Engineering and Testing for EMC and Safety Compliance

Certification Application Report
FCC Part 15.247

Test Lab:	Applicant:
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FCC ID:	SP8-IXU1-ASY1168	**Test Report Date:**	July 25, 2006
Platform:	N/A	**RTL Work Order #:**	2006098
Model Name/ Model Number:	mProm™ 900 MHz Module/ IXU1-ASY1168	**RTL Quote #:**	QRTL06-265
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		
Digital Interface Information	Digital Interface was found to be compliant		

Frequency Range (MHz)	Output Power (W)	Frequency Tolerance	Emission Designator
903–927	0.009	N/A	127KFXD

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, and ANSI C63.4.

Signature: _____ Date: July 25, 2006

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

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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.

1.2 Description of EUT

Equipment Under Test	ISM 902-928 MHz Transceiver
Model Name/Number	mProm™ 900 MHz Module/IXU1-ASY1168
Power Supply	Battery powered (however AC conducted emissions were tested for full modular approval)
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 **MODULAR APPROVAL** for Innovative Wireless Technologies, Inc. Model Name: mProm™ 900 MHz Module, Model # IXU1-ASY1168, FCC ID: SP8-IXU1-ASY1168.

1.5 Modifications

No modifications were required to achieve 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 July 13, 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
Transmitter Module	Innovative Wireless Technologies	IXU1-ASY1168	N/A	SP8-IXU1-ASY1168	N/A	17364
Transmitter Controller	Innovative Wireless Technologies	N/A	N/A	N/A	N/A	17365
Transmitter Module	Innovative Wireless Technologies	IXU1-ASY1168	N/A	SP8-IXU1-ASY1168	N/A	17367

2.5 Configuration of Tested System

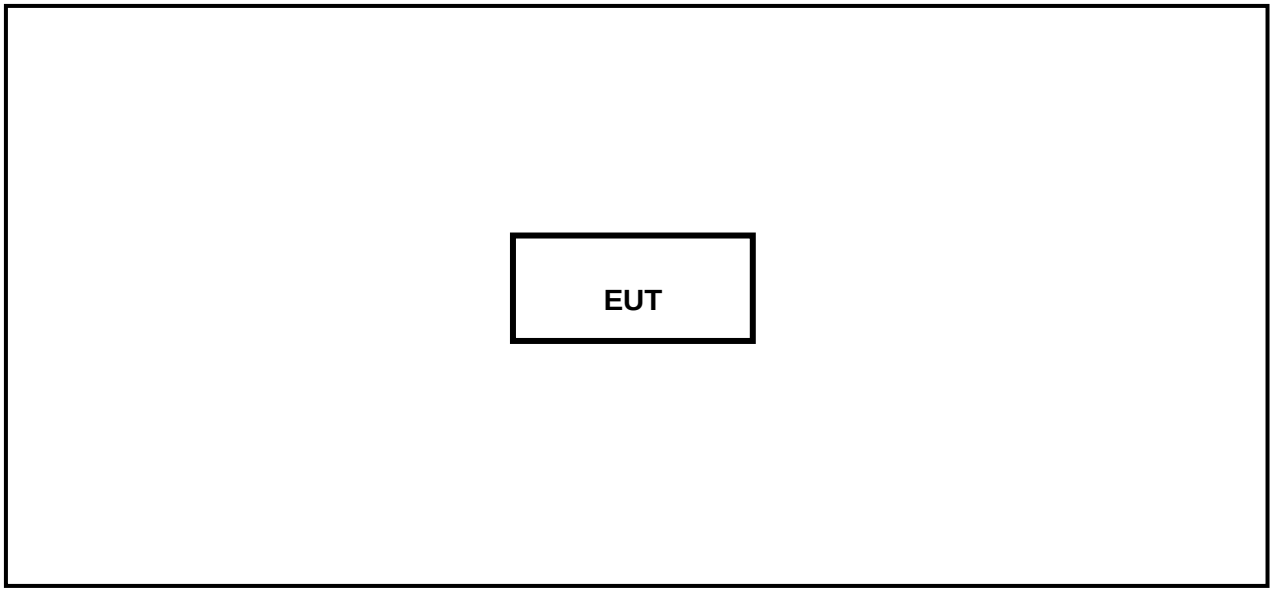


Figure 2-1: Configuration of System Under Test

3 Peak Output Power - §15.247(b)(2)

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

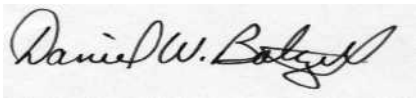
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901104	Agilent Technologies	E4416A	EPM-P Series Power Meter	GB41050573	9/21/2006
901356	Agilent Technologies	E9232A	Power Sensor	US40410920	9/21/2006

3.2 Power Output Test Data

Table 3-2: Power Output Test Data

Channel	Frequency (MHz)	Peak Power Conducted Output (dBm)
Low	903	9.0
Middle	915	9.2
High	927	9.4

Test Personnel:



Daniel W. Baltzell		July 24, 2006
EMC Test Engineer	Signature	Date Of Test

4 Compliance With the Band Edge – FCC §15.247(d)

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
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	8/3/06

4.2 Band Edge Test Results

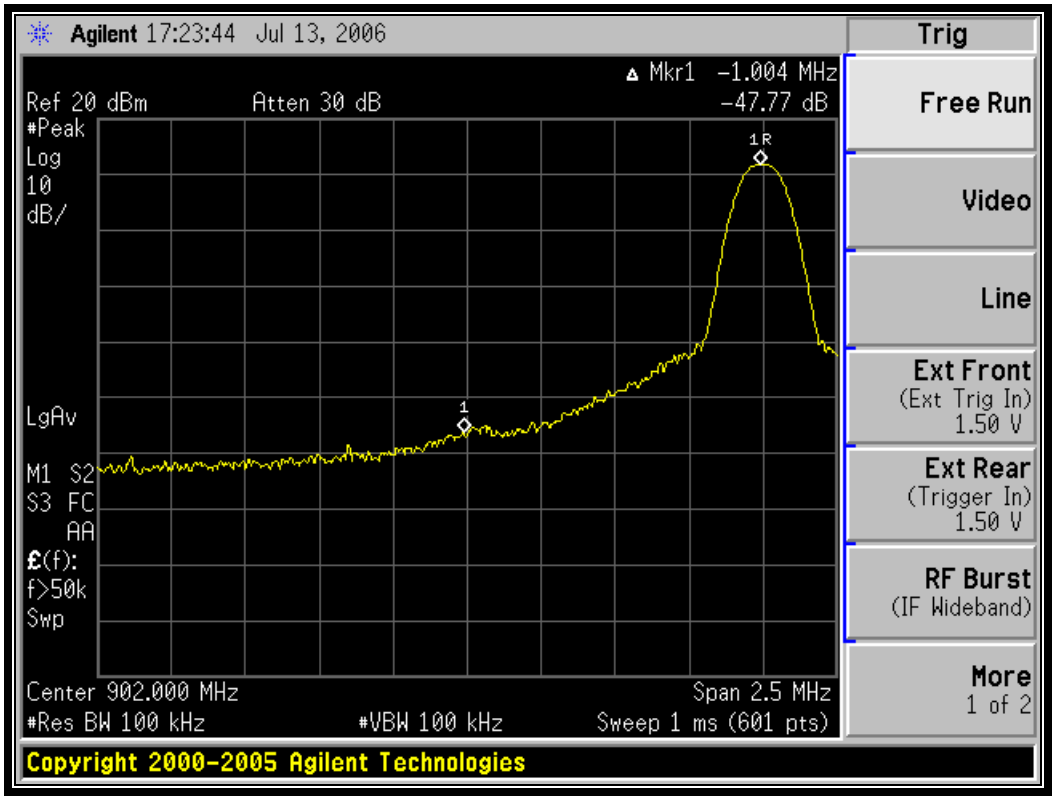
4.2.1 Calculation of Lower Band Edge

106.3 dBuV/m is the field strength measurement, from which the delta measurement of 49.6 dB is subtracted (reference hopping plot), resulting in a level of 56.7 dB. This level has a margin of 29.6 dB below the limit of 86.3 dBuV/m.

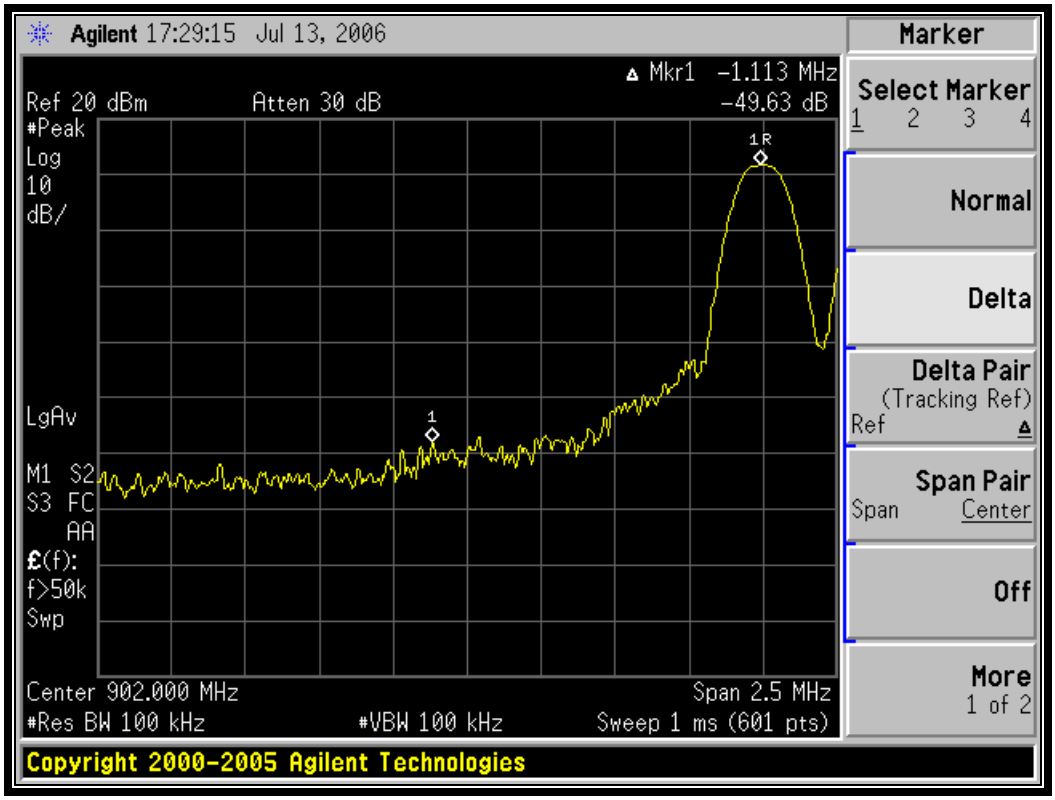
Calculation: 106.3 dBuV/m – 49.6 dB – 86.3 dBuV/m = -29.6 dB

Peak Field Strength of Lower Band Edge (100 kHz RBW/300 kHz VBW) = 106.3 dBuV/m
Quasi-Peak Field Strength of Lower Band Edge (120 kHz RBW/300 kHz VBW) = 105.7 dBuV/m
Delta measurement = 49.6 dB

4.2.2 Conducted Lower Band Edge Plots



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



Plot 4-2: Conducted Lower Band Edge – Hopping

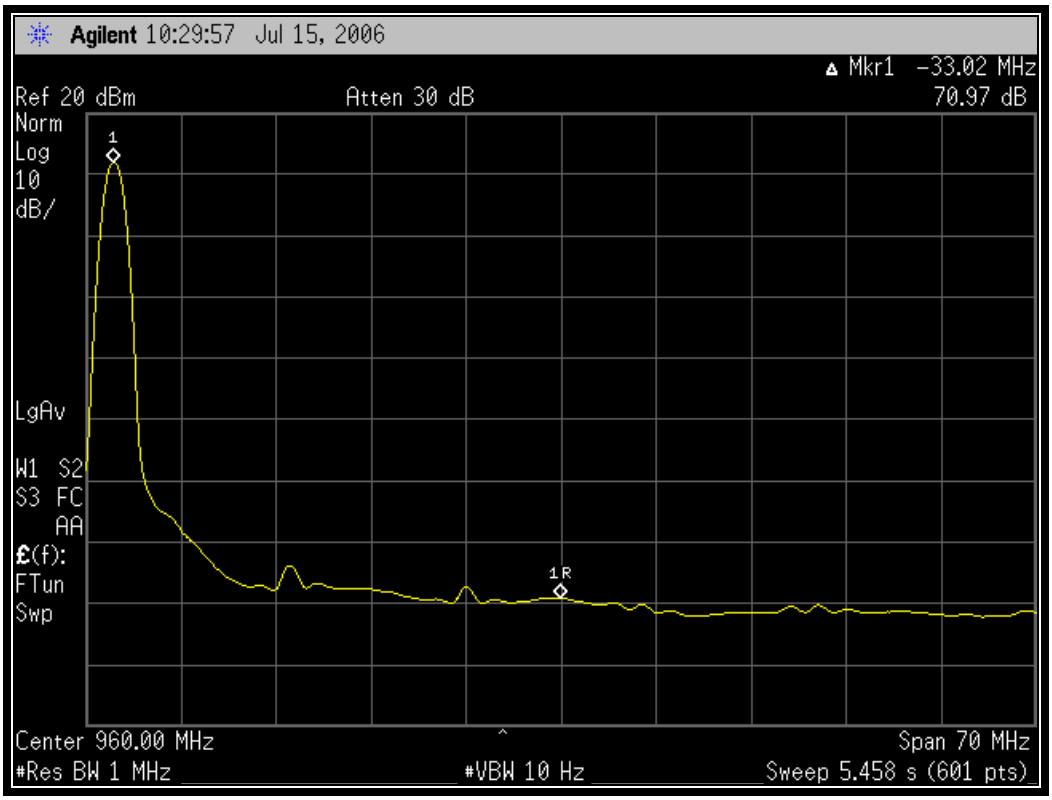
4.2.3 Calculation of Upper Band Edge

99.7 dBuV/m is the average field strength measurement, from which the delta measurement of 47.3 dB is subtracted (reference hopping plot), resulting in a level of 52.4 dB. This level has a margin of 1.6 dB below the limit of 54 dBuV/m.

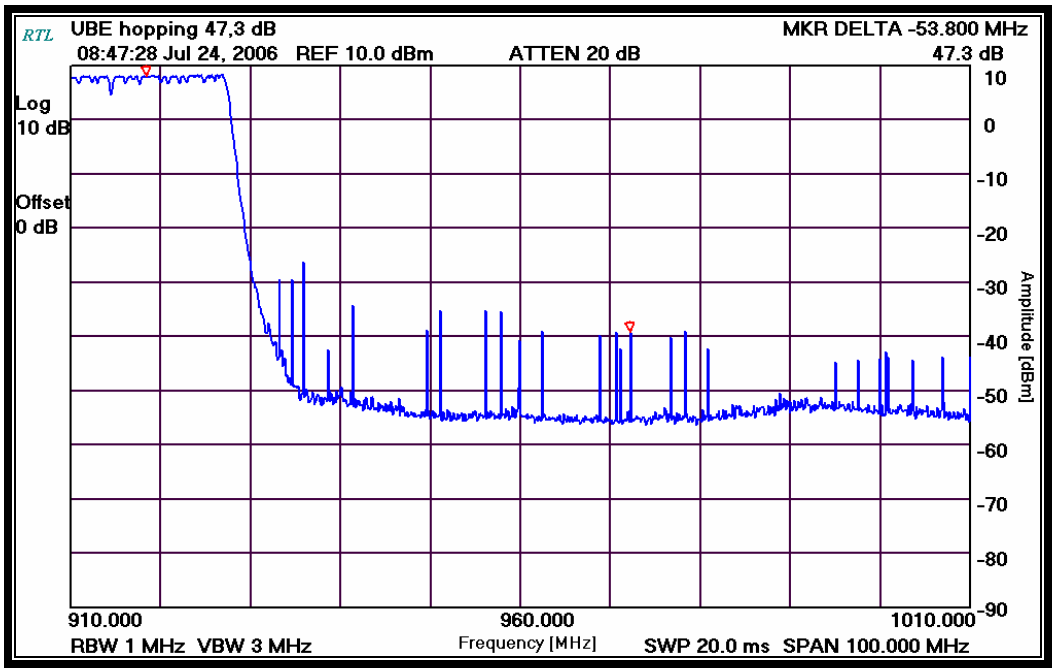
Calculation: 99.7 dBuV/m – 47.3 dB – 54.0 dBuV/m = -1.6 dB

Peak Field Strength of Upper Band Edge (1 MHz RBW/1 MHz VBW) = 103.0 dBuV/m
Average Field Strength of Upper Band Edge (1 MHz RBW/10 Hz VBW) = 99.7 dBuV/m
Delta measurement = 47.6 dB

4.2.4 Conducted Upper Band Edge Plots

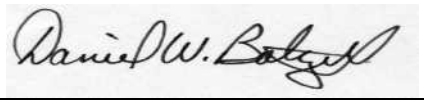


Plot 4-3: Conducted Upper Band Edge – Fixed High Channel Operation



Plot 4-4: Conducted Upper Band Edge – Hopping

Test Personnel:

Daniel W. Baltzell		July 13, 15 and 24, 2006
EMC Test Engineer	Signature	Dates Of Tests

5 Antenna Conducted Spurious Emissions - §15.247(d)

5.1 Antenna Conducted Spurious Emissions Test Procedure

Antenna spurious emissions per FCC 15.247(d) were 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 300 kHz. The modulated carrier was identified at the following frequencies: 903 MHz, 915 MHz, 927 MHz, and hopping mode.

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

5.2 Antenna Conducted Spurious Emissions Test Results

Table 5-2: Antenna Conducted Spurious Emissions (903 MHz)

Fundamental Amplitude = 9.0 dBm

Frequency (MHz)	Amplitude Measured (dBm)	Limit (20 dBc)	Margin (dB)
1806.0	-14.7	-11.0	-3.7
2709.0	-19.1	-11.0	-8.1
3612.0	-25.1	-11.0	-14.1
4514.9	-14.6	-11.0	-3.6
5418.1	-33.4	-11.0	-22.4
6321.1	-55.0	-11.0	-44.0
7224.1	-59.5	-11.0	-48.5
8126.8	-51.9	-11.0	-40.9
9029.8	-54.2	-11.0	-43.2

Table 5-3: Antenna Conducted Spurious Emissions (915 MHz)

Fundamental Amplitude = 9.2 dBm

Frequency (MHz)	Amplitude Measured (dBm)	Limit (20 dBc)	Margin (dB)
1829.0	-13.9	-10.8	-3.1
2745.0	-19.3	-10.8	-8.5
3660.0	-24.8	-10.8	-14.0
4575.0	-14.6	-10.8	-3.8
5489.8	-37.1	-10.8	-26.3
6405.1	-59.4	-10.8	-48.6
7319.8	-59.6	-10.8	-48.8
8234.8	-50.5	-10.8	-39.7
9149.7	-55.3	-10.8	-44.5

Table 5-4: Antenna Conducted Spurious Emissions (927 MHz)

Fundamental Amplitude = 9.4 dBm

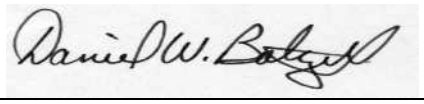
Frequency (MHz)	Amplitude Measured (dBm)	Limit (20 dBc)	Margin (dB)
1853.9	-13.6	-10.6	-3.0
2780.9	-19.5	-10.6	-8.9
3707.9	-23.9	-10.6	-13.3
4635.0	-15.3	-10.6	-4.7
5561.8	-38.4	-10.6	-27.8
6488.8	-65.4	-10.6	-54.8
7415.8	-57.5	-10.6	-46.9
8342.7	-49.5	-10.6	-38.9
9269.7	-55.9	-10.6	-45.3

Table 5-5: Antenna Conducted Spurious Emissions (Hopping Mode)

Fundamental Amplitude = 8.9 dBm

Frequency (MHz)	Amplitude Measured (dBm)	Limit (20 dBc)	Margin (dB)
1843.7	-13.7	-11.1	-2.6
2718.0	-19.0	-11.1	-7.9
3697.0	-24.8	-11.1	-13.7
4591.0	-14.2	-11.1	-3.1
5446.7	-35.9	-11.1	-24.8
6321.0	-55.2	-11.1	-44.1
7368.0	-58.9	-11.1	-47.8
8342.5	-49.1	-11.1	-38.0
9030.0	-53.7	-11.1	-42.6

Test Personnel:



Daniel W. Baltzell		July 24, 2006
EMC Test Engineer	Signature	Date Of Test

6 20 dB Bandwidth – FCC §15.247(a)(1)(i)

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	11/02/06

6.2 20 dB Modulated Bandwidth Test Data

Table 6-2: 20 dB Modulated Bandwidth Test Data

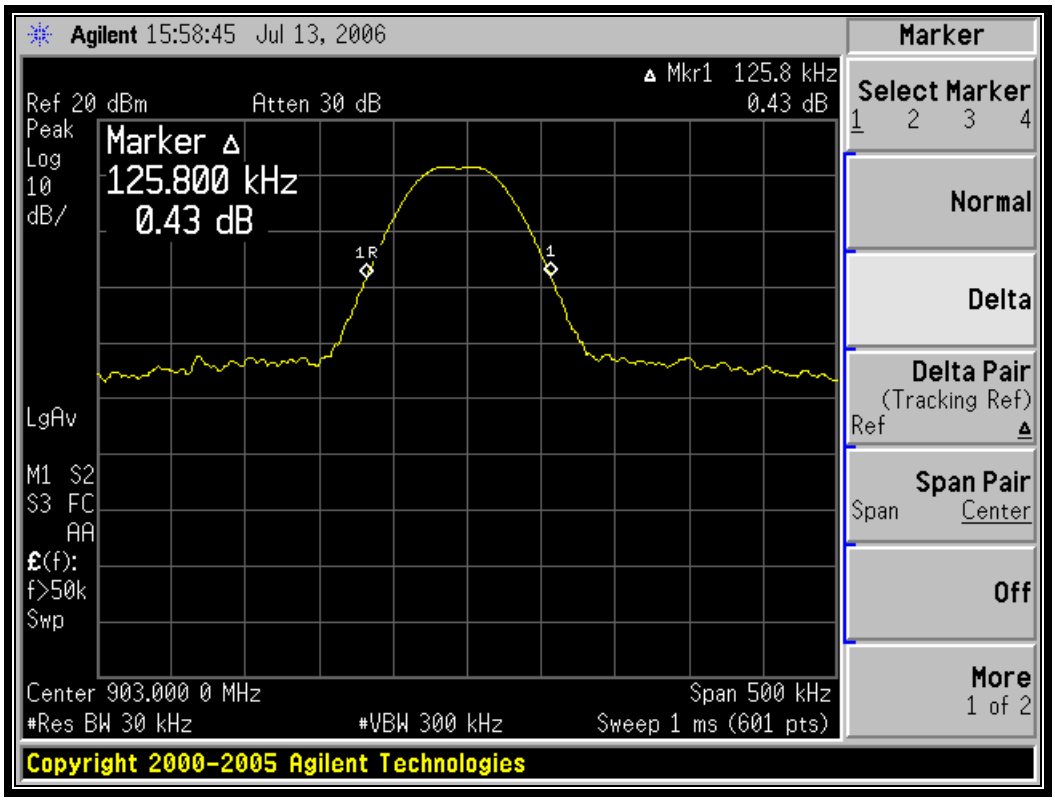
Minimum 20 dB Bandwidths

Channel	20 dB Bandwidth (kHz)
Low	125.8
Mid	125.7
High	126.7

6.3 20 dB Bandwidth Plots

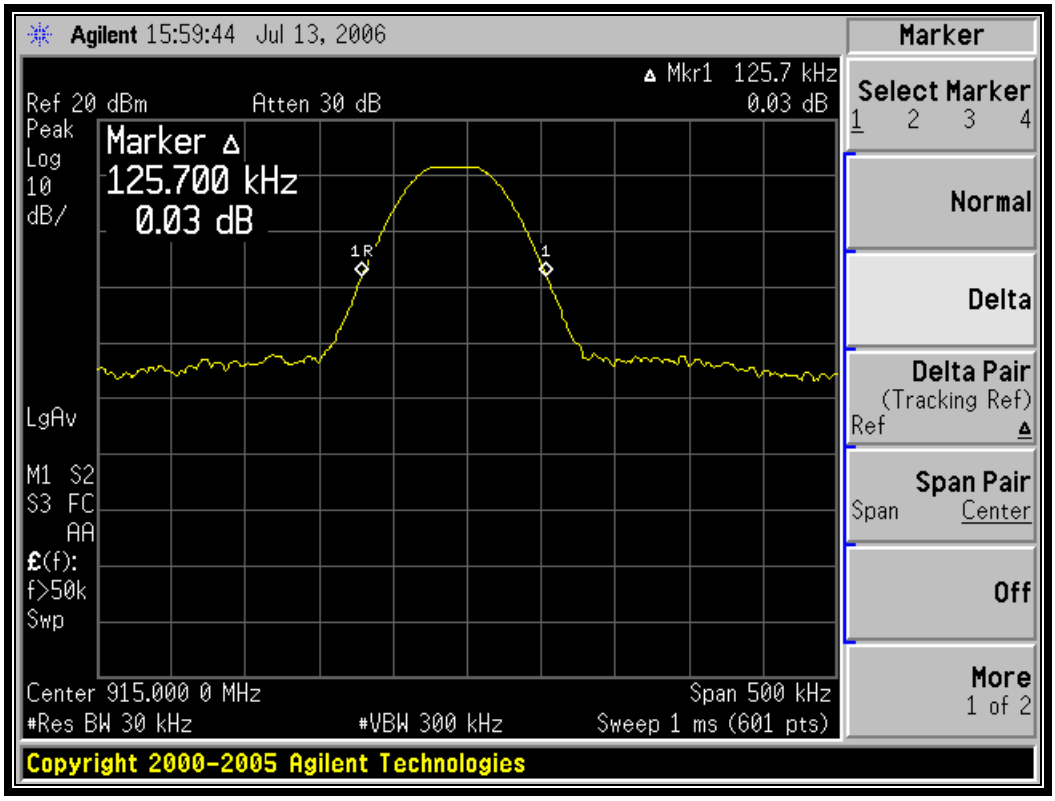
Channel:	Low
Channel Frequency (MHz):	903
Resolution Bandwidth (kHz):	30
Video Bandwidth (kHz):	300
Span (MHz):	0.5

Plot 6-1: 20 dB Bandwidth 903 MHz



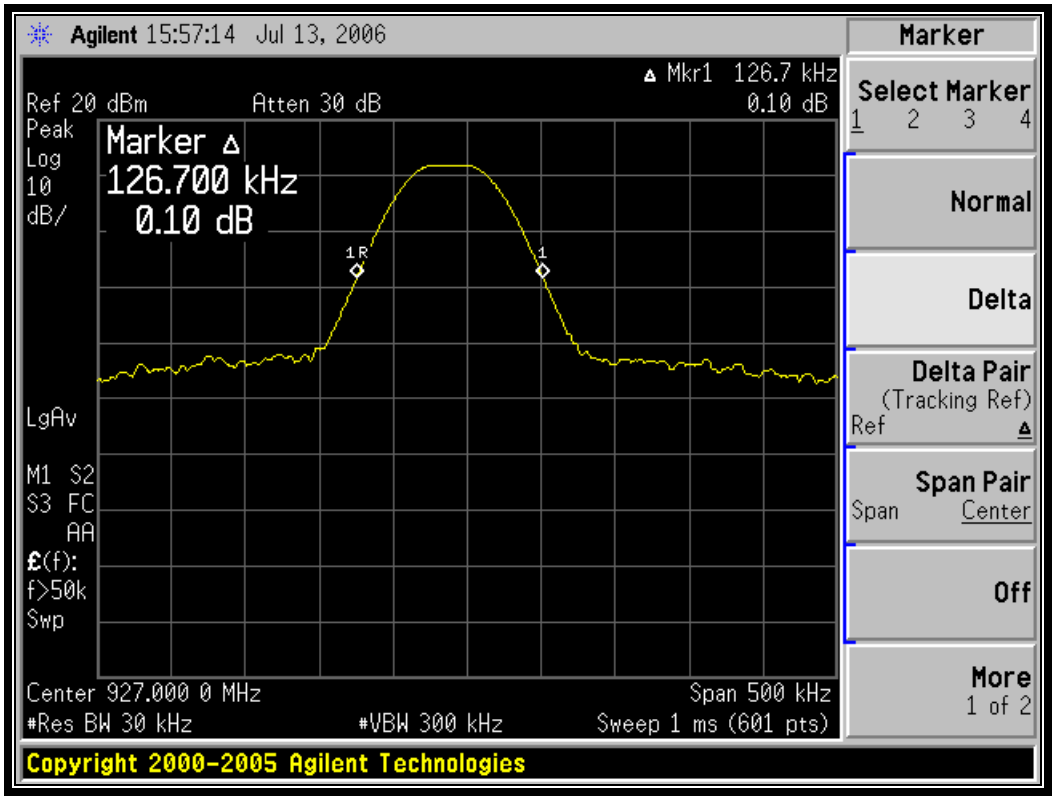
Channel:	Middle
Channel Frequency (MHz):	915
Resolution Bandwidth (kHz):	30
Video Bandwidth (kHz):	300
Span (MHz):	0.5

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	July 13, 2006
EMC Test Engineer	Signature	Date Of Test

7 Carrier Frequency Separation - §15.247(a)(1)

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.

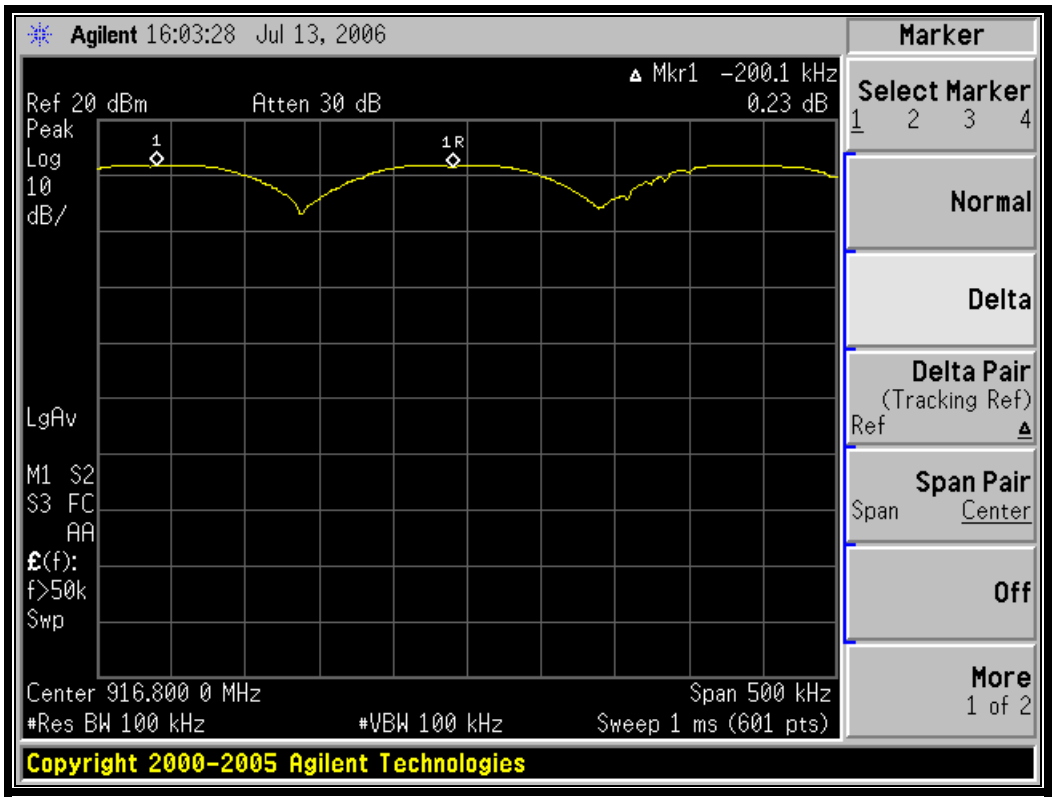
Measured frequency separation = 200.1 kHz

Table 7-1: 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	11/02/06

7.2 Carrier Frequency Separation Test Data

Plot 7-1: Carrier Frequency Separation



Test Personnel:

Richard B. McMurray	Richard B. McMurray	July 13, 2006
EMC Test Engineer	Signature	Date Of Test

8 Hopping Characteristics – FCC §15.247 (a)(1)(i)

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 Characteristics Test Equipment

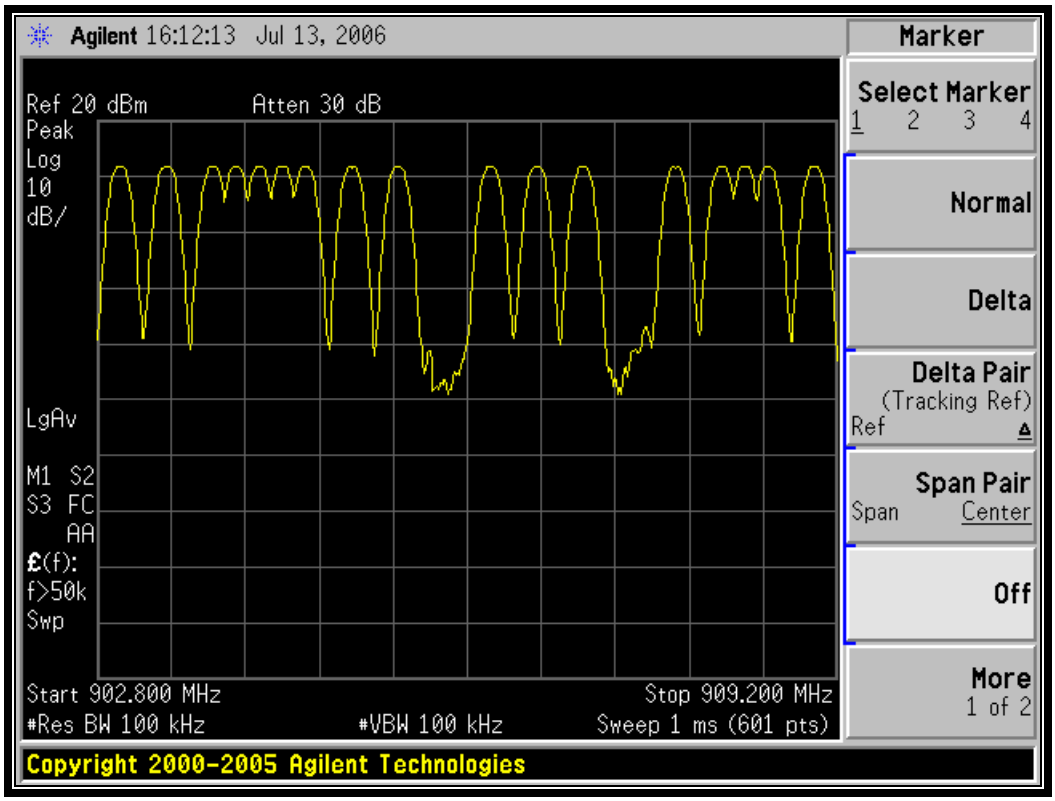
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	PSA Series Spectrum Analyzer	US44020346	11/02/2006

8.2 Number of Hopping Frequencies

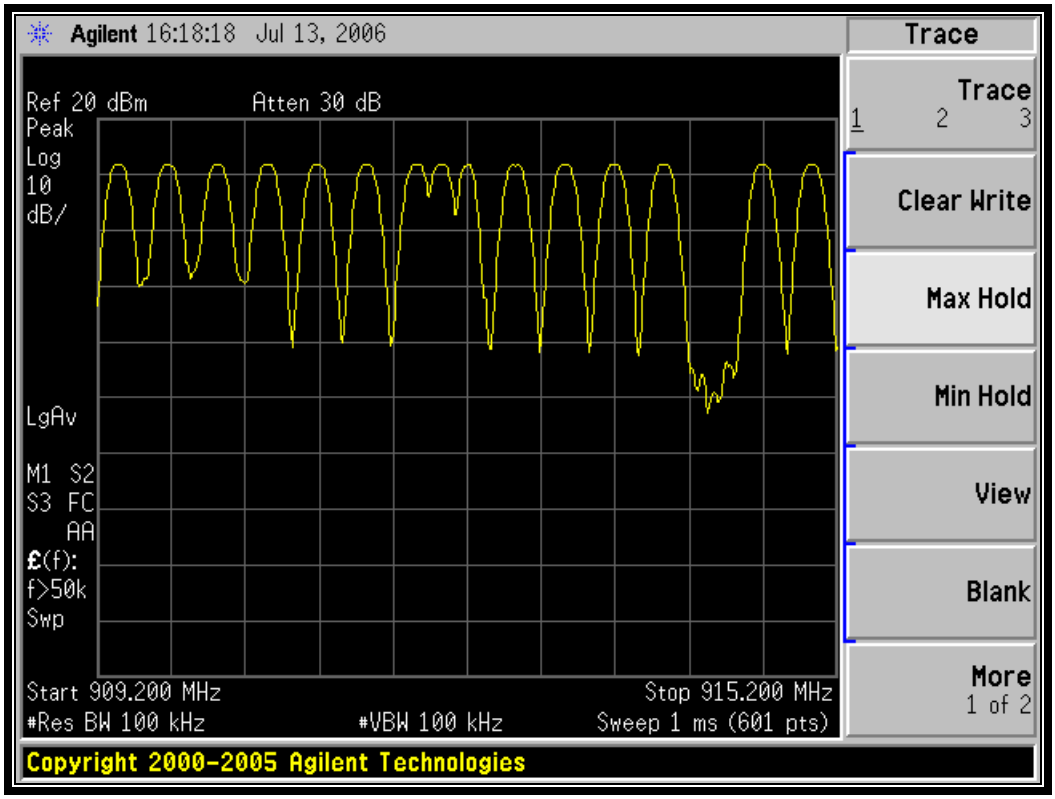
The number of hopping frequencies is shown over the following four screen captures.

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

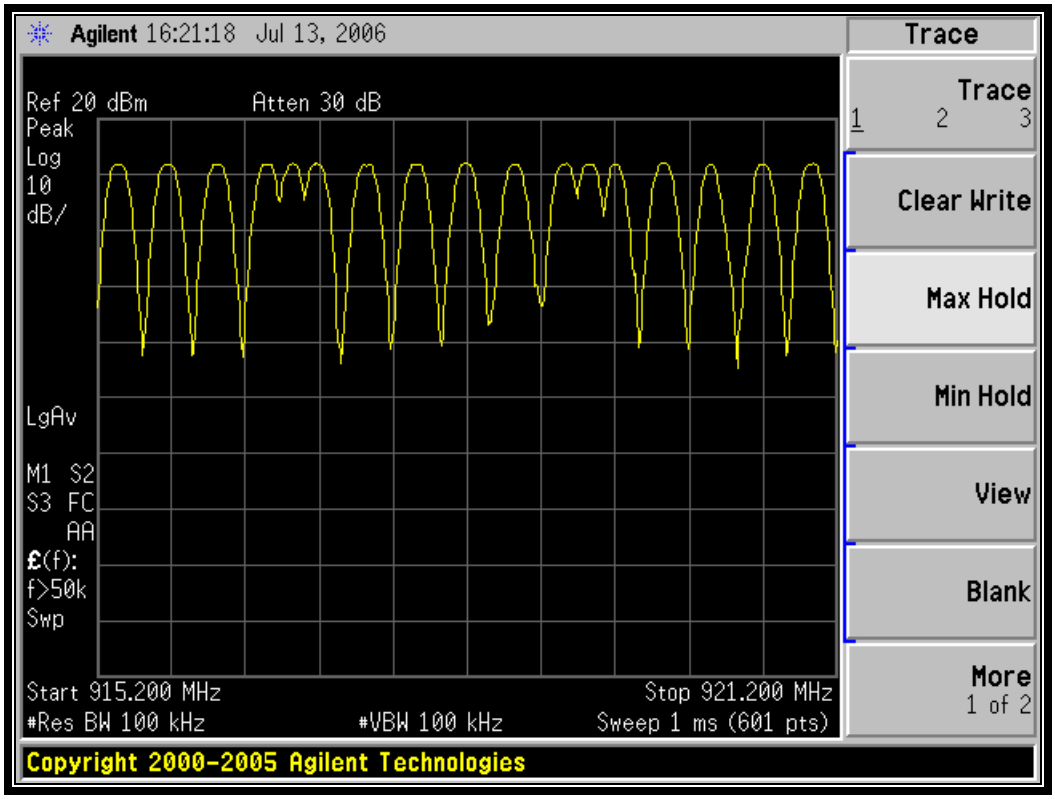
Plot 8-1: Number of Hopping Frequencies: 902.8–909.2 MHz – 17 frequencies



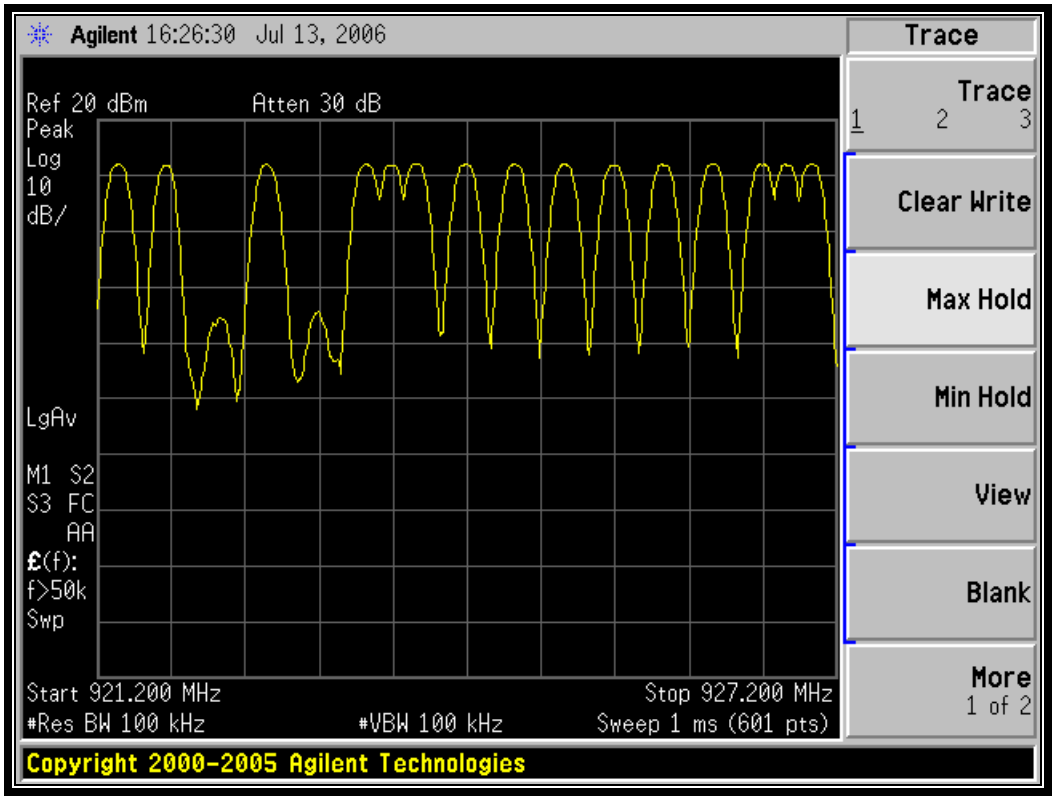
Plot 8-2: Number of Hopping Frequencies: 909.2–915.2 MHz – 15 frequencies



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	July 13, 2006
EMC Test Engineer	Signature	Date Of Test

8.3 Average Time of Occupancy

The spectrum analyzer sweep was set to capture the entire dwell time of a hopping channel, 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.

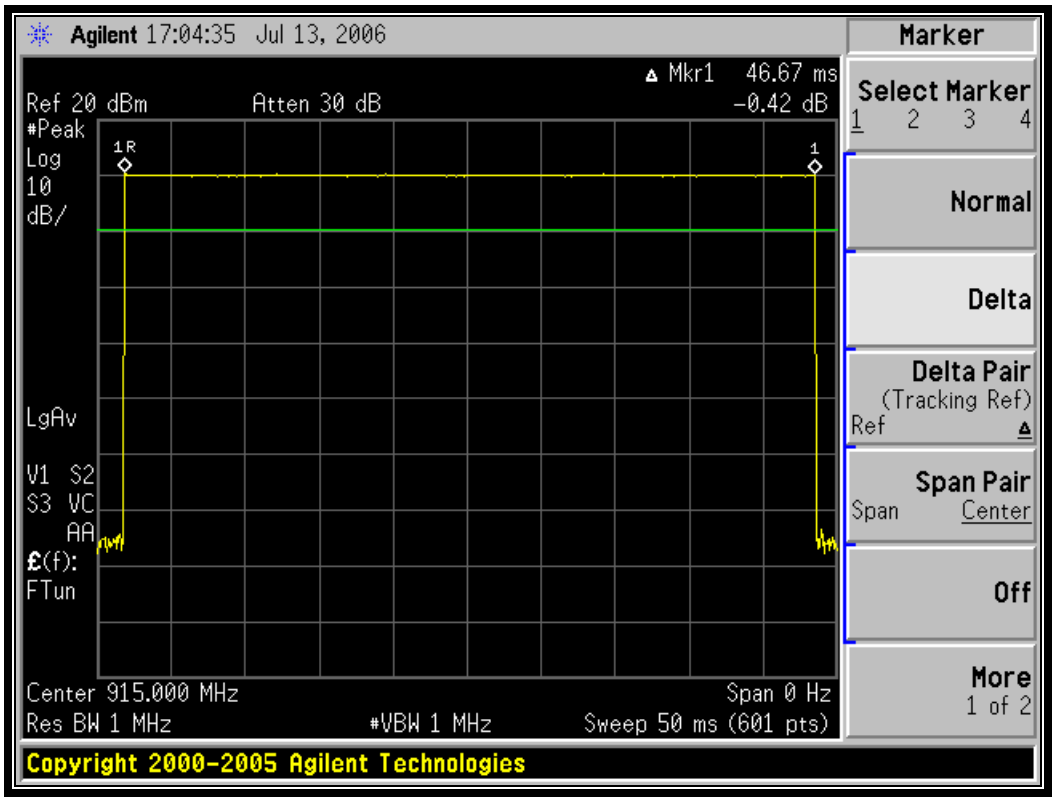
The number of pulses in 20 s was 3.

The average time of occupancy in 20 s is equal to 3 pulses x 46.67 ms = 140 ms, which meets the limit as defined by 15.247(a)(1)(i) of 0.4 seconds in a 20 second period.

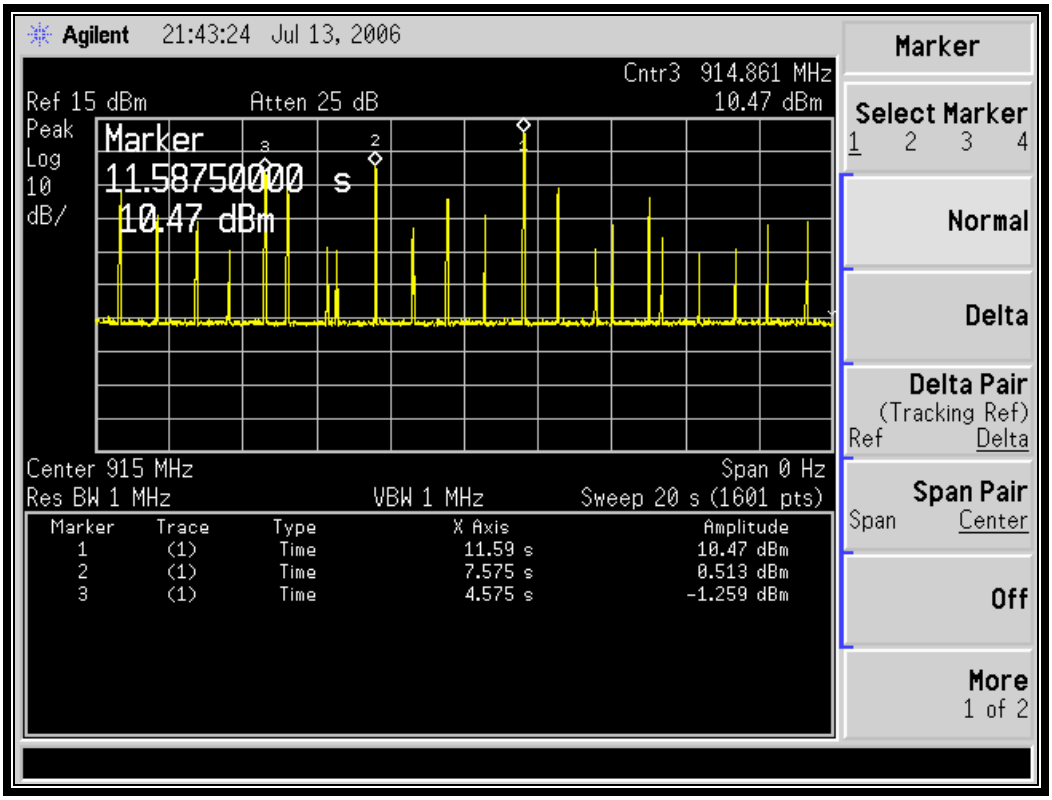
Table 8-2: Average Time of Occupancy Test Equipment

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

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



Plot 8-6: Time of Occupancy (Dwell Time 20 Second Sweep)



Number of pulses in 20 seconds: 3

Note: The emissions other than the 3 that are marked are side band energy from adjacent channels.

Test Personnel:

Richard B. McMurray	Richard B. McMurray	July 13, 2006
EMC Test Engineer	Signature	Date Of Test

9 Conducted Emissions Measurement Limits – FCC §15.207

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

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	3/03/07
900897	Hewlett Packard	8567A	Spectrum Analyzer (10 kHz - 1.5 GHz)	2727A00535	3/03/07
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

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

Temperature: 75°F Humidity: 45%									
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
0.152	Pk	38.1	0.2	38.3	65.9	-27.6	55.9	-17.6	Pass
0.165	Pk	33.8	0.2	34.0	65.2	-31.2	55.2	-21.2	Pass
0.219	Pk	33.5	0.2	33.7	62.9	-29.2	52.9	-19.2	Pass
0.296	Pk	27.5	0.3	27.8	60.4	-32.6	50.4	-22.6	Pass
5.040	Pk	18.7	1.2	19.9	60.0	-40.1	50.0	-30.1	Pass
14.220	Pk	17.6	2.0	19.6	60.0	-40.4	50.0	-30.4	Pass
25.250	Pk	17.9	2.6	20.5	60.0	-39.5	50.0	-29.5	Pass

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

Temperature: 75°F Humidity: 45%									
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
0.156	Pk	37.8	0.2	38.0	65.7	-27.7	55.7	-17.7	Pass
0.212	Pk	33.9	0.2	34.1	63.1	-29.0	53.1	-19.0	Pass
0.314	Pk	27.5	0.3	27.8	59.9	-32.1	49.9	-22.1	Pass
2.120	Pk	18.9	0.7	19.6	56.0	-36.4	46.0	-26.4	Pass
8.580	Pk	17.2	1.5	18.7	60.0	-41.3	50.0	-31.3	Pass
19.320	Pk	17.8	2.4	20.2	60.0	-39.8	50.0	-29.8	Pass

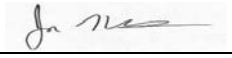
Table 9-4: Conducted Emissions Receive Mode - Neutral Conductor

Temperature: 75°F Humidity: 45%									
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**
0.150	Pk	39.7	0.2	39.9	66.0	-26.1	56.0	-16.1	Pass
0.163	Pk	35.3	0.2	35.5	65.3	-29.8	55.3	-19.8	Pass
0.223	Pk	32.8	0.2	33.0	62.7	-29.7	52.7	-19.7	Pass
0.300	Pk	27.4	0.3	27.7	60.2	-32.5	50.2	-22.5	Pass
7.290	Pk	17.6	1.5	19.1	60.0	-40.9	50.0	-30.9	Pass
11.120	Pk	18.9	1.7	20.6	60.0	-39.4	50.0	-29.4	Pass
16.400	Pk	18.7	2.2	20.9	60.0	-39.1	50.0	-29.1	Pass

Table 9-5: Conducted Emissions Receive Mode - Phase Conductor

Temperature: 75°F Humidity: 45%									
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**
0.152	Pk	39.5	0.2	39.7	65.9	-26.2	55.9	-16.2	Pass
0.216	Pk	34.4	0.2	34.6	63.0	-28.4	53.0	-18.4	Pass
0.302	Pk	28.1	0.3	28.4	60.2	-31.8	50.2	-21.8	Pass
5.570	Pk	18.2	1.3	19.5	60.0	-40.5	50.0	-30.5	Pass
17.910	Pk	17.5	2.4	19.9	60.0	-40.1	50.0	-30.1	Pass
22.420	Pk	18.7	2.5	21.2	60.0	-38.8	50.0	-28.8	Pass

Test Personnel:

Jon Wilson		July 14, 2006
EMC Test Engineer	Signature	Date Of Test

10 Radiated Emissions - §15.209

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 10^{th} 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
900905	Rhein Tech Laboratories, Inc.	PR-1040	OATS 1 Preamplifier 40 dB (30 MHz – 2 GHz)	1006	3/15/07
900878	Rhein Tech Laboratories, Inc.	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 Laboratories, Inc.	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 - 8,2 GHz)	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 GHz)	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	4/12/07

10.3 Radiated Emissions Test Results

10.3.1 Radiated Emissions Digital/Receiver Test Data

Table 10-2: Digital/Receiver Radiated Emissions Test Data

Temperature: 75°F Humidity: 72%										
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
259.996	Qp	H	230	1.4	36.5	-13.5	23.0	47.0	-24.0	Pass
363.997	Qp	H	90	1.2	32.7	-11.0	21.7	47.0	-25.3	Pass
415.997	Qp	H	0	1.0	33.3	-9.1	24.2	47.0	-22.8	Pass
467.996	Qp	H	270	1.4	34.6	-8.3	26.3	47.0	-20.7	Pass
519.996	Qp	H	100	1.6	33.8	-7.4	26.4	47.0	-20.6	Pass
545.995	Qp	H	50	1.8	34.1	-6.7	27.4	47.0	-19.6	Pass
571.995	Qp	H	90	1.5	33.9	-6.3	27.6	47.0	-19.4	Pass
727.994	Qp	H	90	1.8	32.6	-4.4	28.2	47.0	-18.8	Pass

10.3.2 Radiated Emissions Harmonics/Spurious Test Data

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

Fundamental amplitude = 105.3 dBuV/m

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)
1806.0	63.2	60.2	-10.7	49.5	85.3	-35.8
2709.0	52.7	51.4	-5.1	46.3	54.0	-7.7
3612.0	53.2	50.7	-4.4	46.3	54.0	-7.7
4515.0	48.9	47.0	2.0	49.0	54.0	-5.0
5418.0	42.5	39.3	2.6	41.9	54.0	-12.1
6321.0	38.7	29.8	3.3	33.1	85.3	-52.2
7224.0	41.0	32.0	3.3	35.3	85.3	-50.0
8127.0	32.7	27.7	3.8	31.5	54.0	-22.5
9030.0	38.9	25.5	9.6	35.1	54.0	-18.9

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

Fundamental amplitude = 104.2 dBuV/m

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)
1830.0	84.9	84.7	-10.5	74.2	84.2	-10.0
2745.0	53.1	51.2	-4.8	46.4	54.0	-7.6
3660.0	49.5	46.6	-4.2	42.4	54.0	-11.6
4575.0	62.4	51.0	1.6	52.6	54.0	-1.4
5490.0	40.6	35.7	2.8	38.5	84.2	-45.7
6405.0	36.4	28.4	3.4	31.8	84.2	-52.4
7320.0	39.3	30.2	3.3	33.5	54.0	-20.5
8235.0	39.7	27.4	9.5	36.9	54.0	-17.1
9150.0	35.8	25.2	10.0	35.2	54.0	-18.8

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

Fundamental amplitude = 103.0 dBuV/m

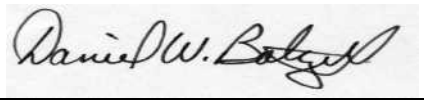
Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
1854.0	87.0	86.3	-10.2	76.1	83.0	-6.9
2781.0	52.4	51.2	-5.3	45.9	54.0	-8.1
3708.0	31.6	49.9	-4.2	45.7	54.0	-8.3
4635.0	52.9	51.9	0.9	52.8	54.0	-1.2
5562.0	42.0	38.0	2.8	40.8	83.0	-42.2
6489.0	32.8	25.5	3.7	29.2	83.0	-53.8
7416.0	40.0	32.8	4.0	36.8	54.0	-17.2
8343.0	38.4	26.7	8.8	35.5	54.0	-18.5
9270.0	37.0	25.0	9.9	34.9	83.0	-48.1

Table 10-6: Radiated Emissions Harmonics/Spurious; Hopping Mode

Fundamental amplitude = 104.1 dBuV/m

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)
1852.0	87.0	86.3	-10.2	76.1	84.1	-8.0
2715.0	52.9	51.2	-4.8	46.4	54.0	-7.6
3618.3	50.5	41.8	-4.4	37.4	54.0	-16.6
4586.8	51.5	47.2	1.4	48.6	54.0	-5.4
5509.0	41.9	30.9	2.8	33.7	84.1	-50.4
6448.0	39.2	24.4	3.4	27.8	84.1	-56.3

Test Personnel:



Daniel W. Baltzell		July 17, 2006
EMC Test Engineer	Signature	Date Of Test

11 Conclusion

The data in this measurement report shows that the EUT as tested, Innovative Wireless Technologies, Inc., Model Name: mProm^{TM} 900 MHz Module, Model # IXU1-ASY1168, FCC ID: SP8-IXU1-ASY1168, complies with all the applicable requirements of Parts 2 and 15 of the FCC Rules and Regulations.