

EMC Test Report

Tested in accordance with
Federal Communications Commission (FCC)
Personal Communications Services
CFR 47, Parts 15.107, 15.109
&
Industry Canada (IC), ICES-003



REPORT NO.: RTS-6057-1406-14

PRODUCT MODEL NO.: RGY181LW
TYPE NAME: BlackBerry® smartphone
FCC ID: L6ARGY180LW
IC: 2503A- RGY180LW

DATE: June 11, 2014

RTS is accredited
according to
EN ISO/IEC 17025 by:



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 BlackBerry.	EMC Test Report for the BlackBerry® smartphone Model RGY181LW	
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Statement of Performance:

The BlackBerry® smartphone, model RGY181LW, part number CER-59665-001 Rev2-x05-02 and accessories when configured and operated per BlackBerry'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:

Reviewed by:

Rex Zhang
Compliance Specialist Student

Kevin Guo
Compliance Specialist I

Reviewed and Approved by:

Masud S. Attayi, P.Eng.
Manager, Regulatory Compliance

	EMC Test Report for the BlackBerry® smartphone Model RGY181LW	
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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, October, 2013 Class B Digital Devices, Unintentional Radiators
- IC ICES-003 Issue 5, August 2013, Information Technology Equipment (ITE) – Limits and methods of measurement

B. Associated Documents

- 1) RGY181LW-R135-HWD_CER-59665-001 – Rev1-x04-01
- 2) RGY181LW-R135-HWD_CER-59665-001 – Rev2-x05-02
- 3) MultiSourceDeclaration_R135_10.3.0.302_10.3.0.596
- 4) MultiSourceDeclaration_R135_10.3.0.302_10.3.0.626

C. Product Identification

Manufactured by BlackBerry Limited whose headquarters is located at:

2200 University Ave. East
Waterloo, Ontario
Canada, N2K 0A7
Phone: 519 888 7465
Fax: 519 888 6906

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

BlackBerry RTS EMC 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 May 15, 22, June 5, 10 and 23, 2014.

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The sample EUT included:

SAMPLE	MODEL	HARDWARE	PIN	Software
1	RGY181LW	CER-59665-001 Rev1-x04-00	2FFF3D4E	OS Version 10.3.0.416 Bundle: 416
2	RGY181LW	CER-59665-001 Rev1-x04-00	2FFF3D3E	OS Version 10.3.0.416 Bundle: 416
3	RGY181LW	CER-59665-001 Rev1-x04-00	2FFF3D3F	OS Version 10.3.0.416 Bundle: 416
4a	RGY181LW	CER-59665-001 Rev2-x05-02	2FFF46EB	OS Version 10.3.0.596 Bundle: 596
4b	RGY181LW	CER-59665-001 Rev2-x05-02	2FFF46EB	OS Version 10.3.0.626 Bundle: 626
5	RGY181LW	CER-59665-001 Rev2-x05-02	2FFF46FD	OS Version 10.3.0.626 Bundle: 626
6	RGY181LW	CER-59665-001 Rev2-x05-02	2FFF470E	OS Version 10.3.0.590 Bundle: 590

AC conducted testing was performed on sample 6.

Radiated Emissions testing was performed on samples 1, 2, 3, 4a, 4b and 5.

Only the characteristics that may have been affected by the changes from RGY181LW Rev1-x04-00 to RGY181LW Rev2-x05-02 were re-tested.

For more details, refer to RGY181LW-R135-HWD_CER-59665-001 - Rev1-x04-01 and RGY181LW-R135-HWD_CER-59665-001 – Rev2-x05-02.

To view the differences between software bundles 10.3.0.416 to 10.3.0.626 for RGY181LW, see document MultiSourceDeclaration_R135_10.3.0.302_10.3.0.596 and MultiSourceDeclaration_R135_10.3.0.302_10.3.0.626.

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BlackBerry® smartphone Accessories Tested

- 1) Fixed Blade Charger RevB, part number HDW-58920-001 with an output voltage of 5.0 volts dc, 1300mA
- 2) Wired Headset, part number HDW-49299-002, with a lead length of 1.1 metres
- 3) Alt. Wired Headset, part number HDW-55351-002, with a lead length of 1.1 metres
- 4) USB Data Cable, part number HDW-50071-001 Rev2, 1.2 metres long
- 5) Alt. USB Data Cable, part number HDW-51800-001 Rev2, 1.2 metres long

D. Support Equipment Used for the Testing of the EUT

- 1) Lenovo Thinkpad laptop, type 4236-D84, S/N PB-HX502 12/02, product ID 4236D84
- 2) Phillips Monitor, Model Number MWE12244T, Product ID 2444E1SB/27
- 3) HDMI Cable
- 4) HDMI-to-USB Adapter

E. Summary of Results

SPECIFICATION		TEST TYPE	Meets Requirement	Test Data APPENDIX
FCC CFR 47	IC			
Part 15.107	ICES-003,6.1	AC Powerline Conducted Emission	Yes	1
Part 15.109	ICES-003,6.1	Radiated Unintentional Spurious Emissions	Yes	2

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a) AC POWERLINE CONDUCTED EMISSIONS

The AC Powerline 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.

Test Configuration	Operating Mode(s)	Charger + Accessories
1	PCS 1900 Idle, Charging, and Video Playback	Fixed Blade Charger + Wired Headset + 1.2m USB Cable
2	LTE FDD 2, Idle, Charging and Audio Playback	Alt. Wired Headset + Alt. 1.2m USB Cable + Laptop
3	UMTS FDD II HSDPA+, Idle, Charging and Audio Playback	Fixed Blade Charger + Alt. Wired Headset + Alt. 1.2m USB Cable
4	UMTS FDD IV DC HSDPA, Idle, Charging and Video Playback	Fixed Blade Charger + Wired Headset + 1.2m USB Cable
5	PCS 1900 Idle, Charging, and Video Playback	Fixed Blade Charger + Wired Headset + Alt. 1.2m USB Cable + HDMI Cable + HDMI-to-USB Adapter + Phillips Monitor

The sample EUT's conducted emissions were compared with respect to the FCC CFR 47 Part 15.107, Class B Limit, and IC ICES-003, 6.1. The sample EUT had a worst case test margin of 13.34 dB below the QP limit at 0.528 MHz using the QP detector in Test Configuration 5.

Measurement Uncertainty ± 3.2 dB

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

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b) RADIATED UNINTENTIONAL SPURIOUS EMISSIONS

The radiated unintentional spurious 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 radiated emissions were measured up to the fifth harmonic of the highest frequency of the band tested. 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 modified semi-anechoic chamber (modified SAC) with floor absorbers above 1 GHz. The SAC's FCC registration number is **778487** and the Industry Canada (IC) file number is **2503B-1**. The modified SAC'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 BlackBerry's specifications.

The BlackBerry® smartphone was in battery charging mode for all configurations. The ac input voltage was 120V, 60Hz.

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Test Configuration	Operating Mode(s)	Charger + Accessories
1	PCS 1900, Idle, Charging and Video Playback	Fixed Blade Charger + Wired Headset + 1.2m USB Cable
2	LTE FDD 2, Idle, Charging and Audio Playback	Alt. Wired Headset + Alt. 1.2m USB Cable + Laptop
3	NFC, Tx, Charging and Video Playback	Fixed Blade Charger + Wired Headset + 1.2m USB Cable
4	UMTS FDD II HSDPA+, Idle, Charging and Audio Playback	Fixed Blade Charger + Alt. Wired Headset + Alt. 1.2m USB Cable
5	UMTS FDD IV DC HSDPA, Idle, Charging and Video Playback	Fixed Blade Charger + Wired Headset + 1.2m USB Cable
6	Bluetooth, Tx, Charging and Video Playback	Fixed Blade Charger + Wired Headset + 1.2m USB Cable
7	802.11b, Tx, Charging and Audio Playback	Fixed Blade Charger + Alt. Wired Headset + Alt. 1.2m USB Cable
8	802.11ac, Tx, Charging and Video Playback	Fixed Blade Charger + Wired Headset + Alt. 1.2m USB Cable
9	PCS 1900, Idle, Charging and Video Playback	Fixed Blade Charger + Wired Headset + Alt. 1.2m USB Cable + HDMI Cable + HDMI-to-USB Adapter + Phillips Monitor

The system's radiated emission levels were compared with respect to the FCC CFR 47 Part 15.109, Class B limit and IC ICES-003, 6.2.

The system met the requirements with a worst case emission test margin of 3.11 dB below the QP limit at 126.05 MHz using QP detector in Test Configuration 9.

To view the test data see APPENDIX 2.

Sample Calculation:

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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 ±4.2 dB

F. 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	14-10-16	Radiated Emissions
Preamplifier system	TDK RF Solutions	PA-02	080010	14-10-16	Radiated Emissions
EMI Receiver	Rohde & Schwarz	ESIB 40	100255	14-12-11	Radiated Emissions
Environment Monitor	OMEGA	iTHX-SD	0380561	16-11-15	Radiated Emission
Environment Monitor	OMEGA	iTHX-SD	0380567	16-11-15	Radiated Emission
L.I.S.N.	Rohde & Schwarz	ENV216	100060	15-10-08	AC Powerline Conducted Emissions
Hybrid Log Antenna	EMC Automation	HLP-3003C	081701	14-08-13	Radiated Emissions
Horn Antenna	EMC Automation	HRN-0118	030101	14-07-08	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA-SP	001	14-10-13	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	837493/073	14-11-24	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	112394	14-11-25	Radiated/AC Powerline Conducted Emission
Universal Radio Communication Tester	Rohde & Schwarz	CMW500	101469	14-12-09	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMW500	109949	14-12-07	Radiated /RF Conducted Emission
EMI Test Receiver	Rohde & Schwarz	ESU 40	100162	14-12-08	Radiated/AC Powerline Conducted Emission
Bluetooth Tester	Rohde & Schwarz	CBT	100368	14-12-04	Radiated Emissions

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Bluetooth Tester	Rohde & Schwarz	CBT	100737	14-12-05	Radiated/AC Powerline Conducted Emission
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G. Test Software Used

<u>SOFTWARE</u>	<u>COMPANY</u>	<u>VERSION</u>	<u>USE</u>
EMC32	Rohde & Schwarz	8.52.0	Radiated Emissions
TDK Standard Emission Test	TDK RF Solutions	8.53.1.62	Radiated Emissions

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APPENDIX 1 - AC POWERLINE CONDUCTED EMISSIONS TEST DATA

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AC Powerline Conducted Emissions Test Results

The following tests were performed by Kevin Guo.

Test Configuration 1

Date of the test: May 29, 2014

The environmental conditions were: Temperature: 26.0 °C
Humidity: 23.9 %

Frequency (MHz)	Line	Reading (QP) (dBμV)	Correction Factor (dB)	Corrected Reading (QP) (dBμV)	Limit (QP) (dBμV)	Limit (AV) (dBμV)	Margin (QP) Limits (dB)
0.164	L1	40.21	11.11	51.32	65.30	55.30	-13.98
0.182	N	35.08	11.01	46.10	64.40	54.40	-18.30
0.227	L1	31.83	10.67	42.50	62.60	52.60	-20.10
0.488	L1	28.27	9.92	38.19	56.20	46.20	-18.02
0.506	N	28.44	9.91	38.35	56.00	46.00	-17.65
1.010	L1	26.16	9.80	35.96	56.00	46.00	-20.04
1.284	L1	24.22	9.80	34.02	56.00	46.00	-21.98

All other emissions are at least 25 dB below the limit.

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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AC Powerline Conducted Emissions Test Graphs

Test Configuration 1

Figure 1-1: L1 lines

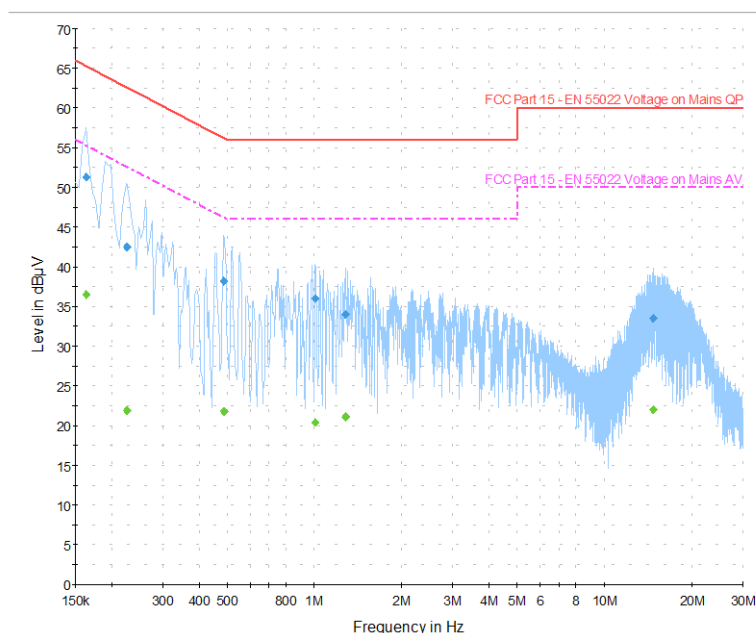
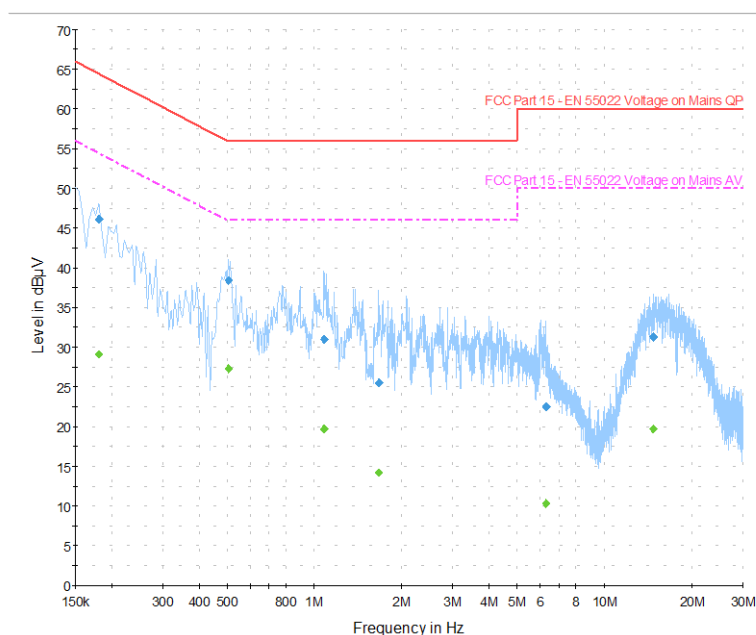


Figure 1-2: N Lines



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AC Powerline Conducted Emissions Test Results cont'd

Test Configuration 2

Date of the test: May 29, 2014

The environmental conditions were: Temperature: 26.0 °C
Humidity: 23.9 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dBµV)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.155	L1	31.46	11.17	42.63	65.80	55.80	-23.17

All other emissions are at least 25 dB below the limit.

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.

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AC Powerline Conducted Emissions Test Graphs

Test Configuration 2

Figure 1-3: L1 lines

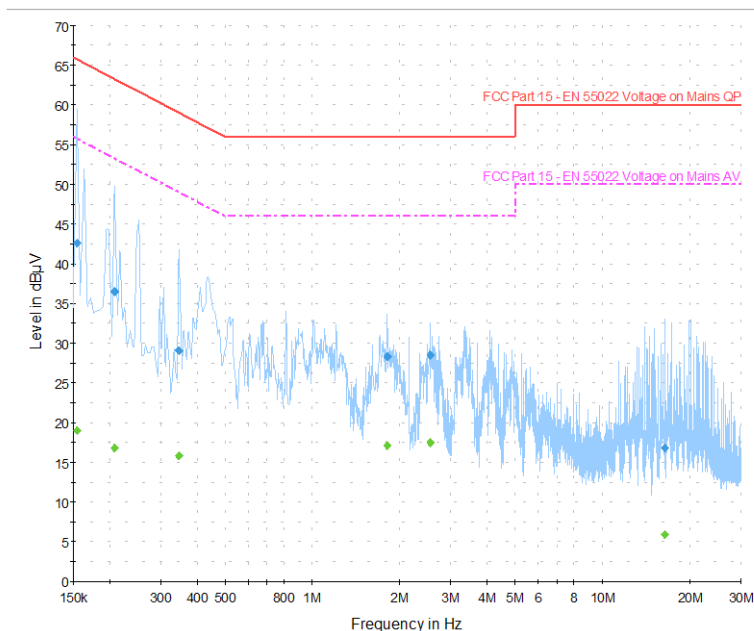
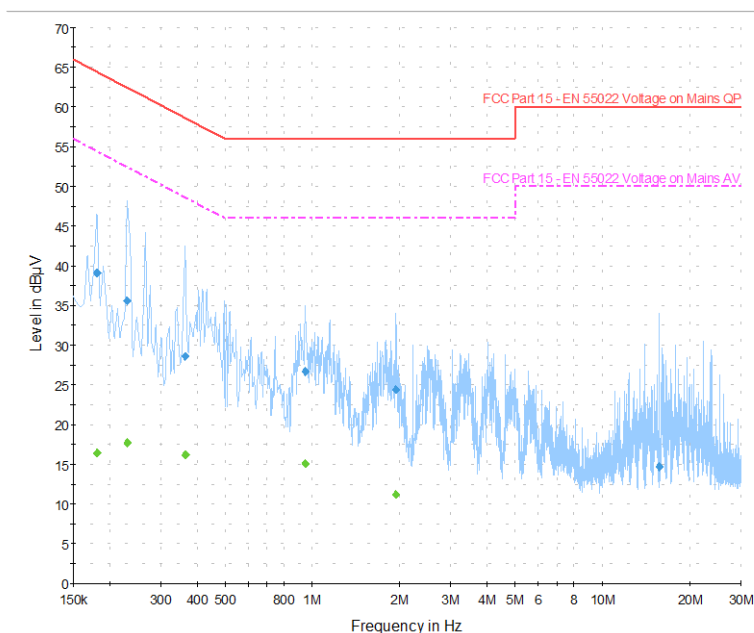


Figure 1-4: N Lines



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AC Powerline Conducted Emissions Test Results cont'd

Test Configuration 3

Date of the test: May 29, 2014

The environmental conditions were: Temperature: 26.0 °C
Humidity: 23.9 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dBµV)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.177	L1	33.53	11.02	44.55	64.60	54.60	-20.06
0.186	N	28.66	10.98	39.64	64.20	54.20	-24.56
0.488	N	22.69	9.92	32.61	56.20	46.20	-23.59
0.519	L1	31.44	9.90	41.34	56.00	46.00	-14.66
0.555	N	21.20	9.89	31.09	56.00	46.00	-24.91
0.866	L1	23.84	9.81	33.65	56.00	46.00	-22.35

All other emissions are at least 25 dB below the limit.

Measurements were done with the quasi-peak detector.

See figure 1-5 and figure 1-6 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

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AC Powerline Conducted Emissions Test Graphs

Test Configuration 3

Figure 1-5: L1 lines

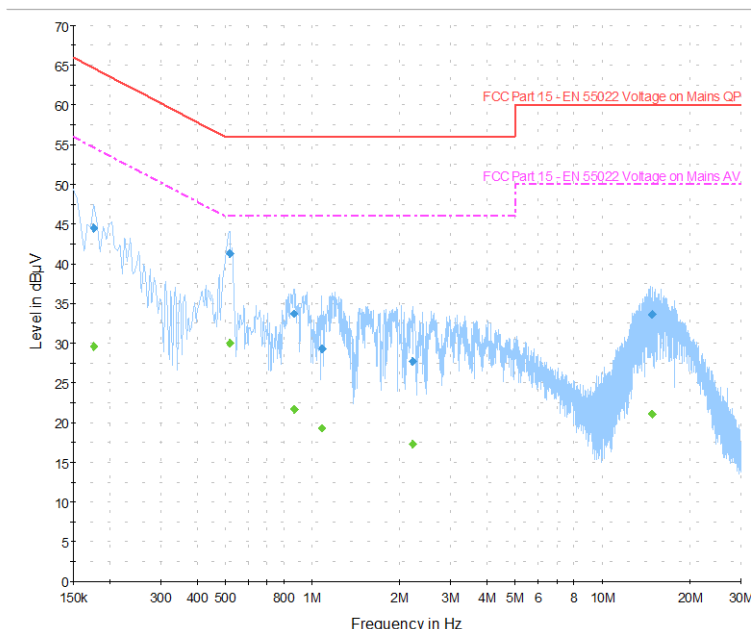
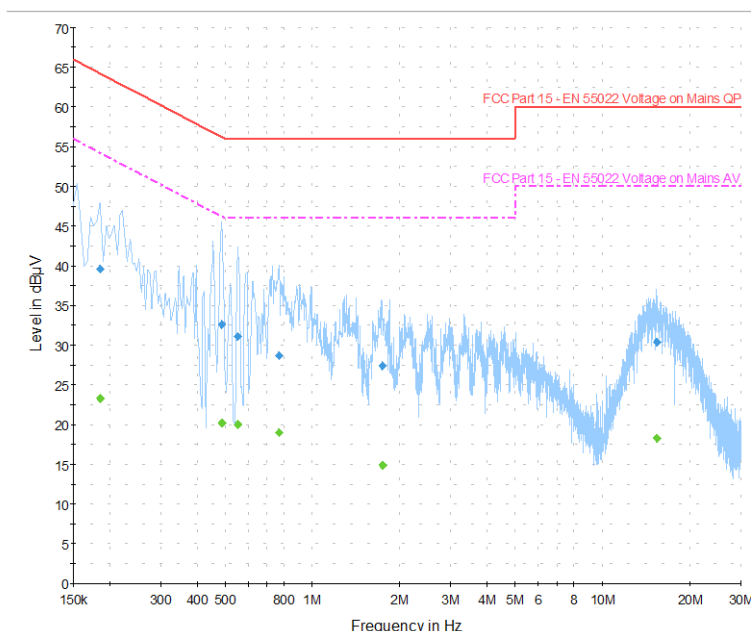


Figure 1-6: N Lines



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AC Powerline Conducted Emissions Test Results cont'd

Test Configuration 4

Date of the test: May 29, 2014

The environmental conditions were: Temperature: 26.0 °C
Humidity: 23.9 %

Frequency (MHz)	Line	Reading (QP) (dBμV)	Correction Factor (dB)	Corrected Reading (QP) (dBμV)	Limit (QP) (dBμV)	Limit (AV) (dBμV)	Margin (QP) Limits (dB)
0.168	N	29.60	11.11	40.71	65.10	55.10	-24.39
0.546	L1	24.87	9.88	34.75	56.00	46.00	-21.25

All other emissions are at least 25 dB below the limit.

Measurements were done with the quasi-peak detector.

See figure 1-7 and figure 1-8 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

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AC Powerline Conducted Emissions Test Graphs

Test Configuration 4

Figure 1-7: L1 lines

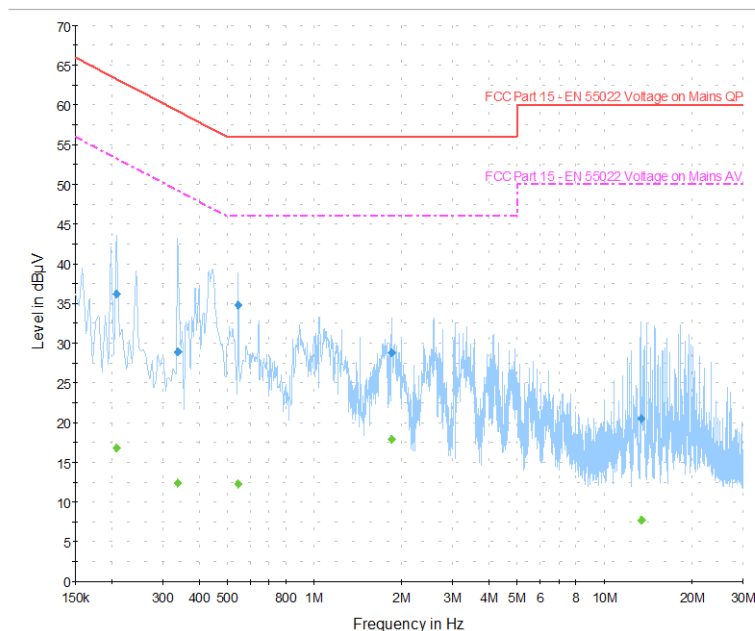
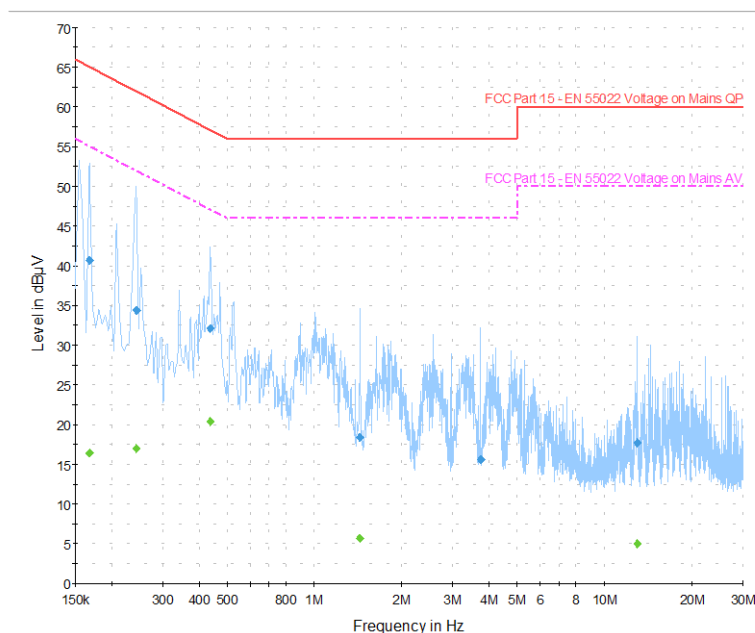


Figure 1-8: N Lines



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AC Powerline Conducted Emissions Test Results cont'd

Test Configuration 5

Date of the test: June 23, 2014

The environmental conditions were: Temperature: 23.5 °C
Humidity: 44.9 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dBµV)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.150	L1	37.00	11.20	48.20	66.00	56.00	-17.80
0.182	L1	33.62	10.99	44.60	64.40	54.40	-19.80
0.191	N	30.26	10.95	41.21	64.00	54.00	-22.79
0.465	L1	26.62	9.93	36.55	56.60	46.60	-20.05
0.528	N	32.76	9.90	42.66	56.00	46.00	-13.34
1.086	L1	26.11	9.80	35.92	56.00	46.00	-20.09
1.388	N	29.09	9.81	38.89	56.00	46.00	-17.11
1.406	N	28.38	9.81	38.19	56.00	46.00	-17.81
2.756	L1	26.96	9.86	36.82	56.00	46.00	-19.18
3.485	N	28.23	9.89	38.12	56.00	46.00	-17.88
5.114	L1	29.13	9.91	39.04	60.00	50.00	-20.96
5.172	N	31.59	9.91	41.51	60.00	50.00	-18.49

All other emissions are at least 25 dB below the limit.

Measurements were done with the quasi-peak detector.

See figure 1-9 and figure 1-10 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

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AC Powerline Conducted Emissions Test Graphs

Test Configuration 5

Figure 1-9: L1 lines

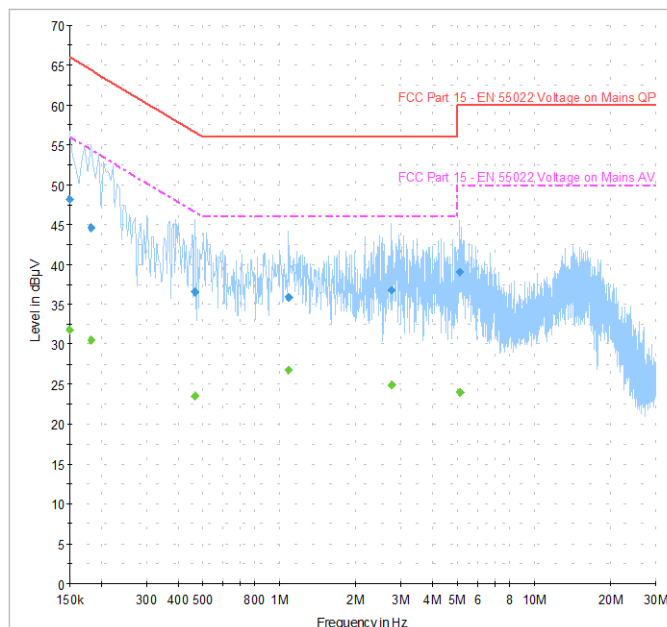
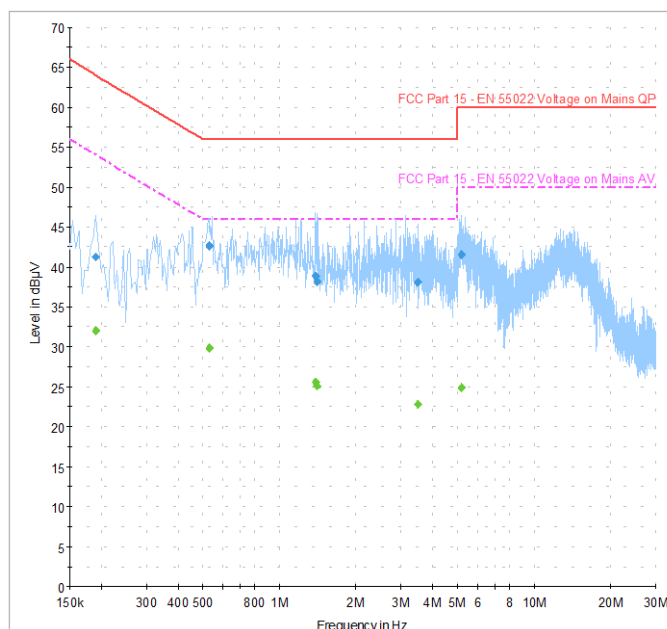


Figure 1-10: N Lines



	EMC Test Report for the BlackBerry® smartphone Model RGY181LW Appendix 2	
Test Report No. RTS-6057-1406-14	Date of Test May 15 to June 23, 2014	FCC ID: L6ARGY180LW IC : 2503A-RGY180LW

APPENDIX 2 - RADIATED UNINTENTIONAL SPURIOUS EMISSIONS TEST DATA

	EMC Test Report for the BlackBerry® smartphone Model RGY181LW Appendix 2	
Test Report No. RTS-6057-1406-14	Date of Test May 15 to June 23, 2014	FCC ID: L6ARGY180LW IC : 2503A-RGY180LW

Radiated Unintentional Spurious Emissions Test Results

The following tests were performed by Rex Zhang and Kevin Guo.

Test Configuration 1

Date of the test: May 15 and 22, 2014

The environmental conditions were: Temperature: 26.0 °C
Humidity: 31.1 %

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 (dBµV/m)	Test Margin (dB)
	Pol. (V/H)	Height (metres)							
45.400	V	1.42	22.00	Q.P.	39.66	-15.20	24.46	40.00	-15.54
185.400	H	1.83	158.00	Q.P.	43.93	-9.89	34.04	43.50	-9.46
187.150	H	2.00	150.00	Q.P.	43.73	-9.81	33.92	43.50	-9.58
195.150	V	1.42	333.00	Q.P.	42.41	-8.85	33.56	43.50	-9.94
278.400	H	1.04	174.00	Q.P.	44.34	-7.62	36.72	46.00	-9.28
280.000	H	1.21	192.00	Q.P.	44.90	-7.47	37.43	46.00	-8.57
361.500	H	1.09	30.00	Q.P.	28.93	-3.86	25.07	46.00	-20.93

All other emissions are at least 25 dB below the limit.

 BlackBerry	EMC Test Report for the BlackBerry® smartphone Model RGY181LW Appendix 2	
Test Report No. RTS-6057-1406-14	Date of Test May 15 to June 23, 2014	FCC ID: L6ARGY180LW IC : 2503A-RGY180LW

Radiated Unintentional Spurious Emissions Test Results cont'd

Test Configuration 4

Date of the test: May 22, 2014

The environmental conditions were: Temperature: 25.0 °C
Humidity: 31.2 %

Frequency (MHz)	Antenna		Test Angle (Deg.)	Detect or (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 (dBµV/m)	Test Margin (dB)
	Pol. (V/H)	Height (metres)							
42.650	V	1.47	282.00	Q.P.	37.07	-14.62	22.45	40.00	-17.55
187.500	V	1.46	64.00	Q.P.	42.22	-9.77	32.45	43.50	-11.05
280.300	H	1.03	239.00	Q.P.	43.25	-7.43	35.82	46.00	-10.18
348.800	H	1.00	173.00	Q.P.	27.49	-1.00	26.49	46.00	-19.51

All other emissions are at least 25 dB below the limit.

