Partial EMI Test Report

Tested in accordance with
Federal Communications Commission (FCC)
Personal Communications Services
CFR 47, Part 15 Subpart C
&
Industry Canada (IC) RSS-210, RSS-GEN

A division of Research In Motion Limited

REPORT NO.: RTS-2068-1007-57

PRODUCT MODEL NO.: RCL22CW
TYPE NAME: BlackBerry® smartphone
FCC ID: L6ARCL20CW
IC: 2503A-RCL20CW

DATE: July 16, 2010

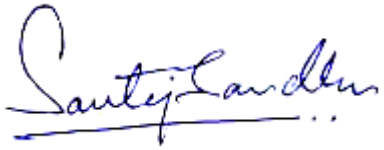
Statement of Performance:

The BlackBerry® smartphone, model RCL22CW, part number CER-32267-001 Rev 2, and its accessories perform within the requirements of the test standards when configured and operated under RIM's operation instructions.

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.

Documented by:



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Date: July 16, 2010

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Date: July 21, 2010

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Table of Contents

A. Scope 4

B. Associated Documents 4

C. Product Identification 4

D. Support Equipment Used for the Testing of the EUT 5

E. Test Results Chart 6

F. Summary of Results 7

G. Compliance Test Equipment Used 9

APPENDIX 1 – AC CONDUCTED EMISSIONS TEST DATA/PLOTS 10

APPENDIX 2 – BLUETOOTH AND 802.11b/g RADIATED EMISSIONS TEST DATA 15

A. Scope

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

- FCC CFR 47 Part 15, Subpart C, October, 2009
- Industry Canada, RSS-210, Issue 7, June 2007, Low Power Licence-Exempt Radiocommunication Devices
- Industry Canada, RSS-GEN, Issue 2, June 2007, General Requirements and Information for the Certification of Radiocommunication Equipment

B. Associated Documents

1. 8530-9330_HW_Difference_Document
2. RTS-2068-0909-23

C. Product Identification

Manufactured by Research In Motion Limited whose headquarters is located at:

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

The equipment under test (EUT) was tested at the following locations:

RIM Testing Services EMI test facilities

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

440 Phillip Street
Waterloo, Ontario
Canada, N2L 5R9
Phone: 519 888 7465
Fax: 519 888 6906

The testing was performed from July 06 to July 15, 2010.

The sample EUT included:

SAMPLE	MODEL	CER NUMBER	PIN	Software
1a	RCL22CW	CER-32267-001 Rev. 2	322FE88E	V5.0.0.782 (Platform4.2.0.352) Bundle 1320
1b	RCL22CW	CER-32267-001 Rev. 2	322FE88E	MFI: V4.2.0.375
2a	RCL22CW	CER-32267-001 Rev. 2	322FE8F8	V5.0.0.782 (Platform4.2.0.352) Bundle 1320
2b	RCL22CW	CER-32267-001 Rev. 2	322FE8F8	MFI: V4.2.0.375

Samples 1a and 1b were used for AC Line Conducted Emissions testing.
Samples 1a, 1b, 2a and 2b were used for Radiated Emissions testing.

Only the characteristics that may have been affected by the changes from RCL21CW to RCL22CW have been re-tested.
For more information, see 8530-9330_HW_Difference_Document.

BlackBerry® smartphone Accessories Tested

1) Captive Cable Charger, part number HDW-17957-003 with an output voltage of 5.0 volts dc, 700 mA.
2) Alternate Fixed Blade Charger, part number HDW-24481-001 (Model Number PSM04A-050QRIM), with an output voltage of 5.0 volts DC, 700 mA.
3) Alternate Stereo Headset, part number HDW-24529-001 with a lead length of 1.1 metres.
4) Stereo Headset, part number HDW-14322-003 with a lead length of 1.3 metres.
5) USB Data Cable, part number HDW-28109-003, 1.3 metres long.

D. Support Equipment Used for the Testing of the EUT

No support equipment used. See section *G. Compliance Test Equipment Used*.

E. Test Results Chart

SPECIFICATION		TEST TYPE	Meets Requirements	TEST DATA
FCC CFR 47	IC			APPENDIX
Part 15.207	RSS-210 RSS-GEN	Conducted AC Line Emission	Pass	1
Part 15.209 Part 15.247	RSS-210 RSS-GEN	BT Radiated Spurious Emissions	Pass	2
Part 15.209 Part 15.247	RSS-210 RSS-GEN	BT Radiated Band Edge Compliance	See Test Report RTS-2068-0909-23	-
Part 15.209 Part 15.247	RSS-210 RSS-GEN	802.11 b/g Radiated Spurious Emissions	Pass	2
Part 15.209 Part 15.247	RSS-210 RSS-GEN	802.11 b/g Radiated Band Edge Compliance	See Test Report RTS-2068-0909-23	-
Part 15.247(a)	RSS-210	BT, 20 dB Bandwidth	See Test Report RTS-2068-0909-23	-
Part 15.247(a)	RSS-210	BT, Carrier Frequency Separation	See Test Report RTS-2068-0909-23	-
Part 15.247(a)	RSS-210	BT, Number of Hopping Frequencies	See Test Report RTS-2068-0909-23	-
Part 15.247(a)	RSS-210	BT, Time of Occupancy (Dwell Time)	See Test Report RTS-2068-0909-23	-
Part 15.247(b)	RSS-210	BT, Maximum Peak Conducted Output Power	See Test Report RTS-2068-0909-23	-
Part 15.247(c)	RSS-210	BT, Band-Edge Compliance of RF Conducted Emissions	See Test Report RTS-2068-0909-23	-
Part 15.247(c)	RSS-210	BT, Spurious RF Conducted Emissions	See Test Report RTS-2068-0909-23	-
Part 15.247(b)	RSS-210	802.11b/g, 6 dB Bandwidth	See Test Report RTS-2068-0909-23	-
Part 15.247(b)	RSS-210	802.11b/g, Maximum Conducted Output Power	See Test Report RTS-2068-0909-23	-
Part 15.247(b)	RSS-210	802.11b/g, Band-Edge	See Test Report RTS-2068-0909-23	-
Part 15.247(b)	RSS-210	802.11b/g, Peak Power Spectral Density	See Test Report RTS-2068-0909-23	-
Part 15.247(b)	RSS-210	802.11b/g, Spurious RF Conducted Emissions	See Test Report RTS-2068-0909-23	-

F. Summary of Results

1) AC LINE CONDUCTED EMISSIONS

The conducted emissions were measured using the test procedure outlined in CISPR Recommendation 22 through a 50 Ohm Line Impedance Stabilization Network (LISN), which was inserted in the power line to the equipment to provide the specified impedance for measurements. The EUT was placed on a nonconductive wooden table, 80 cm high that was positioned 40 cm from a vertical ground plane. The RF output of the network was connected to an EMI receiver system with characteristics that duplicate those of the receiver specified in CISPR Publication 16.
BlackBerry® smartphone was in battery charging mode. The input voltage was 120 V, 60 Hz.
The following test configurations were measured:

Test Configuration	Operating Mode(s)	Charger + Accessories
1	802.11b Tx	Captive Cable Charger + Alternate Stereo Headset
2	Bluetooth Tx, Audio Playback	Alternate Fixed Blade Charger + Stereo Headset + 1.3m USB Cable

The sample EUT's conducted emissions were compared with respect to the FCC CFR 47 Part 15, Subpart C and IC RSS-210 limits. The sample EUT had a worst case test margin of 8.55 dB below the QP limit at 0.564 MHz using the quasi-peak detector with the Alternate Fixed Blade Charger in Test Configuration 2.
See APPENDIX 1 for the test data

Measurement Uncertainty ±3.0 dB

2) RADIATED EMISSIONS

Radiated Spurious and Harmonic Emissions
The EUT was placed on a nonconductive styrofoam table, 80 cm high that was positioned on a remotely controlled turntable. The test distance used between the EUT and the receiving antenna was three metres. The turntable was rotated to determine the azimuth of the peak emissions. Then the emissions were maximized by elevating the antenna in the range of 1 to 4 metres. The maximum emission level was recorded. The frequency range measured was from 30 MHz to 25.0 GHz. Both the horizontal and vertical polarizations of the emissions were measured.

The measurements were done in a semi-anechoic chamber (SAC) below 1 GHz and a fully-anechoic room (FAR) above 1 GHz. The SAC's FCC registration number is **778487** and the Industry Canada (IC) file number is **2503B-1**. The FAR's FCC registration number is **959115** and the IC file number is **2503C-1**.

The EUT was configured and operated to produce the maximum radiated emissions while still keeping within RIM's specifications.

i) The BlackBerry® smartphone was measured in standalone configuration with Bluetooth transmitting in single frequency mode on channel 0 for packet type "DH5" and channel 39 for packet type "2DH5" and "3DH5". The system's radiated emission levels were compared with respect to the FCC CFR 47 Part 15, Subpart C, 15.247 and RSS-210.

The Bluetooth harmonics were investigated up to the 10th harmonic. The sample EUT emissions were in the noise floor (NF).
See APPENDIX 2 for the test data

ii) The BlackBerry® smartphone was measured in standalone configuration transmitting at channel 6 at 1 Mbps for 802.11b mode. The system's radiated emission levels were compared with respect to the FCC CFR 47 Part 15 Subpart C, 15.247 and RSS-210.

The 802.11b/g harmonics were investigated up to the 10th harmonic. The sample EUT emissions were in the noise floor (NF).
See APPENDIX 2 for the test data

Measurement Uncertainty ±4.6 dB

G. Compliance Test Equipment Used

UNIT	MANUFACTURER	MODEL	SERIAL NUMBER	CAL DUE DATE (YY MM DD)	USE
EMI Test Receiver	Rohde & Schwarz	ESIB 40	100255	10-12-01	Conducted/Radiated Emissions
EMI Test Receiver	Rohde & Schwarz	ESU 40	100162	10-11-29	Conducted/Radiated Emissions
Hybrid Log Antenna	EMC Automation	HLP-3003C	017401	10-09-26	Radiated Emissions
Horn Antenna	CMT	LHA 0180	R52734-001	12-01-21	Radiated Emissions
Horn Antenna	ETS-Lindgren	3117	47563	11-07-15	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA4-SP	001	11-02-17	Radiated Emissions
Preamplifier	Sonoma	310N/11909A	185831	10-11-14	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA-SP	001	11-02-19	Radiated Emissions
L.I.S.N.	Rohde & Schwarz	ENV216	100060	10-12-11	Conducted Emissions
Environment Monitor	Control Company	1870	230355190	11-01-08	Radiated Emissions
EMC Analyzer	Agilent	E7405A	US40240226	10-12-10	Radiated Emissions
Bluetooth Tester	Rohde & Schwarz	CBT35	100368	10-11-25	Radiated Emissions
Bluetooth Tester	Rohde & Schwarz	CBT35	100370	10-11-26	Radiated Emissions
Digital Multimeter	Hewlett Packard	34401A	US36042324	10-10-08	Conducted/Radiated Emissions
Environment Monitor	Control Company	1870	230355159	11-01-08	Radiated Emissions

APPENDIX 1 – AC CONDUCTED EMISSIONS TEST DATA/PLOTS

AC Conducted Emissions Test Results
Test Configuration 1

The measurements were performed by Steven Wang.

The BlackBerry® smartphone was tested on July 15, 2010.

The environmental test conditions were: Temperature: 23 ºC
Pressure: 1020 mb
Relative Humidity: 34 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.407	N	26.24	10.01	36.25	57.72	47.72	-21.47
0.416	L1	27.24	9.99	37.23	57.54	47.54	-20.31
0.447	L1	26.78	9.94	36.72	56.93	46.93	-20.21
0.461	N	22.79	9.94	32.73	56.68	46.68	-23.96
2.346	L1	23.00	9.84	32.84	56.00	46.00	-23.16

All other emission levels had a test margin of greater than 25 dB.
Measurements were done with the quasi-peak detector.
See figure 1-1 and figure 1-2 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

AC Conducted Emissions Test Graphs

Test Configuration 1

Figure 1-1: L1 lines

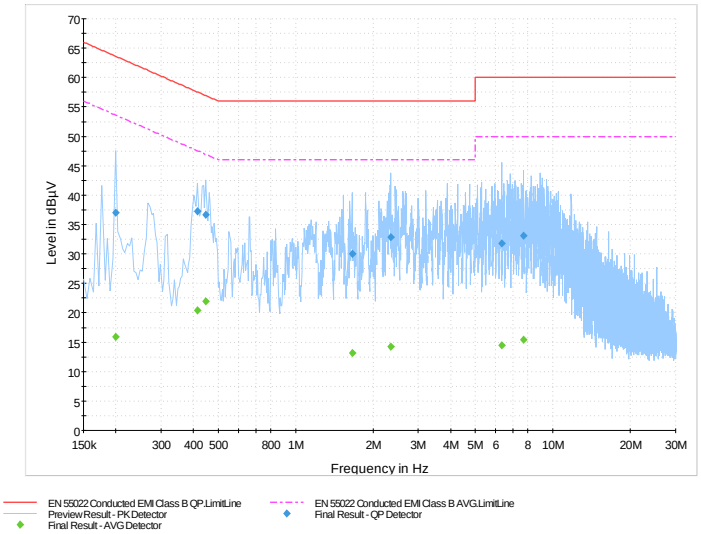
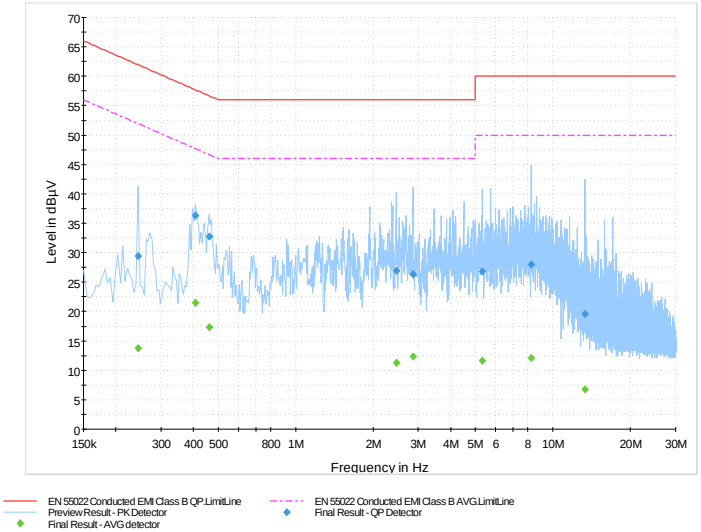


Figure 1-2: N Lines



AC Conducted Emissions Test Results
Test Configuration 2

The measurements were performed by Steven Wang.

The BlackBerry® smartphone was tested on July 15, 2010.

The environmental test conditions were: Temperature: 23 ºC
Pressure: 1020 mb
Relative Humidity: 34 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.150	N	40.48	11.23	51.72	66.00	56.00	-14.28
0.155	L1	43.49	11.17	54.66	65.75	55.75	-11.09
0.159	N	42.75	11.17	53.92	65.52	55.52	-11.59
0.218	L1	42.47	10.73	53.21	62.91	52.91	-9.71
0.218	N	38.20	10.76	48.96	62.91	52.91	-13.96
0.245	L1	34.93	10.55	45.48	61.94	51.94	-16.47
0.290	N	33.93	10.25	44.17	60.54	50.54	-16.36
0.317	L1	30.99	10.14	41.13	59.80	49.80	-18.67
0.402	L1	27.08	10.01	37.09	57.81	47.81	-20.72
0.564	L1	37.57	9.87	47.45	56.00	46.00	**-8.55**
0.582	N	35.90	9.87	45.77	56.00	46.00	-10.23
0.875	L1	33.14	9.81	42.95	56.00	46.00	-13.05
0.893	N	28.62	9.82	38.44	56.00	46.00	-17.56
1.275	L1	31.82	9.80	41.62	56.00	46.00	-14.38
1.590	L1	30.95	9.81	40.75	56.00	46.00	-15.25
1.748	N	25.41	9.82	35.22	56.00	46.00	-20.78
2.441	N	23.82	9.85	33.68	56.00	46.00	-22.33
9.231	L1	28.28	9.97	38.26	60.00	50.00	-21.74
10.041	N	27.09	9.98	37.06	60.00	50.00	-22.94
12.440	N	25.50	10.05	35.55	60.00	50.00	-24.45

All other emission levels had a test margin of greater than 25 dB.
Measurements were done with the quasi-peak detector.
See figure 1-3 and figure 1-4 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

AC Conducted Emissions Test Graphs

Test Configuration 2

Figure 1-3: L1 lines

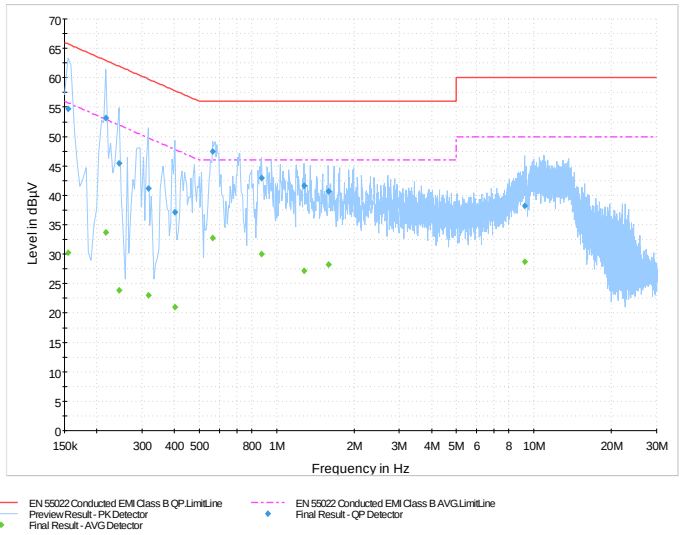
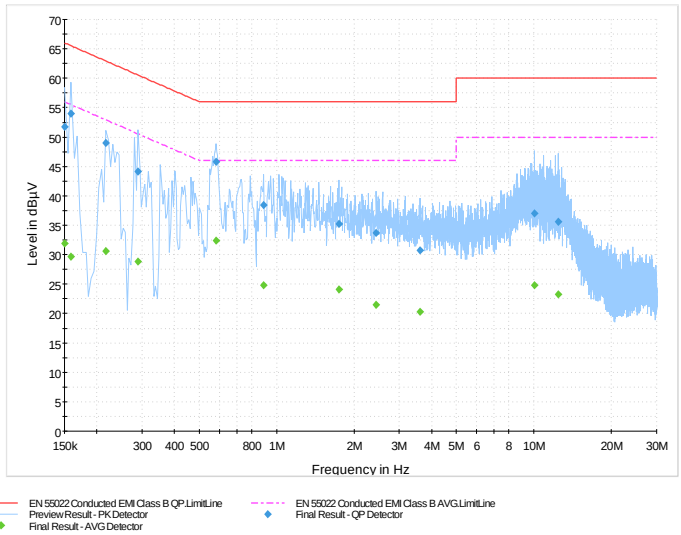


Figure 1-4: N Lines



APPENDIX 2 – BLUETOOTH AND 802.11b/g RADIATED EMISSIONS TEST DATA

Radiated Emissions Test Results
Bluetooth Band

Date of Test: July 14, 2010
Measurements were performed by Fahd Faisal.
The environmental test conditions were: Temperature: 24 ºC
Pressure: 1010 mb
Relative Humidity: 30 %

The test distance was 3.0 metres with a EUT height of 0.8 metres, and sweep frequency of 30 MHz to 1 GHz.
The BlackBerry® smartphone in Bluetooth Tx mode was in standalone, vertical position.
The frequency sweep measurements were performed in single frequency mode on channel 0 using packet type "DH5" and channel 39 using packet types "2-DH5" and "3-DH5".

All emissions had a test margin of greater than 25.0 dB.

Date of Test: July 06-09, 2010
Measurements were performed by Heng Lin.
The environmental test conditions were: Temperature: 22-24 ºC
Pressure: 1016-1027 mb
Relative Humidity: 25-34 %

The test distance was 3.0 metres with a EUT height of 0.8 metres, and sweep frequency of 1 GHz to 25 GHz.
The BlackBerry® smartphone in Bluetooth Tx mode was in standalone, vertical position.
The frequency sweep measurements were performed in single frequency mode on channel 0 using packet type "DH5" and channel 39 using packet types "2-DH5" and "3-DH5".

All other emissions had a test margin of greater than 25.0 dB.

Radiated Emissions Test Results cont'd
802.11b/g Band

Date of Test: July 14, 2010
Measurements were performed by Fahd Faisal.
The environmental test conditions were: Temperature: 24 ºC
Pressure: 1010 mb
Relative Humidity: 30 %

The test distance was 3.0 metres with a EUT height of 0.8 metres, and sweep frequency of 30 MHz to 1 GHz.
The BlackBerry® smartphone was in standalone, USB down position.
The frequency sweep measurements were performed in 802.11b Tx mode at 1 Mbps on channel 6.

All emissions had a test margin of greater than 25.0 dB.

Date of Test: July 15, 2010
Measurements were performed by Steven Wang.
The environmental test conditions were: Temperature: 23 ºC
Pressure: 1020 mb
Relative Humidity: 32 %

The test distance was 3.0 metres with a EUT height of 0.8 metres, and sweep frequency of 1 GHz to 25 GHz.
The BlackBerry® smartphone was in standalone, USB down position.
The frequency sweep measurements were performed in 802.11b Tx mode at 1 Mbps on channel 6.

All emissions had a test margin of greater than 25.0 dB.