

EMI Test Report

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

RIM Testing Services (RTS)

A division of Research In Motion Limited

REPORT NO: RTS-0655-0707-31-Rev1

PRODUCT MODEL NO:	RBR41GW
TYPE NAME:	BlackBerry® smartphone
FCC ID:	L6ARBR40GW
IC:	2503A-RBR40GW
EMISSION DESIGNATOR (GSM):	248KG7W
EMISSION DESIGNATOR (EDGE):	248KGXW

This Rev1 test report supersedes the previous version RTS-0655-0707-31 dated 2nd August, 2007

DATE: 14 September 2007

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Statement of Performance:

The BlackBerry® smartphone, model RBR41GW, part number CER-16231-001 Rev. 3, and accessories when configured and operated per RIM's operation instructions, perform 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.

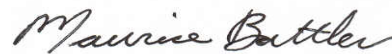
The test methods were consistent with the methods described in the relevant standards.

Documented by:



Caitlin O'Neill
Compliance Specialist
Date: 14 Sep 2007

Tested and reviewed by:



Maurice Battler
Compliance Specialist
Date: 14 Sep 2007

Reviewed by:



Masud S. Attayi, P.Eng.
Team Lead, Regulatory Compliance
Date: 14 Sep 2007

Approved by:



Paul G. Cardinal, Ph.D.
Director
Date: 14 Sep 2007

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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. 1, 2006
- FCC CFR 47 Part 22, Subpart H, Cellular Radiotelephone Services, Oct. 1, 2006
- FCC CFR 47 Part 24 Subpart E, Broadband PCS, Oct 1. 2006
- 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 3, June 2005, 2 GHz Personal Communications Services.
- Industry Canada, RSS-GEN Issue 3, June 2007, General Requirements and Information for the Certification of Radiocommunication Equipment

B. Associated Document

1. Document number CER-16231-REV3-Hardware-Change Notification.doc

C. Product Identification

Manufactured by Research In Motion Limited located at:

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

The equipment under test (EUT) was tested at the RIM Testing Services (RTS) EMI test facility, located at:

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

The testing was performed on July 13 to 26, 2007.

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The sample EUT included:

SAMPLE	MODEL	CER NUMBER	PIN
1	RBR41GW	CER-16231-001 Rev. 2	20610AF1
2	RBR41GW	CER-16231-001 Rev. 3	2061F66C
3	RBR41GW	CER-16231-001 Rev. 3	2061F989

Conducted RF measurements were performed on BlackBerry® smartphone PIN 2061F989. Radiated Emission measurements were performed on BlackBerry® smartphones PIN 20610AF1 and 2061F66C.

To view the differences between CER-16231-001 Rev 2 and CER-16231-001 Rev 3, see document number CER-16231-REV3-Hardware-Change Notification.doc

Only the characteristics that maybe impacted by the changes were re-measured.

D. Support Equipment Used for the Testing of the EUT

- 1) Communication Tester, Rohde & Schwarz, model CMU 200, serial number 837493/073
- 2) Communication Tester, Rohde & Schwarz, model CMU 200, serial number 102204
- 3) DC Power Supply, HP, model 6632B, serial number US37472178

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E. Test Results Chart

SPECIFICATION	TEST TYPE	MEETS REQUIREMENTS	PERFORMED BY
FCC CFR 47 Part 22, Subpart H IC RSS-132	Radiated Spurious/harmonic Emissions, ERP, LO	Yes	Anas Hawari Vimal Olaganathan
FCC CFR 47 Part 2, Subpart J, Part 22, Subpart H IC RSS-132, RSS-GEN	Conducted Output Power, Conducted Emissions, Occupied Bandwidth, Frequency Stability	Yes	Maurice Battler
FCC CFR 47 Part 24, Subpart E IC RSS-133	Radiated Spurious/harmonic Emissions, EIRP, LO	Yes	Anas Hawari Vimal Olaganathan
FCC CFR 47 Part 24, Subpart E IC RSS-133, RSS-GEN	Conducted Emissions, Occupied Bandwidth, Frequency Stability	Yes	Maurice Battler

F. Modifications to EUT

No modifications were required on the EUT.

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G. Summary of Results

SPECIFICATION		TEST TYPE	RESULT	TEST DATA APPENDIX
FCC CFR 47	IC			
Part 2.1051 Part 22.917 Part 22.901(d)	RSS-GEN, 4.9	Conducted Spurious Emissions	Pass	1
Part 2.1051 Part 24.238(a)	RSS-GEN, 4.9	Conducted Spurious Emissions	Pass	1
Part 2.202 Part 22.917	RSS-GEN, 4.6	Occupied Bandwidth and Channel Mask	Pass	1
Part 2.202 Part 24.238	RSS-GEN, 4.6	Occupied Bandwidth and Channel Mask	Pass	1
Part 2.1046(a)	RSS-133, 4.3 RSS-132, 4.4	Conducted RF Output Power	Pass	2
Part 2.1055(a)(d) Part 22.917	RSS-132, 4.3	Frequency Stability vs. Temperature and Voltage	Pass	3
Part 2.1055(a)(d) Part 24.235	RSS-133, 4.2	Frequency Stability vs. Temperature and Voltage	Pass	3
Part 22, Subpart H	RSS-132, 4.5	Radiated Spurious/Harmonic Emissions, ERP, LO	Pass	4
Part 24, Subpart E	RSS-133, 4.4	Radiated Spurious/Harmonic Emissions, EIRP, LO	Pass	4

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- 1) The EUT met the requirements of the Tx Conducted Spurious Emissions requirements in the GSM850 band as per 47 CFR 2.1051, CFR 22.917, CFR 22.901(d) 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 1 for test data.
- 2) The EUT met the requirements of the Tx Conducted Spurious Emissions requirements in the PCS1900 band as per 47 CFR 2.1051, CFR 24.238(a) 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 20 GHz.
See APPENDIX 1 for test data
- 3) The EUT met the requirements of the Occupied Bandwidth and channel mask requirements in the GSM850 band as per 47 CFR 2.202, CFR 22.917 and RSS-GEN, 4.6. The EUT was measured in GSM and EDGE mode on the low, middle and high channels.
See APPENDIX 1 for test data.
- 4) The EUT met the requirements of the Occupied Bandwidth and channel mask requirements in the PCS1900 band as per 47 CFR 2.202, CFR 24.238 and RSS-GEN, 4.6. The EUT was measured in GSM and EDGE mode on the low, middle and high channels.
See APPENDIX 1 for test data.
- 5) The EUT met the requirements of the Conducted RF Output Power requirements for both the GSM850 and PCS1900 bands as per 47 CFR 2.1046(a), RSS-133, 4.3 and RSS-132, 4.4. The EUT was measured in GSM and EDGE mode on the low, middle and high channels.
See APPENDIX 2 for the test data.
- 6) The EUT met the requirements of the Frequency Stability vs. Temperature and Voltage requirements for GSM850 band as per 47 CFR 2.1055(a), 2.1055(d), CFR 22.917 and RSS-132, 4.3. The temperature range was from -30°C to +60°C in 10° temperature steps. The EUT was measured on low, middle and high channels at each temperature step. The EUT was measured at low (3.6 volts), nominal (3.8 volts) and high (4.2 volts) dc input voltage at each temperature step and channel at maximum output power.
See APPENDIX 3 for the test data.

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- 7) The EUT met the requirements of the Frequency Stability vs. Temperature and Voltage requirements for the PCS1900 band as per 47 CFR 2.1055(a), 2.1055(d), 24.235 and RSS-133, 4.2. The temperature range was from -30°C to +60°C in 10° temperature steps. The EUT was measured on low, middle and high channels at each temperature step. The EUT was measured at low (3.6 volts), nominal (3.8 volts) and high (4.2 volts) dc input voltage at each temperature step and channel at maximum output power.
See APPENDIX 3 for the test data.
- 8) The radiated spurious emissions/harmonics and ERP/EIRP were measured for both GSM850 and PCS bands. The results are within the limits. The EUT was placed on a nonconductive styrofoam table, 100 cm high that was positioned on a remotely controlled turntable. The test distance used between the EUT and the receiving antenna was three metres. Then the emissions were maximized by elevating the antenna in the range of 1 to 4 metres. The turntable was rotated to determine the azimuth of the peak emissions. The maximum emissions level was recorded. Both the horizontal and vertical polarisations of the emissions were measured. The maximum emissions level was recorded. The EUT was then substituted with an antenna placed in the same location as the EUT. A Dipole antenna was used for the ERP measurements and a Horn antenna was used for EIRP measurements. The substitution antenna was connected into a signal generator that was set to the test frequency. The emissions were maximized by elevating the antenna in the range of 1 to 4 metres. 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 polarisations of the emissions were measured.

The measurements were performed in a semi-anechoic chamber. The semi-anechoic chamber FCC registration number is **778487** and the Industry Canada file number is **IC4240**. The EUT was measured on the low, middle and high channels.

The highest ERP in the GSM850 band measured was 29.31 dBm (0.853 W) at 824.2 MHz (channel 128).

The highest EIRP in the PCS band measured was 27.62 dBm (0.578 W) at 1880.00 MHz (channel 661).

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The radiated carrier harmonics were measured up to the 10th harmonic for low, middle and high channels in the GSM850 and PCS bands. Each band was measured in GSM, GPRS, and EDGE mode, and also simultaneous GSM and Bluetooth transmit mode as well as GSM and 802.11b/g transmit mode. Both the horizontal and vertical polarizations were measured. The harmonic emissions above the 3rd harmonic were in the noise floor (NF) for the GSM850 band and above the 2nd harmonic for the PCS band.

The worst test margin in the GSM850 band for GSM mode harmonic emissions measured was 25.3 dB below the limit at 2512.80 MHz, for GPRS mode it was 24.4 dB below the limit at 2512.80 MHz, and for EDGE mode was 28.6 dB below the limit at 1648.40 MHz.

The worst test margin in the PCS band for GSM mode harmonic emissions measured was 26.08 dB below the limit at 3760.00 MHz, for GPRS mode it was 26.08 dB below the limit at 3760.00 MHz and in EDGE mode it was 26.88 dB below the limit at 3760.00 MHz.

The EUT's RF local oscillator (LO) emissions were measured in the GSM850 band and PCS band in the standalone configuration on the low and high channels. Both the horizontal and vertical polarizations were measured. The RF LO emissions were in the NF.

Sample Calculation:

Field Strength (dBμV/M) is calculated as follows:

FS = Measured Level (dBμV) + A.F. (dB/m) + Cable Loss (dB) - Preamp (dB) + Filter Loss (dB)

To view the test data see APPENDIX 4.

Measurement Uncertainty ±4.0 dB

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H. Compliance Test Equipment Used

<u>UNIT</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>SERIAL NUMBER</u>	<u>CAL DUE DATE</u> (YY MM DD)	<u>USE</u>
Preamplifier	Sonoma	310N/11909A	185831	07-11-23	Radiated Emissions
Preamplifier system	TDK RF Solutions	PA-02	080010	07-11-22	Radiated Emissions
Hybrid Log Antenna	TDK	HLP-3003C	017401	08-08-04	Radiated Emissions
Horn Antenna	TDK	HRN-0118	030101	08-07-26	Radiated Emissions
Horn Antenna	TDK	HRN-0118	030201	09-01-17	Radiated Emissions
Horn Antenna	Emco	3116	2538	08-09-25	Radiated Emissions
Preamplifier	TDK	18-26	030002	07-11-23	Radiated Emissions
Dipole Antenna	Schwarzbeck	UHAP	973	08-12-18	Radiated Emissions
Dipole Antenna	Schwarzbeck	UHAP	974	08-09-28	Radiated Emissions
EMC Analyzer	Agilent	E7405A	US40240226	07-10-20	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	837493/073	07-12-01	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	102204	08-04-22	RF Conducted Emissions
Spectrum Analyzer	HP	8563E	3745A08112	07-09-20	RF Conducted Emissions
DC Power Supply	HP	6632B	US37472178	07-09-14	RF Conducted Emissions
Environment Monitor	Control Company	1870	230355190	07-12-28	Radiated Emissions
Environment Monitor	Control Company	1870	230199533	07-12-01	RF Conducted Emissions
Temperature Probe	Hart Scientific	61161-302	21352860	07-08-31	Frequency Stability
Environmental Chamber	ESPEC Corp.	SH-240S1	91007118	N/R	Frequency Stability
Signal Generator	Agilent	8648C	4037U03155	07-09-13	Frequency Stability
Power Meter	Giga-tronics	8541C	1837762	07-12-15	Frequency Stability
Power Sensor	Giga-tronics	80401A	1835838	07-12-15	Frequency Stability

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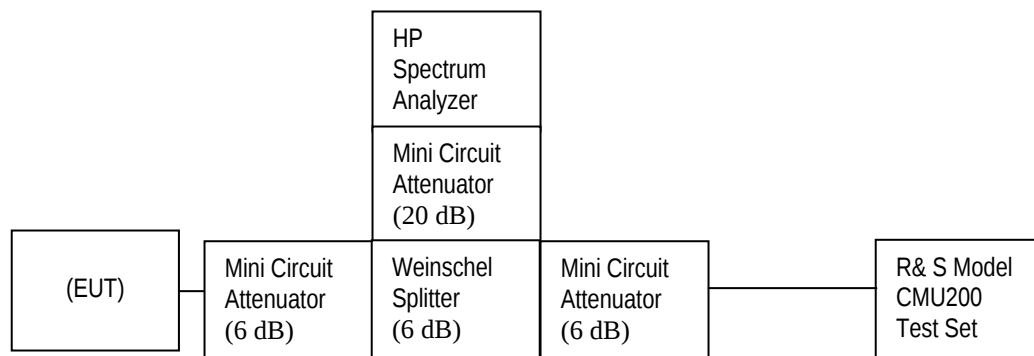
APPENDIX 1 - CONDUCTED RF EMISSIONS TEST DATA/PLOTS

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Conducted RF Emission Test Data cont'd

This appendix contains measurement data pertaining to conducted spurious emissions, –26 dBc bandwidth, 99% power bandwidth and the channel mask on BlackBerry® smartphone PIN 2061F989.

Test Setup Diagram



The environmental test conditions were:

Temperature 22°C
 Pressure 1017 mb
 Relative Humidity 33%

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Conducted RF Emission Test Data cont'd

The conducted spurious emissions – As per 47 CFR 2.1051, CFR 24.238(a), RSS-GEN, 4.9, CFR 22 Subpart H and RSS-132 were measured from 10 MHz to 20 GHz. The EUT emissions were in the noise floor.

See figures 1 to 12 for the plots of the conducted spurious emissions.

Date of Test: July 26, 2007

–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 282 kHz, and for the PCS1900 band was measured to be 273 kHz as shown below. This results 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 employed.

Test Data for GSM850 band and PCS1900 band selected Frequencies in GSM mode.

850 band Frequency (MHz)	-26dBc Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
824.2	282	246.7
837.6	272	246.7
848.8	267	245.0

1900 band Frequency (MHz)	-26dBc Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
1850.2	270	248.3
1880.0	273	245.0
1909.8	268	241.7

Measurement Plots for GSM850 and PCS1900 in GSM mode

Refer to the following measurement plots for more detail.

See Figures 13 to 24 for the plots of the –26dBc Bandwidth and 99% Occupied Bandwidth.

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

Date of Test: July 26, 2007

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Conducted RF Emission Test Data cont'd

Test Data for GSM850 band and PCS1900 band selected Frequencies in EDGE mode.

850 band Frequency (MHz)	99% Occupied Bandwidth (kHz)
824.2	248.3
837.6	243.3
848.8	243.3

1900 band Frequency (MHz)	99% Occupied Bandwidth (kHz)
1850.2	247.0
1880.0	245.0
1909.8	245.0

Measurement Plots for GSM850 band and PCS1900 band in EDGE mode

Refer to the following measurement plots for more detail.

See Figures 13 to 30 for the plots of the 99% Occupied Bandwidth.

See Figures 31 to 34 for plots of the channel mask results.

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

Date of Test: July 26, 2007

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Conducted RF Emission Test Data cont'd

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

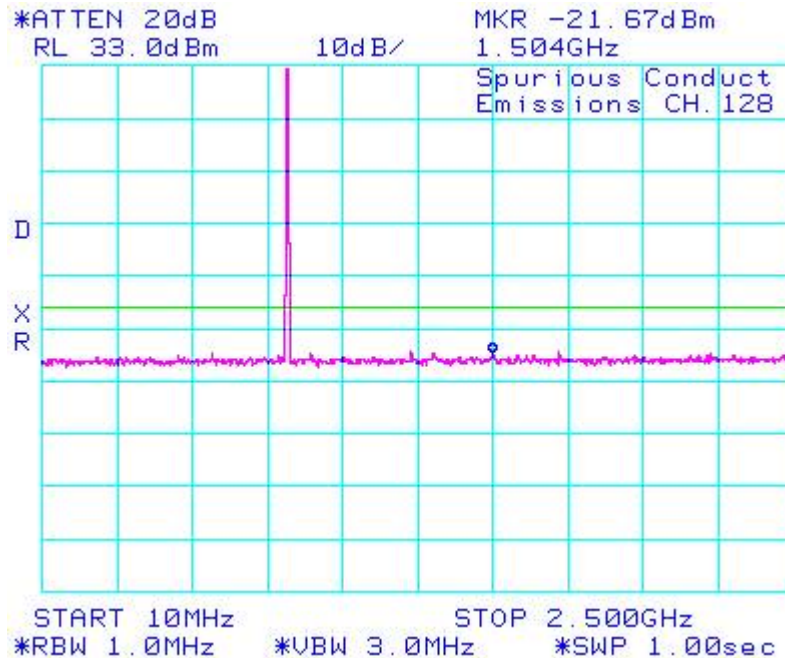
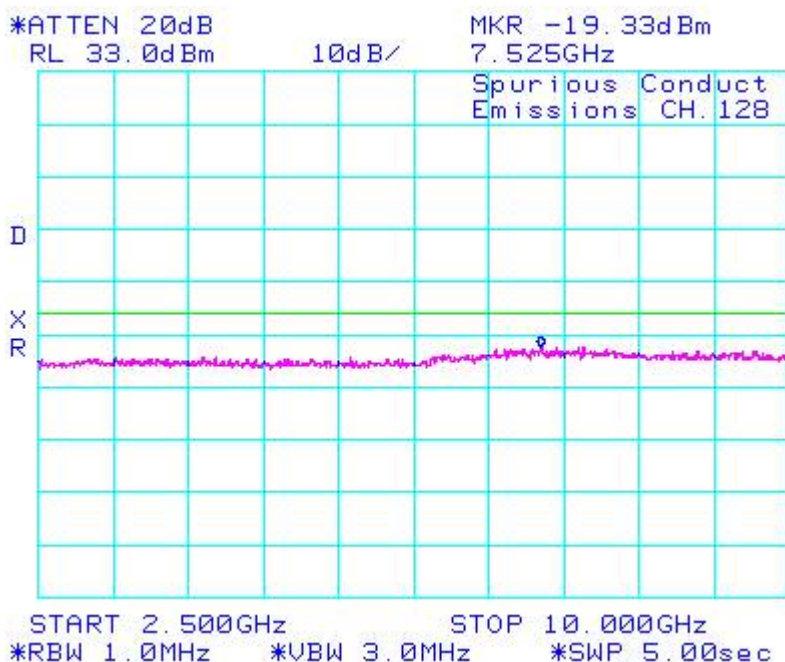


Figure 2: GSM850 band, Spurious Conducted Emissions, Low channel



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Conducted RF Emission Test Data cont'd

Figure 3: GSM850 band, Spurious Conducted Emissions, Middle Channel

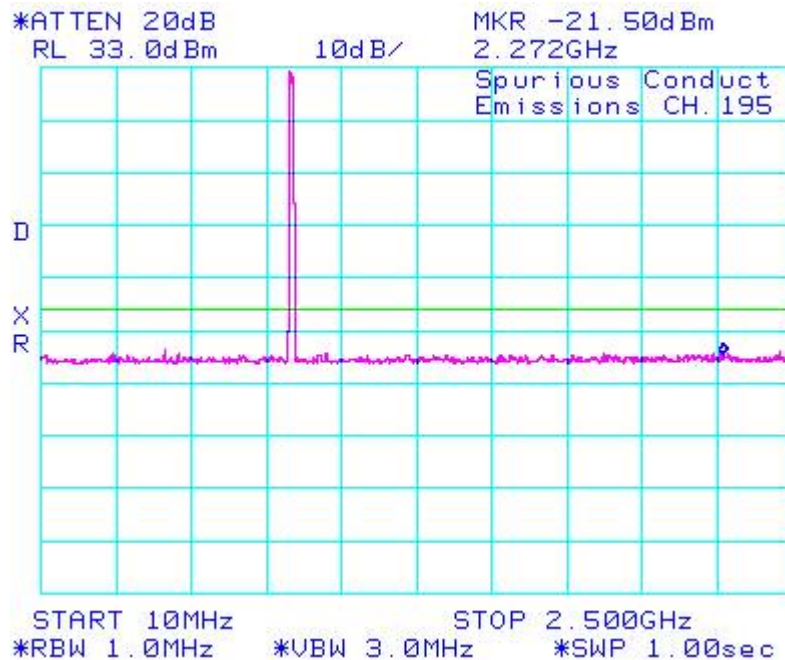
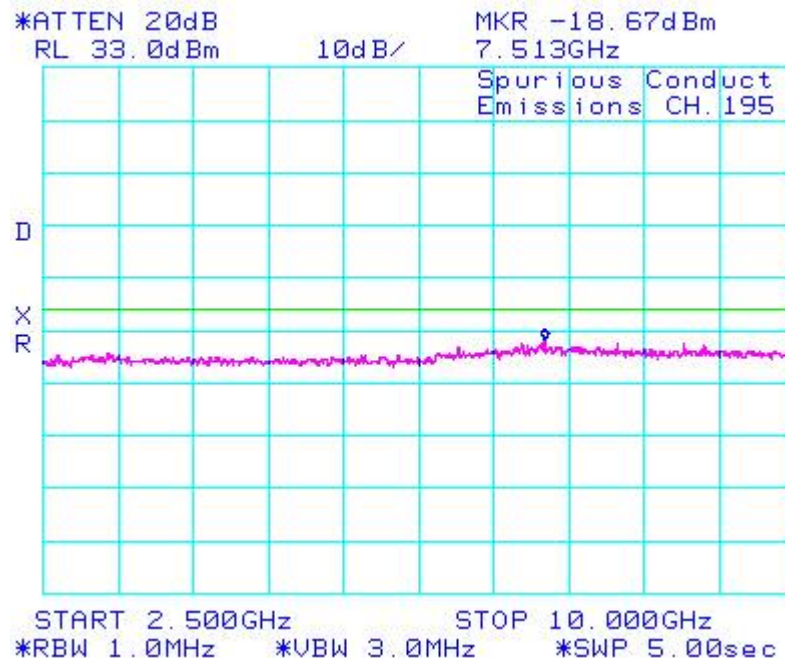


Figure 4: GSM850 band, Spurious Conducted Emissions, Middle Channel



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Conducted RF Emission Test Data cont'd

Figure 5: GSM850 band, Spurious Conducted Emissions, High Channel

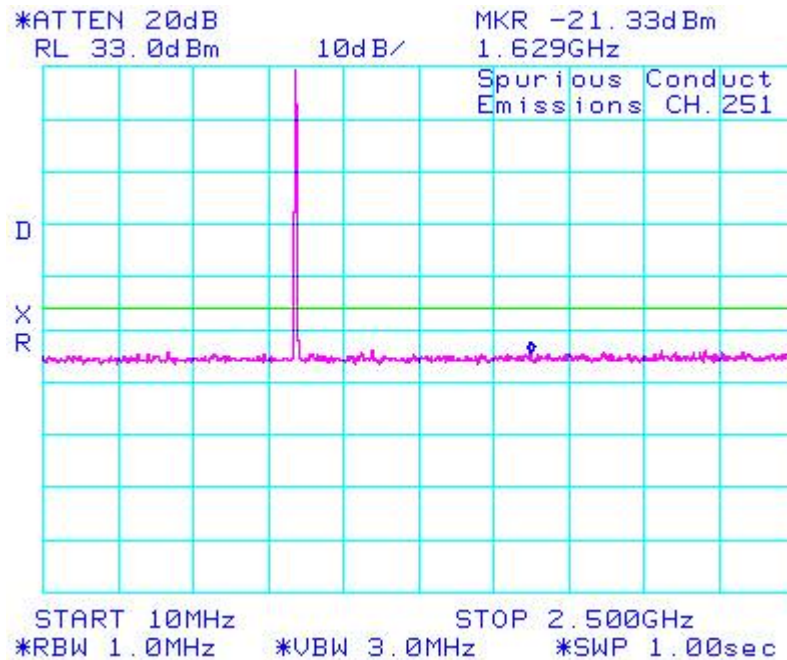
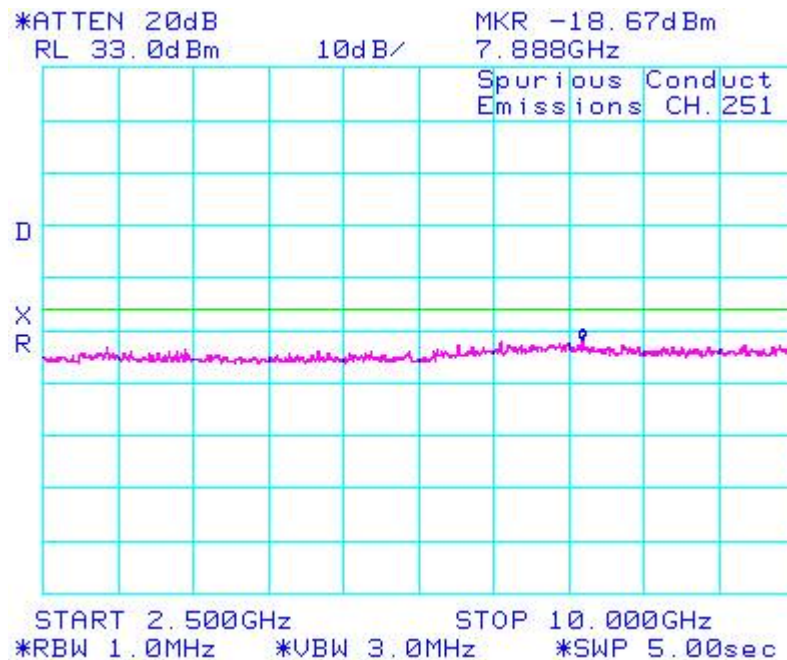


Figure 6: GSM850 band, Spurious Conducted Emissions, High Channel



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Conducted RF Emission Test Data cont'd

Figure 7: PCS1900 band, Spurious Conducted Emissions, Low Channel

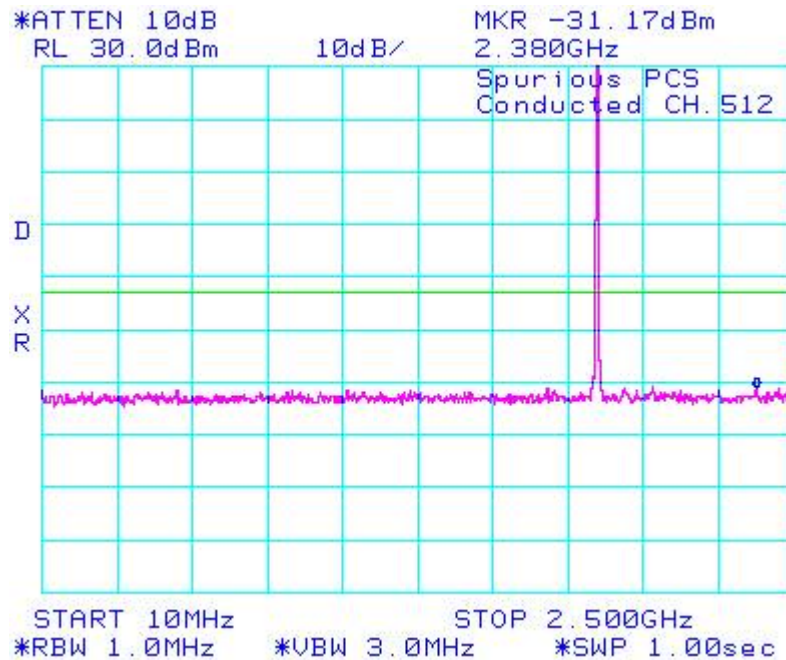
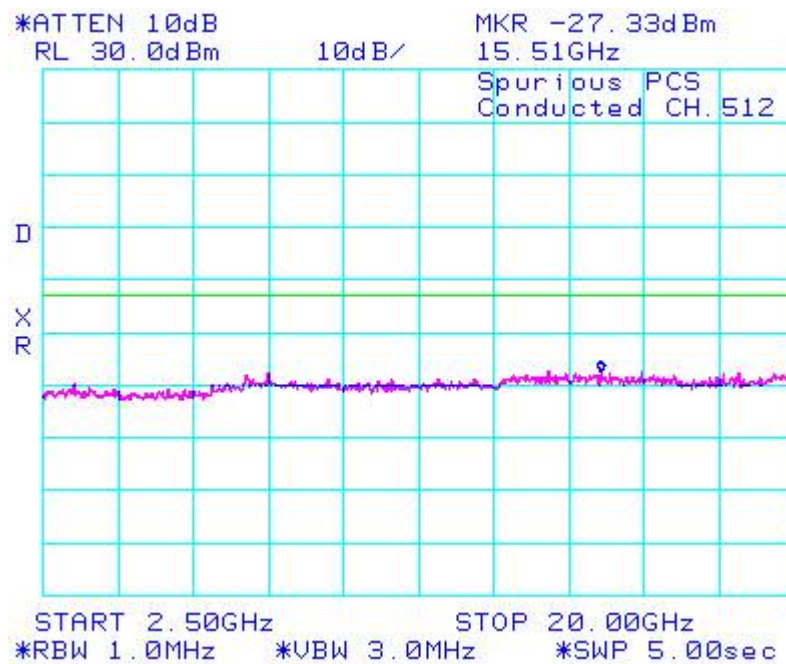


Figure 8: PCS1900 band, Spurious Conducted Emissions, Low Channel



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Conducted RF Emission Test Data cont'd

Figure 9: PCS1900 band, Spurious Conducted Emissions, Middle Channel

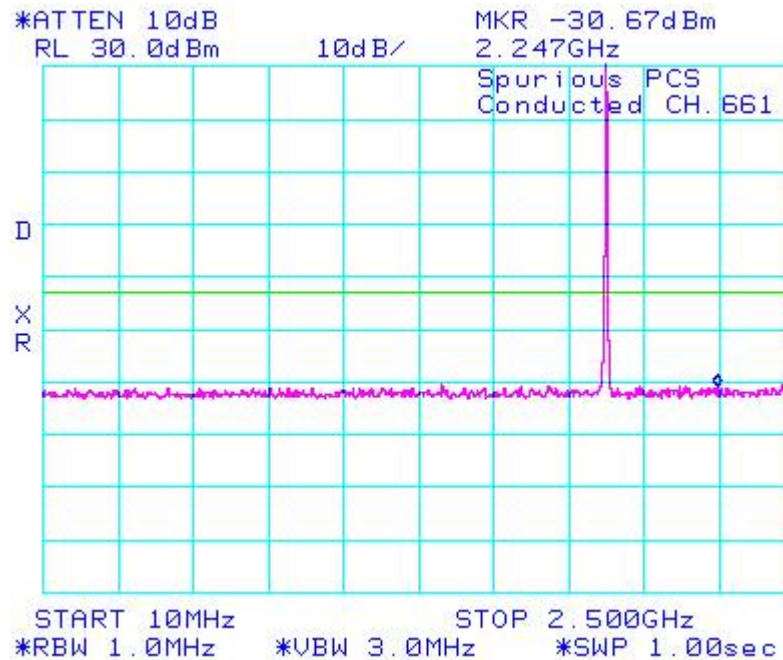
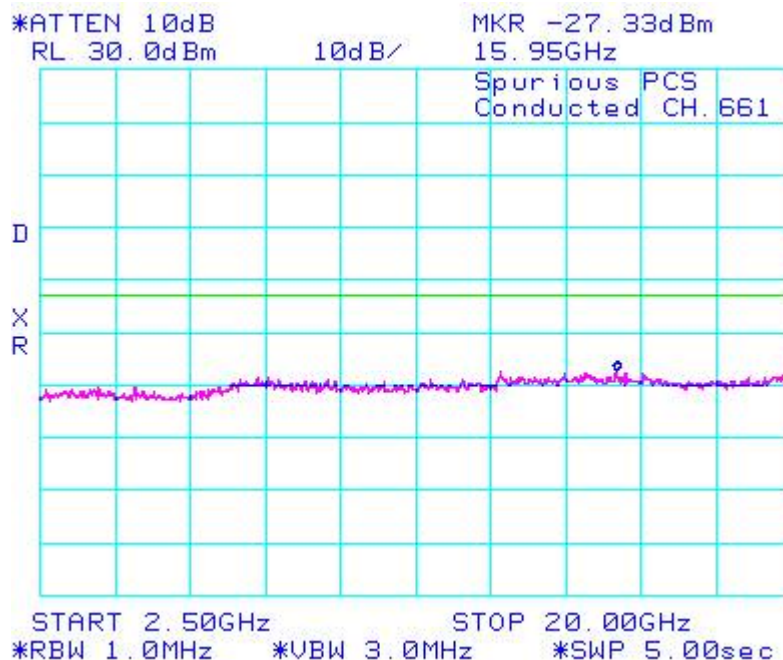


Figure 10: PCS1900 band, Spurious Conducted Emissions, Middle Channel



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Conducted RF Emission Test Data cont'd

Figure 11: PCS1900 band, Spurious Conducted Emissions, High Channel

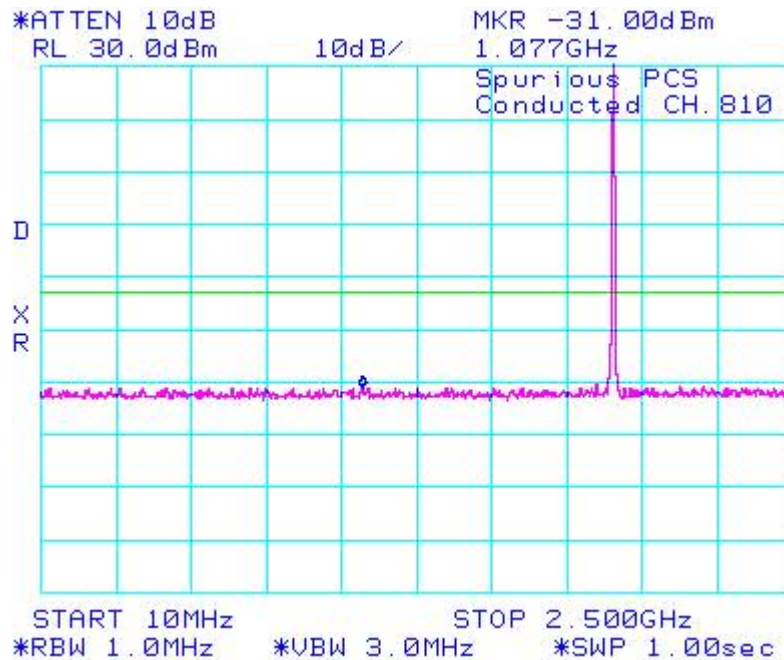
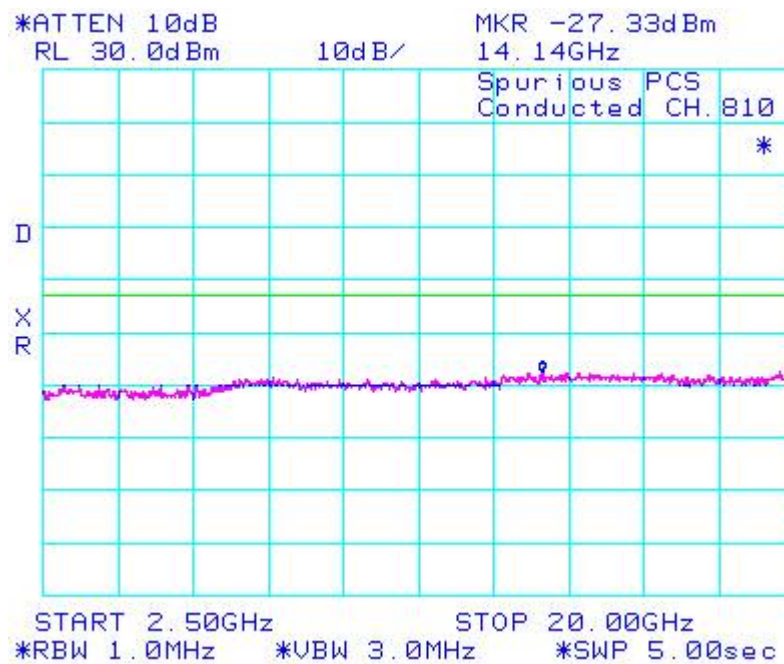


Figure 12: PCS1900 band, Spurious Conducted Emissions, High Channel



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Conducted RF Emission Test Data cont'd

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

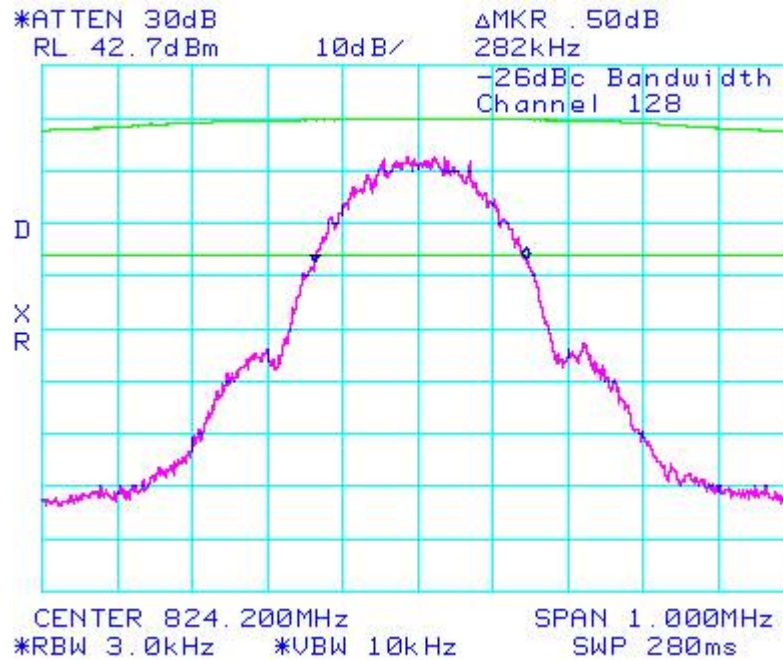
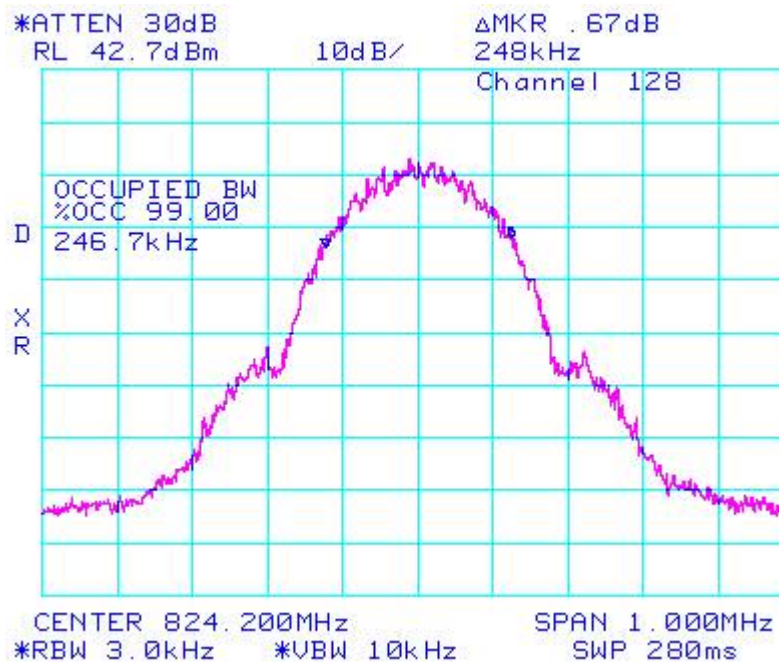


Figure 14: Occupied Bandwidth, GSM850 band Low Channel in GSM mode



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Conducted RF Emission Test Data cont'd

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

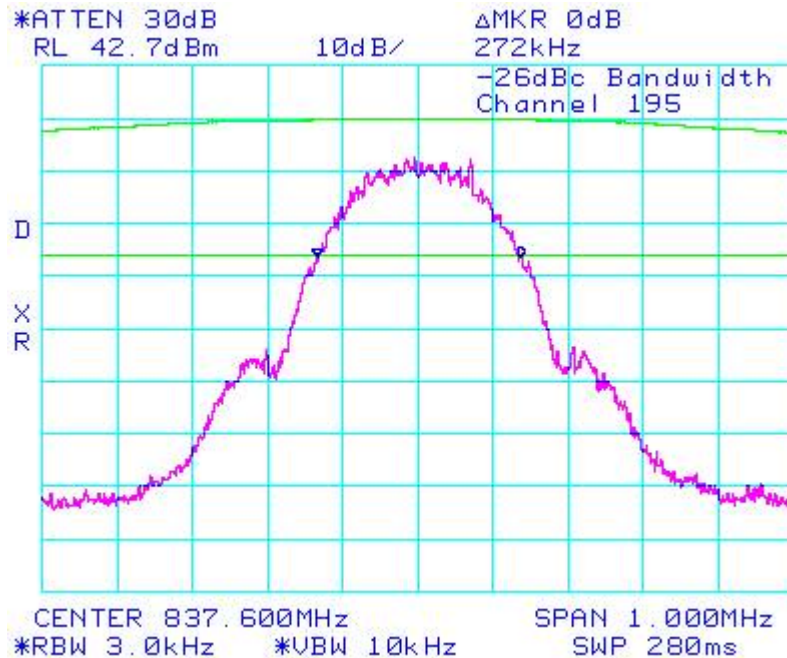
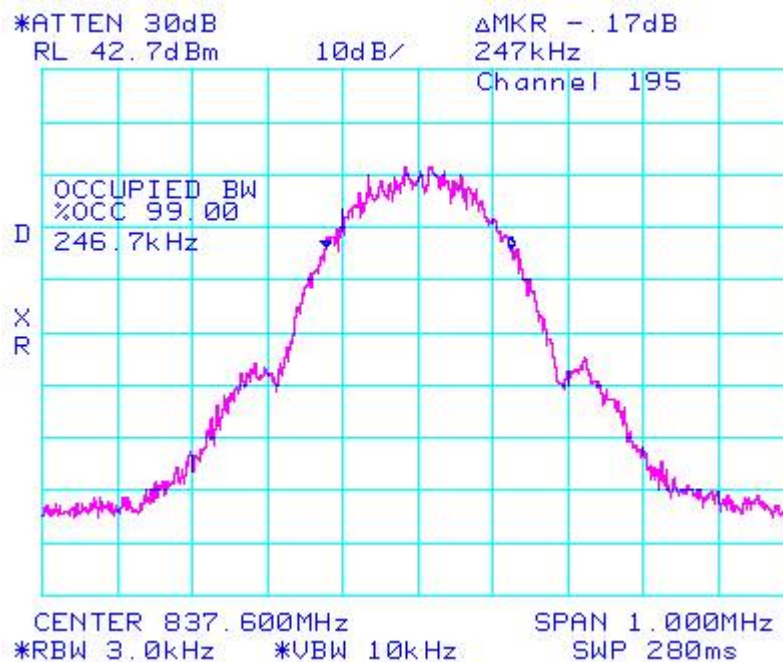


Figure 16: Occupied Bandwidth, GSM850 band Middle Channel in GSM mode



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Conducted RF Emission Test Data cont'd

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

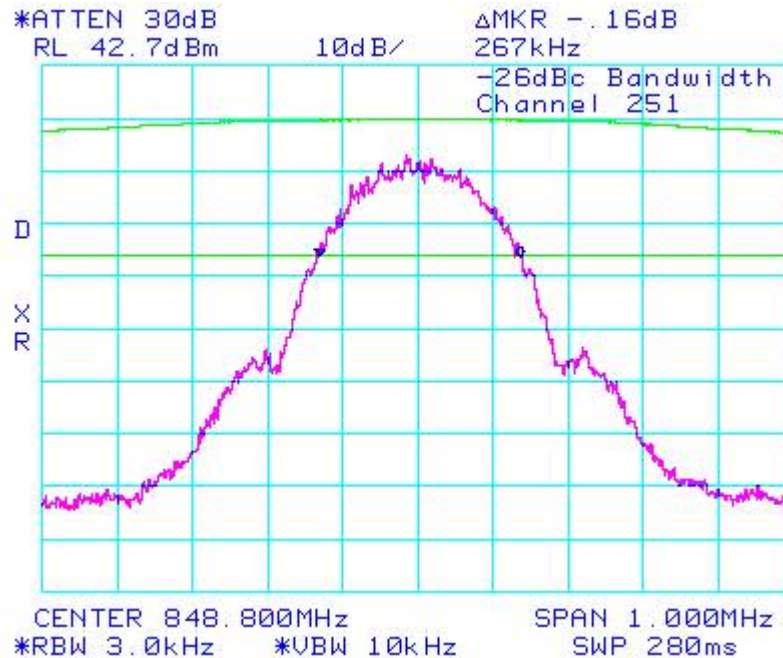
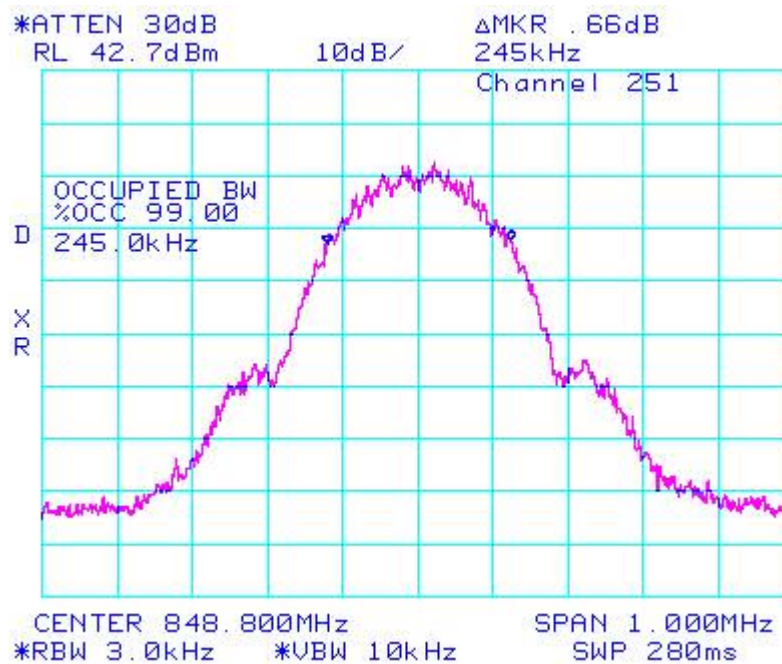


Figure 18: Occupied Bandwidth, GSM850 band High Channel in GSM mode



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Conducted RF Emission Test Data cont'd

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

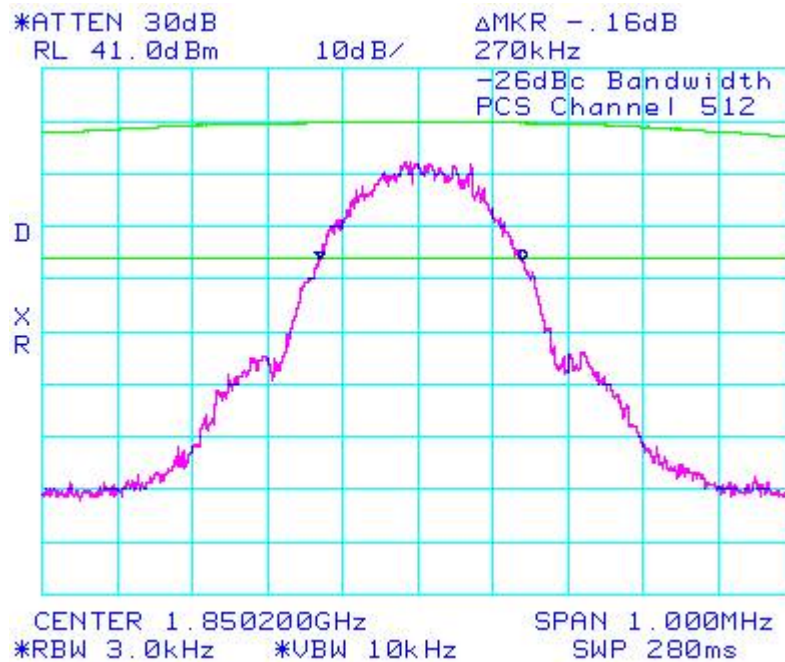
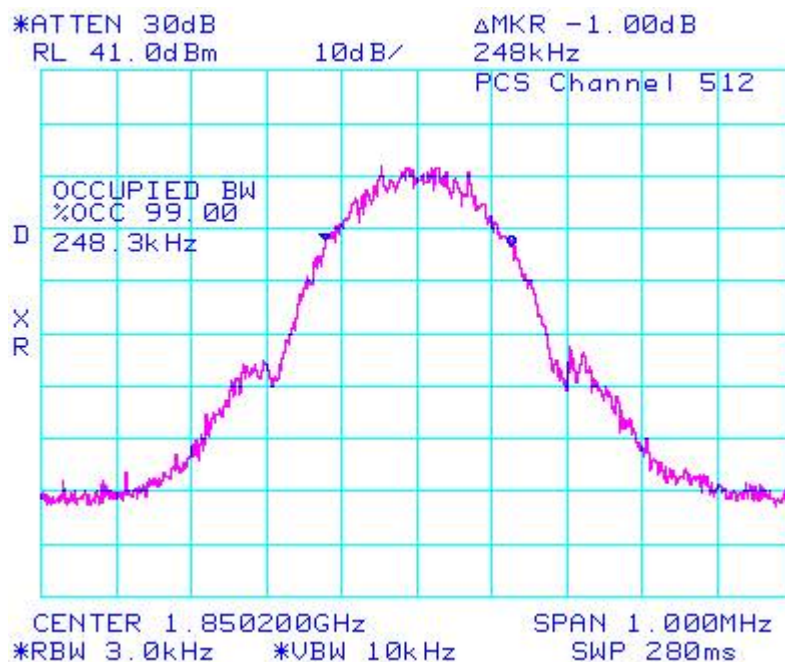


Figure 20: Occupied Bandwidth, PCS1900 Low Channel in GSM mode



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Conducted RF Emission Test Data cont'd

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

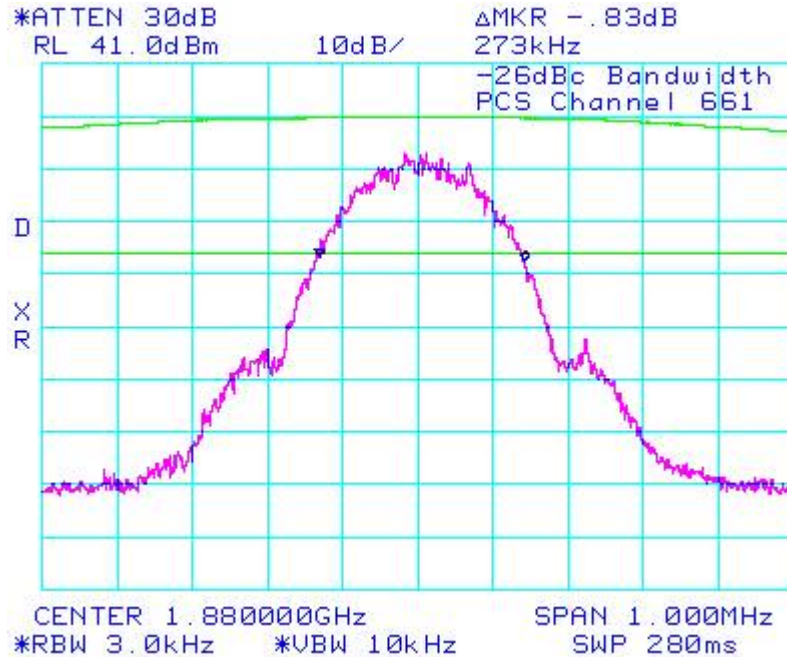
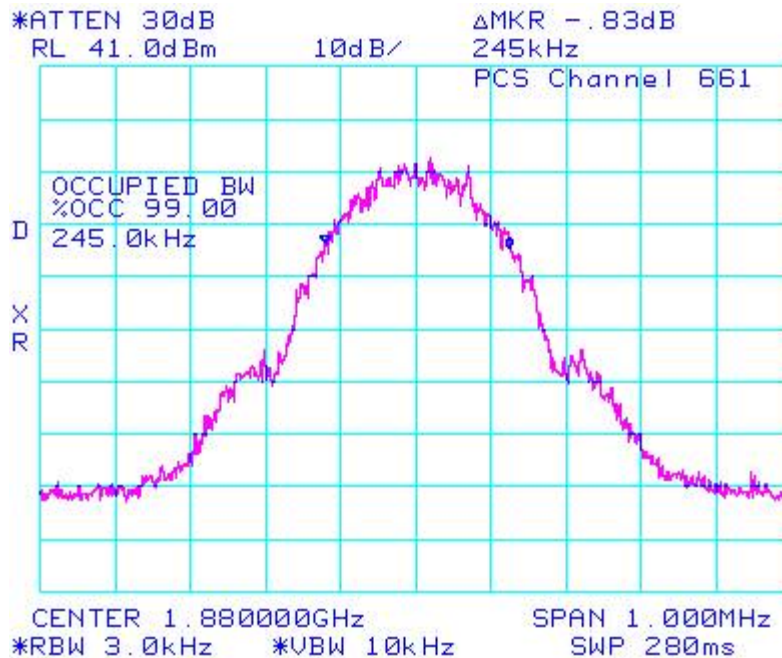


Figure 22: Occupied Bandwidth, PCS1900 Middle Channel in GSM mode



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Conducted RF Emission Test Data cont'd

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

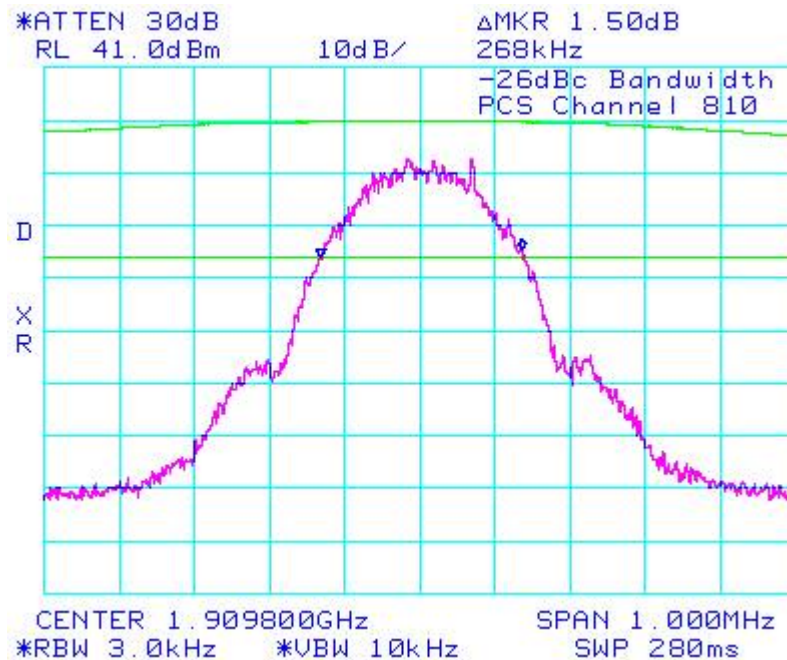
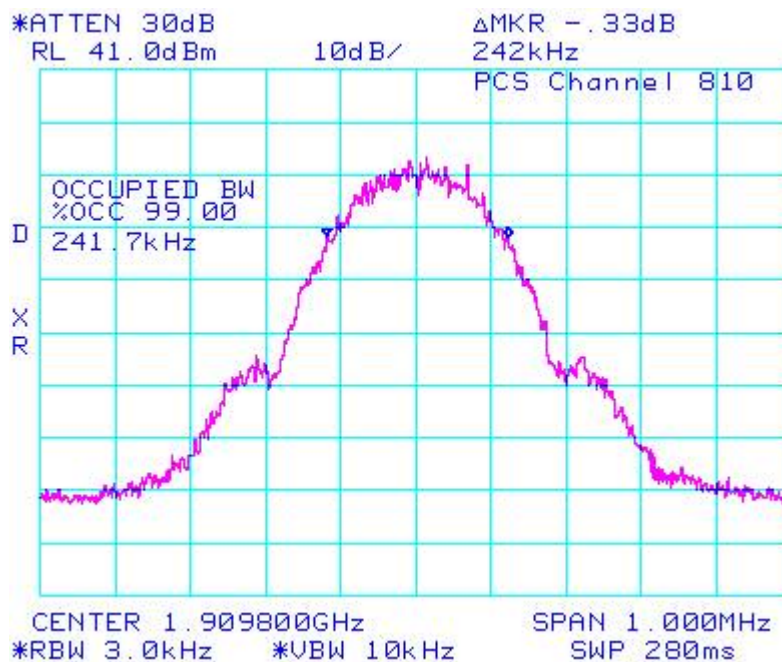


Figure 24: Occupied Bandwidth, PCS1900 High Channel in GSM mode



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Conducted RF Emission Test Data cont'd

Figure 25: Occupied Bandwidth, GSM850 Band, Low Channel in EDGE mode

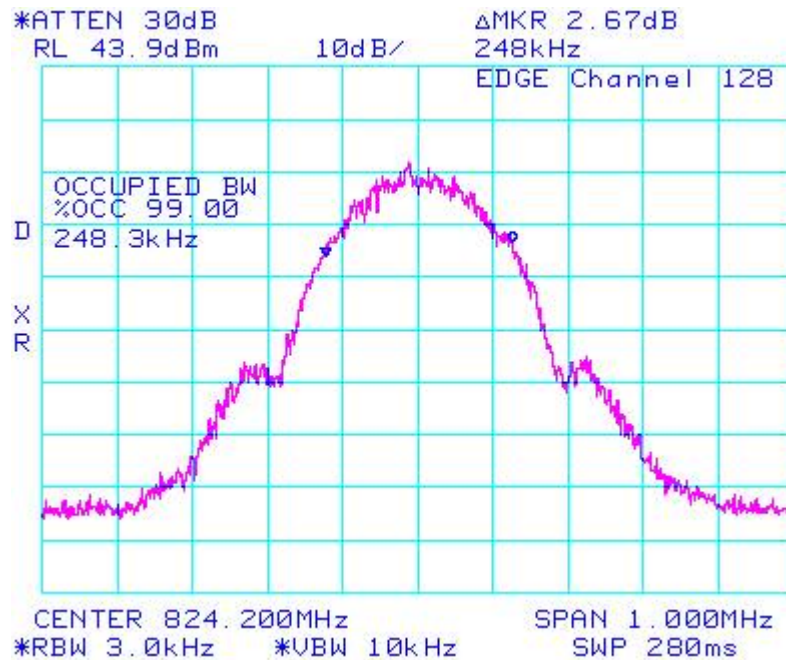
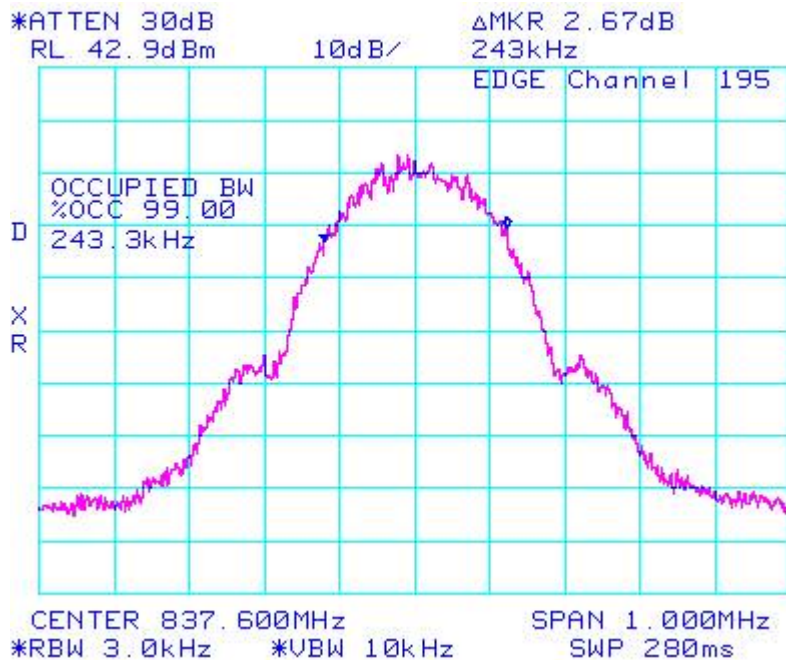


Figure 26: Occupied Bandwidth, GSM850 Band, Middle Channel in EDGE mode



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Conducted RF Emission Test Data cont'd

Figure 27: Occupied Bandwidth, GSM850 band, High Channel in EDGE mode

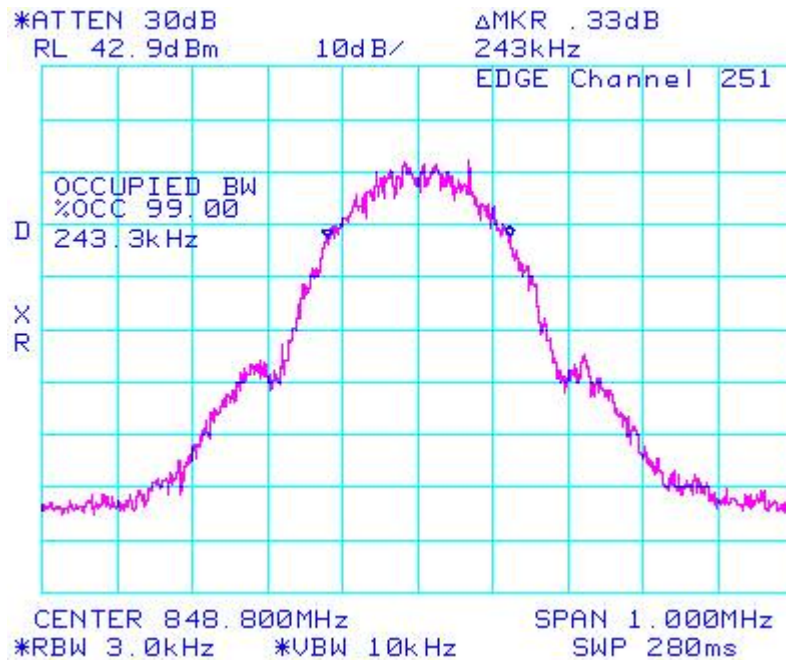
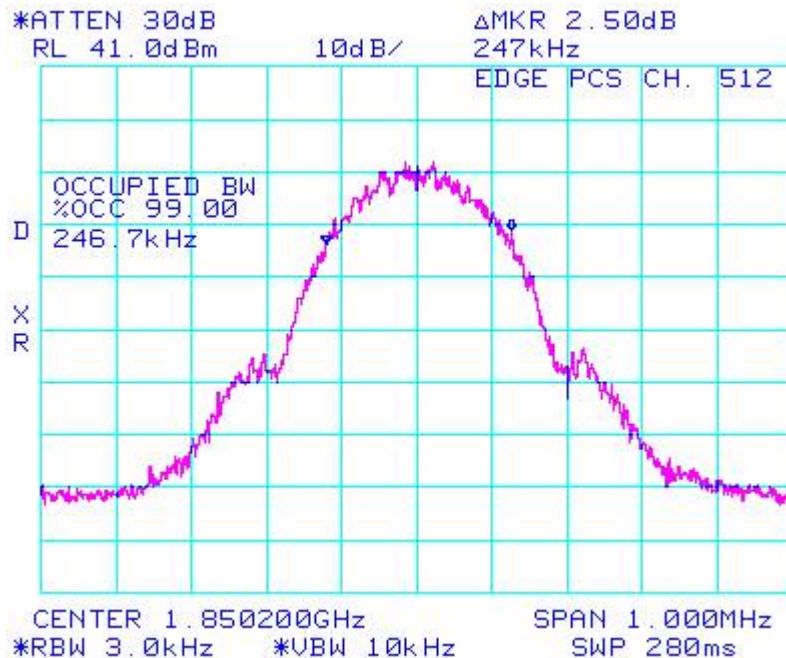


Figure 28: Occupied Bandwidth, PCS1900 Band, Low Channel in EDGE mode



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Conducted RF Emission Test Data cont'd

Figure 29: Occupied Bandwidth, PCS1900 Band, Middle Channel in EDGE mode

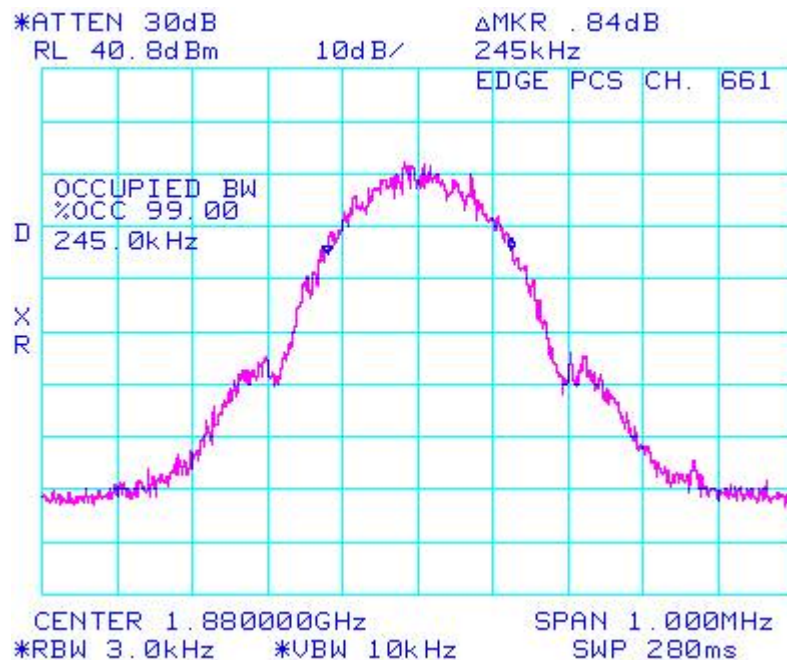
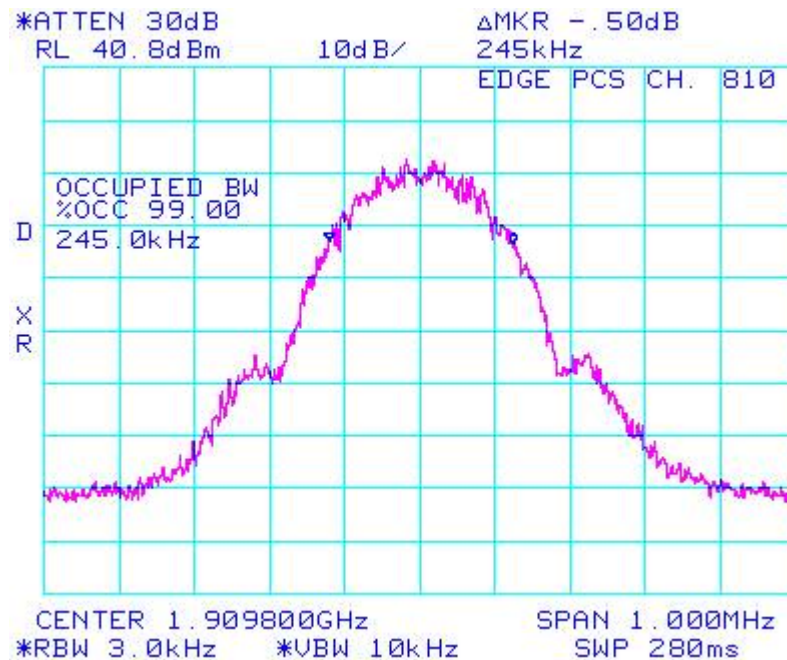


Figure 30: Occupied Bandwidth, PCS1900 Band, High Channel in EDGE mode



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Conducted RF Emission Test Data cont'd

Figure 31: GSM850 band, Low Channel Mask

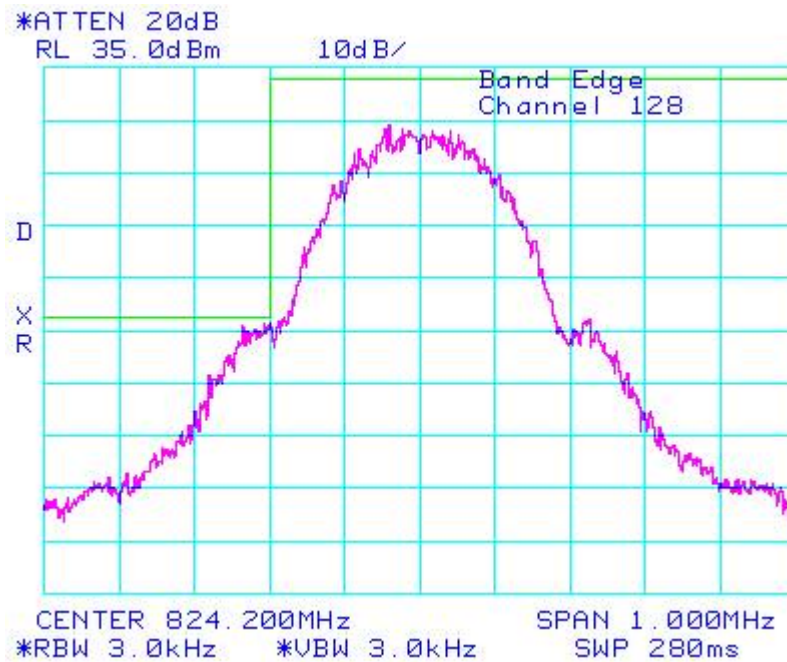
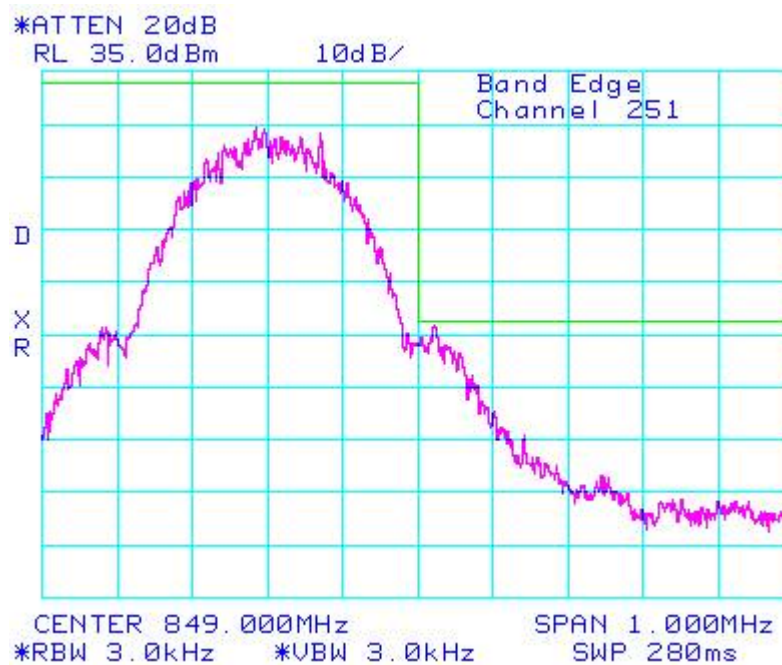


Figure 32: GSM850 band High Channel Mask



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Conducted RF Emission Test Data cont'd

Figure 33: PCS1900, Low Channel Mask

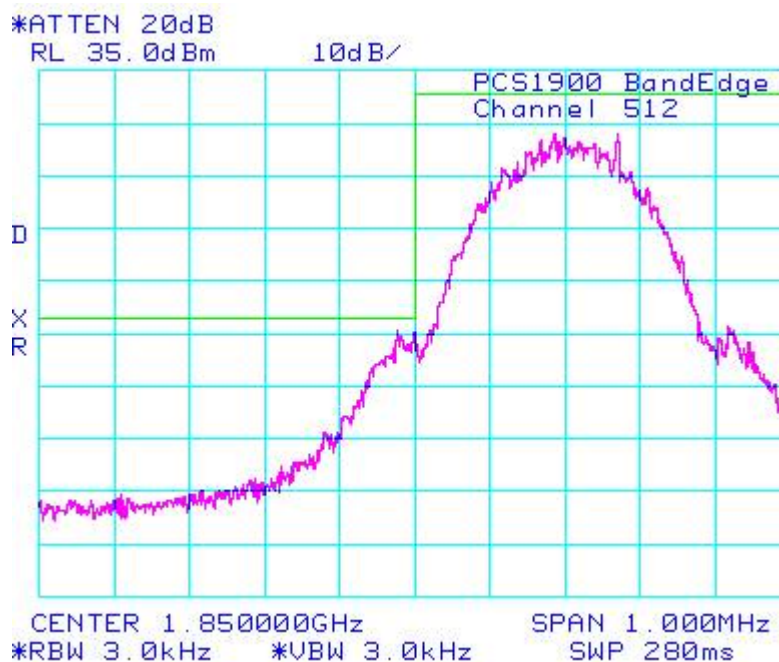
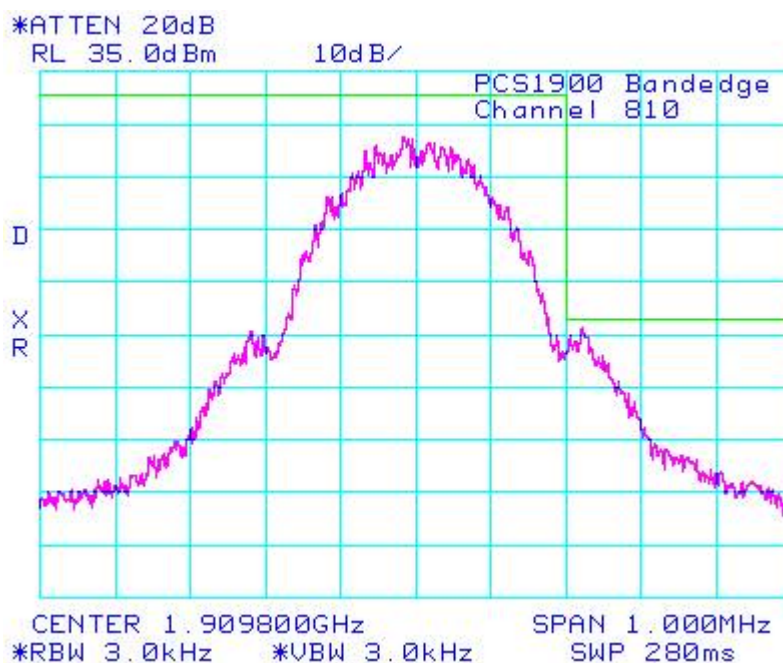


Figure 34: PCS1900, High Channel Mask



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APPENDIX 2 – CONDUCTED RF OUTPUT POWER TEST DATA

RTS RIM Testing Services	EMI Test Report for the BlackBerry® smartphone Model RBR41GW	
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Conducted RF Output Power Test Data

The conducted RF output power was measured using the Communication Tester, Rohde & Schwarz, model CMU 200. The low, middle and high channels were measured at maximum radio output power. The insertion loss of the coaxial cable from the CMU 200 to the BlackBerry® smartphone was compensated for in the measurements. Peak nominal output power is 33.0 dBm $\pm$ 0.5 dB for GSM850 and 30.5 dBm $\pm$ 0.5 dB for PCS.

Date of Test: July 19, 2007

Test Results

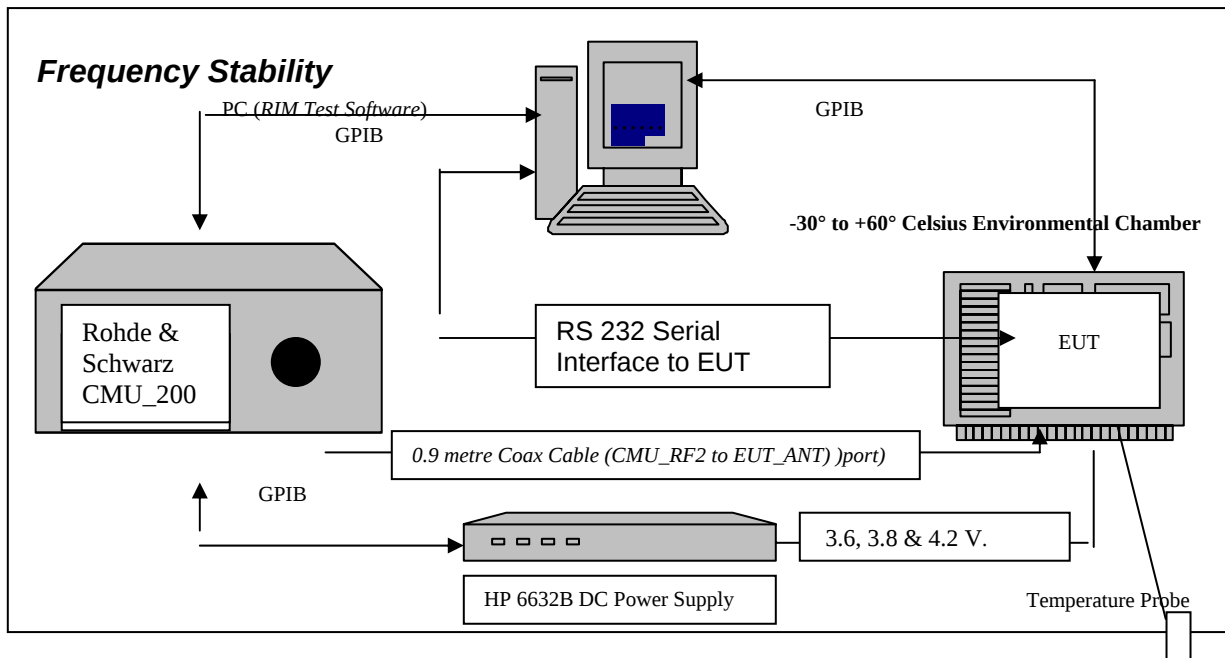
Channel	Frequency (MHz)	Maximum Output Power (dBm)	Maximum Output Power (Watts)
<u>GSM850</u>			
128	824.20	32.6	1.82
189	836.60	32.7	1.86
251	848.80	32.6	1.82
<u>GSM850 EDGE/GPRS/GSM (2-timeslot)</u>			
128	824.20	30.5	1.12
189	836.60	30.5	1.12
251	848.80	30.5	1.12
<u>PCS</u>			
512	1850.2	30.8	1.20
661	1880.0	30.6	1.15
810	1909.8	30.5	1.12
<u>PCS EDGE/GPRS/GSM (2-timeslot)</u>			
512	1850.2	28.5	0.71
661	1880.0	28.3	0.68
810	1909.8	28.3	0.68

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APPENDIX 3 – FREQUENCY STABILITY TEST DATA

RTS RIM Testing Services	EMI Test Report for the BlackBerry® smartphone Model RBR41GW	
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Frequency Stability Test Data



CFR 47 Chapter 1 - Federal Communications Commission Rules

Part 2 Required Measurements

2.995 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, RSS-133, CFR 47 chapter 1, Section 22.917 and RSS-132 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.

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

The cable assembly from the RF input to the RF output was measured at the following Frequencies:

PCS Frequency (MHz)	Cable loss (dB)	GSM 850 Frequency (MHz)	Cable loss (dB)
1850.2	0.80	824.2	0.50
1880.0	0.80	836.4	0.50
1909.8	0.80	848.6	0.50

Procedure:

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 3.8 volts to 4.2 volts nominal 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, 3.8 volts and 4.2 volts. The transmit frequency was varied in 3 steps consisting of 824.2, 836.4, and 848.6 MHz for the GSM850 band and 1850.2, 1880.0 and 1909.8 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.

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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, 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 3.8 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 4.2 volts

Procedure 5 to 10 was repeated at room temperature (20°C) with the power supply voltage set to 3.6, 3.8 and 4.2 volts.

The maximum frequency error in the GSM850 band measured was **-0.0581 PPM**.

The maximum frequency error in the PCS band measured was **-0.0458 PPM**.

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GSM850 Channel results: channels 128, 189 and 250 @ 20°C maximum transmitted power

Date of Test: July 25, 2007

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.6	20	-17.89	-0.0217
189	836.40	3.6	20	-29.32	-0.0351
250	848.60	3.6	20	-35.77	-0.0422

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.8	20	-35.32	-0.0429
189	836.40	3.8	20	-32.16	-0.0385
250	848.60	3.8	20	-35.77	-0.0422

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	4.2	20	-20.79	-0.0252
189	836.40	4.2	20	-19.63	-0.0235
250	848.60	4.2	20	-19.18	-0.0226

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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	9.94	0.0121
128	824.20	3.6	-20	-15.17	-0.0184
128	824.20	3.6	-10	-18.92	-0.0230
128	824.20	3.6	0	-23.83	-0.0289
128	824.20	3.6	10	-11.49	-0.0139
128	824.20	3.6	20	-17.89	-0.0217
128	824.20	3.6	30	-47.91	-0.0581
128	824.20	3.6	40	-39.26	-0.0476
128	824.20	3.6	50	-45.72	-0.0555
128	824.20	3.6	60	-37.58	-0.0456

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.8	-30	14.08	0.0171
128	824.20	3.8	-20	-27.51	-0.0334
128	824.20	3.8	-10	-43.33	-0.0526
128	824.20	3.8	0	-45.39	-0.0551
128	824.20	3.8	10	-29.77	-0.0361
128	824.20	3.8	20	-35.32	-0.0429
128	824.20	3.8	30	-37.06	-0.0450
128	824.20	3.8	40	-36.03	-0.0437
128	824.20	3.8	50	-42.81	-0.0520
128	824.20	3.8	60	-35.26	-0.0428

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	4.2	-30	-22.47	-0.0273
128	824.20	4.2	-20	19.57	0.0238
128	824.20	4.2	-10	-28.02	-0.0340
128	824.20	4.2	0	-18.85	-0.0229
128	824.20	4.2	10	14.98	0.0182
128	824.20	4.2	20	-20.79	-0.0252
128	824.20	4.2	30	-29.12	-0.0353
128	824.20	4.2	40	-24.41	-0.0296
128	824.20	4.2	50	-28.02	-0.0340
128	824.20	4.2	60	-19.11	-0.0232

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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	15.11	0.0178
189	836.40	3.6	-20	-47.14	-0.0564
189	836.40	3.6	-10	-39.65	-0.0474
189	836.40	3.6	0	-28.73	-0.0343
189	836.40	3.6	10	-39.07	-0.0467
189	836.40	3.6	20	-29.32	-0.0351
189	836.40	3.6	30	-30.87	-0.0369
189	836.40	3.6	40	-26.86	-0.0321
189	836.40	3.6	50	-35.19	-0.0421
189	836.40	3.6	60	-26.54	-0.0317

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
189	836.40	3.8	-30	25.96	0.0310
189	836.40	3.8	-20	-25.31	-0.0303
189	836.40	3.8	-10	-38.61	-0.0462
189	836.40	3.8	0	-38.61	-0.0462
189	836.40	3.8	10	-20.79	-0.0249
189	836.40	3.8	20	-30.87	-0.0369
189	836.40	3.8	30	-32.74	-0.0391
189	836.40	3.8	40	-34.80	-0.0416
189	836.40	3.8	50	-35.45	-0.0424
189	836.40	3.8	60	-30.74	-0.0368

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
189	836.40	4.2	-30	-14.92	-0.0178
189	836.40	4.2	-20	-19.37	-0.0232
189	836.40	4.2	-10	-27.77	-0.0332
189	836.40	4.2	0	-14.27	-0.0171
189	836.40	4.2	10	25.57	0.0306
189	836.40	4.2	20	-19.63	-0.0235
189	836.40	4.2	30	-25.31	-0.0303
189	836.40	4.2	40	-15.43	-0.0184
189	836.40	4.2	50	-18.14	-0.0217
189	836.40	4.2	60	-7.94	-0.0095

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GSM850 Results: channel 250 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
250	848.60	3.6	-30	15.11	0.0178
250	848.60	3.6	-20	-26.67	-0.0314
250	848.60	3.6	-10	-43.13	-0.0508
250	848.60	3.6	0	-36.81	-0.0434
250	848.60	3.6	10	-48.36	-0.0570
250	848.60	3.6	20	-35.77	-0.0422
250	848.60	3.6	30	-34.93	-0.0412
250	848.60	3.6	40	-34.29	-0.0404
250	848.60	3.6	50	-38.16	-0.0450
250	848.60	3.6	60	-29.12	-0.0343

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
250	848.60	3.8	-30	-18.66	-0.0220
250	848.60	3.8	-20	-26.73	-0.0315
250	848.60	3.8	-10	-40.36	-0.0476
250	848.60	3.8	0	-37.71	-0.0444
250	848.60	3.8	10	-22.34	-0.0263
250	848.60	3.8	20	-35.77	-0.0422
250	848.60	3.8	30	-33.32	-0.0391
250	848.60	3.8	40	-34.42	-0.0406
250	848.60	3.8	50	-32.16	-0.0379
250	848.60	3.8	60	-32.09	-0.0378

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
250	848.60	4.2	-30	-9.56	-0.0113
250	848.60	4.2	-20	-13.95	-0.0164
250	848.60	4.2	-10	-24.28	-0.0286
250	848.60	4.2	0	9.30	0.0110
250	848.60	4.2	10	-19.95	-0.0235
250	848.60	4.2	20	-19.18	-0.0226
250	848.60	4.2	30	-23.25	-0.0274
250	848.60	4.2	40	-12.72	-0.0150
250	848.60	4.2	50	-9.94	-0.0117
250	848.60	4.2	60	8.91	0.0105

RTS RIM Testing Services	EMI Test Report for the BlackBerry® smartphone Model RBR41GW	
Test Report No. RTS-0655-0707-31-Rev1	Dates of Test July 13 to 26, 2007	Author Data C. O'Neill

PCS Channel results: channels 512, 661, & 810 @ 20°C maximum transmitted power

Date of Test: July 24, 2007

Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	3.6	20	-84.65	-0.0458
661	1880.0	3.6	20	-56.56	-0.0301
810	1909.8	3.6	20	-74.39	-0.0390

Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	3.8	20	-58.82	-0.0318
661	1880.0	3.8	20	-40.94	-0.0218
810	1909.8	3.8	20	-41.20	-0.0216

Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	4.2	20	-45.39	-0.0245
661	1880.0	4.2	20	-67.09	-0.0357
810	1909.8	4.2	20	-68.45	-0.0358

RTS RIM Testing Services	EMI Test Report for the BlackBerry® smartphone Model RBR41GW	
Test Report No. RTS-0655-0707-31-Rev1	Dates of Test July 13 to 26, 2007	Author Data C. O'Neill

PCS 1900 Results: channel 512 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	3.6	-30	-42.49	-0.0230
512	1850.2	3.6	-20	-64.18	-0.0347
512	1850.2	3.6	-10	-57.53	-0.0311
512	1850.2	3.6	0	-67.28	-0.0364
512	1850.2	3.6	10	-67.28	-0.0364
512	1850.2	3.6	20	-84.65	-0.0458
512	1850.2	3.6	30	-42.36	-0.0229
512	1850.2	3.6	40	-65.93	-0.0356
512	1850.2	3.6	50	-81.04	-0.0438
512	1850.2	3.6	60	-53.40	-0.0289

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	3.8	-30	-36.42	-0.0197
512	1850.2	3.8	-20	-22.73	-0.0123
512	1850.2	3.8	-10	-43.59	-0.0236
512	1850.2	3.8	0	-59.79	-0.0323
512	1850.2	3.8	10	-49.66	-0.0268
512	1850.2	3.8	20	-58.82	-0.0318
512	1850.2	3.8	30	-75.42	-0.0408
512	1850.2	3.8	40	-73.93	-0.0400
512	1850.2	3.8	50	-52.50	-0.0284
512	1850.2	3.8	60	-69.48	-0.0376

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	4.2	-30	-62.89	-0.0340
512	1850.2	4.2	-20	-53.40	-0.0289
512	1850.2	4.2	-10	-54.69	-0.0296
512	1850.2	4.2	0	-34.16	-0.0185
512	1850.2	4.2	10	-36.74	-0.0199
512	1850.2	4.2	20	-45.39	-0.0245
512	1850.2	4.2	30	-64.18	-0.0347
512	1850.2	4.2	40	-61.41	-0.0332
512	1850.2	4.2	50	-53.08	-0.0287
512	1850.2	4.2	60	-75.48	-0.0408

RTS RIM Testing Services	EMI Test Report for the BlackBerry® smartphone Model RBR41GW	
Test Report No. RTS-0655-0707-31-Rev1	Dates of Test July 13 to 26, 2007	Author Data C. O'Neill

PCS 1900 Results: channel 661 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880	3.6	-30	-52.11	-0.0277
661	1880	3.6	-20	-43.07	-0.0229
661	1880	3.6	-10	-57.21	-0.0304
661	1880	3.6	0	-46.81	-0.0249
661	1880	3.6	10	-74.00	-0.0394
661	1880	3.6	20	-56.56	-0.0301
661	1880	3.6	30	-56.11	-0.0298
661	1880	3.6	40	-70.45	-0.0375
661	1880	3.6	50	-79.88	-0.0425
661	1880	3.6	60	-71.29	-0.0379

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880	3.8	-30	-28.15	-0.0150
661	1880	3.8	-20	-25.76	-0.0137
661	1880	3.8	-10	-60.63	-0.0323
661	1880	3.8	0	-28.28	-0.0150
661	1880	3.8	10	-54.50	-0.0290
661	1880	3.8	20	-40.94	-0.0218
661	1880	3.8	30	-61.80	-0.0329
661	1880	3.8	40	-52.17	-0.0278
661	1880	3.8	50	-64.31	-0.0342
661	1880	3.8	60	-37.84	-0.0201

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880	4.2	-30	-22.08	-0.0117
661	1880	4.2	-20	-28.67	-0.0153
661	1880	4.2	-10	-20.40	-0.0109
661	1880	4.2	0	-31.25	-0.0166
661	1880	4.2	10	-51.79	-0.0275
661	1880	4.2	20	-67.09	-0.0357
661	1880	4.2	30	-40.68	-0.0216
661	1880	4.2	40	-48.82	-0.0260
661	1880	4.2	50	-37.00	-0.0197
661	1880	4.2	60	-51.21	-0.0272

RTS RIM Testing Services	EMI Test Report for the BlackBerry® smartphone Model RBR41GW	
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PCS 1900 Results: channel 810 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
810	1909.8	3.6	-30	-41.78	-0.0219
810	1909.8	3.6	-20	-55.27	-0.0289
810	1909.8	3.6	-10	-34.87	-0.0183
810	1909.8	3.6	0	-66.19	-0.0347
810	1909.8	3.6	10	-73.55	-0.0385
810	1909.8	3.6	20	-74.39	-0.0390
810	1909.8	3.6	30	-59.86	-0.0313
810	1909.8	3.6	40	-64.64	-0.0338
810	1909.8	3.6	50	-78.71	-0.0412
810	1909.8	3.6	60	-52.95	-0.0277

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
810	1909.8	3.8	-30	-39.97	-0.0209
810	1909.8	3.8	-20	-43.84	-0.0230
810	1909.8	3.8	-10	-58.11	-0.0304
810	1909.8	3.8	0	-30.74	-0.0161
810	1909.8	3.8	10	-56.44	-0.0296
810	1909.8	3.8	20	-41.20	-0.0216
810	1909.8	3.8	30	-63.73	-0.0334
810	1909.8	3.8	40	-53.59	-0.0281
810	1909.8	3.8	50	-63.47	-0.0332
810	1909.8	3.8	60	-46.10	-0.0241

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
810	1909.8	4.2	-30	-19.76	-0.0103
810	1909.8	4.2	-20	-32.67	-0.0171
810	1909.8	4.2	-10	-29.12	-0.0152
810	1909.8	4.2	0	-32.74	-0.0171
810	1909.8	4.2	10	-48.11	-0.0252
810	1909.8	4.2	20	-68.45	-0.0358
810	1909.8	4.2	30	-42.62	-0.0223
810	1909.8	4.2	40	-46.30	-0.0242
810	1909.8	4.2	50	-33.90	-0.0178
810	1909.8	4.2	60	-44.55	-0.0233

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APPENDIX 4 – RADIATED EMMISIONS TEST DATA

RTS RIM Testing Services		EMI Test Report for the BlackBerry® smartphone Model RBR41GW	
Test Report No. RTS-0655-0707-31-Rev1		Dates of Test July 13 to 26, 2007	Author Data C. O'Neill

EDGE Mode

Test distance is 3.0 metres

Date of test: July 24, 2007

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method					
								Tracking Generator					
Type	Ch	Frequency	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Dipole)		Limit (dBm)	Diff. To Limit (dB)
		(MHz)									(dBm)		
GSM850 Band (ERP)													
Handheld Standalone, USB down													
F0	128	824.20	850	Dipole	V	74.45	85.11	V-V	12.86	26.63	0.460	38.50	-11.87
F0	128	824.20	850	Dipole	H	85.11		H-H	9.44				
F0	195	837.60	850	Dipole	V	73.95	84.38	V-V	11.40	24.96	0.313	38.50	-13.54
F0	195	837.60	850	Dipole	H	84.38		H-H	9.82				
F0	251	848.80	850	Dipole	V	73.47	84.71	V-V	10.58	23.95	0.248	38.50	-14.55
F0	251	848.80	850	Dipole	H	84.71		H-H	10.10				

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Test Report No. RTS-0655-0707-31-Rev1	Dates of Test July 13 to 26, 2007	Author Data C. O'Neill

Radiated Emissions Test Data Results cont'd

GSM Mode

The environmental test conditions were:

Temperature	25°C
Pressure	1001 mb
Relative Humidity	32%

The Spurious Emission measurements were performed in GSM 850 Tx mode, channel 195, 837.6 MHz.

Date of Test: July 14, 2007

Test Distance was 3.0 metres with a EUT height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone was in standalone, vertical position.

Frequency (MHz)	Antenna		Test Angle (Deg.)	Detector (PK or AVE)	Measured Level (dBµV)	Correction Factor for preamp/antenna/ cables/ filter (dB/m)	Field Strength Level (reading+corr) (dBµV/m)	Limit @ 3.0 m (dB)	Test Margin (dB)
	Pol. (V/H)	Height (metres)							
-	-	-	-	-	-	-	-	-	-

All emissions had a test margin greater than 25.0 dB.

RTS RIM Testing Services		EMI Test Report for the BlackBerry® smartphone Model RBR41GW	
Test Report No. RTS-0655-0707-31-Rev1		Dates of Test July 13 to 26, 2007	Author Data C. O'Neill

Radiated Emissions Test Data Results cont'd

Test distance is 3.0 metres. Harmonics were measured up to 9 GHz.

Date of test: July 13, 2007

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method				
								Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to dipole)	Limit (dBm)	Diff to Limit (dB)
GSM850 Band (Harmonics) BlackBerry® smartphone Standalone, Horizontal												
<u>Low Channel</u> – 824.2 MHz												
2nd	128	1648.40	850	Horn	V	51.15	56.79	V-V	-6.14	-42.81	-13	-29.8
2nd	128	1648.40	850	Horn	H	56.79		H-H	-7.58			
3rd	128	2472.60	850	Horn	V	44.14	48.38	V-V	-4.04	-41.54	-13	-28.5
3rd	128	2472.60	850	Horn	H	48.38		H-H	-7.26			
The emissions were investigated up to the 10 th harmonic. Emissions above the 3 rd harmonic were in the noise floor (NF).												
<u>Mid Channel</u> – 837.6 MHz												
2nd	195	1675.20	850	Horn	V	55.49	57.31	V-V	-5.48	-42.28	-13	-29.3
2nd	195	1675.20	850	Horn	H	57.31		H-H	-6.80			
3rd	195	2512.80	850	Horn	V	48.20	50.38	V-V	-0.74	-38.34	-13	-25.3
3rd	195	2512.80	850	Horn	H	50.38		H-H	-3.76			
The emissions were investigated up to the 10 th harmonic. Emissions above the 3 rd harmonic were in the NF.												
<u>High Channel</u> – 848.8 MHz												
2nd	251	1697.60	850	Horn	V	55.07	57.41	V-V	-5.42	-42.28	-13	-29.9
2nd	251	1697.60	850	Horn	H	57.41		H-H	-6.54			
3rd	251	2546.40	850	Horn	V	46.92	50.12	V-V	-1.06	-38.59	-13	-25.6
3rd	251	2546.40	850	Horn	H	50.12		H-H	-4.42			
The emissions were investigated up to the 10 th harmonic. Emissions above the 3 rd harmonic were in the NF.												

RTS RIM Testing Services	EMI Test Report for the BlackBerry® smartphone Model RBR41GW		
Test Report No. RTS-0655-0707-31-Rev1	Dates of Test July 13 to 26, 2007	Author Data C. O'Neill	

Radiated Emissions Test Data Results cont'd

GPRS Mode

Test distance is 3.0 metres.

Date of test: July 13, 2007

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method				
								Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to dipole)	Limit (dBm)	Diff to Limit (dB)
GSM850 Band (Harmonics) BlackBerry® smartphone Standalone, Horizontal												
Low Channel – 824.2 MHz												
2nd	128	1648.40	850	Horn	V	52.94	58.49	V-V	-4.18	-40.85	-13	-27.9
2nd	128	1648.40	850	Horn	H	58.49		H-H	-5.38			
3rd	128	2472.60	850	Horn	V	47.49	50.45	V-V	-1.68	-39.18	-13	-26.2
3rd	128	2472.60	850	Horn	H	50.45		H-H	-4.62			
The emissions were investigated up to the 10 th harmonic. Emissions above the 3 rd harmonic were in the NF												
Mid Channel – 837.6 MHz												
2nd	195	1675.20	850	Horn	V	52.38	57.02	V-V	-5.94	-42.74	-13	-29.7
2nd	195	1675.20	850	Horn	H	57.02		H-H	-6.86			
3rd	195	2512.80	850	Horn	V	48.00	50.91	V-V	0.20	-37.40	-13	-24.4
3rd	195	2512.80	850	Horn	H	50.91		H-H	-2.98			
The emissions were investigated up to the 10 th harmonic. Emissions above the 3 rd harmonic were in the NF.												
High Channel – 848.8 MHz												
2nd	251	1697.60	850	Horn	V	53.74	58.76	V-V	-3.98	-40.84	-13	-27.8
2nd	251	1697.60	850	Horn	H	58.76		H-H	-4.90			
3rd	251	2546.40	850	Horn	V	46.65	49.34	V-V	-1.84	-39.37	-13	-26.4
3rd	251	2546.40	850	Horn	H	49.34		H-H	-5.44			
The emissions were investigated up to the 10 th harmonic. Emissions above the 3 rd harmonic were in the NF.												

RTS RIM Testing Services	EMI Test Report for the BlackBerry® smartphone Model RBR41GW	
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Radiated Emissions Test Data Results cont'd

EDGE Mode

The environmental test conditions were:

Temperature	25°C
Pressure	1001 mb
Relative Humidity	32%

The Spurious Emissions measurements were performed in GSM 850 EDGE Tx mode, channel 195, 837.6 MHz.

Date of Test: July 14, 2007

Test Distance was 3.0 metres with a EUT height of 1.0 metres, 30 MHz to 1000 MHz. The BlackBerry® smartphone was in standalone, vertical position.

Frequency (MHz)	Antenna		Test Angle (Deg.)	Detector (PK or AVE)	Measured Level (dBµV)	Correction Factor for preamp/antenna/ cables/ filter (dB/m)	Field Strength Level (reading+corr) (dBµV/m)	Limit @ 3.0 m (dB)	Test Margin (dB)
	Pol. (V/H)	Height (metres)							
-	-	-	-	-	-	-	-	-	-

All emissions had a test margin greater than 25.0 dB.

RTS RIM Testing Services		EMI Test Report for the BlackBerry® smartphone Model RBR41GW	
Test Report No. RTS-0655-0707-31-Rev1		Dates of Test July 13 to 26, 2007	Author Data C. O'Neill

Radiated Emissions Test Data Results cont'd

Test distance is 3.0 metres.

Date of test: July 13, 2007

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method				
								Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to dipole)	Limit (dBm)	Diff to Limit (dB)
GSM850 Band (Harmonics) BlackBerry® smartphone Standalone, Horizontal												
Low Channel – 824.2 MHz												
2nd	128	1648.40	850	Horn	V	54.16	57.97	V-V	-4.96	-41.63	-13	-28.6
2nd	128	1648.40	850	Horn	H	57.97		H-H	-5.84			
3rd	128	2472.60	850	Horn	V	45.46	47.74	V-V	-4.64	-42.14	-13	-29.1
3rd	128	2472.60	850	Horn	H	47.74		H-H	-8.16			
The emissions were investigated up to the 10 th harmonic. Emissions above the 3 rd harmonic were in the NF												
Mid Channel – 837.6 MHz												
2nd	195	1675.20	850	Horn	V	51.20	53.91	V-V	-9.04	-45.84	-13	-32.8
2nd	195	1675.20	850	Horn	H	53.91		H-H	-10.46			
3rd	195	2512.80	850	Horn	V	43.65	46.34	V-V	-4.88	-42.48	-13	-29.5
3rd	195	2512.80	850	Horn	H	46.34		H-H	-9.60			
The emissions were investigated up to the 10 th harmonic. Emissions above the 3 rd harmonic were in the NF.												
High Channel – 848.8 MHz												
2nd	251	1697.60	850	Horn	V	52.05	55.51	V-V	-7.20	-43.73	-13	-30.7
2nd	251	1697.60	850	Horn	H	55.51		H-H	-6.87			
3rd	251	2546.40	850	Horn	V	42.11	46.17	V-V	-5.50	-43.03	-13	-30.0
3rd	251	2546.40	850	Horn	H	46.17		H-H	-6.48			
The emissions were investigated up to the 10 th harmonic. Emissions above the 3 rd harmonic were in the NF.												

RTS RIM Testing Services		EMI Test Report for the BlackBerry® smartphone Model RBR41GW	
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Radiated Emissions Test Data Results cont'd

Test distance is 3.0 metres.

Date of test: July 13, 2007

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method				
								Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to dipole)	Limit (dBm)	Diff to Limit (dB)
GSM BAND												
RF Local Oscillator (LO₁) BlackBerry® smartphone Standalone, USB up												
<u>Low Channel (824.2 MHz)</u>												
F0	128	3296.8	850	Horn	V	NF	N/A	V-V	N/A	N/A	-	N/A
F0	128	3296.8	850	Horn	H	NF						
Emissions were in the NF.												
<u>High Channel (848.8 MHz)</u>												
F0	251	3395.2	850	Horn	V	NF	N/A	V-V	N/A	N/A	-	N/A
F0	251	3395.2	850	Horn	H	NF						
Emissions were in the NF.												
RF LO₂												
<u>Low Channel (824.2 MHz)</u>												
F0	128	3476.80	850	Horn	V	NF	N/A	V-V	N/A	N/A	-	N/A
F0	128	3476.80	850	Horn	H	NF						
Emissions were in the NF.												
<u>High Channel (848.8 MHz)</u>												
F0	251	3575.20	850	Horn	V	NF	N/A	V-V	N/A	N/A	-	N/A
F0	251	3575.20	850	Horn	H	NF						
Emissions were in the NF.												

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Radiated Emissions Test Data Results cont'd

PCS Band

Test Distance was 3.0 metres.

Date of test: July 24, 2007

								Substitution Method					
EUT				Receive Antenna		Spectrum Analyzer		Tracking Generator					
										Corrected Reading (relative to Isotropic Radiator)			
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) dBuV	Pol. Tx-Rx	Reading (dBm)			Limit (dBm)	Diff to Limit (dB)
										(dBm)	(W)		
PCS BAND (EIRP)													
BlackBerry® smartphone Standalone, USB down													
F0	512	1850.20	1900	Horn	V	87.50	90.24	V-V	-8.96	27.34	0.542	33	-5.66
F0	512	1850.20	1900	Horn	H	90.24		H-H	-7.56				
F0	661	1880.00	1900	Horn	V	87.14	89.75	V-V	-8.24	27.62	0.578	33	-5.38
F0	661	1880.00	1900	Horn	H	89.75		H-H	-6.88				
F0	810	1909.80	1900	Horn	V	87.71	89.68	V-V	-7.76	27.46	0.557	33	-5.54
F0	810	1909.80	1900	Horn	H	89.68		H-H	-6.74				

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EDGE Mode

Test Distance was 3.0 metres.

Date of test: July 24, 2007

								Substitution Method					
EUT				Receive Antenna		Spectrum Analyzer		Tracking Generator					
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)		
PCS BAND (EIRP)													
Handheld Standalone, USB down													
F0	512	1850.20	1900	Horn	V	84.64	87.85	V-V	-11.48	24.78	0.301	33	-8.22
F0	512	1850.20	1900	Horn	H	87.85		H-H	-10.12				
F0	661	1880.00	1900	Horn	V	85.24	87.39	V-V	-10.5	25.3	0.339	33	-7.7
F0	661	1880.00	1900	Horn	H	87.39		H-H	-9.2				
F0	810	1909.80	1900	Horn	V	85.07	87.66	V-V	-9.82	25.52	0.356	33	-7.48
F0	810	1909.80	1900	Horn	H	87.66		H-H	-8.68				

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Radiated Emissions Test Data Results cont'd

GSM Mode

The environmental test conditions were:

Temperature	24°C
Pressure	1001 mb
Relative Humidity	33%

The Spurious Emission measurements were performed in PCS Tx mode, channel 661, 1880.0 MHz.

Date of Test: July 14, 2007

Test Distance was 3.0 metres with a EUT height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone was in standalone, vertical position.

Frequency (MHz)	Antenna		Test Angle (Deg.)	Detector (PK or AVE)	Measured Level (dBµV)	Correction Factor for preamp/antenna/ cables/ filter (dB/m)	Field Strength Level (reading+corr) (dBµV/m)	Limit @ 3.0 m (dB)	Test Margin (dB)
	Pol. (V/H)	Height (metres)							
-	-	-	-	-	-	-	-	-	-

All emissions had a test margin greater than 25.0 dB.

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Radiated Emissions Test Data Results cont'd

Test Distance was 3.0 metres. Harmonics were measured up to 19 GHz.

Date of test: July 13, 2007

								Substitution Method				
EUT				Receive Antenna		Spectrum Analyzer		Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Pol. Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Isotropic Radiator) (dBm)	Limit (dBm)	Diff to Limit (dB)
PCS BAND (Harmonics) BlackBerry® smartphone Standalone, USB down												
Low Channel 1850.2 MHz												
2 nd	512	3700.40	1900	Horn	V	42.46	42.46	V-V	-4.66	-40.73	-13	-27.73
2 nd	512	3700.40	1900	Horn	H	42.03		H-H	-4.68			
3 rd	512	5550.60	1900	Horn	V	NF	NF	V-V	-	-	-	-
3 rd	512	5550.60	1900	Horn	H	NF		H-H	-			
The emissions were investigated up to the 10th harmonic. Emissions above the 2 nd harmonic were in the NF												
Middle Channel 1880.0 MHz												
2 nd	661	3760.00	1900	Horn	V	40.85	40.87	V-V	-2.98	-39.08	-13	-26.08
2 nd	661	3760.00	1900	Horn	H	40.87		H-H	-3.10			
3 rd	661	5640.00	1900	Horn	V	NF	NF	V-V	-	-	-	-
3 rd	661	5640.00	1900	Horn	H	NF		H-H	-			
The emissions were investigated up to the 10th harmonic. Emissions above the 2 nd harmonic were in the NF												
High Channel 1909.8 MHz												
2 nd	810	3819.60	1900	Horn	V	40.41	40.41	V-V	-6.80	-42.93	-13	-29.93
2 nd	810	3819.60	1900	Horn	H	39.70		H-H	-7.32			
3 rd	810	5729.40	1900	Horn	V	NF	NF	V-V	-	-	-	-
3 rd	810	5729.40	1900	Horn	H	NF		H-H	-			
The emissions were investigated up to the 10th harmonic. Emissions above the 2 nd harmonic were in the NF												

RTS RIM Testing Services	EMI Test Report for the BlackBerry® smartphone Model RBR41GW		
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Radiated Emissions Test Data Results cont'd

GPRS Mode

Test Distance was 3.0 metres.

Date of test: July 13, 2007

								Substitution Method				
EUT				Receive Antenna		Spectrum Analyzer		Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Pol. Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Isotropic Radiator) (dBm)	Limit (dBm)	Diff to Limit (dB)
PCS BAND (Harmonics) BlackBerry® smartphone Standalone, USB up												
Low Channel 1850.2 MHz												
2 nd	512	3700.40	1900	Horn	V	42.37	42.37	V-V	-4.94	-40.83	-13	-27.83
2 nd	512	3700.40	1900	Horn	H	41.48		H-H	-4.76			
3 rd	512	5550.60	1900	Horn	V	NF	NF	V-V	-	-	-	-
3 rd	512	5550.60	1900	Horn	H	NF		H-H	-			
The emissions were investigated up to the 10th harmonic. Emissions above the 2 nd harmonic were in the NF												
Middle Channel 1880.0 MHz												
2 nd	661	3760.00	1900	Horn	V	40.87	40.87	V-V	-2.98	-39.08	-13	-26.08
2 nd	661	3760.00	1900	Horn	H	40.57		H-H	-3.44			
3 rd	661	5640.00	1900	Horn	V	NF	NF	V-V	-	-	-	-
3 rd	661	5640.00	1900	Horn	H	NF		H-H	-			
The emissions were investigated up to the 10th harmonic. Emissions above the 2 nd harmonic were in the NF												
High Channel 1909.8 MHz												
2 nd	810	3819.60	1900	Horn	V	40.67	40.67	V-V	-6.60	-42.73	-13	-29.73
2 nd	810	3819.60	1900	Horn	H	40.17		H-H	-7.00			
3 rd	810	5729.40	1900	Horn	V	NF	NF	V-V	-	-	-	-
3 rd	810	5729.40	1900	Horn	H	NF		H-H	-			
The emissions were investigated up to the 10th harmonic. Emissions above the 2 nd harmonic were in the NF												

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Radiated Emissions Test Data Results cont'd

EDGE Mode

The environmental test conditions were:

Temperature	24°C
Pressure	1001 mb
Relative Humidity	32%

The Spurious Emission measurements were performed in PCS EDGE Tx mode, channel 661, 1880.0 MHz.

Date of Test: July 14, 2007

Test Distance was 3.0 metres with a EUT height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone was in standalone, vertical position.

Frequency (MHz)	Antenna		Test Angle (Deg.)	Detector (PK or AVE)	Measured Level (dBµV)	Correction Factor for preamp/antenna/ cables/ filter (dB/m)	Field Strength Level (reading+corr) (dBµV/m)	Limit @ 3.0 m (dB)	Test Margin (dB)
	Pol. (V/H)	Height (metres)							
-	-	-	-	-	-	-	-	-	-

All emissions had a test margin greater than 25.0 dB.

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Radiated Emissions Test Data Results cont'd

Test Distance was 3.0 metres.

Date of test: July 13, 2007

								Substitution Method				
EUT				Receive Antenna		Spectrum Analyzer		Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Pol. Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Isotropic Radiator) (dBm)	Limit (dBm)	Diff to Limit (dB)
PCS BAND (Harmonics) BlackBerry® smartphone Standalone, USB up												
Low Channel 1850.2 MHz												
2 nd	512	3700.40	1900	Horn	V	41.12	41.12	V-V	-6.46	-42.53	-13	-29.53
2 nd	512	3700.40	1900	Horn	H	40.39		H-H	-6.58			
3 rd	512	5550.60	1900	Horn	V	NF	NF	V-V	-	-	-	-
3 rd	512	5550.60	1900	Horn	H	NF		H-H	-			
The emissions were investigated up to the 10th harmonic. Emissions above the 2 nd harmonic were in the NF												
Middle Channel 1880.0 MHz												
2 nd	661	3760.00	1900	Horn	V	40.55	40.55	V-V	-3.78	-39.88	-13	-26.88
2 nd	661	3760.00	1900	Horn	H	40.19		H-H	-4.00			
3 rd	661	5640.00	1900	Horn	V	NF	NF	V-V	-	-	-	-
3 rd	661	5640.00	1900	Horn	H	NF		H-H	-			
The emissions were investigated up to the 10th harmonic. Emissions above the 2 nd harmonic were in the NF												
High Channel 1909.8 MHz												
2 nd	810	3819.60	1900	Horn	V	39.55	39.55	V-V	-8.08	-44.21	-13	-31.21
2 nd	810	3819.60	1900	Horn	H	39.25		H-H	-8.70			
3 rd	810	5729.40	1900	Horn	V	NF	NF	V-V	-	-	-	-
3 rd	810	5729.40	1900	Horn	H	NF		H-H	-			
The emissions were investigated up to the 10th harmonic. Emissions above the 2 nd harmonic were in the NF												

RTS RIM Testing Services		EMI Test Report for the BlackBerry® smartphone Model RBR41GW	
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Radiated Emissions Test Data Results cont'd

Test Distance was 3.0 metres.

Date of test: July 13, 2007

The measurements were performed in transmit mode with the BlackBerry® smartphone in standalone position.

EUT				Rx Antenna		Spectrum Analyzer			Substitution Method				
									Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Corrected Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx- Rx	Reading (dBm)	Corrected Reading (relative to Isotropic Radiator) (dBm)	Limit (dBm)	Diff to Limit (dB)
RF LO ₁ . BlackBerry® smartphone Standalone, Horizontal													
Low Channel													
F0	512	3700.4	1900	Horn	V	NF	N/A	N/A	V-V	N/A	N/A	-	N/A
F0	512	3700.4	1900	Horn	H	NF							
Emissions were in the NF.													
High Channel													
F0	810	3819.6	1900	Horn	V	NF	N/A	N/A	V-V	N/A	N/A	-	N/A
F0	810	3819.6	1900	Horn	H	NF							
Emissions were in the NF.													
RF LO ₂													
Low Channel													
F0	512	3860.4	1900	Horn	V	NF	NF	N/A	V-V	N/A	N/A	-	N/A
F0	512	3860.4	1900	Horn	H	NF							
Emissions were in the NF.													
High Channel													
F0	810	3979.6	1900	Horn	V	NF	NF	N/A	V-V	N/A	N/A	-	N/A
F0	810	3979.6	1900	Horn	H	NF							
Emissions were in the NF.													