EMI Test Report

Tested in accordance with
Federal Communications Commission (FCC)
Personal Communications Services
CFR 47, Parts 2 and 24
and
Industry Canada, RSS-133

RTS

RIM Testing Services

REPORT NUMBER: RTS-0248-0508-11

PRODUCT MODEL NO: RAP31GW
TYPE NAME: BlackBerry Wireless Handheld
FCC ID: L6ARAP31GW
IC: 2503A-RAP31GW

DATE: August 17, 2005

Declaration

Statement of Performance:

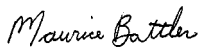
The BlackBerry Wireless Handheld, model RAP31GW when configured and operated per RIM's operation instructions, performs within the requirements of the test standards.

Declaration:

We hereby certify that:
The test data reported herein is an accurate record of the performance of the sample(s) tested.
The test results are valid for the tested unit (s) only.
The test equipment used was suitable for the tests performed and within manufacturer's published specifications and operating parameters.
The test methods were consistent with the methods described in the relevant standards.

Tested by

Lauren Weber
Compliance Specialist — Date: August 17, 2005



Maurice Battler
Compliance Specialist — Date: August 18, 2005

Masud S. Attayi, P.Eng.
Senior Compliance Engineer — Date: August 23, 2005

Reviewed and Approved by:

Paul G. Cardinal, Ph.D.
Manager — Date: August 24, 2005

Table of Contents

A) Scope

This report details the results of compliance tests that were performed in accordance to the requirements of:

FCC CFR 47 Part 2, Oct. 1, 2000
FCC CFR 47 Part 24 Subpart E, Broadband PCS, Oct 1. 2000
Industry Canada, RSS-133 Issue 2, Rev. 1 Nov. 6/1999, 2.0 GHz Personal Communications Services

B) Associated Documents

RIM-0086-0404-01 EMI Test report for BlackBerry Wireless Handheld model RAP40GW

C) Product Identification

The equipment under test (EUT) was tested at the RIM Testing Services (RTS) EMI test facility, located at:

305 Phillip Street
Waterloo, Ontario
Canada, N2L 3W8
Phone: 519 888 7465
Fax: 519 888 6906

The testing began on August 12, 2005 and completed on August 17, 2005. The sample equipment under test (EUT) included:

1a BlackBerry Wireless Handheld, model number RAP31GW ASY-07147-008 revision 1A, RF PCB version 005, PIN 202E293A, FCC ID L6ARAP31GW, IC: 2503A-RAP31GW (conducted emissions).

1b BlackBerry Wireless Handheld, model number RAP31GW ASY-07147-008 revision 1A, RF PCB version 005, PIN 202E0FD4, FCC ID L6ARAP31GW, IC: 2503A-RAP31GW (radiated emissions).

For the purpose of this report, items 1a and 1b are interchangeable. The differences do not impact the test results.

The transmit frequency ranges for the BlackBerry Wireless Handheld model number RAP31GW are: GSM 880 to 915 MHz, DCS 1710 to 1785 MHz, PCS 1850 to 1910 MHz and Bluetooth 2402 to 2480 MHz.

- The RAP31GW is identical to the RAP40GW with the following changes: The GSM850 band has been deactivated and the transmit power on the PCS1900 band has been lowered by 1.0 dB.
- Only tests affected by these changes are documented in this report. For additional information, please refer to test report RIM-0086-0404-01 for the RAP40GW.

D) Support Equipment Used for the Testing of the EUT

1) Communication Tester, Rohde & Schwarz, model CMU 200, serial number 102204
2) Communication Tester, Rohde & Schwarz, model CMU 200, serial number 837/493/073
3) DC Power Supply, H/P, model 6632B, serial number US37472178

E) Test Voltage

The ac input voltage was 120 volts, 60 Hz where applicable. This configuration was per RIM's specifications.

F) Test Results Chart

SPECIFICATION	TEST TYPE	MEETS REQUIREMENTS	PERFORMED BY
FCC CFR 47 Part 24, Subpart E IC RSS-133	Radiated Spurious/harmonic Emissions, EIRP	Yes	Masud Attayi
FCC CFR 47 Part 24, Subpart E IC RSS-133	Local Oscillator (LO) emissions	Yes, see test report RIM-0086-0404-01	Masud Attayi
FCC CFR 47 Part 24, Subpart E IC RSS-133	Conducted Output Power Conducted Emissions Occupied Bandwidth Frequency Stability	Yes	Maurice Battler / Lauren Weber

G) Modifications to EUT

No modifications were required to the EUT used for radiated emissions. For conducted emissions, a hole was drilled in the device's plastic case so the RF connector could be accessed.

H) Summary of Results

1) The EUT met the Conducted Spurious Emissions requirements in the PCS band as per 47 CFR 2.1051, CFR 24.238(a) and RSS-133. The EUT was measured on the low, middle and high channels. The frequency range investigated was from 10 MHz to 20 GHz.
See APPENDIX 1 for the test data.

2) The EUT met the Occupied Bandwidth and channel mask requirements in the PCS band as per 47 CFR 2.202, CFR 24.238 and RSS-133. The EUT was measured on the low, middle and high channels.
See APPENDIX 1 for the test data.

3) The EUT met the Conducted RF Output Power requirements for the PCS band as per 47 CFR 2.1046(a). The EUT was measured on the low, middle and high channels.
See APPENDIX 2 for the test data.

4) The EUT met the Frequency Stability vs. Temperature and Voltage requirements for the PCS band as per 47 CFR 2.1055(a), 2.1055(d), 24.235 and RSS-133. The maximum frequency error measured was less than 0.1PPM.
The temperature range was from -30°C to +60°C in 10 degree temperature steps. The EUT was measured on low, middle and high channels at each temperature step. The EUT was measured at low (3.5 volts), nominal (3.8 volts) and high (4.1 volts) dc input voltage at each temperature step and channel at maximum output power.
See APPENDIX 3 for the test data.

5) The radiated spurious emissions/harmonics and EIRP were measured for the PCS band. The results are within the limits. The EUT was placed on a nonconductive Styrofoam table, 100 cm high that was positioned on a remote-controlled turntable. The test distance used between the EUT and the receiving antenna was three metres. The emissions were maximized by elevating the antenna in the range of 1 to 4 metres. The turntable was rotated to determine the azimuth of the peak emissions. Both the horizontal and vertical polarisations of the emissions were measured.
The maximum emissions level was recorded. The EUT was then replaced with a substitution antenna placed in the same location as the EUT. A horn antenna was used for EIRP measurements. The substitution antenna was connected into a signal generator that was set to the test frequency. The emissions were maximized by elevating the antenna in the range of 1 to 4 metres. The signal generator output was then adjusted to match the EUT output reading. The signal generator output was recorded. Both the horizontal and vertical polarisations of the emissions were measured.
The measurements were performed in a semi-anechoic chamber. The semi-anechoic chamber FCC registration number is **778487** and the Industry Canada file number is **IC4240**. The EUT was measured on the low, middle and high channels.

The highest EIRP in the PCS band measured was 28.8 dBm at 1880 MHz (channel 661).

The radiated carrier harmonics were measured up to the 10th harmonic for low, middle and high channels in the PCS band.
The worst test margin for PCS band measured was 30.4 dB below the limit at 1909.8 MHz.

PCS and Bluetooth simultaneous transmission and Local Oscillator emissions are unaffected by the changes from RAP40GW to RAP31GW. Please refer to test report number RIM-0086-0404-01 for the RAP40GW.

Sample Calculation:

Field Strength (dBµV/m) is calculated as follows:
FS = Measured Level (dBµV) + A.F. (dB/m) + Cable Loss (dB) - Preamp (dB) + Filter Loss (dB)

Measurement Uncertainty ±4.0 dB

To view the test data see APPENDIX 4.

H) Compliance Test Equipment Used

UNIT	MANUFACTURER	MODEL	SERIAL NUMBER	CAL DUE DATE (YY-MM-DD)	USE
Preamplifier	Sonoma	310N/11909A	185831	05-11-26	Radiated Emissions
Preamplifier system	TDK RF Solutions	PA-02	080010	05-11-26	Radiated Emissions
EMC Analyzer	Agilent	E7405A	US40240226	06-07-18	Radiated Emissions
Hybrid Log Antenna	TDK	HLP-3003C	017301	05-12-16	Radiated Emissions
Horn Antenna	TDK	HRN-0118	130092	05-09-24	Radiated Emissions
Horn Antenna	TDK	HRN-0118	30101	06-07-21	Radiated Emissions
Dipole Antenna	Schwarzbeck	UHAP	974	05-09-21	Radiated Emissions
Dipole Antenna	Schwarzbeck	UHAP	973	05-12-13	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	837/493/073	06-02-06	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	102204	06-06-09	Conducted Emissions
Spectrum Analyzer	HP	8563E	3745A08112	06-07-13	Conducted Emissions
DC Power Supply	HP	6632B	US37472178	07-07-12	Conducted Emissions
Temperature Probe	Hart Scientific	61161-302	21352860	05-09-10	Frequency Stability
Environmental Chamber	ESPEC Corp.	SH-240S1	91005607	N/R	Frequency Stability

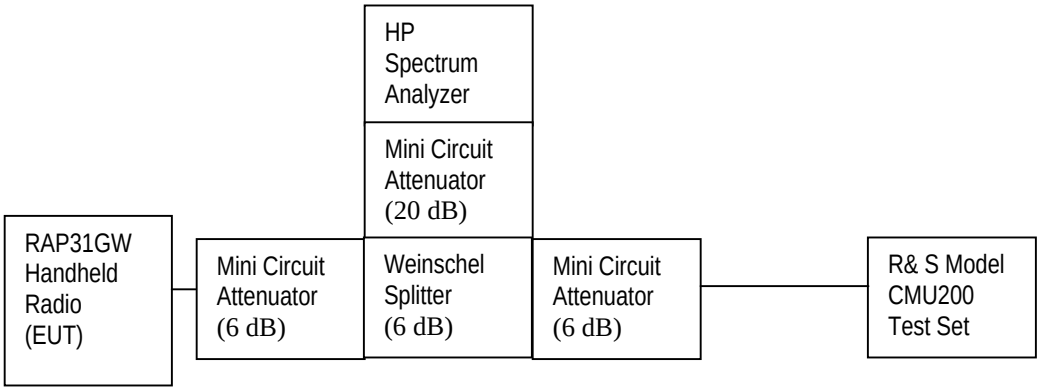
APPENDIX 1

RF CONDUCTED EMISSIONS TEST DATA/PLOTS

RF Conducted Emission Test Data cont'd

This appendix contains measurement data pertaining to conducted spurious emissions, –26dBc bandwidth, 99% power bandwidth and the channel mask.

Test Setup Diagram



Test Equipment List

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer	HP	8563E	3745A08112	30 Hz – 26.5 GHz
Splitter	Weinschel	1515	ME092	DC – 18 GHz
Attenuator	Mini Circuit	MCL BW-S20W2	--	DC – 18 GHz
Attenuator	Mini Circuit	MCL BW-S6W2	--	DC – 18 GHz
Attenuator	Mini Circuit	MCL BW-S6W2	--	DC – 18 GHz
Universal Radio Communication Tester	Rohde & Schwarz	CMU200	102204	--

RF Conducted Emission Test Data cont'd

Conducted spurious emissions – As per 47 CFR 2.1051, CFR 24.238(a), RSS-133, CFR 22 Subpart H and RSS-128, emissions were measured from 10 MHz to 20 GHz. The harmonics were in the noise floor.

See figures 1 to 6 for the plots of the conducted spurious emissions.

–26dBc Bandwidth and Occupied Bandwidth (99%)

For each carrier frequency of low, middle and high, the modulation spectrum was measured by both methods of 99% power bandwidth and –26dBc bandwidth.
The resolution bandwidth required for out-of-band emissions in the 1 MHz bands immediately outside and adjacent to the frequency block, was determined to be at least 1% of the emission bandwidth.
The worst-case emission bandwidth for the three PCS channels was measured to be 278kHz as shown below; therefore the resolution bandwidth was set to 3.0 kHz.
On any frequency outside the frequency block and outside the adjacent 1 MHz bands, a resolution bandwidth of at least 1 MHz was employed.

Test Data for PCS selected Frequencies

PCS Frequency (MHz)	-26dBc Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
1850.2	278	248
1880.0	270	245
1909.8	272	245

Measurement Plots for PCS

Refer to the following measurement plots for more detail.

See Figures 7 to 12 for the plots of the –26dBc Bandwidth and 99% Occupied Bandwidth.
See Figures 13 to 14 for plots of the channel mask results.

The RF power output was at maximum for all the recorded measurements shown below.

RF Conducted Emission Test Data cont'd

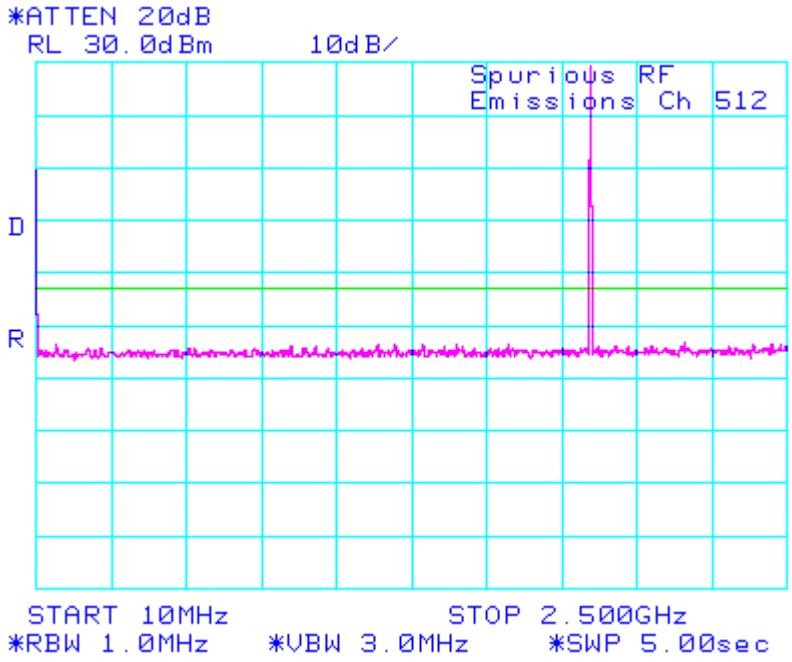


Figure 1: PCS, Spurious Conducted Emissions, Low channel

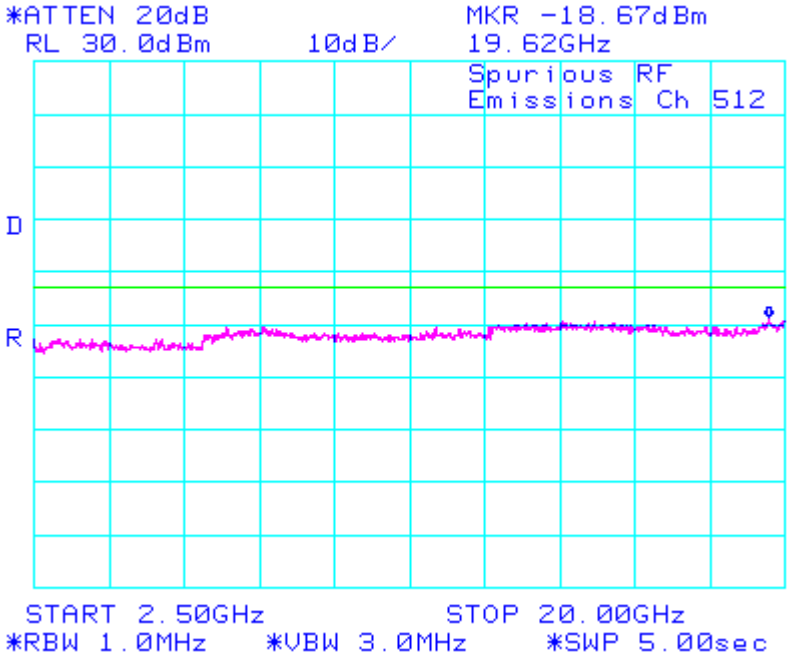


Figure 2: PCS, Spurious Conducted Emissions, Low channel

RF Conducted Emission Test Data cont'd

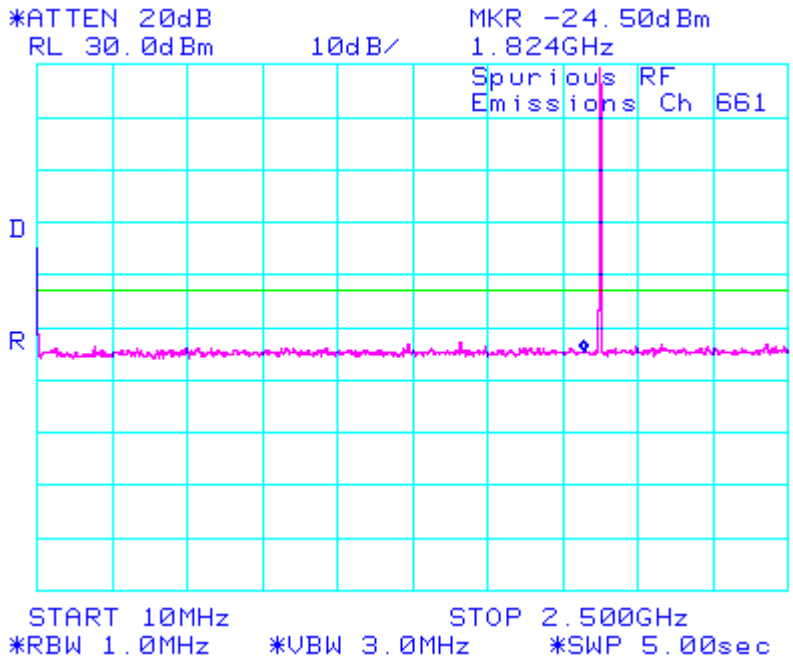


Figure 3: PCS, Spurious Conducted Emissions, Middle Channel

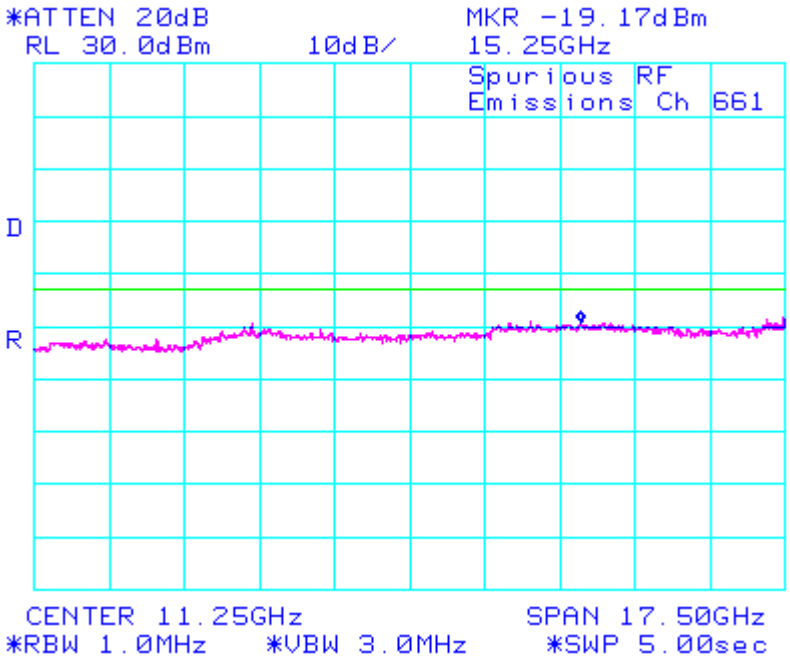


Figure 4: PCS, Spurious Conducted Emissions, Middle Channel

RF Conducted Emission Test Data cont'd

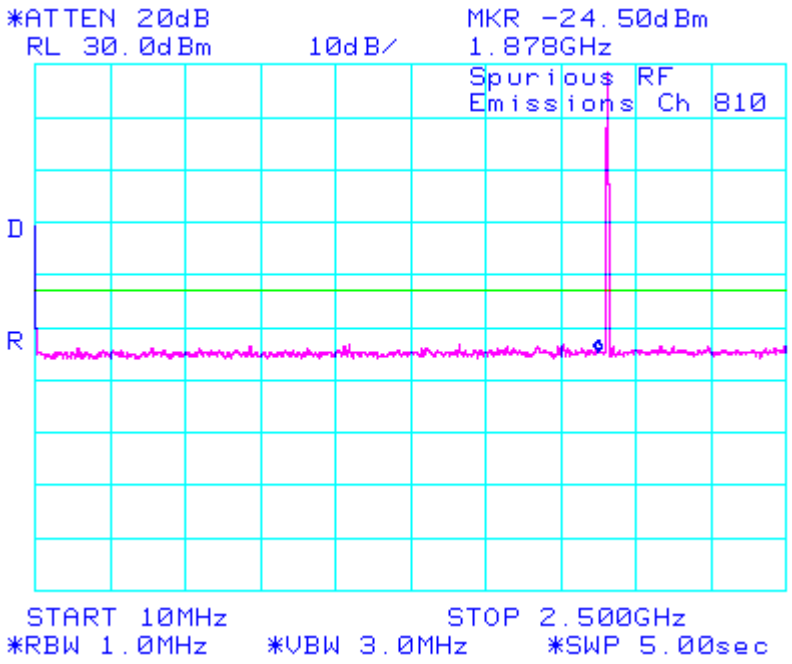


Figure 5: PCS, Spurious Conducted Emissions, High Channel

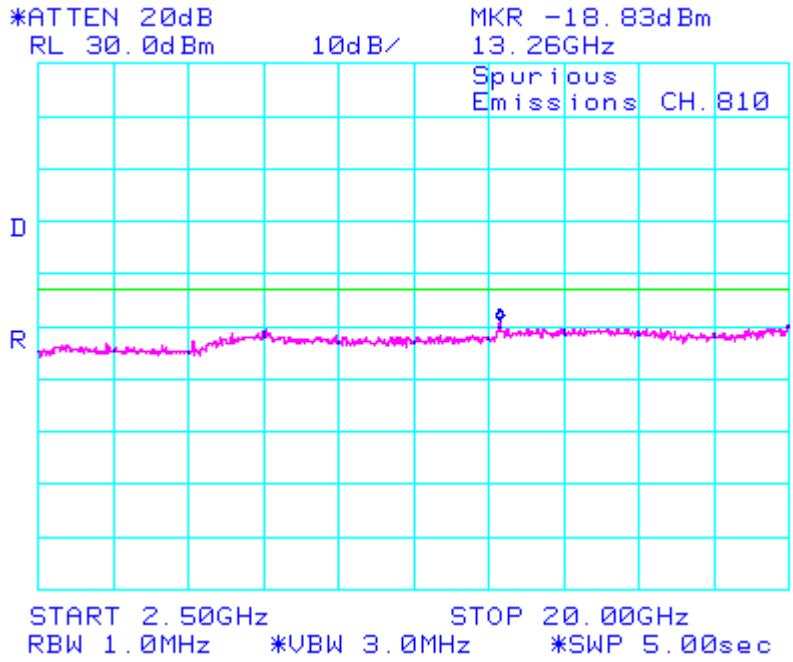


Figure 6: PCS, Spurious Conducted Emissions, High Channel

RF Conducted Emission Test Data cont'd

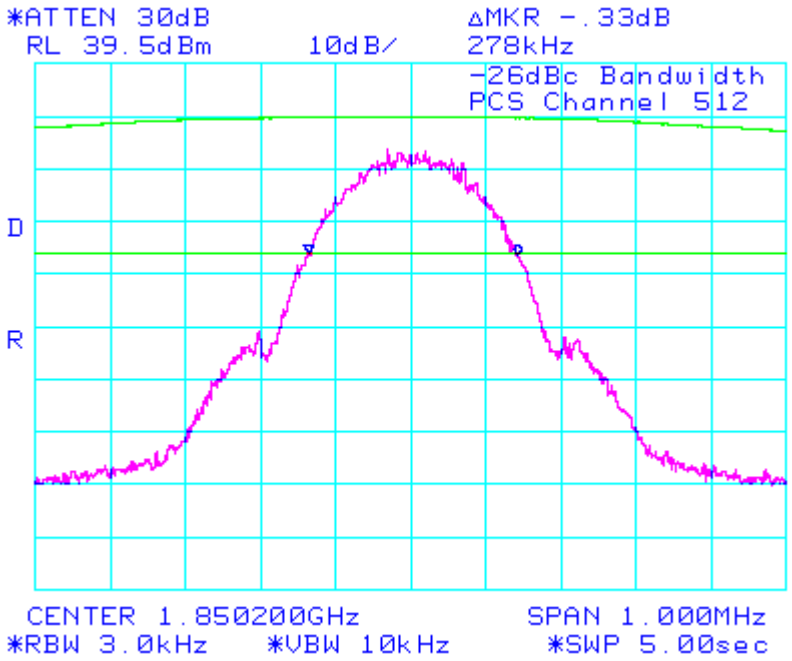


Figure 7: -26dBc bandwidth, PCS Low Channel

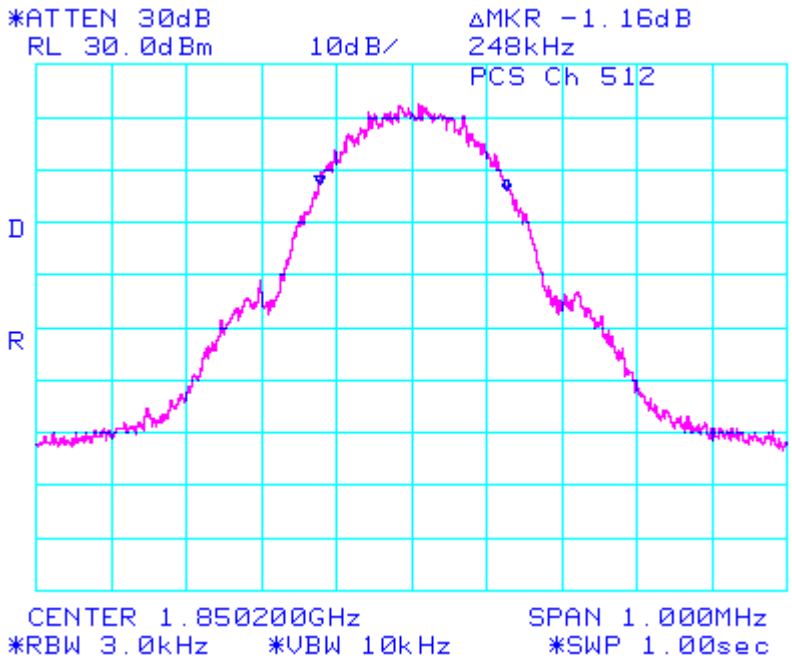


Figure 8: Occupied Bandwidth, PCS Low Channel

RF Conducted Emission Test Data cont'd

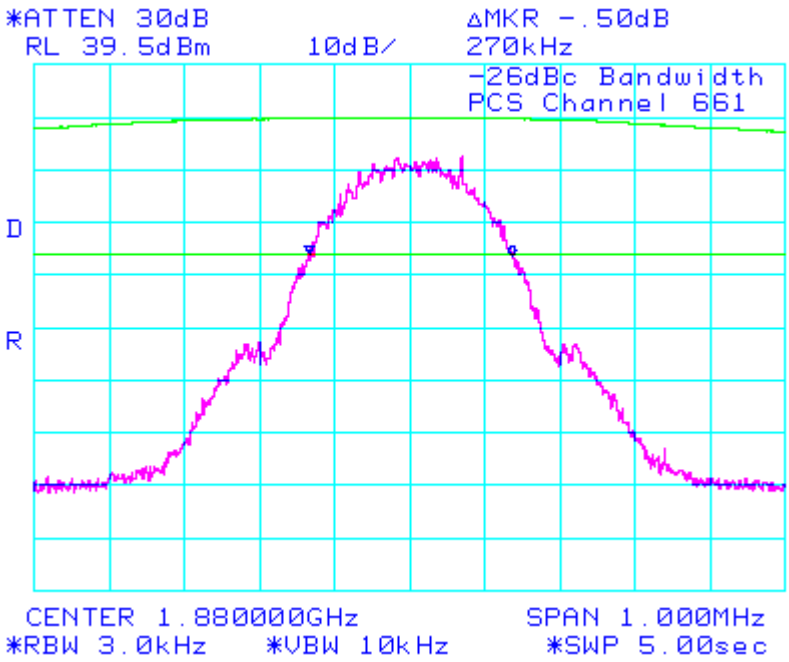


Figure 9: -26dBc bandwidth, PCS Middle Channel

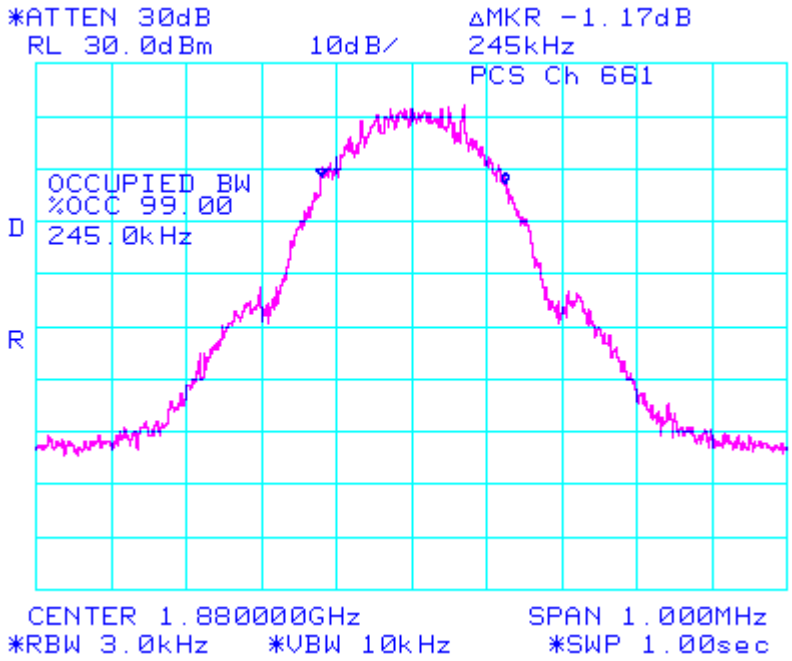


Figure 10: Occupied Bandwidth, PCS Middle Channel

RF Conducted Emission Test Data cont'd

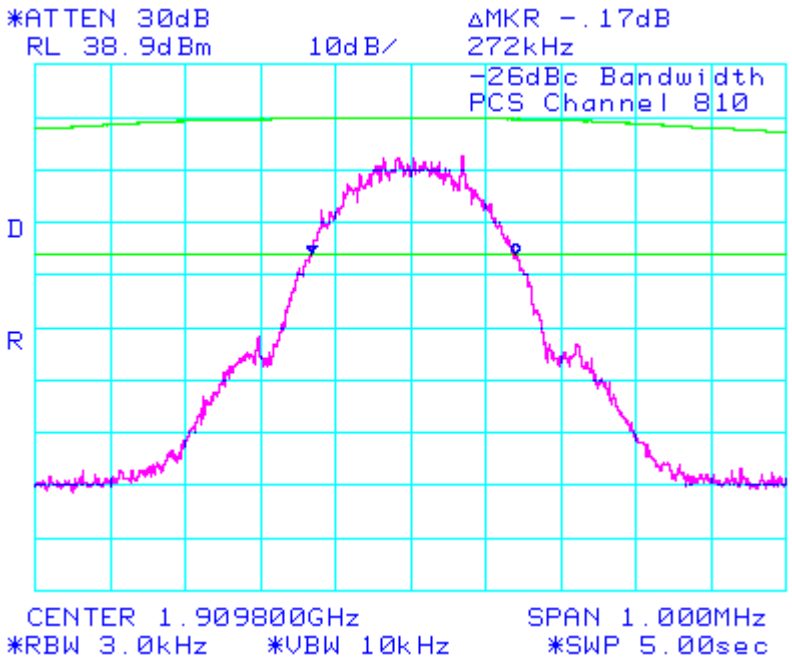


Figure 11: -26dBc bandwidth, PCS High Channel

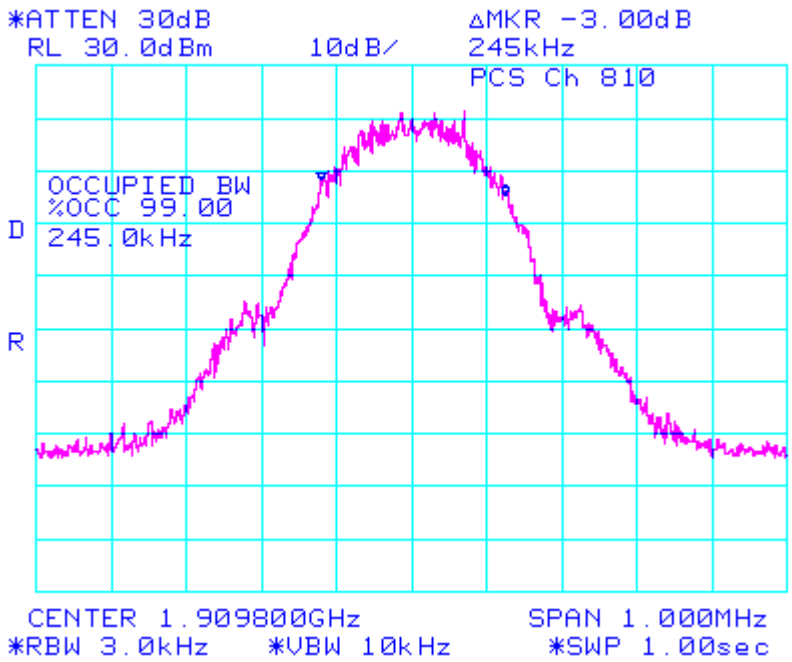


Figure 12: Occupied Bandwidth, PCS High Channel

RF Conducted Emission Test Data cont'd

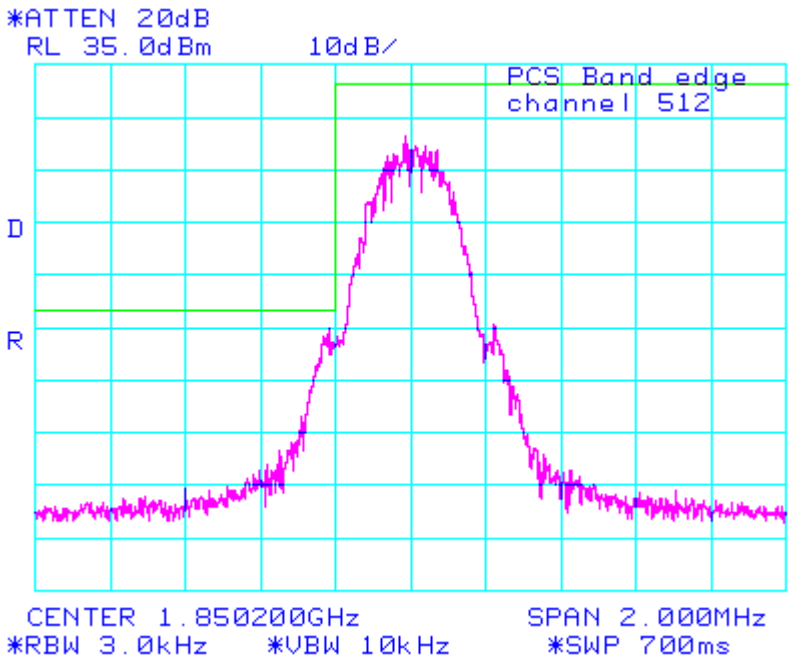


Figure 13: PCS, Low Channel Mask

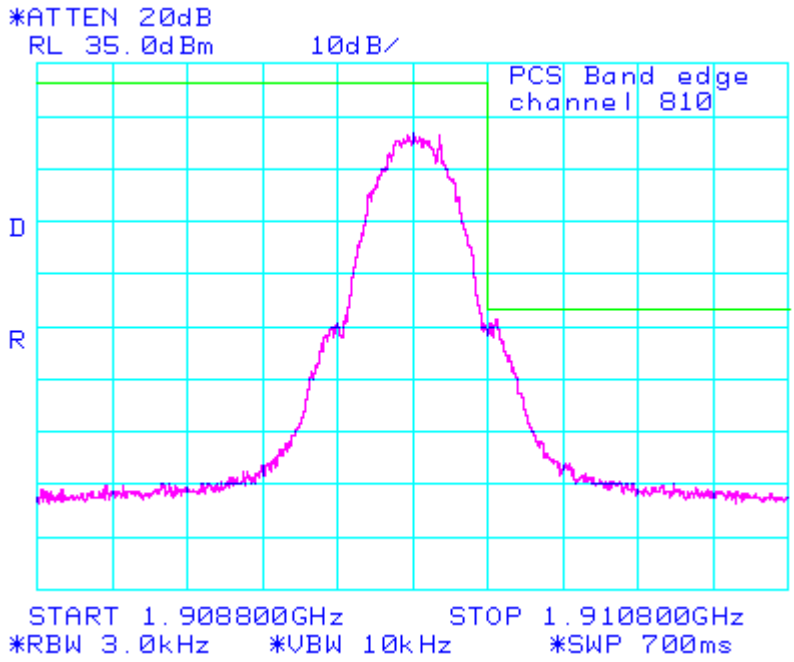
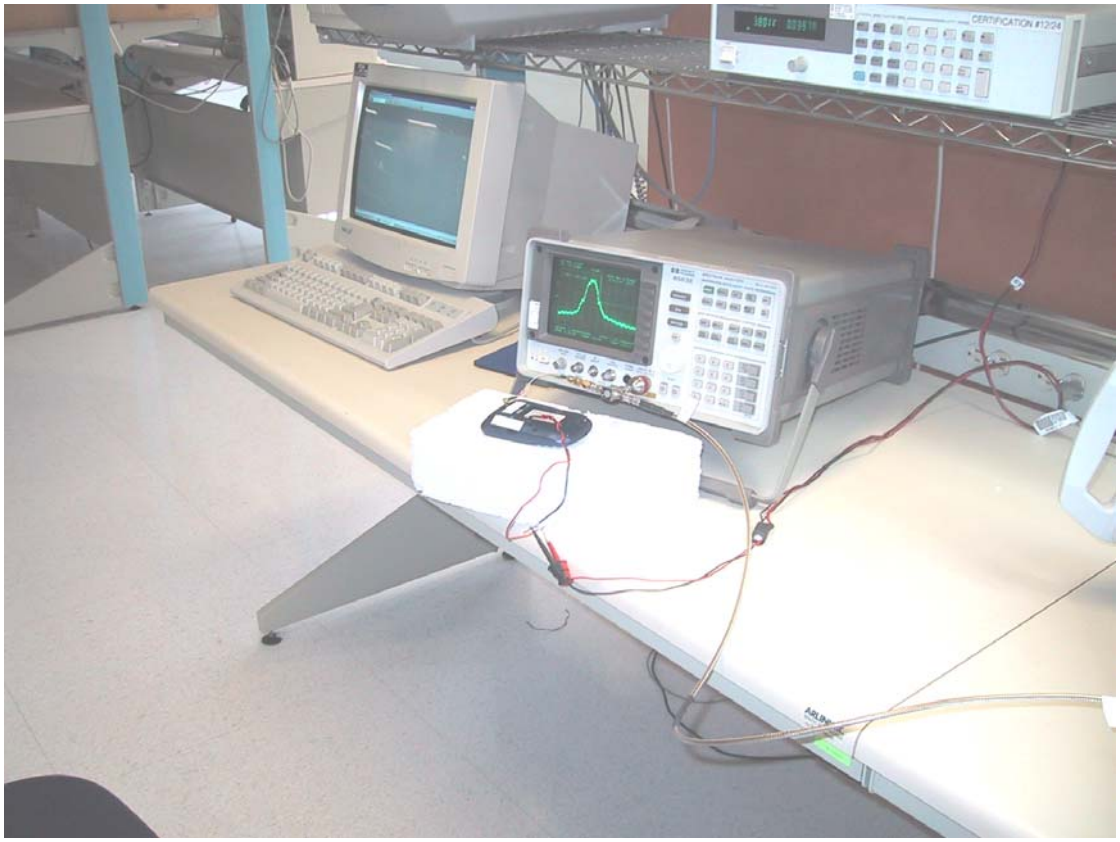


Figure 14: PCS, High Channel Mask

RF Conducted Emission Test Data cont'd

Test Setup - FCC CFR 47 Part 24, Subpart E, RSS-133



APPENDIX 2

CONDUCTED RF OUTPUT POWER TEST DATA

Conducted RF Output Power Test Data

The conducted RF output power was measured using the Rohde & Schwarz CMU 200 Communication Tester. The low, middle and high channels were measured at maximum radio output power. Compensation was made for the insertion loss of the coaxial cable between the CMU 200 and the EUT.

RIM has stated that the peak nominal output power on center channel is 29.0 dBm for PCS and the nominal tolerance on power output is ±0.56 dBm.

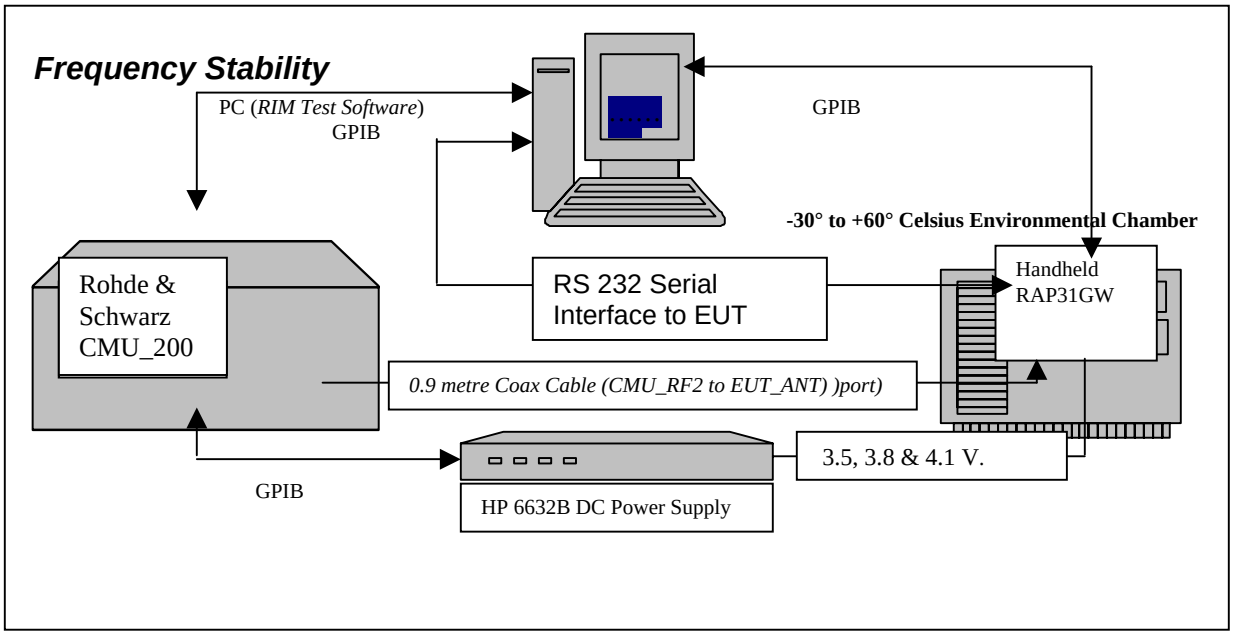
Test Results

Channel	Frequency (MHz)	Maximum Output Power (dBm)
PCS		
512	1850.2	29.2
661	1880.0	29.1
810	1909.8	28.6

APPENDIX 3

FREQUENCY STABILITY TEST DATA

Frequency Stability Test Data



SYSTEM	*Model*	*Serial Number*	*Calibration Due Date.*
R & S Universal Radio Communication Test Set	CMU200	102204	09-June-2006
HP System DC Power Supply	6632B	US37472178	12-July-2006
Network Analyzer	HP 8753D	3410A07083	03-Aug-2006
Calibration Kit	HP85033C	3423A02787	24-Sept-2005
Espec Environmental Chamber	SH240S1	91004919	N/A
Hart Temperature Probe	61161-302	21352860	10-Sept-2005

CFR 47 Chapter 1 - Federal Communications Commission Rules

Part 2 Required Measurements
2.995 Frequency Stability - Procedures
(a,b) Frequency Stability - Temperature Variation
(d) Frequency Stability - Voltage Variation

24.235 *Frequency Stability*.
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

The RAP31GW handheld (referred to as EUT hereinafter) transmitted frequency deviations are less than 0.1PPM as reported by the Rohde & Schwarz CMU 200 Universal Radio Communication Test Set.
The EUT meets the requirements as stated in CFR 47 chapter 1, Section 24.235, RSS-133 and RSS-128 Frequency Stability.

Frequency Stability measurement devices were configured as presented in the block diagram. Test software recorded the channel, frequency drift, power, temperatures, and stepped voltages. It also controlled the Environmental chamber, a DC power supply, and the Communications Test Set via a GPIB interface. A 0.9-meter coaxial cable connected the EUT to the CMU 200. The cable's loss was measured and accounted for.

Compensation for the Cable Loss was determined in the RF Laboratory on August 9, 2005.

Procedure:

-Full two-port verification of 8753D using the 85033D was completed.
-The cable assembly from the RF input to the RF output was measured at the following frequencies:

PCS Frequency (MHz)	Cable loss (dB)
1850.2	*1.10*
1880.0	*1.10*
1909.8	*1.10*

Procedure:

The EUT was placed in the Temperature chamber and connected to CMU 200 outside as shown in the figure above. Dry air was pumped inside the temperature chamber to maintain a backpressure during the test. The EUT was kept in the off condition at all times except when the measurements were to be made.

Test system software was used to control the CMU-200, power supply and temperature chamber through the IEEE-488 General Purpose Interface BUS (GPIB).

The chamber was switched on and the temperature was set to -30°C.
After the chamber stabilized at -30°C there was a soak period of one hour to alleviate moisture in the chamber, then the EUT voltage was enabled.

A call was established between the CMU-200 and the EUT. The test system software logged the EUT output power and largest frequency deviation measured over 100 bursts. The radio channel, temperature and supply voltage were also recorded.

The measurements were taken at supply voltages of 3.5 volts, 3.8 volts and 4.1 volts. The transmit frequency was varied in 3 steps consisting of 1850.2, 1880.0 and 1909.8 MHz for the PCS band. This frequency was recorded in MHz and the deviation from nominal recorded in Hz and Parts Per Million.

After the initial one-hour soak at the beginning of the test, a period of thirty minutes soak was initialized between each ascending temperature step, before proceeding to the next measurement test cycle.

PROCEDURE:

The test system software for commencing the Frequency Stability Tests carried through the following cycle.

1. Switch on the HP 6632B power supply; CMU 200 Communications test Set, and Environmental Chamber.
2. Start test program
3. Set the Temperature to –30 degrees Celsius and maintain a period of one- hour soak time, with the EUT supply voltage disabled.
4. Set power supply voltage to 3.5 Volts.
5. Set up CMU 200 Radio Communication Tester.
6. Command the CMU 200 to switch to the low channel.
7. Enable the voltage to the EUT, and establish a link to the CMU 200 test set.
8. Software logs the following data from the CMU 200, power supply and temperature chamber: Traffic Channel Number, Traffic Channel Frequency, Power Level, Chamber Temperature, Supply Voltage, Power, Frequency Error. Measurements were taken over 100 bursts.
9. The CMU 200 commands the EUT to change frequency to the middle channel and high channel and repeats steps 7 - 9.
10. Repeat steps 5 - 10 changing the supply voltage to 3.8 Volts and 4.1 Volts
11. Increase temperature by 10°C and soak for 1/2 hour.
12. Repeat steps 4 - 12 for temperatures –30 degrees to 60 degrees Celsius.

Steps 5 to 10 were repeated at room temperature (20°C) with the power supply voltage set to 3.5, 3.8 and 4.1 Volts.

The maximum frequency error in the PCS band measured was 0.073 PPM.

PCS Channel results: channels 512, 661, & 810 @ 20°C maximum transmitted power

Traffic Channel Number	PCS Frequency (MHz	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	*PPM*
512	1850.2	3.5	20	-25.38	-0.0137
661	1880.0	3.5	20	21.57	0.0115
810	1909.8	3.5	20	31.83	0.0167

Traffic Channel Number	PCS Frequency (MHz	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	3.8	20	42.75	0.0231
661	1880.0	3.8	20	36.61	0.0194
810	1909.8	3.8	20	31.19	0.0163

Traffic Channel Number	PCS Frequency (MHz	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	4.1	20	31.83	0.0172
661	1880.0	4.1	20	35.00	0.0186
810	1909.8	4.1	20	-19.05	-0.0100

PCS 1900 Results: channel 512 @ maximum transmitted power

Traffic Channel Number	*Frequency (MHz)*	*Voltage (Volts)*	*Temperature (Celsius)*	*Frequency Error (Hz)*	*PPM*
512	1850.2	3.5	-30	-49.72	-0.0269
512	1850.2	3.5	-20	-128.11	-0.0692
512	1850.2	3.5	-10	-42.68	-0.0231
512	1850.2	3.5	0	-49.85	-0.0269
512	1850.2	3.5	10	-25.12	-0.0136
512	1850.2	3.5	20	-25.38	-0.0137
512	1850.2	3.5	30	-38.61	-0.0209
512	1850.2	3.5	40	-19.95	-0.0108
512	1850.2	3.5	50	-49.98	-0.0270
512	1850.2	3.5	60	-23.7	-0.0128

Traffic Channel Number	*Frequency (MHz)*	*Voltage (Volts)*	*Temperature (Celsius)*	*Frequency Error (Hz)*	*PPM*
512	1850.2	3.8	-30	27.06	0.0146
512	1850.2	3.8	-20	-104.93	-0.0567
512	1850.2	3.8	-10	41.07	0.0222
512	1850.2	3.8	0	38.81	0.0210
512	1850.2	3.8	10	36.48	0.0197
512	1850.2	3.8	20	42.75	0.0231
512	1850.2	3.8	30	-22.15	-0.0120
512	1850.2	3.8	40	-36.48	-0.0197
512	1850.2	3.8	50	13.75	0.0074
512	1850.2	3.8	60	-21.11	-0.0114

Traffic Channel Number	*Frequency (MHz)*	*Voltage (Volts)*	*Temperature (Celsius)*	*Frequency Error (Hz)*	*PPM*
512	1850.2	4.1	-30	50.24	0.0271
512	1850.2	4.1	-20	-132.63	-0.0717
512	1850.2	4.1	-10	35.77	0.0193
512	1850.2	4.1	0	32.61	0.0176
512	1850.2	4.1	10	32.74	0.0177
512	1850.2	4.1	20	31.83	0.0172
512	1850.2	4.1	30	-18.34	-0.0099
512	1850.2	4.1	40	14.33	0.0077
512	1850.2	4.1	50	-21.50	-0.0116
512	1850.2	4.1	60	-16.53	-0.0089

PCS 1900 Results: channel 661 @ maximum transmitted power

Traffic Channel Number	*Frequency (MHz)*	*Voltage (Volts)*	*Temperature (Celsius)*	*Frequency Error (Hz)*	*PPM*
661	1880.0	3.5	-30	-23.44	-0.0124
661	1880.0	3.5	-20	-110.03	-0.0585
661	1880.0	3.5	-10	-27.57	-0.0147
661	1880.0	3.5	0	-29.06	-0.0155
661	1880.0	3.5	10	19.24	0.0102
661	1880.0	3.5	20	21.57	0.0115
661	1880.0	3.5	30	33.58	0.0179
661	1880.0	3.5	40	23.96	0.0127
661	1880.0	3.5	50	-37.19	-0.0198
661	1880.0	3.5	60	21.05	0.0112

Traffic Channel Number	*Frequency (MHz)*	*Voltage (Volts)*	*Temperature (Celsius)*	*Frequency Error (Hz)*	*PPM*
661	1880.0	3.8	-30	33.32	0.0177
661	1880.0	3.8	-20	-122.3	-0.0651
661	1880.0	3.8	-10	21.50	0.0114
661	1880.0	3.8	0	34.93	0.0186
661	1880.0	3.8	10	28.15	0.0150
661	1880.0	3.8	20	36.61	0.0195
661	1880.0	3.8	30	-17.82	-0.0095
661	1880.0	3.8	40	-22.73	-0.0120
661	1880.0	3.8	50	-21.70	-0.0115
661	1880.0	3.8	60	-32.74	-0.0174

Traffic Channel Number	*Frequency (MHz)*	*Voltage (Volts)*	*Temperature (Celsius)*	*Frequency Error (Hz)*	*PPM*
661	1880.0	4.1	-30	36.22	0.0192
661	1880.0	4.1	-20	-127.01	-0.0676
661	1880.0	4.1	-10	29.90	0.0159
661	1880.0	4.1	0	28.73	0.0153
661	1880.0	4.1	10	30.87	0.0164
661	1880.0	4.1	20	35.00	0.0186
661	1880.0	4.1	30	21.76	0.0116
661	1880.0	4.1	40	-26.02	-0.0138
661	1880.0	4.1	50	-13.30	-0.0071
661	1880.0	4.1	60	-39.58	-0.0210

PCS 1900 Results: channel 810 @ maximum transmitted power

Traffic Channel Number	*Frequency (MHz)*	*Voltage (Volts)*	*Temperature (Celsius)*	*Frequency Error (Hz)*	*PPM*
810	1909.8	3.5	-30	-25.83	-0.0135
810	1909.8	3.5	-20	-109.58	-0.0574
810	1909.8	3.5	-10	31.25	0.0164
810	1909.8	3.5	0	36.29	0.0190
810	1909.8	3.5	10	28.35	0.0149
810	1909.8	3.5	20	31.83	0.0167
810	1909.8	3.5	30	18.08	0.0095
810	1909.8	3.5	40	-17.50	-0.0092
810	1909.8	3.5	50	13.11	0.0069
810	1909.8	3.5	60	-26.93	-0.0141

Traffic Channel Number	*Frequency (MHz)*	*Voltage (Volts)*	*Temperature (Celsius)*	*Frequency Error (Hz)*	*PPM*
810	1909.8	3.8	-30	18.08	0.0095
810	1909.8	3.8	-20	-130.95	-0.0686
810	1909.8	3.8	-10	26.22	0.0137
810	1909.8	3.8	0	33.00	0.0173
810	1909.8	3.8	10	38.81	0.0203
810	1909.8	3.8	20	31.19	0.0163
810	1909.8	3.8	30	-31.12	-0.0163
810	1909.8	3.8	40	-36.03	-0.0189
810	1909.8	3.8	50	-43.97	-0.0230
810	1909.8	3.8	60	-32.29	-0.0169

Traffic Channel Number	*Frequency (MHz)*	*Voltage (Volts)*	*Temperature (Celsius)*	*Frequency Error (Hz)*	*PPM*
810	1909.8	4.1	-30	34.61	0.0181
810	1909.8	4.1	-20	**-139.15**	**-0.0729**
810	1909.8	4.1	-10	36.74	0.0192
810	1909.8	4.1	0	21.37	0.0112
810	1909.8	4.1	10	23.63	0.0123
810	1909.8	4.1	20	-19.05	-0.0010
810	1909.8	4.1	30	-22.41	-0.0117
810	1909.8	4.1	40	-17.95	-0.0094
810	1909.8	4.1	50	-18.85	-0.0099
810	1909.8	4.1	60	-28.67	-0.0150

APPENDIX 4

RADIATED EMISSIONS TEST DATA

Radiated Emissions Test Data Results

Test Distance was 3.0 metres. PCS Band August 16, 2005

								Substitution Method				
EUT				Receive Antenna		Spectrum Analyzer		Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) dBuV	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Isotropic Radiator) (dBm)	Limit (dBm)	Diff to Limit (dB)
PCS BAND (EIRP) Handheld Standalone, vertical position												
F0	512	1850.20	1900	Horn	V	89.1	89.1	V-V	-8.6	27.2	33	-5.8
F0	512	1850.20	1900	Horn	H	81.7		H-H	-7.4			
F0	661	1880.00	1900	Horn	V	89.5	89.5	V-V	-7	**28.8**	33	**-4.2**
F0	661	1880.00	1900	Horn	H	81.1		H-H	-5.8			
F0	810	1909.80	1900	Horn	V	87.7	87.7	V-V	-8.5	27.1	33	-5.9
F0	810	1909.80	1900	Horn	H	79.5		H-H	-7.5			

EIRP = Tracking Generator Level + Antenna Factor – Cable Loss + Preamp Gain

Example @ 1880 MHz: EIRP = -5.8 (Tracking Generator Level) + 8.2 (Antenna Factor) – 6.6 (Cable Loss) + 33.0 (Preamp Gain) = 28.8 dBm (Reading Relative to Isotropic Radiator)

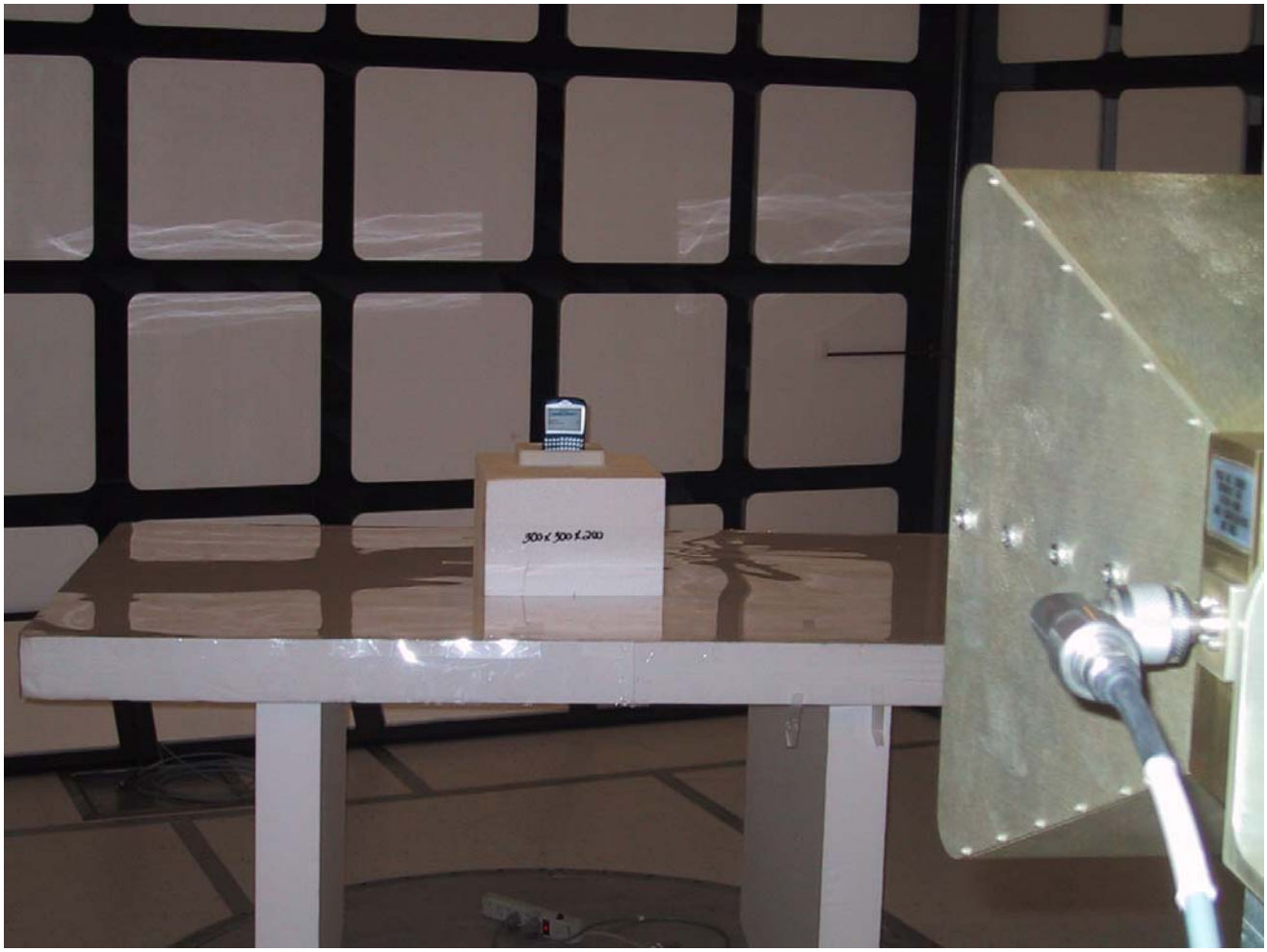
Radiated Emissions Test Data Results cont'd

Test Distance was 3.0 metres. PCS Band August 16, 2005

								Substitution Method				
EUT				Receive Antenna		Spectrum Analyzer		Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Pol. Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Isotropic Radiator) (dBm)	Limit (dBm)	Diff to Limit (dB)
PCS BAND (Harmonics) Handheld Standalone, vertical position **Low Channel** 1850.20 MHz												
2nd	512	3700.40	1900	Horn	V	NF	NF	V-V	-	-	-13	-
2nd	512	3700.40	1900	Horn	H	NF		H-H	-			
The harmonics were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF												
Middle Channel 1880.00 MHz												
2nd	661	3760.00	1900	Horn	V	NF	NF	V-V	-	-	-13	-
2nd	661	3760.00	1900	Horn	H	NF		H-H	-			
The harmonics were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF												
High Channel 1909.8 MHz												
2nd	810	3819.60	1900	Horn	V	42.2	42.2	V-V	-45.4	**-43.4**	-13	**-30.4**
2nd	810	3819.60	1900	Horn	H	40.4		H-H	-46			
The harmonics were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF												

For PCS and Bluetooth simultaneous transmission and Local Oscillator emissions, please refer to test report number RIM-0086-0404-01 for the RAP40GW.

Radiated Emissions Test Photos



Radiated Emissions at 3.0 metres