

EMI Test Report

Tested in accordance with
Federal Communications Commission (FCC)
Personal Communications Services
CFR 47, Parts 2, 22, 24 and 27
&
Industry Canada (IC), RSS-GEN, 132 and 133



A division of Research In Motion Limited

REPORT NO.: RTS-6012-1211-57_Rev2

PRODUCT MODEL NO.:	RFA91LW
TYPE NAME:	BlackBerry® smartphone
FCC ID:	L6ARFA90LW
IC:	2503A-RFA90LW
EMISSION DESIGNATOR (GSM):	247KGXW
EMISSION DESIGNATOR (EDGE):	245KG7W
EMISSION DESIGNATOR (CDMA):	1M31F9W
EMISSION DESIGNATOR (LTE QPSK):	8M92G7D
EMISSION DESIGNATOR (LTE 16QAM):	8M92D7W


DATE: February 05, 2013

This report supersedes the report RTS-6012-1211-57_Rev1 dated January 04, 2013.

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



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Report revision History:

Rev1:

1. Adding ERP of LTE Band 13 in 16QAM mode.

Rev2:

1. Remove Low and high Channels result for 10MHz bandwidth of LTE Band 13.
2. Adding Frequency Stability test result for 5MHz bandwidth of LTE Band 13.

Statement of Performance:

The BlackBerry® smartphone, model RFA91LW, part number CER-48926-001 Rev 2 and accessories when configured and operated per RIM’s operation instructions, and 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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A. Scope

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

- FCC CFR 47 Part 2, Oct, 2011.
- FCC CFR 47 Part 22, Subpart H, Cellular Radiotelephone Services, Oct., 2011.
- FCC CFR 47 Part 24 Subpart E, Broadband PCS, Oct., 2011.
- Industry Canada, RSS-132 Issue 2, September 2005, Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz.
- Industry Canada, RSS-133 Issue 5, February 2009, 2 GHz Personal Communications Services.
- Industry Canada, RSS-GEN Issue 3, December 2010, General Requirements and Information for the Certification of Radio communication Equipment.

B. Associated Documents

1. RFA91LW_HW_Declaration_CER-48926-001_Rev2
2. MultiSourceDeclaration_RFA91LW_b1848
3. MultiSourceDeclaration_RFA91LW_10.0.9.602
4. MultiSourceDeclaration_RFA91LW_10.0.9.927
5. MultiSourceDeclaration_RFA91LW_10.0.9.1107

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 August 20 – September 27, October 25 to December 13, 2012, 2012, January 04 and February 05 2013.

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BlackBerry® smartphone Samples Tested

Sample	Model	CER NUMBER	PIN	Software Information
1	RFA91LW	CER-48926-001 Rev1	332BED93	OS: 127.0.1.1651
2	RFA91LW	CER-48926-001 Rev2	332F96DD	OS: 10.0.9.602
3	RFA91LW	CER-48926-001 Rev2	332F9789	OS: 10.0.9.602
4	RFA91LW	CER-48926-001 Rev2	332F96D0	OS: 10.0.9.1107
5	RFA91LW	CER-48926-001 Rev1	332BED61	OS: 127.0.1.1651
6	RFA91LW	CER-48926-001 Rev2	332F96D8	OS: 10.0.9.602
7A	RFA91LW	CER-48926-001 Rev1	332BED6A	OS: 127.0.1.1651
7B	RFA91LW	CER-48926-001 Rev1	332BED6A	OS: 127.0.1.1848
8A	RFA91LW	CER-48926-001 Rev2	332F96E0	OS: 10.0.9.927
8B	RFA91LW	CER-48926-001 Rev2	332F96E0	OS: 10.0.9.1107

RF Conducted Emissions testing was performed on samples 1, 2, 3, and 4.
RF Radiated Emissions testing was performed on samples 5, 6, 7A, 7B, 8A and 8B.

Only the characteristics that may have been affected by the changes from RFA91LW Rev1 to RFA91LW Rev2 were re-tested.

For more details, refer to RFA91LW_HW_Declaration_CER-48926-001_Rev2.

To view the differences between OS: 127.0.1.1651 and OS: 10.0.9.1107, see documents

MultiSourceDeclaration_RFA91LW_b1848,
MultiSourceDeclaration_RFA91LW_10.0.9.602,
MultiSourceDeclaration_RFA91LW_10.0.9.927 and
MultiSourceDeclaration_RFA91LW_10.0.9.1107

BlackBerry® smartphone Accessories Tested

- 1) Bat. LS1, part number BAT-47277-001.

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D. Support Equipment Used for the Testing of the EUT

No support equipment required; for list of equipment refer to section G, Compliance Test Equipment Used.

E. Test Results Chart

SPECIFICATION		TEST TYPE	RESULT	TEST DATA APPENDIX
FCC CFR 47	IC			
Part 2.1051 Part 22.917 Part 24.238	RSS-GEN, 4.9 RSS-132, 4.5 RSS-133, 6.5	GSM850 / PCS1900 Conducted Spurious Emissions	Pass	1A
Part 2.1049 Part 22.917 Part 24.238	RSS-GEN, 4.6	GSM 850 / PCS1900 Occupied Bandwidth and Channel Mask	Pass	1A
Part 2.1046(a)	RSS-132, 4.4 RSS-133, 6.4	GSM850 / PCS1900 Conducted RF Output Power	Pass	1B
Part 2.1055 Part 24.235	RSS-132, 4.3 RSS-133, 6.3	GSM 850 /PCS 1900 Frequency Stability vs. Temperature and Voltage	Pass	1C
Part 22.913(a)(2) Part 24.232(c)	RSS-132, 4.4 RSS-133, 6.4	GSM850 ERP / PCS1900 EIRP	Pass	1D
Part 2.1053 Part 22.917 Part 24.238	RSS-GEN, 4.9 RSS-132, 4.5 RSS-133, 6.5	GSM850 / PCS1900 Radiated Spurious/Harmonic Emissions	Pass	1D
Part 2.1051 Part 22.917 Part 24.238	RSS-GEN, 4.9 RSS-132, 4.5	CDMA CELL/PCS Conducted Spurious Emissions	Pass	2A
Part 2.1049 Part 22.917 Part 24.238	RSS-GEN, 4.6	CDMA CELL / PCS Occupied Bandwidth and Channel Mask	Pass	2A
Part 2.1046(a)	RSS-132, 4.4	CDMA CELL / PCS Conducted RF Output Power	Pass	2B
Part 2.1055 Part 24.235	RSS-132, 4.3	CDMA CELL / PCS Frequency Stability vs. Temperature and Voltage	Pass	2C
Part 22.913(a)(2) Part 24.232(c)	RSS-132, 4.4	CDMA CELL ERP / CDMA PCS EIRP	Pass	2D
Part 2.1053 Part 22.917 Part 24.238	RSS-GEN, 4.9 RSS-132, 4.5	CDMA CELL / PCS Radiated Spurious/Harmonic Emissions	Pass	2D




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Part 2.1051 Part 27.53	-	LTE Band 13 Conducted Spurious Emissions	Pass	3A
Part 2.1049 Part 27.53(c)(4)	-	LTE Band 13 Occupied Bandwidth and Channel Mask	Pass	3A
Part 27.50 (d)(5)	-	LTE Band 13 Peak to Average Ratio measurements	Pass	3A
Part 2.1046(a)	-	LTE Band 13 Conducted RF Output Power	Pass	3B
Part 2.1055 Part 27.54	-	LTE Band 13 Frequency Stability vs. Temperature and Voltage	Pass	3C
Part 2.1053 Part 27.50(b)(10)	-	LTE Band 13 ERP	Pass	3D
Part 2.1053 Part 27.53	-	LTE Band 13 Radiated Spurious/Harmonic Emissions	Pass	3D

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F. Summary of Results

1) Conducted Emission Measurements

a) The BlackBerry® smartphone met the requirements of the Tx Conducted Spurious Emissions in the GSM850 as per 47 CFR 2.1051, CFR 22.917, RSS-132, 4.5 and RSS-GEN, 4.9. The EUT was measured on the low, middle and high channels. The frequency range investigated was from 10 MHz to 10 GHz. See APPENDIX 1A for test data.


The BlackBerry® smartphone met the requirements of the Tx Conducted Spurious Emissions in the PCS1900 as per 47 CFR 2.1051, CFR 24.238(a) RSS-133, 6.5 and RSS-GEN, 4.9. The EUT was measured on the low, middle and high channels. The frequency range investigated was from 30 MHz to 20 GHz. See APPENDIX 1A for test data

b) The BlackBerry® smartphone met the requirements of the Occupied Bandwidth and channel mask in the GSM850 as per 47 CFR 2.1049, CFR 22.917 and RSS-GEN, 4.6. The EUT was measured in CALL and EDGE mode on the low, middle and high channels. The worst case occupied bandwidth was 247 kHz on the low channel in CALL mode, and 245 kHz on the mid channel in EDGE mode. See APPENDIX 1A for test data.

The BlackBerry® smartphone met the requirements of the Occupied Bandwidth and channel mask in the PCS1900 as per 47 CFR 2.1049, CFR 24.238 and RSS-GEN, 4.6. The EUT was measured in CALL and EDGE mode on the low, middle and high channels. The worst case occupied bandwidth was 245 kHz on the low channel in CALL mode, and 245 kHz on the high channels in EDGE mode. See APPENDIX 1A for test data.

c) The BlackBerry® smartphone met the requirements of the Tx Conducted RF output Power in the GSM850 as per 47 CFR 2.1046, and RSS-132, 4.4. The EUT was measured on the low, middle and high channel. See APPENDIX 1B for test data.

The BlackBerry® smartphone met the requirements of the Tx Conducted RF output Power in the PCS1900 as per 47 CFR 2.1046, and RSS-133, 6.4. The EUT was measured on the low, middle and high channels. See APPENDIX 1B for test data

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The BlackBerry® smartphone met the requirements of the Frequency Stability in the GSM850 as per 47 CFR 2.1055 and RSS-132, 4.3. The EUT was measured in GSM850 mode on the low, middle and high channels. See APPENDIX 1C for test data.

The BlackBerry® smartphone met the requirements of the Frequency Stability in the PCS1900 as per 47 CFR 2.1055, CFR 24.238 and RSS-133, 6.3. The EUT was measured in PCS1900 mode on the low, middle and high channels. See APPENDIX 1C for test data.


d) The EUT met the requirements of the Conducted Spurious Emissions in the CDMA Cellular band as per 47 CFR 2.1051, CFR 22.917, RSS-132, 4.5 and RSS-Gen, 4.9. The EUT was measured in Loopback and 1xEVDO mode on the low, middle and high channels. The frequency range investigated was from 30 MHz to 10 GHz. See APPENDIX 2A for the test data.

The BlackBerry® smartphone met the requirements of the Conducted Spurious Emissions in the CDMA PCS band as per 47 CFR 2.1051, CFR 24.238, RSS-133, 6.5 and RSS-Gen, 4.9. The EUT was measured in Loopback and 1xEVDO mode on the low, middle and high channels. The frequency range investigated was from 30 MHz to 20 GHz. See APPENDIX 2A for the test data.

e) The BlackBerry® smartphone met the requirements of the Occupied Bandwidth in the CDMA Cellular band as per 47 CFR 2.1049, CFR 22.917 and RSS-Gen, 4.6. The EUT was measured in Loopback and 1xEVDO mode on the low, middle and high channels. The worst case occupied bandwidth was 1.271 MHz on middle channel in Loopback mode and 1.308 MHz on high channel in 1xEVDO mode. See APPENDIX 2A for the test data.

The BlackBerry® smartphone met the requirements of the Occupied Bandwidth and channel mask in the CDMA PCS band as per 47 CFR 2.1049, CFR 24.238 and RSS-Gen, 4.6. The EUT was measured in Loopback and 1xEVDO mode on the low, middle and high channels. The worst case occupied bandwidth was 1.279 MHz on low channel in Loopback mode and 1.305 MHz on all channels in 1xEVDO mode. See APPENDIX 2A for the test data.

f) The BlackBerry® smartphone met the requirements of the Conducted RF Output Power in CDMA Cellular as per 47 CFR 2.1046, and RSS-132, 4.4.. The EUT was measured in Loopback and 1xEVDO mode on the low, middle and high channels. See APPENDIX 2B for test data.

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The BlackBerry® smartphone met the requirements of the Conducted RF Output Power in CDMA PCS band as per 47 CFR 2.1046, and RSS-133, 6.4.. The EUT was measured in Loopback and 1xEVDO mode on the low, middle and high channels

See APPENDIX 2B for test data.

g) The BlackBerry® smartphone met the requirements of the Frequency Stability vs. Temperature and Voltage for CDMA Cellular band as per 47 CFR 2.1055 and RSS-132, 4.3.. The EUT was measured in Cellular mode on the low, middle and high channels.

See APPENDIX 2C for test data.

The BlackBerry® smartphone met the requirements of the Frequency Stability vs. Temperature and Voltage requirements for the PCS band as per 47 CFR 2.1055, CFR 24.238 and RSS-133, 6.3. The EUT was measured in CDMA PCS mode on the low, middle and high channels.

See APPENDIX 2C for test data.

h) The BlackBerry® smartphone met the requirements of the Tx Conducted Spurious Emissions in the LTE Band 13 as per 47 CFR 2.1051, CFR 27.53. The EUT was measured on the low, middle and high channels in 5MHz and 10MHz, bandwidths for LTE Band 13 with QPSK and 16-QAM modulations. Different resource block allocations were investigated, a minimum one resource block case was also tested. The frequency range investigated was from 30 MHz to 20 GHz.


See Appendix 3A for test data

i) The BlackBerry® smartphone met the requirements of the Occupied Bandwidth and channel mask in the LTE Band 13 as per 47 CFR 2.1049, CFR 27.53. The EUT was measured on the low, middle and high channels. The worst case occupied bandwidth was 8.92 MHz on the middle channel in 10MHz BW, 50 resource blocks and QPSK modulation.

See Appendix 3A for test data

j) The BlackBerry® smartphone met the requirements of the Tx Peak to Average Ratio in the LTE Band 13 as per 47 CFR 27.50 (d)(5). The EUT was measured on the low, middle and high channels in 5MHz and 10MHz bandwidths for LTE Band 13 with QPSK and 16-QAM modulations. Different resource block allocations were also investigated, a minimum one resource block case was also tested. The worst case Peak to Average Ratio was 9.66 dB on the low channel in 10MHz bandwidth with 25 resource blocks.

See APPENDIX 3A for test data

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k) The BlackBerry® smartphone met the requirements of the Tx Conducted RF output Power in the LTE Band 13 as per 47 CFR 2.1046. The EUT was measured on the low, middle and high channels in 5MHz and 10MHz bandwidths for LTE Band 13 with QPSK and 16-QAM modulations. Different resource block allocations were also investigated, a minimum one resource block case was also tested. See APPENDIX 3B for test data

l) The BlackBerry® smartphone met the requirements of the Frequency Stability in the LTE Band 13 as per 47 CFR 2.1055, CFR 27.54. The EUT was measured in LTE Band 13 mode on the low, middle and high channels in 10MHz BW with 50 resource blocks and QPSK modulation. See APPENDIX 3C for test data.


2) Radiated Emission Measurements

The radiated spurious emissions/harmonics and ERP/EIRP were measured. The emissions were maximized by elevating the antenna in the range of 1 to 4 meters. The signal generator output was then adjusted to match the BlackBerry® smartphone output reading. The signal generator output was recorded. Both the horizontal and vertical polarizations of the emissions were measured.

The following measurements were done in a semi-anechoic chamber (SAC) below 1 GHz and a Semi-anechoic Chamber ((SAC) with floor absorber) above 1 GHz. The SAC's FCC registration number is **778487** and the Industry Canada (IC) file number is **2503B-1**. The SAC with floor absorber's FCC registration number is **959115** and the IC file number is **2503C-1**. The BlackBerry® smartphone was measured on the low, middle and high channels.

a) The radiated spurious emissions/harmonics and ERP/EIRP were measured for GSM850 and PCS1900. The results are within the limits.

- The highest ERP in the 850 band Call mode measured was 30.22 dBm (1.05 W) at 824.20 MHz (channel 128)
- The highest ERP in the 850 band EDGE mode measured was 26.42 dBm (0.44 W) at 824.20 MHz (channel 128).
- The highest EIRP in the PCS band Call mode measured was 32.85 dBm (1.93 W) at 1909.80 MHz (channel 810).
- The highest EIRP in the PCS band EDGE mode measured was 30.05 dBm (1.01 W) at 1909.80 MHz (channel 810).

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The radiated spurious emission and carrier harmonics were measured up to the 10th harmonic for low, middle, and high channels in the GSM850 and PCS1900. Each band was measured in CALL and EDGE modes, with both the horizontal and vertical polarizations.

- The worst margin was 12.9dB below the limit at 1673.116MHz in the GSM850 band in CALL mode.
- All emissions in the PCS1900 were greater than 25 dB below the accepted limits for all test frequencies.

See Appendix 1D for test data.

b) The radiated spurious emissions/harmonics and ERP/EIRP were measured for CDMA Cellular and CDMA PCS. The results are within the limits.

- The highest ERP measured in the CDMA Cellular band, Loopback Service mode, was 22.90 dBm (0.19 W) at 824.70 MHz (channel 1013).
- The highest ERP measured in the CDMA Cellular band, 1xEVDO mode, was 22.69 dBm (0.19 W) at 824.70 MHz (channel 1013).
- The highest EIRP measured in the CDMA PCS band, Loopback Service mode, was 29.03 dBm (0.80 W) at 1880.00 MHz (channel 600).
- The highest EIRP measured in the CDMA PCS band, 1xEVDO mode, was 29.65 dBm (0.92 W) at 1880.00 MHz (channel 600).


The radiated carrier harmonics were measured up to the 10th harmonic for low, middle and high channels in the Cellular and PCS. Each band was measured in Loopback, Test Data and EVDO modes, with both the horizontal and vertical polarizations.

- All emissions were greater than 25 dB below the accepted limits for all test frequencies.

See Appendix 2D for test data.

c) The radiated spurious emissions/harmonics and ERP were measured for LTE Band 13.

The EUT was measured on the low, middle and high channels in 5MHz and 10MHz bandwidths for LTE band 13 with QPSK and 16-QAM modulations. Different resource block allocations were investigated, a minimum one resource

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block case was also tested. Both the horizontal and vertical polarizations were measured.

The highest ERP in the LTE band 13 measured was 21.58 dBm (0.14 W) at 779.5 MHz (channel 23205) in 5MHz BW, 25 resource block and QPSK modulation.

The highest ERP in the LTE band 13 measured was 21.18 dBm (0.13 W) at 784.4 MHz (channel 23254) in 5MHz BW, 25 resource block and 16QAM modulation.

The radiated carrier harmonics were measured up to the 10th harmonic. The EUT was measured on the low, middle and high channels in 5MHz and 10MHz bandwidths for LTE Band 13 with QPSK and 16QAM modulations. Different resource block allocations were investigated, a minimum one resource block case was also tested. Both the horizontal and vertical polarizations were measured.

- All margins in the LTE Band 13 for harmonic emissions were greater than 25 dB below the accepted limits for all test frequencies.

See Appendix 3D for test data.

3) Co-Location Radiated Measurements

The radiated emissions were measured up to 18 GHz for middle channels for simultaneous transmission in the following test configuration combinations:

- GSM 850 + Bluetooth(DH5) + 802.11b + NFC
- PCS 1900 + Bluetooth(2DH5) + 802.11g
- CDMA Cellular + Bluetooth(3DH5) + 802.11a
- CDMA PCS + Bluetooth(DH5) + 802.11n(5GHz)
- CDMA Cellular + LTE B13 + Bluetooth(DH5) + 802.11b

Both the horizontal and vertical polarizations were measured. The emissions due to different simultaneous transmission did not increase the amplitude of any emissions nor did it produce any new inter-modulation products as a result of mixing.

Sample Calculation:

Corrected Signal level (CSL) is calculated as follows:

$$\text{CSL (dBm)} = \text{Measured Level (dB}\mu\text{V)} - \text{Antenna Gain (dBi)} + \text{Free Space loss (dB)} - 107(\text{dB}) + \text{Cable Loss (dB)} - \text{Preamp (dB)} + \text{Filter Loss (dB)} - 2.15(\text{dB})$$

Measurement Uncertainty ±4.5 dB


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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	13-10-17	Radiated Emissions
Preamplifier system	TDK RF Solutions	PA-02	080010	13-10-17	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA4-SP	001	13-09-01	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA-SP	001	13-09-01	Radiated Emissions
Hybrid Log Antenna	EMC Automation	HLP-3003C	017301	13-08-23	Radiated Emissions
Horn Antenna	EMC Automation	HRN-0118	030101	13-03-15	Radiated Emissions
Horn Antenna	EMC Automation	HRN-0118	030201	14-09-22	Radiated Emissions
Horn Antenna	Emco	3117	47563	14-08-04	Radiated Emissions
Horn Antenna	ETS	3116	2538	14-09-24	Radiated Emissions
Dipole Antenna	Schwarzbeck	UHAP	973	14-06-03	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	837493/073	13-11-24	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	112394	13-11-24	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	109747	13-11-18	RF Conducted Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	109949	13-01-12	RF Conducted Emission/ Radiated Emissions
EMI Receiver	Rohde & Schwarz	ESIB-40	100255	12-12-08	Radiated Emissions
EMI Receiver	Rohde & Schwarz	ESU-40	100162	12-12-07	Radiated Emissions
Spectrum Analyzer	HP	8563E	3745A08112	13-10-05	RF Conducted Emissions
DC Power Supply	HP	6632B	US37472178	13-09-27	RF Conducted Emissions
Environment Monitor	Omega	iTHX-SD	0380561	13-10-20	Radiated Emissions

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Compliance Test Equipment Used cont'd

<u>UNIT</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>SERIAL NUMBER</u>	<u>CAL DUE DATE</u> (YY MM DD)	<u>USE</u>
Environment Monitor	Omega	iTHX-SD	0340060	13-10-20	RF Conducted Emissions
Environment Monitor	Omega	iTHX-SD	0380567	13-10-20	Radiated Emissions
Signal Generator	Rohde & Schwarz	SMA100A	101540	13-12-03	Radiated Emissions
Signal Generator	Rohde & Schwarz	SMA100A	102106	13-12-02	Radiated Emissions
Spectrum Analyzer	Rohde & Schwarz	FSV	101820	12-12-06	RF Conducted Emissions
Spectrum Analyzer	Rohde & Schwarz	FSP	100884	12-12-03	RF Conducted Emissions

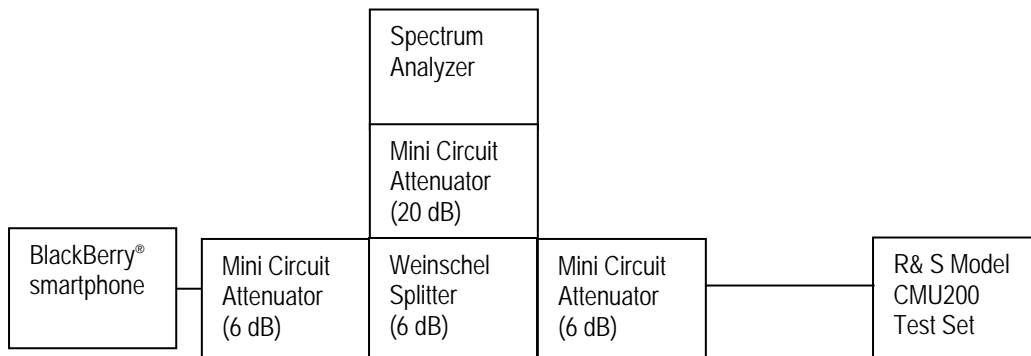
APPENDIX 1A – GSM CONDUCTED RF EMISSIONS TEST DATA/PLOTS

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 1A	
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GSM Conducted RF Emission Test Data

This appendix contains measurement data pertaining to conducted spurious emissions, -26 dBc bandwidth, 99% power bandwidth and the channel mask on BlackBerry® smartphone.

Test Setup Diagram




Date of Test: September 25, 2012

The environmental test conditions were:

Temperature: 24.9 °C
Relative Humidity: 27.4 %

The following measurements were performed by Berkin Can.

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GSM Conducted RF Emission Test Data cont'd

The conducted spurious emissions – As per 47 CFR 2.1051, CFR 22.917, CFR 24.238 and RSS-132 4.5 and RSS-133, 6.5 were measured from 30 MHz to 20 GHz. The EUT emissions were in the noise floor.

–26 dBc Bandwidth and Occupied Bandwidth (99%)

For each carrier frequency of low, middle and high, the modulation spectrum was measured by both methods of 99% power bandwidth and –26 dBc bandwidth.

The resolution bandwidth required for out-of-band emissions in the 1 MHz bands immediately outside and adjacent to the frequency block, was determined to be at least 1% of the emission bandwidth.

The worst case –26dBc bandwidth for the GSM850 band was measured to be 276 kHz, and for the PCS1900 band was measured to be 276 kHz as shown below. Results were derived in a 3.0 kHz resolution bandwidth.

On any frequency outside the frequency block and outside the adjacent 1 MHz bands, a resolution bandwidth of at least 1 MHz was applied.

Test Data for GSM850 band and PCS1900 band in Call mode

GSM850 band Frequency (MHz)	-26dBc Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
824.2	276	247
837.6	276	241
848.8	275	245


PCS1900 band Frequency (MHz)	-26dBc Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
1850.2	274	245
1880.0	274	243
1909.8	276	243

Measurement Plots for GSM850 and PCS1900 bands in Call mode


See Figures 1-1a to 1-12a for the plots of the conducted spurious emissions.

See Figures 1-13a to 1-24a for the plots of 26dBc/99% Occupied Bandwidth.

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See Figures 1-25a to 1-28a for the plots of the Channel mask.

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GSM Conducted RF Emission Test Data cont'd

Test Data for GSM850 and PCS1900 bands in EDGE mode

GSM850 band Frequency (MHz)	99% Occupied Bandwidth (kHz)
824.2	243
837.6	245
848.8	243


PCS1900 band Frequency (MHz)	99% Occupied Bandwidth (kHz)
1850.2	240
1880.0	243
1909.8	245

Measurement Plots for GSM850 and PCS1900 bands in EDGE mode

See Figures 1-29a to 1-34a for the plots of the 99% Occupied Bandwidth EDGE results.

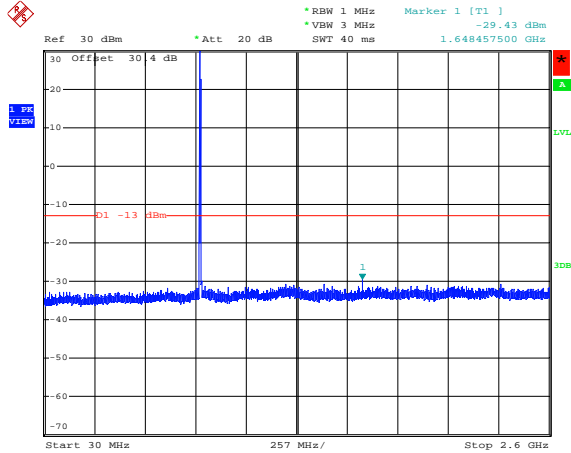
See Figures 1-35a to 1-38a for the plots of channel mask EDGE results.

See Figures 1-39a to 1-50a for the plots of the conducted spurious emissions EDGE results

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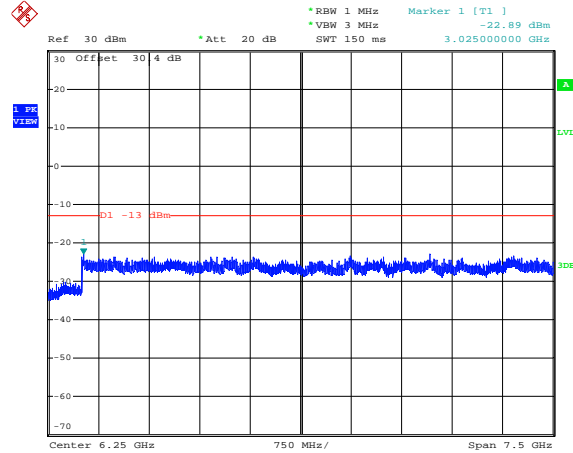
GSM Conducted RF Emission Test Data cont'd

Figure 1-1a: GSM850 band, Spurious Conducted Emissions, Low channel



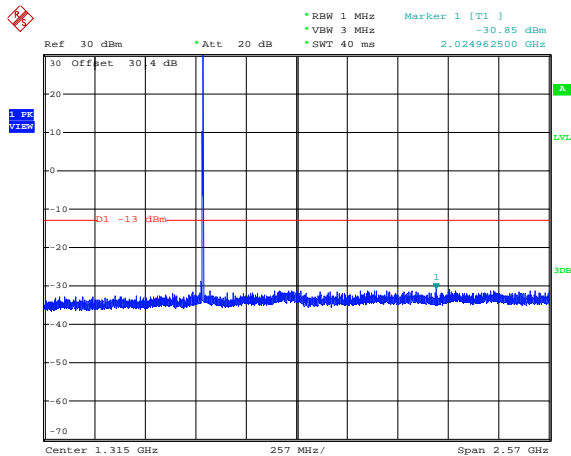
Date: 19.NOV.2012 12:33:56

Figure 1-2a: GSM850 band, Spurious Conducted Emissions, Low channel



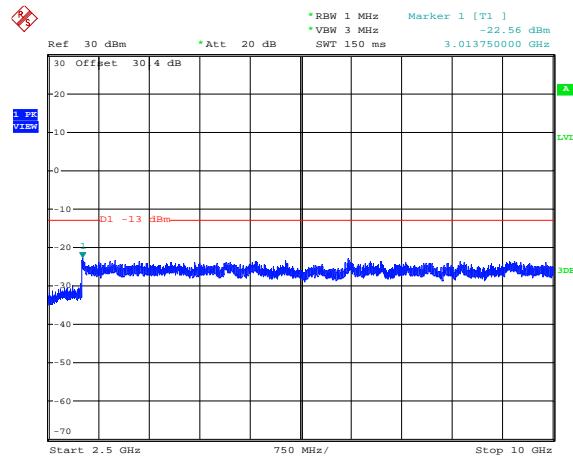
Date: 19.NOV.2012 12:31:52

Figure 1-3a: GSM850 band, Spurious Conducted Emissions, Middle Channel




Date: 19.NOV.2012 12:28:33

Figure 1-4a: GSM850 band, Spurious Conducted Emissions, Middle Channel

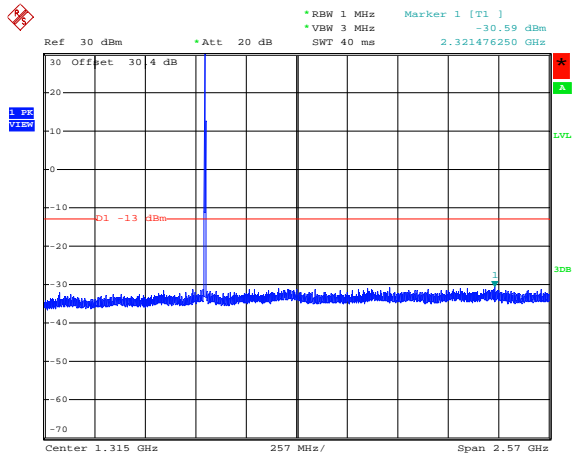


Date: 19.NOV.2012 12:30:50

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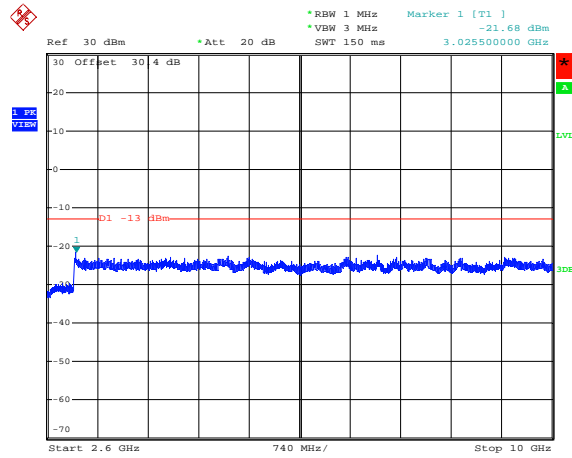
GSM Conducted RF Emission Test Data cont'd

Figure 1-5a: GSM850 band, Spurious Conducted Emissions, High Channel



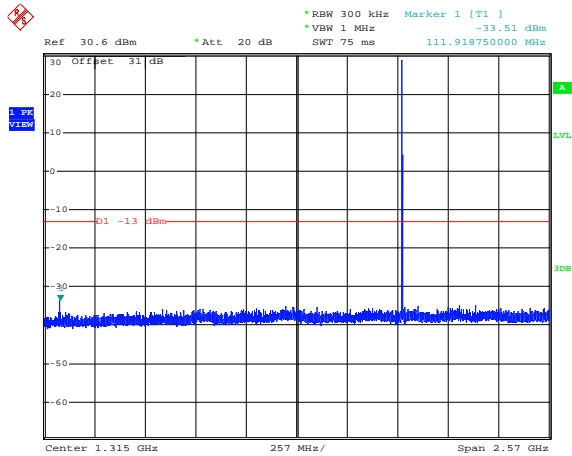
Date: 19.NOV.2012 12:35:58

Figure 1-6a: GSM850 band, Spurious Conducted Emissions, High Channel



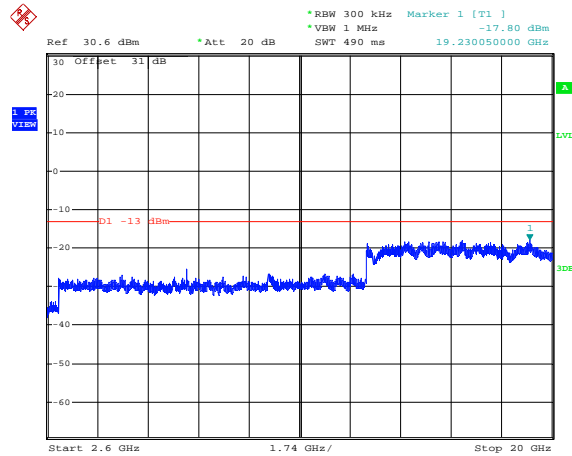
Date: 19.NOV.2012 12:42:01

Figure 1-7a: PCS1900 band, Spurious Conducted Emissions, Low Channel




Date: 19.NOV.2012 13:40:08

Figure 1-8a: PCS1900 band, Spurious Conducted Emissions, Low Channel

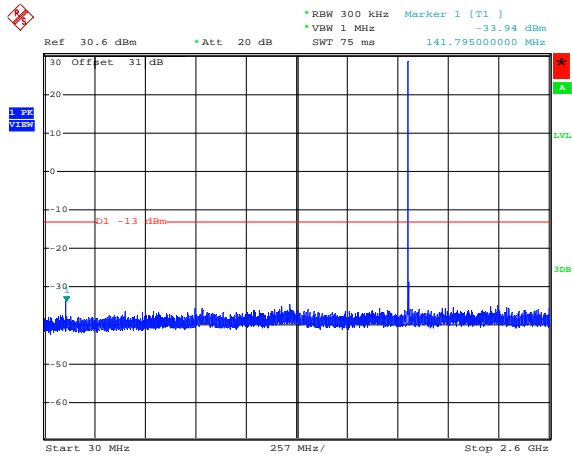


Date: 19.NOV.2012 13:45:06

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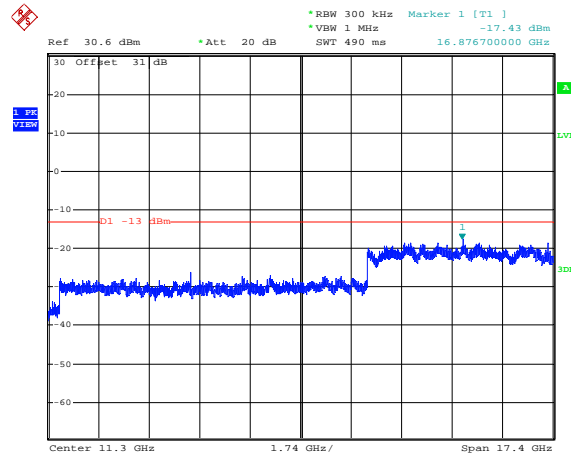
GSM Conducted RF Emission Test Data cont'd

Figure 1-9a: PCS1900 band, Spurious Conducted Emissions, Middle Channel



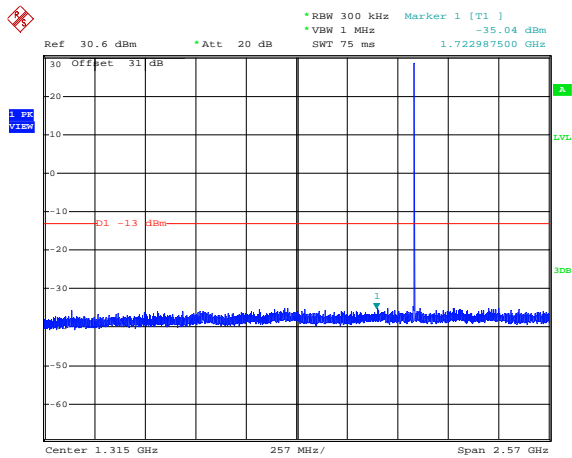
Date: 19.NOV.2012 13:47:30

Figure 1-10a: PCS1900 band, Spurious Conducted Emissions, Middle Channel



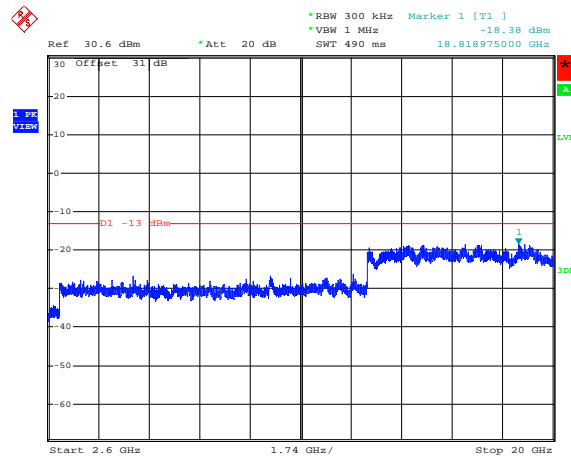
Date: 19.NOV.2012 13:46:39

Figure 1-11a: PCS1900 band, Spurious Conducted Emissions, High Channel



Date: 19.NOV.2012 13:49:13

Figure 1-12a: PCS1900 band, Spurious Conducted Emissions, High Channel



Date: 19.NOV.2012 13:50:43

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 IC: 2503A-RFA90LW

GSM Conducted RF Emission Test Data cont'd

Figure 1-13a: -26dBc bandwidth, GSM850 band Low Channel in GSM mode

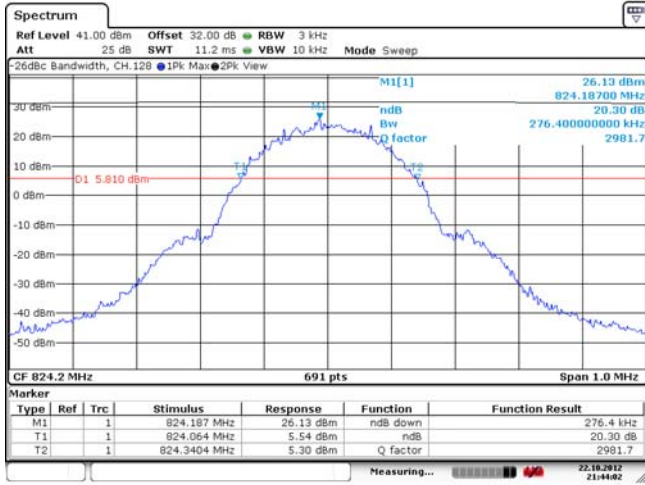


Figure 1-14a: Occupied Bandwidth, GSM850 band Low Channel in GSM mode

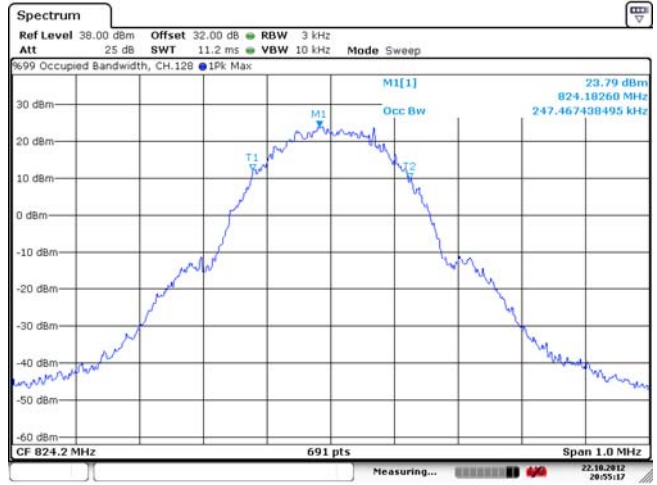


Figure 1-15a: -26dBc bandwidth, GSM850 band Middle Channel in GSM mode

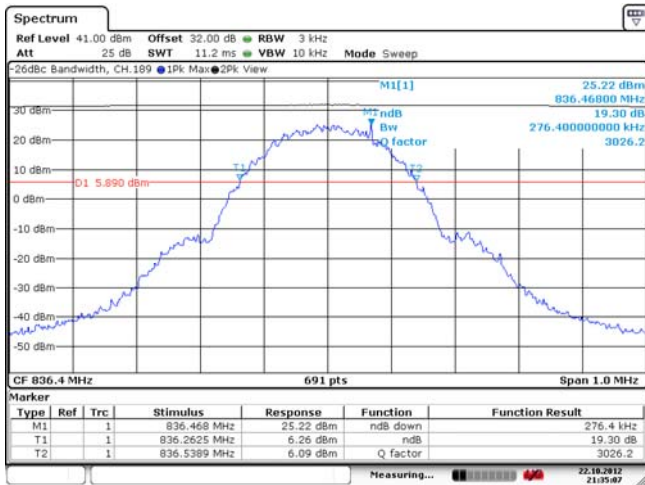
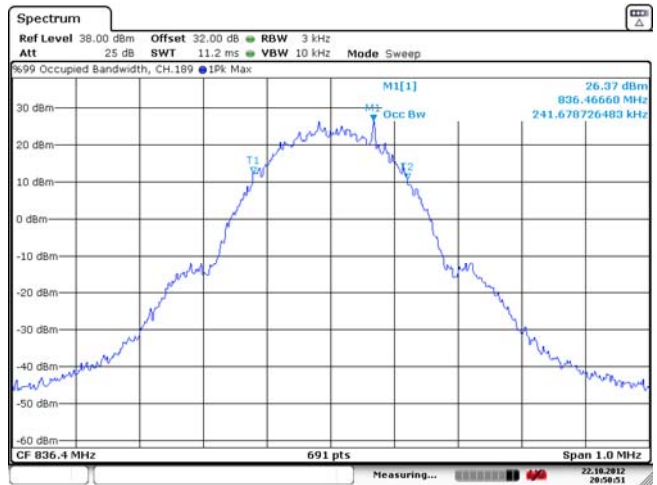


Figure 1-16a: Occupied Bandwidth, GSM850 band Middle Channel in GSM mode



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 IC: 2503A-RFA90LW

GSM Conducted RF Emission Test Data cont'd

Figure 1-17a: -26dBc bandwidth, GSM850 band High Channel in GSM mode

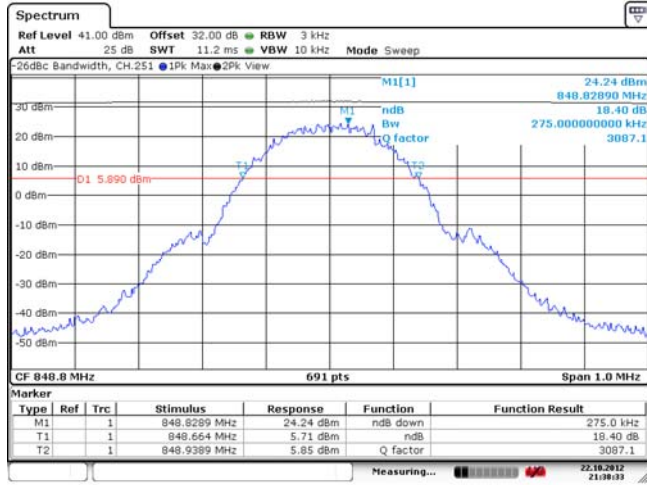


Figure 1-18a: Occupied Bandwidth, GSM850 band High Channel in GSM mode

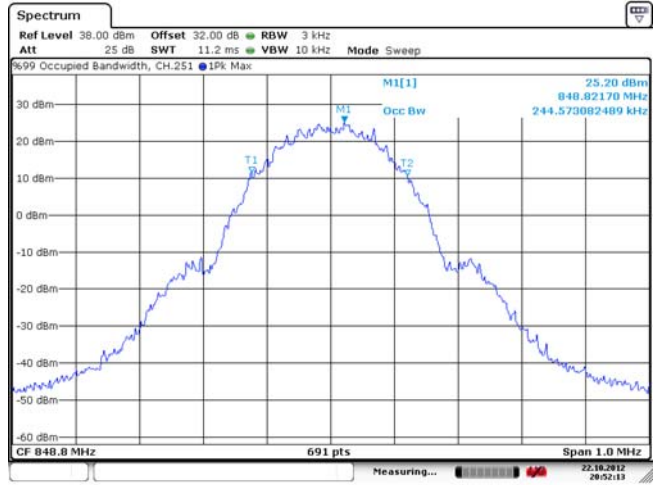


Figure 1-19a: -26dBc bandwidth, PCS1900 Low Channel in GSM mode

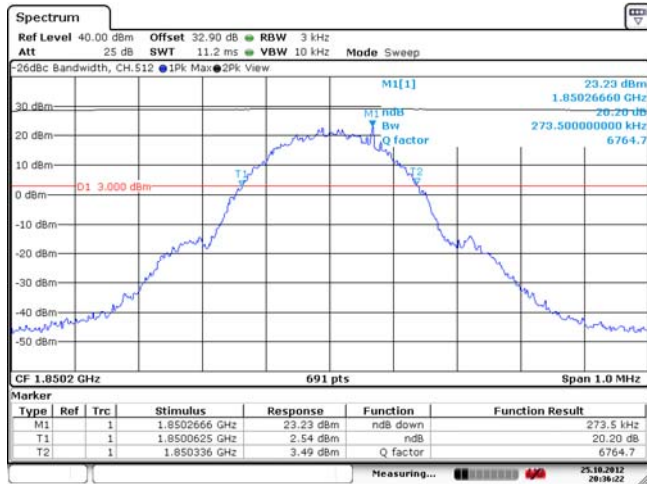
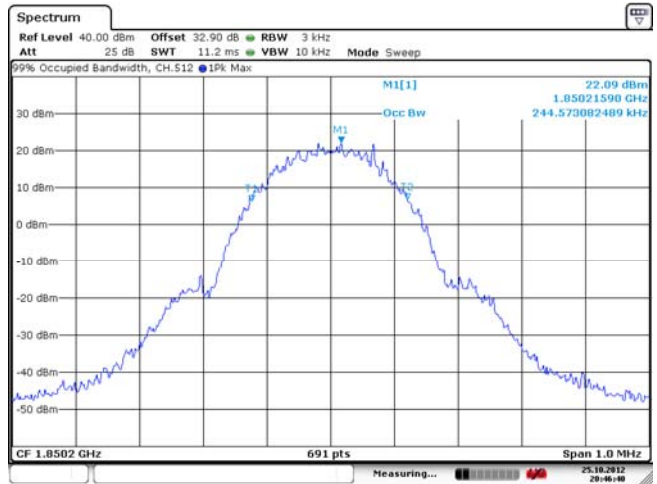


Figure 1-20a: Occupied Bandwidth, PCS1900 Low Channel in GSM mode



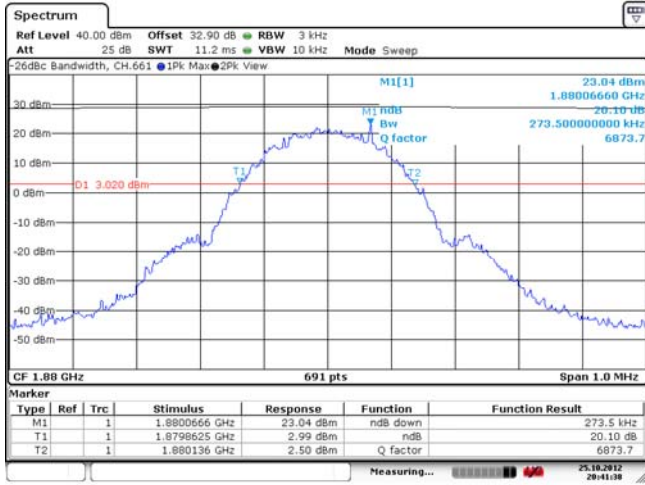
Test Report No.:
 RTS-6012-1211-57_Rev2

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FCC ID: L6ARFA90LW
 IC: 2503A-RFA90LW

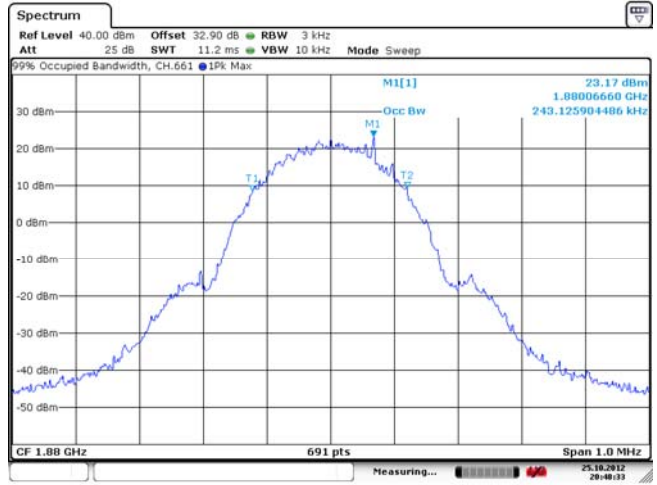
GSM Conducted RF Emission Test Data cont'd

Figure 1-21a: -26dBc bandwidth, PCS1900 Middle Channel in GSM mode



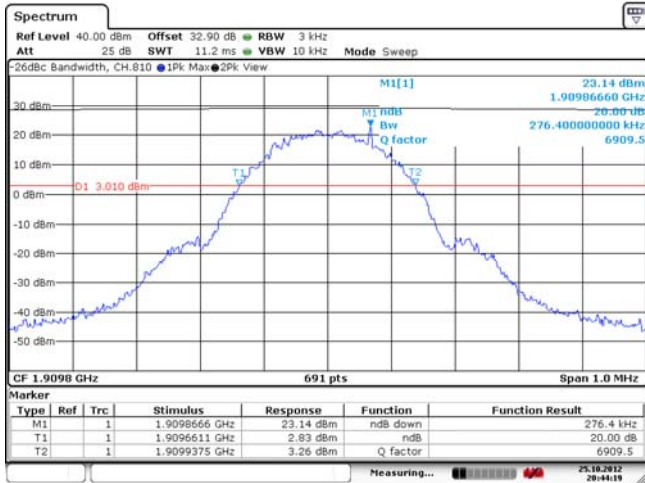
Date: 25.OCT.2012 20:41:39

Figure 1-22a: Occupied Bandwidth, PCS1900 Middle Channel in GSM mode



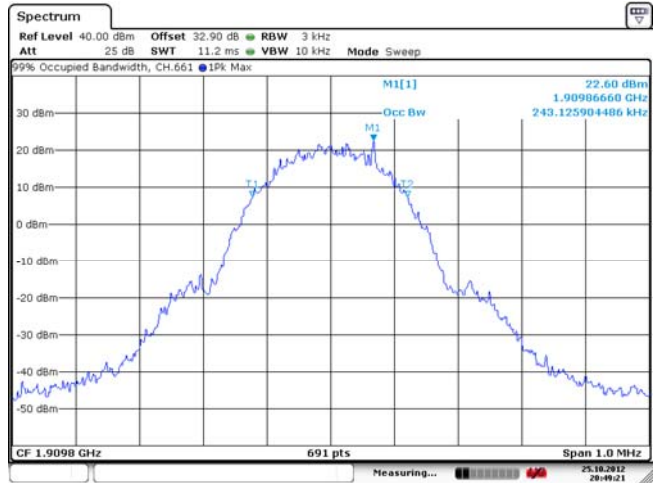
Date: 25.OCT.2012 20:48:33

Figure 1-23a: -26dBc bandwidth, PCS1900 High Channel in GSM mode




Date: 25.OCT.2012 20:44:18

Figure 1-24a: Occupied Bandwidth, PCS1900 High Channel in GSM mode



Date: 25.OCT.2012 20:49:21

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GSM Conducted RF Emission Test Data cont'd

Figure 1-25a: GSM850 band, Low Channel Mask in GSM mode

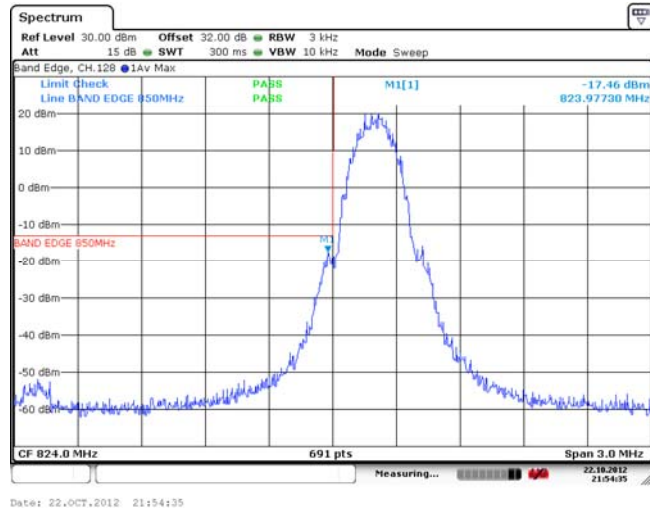


Figure 1-26a: GSM850 band High Channel Mask in GSM mode

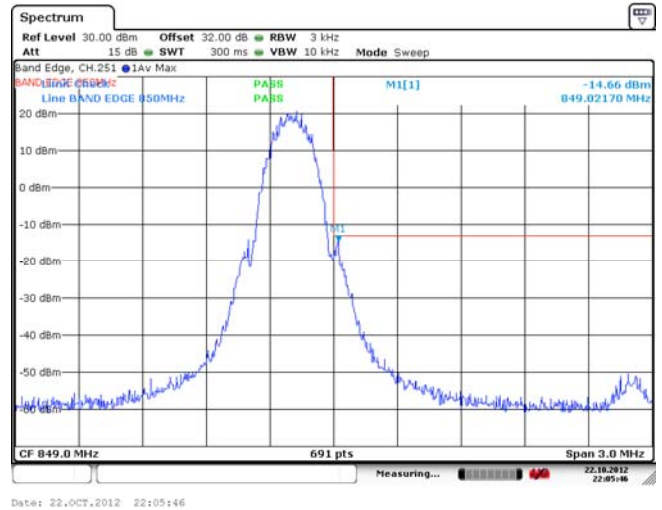


Figure 1-27a: PCS1900, Low Channel Mask in GSM mode

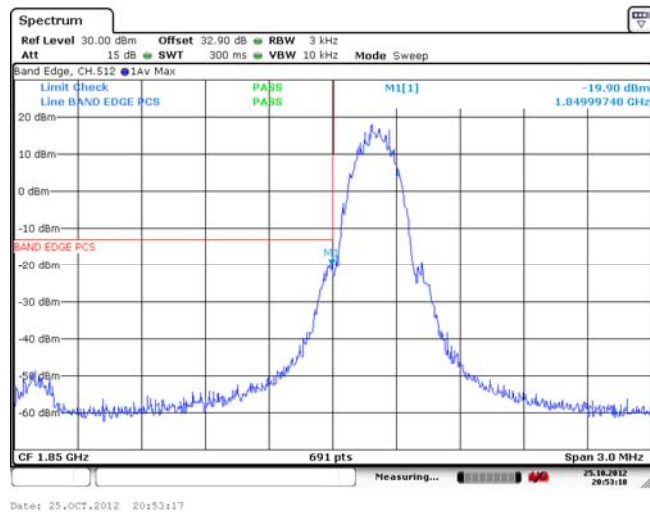
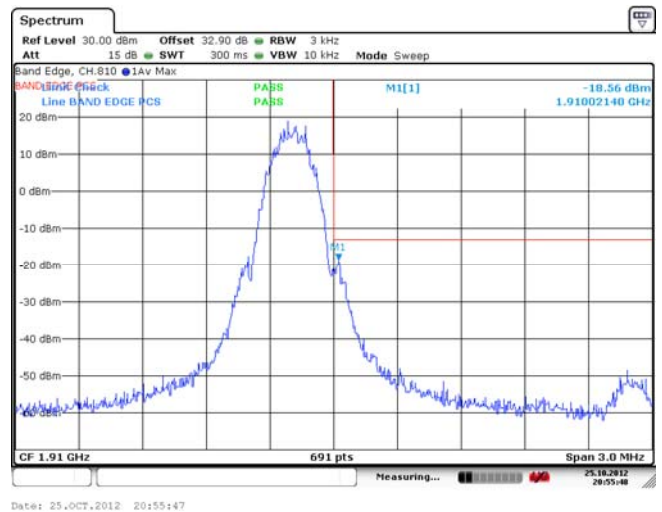



Figure 1-28a: PCS1900, High Channel Mask in GSM mode



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GSM Conducted RF Emission Test Data cont'd

Figure 1-29a: Occupied Bandwidth, GSM850 Band, Low Channel in EDGE mode

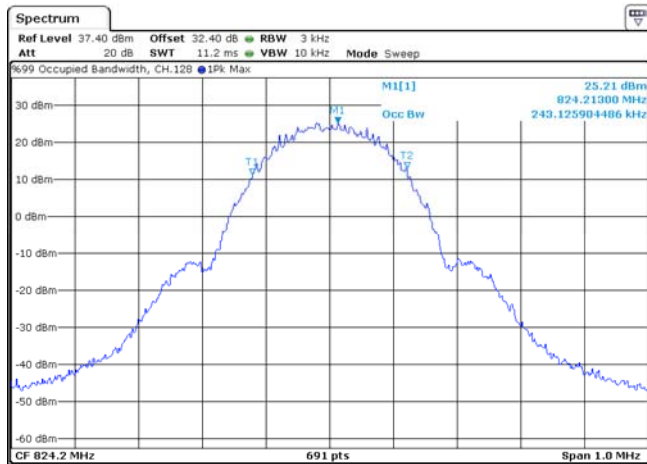


Figure 1-30a: Occupied Bandwidth, GSM850 Band, Middle Channel in EDGE mode

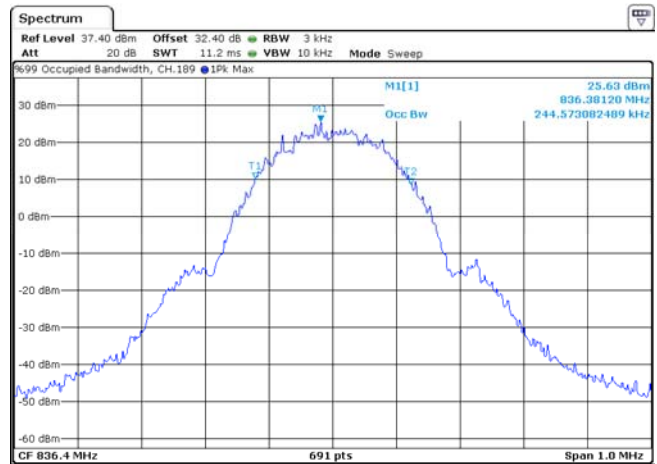


Figure 1-31a: Occupied Bandwidth, GSM850 band, High Channel in EDGE mode

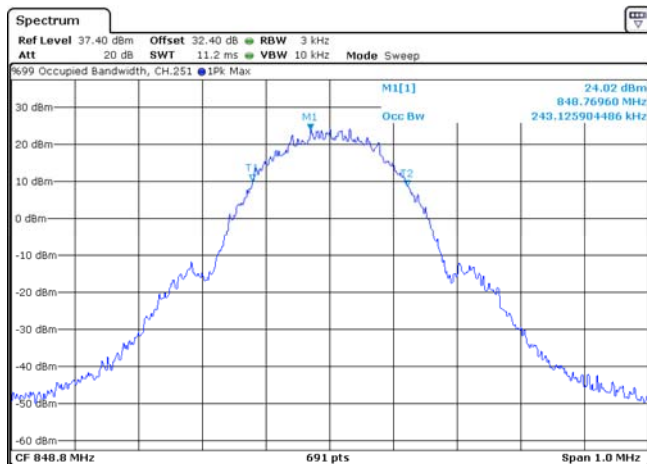
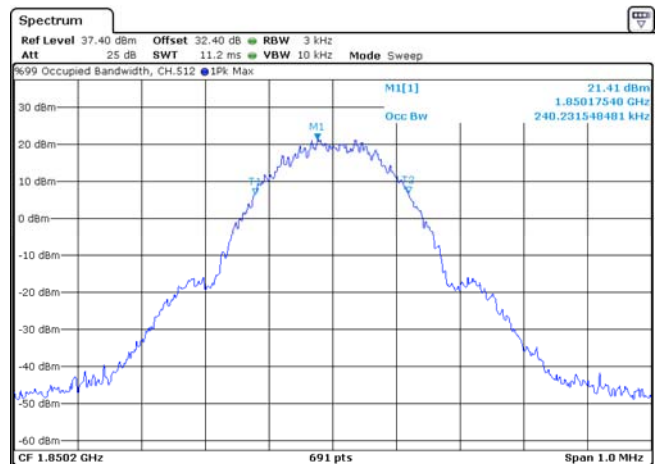



Figure 1-32a: Occupied Bandwidth, PCS1900 Band, Low Channel in EDGE mode



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GSM Conducted RF Emission Test Data cont'd

Figure 1-33a: Occupied Bandwidth, PCS1900 Band, Middle Channel in EDGE mode

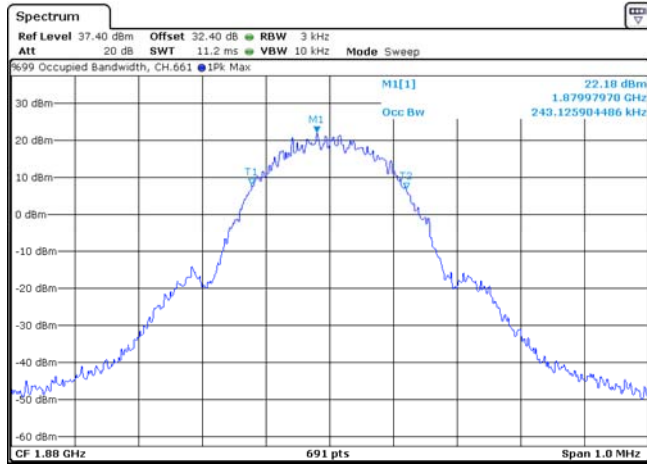


Figure 1-34a: Occupied Bandwidth, PCS1900 Band, High Channel in EDGE mode

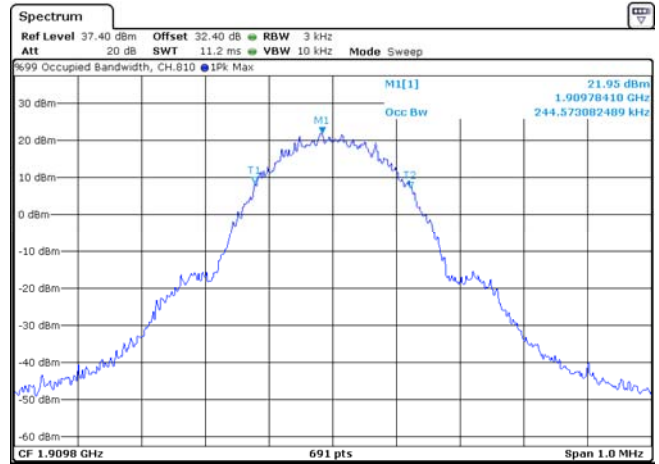


Figure 1-35a: GSM850 Band, Low Channel Mask in EDGE mode

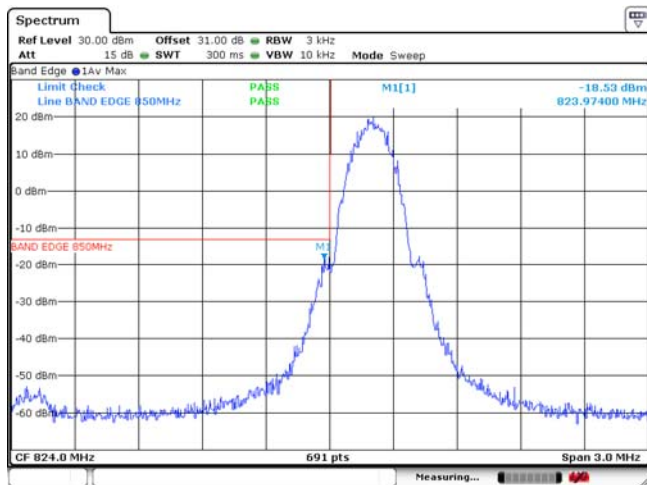
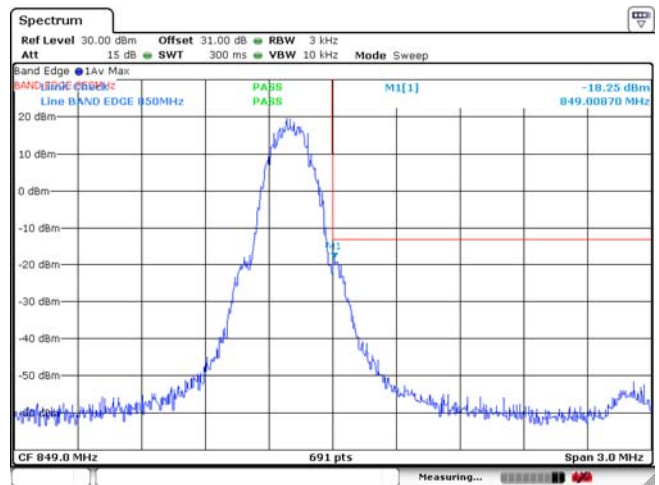



Figure 1-36a: GSM850 Band, High Channel Mask in EDGE mode

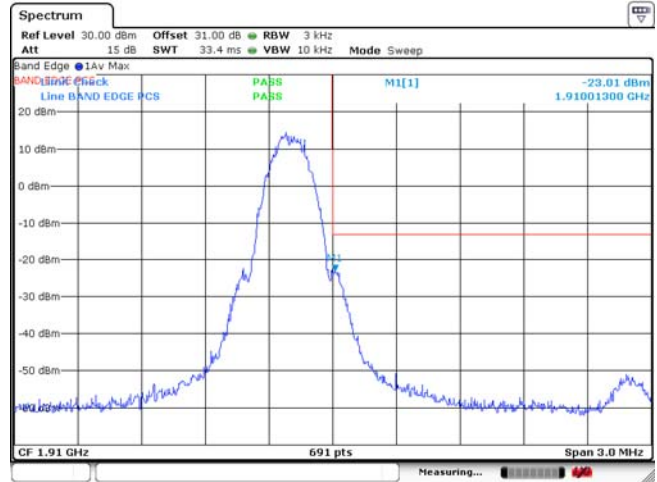
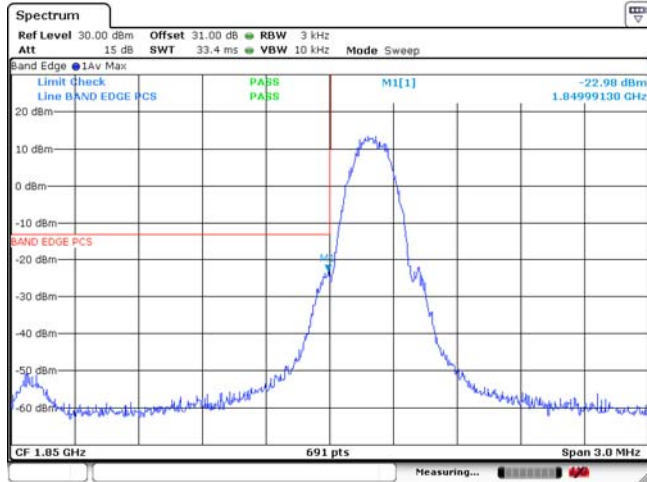



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GSM Conducted RF Emission Test Data cont'd

Figure 1-37a: PCS1900 Band, Low Channel Mask in EDGE mode

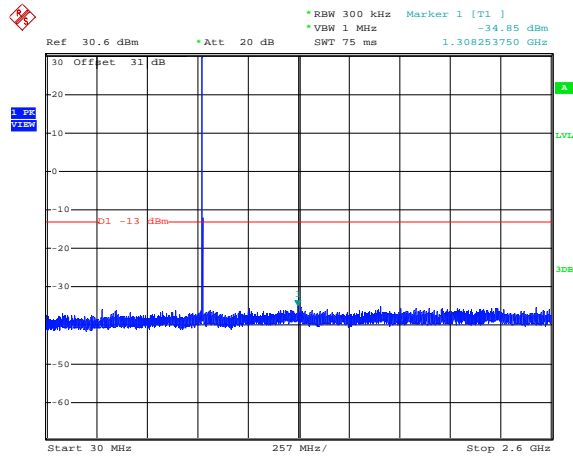
Figure 1-38a: PCS1900 Band, High Channel Mask in EDGE mode



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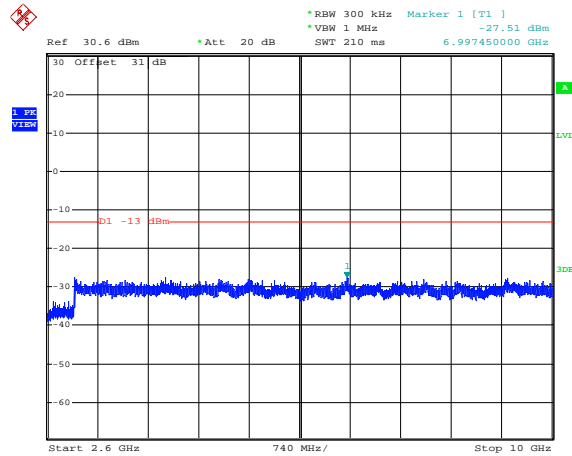
GSM Conducted RF Emission Test Data cont'd

Figure 1-39a: GSM850 band, Spurious Conducted Emissions, Low channel in EDGE Mode



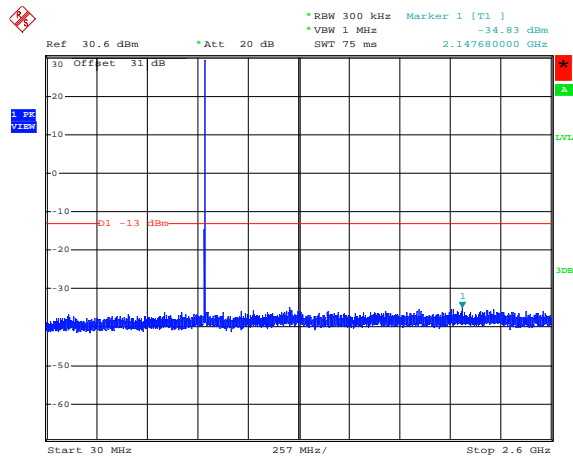
Date: 19.NOV.2012 14:22:32

Figure 1-40a: GSM850 band, Spurious Conducted Emissions, Low channel in EDGE Mode



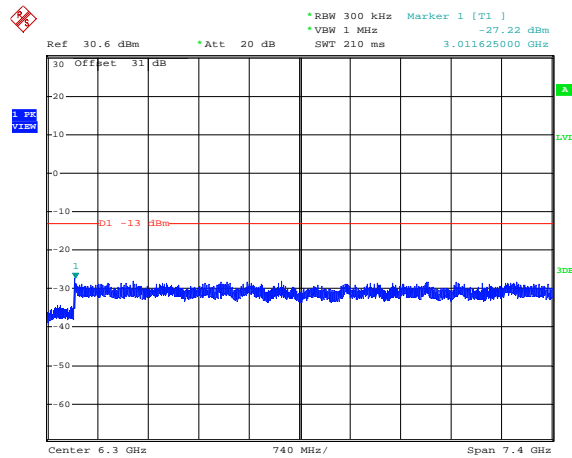
Date: 19.NOV.2012 14:23:37

Figure 1-41a: GSM850 band, Spurious Conducted Emissions, Middle channel in EDGE Mode




Date: 19.NOV.2012 14:26:25

Figure 1-42a: GSM850 band, Spurious Conducted Emissions, Middle channel in EDGE Mode

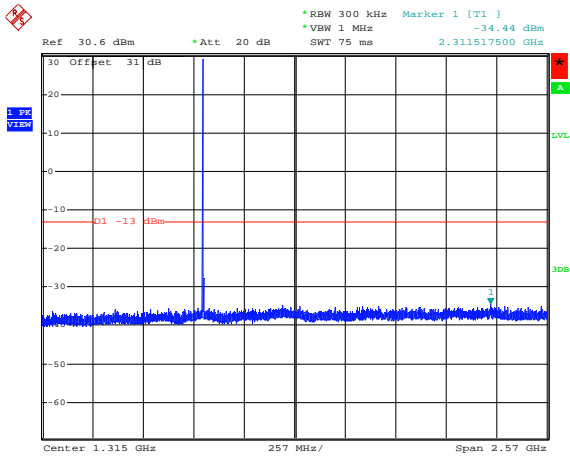


Date: 19.NOV.2012 14:24:40

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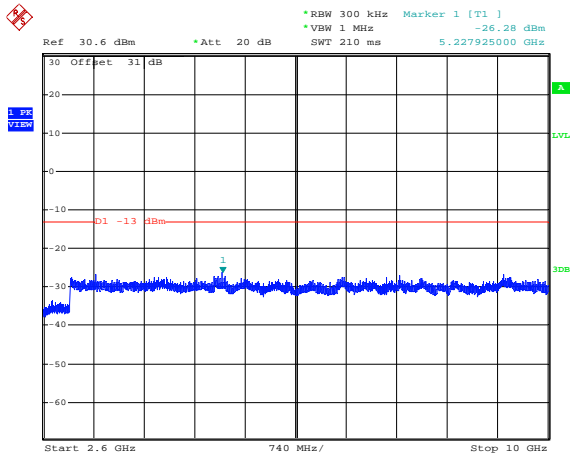
GSM Conducted RF Emission Test Data cont'd

Figure 1-43a: GSM850 band, Spurious Conducted Emissions, High channel in EDGE Mode



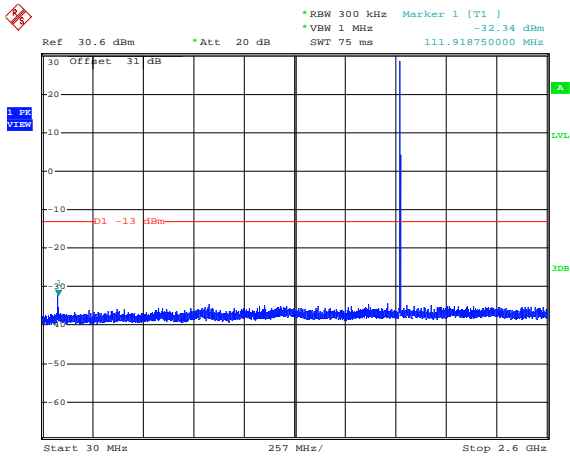
Date: 19.NOV.2012 14:29:01

Figure 1-44a: GSM850 band, Spurious Conducted Emissions, High channel in EDGE Mode



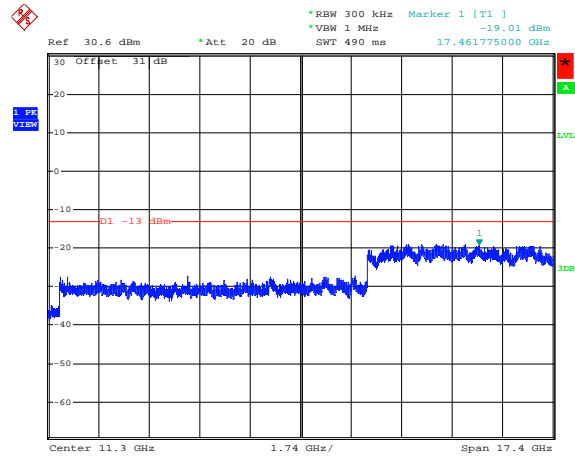
Date: 19.NOV.2012 14:34:28

Figure 1-45a: PCS1900 band, Spurious Conducted Emissions, Low channel in EDGE Mode




Date: 19.NOV.2012 14:06:38

Figure 1-46a: PCS1900 band, Spurious Conducted Emissions, Low channel in EDGE Mode

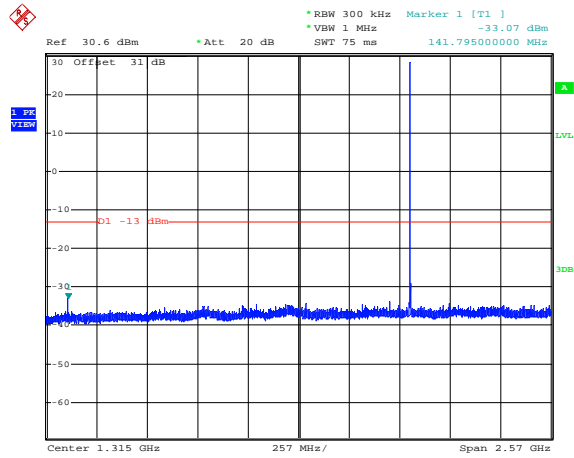


Date: 19.NOV.2012 14:02:25

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 1A	
	Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013

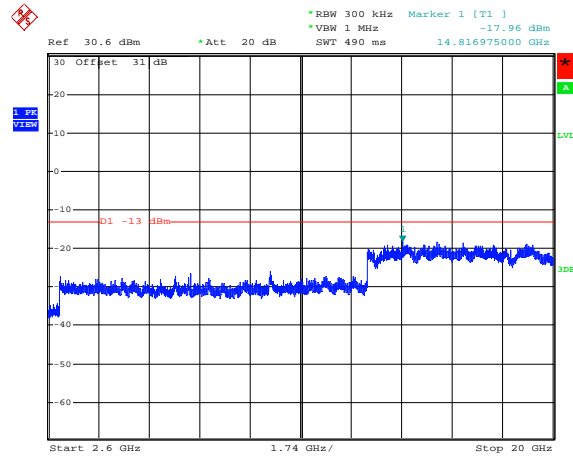
GSM Conducted RF Emission Test Data cont'd

Figure 1-47a: PCS1900 band, Spurious Conducted Emissions, middle channel in EDGE Mode



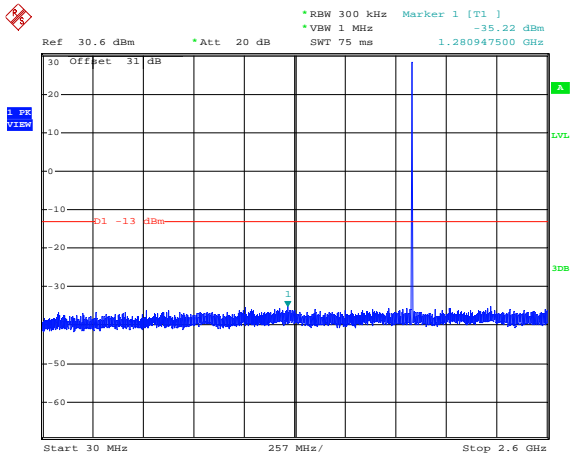
Date: 19.NOV.2012 14:12:53

Figure 1-48a: PCS1900 band, Spurious Conducted Emissions, middle channel in EDGE Mode



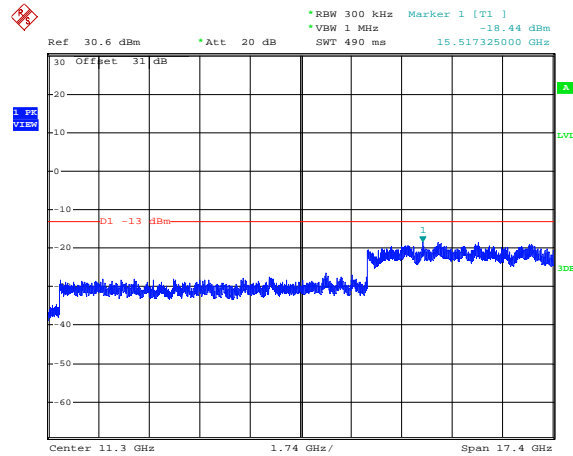
Date: 19.NOV.2012 14:14:11

Figure 1-49a: PCS1900 band, Spurious Conducted Emissions, High channel in EDGE Mode



Date: 19.NOV.2012 14:21:07

Figure 1-50a: PCS1900 band, Spurious Conducted Emissions, High channel in EDGE Mode



Date: 19.NOV.2012 14:15:17

APPENDIX 1B – GSM CONDUCTED RF OUTPUT POWER TEST DATA

Test Report No.:
RTS-6012-1211-57_Rev2**Dates of Test:**
Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012,
Jan. 04 and Feb.05, 2013**FCC ID:** L6ARFA90LW
IC: 2503A-RFA90LWGSM Conducted RF Output Power Test Data

The conducted RF output power was measured on the BlackBerry® smartphone using the Communication Tester, Rohde & Schwarz, model CMU 200. The low, middle and high channels were measured at maximum output power. The insertion loss of the coaxial cable from the CMU 200 to the BlackBerry® smartphone was compensated for in the measurements.


Date of Test: September 14 and November 27, 2012

The environmental conditions were: Temperature: 22.0 -25.0 °C
 Humidity: 24.0 – 46 %

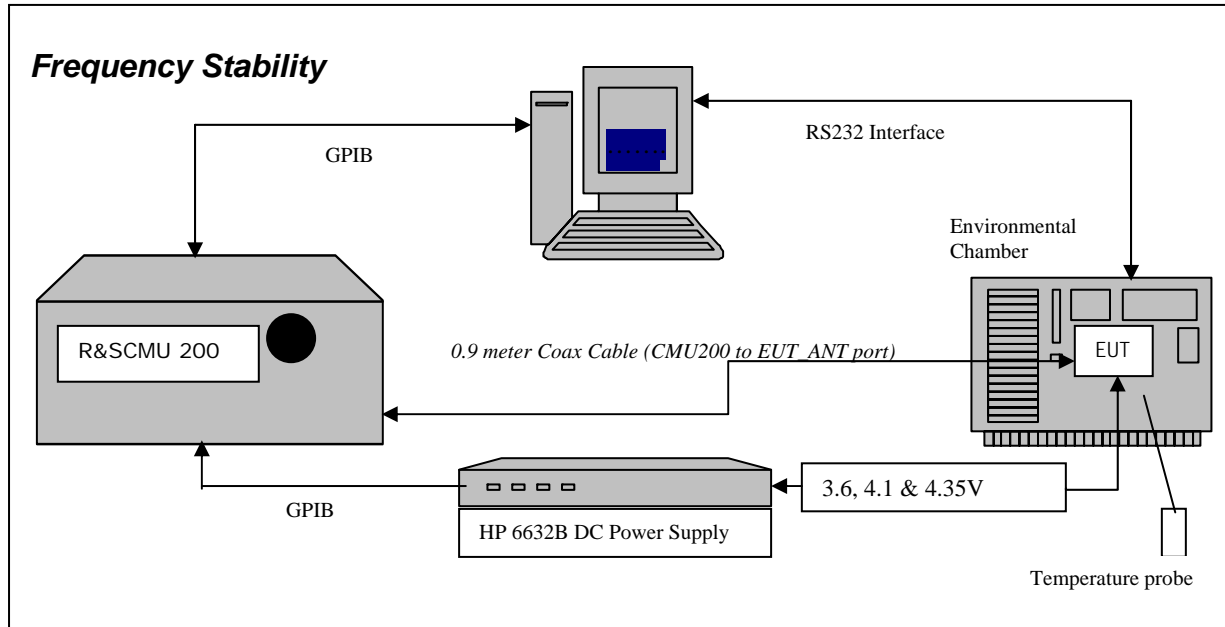
The measurements were performed by Daoud Attayi

Channel	Frequency (MHz)	Maximum Output Power (dBm)	Maximum Output Power (Watts)	Channel	Frequency (MHz)	Maximum Output Power (dBm)	Maximum Output Power (Watts)
<u>GSM850</u>				<u>GSM850 EDGE</u>			
128	824.20	32.2	1.66	128	824.20	28.7	0.74
189	836.80	32.2	1.66	189	836.80	28.7	0.74
251	848.80	32.0	1.58	251	848.80	28.6	0.72
<u>PCS1900</u>				<u>PCS1900 EDGE</u>			
512	1850.2	29.0	0.79	512	1850.2	25.7	0.37
661	1880.0	29.4	0.87	661	1880.0	25.7	0.37
810	1909.8	29.5	0.89	810	1909.8	25.8	0.38

APPENDIX 1C – GSM FREQUENCY STABILITY TEST DATA

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 1C	
	Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013

GSM Frequency Stability Test Data



The measurements were performed by Berkin Can.

CFR 47 Chapter 1 - Federal Communications Commission Rules

Part 2 Required Measurements

2.1055 Frequency Stability - Procedures


(a,b) Frequency Stability - Temperature Variation

(d) Frequency Stability - Voltage Variation

The EUT meets the requirements as stated in CFR 47 chapter 1, RSS-132, 4.3 Frequency Stability.

Frequency Stability measurement devices were configured as presented in the block diagram recording frequency, power, data, temperatures, and stepped voltages controlled via a GPIB interface linked to the Environmental chamber, a DC power supply, and the Communications Test Set. A 0.9-metre coax cable was calibrated to characterize the insertion loss for the transmitted frequencies between the RF input/output of the CMU 200 and the EUT antenna port.

Calibration for the Cable Loss was performed in the RF Laboratory using the Agilent power meter and Agilent Signal Generator.

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 1C	
Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW

Test setup:


The EUT was placed in the Temperature chamber and connected to CMU 200 outside as shown in the figure above. Dry air was pumped inside the temperature chamber to maintain a backpressure during the test. The EUT was kept in the off condition at all times except when the measurements were to be made.

The chamber was switched on and the temperature was set to -30°C. After the chamber stabilized at -30 °C there was a soak period of one hour to alleviate moisture in the chamber, the EUT voltage was enabled. The system software recorded the frequency, power, and associated measurements.

A Computer system controlled the automated software. This application was given the command of activating all machines intrinsic to the temperature and voltage tests controlling the CMU 200 via the GPIB Bus. The Environmental Chamber was instructed through an RS-232 serial line. The EUT dialogue was passed through a serial connection.

The EUT repetitively transmitted 100 bursts for each set of programmed parameters recording temperature, voltage settings, and systematically selected frequencies. The power supply was cycled from minimum voltage 3.6 volts, to 4.1 and to 4.35 volts maximum voltage. The frequency error was measured at a maximum output power and recorded by the automated system test software.

The EUT output power and frequency was measured at 3.6 volts, 4.1 and 4.35 volts. The transmit frequency was varied in 3 steps consisting of 824.2, 836.4, and 848.8 MHz for the GSM850 band, 1850.2, 1880.0 and 1909.8 MHz for the PCS1900 band. This frequency was recorded in MHz and deviation from nominal, in Parts Per Million. After the initial one-hour soak at the beginning of the tests, a period of thirty minutes soak was initialized between each ascending temperature step, before proceeding to the next measurement test cycle.

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW	
	APPENDIX 1C	
Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW


Procedure:

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

1. Switch on the HP 6632B power supply; CMU 200 Communications test Set, and Environmental Chamber.
2. Start test program
3. Set the Temperature to –30°C and maintain a period of one- hour soak time, with the EUT supply voltage disabled.
4. Set power supply voltage to 3.6 volts.
5. Set up CMU 200 Radio Communication Tester.
6. Command the CMU 200 to switch to the low channel.
7. Enable the voltage to the EUT, and connect a link to the CMU 200 test set.
8. EUT is commanded to Transmit 100 Bursts.
9. Software logs the following data from the CMU 200, power supply and temperature chamber: Traffic Channel Number, Traffic Channel Frequency, Power Level, Chamber Temperature, Supply Voltage, Power and Frequency Error.
10. The CMU 200 commands the EUT to change frequency to the middle channel and high channel and repeats steps 7 to 9.
11. Repeat steps 5 to 10 changing the supply voltage to 3.6 Volts
12. Increase temperature by 10°C and soak for 1/2 hour.
13. Repeat steps 4 - 12 for temperatures –30°C to 60°C.
14. Repeat steps 5 to 10 changing the supply voltage to 4.1 volts
15. Repeat steps 5 to 10 changing the supply voltage to 4.35 volts

Procedure 5 to 10 was repeated at room temperature (20°C) with the power supply voltage set to 3.6, 4.1 and 4.35 volts.

The maximum frequency error in the GSM850 band measured was **0.0317 PPM**.
The maximum frequency error in the PCS1900 band measured was **0.0346 PPM**.

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW	
	APPENDIX 1C	
Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW

Date of Test: October 25, 2012

GSM850 results: channels 128, 189 and 251 @ 20°C maximum transmitted power

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.6	20	-21.00	-0.0255
189	836.40	3.6	20	-20.20	-0.0242
251	848.60	3.6	20	-19.20	-0.0226
Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	4.1	20	-11.90	-0.0144
189	836.40	4.1	20	-13.40	-0.0160
251	848.60	4.1	20	-18.50	-0.0218
Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	4.35	20	-22.50	-0.0273
189	836.40	4.35	20	-19.50	-0.0233
251	848.60	4.35	20	-13.90	-0.0164

Test Report No.:
 RTS-6012-1211-57_Rev2

Dates of Test:
 Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012,
 Jan. 04 and Feb.05, 2013

FCC ID: L6ARFA90LW
IC: 2503A-RFA90LW

GSM850 Results: channel 128 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.6	-30	-14.50	-0.0176
128	824.20	3.6	-20	-21.10	-0.0256
128	824.20	3.6	-10	20.70	0.0251
128	824.20	3.6	0	6.60	0.0080
128	824.20	3.6	10	9.50	0.0115
128	824.20	3.6	20	-21.00	-0.0255
128	824.20	3.6	30	20.50	0.0249
128	824.20	3.6	40	-10.60	-0.0129
128	824.20	3.6	50	-9.70	-0.0118
128	824.20	3.6	60	-12.90	-0.0157
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	4.1	-30	10.90	0.0132
128	824.20	4.1	-20	10.30	0.0125
128	824.20	4.1	-10	11.80	0.0143
128	824.20	4.1	0	5.80	0.0070
128	824.20	4.1	10	6.60	0.0080
128	824.20	4.1	20	-11.90	-0.0144
128	824.20	4.1	30	-11.50	-0.0140
128	824.20	4.1	40	-6.00	-0.0073
128	824.20	4.1	50	-12.60	-0.0153
128	824.20	4.1	60	-15.40	-0.0187
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	4.35	-30	10.90	0.0132
128	824.20	4.35	-20	18.30	0.0222
128	824.20	4.35	-10	14.20	0.0172
128	824.20	4.35	0	10.40	0.0126
128	824.20	4.35	10	12.10	0.0147
128	824.20	4.35	20	-22.50	-0.0273
128	824.20	4.35	30	7.50	0.0091
128	824.20	4.35	40	-17.90	-0.0217
128	824.20	4.35	50	-17.50	-0.0212
128	824.20	4.35	60	-18.10	-0.0220

Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW
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GSM850 Results: channel 189 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
189	836.40	3.6	-30	-20.80	-0.0249
189	836.40	3.6	-20	-17.30	-0.0207
189	836.40	3.6	-10	20.50	0.0245
189	836.40	3.6	0	6.30	0.0075
189	836.40	3.6	10	-6.80	-0.0081
189	836.40	3.6	20	-20.20	-0.0242
189	836.40	3.6	30	-19.70	-0.0236
189	836.40	3.6	40	7.80	0.0093
189	836.40	3.6	50	-18.60	-0.0222
189	836.40	3.6	60	-19.10	-0.0228
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
189	836.40	4.1	-30	-16.60	-0.0198
189	836.40	4.1	-20	14.80	0.0177
189	836.40	4.1	-10	10.90	0.0130
189	836.40	4.1	0	8.30	0.0099
189	836.40	4.1	10	12.90	0.0154
189	836.40	4.1	20	-13.40	-0.0160
189	836.40	4.1	30	14.80	0.0177
189	836.40	4.1	40	-16.10	-0.0192
189	836.40	4.1	50	-8.10	-0.0097
189	836.40	4.1	60	-6.10	-0.0073
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
189	836.40	4.35	-30	-10.20	-0.0122
189	836.40	4.35	-20	25.60	0.0306
189	836.40	4.35	-10	20.80	0.0249
189	836.40	4.35	0	14.00	0.0167
189	836.40	4.35	10	-15.40	-0.0184
189	836.40	4.35	20	-19.50	-0.0233
189	836.40	4.35	30	-16.30	-0.0195
189	836.40	4.35	40	-16.40	-0.0196
189	836.40	4.35	50	-13.20	-0.0158
189	836.40	4.35	60	-18.60	-0.0222

Test Report No.:
 RTS-6012-1211-57_Rev2

Dates of Test:
 Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012,
 Jan. 04 and Feb.05, 2013

FCC ID: L6ARFA90LW
 IC: 2503A-RFA90LW

GSM850 Results: channel 251 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
251	848.8	3.6	-30	-21.20	-0.0250
251	848.8	3.6	-20	-14.40	-0.0170
251	848.8	3.6	-10	18.70	0.0220
251	848.8	3.6	0	7.50	0.0088
251	848.8	3.6	10	-13.50	-0.0159
251	848.8	3.6	20	-19.20	-0.0226
251	848.8	3.6	30	11.40	0.0134
251	848.8	3.6	40	9.80	0.0115
251	848.8	3.6	50	-19.40	-0.0229
251	848.8	3.6	60	-15.50	-0.0183
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
251	848.8	4.1	-30	-11.70	-0.0138
251	848.8	4.1	-20	13.70	0.0161
251	848.8	4.1	-10	19.30	0.0227
251	848.8	4.1	0	11.60	0.0137
251	848.8	4.1	10	-9.60	-0.0113
251	848.8	4.1	20	-18.50	-0.0218
251	848.8	4.1	30	10.30	0.0121
251	848.8	4.1	40	-14.60	-0.0172
251	848.8	4.1	50	-10.60	-0.0125
251	848.8	4.1	60	-17.70	-0.0209
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
251	848.8	4.35	-30	-19.30	-0.0227
251	848.8	4.35	-20	8.90	0.0105
251	848.8	4.35	-10	26.90	0.0317
251	848.8	4.35	0	12.60	0.0148
251	848.8	4.35	10	-18.80	-0.0221
251	848.8	4.35	20	-13.90	-0.0164
251	848.8	4.35	30	10.50	0.0124
251	848.8	4.35	40	-18.30	-0.0216
251	848.8	4.35	50	-8.80	-0.0104
251	848.8	4.35	60	-14.80	-0.0174

Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW
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PCS1900 results: channels 512, 661, & 810 @ 20°C maximum transmitted power

Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.20	3.6	20	35.71	0.0193
661	1880.00	3.6	20	30.41	0.0162
810	1909.80	3.6	20	29.96	0.0157
Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.20	4.1	20	27.31	0.0148
661	1880.00	4.1	20	28.41	0.0151
810	1909.80	4.1	20	28.73	0.0150
Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.20	4.35	20	27.31	0.0148
661	1880.00	4.35	20	26.28	0.0140
810	1909.80	4.35	20	23.76	0.0124

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PCS1900 Results: channel 512 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.20	3.6	-30	-7.81	-0.0042
512	1850.20	3.6	-20	37.52	0.0203
512	1850.20	3.6	-10	45.52	0.0246
512	1850.20	3.6	0	62.63	0.0339
512	1850.20	3.6	10	36.03	0.0195
512	1850.20	3.6	20	35.71	0.0193
512	1850.20	3.6	30	9.17	0.0050
512	1850.20	3.6	40	23.37	0.0126
512	1850.20	3.6	50	23.37	0.0126
512	1850.20	3.6	60	32.00	0.0173
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.20	4.1	-30	-9.43	-0.0051
512	1850.20	4.1	-20	24.86	0.0134
512	1850.20	4.1	-10	40.49	0.0219
512	1850.20	4.1	0	54.89	0.0297
512	1850.20	4.1	10	36.55	0.0198
512	1850.20	4.1	20	27.31	0.0148
512	1850.20	4.1	30	-12.40	-0.0067
512	1850.20	4.1	40	16.14	0.0087
512	1850.20	4.1	50	16.14	0.0087
512	1850.20	4.1	60	28.00	0.0151
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.20	4.35	-30	17.69	0.0096
512	1850.20	4.35	-20	32.54	0.0176
512	1850.20	4.35	-10	36.42	0.0197
512	1850.20	4.35	0	58.37	0.0315
512	1850.20	4.35	10	38.48	0.0208
512	1850.20	4.35	20	27.31	0.0148
512	1850.20	4.35	30	-10.33	-0.0056
512	1850.20	4.35	40	17.43	0.0094
512	1850.20	4.35	50	17.43	0.0094
512	1850.20	4.35	60	-34.00	-0.0184

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FCC ID: L6ARFA90LW
 IC: 2503A-RFA90LW

PCS1900 Results: channel 661 @ maximum transmitted power


Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880.00	3.6	-30	-6.52	-0.0035
661	1880.00	3.6	-20	35.00	0.0186
661	1880.00	3.6	-10	46.30	0.0246
661	1880.00	3.6	0	65.54	0.0349
661	1880.00	3.6	10	40.81	0.0217
661	1880.00	3.6	20	30.41	0.0162
661	1880.00	3.6	30	6.07	0.0032
661	1880.00	3.6	40	24.02	0.0128
661	1880.00	3.6	50	24.02	0.0128
661	1880.00	3.6	60	16.00	0.0085
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880.00	4.1	-30	-8.46	-0.0045
661	1880.00	4.1	-20	22.66	0.0121
661	1880.00	4.1	-10	35.64	0.0190
661	1880.00	4.1	0	56.82	0.0302
661	1880.00	4.1	10	38.61	0.0205
661	1880.00	4.1	20	28.41	0.0151
661	1880.00	4.1	30	-12.85	-0.0068
661	1880.00	4.1	40	24.73	0.0132
661	1880.00	4.1	50	24.73	0.0132
661	1880.00	4.1	60	38.00	0.0202
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880.00	4.35	-30	20.02	0.0106
661	1880.00	4.35	-20	29.06	0.0155
661	1880.00	4.35	-10	41.97	0.0223
661	1880.00	4.35	0	57.73	0.0307
661	1880.00	4.35	10	37.58	0.0200
661	1880.00	4.35	20	26.28	0.0140
661	1880.00	4.35	30	-11.49	-0.0061
661	1880.00	4.35	40	16.01	0.0085
661	1880.00	4.35	50	16.01	0.0085
661	1880.00	4.35	60	-17.00	-0.0090

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PCS1900 Results: channel 810 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
810	1909.80	3.6	-30	-7.81	-0.0041
810	1909.80	3.6	-20	33.38	0.0175
810	1909.80	3.6	-10	44.23	0.0232
810	1909.80	3.6	0	65.99	0.0346
810	1909.80	3.6	10	41.46	0.0217
810	1909.80	3.6	20	29.96	0.0157
810	1909.80	3.6	30	7.68	0.0040
810	1909.80	3.6	40	14.92	0.0078
810	1909.80	3.6	50	14.92	0.0078
810	1909.80	3.6	60	-34.00	-0.0178
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
810	1909.80	4.1	-30	11.36	0.0059
810	1909.80	4.1	-20	27.44	0.0144
810	1909.80	4.1	-10	35.00	0.0183
810	1909.80	4.1	0	57.53	0.0301
810	1909.80	4.1	10	37.32	0.0195
810	1909.80	4.1	20	28.73	0.0150
810	1909.80	4.1	30	-6.39	-0.0033
810	1909.80	4.1	40	18.85	0.0099
810	1909.80	4.1	50	18.85	0.0099
810	1909.80	4.1	60	-19.00	-0.0099
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
810	1909.80	4.35	-30	28.93	0.0151
810	1909.80	4.35	-20	31.64	0.0166
810	1909.80	4.35	-10	41.52	0.0217
810	1909.80	4.35	0	51.59	0.0270
810	1909.80	4.35	10	38.03	0.0199
810	1909.80	4.35	20	23.76	0.0124
810	1909.80	4.35	30	-14.33	-0.0075
810	1909.80	4.35	40	17.50	0.0092
810	1909.80	4.35	50	17.50	0.0092
810	1909.80	4.35	60	-10.00	-0.0052

APPENDIX 1D – GSM RADIATED EMISSIONS TEST DATA

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 1D	
	Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013

Radiated Power Test Data Results

Date of test: November 22, 2012

The following measurements were performed by Feras Obeid.

The environmental tests conditions were: Temperature: 24.8 °C
Relative Humidity: 27.6 %

The BlackBerry® smartphone was standalone, horizontal with LCD facing up and top pointing to RX antenna when the turntable is at 0 degree position.


Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height.

GSM850 Band in Call Mode

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method				Limit (dBm)	Diff. To Limit (dB)	
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Dipole)				
											(dBm)	(W)		
F0	128	824.20	850	Dipole	V	77.92	86.01	V-V	13.09	30.22	1.05	38.50	-8.28	
F0	128	824.20	850	Dipole	H	86.01		H-H	11.38					
F0	190	836.60	850	Dipole	V	77.73	85.79	V-V	12.73	29.53	0.90	38.50	-8.97	
F0	190	836.60	850	Dipole	H	85.79		H-H	11.94					
F0	251	848.80	850	Dipole	V	76.71	85.03	V-V	12.94	29.72	0.94	38.50	-8.78	
F0	251	848.80	850	Dipole	H	85.03		H-H	12.60					

GSM850 Band in EDGE Mode

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method				Limit (dBm)	Diff. To Limit (dB)	
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Dipole)				
											(dBm)	(W)		
F0	128	824.20	850	Dipole	V	73.99	82.25	V-V	9.29	26.42	0.44	38.50	-12.08	
F0	128	824.20	850	Dipole	H	82.25		H-H	7.52					
F0	190	836.60	850	Dipole	V	74.37	82.37	V-V	9.23	26.03	0.40	38.50	-12.47	
F0	190	836.60	850	Dipole	H	82.37		H-H	8.48					
F0	251	848.80	850	Dipole	V	73.39	81.56	V-V	9.37	26.15	0.41	38.50	-12.35	
F0	251	848.80	850	Dipole	H	81.56		H-H	9.00					

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 1D	
	Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013

Radiated Power Test Data Results cont'd

Date of test: December 13, 2012

The following measurements were performed by Heng Lin.

The environmental tests conditions were: Temperature: 25.4 °C
Relative Humidity: 20.9 %

The BlackBerry® smartphone was standalone, horizontal with LCD facing down and the top pointing to RX antenna when the turntable is at 0 degree position.


Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height.

PCS1900 Band in Call Mode

EUT								Receive Antenna		Spectrum Analyzer		Substitution Method		Tracking Generator		Limit (dBm)	Diff to Limit (dB)
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) dBuV	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Isotropic Radiator)		Limit (dBm)	Diff to Limit (dB)				
										(dBm)	(W)						
F0	512	1850.20	1900	Horn	V	88.18	90.92	V-V	-2.0	32.81	1.32	33.00	-0.19				
F0	512	1850.20	1900	Horn	H	90.92		H-H	-2.54								
F0	661	1880.00	1900	Horn	V	86.61	89.83	V-V	-3.16	31.80	1.20	33.00	-1.20				
F0	661	1880.00	1900	Horn	H	89.83		H-H	-3.10								
F0	810	1909.80	1900	Horn	V	86.39	89.43	V-V	-1.1	32.85	1.33	33.00	-0.15				
F0	810	1909.80	1900	Horn	H	89.43		H-H	-1.5								

PCS1900 Band in EDGE Mode

EUT								Receive Antenna		Spectrum Analyzer		Substitution Method		Tracking Generator		Limit (dBm)	Diff to Limit (dB)
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) dBuV	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Isotropic Radiator)		Limit (dBm)	Diff to Limit (dB)				
										(dBm)	(W)						
F0	512	1850.20	1900	Horn	V	84.72	87.83	V-V	-5.1	29.71	0.97	33.00	-3.29				
F0	512	1850.20	1900	Horn	H	87.83		H-H	-5.6								
F0	661	1880.00	1900	Horn	V	82.75	86.83	V-V	-6.10	28.86	0.89	33.00	-4.14				
F0	661	1880.00	1900	Horn	H	86.83		H-H	-6.04								
F0	810	1909.80	1900	Horn	V	86.62	86.62	V-V	-3.9	30.05	1.01	33.00	-2.95				
F0	810	1909.80	1900	Horn	H	86.49		H-H	-4.3								

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 1D	
Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW

Radiated Emissions Test Data Results cont'd

GSM850 EDGE Mode

Date of Test: August 20 and November 13, 2012

The following measurements were performed by Feras Obeid.

The environmental test conditions were: Temperature: 24.1 – 24.4°C
Relative Humidity: 25.5 – 27.7 %

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and a frequency range of 30 MHz to 1000 MHz.

The BlackBerry® smartphone was standalone, horizontally with LCD facing down and the top pointing to the RX antenna when the turntable is at 0 degree position.

Measurements were performed in GSM850 EDGE Tx mode, channels 128, 190, 251.
All emissions had test margins greater than 25.0 dB.

Date of Test: August 21 to September 5, 2012

The following measurements were performed by Shuo Wang


The environmental test conditions were: Temperature: 22.3 - 25.4 °C
Relative Humidity: 36.7 - 41.7 %

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and a frequency range of 1 GHz to 9 GHz.

The BlackBerry® smartphone was standalone, horizontal with LCD facing up and top pointing to the RX antenna when the turntable is at 0 degree position.

The measurements were performed in GSM850 EDGE Tx mode, channels 128, 190, 251.

All emissions had test margins greater than 25.0 dB

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 1D	
Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW

Radiated Emissions Test Data Results cont'd

PCS1900 CALL Mode

Date of Test: August 23 and November 13, 2012

The environmental test conditions were: Temperature: 24.6 -24.8 °C
Relative Humidity: 16.5 - 29.8 %

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and a frequency range of 30 MHz to 1000 MHz.

The BlackBerry® smartphone was standalone, Vertical Upside down with LCD facing the RX antenna when the turntable is at 0 degree position.

Measurements were performed in PCS1900 Call Tx mode, channels 512, 661, 810.
All emissions had test margins greater than 25.0 dB.

Date of Test: August 21 – November 30, 2012


The following measurements were performed by Shuo Wang
The environmental test conditions were: Temperature: 24.3 – 25.4 °C
Relative Humidity: 38.7 – 42.5 %

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and a frequency range of 1 GHz to 20 GHz.

The BlackBerry® smartphone was standalone, horizontal with LCD facing down and top pointing to the RX antenna when the turntable is at 0 degree position.

Measurements were performed in PCS1900 Call Tx mode, channels 512, 661, 810.

All emissions had test margins greater than 25.0 dB.

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 1D	
Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW

Radiated Emissions Test Data Results cont'd

PCS1900 EDGE Mode

Date of Test: August 23 and November 13, 2012

The environmental test conditions were: Temperature: 24.6 -24.8 °C
 Relative Humidity: 16.5 - 29.8 %

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and a frequency range of 30 MHz to 1000 MHz.

The BlackBerry® smartphone was standalone, Vertical Upside down with LCD facing the RX antenna when the turntable is at 0 degree position.

Measurements were performed in PCS1900 EDGE Tx mode, channels 512, 661, 810.
All emissions had test margins greater than 25.0 dB.

Date of Test: August 21 – November 30, 2012

The following measurements were performed by Shuo Wang
The environmental test conditions were: Temperature: 24.3 – 25.4 °C
 Relative Humidity: 38.7 – 42.5 %


Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and a frequency range of 1 GHz to 20 GHz.

The BlackBerry® smartphone was standalone, horizontal with LCD facing down and top pointing to the RX antenna when the turntable is at 0 degree position.

Measurements were performed in PCS1900 EDGE Tx mode, channels 512, 661, 810.

All emissions had test margins greater than 25.0 dB.

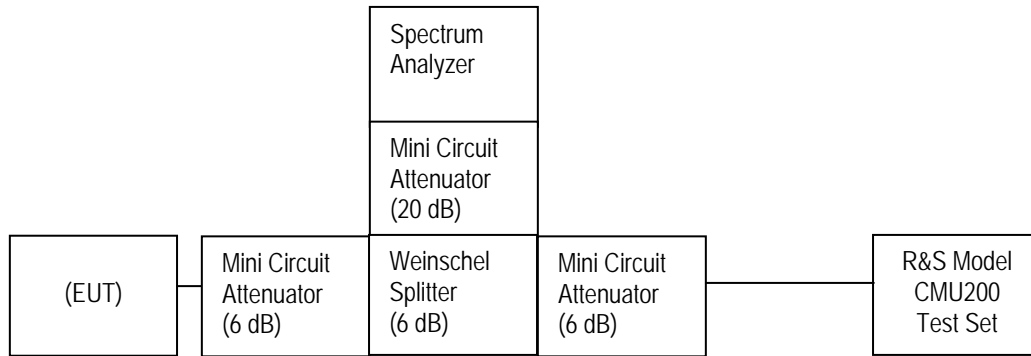
APPENDIX 2A– CDMA CONDUCTED RF EMISSIONS TEST DATA/PLOTS


	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 2A	
Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW

CDMA Conducted RF Emission Test Data

This appendix contains measurement data pertaining to conducted spurious emissions, 99% power bandwidth and the channel mask.

Test Setup Diagram



	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 2A	
Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW

CDMA Conducted RF Emission Test Data cont'd

The conducted spurious emissions – As per 47 CFR 2.1051, CFR 22.917, CFR 24.238 and RSS-132 4.5 and RSS-133, 6.5 were measured from 30 MHz to 20 GHz. The EUT emissions were in the noise floor.

Date of Test: October 25, 2011

The environmental test conditions were: Temperature: 24.0 °C
Relative Humidity: 47.0 %

Test Data for CDMA Cellular and PCS selected Frequencies in Loopback mode

CDMA Cellular Frequency (MHz)	99% Occupied Bandwidth (MHz)
824.70	1.268
836.52	1.271
848.31	1.268

CDMA PCS Frequency (MHz)	99% Occupied Bandwidth (MHz)
1851.20	1.279
1880.00	1.276
1908.75	1.276

Test Data for CDMA Cellular and PCS selected Frequencies in Loopback mode


Refer to the following measurement plots for more detail.

See Figures 2-1a to 2-12a for the plots of the conducted spurious emissions.

See Figures 2-13a to 2-18a for the plots of 99% Occupied Bandwidth.

See Figures 2-19a to 2-24a for the plots of the Channel mask.

The RF power output was at maximum for all the recorded measurements shown below.

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW	
	APPENDIX 2A	
Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW

CDMA Conducted RF Emission Test Data cont'd

Test Data for CDMA Cellular and CDMA PCS selected Frequencies in EVDO mode

Cellular Frequency (MHz)	99% Occupied Bandwidth (MHz)
824.70	1.305
836.52	1.305
848.31	1.308

PCS Frequency (MHz)	99% Occupied Bandwidth (MHz)
1851.20	1.305
1880.00	1.305
1908.75	1.305

Measurement Plots for CDMA Cellular and CDMA PCS in EVDO mode


Refer to the following measurement plots for more detail.

See Figures 2-25a to 2-36a for the plots of the conducted spurious emissions.

See Figures 2-37a to 2-42a for the plots of 99% Occupied Bandwidth.

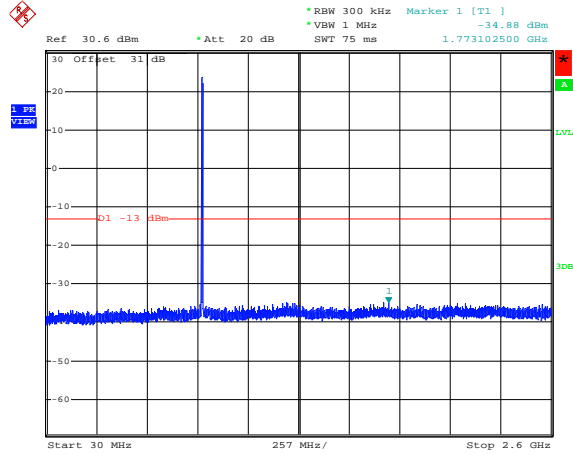
See Figures 2-43a to 2-46a for the plots of the Channel mask.

The RF power output was at maximum for all the recorded measurements shown below.

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 2A	
	Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013

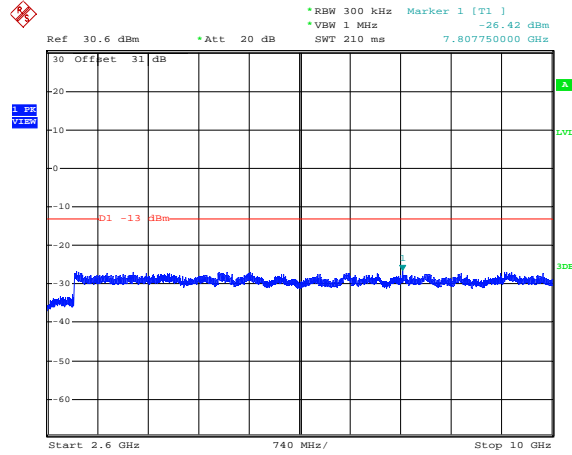
CDMA Conducted RF Emission Test Data cont'd

Figure 2-1a: Spurious Conducted Emissions Cellular Loopback mode, Low channel



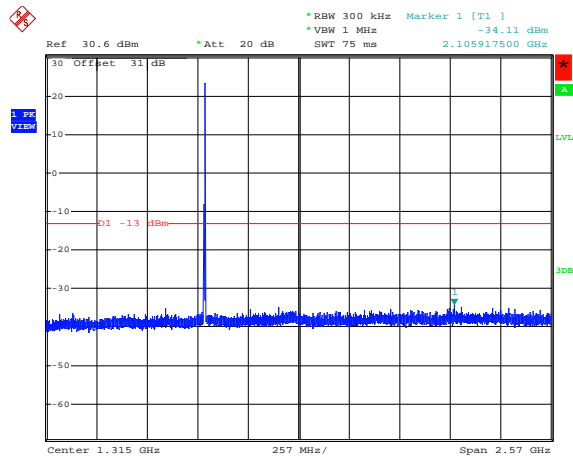
Date: 19.NOV.2012 17:24:50

Figure 2-2a: Spurious Conducted Emissions Cellular Loopback mode, Low channel



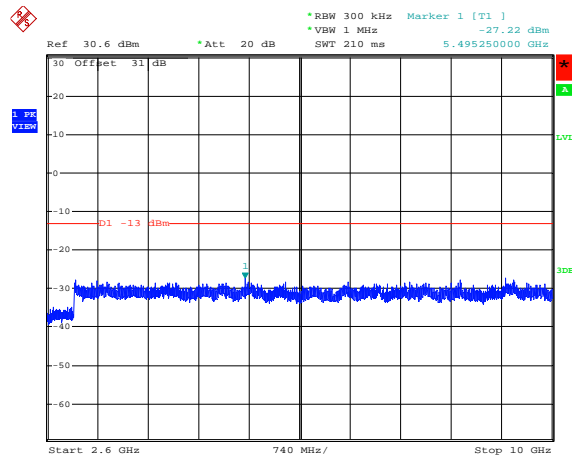
Date: 19.NOV.2012 17:22:54

Figure 2-3a: Spurious Conducted Emissions Cellular Loopback mode, Middle channel



Date: 19.NOV.2012 17:25:51

Figure 2-4a: Spurious Conducted Emissions Cellular Loopback mode, Middle channel



Date: 19.NOV.2012 17:26:55

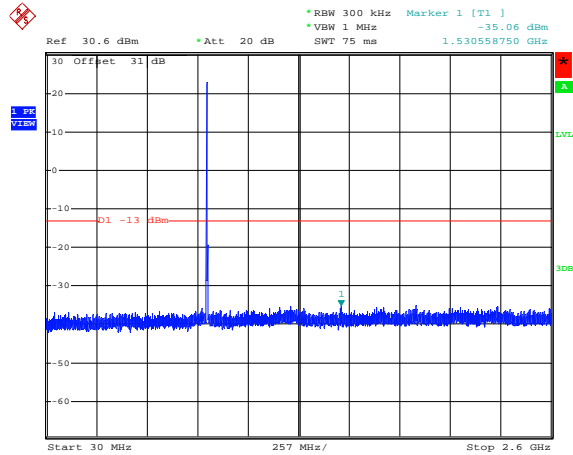
Test Report No.:
 RTS-6012-1211-57_Rev2

Dates of Test:
 Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012,
 Jan. 04 and Feb.05, 2013

FCC ID: L6ARFA90LW
IC: 2503A-RFA90LW

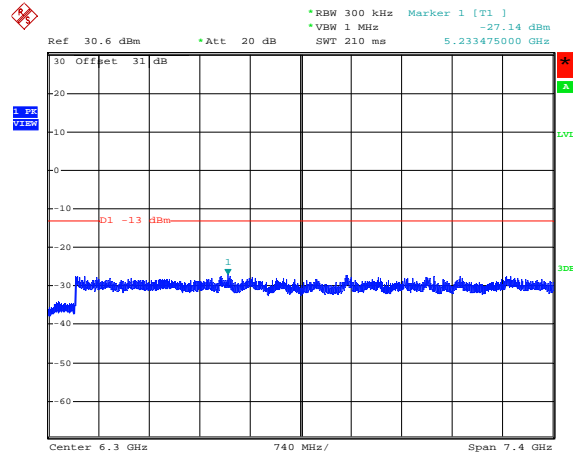
CDMA Conducted RF Emission Test Data cont'd

Figure 2-5a: Spurious Conducted Emissions Cellular Loopback mode, High Channel



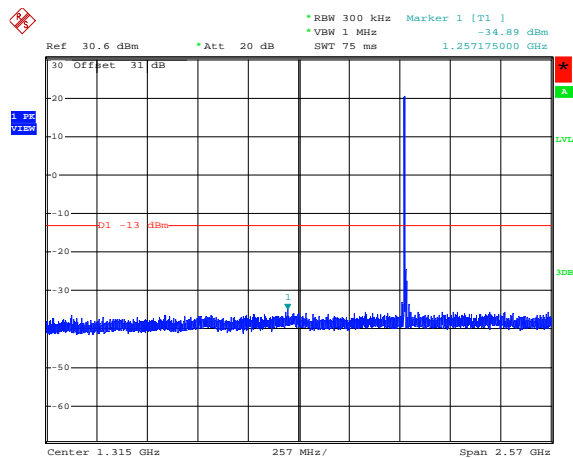
Date: 19.NOV.2012 17:31:45

Figure 2-6a: Spurious Conducted Emissions Cellular Loopback mode, High Channel



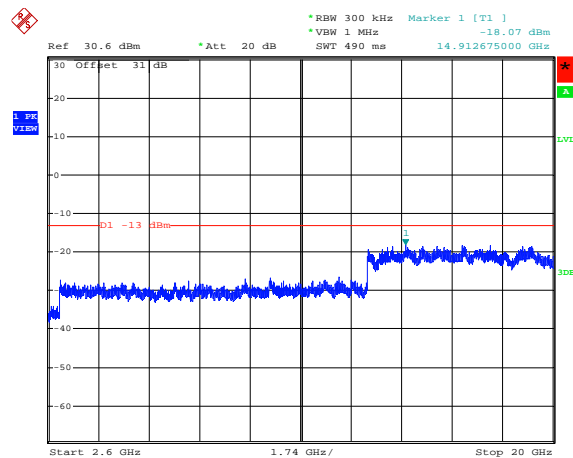
Date: 19.NOV.2012 17:31:03

Figure 2-7a: Spurious Conducted Emissions PCS Loopback mode, Low Channel




Date: 19.NOV.2012 17:34:02

Figure 2-8a: Spurious Conducted Emissions PCS Loopback mode, Low Channel

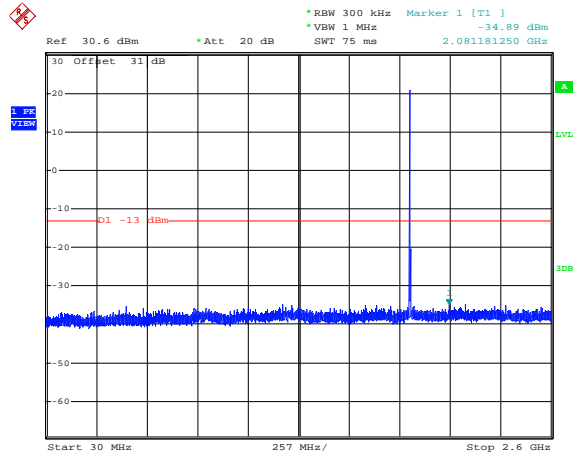


Date: 19.NOV.2012 17:39:40

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 2A	
	Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013

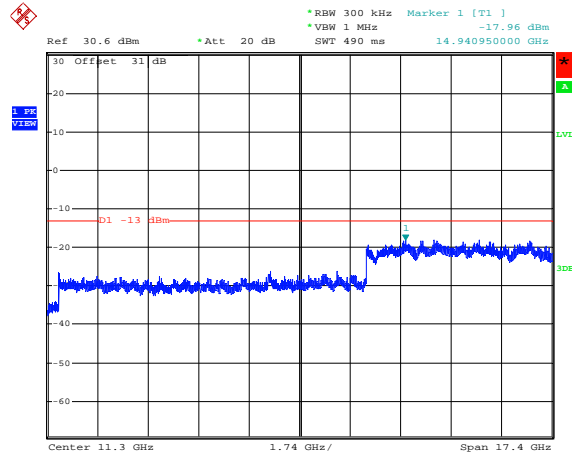
CDMA Conducted RF Emission Test Data cont'd

**Figure 2-9a: Spurious Conducted Emissions
PCS Loopback mode, Middle Channel**



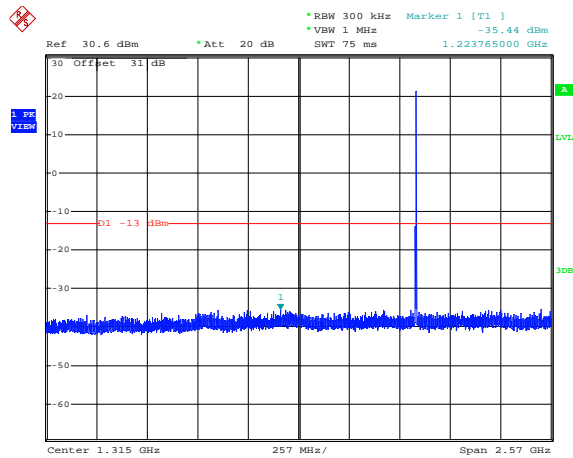
Date: 19.NOV.2012 17:47:50

**Figure 2-10a: Spurious Conducted Emissions
PCS Loopback mode, Middle Channel**



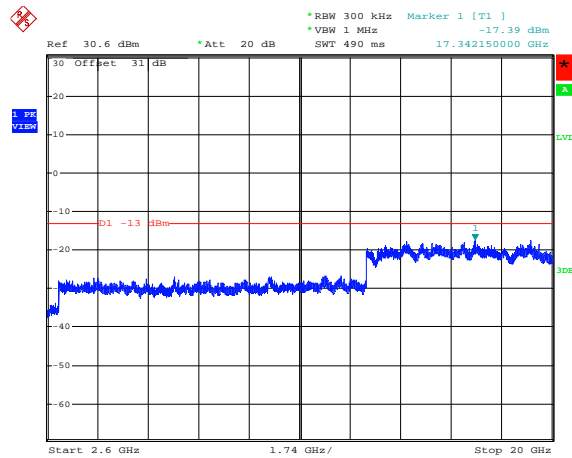
Date: 19.NOV.2012 17:43:08

**Figure 2-11a: Spurious Conducted Emissions
PCS Loopback mode, High Channel**



Date: 19.NOV.2012 17:51:44

**Figure 2-12a: Spurious Conducted Emissions
PCS Loopback mode, High Channel**



Date: 19.NOV.2012 17:55:50

Test Report No.:
 RTS-6012-1211-57_Rev2

Dates of Test:
 Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012,
 Jan. 04 and Feb.05, 2013

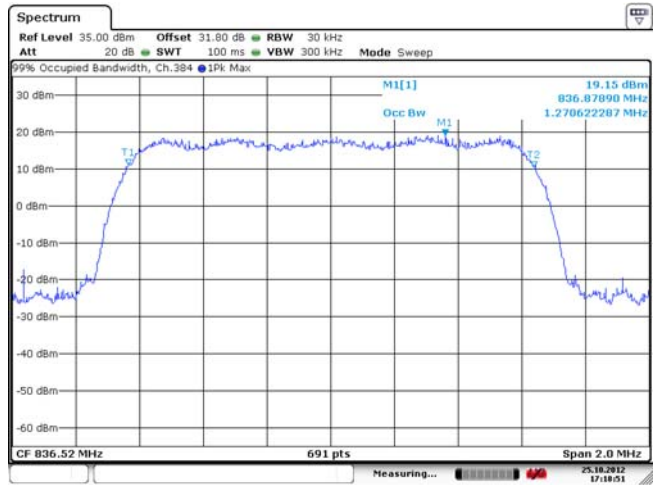
FCC ID: L6ARFA90LW
IC: 2503A-RFA90LW

CDMA Conducted RF Emission Test Data cont'd

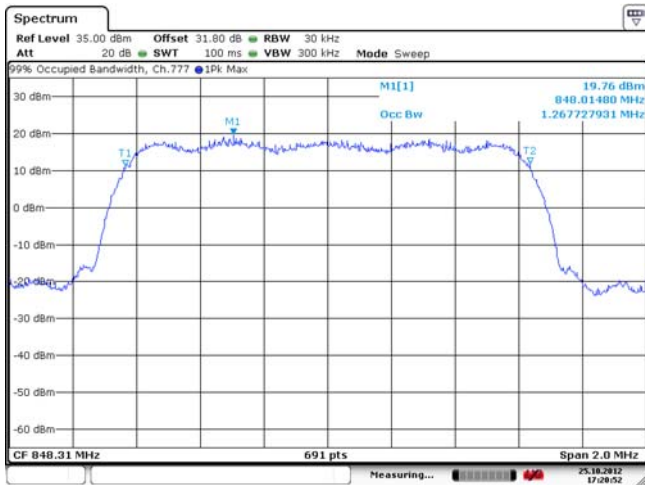
**Figure 2-13a: Occupied Bandwidth
 Cellular Loopback mode, Low Channel**



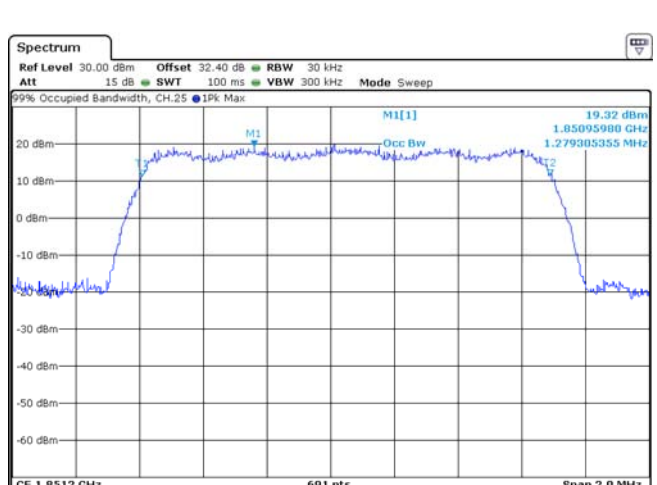
**Figure 2-14a: Occupied Bandwidth
 Cellular Loopback mode, Middle Channel**




**Figure 2-15a: Occupied Bandwidth
 Cellular Loopback mode, High Channel**



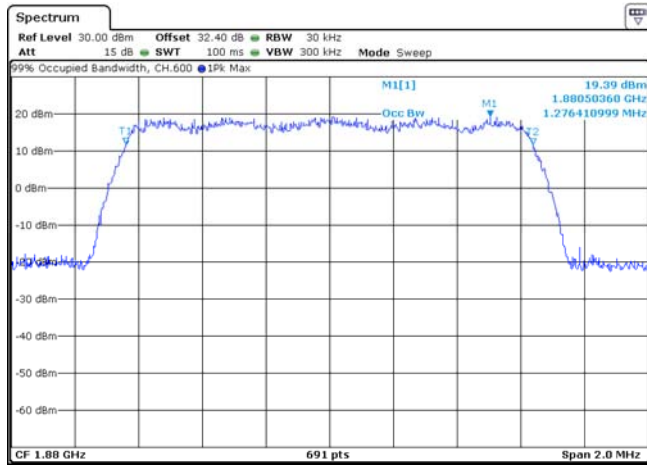
**Figure 2-16a: Occupied Bandwidth
 PCS Loopback mode, Low Channel**



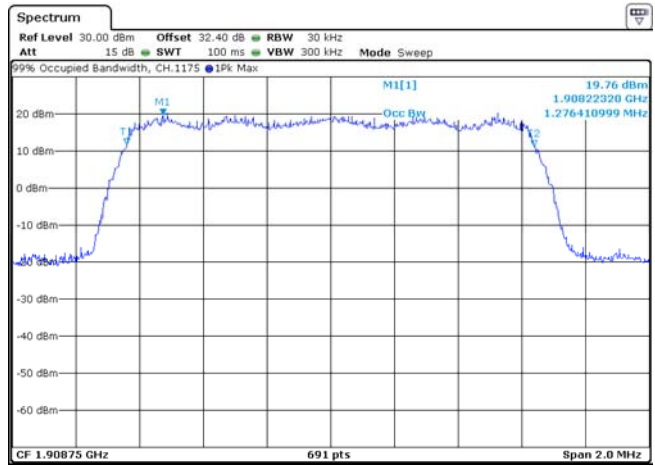
	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 2A	
	Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013

CDMA Conducted RF Emission Test Data cont'd

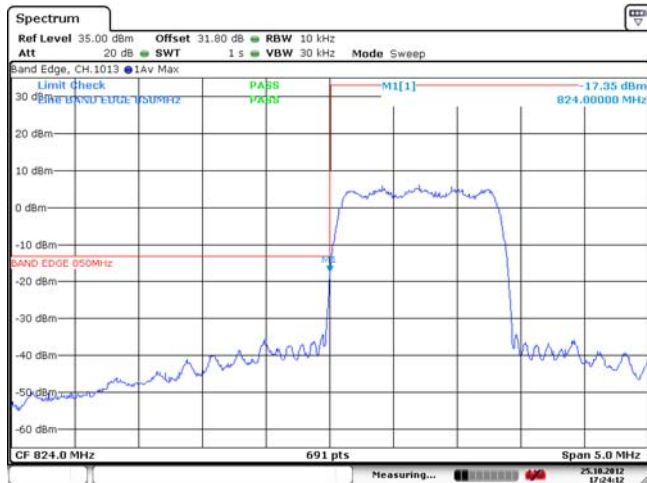
**Figure 2-17a: Occupied Bandwidth
PCS Loopback mode, Middle Channel**



**Figure 2-18a: Occupied Bandwidth
PCS Loopback mode, High Channel**

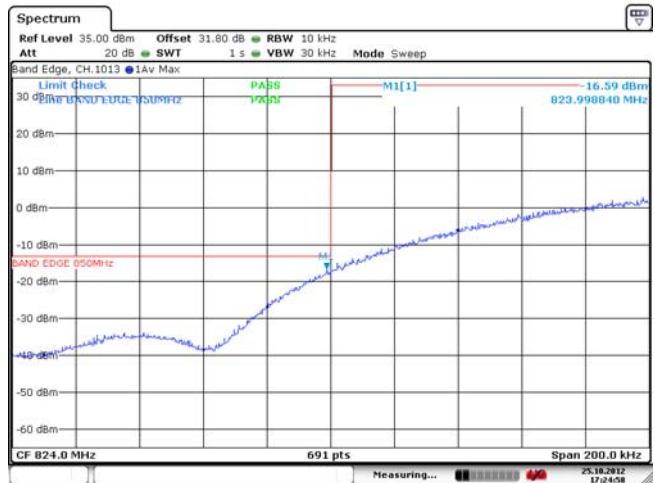


**Figure 2-19a: Low Channel Mask
Cellular Loopback mode**



Date: 25.OCT.2012 17:24:13

**Figure 2-20a: Low Channel Mask
Cellular Loopback mode**



Date: 25.OCT.2012 17:24:59

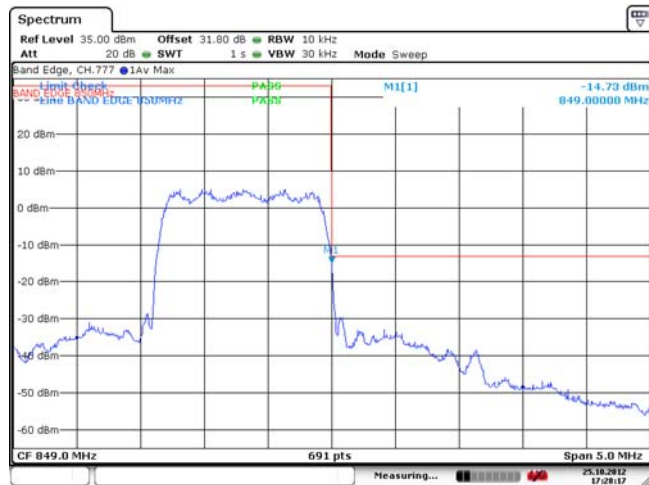
Test Report No.:
 RTS-6012-1211-57_Rev2

Dates of Test:
 Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012,
 Jan. 04 and Feb.05, 2013

FCC ID: L6ARFA90LW
IC: 2503A-RFA90LW

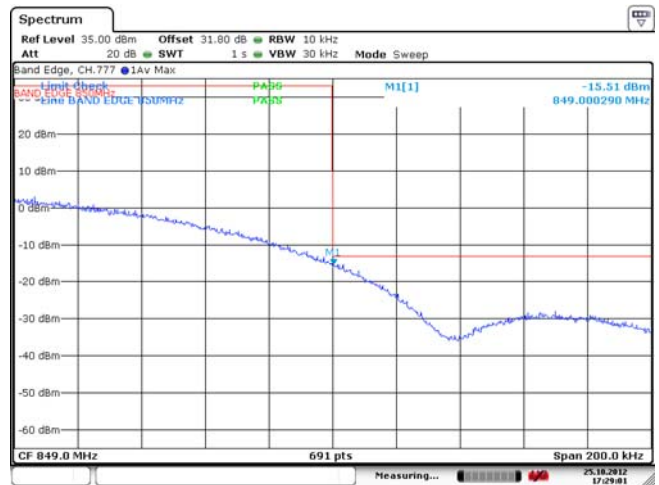
CDMA Conducted RF Emission Test Data cont'd

**Figure 2-21a: High Channel Mask
 Cellular Loopback mode**



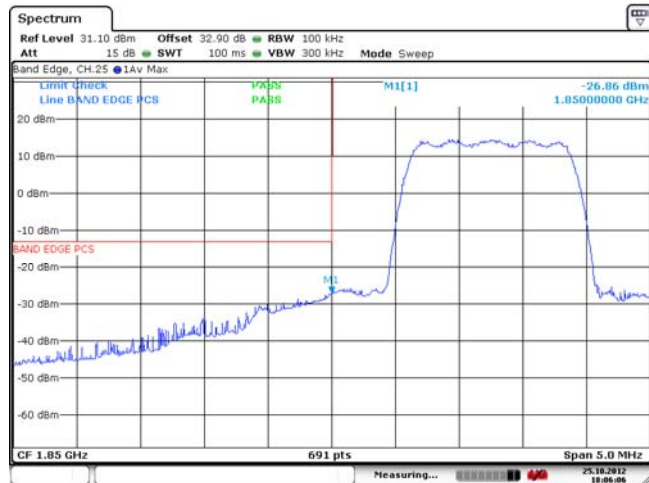
Date: 25.OCT.2012 17:28:18

**Figure 2-22a: High Channel Mask
 Cellular Loopback mode**



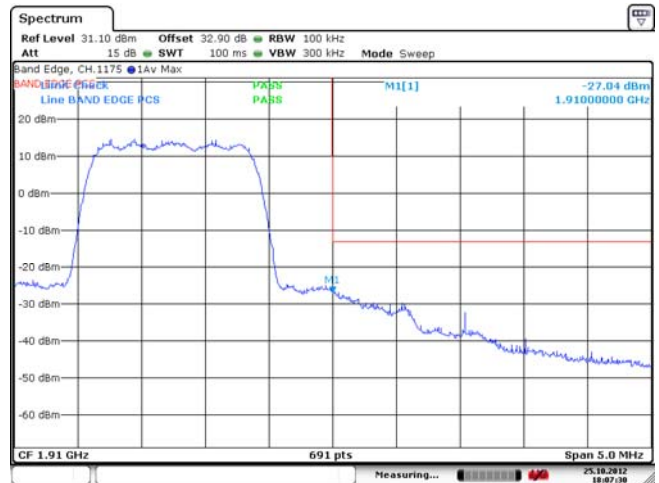
Date: 25.OCT.2012 17:29:02

**Figure 2-23a: Low Channel Mask
 PCS Loopback mode**




Date: 25.OCT.2012 18:06:06

**Figure 2-24a: High Channel Mask
 PCS Loopback mode**

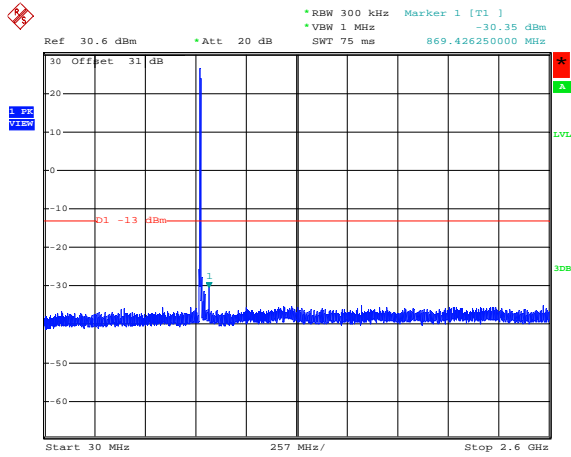


Date: 25.OCT.2012 18:07:30

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 2A	
	Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013

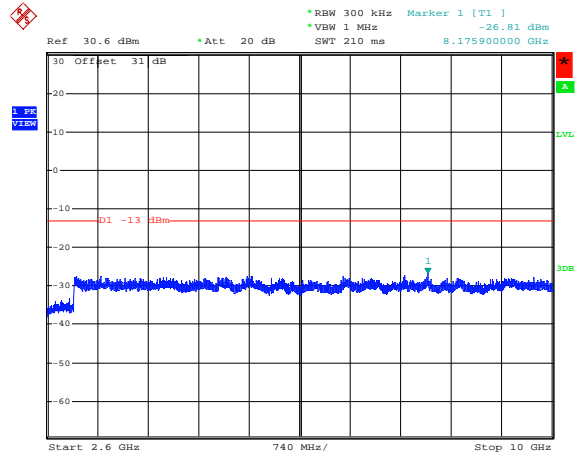
CDMA Conducted RF Emission Test Data cont'd

Figure 2-25a: Spurious Conducted Emissions Cellular EVDO mode, Low channel



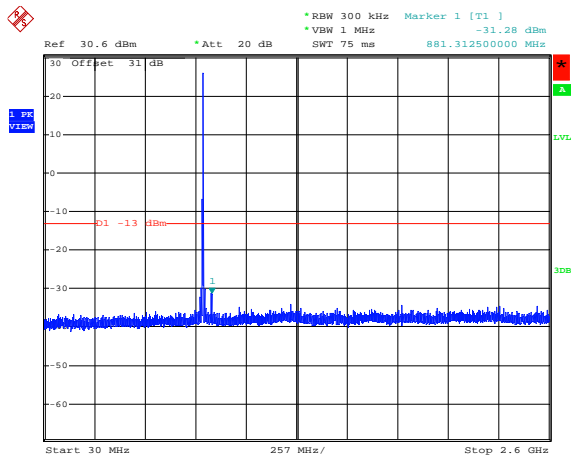
Date: 20.NOV.2012 14:08:59

Figure 2-26b: Spurious Conducted Emissions Cellular EVDO mode, Low channel



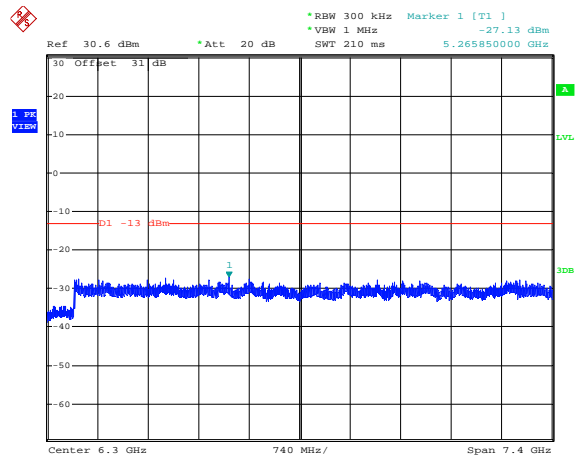
Date: 20.NOV.2012 14:13:01

Figure 2-27a: Spurious Conducted Emissions Cellular EVDO mode, Middle channel



Date: 20.NOV.2012 14:18:38

Figure 2-28a: Spurious Conducted Emissions Cellular EVDO mode, Middle channel



Date: 20.NOV.2012 14:17:10

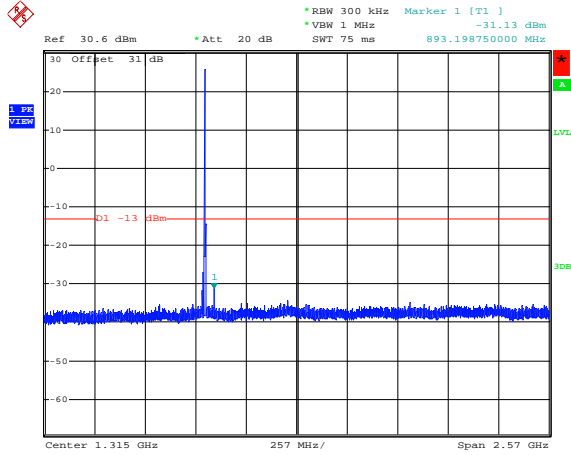
Test Report No.:
 RTS-6012-1211-57_Rev2

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FCC ID: L6ARFA90LW
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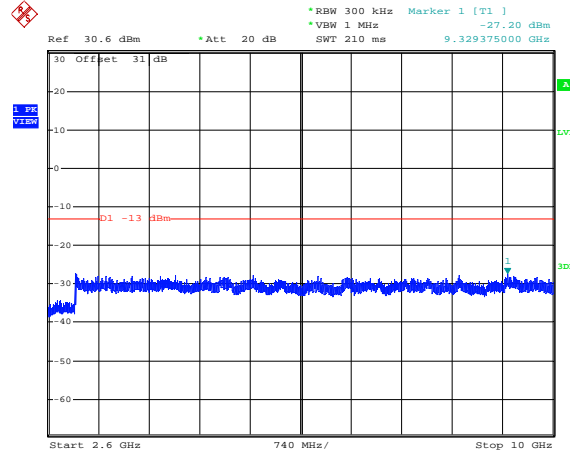
CDMA Conducted RF Emission Test Data cont'd

Figure 7-29a: Spurious Conducted Emissions Cellular EVDO mode, High Channel



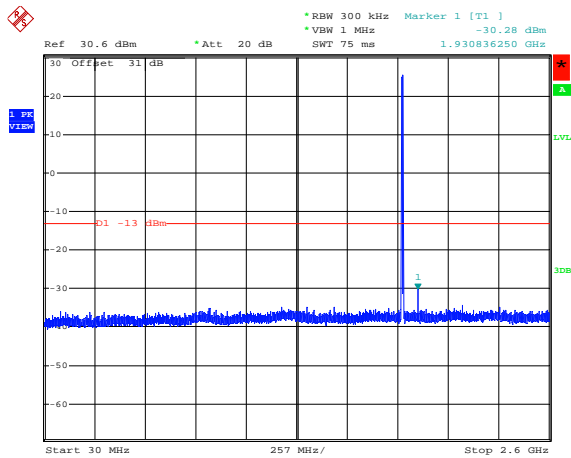
Date: 20.NOV.2012 14:20:26

Figure 2-30a: Spurious Conducted Emissions Cellular EVDO mode, High Channel



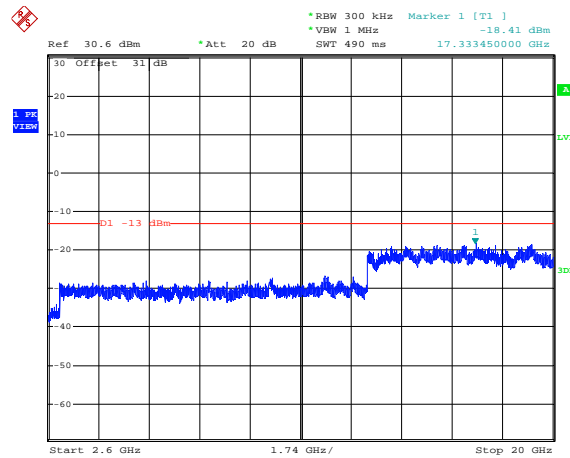
Date: 20.NOV.2012 14:21:57

Figure 2-31a: Spurious Conducted Emissions PCS EVDO mode, Low Channel




Date: 20.NOV.2012 14:29:23

Figure 2-32a: Spurious Conducted Emissions PCS EVDO mode, Low Channel

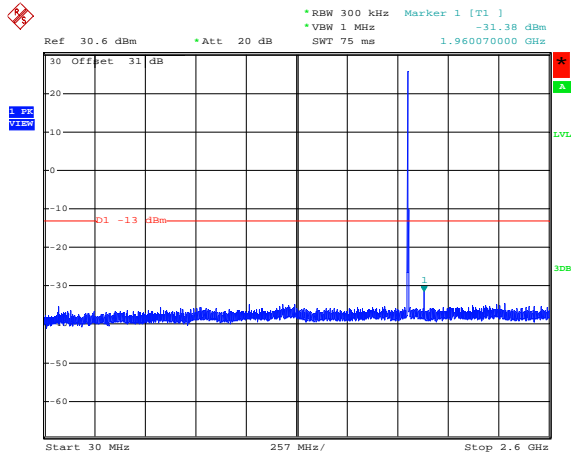


Date: 20.NOV.2012 14:41:27

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 2A	
	Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013

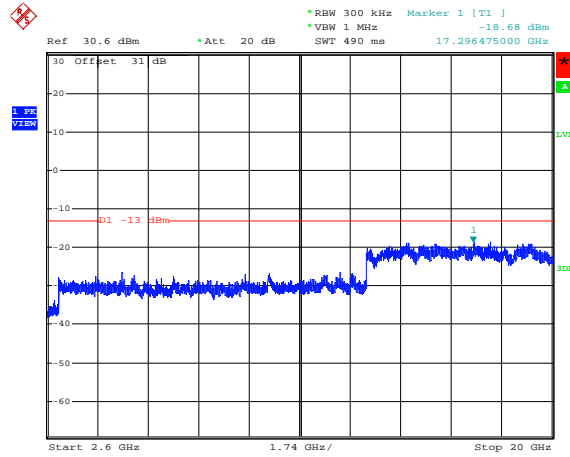
CDMA Conducted RF Emission Test Data cont'd

**Figure 2-33a: Spurious Conducted Emissions
PCS EVDO mode, Middle Channel**



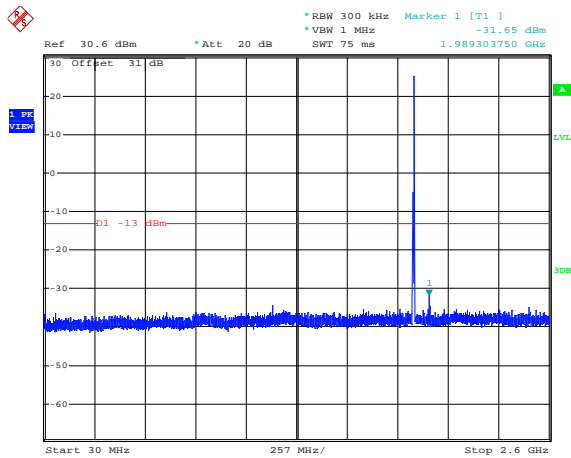
Date: 20.NOV.2012 14:34:35

**Figure 2-34a: Spurious Conducted Emissions
PCS EVDO mode, Middle Channel**



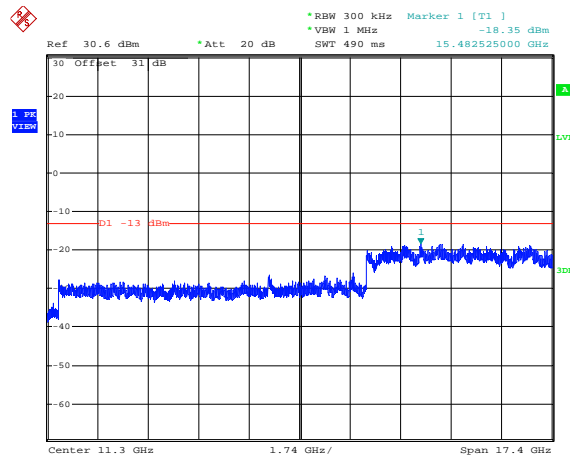
Date: 20.NOV.2012 14:35:43

**Figure 2-35a: Spurious Conducted Emissions
PCS EVDO mode, High Channel**



Date: 20.NOV.2012 14:40:13

**Figure 2-36a: Spurious Conducted Emissions
PCS EVDO mode, High Channel**



Date: 20.NOV.2012 14:39:12

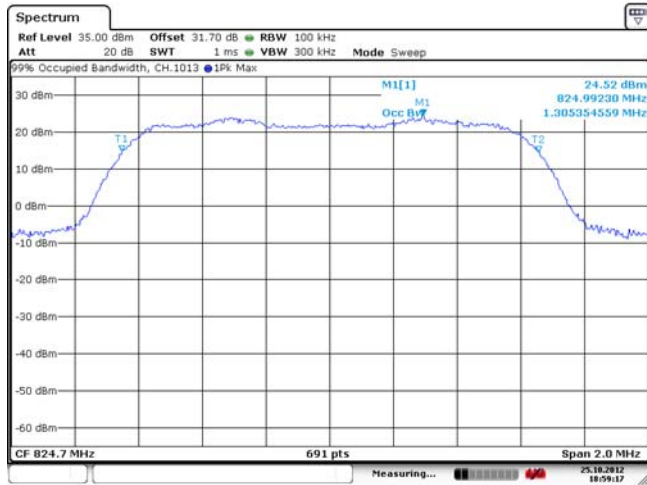
Test Report No.:
 RTS-6012-1211-57_Rev2

Dates of Test:
 Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012,
 Jan. 04 and Feb.05, 2013

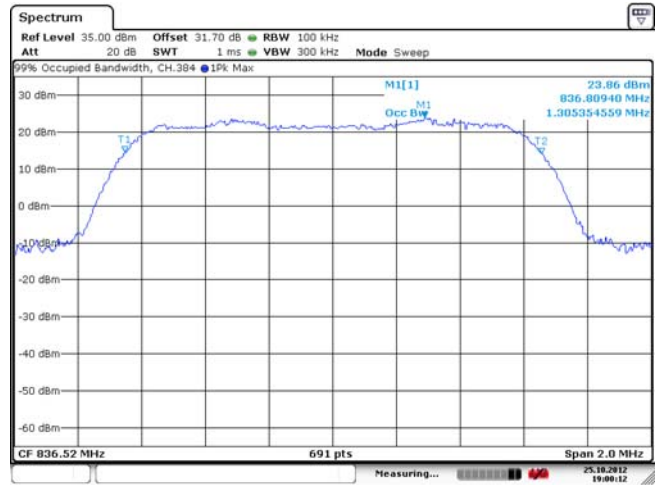
FCC ID: L6ARFA90LW
IC: 2503A-RFA90LW

CDMA Conducted RF Emission Test Data cont'd

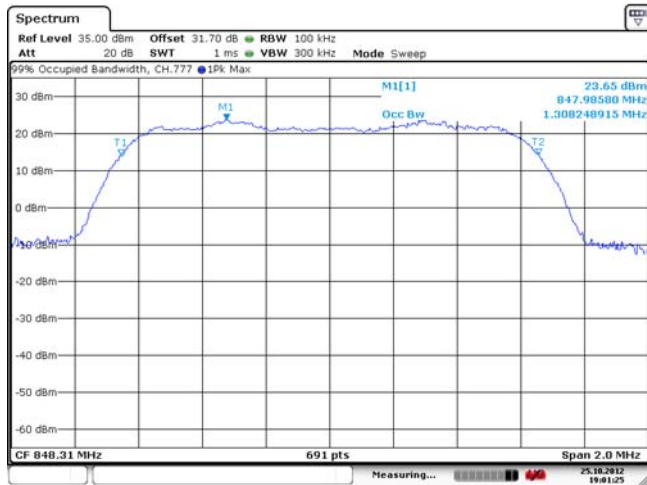
**Figure 2-37a: Occupied Bandwidth
 Cellular EVDO mode, Low Channel**



**Figure 2-38a: Occupied Bandwidth
 Cellular EVDO mode, Middle Channel**



**Figure 2-39a: Occupied Bandwidth
 Cellular EVDO mode, High Channel**



**Figure 2-40a: Occupied Bandwidth
 PCS EVDO mode, Low Channel**



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Dates of Test:
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 Jan. 04 and Feb.05, 2013

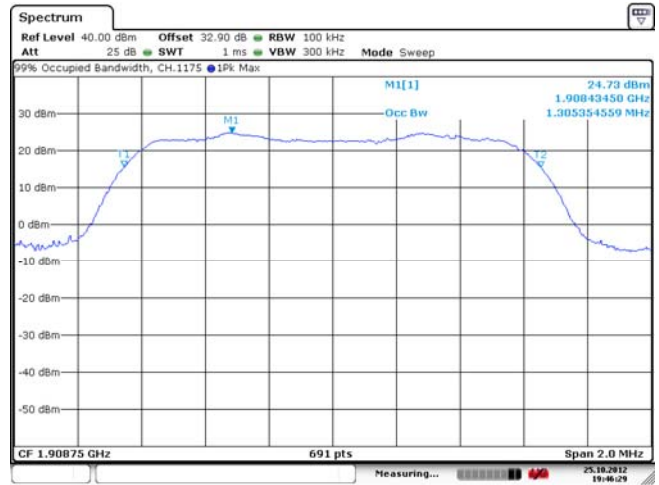
FCC ID: L6ARFA90LW
IC: 2503A-RFA90LW

CDMA Conducted RF Emission Test Data cont'd

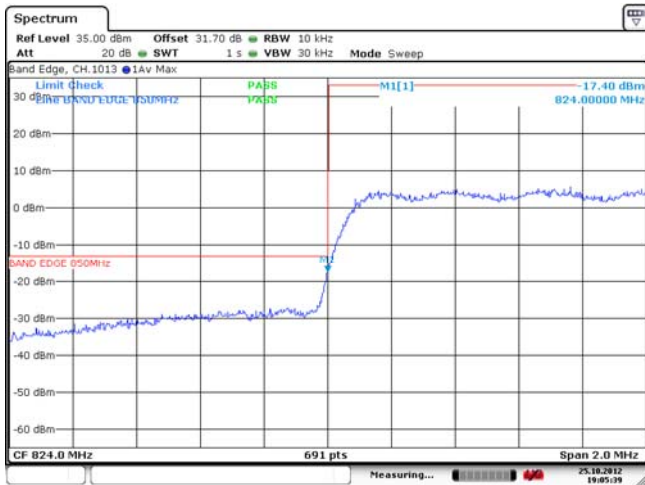
**Figure 2-41a: Occupied Bandwidth
 PCS EVDO mode, Middle Channel**



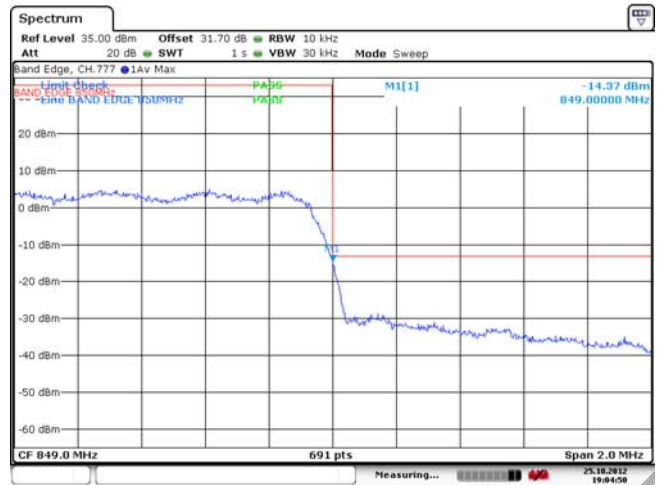
**Figure 2-42a: Occupied Bandwidth
 PCS EVDO mode, High Channel**




**Figure 2-43a: Low Channel Mask
 Cellular EVDO mode**



**Figure 2-44a: High Channel Mask
 Cellular EVDO mode**

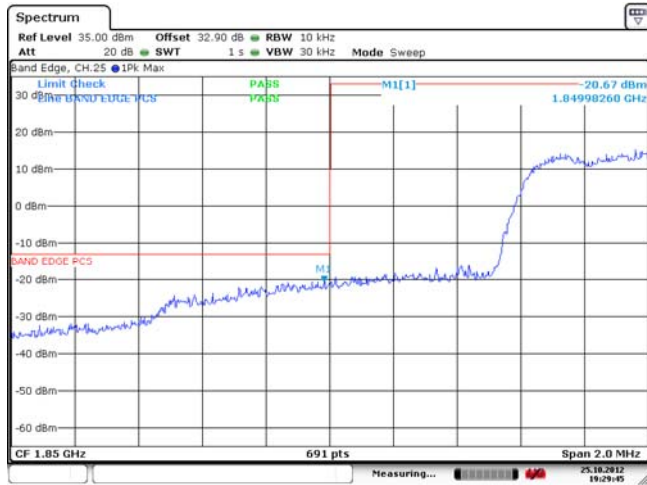


	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 2A	
	Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013

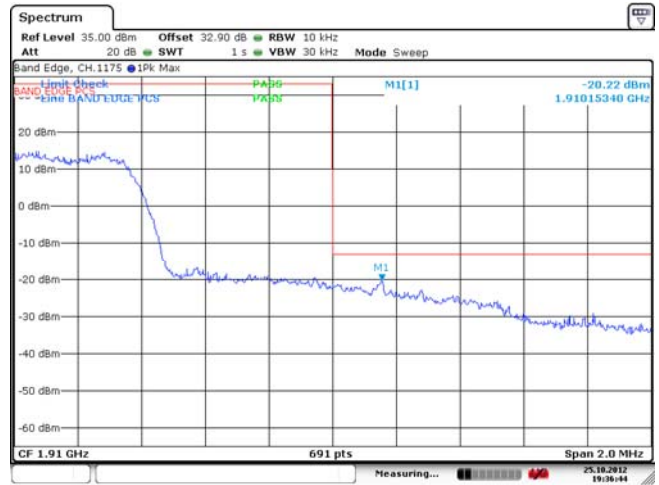
CDMA Conducted RF Emission Test Data cont'd

**Figure 2-45a: Low Channel Mask
PCS EVDO mode**

**Figure 2-46a: High Channel Mask
PCS EVDO mode**




Date: 25.OCT.2012 19:29:46



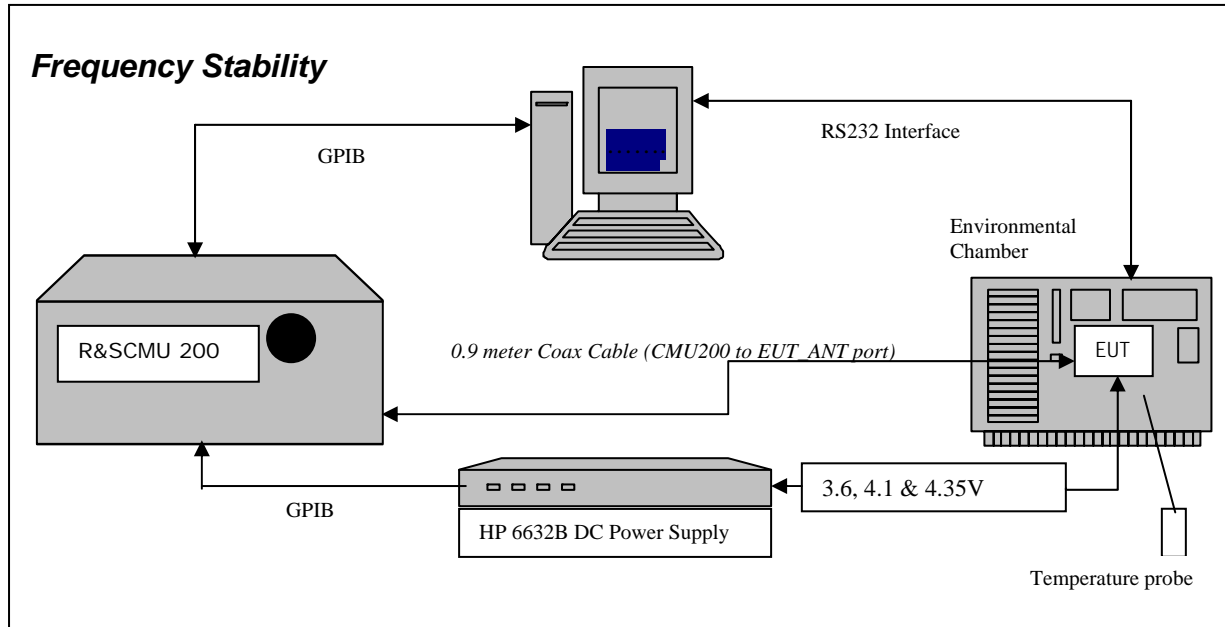
Date: 25.OCT.2012 19:36:44

APPENDIX 2B – CDMA CONDUCTED RF OUTPUT POWER TEST DATA

APPENDIX 2C – CDMA FREQUENCY STABILITY TEST DATA

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 2C	
	Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013

CDMA Frequency Stability Test Data



The following measurements were performed by Berkin Can.

CFR 47 Chapter 1 - Federal Communications Commission Rules

Part 2 Required Measurements

2.1055 Frequency Stability - Procedures

(a,b) Frequency Stability - Temperature Variation


(d) Frequency Stability - Voltage Variation

24.235 *Frequency Stability.*

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

The EUT meets the requirements as stated in CFR 47 chapter 1, Section 24.235, CFR 47 chapter 1, Section 22.917 RSS-132, 4.3 Frequency Stability, and RSS-133, 6.3 Frequency Stability.

Frequency Stability measurement devices were configured as presented in the block diagram recording frequency, power, data, temperatures, and stepped voltages controlled via a GPIB interface linked to the Environmental chamber, a DC power supply, and the Communications Test Set. A 0.9-metre coax cable was calibrated to characterize the insertion loss for the transmitted frequencies between the RF input/output of the CMU 200 and the EUT antenna port.

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW	
	APPENDIX 2C	
Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW

Test Setup:


The EUT was placed in the Temperature chamber and connected to CMU 200 outside as shown in the figure above. Dry air was pumped inside the temperature chamber to maintain a backpressure during the test. The EUT was kept in the off condition at all times except when the following measurements were to be made.

The chamber was switched on and the temperature was set to -30°C. After the chamber stabilized at -30 °C there was a soak period of one hour to alleviate moisture in the chamber, the EUT voltage was enabled. The system software recorded the frequency, power, and associated measurements.

A Computer system controlled the automated software. This application was given the command of activating all machines intrinsic to the temperature and voltage tests controlling the CMU 200 via the GPIB Bus. The Environmental Chamber was instructed through an RS-232 serial line. The EUT dialogue was passed through a serial connection.

The EUT repetitively transmitted 100 bursts for each set of programmed parameters recording temperature, voltage settings, and systematically selected frequencies. The power supply was cycled from minimum voltage 3.6 volts, 4.1 volts and to 4.35 volts maximum voltage. The frequency error was measured at a maximum output power and recorded by the automated system test software.

The EUT output power and frequency was measured at 3.6 volts, 4.1 volts and 4.35 volts. The transmit frequency was varied in 3 steps consisting of 824.70, 836.52, and 848.31 MHz for the cellular band and 1851.20, 1880.00 and 1908.75 MHz for the PCS band. This frequency was recorded in MHz and deviation from nominal, in Parts per Million. After the initial one-hour soak at the beginning of the tests, a period of thirty minutes soak was initialized between each ascending temperature step, before proceeding to the next measurement test cycle.

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW	
	APPENDIX 2C	
Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW


Procedure:

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

1. Switch on the HP 6632B power supply; CMU 200 Communications test Set, and Environmental Chamber.
2. Start test program
3. Set the Temperature to –30°C and maintain a period of one- hour soak time, with the EUT supply voltage disabled.
4. Set power supply voltage to 3.6 volts.
5. Set up CMU 200 Radio Communication Tester.
6. Command the CMU 200 to switch to the low channel.
7. Enable the voltage to the EUT, and connect a link to the CMU 200 test set.
8. EUT is commanded to Transmit 100 Bursts.
9. Software logs the following data from the CMU 200, power supply and temperature chamber: Traffic Channel Number, Traffic Channel Frequency, Power Level, Chamber Temperature, Supply Voltage, Power and Frequency Error.
10. The CMU 200 commands the EUT to change frequency to the middle channel and high channel and repeats steps 7 to 9.
11. Repeat steps 5 to 10 changing the supply voltage to 3.6 Volts
12. Increase temperature by 10°C and soak for 1/2 hour.
13. Repeat steps 4 - 12 for temperatures –30°C to 60°C.
14. Repeat steps 5 to 10 changing the supply voltage to 4.1 volts
15. Repeat steps 5 to 10 changing the supply voltage to 4.35 volts

Procedure 5 to 10 was repeated at room temperature (20°C) with the power supply voltage set to 3.6, 4.1 and 4.35 volts

The maximum frequency error in the CDMA Cellular measured was **0.0251 PPM**.
The maximum frequency error in the CDMA PCS measured was **0.011 PPM**.

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 2C	
	Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013

Date of test: October 26, 2012

CDMA Cellular Channel results: channels 1013, 384 and 777 @ 20°C maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
1013	824.70	3.6	20	-6.60	-0.0080
384	836.52	3.6	20	-10.90	-0.0130
777	848.31	3.6	20	-13.50	-0.0159

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
1013	824.70	4.1	20	8.70	0.0105
384	836.52	4.1	20	-12.30	-0.0147
777	848.31	4.1	20	-17.70	-0.0209

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
1013	824.70	4.35	20	-7.70	-0.0093
384	836.52	4.35	20	-11.30	-0.0135
777	848.31	4.35	20	-11.20	-0.0132

Test Report No.:
 RTS-6012-1211-57_Rev2

Dates of Test:
 Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012,
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FCC ID: L6ARFA90LW
IC: 2503A-RFA90LW

CDMA Cellular Results:: channel 4132 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
1013	824.70	3.6	-30	20.70	0.0251
1013	824.70	3.6	-20	-14.00	-0.0170
1013	824.70	3.6	-10	-15.00	-0.0182
1013	824.70	3.6	0	-19.20	-0.0233
1013	824.70	3.6	10	-8.60	-0.0104
1013	824.70	3.6	20	-6.60	-0.0080
1013	824.70	3.6	30	-8.60	-0.0104
1013	824.70	3.6	40	10.60	0.0129
1013	824.70	3.6	50	8.40	0.0102
1013	824.70	3.6	60	10.30	0.0125
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
1013	824.70	4.1	-30	-14.30	-0.0173
1013	824.70	4.1	-20	-16.80	-0.0204
1013	824.70	4.1	-10	-14.30	-0.0173
1013	824.70	4.1	0	-14.50	-0.0176
1013	824.70	4.1	10	-18.60	-0.0226
1013	824.70	4.1	20	8.70	0.0105
1013	824.70	4.1	30	10.80	0.0131
1013	824.70	4.1	40	11.30	0.0137
1013	824.70	4.1	50	13.70	0.0166
1013	824.70	4.1	60	10.10	0.0122
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
1013	824.70	4.35	-30	-8.40	-0.0102
1013	824.70	4.35	-20	-12.50	-0.0152
1013	824.70	4.35	-10	11.60	0.0141
1013	824.70	4.35	0	13.40	0.0162
1013	824.70	4.35	10	11.30	0.0137
1013	824.70	4.35	20	-7.70	-0.0093
1013	824.70	4.35	30	-13.90	-0.0169
1013	824.70	4.35	40	11.00	0.0133
1013	824.70	4.35	50	-11.50	-0.0139
1013	824.70	4.35	60	-13.90	-0.0169

Test Report No.:
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Dates of Test:
 Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012,
 Jan. 04 and Feb.05, 2013

FCC ID: L6ARFA90LW
IC: 2503A-RFA90LW

CDMA Cellular Results: channel 384 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
384	836.52	3.6	-30	-17.10	-0.0204
384	836.52	3.6	-20	-10.90	-0.0130
384	836.52	3.6	-10	-11.10	-0.0133
384	836.52	3.6	0	16.60	0.0198
384	836.52	3.6	10	11.90	0.0142
384	836.52	3.6	20	-10.90	-0.0130
384	836.52	3.6	30	-12.10	-0.0145
384	836.52	3.6	40	15.40	0.0184
384	836.52	3.6	50	6.80	0.0081
384	836.52	3.6	60	9.40	0.0112
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
384	836.52	4.1	-30	-7.00	-0.0084
384	836.52	4.1	-20	11.70	0.0140
384	836.52	4.1	-10	-14.00	-0.0167
384	836.52	4.1	0	10.20	0.0122
384	836.52	4.1	10	-12.90	-0.0154
384	836.52	4.1	20	-12.30	-0.0147
384	836.52	4.1	30	11.60	0.0139
384	836.52	4.1	40	13.80	0.0165
384	836.52	4.1	50	-8.50	-0.0102
384	836.52	4.1	60	-13.10	-0.0157
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
384	836.52	4.35	-30	-10.70	-0.0128
384	836.52	4.35	-20	-10.50	-0.0126
384	836.52	4.35	-10	8.90	0.0106
384	836.52	4.35	0	-12.40	-0.0148
384	836.52	4.35	10	-10.90	-0.0130
384	836.52	4.35	20	-11.30	-0.0135
384	836.52	4.35	30	-8.90	-0.0106
384	836.52	4.35	40	12.70	0.0152
384	836.52	4.35	50	10.80	0.0129
384	836.52	4.35	60	-13.10	-0.0157

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Dates of Test:
 Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012,
 Jan. 04 and Feb.05, 2013

FCC ID: L6ARFA90LW
IC: 2503A-RFA90LW

CDMA Cellular Results: channel 777 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
777	848.31	3.6	-30	-11.90	-0.0140
777	848.31	3.6	-20	14.00	0.0165
777	848.31	3.6	-10	9.00	0.0106
777	848.31	3.6	0	13.30	0.0157
777	848.31	3.6	10	13.70	0.0161
777	848.31	3.6	20	-13.50	-0.0159
777	848.31	3.6	30	-14.40	-0.0170
777	848.31	3.6	40	-15.40	-0.0182
777	848.31	3.6	50	12.30	0.0145
777	848.31	3.6	60	-10.10	-0.0119
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
777	848.31	4.1	-30	-14.70	-0.0173
777	848.31	4.1	-20	9.10	0.0107
777	848.31	4.1	-10	8.70	0.0103
777	848.31	4.1	0	10.50	0.0124
777	848.31	4.1	10	10.90	0.0128
777	848.31	4.1	20	-17.70	-0.0209
777	848.31	4.1	30	-13.10	-0.0154
777	848.31	4.1	40	-15.60	-0.0184
777	848.31	4.1	50	-11.90	-0.0140
777	848.31	4.1	60	-11.90	-0.0140
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
777	848.31	4.35	-30	-12.70	-0.0150
777	848.31	4.35	-20	11.40	0.0134
777	848.31	4.35	-10	13.80	0.0163
777	848.31	4.35	0	-9.30	-0.0110
777	848.31	4.35	10	-12.50	-0.0147
777	848.31	4.35	20	-11.20	-0.0132
777	848.31	4.35	30	-11.40	-0.0134
777	848.31	4.35	40	-13.10	-0.0154
777	848.31	4.35	50	-12.10	-0.0143
777	848.31	4.35	60	-13.10	-0.0154

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 Jan. 04 and Feb.05, 2013

FCC ID: L6ARFA90LW
IC: 2503A-RFA90LW

CDMA PCS Channel results: channels 25, 600, & 1175 @ 20°C maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
25	1851.20	3.6	20	-7.00	-0.0038
600	1880.00	3.6	20	-11.30	-0.0060
1175	1908.75	3.6	20	-13.80	-0.0072

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
25	1851.20	4.1	20	9.50	0.0051
600	1880.00	4.1	20	-11.90	-0.0063
1175	1908.75	4.1	20	-16.60	-0.0087

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
25	1851.20	4.35	20	-6.90	-0.0037
600	1880.00	4.35	20	-10.50	-0.0056
1175	1908.75	4.35	20	-11.40	-0.0060

Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW
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CDMA PCS Results: channel 25 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
25	1851.20	3.6	-30	20.30	0.0110
25	1851.20	3.6	-20	-13.40	-0.0072
25	1851.20	3.6	-10	-15.30	-0.0083
25	1851.20	3.6	0	-19.50	-0.0105
25	1851.20	3.6	10	-8.70	-0.0047
25	1851.20	3.6	20	-7.00	-0.0038
25	1851.20	3.6	30	-7.70	-0.0042
25	1851.20	3.6	40	11.00	0.0059
25	1851.20	3.6	50	8.80	0.0048
25	1851.20	3.6	-30	9.80	0.0053
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
25	1851.20	4.1	-30	-13.30	-0.0072
25	1851.20	4.1	-20	-16.60	-0.0090
25	1851.20	4.1	-10	-14.10	-0.0076
25	1851.20	4.1	0	-14.00	-0.0076
25	1851.20	4.1	10	-18.60	-0.0100
25	1851.20	4.1	20	9.50	0.0051
25	1851.20	4.1	30	11.50	0.0062
25	1851.20	4.1	40	11.70	0.0063
25	1851.20	4.1	50	13.00	0.0070
25	1851.20	4.1	60	11.10	0.0060
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
25	1851.20	4.35	-30	-8.30	-0.0045
25	1851.20	4.35	-20	-12.90	-0.0070
25	1851.20	4.35	-10	11.80	0.0064
25	1851.20	4.35	0	14.10	0.0076
25	1851.20	4.35	10	11.60	0.0063
25	1851.20	4.35	20	-6.90	-0.0037
25	1851.20	4.35	30	-13.30	-0.0072
25	1851.20	4.35	40	11.00	0.0059
25	1851.20	4.35	50	-10.50	-0.0057
25	1851.20	4.35	60	-13.80	-0.0075

Test Report No.:
 RTS-6012-1211-57_Rev2

Dates of Test:
 Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012,
 Jan. 04 and Feb.05, 2013

FCC ID: L6ARFA90LW
IC: 2503A-RFA90LW

CDMA PCS Results: channel 600 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
600	1880.00	3.6	-30	-16.80	-0.0089
600	1880.00	3.6	-20	-10.90	-0.0058
600	1880.00	3.6	-10	-11.20	-0.0060
600	1880.00	3.6	0	16.30	0.0087
600	1880.00	3.6	10	11.90	0.0063
600	1880.00	3.6	20	-11.30	-0.0060
600	1880.00	3.6	30	-11.70	-0.0062
600	1880.00	3.6	40	14.70	0.0078
600	1880.00	3.6	50	7.90	0.0042
600	1880.00	3.6	60	10.20	0.0054
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
600	1880.00	4.1	-30	-6.20	-0.0033
600	1880.00	4.1	-20	12.70	0.0068
600	1880.00	4.1	-10	-12.70	-0.0068
600	1880.00	4.1	0	10.40	0.0055
600	1880.00	4.1	10	-12.70	-0.0068
600	1880.00	4.1	20	-11.90	-0.0063
600	1880.00	4.1	30	11.30	0.0060
600	1880.00	4.1	40	13.70	0.0073
600	1880.00	4.1	50	-8.70	-0.0046
600	1880.00	4.1	60	-12.50	-0.0066
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
600	1880.00	4.35	-30	-11.20	-0.0060
600	1880.00	4.35	-20	-10.70	-0.0057
600	1880.00	4.35	-10	8.80	0.0047
600	1880.00	4.35	0	-12.30	-0.0065
600	1880.00	4.35	10	-9.80	-0.0052
600	1880.00	4.35	20	-10.50	-0.0056
600	1880.00	4.35	30	-8.60	-0.0046
600	1880.00	4.35	40	13.00	0.0069
600	1880.00	4.35	50	10.50	0.0056
600	1880.00	4.35	60	-11.70	-0.0062

Test Report No.:
 RTS-6012-1211-57_Rev2


Dates of Test:
 Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012,
 Jan. 04 and Feb.05, 2013

FCC ID: L6ARFA90LW
IC: 2503A-RFA90LW

CDMA PCS Results: channel 1175 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
1175	1908.75	3.6	-30	-10.90	-0.0057
1175	1908.75	3.6	-20	14.60	0.0076
1175	1908.75	3.6	-10	9.60	0.0050
1175	1908.75	3.6	0	14.40	0.0075
1175	1908.75	3.6	10	13.40	0.0070
1175	1908.75	3.6	20	-13.80	-0.0072
1175	1908.75	3.6	30	-13.20	-0.0069
1175	1908.75	3.6	40	-15.10	-0.0079
1175	1908.75	3.6	50	12.70	0.0067
1175	1908.75	3.6	60	-9.80	-0.0051
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
1175	1908.75	4.1	-30	-15.70	-0.0082
1175	1908.75	4.1	-20	10.00	0.0052
1175	1908.75	4.1	-10	7.70	0.0040
1175	1908.75	4.1	0	10.70	0.0056
1175	1908.75	4.1	10	11.30	0.0059
1175	1908.75	4.1	20	-16.60	-0.0087
1175	1908.75	4.1	30	-13.40	-0.0070
1175	1908.75	4.1	40	-15.40	-0.0081
1175	1908.75	4.1	50	-11.00	-0.0058
1175	1908.75	4.1	60	-13.00	-0.0068
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
1175	1908.75	4.35	-30	-12.30	-0.0064
1175	1908.75	4.35	-20	12.10	0.0063
1175	1908.75	4.35	-10	14.10	0.0074
1175	1908.75	4.35	0	-9.90	-0.0052
1175	1908.75	4.35	10	-11.70	-0.0061
1175	1908.75	4.35	20	-11.40	-0.0060
1175	1908.75	4.35	30	-11.30	-0.0059
1175	1908.75	4.35	40	-11.90	-0.0062
1175	1908.75	4.35	50	-12.20	-0.0064
1175	1908.75	4.35	60	-12.20	-0.0064

APPENDIX 2D – CDMA RADIATED EMISSIONS TEST DATA

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW	
	APPENDIX 2D	
Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW

Radiated Emissions Test Data Results cont'd

CDMA Cellular Loopback and Test Data Mode

Date of Test: September 4 and November 14, 2012

The following measurements were performed by Feras Obeid.

The environmental test conditions were: Temperature: 23.8 - 25.4 °C
Relative Humidity: 14.5 - 28.1 %

The BlackBerry® smartphone was standalone, horizontal with LCD facing up and top pointing to the RX antenna when the turntable is at 0 degree position.

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and the frequency range scanned was 30MHz – 1GHz.

Measurements were performed in CDMA Cellular Band Loopback and Test Data Mode on channels 1013, 384, and 777.

All emissions had test margins greater than 25.0 dB.

Date of Test: September 10, November 26 and 27, 2012

The following measurements were performed by Shuo Wang

The environmental test conditions were: Temperature: 23.2 - 25.4 °C
Relative Humidity: 19.8 - 41.7 %


Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height, and a frequency range of 1 GHz to 9 GHz.

The BlackBerry® smartphone was standalone, horizontal with LCD facing up and top pointing to the RX antenna when the turntable is at 0 degree position.

Measurements were performed in CDMA Cellular Band Loopback and Test Data Mode on channels 1013, 384, and 777.

All emissions had test margins greater than 25.0 dB.

APPENDIX 3A– LTE Band 13 CONDUCTED RF EMISSIONS TEST DATA/PLOTS

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW	
	APPENDIX 3A	
Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW

LTE Band 13 Conducted RF Emission Test Data cont'd

The conducted spurious emissions – As per 47 CFR 2.202, CFR 2.1046, CFR 27.53 CFR 27.54, CFR 27.50 were measured from 30 MHz to 20 GHz.

–26 dBc Bandwidth and Occupied Bandwidth (99%)

the modulation spectrum was measured by both methods of 99% power bandwidth and –26 dBc bandwidth for each 5MHz and 10MHz with different number of resource blocks for LTE Band 13.

QPSK and 16-QAM modulations were applied to each of the bandwidths. Only the worst case measurements are documented in this report.

A minimum resource block condition was also measured (RB = 1).

The resolution bandwidth required for out-of-band emissions in the 1 MHz bands immediately outside and adjacent to the frequency block, was determined to be at least 1% of the emission bandwidth.

The worst case –26dBc bandwidth for LTE Band 13 was measured to be 9.28MHz. Results were derived in a 100 kHz resolution bandwidth.


On any frequency outside the frequency block and outside the adjacent 1 MHz bands, a resolution bandwidth of at least 1 MHz was applied.

Test Data for LTE Band 13 selected Frequencies in 10MHz BW (RB = 50)

LTE Band 13 Frequency (MHz)	26dBc Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
782.0	9.28	8.92

Test Data for LTE Band 13 selected Frequencies in 5MHz BW (RB = 25)

LTE Band 13 Frequency (MHz)	26dBc Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
779.5	4.64	4.51
782.0	4.65	4.52
784.5	4.64	4.52

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 3A	
Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW

Peak to Average Ratio (PAR)

For each 5MHz and 10MHz with different number of resource blocks as per scalable bandwidths for LTE band 13, the peak to average ratio was measured on the low, middle and high channels with QPSK modulation.

On any frequency outside the frequency block and outside the adjacent 1 MHz bands, a resolution bandwidth of at least 1 MHz was applied.

The worst case measured was 9.65 dB on 10MHz bandwidth with 25 resource blocks while transmitting at 782MHz.


Measurement Plots for LTE Band 13

See Figures 3-1a to 3-8a for the plots of the conducted spurious emissions.

See Figures 3-9a to 3-16a for the plots of 99% Occupied Bandwidth and -26 dBc Bandwidth.

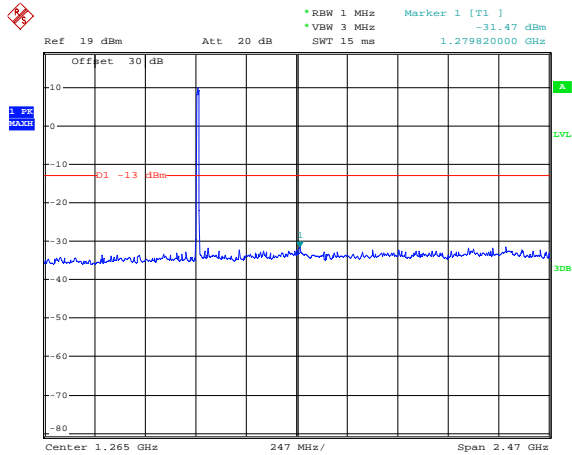
See Figures 3-17a to 3-21a for the plots of the Channel mask.

See Figures 3-22a for the plots of the Peak to Average Ratio.

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 3A	
	Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013

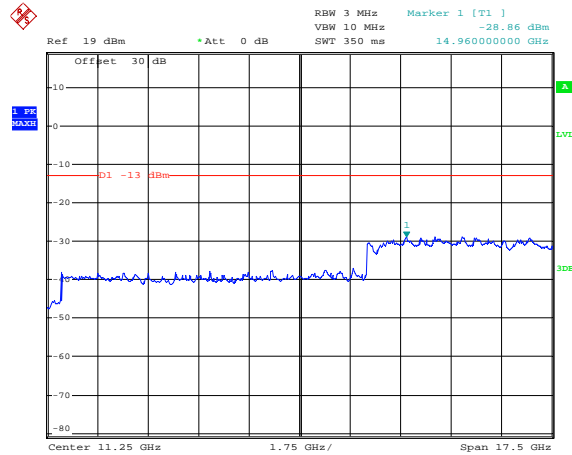
LTE Band 13 Conducted RF Emission Test Data cont'd

Figure 3-1a: Band 13, Spurious Conducted Emissions, 10MHz BW (RB= 50)



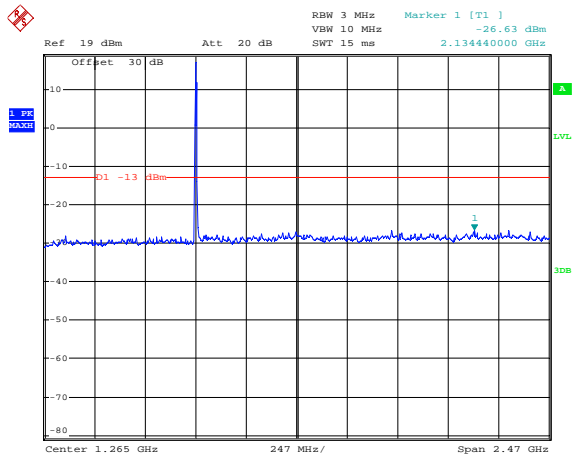
Date: 26.NOV.2012 17:04:26

Figure 3-2a: Band 13, Spurious Conducted Emissions, 10MHz BW (RB= 50)



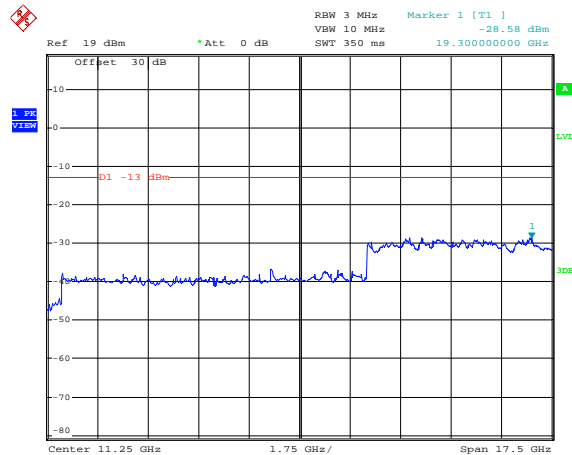
Date: 26.NOV.2012 16:53:18

Figure 3-3a: Band 13, Spurious Conducted Emissions, Low channel, 5MHz BW (RB= 25)



Date: 26.NOV.2012 16:59:03

Figure 3-4a: Band 13, Spurious Conducted Emissions, Low channel, 5MHz BW (RB= 25)



Date: 26.NOV.2012 16:48:20

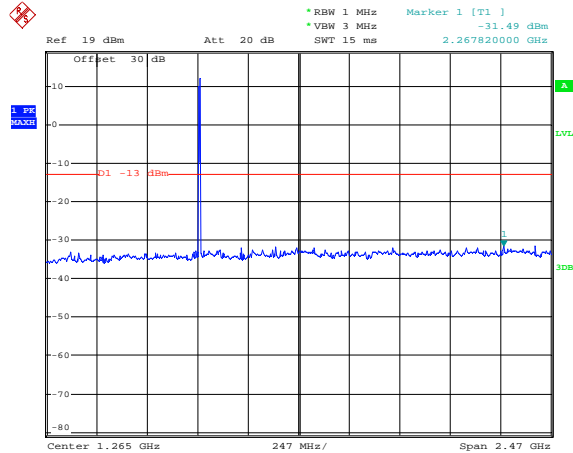
Test Report No.:
 RTS-6012-1211-57_Rev2

Dates of Test:
 Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012,
 Jan. 04 and Feb.05, 2013

FCC ID: L6ARFA90LW
IC: 2503A-RFA90LW

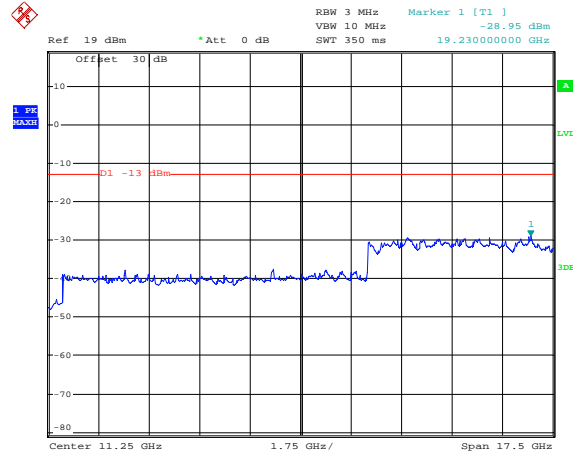
LTE Band 13 Conducted RF Emission Test Data cont'd

Figure 3-5a: Band 13, Spurious Conducted Emissions, Middle Channel, 5MHz BW (RB= 25)



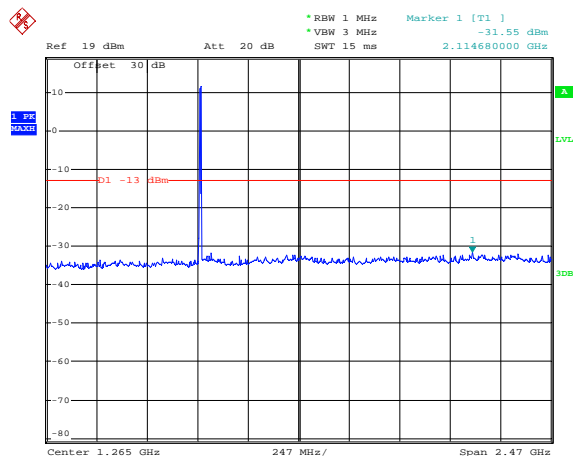
Date: 26.NOV.2012 17:03:38

Figure 3-6a: Band 13, Spurious Conducted Emissions, High Channel, 5MHz BW (RB= 25)



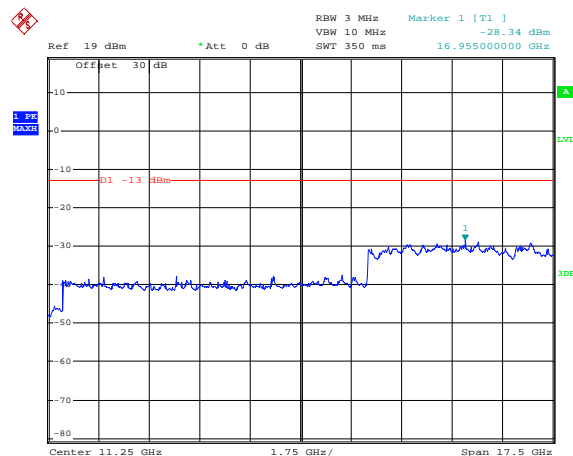
Date: 26.NOV.2012 16:50:45

Figure 3-7a: Band 13, Spurious Conducted Emissions, High channel, 5MHz BW (RB= 25)




Date: 26.NOV.2012 17:06:45

Figure 3-8a: Band 13, Spurious Conducted Emissions, High channel, 5MHz BW (RB= 25)

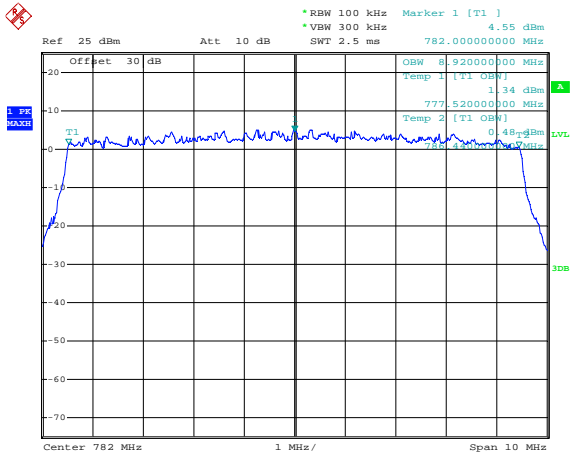


Date: 26.NOV.2012 16:56:25

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 3A	
	Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013

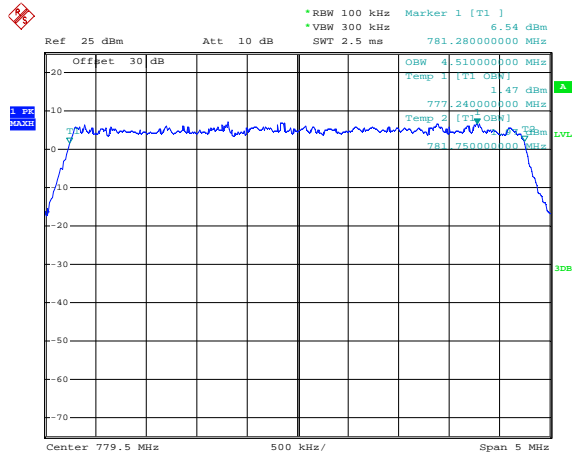
LTE Band 13 Conducted RF Emission Test Data cont'd

**Figure 3-9a: Occupied Bandwidth, Band 13
10MHz BW, RB=50**



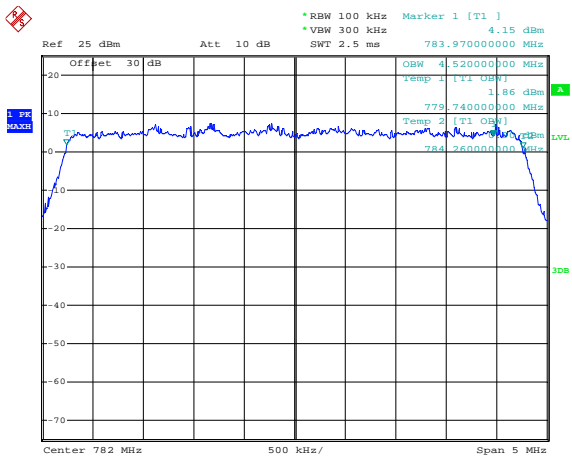
Date: 27.NOV.2012 10:25:05

**Figure 3-10a: Occupied Bandwidth, Band 5 Low
Channel, 5MHz BW, RB=25**



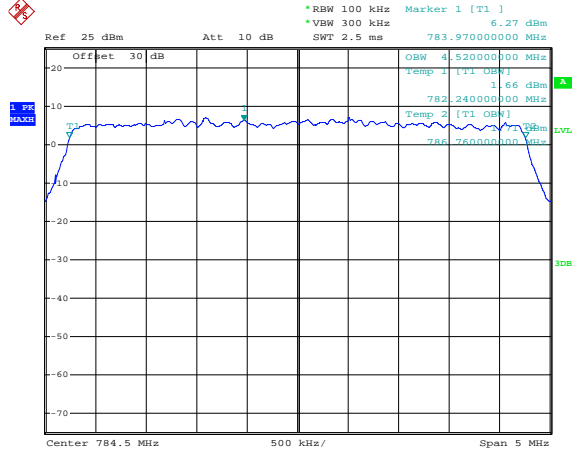
Date: 27.NOV.2012 11:13:12

**Figure 3-11a: Occupied Bandwidth, Band 5 Middle
Channel, 5MHz BW, RB=25**




Date: 27.NOV.2012 11:14:13

**Figure 3-12a: Occupied Bandwidth, Band 5 High
Channel, 5MHz BW, RB=25**



Date: 27.NOV.2012 11:18:04

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 3A	
	Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013

LTE Band 13 Conducted RF Emission Test Data cont'd

Figure 3-13a: -26 dBc Bandwidth, Band 13 Middle Channel, 10MHz BW, RB=50

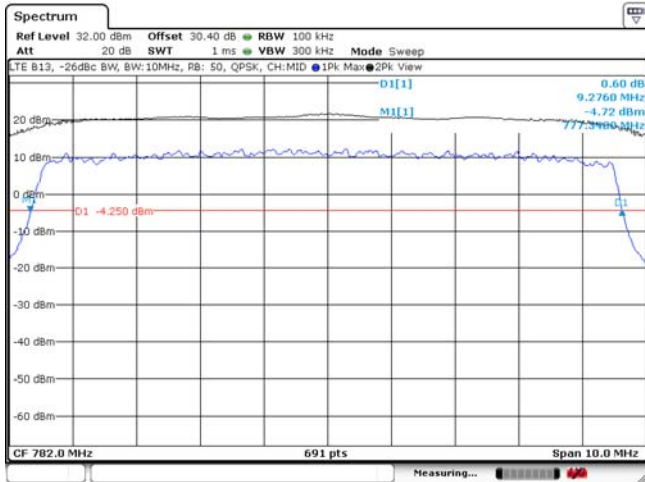


Figure 3-14a: -26 dBc Bandwidth, Band 13 Low Channel, 5MHz BW, RB=25

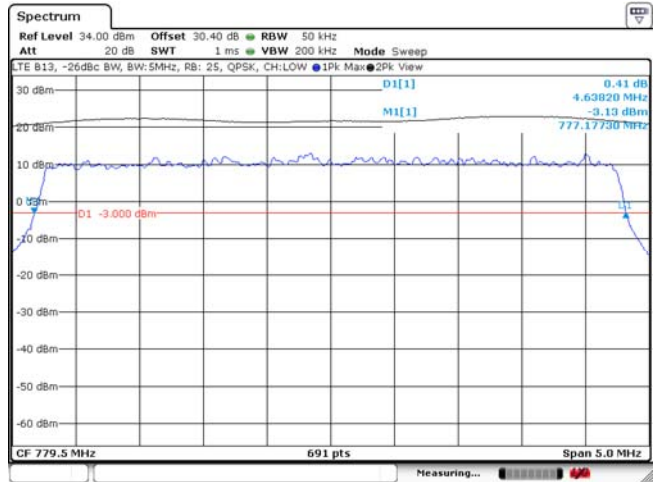


Figure 3-15a: -26 dBc Bandwidth, Band 13 Middle Channel, 5MHz BW, RB=25

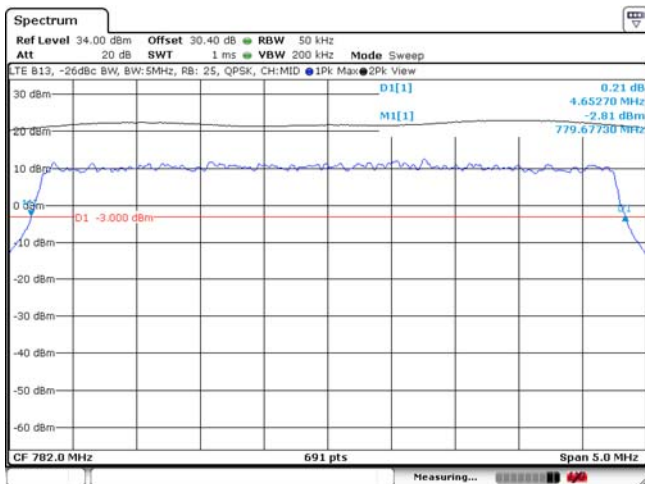
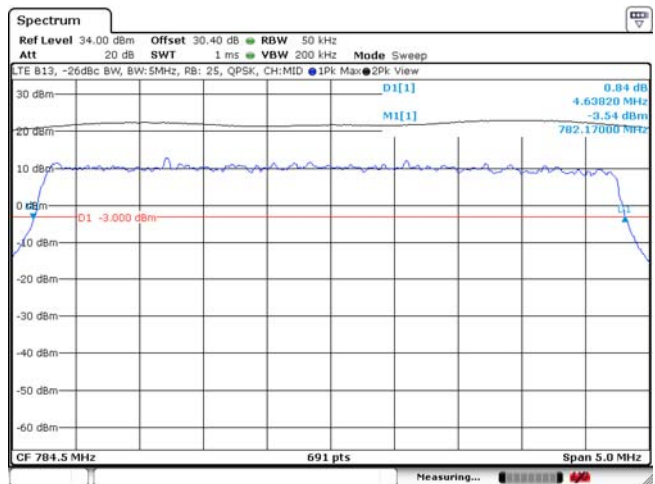



Figure 3-16a: -26 dBc Bandwidth, Band 13 High Channel, 5MHz BW, RB=25



	EMI Test Report for the BlackBerry® smartphone Model RFA91LW	
	APPENDIX 3A	
Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW

LTE Band 13 Conducted RF Emission Test Data cont'd

Figure 3-17a: Band 13 Channel Mask, 10MHz BW, RB=50

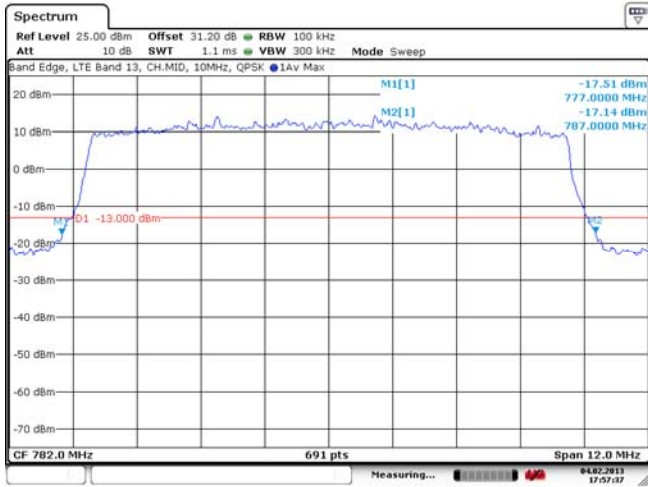
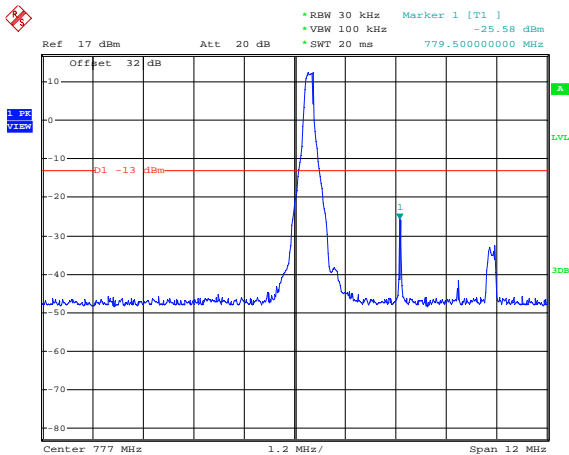
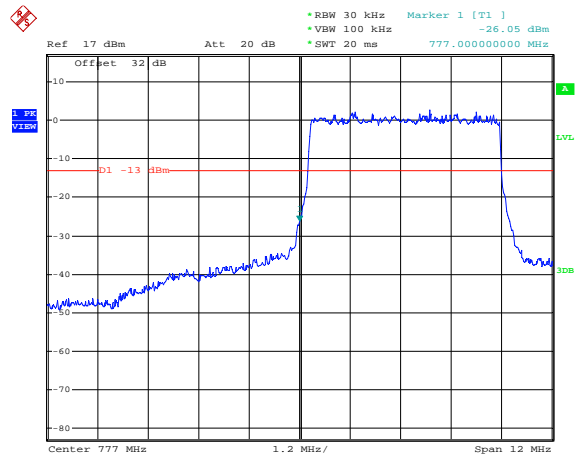


Figure 3-18a: Band 13 Low Channel Mask, 5MHz BW, RB=1




Date: 28.NOV.2012 17:50:26

Figure 3-19a: Band 13 Low Channel Mask, 5MHz BW, RB=25

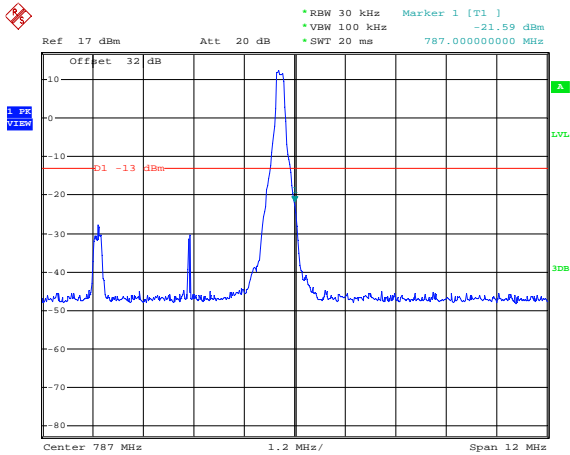


Date: 28.NOV.2012 17:48:52

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 3A	
	Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013

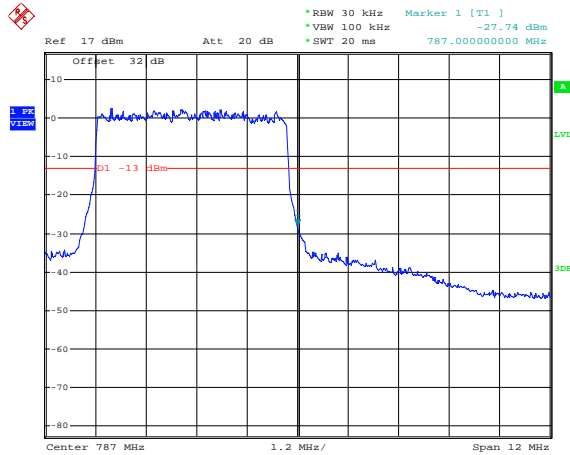
LTE Band 13 Conducted RF Emission Test Data cont'd

Figure 3-20a: Band 13 High Channel Mask, 5MHz BW, RB=1



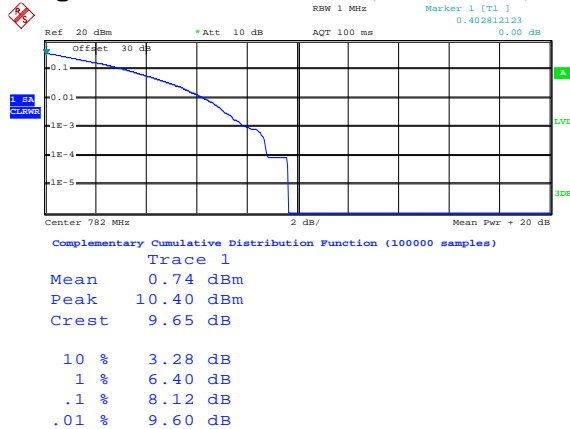
Date: 28.NOV.2012 17:52:59

Figure 3-21a: Band 13 High Channel Mask, 5MHz BW, RB=25




Date: 28.NOV.2012 18:01:40

Figure 3-22a: Band 13 PAR, 10MHz BW, RB=25



Date: 27.NOV.2012 12:19:56

APPENDIX 3B – LTE Band 13 CONDUCTED RF OUTPUT POWER TEST DATA


	EMI Test Report for the BlackBerry® smartphone Model RFA91LW	
	APPENDIX 3B	
Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013	FCC ID: L6ARFA90LW IC: 2503A-RFA90LW

LTE Band 13 Conducted RF Output Power Test Data Cont'd

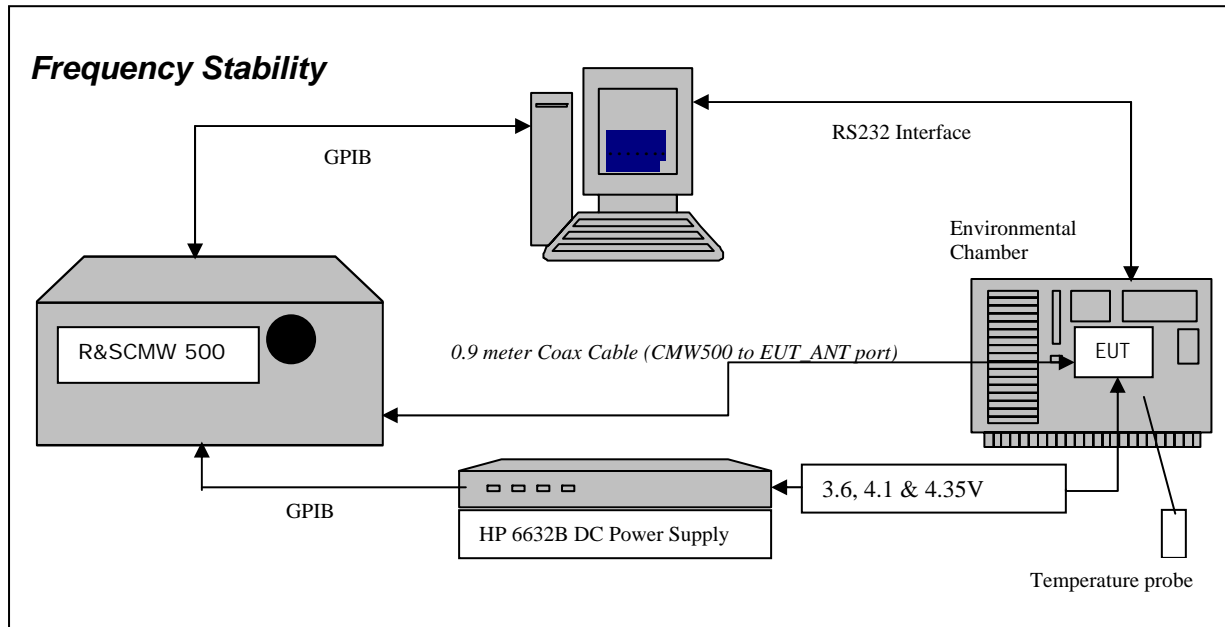
Band	LTE Band 13					
Frequency (MHz)	Channel	BW	Modulation	RB Size	RB Offset	Maximum Avg. Power (dBm)
782	23230	10 MHz	QPSK	1	0	
			QPSK	1	49	23.2
			QPSK	25	25	
			QPSK	50	0	
			16QAM	1	0	
			16QAM	1	49	21.4
			16QAM	16	34	
			16QAM	50	0	

LTE Band 13 conducted power measurements
Rev 2

APPENDIX 3C – LTE Band 13 FREQUENCY STABILITY TEST DATA

	EMI Test Report for the BlackBerry® smartphone Model RFA91LW APPENDIX 3C	
	Test Report No.: RTS-6012-1211-57_Rev2	Dates of Test: Aug. 20 – Sept. 27, Oct. 25 to Dec. 13, 2012, Jan. 04 and Feb.05, 2013

LTE Band 13 Frequency Stability Test Data



The following measurements were performed by Berkin Can.


CFR 47 Chapter 1 - Federal Communications Commission Rules

Part 2 Required Measurements

- 2.1055** Frequency Stability - Procedures
 (a,b) Frequency Stability - Temperature Variation
 (d) Frequency Stability - Voltage Variation

The EUT meets the requirements as stated in CFR 47 chapter 1, Section 27.54, Frequency Stability.

Frequency Stability measurement devices were configured as presented in the block diagram recording frequency, power, data, temperatures, and stepped voltages controlled via a GPIB interface linked to the Environmental chamber, a DC power supply, and the Communications Test Set. A 0.9-metre coax cable was calibrated to characterize the insertion loss for the transmitted frequencies between the RF input/output of the CMW 500 and the EUT antenna port.

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	APPENDIX 3C	
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Test Setup:

The EUT was placed in the Temperature chamber and connected to CMW 500 outside as shown in the figure above. Dry air was pumped inside the temperature chamber to maintain a backpressure during the test. The EUT was kept in the off condition at all times except when the following measurements were to be made.


The chamber was switched on and the temperature was set to -30°C. After the chamber stabilized at -30 °C there was a soak period of one hour to alleviate moisture in the chamber, the EUT voltage was enabled. The system software recorded the frequency, power, and associated measurements.

A Computer system controlled the automated software. This application was given the command of activating all machines intrinsic to the temperature and voltage tests controlling the CMW 500 via the GPIB Bus. The Environmental Chamber was instructed through an RS-232 serial line. The EUT dialogue was passed through a serial connection.

The EUT repetitively transmitted 100 bursts for each set of programmed parameters recording temperature, voltage settings, and systematically selected frequencies. The power supply was cycled from minimum voltage 3.6 volts, 4.1 volts and to 4.35 volts maximum voltage. The frequency error was measured at a maximum output power and recorded by the automated system test software.

The EUT output power and frequency was measured at 3.6 volts, 4.1 volts and 4.35 volts. The transmit frequency was measured on 782MHz for 10MHz bandwidth with maximum (50) resource block. The transmit frequency was varied in 3 steps consisting of 779.5 MHz, 782.0 MHz and 784.5 MHz each was measured under 5 MHz bandwidth with maximum (25) resource blocks. This frequency was recorded in MHz and deviation from nominal, in Parts Per Million.

After the initial one-hour soak at the beginning of the tests, a period of thirty minutes soak was initialized between each ascending temperature step, before proceeding to the next measurement test cycle.

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Procedure:

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

16. Switch on the HP 6632B power supply; CMW 500 Communications test Set, and Environmental Chamber.
17. Start test program
18. Set the Temperature to –30°C and maintain a period of one- hour soak time, with the EUT supply voltage disabled.
19. Set power supply voltage to 3.6 volts.
20. Set up CMW 500 Radio Communication Tester.
21. Command the CMW 500 to switch to the low channel.
22. Enable the voltage to the EUT, and connect a link to the CMW 500 test set.
23. EUT is commanded to Transmit 100 Bursts.
24. Software logs the following data from the CMW 500, power supply and temperature chamber: Traffic Channel Number, Traffic Channel Frequency, Power Level, Chamber Temperature, Supply Voltage, Power and Frequency Error.
25. The CMW 500 commands the EUT to change frequency to the middle channel and high channel and repeats steps 7 to 9.
26. Repeat steps 5 to 10 changing the supply voltage to 4.1 Volts
27. Increase temperature by 10°C and soak for 1/2 hour.
28. Repeat steps 4 - 12 for temperatures –30°C to 60°C.
29. Repeat steps 5 to 10 changing the supply voltage to 4.35 volts

Procedure 5 to 10 was repeated at room temperature (20°C) with the power supply voltage set to 3.6, 4.1 and 4.35 volts

The maximum frequency error in the LTE Band 13 measured was **-0.0358 PPM**.

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Date of test: November 27, 2012

LTE Band 13 results (10MHz Bandwidth): channels 23230 @ 20°C maximum transmitted power

Traffic Channel Number	LTE Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
23230	782.00	3.6	20	19.60	0.0251

Traffic Channel Number	LTE Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
23230	782.00	4.1	20	18.20	0.0233

Traffic Channel Number	LTE Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
23230	782.00	4.35	20	16.00	0.0205

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LTE Band 13 Results (10MHz Bandwidth): channel 23230 @ maximum transmitted power (cont'd)

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
23230	782.00	3.6	-30	14.10	0.0180
23230	782.00	3.6	-20	-24.00	-0.0307
23230	782.00	3.6	-10	13.60	0.0174
23230	782.00	3.6	0	18.00	0.0230
23230	782.00	3.6	10	14.80	0.0189
23230	782.00	3.6	20	19.60	0.0251
23230	782.00	3.6	30	-15.00	-0.0192
23230	782.00	3.6	40	18.90	0.0242
23230	782.00	3.6	50	18.20	0.0233
23230	782.00	3.6	60	13.90	0.0178
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
23230	782.00	4.1	-30	14.10	0.0180
23230	782.00	4.1	-20	-12.00	-0.0153
23230	782.00	4.1	-10	-28.00	-0.0358
23230	782.00	4.1	0	20.80	0.0266
23230	782.00	4.1	10	11.20	0.0143
23230	782.00	4.1	20	18.20	0.0233
23230	782.00	4.1	30	-13.00	-0.0166
23230	782.00	4.1	40	10.40	0.0133
23230	782.00	4.1	50	-14.00	-0.0179
23230	782.00	4.1	60	-21.00	-0.0269
Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
23230	782.00	4.35	-30	-16.00	-0.0205
23230	782.00	4.35	-20	-12.00	-0.0153
23230	782.00	4.35	-10	19.60	0.0251
23230	782.00	4.35	0	-23.00	-0.0294
23230	782.00	4.35	10	12.80	0.0164
23230	782.00	4.35	20	16.00	0.0205
23230	782.00	4.35	30	-19.00	-0.0243
23230	782.00	4.35	40	-17.00	-0.0217
23230	782.00	4.35	50	14.20	0.0182
23230	782.00	4.35	60	19.30	0.0247

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**LTE Band 13 results (5MHz Bandwidth): channels 23205, 23230 and 23255 @ 20°C
 maximum transmitted power**

Traffic Channel Number	LTE Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
23205	779.50	3.6	20	4.64	0.0060
23230	782.00	3.6	20	0.41	0.0005
23255	784.50	3.6	20	4.82	0.0061

Traffic Channel Number	LTE Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
23205	779.50	4.1	20	-4.51	-0.0058
23230	782.00	4.1	20	-3.71	-0.0047
23255	784.50	4.1	20	2.92	0.0037

Traffic Channel Number	LTE Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
23205	779.50	4.35	20	-4.23	-0.0054
23230	782.00	4.35	20	-1.03	-0.0013
23255	784.50	4.35	20	4.34	0.0055


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LTE Band 13 Results(5MHz Bandwidth): channel 23205 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
23205	779.50	3.6	-30	1.10	0.0014
23205	779.50	3.6	-20	-0.51	-0.0007
23205	779.50	3.6	-10	-2.20	-0.0028
23205	779.50	3.6	0	0.40	0.0005
23205	779.50	3.6	10	-1.21	-0.0015
23205	779.50	3.6	20	4.64	0.0060
23205	779.50	3.6	30	-4.08	-0.0052
23205	779.50	3.6	40	-0.85	-0.0011
23205	779.50	3.6	50	-1.06	-0.0014
23205	779.50	3.6	60	-3.03	-0.0039

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
23205	779.50	4.1	-30	-1.09	-0.0014
23205	779.50	4.1	-20	-3.03	-0.0039
23205	779.50	4.1	-10	-2.99	-0.0038
23205	779.50	4.1	0	2.56	0.0033
23205	779.50	4.1	10	-1.83	-0.0023
23205	779.50	4.1	20	-4.51	-0.0058
23205	779.50	4.1	30	3.68	0.0047
23205	779.50	4.1	40	-0.74	-0.0010
23205	779.50	4.1	50	-3.73	-0.0048
23205	779.50	4.1	60	-2.88	-0.0037

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
23205	779.50	4.35	-30	-2.69	-0.0035
23205	779.50	4.35	-20	-2.53	-0.0032
23205	779.50	4.35	-10	-2.59	-0.0033
23205	779.50	4.35	0	2.84	0.0036
23205	779.50	4.35	10	3.17	0.0041
23205	779.50	4.35	20	-4.23	-0.0054
23205	779.50	4.35	30	4.56	0.0058
23205	779.50	4.35	40	0.88	0.0011
23205	779.50	4.35	50	0.50	0.0006
23205	779.50	4.35	60	-2.89	-0.0037


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**LTE Band 13 Results(5MHz Bandwidth): channel 23230 @ maximum transmitted power
(cont'd)**

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
23230	782.00	3.6	-30	1.29	0.0016
23230	782.00	3.6	-20	2.16	0.0028
23230	782.00	3.6	-10	3.50	0.0045
23230	782.00	3.6	0	-1.91	-0.0024
23230	782.00	3.6	10	2.62	0.0034
23230	782.00	3.6	20	0.41	0.0005
23230	782.00	3.6	30	-2.90	-0.0037
23230	782.00	3.6	40	-3.14	-0.0040
23230	782.00	3.6	50	4.06	0.0052
23230	782.00	3.6	60	-2.89	-0.0037

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
23230	782.00	4.1	-30	-0.14	-0.0002
23230	782.00	4.1	-20	-2.65	-0.0034
23230	782.00	4.1	-10	3.36	0.0043
23230	782.00	4.1	0	2.07	0.0026
23230	782.00	4.1	10	1.49	0.0019
23230	782.00	4.1	20	-3.71	-0.0047
23230	782.00	4.1	30	8.18	0.0105
23230	782.00	4.1	40	-1.56	-0.0020
23230	782.00	4.1	50	1.93	0.0025
23230	782.00	4.1	60	2.16	0.0028

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
23230	782.00	4.35	-30	-2.04	-0.0026
23230	782.00	4.35	-20	-3.33	-0.0043
23230	782.00	4.35	-10	-2.86	-0.0037
23230	782.00	4.35	0	4.47	0.0057
23230	782.00	4.35	10	4.70	0.0060
23230	782.00	4.35	20	-1.03	-0.0013
23230	782.00	4.35	30	3.20	0.0041
23230	782.00	4.35	40	-0.31	-0.0004
23230	782.00	4.35	50	-0.58	-0.0007
23230	782.00	4.35	60	19.30	0.0247

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LTE Band 13 Results(5MHz Bandwidth): channel 23255 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
23255	784.50	3.6	-30	1.29	0.0016
23255	784.50	3.6	-20	3.32	0.0042
23255	784.50	3.6	-10	3.89	0.0050
23255	784.50	3.6	0	2.69	0.0034
23255	784.50	3.6	10	0.96	0.0012
23255	784.50	3.6	20	4.82	0.0061
23255	784.50	3.6	30	3.65	0.0047
23255	784.50	3.6	40	1.48	0.0019
23255	784.50	3.6	50	1.30	0.0017
23255	784.50	3.6	60	2.65	0.0034

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
23255	784.50	4.1	-30	1.59	0.0020
23255	784.50	4.1	-20	3.65	0.0047
23255	784.50	4.1	-10	3.62	0.0046
23255	784.50	4.1	0	-0.73	-0.0009
23255	784.50	4.1	10	-2.01	-0.0026
23255	784.50	4.1	20	2.92	0.0037
23255	784.50	4.1	30	4.23	0.0054
23255	784.50	4.1	40	-2.69	-0.0034
23255	784.50	4.1	50	3.26	0.0042
23255	784.50	4.1	60	-7.48	-0.0095

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
23255	784.50	4.35	-30	1.10	0.0014
23255	784.50	4.35	-20	3.92	0.0050
23255	784.50	4.35	-10	2.70	0.0034
23255	784.50	4.35	0	-4.13	-0.0053
23255	784.50	4.35	10	-2.51	-0.0032
23255	784.50	4.35	20	4.34	0.0055
23255	784.50	4.35	30	4.51	0.0057
23255	784.50	4.35	40	-2.18	-0.0028
23255	784.50	4.35	50	0.11	0.0001
23255	784.50	4.35	60	2.79	0.0036

APPENDIX 3D – LTE Band 13 RADIATED EMISSIONS TEST DATA

