EMISSIONS TEST REPORT FOR A LOW POWER TRANSMITTER

I. GENERAL INFORMATION

Requirement: Federal Communications Commissions
Test Requirements: 15.205, 15.207, 15.209, 15.247

Applicant: Sensus Metering Systems

FCC ID: **KCH520R**

II. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

The Sensus FCC ID: **KCH520R** is a digital transmission system (DTS) operating under the requirements in FCC Part 15. 247. The Model 510R/520R incorporates a part 15.247 Direct Sequence Spread Spectrum Transmitter operating in the 902 to 928 MHz ISM band, and a Part 15 AM Receiver operating in the 952 or 956 MHz MAS bands. The MXU uses spread spectrum techniques for remote water meter reading.

Transmitter Specification

TX Power	24.15 dBm max.
Frequency of operation	904.6-925.4 MHz
Data Rate	15.625 Kbps in <80ms burst
6 dB bandwidth	1.15 MHz
Power source	3.6 V lithium thionyl chloride battery
Radio firmware	MXU4 GP-TC v0.0.4
Test software name	MXU4T

III. TEST DATES AND TEST LOCATION

Testing was performed 16-17 June 2005. All tests were performed at:

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

T.N. Cokenias 17 June 2005
EMC Consultant/Agent for Sensus Metering Systems

15.203 Antenna connector requirement

The antenna is permanently attached to the product. For antenna conducted tests, a unit was modified by disconnecting the printed circuit antenna and replacing it with a 50 ohm coaxial cable connection terminated at one end with an SMA connector.

15.204 Antenna description

The meter transceiver uses a printed circuit folded dipole antenna:

Antenna description	Gain
printed ckt antenna	2.2 dBi

TEST PROCEDURES

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

1) **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
2) **FCC Public Notice 97-114,** Guidance on Measurements for Direct Sequence Spread Spectrum Systems

TEST RESULTS

Radiated Emissions
Test Requirement: 15.205, 15.247

Out of Band Measurements
Test Requirement: 15.247

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

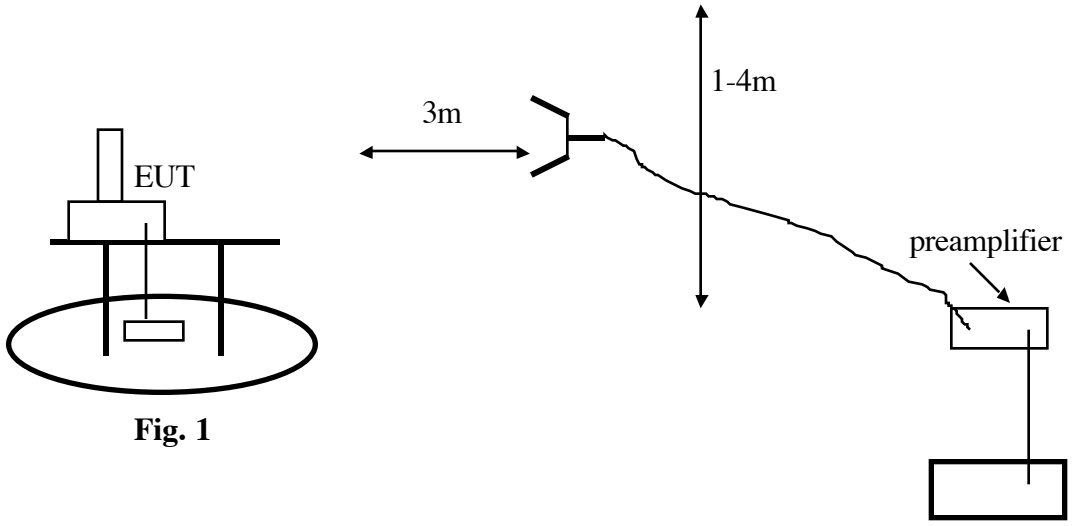


Fig. 1

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 XY plane, the first of three test positions.

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. Radiated emissions were investigated for a LOW channel, a MID channel, and HIGH channel. Emissions were investigated to the 10^{th} harmonic.

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.

5. Steps 2 through 5 were repeated for YZ and XZ orientation of the EUT.

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(c). FCC Radiated Emissions Limits

Section 15.205 Restricted bands of operation.
(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

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	(2)
13.36 - 13.41	322 - 335.4		

1 Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
2 Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.
(c) Except as provided in paragraphs (d) and (e), regardless of the field strength limits specified elsewhere in this Subpart, the provisions of this Section apply to emissions from any intentional radiator.

Section 15.209 Radiated emission limits, general requirements.

(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

(b) In the emission table above, the tighter limit applies at the band edges.

(c) The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other Sections within this Part and which are required to reduce their unwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emission and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.

(d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

(e) The provisions in Sections 15.31, 15.33, and 15.35 for measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this Part.

06/16/05 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr:William Zhuang
Project #:05U3492
Company:Thomas N. Cokenias RFI/EMI Consultant
EUT Descrip.:Swell Device (Applicant: Sensus)
EUT M/N:520R FCC ID:KCH520R
Test Target:FCC 101
Mode Oper:Tx On, Low Ch. 904.6MHz

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)
XY Position															
1.809	3.0	74.0	73.2	27.2	1.8	-42.6	0.0	0.3	60.8	60.0	74.0	54.0	-13.2	6.0	H, not 15.205 (-20dBc limit)
1.809	3.0	75.3	74.6	27.2	1.8	-42.6	0.0	0.3	62.1	61.4	74.0	54.0	-11.9	7.4	V, not 15.205 (-20dBc limit)
2.714	3.0	55.8	50.6	29.3	2.3	-42.5	0.0	0.6	45.4	40.2	74.0	54.0	-28.6	-13.8	H
2.714	3.0	52.8	42.3	29.3	2.3	-42.5	0.0	0.6	42.4	31.9	74.0	54.0	-31.6	-22.1	V
3.618	3.0	53.5	49.2	31.7	2.7	-42.8	0.0	0.6	45.7	41.4	74.0	54.0	-28.3	-12.6	V
3.618	3.0	56.8	53.4	31.7	2.7	-42.8	0.0	0.6	49.0	45.6	74.0	54.0	-25.0	-8.4	H
4.523	3.0	54.4	47.4	33.3	3.1	-43.7	0.0	0.6	47.7	40.7	74.0	54.0	-26.3	-13.3	H
4.523	3.0	53.9	43.9	33.3	3.1	-43.7	0.0	0.6	47.2	37.2	74.0	54.0	-26.8	-16.8	V
5.428	3.0	51.3	43.0	34.2	3.5	-44.5	0.0	0.5	45.1	36.7	74.0	54.0	-28.9	-17.3	V
5.428	3.0	53.3	47.6	34.2	3.5	-44.5	0.0	0.5	47.0	41.3	74.0	54.0	-27.0	-12.7	H
6.332	3.0	59.8	55.3	35.0	3.8	-45.0	0.0	0.5	54.1	49.6	74.0	54.0	-19.9	-4.4	H
6.332	3.0	57.1	51.7	35.0	3.8	-45.0	0.0	0.5	51.3	45.9	74.0	54.0	-22.7	-8.1	V
7.237	3.0	52.5	46.3	36.1	3.9	-44.7	0.0	0.6	48.4	42.2	74.0	54.0	-25.6	-11.8	V
7.237	3.0	54.7	48.3	36.1	3.9	-44.7	0.0	0.6	50.7	44.2	74.0	54.0	-23.3	-9.8	H
8.141	3.0	49.8	40.4	36.9	4.1	-44.4	0.0	0.7	47.2	37.7	74.0	54.0	-26.8	-16.3	H
8.141	3.0	50.1	37.6	36.9	4.1	-44.4	0.0	0.7	47.5	34.9	74.0	54.0	-26.5	-19.1	V
9.046	3.0	49.0	39.1	37.5	4.3	-43.6	0.0	0.7	47.9	38.0	74.0	54.0	-26.1	-16.0	V
9.046	3.0	49.8	40.4	37.5	4.3	-43.6	0.0	0.7	48.6	39.3	74.0	54.0	-25.4	-14.7	H
XZ Position															
1.809	3.0	67.5	66.4	27.2	1.8	-42.6	0.0	0.3	54.3	53.2	74.0	54.0	-19.7	-0.8	V, not 15.205 (-20dBc limit)
1.809	3.0	65.6	64.4	27.2	1.8	-42.6	0.0	0.3	52.4	51.1	74.0	54.0	-21.6	-2.9	H, not 15.205 (-20dBc limit)
2.714	3.0	58.5	52.9	29.3	2.3	-42.5	0.0	0.6	48.1	42.5	74.0	54.0	-25.9	-11.5	H
2.714	3.0	52.5	45.6	29.3	2.3	-42.5	0.0	0.6	42.1	35.3	74.0	54.0	-31.9	-18.7	V
3.618	3.0	53.1	48.6	31.7	2.7	-42.8	0.0	0.6	45.3	40.8	74.0	54.0	-28.7	-13.2	V
3.618	3.0	52.0	46.6	31.7	2.7	-42.8	0.0	0.6	44.1	38.8	74.0	54.0	-29.9	-15.2	H
4.523	3.0	54.3	50.1	33.3	3.1	-43.7	0.0	0.6	47.6	43.4	74.0	54.0	-26.4	-10.6	H
4.523	3.0	52.5	44.1	33.3	3.1	-43.7	0.0	0.6	45.8	37.4	74.0	54.0	-28.2	-16.6	V
5.428	3.0	54.2	48.9	34.2	3.5	-44.5	0.0	0.5	48.0	42.6	74.0	54.0	-26.0	-11.4	V
5.428	3.0	51.3	42.9	34.2	3.5	-44.5	0.0	0.5	45.0	36.6	74.0	54.0	-29.0	-17.4	H
6.332	3.0	57.2	52.0	35.0	3.8	-45.0	0.0	0.5	51.4	46.3	74.0	54.0	-22.6	-7.7	H
6.332	3.0	60.1	55.9	35.0	3.8	-45.0	0.0	0.5	54.4	50.2	74.0	54.0	-19.6	-3.8	V
7.237	3.0	51.7	42.0	36.1	3.9	-44.7	0.0	0.6	47.6	37.9	74.0	54.0	-26.4	-16.1	V
7.237	3.0	52.0	44.7	36.1	3.9	-44.7	0.0	0.6	47.9	40.6	74.0	54.0	-26.1	-13.4	H
8.141	3.0	50.5	41.4	36.9	4.1	-44.4	0.0	0.7	47.8	38.7	74.0	54.0	-26.2	-15.3	H
8.141	3.0	50.1	41.3	36.9	4.1	-44.4	0.0	0.7	47.4	38.6	74.0	54.0	-26.6	-15.4	V
9.046	3.0	49.5	40.3	37.5	4.3	-43.6	0.0	0.7	48.4	39.2	74.0	54.0	-25.6	-14.8	V
9.046	3.0	49.6	41.0	37.5	4.3	-43.6	0.0	0.7	48.5	39.9	74.0	54.0	-25.5	-14.1	H
YZ Position															
1.809	3.0	68.3	67.3	27.2	1.8	-42.6	0.0	0.3	55.0	54.1	74.0	54.0	-19.0	0.1	V, not 15.205 (-20dBc limit)
1.809	3.0	65.8	64.8	27.2	1.8	-42.6	0.0	0.3	52.6	51.6	74.0	54.0	-21.4	-2.4	H, not 15.205 (-20dBc limit)
2.714	3.0	52.4	45.7	29.3	2.3	-42.5	0.0	0.6	42.0	35.3	74.0	54.0	-32.0	-18.7	H
2.714	3.0	55.1	48.3	29.3	2.3	-42.5	0.0	0.6	44.7	37.9	74.0	54.0	-29.3	-16.1	V
3.618	3.0	53.8	49.9	31.7	2.7	-42.8	0.0	0.6	46.0	42.1	74.0	54.0	-28.0	-11.9	V
3.618	3.0	50.3	42.1	31.7	2.7	-42.8	0.0	0.6	42.5	34.2	74.0	54.0	-31.5	-19.8	H
4.523	3.0	51.1	40.6	33.3	3.1	-43.7	0.0	0.6	44.3	33.9	74.0	54.0	-29.7	-20.1	H
4.523	3.0	50.9	41.3	33.3	3.1	-43.7	0.0	0.6	44.2	34.6	74.0	54.0	-29.8	-19.4	V
5.428	3.0	51.3	44.0	34.2	3.5	-44.5	0.0	0.5	45.0	37.7	74.0	54.0	-29.0	-16.3	V
5.428	3.0	49.4	39.6	34.2	3.5	-44.5	0.0	0.5	43.1	33.4	74.0	54.0	-30.9	-20.6	H
6.332	3.0	56.5	50.9	35.0	3.8	-45.0	0.0	0.5	50.7	45.2	74.0	54.0	-23.3	-8.8	H
6.332	3.0	57.0	51.2	35.0	3.8	-45.0	0.0	0.5	51.3	45.5	74.0	54.0	-22.7	-8.5	V
7.237	3.0	52.3	45.0	36.1	3.9	-44.7	0.0	0.6	48.2	40.9	74.0	54.0	-25.8	-13.1	V
7.237	3.0	52.8	45.8	36.1	3.9	-44.7	0.0	0.6	48.8	41.7	74.0	54.0	-25.2	-12.3	H
8.141	3.0	51.0	39.9	36.9	4.1	-44.4	0.0	0.7	48.4	37.2	74.0	54.0	-25.6	-16.8	H
8.141	3.0	49.3	39.6	36.9	4.1	-44.4	0.0	0.7	46.7	36.9	74.0	54.0	-27.3	-17.1	V
9.046	3.0	49.5	38.1	37.5	4.3	-43.6	0.0	0.7	48.3	37.0	74.0	54.0	-25.7	-17.0	V
9.046	3.0	48.8	39.1	37.5	4.3	-43.6	0.0	0.7	47.6	38.0	74.0	54.0	-26.4	-16.0	H

06/16/05 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr:William Zhuang
Project #:05U3492
Company:Thomas N. Cokenias RFI/EMI Consultant
EUT Descrip.:Swell Device (Applicant: Sensus)
EUT M/N:520R FCC ID:KCH520R
Test Target:FCC 101
Mode Oper:Tx On, Mid Ch. 915.0MHz

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)
YZ Position															
1.830	3.0	68.5	67.4	27.3	1.9	-42.6	0.0	0.3	55.4	54.3	74.0	54.0	-18.6	0.3	V, not 15.205 (-20dBc limit)
1.830	3.0	63.8	62.0	27.3	1.9	-42.6	0.0	0.3	50.7	48.9	74.0	54.0	-23.4	-5.1	H, not 15.205 (-20dBc limit)
2.745	3.0	58.1	52.5	29.3	2.3	-42.5	0.0	0.6	47.8	42.2	74.0	54.0	-26.2	-11.8	H
2.745	3.0	56.4	49.1	29.3	2.3	-42.5	0.0	0.6	46.2	38.8	74.0	54.0	-27.8	-15.2	V
3.660	3.0	53.3	49.2	31.8	2.7	-42.9	0.0	0.6	45.5	41.4	74.0	54.0	-28.5	-12.6	H
3.660	3.0	51.7	45.4	31.8	2.7	-42.9	0.0	0.6	43.9	37.6	74.0	54.0	-30.1	-16.4	V
4.575	3.0	51.6	43.3	33.3	3.1	-43.8	0.0	0.6	44.9	36.6	74.0	54.0	-29.1	-17.4	V
4.575	3.0	50.0	40.3	33.3	3.1	-43.8	0.0	0.6	43.3	33.6	74.0	54.0	-30.7	-20.4	H
5.490	3.0	51.2	43.8	34.3	3.5	-44.6	0.0	0.5	44.9	37.5	74.0	54.0	-29.1	-16.5	H
5.490	3.0	54.3	48.9	34.3	3.5	-44.6	0.0	0.5	48.0	42.7	74.0	54.0	-26.0	-11.3	V
6.405	3.0	60.1	56.1	35.1	3.8	-45.0	0.0	0.5	54.6	50.5	74.0	54.0	-19.4	-3.5	V
6.405	3.0	56.0	49.7	35.1	3.8	-45.0	0.0	0.5	50.4	44.1	74.0	54.0	-23.6	-9.9	H
7.320	3.0	52.7	45.1	36.2	3.9	-44.7	0.0	0.6	48.7	41.1	74.0	54.0	-25.3	-12.9	H
7.320	3.0	51.2	44.3	36.2	3.9	-44.7	0.0	0.6	47.3	40.3	74.0	54.0	-26.7	-13.7	V
8.235	3.0	50.8	42.1	37.0	4.1	-44.3	0.0	0.7	48.3	39.6	74.0	54.0	-25.7	-14.4	V
8.235	3.0	50.7	41.8	37.0	4.1	-44.3	0.0	0.7	48.2	39.3	74.0	54.0	-25.8	-14.7	H
9.150	3.0	48.6	37.7	37.6	4.3	-43.4	0.0	0.7	47.8	36.9	74.0	54.0	-26.2	-17.1	H
9.150	3.0	48.1	38.0	37.6	4.3	-43.4	0.0	0.7	47.3	37.3	74.0	54.0	-26.7	-16.7	V
XZ Position															
1.830	3.0	67.0	65.8	27.3	1.9	-42.6	0.0	0.3	53.9	52.7	74.0	54.0	-20.1	-1.3	V, not 15.205 (-20dBc limit)
1.830	3.0	61.5	59.9	27.3	1.9	-42.6	0.0	0.3	48.4	46.7	74.0	54.0	-25.6	-7.3	H, not 15.205 (-20dBc limit)
2.745	3.0	57.6	52.0	29.3	2.3	-42.5	0.0	0.6	47.4	41.7	74.0	54.0	-26.6	-12.3	V
2.745	3.0	56.3	49.0	29.3	2.3	-42.5	0.0	0.6	46.0	38.7	74.0	54.0	-28.0	-15.3	H
3.660	3.0	53.0	49.3	31.8	2.7	-42.9	0.0	0.6	45.3	41.5	74.0	54.0	-28.7	-12.5	H
3.660	3.0	51.5	46.2	31.8	2.7	-42.9	0.0	0.6	43.8	38.4	74.0	54.0	-30.2	-15.6	V
4.575	3.0	52.9	44.7	33.3	3.1	-43.8	0.0	0.6	46.2	37.9	74.0	54.0	-27.8	-16.1	V
4.575	3.0	54.2	48.6	33.3	3.1	-43.8	0.0	0.6	47.5	41.8	74.0	54.0	-26.5	-12.2	H
5.490	3.0	51.9	45.0	34.3	3.5	-44.6	0.0	0.5	45.7	38.8	74.0	54.0	-28.3	-15.2	H
5.490	3.0	55.8	51.6	34.3	3.5	-44.6	0.0	0.5	49.6	45.3	74.0	54.0	-24.4	-8.7	V
6.405	3.0	60.1	56.1	35.1	3.8	-45.0	0.0	0.5	54.5	50.5	74.0	54.0	-19.5	-3.5	V
6.405	3.0	55.9	50.6	35.1	3.8	-45.0	0.0	0.5	50.3	45.0	74.0	54.0	-23.7	-9.0	H
7.320	3.0	52.2	45.8	36.2	3.9	-44.7	0.0	0.6	48.3	41.9	74.0	54.0	-25.7	-12.1	H
7.320	3.0	51.0	42.6	36.2	3.9	-44.7	0.0	0.6	47.1	38.6	74.0	54.0	-26.9	-15.4	V
8.235	3.0	51.8	43.6	37.0	4.1	-44.3	0.0	0.7	49.3	41.1	74.0	54.0	-24.7	-12.9	V
8.235	3.0	52.6	43.9	37.0	4.1	-44.3	0.0	0.7	50.1	41.4	74.0	54.0	-23.9	-12.6	H
9.150	3.0	49.3	41.5	37.6	4.3	-43.4	0.0	0.7	48.5	40.7	74.0	54.0	-25.5	-13.3	H
9.150	3.0	48.9	39.3	37.6	4.3	-43.4	0.0	0.7	48.1	38.5	74.0	54.0	-25.9	-15.5	V
XY Position															
1.830	3.0	65.9	64.8	27.3	1.9	-42.6	0.0	0.3	52.8	51.7	74.0	54.0	-21.2	-2.3	V, not 15.205 (-20dBc limit)
1.830	3.0	69.5	68.7	27.3	1.9	-42.6	0.0	0.3	56.4	55.5	74.0	54.0	-17.6	1.5	H, not 15.205 (-20dBc limit)
2.745	3.0	59.2	54.3	29.3	2.3	-42.5	0.0	0.6	49.0	44.0	74.0	54.0	-25.0	-10.0	H
2.745	3.0	56.5	47.7	29.3	2.3	-42.5	0.0	0.6	46.2	37.4	74.0	54.0	-27.8	-16.6	V
3.660	3.0	54.8	51.0	31.8	2.7	-42.9	0.0	0.6	47.1	43.2	74.0	54.0	-26.9	-10.8	H
3.660	3.0	50.5	44.2	31.8	2.7	-42.9	0.0	0.6	42.8	36.4	74.0	54.0	-31.2	-17.6	V
4.575	3.0	54.4	47.5	33.3	3.1	-43.8	0.0	0.6	47.7	40.8	74.0	54.0	-26.3	-13.2	V
4.575	3.0	54.1	46.5	33.3	3.1	-43.8	0.0	0.6	47.4	39.8	74.0	54.0	-26.6	-14.2	H
5.490	3.0	56.5	53.5	34.3	3.5	-44.6	0.0	0.5	50.3	47.2	74.0	54.0	-23.7	-6.8	H
5.490	3.0	50.6	43.1	34.3	3.5	-44.6	0.0	0.5	44.3	36.8	74.0	54.0	-29.7	-17.2	V
6.405	3.0	56.3	51.0	35.1	3.8	-45.0	0.0	0.5	50.7	45.4	74.0	54.0	-23.3	-8.6	V
6.405	3.0	57.0	51.8	35.1	3.8	-45.0	0.0	0.5	51.4	46.2	74.0	54.0	-22.6	-7.8	H
7.320	3.0	52.0	44.2	36.2	3.9	-44.7	0.0	0.6	48.1	40.3	74.0	54.0	-25.9	-13.7	H
7.320	3.0	51.3	44.7	36.2	3.9	-44.7	0.0	0.6	47.3	40.8	74.0	54.0	-26.7	-13.2	V
8.235	3.0	48.9	38.3	37.0	4.1	-44.3	0.0	0.7	46.4	35.8	74.0	54.0	-27.6	-18.2	V
8.235	3.0	49.6	39.2	37.0	4.1	-44.3	0.0	0.7	47.1	36.7	74.0	54.0	-26.9	-17.3	H
9.150	3.0	48.0	36.6	37.6	4.3	-43.4	0.0	0.7	47.2	35.8	74.0	54.0	-26.8	-18.2	H
9.150	3.0	47.8	38.4	37.6	4.3	-43.4	0.0	0.7	47.0	37.6	74.0	54.0	-27.0	-16.4	V

06/16/05 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr:William Zhuang
Project #:05U3492
Company:Thomas N. Cokenias RFI/EMI Consultant
EUT Descrip.:Swell Device (Applicant: Sensus)
EUT M/N:520R FCC ID:KCH520R
Test Target:FCC 101
Mode Oper:Tx On, High Ch. 925.4MHz

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		

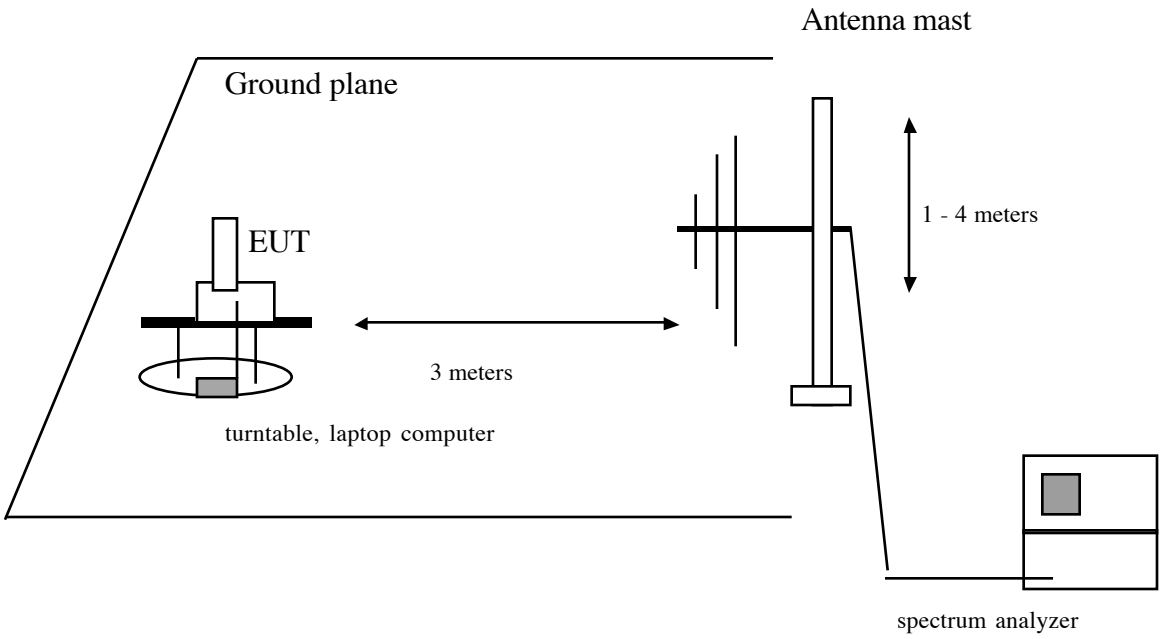
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
XY Position															
1.851	3.0	67.6	66.6	27.4	1.9	-42.6	0.0	0.3	54.6	53.5	74.0	54.0	-19.4	-0.5	V
1.851	3.0	65.1	63.7	27.4	1.9	-42.6	0.0	0.3	52.1	50.7	74.0	54.0	-21.9	-3.3	H
2.776	3.0	56.1	51.0	29.4	2.4	-42.5	0.0	0.6	45.9	40.8	74.0	54.0	-28.1	-13.2	H
2.776	3.0	53.5	47.3	29.4	2.4	-42.5	0.0	0.6	43.4	37.2	74.0	54.0	-30.6	-16.8	V
3.702	3.0	50.8	44.7	31.9	2.7	-42.9	0.0	0.6	43.1	37.0	74.0	54.0	-30.9	-17.0	V
3.702	3.0	53.7	48.1	31.9	2.7	-42.9	0.0	0.6	46.0	40.5	74.0	54.0	-28.0	-13.5	H
4.627	3.0	53.0	44.1	33.4	3.1	-43.8	0.0	0.6	46.3	37.4	74.0	54.0	-27.7	-16.6	H
4.627	3.0	53.8	47.3	33.4	3.1	-43.8	0.0	0.6	47.1	40.6	74.0	54.0	-26.9	-13.4	V
5.552	3.0	54.2	50.8	34.3	3.6	-44.6	0.0	0.5	47.9	44.5	74.0	54.0	-26.1	-9.5	V
5.552	3.0	57.3	54.3	34.3	3.6	-44.6	0.0	0.5	51.1	48.0	74.0	54.0	-22.9	-6.0	H
6.478	3.0	57.1	51.6	35.2	3.8	-45.0	0.0	0.5	51.6	46.2	74.0	54.0	-22.4	-7.8	H
6.478	3.0	56.0	50.5	35.2	3.8	-45.0	0.0	0.5	50.6	45.0	74.0	54.0	-23.4	-9.0	V
7.403	3.0	51.1	44.3	36.2	4.0	-44.7	0.0	0.6	47.3	40.5	74.0	54.0	-26.7	-13.5	V
7.403	3.0	50.4	43.7	36.2	4.0	-44.7	0.0	0.6	46.6	39.9	74.0	54.0	-27.4	-14.1	H
8.329	3.0	50.3	40.7	37.0	4.1	-44.2	0.0	0.7	48.0	38.3	74.0	54.0	-26.0	-15.7	H
8.329	3.0	51.0	42.5	37.0	4.1	-44.2	0.0	0.7	48.6	40.1	74.0	54.0	-25.4	-13.9	V
9.254	3.0	48.3	38.0	37.7	4.3	-43.2	0.0	0.7	47.8	37.5	74.0	54.0	-26.2	-16.5	V
9.254	3.0	48.5	37.8	37.7	4.3	-43.2	0.0	0.7	48.1	37.4	74.0	54.0	-25.9	-16.6	H
YZ Position															
1.851	3.0	65.6	64.3	27.4	1.9	-42.6	0.0	0.3	52.6	51.3	74.0	54.0	-21.4	-2.7	V
2.776	3.0	54.6	48.8	29.4	2.4	-42.5	0.0	0.6	44.4	38.7	74.0	54.0	-29.6	-15.3	V
3.702	3.0	52.2	46.8	31.9	2.7	-42.9	0.0	0.6	44.5	39.1	74.0	54.0	-29.5	-14.9	V
4.627	3.0	51.6	41.1	33.4	3.1	-43.8	0.0	0.6	44.9	34.4	74.0	54.0	-29.1	-19.6	V
5.552	3.0	51.9	46.3	34.3	3.6	-44.6	0.0	0.5	45.7	40.0	74.0	54.0	-28.3	-14.0	V
6.478	3.0	59.4	54.6	35.2	3.8	-45.0	0.0	0.5	54.0	49.2	74.0	54.0	-20.0	-4.8	V
7.403	3.0	49.9	41.3	36.2	4.0	-44.7	0.0	0.6	46.1	37.5	74.0	54.0	-27.9	-16.5	V
8.329	3.0	51.1	41.5	37.0	4.1	-44.2	0.0	0.7	48.8	39.1	74.0	54.0	-25.2	-14.9	V
9.254	3.0	48.3	37.6	37.7	4.3	-43.2	0.0	0.7	47.8	37.1	74.0	54.0	-26.2	-16.9	V
1.851	3.0	63.4	61.8	27.4	1.9	-42.6	0.0	0.3	50.4	48.7	74.0	54.0	-23.6	-5.3	H
2.776	3.0	53.9	47.9	29.4	2.4	-42.5	0.0	0.6	43.8	37.8	74.0	54.0	-30.2	-16.2	H
3.702	3.0	51.9	47.7	31.9	2.7	-42.9	0.0	0.6	44.2	40.0	74.0	54.0	-29.8	-14.0	H
4.627	3.0	51.4	41.0	33.4	3.1	-43.8	0.0	0.6	44.7	34.3	74.0	54.0	-29.3	-19.7	H
5.552	3.0	54.7	50.3	34.3	3.6	-44.6	0.0	0.5	48.4	44.1	74.0	54.0	-25.6	-9.9	H
6.478	3.0	57.4	52.7	35.2	3.8	-45.0	0.0	0.5	51.9	47.2	74.0	54.0	-22.1	-6.8	H
7.403	3.0	50.8	43.2	36.2	4.0	-44.7	0.0	0.6	47.0	39.4	74.0	54.0	-27.0	-14.6	H
8.329	3.0	51.2	42.3	37.0	4.1	-44.2	0.0	0.7	48.8	40.0	74.0	54.0	-25.2	-14.0	H
9.254	3.0	47.8	36.1	37.7	4.3	-43.2	0.0	0.7	47.3	35.6	74.0	54.0	-26.7	-18.4	H
XZ Position															
1.851	3.0	65.3	64.0	27.4	1.9	-42.6	0.0	0.3	52.3	50.9	74.0	54.0	-21.7	-3.1	V
2.776	3.0	58.3	45.9	29.4	2.4	-42.5	0.0	0.6	48.2	35.8	74.0	54.0	-25.8	-18.2	V
3.702	3.0	53.1	49.5	31.9	2.7	-42.9	0.0	0.6	45.5	41.9	74.0	54.0	-28.5	-12.1	V
4.627	3.0	54.5	47.5	33.4	3.1	-43.8	0.0	0.6	47.8	40.8	74.0	54.0	-26.2	-13.2	V
5.552	3.0	55.8	51.7	34.3	3.6	-44.6	0.0	0.5	49.6	45.4	74.0	54.0	-24.4	-8.6	V
6.478	3.0	60.4	56.2	35.2	3.8	-45.0	0.0	0.5	55.0	50.8	74.0	54.0	-19.0	-3.2	V
7.403	3.0	51.0	44.1	36.2	4.0	-44.7	0.0	0.6	47.2	40.3	74.0	54.0	-26.8	-13.7	V
8.329	3.0	51.9	44.4	37.0	4.1	-44.2	0.0	0.7	49.5	42.1	74.0	54.0	-24.5	-11.9	V
9.254	3.0	49.9	40.9	37.7	4.3	-43.2	0.0	0.7	49.5	40.4	74.0	54.0	-24.5	-13.6	V
1.851	3.0	62.2	60.6	27.4	1.9	-42.6	0.0	0.3	49.2	47.6	74.0	54.0	-24.8	-6.4	H
2.776	3.0	59.0	54.4	29.4	2.4	-42.5	0.0	0.6	48.8	44.2	74.0	54.0	-25.2	-9.8	H
3.702	3.0	55.1	51.6	31.9	2.7	-42.9	0.0	0.6	47.5	44.0	74.0	54.0	-26.5	-10.0	H
4.627	3.0	55.1	48.0	33.4	3.1	-43.8	0.0	0.6	48.4	41.3	74.0	54.0	-25.6	-12.7	H
5.552	3.0	54.1	49.0	34.3	3.6	-44.6	0.0	0.5	47.9	42.8	74.0	54.0	-26.1	-11.2	H
6.478	3.0	59.1	54.7	35.2	3.8	-45.0	0.0	0.5	53.6	49.3	74.0	54.0	-20.4	-4.7	H
7.403	3.0	51.7	46.2	36.2	4.0	-44.7	0.0	0.6	47.9	42.4	74.0	54.0	-26.1	-11.6	H
8.329	3.0	51.8	42.8	37.0	4.1	-44.2	0.0	0.7	49.4	40.4	74.0	54.0	-24.6	-13.6	H
9.254	3.0	48.7	40.0	37.7	4.3	-43.2	0.0	0.7	48.3	39.6	74.0	54.0	-25.7	-14.5	H

Radiated Emissions
Test Requirement: 15.109

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.

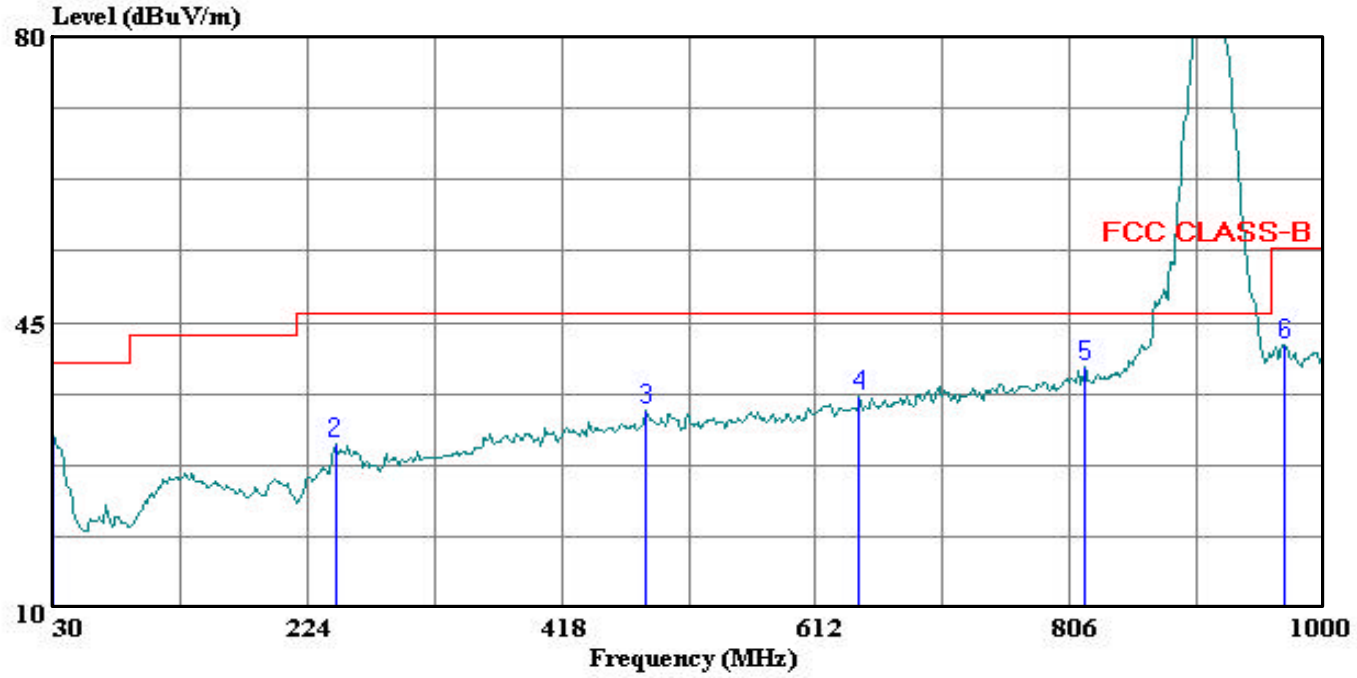
2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205.

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#: 17 File#: Fundamental.EMI Date: 06-16-2005 Time: 18:06:05



(Audix ATC)

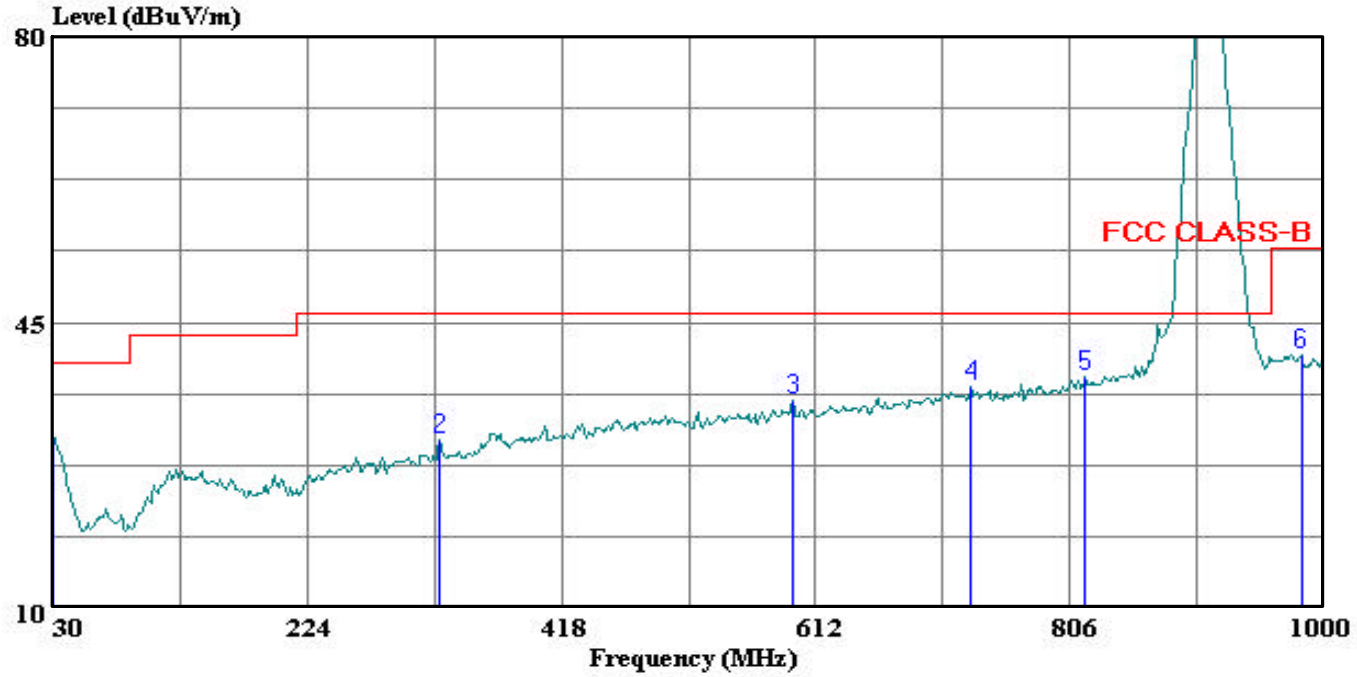
Trace: 15 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator : William Zhuang
Project # : 05U3492
Company : T Cokenias
EUT : Swell Device (Applicant: Sensus)
Model No. : 520R
Configuration : EUT
Target of Test : FCC Class B
Mode of Operation: Tx, YZ Position, worst case

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	30.000	10.59	20.45	31.04	40.00	-8.96	Peak
2	245.340	16.42	13.72	30.14	46.00	-15.86	Peak
3	482.990	14.41	19.89	34.30	46.00	-11.70	Peak
4	644.980	13.73	22.23	35.96	46.00	-10.04	Peak
5	817.640	14.84	24.83	39.67	46.00	-6.33	Peak
6	969.930	15.49	26.66	42.15	54.00	-11.85	Peak

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

Data#: 14 File#: Fundamental.EMI Date: 06-16-2005 Time: 17:59:12



(Audix ATC)

Trace: 13 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator: : William Zhuang
Project #: : 05U3492
Company: : T Cokenias
EUT: : Swell Device (Applicant: Sensus)
Model No. : 520R
Configuration : EUT
Target of Test : FCC Class B
Mode of Operation: Tx, YZ Position, worst case

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	30.000	10.43	20.45	30.88	40.00	-9.12	Peak
2	324.880	14.25	16.28	30.53	46.00	-15.47	Peak
3	594.540	13.97	21.41	35.38	46.00	-10.62	Peak
4	730.340	13.52	23.57	37.09	46.00	-8.91	Peak
5	817.640	13.53	24.83	38.36	46.00	-7.64	Peak
6	982.540	14.29	26.74	41.03	54.00	-12.97	Peak

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

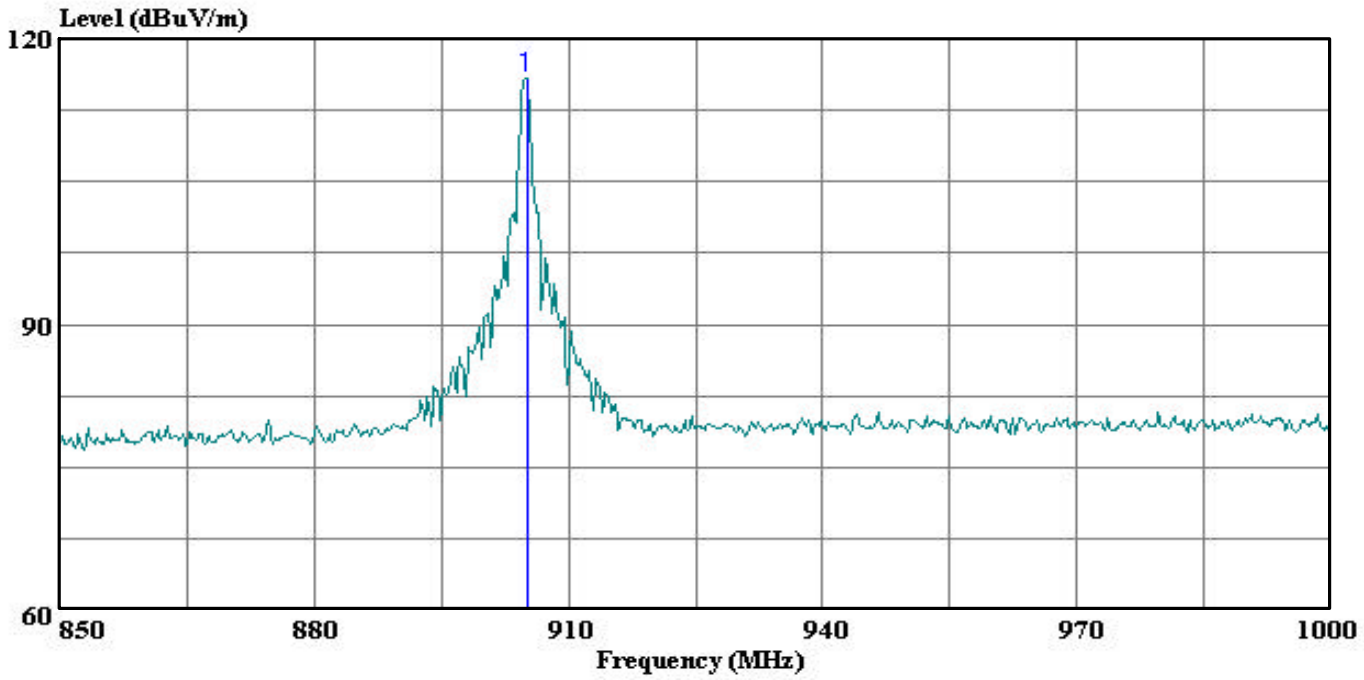
Data#: 2 File#: Fundamental.EMI Date: 06-16-2005 Time: 17:25:29
Audix ATC

Condition: FCC CLASS-B HORIZONTAL
Test Operator: : William Zhuang
Project #: : 05U3492
Company: : T Cokenias
EUT: : Swell Device (Applicant: Sensus)
Model No. : 520R
Configuration : EUT
Target of Test : FCC Class B
Mode of Operation: Tx Low Ch, XY Position

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1 *	905.050	83.06	25.99	109.05	46.00	63.05	Peak

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

Data#: 4 File#: Fundamental.EMI Date: 06-16-2005 Time: 17:31:04



(Audix ATC)

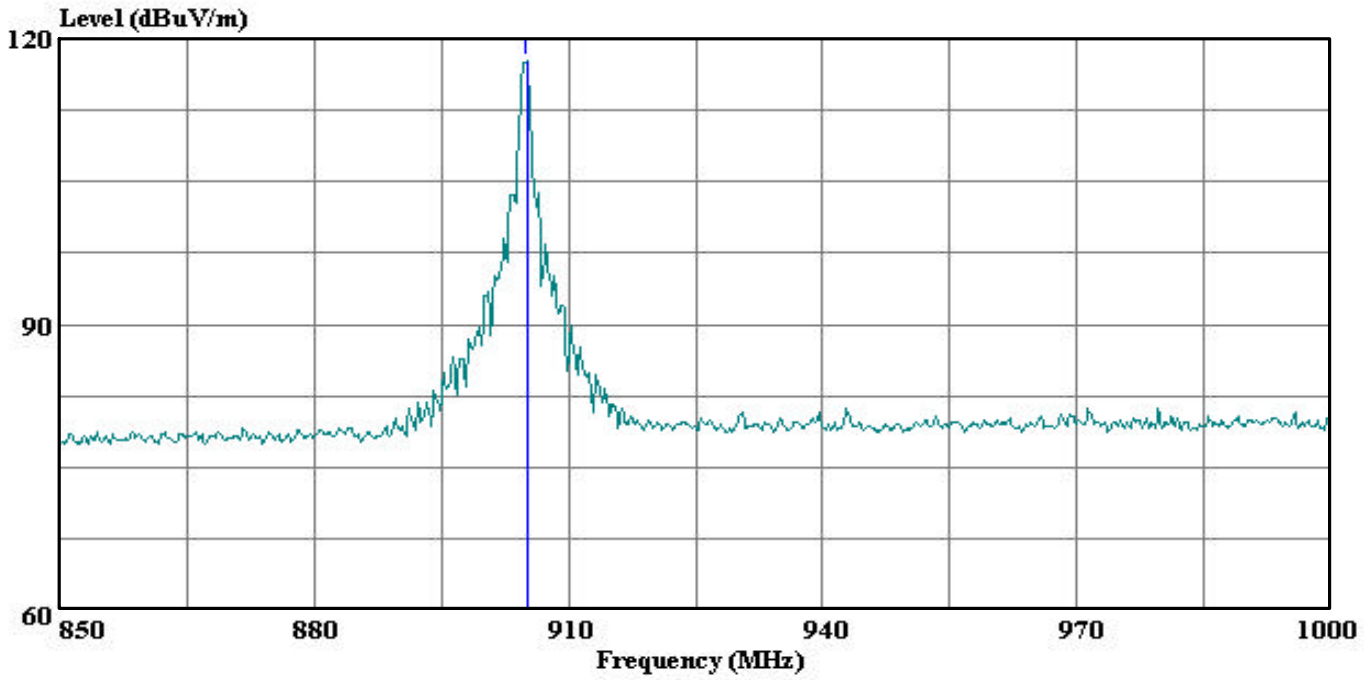
Trace: 3 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator: : William Zhuang
Project #: : 05U3492
Company: : T Cokenias
EUT: : Swell Device (Applicant: Sensus)
Model No. : 520R
Configuration : EUT
Target of Test : FCC Class B
Mode of Operation: Tx Low Ch, XY Position

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1 *	905.050	89.81	25.99	115.80	46.00	69.80	Peak

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

Data#: 8 File#: Fundamental.EMI Date: 06-16-2005 Time: 17:40:19



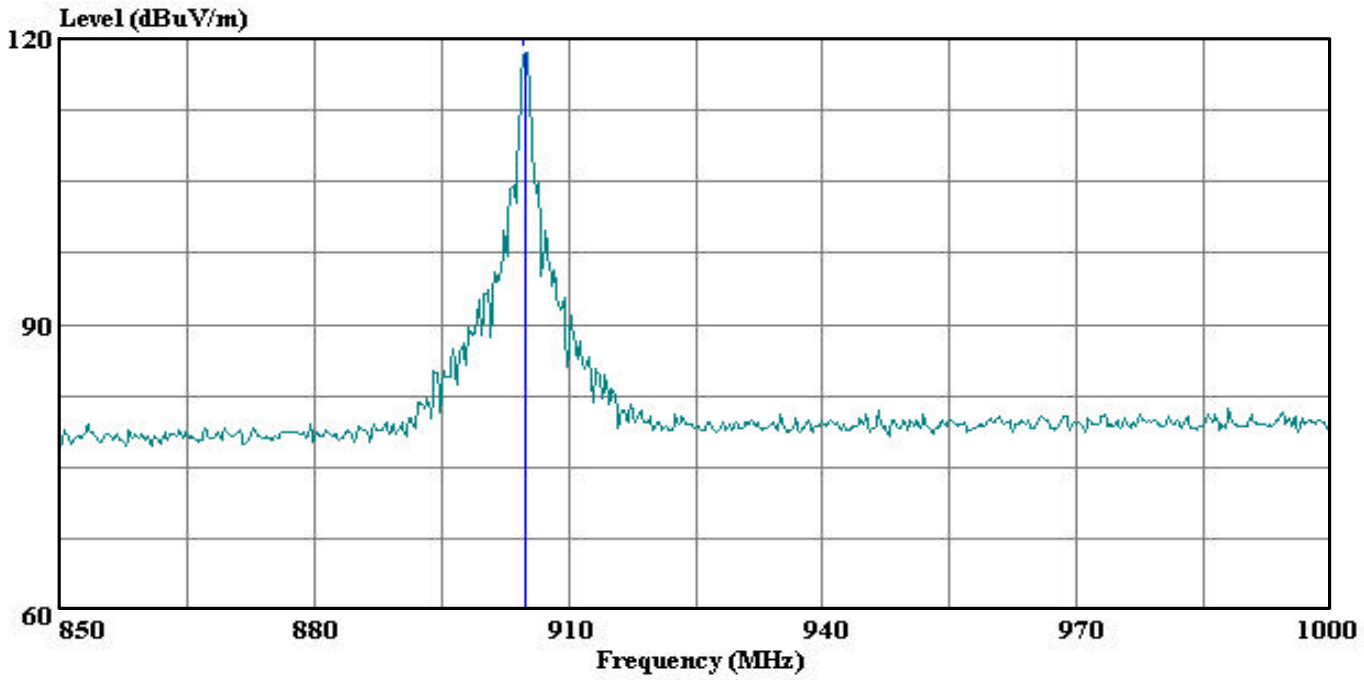
Trace: 7 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator: : William Zhuang
Project #: : 05U3492
Company: : T Cokenias
EUT: : Swell Device (Applicant: Sensus)
Model No. : 520R
Configuration : EUT
Target of Test : FCC Class B
Mode of Operation: Tx Low Ch, XZ Position

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1 *	905.050	91.76	25.99	117.75	46.00	71.75	Peak

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

Data#: 10 File#: Fundamental.EMI Date: 06-16-2005 Time: 17:44:07



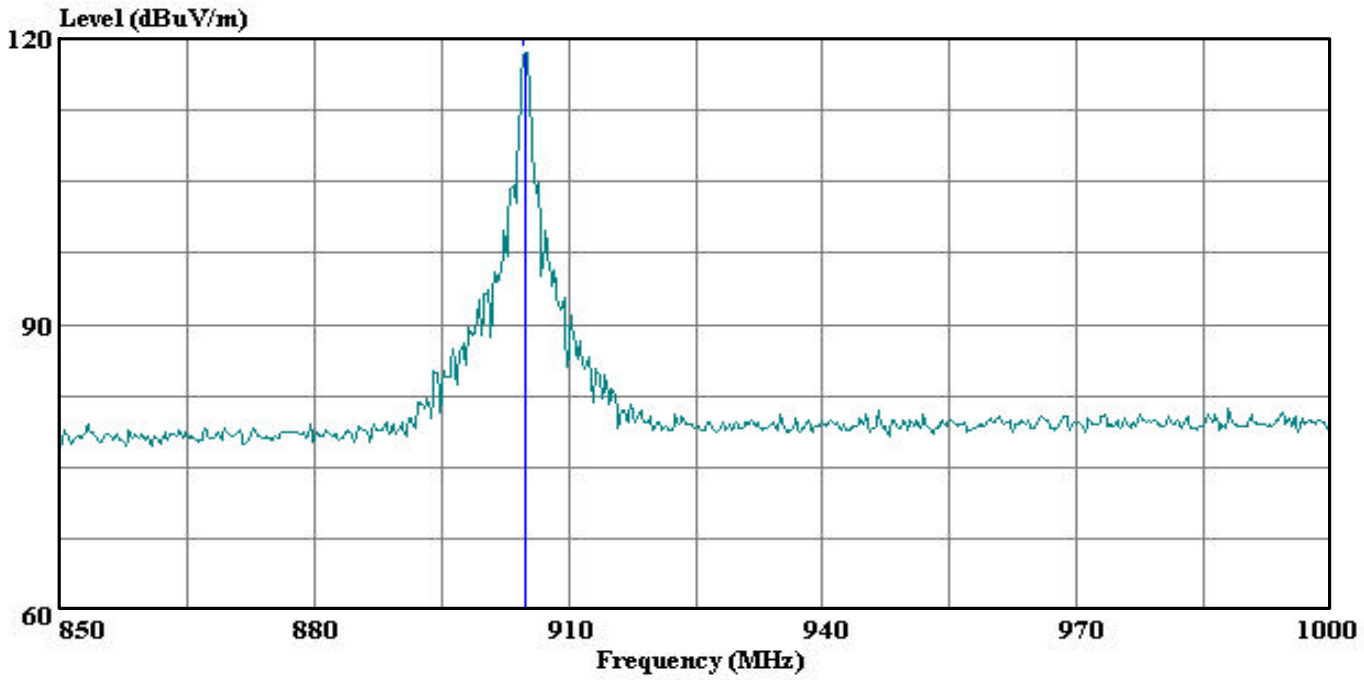
Trace: 9 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator: : William Zhuang
Project #: : 05U3492
Company: : T Cokenias
EUT: : Swell Device (Applicant: Sensus)
Model No. : 520R
Configuration : EUT
Target of Test : FCC Class B
Mode of Operation: Tx Low Ch, YZ Position

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1 *	904.900	92.46	25.99	118.45	46.00	72.45	Peak

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

Data#: 10 File#: Fundamental.EMI Date: 06-16-2005 Time: 17:44:07



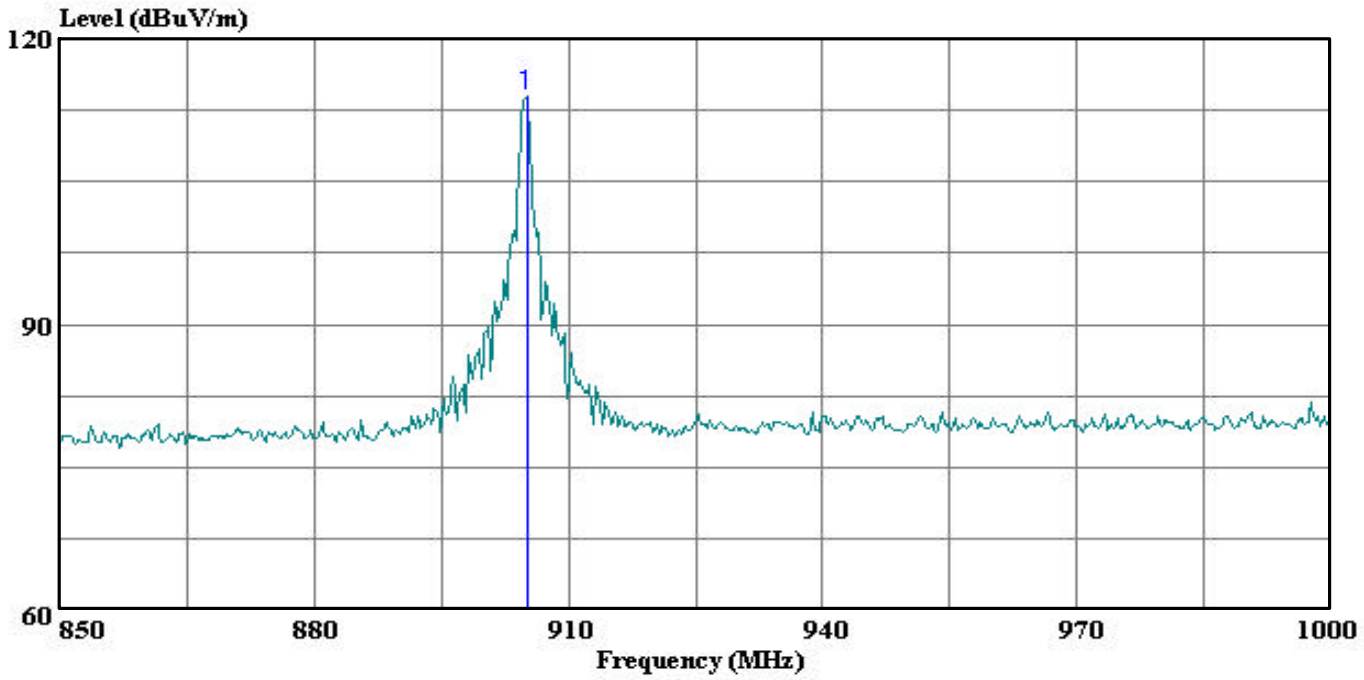
Trace: 9 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator: : William Zhuang
Project #: : 05U3492
Company: : T Cokenias
EUT: : Swell Device (Applicant: Sensus)
Model No. : 520R
Configuration : EUT
Target of Test : FCC Class B
Mode of Operation: Tx Low Ch, YZ Position

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1 *	904.900	92.46	25.99	118.45	46.00	72.45	Peak

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

Data#: 12 File#: Fundamental.EMI Date: 06-16-2005 Time: 17:47:27



Trace: 11 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator : William Zhuang
Project #: : 05U3492
Company: : T Cokenias
EUT: : Swell Device (Applicant: Sensus)
Model No. : 520R
Configuration : EUT
Target of Test : FCC Class B
Mode of Operation: Tx Low Ch, YZ Position

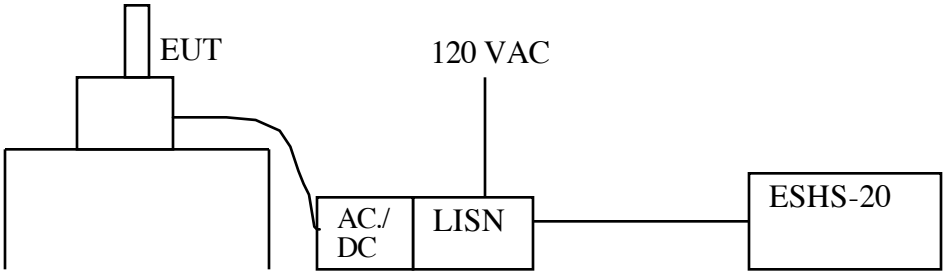
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1 *	905.050	88.01	25.99	114.00	46.00	68.00	Peak

AC Line Conducted Emissions
Test Requirement: 15.107, 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

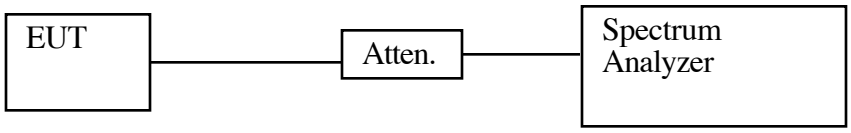
NOT APPLICABLE. EUT battery powered only.

6dB Bandwidth for DTS
Test Requirement: 15.247

Measurement Equipment Used:

Agilent 4446A Spectrum Analyzer, 9 kHz-40 GHz
10 dB attenuator
1 ft coax cable, 0.3 dB loss max.

Test Set-up



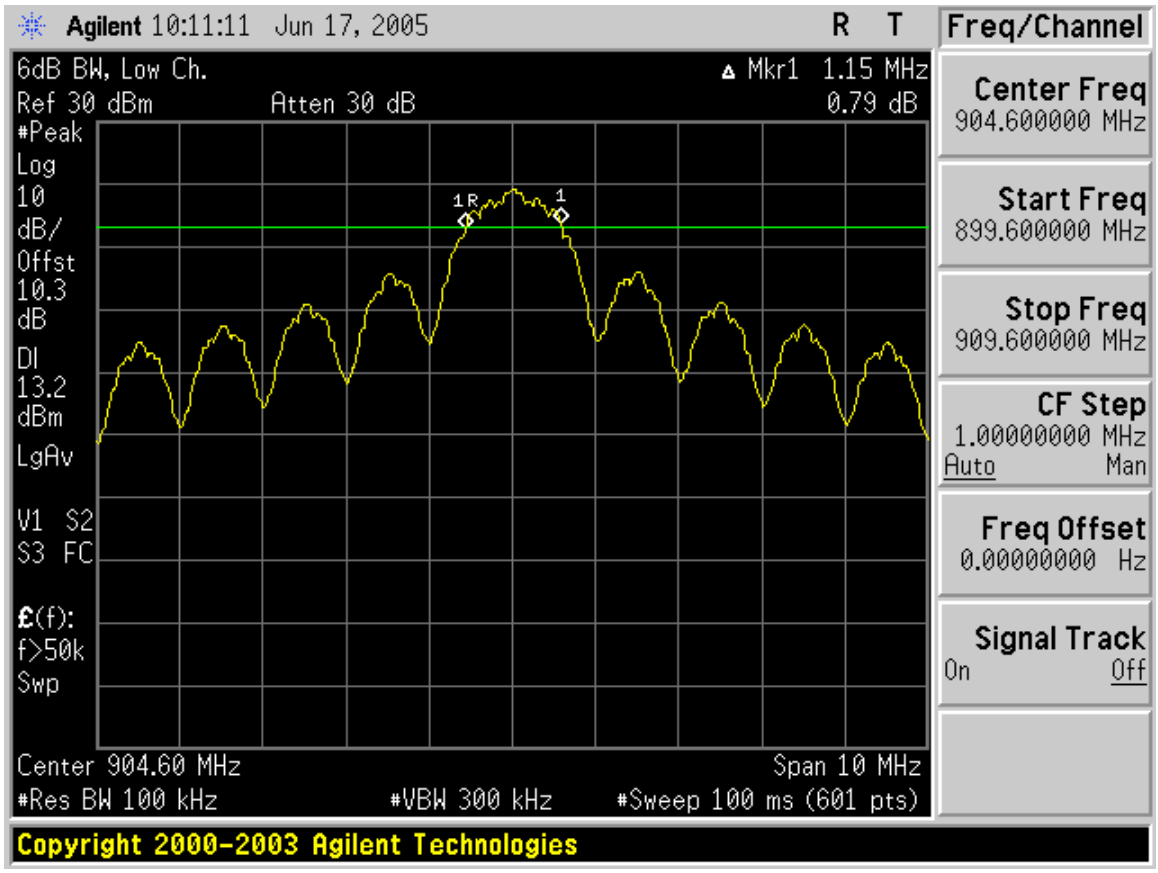
Test Procedures

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 904.6 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.

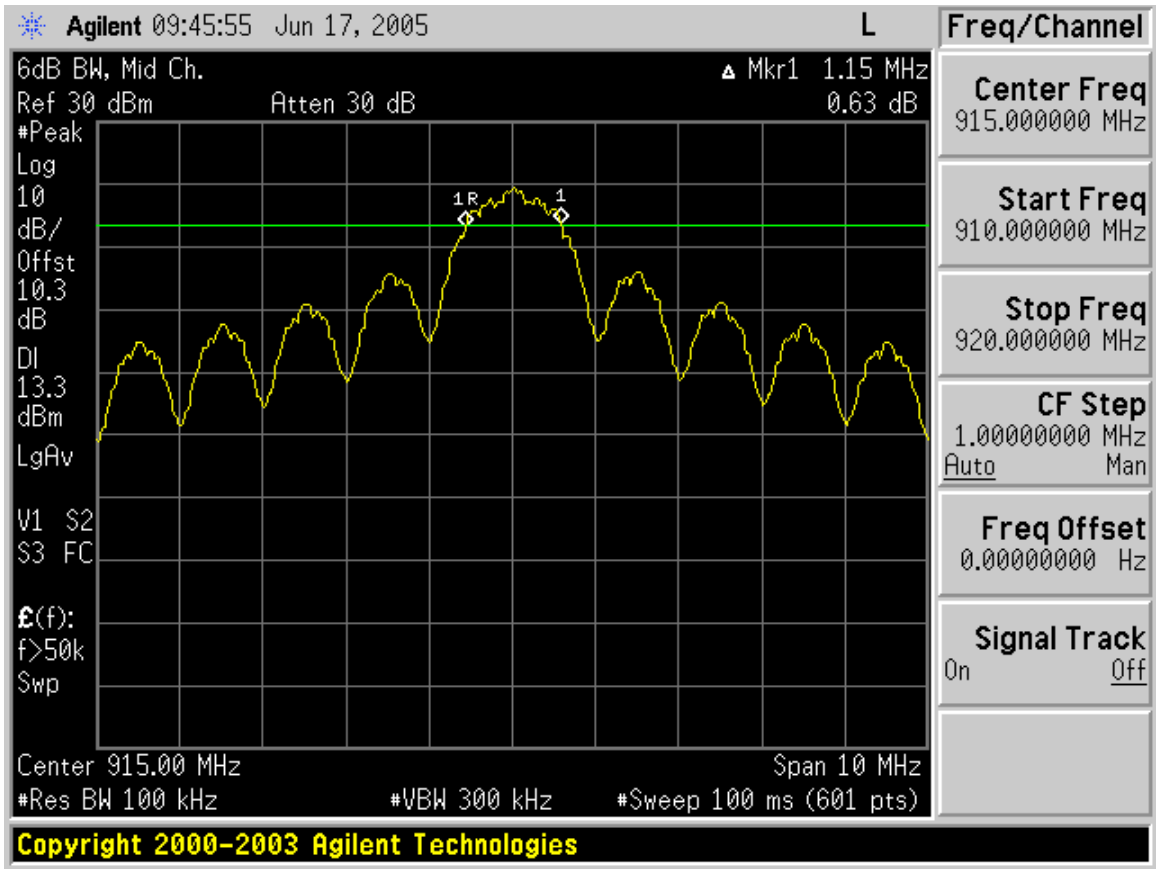
Test was repeated for MID and HIGH channels.

Test Results: Measured approximately 1.15 MHz 6 dB BW. Refer to data sheets below.

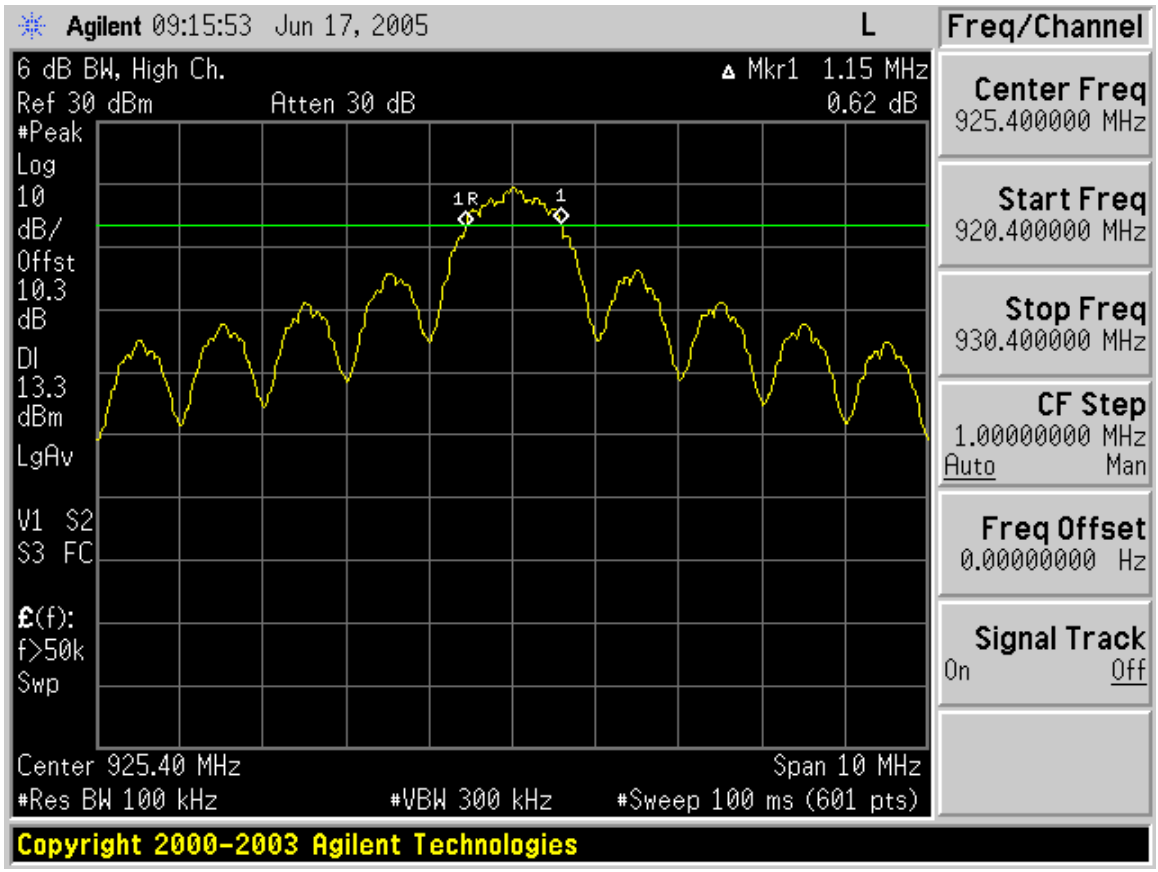
15.247 6dB Channel Bandwidth LOW channel



15.247 6 dB Channel Bandwidth MID channel



15.247 6 dB Channel Bandwidth HIGH channel

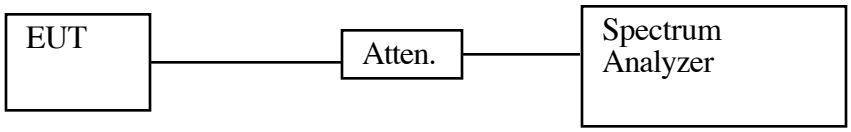


99% Bandwidth
Test Requirement: RSS-210 (Canada Only, FCC Information Only)

Measurement Equipment Used:

Agilent 4446A Spectrum Analyzer, 9 kHz-40 GHz
10 dB attenuator
1 ft coax cable, 0.3 dB loss max.

Test Setup



Limit

None: for reporting purposes only.

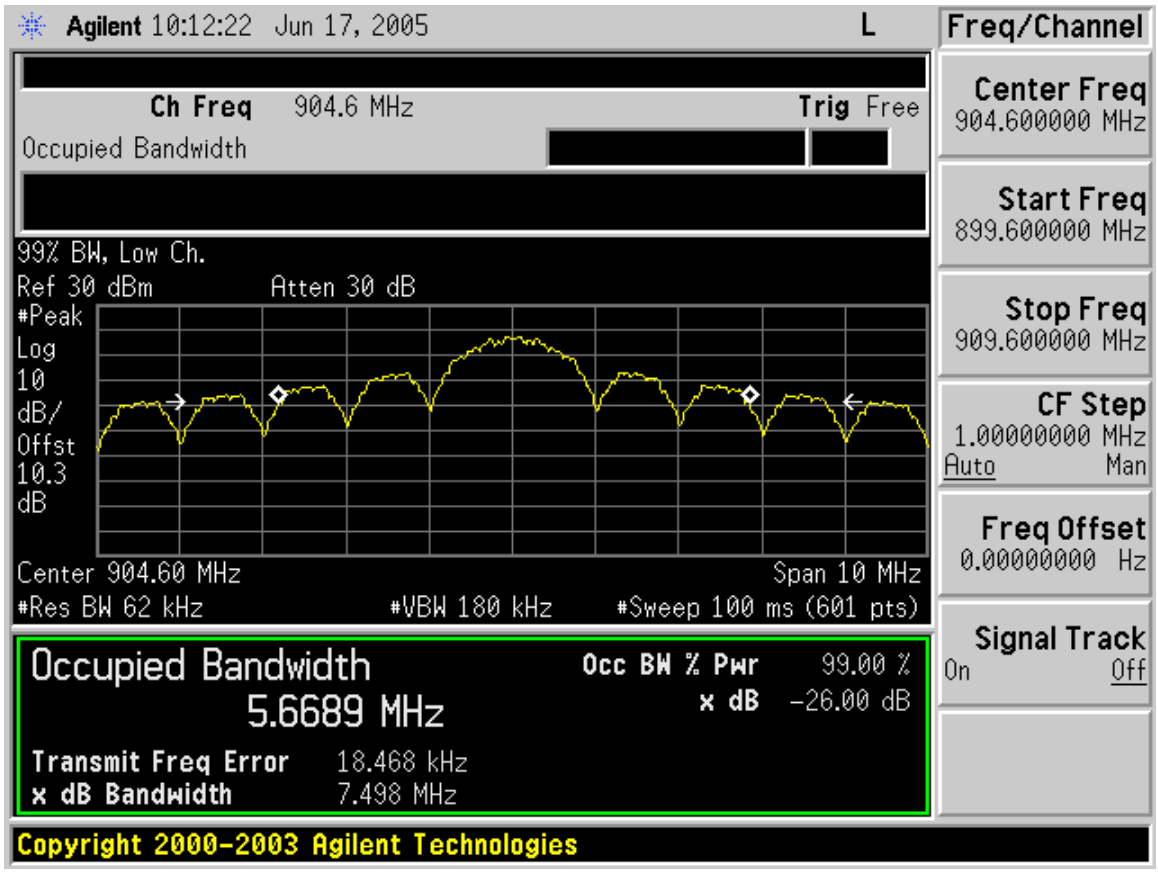
Test Procedure

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.

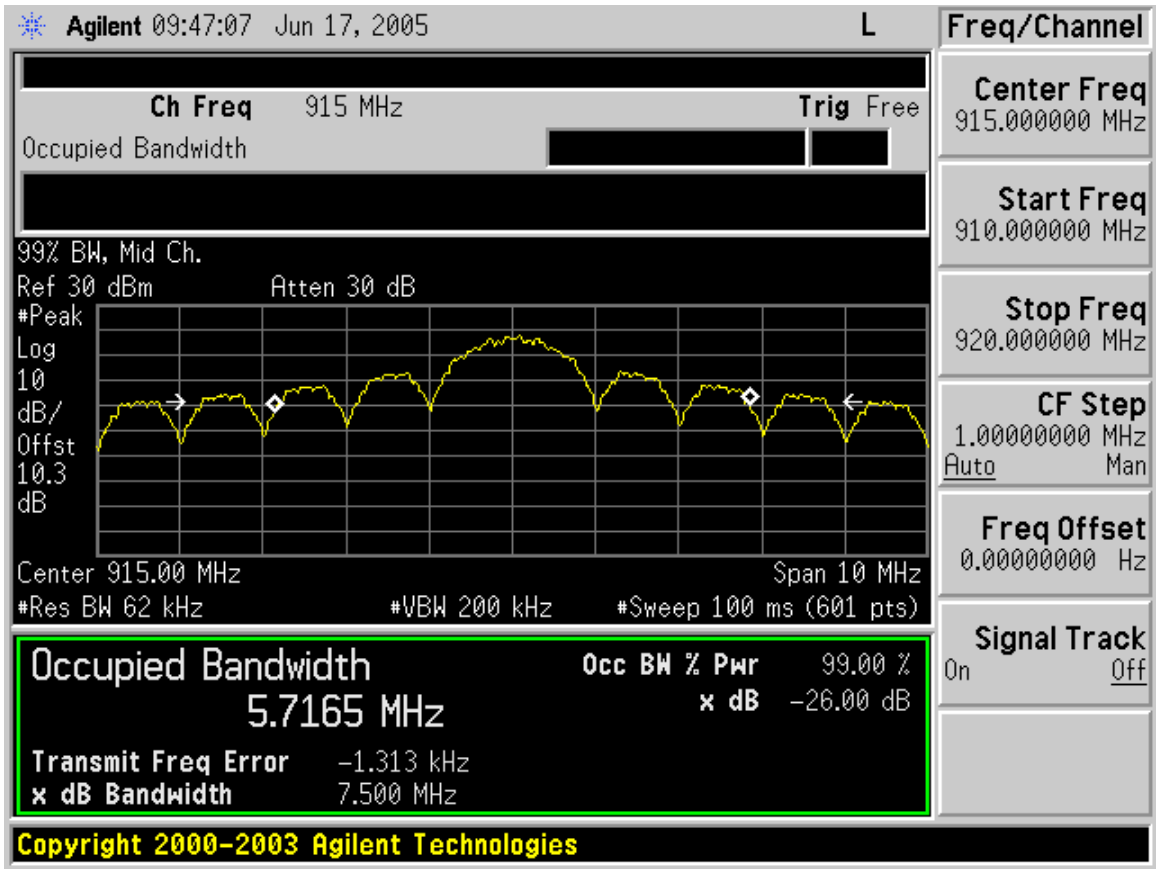
Test Results

Refer to spectrum analyzer charts below. 99% bandwidth approximately 5.7 MHz.

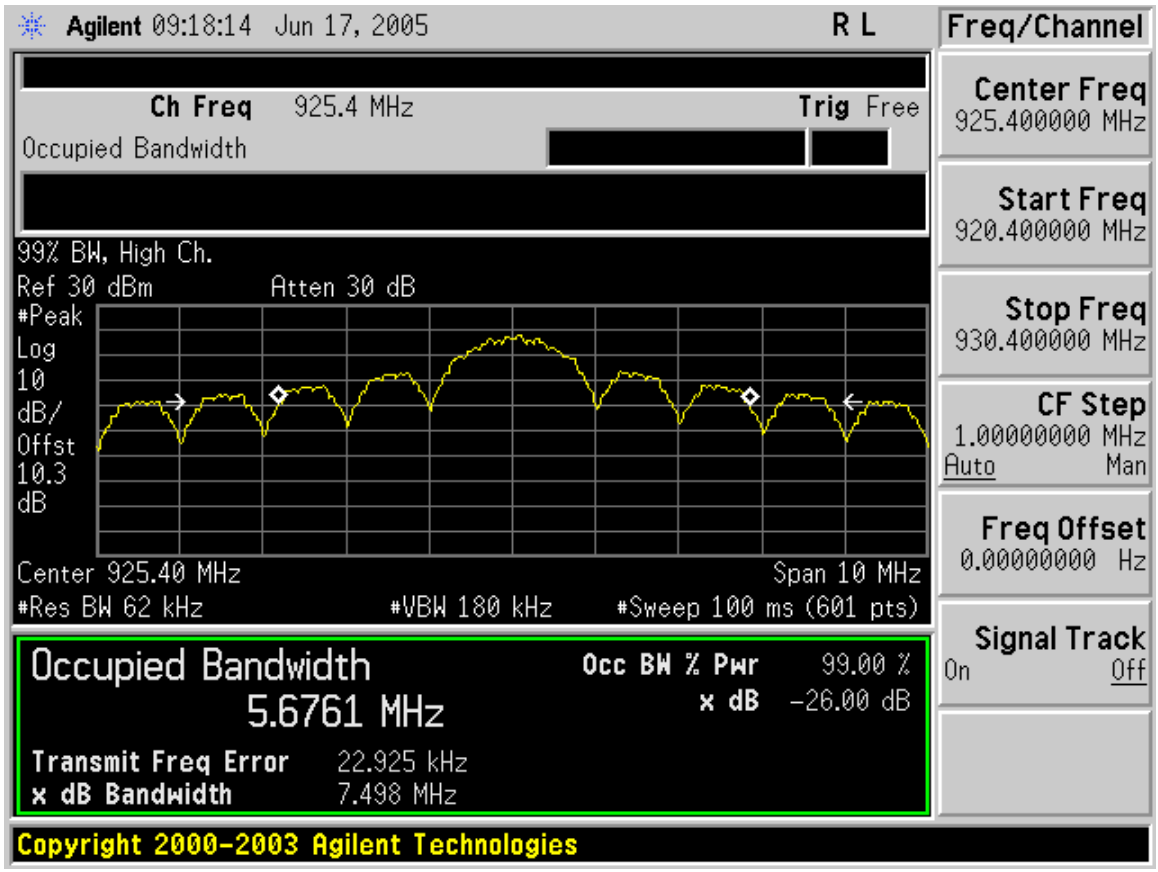
99% Bandwidth LOW Channel



99% Bandwidth MID Channel



99% Bandwidth HIGH Channel



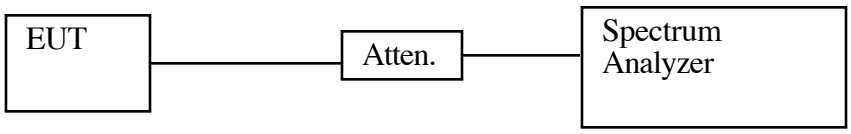
RF Power Output
Test Requirement: 15.247

Measurement Equipment Used:

Measurement Equipment Used:

Agilent 4446A Spectrum Analyzer, 9 kHz-40 GHz
10 dB attenuator
1 ft coax cable, 0.3 dB loss max.

Test Setup



Test Procedures

1.The EUT was configured on a test bench. The spectrum analyzer RBW and VBW were set to 1 MHz and 3 MHz respectively,

2. The spectrum analyzer channel power was used to measure peak power.

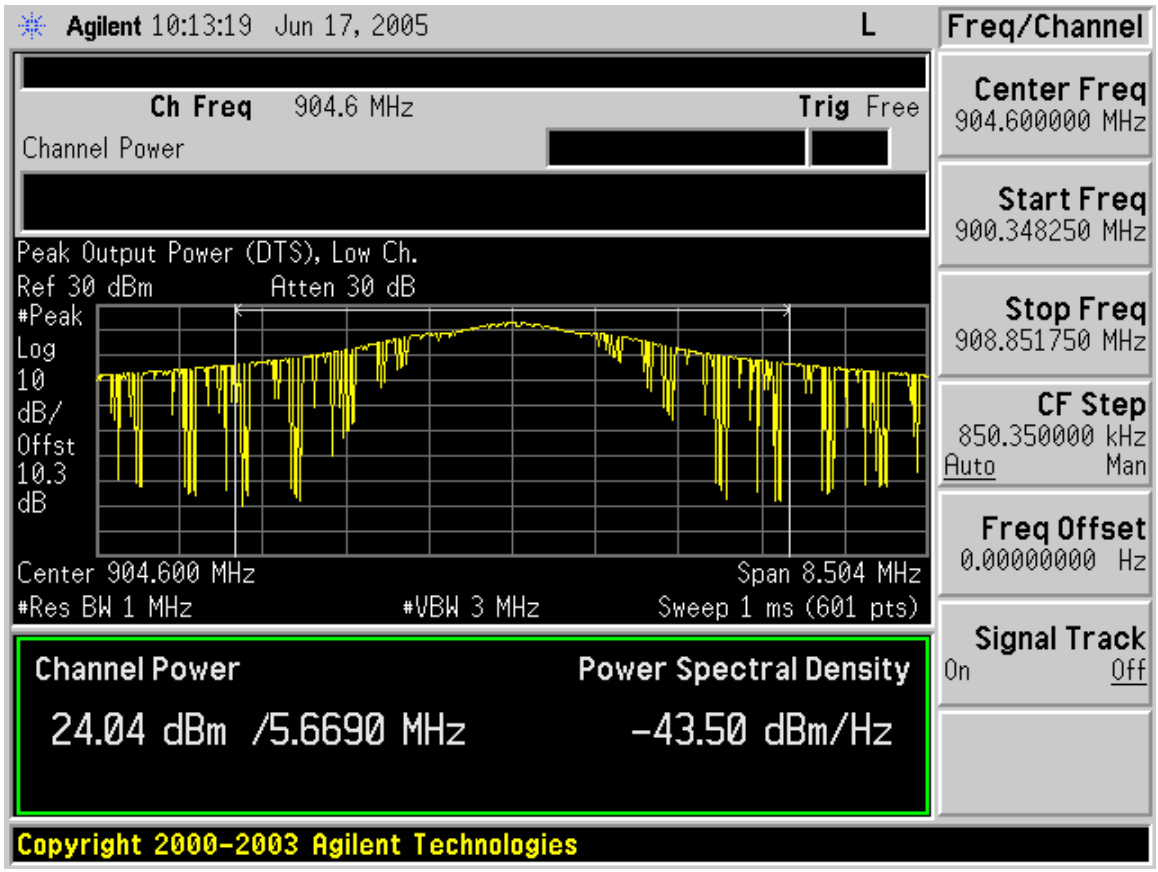
3. The process in (1) and (2) was repeated for MID channel and HIGH channel.

Test Results

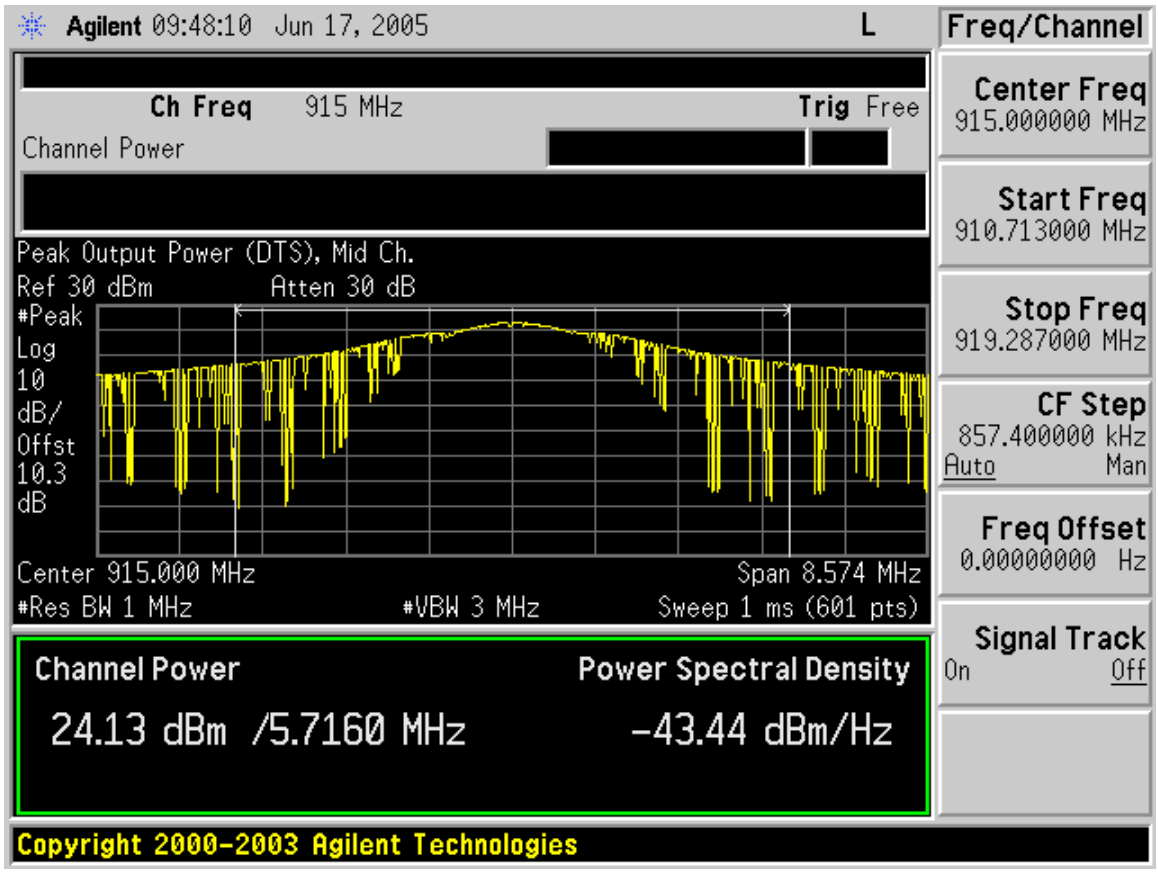
Power level readings converted to dBm are shown below. Refer also to spectrum analyzer graphs. Reference level offset corrects for external attenuation and cable loss.

Channel	Frequency, MHz	Output Power, dBm
LOW	904.6	24.04
MID	915.0	24.13
HIGH	925.4	24.17

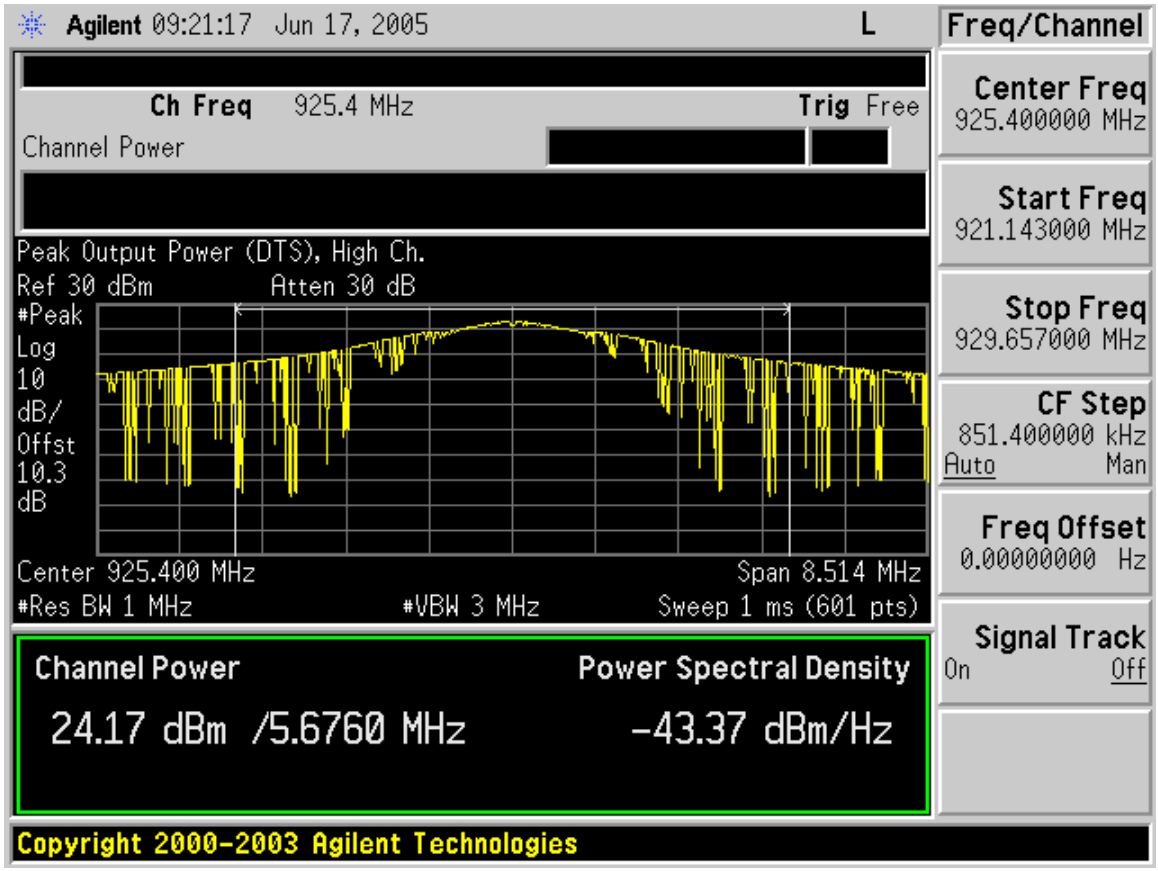
Low Channel Peak Output Power



Mid Channel Peak Output Power



High Channel Peak Output Power



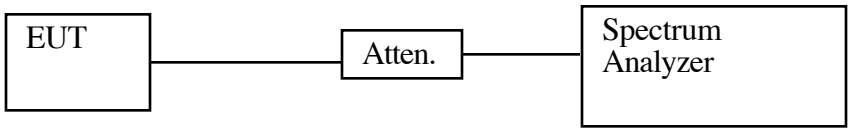
Spurious Emissions, Conducted
Test Requirement: 15.247(c)

Measurement Equipment Used:

Measurement Equipment Used:

Agilent 4446A Spectrum Analyzer, 9 kHz-40 GHz
10 dB attenuator
1 ft coax cable, 0.3 dB loss max.

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.

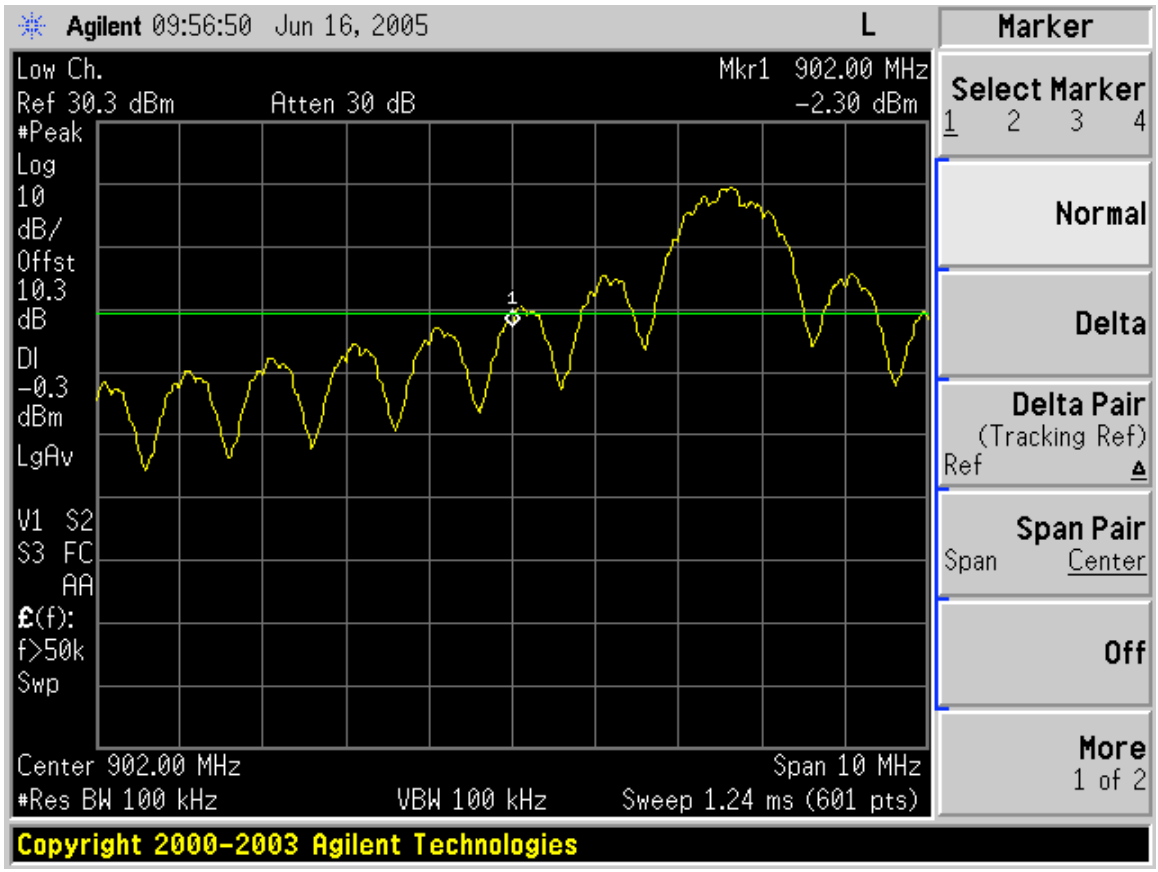
2. The process in (1) was repeated for MID channel and HIGH channel.

Test Results

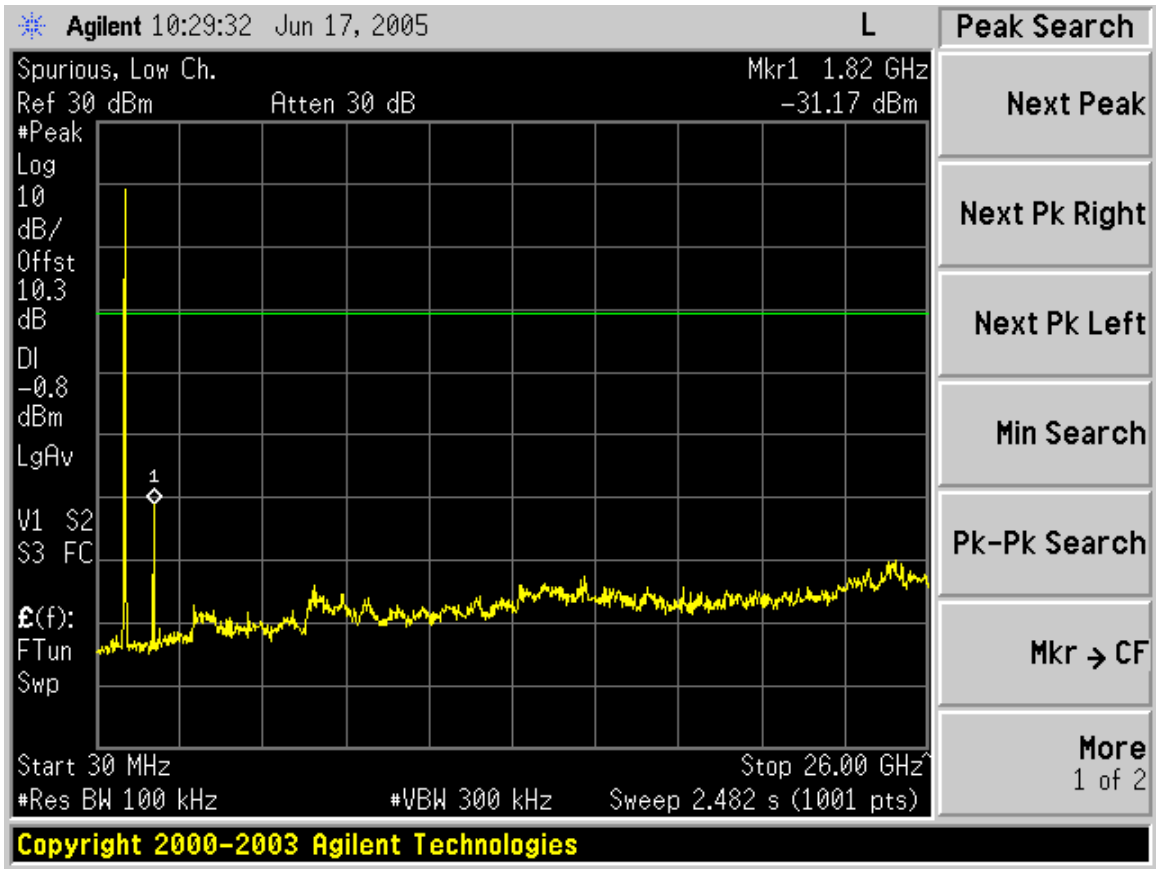
Refer to attached data sheets. Data shows out of band emissions are suppressed well below the -20 dBc minimum required by the Rules.

Channel	**Frequency, MHz**
LOW	904.6
MID	915
HIGH	925.4

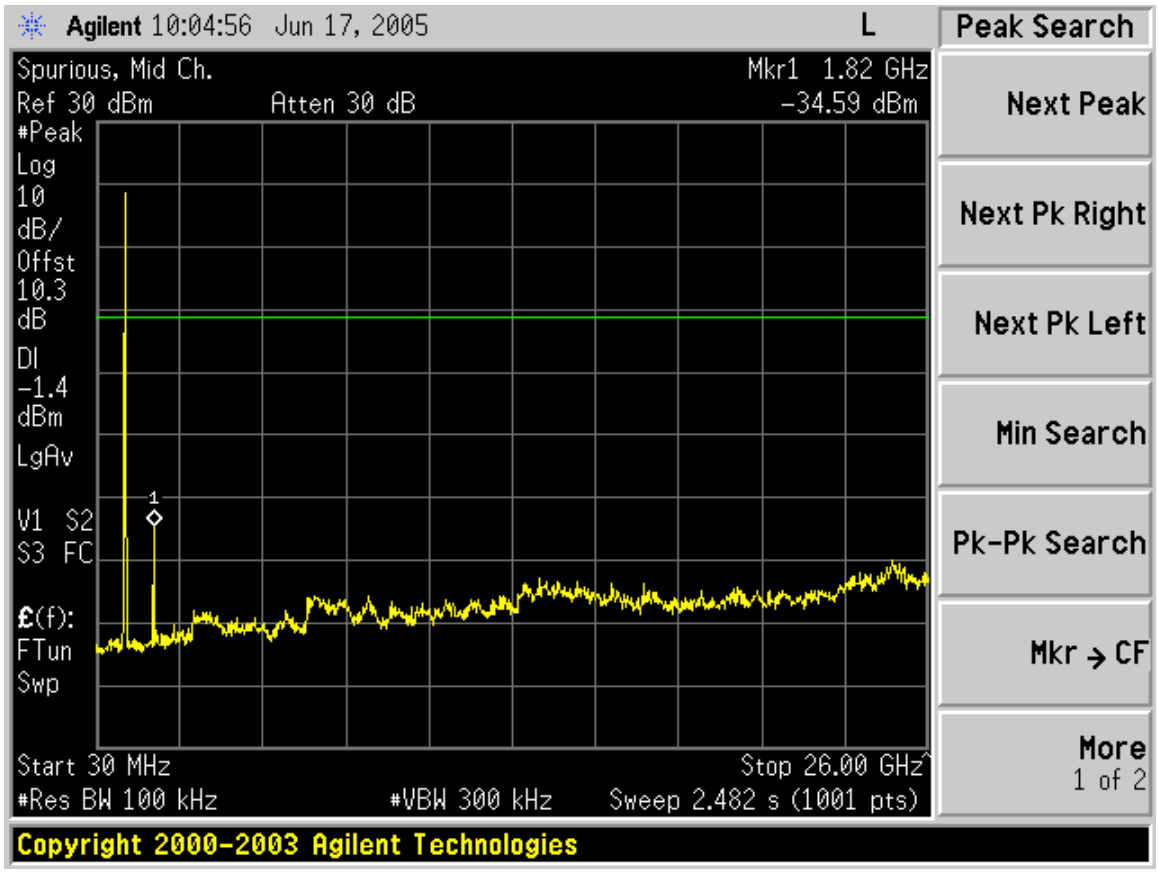
Out of Band Low Channel (1 of 2)



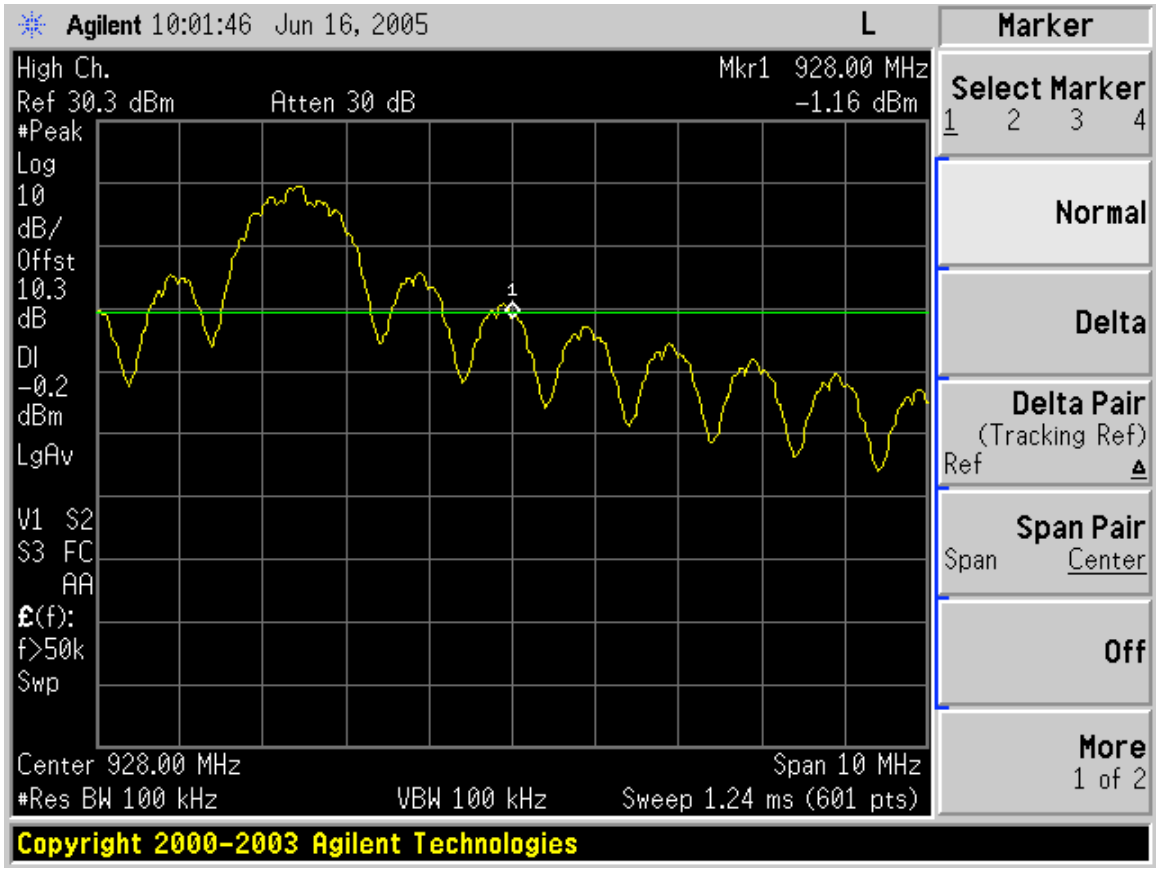
Out of Band Low Channel (2 of 2)



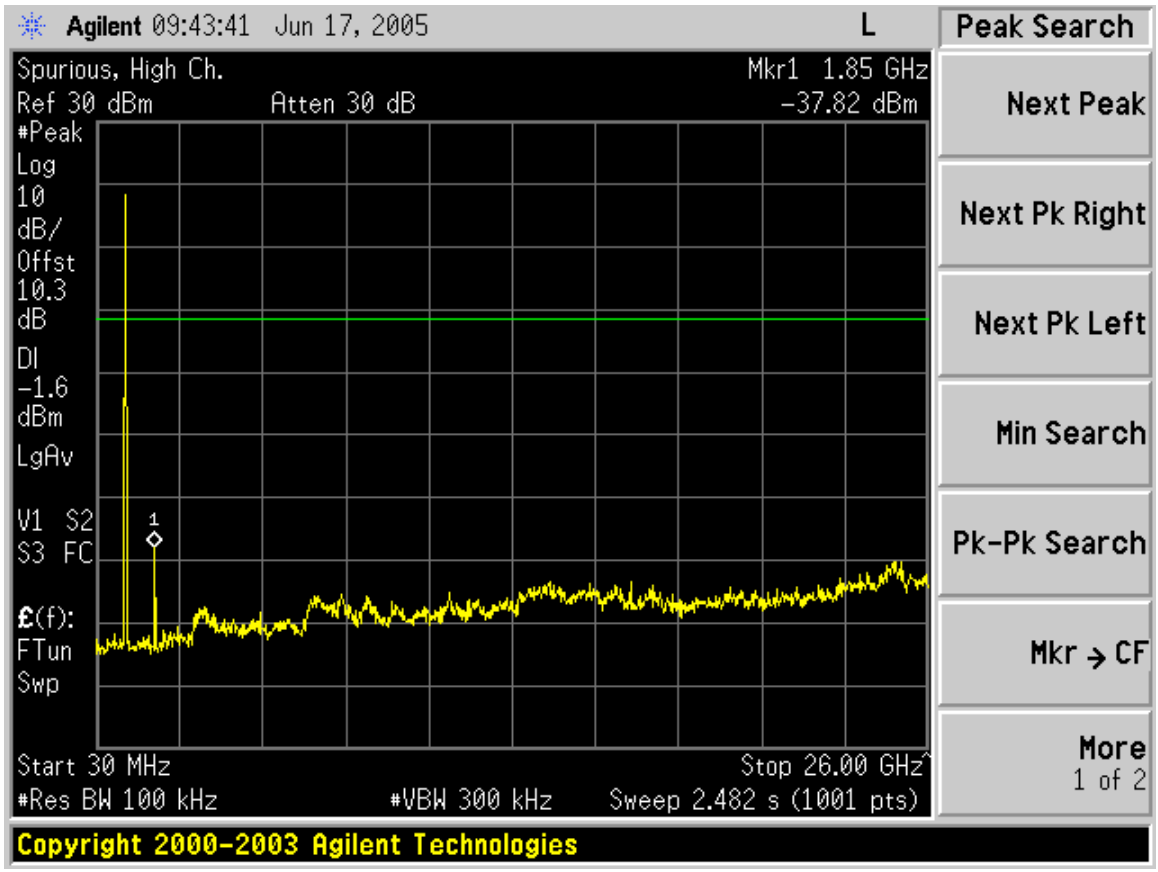
Out of Band Mid Channel (1 of 2)



Out of Band High Channel (1 of 2)



Out of Band High Channel (2 of 2)



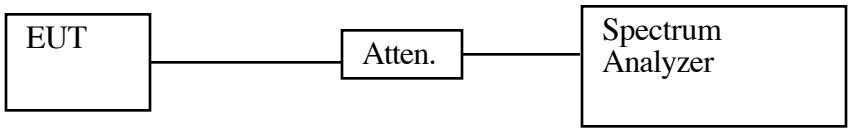
Power Spectral Density
Test Requirement: 15.247(d)

Measurement Equipment Used:

Measurement Equipment Used:

Agilent 4446A Spectrum Analyzer, 9 kHz-40 GHz
10 dB attenuator
1 ft coax cable, 0.3 dB loss max.

Test Setup



Test Procedure

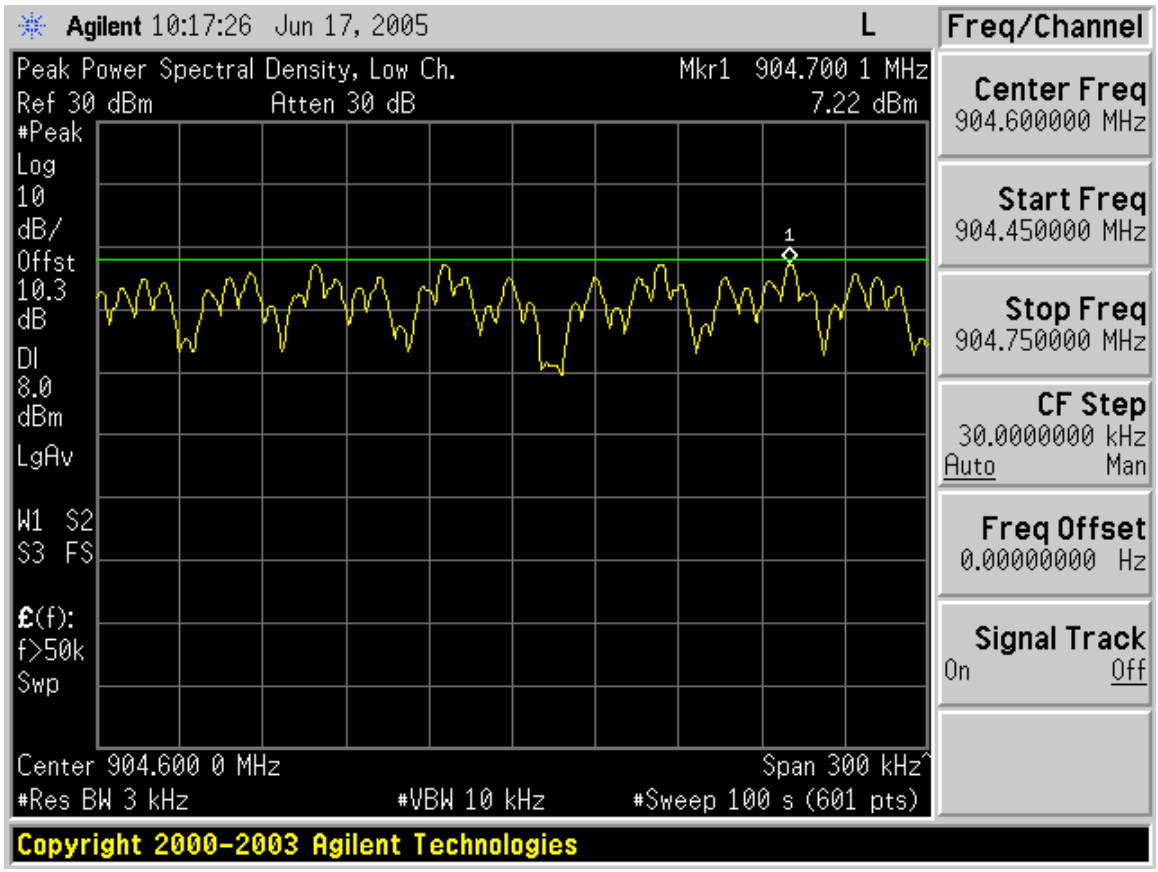
1. Using PEAK search and CF analyzer functions, set LOW channel peak emission to center of analyzer screen.
2. Gradually reduce SPAN to 300 kHz, while adjusting tuning frequency so that peak remains at center of screen.
3. Set RES BW =3 kHz, VID BW = 10 kHz, SWEEP = 100 sec.
4. Record highest reading and compare to 8 dBm limit.

The test was repeated for MID and HIGH channel.

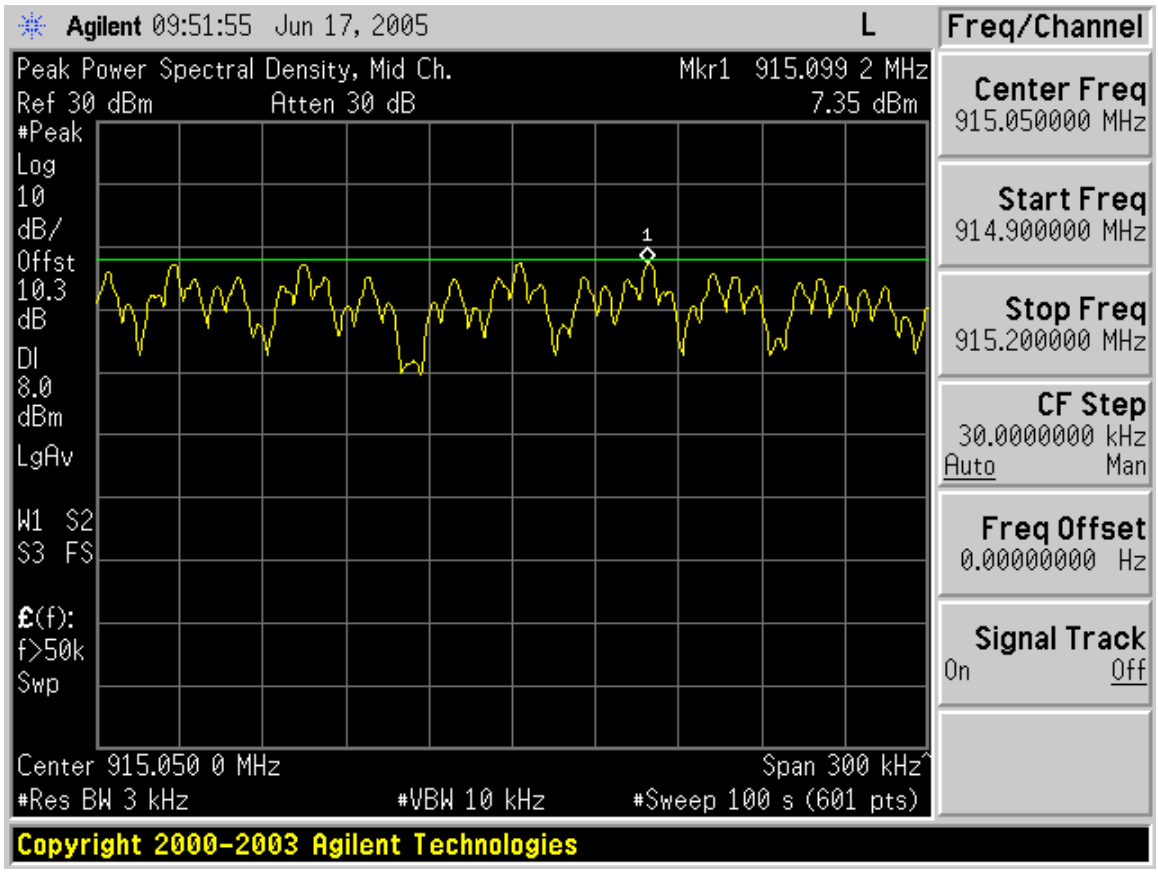
Test Results

Maximum PSD was 7.38 dBm. Refer to attached spectrum analyzer charts.

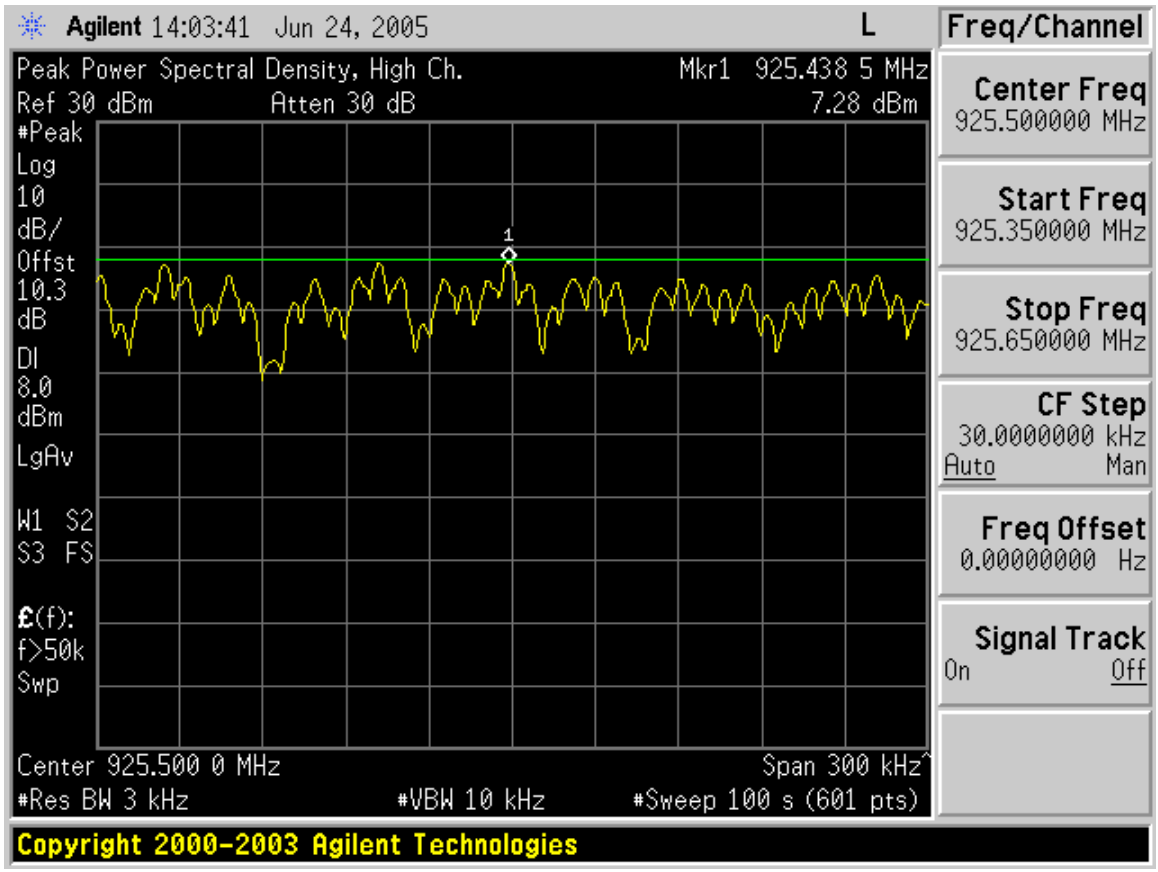
Power Spectral Density, LOW Channel



Power Spectral Density, MID Channel



Power Spectral Density, HIGH Channel



RF Exposure (MPE) Calculations

904.6 - 924.6 MHz DTS Radio

Applicant: **Sensus Metering Systems**

FCC ID: **KCH520R**

RF Hazard Distance Calculation

mW/cm2 from Table1: 0.6

Max RF Power TX Antenna P, dBm	G, dBi	MPE Safe Distance, cm	MPE, inches
24.2	2.2	7.6	3.0

Basis of Calculations:

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)

NOTE: TX burst is <80 msec, for a source based duty cycle of 0.8. When duty cycle is factored into power output, MPE is reduced to 6.8 cm.