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-2337-1008-48

PRODUCT MODEL NO.:RDG71UWTYPE NAME:BlackBerry® smartphoneFCC ID:L6ARDG70UWIC:2503A-RDG70UW

DATE: August 19, 2010

Testing Services ^{**}	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW		
Test Report No. RTS-2337-1008-48		FCC ID: L6ARDG70UW IC: 2503A-RDG70UW	

Statement of Performance:

The BlackBerry[®] smartphone, model RDG71UW, part number CER-33874-001 Rev. 1, 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:

Savtej S. Sandhu Regulatory Compliance Specialist Date: August 19, 2010

Reviewed and Approved by:

Masul Alta

Masud S. Attayi, P.Eng. Manager, Regulatory Compliance Date: August 25, 2010

Reviewed by:

Michael Cino Regulatory Compliance Associate Date: August 25, 2010

Testing Services™	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW	
Test Report No .	Dates of Test	FCC ID: L6ARDG70UW
RTS-2337-1008-48	July 21 to August 10, 2010	IC: 2503A-RDG70UW

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A. Scope

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

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

B. Associated Documents

- 1. RDG71UW_HW_Declaration_CER-33874_Rev1 (Similarity Document)
- 2. RTS-2337-1003-20

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 21 to August 10, 2010.

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The sample EUT included:

SAMPLE	MODEL	CER NUMBER	PIN	Software
1a	RDG71UW	CER-33874-001 Rev. 1	229CD442	V6.0.0.129 (Platform 6.4.0.59) Bundle 259
1b	RDG71UW	CER-33874-001 Rev. 1	229CD442	MFI V6.4.0.63 Bundle 277
2a	RDG71UW	CER-33874-001 Rev. 1	229CD443	V6.0.0.129 (Platform 6.4.0.59) Bundle 259
2b	RDG71UW	CER-33874-001 Rev. 1	229CD443	MFI V6.4.0.63 Bundle 277
3	RDG71UW	CER-33874-001 Rev. 1	229CD7F4	V6.0.0.129 (Platform 6.4.0.59) Bundle 259

Samples 1a and 1b were used for AC Line Conducted Emissions testing. Samples 1a, 1b, 2a and 2b were used for Radiated Emissions testing. Sample 3 was used for Bluetooth Conducted Emissions testing.

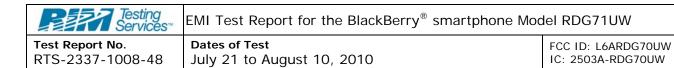
Only the characteristics that may have been affected by the changes from model RCY71UW to RDG71UW were re-tested. For more information, see RDG71UW_HW_Declaration_CER-33874_Rev1 (Similarity Document).

BlackBerry[®] smartphone Accessories Tested

- 1) Alternate Fixed Blade Charger, part number HDW-24481-001 (Model Number PSM04A-050QRIM), with an output voltage of 5.0 volts DC, 700 mA.
- 2) Captive Cable Charger, part number HDW-17957-003, with an output voltage of 5.0 volts DC, 700 mA.
- 3) Premium Stereo Headset, part number HDW-15766-005, with a lead length of 1.3 metres.
- 4) Alternate Stereo Headset, part number HDW-24529-001, with a lead length of 1.1 metres.
- 5) Charging Pod, part number HDW-14396-013.
- 6) USB Data Cable, part number HDW-29108-003, 1.20 metres long.

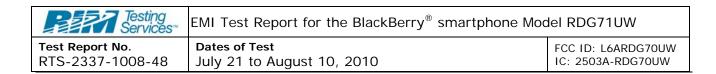
D. Support Equipment Used for the Testing of the EUT

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		Meets Requirements	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-2337-1003-20	-
Part 15.209 Part 15.247	RSS-210 RSS-GEN	802.11 b/g/n Radiated Spurious Emissions	Pass	2
Part 15.209 Part 15.247	RSS-210 RSS-GEN	802.11 b/g/n Radiated Band Edge Compliance	See Test Report RTS-2337-1003-20	-
Part 15.247(a)	RSS-210	BT, 20 dB Bandwidth	Pass	3
Part 15.247(a)	RSS-210	BT, Carrier Frequency Separation	Pass	3
Part 15.247(a)	RSS-210	BT, Number of Hopping Frequencies	Pass	3
Part 15.247(a)	RSS-210	BT, Time of Occupancy (Dwell Time)	Pass	3
Part 15.247(b)	RSS-210	BT, Maximum Peak Conducted Output Power	Pass	3
Part 15.247(c)	RSS-210	BT, Band-Edge Compliance of RF Conducted Emissions	Pass	3
Part 15.247(c)	RSS-210	BT, Spurious RF Conducted Emissions	Pass	3
Part 15.247(b)	RSS-210	802.11b/g/n, 6 dB Bandwidth	See Test Report RTS-2337-1003-20	-
Part 15.247(b)	RSS-210	802.11b/g/n, Maximum Conducted Output Power	See Test Report RTS-2337-1003-20	-
Part 15.247(b)	RSS-210	802.11b/g/n, Band-Edge	See Test Report RTS-2337-1003-20	-
Part 15.247(b)	RSS-210	802.11b/g/n, Peak Power Spectral Density	See Test Report RTS-2337-1003-20	-
Part 15.247(b)	RSS-210	802.11b/g/n, Spurious RF Conducted Emissions	See Test Report RTS-2337-1003-20	-



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	
		Alternate Fixed Blade	
1	Bluetooth Tx,	Charger + Premium	
I	Audio Playback	Stereo Headset + 1.2m	
		USB cable	
		Captive Cable Charger	
2	802.11b Tx	+ POD + Alternate	
		Stereo Headset	

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 5.50 dB below the QP limit at 0.155 MHz using the quasi-peak detector with the Alternate Fixed Blade Charger in Test Configuration 1.

See APPENDIX 1 for the test data.

Measurement Uncertainty ±3.0 dB

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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.

The BlackBerry[®] smartphone was measured in standalone configuration with Bluetooth transmitting in single frequency mode at low channel (0), middle channel (39) and high channel (78) for packet type "DH5", "2-DH5" and "3-DH5". 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 BlackBerry[®] smartphone was measured in standalone configuration transmitting on channels 1, 6 & 11 at 1 Mbps for 802.11b mode, on channel 6 at 6 Mbps for 802.11g mode, and on channel 6 at MCS 0 and MCS 7 for 802.11n 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 Bluetooth harmonics were investigated up to the 10th harmonic. The worst case test margin was 5.59 dB below the accepted limit at 7322.917 MHz.

The 802.11b/g/n 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

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BLUETOOTH RF CONDUCTED EMISSIONS

The Bluetooth conducted RF emissions from the BlackBerry[®] smartphone were measured using the methods outlined in FCC CFR 47 Part 15, Subpart C.

a) 20 dB Bandwidth

The BlackBerry[®] smartphone met the requirements of the 20 dB bandwidth as per 47 CFR 15.247(a) and RSS-210. Low channel (0), middle channel (39) and high channel (78) were measured. The result includes both normal data rate and EDR. The worst case 20 dB Bandwidth was 0.923 MHz for all channels in normal data rate mode and 1.313 MHz for channel 78 in EDR mode. See APPENDIX 3 for the test data.

b) Carrier Frequency Separation

The BlackBerry[®] smartphone met the requirements of the carrier frequency separation as per 47 CFR 15.247(a) and RSS-210. Channel 38 to 39 was measured. The result includes both normal data rate and EDR. See APPENDIX 3 for the test data.

- c) Number of Hopping Frequencies The BlackBerry[®] smartphone met the requirements of the number of hopping frequencies as per 47 CFR 15.247(a) and RSS-210. The number of hopping channels measured was 79. See APPENDIX 3 for the test data.
- d) Time of Occupancy (Dwell Time) The EUT met the requirements of the dwell time as per 47 CFR 15.247(a) and RSS-210. Low channel (0), middle channel (39) and high channel (78) were measured in DH1, DH3 and DH5 modes. Bluetooth was operating in frequency hopping (Euro/US) mode during the measurements. See APPENDIX 3 for the test data.
- e) Maximum Peak Conducted Output Power The BlackBerry[®] smartphone met the requirements of the maximum peak conducted output power as per 47 CFR 15.247(b) and RSS-210. Low channel (0), middle channel (39) and high channel (78) were measured. The result includes both normal data rate and EDR. The worst case Conducted Output Power level was 10.50 dBm (0.01122 W) for Channel 39 and 78 in normal data rate mode and 10.33 dBm (0.01079 W) for channel 39 and 78 in EDR mode. See APPENDIX 3 for the test data.
- f) Band-Edge Compliance of RF Conducted Emissions The BlackBerry[®] smartphone met the requirements of the band-edge compliance of RF conducted emissions as per 47 CFR 15.247(c) and RSS-210. Channels 0 and 78 were measured in frequency hopping (Euro/US) mode and single frequency mode. The result includes both normal data rate and EDR.

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See APPENDIX 3 for the test data.

g) Spurious RF Conducted Emissions

The BlackBerry[®] smartphone met the requirements of the spurious RF conducted emissions as per 47 CFR 15.247(c) and RSS-210. The frequency range measured was 10 MHz to 26 GHz. Low channel (0), middle channel (39) and high channel (78) were measured in single frequency mode and frequency hopping (Euro/US) mode. The result includes both normal data rate and EDR. See APPENDIX 3 for the test data.

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G. Compliance Test Equipment Used

UNIT	MANUFACTURER	MODEL	<u>SERIAL</u> <u>NUMBER</u>	<u>CAL DUE</u> <u>DATE</u> (YY MM DD)	<u>USE</u>
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	СМТ	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	11-02-17	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
Spectrum Analyzer	HP	8563E	3745A08112	11-09-30	RF Conducted Emissions
DC Power Supply	HP	6632B	US37472178	10-09-03	RF Conducted Emissions
Environment Monitor	Control Company	1870	80117164	11-01-08	RF Conducted Emissions
Temperature Probe	Control Company	15-077-21	51129471	11-04-29	Frequency Stability
Environmental Chamber	ESPEC Corp.	SH-240S1	91005607	N/R	Frequency Stability
Bluetooth Tester	Rohde & Schwarz	СВТ	100034	10-11-10	RF Conducted Emissions
Bluetooth Tester	Rohde & Schwarz	CBT35	100368	10-11-25	Radiated Emissions
Bluetooth Tester	Rohde & Schwarz	CBT35	100370	10-11-26	Radiated Emissions
Power Meter	Agilent	N1911A	MY45100905	11-01-05	RF Conducted / Frequency Stability
Power Sensor	Agilent	N1921A	SG45240281	11-05-22	RF Conducted / Frequency Stability
Digital Multimeter	Hewlett Packard	34401A	US36042324	10-10-08	Conducted/Radiated Emissions
Environment Monitor	Control Company	1870	230355159	11-01-08	Radiated Emissions

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APPENDIX 1 – AC CONDUCTED EMISSIONS TEST DATA/PLOTS

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AC Conducted Emission Test Results

The following tests were performed by Savtej Sandhu.

Test Configuration 1

The BlackBerry[®] smartphone was tested on August 03, 2010.

The environmental test conditions were: Temperature: 24 °C Pressure: 974 mb Relative Humidity: 31 %

Frequency	Line	Reading (QP)	Correction Factor	Corrected Reading (QP)	Limit (QP)	Limit (AV)	Margin (QP) Limits
(MHz)		(dBµV)	(dB)	(dB)	(dBµV)	(dBµV)	(dB)
0.155	L1	49.08	11.17	60.25	65.75	55.75	-5.50
0.164	Ν	43.94	11.14	55.08	65.28	55.28	-10.21
0.227	Ν	39.08	10.69	49.78	62.58	52.58	-12.80
0.254	L1	41.39	10.48	51.88	61.64	51.64	-9.76
0.326	L1	36.56	10.12	46.68	59.57	49.57	-12.88
0.326	Ν	31.08	10.14	41.22	59.57	49.57	-18.34
0.339	L1	31.00	10.10	41.10	59.23	49.23	-18.12
0.384	L1	25.35	10.04	35.39	58.19	48.19	-22.80
0.425	L1	23.70	9.97	33.67	57.36	47.36	-23.69
0.452	L1	28.00	9.94	37.93	56.85	46.85	-18.92
0.596	Ν	33.22	9.87	43.09	56.00	46.00	-12.91
0.600	L1	34.07	9.86	43.93	56.00	46.00	-12.07
0.902	Ν	24.97	9.81	34.79	56.00	46.00	-21.22
0.996	L1	27.07	9.80	36.87	56.00	46.00	-19.13
1.329	L1	26.77	9.80	36.57	56.00	46.00	-19.43
1.496	Ν	23.73	9.81	33.54	56.00	46.00	-22.46
2.157	L1	24.53	9.83	34.36	56.00	46.00	-21.64
3.782	L1	23.34	9.90	33.24	56.00	46.00	-22.76
9.294	Ν	26.36	9.98	36.34	60.00	50.00	-23.66
10.280	L1	29.06	9.97	39.03	60.00	50.00	-20.97
11.333	Ν	26.53	10.00	36.53	60.00	50.00	-23.47
13.443	L1	29.58	10.07	39.65	60.00	50.00	-20.36

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.

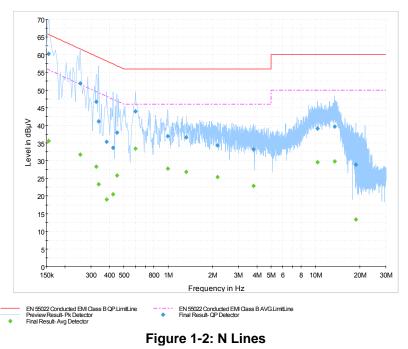
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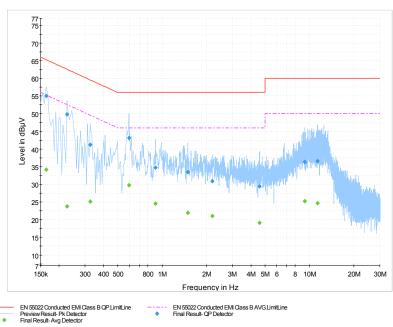
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AC Conducted Emissions Test Graphs

Test Configuration 1

Figure 1-1: L1 lines





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AC Conducted Emission Test Results

Test Configuration 2

Relative Humidity:

The BlackBerry[®] smartphone was tested on August 10, 2010.

The environmental test conditions were: Temperature: Pressure:

24 °C 1010 mb 32 %

Frequency	Line	Reading (QP)	Correction Factor	Corrected Reading (QP)	Limit (QP)	Limit (AV)	Margin (QP) Limits
(MHz)		(dBµV)	(dB)	(dB)	(dBµV)	(dBµV)	(dB)
0.164	Ν	36.66	11.14	47.80	65.28	55.28	-17.48
0.173	L1	35.23	11.05	46.28	64.84	54.84	-18.56
0.177	Ν	34.13	11.05	45.18	64.63	54.63	-19.45
0.182	L1	34.93	10.99	45.91	64.42	54.42	-18.51
0.191	Ν	33.51	10.95	44.46	64.01	54.01	-19.55
0.195	L1	33.39	10.89	44.28	63.82	53.82	-19.54
0.227	L1	30.36	10.67	41.03	62.58	52.58	-21.55
0.240	L1	29.98	10.58	40.56	62.10	52.10	-21.54
0.249	L1	29.38	10.51	39.90	61.79	51.79	-21.89
0.276	Ν	27.75	10.34	38.09	60.94	50.94	-22.84
0.285	Ν	26.82	10.28	37.10	60.67	50.67	-23.57
0.425	Ν	27.21	9.98	37.19	57.36	47.36	-20.17
0.434	Ν	29.22	9.97	39.19	57.19	47.19	-18.00
0.452	L1	29.28	9.94	39.21	56.85	46.85	-17.63
0.888	L1	25.39	9.81	35.20	56.00	46.00	-20.80
0.906	Ν	22.21	9.81	32.02	56.00	46.00	-23.98
1.185	L1	26.83	9.80	36.63	56.00	46.00	-19.37
1.226	Ν	22.97	9.80	32.77	56.00	46.00	-23.23
1.293	L1	28.56	9.80	38.36	56.00	46.00	-17.64
1.586	Ν	25.47	9.81	35.28	56.00	46.00	-20.72
1.811	L1	29.53	9.82	39.34	56.00	46.00	-16.66
1.847	Ν	25.62	9.82	35.44	56.00	46.00	-20.56
2.067	Ν	26.77	9.83	36.61	56.00	46.00	-19.40
2.090	L1	28.98	9.83	38.80	56.00	46.00	-17.20
2.252	Ν	26.02	9.84	35.86	56.00	46.00	-20.14
2.603	L1	32.51	9.86	42.37	56.00	46.00	-13.63
2.643	Ν	26.63	9.86	36.49	56.00	46.00	-19.51

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AC Conducted Emission Test Results cont'd

Test Configuration 2 cont'd

Frequency	Line	Reading (QP)	Correction Factor	Corrected Reading (QP)	Limit (QP)	Limit (AV)	Margin (QP) Limits
(MHz)		(dBµV)	(dB)	(dB)	(dBµV)	(dBµV)	(dB)
3.705	Ν	24.79	9.90	34.68	56.00	46.00	-21.32
3.741	L1	28.90	9.89	38.80	56.00	46.00	-17.20
7.859	L1	29.96	9.98	39.94	60.00	50.00	-20.06
10.541	L1	28.33	9.97	38.30	60.00	50.00	-21.70

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

Measurements were done with the quasi-peak detector.

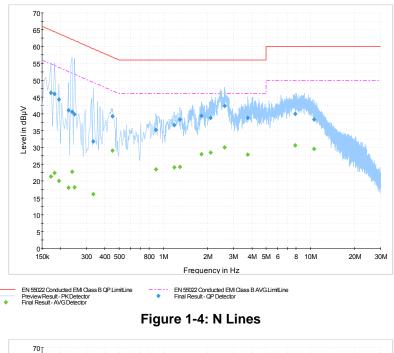
See figure 1-3 and figure 1-4 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

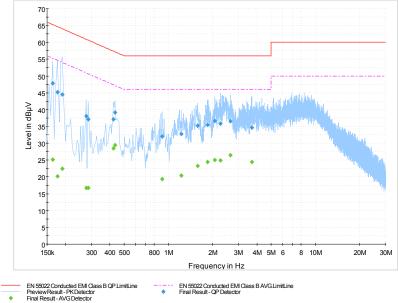
Testing	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW		
Services ^{**}	APPENDIX 1		
Test Report No.	Dates of Test	FCC ID: L6ARDG70UW	
RTS-2337-1008-48	July 21 to August 10, 2010	IC: 2503A-RDG70UW	

AC Conducted Emissions Test Graphs

Test Configuration 2

Figure 1-3: L1 lines





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Testing	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW		
Services ^{**}	APPENDIX 2		
Test Report No.	Dates of Test	FCC ID: L6ARDG70UW	
RTS-2337-1008-48	July 21 to August 10, 2010	IC: 2503A-RDG70UW	

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

Testing	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW	
Services ^{**}	APPENDIX 2	
Test Report No.	Dates of Test	FCC ID: L6ARDG70UW
RTS-2337-1008-48	July 21 to August 10, 2010	IC: 2503A-RDG70UW

Radiated Emissions Test Results Bluetooth Band

Date of Test: July 22, 2010 Measurements were performed by Kevin Rose.

The environmental test conditions were:	24 °C	
	Pressure:	1014 mb
	Relative Humidity:	22 %

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 open, USB down position.

The frequency sweep measurements were performed in single frequency mode on channels 0, 39 and 78 using packet types "<u>DH5</u>", "<u>2-DH5</u>" and "<u>3-DH5</u>".

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

Date of Test: July 21 to August 09, 2010 Measurements were performed by Steven Wang.

The environmental test conditions were:	Temperature:	23 - 25 °C
	Pressure:	1006 - 1023 mb
	Relative Humidity:	25 - 30 %

The test distance was 3.0 metres with a EUT height of 0.8 metres, and sweep frequency of 1GHz to 25GHz.

The BlackBerry[®] smartphone in Bluetooth Tx mode was in open, USB down position.

The frequency sweep measurements were performed in single frequency mode on channels 0, 39 and 78 using packet types "<u>DH5</u>", "<u>2-DH5</u>" and "<u>3-DH5</u>".

Testing	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW				
Services ^{**}	APPENDIX 2				
Test Report No. RTS-2337-1008-48	Dates of Test	FCC ID: L6ARDG70UW			

Radiated Emissions Test Results cont'd Bluetooth Band cont'd

Frequency	Channel	Packet	Ar	ntenna	Test Measured Angle RBW / Level		Measured	tor Level		Limit @ 3.0 m	Test Margin
		Туре	Pol.	Height	Angle	VBW		preamp/antenna/ cables/ filter	(reading+corr)	5.0 m	-
(MHz)			(V/H)	(metres)	(Deg.)		(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dB)
2376.808	0	DH5	Н	2.08	150.00	1MHz/ 3MHz	46.48	8.66	55.14	74.00	-18.86
2376.808	0	DH5	Н	2.08	150.00	1MHz/ 10Hz	28.80	8.66	37.46	54.00	-16.54
19217.099	0	DH5	Н	4.00	172.00	1MHz/ 3MHz	40.06	14.92	54.98	74.00	-19.02
19217.099	0	DH5	Н	4.00	172.00	1MHz/ 10Hz	21.48	14.92	36.40	54.00	-17.60
19216.875	0	2DH5	Н	1.00	171.00	1MHz/ 3MHz	39.85	14.92	54.77	74.00	-19.23
19216.875	0	2DH5	н	1.00	171.00	1MHz/ 10Hz	20.35	14.92	35.27	54.00	-18.73
19215.753	0	3DH5	Н	4.00	171.00	1MHz/ 3MHz	38.46	14.92	53.38	74.00	-20.62
19215.753	0	3DH5	н	4.00	171.00	1MHz/ 10Hz	20.58	14.92	35.50	54.00	-18.50
2385.504	39	DH5	н	3.00	144.00	1MHz/ 3MHz	49.54	8.60	58.14	74.00	-15.86
2385.504	39	DH5	н	3.00	144.00	1MHz/ 10Hz	30.19	8.60	38.79	54.00	-15.21
7323.478	39	DH5	н	1.81	185.00	1MHz/ 3MHz	49.47	15.50	64.79	74.00	-9.03
7323.478	39	DH5	н	1.81	185.00	1MHz/ 10Hz	31.98	15.50	47.48	54.00	-6.52
2364.032	39	2DH5	V	3.25	89.00	1MHz/ 3MHz	48.31	8.76	57.07	74.00	-16.93
2364.032	39	2DH5	V	3.25	89.00	1MHz/ 10Hz	29.53	8.76	38.29	54.00	-15.71
7322.468	39	2DH5	Н	1.83	178.00	1MHz/ 3MHz	50.37	15.51	65.88	74.00	-8.12
7322.468	39	2DH5	н	1.84	178.00	1MHz/ 10Hz	31.30	15.51	46.81	54.00	-7.19
2390.984	39	3DH5	V	2.69	76.00	1MHz/ 3MHz	47.52	8.58	56.10	74.00	-17.90
2390.984	39	3DH5	V	2.69	76.00	1MHz/ 10Hz	29.67	8.58	38.25	54.00	-15.75
7322.917	39	3DH5	Н	1.81	177.00	1MHz/ 3MHz	49.63	15.51	65.14	74.00	-8.86
7322.917	39	3DH5	Н	1.81	177.00	1MHz/ 10Hz	32.90	15.51	48.41	54.00	-5.59

Testing	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW				
Services ^{**}	APPENDIX 2				
Test Report No.	Dates of Test	FCC ID: L6ARDG70UW			
RTS-2337-1008-48	July 21 to August 10, 2010	IC: 2503A-RDG70UW			

Radiated Emissions Test Results cont'd Bluetooth Band cont'd

Frequency	Channel	Dealist	Ar	ntenna	Test		Measured	Correction Factor for	Field Strength Level	Limit @	Test
		Packet Type	Pol.	Height	Angle	RBW / VBW	Level	preamp/antenna/ cables/ filter	(reading+corr)	3.0 m	Margin
(MHz)		5.	(V/H)	(metres)	(Deg.)		(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dB)
7439.551	78	DH5	Н	1.77	186.00	1MHz/ 3MHz	44.26	15.71	59.97	74.00	-14.03
7439.551	78	DH5	н	1.77	186.00	1MHz/ 10Hz	29.88	15.71	45.59	54.00	-8.41
18187.868	78	DH5	н	1.95	3.00	1MHz/ 3MHz	39.92	15.37	55.29	74.00	-18.71
18187.868	78	DH5	Н	1.95	3.00	1MHz/ 10Hz	23.52	15.37	38.89	54.00	-15.11
19841.074	78	DH5	Н	2.42	345.00	1MHz/ 3MHz	41.20	15.95	57.15	74.00	-16.85
19841.074	78	DH5	Н	2.42	345.00	1MHz/ 10Hz	24.25	15.95	40.20	54.00	-13.80
2385.552	78	2DH5	Н	2.00	136.00	1MHz/ 3MHz	47.56	8.60	56.16	74.00	-17.84
2385.552	78	2DH5	Н	2.00	136.00	1MHz/ 10Hz	28.37	8.60	36.97	54.00	-17.03
7439.888	78	2DH5	Н	1.75	180.00	1MHz/ 3MHz	45.26	15.71	60.97	74.00	-13.03
7439.888	78	2DH5	Н	1.75	180.00	1MHz/ 10Hz	28.42	15.71	44.13	54.00	-9.87
18187.692	78	2DH5	Н	1.00	16.00	1MHz/ 3MHz	39.71	15.37	55.08	74.00	-18.92
18187.692	78	2DH5	Н	1.00	16.00	1MHz/ 10Hz	23.56	15.37	38.93	54.00	-15.07
19841.618	78	2DH5	Н	1.84	352.00	1MHz/ 3MHz	40.47	15.95	56.42	74.00	-17.58
19841.618	78	2DH5	Н	1.84	352.00	1MHz/ 10Hz	23.66	15.95	39.61	54.00	-14.39
2363.880	78	3DH5	Н	2.20	217.00	1MHz/ 3MHz	46.25	8.76	55.01	74.00	-18.99
2363.880	78	3DH5	Н	2.20	217.00	1MHz/ 10Hz	28.21	8.76	36.97	54.00	-17.03
7439.135	78	3DH5	Н	1.63	185.00	1MHz/ 3MHz	44.56	15.71	60.27	74.00	-13.73
7439.135	78	3DH5	Н	1.65	185.00	1MHz/ 10Hz	26.66	15.71	42.37	54.00	-11.63

Testing	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW				
Services ^{**}	APPENDIX 2				
Test Report No.	Dates of Test	FCC ID: L6ARDG70UW			
RTS-2337-1008-48	July 21 to August 10, 2010	IC: 2503A-RDG70UW			

Radiated Emissions Test Results cont'd Bluetooth Band cont'd

Frequency	Channel	Packet	Ar Pol.	ntenna Height	Test Angle	RBW /	Measured Level	Correction Factor for preamp/antenna/	Level		Test Margin
(MHz)		Туре		(metres)	(Deg.)	VBW	(dBµV)	cables/ filter (dB/m)	(dBµV/m)	(dBµV/m)	(dB)
18185.673	78	3DH5	Н	1.99	16.00	1MHz/ 3MHz	39.61	15.37	54.98	74.00	-19.02
18185.673	78	3DH5	н	1.99	16.00	1MHz/ 10Hz	23.22	15.37	38.59	54.00	-15.41
19839.840	78	3DH5	н	1.90	350.00	1MHz/ 3MHz	39.22	15.95	55.17	74.00	-18.83
19839.840	78	3DH5	Н	1.90	350.00	1MHz/ 10Hz	23.15	15.95	39.10	54.00	-14.90

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

Testing	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW				
Services ^{**}	APPENDIX 2				
Test Report No.	Dates of Test	FCC ID: L6ARDG70UW			
RTS-2337-1008-48	July 21 to August 10, 2010	IC: 2503A-RDG70UW			

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

Date of Test: July 21, 2010

The environmental test conditions were:	24 °C	
	Pressure:	1014 mb
	Relative Humidity:	22 %

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 open, USB up position.

The frequency sweep measurements were performed in 802.11b Tx mode at 1 Mbps on channels 1, 6 and 11, in 802.11g Tx mode at 6 Mbps on channel 6, and in 802.11n Tx mode at MCS 0 and MCS7 on channels 6.

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

Date of Test: June 22, 2010

The environmental test conditions were:	Temperature:	24 - 25 °C
	Pressure:	1003 - 1009 mb
	Relative Humidity:	30 - 32 %

The test distance was 3.0 metres with a EUT height of 0.8 metres, and sweep frequency of 1GHz to 25GHz.

The BlackBerry[®] smartphone was in open, USB up position.

The frequency sweep measurements were performed in 802.11b Tx mode at 1 Mbps on channels 1, 6 and 11, in 802.11g Tx mode at 6 Mbps on channel 6, and in 802.11n Tx mode at MCS 0 and MCS7 on channel 6.

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

Testing	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW				
Services ^{**}	APPENDIX 3				
Test Report No.	Dates of Test	FCC ID: L6ARDG70UW			
RTS-2337-1008-48	July 21 to August 10, 2010	IC: 2503A-RDG70UW			

APPENDIX 3 – BLUETOOTH CONDUCTED EMISSIONS TEST DATA/PLOTS

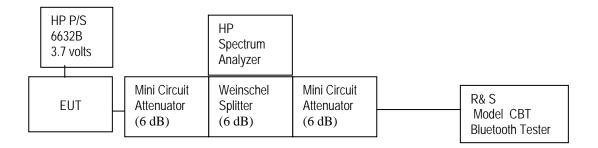
Testing	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW	
Services ^{**}	APPENDIX 3	
Test Report No.	Dates of Test	FCC ID: L6ARDG70UW
RTS-2337-1008-48	July 21 to August 10, 2010	IC: 2503A-RDG70UW

Bluetooth power output from BlackBerry[®] smartphone was at maximum for all the recorded measurements shown below.

The measurements were performed by Maurice Battler.

Date of test: July 22, 2010

Test Setup Diagram



A reference offset of 12.4 dB was applied to the spectrum analyzer reference level for the attenuators and coaxial cable loss in the test circuit.

The environmental test conditions were: Temperature: 21 °C Pressure: 1016 mb Relative Humidity: 34 %

Testing	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW	
Services ^{**}	APPENDIX 3	
Test Report No.	Dates of Test	FCC ID: L6ARDG70UW
RTS-2337-1008-48	July 21 to August 10, 2010	IC: 2503A-RDG70UW

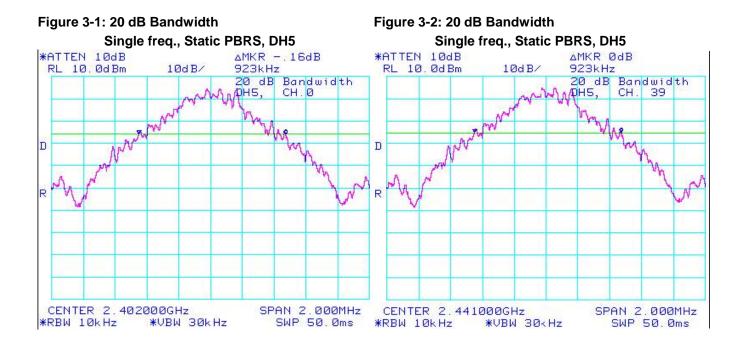
20 dB Bandwidth

The EUT met the requirements of the 20 dB bandwidth as per 47 CFR 15.247(a) and RSS-210. Low channel (0), middle channel (39) and high channel (78) were measured. Bluetooth was operating in single frequency mode.

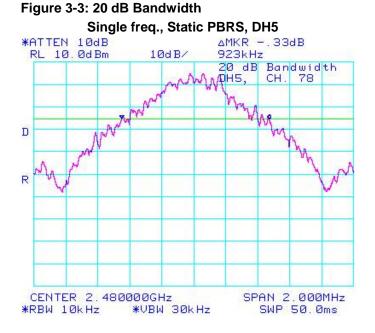
Using pattern type "Static PBRS" and packet type "DH5" during the measurements.

Bluetooth Channel	Limit (MHz)	Measured Level (MHz)
0	≤1.0	0.923
39	≤1.0	0.923
78	≤1.0	0.923

See figures 3-1 to 3-3 for the plots of the 20 dB bandwidth measurements.



Testing	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW	
Services ^{**}	APPENDIX 3	
Test Report No.	Dates of Test	FCC ID: L6ARDG70UW
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Using Pattern type "Static PBRS" and packet type "<u>3-DH5</u>" during the measurements.

Bluetooth Channel	Limit (MHz)	Measured Level (MHz)
0	≤1.5	1.303
39	≤1.5	1.300
78	≤1.5	1.313

See figures 3-4 to 3-6 for the plots of the 20 dB bandwidth measurements.

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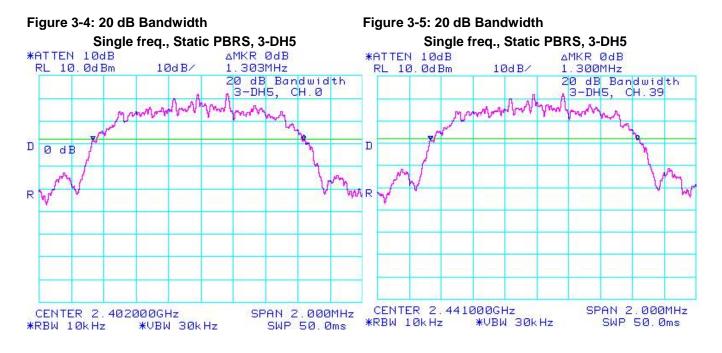
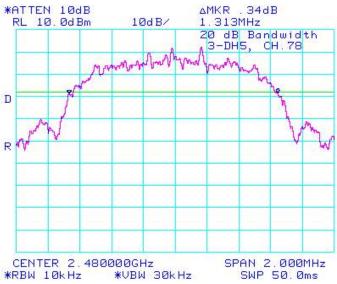


Figure 3-6: 20 dB Bandwidth Single freq., Static PBRS, 3-DH5



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Carrier Frequency Separation

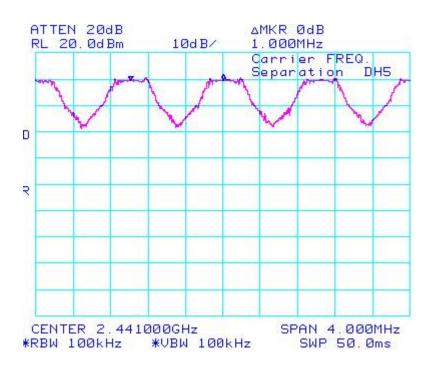
The EUT met the requirements of the Carrier Frequency Separation as per 47 CFR 15.247(a) and RSS-210. Channel 38 to 39 was measured. Bluetooth was operating in frequency hopping (Euro/US) mode.

Using pattern type "Static PBRS" and packet type "DH5" during the measurements.

Bluetooth Channels	Limit (MHz)	Measured Level (MHz)
38 to 39	\ge 0.025 or 20 dB bandwidth	1.000

See figure 3-7 for the plot of the Carrier Frequency Separation measurement.

Figure 3-7: Carrier Frequency Separation, Freq. Hopping, Static PBRS, DH5, Channels 38 to 39



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Using Pattern type "Static PBRS" and packet type "<u>3-DH5</u>" during the measurements.

Bluetooth Channels	Limit (MHz)	Measured Level (MHz)
38 to 39	≥ 0.025 or 20 dB bandwidth	1.000

See figure 3-8 for the plot of the Carrier Frequency Separation measurement.

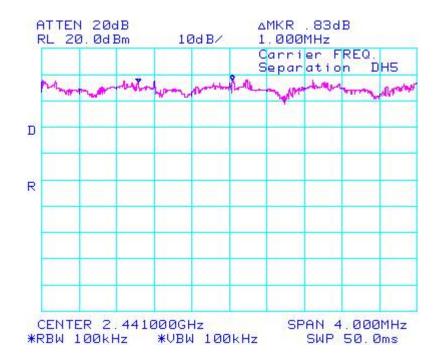


Figure 3-8: Carrier Frequency Separation, Freq. Hopping, Static PBRS, 3-DH5, Channels 38 to 39

Testing	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW	
Services ^{**}	APPENDIX 3	
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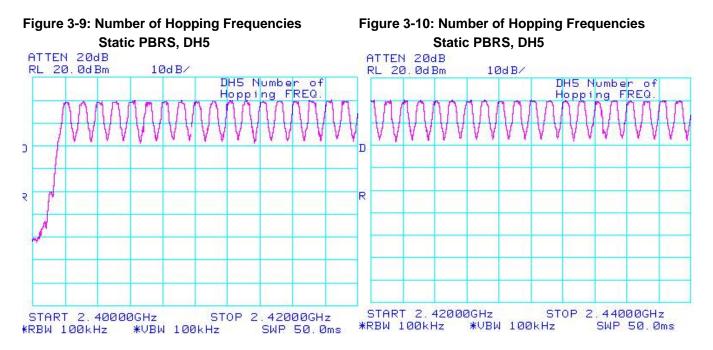
Number of Hopping Frequencies

The EUT met the requirements of the number of hopping frequencies as per 47 CFR 15.247(a) and RSS-210. Bluetooth was operating in frequency hopping (Euro/US) mode.

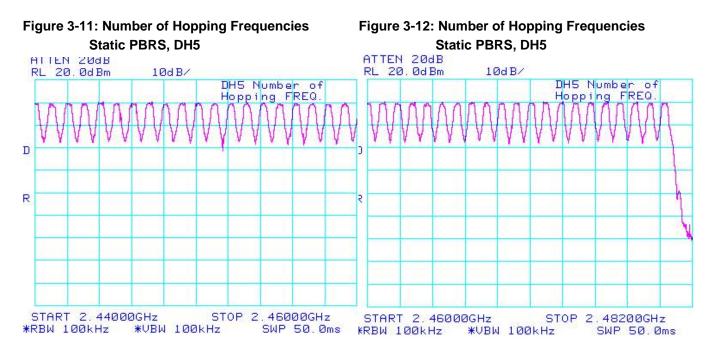
Using pattern type "Static PBRS" and packet type "DH5" during the measurements.

Limit	Number of Hopping Frequencies
(CH)	(CH)
≥75	79

See figures 3-9 to 3-12 for the plots of the number of hopping frequencies.



Testing	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW	
Services ^{**}	APPENDIX 3	
Test Report No.	Dates of Test	FCC ID: L6ARDG70UW
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Time of Occupancy (Dwell Time)

The EUT met the requirements of the time of occupancy (dwell time) as per 47 CFR 15.247(a) and RSS-210. Low channel (0), middle channel (39) and high channel (78) were measured in packet types DH1, DH3 and DH5. Bluetooth was operating in frequency hopping (Euro/US) mode during the measurements. The frequency hopping is 1600 hops per second for a dwell time of 625 usec for 79 channels.

A DH1 packet needs one time slot for transmitting and one time slot for receiving. The frequency hopping is 800 hops per second with 79 channels which is 10.127 times per second. As per 15.247(a) (iii) "The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed". Therefore for 31.6 seconds (79x0.4) there are 320.0 times of appearance.

A DH3 packet needs one time slot for transmitting and one time slot for receiving. The frequency hopping is 400 hops per second with 79 channels which is 5.06 times per second. Therefore for 31.6 seconds there are 159.9 times of appearance.

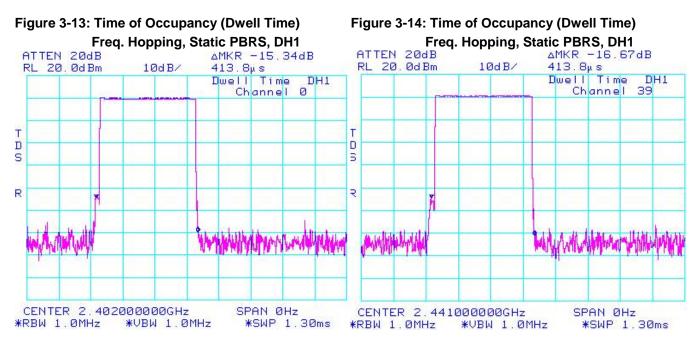
A DH5 packet needs one time slot for transmitting and one time slot for receiving. The frequency hopping is 266.7 hops per second with 79 channels which is 3.38 times per second. Therefore for 31.6 seconds there are 106.8 times of appearance.

Testing	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW	
Services ^{**}	APPENDIX 3	
Test Report No.	Dates of Test	FCC ID: L6ARDG70UW
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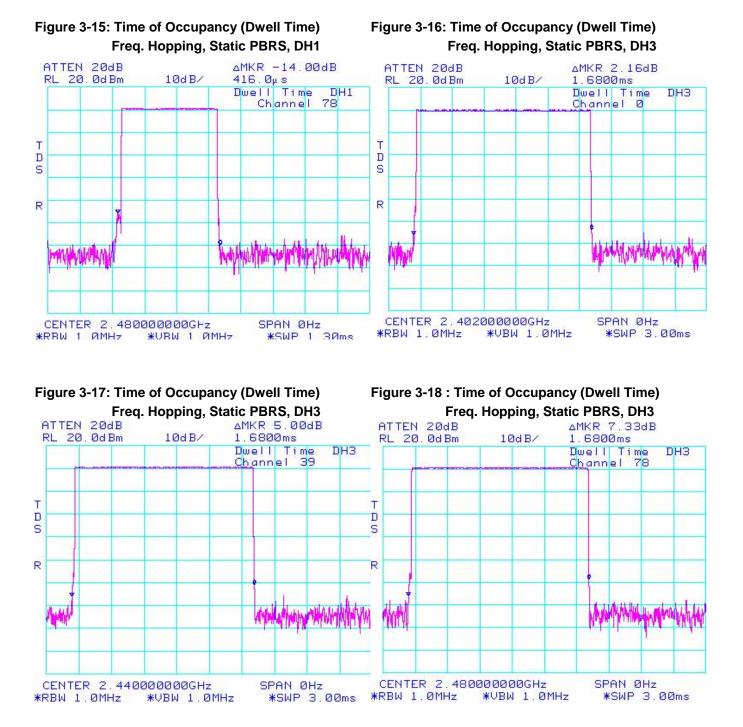
Bluetooth Channel	Mode	Tx Time (ms)	Dwell Time/31.6 sec. (msec.)	Limit (msec.)	Margin (msec.)
0	DH1	0.4138	0.4138 x 320.0 = 132.42	400	267.58
39	DH1	0.4138	0.4138 x 320.0 = 132.42	400	267.58
78	DH1	0.4160	0.4160 x 320.0 = 133.12	400	266.88
0	DH3	1.6800	1.6800 x 159.9 = 268.63	400	131.37
39	DH3	1.6800	1.6800 x 159.9 = 268.63	400	131.37
78	DH3	1.6800	1.6800 x 159.9 = 268.63	400	131.37
0	DH5	2.9200	2.9200 x 106.8 = 311.86	400	88.14
39	DH5	2.9200	2.9200 x 106.8 = 311.86	400	88.14
78	DH5	2.9300	2.9300 x 106.8 = 312.92	400	87.08

See figures 3-13 to 3-21 for the plots of the dwell time.

Bluetooth RF Conducted Emission Test Results cont'd



Testing	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW	
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Testing	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW	
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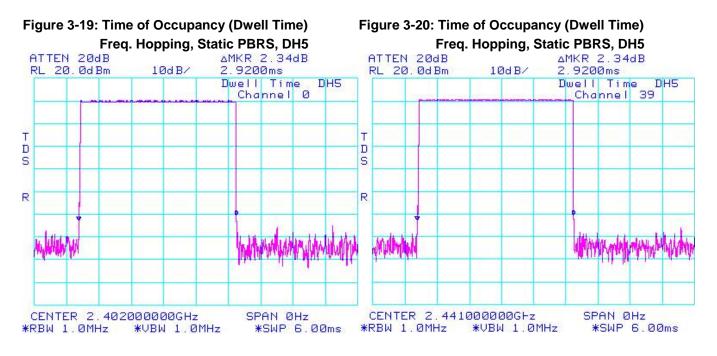
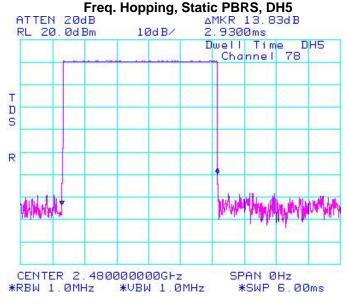


Figure 3-21: Time of Occupancy (Dwell Time)



Testing	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW	
Services ^{**}	APPENDIX 3	
Test Report No.	Dates of Test	FCC ID: L6ARDG70UW
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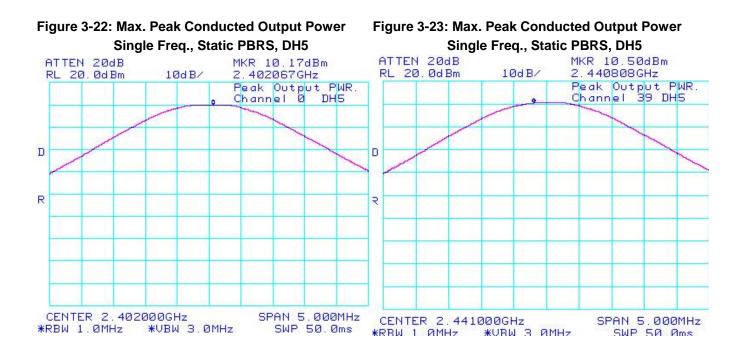
Maximum Peak Conducted Output Power

The EUT met the requirements of the maximum peak conducted output power of class 2 as per 47 CFR 15.247(b) and RSS-210. Low channel (0), middle channel (39) and high channel (78) were measured. Bluetooth was operating in single frequency mode during the measurements. A reference offset of 12.4 dB was applied to the spectrum analyzer reference level for the coaxial cable loss and attenuators in the test circuit.

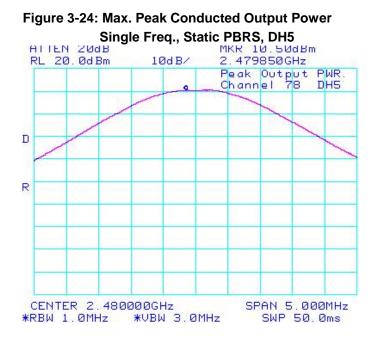
Using pattern type "Static PBRS" and packet type "DH5" during the measurements.

Bluetooth Channel	Measured Level (dBm)	Measured Level (W)	Class 1 Limit (dBm)
0	10.17	0.01040	0.0 to 20.0
39	10.50	0.01122	0.0 to 20.0
78	10.50	0.01122	0.0 to 20.0

See figures 3-22 to 3-24 for the plots of the maximum peak conducted output power.



Testing	EMI Test Report for the BlackBerry [®] smartphone Model RDG71UW	
Services ^{**}	APPENDIX 3	
Test Report No.	Dates of Test	FCC ID: L6ARDG70UW
RTS-2337-1008-48	July 21 to August 10, 2010	IC: 2503A-RDG70UW



Using Pattern type "Static PBRS" and packet type "<u>3-DH5</u>" during the measurements.

Bluetooth Channel	Measured Level (dBm)	Measured Level (W)	Class 1 Limit (dBm)
0	9.83	0.00962	0.0 to 20.0
39	10.33	0.01079	0.0 to 20.0
78	10.33	0.01079	0.0 to 20.0

See figures 3-25 to 3-27 for the plots of the maximum peak conducted output power.

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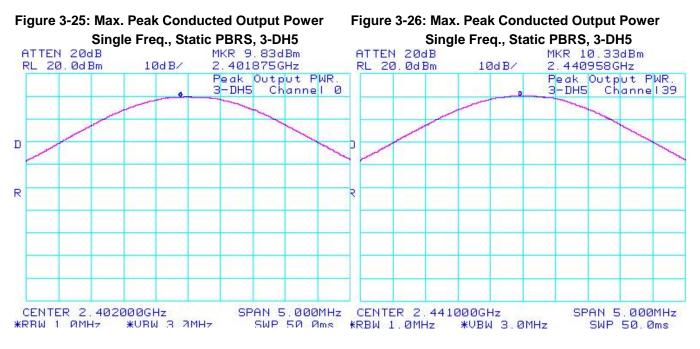
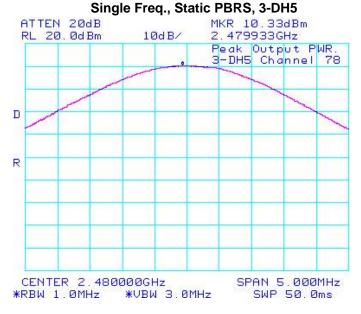


Figure 3-27: Max. Peak Conducted Output Power



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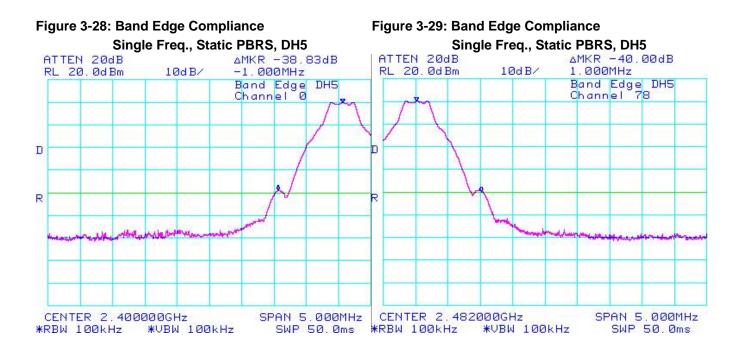
Band Edge Compliance

The EUT met the requirements of the band edge compliance as per 47 CFR 15.247(c) and RSS-210. Low channel (0) and high channel (78) were measured. Bluetooth was operating in single frequency and hopping mode.

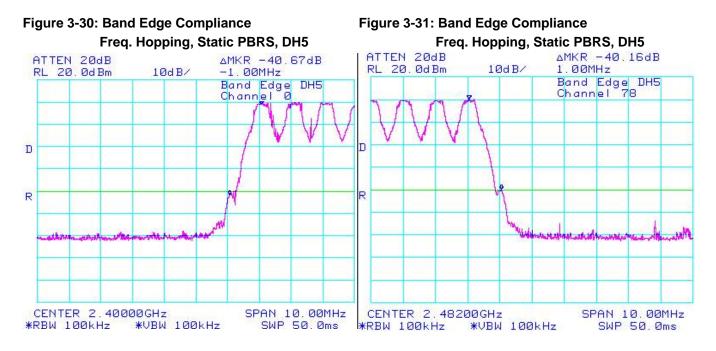
Using pattern type "Static PBRS" and packet type "DH5" during the measurements.

Bluetooth Channel	Operating Mode	Measured Level (dBc)	Limit (dBc)	Margin (dB)
0	Single Frequency	-38.83	-20	-18.83
78	Single Frequency	-40.00	-20	-20.00
0	Hopping	-40.67	-20	-20.67
78	Hopping	-40.16	-20	-20.16

See figures 3-28 to 3-31 for the plots of the band edge compliance measurements.



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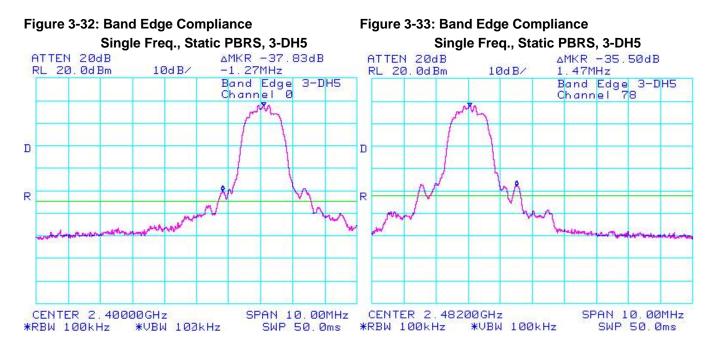


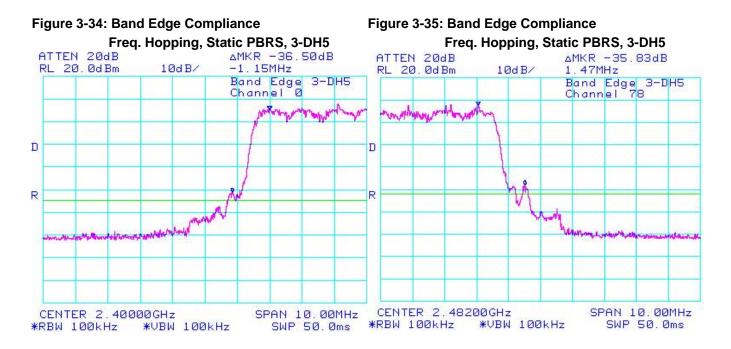
Using pattern type "Static PBRS" and packet type "<u>3-DH5</u>" during the measurements.

Bluetooth Channel	Operating Mode	Measured Level (dBc)	Limit (dBc)	Margin (dB)
0	Single Frequency	-37.83	-20	-17.83
78	Single Frequency	-35.50	-20	-15.50
0	Hopping	-36.50	-20	-16.50
78	Hopping	-35.83	-20	-15.83

See figures 3-32 to 3-35 for the plots of the band edge compliance measurements.

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Spurious RF Conducted Emissions

The EUT met the requirements of the spurious RF conducted emissions as per 47 CFR 15.247(c) and RSS-210. Low channel (0), mid channel (39) and high channel (78) were measured. Bluetooth was operating in single frequency and hopping mode. A reference offset of 12.4 dB was applied to the spectrum analyzer reference level for the attenuators and coaxial cable loss in the test circuit.

Using pattern type "Static PBRS" and packet type "DH5" during the measurements.

Bluetooth Channel	Channel Power (dBm)	Max. Measured Level (dBm)	Max. Measured Level from carrier (dBc)	Limit (dBc)
0	10.17	-33.83	-44.00	-20
39	10.50	-37.83	-48.33	-20
78	10.50	-38.17	-48.67	-20
Hopping mode	10.17	-36.00	-46.17	-20

See figures 2-36 to 2-39 for the plots of the spurious RF conducted emissions.

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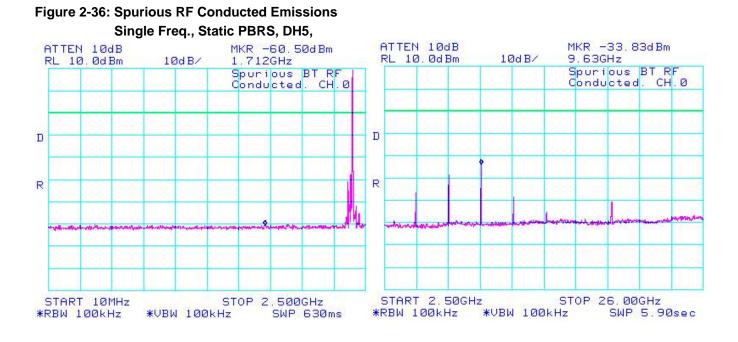
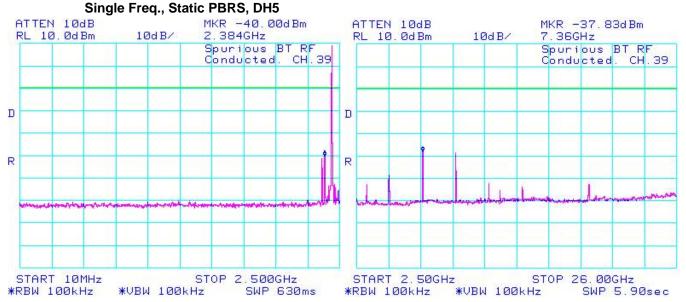


Figure 2-37: Spurious RF Conducted Emissions



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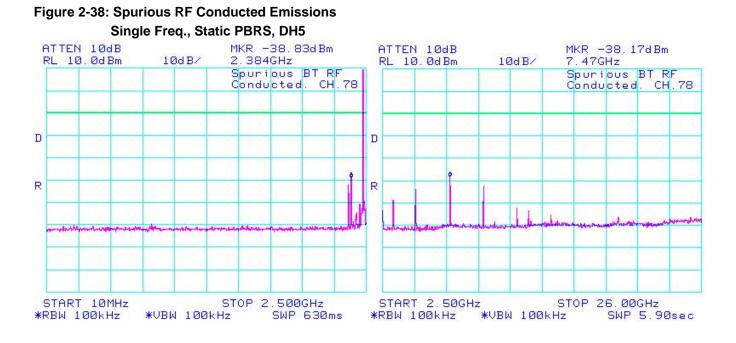
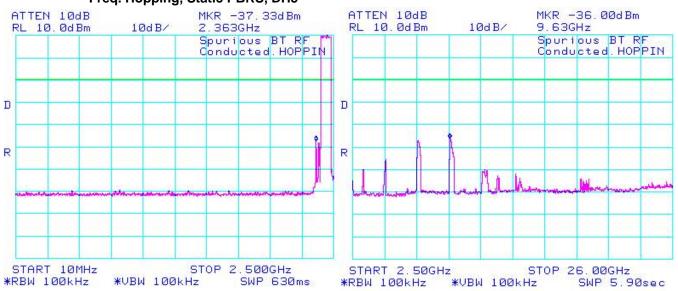


Figure 2-39: Spurious RF Conducted Emissions Freq. Hopping, Static PBRS, DH5



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Using pattern type "Static PBRS" and packet type "<u>3-DH5"</u> during the measurements.

Bluetooth Channel	Channel Power (dBm)	Max. Measured Level (dBm)	Max. Measured Level from carrier (dBc)	Limit (dBc)
0	9.83	-42.83	-52.66	-20
39	10.33	-37.17	-47.50	-20
78	10.33	-37.00	-47.33	-20
Hopping mode	9.83	-37.50	-47.33	-20

See figures 3-40 to 3-43 for the plots of the spurious RF conducted emissions.

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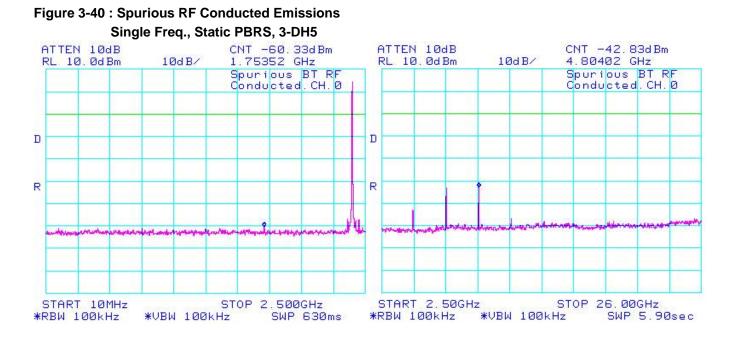
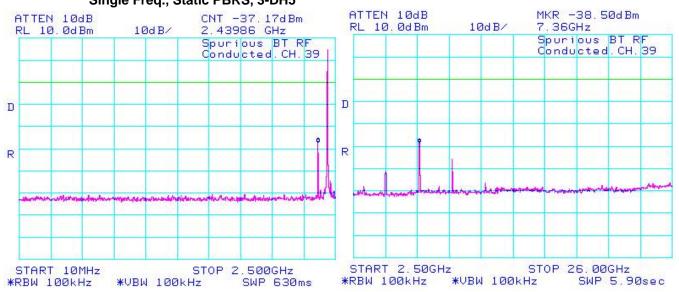


Figure 3-41: Spurious RF Conducted Emissions Single Freq., Static PBRS, 3-DH5



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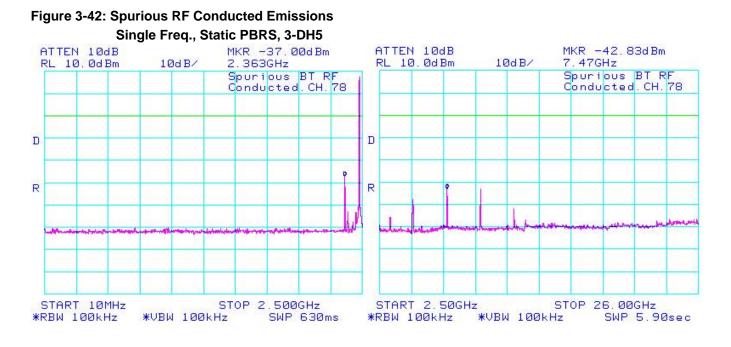
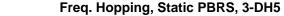
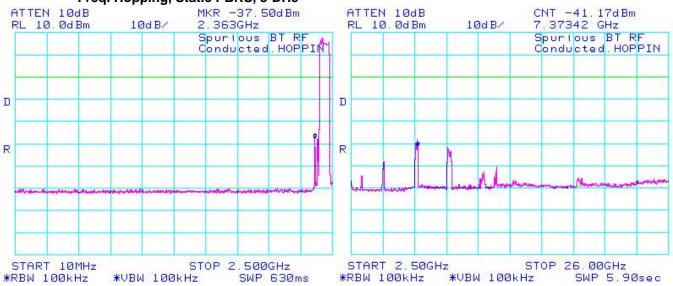


Figure 3-43 : Spurious RF Conducted Emissions





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