

*Electromagnetic Emissions Test Report  
In Accordance With Industry Canada  
Radio Standards Specification 129 Issue 2,  
FCC Part 22 Subpart H  
on the  
Handspring  
Model: Treo 600 (CDMA Version)*

FCC ID NUMBER: O8FBW

UPN: 3959ABW

APPLICANT: Handspring  
189 Bernardo Avenue  
Mountain View, CA 94043

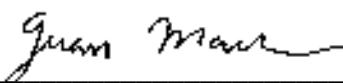
TEST SITE: Elliott Laboratories, Inc.  
684 W. Maude Ave  
Sunnyvale, CA 94086

TEST SITE: Elliott Laboratories, Inc.  
41039 Boyce Road  
Fremont, CA 94538

REPORT DATE: July 03, 2003

FINAL TEST DATE: June 24, June 25, and June 27, 2003

AUTHORIZED SIGNATORY:

  
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Sr. EMC Engineer

**TABLE OF CONTENTS**

<b>COVER PAGE.....</b>	<b>1</b>
<b>TABLE OF CONTENTS.....</b>	<b>2</b>
<b>FCC CERTIFICATION INFORMATION.....</b>	<b>3</b>
<b>DECLARATIONS OF COMPLIANCE.....</b>	<b>5</b>
<b>SCOPE.....</b>	<b>6</b>
<b>OBJECTIVE.....</b>	<b>6</b>
<b>SUMMARY OF TEST RESULTS.....</b>	<b>7</b>
PART 22H AND RSS-129 TEST SUMMARY.....	7
<b>MEASUREMENT UNCERTAINTIES .....</b>	<b>8</b>
<b>EQUIPMENT UNDER TEST (EUT) DETAILS .....</b>	<b>9</b>
GENERAL.....	9
OTHER EUT DETAILS .....	9
ENCLOSURE.....	9
MODIFICATIONS .....	9
SUPPORT EQUIPMENT.....	9
EUT INTERFACE PORTS.....	9
EUT OPERATION DURING TESTING.....	9
<b>TEST SITE.....</b>	<b>10</b>
GENERAL INFORMATION .....	10
CONDUCTED EMISSIONS CONSIDERATIONS .....	10
RADIATED EMISSIONS CONSIDERATIONS.....	10
<b>MEASUREMENT INSTRUMENTATION.....</b>	<b>11</b>
RECEIVER SYSTEM .....	11
PEAK POWER METER.....	11
FILTERS/ATTENUATORS .....	11
ANTENNAS .....	12
ANTENNA MAST AND EQUIPMENT TURNTABLE .....	12
INSTRUMENT CALIBRATION.....	12
<b>TEST PROCEDURES .....</b>	<b>13</b>
<b>SPECIFICATION LIMITS AND SAMPLE CALCULATIONS .....</b>	<b>17</b>
RADIATED EMISSIONS SPECIFICATION LIMITS .....	17
CALCULATIONS – EFFECTIVE RADIATED POWER.....	17
EXHIBIT 1: Test Equipment Calibration Data.....	1
EXHIBIT 2: Test Measurement Data.....	2
EXHIBIT 3: Test Configuration Photos.....	3
EXHIBIT 4: FCC ID Label and Label Location .....	4
EXHIBIT 5: Detailed Photographs.....	5
EXHIBIT 6: Schematics.....	6
EXHIBIT 7: Theory of Operation.....	7
EXHIBIT 8: User Manual.....	8

## FCC CERTIFICATION INFORMATION

The following information is in accordance with FCC Rules, 47CFR Part 2, Subpart J, Section 2.1033(C) & to Industry Canada RSP-100.

**2.1033(c)(1)** Applicant: Hardspring  
189 Bernardo Avenue  
Mountain View, CA 94043

**2.1033(c)(2) & RSP-100 (4)** FCC ID: **O8FBW**  
UPN: **3959ABW**

### **2.1033(c)(3) & RSP-100 (7.2(a)) Instructions/Installation Manual**

Please refer to Exhibit 7: User Manual, Theory of Operation, and Tune-up Procedure

### **2.1033(c)(4) & RSP-100 (7.2(b)(iii)) Type of emissions**

FCC 22H & RSS-129: **1M3F9W**

### **2.1033(c)(5) & RSP-100 (7.2(a)) Frequency Range**

FCC 22H & RSS-129: 824.70 - 848.31 MHz (850)

### **2.1033(c)(6) & RSP-100 (7.2(a)) Range of Operation Power**

FCC 22H & RSS-129: **21.8dBm (0.151 Watts ERP)**

### **2.1033(c)(7) & RSP-100 (7.2(a)) Maximum FCC & IC Allowed Power Level**

Section 22.913 & RSS-129 (6.4): limited to 7 Watts ERP

### **2.1033(c)(8) & RSP-100 (7.2(a)) Applied voltage and currents into the final transistor elements**

Refer to Exhibit 6. The schematic diagram

### **2.1033(c)(9) & RSP-100 (7.2(a)) Tune-up Procedure**

Please refer to Exhibit 7: User Manual, Theory of Operation, and Tune-up Procedure

**2.1033(c)(10) & RSP 100 (7.2(a)) Schematic Diagram of the Transmitter**

Refer to Exhibit 6. The schematic diagram

**2.1033(c)(10) & RSP-100 (7.2(a)) Means for Frequency Stabilization**

Refer to Exhibit 6. The schematic diagram

**2.1033(c)(10) & RSP-100 (7.2(a)) Means for Suppression of Spurious radiation**

Refer to Exhibit 6. The schematic diagram

**2.1033(c)(10) & RSP-100 (7.2(a)) Means for Limiting Modulation**

For more information please refer to Exhibit 7: Theory of Operation

**2.1033(c)(10) & RSP-100 (7.2(a)) Means for Limiting Power**

Refer to Exhibit 6. The schematic diagram

**2.1033(c)(11) & RSP-100 (7.2(g)) Photographs or Drawing of the Equipment Identification Plate or Label**

Refer to Exhibit 4

**2.1033(c)(12) & RSP-100 (7.2(c)) Photographs of equipment**

Refer to Exhibit 5

**2.1033(c)(13) & RSP-100 (7.2(a)) Equipment Employing Digital Modulation**

Manufacturer to provide detailed information.

**2.1033(c)(14) & RSP-100 (7.2(b)(ii)) Data taken per Section 2.1046 to 2.1057 and RSS-133 issue 2, Rev. 1.**

Refer to Exhibit 2

**DECLARATIONS OF COMPLIANCE**

Equipment Name and Model:  
Treo 600 (CDMA Version)

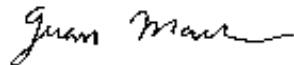
Manufacturer:  
Handspring  
189 Bernardo Avenue  
Mountain View, CA 94043

Tested to applicable standards:  
RSS-129 Issue 2 (Provisional) September 25, 1999 (800 MHz Dual-Mode CDMA Cellular Telephones)  
FCC Part 22 Subpart H

Measurement Facility Description Filed With Department of Industry:

Departmental Acknowledgement Number: IC2845 **SV4** Dated July 30, 2001  
Departmental Acknowledgement Number: IC4549\_3 Dated March 5, 2003  
Departmental Acknowledgement Number: IC2549\_4 Dated March 5, 2003

I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above mentioned departmental standards (through the use of TIA/EIA-603 and the specific RSS standards applicable to this device); and that the equipment performed in accordance with the data submitted in this report.



Signature	
Name	Juan Martinez
Title	Sr. EMC Engineer
Company	Elliott Laboratories Inc.
Address	684 W. Maude Ave Sunnyvale, CA 94086 USA

Date: July 3, 2003

Maintenance of compliance with the above standards is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

## **SCOPE**

FCC Part 22 Subpart H & IC RSS-129 testing was performed for the equipment mentioned in this report. The equipment was tested in accordance with the procedures specified in Sections 2.1046 to 2.1057 of the FCC Rules & IC RSS-129. TIA-603 was also used as a test procedure guideline to perform some of the required tests.

The intentional radiator above was tested in a simulated typical installation to demonstrate compliance with the relevant FCC & RSS performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

## **OBJECTIVE**

The primary objective of the manufacturer is compliance with the FCC Part 22 Subpart H & IC RSS-129. Certification of these devices is required as a prerequisite to marketing as defined in Section 2.1033 & RSP-100.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to FCC & Industry Canada. FCC & Industry Canada issues a grant of equipment authorization and a certification number upon successful completion of their review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product that may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

**SUMMARY OF TEST RESULTS****Part 22H and RSS-129 Test Summary**

Part 2 Measurements Required Section	FCC Part 22 Subpart H Section	RSS-129 Section	Test Performed	Measured Value	Test Procedure Used	Result
Modulation Tested	CDMA	CDMA	-	-	-	-
2.1047: Modulation characteristics	22.901 (d)(1)(2)	8.1.1 (1)	99% Bandwidth	1.292 MHz	D	Complies
2.1046: RF power output	22.913	9.2	Output Power Test	21.8 dBm (0.151 Watts ERP)	A	Complies
2.1046: RF power output	22.913	9.2	Conducted Output Power Test (Antenna Conducted)	24 dBm (0.251 Watts)	B	Complies
-	-	9.3	Standby Output Power Measurement (Mobile)	-67.8 dBm	Used RSS-129 9.3	Complies
-	-	9.4	Minimum Controlled Output Power (Mobile)	-57.8 dBm	Used RSS-129 9.4	Complies
2.1051: Spurious emissions at antenna Port	22.917 (e)	8.1.1 (3)	Emission Limits and/or Unwanted Emission 30MHz – 25GHz (Antenna Conducted)	All spurious emissions < -13dBm	J	Complies
2.1051: Spurious emissions at antenna Port	22.917 (f)	8.1.1 (2)	Mobile Emission in base frequency	-80.67 dBm	O	Complies
2.1049: Occupied Bandwidth	22.917 (e)	8.1.1 (1)	Out of Block Emissions (Antenna Conducted)	All spurious emissions < -13dBm	I	Complies
2.1053 Field strength of spurious radiation	22.917 (e)	8.1.1 (3)	Radiated Spurious Emissions 30MHz – 25GHz	-39.9dBm @ 2562.5 MHz (-26.9 dB)	N	Complies
2.1055: Frequency stability	22.355	9.2.1	Frequency Stability (Frequency Vs. Temperature)	812 Hz	K	Complies

2.1055: Frequency stability	22.355	9.2.1	Frequency Stability (Frequency Vs. Voltage)	10 Hz	L & M	Complies
-	-	9.2.2	Frequency Stability (Power Vs. Temperature)	0.8 dB	K	Complies
-	-	9.2.2	Frequency Stability (Power Vs. Voltage)	0.2 dB	L	Complies
2.1093: Exposure to portable devices	-	11	Exposure of Humans to RF Fields	SAR Report provided	N/A	-
-	15.109	10 (d)	Receiver Spurious Emissions	42.4 dBuV/m @ 824 MHz (-3.6 dB)	N/A	Complies

### MEASUREMENT UNCERTAINTIES

ISO Guide 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with NAMAS document NIS 81.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	30 to 1000	± 3.6

**EQUIPMENT UNDER TEST (EUT) DETAILS****GENERAL**

The EUT is a personal digital assistant with a built-in cellular phone. Normally, the EUT would be placed on a tabletop during operation. The EUT was, therefore, treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 120/240 V, 50/60 Hz, 1 Amps.

The sample was received on June 23, 2003 and tested on June 24, June 25, and June 27, 2003. The EUT consisted of the following component(s):

Manufacturer/Model/Description	Serial Number	Proposed FCC ID #
Handspring/Treo 600 (CDMA Version)/PDA phone	N/A	<b>O8FBW</b>

**OTHER EUT DETAILS**

None

**ENCLOSURE**

The EUT enclosure is primarily constructed of plastic. It measures approximately 6.5 cm wide by 1.5 cm deep by 13 cm high.

**MODIFICATIONS**

The EUT did not require modifications during testing in order to comply with the emission specifications.

**SUPPORT EQUIPMENT**

No remote support equipment was used during testing.

**EUT INTERFACE PORTS**

The I/O cabling configuration during emissions testing was as follows:

Port	Connected to	Description	Shielded or Unshielded	Length (m)
Docking Port (EUT)	Serial (Computer) and AC Mains	Multiconductor (Y-cable)	Shielded	1.9

**EUT OPERATION DURING TESTING**

EUT was set to operate on the low, middle, and high channel at full power.

**TEST SITE****GENERAL INFORMATION**

Final test measurements were taken on June 24 at the Elliott Laboratories Chamber # 3 and 4 located Fremont, 41039 Boyce Road, Fremont CA 94538. Final test measurements were taken on June 25 &, 27, 2003 at the Elliott Laboratories Open Area Test Site # 4 located at 684 West Maude Avenue, Sunnyvale, California. Pursuant to Section 2.948 of the FCC Rules, construction, calibration, and equipment data has been filed with the Commission.

**CONDUCTED EMISSIONS CONSIDERATIONS**

Conducted emissions testing are performed in conformance with Section 2 of FCC Rules. Measurements are made with the EUT connected to a spectrum analyzer through an attenuator to prevent overloading the analyzer.

**RADIATED EMISSIONS CONSIDERATIONS**

Radiated measurements are performed in an open field environment or Anechoic Chamber. The test site is maintained free of conductive objects within the CISPR 16-1 defined elliptical area.

## MEASUREMENT INSTRUMENTATION

### RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers are capable of measuring over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the particular detector used during measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. If average measurements above 1000MHz are performed, the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz is used.

### INSTRUMENT CONTROL COMPUTER

A personal computer is utilized to record the receiver measurements of the field strength at the antenna, which is then compared directly with the appropriate specification limit. The receiver is programmed with appropriate factors to convert the received voltage into field strength at the antenna. Results are printed in a graphic and/or tabular format, as appropriate.

The test receiver also provides a visual display of the signal being measured.

### PEAK POWER METER

A peak power meter and thermister mount may be used for output power measurements from transmitters as they provide a broadband indication of the power output.

### FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or EUT and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transmitters and transient events.

**ANTENNAS**

A biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors programmed into the test receivers

**ANTENNA MAST AND EQUIPMENT TURNTABLE**

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor drive to vary the antenna height.

The requirements of ANSI C63.4 were used for configuration of the equipment turntable. It specifies that the test height above ground for table-mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

**INSTRUMENT CALIBRATION**

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An appendix of this report contains the list of test equipment used and calibration information.

## TEST PROCEDURES

**General:** For Transmitters with detachable antenna, direct measurements for output power, modulation characterization, occupied bandwidth, and frequency stability are performed with the antenna port of the EUT connected to either the power meter, modulation analyzer, or spectrum analyzer via a suitable attenuator and/or filter. The attenuators and/or filters are used to ensure that the transmitter fundamental will not overload the front end of the measurement instrument.

**Procedure A – Power Measurement (Radiated Method):** The following procedure was used for transmitters that do not use external antennas or with devices with test port were the output power can be measured directly, but Power must still be made with antenna attached.

- 1) Set the EUT to maximum power and to the lowest channel.
- 2) A spectrum analyzer was used to measure the power output. The search antenna was located 3 meter from the EUT.
- 3) The spectrum analyzer resolution and video bandwidth was set to 2 MHz to measure the power output. No amplifier was used since the fundamental will cause the amplifier to saturate.
- 4) The EUT was then rotated for a complete 360 degrees and the search antenna was raised and lowered to maximize the fundamental. Both vertical and horizontal polarization's were performed. All correction factors are applied to the fundamental.
- 5) Substitution is then performed. Substitution method is performed by replacing the EUT with a horn antenna and signal generator. The horn antenna factors can be reference to a half-wave dipole in dBi. The signal generator power level is adjusted until a similar level, which was measured, in step 4, is achieved on the spectrum analyzer. The level on the signal generator is then added to the antenna factor, in dBi, which will give the corrected value.
- 6) Steps 1 to 5 are repeated for the middle and the highest channel.

**Procedure B – Power Measurement (Conducted Method):** The following procedure was used for transmitters that do use external antennas.

- 1) Set the EUT to maximum power and to the lowest channel.
- 2) Either a power meter or a spectrum analyzer was used to measure the power output.
- 3) If a spectrum analyzer was used a resolution and video bandwidth 1MHz was used to measure the power output. Corrected for any external attenuation used for the protection of the input of analyzer. In addition, For CDMA or TDMA modulations set spectrum analyzer resolution to 1MHz and video to 30 kHz. Use video averaging with a 100-sample rate.
- 4) If a power meter was used, corrected for any external attenuation used for the protection of the input of the sensor head. Also set the power sensor correction by setting up the frequency range that will be measured.
- 5) Repeat this for the high channel and all modulations that will be used and all output ports used for transmission

**Procedure D - Occupied Bandwidth (Conducted Method):** Either for analog, digital, or data modulations, occupied bandwidth was performed. The EUT was set to transmit the appropriate modulation at maximum power. The bandwidth was measured using following methods:

- 1) The built-in 99% function of the spectrum analyzer was used.
- 2) If the built-in 99% is not available then the following method is used:

26-dB was subtracted to the maximum peak of the emission. Then the display line function was used, in conjunction with the marker delta function, to measure the emissions bandwidth.

- 3) For the above two methods a resolution and video bandwidth of 10 or 30 kHz was used to measure the emission's bandwidth.

**Procedure H - Other Types of Equipment:** Either digital or data modulated signals were simulated, by software or external sources, to performed the required tests. The EUT was set to transmit the appropriate digital modulation.

**Procedure I – Bandedge:** Where Bandedge measurements are specified the following procedure was performed:

- 1) Set the transmitting signal as close as possible to the edge of the frequency band/block as specified in the standard. Power is set to maximum
- 2) Set the spectrum analyzer display line function to -13 dBm.
- 3) Set the spectrum analyzer bandwidth to the minimum 1% of the emission bandwidth. The emission bandwidth is determined by using **procedure D**. For CDMA or TDMA modulations used trace averaging set to 100 sweeps.
- 4) Set the marker function to the FCC or IC specified frequency band/block.
- 5) Set the spectrum analyzer span to show any emission within 2 MHz above or below the frequency band/block. All spurious or intermodulation emission must not exceed the -13 dBm limit.
- 6) Steps 1 to 5 were repeated for all modulations and output ports that will be used for transmission. Also, bandedge is determined for blocks A (high edge), D, B, E, F, C (low edge).

**Procedure J – Antenna Conducted Emissions:** For spurious emission measurements at the antenna terminal the following procedure was performed:

- 1) Set the transmitting signal as close as possible to the edge of the frequency band/block as specified in the standard. Power is set to maximum
- 2) Set the spectrum analyzer display line function to -13-dBm.
- 3) Set the spectrum analyzer bandwidth to 1 MHz.
- 4) For the spectrum analyzer, the start frequency was set to 30 MHz and the stop frequency set to the 10<sup>th</sup> harmonic of the fundamental. All spurious or intermodulation emission must not exceed the -13dBm limit.
- 5) Steps 1 to 4 were repeated for all modulations and output ports that will be used for

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transmission.

**Procedure K - Frequency Stability:** The EUT is placed inside a temperature chamber with all support and test equipment located outside of the chamber. The spectrum analyzer is configured to give a 6-digit display for the marker-frequency function. The spectrum analyzer's built-in frequency counter is used to measure the maximum deviation of the fundamental frequency at each temperature. The Temperature chamber was varied from  $-30$  to  $+50^{\circ}\text{C}$  (or  $+60^{\circ}\text{C}$  for some IC RSS standards) in 10 degrees increment. The EUT was allowed enough time to stabilize for each temperature variation. For Industry Canada requirement the power was also monitor during the temperature test with a power meter.

**Procedure L - Frequency Stability:** For AC or DC operated devices the nominal voltage is varied to 85% and to 115% at either room temperature or at a controlled  $+20^{\circ}\text{C}$  temperature. For Industry Canada requirement the power was also monitor during the temperature test with a power meter.

**Procedure M - Frequency Stability:** For battery-powered devices the voltage battery endpoint is determined by reducing the dc voltage until the unit ceases to function. This is performed at either room temperature or at a controlled  $+20^{\circ}\text{C}$  temperature.

**Procedure N - Field Strength Measurement:** The EUT was set on the turntable and the search antenna position 3 meters away. The output antenna terminal was terminated with a 50-ohm terminator. The EUT was set at the middle of the frequency band and set at maximum output power.

For the first scan, a pre-liminary measurement is performed. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. One or more of these is with the antenna polarized vertically while the one or more of these are with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through  $360^{\circ}$ , the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit.

For the final measurement, Substitution method is performed on spurious emissions not being 20-dB below the calculated radiated limit. Substitution method is performed by replacing the EUT with a horn antenna and signal generator. The horn antenna factors can be reference to a half-wave dipole in dBi. The signal generator power level was adjusted until a similar level, which was measured on the first scan, is achieved on the spectrum analyzer. The level on the signal generator is than added to the antenna factor, in dBi, which will give the corrected value.

**Procedure O – Antenna Conducted Emissions (22.917(f)):** For Mobile spurious emission in base frequency the following procedure was performed:

- 1) Set the transmitting signal as close as possible to the edge of the frequency band/block as specified in the standard. Power is set to maximum
- 2) Set the spectrum analyzer display line function to -80-dBm.
- 3) Set the spectrum analyzer bandwidth to 1 kHz. The reason for using 1 kHz BW was to bring the analyzer noise floor down below the limit and provide more dynamic range, since no notch filter was available to attenuate the fundamental.
- 4) For the spectrum analyzer, the start frequency was set to 869 MHz and the stop frequency set to 894 MHz. All spurious or intermodulation emission must not exceed the -80-dBm limit.
- 5) Steps 1 to 4 were repeated for low, middle, and high channels.

**Procedure P – Receiver Antenna Conducted Emissions:** Receiver spurious emission was measured at the antenna terminal, as a port was available.

- 1) Set the receiver was set to the midpoint of the operating band as specified in the standard.
- 2) Set the spectrum analyzer display line function to 2 nanowatts for measurements below 1 GHz and 5 nanowatts for measurements above 1 GHz.
- 3) Set the spectrum analyzer bandwidth to 1 MHz.
- 4) For the spectrum analyzer, the start frequency was set to 30 MHz and the stop frequency set to the 5<sup>th</sup> harmonic of the receiver LO. All spurious or intermodulation emission must not exceed the specified limit.

**SPECIFICATION LIMITS AND SAMPLE CALCULATIONS****RADIATED EMISSIONS SPECIFICATION LIMITS**

The limits for radiated emissions are based on the power of the transmitter at the operating frequency. Data is measured in the logarithmic form of decibels relative to one milliwatt (dBm) or one microvolt/meter (dBuV/m.). The field strength of the emissions from the EUT is measured on a test site with a receiver.

Below is a formula example used to calculate the attenuation requirement, relative to the transmitters power output, in dBuV/m. For this example an operating power range of 3 watts is used. The radiated emissions limit for spurious signals outside of the assigned frequency block is  $43 + 10\log_{10}$  (mean output power in watts) dB below the measured amplitude at the operating power.

**CALCULATIONS – EFFECTIVE RADIATED POWER**

$$E(V/m) = \frac{\sqrt{30 * P * G}}{d}$$

E= Field Strength in V/m

P= Power in Watts (for this example we use 3 watts)

G= Gain of antenna in numeric gain (Assume 1.64 for ERP)

d= distance in meters

$$E(V/m) = \frac{\sqrt{30 * 3 \text{ watts} * 1.64 \text{ dB}}}{3 \text{ meters}}$$

$$20 * \log (4.049 \text{ V/m} * 1,000,000) = 132.14 \text{ dBuV/m} @ 3 \text{ meters}$$

FCC Rules request an attenuation of  $43 + 10 \log (3)$  or 47.8 dB for all emissions outside the assigned block, the limit for spurious and harmonic emissions is:

$$132.1 \text{ dBuV/m} - 47.8 \text{ dB} = 84.3 \text{ dBuV/m} @ 3 \text{ meter.}$$

**Note: Substitution Method is performed for spurious emission not being 20-dB below the calculated field strength.**

***EXHIBIT 1: Test Equipment Calibration Data***

**Antenna Conducted Emissions, 02-Jul-03****Engineer: jmartinez**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Assett #</u>	<u>Cal interval</u>	<u>Last Calibrated</u>	<u>Cal Due</u>
Hewlett Packard	Microwave EMI test system (SA40, 9kHz - 40GHz)	84125C	1149	12	3/12/2003	3/12/2004

**Power Output Measurement, 02-Jul-03****Engineer: jmartinez**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Assett #</u>	<u>Cal interval</u>	<u>Last Calibrated</u>	<u>Cal Due</u>
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1290	12	4/8/2003	4/8/2004
Rohde & Schwarz	Power Sensor 100uW - 10 Watts	NRV-Z53	1236	12	8/15/2002	8/15/2003
Rohde & Schwarz	Peak Power Sensor 100uW - 2 Watts	NRV-Z32	1536	12	3/20/2003	3/20/2004

**Radiated Emissions, 1000 - 20,000 MHz, 07-Jul-03****Engineer: jmartinez**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Assett #</u>	<u>Cal interval</u>	<u>Last Calibrated</u>	<u>Cal Due</u>
EMCO	Log Periodic Antenna, 0.2-2 GHz	3148	1404	12	11/11/2002	11/11/2003
Hewlett Packard	Spectrum Analyzer 9kHz - 40 GHz	8564E (84125C)	1393	12	3/12/2003	3/12/2004
Miteq	Preamplifier, 1-18GHz	AFS44	1540	12	6/16/2003	6/16/2004

**Radiated Emissions, 1 - 20,000 GHz, 07-Jul-03****Engineer: jmartinez**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Assett #</u>	<u>Cal interval</u>	<u>Last Calibrated</u>	<u>Cal Due</u>
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	487	12	4/24/2003	4/24/2004
Elliott Laboratories	Log Periodic Antenna 300-1000 MHz	EL300.1000	297	12	1/21/2003	1/21/2004
Hewlett Packard	Signal Generator (sweep) 0.01 - 26.5 GHz	8340A	1244	N/A		

### ***EXHIBIT 2: Test Measurement Data***

The following data includes conducted and radiated emission measurements of the Handspring, Model No: TREO 600 (CDMA VERSION).

T51640_22H	31 Pages
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## ***EMC Test Data***

Client:	Handspring	Job Number:	J49635
Model:	Robin	T-Log Number:	T51640
Contact:	David Waitt	Account Manager:	Christine Vu
Emissions Spec:	FCC 22H & 24E	Class:	Radio
Immunity Spec:		Environment:	

## **EMC Test Data**

For The

### **Handspring**

Model

**Robin**

Date of Last Test: 6/27/2003



## EMC Test Data

Client:	Handspring	Job Number:	J49635
Model:	Robin	T-Log Number:	T51640
		Account Manager:	Christine Vu
Contact:	David Waitt		
Emissions Spec:	FCC 22H & 24E	Class:	Radio
Immunity Spec:	Enter immunity spec on cover	Environment:	

### EUT INFORMATION

#### General Description

The EUT is a personal digital assistant with a built-in cellular phone.. Normally, the EUT would be placed on a table top during operation. The EUT was, therefore, treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 120/240 V, 50/60 Hz, 1 Amps.

#### Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Handspring	Trio 600	Robin	N/A	TBD
Motorola	MU12-1052100-A1	Power Supply	N/A	N/A

#### EUT Enclosure

The EUT enclosure is primarily constructed of plastic. It measures approximately 6.5 cm wide by 1.5 cm deep by 13 cm high.

#### Modification History

Mod. #	Test	Date	Modification
1			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.



## EMC Test Data

Client:	Handspring	Job Number:	J49635
Model:	Robin	T-Log Number:	T51640
		Account Manager:	Christine Vu
Contact:	David Waitt		
Emissions Spec:	FCC 22H & 24E	Class:	Radio
Immunity Spec:	Enter immunity spec on cover	Environment:	

### Test Configuration #1

#### Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
IBM	2635	Laptop	78-Gy734	AM09611TBOON
IBM	02K6663	Power Supply	N/A	N/A

#### Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

#### Interface Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Docking Port(EUT)	Serial (Computer) and AC Mains	Multiconductor (Y-cabe)	Shielded	1.9

Note: The parallel port was not connected as would not normally be connected for the radio to function properly.

#### EUT Operation During Emissions Radio

EUT was set to operate on the low, middle, and high channel at full power.



## *EMC Test Data*

Client:	Handspring	Job Number:	J49635
Model:	Robin	T-Log Number:	T51640
Contact:	David Waitt	Account Manager:	Christine Vu
Spec:	FCC 22H & 24E	Class:	Radio

## Radiated Emissions

## Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 6/24/2003 Config. Used: 1  
Test Engineer: jmartinez Config Change: None  
Test Location: FTChamber #4 EUT Voltage: 120V/60Hz

## General Test Configuration

The EUT was located on the turntable for radiated field strength measurements and the local support equipment was located underneath the table.

For radiated measurements were taken with receive antenna located 3 meters from the EUT.

**Ambient Conditions:** Temperature: 15 °C  
Rel. Humidity: 55 %

## Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, Fundamental Power Output	FCC 24E	Pass	24 dBm (EIRP)
1	Conducted Output Power	FCC 24E	Pass	23.92 dBm
2	RE, Fundamental Power Output	FCC 22H	Pass	21.8 dBm (ERP)
2	Conducted Output Power	FCC 22H	Pass	24 dBm
3	Standby Power Output	RSS-129 (9.3 & 9.4)	Pass	-67.8 dBm
3	Control Power Output	RSS-129 (9.3 & 9.4)	Pass	-57.8 dBm

### Modifications Made During Testing:

No modifications were made to the EUT during testing

## Deviations From The Standard

No deviations were made from the requirements of the standard.



## EMC Test Data

Client: Handspring		Job Number: J49635
Model: Robin		
	T-Log Number: T51640	
Contact: David Waitt	Account Manager: Christine Vu	
Spec: FCC 22H & 24E	Class: Radio	

### Run #1: Fundamental 1900 MHz

#### Fundamental Field strength level

Frequency	Level	Pol	FCC 24E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
<b>Low Channel</b>								
1851.229	118.5	V	-	-	Avg	0	1.0	Vertical produced highest field level
<b>Middle Channel</b>								
1867.223	117.5	V	-	-	Avg	0	1.0	Vertical produced highest field level
<b>High Channel</b>								
1907.957	121.1	V	-	-	Avg	360	1.0	Vertical produced highest field level

#### Output Power (Substitution Method)

Frequency	EUT Measured Level	Max field produced by Sig. Gen & horn	Pol	Delta	Sig Gen. Actual Pin	Corrected Pin	Comment
MHz	dB $\mu$ V/m	dB $\mu$ V/m	v/h	(dB)	(dBm)	(dBm)	
1851.229	118.5	117.0	V	1.5	15.0	16.5	Note 1
1867.223	117.5	116.1	V	1.4	15.0	16.4	Note 1
1907.957	121.1	117.0	V	4.1	12.0	16.1	Note 1

Output Power Substitution <small>Note 2</small>					
Frequency	Pin	Gain	EIRP	ERP	Comment
MHz	dBm	dBi	dBm	dBm	
1851.229	16.5	7.5	24.0	21.8	Note 2
1867.223	16.4	7.5	23.9	21.7	Note 2
1907.957	16.1	7.8	23.9	21.7	Note 2

Note 1: Delta (dB) = EUT measured level - Maximum field level produced by signal generator & substitution antenna. The resulting Delta (dB) was then added to the actual signal generators Pin going into the substitution antenna, which will yield the values located under the column label "Corrected Pin".

Note 2: Pin is the power input (dBm) to the substitution antenna to obtain the field strength recorded from the EUT (refer to note 1). G is the gain (dBi) for the substitution antenna. ERP is the effective radiated power (Pin + GdBi - 2.2) from the substitution antenna. EIRP is calculated as follows (Pin+GdBi)

#### Antenna Conducted Output Power (Power Meter)

Frequency	Power Output
MHz	(dBm)
1867.000	23.92



## EMC Test Data

Client: Handspring

Job Number: J49635

Model: Robin

T-Log Number: T51640

Account Manager: Christine Vu

Contact: David Waitt

Spec: FCC 22H &amp; 24E

Class: Radio

**Run #2: Fundamental 850 MHz****Fundamental Field strength level**

Frequency	Level	Pol	FCC 22H		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
<b>Low Channel</b>								
825.283	121.2	V	-	-	Avg	55	1.0	Vertical produced highest field level
<b>Middle Channel</b>								
835.392	120.2	V	-	-	Avg	46	1.0	Vertical produced highest field level
<b>High Channel</b>								
835.392	122.1	V	-	-	Avg	57	1.0	Vertical produced highest field level

**Output Power (Substitution Method)**

Frequency	EUT Measured Level	Max field produced by Sig. Gen & horn	Pol	Delta	Sig Gen. Actual Pin	Corrected Pin	Comment
MHz	dB $\mu$ V/m	dB $\mu$ V/m	v/h	(dB)	(dBm)	(dBm)	
825.283	121.2	119.8	V	1.5	15.0	16.5	Note 1
835.392	120.2	117.8	V	2.4	14.0	16.4	Note 1
845.525	122.1	118.0	V	4.1	12.0	16.1	Note 1

Output Power Substitution <sup>Note 2</sup>					
Frequency	Pin	Gain	EIRP	ERP	Comment
MHz	dBm	dBi	dBm	dBm	
825.283	16.5	7.5	24.0	21.8	Note 2
835.392	16.4	7.5	23.9	21.7	Note 2
845.525	16.1	7.8	23.9	21.7	Note 2

Note 1:	Delta (dB) = EUT measured level - Maximum field level produced by signal generator & substitution antenna. The resulting Delta (dB) was then added to the actual signal generators Pin going into the substitution antenna, which will yield the values located under the column label "Corrected Pin".
Note 2:	Pin is the power input (dBm) to the substitution antenna to obtain the field strength recorded from the EUT (refer to note 1). G is the gain (dBi) for the substitution antenna. ERP is the effective radiated power (Pin + GdBi - 2.2) from the substitution antenna. EIRP is calculated as follows (Pin+GdBi)

**Antenna Conducted Output Power (Power Meter)**

Frequency	Power Output
MHz	(dBm)
835.000	24.00



## EMC Test Data

Client: Handspring

Job Number: J49635

Model: Robin

T-Log Number: T51640

Account Manager: Christine Vu

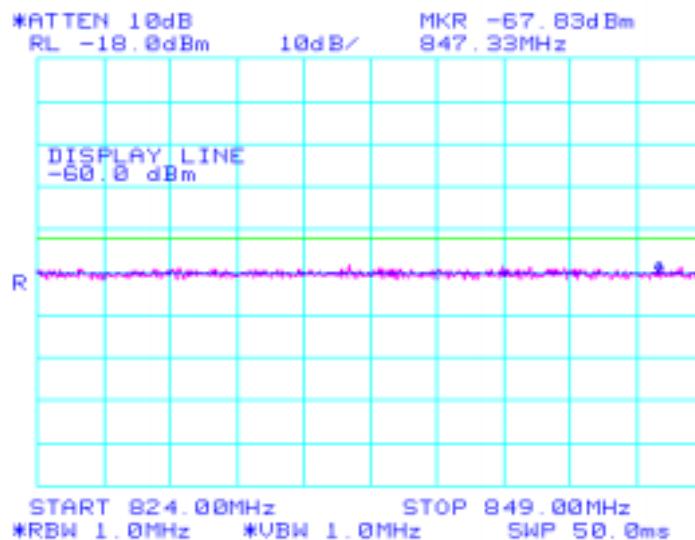
Contact: David Waitt

Spec: FCC 22H & 24E

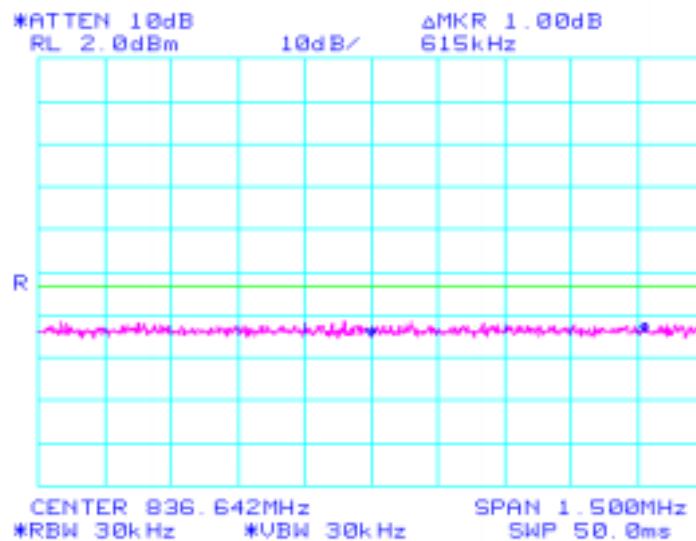
Class: Radio

### Run #3: Minimum Standby and Control Output Power

#### RSS-129 (9.3)



#### RSS-129 (9.4) Minimum Power Open Loop





## EMC Test Data

Client: Handspring

Job Number: J49635

Model: Robin

T-Log Number: T51640

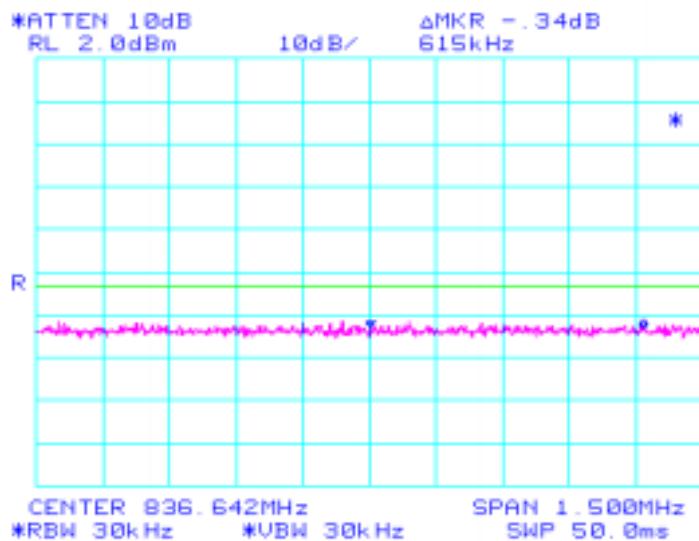
Account Manager: Christine Vu

Contact: David Waitt

Spec: FCC 22H & 24E

Class: Radio

### RSS-129 (9.4) Minimum Power Close Loop





## *EMC Test Data*

Client:	Handspring	Job Number:	J49635
Model:	Robin	T-Log Number:	T51640
Contact:	David Waitt	Account Manager:	Christine Vu
Spec:	FCC 22H & 24E	Class:	Radio

## Radiated Emissions

## Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 6/27/2003 Config. Used: 1  
Test Engineer: jmartinez Config Change: None  
Test Location: SVOATS #4 EUT Voltage: 120V/60Hz

## General Test Configuration

When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators used.

**Ambient Conditions:** Temperature: 16 °C  
Rel. Humidity: 45 %

## Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	Bandedge	22.917(e) & RSS-129 8.1 (1)	Pass	-15dBm @ 846.48 MHz
2	Out of Band	22.917(e) & RSS-129 8.1 (3)	Pass	All emission < -13 dBm
2	99% BW	2.1049	Pass	1.292 MHz
2	Mobile Emission	22.917 (f) & RSS-129 8.1 (2)	Pass	-81.33 dBm
3	Bandedge	22.917(e) & RSS-129 8.1 (1)	Pass	-14.78dBm @ 846.5 MHz
4	Out of Band	22.917(e) & RSS-129 8.1 (3)	Pass	All emission < -13 dBm
4	99% BW	2.1049	Pass	1.283 MHz
4	Mobile Emission	22.917 (f) & RSS-129 8.1 (2)	Pass	-80.67 dBm

### Modifications Made During Testing:

No modifications were made to the EUT during testing

## Deviations From The Standard

No deviations were made from the requirements of the standard.



## EMC Test Data

Client: Handspring

Job Number: J49635

Model: Robin

T-Log Number: T51640

Account Manager: Christine Vu

Contact: David Waitt

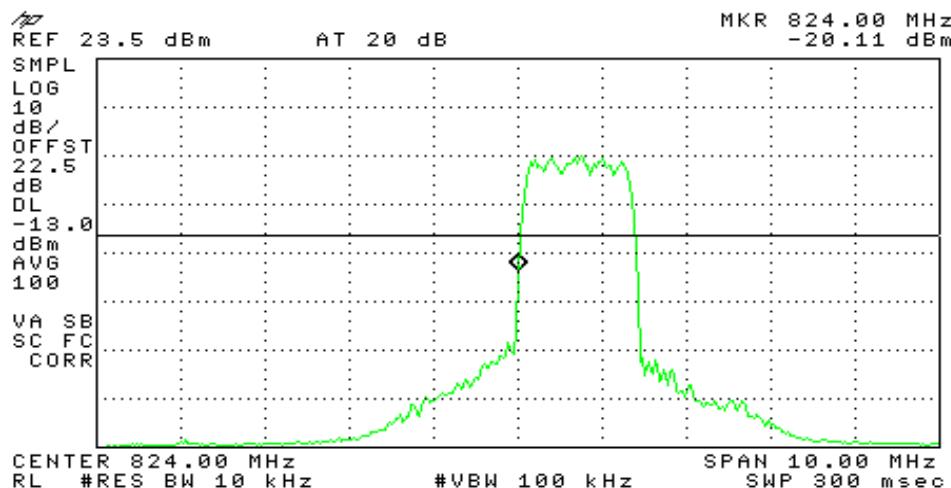
Spec: FCC 22H & 24E

Class: Radio

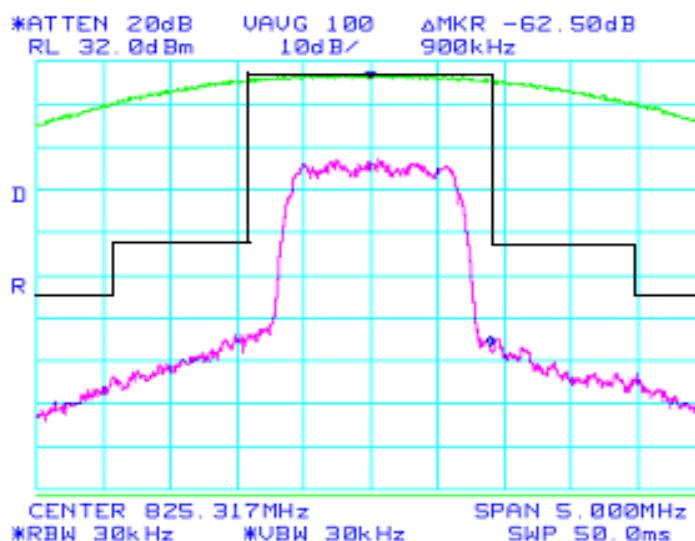
Run# 1: Sub-band A of the cellular range.

Low Channel Bandedge 1013

Channel	Frequency (MHz)	Resolution used (kHz)	1% Resolution BW (kHz)	Correction (dB)	Measured Bandedge (dBm)	Corrected Value (dBm)
Low	824	10	13	1.14	-20.11	-18.97



Emission Mask





## EMC Test Data

Client: Handspring

Job Number: J49635

Model: Robin

T-Log Number: T51640

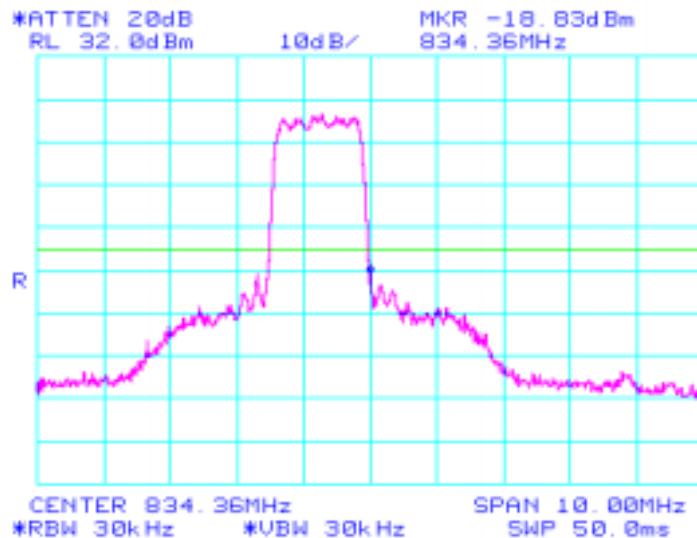
Account Manager: Christine Vu

Contact: David Waitt

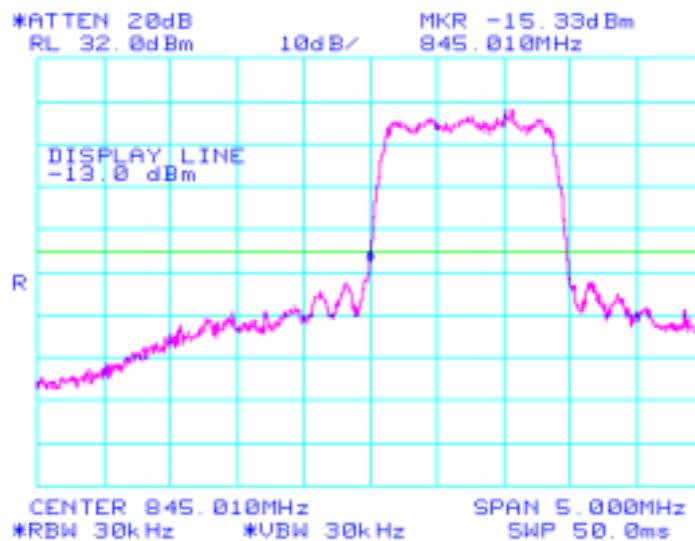
Spec: FCC 22H & 24E

Class: Radio

Middle Block A (1) 285



Middle Block A (2) 691





## EMC Test Data

Client: Handspring

Job Number: J49635

Model: Robin

T-Log Number: T51640

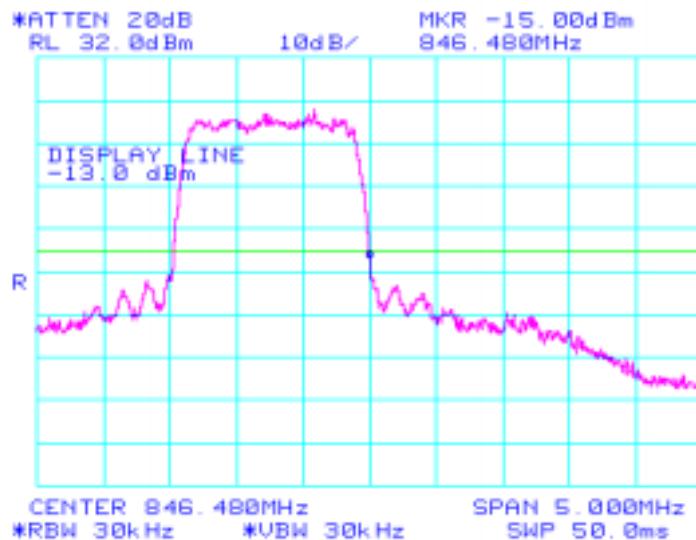
Account Manager: Christine Vu

Contact: David Waitt

Spec: FCC 22H & 24E

Class: Radio

High Channel Bandedge 692





## EMC Test Data

Client: Handspring

Job Number: J49635

Model: Robin

T-Log Number: T51640

Contact: David Waitt

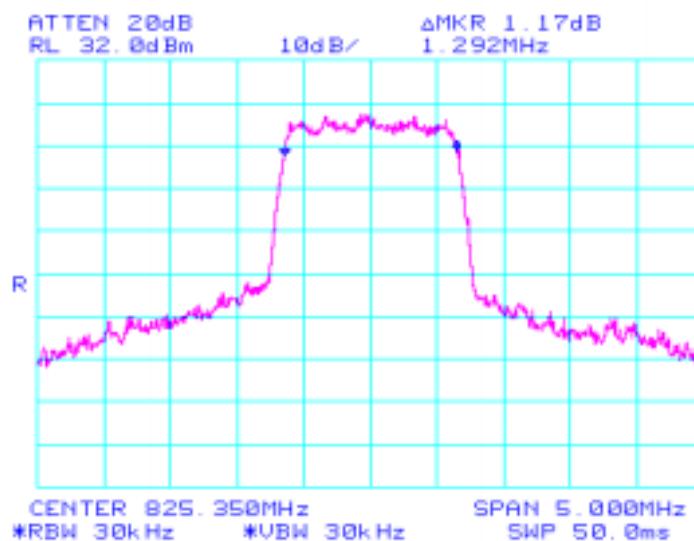
Account Manager: Christine Vu

Spec: FCC 22H & 24E

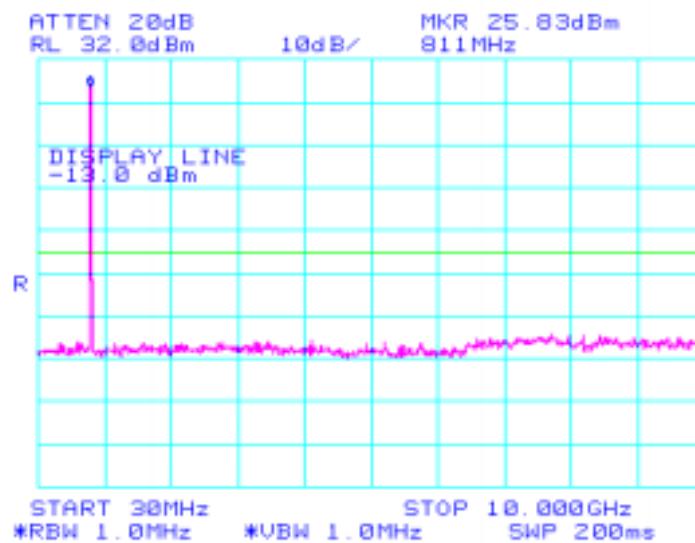
Class: Radio

Run# 2: Sub-band A: Out of band emission, 99% BW, Mobile emissions

Low channel 99% BW



Low Channel Out of Band





## EMC Test Data

Client: Handspring

Job Number: J49635

Model: Robin

T-Log Number: T51640

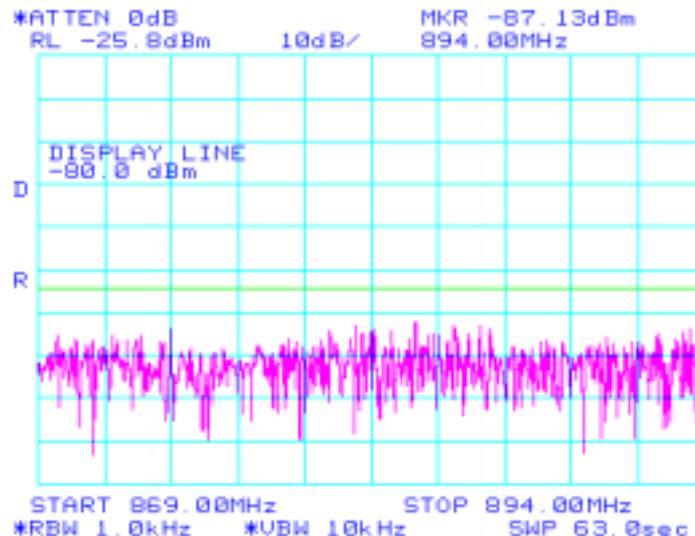
Account Manager: Christine Vu

Contact: David Waitt

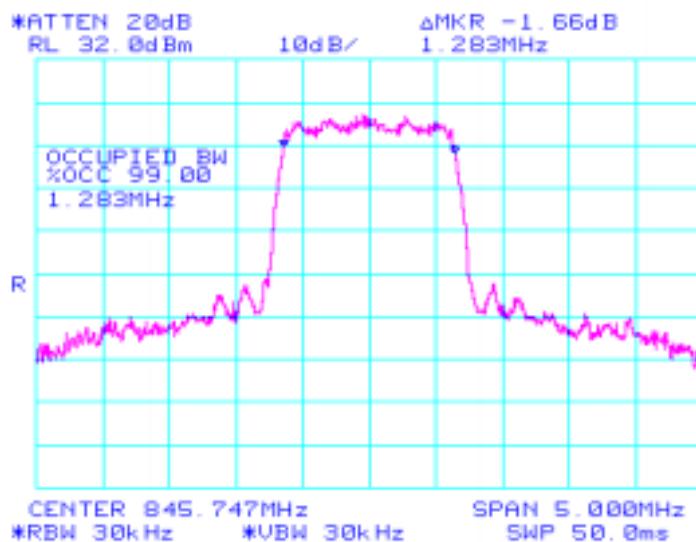
Spec: FCC 22H & 24E

Class: Radio

### Low Channel Mobile Emissions



### High Channel 99% BW





## EMC Test Data

Client: Handspring

Job Number: J49635

Model: Robin

T-Log Number: T51640

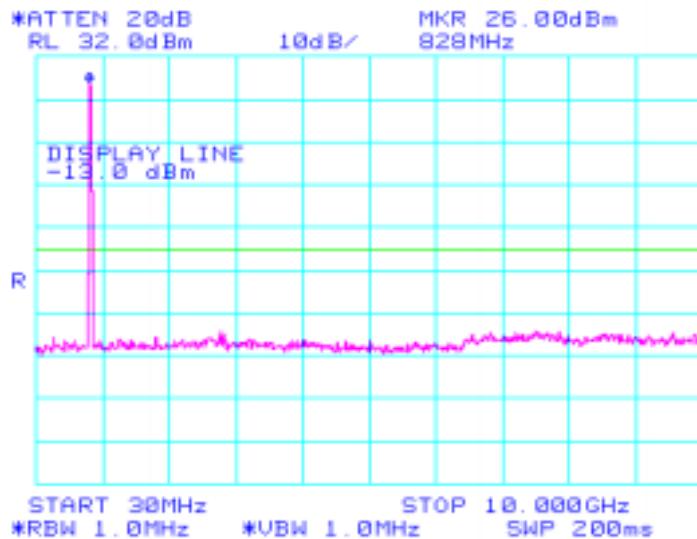
Account Manager: Christine Vu

Contact: David Waitt

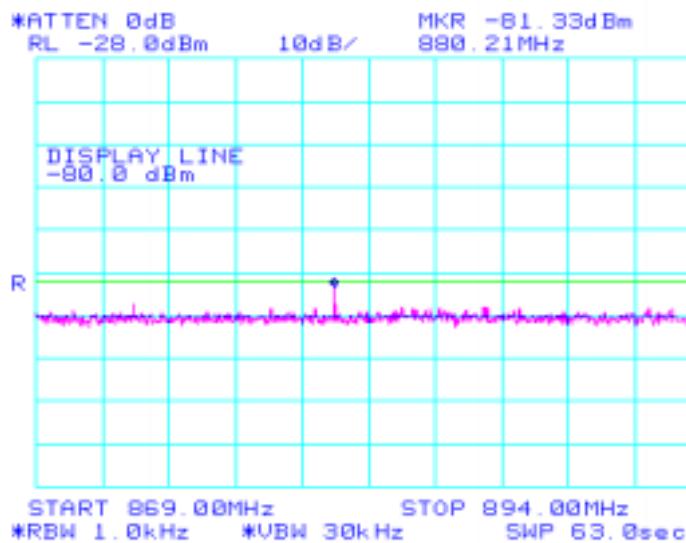
Spec: FCC 22H & 24E

Class: Radio

High Channel out of band



High Channel Mobile emissions



Client: Handspring

Job Number: J49635

Model: Robin

T-Log Number: T51640

Account Manager: Christine Vu

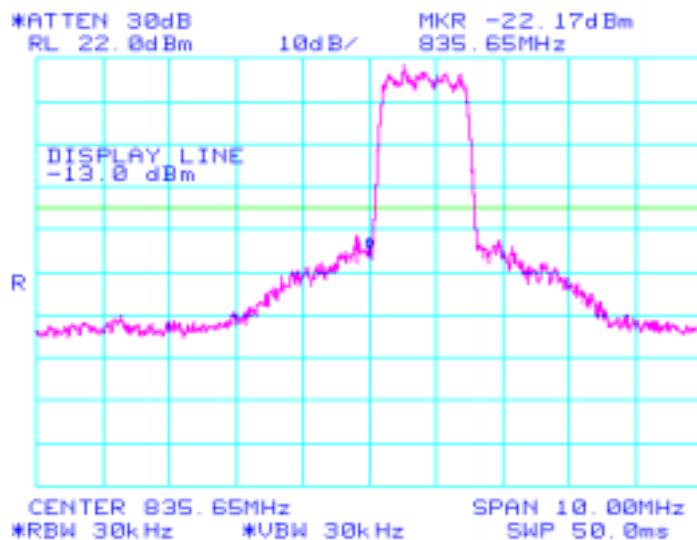
Contact: David Waitt

Spec: FCC 22H &amp; 24E

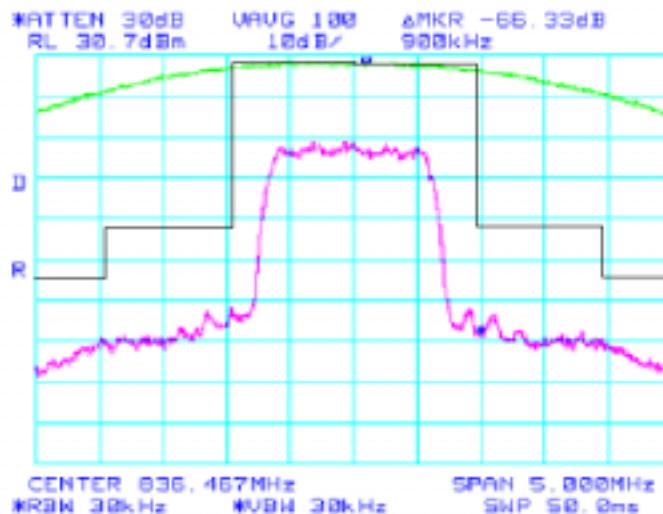
Class: Radio

Run# 3: Sub-band B of the cellular range.

Low Blockedge 389



Low Channel Emission Mask





## EMC Test Data

Client: Handspring

Job Number: J49635

Model: Robin

T-Log Number: T51640

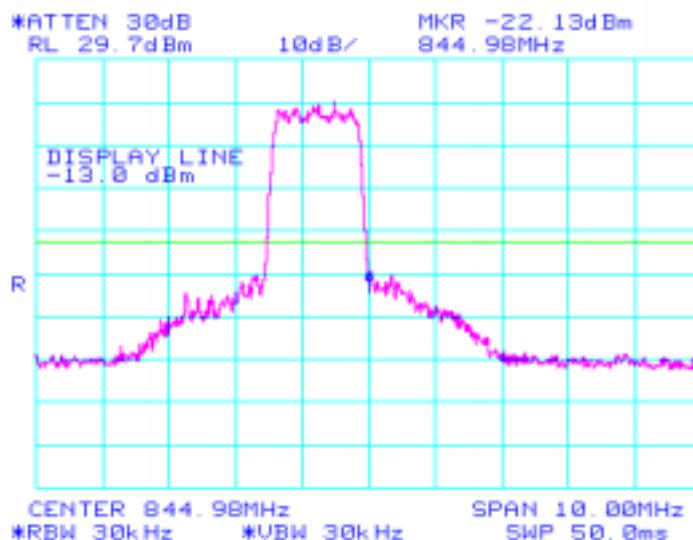
Contact: David Waitt

Account Manager: Christine Vu

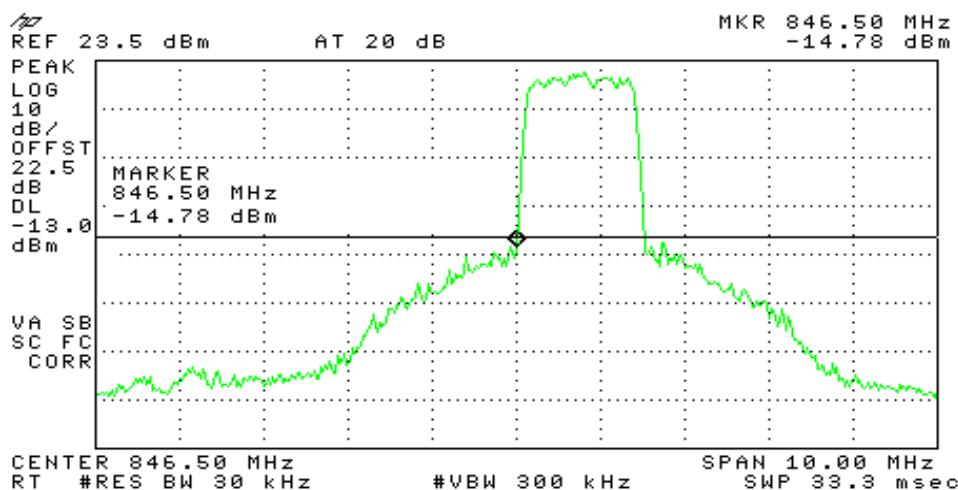
Spec: FCC 22H & 24E

Class: Radio

639 Middle block edge (1)



Middle block edge (2) 742





## EMC Test Data

Client: Handspring

Job Number: J49635

Model: Robin

T-Log Number: T51640

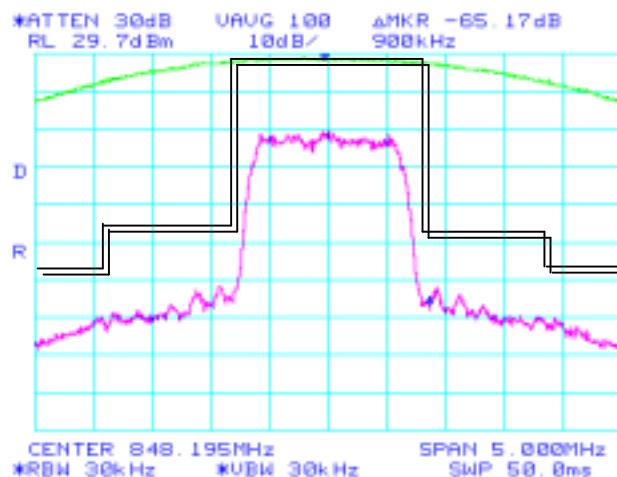
Account Manager: Christine Vu

Contact: David Waitt

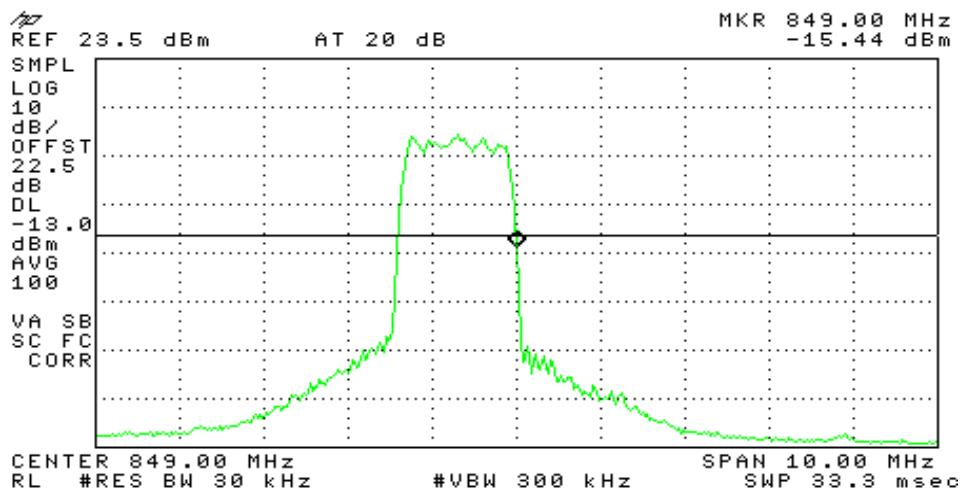
Spec: FCC 22H & 24E

Class: Radio

High Channel Emission Mask



High Channel Bandedge 777





## EMC Test Data

Client: Handspring

Job Number: J49635

Model: Robin

T-Log Number: T51640

Account Manager: Christine Vu

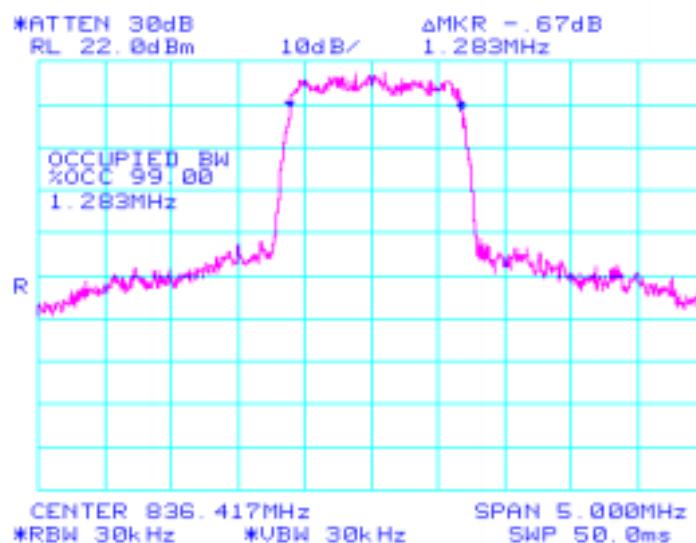
Contact: David Waitt

Spec: FCC 22H & 24E

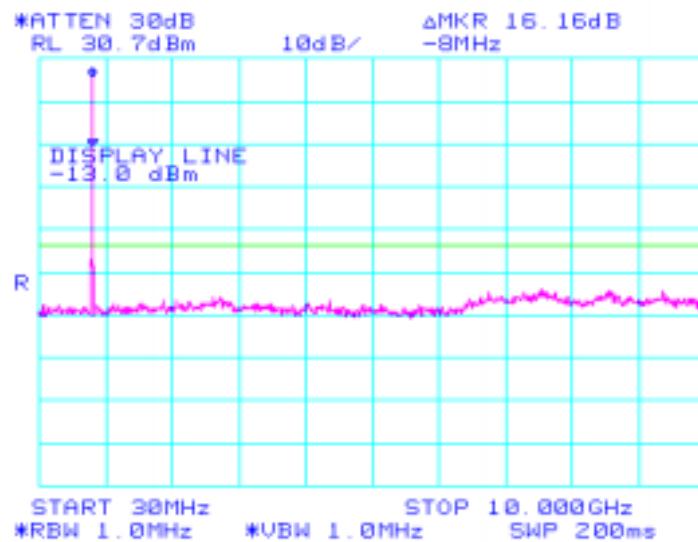
Class: Radio

Run# 4: Sub-band B: out of band emission, 99% BW, Mobile emissions.

Low Channel 99% BW



Low Channel Out of Band





## EMC Test Data

Client: Handspring

Job Number: J49635

Model: Robin

T-Log Number: T51640

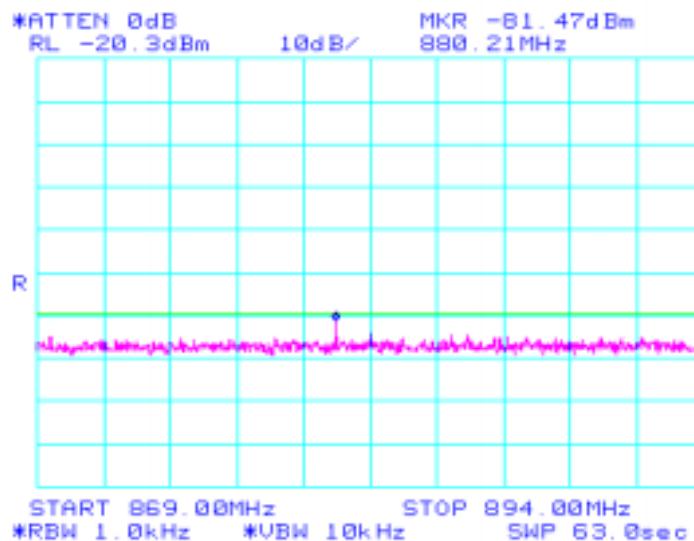
Account Manager: Christine Vu

Contact: David Waitt

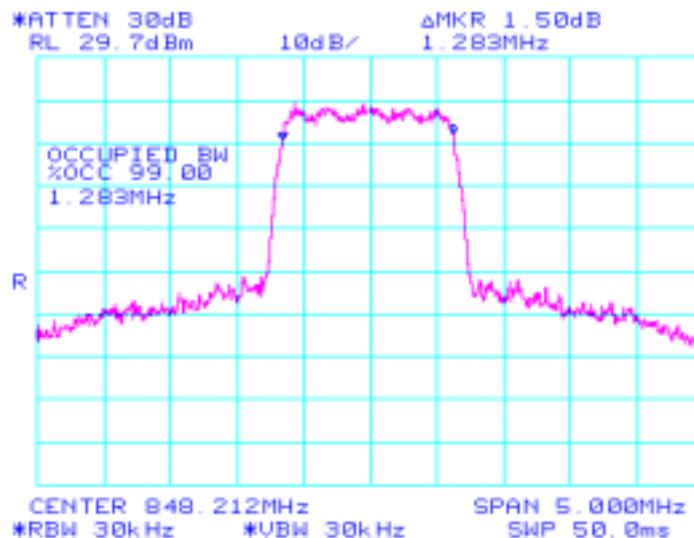
Spec: FCC 22H & 24E

Class: Radio

### Low Channel Mobile emissions



### High Channel 99% BW

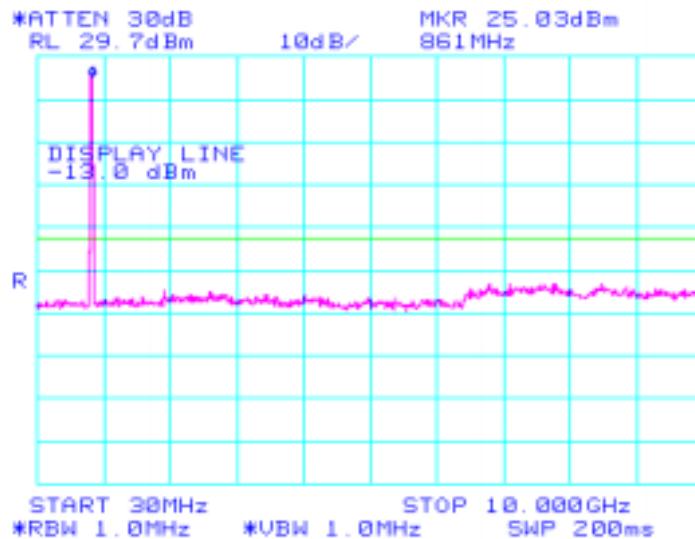




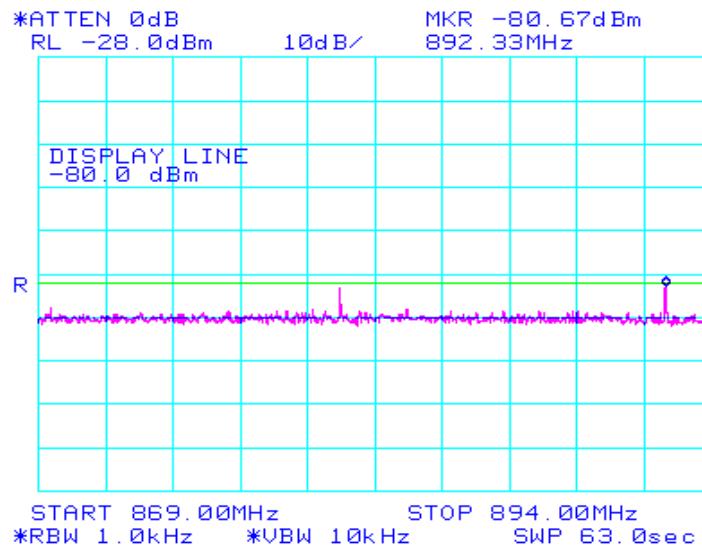
## *EMC Test Data*

Client: Handspring	Job Number: J49635
Model: Robin	T-Log Number: T51640
Contact: David Waitt	Account Manager: Christine Vu
Spec: FCC 22H & 24E	Class: Radio

## High Channel Out of Band



## High Channel Mobile Emissions





## *EMC Test Data*

Client:	Handspring	Job Number:	J49635
Model:	Robin	T-Log Number:	T51640
Contact:	David Waitt	Account Manager:	Christine Vu
Spec:	FCC 22H & 24E	Class:	Radio

## Radiated Emissions

## Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 6/24/2003 Config. Used: 1  
Test Engineer: jmartinez Config Change: None  
Test Location: FTChamber #4 EUT Voltage: 120V/60Hz

## General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing.

On the OATS, the measurement antenna was located 3m from the EUT for the frequency range 1 - 10 GHz.

**Ambient Conditions:** Temperature: 15 °C  
Rel. Humidity: 55 %

## Summary of Results

Run #	Test Performed	Limit	Result	Margin
1 & 3	RE, 1000 - 9000 MHz, Maximized Emissions	FCC 22H	Pass	-26.9 dB @ 2562.5 MHz

### Modifications Made During Testing:

No modifications were made to the EUT during testing

## Deviations From The Standard

No deviations were made from the requirements of the standard.



## EMC Test Data

Client: Handspring	Job Number: J49635
Model: Robin	T-Log Number: T51640
Contact: David Waitt	Account Manager: Christine Vu
Spec: FCC 22H & 24E	Class: Radio

### Run #1: Preliminary Radiated Emissions, High Channel

Frequency	Level	Pol	FCC 22H		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1712.500	49.5	H	82.2	-32.7	Peak	323	1.0	
2562.500	47.0	H	82.2	-35.2	Peak	141	1.6	

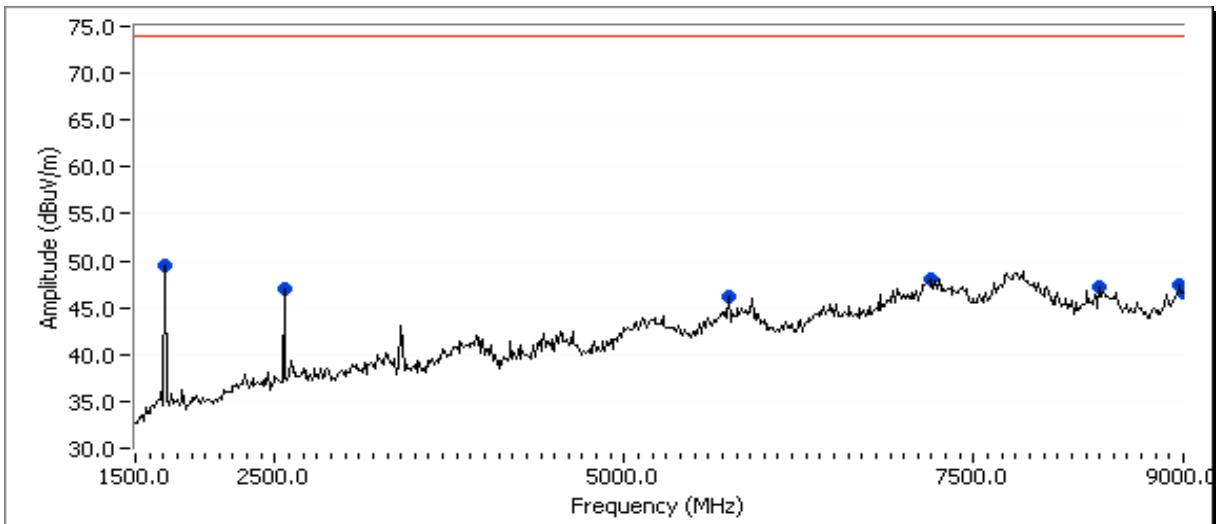
Note 1: Add note here

Note 2:

### Harmonics Emissions (Substitution Method)

Frequency	Level	Pol	Substitution Note 1				Limit (dBm)	Margin (dB)	Comment
			Pin	Gain	EIRP	ERP			
1712.500	49.5	H	-48.8	7.8	-41.0	-43.2	-13.0	-30.2	Note 1
2562.500	47.0	H	-46.8	9.1	-37.7	-39.9	-13.0	-26.9	Note 1

Note 1: Pin is the power input (dBm) to the substitution antenna to obtain the field strength recorded from the EUT. G is the gain (dBi) for the substitution antenna. ERP is the effective radiated power (Pin + GdBi - 2.2) from the substitution antenna. EIRP is calculated as follows (Pin+GdBi)





## EMC Test Data

Client: Handspring

Job Number: J49635

Model: Robin

T-Log Number: T51640

Account Manager: Christine Vu

Contact: David Waitt

Spec: FCC 22H & 24E

Class: Radio

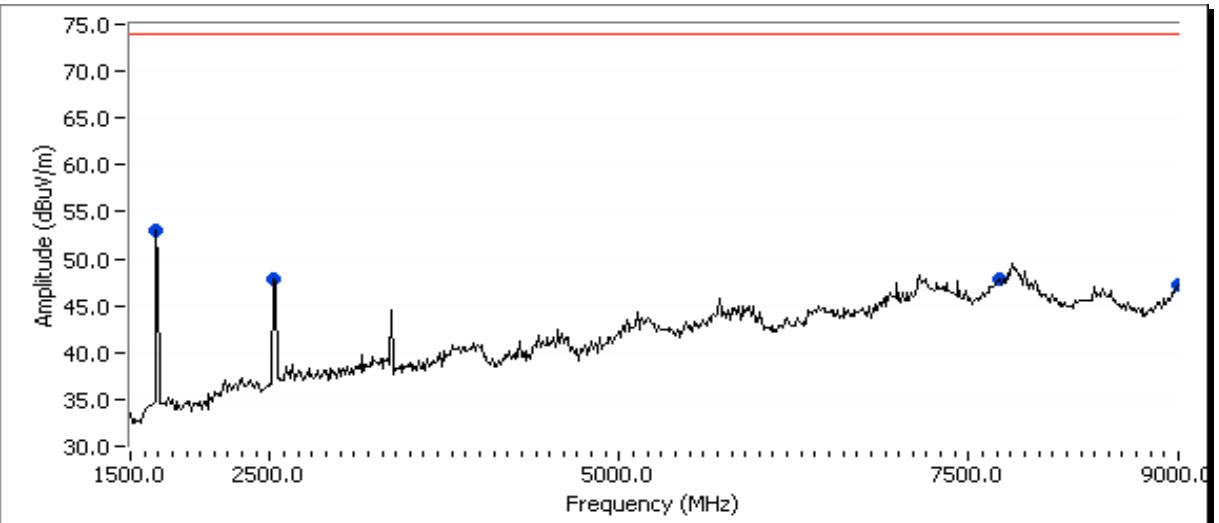
### Run #2: Preliminary Radiated Emissions, Middle Channel

Frequency	Level	Pol	FCC 22H		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1687.500	52.9	V	82.2	-29.3	Peak	83	1.6	
2525.000	47.9	V	82.2	-34.3	Peak	346	1.3	

### Harmonics Emissions (Substitution Method)

Frequency	Level	Pol	Substitution Note 1				Limit (dBm)	Margin (dB)	Comment
			Pin	Gain	EIRP	ERP			
MHz	dB $\mu$ V/m	v/h	dBm	dBi	dBm	dBm			
1687.500	52.9	V	-46.8	7.8	-39.0	-41.2	-13.0	-28.2	Note 1
2525.000	47.9	V	-47.0	9.1	-37.9	-40.1	-13.0	-27.1	Note 1

Note 1: Pin is the power input (dBm) to the substitution antenna to obtain the field strength recorded from the EUT. G is the gain (dBi) for the substitution antenna. ERP is the effective radiated power (Pin + GdBi - 2.2) from the substitution antenna. EIRP is calculated as follows (Pin+GdBi)





## EMC Test Data

Client: Handspring

Job Number: J49635

Model: Robin

T-Log Number: T51640

Account Manager: Christine Vu

Contact: David Waitt

Spec: FCC 22H & 24E

Class: Radio

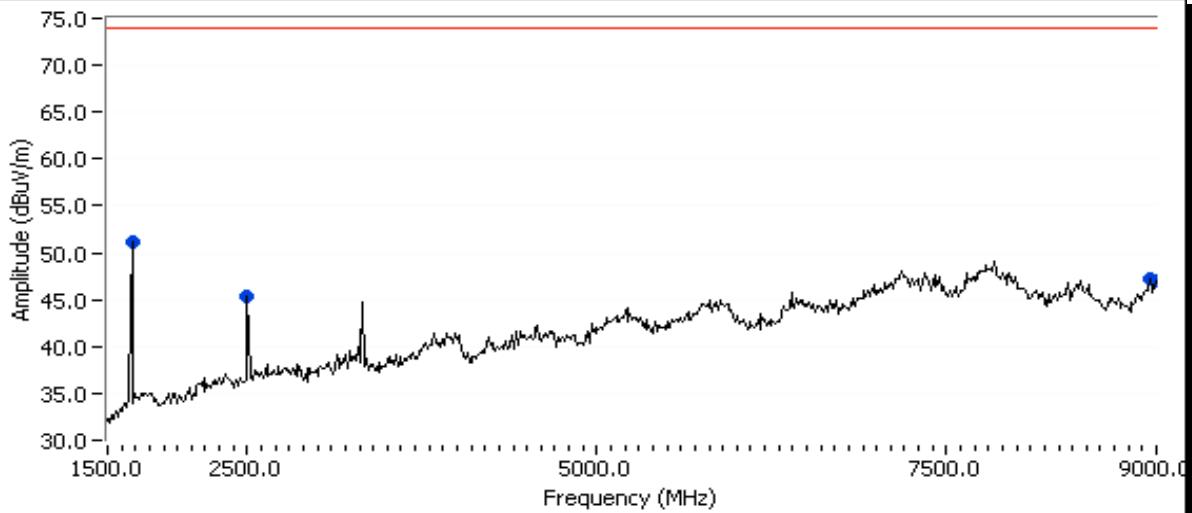
### Run #3: Preliminary Radiated Emissions, Low Channel

Frequency	Level	Pol	FCC 22H		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1675.000	51.2	V	82.2	-31.0	Peak	4	1.6	
2500.000	45.3	H	82.2	-36.9	Peak	153	1.6	

### Harmonics Emissions (Substitution Method)

Frequency	Level	Pol	Substitution Note 1				Limit (dBm)	Margin (dB)	Comment
			Pin	Gain	EIRP	ERP			
MHz	dB $\mu$ V/m	v/h	dBm	dBi	dBm	dBm			
1675.000	51.2	V	-47.1	7.8	-39.3	-41.5	-13.0	-28.5	Note 1
2500.000	45.3	H	-51.2	9.1	-42.1	-44.3	-13.0	-31.3	Note 1

Note 1: Pin is the power input (dBm) to the substitution antenna to obtain the field strength recorded from the EUT. G is the gain (dBi) for the substitution antenna. ERP is the effective radiated power (Pin + GdBi - 2.2) from the substitution antenna. EIRP is calculated as follows (Pin+GdBi)





## EMC Test Data

Client: Handspring	Job Number: J49635
Model: Robin	T-Log Number: T51640
	Account Manager: Christine Vu
Contact: David Waitt	
Spec: FCC 22H & 24E	Class: Radio

## Frequency Stability

## Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 6/25/2003 Config. Used: 1  
Test Engineer: Juan Martinez Config Change: None  
Test Location: Environmental Chamber EUT Voltage: 120V/60Hz

## General Test Configuration

EUT was placed inside the Temperature Chamber and all local support equipment were located outside on a table for testing. The Eut was connected directly to Spectrum Analyzer. An attenuator was used between the EUT and Spectrum Analyzer. Chamber was set to -30 to 50 degrees Celsius (60 degrees Celsius for Canada). Incremented 10 degrees per temperature and let unit stabilized for every temperature.

Voltage stability was done at 20 degrees Celsius. For battery operated units decrease DC voltage until battery end-point was found.

Voltage stability was done at 20 degrees Celsius. For AC operated units varied voltage at 85% and 115% of the nominal AC voltage.

Chamber was set to -30 to 50 degrees Celsius (60 degrees Celsius for Canada). Incremented 10 degrees per temperature and let unit stabilized for every temperature. The power was monitor with a power meter during the test session.

Voltage stability was done at 20 degrees Celsius. For AC operated units varied voltage at 85% and 115% of the nominal AC voltage. The power was monitor with a power meter during the test session.

## Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	Temperature Vs. Frequency	22.355 & RSS-129 (9.2.1)	Pass	812 Hz (result)
2	Voltage Vs. Frequency	22.355 & RSS-129 (9.2.1)	Pass	10 Hz
3	Power Vs. Temperature	RSS-129 (9.2.2)	Pass	0.8 dB
4	Power Vs. Voltage	RSS-129 (9.2.2)	Pass	0.2 dB

### Modifications Made During Testing:

No modifications were made to the EUT during testing

## Deviations From The Standard

No deviations were made from the requirements of the standard.



## EMC Test Data

Client: Handspring	Job Number: J49635
Model: Robin	T-Log Number: T51640
Contact: David Waitt	Account Manager: Christine Vu
Spec: FCC 22H & 24E	Class: Radio

### Run# 1: Temperature Vs. Frequency

Drift	Freq.	Limit
(ppm)	(MHz)	(Hz)
2.5	836.867	2092.2

<u>Temperature</u> (Celsius)	Reference Frequency (MHz)	Frequency Drift (MHz)	<u>Drift</u> (Hz)	<u>Limit</u> (Hz)
-30	836.866500	836.866388	112	2092.2
-20	836.866500	836.866613	-113	2092.2
-10	836.866500	836.866713	-213	2092.2
0	836.866500	836.866713	-213	2092.2
10	836.866500	836.866575	-75	2092.2
20	836.866500	836.866500	0	2092.2
30	836.866500	836.866275	225	2092.2
40	836.866500	836.866088	412	2092.2
50	836.866500	836.865688	812	2092.2

### Run# 2: Voltage Vs. Frequency

Battery end point is 3.5 **Vdc**. This will be stated by the manufacturer. No frequency drift occurred, only power decreased as voltage decreased.

### Run# 2: Voltage Vs. Frequency

Nominal Voltage is 120Vac.

Voltage	Voltage	Drift	Limit
(Dc)	(AC)	(Hz)	(Hz)
85%	102.00	10.0	2092.2
115%	138.00	8.0	2092.2



## EMC Test Data

Client: Handspring	Job Number: J49635
Model: Robin	T-Log Number: T51640
Contact: David Waitt	Account Manager: Christine Vu
Spec: FCC 22H & 24E	Class: Radio

### Run# 3: Temperature Vs. Power

Reference Power = 23.9 dBm

Temperature (Celsius)	Deviation (dB)	Power (dBm)
-30	0.40	23.5
-20	0.20	23.7
-10	0.70	23.2
0	0.80	23.1
10	0.40	23.5
20	0.40	23.5
30	0.30	23.6
40	0.20	23.7
50	0.10	23.8
60	0.00	23.9

### Run# 4: Voltage Vs. Frequency

Reference Power = 23.9 dBm

Nominal Voltage is 120Vac.

Voltage (Dc)	Voltage (AC)	Deviation (dB)	Power (dBm)
85%	102.00	0.10	23.8
115%	138.00	0.20	23.7



## *EMC Test Data*

Client:	Handspring	Job Number:	J49635
Model:	Robin	T-Log Number:	T51640
		Proj Eng:	Christine Vu
Contact:	David Waitt		
Spec:	FCC 22H & 24E	Class:	Radio

## 800 MHz Receiver Emissions

## Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 6/24/2003 Config. Used: 1  
Test Engineer: jmartinez Config Change: None  
Test Location: FTChamber #4 EUT Voltage: 120V/60Hz

## General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing.

On the OATS, the measurement antenna was located 3 meters from the EUT for the measurement range 800 - 5000 MHz.

Note, **preliminary** testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. **Maximized** testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

**Ambient Conditions:** Temperature: 15 °C  
Rel. Humidity: 55 %

## Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 800 - 5000MHz, Maximized Emissions	FCC 15.109 & RSS 129 (10)	Pass	-3.56dB @ 824MHz
2	Additional Receiver Spurious Attenuation	FCC 15.109 & RSS 129 (10)	Pass	-82 dBm

## Modifications Made During Testing:

No modifications were made to the EUT during testing

## Deviations From The Standard

No deviations were made from the requirements of the standard.



## EMC Test Data

Client: Handspring	Job Number: J49635
Model: Robin	T-Log Number: T51640
	Proj Eng: Christine Vu
Contact: David Waitt	
Spec: FCC 22H & 24E	Class: Radio

### Run #1: Maximized Radiated Emissions, 800-5000 MHz

#### Receive Mode

Frequency	Level	Pol	FCC B		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
824.000	42.4	V	46.0	-3.6	Peak	143	2.0	
835.000	42.3	V	46.0	-3.7	Peak	271	2.0	
849.000	42.2	V	46.0	-3.9	Peak	276	2.5	

Note 1: No other emission detected after the first LO 20-dB of the limit

Note 2:



## EMC Test Data

Client: Handspring

Job Number: J49635

Model: Robin

T-Log Number: T51640

Proj Eng: Christine Vu

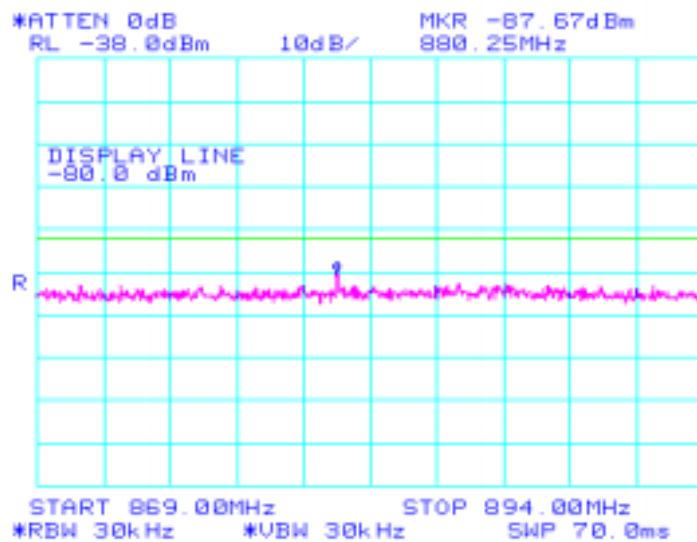
Contact: David Waitt

Spec: FCC 22H & 24E

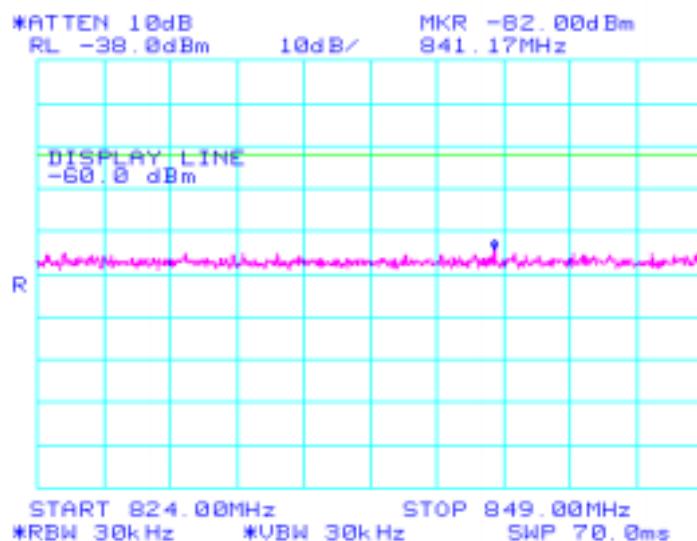
Class: Radio

Run #2: Additional receiver spurious attenuation.

### RSS-129 (10)(b) Rx



### RSS-129 (10)(c) Rx



***EXHIBIT 3: Test Configuration Photos***

***EXHIBIT 4: FCC ID Label and Label Location***

***EXHIBIT 5: Detailed Photographs***

***EXHIBIT 6: Schematics***

***EXHIBIT 7: Theory of Operation***

***EXHIBIT 8: User Manual***