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 and 133

RIM Testing Services (RTS)

A division of Research In Motion Limited

REPORT NO: RTS-1114-0806-08

PRODUCT MODEL NO:	RBY41GW
TYPE NAME:	BlackBerry® smartphone
FCC ID:	L6ARBY40GW
IC:	2503A-RBY40GW
EMISSION DESIGNATOR (GSM):	247KG7W
EMISSION DESIGNATOR (EDGE):	247KGXW

DATE: 30 July 2008

Statement of Performance:

The BlackBerry® smartphone, model RBY41GW, part number CER-18134-001 Rev. 6 and accessories when configured and operated per RIM's operation instructions, perform within the requirements of the test standards.

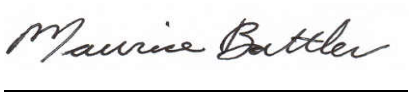
Declaration:

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:

Jean-Paul Hacquoil
Compliance Specialist
Date: 30 July, 2008

Reviewed by:



Maurice Battler
Compliance Specialist
Date:31 July 2008

Reviewed by:

Masud S. Attayi, P.Eng.
Team Lead, Regulatory Compliance
Date: 31 July 2008

Approved by:

Paul G. Cardinal, Ph.D.
Director
Date: 31 July 2008

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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 4, February 2008, 2 GHz Personal Communications Services.

B. Associated Documents

1. Document number RTS-1114-RBY41GW-02
2. Document number RTS-1114-RBY41GW-03
3. Document number RTS-1114-RBY41GW-04

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 RIM Testing Services (RTS) EMI test facilities, located at:

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 June 11 to July 28, 2008.

The sample EUT included:

SAMPLE	MODEL	CER NUMBER	PIN
1	RBY41GW	CER-18134-001 Rev. 3	2073EB6F
2	RBY41GW	CER-18134-001 Rev. 3	20746583
3	RBY41GW	CER-18134-001 Rev. 4	20746434
4	RBY41GW	CER-18134-001 Rev. 5	2074CABB
5	RBY41GW	CER-18134-001 Rev. 5	20750FEA
6	RBY41GW	CER-18134-001 Rev. 6	207461F5

To view the differences between CER-18134-001 Rev. 3 to CER-18134-001 Rev. 4, see document number RTS-1114-RBY41GW-02.
To view the differences between CER-18134-001 Rev. 4 to CER-18134-001 Rev. 5, see document number RTS-1114-RBY41GW-03.
To view the differences between CER-18134-001 Rev. 5 to CER-18134-001 Rev. 6, see document number RTS-1114-RBY41GW-04.

Only the measurements that may have been impacted by the changes from Rev 3 to Rev 6 were re-measured.

Conducted RF measurements were performed on BlackBerry® smartphone sample 3. Radiated Emission measurements were performed on BlackBerry® smartphone samples 1, 2, 4, 5 and 6.

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

E. Test Voltage

The ac input voltage was 120 volts, 60 Hz where applicable. This configuration was per RIM's specifications.

F. Modifications to EUT

No modifications were required on the EUT.

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-132	Conducted Spurious Emissions	Pass	1
Part 2.1051 Part 24.238(a)	RSS-133	Conducted Spurious Emissions	Pass	1
Part 2.202 Part 22.917	RSS-132	Occupied Bandwidth and Channel Mask	Pass	1
Part 2.202 Part 24.238	RSS-133	Occupied Bandwidth and Channel Mask	Pass	1
Part 2.1046(a)	RSS-133 RSS-132	Conducted RF Output Power	Pass	2
Part 2.1055(a)(d) Part 22.917	RSS-132	Frequency Stability vs. Temperature and Voltage	Pass	3
Part 2.1055(a)(d) Part 24.235	RSS-133	Frequency Stability vs. Temperature and Voltage	Pass	3
Part 22, Subpart H	RSS-132	Radiated Spurious/Harmonic Emissions, ERP, LO	Pass	4
Part 24, Subpart E	RSS-133	Radiated Spurious/Harmonic Emissions, EIRP, LO	Pass	4

1) The EUT met the requirements of the Tx Conducted Spurious Emissions requirements in the GSM850 as per 47 CFR 2.1051, CFR 22.917, CFR 22.901(d) and RSS-132. 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 as per 47 CFR 2.1051, CFR 24.238(a) and RSS-133. The EUT was 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 as per 47 CFR 2.202, CFR 22.917 and RSS-132. 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 as per 47 CFR 2.202, CFR 24.238 and RSS-133. 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 the GSM850 and PCS1900 as per 47 CFR 2.1046(a). 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 as per 47 CFR 2.1055(a), 2.1055(d), CFR 22.917 and RSS-132. 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 (3.7 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.

7) The EUT met the requirements of the Frequency Stability vs. Temperature and Voltage requirements for the PCS1900 as per 47 CFR 2.1055(a), 2.1055(d), 24.235 and RSS-133. 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 (3.7 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 GSM850 and PCS1900. 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 polarizations 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 polarizations of the emissions were measured.

The measurements were done in a semi-anechoic chamber (SAC) below 1 GHz and a fully-anechoic room (FAR) above 1 GHz. The SAC's FCC registration number is **778487** and the Industry Canada (IC) file number is **2503B-1**. The FAR's FCC registration number is **959115** and the IC file number is **2503C-1**. The EUT was measured on the low, middle and high channels.

The ERP in the GSM850 band was measured on BlackBerry® smartphone, PIN 20750FEA. The highest ERP measured was 26.89 dBm (0.489 W) at 824.2 MHz (channel 128), GSM/GPRS mode.

The ERP in the GSM850 band was measured on BlackBerry® smartphone, PIN 20750FEA. The highest ERP measured was 27.07 dBm (0.509 W) at 824.2 MHz (channel 128), EDGE mode.

The EIRP in the PCS1900 band was measured on BlackBerry® smartphone, PIN 207461F5. The highest EIRP measured was 28.08 dBm (0.643 W) at 1850.2 MHz (channel 512), GSM/GPRS mode.

The EIRP in the PCS1900 band was measured on BlackBerry® smartphone, PIN 207461F5. The highest EIRP measured was 27.92 dBm (0.619 W) at 1909.8 MHz (channel 810), EDGE mode.

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. Both the horizontal and vertical polarizations were measured. The harmonic emissions above the 4th harmonic were in the noise floor (NF) for the GSM850 and PCS bands.

The worst test margin in the GSM850 band for GSM, GPRS and EDGE modes harmonic emissions measured was 16.74 dB below the limit at 3296.96 MHz.

The worst test margin in the PCS band for GSM, GPRS and EDGE modes harmonic emissions measured was 18.59 dB below the limit at 3579.97 MHz.

The EUT's RF local oscillator (LO) emissions were measured in the GSM850 band and PCS1900 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.

Co-Location Measurements

The radiated emissions were measured up to 18 GHz for middle channels for simultaneous transmission in the following test configuration combinations: GSM850, PCS1900, Bluetooth and 802.11b/g.

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:

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 ±4.6 dB

H. Compliance Test Equipment Used

UNIT	MANUFACTURER	MODEL	SERIAL NUMBER	CAL DUE DATE (YY MM DD)	USE
Preamplifier	Sonoma	310N/11909A	185831	08-11-21	Radiated Emissions
Preamplifier system	TDK RF Solutions	PA-02	080010	08-11-16	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA4-SP	001	09-06-03	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA-SP	001	09-02-29	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
Hybrid Log Antenna	TDK	HLP-3003C	017201	09-09-24	Radiated Emissions
Horn Antenna	ETS	3117	00047563	09-07-03	Radiated Emissions
Preamplifier	TDK	18-26	030002	08-11-20	Radiated Emissions
Dipole Antenna	Schwarzbeck	UHAP	973	08-12-18	Radiated Emissions
Dipole Antenna	Schwarzbeck	UHAP	974	08-09-28	Radiated Emissions
EMC Analyzer	Aglient	E7405A	US40240226	08-10-01	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	837493/073	08-12-06	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	112394	08-12-10	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	102204	09-12-06	RF Conducted Emissions
EMI Receiver	Rohde & Schwarz	ESIB-40	100255	08-09-24	Radiated Emissions
Spectrum Analyzer	HP	8563E	3745A08112	08-09-22	RF Conducted Emissions

Compliance Test Equipment Used cont'd

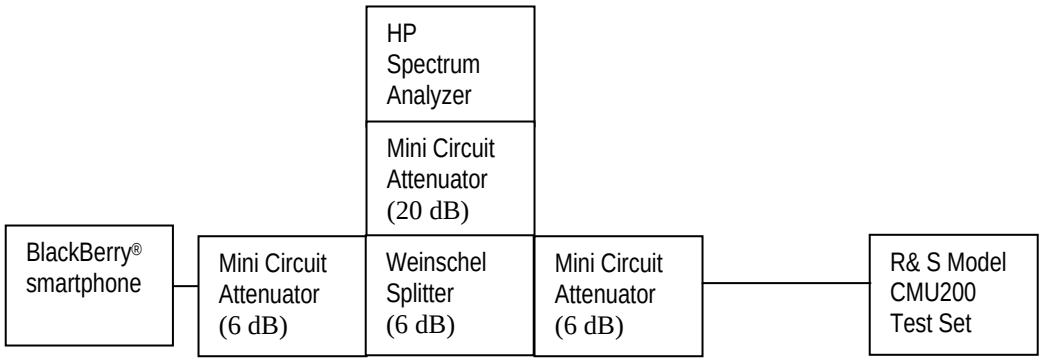
UNIT	MANUFACTURER	MODEL	SERIAL NUMBER	CAL DUE DATE (YY MM DD)	USE
DC Power Supply	HP	6632B	US37472178	08-09-24	RF Conducted Emissions
Environment Monitor	Control Company	1870	230355190	08-12-11	Radiated Emissions
Environment Monitor	Control Company	1870	230355189	08-12-11	RF Conducted Emissions
Temperature Probe	Hart Scientific	61161-302	21352860	08-08-14	Frequency Stability
Environmental Chamber	ESPEC Corp.	SH-240S1	91007118	N/R	Frequency Stability
Signal Generator	Agilent	8648C	4037U03155	09-09-20	Frequency Stability
Signal Generator	Agilent	E8257D	MY45140527	08-09-19	Radiated Emissions
Power Meter	Agilent	E4419B	GB40202821	08-09-19	Frequency Stability
Power Sensor	Agilent	8481A	MY41095417	08-09-19	Frequency Stability

APPENDIX 1 - CONDUCTED RF EMISSIONS TEST DATA/PLOTS

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 20746434.

Test Setup Diagram



The environmental test conditions were:

Temperature	23ºC
Pressure	1008 mb
Relative Humidity	34%

The measurements were performed by Maurice Battler.

Conducted RF Emission Test Data cont'd

The conducted spurious emissions – As per 47 CFR 2.1051, CFR 24.238(a), RSS-133, 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 1-1 to 1-12 for the plots of the conducted spurious emissions.

Date of Test: June 26, 2008

–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 275 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	272	243.3
837.6	263	243.3
848.8	275	243.3

1900 band Frequency (MHz)	-26dBc Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
1850.2	268	246.7
1880.0	273	243.3
1909.8	270	245.0

Measurement Plots for GSM850 and PCS1900 in GSM mode
Refer to the following measurement plots for more detail.
See Figures 1-13 to 1-24 for the plots of the –26dBc Bandwidth and 99% Occupied Bandwidth.
See Figures 1-25 to 1-28 for plots of the channel mask results.

The RF power output was at maximum for all the recorded measurements shown below.
Date of Test: June 26, 2008

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	246.7
837.6	241.7
848.8	246.7

1900 band Frequency (MHz)	99% Occupied Bandwidth (kHz)
1850.2	243.3
1880.0	246.7
1909.8	243.3

Measurement Plots for GSM850 band and PCS1900 band in EDGE mode
Refer to the following measurement plots for more detail.

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

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

Date of Test: June 26, 2008

Conducted RF Emission Test Data cont'd

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

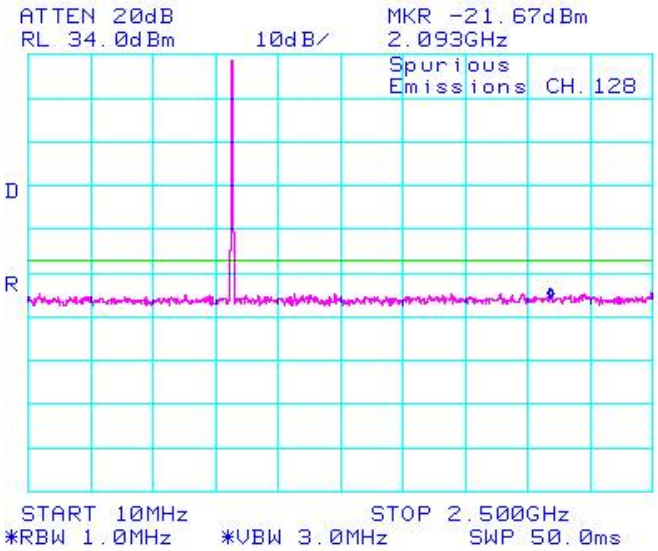


Figure 1-2: GSM850 band, Spurious Conducted Emissions, Low channel

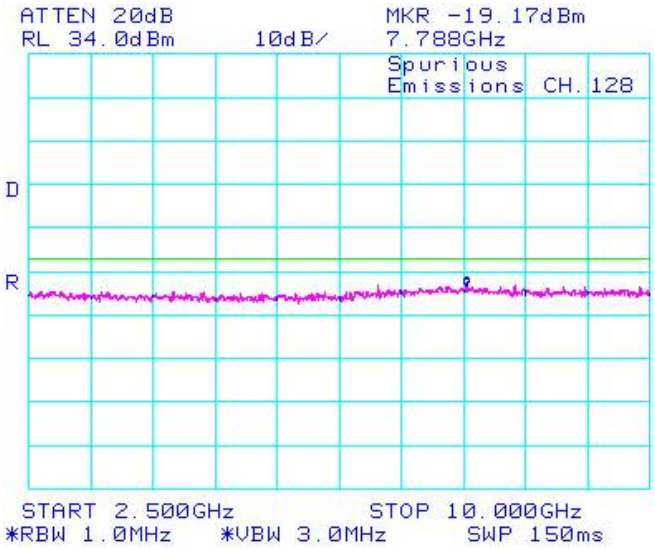


Figure 1-3: GSM850 band, Spurious Conducted Emissions, Middle Channel

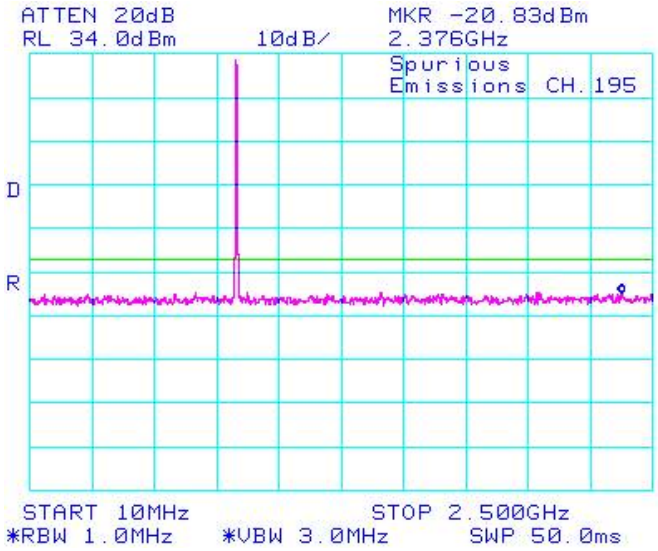
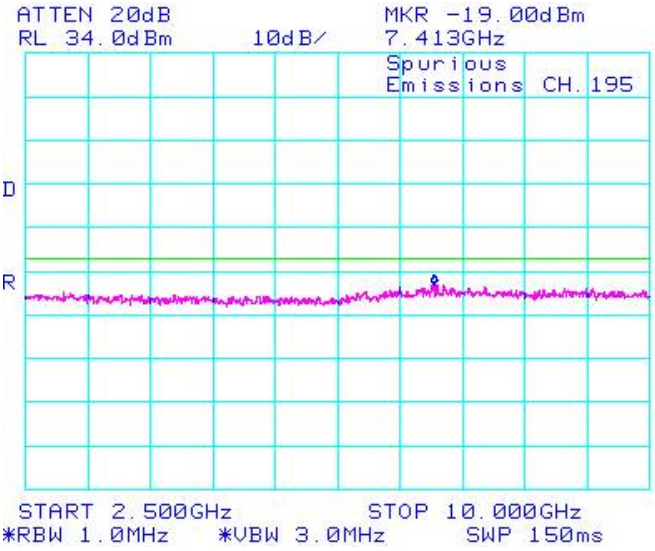


Figure 1-4: GSM850 band, Spurious Conducted Emissions, Middle Channel



Conducted RF Emission Test Data cont'd

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

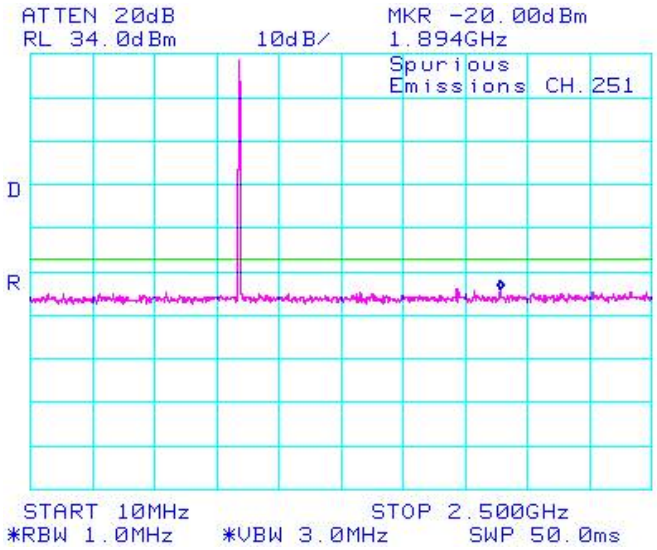


Figure 1-6: GSM850 band, Spurious Conducted Emissions, High Channel

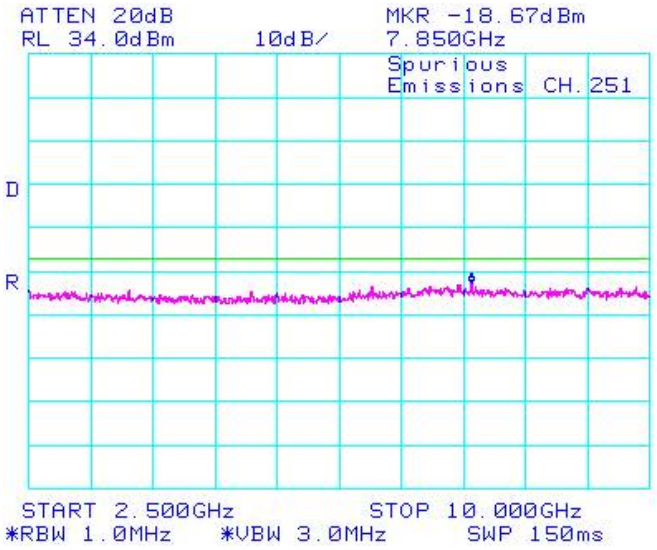


Figure 1-7: PCS1900 band, Spurious Conducted Emissions, Low Channel

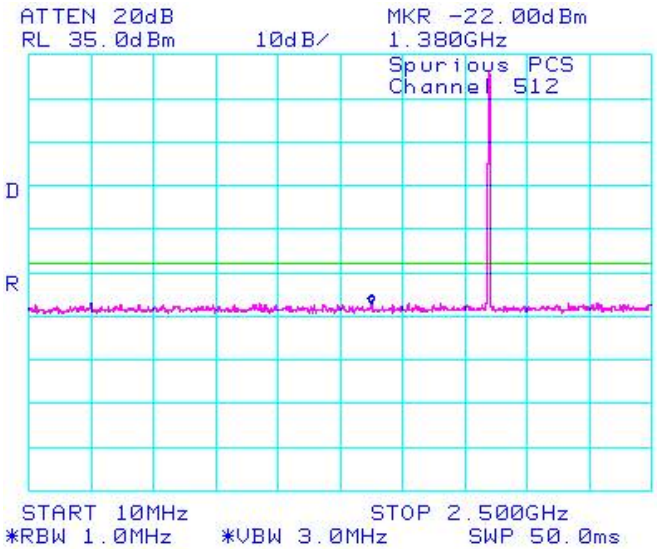
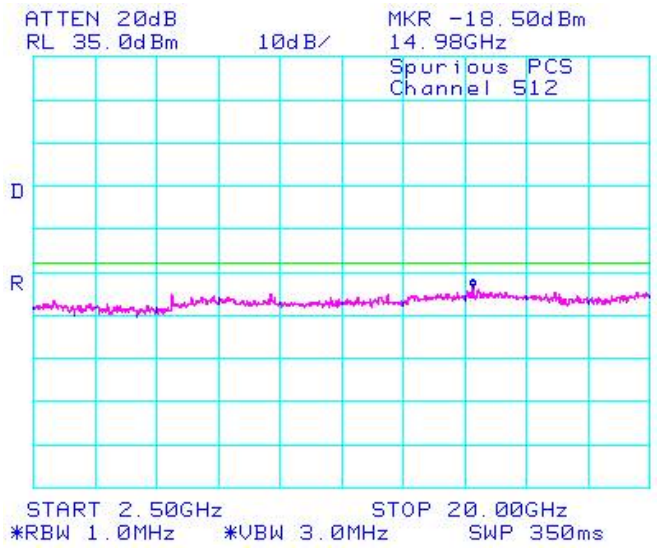


Figure 1-8: PCS1900 band, Spurious Conducted Emissions, Low Channel



Conducted RF Emission Test Data cont'd

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

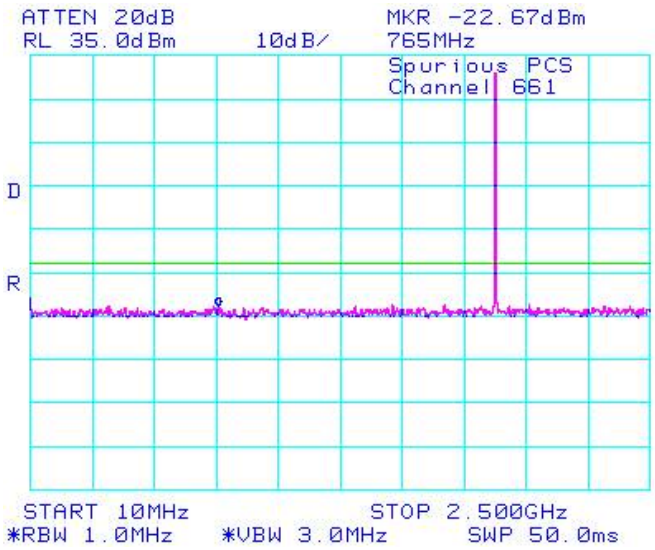


Figure 1-10: PCS1900 band, Spurious Conducted Emissions, Middle Channel

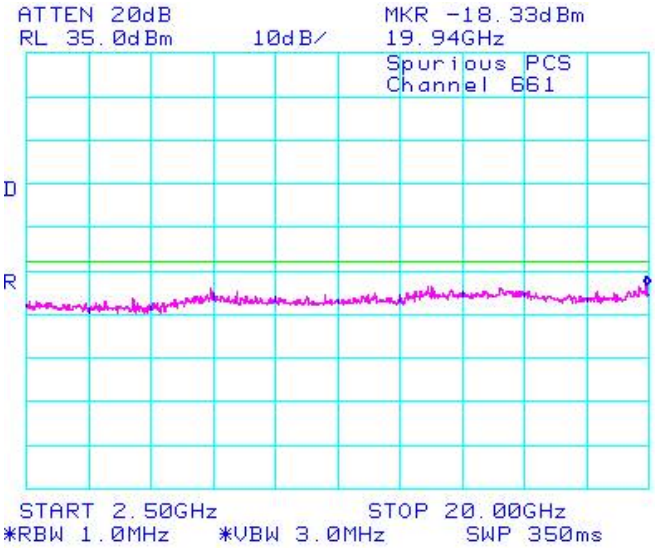


Figure 1-11: PCS1900 band, Spurious Conducted Emissions, High Channel

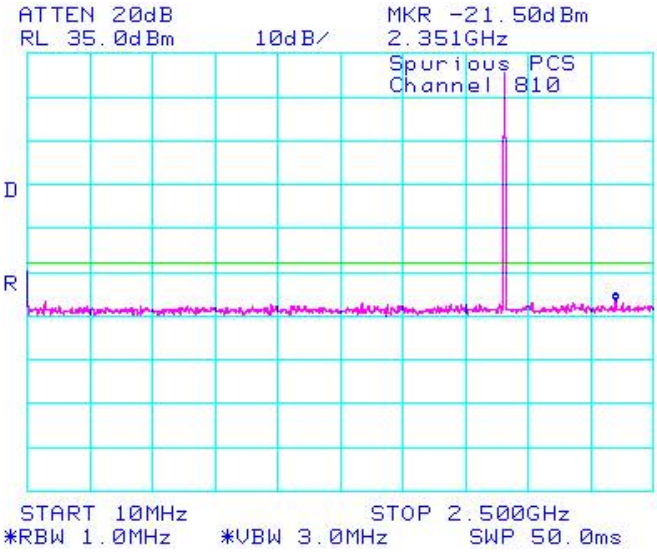
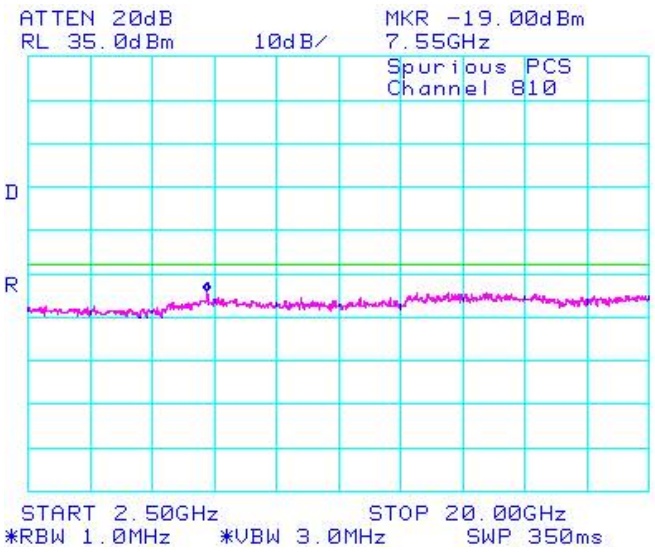


Figure 1-12: PCS1900 band, Spurious Conducted Emissions, High Channel



Conducted RF Emission Test Data cont'd

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

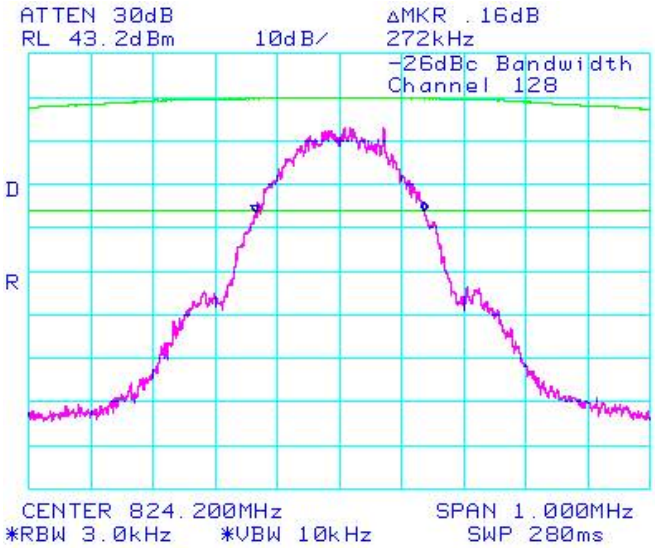


Figure 1-14: Occupied Bandwidth, GSM850 band Low Channel in GSM mode

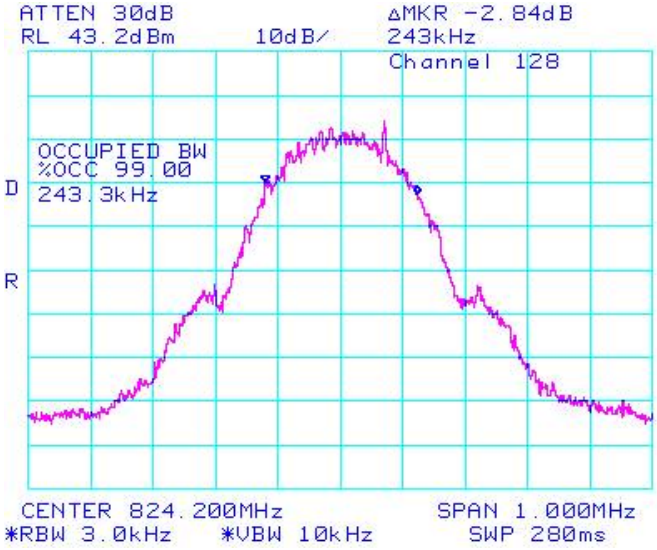


Figure 1-15: -26dBc bandwidth, GSM850 band Middle Channel in GSM mode

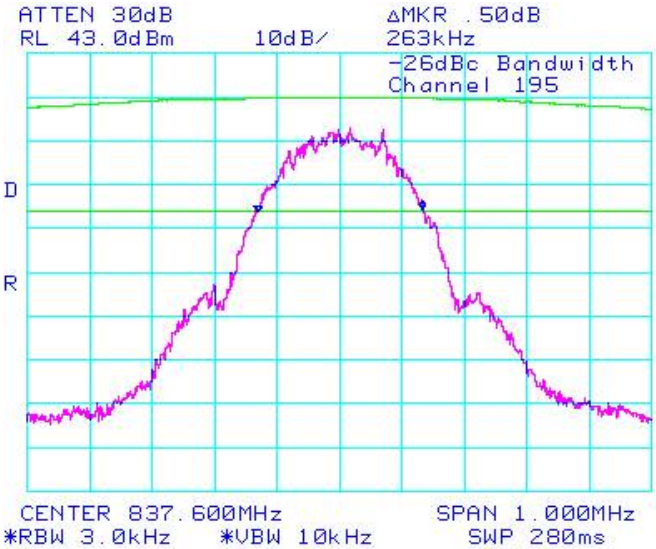
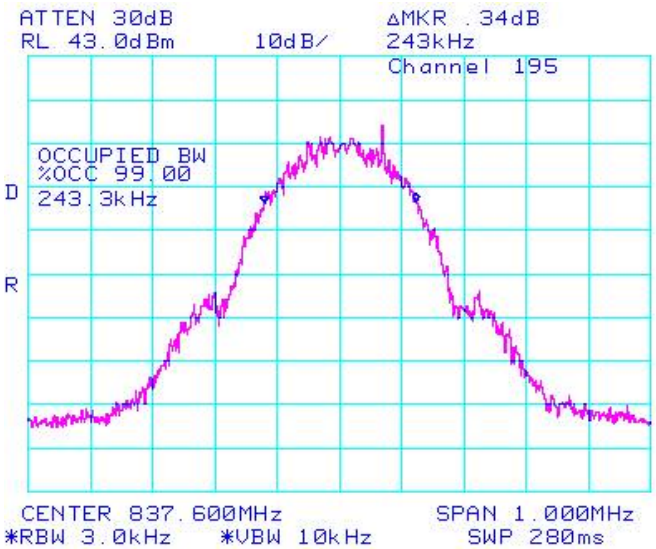


Figure 1-16: Occupied Bandwidth, GSM850 band Middle Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

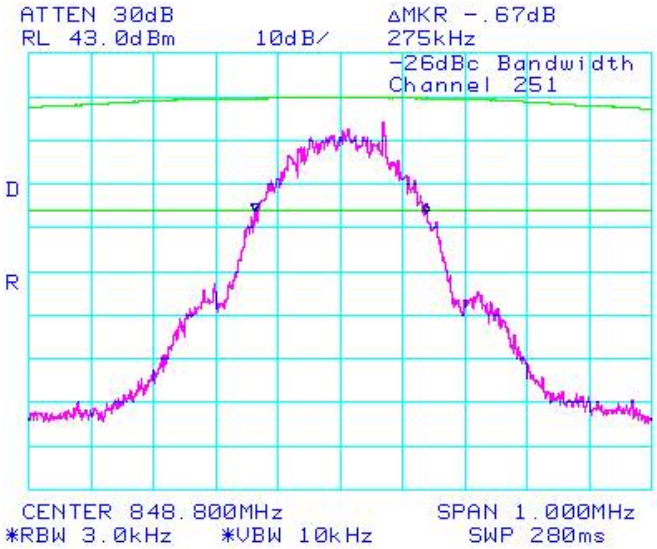


Figure 1-18: Occupied Bandwidth, GSM850 band High Channel in GSM mode

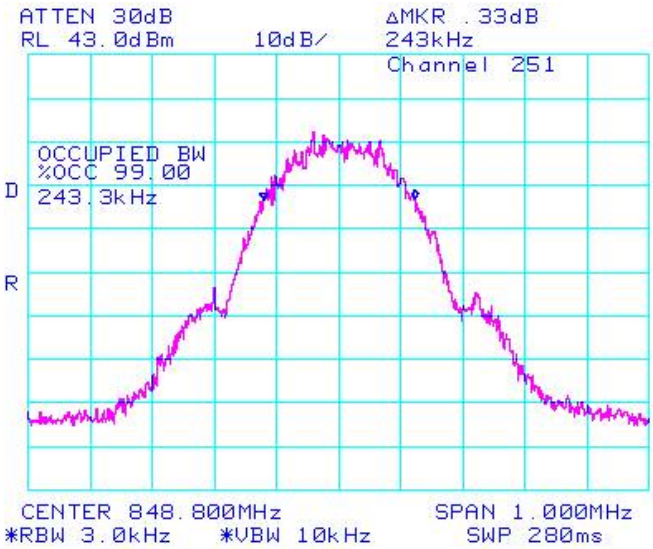


Figure 1-19: -26dBc bandwidth, PCS1900 Low Channel in GSM mode

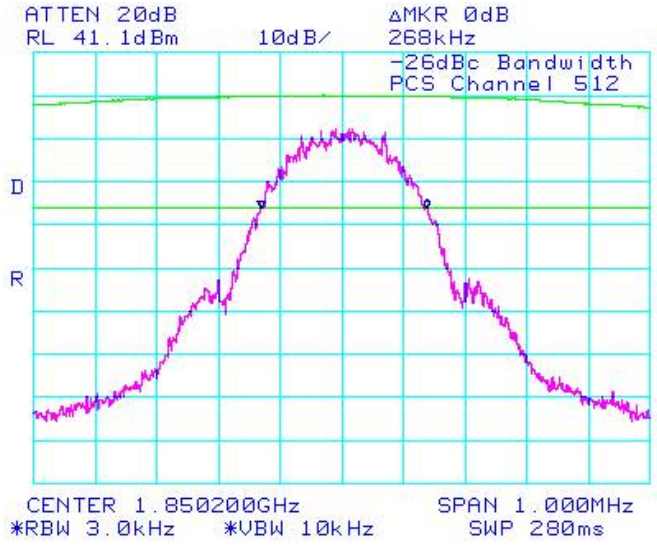
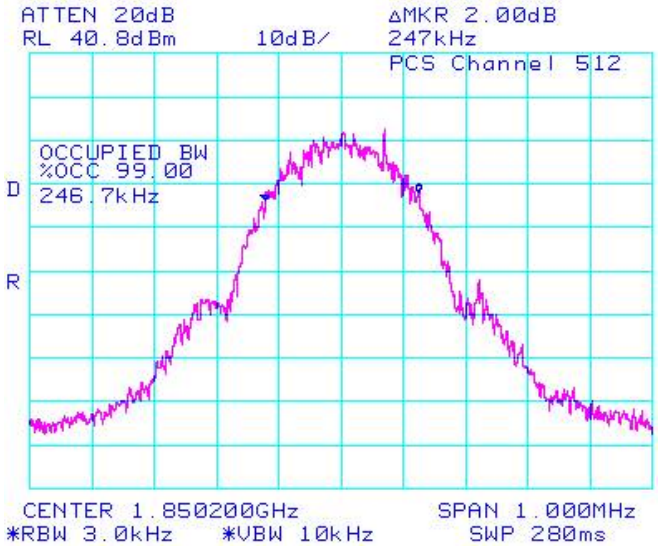


Figure 1-20: Occupied Bandwidth, PCS1900 Low Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

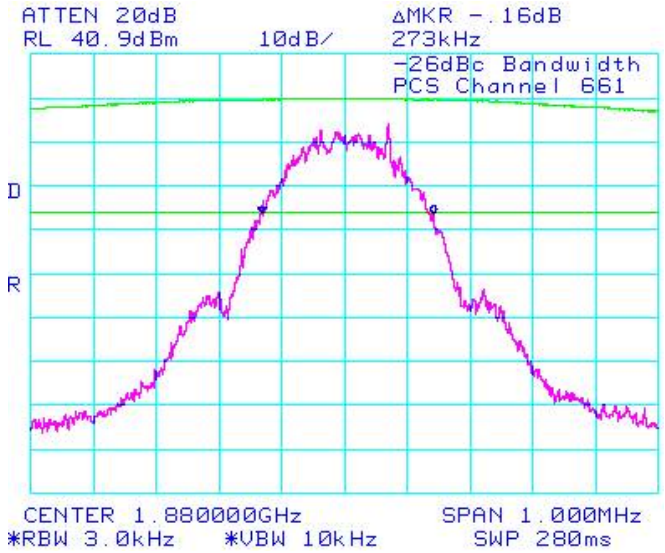


Figure 1-22: Occupied Bandwidth, PCS1900 Middle Channel in GSM mode

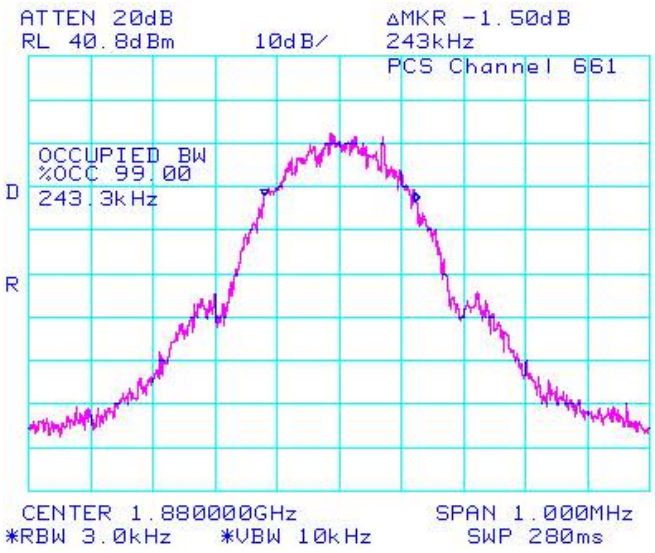


Figure 1-23: -26dBc bandwidth, PCS1900 High Channel in GSM mode

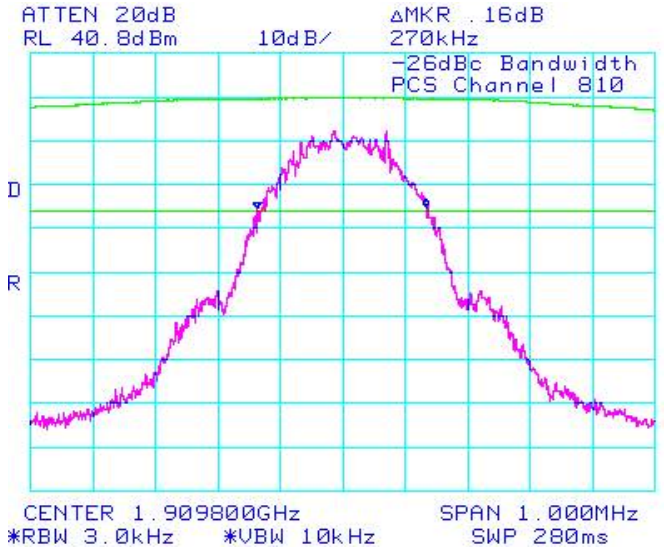
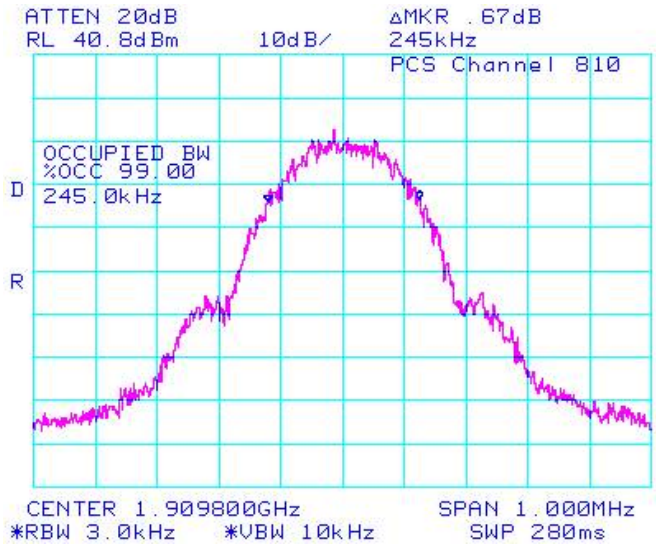


Figure 1-24: Occupied Bandwidth, PCS1900 High Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

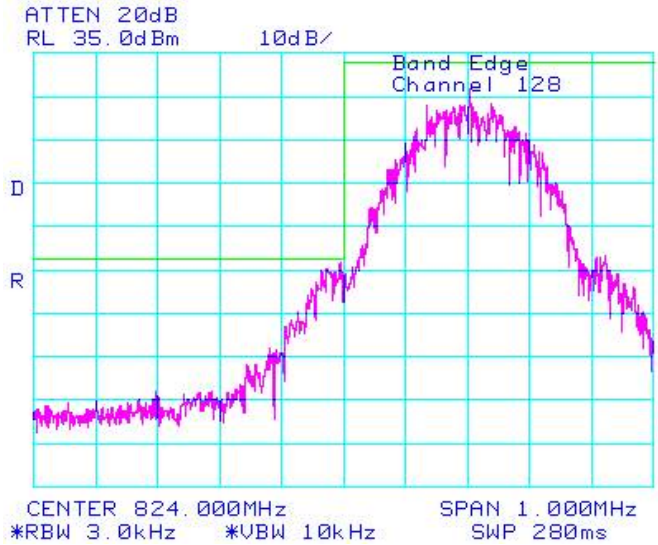


Figure 1-26: GSM850 band High Channel Mask in GSM mode

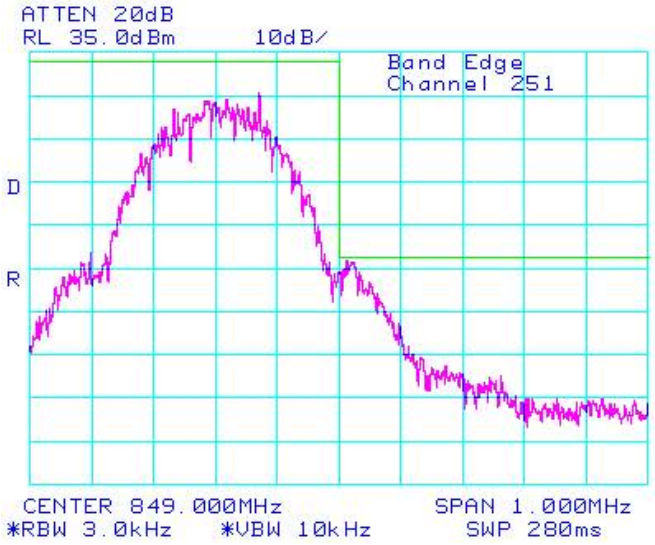


Figure 1-27: PCS1900, Low Channel Mask in GSM mode

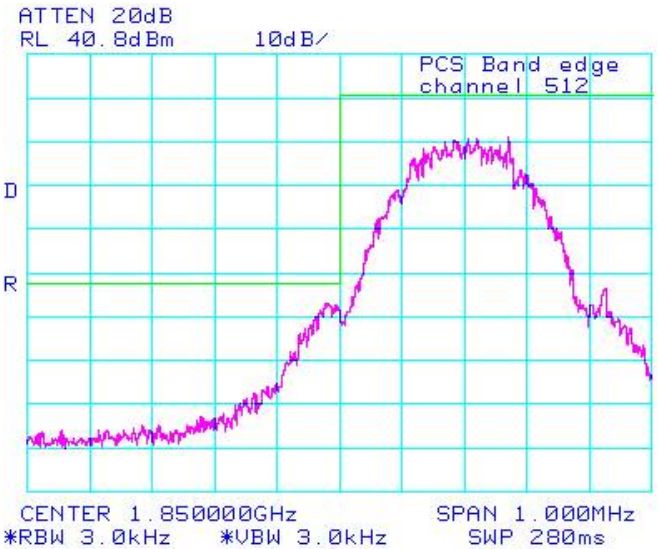
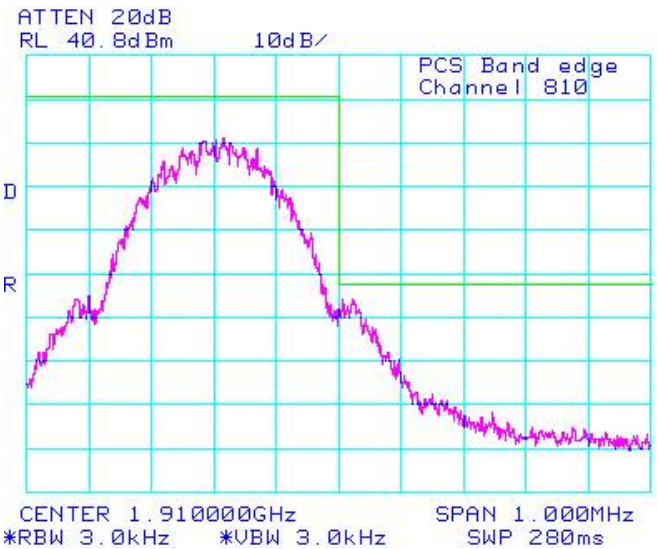


Figure 1-28: PCS1900, High Channel Mask in GSM mode



Conducted RF Emission Test Data cont'd

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

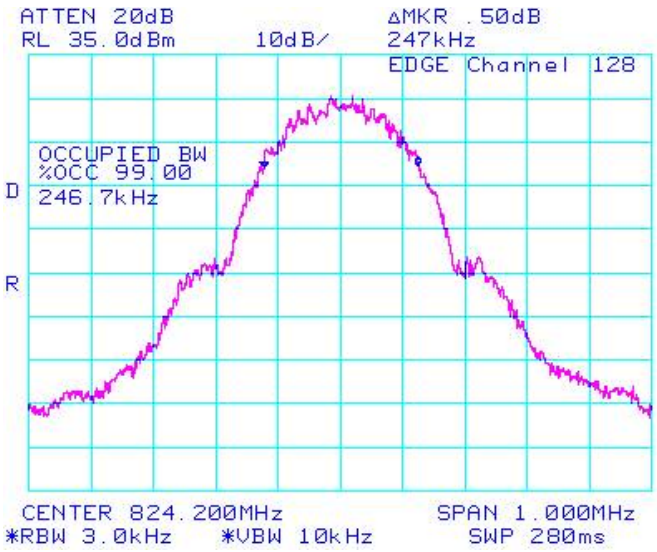


Figure 1-30: Occupied Bandwidth, GSM850 Band, Middle Channel in EDGE mode

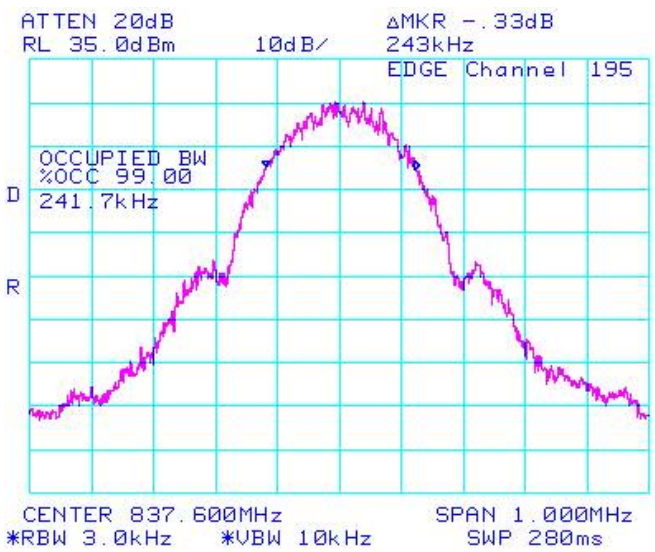


Figure 1-31: Occupied Bandwidth, GSM850 band, High Channel in EDGE mode

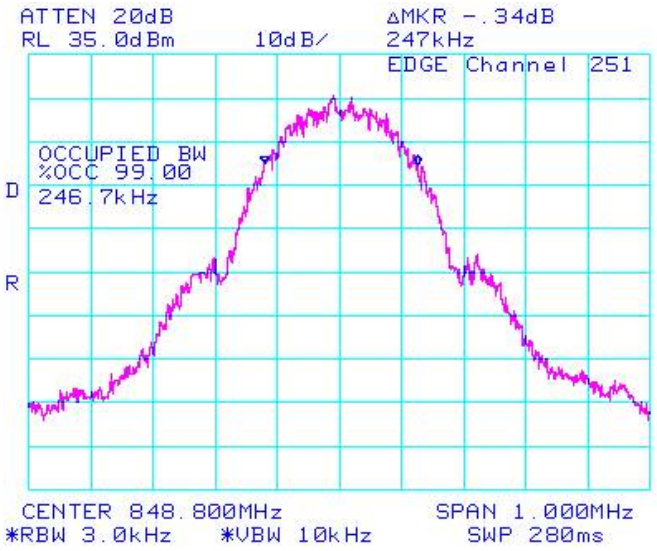
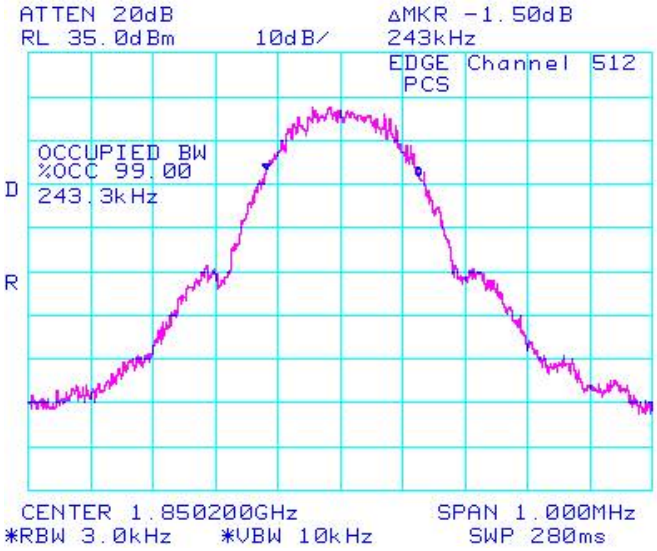


Figure 1-32: Occupied Bandwidth, PCS1900 Band, Low Channel in EDGE mode



Conducted RF Emission Test Data cont'd

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

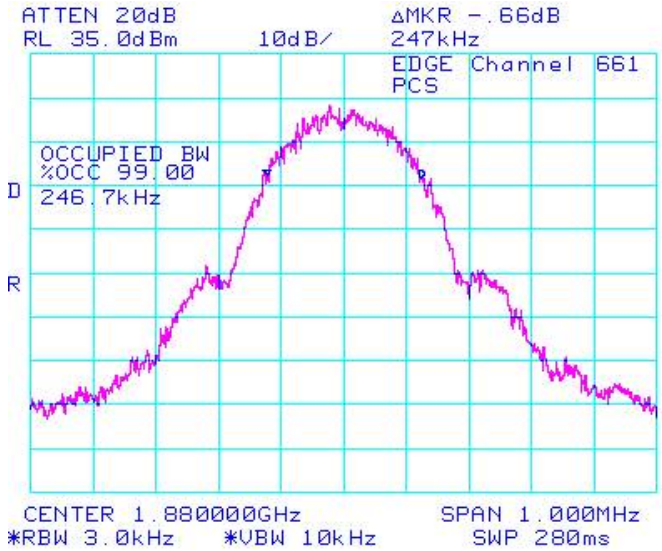
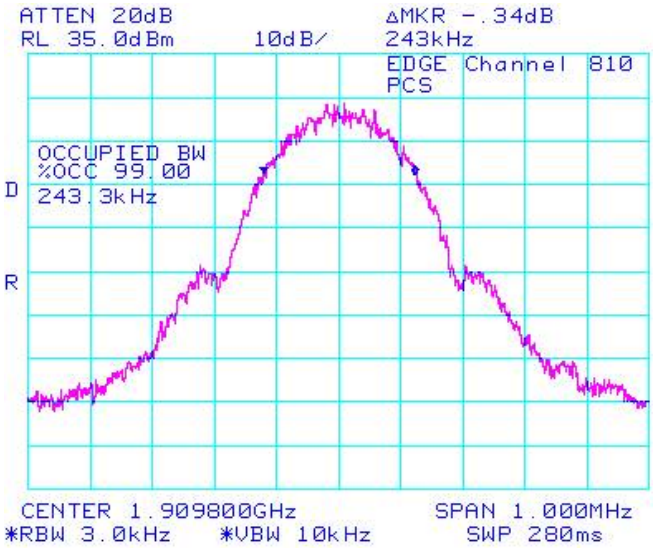


Figure 1-34: Occupied Bandwidth, PCS1900 Band, High Channel in EDGE mode



APPENDIX 2 – CONDUCTED RF OUTPUT POWER TEST DATA

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 32.5 dBm ±0.5 dB for GSM850 and 30.5 dBm ±0.5 dB for PCS.
Peak nominal output power is 32.5 dBm ±0.5 dB for Edge GSM850 and 30.5 dBm ±0.5 dB for Edge PCS.

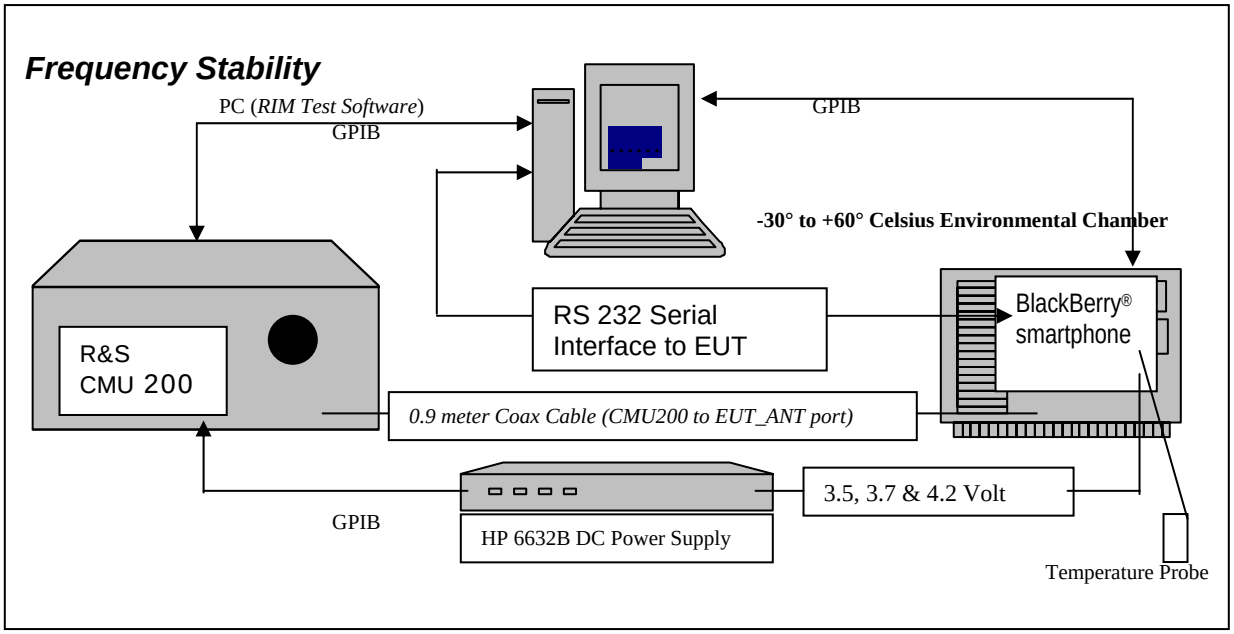
Date of Test: June 26, 2008

The measurements were performed by Maurice Battler.

Channel	Frequency (MHz)	Maximum Output Power (dBm)	Maximum Output Power (Watts)	Channel	Frequency (MHz)	Maximum Output Power (dBm)	Maximum Output Power (Watts)
GSM850				GSM850 EDGE/GPRS/GSM (2-timeslot)			
128	824.20	32.2	1.66	128	824.20	32.2	1.66
189	837.60	32.3	1.70	189	837.60	32.3	1.70
251	848.80	32.3	1.70	251	848.80	32.3	1.70
PCS				PCS EDGE/GPRS/GSM (2-timeslot)			
512	1850.2	30.6	1.15	512	1850.2	30.6	1.15
661	1880.0	30.4	1.10	661	1880.0	30.4	1.10
810	1909.8	30.3	1.07	810	1909.8	30.4	1.10

APPENDIX 3 – FREQUENCY STABILITY TEST DATA

Frequency Stability Test Data



The measurements were performed by Maurice Battler.

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.

Calibration for the Cable Loss was performed in the RF Laboratory using the Agilent power meter and Agilent Signal Generator.
The cable assembly from the RF input to the RF output was measured at the following Frequencies:

PCS1900 Frequency (MHz)	Cable loss (dB)
1850.2	1.20
1880.0	1.20
1909.8	1.20

GSM850 Frequency (MHz)	Cable loss (dB)
824.2	0.90
836.4	0.90
848.6	0.90

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 3.7 volts to 4.2 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, 3.7 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 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.

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 3.7 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, 3.7 and 4.2 volts.

The maximum frequency error in the GSM850 band measured was **-0.0868 PPM**.
The maximum frequency error in the PCS band measured was **-0.0612 PPM**.

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

Date of Test: June 25, 2008

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.6	20	-55.08	-0.0668
189	836.40	3.6	20	-61.47	-0.0735
250	848.60	3.6	20	-60.57	-0.0714

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.7	20	-42.94	-0.0521
189	836.40	3.7	20	-47.33	-0.0566
250	848.60	3.7	20	-61.08	-0.0720

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	4.2	20	19.05	0.0231
189	836.40	4.2	20	34.93	0.0418
250	848.60	4.2	20	-16.85	-0.0199

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	26.73	0.0324
128	824.20	3.6	-20	-59.99	-0.0728
128	824.20	3.6	-10	-55.98	-0.0679
128	824.20	3.6	0	-49.33	-0.0599
128	824.20	3.6	10	-32.48	-0.0394
128	824.20	3.6	20	-55.08	-0.0668
128	824.20	3.6	30	-51.59	-0.0626
128	824.20	3.6	40	-71.55	**-0.0868**
128	824.20	3.6	50	-56.05	-0.0680
128	824.20	3.6	60	-65.86	-0.0799

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.7	-30	-29.06	-0.0353
128	824.20	3.7	-20	-22.99	-0.0279
128	824.20	3.7	-10	-49.40	-0.0599
128	824.20	3.7	0	-67.48	-0.0819
128	824.20	3.7	10	-28.61	-0.0347
128	824.20	3.7	20	-42.94	-0.0521
128	824.20	3.7	30	-66.64	-0.0809
128	824.20	3.7	40	-32.16	-0.0390
128	824.20	3.7	50	-37.65	-0.0457
128	824.20	3.7	60	-37.84	-0.0459

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	4.2	-30	-12.91	-0.0157
128	824.20	4.2	-20	44.88	0.0545
128	824.20	4.2	-10	42.62	0.0517
128	824.20	4.2	0	-13.50	-0.0164
128	824.20	4.2	10	37.13	0.0450
128	824.20	4.2	20	19.05	0.0231
128	824.20	4.2	30	39.07	0.0474
128	824.20	4.2	40	15.17	0.0184
128	824.20	4.2	50	27.96	0.0339
128	824.20	4.2	60	22.54	0.0273

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	-39.20	-0.0469
189	836.40	3.6	-20	-22.54	-0.0269
189	836.40	3.6	-10	-33.00	-0.0395
189	836.40	3.6	0	-64.57	-0.0772
189	836.40	3.6	10	-49.46	-0.0591
189	836.40	3.6	20	-61.47	-0.0735
189	836.40	3.6	30	-54.95	-0.0657
189	836.40	3.6	40	-61.60	-0.0736
189	836.40	3.6	50	-63.67	-0.0761
189	836.40	3.6	60	-62.96	-0.0753

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
189	836.40	3.7	-30	-32.93	-0.0394
189	836.40	3.7	-20	-29.64	-0.0354
189	836.40	3.7	-10	-16.27	-0.0195
189	836.40	3.7	0	-39.71	-0.0475
189	836.40	3.7	10	-36.87	-0.0441
189	836.40	3.7	20	-47.33	-0.0566
189	836.40	3.7	30	-21.89	-0.0262
189	836.40	3.7	40	-35.51	-0.0425
189	836.40	3.7	50	-40.03	-0.0479
189	836.40	3.7	60	-36.29	-0.0434

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
189	836.40	4.2	-30	21.44	0.0256
189	836.40	4.2	-20	25.18	0.0301
189	836.40	4.2	-10	22.08	0.0264
189	836.40	4.2	0	33.90	0.0405
189	836.40	4.2	10	-12.33	-0.0147
189	836.40	4.2	20	34.93	0.0418
189	836.40	4.2	30	-15.30	-0.0183
189	836.40	4.2	40	31.32	0.0374
189	836.40	4.2	50	13.43	0.0161
189	836.40	4.2	60	38.61	0.0462

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	-60.50	-0.0713
250	848.60	3.6	-20	-31.25	-0.0368
250	848.60	3.6	-10	-49.20	-0.0580
250	848.60	3.6	0	-23.37	-0.0275
250	848.60	3.6	10	-47.27	-0.0557
250	848.60	3.6	20	-60.57	-0.0714
250	848.60	3.6	30	-35.45	-0.0418
250	848.60	3.6	40	-42.62	-0.0502
250	848.60	3.6	50	-44.43	-0.0524
250	848.60	3.6	60	-56.37	-0.0664

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
250	848.60	3.7	-30	-31.51	-0.0371
250	848.60	3.7	-20	-46.81	-0.0552
250	848.60	3.7	-10	-33.00	-0.0389
250	848.60	3.7	0	-51.08	-0.0602
250	848.60	3.7	10	-48.69	-0.0574
250	848.60	3.7	20	-61.08	-0.0720
250	848.60	3.7	30	-32.87	-0.0387
250	848.60	3.7	40	-48.17	-0.0568
250	848.60	3.7	50	-47.14	-0.0556
250	848.60	3.7	60	-42.55	-0.0501

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
250	848.60	4.2	-30	33.00	0.0389
250	848.60	4.2	-20	38.61	0.0455
250	848.60	4.2	-10	39.00	0.0460
250	848.60	4.2	0	-9.69	-0.0114
250	848.60	4.2	10	15.43	0.0182
250	848.60	4.2	20	-16.85	-0.0199
250	848.60	4.2	30	13.88	0.0164
250	848.60	4.2	40	44.04	0.0519
250	848.60	4.2	50	35.90	0.0423
250	848.60	4.2	60	-18.21	-0.0215

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

Date of Test: June 25, 2008

Traffic Channel Number	PCS Frequency (MHz	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	*PPM*
512	1850.2	3.6	20	-68.70	-0.0371
661	1880.0	3.6	20	-72.97	-0.0388
810	1909.8	3.6	20	-104.15	-0.0545

Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	3.7	20	-62.51	-0.0338
661	1880.0	3.7	20	-64.96	-0.0346
810	1909.8	3.7	20	-89.37	-0.0468

Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	4.2	20	-36.10	-0.0195
661	1880.0	4.2	20	-35.45	-0.0189
810	1909.8	4.2	20	-15.30	-0.0080

PCS1900 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	-39.58	-0.0214
512	1850.2	3.6	-20	-66.25	-0.0358
512	1850.2	3.6	-10	-90.98	-0.0492
512	1850.2	3.6	0	-93.31	-0.0504
512	1850.2	3.6	10	-105.77	-0.0572
512	1850.2	3.6	20	-68.70	-0.0371
512	1850.2	3.6	30	-94.92	-0.0513
512	1850.2	3.6	40	-102.48	-0.0554
512	1850.2	3.6	50	-70.12	-0.0379
512	1850.2	3.6	60	-93.69	-0.0506

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	3.7	-30	-72.71	-0.0393
512	1850.2	3.7	-20	-99.96	-0.0540
512	1850.2	3.7	-10	-107.96	-0.0584
512	1850.2	3.7	0	-98.41	-0.0532
512	1850.2	3.7	10	-64.96	-0.0351
512	1850.2	3.7	20	-62.51	-0.0338
512	1850.2	3.7	30	-92.47	-0.0500
512	1850.2	3.7	40	-71.67	-0.0387
512	1850.2	3.7	50	-67.74	-0.0366
512	1850.2	3.7	60	-66.25	-0.0358

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	4.2	-30	-58.89	-0.0318
512	1850.2	4.2	-20	-48.88	-0.0264
512	1850.2	4.2	-10	-43.26	-0.0234
512	1850.2	4.2	0	-57.86	-0.0313
512	1850.2	4.2	10	-16.40	-0.0089
512	1850.2	4.2	20	-36.10	-0.0195
512	1850.2	4.2	30	-34.80	-0.0188
512	1850.2	4.2	40	-21.95	-0.0119
512	1850.2	4.2	50	22.15	0.0120
512	1850.2	4.2	60	-28.61	-0.0155

PCS1900 Results: channel 661 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880	3.6	-30	-101.38	-0.0539
661	1880	3.6	-20	-81.10	-0.0431
661	1880	3.6	-10	-80.20	-0.0427
661	1880	3.6	0	-86.85	-0.0462
661	1880	3.6	10	-61.60	-0.0328
661	1880	3.6	20	-72.97	-0.0388
661	1880	3.6	30	-115.00	**-0.0612**
661	1880	3.6	40	-105.06	-0.0559
661	1880	3.6	50	-72.84	-0.0387
661	1880	3.6	60	-82.65	-0.0440

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880	3.7	-30	-37.71	-0.0201
661	1880	3.7	-20	-101.25	-0.0539
661	1880	3.7	-10	-110.09	-0.0586
661	1880	3.7	0	-95.18	-0.0506
661	1880	3.7	10	-71.03	-0.0378
661	1880	3.7	20	-64.96	-0.0346
661	1880	3.7	30	-101.25	-0.0539
661	1880	3.7	40	-73.81	-0.0393
661	1880	3.7	50	-75.94	-0.0404
661	1880	3.7	60	-76.78	-0.0408

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880	4.2	-30	29.64	0.0158
661	1880	4.2	-20	-22.73	-0.0121
661	1880	4.2	-10	-64.83	-0.0345
661	1880	4.2	0	-33.19	-0.0177
661	1880	4.2	10	-22.15	-0.0118
661	1880	4.2	20	-35.45	-0.0189
661	1880	4.2	30	-46.10	-0.0245
661	1880	4.2	40	-35.64	-0.0190
661	1880	4.2	50	-18.92	-0.0101
661	1880	4.2	60	-28.93	-0.0154

PCS1900 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	-83.81	-0.0439
810	1909.8	3.6	-20	-70.51	-0.0369
810	1909.8	3.6	-10	-103.31	-0.0541
810	1909.8	3.6	0	-37.65	-0.0197
810	1909.8	3.6	10	-100.02	-0.0524
810	1909.8	3.6	20	-104.15	-0.0545
810	1909.8	3.6	30	-74.77	-0.0392
810	1909.8	3.6	40	-68.19	-0.0357
810	1909.8	3.6	50	-110.55	-0.0579
810	1909.8	3.6	60	-112.68	-0.0590

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
810	1909.8	3.7	-30	-37.26	-0.0195
810	1909.8	3.7	-20	-73.68	-0.0386
810	1909.8	3.7	-10	-106.22	-0.0556
810	1909.8	3.7	0	-79.55	-0.0417
810	1909.8	3.7	10	-98.60	-0.0516
810	1909.8	3.7	20	-89.37	-0.0468
810	1909.8	3.7	30	-72.13	-0.0378
810	1909.8	3.7	40	-47.72	-0.0250
810	1909.8	3.7	50	-105.38	-0.0552
810	1909.8	3.7	60	-106.61	-0.0558

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
810	1909.8	4.2	-30	-50.88	-0.0266
810	1909.8	4.2	-20	-53.72	-0.0281
810	1909.8	4.2	-10	-38.61	-0.0202
810	1909.8	4.2	0	-17.56	-0.0092
810	1909.8	4.2	10	-50.82	-0.0266
810	1909.8	4.2	20	-15.30	-0.0080
810	1909.8	4.2	30	15.37	0.0080
810	1909.8	4.2	40	21.57	0.0113
810	1909.8	4.2	50	-45.72	-0.0239
810	1909.8	4.2	60	30.74	0.0161

APPENDIX 4 – RADIATED EMMISIONS TEST DATA

Radiated Power Test Data Results

GSM850 Band

GSM Mode

The environmental tests conditions were: Temperature 25° C
Pressure 1010 mb
Relative Humidity 31%

Date of test: July 10, 2008 Test distance is 3.0 metres

The measurements were performed by Arjun Rai Bhatti and Vimal Olaganathan.

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) (dBm)	(W)	Limit (dBm)	Diff. To Limit (dB)
GSM850 Band (ERP) BlackBerry® smartphone, PIN 206CE13A Standalone, USB down position													
F0	128	824.20	850	Dipole	V	74.90	84.93	V-V	11.21	**26.89**	0.489	38.50	-11.61
F0	128	824.20	850	Dipole	V	84.93		H-H	9.62				
F0	195	837.60	850	Dipole	V	74.79	84.15	V-V	11.14	26.82	0.481	38.50	-11.68
F0	195	837.60	850	Dipole	V	84.15		H-H	9.15				
F0	251	848.80	850	Dipole	V	74.89	84.41	V-V	10.73	26.22	0.419	38.50	-12.28
F0	251	848.80	850	Dipole	V	84.41		H-H	9.33				

Radiated Power Test Data Results, Cont'd

GSM850 Band

GPRS Mode

The environmental tests conditions were: Temperature 25° C
Pressure 1010 mb
Relative Humidity 31%

Date of test: July 10, 2008 Test distance is 3.0 meters

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) (dBm)	(W)	Limit (dBm)	Diff. To Limit (dB)
GSM850 Band (ERP) BlackBerry® smartphone Standalone, USB down position													
F0	128	824.20	850	Dipole	V	76.31	84.86	V-V	11.14	26.82	0.481	38.50	-11.68
F0	128	824.20	850	Dipole	H	84.86		H-H	9.44				
F0	195	837.60	850	Dipole	V	75.94	84.04	V-V	11.02	26.70	0.468	38.50	-11.80
F0	195	837.60	850	Dipole	H	84.04		H-H	9.02				
F0	251	848.80	850	Dipole	V	75.27	84.09	V-V	10.37	25.86	0.385	38.50	-12.64
F0	251	848.80	850	Dipole	H	84.09		H-H	9.02				

Radiated Power Test Data Results, Cont'd

GSM850 Band

EDGE Mode

The environmental tests conditions were: Temperature 25° C
Pressure 1010 mb
Relative Humidity 31%

Date of test: July 10, 2008 Test distance is 3.0 meters

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) (dBm)	(W)	Limit (dBm)	Diff. To Limit (dB)
GSM850 Band (ERP) BlackBerry® smartphone Standalone, USB down position													
F0	128	824.20	850	Dipole	V	75.14	85.02	V-V	11.39	**27.07**	0.509	38.50	-11.43
F0	128	824.20	850	Dipole	H	85.02		H-H	9.95				
F0	195	837.60	850	Dipole	V	74.69	84.21	V-V	11.16	26.84	0.483	38.50	-11.66
F0	195	837.60	850	Dipole	H	84.21		H-H	9.12				
F0	251	848.80	850	Dipole	V	74.99	84.60	V-V	10.98	26.47	0.444	38.50	-12.03
F0	251	848.80	850	Dipole	H	84.60		H-H	9.56				

Radiated Power Test Data Results cont'd

PCS1900 Band

GSM Mode

The environmental test conditions were: Temperature 24ºC
Pressure 1006 mb
Relative Humidity 32%

Date of test: July 28, 2008 Test Distance was 3.0 metres.

								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)	(dBm)	(W)	Limit (dBm)	Diff to Limit (dB)
PCS BAND (EIRP) BlackBerry® smartphone Standalone, USB up position													
F0	512	1850.20	1900	Horn	V	85.73	91.67	V-V	-7.74	27.97	0.627	33	-5.03
F0	512	1850.20	1900	Horn	H	91.67		H-H	-6.92				
F0	661	1880.00	1900	Horn	V	85.38	90.24	V-V	-8.83	27.05	0.507	33	-5.95
F0	661	1880.00	1900	Horn	H	90.24		H-H	-7.69				
F0	810	1909.80	1900	Horn	V	84.60	90.86	V-V	-7.89	27.86	0.611	33	-5.14
F0	810	1909.80	1900	Horn	H	90.86		H-H	-6.51				

Radiated Power Test Data Results cont'd

PCS1900 Band

GPRS Mode

The environmental test conditions were: Temperature 24ºC
Pressure 1006 mb
Relative Humidity 32%

Date of test: July 28, 2008 Test Distance was 3.0 meters.

								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) (dBm)	(W)	Limit (dBm)	Diff to Limit (dB)
PCS BAND (EIRP) BlackBerry® smartphone Standalone, USB up position													
F0	512	1850.20	1900	Horn	V	85.51	91.45	V-V	-7.73	**28.08**	0.643	33	-4.92
F0	512	1850.20	1900	Horn	H	91.45		H-H	-6.81				
F0	661	1880.00	1900	Horn	V	85.55	90.11	V-V	-8.74	27.10	0.513	33	-5.90
F0	661	1880.00	1900	Horn	H	90.11		H-H	-7.64				
F0	810	1909.80	1900	Horn	V	84.81	90.86	V-V	-7.89	27.86	0.611	33	-5.14
F0	810	1909.80	1900	Horn	H	90.86		H-H	-6.51				

Radiated Power Test Data Results cont'd

PCS1900 Band

EDGE Mode

The environmental test conditions were: Temperature 24ºC
Pressure 1006 mb
Relative Humidity 32%

Date of test: July 28, 2008 Test Distance was 3.0 meters.

								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)	(dBm)	(W)	Limit (dBm)	Diff to Limit (dB)
PCS BAND (EIRP) BlackBerry® smartphone Standalone, USB up position													
F0	512	1850.20	1900	Horn	V	85.44	91.34	V-V	-7.98	27.80	0.603	33	-5.20
F0	512	1850.20	1900	Horn	H	91.34		H-H	-7.09				
F0	661	1880.00	1900	Horn	V	85.47	90.11	V-V	-8.74	27.10	0.513	33	-5.90
F0	661	1880.00	1900	Horn	H	90.11		H-H	-7.64				
F0	810	1909.80	1900	Horn	V	84.86	90.98	V-V	-7.91	**27.92**	0.619	33	-5.08
F0	810	1909.80	1900	Horn	H	90.98		H-H	-6.45				

Radiated Emissions Test Data Results

GSM850

The environmental test conditions were: Temperature 23ºC
Relative Humidity 22%

Date of Test: July 08, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 2074CABB was in standalone, vertical position.

The measurements were performed in GSM850 Tx mode, channel 128.

All emissions had a test margin greater than 25.0 dB.

The environmental test conditions were: Temperature 23ºC
Relative Humidity 43%

Date of Test: June 11, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 7 GHz and 7 GHz to 9 GHz.
The BlackBerry® smartphone PIN 2073EB6F was in standalone, vertical position.

The measurements were performed in GSM850 Tx mode, channel 128.

Frequency	Antenna		Test Angle	Detector	Measured Level	Correction Factor for preamp/antenna/ cables/ filter	Field Strength Level (reading+corr)	Limit @ 3.0 m	Test Margin
	Pol.	Height							
(MHz)	(V/H)	(metres)	(Deg.)	(PK or QP)	(dBµV)	(dB)	(dBm)	(dBm)	(dB)
1648.206	H	1.99	327	PK	-53.69	-89.56	-35.87	-13.00	-22.87
2473.096	V	1.60	88	PK	-54.10	-86.58	-32.48	-13.00	-19.48
3296.603	V	2.28	279	PK	-51.30	-82.49	-31.19	-13.00	-18.19

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

Radiated Emissions Test Data Results cont'd

GSM850

The environmental test conditions were: Temperature 23ºC
Relative Humidity 22%

Date of Test: July 08, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 2074CABB was in standalone, vertical position.

The measurements were performed in GSM850 Tx mode, channel 195.

All emissions had a test margin greater than 25.0 dB.

The environmental test conditions were: Temperature 24ºC
Relative Humidity 37%

Date of Test: June 12, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 7 GHz and 7 GHz to 9 GHz.
The BlackBerry® smartphone PIN 20746583 was in standalone, vertical position.

The measurements were performed in GSM850 Tx mode, channel 195.

Frequency (MHz)	Antenna Pol. (V/H)	Antenna Height (metres)	Test Angle (Deg.)	Detector (PK or QP)	Measured Level (dBµV)	Correction Factor for preamp/antenna/ cables/ filter (dB)	Field Strength Level (reading+corr) (dBm)	Limit @ 3.0 m (dBm)	Test Margin (dB)
1675.361	H	1.19	134	PK	-53.28	-89.87	-36.59	-13.00	-23.59
3350.671	H	1.00	111	PK	-49.41	-82.86	-33.45	-13.00	-20.45
6695.840	V	1.88	50	PK	-37.20	-71.72	-34.52	-13.00	-21.52

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

Radiated Emissions Test Data Results cont'd

GSM850

The environmental test conditions were: Temperature 23ºC
Relative Humidity 22%

Date of Test: July 08, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 2074CABB was in standalone, vertical position.

The measurements were performed in GSM850 Tx mode, channel 251.

All emissions had a test margin greater than 25.0 dB.

The environmental test conditions were: Temperature 23ºC
Relative Humidity 43%

Date of Test: June 11, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 7 GHz and 7 GHz to 9 GHz.
The BlackBerry® smartphone PIN 20746583 was in standalone, vertical position.

The measurements were performed in GSM850 Tx mode, channel 251.

Frequency	Antenna		Test Angle	Detector	Measured Level	Correction Factor for preamp/antenna/ cables/ filter	Field Strength Level (reading+corr)	Limit @ 3.0 m	Test Margin
	Pol.	Height			(dBµV)	(dB)	(dBm)	(dBm)	(dB)
(MHz)	(V/H)	(metres)	(Deg.)	(PK or QP)					
1697.806	H	2.35	133	PK	-55.03	-90.77	-35.74	-13.00	-22.74
2546.764	V	2.05	214	PK	-49.67	-86.46	-36.79	-13.00	-23.79

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

Radiated Emissions Test Data Results cont'd

GSM850 GPRS

The environmental test conditions were: Temperature 23ºC
Relative Humidity 22%

Date of Test: July 08, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 2074CABB was in standalone, vertical position.

The measurements were performed in GSM850 Tx mode, channel 195.

All emissions had a test margin greater than 25.0 dB.

The environmental test conditions were: Temperature 23ºC
Relative Humidity 40%

Date of Test: July 03, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 7 GHz and 7 GHz to 9 GHz.
The BlackBerry® smartphone PIN 20746583 was in standalone, vertical position.

The measurements were performed in GSM850 Tx mode, channel 195.

Frequency	Antenna		Test Angle	Detector	Measured Level	Correction Factor for preamp/antenna/ cables/ filter	Field Strength Level (reading+corr)	Limit @ 3.0 m	Test Margin
	Pol.	Height			(dBµV)	(dB)	(dBm)	(dBm)	(dB)
(MHz)	(V/H)	(metres)	(Deg.)	(PK or QP)					
1675.390	H	1.75	15	PK	-53.56	-89.87	-36.31	-13.00	-23.31

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

Radiated Emissions Test Data Results cont'd

GSM850 EDGE

The environmental test conditions were: Temperature 23ºC
Relative Humidity 22%

Date of Test: July 08, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 2074CABB was in standalone, vertical position.

The measurements were performed in GSM850 Tx mode, channel 128.

All emissions had a test margin greater than 25.0 dB.

The environmental test conditions were: Temperature 24ºC
Relative Humidity 39%

Date of Test: June 23, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 7 GHz and 7 GHz to 9 GHz.
The BlackBerry® smartphone PIN 20746583 was in standalone, vertical position.

The measurements were performed in GSM850 Tx mode, channel 128.

Frequency	Antenna		Test Angle	Detector	Measured Level	Correction Factor for preamp/antenna/ cables/ filter	Field Strength Level (reading+corr)	Limit @ 3.0 m	Test Margin
	Pol.	Height			(dBµV)	(dB)	(dBm)	(dBm)	(dB)
(MHz)	(V/H)	(metres)	(Deg.)	(PK or QP)					
2472.71	V	1.00	261	PK	-56.41	-86.60	-30.19	-13.00	-17.19
3296.96	V	2.88	86	PK	-52.75	-82.49	-29.74	-13.00	**-16.74**
4121.35	V	1.00	95	PK	-42.85	-79.28	-36.43	-13.00	-23.43

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

Radiated Emissions Test Data Results cont'd

GSM850 EDGE

The environmental test conditions were: Temperature 23ºC
Relative Humidity 22%

Date of Test: July 08, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 2074CABB was in standalone, vertical position.

The measurements were performed in GSM850 Tx mode, channel 195.

All emissions had a test margin greater than 25.0 dB.

The environmental test conditions were: Temperature 24ºC
Relative Humidity 33%

Date of Test: June 19, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 7 GHz and 7 GHz to 9 GHz.
The BlackBerry® smartphone PIN 20746583 was in standalone, vertical position.

The measurements were performed in GSM850 Tx mode, channel 195.

Frequency	Antenna		Test Angle	Detector	Measured Level	Correction Factor for preamp/antenna/ cables/ filter	Field Strength Level (reading+corr)	Limit @ 3.0 m	Test Margin
	Pol.	Height							
(MHz)	(V/H)	(metres)	(Deg.)	(PK or QP)	(dBµV)	(dB)	(dBm)	(dBm)	(dB)
3349.829	H	1.00	114	PK	-46.97	-82.86	-35.89	-13.00	-22.89
2512.850	V	2.00	277	PK	-53.00	-87.33	-34.33	-13.00	-21.33
3350.210	V	3.00	89	PK	-50.19	-82.81	-32.62	-13.00	-19.62

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

Radiated Emissions Test Data Results cont'd

GSM850 EDGE

The environmental test conditions were: Temperature 23ºC
Relative Humidity 22%

Date of Test: July 08, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 2074CABB was in standalone, vertical position.

The measurements were performed in GSM850 Tx mode, channel 251.

All emissions had a test margin greater than 25.0 dB.

The environmental test conditions were: Temperature 24ºC
Relative Humidity 33%

Date of Test: June 19, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 7 GHz and 7 GHz to 9 GHz.
The BlackBerry® smartphone PIN 20746583 was in standalone, vertical position.

The measurements were performed in GSM850 Tx mode, channel 251.

Frequency	Antenna		Test Angle	Detector	Measured Level	Correction Factor for preamp/antenna/ cables/ filter	Field Strength Level (reading+corr)	Limit @ 3.0 m	Test Margin
	Pol.	Height							
(MHz)	(V/H)	(metres)	(Deg.)	(PK or QP)	(dBµV)	(dB)	(dBm)	(dBm)	(dB)
1697.670	H	1.73	135	PK	-54.10	-90.76	-36.66	-13.00	-23.66

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

Radiated Emissions Test Data Results cont'd

GSM850 Mode

The environmental test conditions were: Temperature 25ºC
Pressure 1010 mb
Relative Humidity 31%

The measurements were performed in GSM850 Tx mode.

Date of Test: July 10, 2008

Test Distance was 3.0 metres with a EUT height of 1.0 meter.
The BlackBerry® smartphone PIN 20750FEA was in standalone.

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 (LO_1)** BlackBerry® smartphone Standalone, USB up **Low Channel (824.2 MHz)**												
F0	128	3296.8	850	Horn	V	NF	NF	V-V	-	-	-13	-
F0	128	3296.8	850	Horn	H	NF						
Emissions were in the NF. **High Channel (848.8 MHz)**												
F0	251	3395.2	850	Horn	V	NF	NF	V-V	-	-	-13	-
F0	251	3395.2	850	Horn	H	NF						
Emissions were in the NF. **RF LO_2** **Low Channel (824.2 MHz)**												
F0	128	3476.80	850	Horn	V	NF	NF	V-V	-	-	-13	-
F0	128	3476.80	850	Horn	H	NF						
Emissions were in the NF. **High Channel (848.8 MHz)**												
F0	251	3575.20	850	Horn	V	NF	NF	V-V	-	-	-13	-
F0	251	3575.20	850	Horn	H	NF						
Emissions were in the NF.												

Radiated Emissions Test Data Results cont'd

PCS1900

The environmental test conditions were: Temperature 23ºC
Relative Humidity 35%

Date of Test: July 08, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 2074CABB was in standalone, vertical position.

The measurements were performed in PCS1900 Tx mode, channel 512.

All emissions had a test margin greater than 25.0 dB.

The environmental test conditions were: Temperature 24ºC
Relative Humidity 37%

Date of Test: June 12, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 7 GHz, 7 GHz to 18 GHz and 18 GHz to 20 GHz.
The BlackBerry® smartphone PIN 2073EB6F was in standalone, vertical position.

The measurements were performed in PCS1900 Tx mode, channel 512.

Frequency	Antenna		Test Angle	Detector	Measured Level	Correction Factor for preamp/antenna/ cables/ filter	Field Strength Level (reading+corr)	Limit @ 3.0 m	Test Margin
	Pol.	Height			(dBµV)	(dB)	(dBm)	(dBm)	(dB)
(MHz)	(V/H)	(metres)	(Deg.)	(PK or QP)					
7400.750	V	1.26	85	PK	-44.08	-80.74	-36.66	-13.00	-23.66

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

Radiated Emissions Test Data Results cont'd

PCS1900

The environmental test conditions were: Temperature 25ºC
Relative Humidity 35%

Date of Test: July 08, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 2074CABB was in standalone, vertical position.

The measurements were performed in PCS1900 Tx mode, channel 661.

All emissions had a test margin greater than 25.0 dB.

The environmental test conditions were: Temperature 24ºC
Relative Humidity 37%

Date of Test: June 12, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 7 GHz, 7 GHz to 18 GHz and 18 GHz to 20 GHz.
The BlackBerry® smartphone PIN 2073EB6F was in standalone, vertical position.

The measurements were performed in PCS1900 Tx mode, channel 661.

Frequency	Antenna		Test Angle	Detector	Measured Level	Correction Factor for preamp/antenna/ cables/ filter	Field Strength Level (reading+corr)	Limit @ 3.0 m	Test Margin
	Pol.	Height							
(MHz)	(V/H)	(metres)	(Deg.)	(PK or QP)	(dBµV)	(dB)	(dBm)	(dBm)	(dB)
3759.970	H	1.18	114	PK	-44.93	-76.52	-31.59	-13.00	**-18.59**
3759.870	V	1.00	161	PK	-41.82	-76.44	-34.62	-13.00	-21.62
7520.190	V	1.00	160	PK	-42.73	-80.57	-37.84	-13.00	-24.84

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

Radiated Emissions Test Data Results cont'd

PCS1900

The environmental test conditions were: Temperature 23ºC
Relative Humidity 35%

Date of Test: July 08, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 2074CABB was in standalone, vertical position.

The measurements were performed in PCS1900 Tx mode, channel 810.

All emissions had a test margin greater than 25.0 dB.

The environmental test conditions were: Temperature 24ºC
Relative Humidity 37%

Date of Test: June 12, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 7 GHz, 7 GHz to 18 GHz and 18 GHz to 20 GHz.
The BlackBerry® smartphone PIN 2073EB6F was in standalone, vertical position.

The measurements were performed in PCS1900 Tx mode, channel 810.

All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

PCS1900 GPRS

The environmental test conditions were: Temperature 24ºC
Relative Humidity 35%

Date of Test: July 08, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 2074CABB was in standalone, vertical position.

The measurements were performed in PCS1900 Tx mode, channel 661.

All emissions had a test margin greater than 25.0 dB.

The environmental test conditions were: Temperature 23ºC
Relative Humidity 41%

Date of Test: July 03, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 7 GHz, 7 GHz to 18 GHz and 18 GHz to 20 GHz.
The BlackBerry® smartphone PIN 2073EB6F was in standalone, vertical position.

The measurements were performed in PCS1900 Tx mode, channel 661.

All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

PCS1900 EDGE

The environmental test conditions were: Temperature 24ºC
Relative Humidity 34%

Date of Test: July 08, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 2074CABB was in standalone, vertical position.

The measurements were performed in PCS1900 Tx mode, channel 512.

All emissions had a test margin greater than 25.0 dB.

The environmental test conditions were: Temperature 24ºC
Relative Humidity 39%

Date of Test: June 23, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 7 GHz, 7 GHz to 18 GHz and 18 GHz to 20 GHz.
The BlackBerry® smartphone PIN 2073EB6F was in standalone, vertical position.

The measurements were performed in PCS1900 Tx mode, channel 512.

All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

PCS1900 EDGE

The environmental test conditions were: Temperature 25ºC
Relative Humidity 35%

Date of Test: July 08, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 2074CABB was in standalone, vertical position.

The measurements were performed in PCS1900 Tx mode, channel 661.

All emissions had a test margin greater than 25.0 dB.

The environmental test conditions were: Temperature 24ºC
Relative Humidity 39%

Date of Test: June 23, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 7 GHz, 7 GHz to 18 GHz and 18 GHz to 20 GHz.
The BlackBerry® smartphone PIN 2073EB6F was in standalone, vertical position.

The measurements were performed in PCS1900 Tx mode, channel 661.

All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

PCS1900 EDGE

The environmental test conditions were: Temperature 24ºC
Relative Humidity 35%

Date of Test: July 08, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 2074CABB was in standalone, vertical position.

The measurements were performed in PCS1900 Tx mode, channel 810.

All emissions had a test margin greater than 25.0 dB.

The environmental test conditions were: Temperature 23ºC
Relative Humidity 44%

Date of Test: June 24, 2008

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 7 GHz, 7 GHz to 18 GHz and 18 GHz to 20 GHz.
The BlackBerry® smartphone PIN 2073EB6F was in standalone, vertical position.

The measurements were performed in PCS1900 Tx mode, channel 810.

All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

PCS1900

GSM Mode

The environmental tests conditions were: Temperature 25° C
Pressure 1010 mb
Relative Humidity 31%

The measurements were performed in PCS Tx mode. Date of Test: July 10, 2008

Test Distance was 3.0 metres with a EUT height of 1.0 meter.
The BlackBerry® smartphone PIN 20750FEA was in standalone.

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, Vertical **Low Channel**													
F0	512	3700.4	1900	Horn	V	NF	NF	-	V-V	-	-	-	-
F0	512	3700.4	1900	Horn	H	NF							
Emissions were in the NF. **High Channel**													
F0	810	3819.6	1900	Horn	V	NF	NF	-	V-V	-	-	-	-
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	-	V-V	-	-	-	-
F0	512	3860.4	1900	Horn	H	NF							
Emissions were in the NF. **High Channel**													
F0	810	3979.6	1900	Horn	V	NF	NF	-	V-V	-	-	-	-
F0	810	3979.6	1900	Horn	H	NF							
Emissions were in the NF.													