	Signature	Date Of Test

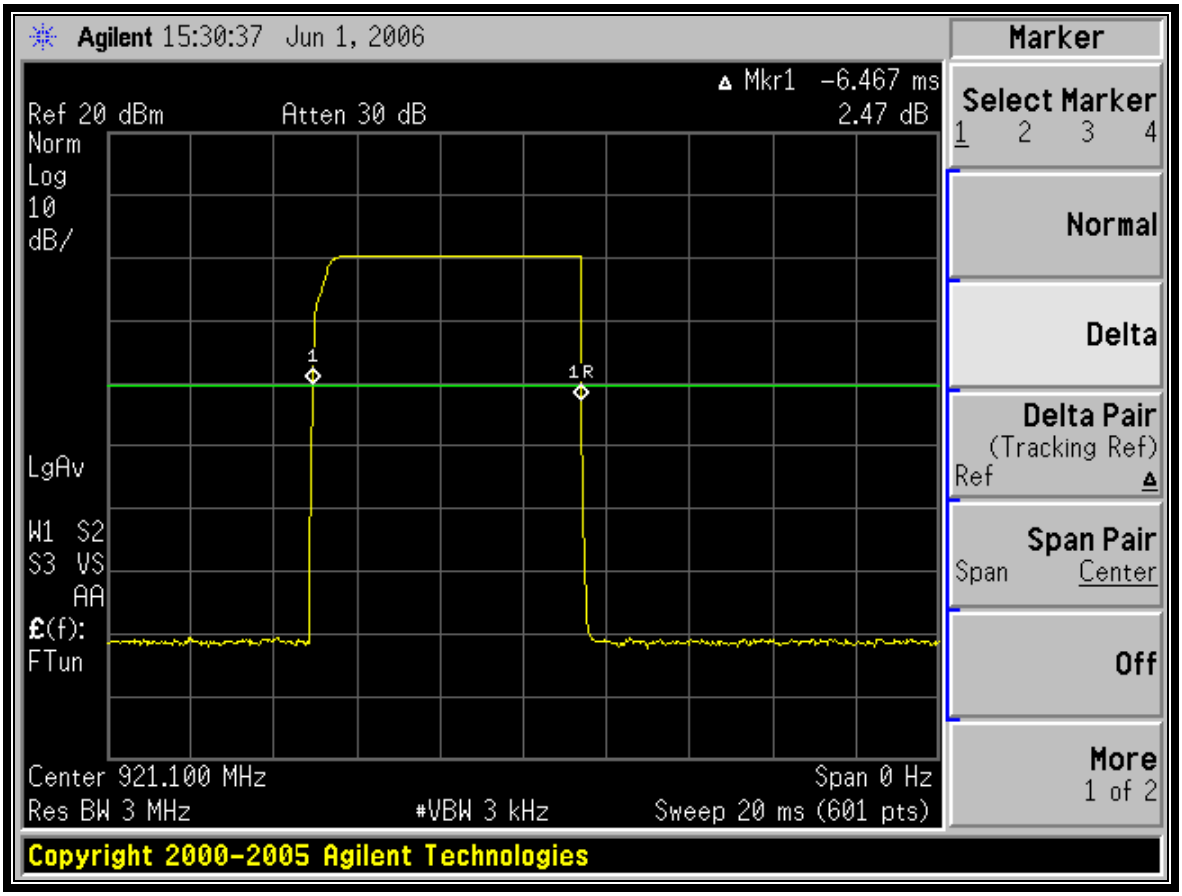
8.3 Average Time of Occupancy

The spectrum analyzer sweep was set to 20 ms, with a zero span and max hold until a pulse from the device under test was captured. A marker delta was used to measure the dwell time for this pulse. The sweep was then set to single sweep for 20 s.

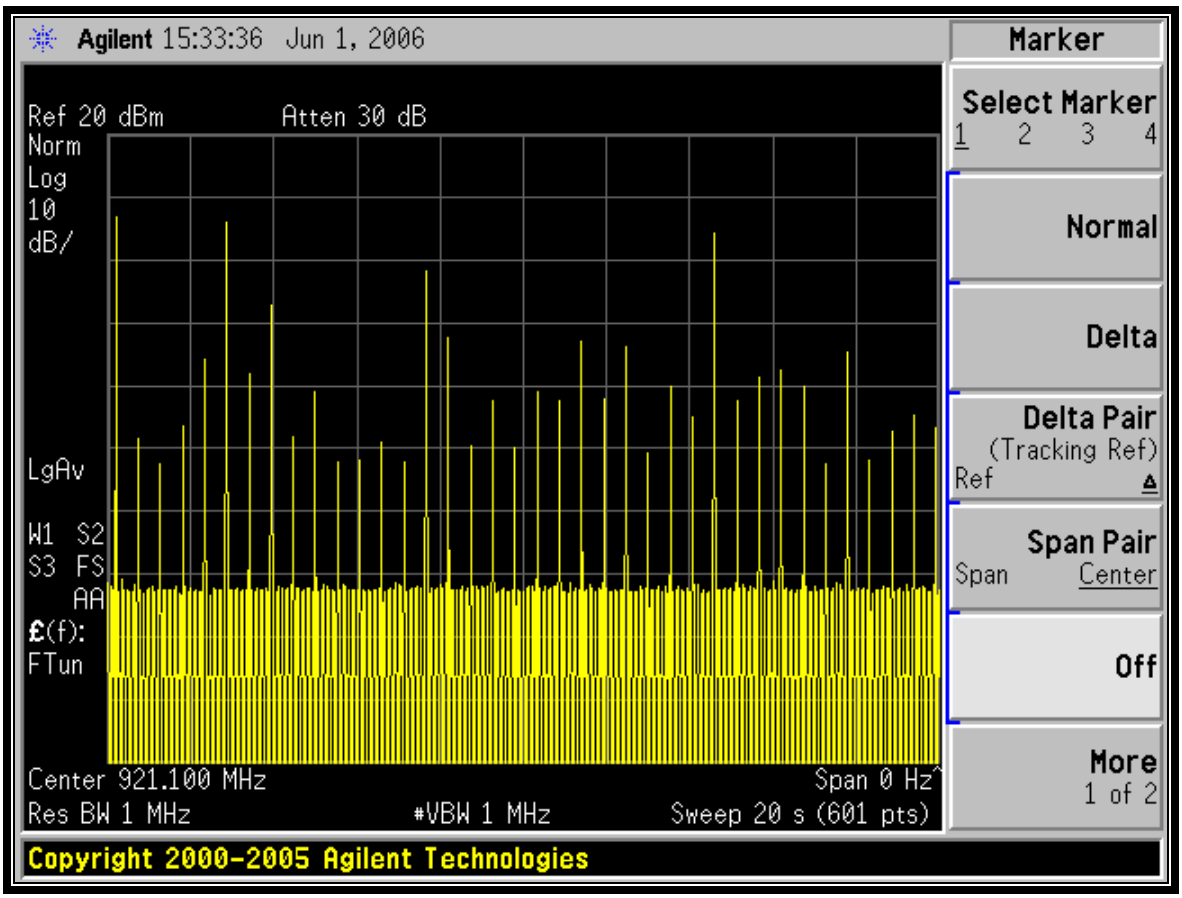
The number of pulses in 20 s was 38.

The average time of occupancy in the 20 s is equal to 38 pulses x 6.5 ms = 247 ms, which meets the limit as defined by 15.247(a)(1)(iii) of 0.4 seconds.

Plot 8-5: Time of Occupancy (Dwell Time)



Plot 8-6: Time of Occupancy (Dwell Time 5 Second Sweep)



Number of pulses in 20 seconds: 38

Test Personnel:

Richard B. McMurray	Richard B. McMurray	June 1, 2006
EMC Test Engineer	Signature	Date Of Test

9 Conducted Emissions Measurement Limits – FCC §15.207; RSS-Gen

9.1 Limits of Conducted Emissions Measurement

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

9.2 Conducted Emissions Measurement Test Procedure

9.2.1 Site and Test Description

The conducted emissions measurements were performed in a Series 81 type shielded enclosure manufactured by Rayproof. The EUT was assembled on a wooden table 0.8 meters high. Power was fed to the EUT through a 50 Ω/50 μH Line Impedance Stabilization Network (LISN). The EUT LISN was fed power through an AC filter box on the outside of the shielded enclosure. The filter box and EUT LISN housing are bonded to the ground plane of the shielded enclosure. A second LISN, the peripheral LISN, provides isolation for the EUT test peripherals. This peripheral LISN was also fed AC power. A metal power outlet box, which is bonded to the ground plane and electrically connected to the peripheral LISN, powers the EUT host peripherals.

The spectrum analyzer was connected to the AC line through an isolation transformer. The 50-ohm output of the EUT LISN was connected to the spectrum analyzer input through a Solar 7 kHz high-pass filter. The filter was used to prevent overload of the spectrum analyzer from noise below 7 kHz. Conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or average mode if applicable). The analyzer's 6 dB bandwidth was set to 9 kHz. No video filter less than 10 times the resolution bandwidth was used. Average measurements were performed in a linear mode using a 10 kHz resolution bandwidth, a 1 Hz video bandwidth, and by increasing the sweep time in order to obtain a calibrated measurement. The highest emissions amplitudes relative to the appropriate limits were measured and have been recorded in this report.

Table 9-1: Conducted Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900896	Hewlett Packard	85662A	Spectrum Analyzer Display Section	2816A16471	2/27/05
900897	Hewlett Packard	8567A	Spectrum Analyzer (10 kHz-1.5 GHz)	2727A00535	2/27/05
900969	Hewlett Packard	85650A	Quasi-Peak Adapter	2412A00414	8/3/2006
900729	Solar	8130	Filter	947306	N/A
901084	AFJ International	LS16/110VAC	16A LISN	16010020082	3/28/08
901083	AFJ International	LS16/110VAC	16A LISN	16010020080	1/23/07
900889	Hewlett Packard	85685A	RF Preselector for HP 8566B or 8568B (20 Hz-2 GHz)	3146A01309	4/12/07
N/A	Rhein Tech Laboratories, Inc.	Automated Emission Tester	Emissions testing software	Rev. 14.0.2	N/A

9.3 Conducted Emissions Test Results

9.3.1 Conducted Emissions Transmit Center Channel

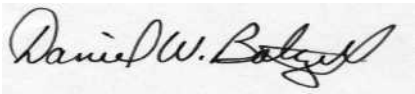
Table 9-2: Conducted Emissions Transmit Center Channel - Neutral Conductor

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)	Pass/ Fail
0.164	Av	37.3	0.4	37.7			55.3	-17.6	Pass
0.164	Qp	62.5	0.4	62.9	65.3	-2.4			Pass
0.205	Av	37.4	0.3	37.7			53.4	-15.7	Pass
0.205	Qp	61.4	0.3	61.7	63.4	-1.7			Pass
0.229	Av	37.7	0.3	38.0			52.5	-14.5	Pass
0.229	Qp	61.6	0.3	61.9	62.5	-0.6			Pass
0.317	Av	37.5	0.4	37.9			49.8	-11.9	Pass
0.317	Qp	59.1	0.4	59.5	59.8	-0.3			Pass
0.360	Av	36.7	0.4	37.1			48.7	-11.6	Pass
0.360	Qp	57.2	0.4	57.6	58.7	-1.1			Pass
0.397	Av	33.7	0.4	34.1			47.9	-13.8	Pass
0.397	Qp	57.4	0.4	57.8	57.9	-0.1			Pass
0.518	Av	28.0	0.4	28.4			46.0	-17.6	Pass
0.518	Qp	52.7	0.4	53.1	56.0	-2.9			Pass
0.559	Av	29.8	0.4	30.2			46.0	-15.8	Pass
0.559	Qp	51.6	0.4	52.0	56.0	-4.0			Pass
0.608	Av	30.9	0.4	31.3			46.0	-14.7	Pass
0.608	Qp	49.5	0.4	49.9	56.0	-6.1			Pass
0.806	Av	32.0	0.5	32.5			46.0	-13.5	Pass
0.806	Qp	47.9	0.5	48.4	56.0	-7.6			Pass
2.000	Pk	37.3	1.2	38.5			46.0	-7.5	Pass
28.350	Pk	19.6	3.5	23.1			50.0	-26.9	Pass

Table 9-3: Conducted Emissions Transmit Center Channel - Phase Conductor

Temperature: 74°F Humidity: 46%									
Emission Frequency (MHz)	**Test Detector**	**Analyzer Reading (dBuV)**	**Site Correction Factor (dB)**	**Emission Level (dBuV)**	**QP Limit (dBuV)**	**QP Margin (dBuV)**	**AV Limit (dBuV)**	**AV Margin (dBuV)**	**Pass/ Fail**
0.174	Av	36.8	0.3	37.1			54.8	-17.7	Pass
0.174	Qp	60.5	0.3	60.8	64.8	-4.0			Pass
0.233	Av	38.6	0.3	38.9			52.3	-13.4	Pass
0.233	Qp	60.2	0.3	60.5	62.3	-1.8			Pass
0.273	Av	39.1	0.3	39.4			51.0	-11.6	Pass
0.273	Qp	59.9	0.3	60.2	61.0	-0.8			Pass
0.521	Av	30.0	0.4	30.4			46.0	-15.6	Pass
0.521	Qp	51.5	0.4	51.9	56.0	-4.1			Pass
0.596	Av	32.1	0.4	32.5			46.0	-13.5	Pass
0.596	Qp	50.1	0.4	50.5	56.0	-5.5			Pass
0.641	Av	33.2	0.4	33.6			46.0	-12.4	Pass
0.641	Qp	50.4	0.4	50.8	56.0	-5.2			Pass
0.801	Av	33.6	0.5	34.1			46.0	-11.9	Pass
0.801	Qp	47.4	0.5	47.9	56.0	-8.1			Pass
2.530	Pk	33.6	1.3	34.9			46.0	-11.1	Pass
27.930	Pk	27.4	3.5	30.9	60.0	-29.1	50.0	-19.1	Pass

Test Personnel:



Daniel W. Baltzell		June 21, 2006
EMC Test Engineer	Signature	Date Of Test

10 Radiated Emissions - §15.209; RSS-210 §A8.5 & RSS-Gen

10.1 Limits of Radiated Emissions Measurement

Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009-0.490	2400/f (kHz)	300
0.490-1.705	2400/f (kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

As shown in 15.35(b), for frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any circumstances of modulation.

10.2 Radiated Emissions Measurement Test Procedure

Before final measurements of radiated emissions were made on the open-field three/ten meter range, the EUT was scanned indoors at one and three meter distances. This was done in order to determine its emissions spectrum signature. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. This process was repeated during final radiated emissions measurements on the open-field range, at each frequency, in order to ensure that maximum emission amplitudes were attained.

Final radiated emissions measurements were made on the three/ten-meter, open-field test site. The EUT was placed on a nonconductive turntable 0.8 meters above the ground plane. The spectrum was examined from 9 kHz to the 10th harmonic of the highest fundamental transmitter frequency (24.8 GHz).

At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations. For frequencies between 30 and 1000 MHz, the spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode. For emissions above 1000 MHz, emissions are measured using the average detector function with a minimum resolution bandwidth of 1 MHz. No video filter less than 10 times the resolution bandwidth was used. The highest emission amplitudes relative to the appropriate limit were measured and recorded in this report.

Table 10-1: Radiated Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900151	Rohde and Schwarz	HFH2-Z2	Loop Antenna (9 kHz - 30 MHz)	827525/019	8/25/06
900932	Hewlett Packard	8449B OPT H02	Preamplifier (1 - 26.5 GHz)	3008A00505	8/3/06
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	9/14/06
900811	Rhein Tech Labs	PR-1040	Amplifier	1003	2/23/05
900878	Rhein Tech Labs	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	Not Required
901231	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	9/1/06
901232	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	9/1/06
901235	IW Microwave Products	KPS-1503-360-KPS	High frequency RF cables	36"	9/1/06
901242	Rhein Tech Labs	WRT-000-0003	Wood rotating table	N/A	Not Required
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	5/20/07
900321	EMCO	3161-03	Horn Antennas (4 - 8,2GHz)	9508-1020	5/20/07
900323	EMCO	3160-7	Horn Antennas (8,2 - 12,4 GHz)	9605-1054	5/20/07
900356	EMCO	3160-08	Horn Antenna (12.4 - 18 GHz)	9607-1044	5/20/07
900325	EMCO	3160-9	Horn Antennas (18 - 26.5 GHz)	9605-1051	5/20/07
901218	EMCO	3301B	Horn Antenna (18 - 26.5 GHz)	960281-003	5/20/07
900392	Hewlett Packard	1197OK	Harmonic Mixer (18 – 26.5 GH)z	3525A00159	11/27/07
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	8/3/06
900930	Hewlett Packard	85662A	Spectrum Analyzer Display Section	3144A20839	8/3/06
900889	Hewlett Packard	85685A	RF Preselector (20 Hz - 2 GHz)	3146A01309	2/23/05

10.3 Radiated Emissions Test Results

10.3.1 Radiated Emissions Digital/Receiver

Temperature: 68°F Humidity: 60%

Table 10-2: Digital/Receiver Radiated Emissions

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pass/ Fail
110.554	Qp	V	0	1.0	27.1	-15.9	11.2	43.5	-32.3	Pass
132.663	Qp	V	0	1.0	25.4	-16.0	9.4	43.5	-34.1	Pass
154.772	Qp	V	0	1.0	25.8	-17.0	8.8	43.5	-34.7	Pass
663.000	Qp	V	0	1.0	29.2	-5.2	24.0	46.0	-22.0	Pass
676.000	Qp	V	0	1.0	37.2	-5.3	31.9	46.0	-14.1	Pass
689.000	Qp	V	0	1.0	27.7	-5.1	22.6	46.0	-23.4	Pass

10.3.2 Radiated Emissions Harmonics/Spurious

Table 10-3: Radiated Emissions Harmonics/Spurious - 903 MHz

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
903.0	66.7	66.5	38.9	105.4	fundamental	
1806.0	70.6	70.3	9.2	79.5	85.4	-5.9
2709.0	54.3	51.8	-5.1	46.7	54.0	-7.3
3612.0	47.7	42.5	-4.4	38.1	54.0	-15.9
4515.0	43.2	32.2	2.0	34.2	54.0	-19.8
5418.0	47.1	38.2	2.6	40.8	54.0	-13.2
6321.0	45.8	38.5	3.3	41.8	85.4	-43.6
7224.0	44.8	32.7	3.3	36.0	85.4	-49.4
8127.0	43.0	31.7	3.8	35.5	54.0	-18.5
9030.0	44.0	31.7	9.6	41.3	54.0	-12.7

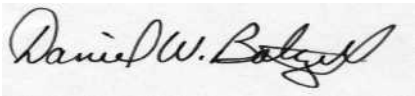
Table 10-4: Radiated Emissions Harmonics/Spurious - 915 MHz

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
915.0	66.9	66.5	38.9	105.4	fundamental	
1830.0	70.8	70.3	9.6	79.9	85.4	-5.5
2745.0	51.7	49.3	-4.8	44.5	54.0	-9.5
3660.0	47.0	40.3	-4.2	36.1	54.0	-17.9
4575.0	41.1	31.5	1.6	33.1	54.0	-20.9
5490.0	44.7	36.5	2.8	39.3	85.4	-46.1
6405.0	42.8	31.3	3.4	34.7	85.4	-50.7
7320.0	44.3	32.7	3.3	36.0	54.0	-18.0
8235.0	43.3	31.7	9.5	41.2	54.0	-12.8
9150.0	44.3	31.8	10.0	41.8	54.0	-12.2

Table 10-5: Radiated Emissions Harmonics/Spurious - 927 MHz

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
927.0	70.4	70.2	39.1	109.3	fundamental	
1854.0	77.1	76.7	10.0	86.7	89.3	-2.6
2781.0	53.8	49.2	-5.3	43.9	54.0	-10.1
3708.0	44.8	37.2	-4.2	33.0	54.0	-21.0
4635.0	45.3	33.7	0.9	34.6	54.0	-19.4
5562.0	43.2	32.5	2.8	35.3	89.3	-54.0
6489.0	48.0	31.7	2.8	34.5	89.3	-54.8
7416.0	44.3	32.3	4.0	36.3	54.0	-17.7
8343.0	43.2	31.7	8.8	40.5	54.0	-13.5
9270.0	44.2	31.7	9.9	41.6	89.3	-47.7

Test Personnel:



Daniel W. Baltzell		June 21, 2006
EMC Test Engineer	Signature	Date Of Test

11 Conclusion

The data in this measurement report shows that the EUT as tested, Strategic Services Group, Inc., Model: ROAM Enabled Endpoint, Model # REN91812, FCC ID: UJX-SSG-REN91812, IC: 6715A-SSG91812, complies with all the applicable requirements of Parts 2 and 15 of the FCC Rules and Regulations, and Industry Canada RSS-210 and RSS-Gen.