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Measured Radio Frequency Emissions
From

Fidelity Comtech, Inc.
Model: FCI-2400

Report No. 162
April 9, 2003

For:
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Summary

Tests for compliance with FCC Regulations, Part 15.247, and with Industry Canada Regulations, RSS-210, Section 6.2.2 (o), were performed on Fidelity Comtech spread spectrum RF extended range LAN system. The DUT is subject to the Rules and Regulations as a transmitter, a receiver, and a digital device. This link uses an FCC certified spread spectrum Lucent radio, but adds high gain antennas, amplifiers and cables. Here we report on measurements as required for combinations of antennas and amplifiers. We also report on measurements of conducted emissions for the power supply used by the power amplifiers.

In testing completed 28-Mar-03, the radiated emissions limits in restricted bands were met, in the worst case, by 0.1 dB at a frequency of 2390 MHz (see p. 11). Power supply conducted emissions, CISPR/FCC Class B, were met by 1.9 dB at a frequency of 170 kHz (see p. 12).

1. Introduction

Fidelity Comtech, Inc. / Lucent extended range radio, FCI-2400 series, were tested for compliance with FCC Regulations, Part 15, adopted under Docket 87-389, April 18, 1989, and with Industry Canada RSS-210, Issue 5, Draft 1, Section 6.2.2 (t1). The tests were performed at the University of Michigan Radiation Laboratory Willow Run Test Range following the procedures described in ANSI C63.4-1992 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". The Site description and attenuation characteristics of the Open Site facility are on file with FCC Laboratory, Columbia, Maryland (FCC Reg. No: 91050) and with Industry Canada, Ottawa, ON (File Ref. No: IC 2057).

2. Test Procedure and Equipment Used

The test equipment commonly used in our facility is listed in Table 2.1 below. The HP 8593E spectrum analyzer is used for primary amplitude and frequency reference.

Table 2.1 Test Equipment

Test Instrument	Eqpt. Used	Manufacturer/Model
Spectrum Analyzer (0.1-1500 MHz)		Hewlett-Packard, 182T/8558B
Spectrum Analyzer (9kHz-22GHz)	X	Hewlett-Packard 8593A SN: 3107A01358
Spectrum Analyzer (9kHz-26GHz)	X	Hewlett-Packard 8593E, SN: 3412A01131
Spectrum Analyzer (9kHz-26GHz)		Hewlett-Packard 8563E, SN: 3310A01174
Spectrum Analyzer (9kHz-40GHz)		Hewlett-Packard 8564E, SN: 3745A01031
Power Meter	X	Hewlett-Packard, 432A
Power Meter		Anritsu, ML4803A/MP
Peak Power Meter	X	Pacific Instruments 1018B
Harmonic Mixer (26-40 GHz)		Hewlett-Packard 11970A, SN: 3003A08327
Harmonic Mixer (40-60 GHz)		Hewlett-Packard 11970U, SN: 2332A00500
Harmonic Mixer (75-110 GHz)		Hewlett-Packard 11970W, SN: 2521A00179
Harmonic Mixer (140-220 GHz)		Pacific Millimeter Prod., GMA, SN: 26
S-Band Std. Gain Horn	X	S/A, Model SGH-2.6
C-Band Std. Gain Horn	X	University of Michigan, NRL design
XN-Band Std. Gain Horn	X	University of Michigan, NRL design
X-Band Std. Gain Horn	X	S/A, Model 12-8.2
X-band horn (8.2- 12.4 GHz)	X	Narda 640
X-band horn (8.2- 12.4 GHz)		Scientific Atlanta , 12-8.2, SN: 730
K-band horn (18-26.5 GHz)	X	FXR, Inc., K638KF
Ka-band horn (26.5-40 GHz)	X	FXR, Inc., U638A
U-band horn (40-60 GHz)		Custom Microwave, HO19
W-band horn(75-110 GHz)		Custom Microwave, HO10
G-band horn (140-220 GHz)		Custom Microwave, HO5R
Bicone Antenna (30-250 MHz)	X	University of Michigan, RLBC-1
Bicone Antenna (200-1000 MHz)	X	University of Michigan, RLBC-2
Dipole Antenna Set (30-1000 MHz)	X	University of Michigan, RLDP-1,-2,-3
Dipole Antenna Set (30-1000 MHz)		EMCO 2131C, SN: 992
Active Rod Antenna (30 Hz-50 MHz)		EMCO 3301B, SN: 3223
Active Loop Antenna (30 Hz-50 MHz)		EMCO 6502, SN:2855
Ridge-horn Antenna (300-5000 MHz)	X	University of Michigan
Amplifier (5-1000 MHz)	X	Avantak, A11-1, A25-1S
Amplifier (5-4500 MHz)	X	Avantak
Amplifier (4.5-13 GHz)	X	Avantek, AFT-12665
Amplifier (6-16 GHz)	X	Trek
Amplifier (16-26 GHz)	X	Avantek
LISN Box	X	University of Michigan
Signal Generator		Hewlett-Packard 8657B

3. Configuration and Identification of Device Under Test

The DUT is a spread spectrum RF wireless link operating in the 2400 - 2483.5 MHz band. The system tested consists of a laptop computer, Lucent PCMCIA radio, coax cable, (choice of) amplifier, and (choice of) antenna. There are three primary configurations for this system: 1) outdoor amplifier and separate antenna with DC injector coaxial power feed, 2) indoor amplifier with DC power (fed directly into the amplifier) and separate antenna, 3) Witch's Hat amplified antenna with DC injector coaxial power feed.

The system is designed to operate with up to 12 channels from 2412 to 2462 MHz.; however, depending on the choice of components used (amplifier, antenna), channels are restricted so as to meet the FCC and IC emissions limits. The DUT was designed and manufactured by Fidelity Comtech, 5485 Conestoga Court, Suite 237, Boulder, Colorado 80301. Figure 3.1 shows the block diagram of the basic system. It is identified as:

Fidelity Comtech
Model(s): FCI-2401, FCI-2401i, FCI-2405, FCI-2405i, FCI-2451
SN(s): AE030, AE043, AE048
FCC ID: Q2A-FCI2400
IC: 4569A-FCI2400

13 configurations were fully tested for compliance. It is demonstrated in this test report that these configurations accurately depict the worst case emissions from the DUT over the full set of configurations listed in the *System Conf. Information* exhibit, which is included in this filing. It is the intent of this test report to demonstrate compliance for all configurations listed in the *System Conf. Information* exhibit.

With components evaluated:

Lucent Radio — SN: 3892B510
Model PC24E-H-FC — FCC ID: IMRWLPCE24H
CAN: 230-391-152A

Laptop Computer
Compaq Armada
Model: Series 2920A — FCC ID: DGIP5665

Amplifier(s)

Table 3.1 Amplifiers

Amplifier Model	Output Power (mW)	Used in Testing
FCI-2401	100, 250, 500, 1000	X
FCI-2401i	100, 250, 500, 1000	X
FCI-2405	100, 250, 500	X
FCI-2405i	100, 250, 500	X
FCI-2451	100, 250, 500, 1000	X

Power Supply, for amplifier(s)
CUI, Inc.
Model: DV-0950-B11 — FCC: Class B

DC Injector
FCI-2400 DC Injector — SN: none

Cables

Antenna cable, 50 feet, with N-connectors - 3dB/50ft loss at 2.437 GHz
Antenna cable, 0.4 m with N-connectors - 0.2 dB loss at 2.437 GHz
Antenna cable, 0.1 m with N-connectors - 0.1 dB loss at 2.437 GHz
Pigtail cable, 18 in., FCI

Antennas

Table 3.2 Antennas

Antenna Model	PN/SN	Construction	Gain (dBi)	Used in Testing
ARC Wireless 13 dBi	AAI-00079	Patch Array	13	X
ARC Wireless 19 dBi	AAI-00084	Patch Array	19	X
FCI Witch's Hat	N/A	whip/monopole	3	X
MAXRAD	N/A	whip/monopole	4	X

3.1 EMI Relevant Modifications

During the course of testing, an amplifier and antenna were selected and then the available channels for the particular configuration were reduced (if necessary) to meet the band-edge and harmonic emission limits.

In addition, it was recommended to the manufacturer that RF absorbing material be added to the FCI-2401, 2401i, 2405, 2405i amplifier chassis to decrease an existing 2nd harmonic resonance within the structure. RF absorber (LS-26, ARC Technologies, ½ inch) is used. For the FCI-2451 EMI gasketing (Laird Elastomeric Silicone) and copper tape (generic) were added to the Witch's Hat configuration to help contain existing 2nd harmonic emissions. All EMI relevant modifications can be seen in the internal photographs exhibit.

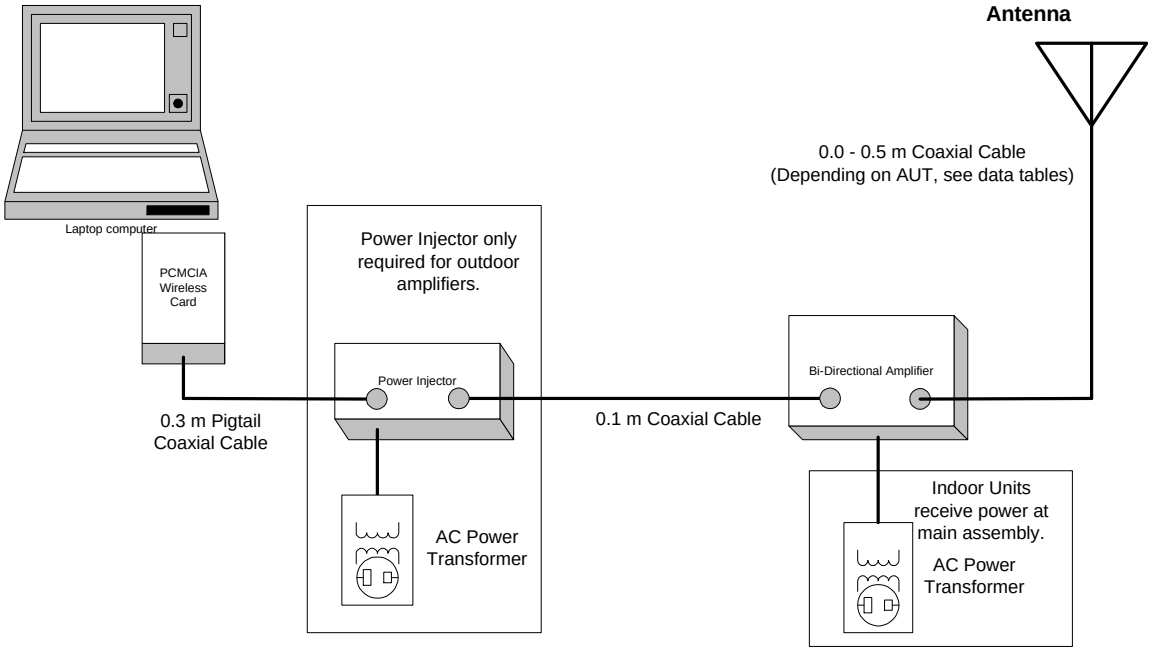

Figure 3.1 Basic block diagram of the system

4. Emission Limits

4.1 Radiated Emission Limits

Since the DUT is a spread spectrum device (15.247, 2.4 GHz), the radiated emissions are subject to emissions in restricted bands only (15.205). The applicable frequencies, through ten harmonics, are given below in Table 4.1. Emission limits from digital circuitry are specified in Table 4.2.

Table 4.1 Radiated Emission Limits (FCC:15.205; IC:RSS-210, 6.3) - Transmitter

Frequency (MHz)	Fundamental Ave. E_{lim} (3m)		Spurious* Ave. E_{lim} (3m)	
	(µV/m)	dB (µV/m)	(µV/m)	dB (µV/m)
2400-2483.5	---		---	
2310-2390 2483.5-2500 4500-5250	Restricted Bands		500	54.0
7250-7750 14470-14500 17700-21400 22010-23120 23600-24000	Restricted Bands		500	54.0

* Measure up to tenth harmonic; 1 MHz res. BW, 100 Hz video BW (for average detection)

Table 4.2 Radiated Emission Limits (FCC:15.109;IC: RSS-210, 7.3) - Digital device.

Frequency (MHz)	Class A ds = 10 m		Class B ds = 3 m	
	(µV/m)	dB (µV/m)	(µV/m)	dB (µV/m)
30-88	90	39.0	100	40.0
88-216	150	43.5	150	43.5
219-960	210	46.4	200	46.0
960-	300	49.5	500	54.0

120 kHz BW up to 1 GHz, 1 MHz BW above 1 GHz

4.2 Conductive Emission Limits

Table 4.3 Conducted Emission Limits (FCC:15.107; IC: RSS-210, 6.6).

Frequency MHz	Class A (dBμV)		Class B (dBμV)	
	Quasi-peak	Average	Quasi-peak	Average
.150 - 0.50	79	66	66 - 56*	56 - 46*
0.50 - 5	73	60	56	46
5 - 30	73	60	60	50

Notes:
1. The lower limit shall apply at the transition frequency
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15-0.50 MHz:

*Class B Quasi-peak: dBμV = 50.25 - 19.12*log(f)
*Class B Average: dBμV = 40.25 - 19.12*log(f)

3. 9 kHz RBW

5. Radiated Emission Tests and Results

Note: The following measurements for a given amplifier/radio configuration are performed with no cables in the system, i.e. maximum input power to the amplifier. Since these are AGC amplifiers, their compliance must be demonstrated over a range of input power levels. *For the case of radiated emissions, it was determined that, over the full range of power settings, when no attenuation is placed before the AGC the highest radiated emissions in the restricted bands occur.* (The AGC performance of these amplifiers tends to degrade with added attenuation, resulting in slightly lower output powers at higher attenuation levels. Additionally, the amplifier gain stage remains at a constant gain level for all power settings, while the AGC operates an attenuator with limited dynamic range that is sometimes unable to sufficiently attenuate the input signal.)

5.1 Anechoic Chamber Measurements

In our chamber, there is a set-up similar to that of an outdoor 3-meter site, with a turntable, an antenna mast, and a ground plane. Instrumentation includes spectrum analyzers and other equipment as needed. For these tests the receiver (horn) antennas were placed on a Styrofoam block, at about 1.2 m height, and the DUT on a turntable at 3 meter distance.

Standard gain horn antennas were used for the measurements. At 2.4 GHz the horns were connected directly to a spectrum analyzer via RG-214 coaxial cable, and above 2.4 GHz a pre-amp was added. The cables and the pre-amplifier used were specially calibrated for these tests using a spectrum analyzer with built in sweep generator.

The DUT antenna was rotated in all possible ways and the maximum emission recorded. Photographs in the *Test Setup Photos* exhibit demonstrate the measurement set-up.

Note: Digital Radiated emissions limits were > 20 dB below the FCC Class B limit. No data is reported.

5.2 Outdoor Measurements

None made

5.3 Computations and Results

To convert the dBm measured on the spectrum analyzer to dB(μV/m), we use expression

$$E_3(dB\mu V/m) = 107 + P_R + K_A - K_G + K_E$$

where P_R = power recorded on spectrum analyzer, dB, measured at 3m
K_A = antenna factor, dB/m
K_G = pre-amplifier gain, including cable loss, dB
K_E = pulse operation correction factor, dB

When presenting the data, the dominant measured emissions at each frequency, under all of the possible orientations, are given. Computations and results are given in Tables 5.1 through 5.13. There we see that in the worst case the DUT meets the limit by 0.1 dB at 2390 MHz in Table 5.1. Note, that besides the emission measurements, each table contains the frequency range of operation (in upper section of the table).

5.4 Duty Factor for Normal Operation

No Duty Factor was used during testing of this device, as it was programmed to transmit continuous.

6. Other Measurements and Computations

Note: The following measurements for a given amplifier/radio configuration are performed with no cables in the system, i.e. maximum input power to the amplifier. Since these are AGC amplifiers, their compliance must be demonstrated over a range of input power levels. *For all systems tested, preliminary testing was performed to determine the setup which resulted in the worst case performance for the system. These worst case systems were tested to demonstrate compliance and the results of those tests are listed below.*

6.1 Peak-to-Average Ratio (15.35(b))

For the measurements presented here (for emissions in restricted bands), the DUT was programmed to transmit continuous, and such was verified with spectrum analyzer set to zero-span mode. See Figure 6.1. Average measurements were made using 1 MHz RBW and 100 Hz VBW. Peak measurements were made using 1 MHz RBW and 3 MHz VBW.

Typically the difference between peak and average was 12 to 13 dB, and never exceeded the 20 dB limit.

6.2 Potential Health Hazard EM Radiation Level

The following table summarizes the minimum separation distance as calculated following FCC OET Bulletin 65. Because of the large variation in antenna and amplifier configurations, minimum separation distance is calculated over the full range of total EIRP only.

To obtain the minimum separation distance for a particular system, the antenna gain (dBi) listed in Table 3.2 must be added to the amplifier output power (dBm) listed in Table 3.1, resulting in the total EIRP for a given system. If no amplifier is used, the output power of the radio from Table 6.2 is to be used in place of the amplifier output power. Cross referencing this EIRP (dBm) with that listed below will give the corresponding minimum separation distance for the given system.

Table 6.1 Potential Health Hazard Radiation Level

EIRP(dBm)	R (cm)	EIRP(dBm)	R (cm)	EIRP(dBm)	R (cm)
43	39.8	28	7.1	13	1.3
42	35.5	27	6.3	12	1.1
41	31.7	26	5.6	11	1.0
40	28.2	25	5.0	10	0.9
39	25.1	24	4.5	9	0.8
38	22.4	23	4.0	8	0.7
37	20.0	22	3.6	7	0.6
36	17.8	21	3.2	6	0.6
35	15.9	20	2.8	5	0.5
34	14.1	19	2.5	4	0.4
33	12.6	18	2.2	3	0.4
32	11.2	17	2.0	2	0.4
31	10.0	16	1.8	1	0.3
30	8.9	15	1.6		
29	8.0	14	1.4		

The following equations were used in calculating the operating distance (R).

$$EIRP(mW) = Po(mW) \cdot 10^{\frac{Gain(dB)}{10}}$$

and

$$R = \sqrt{\frac{EIRP(mW)}{4 \cdot \Pi \cdot S(mW/cm^2)}}, \quad S = 1mW/cm^2$$

6.3 Peak Output Power (15.247(b))

For this measurement, the DUT was set in a test mode for continuous data transmission. No additional cable was used in the system. A peak (diode detector) power meter was connected where the antenna attaches to the system. Since the DUT transmits in continuous mode, there is no adjustment needed to the readings. Table 6.2, below, presents the results. The peak output power limit is 30dBm.

Table 6.2 Peak and Average Output Power (Antenna Conducted)

Freq (MHz)	Peak P(dBm)	Comment
2412	28.7	1W setting
2437	29.3	
2462	28.0	
2412	26.4	500 mW setting
2437	26.4	
2462	26.5	
2412	24.5	250 mW setting
2437	24.7	
2462	24.0	
2412	21.6	100 mW setting
2437	21.9	
2462	21.7	

2412 2437 2462	10.7 10.8 11.1	(Radio Alone)

Figure 6.2 at the end of this report demonstrates the peak output power variation of the AGC amplifier as a function of attenuation placed before the amplifier.

6.4 Power Line Conducted Emissions (15.107)

The RF amplifier is powered from a switching power supply. Conducted emissions were measured using a LISN in the standard set-up. Table 6.1 shows the results of this testing. Photographs of the set-up are in the *Test Setup Photos* exhibit.

The radio and laptop conducted emissions were measured; the laptop and Lucent radio have been retested to demonstrate compliance with the new FCC conducted emissions limits.

6.5 Bandwidth (15.247(a)(2))

For this test, the DUT was put in a test mode for continuous data transmission, and the amplifier was attached, without additional cables, to the radio. The spectrum analyzer was connected where the antenna attaches to the system. The analyzer was set for RBW=100 kHz, VBW=300 kHz, SPAN=30 MHz. The 6-dB bandwidth was measured for lowest, middle, and highest channels that could be used in a given configuration. Since the amplifier itself is identical, despite changes in the configured output power levels, results for only the highest and lowest power settings are reported here. It was verified that these reported emissions are consistent across all power settings. Plots are shown in Figure 6.3 through 6.7.

1000 mW Setting (0 dB attenuation before AGC)

Frequency	6 dB Bandwidth
2.412 GHz	10.05 MHz
2.437 GHz	10.05 MHz
2.462 GHz	10.13 MHz

1000 mW Setting (6 dB attenuation before AGC)

Frequency	6 dB Bandwidth
2.412 GHz	10.13 MHz
2.437 GHz	9.97 MHz
2.462 GHz	9.97 MHz

100 mW Setting (0 dB attenuation before AGC)

Frequency	6 dB Bandwidth
2.412 GHz	10.05 MHz
2.437 GHz	9.97 MHz
2.462 GHz	9.97 MHz

100 mW Setting (10 dB attenuation before AGC)

Frequency	6 dB Bandwidth
2.412 GHz	10.20 MHz
2.437 GHz	10.05 MHz
2.462 GHz	9.90 MHz

Radio Alone

Frequency	6 dB Bandwidth
2.412 GHz	10.28 MHz
2.437 GHz	10.13 MHz
2.462 GHz	10.13 MHz

6.6 RF Antenna Conducted Spurious Emissions (15.247(c))
For this test, the DUT was put in a test mode for continuous data transmission, and the amplifier was attached, without additional cables, to the radio. The spectrum analyzer was connected where the antenna attaches to the system. The analyzer was set for RBW=100 kHz, VBW=300 kHz, the frequency was swept from 0 to 25 GHz. See Figures 6.8 through 6.12. In the plots, only the fundamental is seen, the rest is noise. In all cases, the noise is at least 35 dB below the carrier. (Limit -20.0 dB below carrier). Figure 6.13 through 6.17 demonstrate band-edge compliance at lower and upper edges of the operating band.

6.7 Power Spectral Density and Line Spacing (15.247(d))
For this test, the DUT was put in a test mode for continuous data transmission, and the amplifier was attached, without additional cables, to the radio. The spectrum analyzer was connected where the antenna attaches to the system. The spectrum was first scanned for the maximum spectrum peaks and then at these peaks the sweep was repeated with RBW=3 kHz, VBW=300 kHz, SPAN=300 kHz, and RBW=1 kHz, VBW=300 kHz, SPAN=100 kHz. Because of the excessive number of plots taken to ascertain this data, only one example set is shown in Figure 6.18-6.20. The complete readings obtained are:

1000 mW Setting (0 dB attenuation before AGC)

Frequency	Analyzer Reading	Line Spacing
2.41134 GHz	3.61 dBm (Limit 8.0 dBm)	4.3 kHz
2.43634 GHz	4.07 dBm (Limit 8.0 dBm)	4.3 kHz
2.46134 GHz	4.07 dBm (Limit 8.0 dBm)	4.5 kHz

1000 mW Setting (6 dB attenuation before AGC)

Frequency	Analyzer Reading	Line Spacing
2.41134 GHz	-0.98 dBm (Limit 8.0 dBm)	4.5 kHz
2.43634 GHz	-1.10 dBm (Limit 8.0 dBm)	4.3 kHz
2.46134 GHz	-1.30 dBm (Limit 8.0 dBm)	4.5 kHz

100 mW Setting (0 dB attenuation before AGC)

Frequency	Analyzer Reading	Line Spacing
2.41134 GHz	-3.28 dBm (Limit 8.0 dBm)	4.3 kHz
2.43634 GHz	-3.03 dBm (Limit 8.0 dBm)	4.3 kHz
2.46134 GHz	-3.53 dBm (Limit 8.0 dBm)	4.5 kHz

100 mW Setting (10 dB attenuation before AGC)

Frequency	Analyzer Reading	Line Spacing
2.41134 GHz	-3.87 dBm (Limit 8.0 dBm)	4.3 kHz
2.43634 GHz	-3.80 dBm (Limit 8.0 dBm)	4.3 kHz
2.46134 GHz	-3.65 dBm (Limit 8.0 dBm)	4.3 kHz

Radio Alone

Frequency	Analyzer Reading	Line Spacing
2.41134 GHz	-9.60 dBm (Limit 8.0 dBm)	4.3 kHz
2.43634 GHz	-9.40 dBm (Limit 8.0 dBm)	4.5 kHz
2.46134 GHz	-9.42 dBm (Limit 8.0 dBm)	4.3 kHz

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Table 5.1 Highest Emissions Measured

Radiated Emissions										ARC 19dBi; 250mW
#	Freq. MHz	Ant. Used	Ant. Pol.	Ave dBm	Ka dB/m	Kg dB	E3 dBµV/m	E3lim dBµV/m	Pass dB	Comments
1	2437.0									Low channel
2	2437.0									Mid channel
3	2437.0									High channel
4										
5	2390.0	Horn S	H/V	-75.3	21.5	- 0.6	53.8	54.0	0.2	Low
6	2390.0	Horn S	H/V	-75.3	21.5	- 0.6	53.8	54.0	0.2	Mid
7	2390.0	Horn S	H/V	-75.3	21.5	- 0.6	53.8	54.0	0.2	High
8	2483.5	Horn S	H/V	-75.2	21.5	- 0.6	53.9	54.0	**0.1**	Low
9	2483.5	Horn S	H/V	-75.2	21.5	- 0.6	53.9	54.0	**0.1**	Mid
10	2483.5	Horn S	H/V	-75.2	21.5	- 0.6	53.9	54.0	**0.1**	High
11	4874.0	Horn C	H/V	-44.4	25.5	37.0	51.1	54.0	2.9	Low
12	4874.0	Horn C	H/V	-50.9	25.5	37.0	44.6	54.0	9.4	Mid
13	4874.0	Horn C	H/V	-49.4	25.5	37.0	46.1	54.0	7.9	High
14	7311.0	Horn XN	H/V	-57.3	25.5	36.0	39.2	54.0	14.8	Low
15	7311.0	Horn XN	H/V	-57.3	25.5	36.0	39.2	54.0	14.8	Mid
16	7311.0	Horn XN	H/V	-57.3	25.5	36.0	39.2	54.0	14.8	High
17	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Low
18	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Mid
19	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	High
20	12185.0	Horn X	H/V	-69.7	25.5	34.0	28.8	54.0	25.2	Low
21	12185.0	Horn X	H/V	-69.7	25.5	34.0	28.8	54.0	25.2	Mid
22	12185.0	Horn X	H/V	-69.7	25.5	34.0	28.8	54.0	25.2	High
23	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Low
24	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Mid
25	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	High
26	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Low
27	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Mid
28	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	High
29	19496.0	Horn K	H/V	-72.2	32.3	32.0	35.1	54.0	18.9	Low, noise
30	19496.0	Horn K	H/V	-72.2	32.3	32.0	35.1	54.0	18.9	Mid, noise
31	19496.0	Horn K	H/V	-72.2	32.3	32.0	35.1	54.0	18.9	High, noise
32	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Low
33	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Mid
34	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	High, noise
35	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Low
36	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Mid
37	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	High
38										
39	**Configuration:**						* Ave: measured with 1 MHz RBW and 100 Hz			
40	Pwr supp	DC Injector	Coax	Amp	Filter	Antenna				
41	DV-0950-B11	Yes	0.4 m	250mW	No	ARC 19 dBi				
42										

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Table 5.2 Highest Emissions Measured

Radiated Emissions										ARC 19dBi; 100mW
#	Freq. MHz	Ant. Used	Ant. Pol.	Ave dBm	Ka dB/m	Kg dB	E3 dBµV/m	E3lim dBµV/m	Pass dB	Comments
1	2427.0									Low channel
2	2437.0									Mid channel
3	2447.0									High channel
4										
5	2390.0	Horn S	H/V	-75.4	21.5	- 0.6	53.7	54.0	0.3	Low
6	2390.0	Horn S	H/V	-75.7	21.5	- 0.6	53.4	54.0	0.6	Mid
7	2390.0	Horn S	H/V	-76.1	21.5	- 0.6	53.0	54.0	1.0	High
8	2483.5	Horn S	H/V	-76.4	21.5	- 0.6	52.8	54.0	1.2	Low
9	2483.5	Horn S	H/V	-76.2	21.5	- 0.6	52.9	54.0	1.1	Mid
10	2483.5	Horn S	H/V	-75.3	21.5	- 0.6	53.8	54.0	**0.2**	High
11	4854.0	Horn C	H/V	-52.3	25.5	37.0	43.2	54.0	10.8	Low
12	4874.0	Horn C	H/V	-54.8	25.5	37.0	40.7	54.0	13.3	Mid
13	4894.0	Horn C	H/V	-51.2	25.5	37.0	44.3	54.0	9.7	High
14	7281.0	Horn XN	H/V	-61.9	25.5	36.0	34.6	54.0	19.4	Low
15	7311.0	Horn XN	H/V	-61.8	25.5	36.0	34.7	54.0	19.3	Mid
16	7341.0	Horn XN	H/V	-62.9	25.5	36.0	33.6	54.0	20.4	High
17	9708.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Low
18	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Mid
19	9788.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	High
20	12135.0	Horn X	H/V	-70.4	25.5	34.0	28.1	54.0	25.9	Low
21	12185.0	Horn X	H/V	-71.5	25.5	34.0	27.0	54.0	27.0	Mid, noise
22	12235.0	Horn X	H/V	-70.1	25.5	34.0	28.4	54.0	25.6	High
23	14562.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Low
24	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Mid
25	14682.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	High
26	16989.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Low
27	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Mid
28	17129.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	High
29	19416.0	Horn K	H/V	-72.3	32.3	32.0	35.0	54.0	19.0	Low, noise
30	19496.0	Horn K	H/V	-72.0	32.3	32.0	35.3	54.0	18.7	Mid, noise
31	19576.0	Horn K	H/V	-72.0	32.3	32.0	35.3	54.0	18.7	High, noise
32	21843.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Low
33	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Mid
34	22023.0	Horn K	H/V	-68.9	32.3	32.0	38.4	54.0	15.6	High, noise
35	24270.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Low
36	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Mid
37	24470.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	High
38										
39	**Configuration:**						* Ave: measured with 1 MHz RBW and 100 Hz VBW			
40	Pwr supp	DC Injector	Coax	Amp	Filter	Antenna				
41	DV-0950-B11	Yes	0.4 m	100mW	none	ARC 19 dBi				
42										

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Table 5.3 Highest Emissions Measured

Radiated Emissions										ARC 13dBi; 500mW
#	Freq. MHz	Ant. Used	Ant. Pol.	Ave dBm	Ka dB/m	Kg dB	E3 dBµV/m	E3lim dBµV/m	Pass dB	Comments
1	2437.0									Low channel
2	2437.0									Mid channel
3	2437.0									High channel
4										
5	2390.0	Horn S	H/V	-75.2	21.5	- 0.6	53.9	54.0	**0.1**	Low
6	2390.0	Horn S	H/V	-75.2	21.5	- 0.6	53.9	54.0	**0.1**	Mid
7	2390.0	Horn S	H/V	-75.2	21.5	- 0.6	53.9	54.0	**0.1**	High
8	2483.5	Horn S	H/V	-75.3	21.5	- 0.6	53.8	54.0	0.2	Low
9	2483.5	Horn S	H/V	-75.3	21.5	- 0.6	53.8	54.0	0.2	Mid
10	2483.5	Horn S	H/V	-75.3	21.5	- 0.6	53.8	54.0	0.2	High
11	4874.0	Horn C	H/V	-46.2	25.5	37.0	49.3	54.0	4.7	Low
12	4874.0	Horn C	H/V	-46.2	25.5	37.0	49.3	54.0	4.7	Mid
13	4874.0	Horn C	H/V	-46.2	25.5	37.0	49.3	54.0	4.7	High
14	7311.0	Horn XN	H/V	-57.3	25.5	36.0	39.2	54.0	14.8	Low
15	7311.0	Horn XN	H/V	-57.3	25.5	36.0	39.2	54.0	14.8	Mid
16	7311.0	Horn XN	H/V	-57.3	25.5	36.0	39.2	54.0	14.8	High
17	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Low
18	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Mid
19	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	High
20	12185.0	Horn X	H/V	-71.9	25.5	34.0	26.6	54.0	27.4	Low, noise
21	12185.0	Horn X	H/V	-71.9	25.5	34.0	26.6	54.0	27.4	Mid, noise
22	12185.0	Horn X	H/V	-71.9	25.5	34.0	26.6	54.0	27.4	High, noise
23	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Low
24	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Mid
25	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	High
26	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Low
27	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Mid
28	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	High
29	19496.0	Horn K	H/V	-72.0	32.3	32.0	35.3	54.0	18.7	Low, noise
30	19496.0	Horn K	H/V	-72.0	32.3	32.0	35.3	54.0	18.7	Mid, noise
31	19496.0	Horn K	H/V	-72.0	32.3	32.0	35.3	54.0	18.7	High, noise
32	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Low
33	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Mid
34	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	High, noise
35	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Low
36	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Mid
37	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	High
38										
39	**Configuration:**						* Ave: measured with 1 MHz RBW and 100 Hz VBW			
40	Pwr supp	DC Injector	Coax	Amp	Filter	Antenna				
41	DV-0950-B11	Yes	0.4 m	500mW	No	ARC 13 dBi				
42										

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Table 5.4 Highest Emissions Measured

Radiated Emissions										ARC 13dBi; 250mW
#	Freq. MHz	Ant. Used	Ant. Pol.	Ave dBm	Ka dB/m	Kg dB	E3 dBµV/m	E3lim dBµV/m	Pass dB	Comments
1	2422.0									Low channel
2	2437.0									Mid channel
3	2452.0									High channel
4										
5	2390.0	Horn S	H/V	-75.6	21.5	- 0.6	53.5	54.0	0.5	Low
6	2390.0	Horn S	H/V	-77.0	21.5	- 0.6	52.1	54.0	1.9	Mid
7	2390.0	Horn S	H/V	-76.3	21.5	- 0.6	52.8	54.0	1.2	High
8	2483.5	Horn S	H/V	-75.9	21.5	- 0.6	53.2	54.0	0.8	Low
9	2483.5	Horn S	H/V	-75.3	21.5	- 0.6	53.8	54.0	**0.2**	Mid
10	2483.5	Horn S	H/V	-75.4	21.5	- 0.6	53.7	54.0	0.3	High
11	4844.0	Horn C	H/V	-43.2	25.5	37.0	52.3	54.0	1.7	Low
12	4874.0	Horn C	H/V	-54.2	25.5	37.0	41.3	54.0	12.7	Mid
13	4904.0	Horn C	H/V	-50.3	25.5	37.0	45.2	54.0	8.8	High
14	7266.0	Horn XN	H/V	-61.9	25.5	36.0	34.6	54.0	19.4	Low
15	7311.0	Horn XN	H/V	-62.1	25.5	36.0	34.4	54.0	19.6	Mid
16	7356.0	Horn XN	H/V	-61.5	25.5	36.0	35.0	54.0	19.0	High
17	9688.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Low
18	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Mid
19	9808.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	High
20	12110.0	Horn X	H/V	-70.5	25.5	34.0	28.0	54.0	26.0	Low
21	12185.0	Horn X	H/V	-71.5	25.5	34.0	27.0	54.0	27.0	Mid, noise
22	12260.0	Horn X	H/V	-69.4	25.5	34.0	29.1	54.0	24.9	High
23	14532.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Low
24	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Mid
25	14712.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	High
26	16954.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Low
27	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Mid
28	17164.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	High
29	19376.0	Horn K	H/V	-72.3	32.3	32.0	35.0	54.0	19.0	Low, noise
30	19496.0	Horn K	H/V	-72.1	32.3	32.0	35.2	54.0	18.8	Mid, noise
31	19616.0	Horn K	H/V	-72.0	32.3	32.0	35.3	54.0	18.7	High, noise
32	21798.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Low
33	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Mid
34	22068.0	Horn K	H/V	-69.1	32.3	32.0	38.2	54.0	15.8	High, noise
35	24220.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Low
36	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Mid
37	24520.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	High
38										
39	**Configuration:**						* Ave: measured with 1 MHz RBW and 100 Hz VBW			
40	Pwr supp	DC Injector	Coax	Amp	Filter	Antenna				
41	DV-0950-B11	Yes	0.4 m	250mW	No	ARC 13 dBi				
42										

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Table 5.5 Highest Emissions Measured

Radiated Emissions										ARC 13dBi; 100mW
#	Freq. MHz	Ant. Used	Ant. Pol.	Ave dBm	Ka dB/m	Kg dB	E3 dBµV/m	E3lim dBµV/m	Pass dB	Comments
1	2412.0									Low channel
2	2437.0									Mid channel
3	2462.0									High channel
4										
5	2390.0	Horn S	H/V	-75.9	21.5	- 0.6	53.2	54.0	0.8	Low
6	2390.0	Horn S	H/V	-79.2	21.5	- 0.6	49.9	54.0	4.1	Mid
7	2390.0	Horn S	H/V	-78.4	21.5	- 0.6	50.7	54.0	3.3	High
8	2483.5	Horn S	H/V	-76.4	21.5	- 0.6	52.7	54.0	1.3	Low
9	2483.5	Horn S	H/V	-76.0	21.5	- 0.6	53.2	54.0	0.9	Mid
10	2483.5	Horn S	H/V	-75.6	21.5	- 0.6	53.5	54.0	**0.5**	High
11	4824.0	Horn C	H/V	-47.1	25.5	37.0	48.4	54.0	5.6	Low
12	4874.0	Horn C	H/V	-54.7	25.5	37.0	40.8	54.0	13.2	Mid
13	4924.0	Horn C	H/V	-52.8	25.5	37.0	42.7	54.0	11.3	High
14	7236.0	Horn XN	H/V	-	25.5	36.0	-	N/A	-	Low
15	7311.0	Horn XN	H/V	-67.4	25.5	36.0	29.1	54.0	24.9	Mid
16	7386.0	Horn XN	H/V	-64.2	25.5	36.0	32.3	54.0	21.7	High
17	9648.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Low
18	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Mid
19	9848.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	High
20	12060.0	Horn X	H/V	-71.5	25.5	34.0	27.0	54.0	27.0	Low
21	12185.0	Horn X	H/V	-71.7	25.5	34.0	26.8	54.0	27.2	Mid, noise
22	12310.0	Horn X	H/V	-71.5	25.5	34.0	27.0	54.0	27.0	High
23	14472.0	Horn Ku	H/V	-78.9	25.5	17.3	36.3	54.0	17.7	Low
24	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Mid
25	14772.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	High
26	16884.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Low
27	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Mid
28	17234.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	High
29	19296.0	Horn K	H/V	-72.3	32.3	32.0	35.0	54.0	19.0	Low, noise
30	19496.0	Horn K	H/V	-72.2	32.3	32.0	35.1	54.0	18.9	Mid, noise
31	19696.0	Horn K	H/V	-72.2	32.3	32.0	35.1	54.0	18.9	High, noise
32	21708.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Low
33	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Mid
34	22158.0	Horn K	H/V	-69.0	32.3	32.0	38.3	54.0	15.7	High, noise
35	24120.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Low
36	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Mid
37	24620.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	High
38										
39	**Configuration:**						* Ave: measured with 1 MHz RBW and 100 Hz VBW			
40	Pwr supp	DC Injector	Coax	Amp	Filter	Antenna				
41	DV-0950-B11	Yes	0.4 m	100mW	No	ARC 13 dBi				
42										

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Table 5.6 Highest Emissions Measured

Radiated Emissions										MAXRAD; 1 W
#	Freq. MHz	Ant. Used	Ant. Pol.	Ave dBm	Ka dB/m	Kg dB	E3 dBµV/m	E3lim dBµV/m	Pass dB	Comments
1	2437.0									Low channel
2	2437.0									Mid channel
3	2437.0									High channel
4										
5	2390.0	Horn S	H/V	-75.9	21.5	- 0.6	53.2	54.0	0.8	Low
6	2390.0	Horn S	H/V	-75.9	21.5	- 0.6	53.2	54.0	0.8	Mid
7	2390.0	Horn S	H/V	-75.9	21.5	- 0.6	53.2	54.0	0.8	High
8	2483.5	Horn S	H/V	-75.5	21.5	- 0.6	53.6	54.0	**0.4**	Low
9	2483.5	Horn S	H/V	-75.5	21.5	- 0.6	53.6	54.0	**0.4**	Mid
10	2483.5	Horn S	H/V	-75.5	21.5	- 0.6	53.6	54.0	**0.4**	High
11	4874.0	Horn C	H/V	-45.6	25.5	37.0	49.9	54.0	4.1	Low
12	4874.0	Horn C	H/V	-45.6	25.5	37.0	49.9	54.0	4.1	Mid
13	4874.0	Horn C	H/V	-45.6	25.5	37.0	49.9	54.0	4.1	High
14	7311.0	Horn XN	H/V	-50.8	25.5	36.0	45.7	54.0	8.3	Low
15	7311.0	Horn XN	H/V	-50.8	25.5	36.0	45.7	54.0	8.3	Mid
16	7311.0	Horn XN	H/V	-50.8	25.5	36.0	45.7	54.0	8.3	High
17	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Low
18	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Mid
19	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	High
20	12185.0	Horn X	H/V	-62.1	25.5	34.0	36.4	54.0	17.6	Low
21	12185.0	Horn X	H/V	-62.1	25.5	34.0	36.4	54.0	17.6	Mid
22	12185.0	Horn X	H/V	-62.1	25.5	34.0	36.4	54.0	17.6	High
23	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Low
24	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Mid
25	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	High
26	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Low
27	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Mid
28	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	High
29	19496.0	Horn K	H/V	-72.2	32.3	32.0	35.1	54.0	18.9	Low, noise
30	19496.0	Horn K	H/V	-72.2	32.3	32.0	35.1	54.0	18.9	Mid, noise
31	19496.0	Horn K	H/V	-72.2	32.3	32.0	35.1	54.0	18.9	High, noise
32	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Low
33	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Mid
34	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	High, noise
35	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Low
36	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Mid
37	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	High
38										
39	**Configuration:**						* Ave: measured with 1 MHz RBW and 100 Hz VBW			
40	Pwr supp	DC Injector	Coax	Amp	Filter	Antenna				
41	DV-0950-B11	Yes	0 m	1 W	No	Maxrad 4 dBi				
42										

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Table 5.7 Highest Emissions Measured

Radiated Emissions										MAXRAD; 500mW
#	Freq. MHz	Ant. Used	Ant. Pol.	Ave dBm	Ka dB/m	Kg dB	E3 dBµV/m	E3lim dBµV/m	Pass dB	Comments
1	2422.0									Low channel
2	2437.0									Mid channel
3	2457.0									High channel
4										
5	2390.0	Horn S	H/V	-75.3	21.5	- 0.6	53.8	54.0	**0.2**	Low
6	2390.0	Horn S	H/V	-78.8	21.5	- 0.6	50.3	54.0	3.7	Mid
7	2390.0	Horn S	H/V	-77.0	21.5	- 0.6	52.2	54.0	1.9	High
8	2483.5	Horn S	H/V	-76.0	21.5	- 0.6	53.1	54.0	0.9	Low
9	2483.5	Horn S	H/V	-78.3	21.5	- 0.6	50.8	54.0	3.2	Mid
10	2483.5	Horn S	H/V	-75.4	21.5	- 0.6	53.7	54.0	0.3	High
11	4844.0	Horn C	H/V	-45.2	25.5	37.0	50.3	54.0	3.7	Low
12	4874.0	Horn C	H/V	-49.1	25.5	37.0	46.4	54.0	7.6	Mid
13	4914.0	Horn C	H/V	-47.8	25.5	37.0	47.7	54.0	6.3	High
14	7266.0	Horn XN	H/V	-65.1	25.5	36.0	31.4	54.0	22.6	Low
15	7311.0	Horn XN	H/V	-54.9	25.5	36.0	41.6	54.0	12.4	Mid
16	7371.0	Horn XN	H/V	-60.9	25.5	36.0	35.7	54.0	18.4	High
17	9688.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Low
18	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Mid
19	9828.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	High
20	12110.0	Horn X	H/V	-62.7	25.5	34.0	35.8	54.0	18.2	Low
21	12185.0	Horn X	H/V	-64.6	25.5	34.0	33.9	54.0	20.1	Mid
22	12285.0	Horn X	H/V	-65.3	25.5	34.0	33.2	54.0	20.8	High
23	14532.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Low
24	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Mid
25	14742.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	High
26	16954.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Low
27	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Mid
28	17199.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	High
29	19376.0	Horn K	H/V	-72.1	32.3	32.0	35.2	54.0	18.8	Low, noise
30	19496.0	Horn K	H/V	-72.1	32.3	32.0	35.2	54.0	18.8	Mid, noise
31	19656.0	Horn K	H/V	-72.0	32.3	32.0	35.3	54.0	18.7	High, noise
32	21798.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Low
33	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Mid
34	22113.0	Horn K	H/V	-69.1	32.3	32.0	38.2	54.0	15.8	High, noise
35	24220.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Low
36	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Mid
37	24570.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	High
38										
39	**Configuration:**						* Ave: measured with 1 MHz RBW and 100 Hz VBW			
40	Pwr supp	DC Injector	Coax	Amp	Filter	Antenna				
41	DV-0950-B11	Yes	0 m	500 mW	No	Maxrad 4 dBi				
42										

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Table 5.8 Highest Emissions Measured

Radiated Emissions										MAXRAD; 250 mW
#	Freq. MHz	Ant. Used	Ant. Pol.	Ave dBm	Ka dB/m	Kg dB	E3 dBµV/m	E3lim dBµV/m	Pass dB	Comments
1	2412.0									Low channel
2	2437.0									Mid channel
3	2462.0									High channel
4										
5	2390.0	Horn S	H/V	-77.0	21.5	- 0.6	52.2	54.0	**1.9**	Low
6	2390.0	Horn S	H/V	-81.6	21.5	- 0.6	47.5	54.0	6.5	Mid
7	2390.0	Horn S	H/V	-79.8	21.5	- 0.6	49.3	54.0	4.7	High
8	2483.5	Horn S	H/V	-79.2	21.5	- 0.6	50.0	54.0	4.1	Low
9	2483.5	Horn S	H/V	-81.0	21.5	- 0.6	48.1	54.0	5.9	Mid
10	2483.5	Horn S	H/V	-76.4	21.5	- 0.6	52.7	54.0	1.3	High
11	4824.0	Horn C	H/V	-46.7	25.5	37.0	48.8	54.0	5.2	Low
12	4874.0	Horn C	H/V	-50.3	25.5	37.0	45.2	54.0	8.8	Mid
13	4924.0	Horn C	H/V	-49.2	25.5	37.0	46.3	54.0	7.7	High
14	7236.0	Horn XN	H/V	-	25.5	36.0	-	N/A	-	Low
15	7311.0	Horn XN	H/V	-64.4	25.5	36.0	32.1	54.0	21.9	Mid
16	7386.0	Horn XN	H/V	-64.0	25.5	36.0	32.6	54.0	21.5	High
17	9648.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Low
18	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Mid
19	9848.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	High
20	12060.0	Horn X	H/V	-63.6	25.5	34.0	34.9	54.0	19.1	Low
21	12185.0	Horn X	H/V	-67.7	25.5	34.0	30.8	54.0	23.2	Mid
22	12310.0	Horn X	H/V	-71.2	25.5	34.0	27.4	54.0	26.7	High
23	14472.0	Horn Ku	H/V	-72.8	25.5	17.3	42.4	54.0	11.6	Low
24	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Mid
25	14772.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	High
26	16884.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Low
27	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Mid
28	17234.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	High
29	19296.0	Horn K	H/V	-72.0	32.3	32.0	35.3	54.0	18.7	Low, noise
30	19496.0	Horn K	H/V	-72.2	32.3	32.0	35.1	54.0	18.9	Mid, noise
31	19696.0	Horn K	H/V	-72.1	32.3	32.0	35.2	54.0	18.8	High, noise
32	21708.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Low
33	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Mid
34	22158.0	Horn K	H/V	-69.1	32.3	32.0	38.2	54.0	15.8	High, noise
35	24120.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Low
36	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Mid
37	24620.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	High
38										
39	**Configuration:**						* Ave: measured with 1 MHz RBW and 100 Hz VBW			
40	Pwr supp	DC Injector	Coax	Amp	Filter	Antenna				
41	DV-0950-B11	Yes	0 m	250 mW	No	Maxrad 4 dBi				
42										

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Table 5.9 Highest Emissions Measured

Radiated Emissions										MAXRAD; 100 mW
#	Freq. MHz	Ant. Used	Ant. Pol.	Ave dBm	Ka dB/m	Kg dB	E3 dBµV/m	E3lim dBµV/m	Pass dB	Comments
1	2412.0									Low channel
2	2437.0									Mid channel
3	2462.0									High channel
4										
5	2390.0	Horn S	H/V	-79.1	21.5	- 0.6	50.0	54.0	4.0	Low
6	2390.0	Horn S	H/V	-81.9	21.5	- 0.6	47.2	54.0	6.8	Mid
7	2390.0	Horn S	H/V	-81.1	21.5	- 0.6	48.0	54.0	6.0	High
8	2483.5	Horn S	H/V	-80.1	21.5	- 0.6	49.0	54.0	5.0	Low
9	2483.5	Horn S	H/V	-82.0	21.5	- 0.6	47.1	54.0	6.9	Mid
10	2483.5	Horn S	H/V	-78.8	21.5	- 0.6	50.3	54.0	**3.7**	High
11	4824.0	Horn C	H/V	-55.0	25.5	37.0	40.5	54.0	13.5	Low
12	4874.0	Horn C	H/V	-59.7	25.5	37.0	35.8	54.0	18.2	Mid
13	4924.0	Horn C	H/V	-55.2	25.5	37.0	40.3	54.0	13.7	High
14	7236.0	Horn XN	H/V	-59.4	25.5	36.0	37.1	N/A	-	Low
15	7311.0	Horn XN	H/V	-64.6	25.5	36.0	32.0	54.0	22.1	Mid
16	7386.0	Horn XN	H/V	-59.1	25.5	36.0	37.4	54.0	16.6	High
17	9648.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Low
18	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Mid
19	9848.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	High
20	12060.0	Horn X	H/V	-67.7	25.5	34.0	30.8	54.0	23.2	Low
21	12185.0	Horn X	H/V	-72.0	25.5	34.0	26.5	54.0	27.5	Mid, noise
22	12310.0	Horn X	H/V	-71.4	25.5	34.0	27.1	54.0	26.9	High, noise
23	14472.0	Horn Ku	H/V	-78.8	25.5	17.3	36.4	54.0	17.6	Low, noise
24	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Mid
25	14772.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	High
26	16884.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Low
27	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Mid
28	17234.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	High
29	19296.0	Horn K	H/V	-72.2	32.3	32.0	35.1	54.0	18.9	Low, noise
30	19496.0	Horn K	H/V	-72.1	32.3	32.0	35.2	54.0	18.8	Mid, noise
31	19696.0	Horn K	H/V	-71.9	32.3	32.0	35.4	54.0	18.6	High, noise
32	21708.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Low
33	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Mid
34	22158.0	Horn K	H/V	-69.0	32.3	32.0	38.3	54.0	15.7	High, noise
35	24120.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Low
36	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Mid
37	24620.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	High
38										
39	**Configuration:**						* Ave: measured with 1 MHz RBW and 100 Hz VBW			
40	Pwr supp	DC Injector	Coax	Amp	Filter	Antenna				
41	DV-0950-B11	Yes	0 m	100 mW	No	Maxrad 4 dBi				
42										

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Table 5.10 Highest Emissions Measured

Radiated Emissions										WitchHat; 1 W
#	Freq. MHz	Ant. Used	Ant. Pol.	Ave dBm	Ka dB/m	Kg dB	E3 dBµV/m	E3lim dBµV/m	Pass dB	Comments
1	2432.0									Low channel
2	2437.0									Mid channel
3	2442.0									High channel
4										
5	2390.0	Horn S	H/V	-76.6	21.5	- 0.6	52.5	54.0	1.5	Low
6	2390.0	Horn S	H/V	-77.5	21.5	- 0.6	51.6	54.0	2.4	Mid
7	2390.0	Horn S	H/V	-79.4	21.5	- 0.6	49.7	54.0	4.3	High
8	2483.5	Horn S	H/V	-78.2	21.5	- 0.6	50.9	54.0	3.1	Low
9	2483.5	Horn S	H/V	-77.6	21.5	- 0.6	51.5	54.0	2.5	Mid
10	2483.5	Horn S	H/V	-75.9	21.5	- 0.6	53.2	54.0	**0.8**	High
11	4864.0	Horn C	H/V	-45.2	25.5	37.0	50.3	54.0	3.7	Low
12	4874.0	Horn C	H/V	-46.5	25.5	37.0	49.0	54.0	5.0	Mid
13	4884.0	Horn C	H/V	-50.7	25.5	37.0	44.9	54.0	9.2	High
14	7296.0	Horn XN	H/V	-44.3	25.5	36.0	52.2	54.0	1.8	Low
15	7311.0	Horn XN	H/V	-44.2	25.5	36.0	52.3	54.0	1.7	Mid
16	7326.0	Horn XN	H/V	-44.1	25.5	36.0	52.4	54.0	1.6	High
17	9728.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Low
18	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Mid
19	9768.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	High
20	12160.0	Horn X	H/V	-62.4	25.5	34.0	36.1	54.0	17.9	Low
21	12185.0	Horn X	H/V	-64.5	25.5	34.0	34.0	54.0	20.0	Mid
22	12210.0	Horn X	H/V	-69.3	25.5	34.0	29.2	54.0	24.8	High
23	14592.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Low
24	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Mid
25	14652.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	High
26	17024.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Low
27	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Mid
28	17094.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	High
29	19456.0	Horn K	H/V	-72.3	32.3	32.0	35.0	54.0	19.0	Low, noise
30	19496.0	Horn K	H/V	-72.1	32.3	32.0	35.2	54.0	18.8	Mid, noise
31	19536.0	Horn K	H/V	-72.0	32.3	32.0	35.3	54.0	18.7	High, noise
32	21888.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Low
33	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Mid
34	21978.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	High, noise
35	24320.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Low
36	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Mid
37	24420.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	High
38										
39	**Configuration:**						* Ave: measured with 1 MHz RBW and 100 Hz VBW			
40	Pwr supp	DC Injector	Coax	Amp	Filter	Antenna				
41	DV-0950-B11	Yes	N/A	1 W	No	WitchHat 3dBi				
42										

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Table 5.11 Highest Emissions Measured

Radiated Emissions										WitchHat; 500mW
#	Freq. MHz	Ant. Used	Ant. Pol.	Ave dBm	Ka dB/m	Kg dB	E3 dBµV/m	E3lim dBµV/m	Pass dB	Comments
1	2417.0									Low channel
2	2437.0									Mid channel
3	2462.0									High channel
4										
5	2390.0	Horn S	H/V	-76.9	21.5	- 0.6	52.2	54.0	1.8	Low
6	2390.0	Horn S	H/V	-80.6	21.5	- 0.6	48.5	54.0	5.5	Mid
7	2390.0	Horn S	H/V	-80.5	21.5	- 0.6	48.6	54.0	5.4	High
8	2483.5	Horn S	H/V	-80.1	21.5	- 0.6	49.0	54.0	5.0	Low
9	2483.5	Horn S	H/V	-80.6	21.5	- 0.6	48.5	54.0	5.5	Mid
10	2483.5	Horn S	H/V	-75.2	21.5	- 0.6	53.9	54.0	**0.1**	High
11	4834.0	Horn C	H/V	-47.4	25.5	37.0	48.1	54.0	5.9	Low
12	4874.0	Horn C	H/V	-52.0	25.5	37.0	43.6	54.0	10.5	Mid
13	4924.0	Horn C	H/V	-50.4	25.5	37.0	45.1	54.0	8.9	High
14	7251.0	Horn XN	H/V	-49.6	25.5	36.0	46.9	54.0	7.1	Low
15	7311.0	Horn XN	H/V	-48.4	25.5	36.0	48.1	54.0	5.9	Mid
16	7386.0	Horn XN	H/V	-51.4	25.5	36.0	45.1	54.0	8.9	High
17	9668.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Low
18	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Mid
19	9848.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	High
20	12085.0	Horn X	H/V	-65.6	25.5	34.0	32.9	54.0	21.1	Low
21	12185.0	Horn X	H/V	-65.2	25.5	34.0	33.3	54.0	20.7	Mid
22	12310.0	Horn X	H/V	-64.9	25.5	34.0	33.6	54.0	20.4	High
23	14502.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Low
24	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Mid
25	14772.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	High
26	16919.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Low
27	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Mid
28	17234.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	High
29	19336.0	Horn K	H/V	-72.2	32.3	32.0	35.1	54.0	18.9	Low, noise
30	19496.0	Horn K	H/V	-72.1	32.3	32.0	35.2	54.0	18.8	Mid, noise
31	19696.0	Horn K	H/V	-72.0	32.3	32.0	35.3	54.0	18.7	High, noise
32	21753.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Low
33	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Mid
34	22158.0	Horn K	H/V	-69.1	32.3	32.0	38.2	54.0	15.8	High, noise
35	24170.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Low
36	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Mid
37	24620.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	High
38										
39	**Configuration:**						* Ave: measured with 1 MHz RBW and 100 Hz VBW			
40	Pwr supp	DC Injector	Coax	Amp	Filter	Antenna				
41	DV-0950-B11	Yes	N/A	500 mW	No	WitchHat 3dBi				
42										

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Table 5.12 Highest Emissions Measured

Radiated Emissions										WitchHat; 250mW
#	Freq. MHz	Ant. Used	Ant. Pol.	Ave dBm	Ka dB/m	Kg dB	E3 dBµV/m	E3lim dBµV/m	Pass dB	Comments
1	2412.0									Low channel
2	2437.0									Mid channel
3	2462.0									High channel
4										
5	2390.0	Horn S	H/V	-77.5	21.5	- 0.6	51.6	54.0	**2.4**	Low
6	2390.0	Horn S	H/V	-82.8	21.5	- 0.6	46.3	54.0	7.7	Mid
7	2390.0	Horn S	H/V	-81.7	21.5	- 0.6	47.4	54.0	6.6	High
8	2483.5	Horn S	H/V	-82.2	21.5	- 0.6	47.0	54.0	7.1	Low
9	2483.5	Horn S	H/V	-82.1	21.5	- 0.6	47.0	54.0	7.0	Mid
10	2483.5	Horn S	H/V	-77.7	21.5	- 0.6	51.4	54.0	2.6	High
11	4824.0	Horn C	H/V	-46.7	25.5	37.0	48.8	54.0	5.2	Low
12	4874.0	Horn C	H/V	-50.4	25.5	37.0	45.1	54.0	8.9	Mid
13	4924.0	Horn C	H/V	-49.4	25.5	37.0	46.1	54.0	7.9	High
14	7236.0	Horn XN	H/V	-	25.5	36.0	-	N/A	-	Low
15	7311.0	Horn XN	H/V	-66.6	25.5	36.0	29.9	54.0	24.1	Mid
16	7386.0	Horn XN	H/V	-65.6	25.5	36.0	30.9	54.0	23.1	High
17	9648.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Low
18	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Mid
19	9848.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	High
20	12060.0	Horn X	H/V	-65.4	25.5	34.0	33.1	54.0	20.9	Low
21	12185.0	Horn X	H/V	-70.8	25.5	34.0	27.7	54.0	26.3	Mid
22	12310.0	Horn X	H/V	-67.2	25.5	34.0	31.3	54.0	22.7	High
23	14472.0	Horn Ku	H/V	-78.9	25.5	17.3	36.3	54.0	17.7	Low, noise
24	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Mid
25	14772.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	High
26	16884.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Low
27	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Mid
28	17234.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	High
29	19296.0	Horn K	H/V	-72.2	32.3	32.0	35.1	54.0	18.9	Low, noise
30	19496.0	Horn K	H/V	-72.0	32.3	32.0	35.3	54.0	18.7	Mid, noise
31	19696.0	Horn K	H/V	-72.0	32.3	32.0	35.3	54.0	18.7	High, noise
32	21708.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Low
33	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Mid
34	22158.0	Horn K	H/V	-69.0	32.3	32.0	38.3	54.0	15.7	High, noise
35	24120.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Low
36	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Mid
37	24620.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	High
38										
39	**Configuration:**						* Ave: measured with 1 MHz RBW and 100 Hz VBW			
40	Pwr supp	DC Injector	Coax	Amp	Filter	Antenna				
41	DV-0950-B11	Yes	N/A	250 mW	No	WitchHat 3dBi				
42										

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Table 5.13 Highest Emissions Measured

Radiated Emissions										WitchHat;100mW
#	Freq. MHz	Ant. Used	Ant. Pol.	Ave dBm	Ka dB/m	Kg dB	E3 dBµV/m	E3lim dBµV/m	Pass dB	Comments
1	2412.0									Low channel
2	2437.0									Mid channel
3	2462.0									High channel
4										
5	2390.0	Horn S	H/V	-78.5	21.5	- 0.6	50.6	54.0	**3.4**	Low
6	2390.0	Horn S	H/V	-82.0	21.5	- 0.6	47.1	54.0	6.9	Mid
7	2390.0	Horn S	H/V	-82.6	21.5	- 0.6	46.5	54.0	7.5	High
8	2483.5	Horn S	H/V	-82.0	21.5	- 0.6	47.1	54.0	6.9	Low
9	2483.5	Horn S	H/V	-80.6	21.5	- 0.6	48.5	54.0	5.5	Mid
10	2483.5	Horn S	H/V	-82.6	21.5	- 0.6	46.5	54.0	7.5	High
11	4824.0	Horn C	H/V	-50.7	25.5	37.0	44.8	54.0	9.2	Low
12	4874.0	Horn C	H/V	-57.0	25.5	37.0	38.6	54.0	15.5	Mid
13	4924.0	Horn C	H/V	-56.4	25.5	37.0	39.1	54.0	14.9	High
14	7236.0	Horn XN	H/V	-	25.5	36.0	-	N/A	-	Low
15	7311.0	Horn XN	H/V	-63.3	25.5	36.0	33.2	54.0	20.8	Mid
16	7386.0	Horn XN	H/V	-62.4	25.5	36.0	34.1	54.0	19.9	High
17	9648.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Low
18	9748.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	Mid
19	9848.0	Horn X	H/V	-	25.5	34.0	-	N/A	-	High
20	12060.0	Horn X	H/V	-71.9	25.5	34.0	26.6	54.0	27.4	Low, noise
21	12185.0	Horn X	H/V	-71.7	25.5	34.0	26.8	54.0	27.2	Mid, noise
22	12310.0	Horn X	H/V	-72.1	25.5	34.0	26.4	54.0	27.6	High, noise
23	14472.0	Horn Ku	H/V	-78.8	25.5	17.3	36.4	54.0	17.6	Low, noise
24	14622.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	Mid
25	14772.0	Horn Ku	H/V	-	25.5	17.3	-	N/A	-	High
26	16884.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Low
27	17059.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	Mid
28	17234.0	Horn Ku	H/V	-	32.3	34.0	-	N/A	-	High
29	19296.0	Horn K	H/V	-72.3	32.3	32.0	35.0	54.0	19.0	Low, noise
30	19496.0	Horn K	H/V	-72.3	32.3	32.0	35.0	54.0	19.0	Mid, noise
31	19696.0	Horn K	H/V	-72.0	32.3	32.0	35.3	54.0	18.7	High, noise
32	21708.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Low
33	21933.0	Horn K	H/V	-	32.3	32.0	-	N/A	-	Mid
34	22158.0	Horn K	H/V	-69.1	32.3	32.0	38.2	54.0	15.8	High, noise
35	24120.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Low
36	24370.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	Mid
37	24620.0	Horn Ka	H/V	-	32.3	32.0	-	N/A	-	High
38										
39	**Configuration:**						* Ave: measured with 1 MHz RBW and 100 Hz VBW			
40	Pwr supp	DC Injector	Coax	Amp	Filter	Antenna				
41	DV-0950-B11	Yes	N/A	100 mW	No	WitchHat 3dBi				
42										

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Table 6.1 Highest Conducted Emissions Measurec

FCI-2400; CISPR B

#	Freq. MHz	Line Side	Peak Det., dBµV Vtest	Peak Det., dBµV Vlim*	Pass dB*	QP Det., dBµV Vtest	QP Det., dBµV Vlim	Pass dB	Ave. Det., dBµV Vtest	Ave. Det., dBµV Vlim	Pass dB	Comments
	0.15	Lo	46.0	56.0	10.0		66.0			56.0		
	0.30	Lo	45.1	50.2	5.1		60.3			50.2		
	0.45	Lo	40.8	46.8	6.0		56.9			46.8		
	0.80	Lo	35.0	46.0	11.0		56.0			46.0		
	0.85	Lo	34.5	46.0	11.5		56.0			46.0		
	1.25	Lo	31.0	46.0	15.0		56.0			46.0		
	1.36	Lo	31.3	46.0	14.7		56.0			46.0		
	1.50	Lo	32.2	46.0	13.8		56.0			46.0		
	1.71	Lo	30.0	46.0	16.0		56.0			46.0		
#	1.95	Lo	29.8	46.0	16.2		56.0			46.0		
#	3.00	Lo	26.0	46.0	20.0		56.0			46.0		
#	7.70	Lo	24.0	50.0	26.0		60.0			50.0		
#	13.50	Lo	24.0	50.0	26.0		60.0			50.0		
#	21.50	Lo	28.0	50.0	22.0		60.0			50.0		
#	22.05	Lo	30.8	50.0	19.2		60.0			50.0		
#	23.00	Lo	29.0	50.0	21.0		60.0			50.0		
#	23.80	Lo	30.0	50.0	20.0		60.0			50.0		
#												
#	0.15	Hi	45.2	56.0	10.8		66.0			56.0		
#	0.30	Hi	44.8	50.2	5.4		60.3			50.2		
#	0.45	Hi	43.0	46.8	**3.8**		56.9			46.8		
#	0.50	Hi	40.0	46.0	6.0		56.0			46.0		
#	0.80	Hi	37.5	46.0	8.5		56.0			46.0		
#	0.85	Hi	37.4	46.0	8.6		56.0			46.0		
#	0.90	Hi	37.5	46.0	8.5		56.0			46.0		
#	1.37	Hi	35.0	46.0	11.0		56.0			46.0		
#	1.47	Hi	34.0	46.0	12.0		56.0			46.0		
#	1.75	Hi	34.3	46.0	11.7		56.0			46.0		
#	1.90	Hi	32.0	46.0	14.0		56.0			46.0		
#	3.00	Hi	22.0	46.0	24.0		56.0			46.0		
#	9.00	Hi	21.0	50.0	29.0		60.0			50.0		
#	18.00	Hi	22.0	50.0	28.0		60.0			50.0		
#	22.50	Hi	38.2	50.0	11.8		60.0			50.0		
#												
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#												

**Average limit*

Ieas. 3/14/03; U of Mich.

Since Vpeak >= Vqp >= Vave and if Vtestpeak < Vavelim, then Vqplim and Vavelim are met.

Table 6.2 Highest Conducted Emissions Measurec

FCI-2400 - ORINOCO PCMCIA IN LAPTOP CMPUTER; CISPR B												
	Freq.	Line	Peak Det., dBµV		Pass	QP Det., dBµV		Pass	Ave. Det., dBµV		Pass	
#	MHz	Side	Vtest	Vlim*	dB*	Vtest	Vlim	dB	Vtest	Vlim	dB	Comments
	0.16	Lo		55.4		62.4	65.4	3.0		55.4		
	0.17	Lo	53.2	55.1	**1.9**		65.1			55.1		
	0.22	Lo		52.9		56.3	62.9	6.6		52.9		
	0.24	Lo		52.1		52.0	62.1	10.1		52.1		
	0.29	Lo		50.6		51.7	60.6	8.9		50.6		
	0.47	Lo		46.4		44.7	56.5	11.8		46.4		
	0.67	Lo	43.0	46.0	3.0		56.0			46.0		
	0.81	Lo	41.0	46.0	5.0		56.0			46.0		
	1.08	Lo	40.0	46.0	6.0		56.0			46.0		
#	3.67	Lo		46.0		44.0	56.0	12.0		46.0		
#	5.92	Lo		50.0		48.5	60.0	11.5		50.0		
#	8.12	Lo	48.0	50.0	2.0		60.0			50.0		
#	8.49	Lo	48.8	50.0	1.2		60.0			50.0		
#	12.10	Lo	44.5	50.0	5.5		60.0			50.0		
#	14.00	Lo	43.0	50.0	7.0		60.0			50.0		
#												
#	0.16	Hi		55.4		55.6	65.5	9.9		55.4		
#	0.25	Hi	44.5	51.7	7.2		61.8			51.7		
#	0.30	Hi	45.0	50.2	5.2		60.3			50.2		
#	0.40	Hi	43.0	47.8	4.8		57.9			47.8		
#	0.68	Hi	38.3	46.0	7.7		56.0			46.0		
#	0.80	Hi	39.0	46.0	7.0		56.0			46.0		
#	1.31	Hi	37.5	46.0	8.5		56.0			46.0		
#	1.45	Hi	37.0	46.0	9.0		56.0			46.0		
#	4.10	Hi	43.0	46.0	3.0		56.0			46.0		
#	6.00	Hi	46.0	50.0	4.0		60.0			50.0		
#	8.10	Hi	43.1	50.0	6.9		60.0			50.0		
#	13.00	Hi	36.7	50.0	13.3		60.0			50.0		
#	18.00	Hi	30.1	50.0	19.9		60.0			50.0		
#	29.50	Hi	27.2	50.0	22.8		60.0			50.0		
#	29.50	Hi	27.2	50.0	22.8		60.0			50.0		
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**Average limit* Meas. 3/14/03; U of Mich.

Since Vpeak >= Vqp >= Vave and if Vtestpeak < Vavelim, then Vqplim and Vavelim are met.

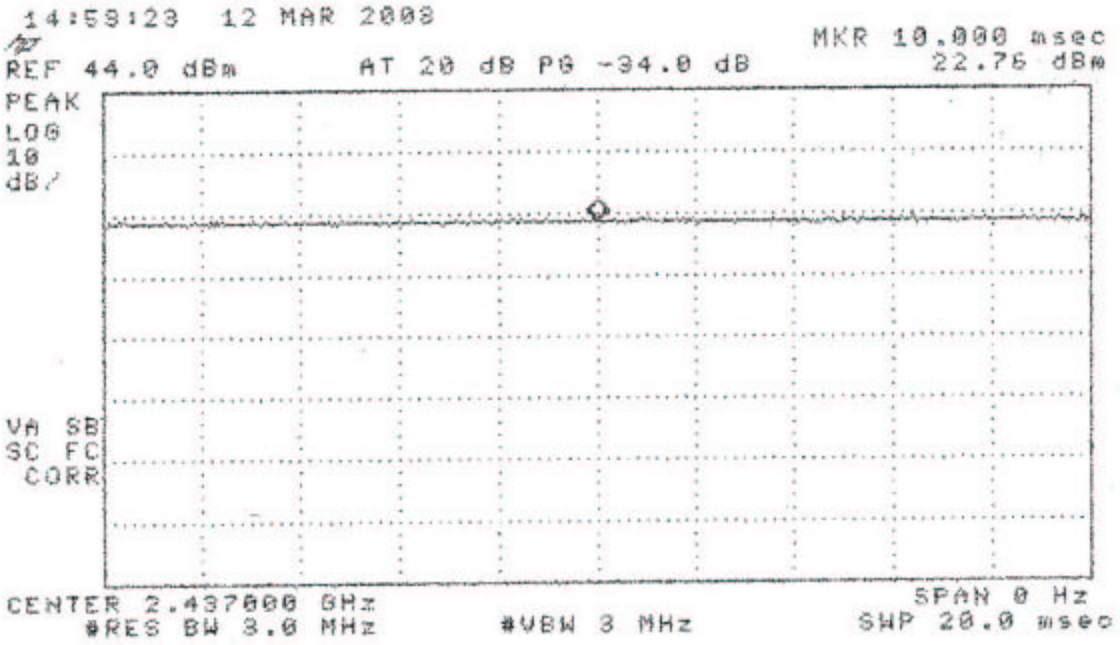


Figure 6.1 Demonstration of CW operation.

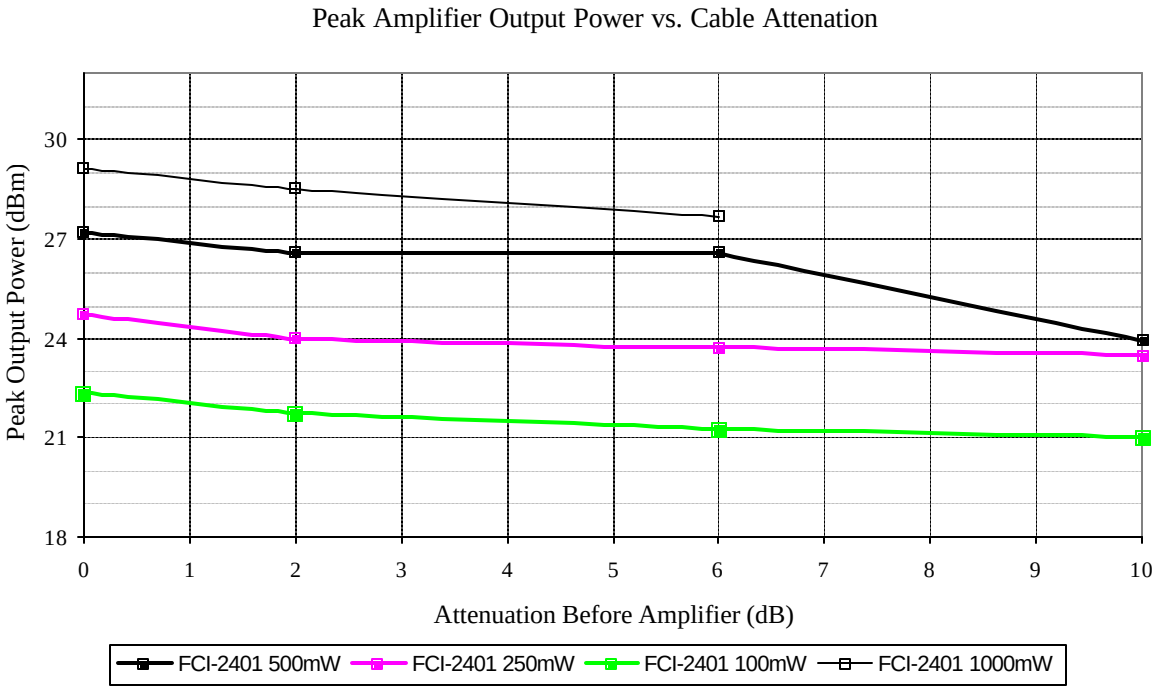
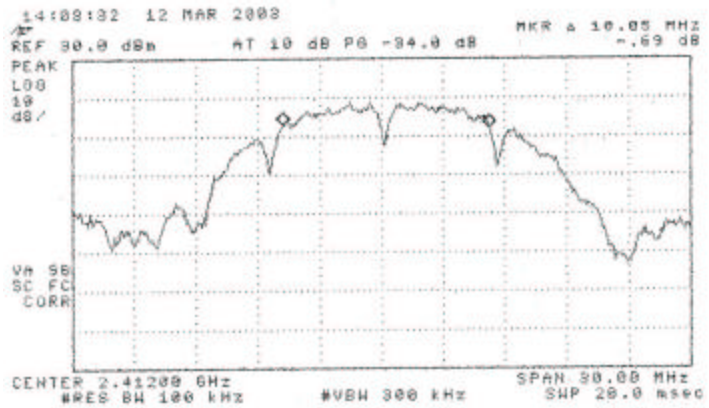
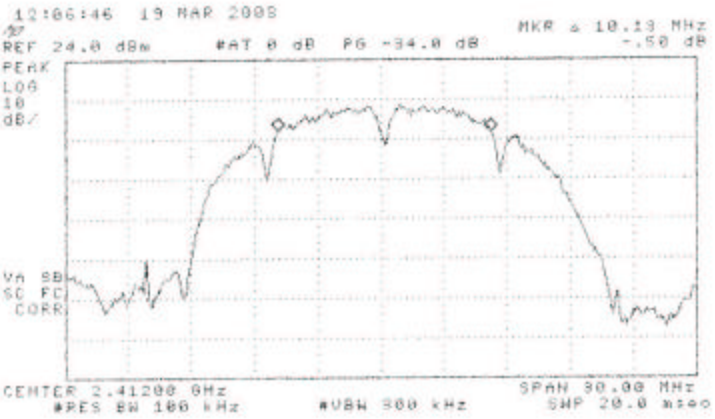
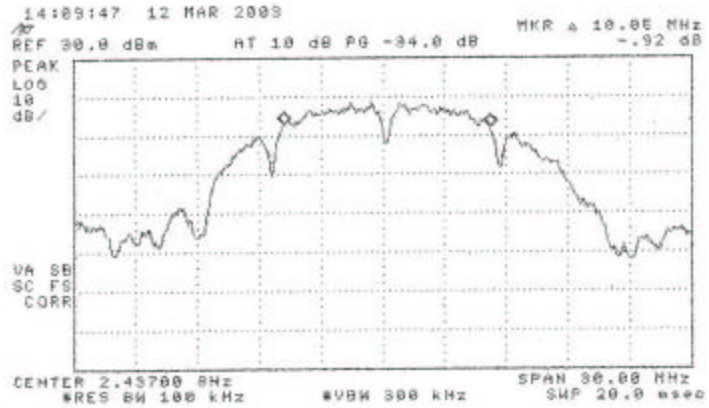
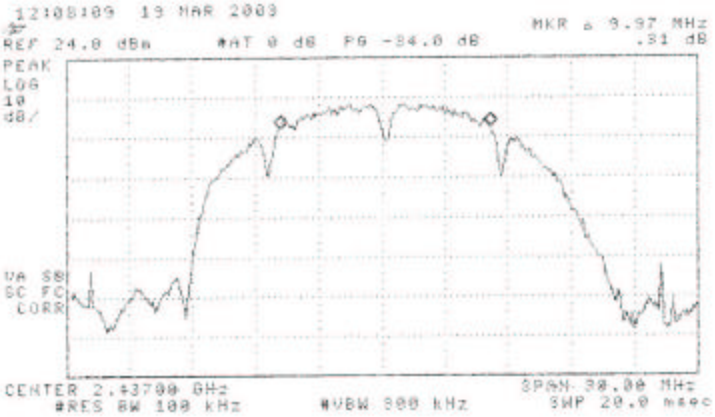


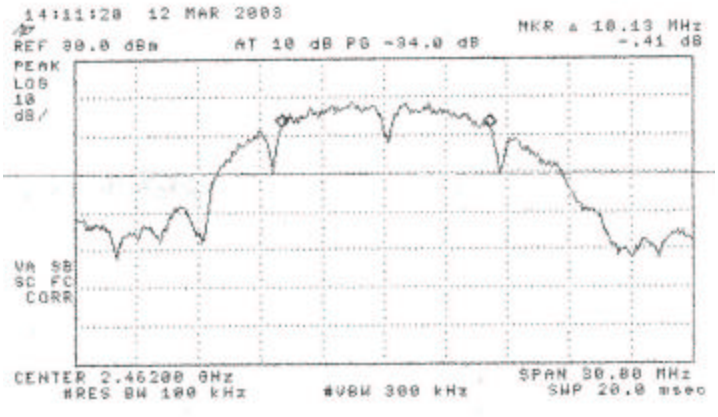
Figure 6.2 Peak Amplifer output power vs. input signal attenuation.
Initial input signal power is equal to that of the Radio Alone (11.1 dBm).











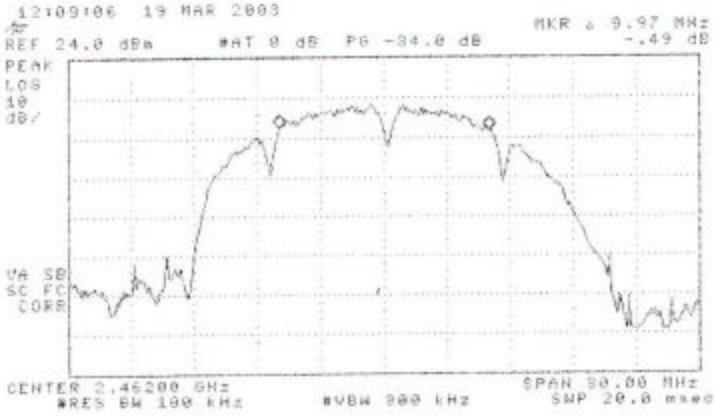
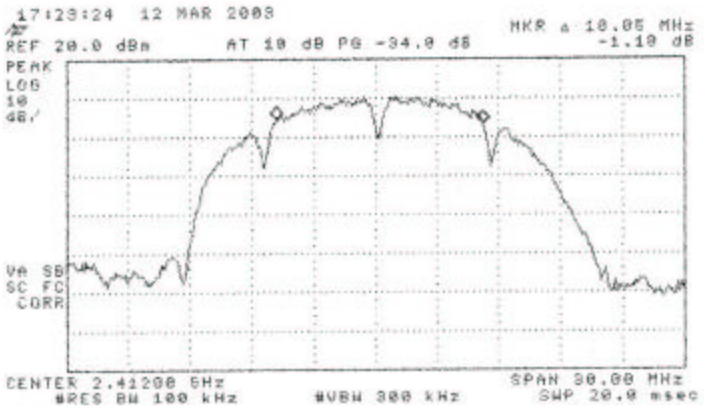
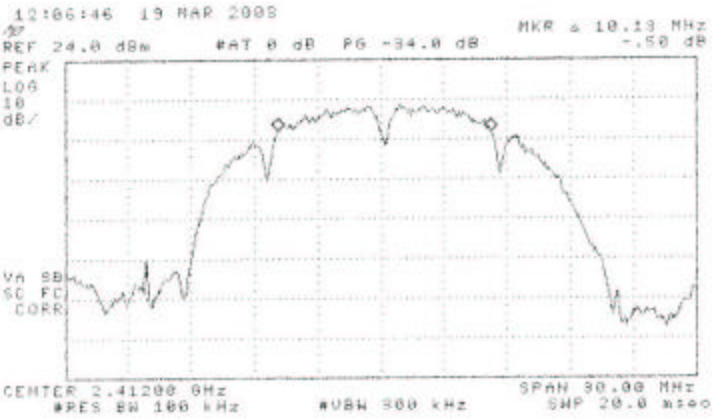
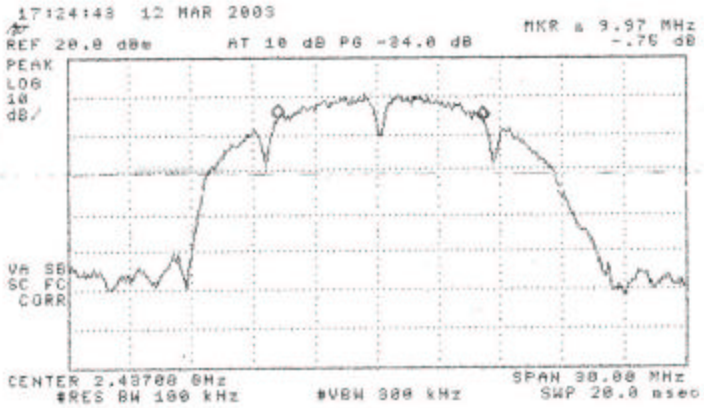


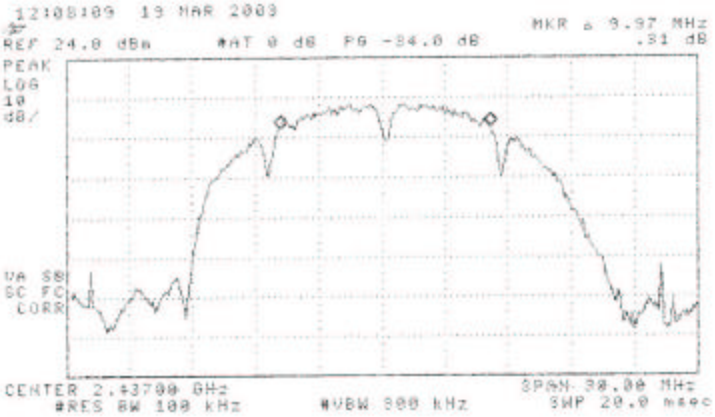
Figure 6.3 6 dB-point Bandwidth
(low, mid, and high channels - 1000 mW)

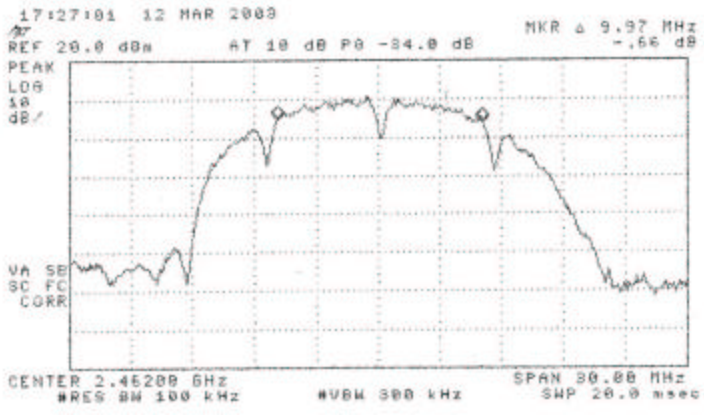
Figure 6.4 6 dB-point Bandwidth
(low, mid, and high channels - 1000 mW, 6dB Pad)











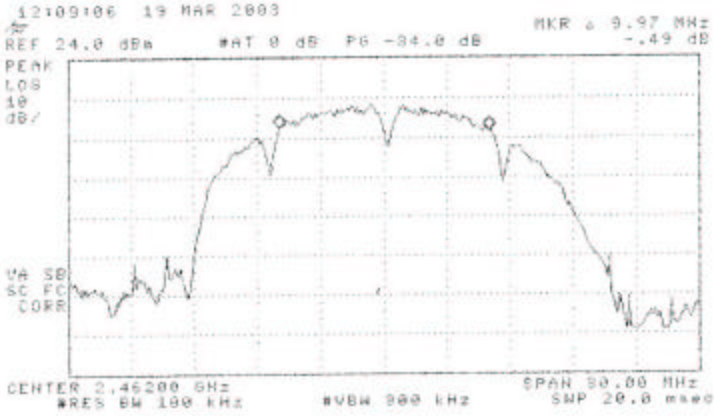


Figure 6.5 6 dB-point Bandwidth
(low, mid, and high channels - 100 mW)

Figure 6.6 6 dB-point Bandwidth
(low, mid, and high channels - 100 mW, 10dB Pad)

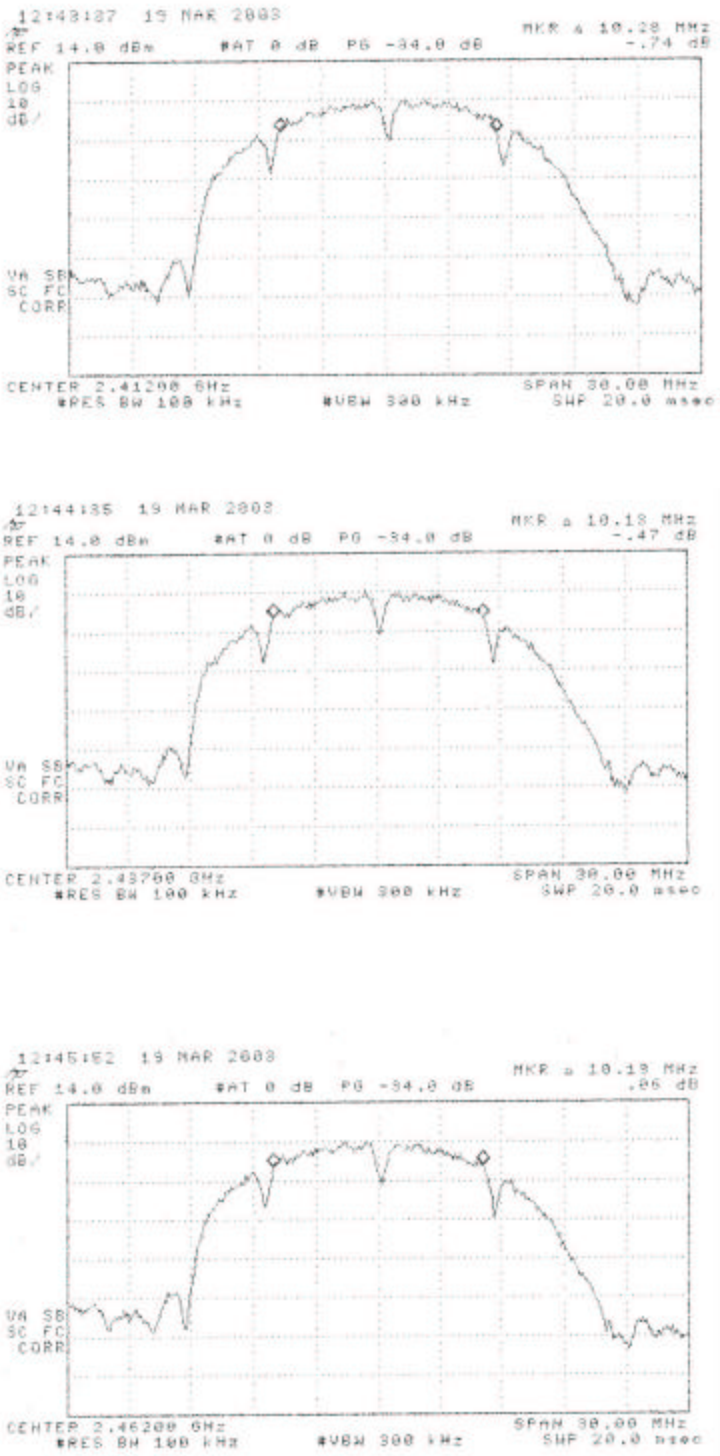
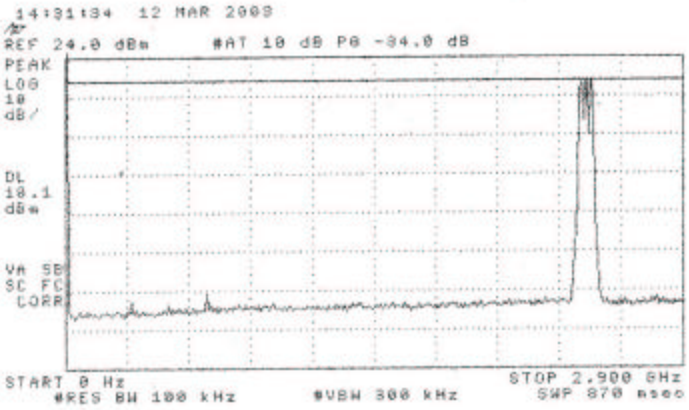
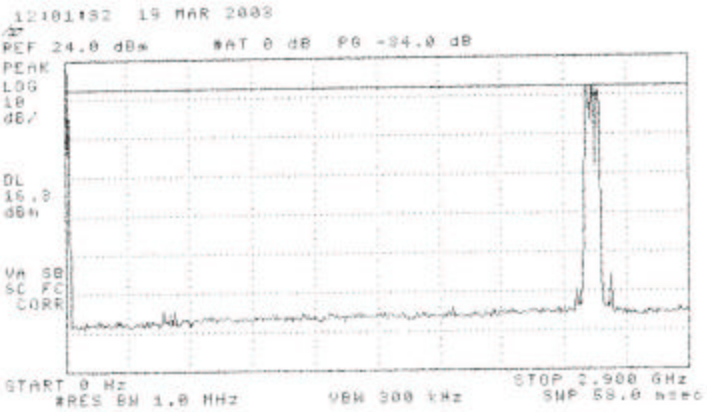
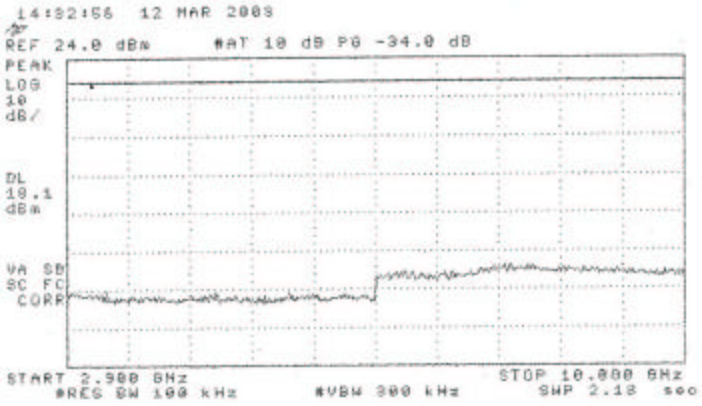
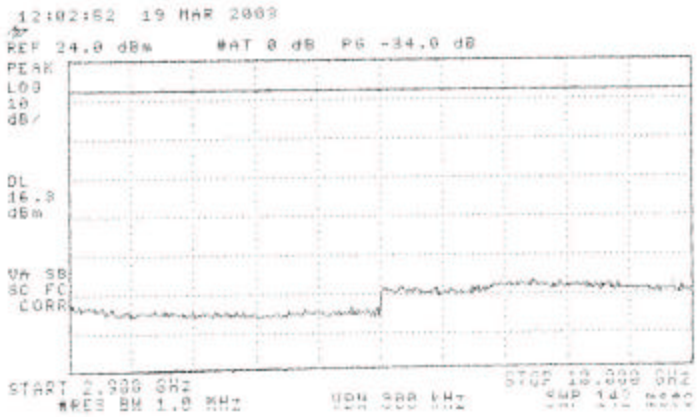


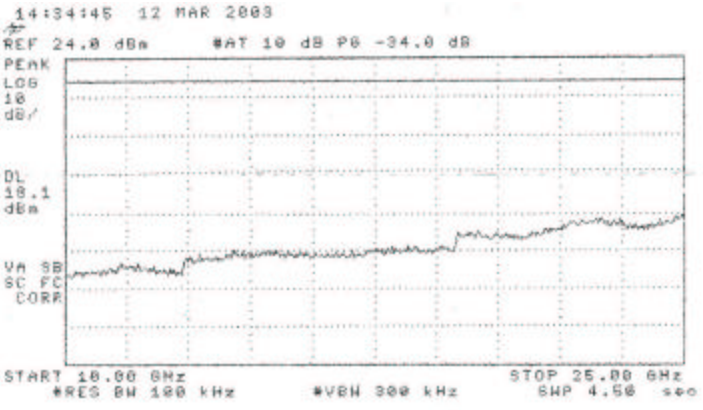
Figure 6.7 6 dB-point Bandwidth
(low, mid, and high channels - Radio Alone)











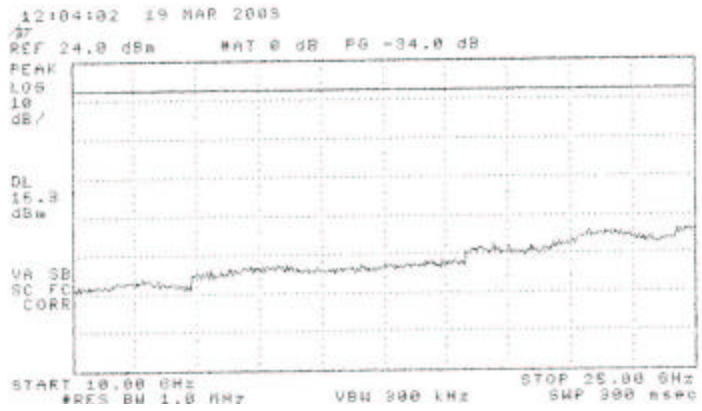
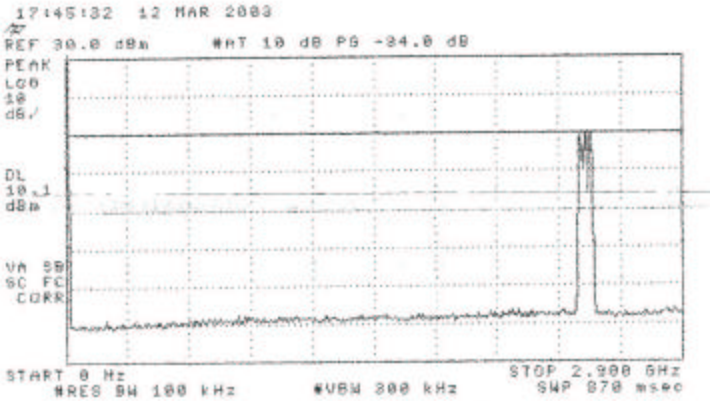
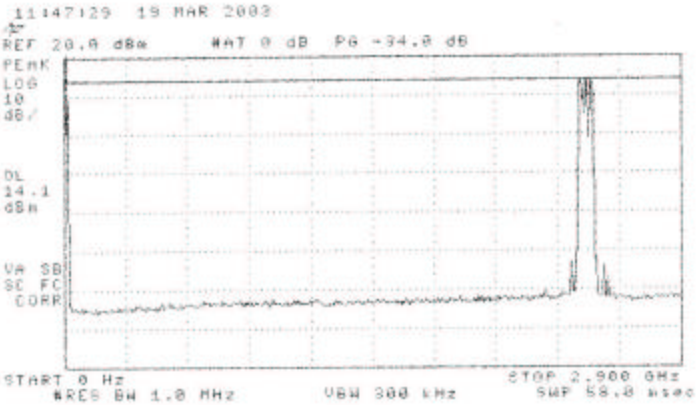
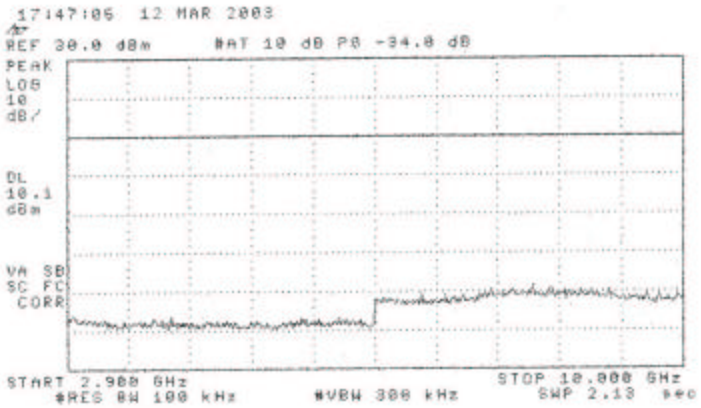


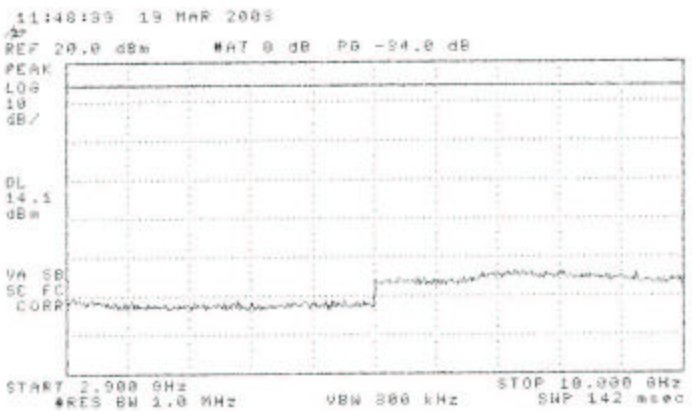
Figure 6.8 Antenna conducted spurious emissions. (low, mid, & high channels – 1000 mW)

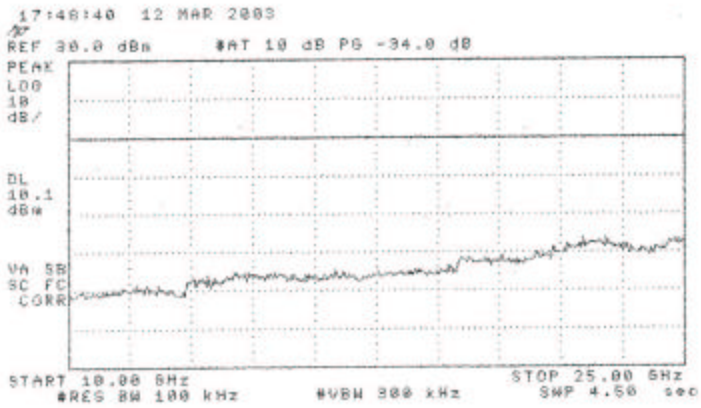
Figure 6.9 Antenna conducted spurious emissions. (low, mid, & high channels – 1000 mW, 6dB Pad)











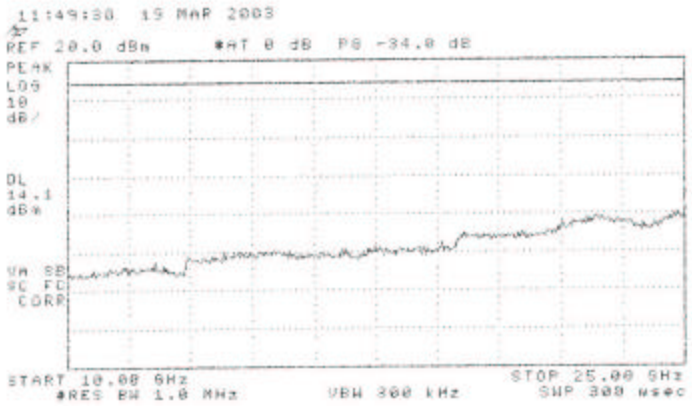
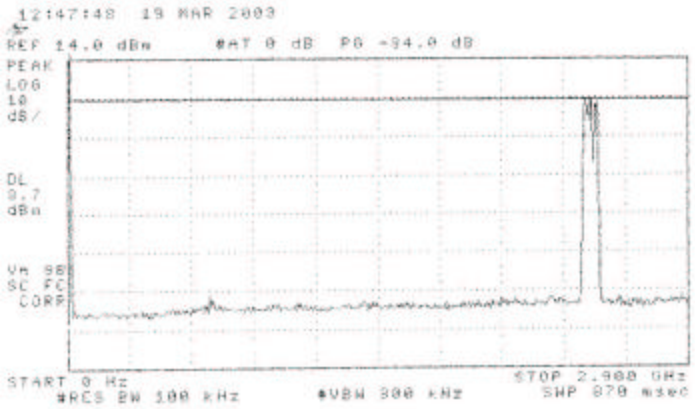
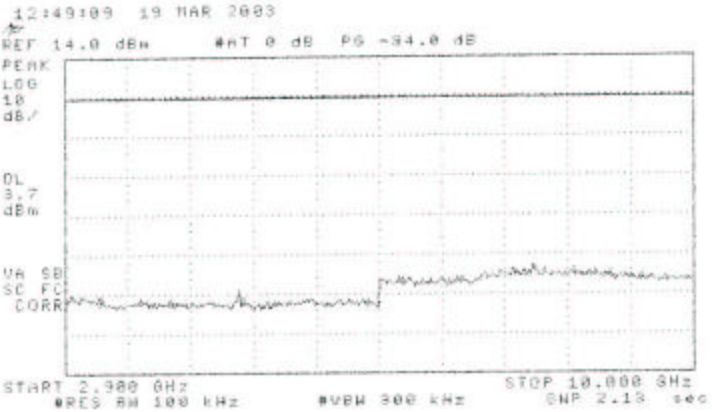


Figure 6.10 Antenna conducted spurious emissions. (low, mid, & high channels – 100 mW)

Figure 6.11 Antenna conducted spurious emissions. (low, mid, & high channels – 100 mW, 10dB Pad)





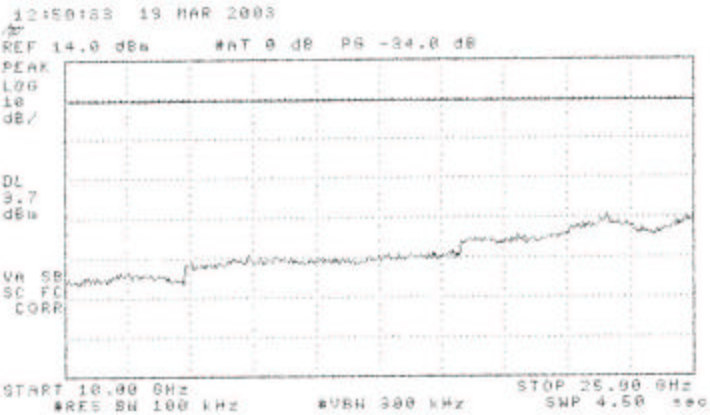
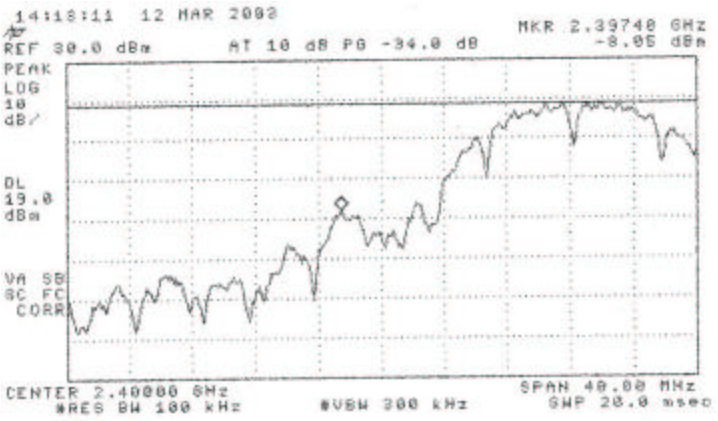
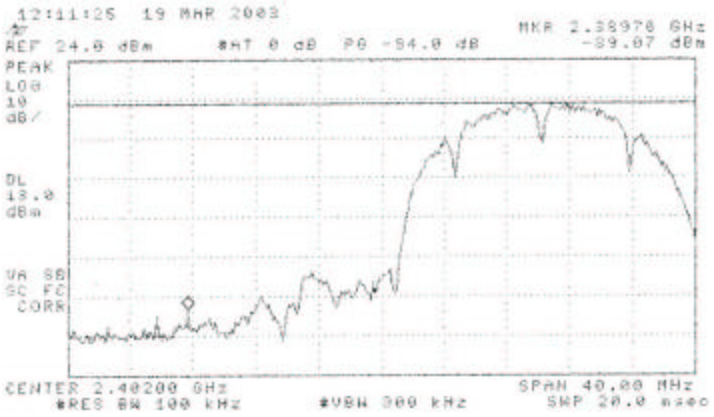
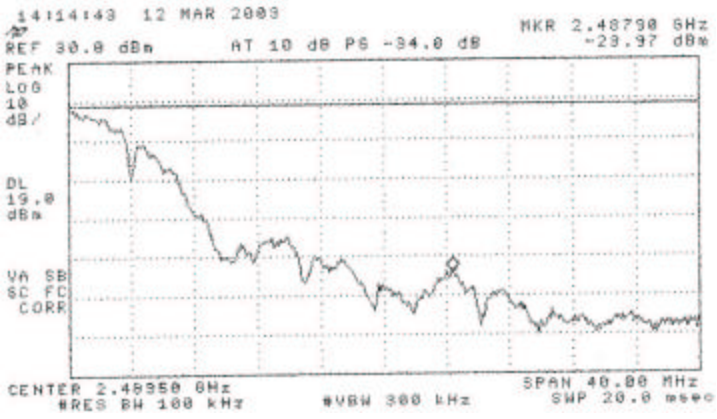


Figure 6.12 Antenna conducted spurious emissions.
(low, mid, & high channels – Radio Alone)







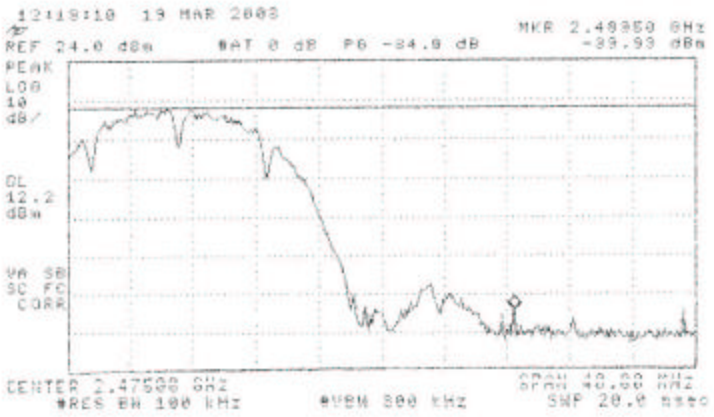
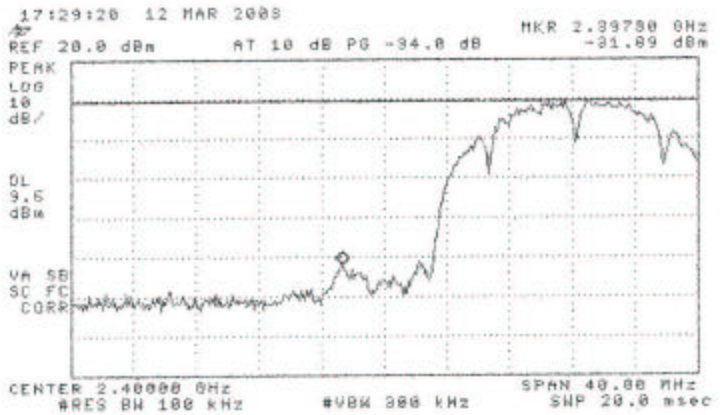
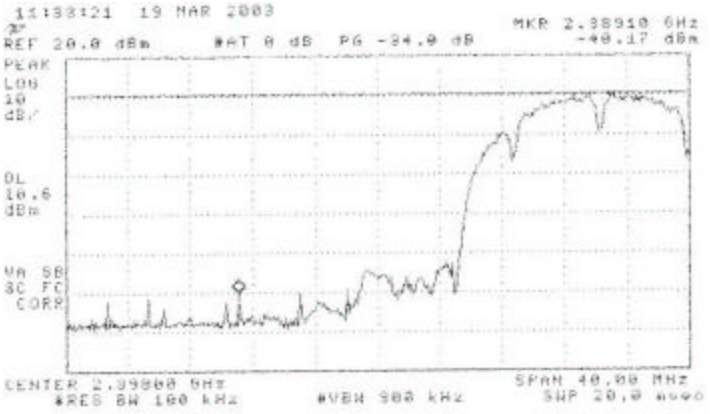
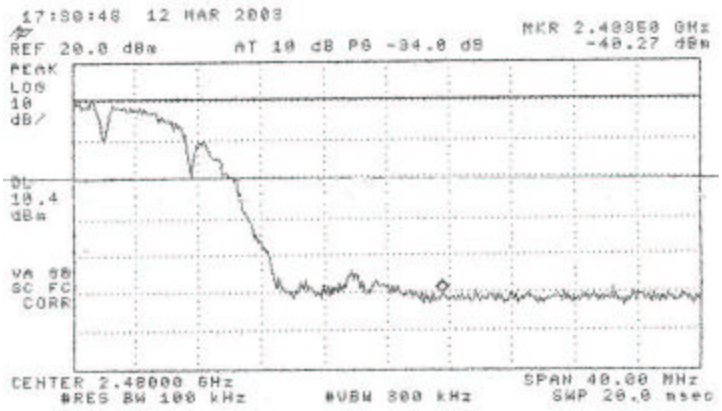


Figure 6.13 Band-edge behavior at low and high ends of the band. (low, mid, & high channels – 1000 mW)

Figure 6.14 Band-edge behavior at low and high ends of the band. (low, mid, & high channels – 1000 mW, 6dB Pad)







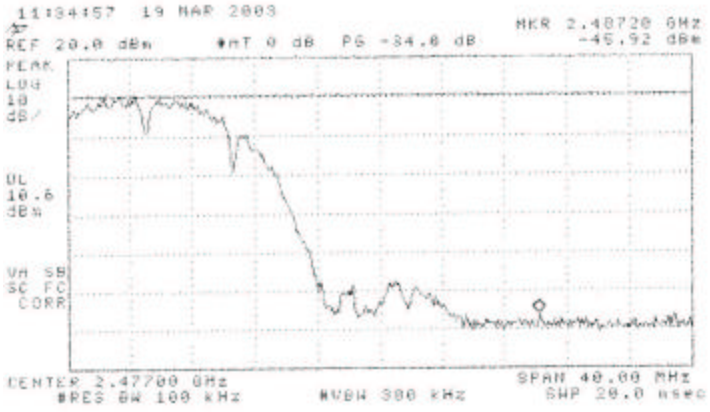


Figure 6.15 Band-edge behavior at low and high ends of the band. (low, mid, & high channels – 100 mW)

Figure 6.16 Band-edge behavior at low and high ends of the band. (low, mid, & high channels – 100 mW, 10dB Pad)

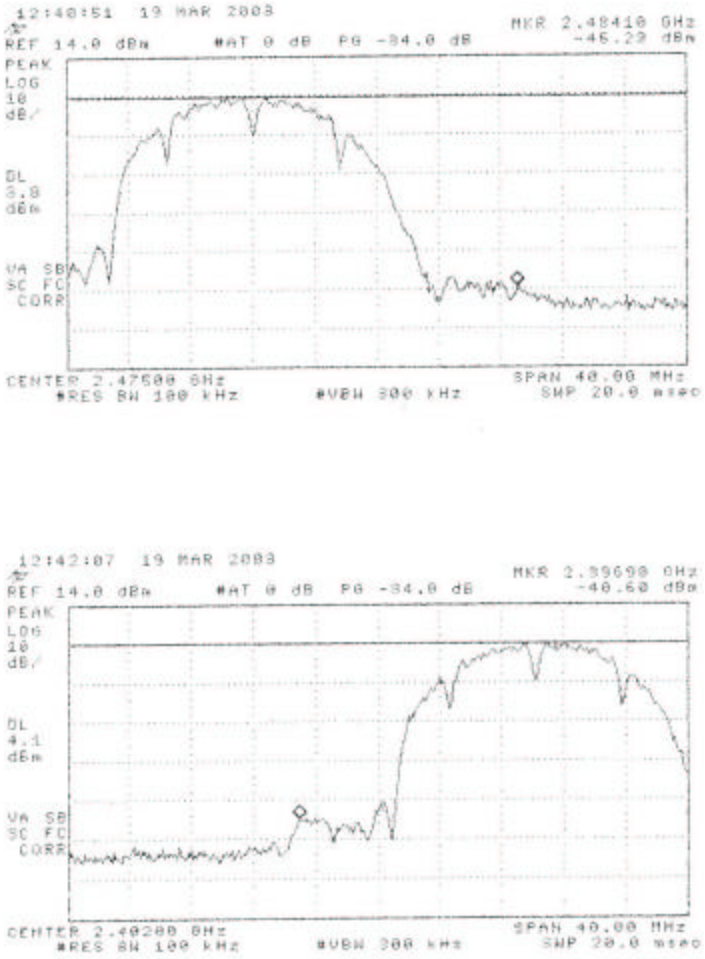


Figure 6.17 Band-edge behavior at low and high ends of the band. (low, mid, & high channels – 100 mW)

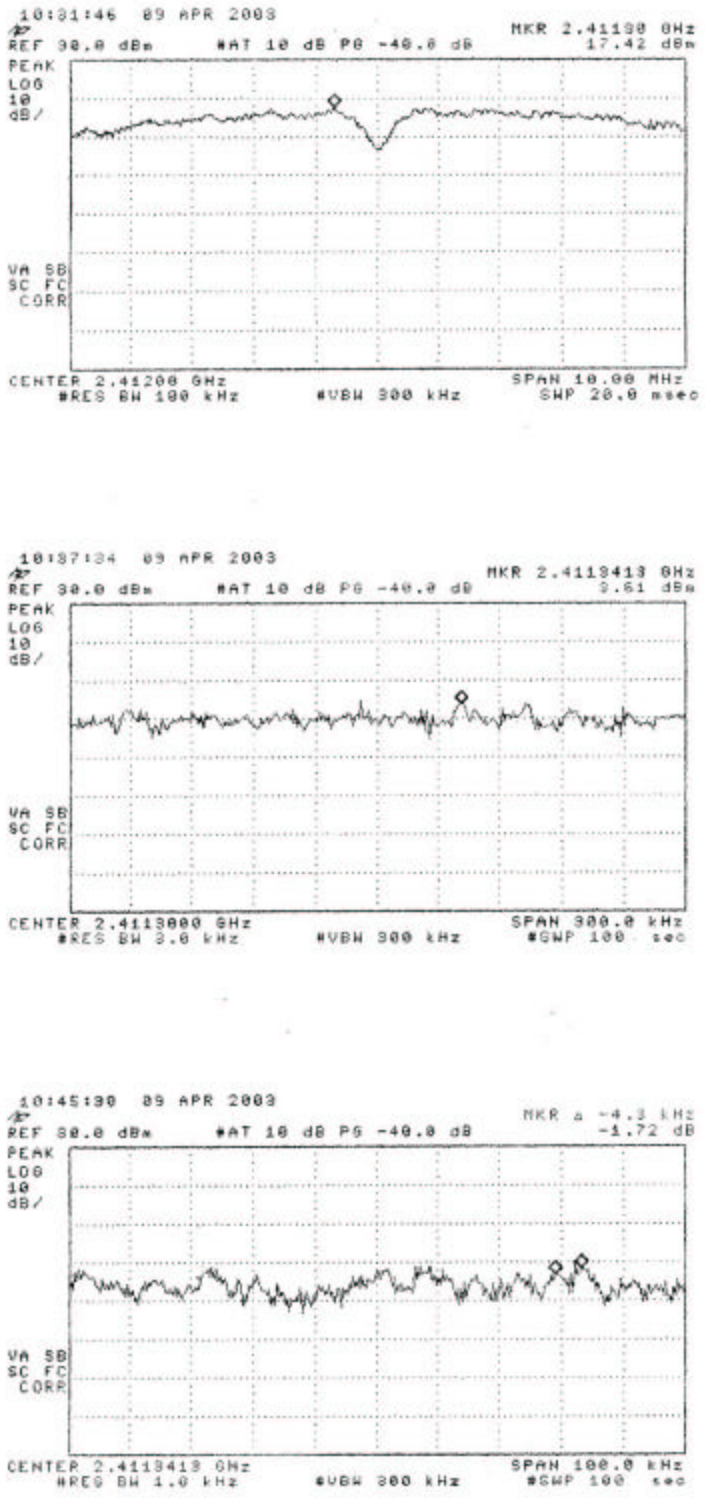


Figure 6.18 Spectral Density 1000 mW Setting (low channel);
(top) Spectrum Scan, (mid) Spectral Density, (bottom) Line Spacing.

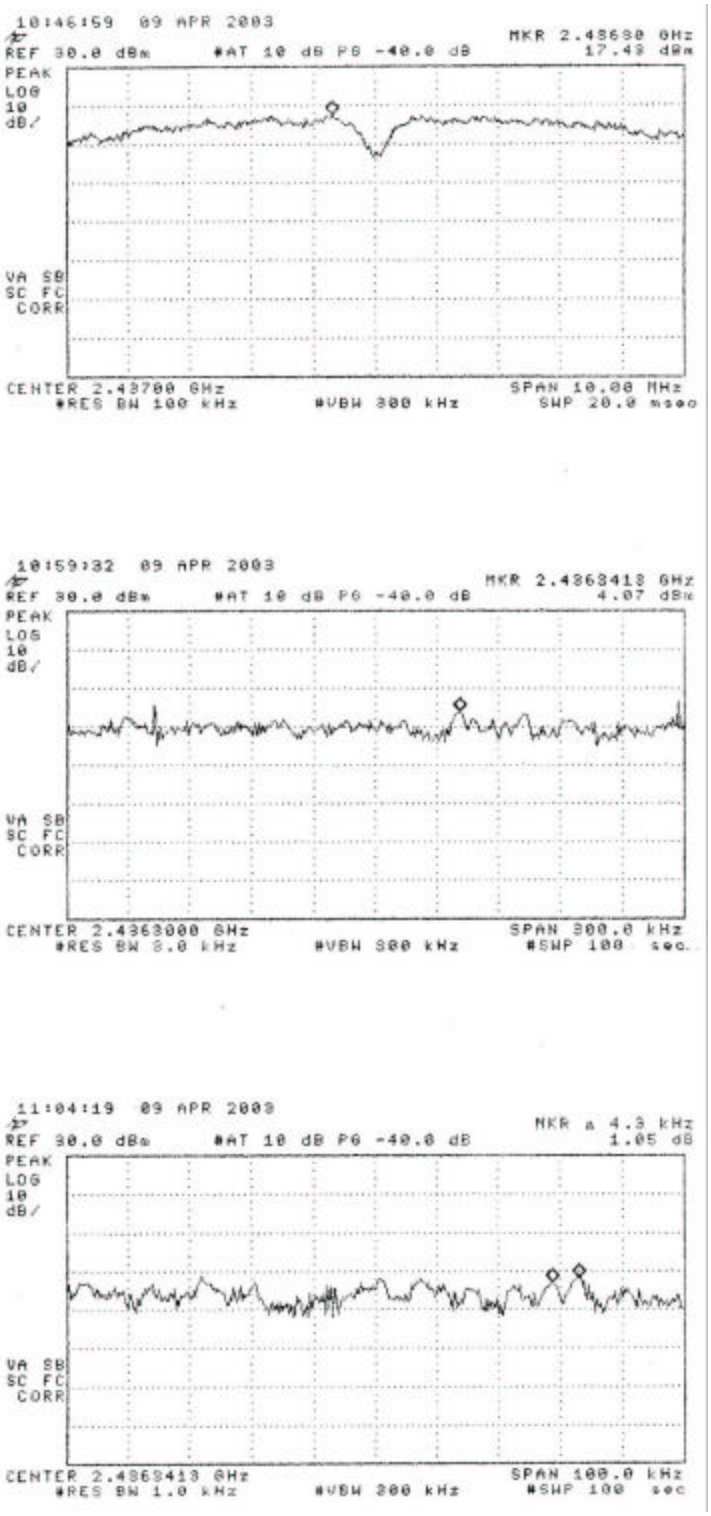


Figure 6.19 Spectral Density 1000 mW Setting (mid channel);
(top) Spectrum Scan, (mid) Spectral Density, (bottom) Line Spacing.

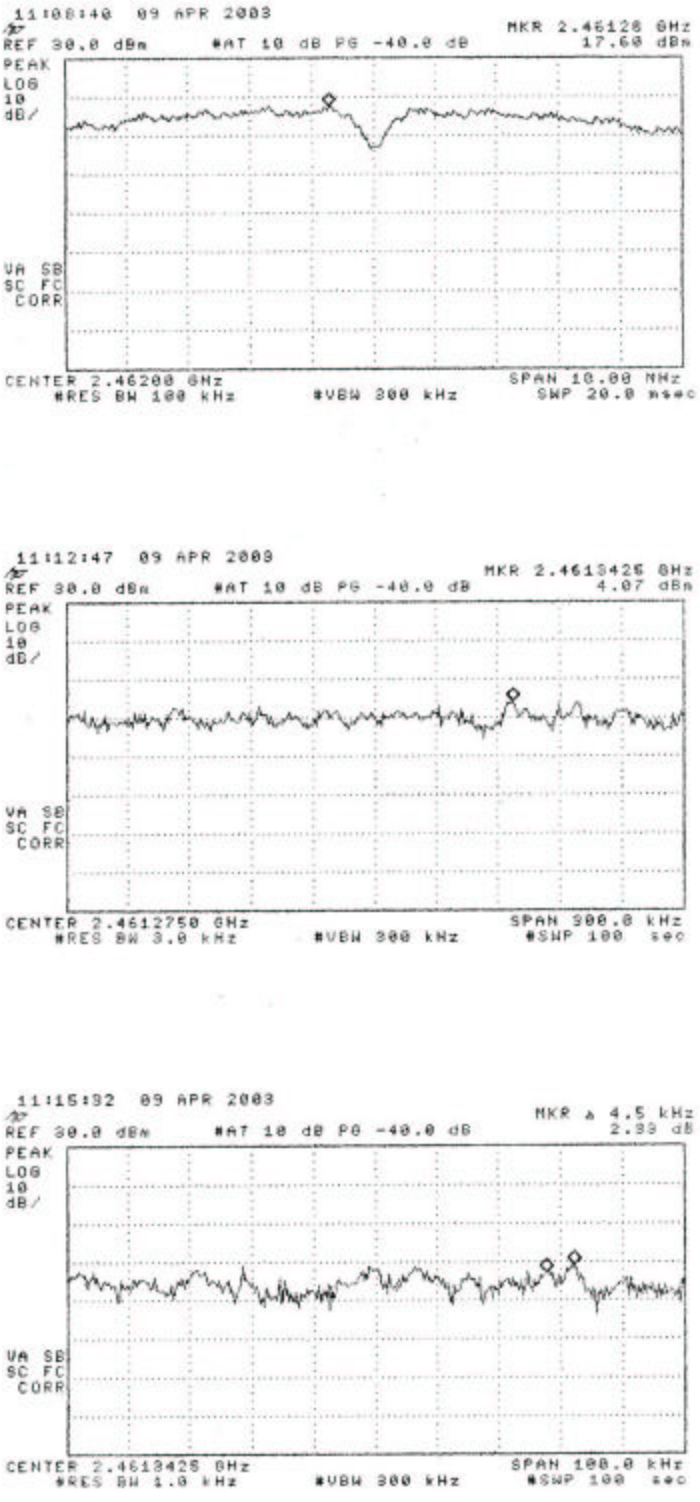


Figure 6.20 Spectral Density 1000 mW Setting (high channel);
(top) Spectrum Scan, (mid) Spectral Density, (bottom) Line Spacing