EMI Test Report

Tested in accordance with
Federal Communications Commission (FCC)
Personal Communications Services
CFR 47, Parts 2 and 90
and
Industry Canada, RSS-119

Research In Motion Limited

REPORT NO.: RIM-0102-0408-06

PRODUCT MODEL NO: RAL11IN
TYPE NAME: BlackBerry Wireless Handheld
FCC ID: L6ARAL11IN
IC: 2503A-RAL11IN

Date: 10 September 2004

Declaration

Statement of Performance:

The BlackBerry Wireless Handheld, model RAL11IN and accessories 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 equipment used was suitable for the tests performed and within the manufacturers published specifications and operating parameters.
The test methods were consistent with the methods described in the relevant standards.

Tested by

Maurice Battler
Compliance Specialist Date: 10 September 2004

Masud S. Attayi, P.Eng.
Senior Compliance and Certification Engineer Date: 13 September 2004

Reviewed by:

Paul Lock
Senior Compliance Specialist Date: 20 September 2004

Reviewed and Approved by:

Paul G. Cardinal, Ph.D.
Manager, Compliance and Certification Date: 20 September 2004

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A) Scope

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

FCC CFR 47 Part 2, Oct. 1, 2000, Subpart L, Marketing of Radio Frequency Devices
FCC CFR 47 Part 90, Oct. 1, 2000, Subpart I, General Technical Standards
Industry Canada, RSS-119 Issue 6, March 25, 2000, Land Mobile and Fixed Radio Transmitters and Receivers, 27.41 to 960 MHz.

B) Product Identification

The equipment under test (EUT) was tested at the Research In Motion (RIM) EMI test facility, located at:

50 Northside Road
Ottawa, Ontario
Canada, K2H 5Z6
Phone: 613 829 7465
Fax: 613 829 0800
Web Site: www.rim.com

The testing began on August 09, 2004 and completed on August 12, 2004. The sample equipment under test (EUT) was a BlackBerry Wireless Handheld, model number RAL11IN, ASY-07523-001 Rev. A, IMEI 010000.00.501919.0, FCC ID L6ARAL11IN, IC: 2503A-RAL11IN.

The BlackBerry Wireless Handheld is an 800 MHz portable unit that uses two digital technologies: Quad 16QAM and Time Division Multiple Access (TDMA). This device also has Bluetooth functionality operating in the frequency range of 2402 to 2480 MHz.

C) Associated Document

1. Test report number RIM-0102-0408-03

D) Support Equipment Used for the Testing of the EUT

1) DC power supply, HP, model number 66321D, serial number US38440638

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 2, Subpart L IC RSS-119	Radiated Spurious/harmonic Emissions, ERP	See test report RIM-0102-0408-03	
FCC CFR 47 Part 2, Subpart L, Part 90, Subpart I IC RSS-119	Conducted Emissions, Occupied Bandwidth	See test report RIM-0102-0408-03	
FCC CFR 47, Part 2.947, 2.1055 and 90.213 IC RSS-119	Frequency Stability	Yes	Johanna Dwyer

G) Modifications to EUT

No modifications were required to the EUT.

H) Summary of Results

1). The EUT passed the Frequency Stability vs. Temperature and Voltage requirements as per CFR 47 2.1055, 90.213 and RSS-119. The maximum frequency error measured was less than 0.1 PPM.
The temperature range was from -30°C to +55°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 (4.2 volts) dc input voltage at each temperature step and channel at maximum output power. The Handheld's frequency was locked to the base station simulator.
See APPENDIX 1 for the test data.

I) Compliance Test Equipment Used

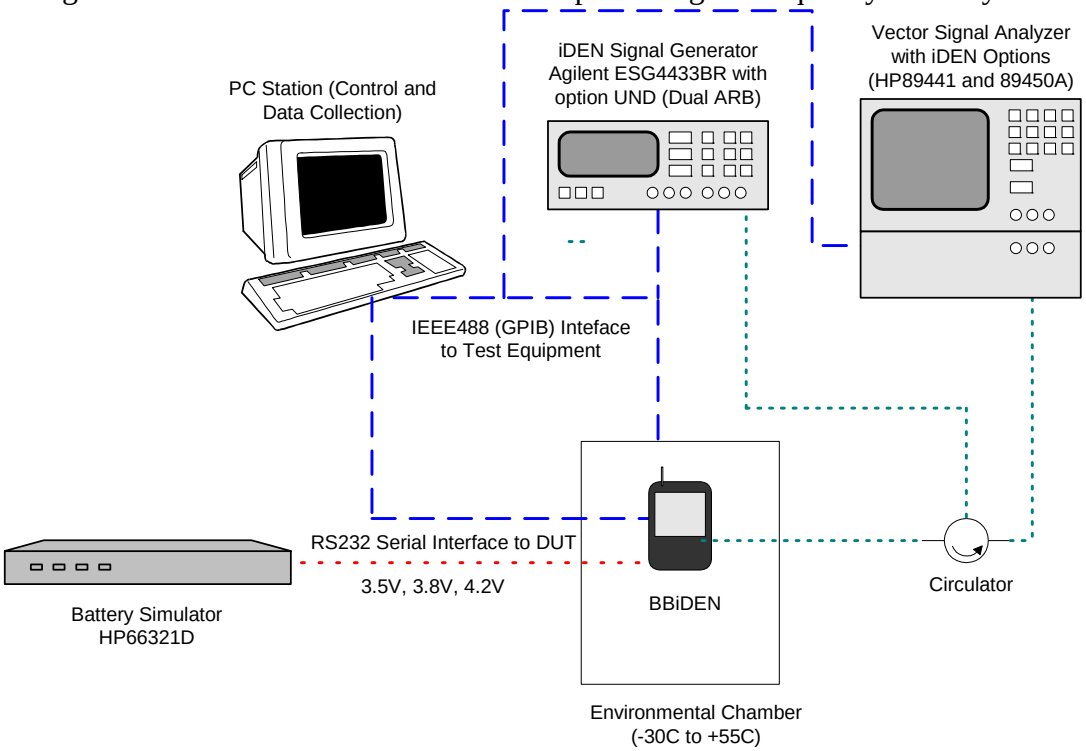
UNIT	MANUFACTURER	MODEL	SERIAL NUMBER	CAL DUE DATE (YY MM DD)	USE
Environmental Chamber	ESPEC Corp.	SH-241	92000147	N/R	Frequency Stability
Signal Generator	HP	ESG4433BR	US38440638	05-08-25	Frequency Stability
DC Power Supply	HP	66321D	GB40180110	04-08-19	Frequency Stability
Vector Signal Analyzer	Agilent	89441	US39313988	05-08-25	Frequency Stability
Temperature Probe	Hart Scientific	61161-302	21352860	04-09-15	Frequency Stability
Power Meter	HP	E4419B	MY40511065	05-08-20	Frequency Stability
Power Sensor	HP	8482H	MY41090594	05-08-20	Frequency Stability
DC Power Supply	HP	66321D	GB40180110	04-08-19	Frequency Stability

APPENDIX 1

FREQUENCY STABILITY TEST DATA

Frequency Stability Test Data

The following document contains measurement data pertaining to Frequency Stability.



SYSTEM	*Model*	*Serial Number*
Agilent Vector Signal Analyzer	HP89441A	US39313988
HP DC Power Supply	HP66321D	GB40180110
Signal Generator	HP ESG4433BR	US38440638
Network Analyzer (Calibration)	E5071B-ATO-7083	MY4210062
Espec Environmental Chamber	SH241	92000147
Temperature Probe	61161-302	21352860
Power Meter	E4419B	MY40511065
Power Sensor	8482H	MY41090594
HP DC Power Supply	66321D	GB40180110

CFR 47 Chapter 1 - Federal Communications Commission Rules

Part 2.947, 2.1055 and 90.213

Required Measurements for Frequency Stability

Procedures

Temperature Variation

Voltage Variation

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

The BlackBerry iDEN Handheld's (referred to as EUT from hereinafter) transmitted frequency stability is less than 0.2 ppm of the ideal transmit frequency. The frequency accuracy is measured by the HP89441 Vector Signal Analyzer.

The BlackBerry iDEN Handheld meets the requirements as stated in CFR 47 chapter 1, Section 2.947, 2.1055 and 90.213, Frequency Stability.

Frequency Stability measurement devices were configured as presented in the block diagram recording frequency, temperatures, and stepped voltages which were controlled via GPIB interfaces linked to the Environmental chamber, a Battery Simulator, a Signal Generator and the Vector Signal Analyzer. The test set was calibrated to characterize the insertion loss for the transmitted frequencies between the RF input of the Vector Signal Analyzer and the EUT antenna port. The EUT is located inside the environmental chamber.
Calibration for the cable loss was performed in the Ottawa RF Laboratory on August 09, 2004.

Procedure:

The EUT was placed in the temperature chamber and connected to the test set. The EUT was kept in idle mode at all times except when the measurements were to be made.

The chamber was switched on, and the temperature was set to –30º C.

After the chamber stabilized at -30º C there was a soak period of 30 minutes. A period of thirty minutes soak was maintained between each ascending temperature step prior to the start of the next measurement test cycle.
A computer system controlled the automated software. All the test equipment intrinsic to the temperature and voltage tests was controlled via the GPIB Bus. The EUT communication was passed through a RS232 serial connection.

The frequency accuracy was averaged over 16 transmit bursts for each combination temperature, voltage and frequency. Three frequencies were selected: 806.0125, 815.5000 and 824.9875 MHz.

The power supply was cycled from minimum voltage of 3.5 volts to 3.8 volts nominal and 4.2V maximum operating voltage under load. The frequency error was measured at the maximum output power and recorded by the automated system test software. The frequency was recorded in MHz and deviation from nominal, in Parts Per Million.

Procedure:

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

1. Switch on the HP66321D dc power supply, the ESG4433BR signal generator, the HP89441A Vector Signal Analyzer.
2. Start system test program
3. Set the Temperature to –30 degrees Celsius and maintain a period of thirty minutes soak time, with the EUT supply voltage disabled.
4. Set power supply voltage to 3.5 volts
5. Set up HP89441A Vector Signal Analyzer.
6. Set the VSA to 806.0125 MHz.
7. Enable the voltage to the EUT, and connect a link to the VSA.
8. Set the transmit frequency of the EUT to 806.0125MHz and put the EUT in RTR (receive/transmit) mode.
9. Capture 16 bursts with the VSA and record the average frequency error over the 16 bursts.
10. Put the EUT back into IDLE mode, change the frequency on the VSA and the EUT to 815.5000 MHz and repeat steps 7, to 9. Repeat again for 824.9875 MHz.
11. Repeat steps 5, to 10 changing the supply voltage to 3.8 volts. Then repeat with the supply voltage at 4.2 volts.
12. Increase temperature to the next temperature step and soak for 1/2 hour.
13. Repeat steps 4 - 12 for temperatures –30 degrees to 55 degrees Celsius.

The maximum frequency error measured was 0.0405 PPM.

Channel results: 806.0125MHz, 815.5MHz and 824.9875MHz @ 20º C and maximum transmitted power.

Frequency (MHz)	Tx Power (dBm)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
806.0125	26.58	3.5	20	-25.25	-0.0313
815.5000	26.40	3.5	20	-10.01	-0.0123
824.9875	26.24	3.5	20	5.62	0.0068

Frequency (MHz)	Tx Power (dBm)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
806.0125	27.38	3.8	20	12.35	0.0153
815.5000	27.25	3.8	20	-4.34	-0.0053
824.9875	27.19	3.8	20	13.72	0.0166

Frequency (MHz)	Tx Power (dBm)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
806.0125	27.94	4.2	20	-24.45	-0.0303
815.5000	27.70	4.2	20	7.05	0.0086
824.9875	27.73	4.2	20	-10.91	-0.0132

Channel Results: 806.0125 @ maximum transmitted power

Frequency (MHz)	Tx Power (dBm)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
806.0125	27.28	3.5	-30	2.67	0.0033
806.0125	27.02	3.5	-20	-12.74	-0.0158
806.0125	26.96	3.5	-10	-6.42	-0.0080
806.0125	26.80	3.5	0	-16.16	-0.0201
806.0125	26.66	3.5	10	5.50	0.0068
806.0125	26.58	3.5	20	-25.25	-0.0313
806.0125	26.41	3.5	30	-24.05	-0.0298
806.0125	26.20	3.5	40	-26.11	-0.0324
806.0125	26.03	3.5	50	-27.80	-0.0345
806.0125	26.01	3.5	55	14.88	0.0185

Frequency (MHz)	Tx Power (dBm)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
806.0125	27.61	3.8	-30	7.06	0.0088
806.0125	27.61	3.8	-20	-29.24	-0.0363
806.0125	27.67	3.8	-10	8.70	0.0108
806.0125	27.74	3.8	0	5.49	0.0068
806.0125	27.52	3.8	10	8.11	0.0101
806.0125	27.38	3.8	20	12.35	0.0153
806.0125	27.27	3.8	30	-25.12	-0.0312
806.0125	27.13	3.8	40	2.03	0.0025
806.0125	27.01	3.8	50	-6.48	-0.0080
806.0125	26.96	3.8	55	-10.38	-0.0129

Frequency (MHz)	Tx Power (dBm)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
806.0125	27.65	4.2	-30	-20.56	-0.0255
806.0125	27.68	4.2	-20	-4.63	-0.0057
806.0125	27.74	4.2	-10	-21.22	-0.0263
806.0125	27.80	4.2	0	8.05	0.0100
806.0125	27.87	4.2	10	-9.03	-0.0112
806.0125	27.94	4.2	20	-24.45	-0.0303
806.0125	28.02	4.2	30	-0.89	-0.0011
806.0125	28.08	4.2	40	-12.41	-0.0154
806.0125	28.01	4.2	50	3.90	0.0048
806.0125	27.94	4.2	55	-32.62	-0.0405

Channel Results: 815.5000 @ maximum transmitted power

Frequency (MHz)	Tx Power (dBm)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
815.5000	27.16	3.5	-30	8.57	0.0105
815.5000	26.93	3.5	-20	-11.78	-0.0144
815.5000	26.81	3.5	-10	11.48	0.0141
815.5000	26.76	3.5	0	-10.63	-0.0130
815.5000	26.63	3.5	10	-8.01	-0.0098
815.5000	26.40	3.5	20	-10.01	-0.0123
815.5000	26.35	3.5	30	-3.62	-0.0044
815.5000	26.16	3.5	40	-15.38	-0.0189
815.5000	25.96	3.5	50	-7.97	-0.0098
815.5000	25.98	3.5	55	8.17	0.0100

Frequency (MHz)	Tx Power (dBm)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
815.5000	27.38	3.8	-30	7.43	0.0091
815.5000	27.37	3.8	-20	6.85	0.0084
815.5000	27.43	3.8	-10	-1.97	-0.0024
815.5000	27.50	3.8	0	-5.99	-0.0073
815.5000	27.55	3.8	10	12.99	0.0159
815.5000	27.25	3.8	20	-4.34	-0.0053
815.5000	27.14	3.8	30	-17.01	-0.0209
815.5000	27.11	3.8	40	-15.36	-0.0188
815.5000	26.97	3.8	50	-20.48	-0.0251
815.5000	26.72	3.8	55	0.16	0.0002

Frequency (MHz)	Tx Power (dBm)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
815.5000	27.39	4.2	-30	-4.76	-0.0058
815.5000	27.45	4.2	-20	8.57	0.0105
815.5000	27.51	4.2	-10	9.72	0.0119
815.5000	27.56	4.2	0	-16.08	-0.0197
815.5000	27.62	4.2	10	17.12	0.0210
815.5000	27.70	4.2	20	7.05	0.0086
815.5000	27.78	4.2	30	5.99	0.0073
815.5000	27.85	4.2	40	-5.21	-0.0064
815.5000	27.91	4.2	50	12.80	0.0157
815.5000	27.95	4.2	55	-7.82	-0.0096

Channel Results: 824.9875 @ maximum transmitted power

Frequency (MHz)	Tx Power (dBm)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
824.9875	26.94	3.5	-30	5.76	0.0070
824.9875	26.79	3.5	-20	-13.96	-0.0169
824.9875	26.65	3.5	-10	-17.90	-0.0217
824.9875	26.60	3.5	0	-4.09	-0.0050
824.9875	26.46	3.5	10	-4.03	-0.0049
824.9875	26.24	3.5	20	5.62	0.0068
824.9875	26.20	3.5	30	-11.74	-0.0142
824.9875	25.99	3.5	40	7.55	0.0091
824.9875	25.78	3.5	50	-15.44	-0.0187
824.9875	25.78	3.5	55	-24.08	-0.0292

Frequency (MHz)	Tx Power (dBm)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
824.9875	27.47	3.8	-30	-17.43	-0.0211
824.9875	27.44	3.8	-20	-10.26	-0.0124
824.9875	27.50	3.8	-10	-13.88	-0.0168
824.9875	27.37	3.8	0	-17.44	-0.0211
824.9875	27.32	3.8	10	17.46	0.0212
824.9875	27.18	3.8	20	13.72	0.0166
824.9875	27.04	3.8	30	-16.38	-0.0199
824.9875	26.94	3.8	40	-5.43	-0.0066
824.9875	26.80	3.8	50	0.02	0.0000
824.9875	26.68	3.8	55	-21.62	-0.0262

Frequency (MHz)	Tx Power (dBm)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
824.9875	27.55	4.2	-30	-12.21	-0.0148
824.9875	27.52	4.2	-20	10.76	0.0130
824.9875	27.58	4.2	-10	-13.72	-0.0166
824.9875	27.62	4.2	0	13.92	0.0169
824.9875	27.67	4.2	10	10.24	0.0124
824.9875	27.73	4.2	20	-10.91	-0.0132
824.9875	27.80	4.2	30	4.12	0.0050
824.9875	27.88	4.2	40	5.96	0.0072
824.9875	27.76	4.2	50	-11.49	-0.0139
824.9875	27.70	4.2	55	-22.42	-0.0272