EMISSIONS TEST REPORT FOR A LOW POWER TRANSMITTER

I. GENERAL INFORMATION

Requirement: Industry Canada
Test Requirements: FCC Part 15

Applicant: Silver Spring Networks Inc.

FCC ID: OWS-NIC41
Model: NICv4.1

II. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

The Silver Spring Networks (SSN) model NICv4.1 is a 902-298 MHz RF module for use in utility meter wireless network applications.

Transmitter Specification

Max Peak TX Power	29.65 dBm
Antenna	4.5 dBi monopole -1 dBi sheet metal antenna
Frequency of operation	903.68 – 926.208 MHz
Modulation	Direct Sequence Spread Spectrum
6 dB bandwidth	1.392 MHz minimum
Emission designator	2M70G1D
99% bandwidth	2.7 MHz max
Power source	AC/DC

III. TEST DATES AND TEST LOCATION

Testing was performed on various dates between 3 Feb – 10 April 2006 . All tests were performed at:

Compliance Certification Services
561F Monterey Road
Morgan Hill, CA 95037

T.N. Cokenias 5 May 2006
EMC Consultant/Agent for Silver Spring Networks

15.203 Antenna connector requirement

The EUT uses a unique antenna connector and all antennas are professionally installed by the manufacturer who incorporates the SSN module into his product(s).

Antenna description

The EUT was tested with two antennas, a commercially available monopole omni and a special sheet metal antenna manufactured by Silver Spring Networks for electric meters

Antenna description	Mfr.	Model No.	Gain
omni monopole	MaxRad		4.5 dBi
sheet metal electric meter	SSN	n/a	-1 dBi

TEST PROCEDURES

All tests were performed in accordance with the applicable procedures called out in the following documents, unless otherwise noted:

ANSI C63.4 – 2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

Tests were performed for three different transmit frequencies:

Channel 0 (LOW) – 903.680 MHz

Channel 6 (MID) - 915.968 MHz

Channel 11 (HIGH) – 926.208 MHz

NOTE: Several spectrum analyzer plots have center frequencies slightly different than those listed here, however, all testing was performed with the EUT tuned to one of the three frequencies listed above.

TEST RESULTS

Radiated Emissions
Test Requirement: 15.205, 15.207

Out of Band Measurements
Test Requirement: 15.247(d)

Measurement Equipment Used:
Agilent 4446A Spectrum Analyzer, 9 kHz-40 GHz
Sunol Sciences JB1 Biconolog antenna
EMCO 3115 Horn antenna, 1-18 GHZ
Miteq NSP2600-SP pre-amplifier, 1 – 26.5 GHz
IFI High pass filter, fp = 1500 MHz
Radiated Test Set-up, 1-26 GHz

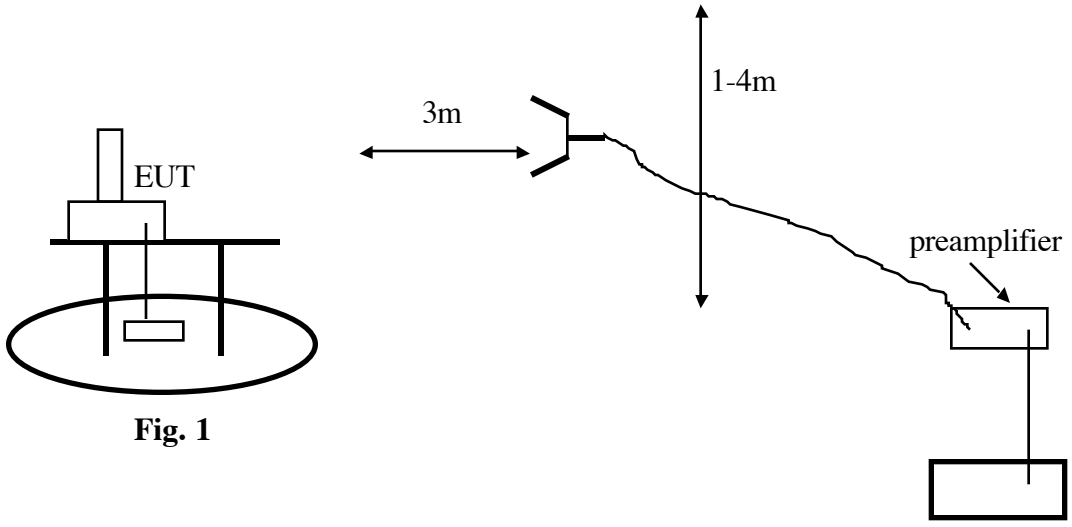


Fig. 1

Test Procedures

Radiated emissions generated by the transmitter portion of the EUT were measured.

1. The EUT was placed on a wooden table resting on a turntable on the test site.
The search antenna was placed 3m from the EUT. The EUT antenna was mounted in the with the EUT TX antenna pointed directly to the search antenna.

2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205.

3. Emissions were investigated to the 10^{th} harmonic of the fundamental.

4. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

Test Results: Worst case results are presented. Refer to data sheets below. Restricted band emissions meet 54 dBuV/m. Other undesired emissions from the transmitter meet the -20 dBc requirement in 15.247(d).

15.205 Restricted Frequency Bands

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505 (1)	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	
13.36 - 13.41	322 - 335.4		

15.209 General Field Strength Limits

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/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

02/03/06 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr:William Zhuang
Project #:06U10065
Company:Tom Cokenias / Silver Spring Networks
EUT Descrip.:902-928 MHz Device
EUT M/N:NIC4.1
Test Target:FCC15.247
Mode Oper:Continueos Sequence Trasmit

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch. 903.68 MHz															
1.807	3.0	69.8	52.6	27.2	2.6	-37.1	0.0	0.0	62.4	45.2	74.0	54.0	-11.6	-8.8	V
2.711	3.0	64.3	47.4	29.2	2.9	-36.1	0.0	0.0	60.4	43.5	74.0	54.0	-13.6	-10.5	V
3.614	3.0	61.4	44.4	31.7	3.2	-35.3	0.0	0.0	61.0	44.0	74.0	54.0	-13.0	-10.0	V
4.518	3.0	49.3	36.6	33.3	3.5	-34.9	0.0	0.0	51.2	38.5	74.0	54.0	-22.8	-15.5	V
5.421	3.0	52.2	38.2	34.2	3.8	-34.7	0.0	0.0	55.5	41.5	74.0	54.0	-18.5	-12.5	V
6.325	3.0	65.4	42.7	35.0	4.1	-34.5	0.0	0.0	70.0	47.3	74.0	54.0	-4.0	-6.7	V
7.228	3.0	55.9	37.0	36.1	4.3	-34.1	0.0	0.0	62.2	43.3	74.0	54.0	-11.8	-10.7	V
8.132	3.0	63.2	44.7	36.9	4.6	-34.0	0.0	0.0	70.7	52.2	74.0	54.0	-3.3	-1.8	V
9.035	3.0	44.7	32.4	37.5	4.9	-35.2	0.0	0.0	52.0	39.6	74.0	54.0	-22.0	-14.4	V
1.807	3.0	67.9	52.1	27.2	2.6	-37.1	0.0	0.0	60.5	44.7	74.0	54.0	-13.5	-9.3	H
2.711	3.0	58.2	43.6	29.2	2.9	-36.1	0.0	0.0	54.2	39.7	74.0	54.0	-19.8	-14.3	H
3.614	3.0	55.6	41.2	31.7	3.2	-35.3	0.0	0.0	55.2	40.7	74.0	54.0	-18.8	-13.3	H
4.518	3.0	41.5	29.4	33.3	3.5	-34.9	0.0	0.0	43.4	31.3	74.0	54.0	-30.6	-22.7	H
5.421	3.0	41.0	29.4	34.2	3.8	-34.7	0.0	0.0	44.3	32.7	74.0	54.0	-29.7	-21.3	H
6.325	3.0	53.0	36.0	35.0	4.1	-34.5	0.0	0.0	57.6	40.6	74.0	54.0	-16.4	-13.4	H
7.228	3.0	46.9	32.4	36.1	4.3	-34.1	0.0	0.0	53.2	38.7	74.0	54.0	-20.8	-15.3	H
8.132	3.0	54.4	38.5	36.9	4.6	-34.0	0.0	0.0	61.9	46.0	74.0	54.0	-12.1	-8.0	H
9.035	3.0	42.0	30.4	37.5	4.9	-35.2	0.0	0.0	49.3	37.7	74.0	54.0	-24.7	-16.3	H
Mid Ch. 915.968 MHz															
1.830	3.0	66.1	51.2	27.3	2.6	-37.1	0.0	0.0	58.8	44.0	74.0	54.0	-15.2	-10.0	V
2.745	3.0	54.9	41.7	29.3	2.9	-36.1	0.0	0.0	51.1	37.9	74.0	54.0	-22.9	-16.1	V
3.660	3.0	58.7	44.1	31.8	3.2	-35.3	0.0	0.0	58.5	43.9	74.0	54.0	-15.5	-10.1	V
4.575	3.0	48.7	36.2	33.3	3.5	-34.9	0.0	0.0	50.7	38.2	74.0	54.0	-23.3	-15.8	V
5.490	3.0	55.8	40.1	34.3	3.9	-34.8	0.0	0.0	59.1	43.5	74.0	54.0	-14.9	-10.5	V
6.405	3.0	68.1	46.0	35.1	4.1	-34.5	0.0	0.0	72.9	50.8	74.0	54.0	-1.1	-3.2	V
7.320	3.0	42.7	29.2	36.2	4.4	-34.1	0.0	0.0	49.2	35.6	74.0	54.0	-24.8	-18.4	V
8.235	3.0	59.9	43.3	37.0	4.7	-34.2	0.0	0.0	67.3	50.7	74.0	54.0	-6.7	-3.3	V
9.150	3.0	42.7	31.6	37.6	5.0	-34.9	0.0	0.0	50.4	39.2	74.0	54.0	-23.6	-14.8	V
1.830	3.0	64.5	50.2	27.3	2.6	-37.1	0.0	0.0	57.2	43.0	74.0	54.0	-16.8	-11.0	H
2.745	3.0	61.1	46.1	29.3	2.9	-36.1	0.0	0.0	57.3	42.3	74.0	54.0	-16.7	-11.7	H
3.660	3.0	57.2	42.6	31.8	3.2	-35.3	0.0	0.0	57.0	42.4	74.0	54.0	-17.0	-11.6	H
4.575	3.0	43.8	32.9	33.3	3.5	-34.9	0.0	0.0	45.8	34.9	74.0	54.0	-28.2	-19.1	H
5.490	3.0	45.0	31.9	34.3	3.9	-34.8	0.0	0.0	48.4	35.2	74.0	54.0	-25.6	-18.8	H
6.405	3.0	60.9	41.6	35.1	4.1	-34.5	0.0	0.0	65.7	46.4	74.0	54.0	-8.3	-7.6	H
7.320	3.0	40.8	28.8	36.2	4.4	-34.1	0.0	0.0	47.3	35.2	74.0	54.0	-26.7	-18.8	H
8.235	3.0	49.2	35.9	37.0	4.7	-34.2	0.0	0.0	56.7	43.4	74.0	54.0	-17.3	-10.6	H
9.150	3.0	42.1	30.0	37.6	5.0	-34.9	0.0	0.0	49.8	37.7	74.0	54.0	-24.2	-16.3	H
High Ch. 926.208 MHz															
1.853	3.0	64.8	51.4	27.4	2.6	-37.1	0.0	0.0	57.7	44.3	74.0	54.0	-16.3	-9.7	V
2.780	3.0	62.4	47.7	29.5	3.0	-36.1	0.0	0.0	58.7	44.0	74.0	54.0	-15.3	-10.0	V
3.706	3.0	58.0	43.2	31.9	3.2	-35.2	0.0	0.0	58.0	43.2	74.0	54.0	-16.0	-10.8	V
4.633	3.0	45.0	33.4	33.4	3.5	-34.9	0.0	0.0	47.1	35.5	74.0	54.0	-26.9	-18.5	V
5.559	3.0	51.7	38.1	34.3	3.9	-34.8	0.0	0.0	55.0	41.4	74.0	54.0	-19.0	-12.6	V
6.486	3.0	64.5	46.7	35.2	4.2	-34.4	0.0	0.0	69.4	51.6	74.0	54.0	-4.6	-2.4	V
7.412	3.0	41.8	29.1	36.3	4.4	-34.1	0.0	0.0	48.4	35.7	74.0	54.0	-25.6	-18.3	V
8.338	3.0	54.7	39.5	37.0	4.7	-34.3	0.0	0.0	62.1	46.9	74.0	54.0	-11.9	-7.1	V
9.265	3.0	41.7	29.5	37.7	5.0	-34.6	0.0	0.0	49.8	37.6	74.0	54.0	-24.2	-16.4	V
1.853	3.0	63.1	49.9	27.4	2.6	-37.1	0.0	0.0	55.9	42.8	74.0	54.0	-18.1	-11.2	H
2.780	3.0	62.7	47.8	29.5	3.0	-36.1	0.0	0.0	59.0	44.2	74.0	54.0	-15.0	-9.8	H
3.706	3.0	53.5	39.9	31.9	3.2	-35.2	0.0	0.0	53.5	39.9	74.0	54.0	-20.6	-14.1	H
4.633	3.0	43.8	32.4	33.4	3.5	-34.9	0.0	0.0	45.9	34.5	74.0	54.0	-28.1	-19.5	H
5.559	3.0	43.1	32.1	34.3	3.9	-34.8	0.0	0.0	46.5	35.4	74.0	54.0	-27.5	-18.6	H
6.486	3.0	53.7	39.3	35.2	4.2	-34.4	0.0	0.0	58.6	44.2	74.0	54.0	-15.4	-9.8	H
7.412	3.0	41.0	29.1	36.3	4.4	-34.1	0.0	0.0	47.6	35.7	74.0	54.0	-26.4	-18.3	H
8.338	3.0	46.2	33.2	37.0	4.7	-34.3	0.0	0.0	53.6	40.7	74.0	54.0	-20.4	-13.3	H
9.265	3.0	41.2	29.4	37.7	5.0	-34.6	0.0	0.0	49.3	37.5	74.0	54.0	-24.7	-16.5	H
													0.0	0.0	
													0.0	0.0	

4.5 dBi Monopole Antenna

Electric meter antenna – Outdoor test 3/28/2006

03/28/06 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr:William Zhuang
Project #:06U10065
Company:Tom Cokenias / Silver Spring Networks
EUT Descrip.:902-928 MHz Device
EUT M/N:
Test Target:FCC15.247
Mode Oper:Continueos Sequence Trasmit

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Mid Ch. 915.968 MHz															V
1.830	3.0	73.2	35.4	26.7	2.6	-38.3	0.0	0.3	64.5	26.7	74.0	54.0	-9.5	-27.3	V
2.745	3.0	78.9	33.3	29.4	2.9	-37.4	0.0	0.6	74.3	28.8	74.0	54.0	0.3	-25.2	Ambient - re-test in chamber
3.660	3.0	58.0	32.0	31.9	3.2	-36.9	0.0	0.6	56.9	30.9	74.0	54.0	-17.1	-23.1	V
4.575	3.0	43.4	30.9	33.4	3.5	-36.5	0.0	0.6	44.5	31.9	74.0	54.0	-29.5	-22.1	V
1.830	3.0	74.5	34.3	26.7	2.6	-38.3	0.0	0.3	65.7	25.5	74.0	54.0	-8.3	-28.5	H
2.745	3.0	79.5	33.9	29.4	2.9	-37.4	0.0	0.6	75.0	29.3	74.0	54.0	1.0	-24.7	Ambient - re-test in chamber
3.660	3.0	57.7	33.1	31.9	3.2	-36.9	0.0	0.6	56.5	32.0	74.0	54.0	-17.5	-22.0	H
4.575	3.0	43.3	30.7	33.4	3.5	-36.5	0.0	0.6	44.3	31.7	74.0	54.0	-29.7	-22.3	H
Low Ch. 903.680 MHz															H
1.807	3.0	78.3	35.1	26.6	2.6	-38.3	0.0	0.3	69.4	26.3	74.0	54.0	-4.6	-27.7	V
2.711	3.0	60.3	33.9	29.3	2.9	-37.4	0.0	0.6	55.7	29.3	74.0	54.0	-18.3	-24.7	V
3.614	3.0	52.3	32.6	31.8	3.2	-36.9	0.0	0.6	51.0	31.3	74.0	54.0	-23.0	-22.7	V
4.518	3.0	48.6	31.2	33.4	3.5	-36.5	0.0	0.6	49.5	32.2	74.0	54.0	-24.5	-21.8	V
1.807	3.0	69.7	34.3	26.6	2.6	-38.3	0.0	0.3	60.9	25.4	74.0	54.0	-13.1	-28.6	H
2.711	3.0	59.4	34.0	29.3	2.9	-37.4	0.0	0.6	54.7	29.3	74.0	54.0	-19.3	-24.7	H
3.614	3.0	55.4	32.9	31.8	3.2	-36.9	0.0	0.6	54.1	31.6	74.0	54.0	-19.9	-22.4	H
4.518	3.0	42.8	30.6	33.4	3.5	-36.5	0.0	0.6	43.8	31.6	74.0	54.0	-30.2	-22.4	H
High Ch. 926.208 MHz															V
1.853	3.0	63.3	35.4	26.8	2.6	-38.3	0.0	0.3	54.7	26.8	74.0	54.0	-19.3	-27.2	V
2.780	3.0	55.8	33.6	29.5	3.0	-37.4	0.0	0.6	51.4	29.2	74.0	54.0	-22.6	-24.8	V
3.706	3.0	59.6	33.1	32.0	3.2	-36.8	0.0	0.6	58.7	32.1	74.0	54.0	-15.3	-21.9	V
4.633	3.0	51.6	31.1	33.5	3.5	-36.5	0.0	0.6	52.8	32.2	74.0	54.0	-21.3	-21.8	V
1.853	3.0	62.8	35.1	26.8	2.6	-38.3	0.0	0.3	54.2	26.5	74.0	54.0	-19.8	-27.5	H
2.780	3.0	56.1	33.5	29.5	3.0	-37.4	0.0	0.6	51.7	29.1	74.0	54.0	-22.3	-24.9	H
3.706	3.0	57.5	32.9	32.0	3.2	-36.8	0.0	0.6	56.5	32.0	74.0	54.0	-17.5	-22.0	H
4.633	3.0	42.1	30.4	33.5	3.5	-36.5	0.0	0.6	43.2	31.6	74.0	54.0	-30.8	-22.4	H
													0.0	0.0	H
													0.0	0.0	H
													0.0	0.0	H
													0.0	0.0	H
													0.0	0.0	H
													0.0	0.0	H
													0.0	0.0	V
													0.0	0.0	V
													0.0	0.0	V
													0.0	0.0	V
													0.0	0.0	V
													0.0	0.0	V
													0.0	0.0	V
													0.0	0.0	V
													0.0	0.0	H
													0.0	0.0	H
													0.0	0.0	H
													0.0	0.0	H
													0.0	0.0	H
													0.0	0.0	H
													0.0	0.0	H
													0.0	0.0	
													0.0	0.0	

Electric meter antenna – 5m chamber test 4/10/2006

02/02/06 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engineer:
Project #:
Company:
EUT Description:
EUT M/N:
EUT S/N:
Test Target:
Mode Of Operation:
Average Power Meter: Low = xx dBm, Mid = xx dBm, High = xx dBm

Test Equipment:

Horn 1-18GHz: T73; S/N: 6717 @3m
Pre-amplifer 1-26GHz: T87 Miteq 924342
Pre-amplifer 26-40GHz:
Horn > 18GHz:

Hi Frequency Cables
2 foot cable: Ninous 177079010
3 foot cable:
12 foot cable: Ninous 208946002

HPF: HPF_4.0GHz
Reject Filter:

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
2.745	3.0	67.8	39.1	29.4	2.4	-44.4	0.0	0.1	55.2	26.6	74	54	-18.8	-27.4	V
2.745	3.0	66.5	39.3	29.4	2.4	-44.4	0.0	0.1	53.9	26.7	74	54	-20.1	-27.3	H
															V
															V
															V
															V
															V
															V
															V
															V
															V
															V
															V
															V
															V
															V
															V
															V
															V
															H
															H
															H
															H
															H
															H
															H
															H
															H
															H
															H
															H
															H

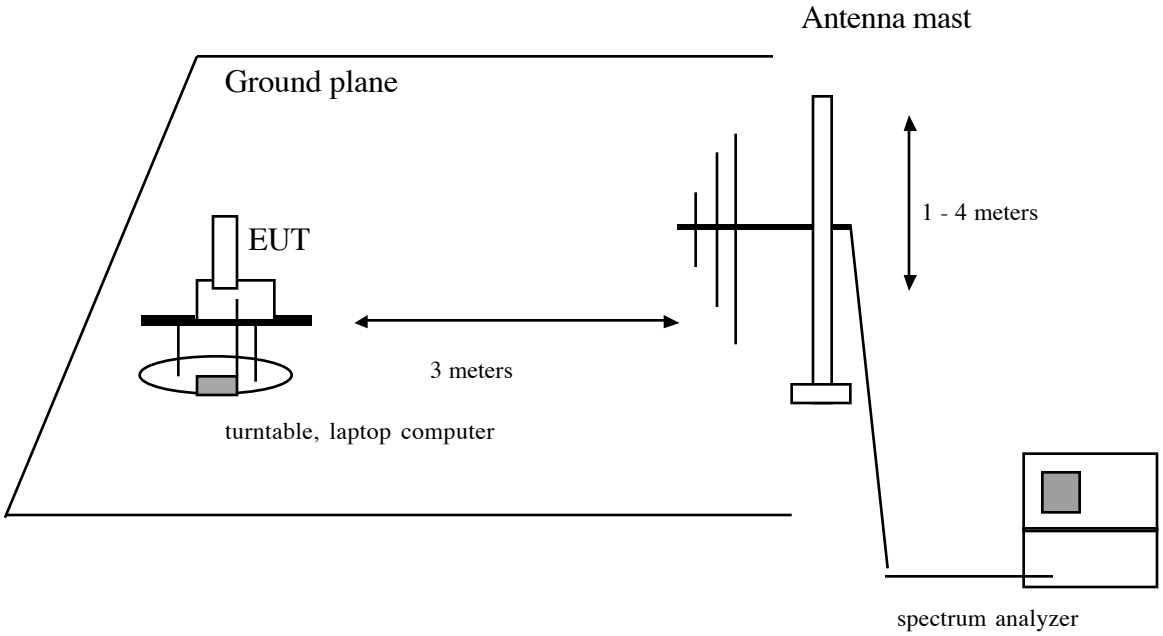
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

Radiated Emissions
Test Requirement: 15.205, 15.209

Measurement Equipment Used:

HP 8542E Receiver, 9 kHz - 2.9 GHz
Sunol Sciences JB1 Biconolog Antenna

Radiated Test Set-up, 30 - 1000 MHz



Test Procedures

1. The EUT was placed on a wooden table resting on a turntable on the open air test site. The search antenna was placed 3m from the EUT. The EUT antenna was mounted vertically as per normal installation. The EUT was set to transmit continuously on the MID channel.

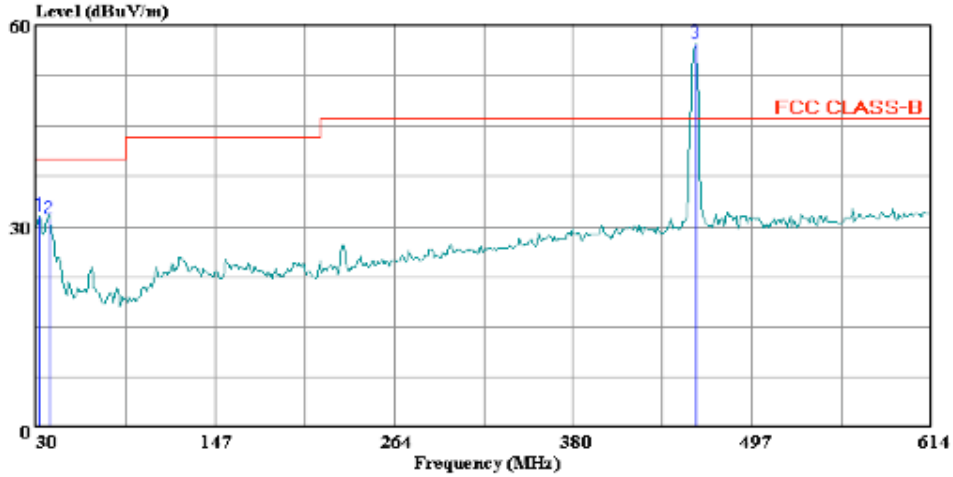
2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205.

3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

Test Results: EUT meets requirements. All transmitter emissions in the 30-1000 MHz band are at least 20 below the carrier:

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 8 File#: rad0301.EMI Date: 03-01-2006 Time: 18:57:56



(Audix ATC)

Trace: 7 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator : Frank Ibrahim
Project # : 06U10065
Company : Silver Spring Networks
EUT : 902-928 MHz Device
Model No : NIC4.1
Configuration : Stand Alone EUT
Mode of operation: TX ON at Mid Channel
Target of Test : FCC Class B

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	32.336	11.70	19.83	31.53	40.00	-8.47	Peak
2	38.760	15.27	15.86	31.13	40.00	-8.87	Peak
3 *	460.408	37.78	19.44	57.22	46.00	11.22	Peak

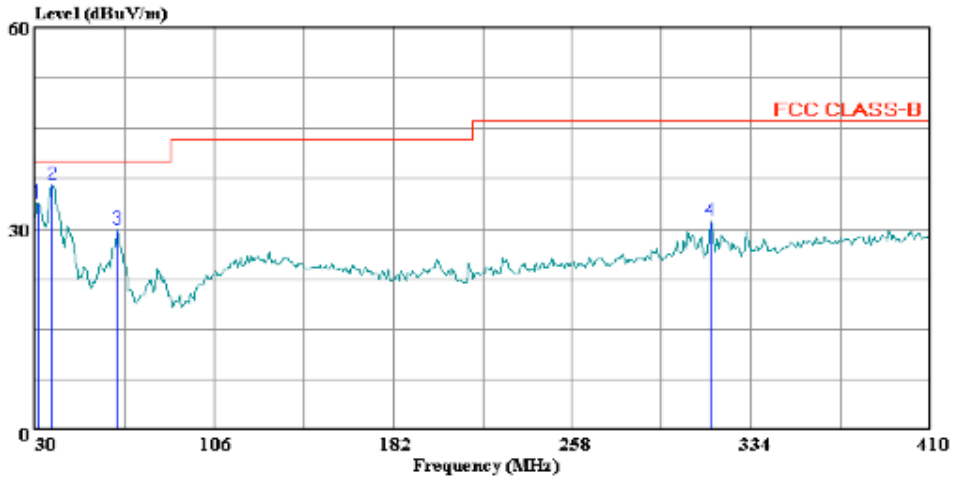
Note: 460.408 MHz is from TX multiplier chain and must be –20 dBc. At fundamental, 29.6 + x dBi = yy dBmeirp

E3m = 95.24 + yy dBm eirp = zz dBuV/m.

57.22 dBuV/m – zz << - 20 dBc

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 12 File#: rad0301.EMI Date: 03-01-2006 Time: 19:12:36



(Audix ATC)

Trace: 11 Ref Trace:

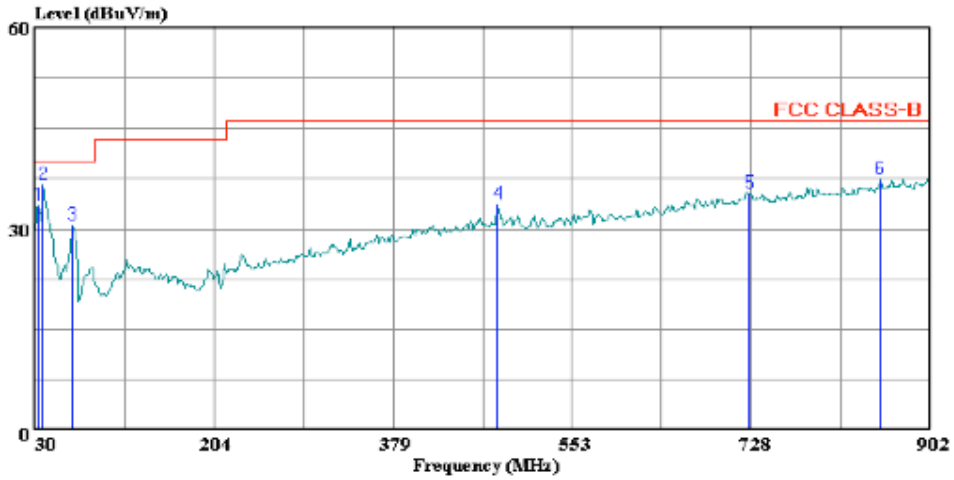
Condition: FCC CLASS-B VERTICAL
Test Operator : Frank Ibrahim
Project # : 06U10065
Company : Silver Spring Networks
EUT : 902-928 MHz Device
Model No : NIC4.1
Configuration : Stand Alone EUT
Mode of operation: TX ON at Mid Channel
Target of Test : FCC Class B

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	31.140	13.75	20.19	33.94	40.00	-6.06	Peak
2	37.220	19.83	16.74	36.57	40.00	-3.43	Peak
3	64.960	20.80	9.03	29.83	40.00	-10.17	Peak
4	316.520	15.09	16.10	31.18	46.00	-14.82	Peak

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 2 File#: rad0301.EMI Date: 03-01-2006 Time: 18:31:12



(Audix ATC)

Trace: 1 Ref Trace:

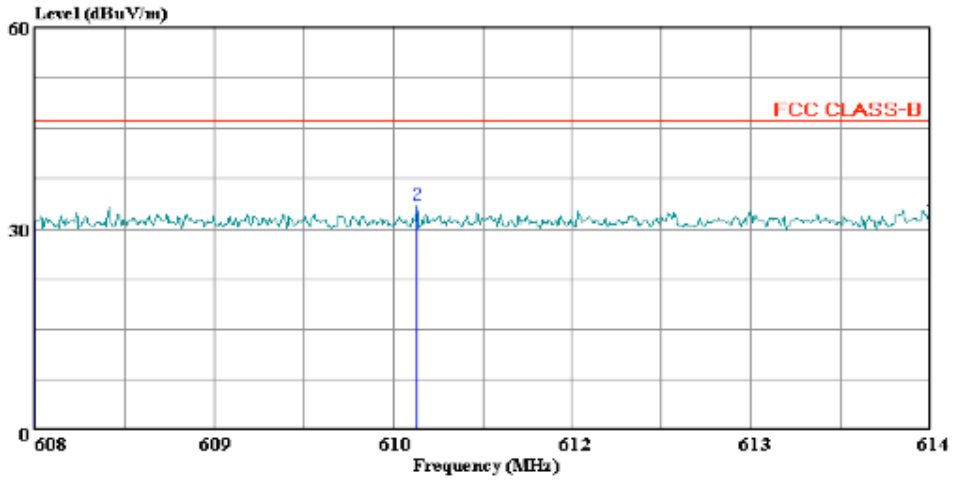
Condition: FCC CLASS-B VERTICAL
Test Operator : Frank Ibrahim
Project # : 06U10065
Company : Silver Spring Networks
EUT : 902-928 MHz Device
Model No : NIC4.1
Configuration : Stand Alone EUT
Mode of operation: TX ON at Mid Channel
Target of Test : FCC Class B

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	33.488	13.76	19.58	33.34	40.00	-6.66	Peak
2	37.848	19.89	16.65	36.54	40.00	-3.46	Peak
3	66.624	21.44	9.14	30.58	40.00	-9.42	Peak
4	480.824	13.75	19.82	33.57	46.00	-12.43	Peak
5	725.856	11.72	23.54	35.25	46.00	-10.75	Peak
6	853.168	12.01	25.27	37.28	46.00	-8.72	Peak

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 16 File#: rad0301.EMI Date: 03-01-2006 Time: 19:18:22



(Audix ATC)

Trace: 15 Ref Trace:

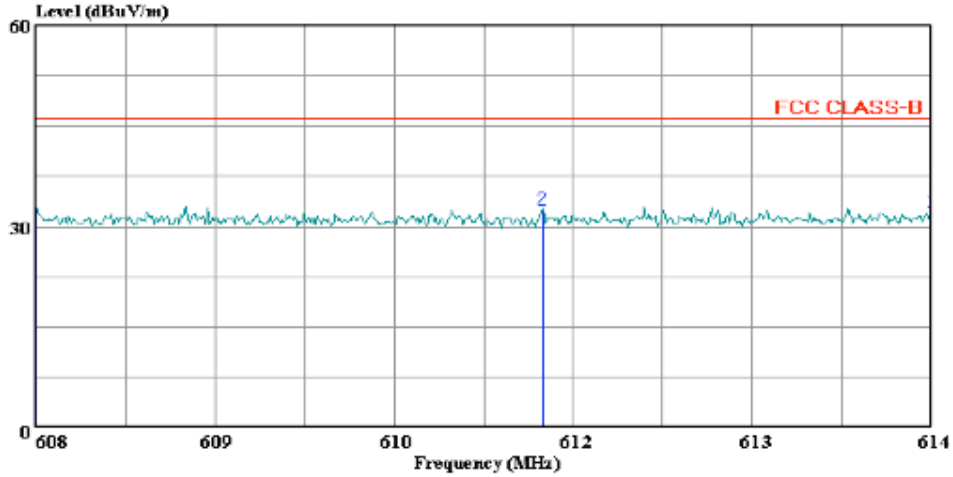
Condition: FCC CLASS-B HORIZONTAL
Test Operator : Frank Ibrahim
Project # : 06U10065
Company : Silver Spring Networks
EUT : 902-928 MHz Device
Model No : NIC4.1
Configuration : Stand Alone EUT
Mode of operation: TX ON at Mid Channel
Target of Test : FCC Class B

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	608.000	9.46	21.63	31.09	46.00	-14.91	Peak
2	610.562	11.81	21.67	33.48	46.00	-12.52	Peak
3	614.000	9.14	21.70	30.84	46.00	-15.16	Peak

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 14 File#: rad0301.EMI Date: 03-01-2006 Time: 19:15:27



(Audix ATC)

Trace: 13 Ref Trace:

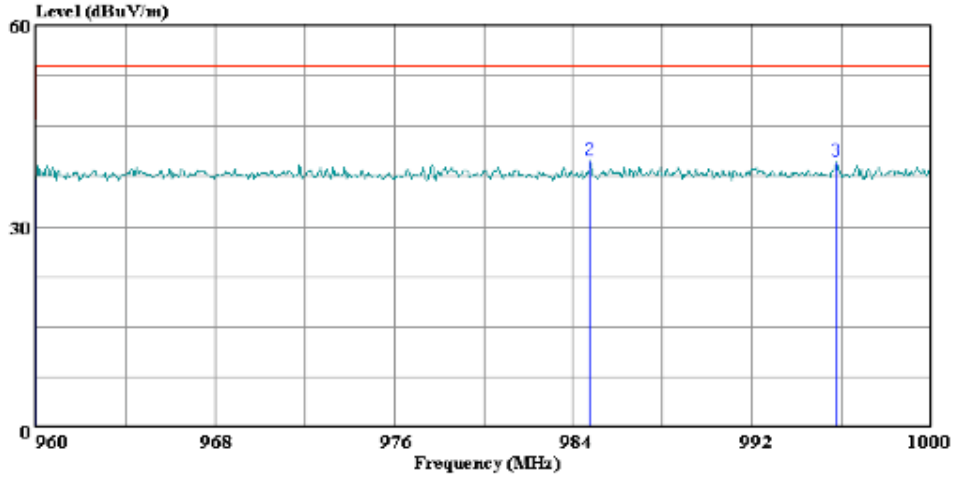
Condition: FCC CLASS-B VERTICAL
Test Operator : Frank Ibrahim
Project # : 06U10065
Company : Silver Spring Networks
EUT : 902-928 MHz Device
Model No : NIC4.1
Configuration : Stand Alone EUT
Mode of operation: TX ON at Mid Channel
Target of Test : FCC Class B

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	608.000	11.10	21.63	32.73	46.00	-13.27	Peak
2	611.396	10.79	21.68	32.47	46.00	-13.53	Peak
3	614.000	10.18	21.70	31.88	46.00	-14.12	Peak

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 6 File#: rad0301.EMI Date: 03-01-2006 Time: 18:51:57



(Audix ATC)
Trace: 5 Ref Trace:

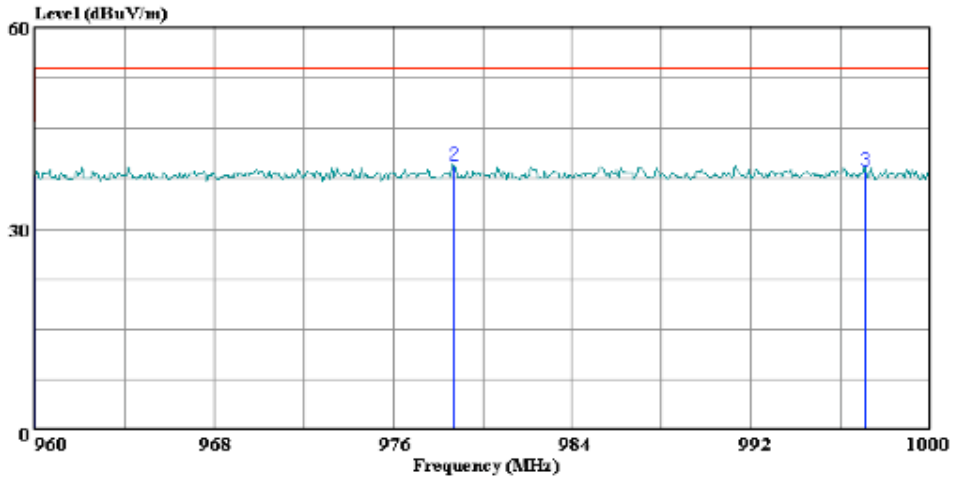
Condition: FCC CLASS-B HORIZONTAL
Test Operator : Frank Ibrahim
Project # : 06U10065
Company : Silver Spring Networks
EUT : 902-928 MHz Device
Model No : NIC4.1
Configuration : Stand Alone EUT
Mode of operation: TX ON at Mid Channel
Target of Test : FCC Class B

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	960.000	10.64	26.54	37.18	54.00	-16.82	Peak
2	984.760	13.03	26.78	39.81	54.00	-14.19	Peak
3	995.760	12.74	26.92	39.66	54.00	-14.34	Peak

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 4 File#: rad0301.EMI Date: 03-01-2006 Time: 18:46:21



(Audix ATC)

Trace: 3 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator : Frank Ibrahim
Project # : 06U10065
Company : Silver Spring Networks
EUT : 902-928 MHz Device
Model No : NIC4.1
Configuration : Stand Alone EUT
Mode of operation: TX ON at Mid Channel
Target of Test : FCC Class B

Page: 1

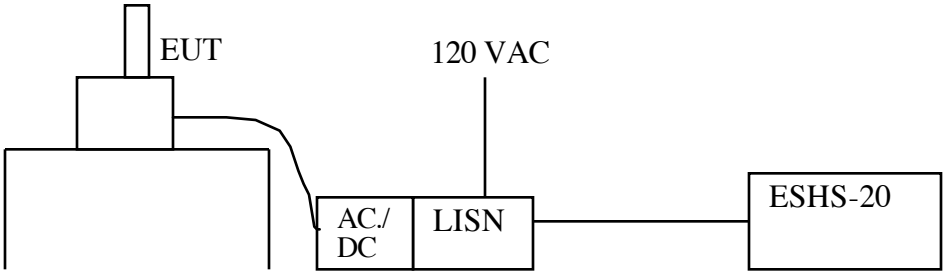
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	960.000	11.47	26.54	38.01	54.00	-15.99	Peak
2	978.720	12.62	26.74	39.36	54.00	-14.64	Peak
3	997.120	11.67	26.90	38.58	54.00	-15.42	Peak

AC Line Conducted Emissions
Test Requirement: 15.207

Measurement Equipment Used:

Rhode & Schwarz EMI Receiver ESHS-20
Fischer Custom Communication LISN, FCC-LISN-50/250-25-2

AC Conducted Set-up



Test Procedure

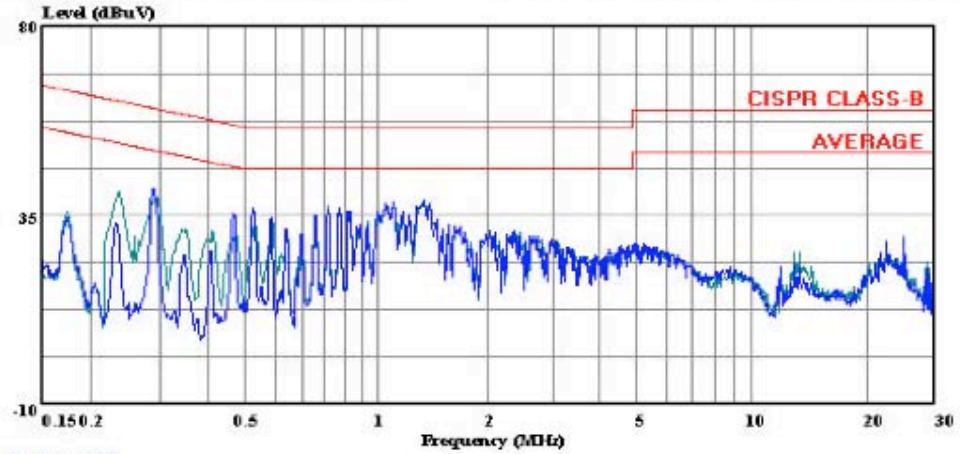
1. The EUT was placed on a wooden table 40 cm from a vertical ground plane and approximately 80 cm above the horizontal ground plane on the floor. The EUT was set to transmit in normally.
2. Line conducted data was recorded for both NEUTRAL and HOT lines.

Test Results

PASS. Refer to data plot below.

Compliance Certification Services
561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0885
Fax: (408) 463-0888

Data#: 9 File#: Lc0302.emi Date: 03-02-2006 Time: 15:40:47



(Audix ATC)

Trace: 5 Ref Trace:

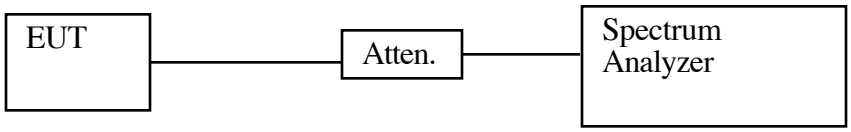
Condition: CISPR CLASS-B
Test Operator : Frank Ibrahim
Project # : 06U10065
Company : Silver Spring Networks
EUT Description: 902-928 MHz Device
Model : NIC4.1
EUT Config : Stand Alone EUT
Mode Of Oper : TX ON at Mid Channel
Target : FCC Class B
Power Source : 115 VAC, 60 Hz
: Peak: L1(Green), L2(Blue)

6dB Bandwidth for DTS
Test Requirement: 15.247 (a)2

Measurement Equipment Used:

Agilent 4446A Spectrum Analyzer, 9 kHz-40 GHz
20 dB attenuator

Test Set-up



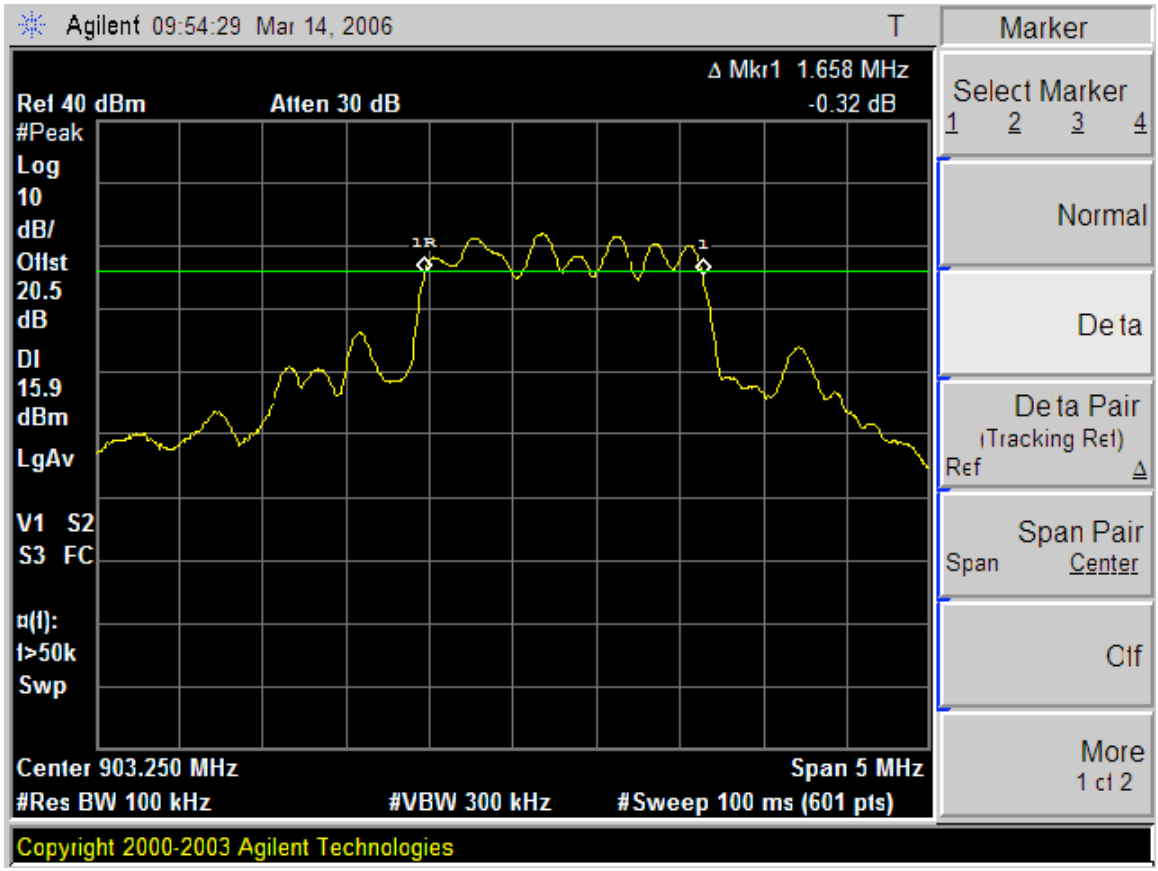
Test Procedures

A modified EUT with a coaxial cable attached to the radio antenna port was configured on a test bench. The cable's SMA connector was connected to the spectrum analyzer. The EUT transmission was continuous at 903.68 MHz (LOW channel). While the transmitter broadcast a steady stream of digital data, the analyzer MAX HOLD function was used to capture the envelope of the transmission occupied bandwidth.

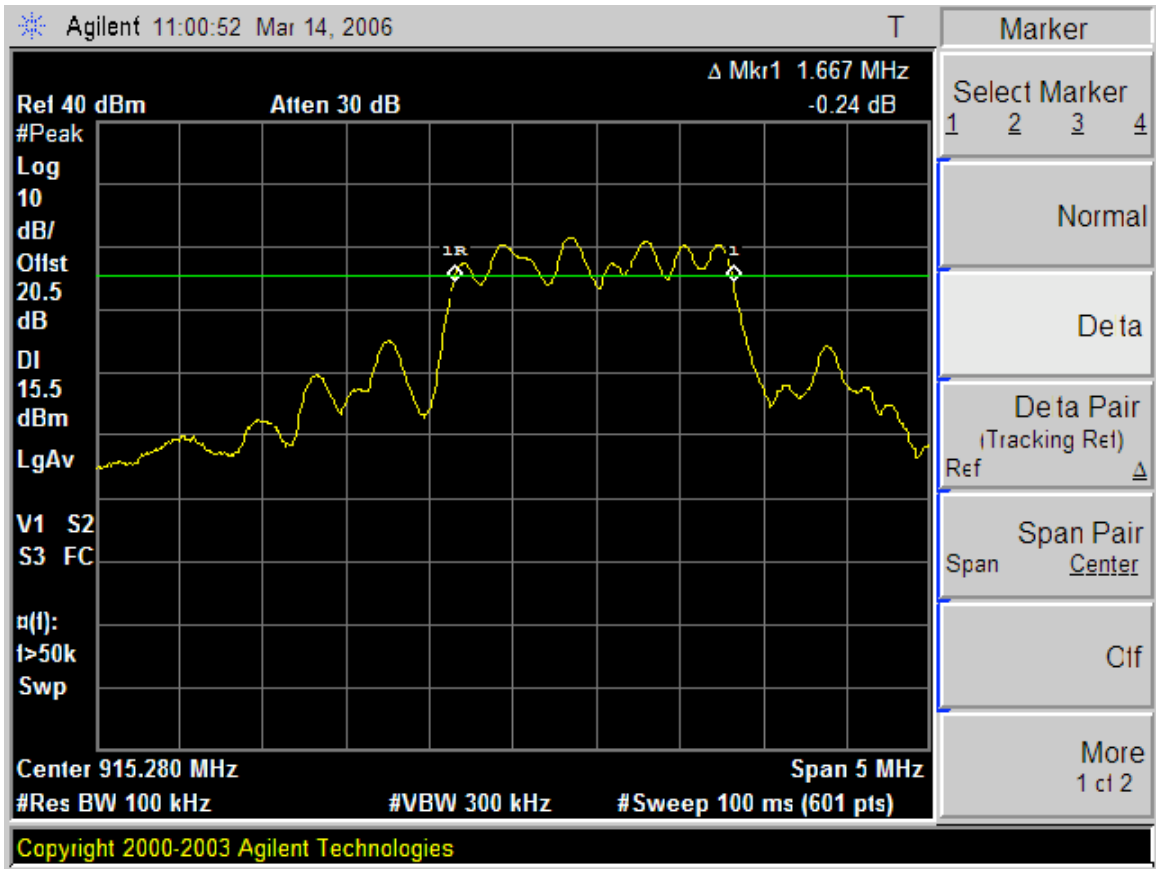
Test was repeated for MID and HIGH channels.

Test Results: Worst case measured easured approximately 1.4 MHz 6 dB BW.
Refer to data plots below.

6dB Bandwidth LOW Channel



6 dB BW, MID Channel



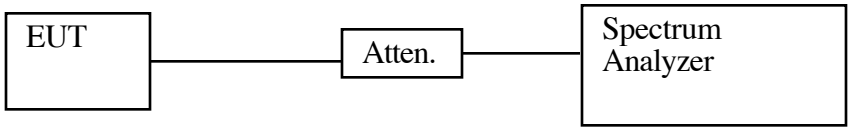
6 dB BW, HIGH Channel

99% Bandwidth
Test Requirement: IC RSS-210

Measurement Equipment Used:

Agilent 4446A Spectrum Analyzer, 9 kHz-40 GHz
20 dB attenuator

Test Setup



Limit

None: for reporting purposes only.

Test Procedure

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

Test Results

Refer to spectrum analyzer charts below. 99% bandwidth approximately 4.22 MHz.

99% Bandwidth LOW Channel

99% Bandwidth MID Channel

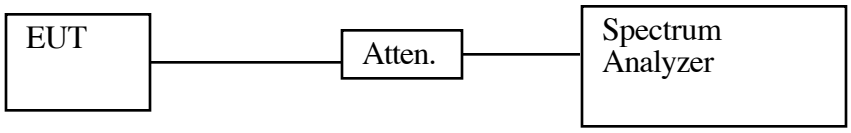
99% Bandwidth HIGH Channel

RF Power Output
Test Requirement: 15.247(b)

Measurement Equipment Used:

Agilent 4446A Spectrum Analyzer, 9 kHz-40 GHz
20 dB attenuator

Test Setup



Test Procedures

1.The EUT was configured on a test bench. The spectrum analyzer RBW and VBW were set to a value higher than the 2.69 MHz 99% bandwidth, 3MHz and 5MHz respectively.

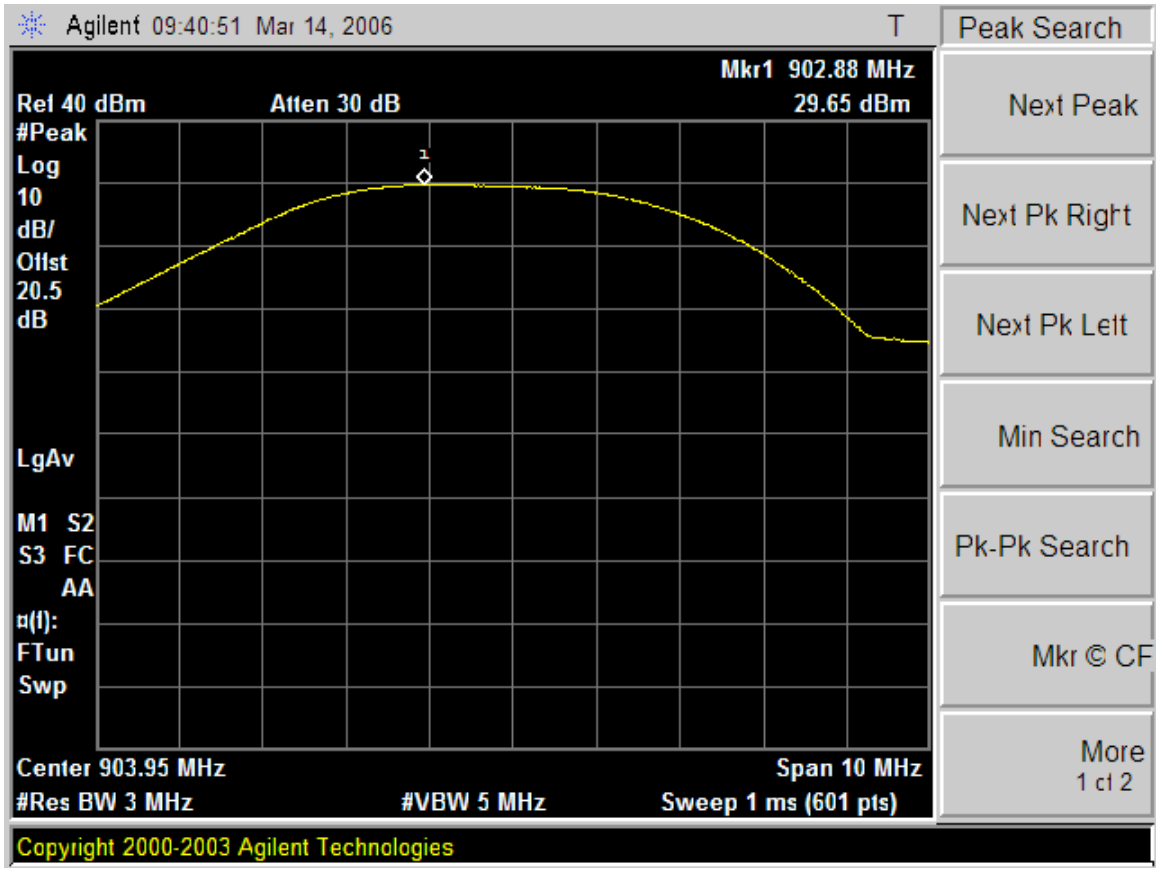
2. The spectrum analyzer detector was set to PEAK and the highest value was recorded using the analyzer PEAK SEARCH function.

Test Results

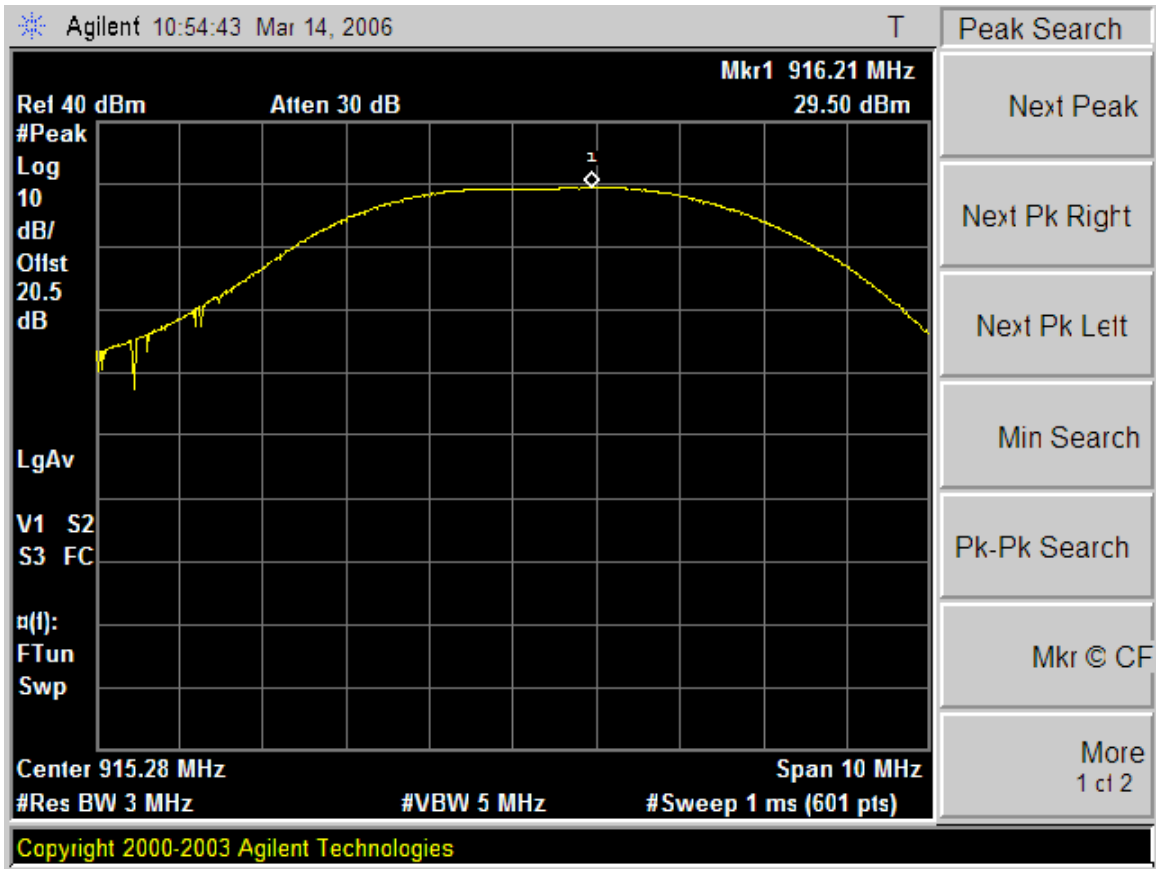
Refer to spectrum analyzer graphs. Reference level offset corrects for external attenuation and cable loss.

Frequency, MHz	**Output Power, dBm**
903.680	29.65
915.968	29.50
926.208	28.86

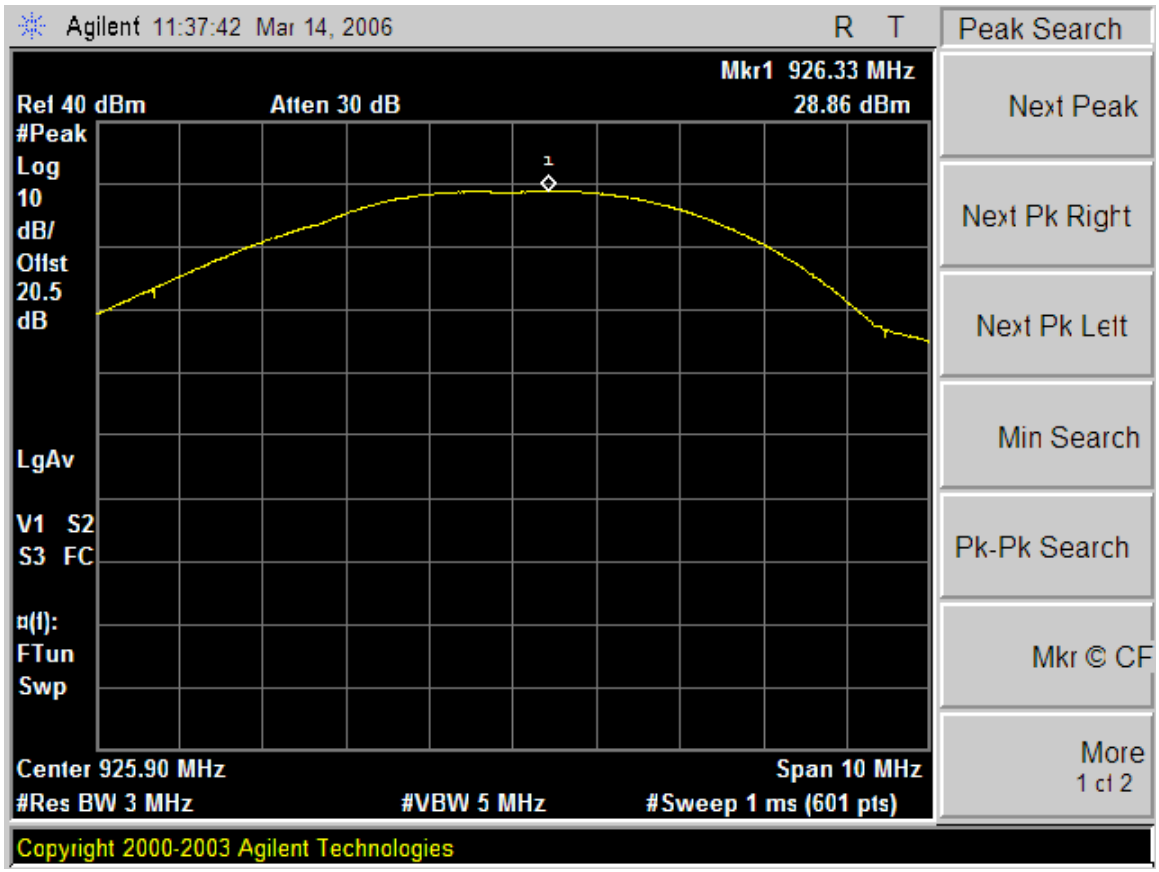
Peak Output Power LOW Channel



Peak Output Power MID Channel



Peak Output Power HIGH Channel

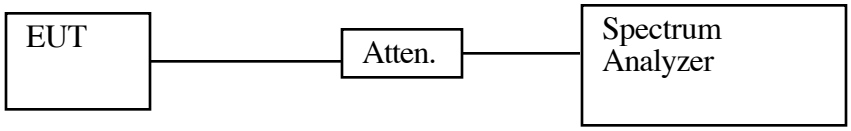


Spurious Emissions, Conducted
Test Requirement: 15.247 (d)

Measurement Equipment Used:

Agilent 4446A Spectrum Analyzer, 9 kHz-40 GHz
20 dB attenuator

Test Setup



Test Procedure

1. The EUT was configured on a test bench. The cable was connected between the EUT antenna port and the spectrum analyzer input port.

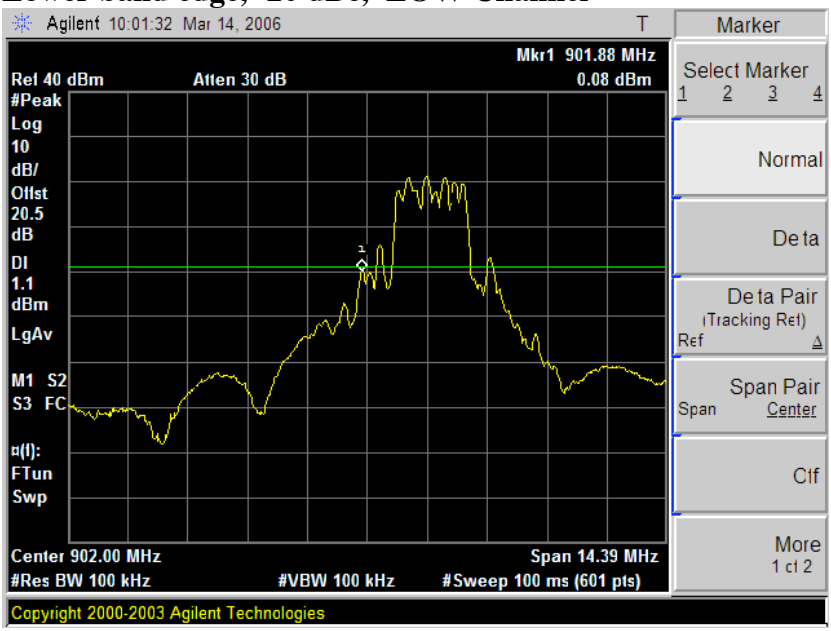
Spectrum analyzer RES BW was set to 100 kHz. While the transmitter broadcast a steady stream of digital data, the analyzer MAX HOLD function was used to capture the envelope of the transmission.

Readings were taken out to 10fo.

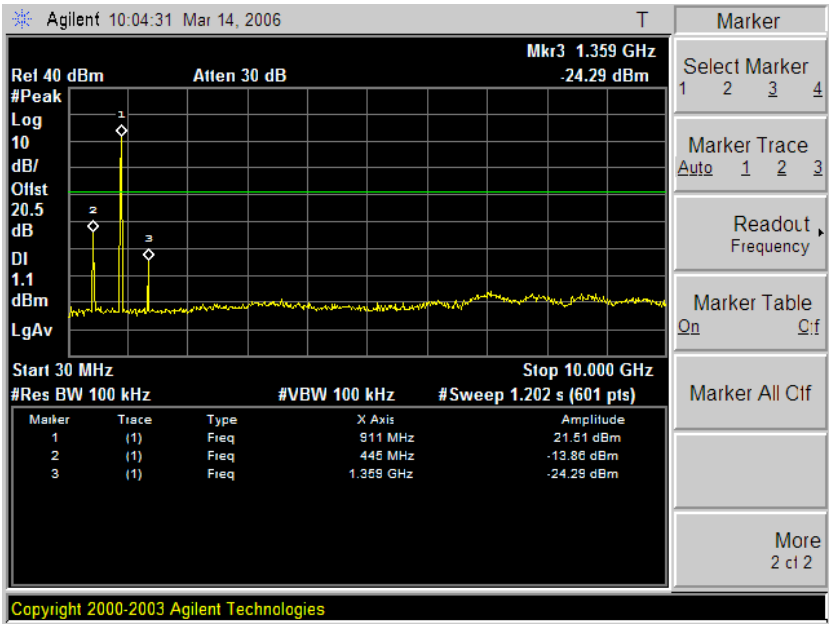
Test Results

Refer to spectrum analyzer plots. Data shows out of band emissions are suppressed well below the -20 dBc minimum required by the Rules.

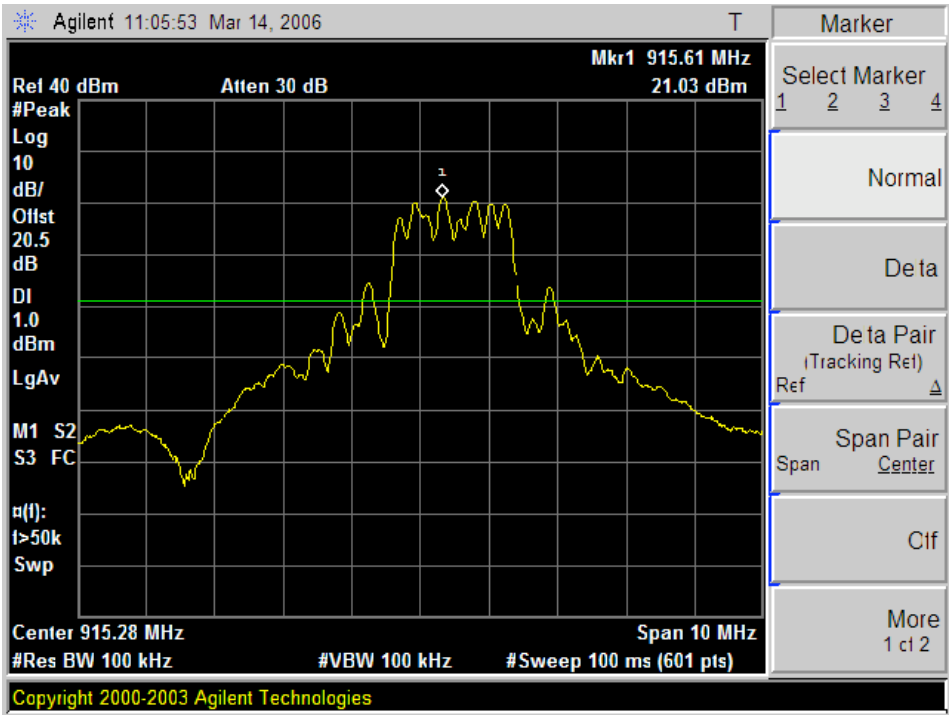
Lower band edge, -20 dBc, LOW Channel



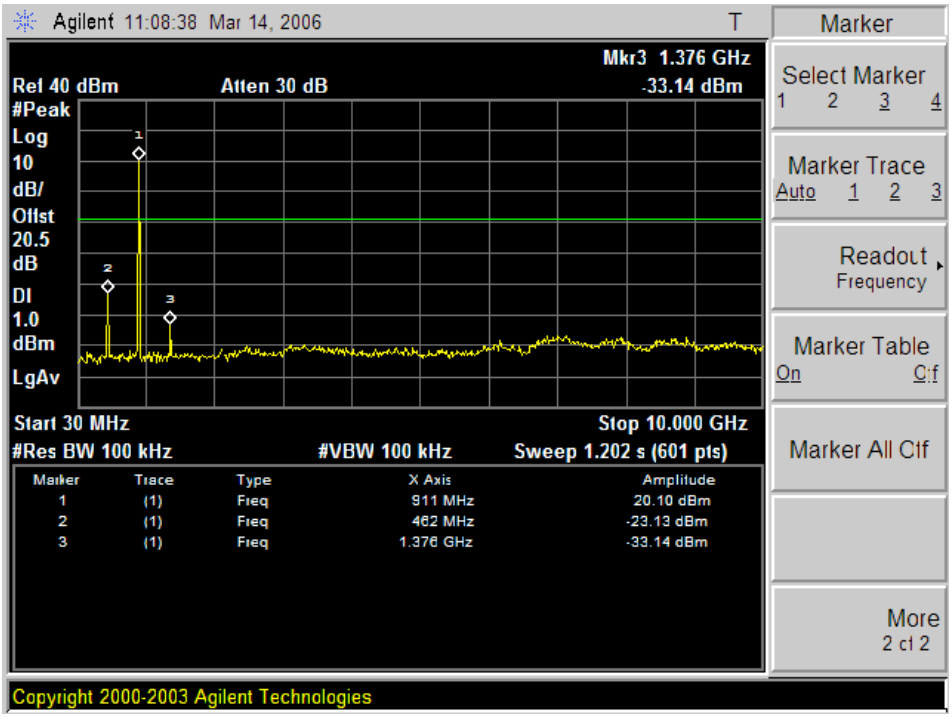
TX Spurious Emissions LOW Channel



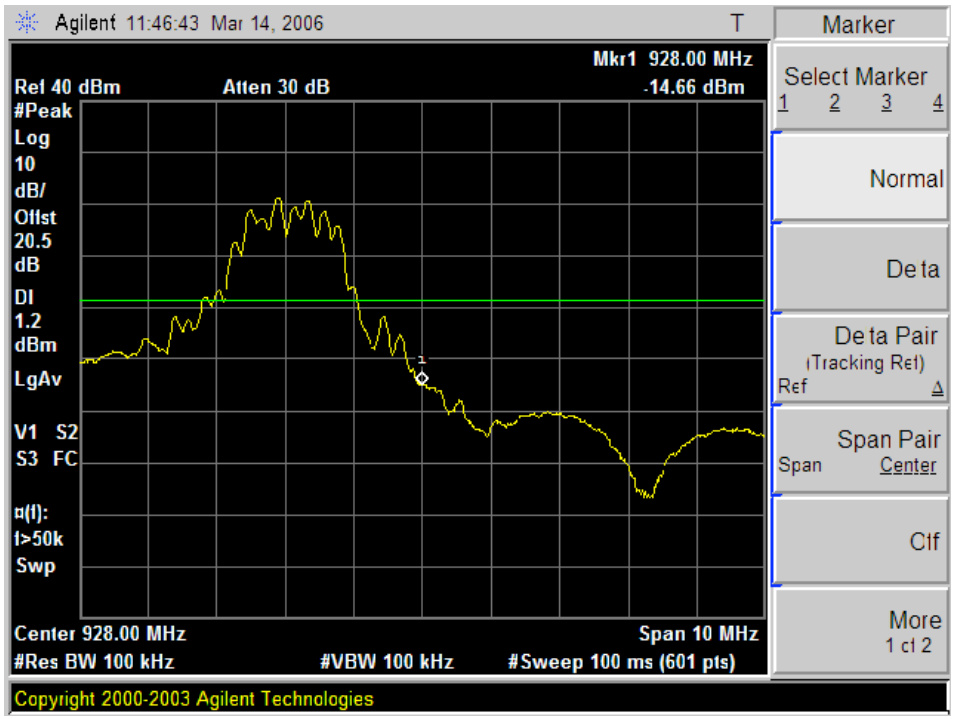
-20 dBc MID Channel Reference



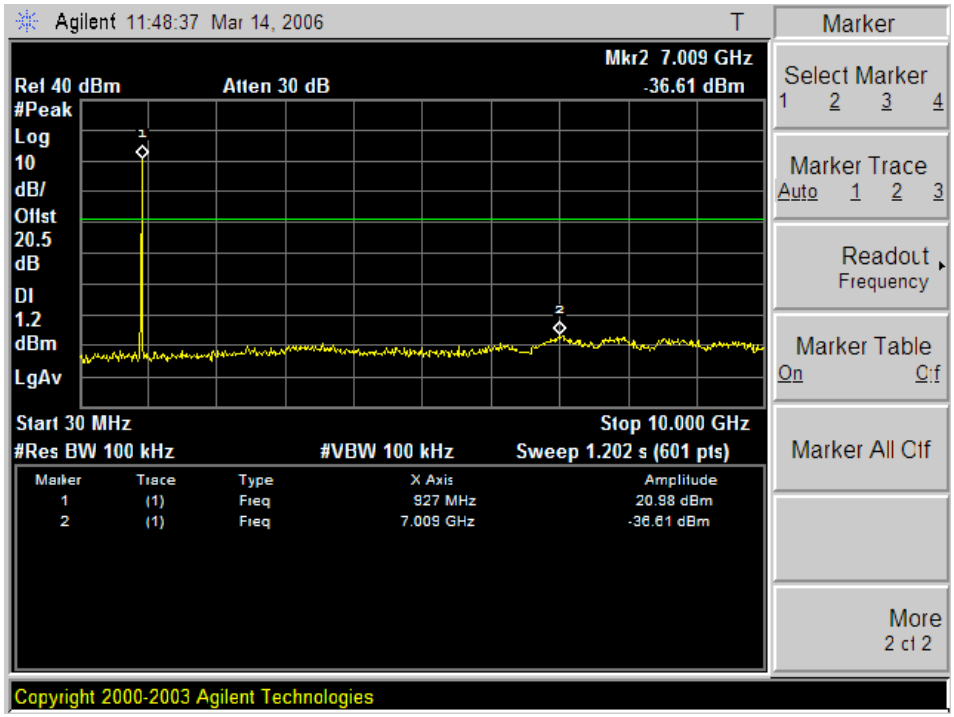
TX Spurious, MID Channel



Upper band edge, -20 dBc HIGH Channel



TX Spurious, HIGH Channel

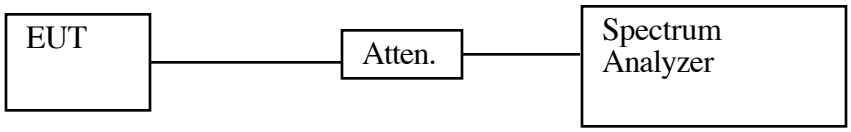


Power Spectral Density
Test Requirement: 15.247(e)

Measurement Equipment Used:

Agilent 4446A Spectrum Analyzer, 9 kHz-40 GHz
20 dB attenuator

Test Setup



Test Procedure

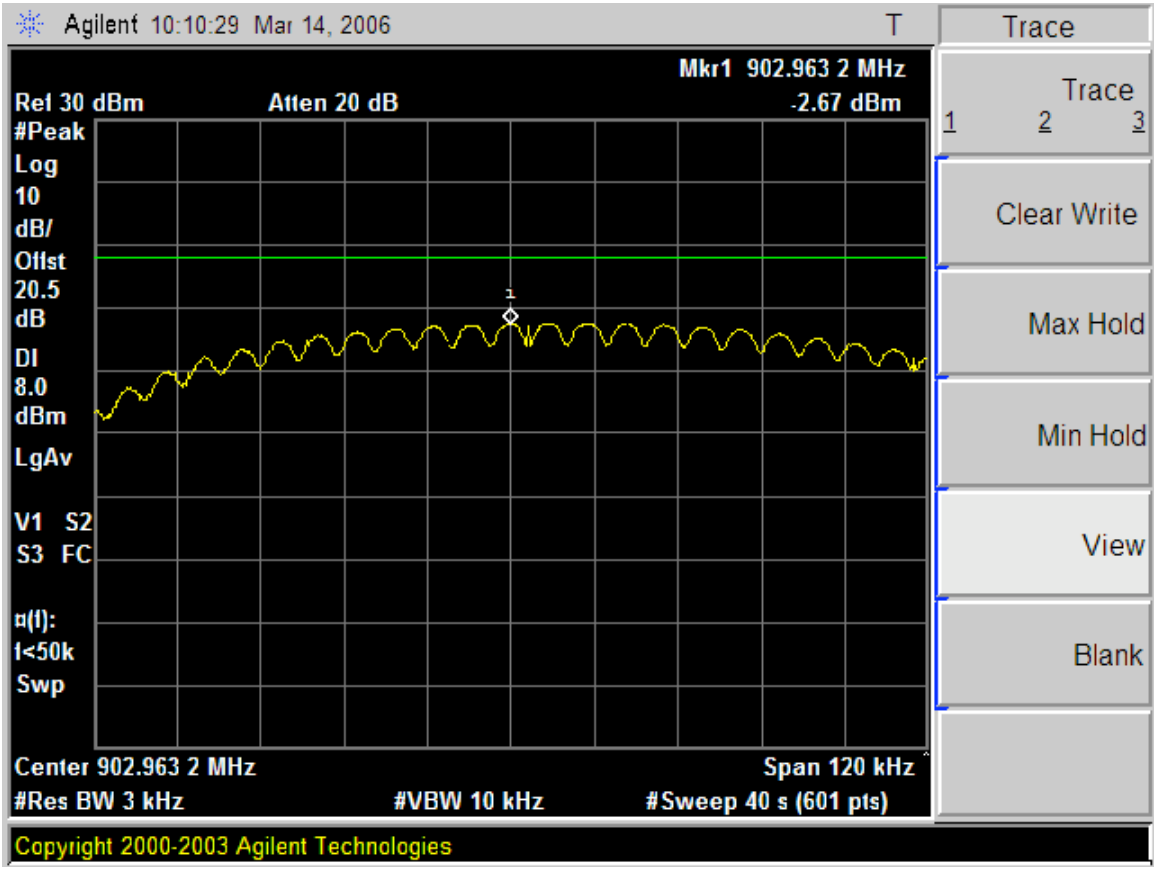
Test software limited ON time to approximately 40 seconds. As such, the standard test procedure for PSD was modified slightly to accommodate this limitation, without compromising the accuracy of the measurement:

1. Determine frequency at which maximum emission occurs during pre-scan.
2. Reduce SPAN to 120 kHz while adjusting tuning frequency so that peak remains at center of screen.
3. Set RES BW =3 kHz, VID BW = 10 kHz, SWEEP = 40 sec.
4. Record highest reading and compare to 8 dBm limit.

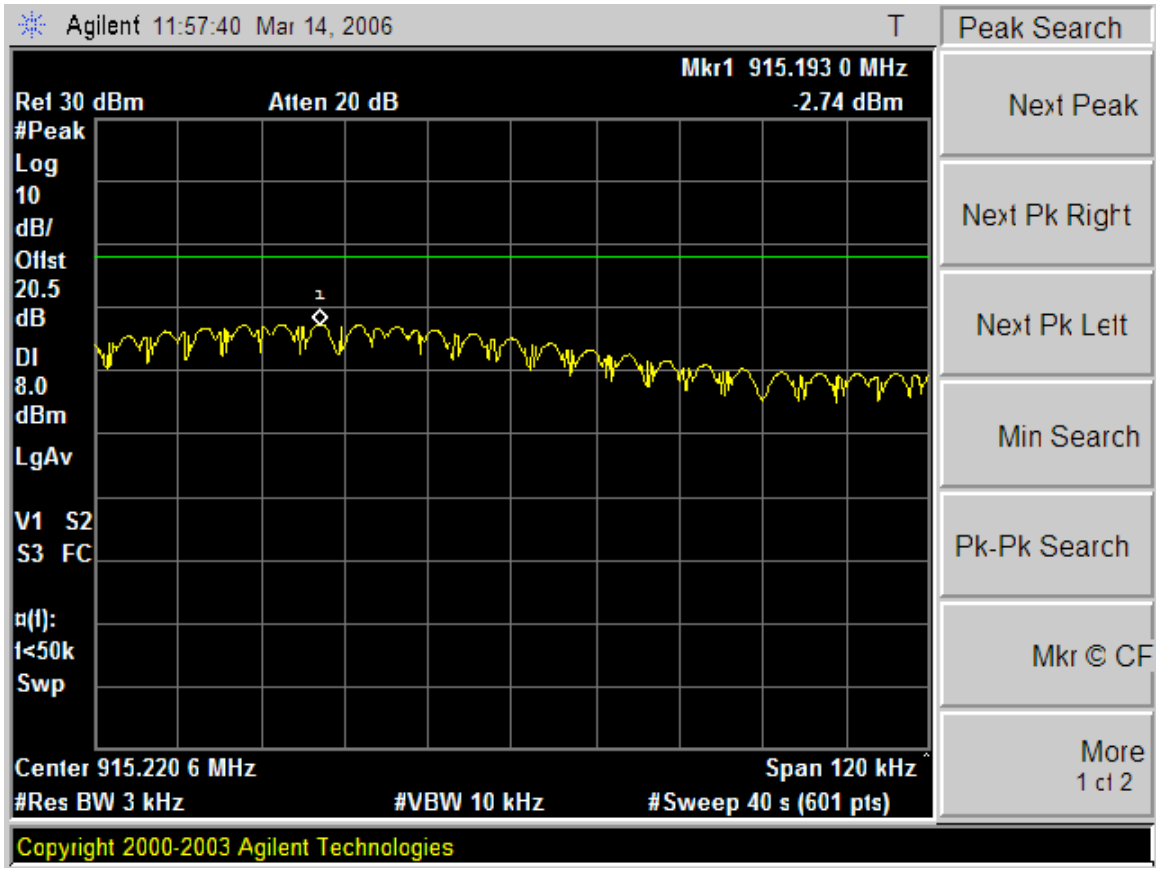
Test Results

Maximum PSD was –2.27 dBm. Refer to attached spectrum analyzer charts.

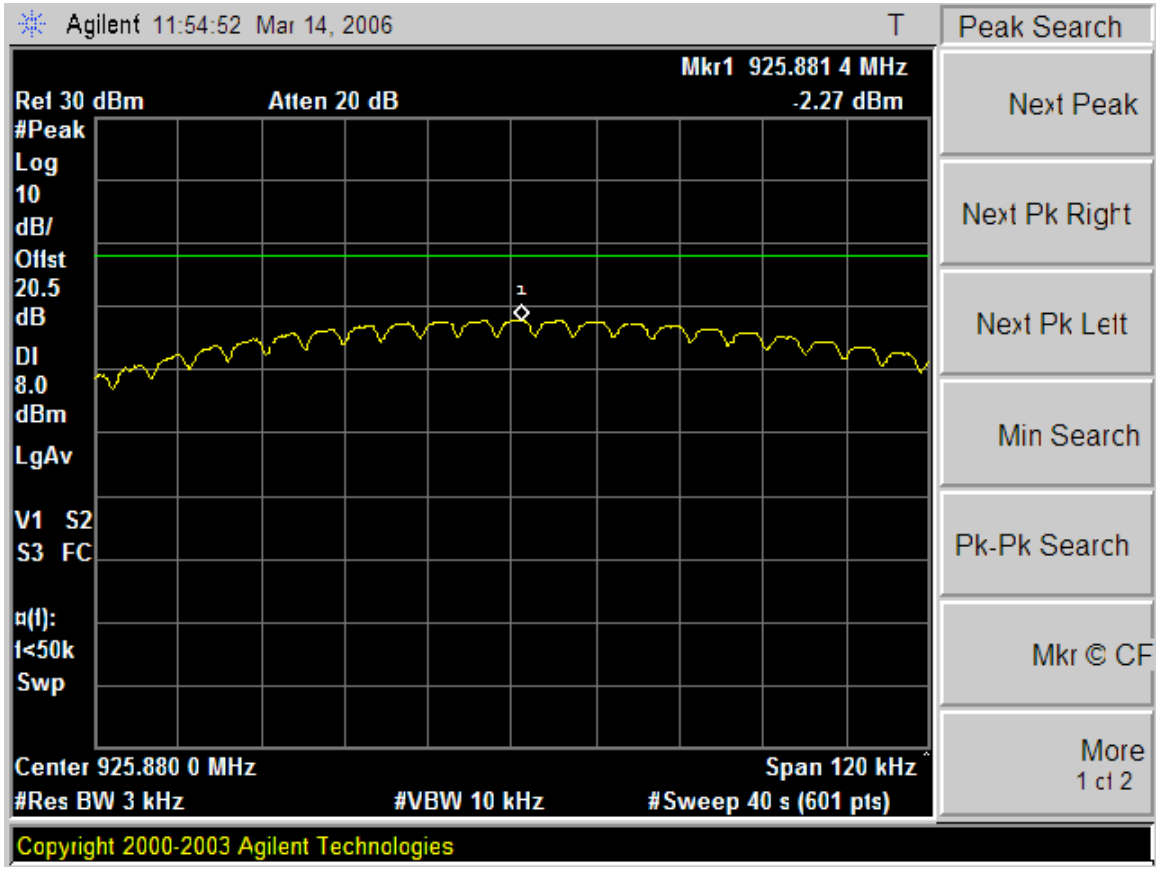
Power Spectral Density LOW Channel



Power Spectral Density MID Channel



Power Spectral Density HIGH Channel



RF Exposure (MPE) Calculations

Silver Spring Networks										
FCC ID: OWS-NIC41										
IC: 5975A- NIC41										
Utility Meter WLAN Transceiver			902-928 MHz			**Calculate mW/cm2 here. Enter frequency in MHz:**				
RF Hazard Distance Calculation						Calculation of Limits from 1.1310 Table 1				
									Controlled	Uncontrolled
									Ave 6 min	Ave 30 min
mW/cm2 from Table1:		0.60	(E: 61 V/m)			F(MHz)	**Actual F, MHz**		Occ, mW/c2	Gen, mW/cm2
						0.3-3	0.5		100.0	100.0
Max RF Power	TX Antenna	MPE distance	S, mW/cm@	Comment		*3.0 - 30.0*	*5*		*180.0*	*36.0*
P, dBm	G, dBi	cm	at 20 cm			**30.0-300**	**55**		**1.0**	**0.2**
						300-1500	*902*		*3.0*	*0.60*
29.6	**4.5**	**18.5**	**0.51**			1500-100000	5555		5.0	1.0
						Enter P(mW)	Equivalent dBm	**Enter dBm**	Equivalent Watts	
Basis of Calculations:						***64***	**18.1**	***18.1***	64.6	
E^2/3770 = S, mW/cm2										
E, V/m = (Pwatts*Ggain*30)^.5/d, meters										
d = ((Pwatts*G*30)/3770*S))^0.5			Pwatts*Ggain = 10^(PdBm-30+GdBi)/10)							
S@20cm = 20 log (MPE dist/20cm)										
NOTE: For mobile or fixed location transmitters, minimum separation distance is for FCC compliance is 20 cm,										
even if calculations indicate MPE distance is less										

REPORT REVISION HISTORY

Revision	Description	Revised By	Date
	Initial Release	T.Cokenias	4/12/06
1.1	Correct typos Minor editorial changes	T. Cokenias	5/5/06