

EMI Test Report

Tested in accordance with
Federal Communications Commission (FCC)
Personal Communications Services
CFR 47, Parts 15, Subpart B
&
Industry Canada (IC), ICES-003

RIM Testing Services (RTS)

A division of Research In Motion Limited

REPORT NO.: RTS-0736-0708-24

PRODUCT MODEL NO.: RBS21CW
TYPE NAME: BlackBerry® smartphone
FCC ID: L6ARBS20CW
IC: 2503A-RBS20CW

DATE: 04 September 2007

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Statement of Performance:

The BlackBerry® smartphone, model RBS21CW, part number CER-16580-001 Rev 1, 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 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.

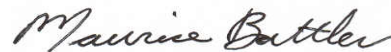
The test methods were consistent with the methods described in the relevant standards.

Documented by:



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Compliance Specialist
Date: 04 Sept 2007

Reviewed by:



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Compliance Specialist
Date: 07 Sept 2007

Reviewed by:



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Date: 10 Sept 2007

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Director
Date: 10 Sept 2007

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A. Scope

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

- FCC CFR 47 Part 15, Subpart B, May 4, 2007, Class B Digital Devices, Unintentional Radiators
- IC ICES-003 Issue 4, February 2004, Class B Digital Devices, Unintentional Radiators

B. Associated Documents

1. None

C. Product Identification

Manufactured by Research In Motion Limited 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 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 was performed on August 21 - 27, 2007.

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The sample BlackBerry® smartphones tested were:

SAMPLE	MODEL	CER NUMBER	PIN
1	RBS21CW	CER-16580-001 Rev. 1	301A4237
2	RBS21CW	CER-16580-001 Rev. 1	301A4233

BlackBerry® smartphone Accessories Tested

- 1) Folding Blade Charger, part number ASY-07040-001 with an output voltage of 5.0 volts dc, 0.75 amps and attached USB cable with a lead length of 1.80 metres.
- 2) Captive Cable Charger, part number ASY-07559-001 with an output voltage of 5.0 volts dc, 0.5 amps and attached USB cable with a lead length of 1.80 metres.
- 3) Alternative Folding Blade Charger, part number ASY-12709-001 with an output voltage of 5.0 volts dc, 0.75 amps with an attached USB cable with a length of 1.80 metres.
- 4) Alternative Captive Cable Charger, part number HDW-14917-001 with an output voltage of 5.0 volts dc, 0.50 amps and attached USB cable with a lead length of 1.80 metres.
- 5) BlackBerry® Power Station, part number HDW-12736-001 Rev. 1
- 6) BlackBerry® Power Station, part number HDW-12736-001 Rev. 2
- 7) Stereo Headset, 3.5mm, part number HDW-14322-001, 1.3 metres long.
- 8) Stereo Headset, 2.5mm, part number HDW-13019-001, 1.3 metres long
- 9) Mono Headset, part number HDW-12420-001, 1.25 metres long.
- 10) TTY Adapter (3.5 mm plug to 2.5 mm jack), part number HDW-15306-002
- 11) USB Data Cable, part number HDW-06610-001, 1.45 metres long.
- 12) Alternative USB Data Cable, part number HDW-06610-003, 1 metre long.
- 13) Mini External Battery Charger, part number HDW-12738-001
- 14) Bluetooth Headset including Charging Pocket, part number ASY-12747-001

D. Support Equipment Used for the Testing of the EUT

- 1) IBM Thinkpad Lenovo T60p laptop, type 8742, product ID 8742C2U

E. Modifications to EUT

No modifications were required on the EUT.

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F. Summary of Results

SPECIFICATION		TEST TYPE	Meets Requirement	TEST DATA APPENDIX
FCC CFR 47	IC			
Part 15, Subpart B	ICES-003	Conducted AC Line Emission	Yes	1
Part 15, Subpart B	ICES-003	Radiated Unintentional Spurious Emissions	Yes	2

a) 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.

The following test configurations were measured. The input voltage was 120 V, 60 Hz. The BlackBerry® smartphone PIN 301A4237 was in idle and battery charging mode.

1. The BlackBerry® smartphone was connected to the Folding Blade Charger.
2. The BlackBerry® smartphone was connected to the Captive Cable Charger.
3. The BlackBerry® smartphone was connected to the Alternative Folding Blade Charger and the 3.5mm Stereo Headset.
4. The BlackBerry® smartphone was connected to the BlackBerry® Power Station Rev. 1, which was connected to a Bluetooth Headset through the USB Data Cable.

The sample EUT's conducted emissions were compared with respect to the FCC CFR 47 Part 15, Subpart B, and IC ICES-003 Class B limit. The sample EUT had a worse case test margin of 10.65 dB below the QP limit at 0.152 MHz for the Captive Cable Charger, test configuration 2.

Measurement Uncertainty ±2.0 dB

To view the test data/plots, see APPENDIX 1.

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b) RADIATED EMISSIONS

The radiated emissions from the EUT were measured using the methods outlined in CISPR Recommendation 22. The EUT was placed on a nonconductive styrofoam table, 80 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 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 2 GHz for setups 1-4 and 6-7. The frequency range measured was from 30 MHz to 5 GHz for setup 5 due to the High-speed USB mode being activated. Both the horizontal and vertical polarizations of the emissions were measured.

The measurements were done 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 configured and operated to produce the maximum radiated emissions while still keeping within RIM's specifications.

The BlackBerry® smartphone was in idle/battery charging mode for modes 1-5 and in Bluetooth Tx/battery charging mode for configurations 6 and 7. For configuration 5, high speed USB and simultaneous charging modes were enabled. The ac input voltage was 120V, 60 Hz. The following test configurations were measured:

1. The BlackBerry® smartphone PIN 301A4237 was connected to the Folding Blade Charger and to the 2.5mm Stereo Headset through the TTY adapter.
2. The BlackBerry® smartphone PIN 301A4237 was connected to the Alternative Folding Blade Charger.
3. The BlackBerry® smartphone PIN 301A4237 was connected to the Alternative Captive Cable Charger and Mono Headset.
4. The BlackBerry® smartphone PIN 301A4237 was connected to the BlackBerry® Power Station Rev. 2 and the 3.5mm Stereo Headset. The Power Station was connected to the Mini External Battery Charger.
5. The BlackBerry® smartphone PIN 301A4233 was connected to the 3.5mm Stereo Headset and the IBM Thinkpad Lenovo T60p laptop through the Alternative USB Data Cable.
6. The BlackBerry® smartphone PIN 301A4237 in Bluetooth transmit and battery charging mode was connected to the Captive Cable Charger.
7. The BlackBerry® smartphone PIN 301A4237 in Bluetooth transmit and battery charging mode was connected to the 3.5mm Mono Headset and the BlackBerry® Power Station Rev. 1, which was connected to the Mini External Battery Charger and the IBM Thinkpad Lenovo T60p laptop through the USB Data Cable.

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The system's radiated emission levels were compared with respect to the FCC CFR 47 Part 15, Subpart B, and IC ICES-003 limit.

The system met the requirements with a worse case emission test margin of 10.36 dB at 32.006 MHz using test configuration 2.

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 2.

G. Compliance Test Equipment Used

<u>UNIT</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>SERIAL NUMBER</u>	<u>CAL DUE DATE</u> (YY MM DD)	<u>USE</u>
Preamplifier	Sonoma	310N/11909A	185831	07-11-23	Radiated Emissions
Preamplifier system	TDK RF Solutions	PA-02	080010	07-11-22	Radiated Emissions
EMI Receiver	Agilent	8546A	3942A00517	07-09-21	Conducted/Radiated Emissions
RF Filter Section	Agilent	85460A	3704A00481	07-09-21	Conducted/Radiated Emissions
Digital Multimeter	Hewlett Packard	34401A	US36042324	07-09-19	Conducted/Radiated Emissions
Environment Monitor	Control Company	1870	230355190	07-12-28	Conducted/Radiated Emissions
L.I.S.N.	Emco	3816/2	1120	08-08-28	Conducted Emissions
Impulse Limiter	Rohde & Schwarz	ESH3-Z2	100475	08-08-20	Conducted Emissions
Hybrid Log Antenna	TDK	HLP-3003C	17401	08-08-04	Radiated Emissions
Universal Radio Communication Tester	R&S	CMU 200	837493/073	07-12-01	Radiated/Conducted Emission
EMI Test Receiver	R&S	ESIB 40	831438/004	08-02-01	Radiated Emission

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APPENDIX 1 - AC LINE CONDUCTED EMISSIONS TEST DATA

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AC Conducted Emissions Test Results

The measurements were performed by Vimal Olaganathan.

Test Configuration 1

The environmental test conditions were:

Temperature	24°C
Pressure	1016mb
Relative Humidity	33%

Date of test: August 27, 2007

FCC CFR 47 Part 15, Subpart B, IC ICES-003 and EN 55022, Class B

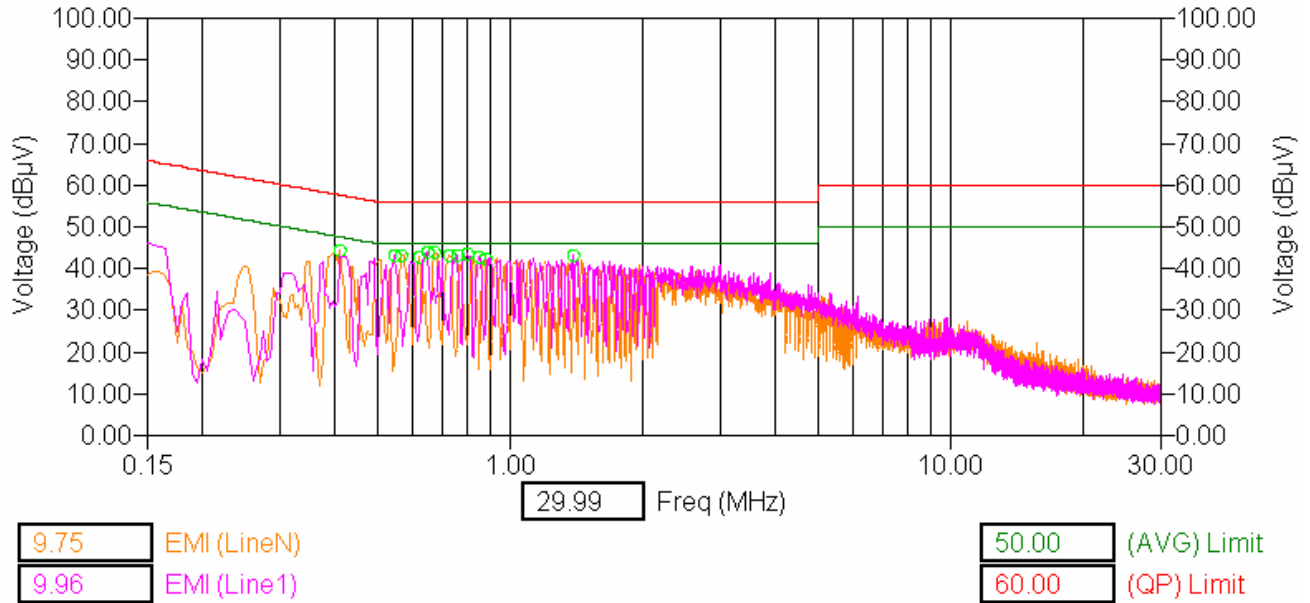
Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor for Impulse Limiter, LISN, Cable (dB)	Corrected Reading (QP) (dBµV)	Limit (QP) (dBµV)	Limit (AV)	Margin (QP) Limits (dB)	Margin (AV) Limits (dB)
0.392	N	31.46	9.94	41.40	57.65	47.65	-16.25	-6.25
0.567	L1	31.63	9.92	41.55	56.00	46.00	-14.45	-4.45
0.573	N	31.52	9.92	41.44	56.00	46.00	-14.56	-4.56
0.597	N	23.63	9.93	33.56	56.00	46.00	-22.44	-12.44
0.673	L1	25.47	9.94	35.41	56.00	46.00	-20.59	-10.59
0.678	N	27.59	9.94	37.53	56.00	46.00	-18.47	-8.47
0.700	N	29.27	9.94	39.21	56.00	46.00	-16.79	-6.79
0.791	L1	28.22	9.96	38.18	56.00	46.00	-17.82	-7.82
0.821	L1	29.36	9.96	39.32	56.00	46.00	-16.68	-6.68
0.894	N	23.04	9.96	33.00	56.00	46.00	-23.00	-13.00
1.381	L1	24.59	9.99	34.58	56.00	46.00	-21.42	-11.42

All other emission levels had a test margin of greater than 25 dB.

See graph 1 for the measurement plot.

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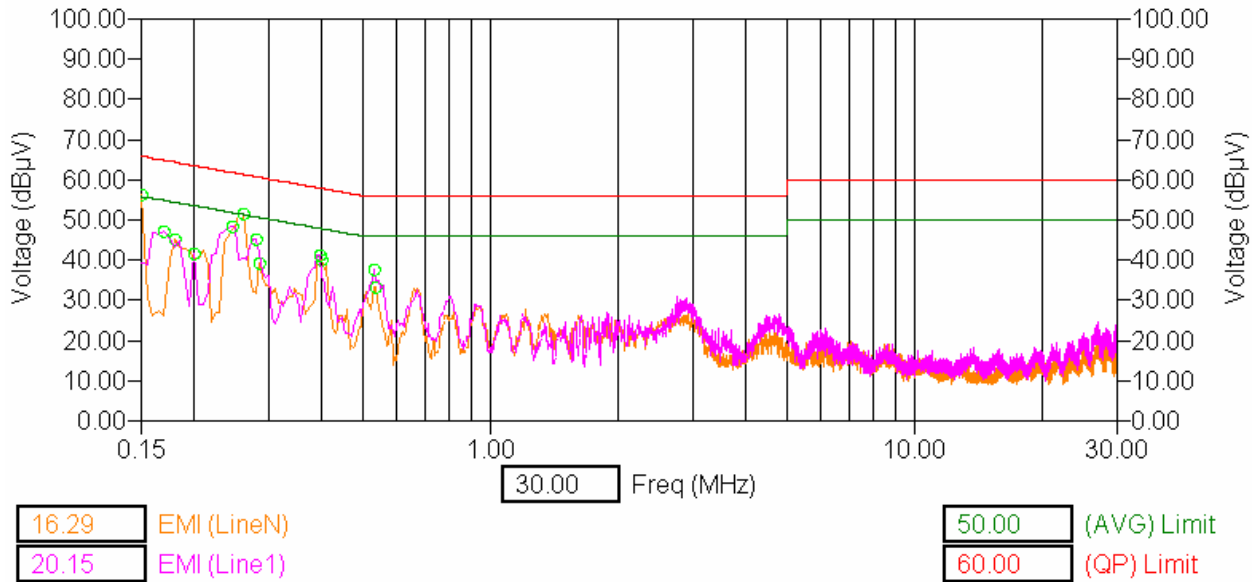
AC Conducted Emissions Test Graph 1



Test Configuration 1

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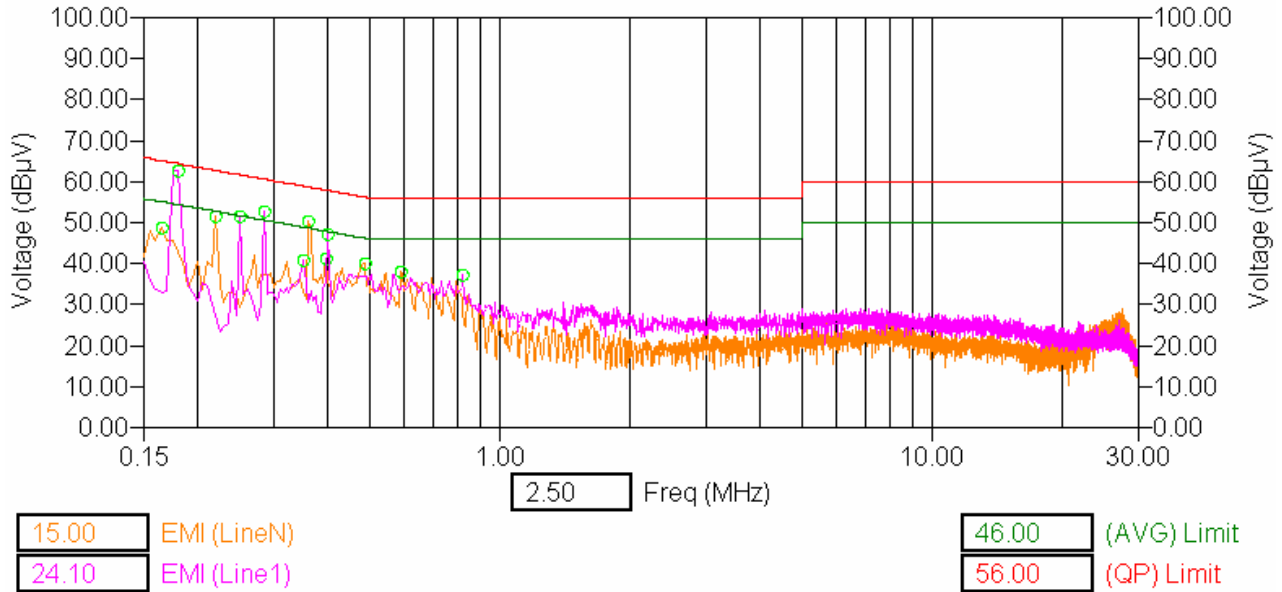
AC Conducted Emissions Test Graph 2



Test Configuration 2

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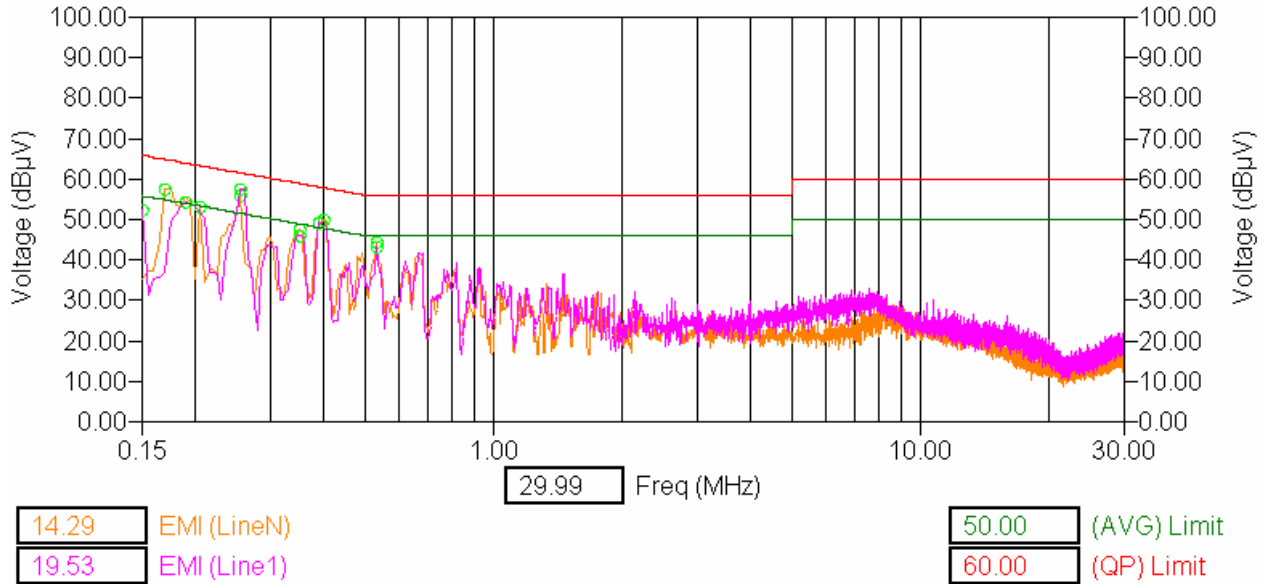
AC Conducted Emissions Test Graph 3



Test Configuration 3

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AC Conducted Emissions Test Graph 4



Test Configuration 4

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APPENDIX 2 - RADIATED EMISSIONS TEST DATA

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Radiated Emissions Test Results

The measurements were performed by Anas Hawari.

Test Configuration 1

The environmental test conditions were:

Temperature	24°C
Pressure	1014 mb
Relative Humidity	32%

Date of test: August 21, 2007

Test Distance was 3.0 metres

FCC CFR 47 Part 15 Subpart B, IC ICES-003

Frequency (MHz)	Antenna		Test Angle (Deg.)	Detector (Q.P. or Peak)	Measured Level (dBµV)	Correction Factor for preamp/antenna/ cables/ filter (dB/m)	Field Strength Level (reading+corr) (dBµV/m)	Limit @ 3.0 m (dB)	Test Margin (dB)
	Pol. (V/H)	Height (metres)							
33.324	V	2.10	270	QP	36.04	-19.06	16.98	40.00	-23.02

All other emission levels had a test margin of greater than 25 dB.

