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-1615-0905-16

PRODUCT MODEL NO: RCG41GW
TYPE NAME: BlackBerry® smartphone
FCC ID: L6RCG40GW
IC: 2503A-RCG40GW
EMISSION DESIGNATOR (GSM): 247KG7W
EMISSION DESIGNATOR (EDGE): 247KGXW

This Rev1 test report supersedes the previous version RTS-1615-0905-16 dated 01 June, 2009.

DATE: 19 June, 2009

Statement of Performance:

The BlackBerry® smartphone, model RCG41GW, part number CER-21961-001 Rev. 3 and accessories when configured and operated per RIM's operation instructions, performs within the requirements of the test standards.

Declaration:

We hereby certify that:
The test data reported herein is an accurate record of the performance of the sample(s) tested.
The test results are valid for the tested unit (s) only.
The test equipment used was suitable for the tests performed and within manufacturer's published specifications and operating parameters.
The test methods were consistent with the methods described in the relevant standards.

Documented by:

Maurice Battler
Compliance Specialist
Date: 19 June, 2009

Reviewed by:

Masud S. Attayi, P.Eng.
Team Lead, Regulatory Compliance
Date: 19 June, 2009

Approved by:

Paul G. Cardinal, Ph.D.
Director
Date: 19 June, 2009

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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, 2008
- FCC CFR 47 Part 22, Subpart H, Cellular Radiotelephone Services, Oct. 1, 2008
- FCC CFR 47 Part 24 Subpart E, Broadband PCS, Oct 1. 2008
- Industry Canada, RSS-132 Issue 2, September 2005, Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz.
- Industry Canada, RSS-133 Issue 5, February 2009, 2 GHz Personal Communications Services.

B. Associated Documents

1. Hardware Declaration CER-21961-001_Rev2
2. Hardware Declaration CER-21961-001_Rev3

C. Product Identification

Manufactured by Research In Motion Limited whose headquarters is located at:

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

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

RIM Testing Services (RTS) EMI test facilities

305 Phillip Street	440 Phillip Street
Waterloo, Ontario	Waterloo, Ontario,
Canada, N2L 3W8	Canada , N2L 5R9
Phone: 519 888 7465	Phone: 519 888 7465
Fax: 519 888 6906	Fax: 519 888 6906

The testing was performed from March 20 to June 15, 2009.

The sample EUT included:

SAMPLE	MODEL	CER NUMBER	PIN
1	RCG41GW	CER-21961-001 Rev. 1	20E3AC4D
2	RCG41GW	CER-21961-001 Rev. 2	20EB5E4B
3	RCG41GW	CER-21961-001 Rev. 2	20EB5E5E
4	RCG41GW	CER-21961-001 Rev. 3	20F36073
5	RCG41GW	CER-21961-001 Rev. 3	20F361D6

To view the differences between CER-21961-001 Rev. 1 and CER-21961-001 Rev. 2, see hardware declaration CER-21961-001_Rev2. To view the differences between CER-21961-001 Rev. 2 and CER-21961-001 Rev. 3 see hardware declaration CER-21961-001_Rev3.

Only the measurements that may have been impacted by the changes from Rev 1 to Rev 2 and Rev 2 to Rev 3 were re-measured.

Conducted RF measurements were performed on BlackBerry® smartphone PIN 20E3AC4D.
Radiated Emission measurements were performed on BlackBerry® smartphones PIN 20EB5E4B and 20EB5E5E.
Simultaneous transmission measurements were performed on BlackBerry® smartphones PIN 20F36073 and 20F361D6.

D. Support Equipment Used for the Testing of the EUT

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

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	Pass	4
Part 24, Subpart E	RSS-133	Radiated Spurious/Harmonic Emissions, EIRP	Pass	4

1) The BlackBerry® smartphone 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-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 BlackBerry® smartphone 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-GEN, 4.9. 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 BlackBerry® smartphone 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-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 BlackBerry® smartphone 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-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 BlackBerry® smartphone met the requirements of the Conducted RF Output Power requirements for the GSM850 and PCS1900 as per 47 CFR 2.1046(a), RSS 133, 6.4 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 BlackBerry® smartphone 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, 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 (3.7 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 BlackBerry® smartphone 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-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 (3.7 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 bands. The results are within the limits. The BlackBerry® smartphone was placed on a nonconductive styrofoam table, 100 cm high that was positioned on a remotely controlled turntable. The test distance used between the BlackBerry® smartphone 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. Both the horizontal and vertical polarizations of the emissions were measured. The maximum emissions level was recorded. The BlackBerry® smartphone was then substituted with an antenna placed in the same location as the BlackBerry® smartphone. 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 BlackBerry® smartphone was measured on the low, middle and high channels.

The ERP in the 850 band, GSM/GPRS mode was measured on BlackBerry® smartphone. The highest ERP measured was 31.44 dBm (1.39 W) at 824.20 MHz (channel 128).

The ERP in the 850 band, EDGE mode was measured on BlackBerry® smartphone. The highest ERP measured was 28.43 dBm (0.70 W) at 848.80 MHz (channel 251).

The EIRP in the PCS band, GSM|GPRS mode was measured on BlackBerry® smartphone. The highest ERP measured was 31.28 dBm (1.34 W) at 1850.20 MHz (channel 512).

The EIRP in the PCS band, EDGE mode was measured on BlackBerry® smartphone. The highest ERP measured was 28.08 dBm (0.64 W) at 1880.0 MHz (channel 661).

The radiated spurious emission and carrier harmonics were measured up to the 10th harmonic for low, middle and high channels in the GSM850 and PCS1900 bands. Each band was measured in GSM, GPRS, and EDGE mode. Both the horizontal and vertical polarizations were measured.

All harmonic emissions measured in the GSM850 band for GSM, GPRS and EDGE modes had a test margin greater than 25.0 dB.

All harmonic emissions measured in the PCS1900 band for GSM, GPRS and EDGE modes had a test margin greater than 25.0 dB.

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/Bluetooth/802.11b/g and PCS1900/Bluetooth/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	09-11-07	Radiated Emissions
Preamplifier system	TDK RF Solutions	PA-02	080010	09-11-07	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA4-SP	001	10-05-08	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA-SP	001	10-03-31	Radiated Emissions
Hybrid Log Antenna	EMC Automation	HLP-3003C	017301	11-02-02	Radiated Emissions
Hybrid Log Antenna	EMC Automation	HLP-3003C	017401	10-09-26	Radiated Emissions
Horn Antenna	EMC Automation	HRN-0118	030101	10-07-22	Radiated Emissions
Horn Antenna	EMC Automation	HRN-0118	030201	11-03-12	Radiated Emissions
Horn Antenna	Emco	3117	47653	09-07-03	Radiated Emissions
Horn Antenna	CMT	LHA 0180	R52734-001	09-12-17	Radiated Emissions
Preamplifier	TDK RF Solutions	18-26	030002	09-11-07	Radiated Emissions
Dipole Antenna	Schwarzbeck	UHAP	1018	11-03-12	Radiated Emissions
Dipole Antenna	Schwarzbeck	UHAP	974	10-10-16	Radiated Emissions
EMC Analyzer	Agilent	E7405A	US40240226	09-11-17	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	837493/073	09-12-08	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	112394	09-12-08	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	102204	09-12-10	RF Conducted Emissions
EMI Receiver	Rohde & Schwarz	ESIB-40	100255	09-12-03	Radiated Emissions
EMI Receiver	Rohde & Schwarz	ESU-40	100162	10-04-22	Radiated Emissions
Spectrum Analyzer	HP	8563E	3745A08112	09-09-22	RF Conducted Emissions
DC Power Supply	HP	6632B	US37472178	09-09-18	RF Conducted Emissions
Environment Monitor	Control Company	1870	230355190	10-01-30	Radiated Emissions

Compliance Test Equipment Used cont'd

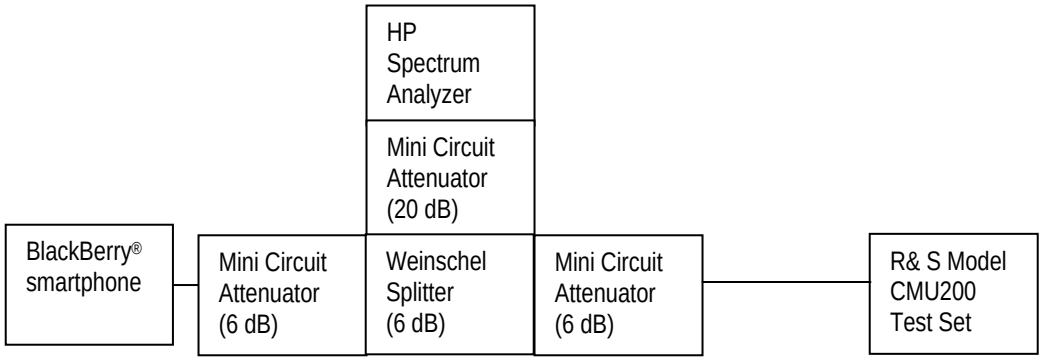
UNIT	MANUFACTURER	MODEL	SERIAL NUMBER	CAL DUE DATE (YY MM DD)	USE
Environment Monitor	Control Company	1870	230355189	10-01-30	RF Conducted Emissions
Environment Monitor	Control Company	1870	80117164	10-01-08	Radiated Emissions
Temperature Probe	Control Company	15-077-21	51129471	10-05-01	Frequency Stability
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	09-10-10	Radiated Emissions
Power Meter	Agilent	N1911A	MY45100951	09-06-23	Frequency Stability
Power Sensor	Agilent	N1921A	MY45241383	09-06-27	Frequency Stability

APPENDIX 1 CONDUCTED RF EMISSIONS TEST DATA/PLOTS

GSM Conducted RF Emission Test Data

This appendix contains measurement data pertaining to conducted spurious emissions, –26 dBc bandwidth, 99% power bandwidth and the channel mask on BlackBerry® smartphone PIN 20E3AC4D.

Test Setup Diagram



The environmental test conditions were:
Temperature: 23ºC
Pressure: 1003 mb
Relative Humidity: 23%

The measurements were performed by Maurice Battler.
Date of test: March 26, 2009

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

–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 273 kHz, and for the PCS1900 band was measured to be 280 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 850 band and 1900 band selected Frequencies in GSM mode.

850 band Frequency (MHz)	-26dBc Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
824.2	267	245.0
837.6	277	246.7
848.8	270	243.3

1900 band Frequency (MHz)	-26dBc Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
1850.2	270	246.7
1880.0	267	245.0
1909.8	268	246.7

Measurement Plots for 850 and 1900 in GSM mode
Refer to the following measurement plots for more detail.
See Figures 1-13a to 1-24a for the plots of the –26dBc Bandwidth and 99% Occupied Bandwidth.
See Figures 1-25a to 1-28a for plots of the channel mask results.

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

GSM Conducted RF Emission Test Data cont'd

Test Data for 850 and 1900 bands selected Frequencies in EDGE mode.

850 band Frequency (MHz)	99% Occupied Bandwidth (kHz)
824.2	246.7
837.6	243.3
848.8	246.7

1900 band Frequency (MHz)	99% Occupied Bandwidth (kHz)
1850.2	243.3
1880.0	243.3
1909.8	245.0

Measurement Plots for 850 and 1900 bands in EDGE mode
Refer to the following measurement plots for more detail.

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

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

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

Date of Test: March 20, 2009

GSM Conducted RF Emission Test Data cont'd

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

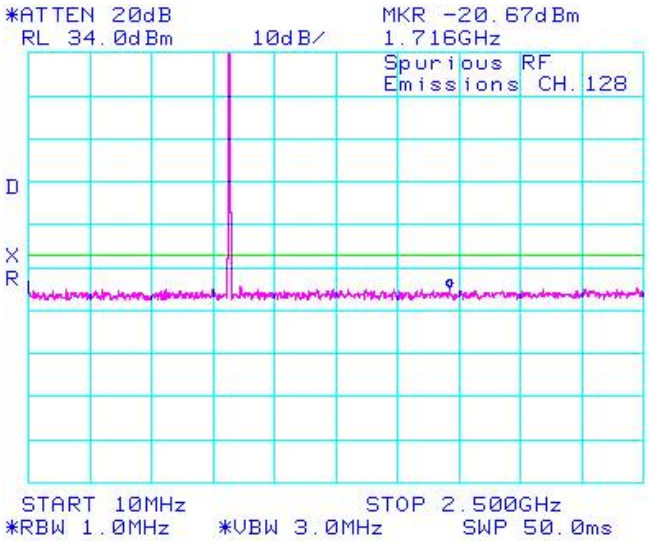


Figure 1-2a: GSM850 band, Spurious Conducted Emissions, Low channel

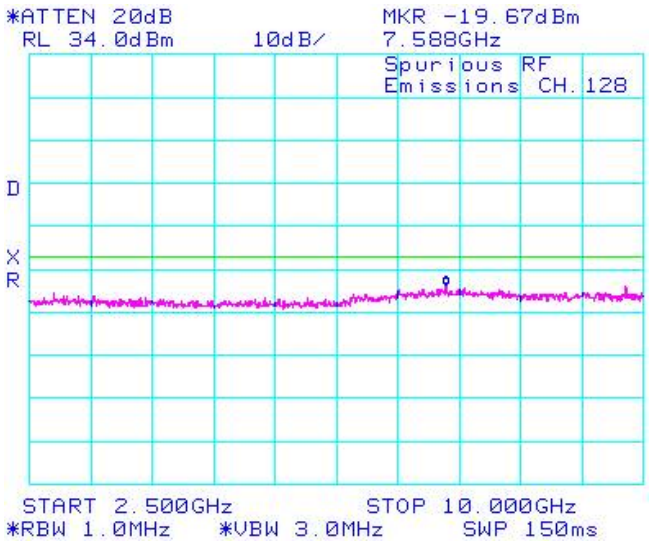


Figure 1-3a: GSM850 band, Spurious Conducted Emissions, Middle Channel

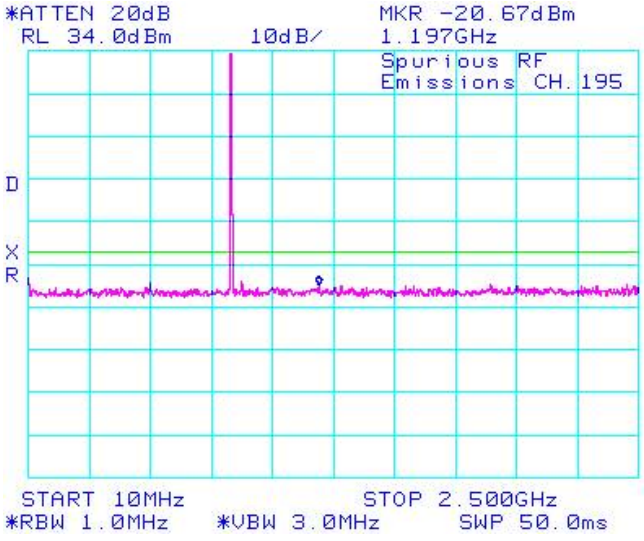
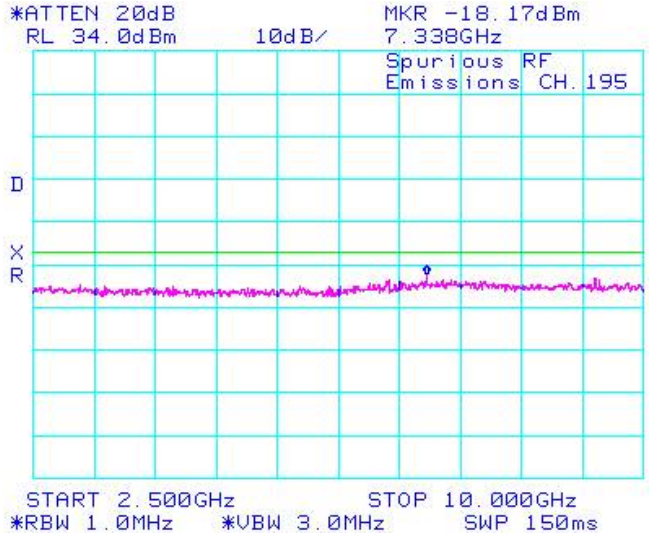


Figure 1-4a: GSM850 band, Spurious Conducted Emissions, Middle Channel



GSM Conducted RF Emission Test Data cont'd

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

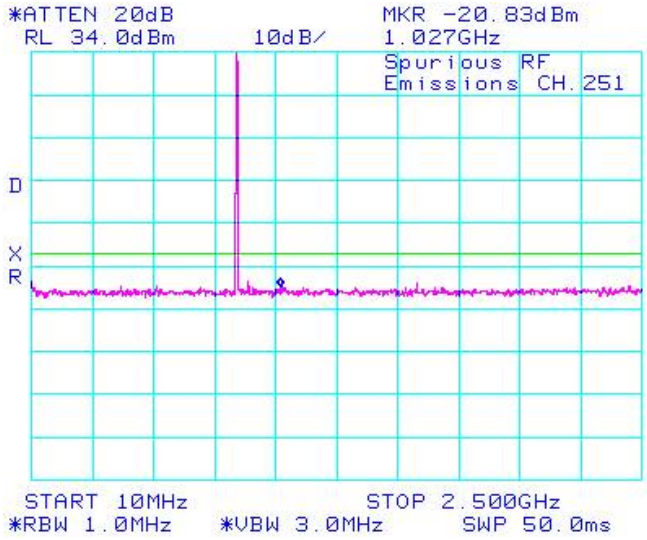


Figure 1-6a: GSM850 band, Spurious Conducted Emissions, High Channel

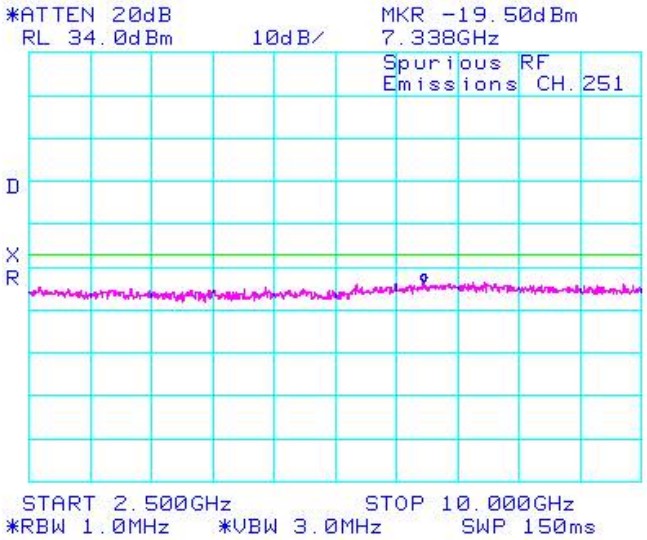


Figure 1-7a: PCS1900 band, Spurious Conducted Emissions, Low Channel

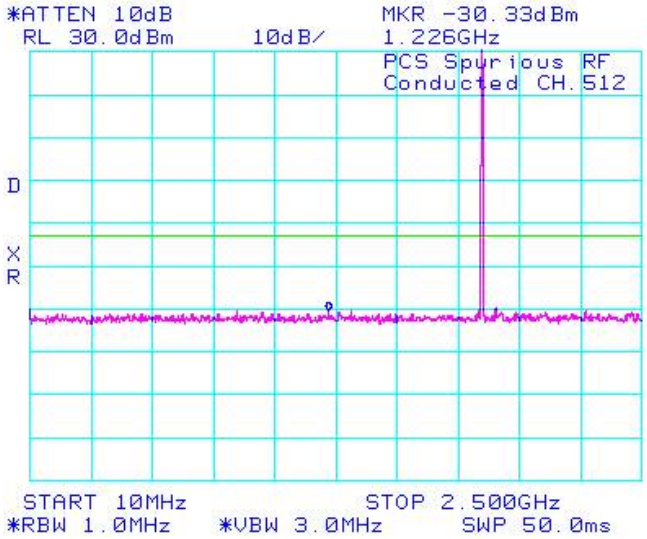
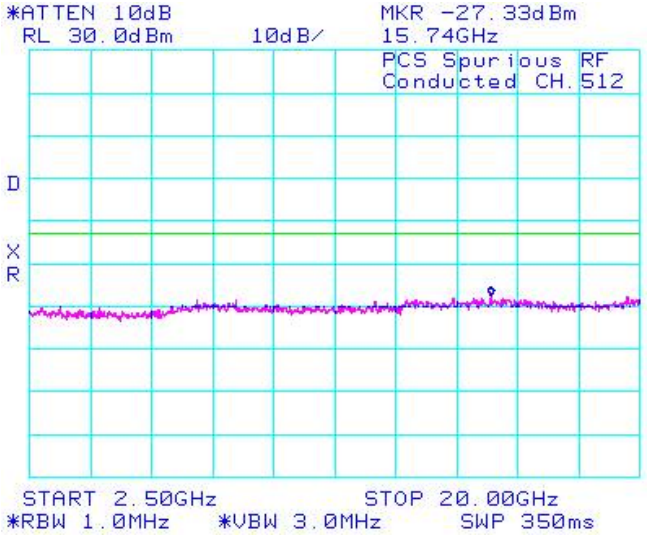


Figure 1-8a: PCS1900 band, Spurious Conducted Emissions, Low Channel



GSM Conducted RF Emission Test Data cont'd

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

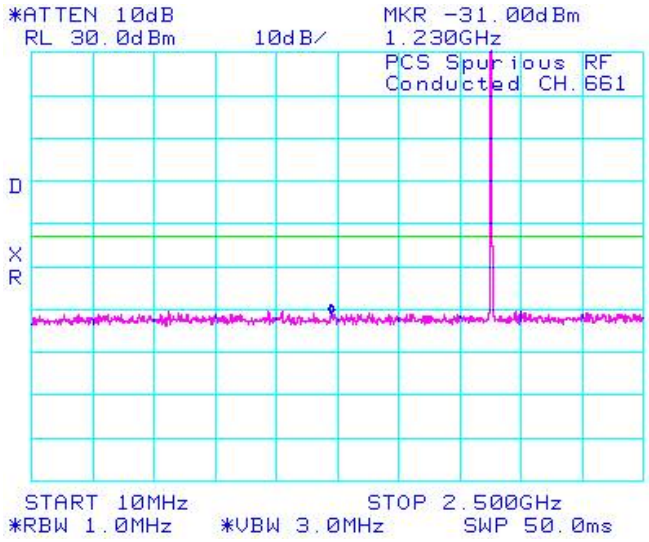


Figure 1-10a: PCS1900 band, Spurious Conducted Emissions, Middle Channel

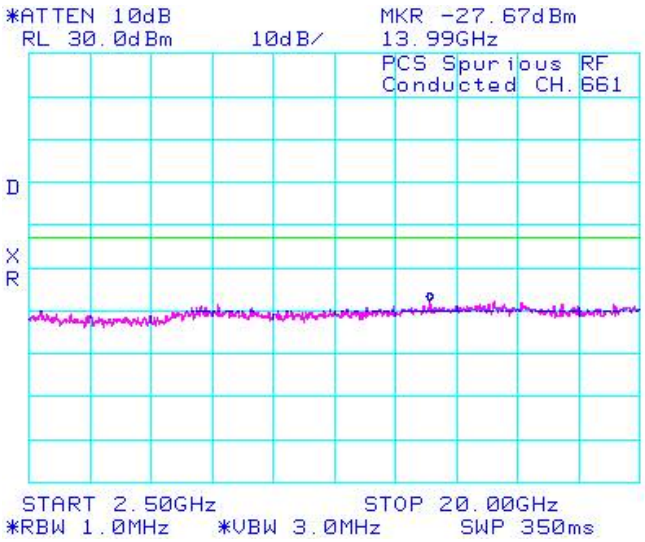


Figure 1-11a: PCS1900 band, Spurious Conducted Emissions, High Channel

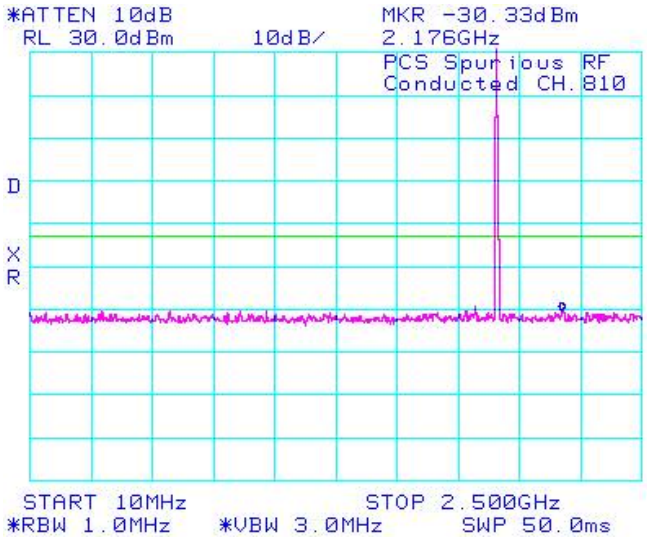
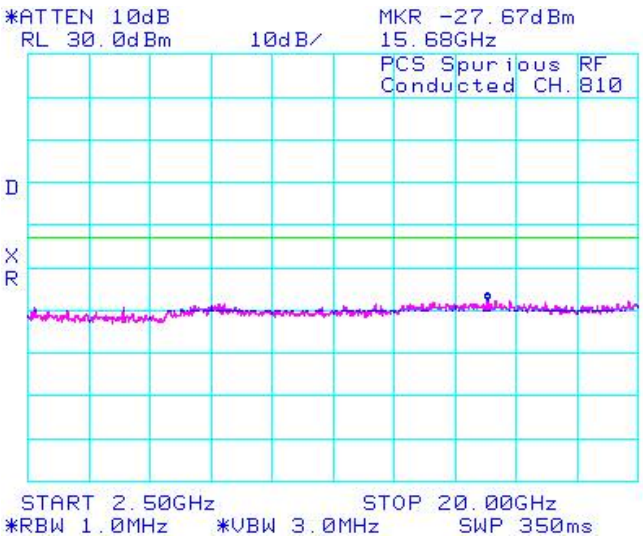


Figure 1-12a: PCS1900 band, Spurious Conducted Emissions, High Channel



GSM Conducted RF Emission Test Data cont'd

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

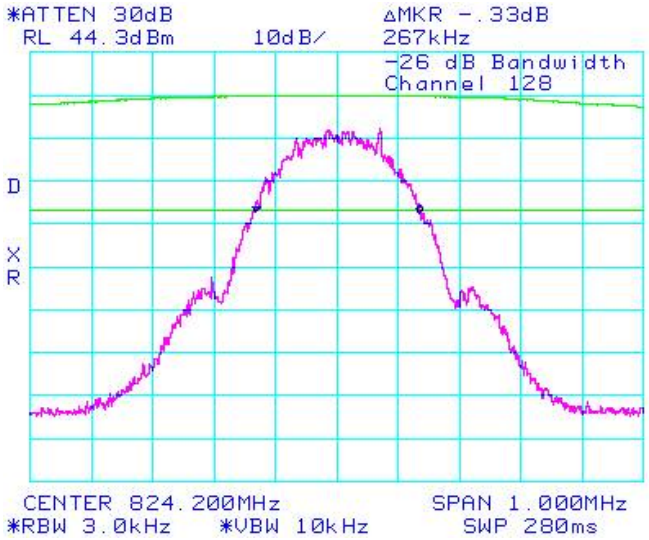


Figure 1-14a: Occupied Bandwidth, GSM850 band Low Channel in GSM mode

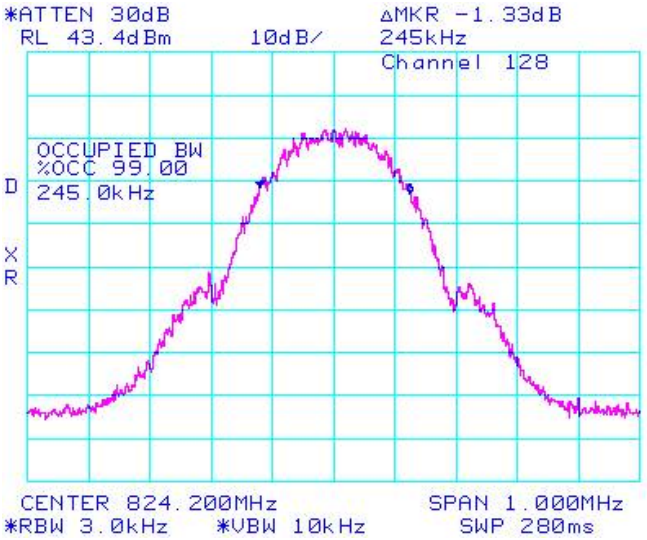


Figure 1-15a: -26dBc bandwidth, GSM850 band Middle Channel in GSM mode

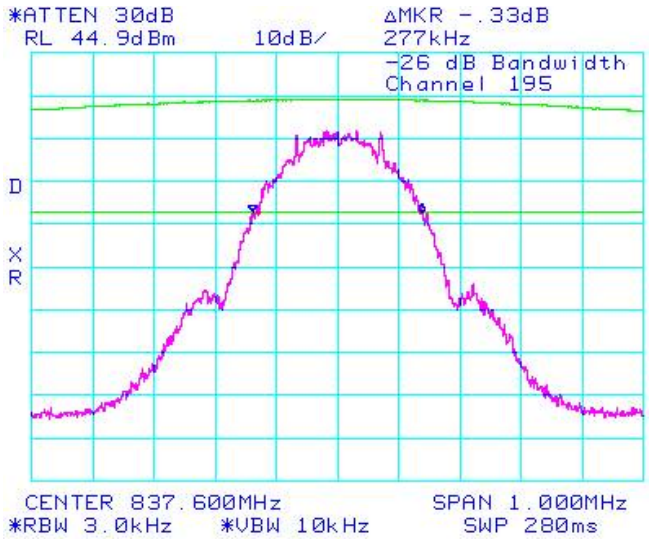
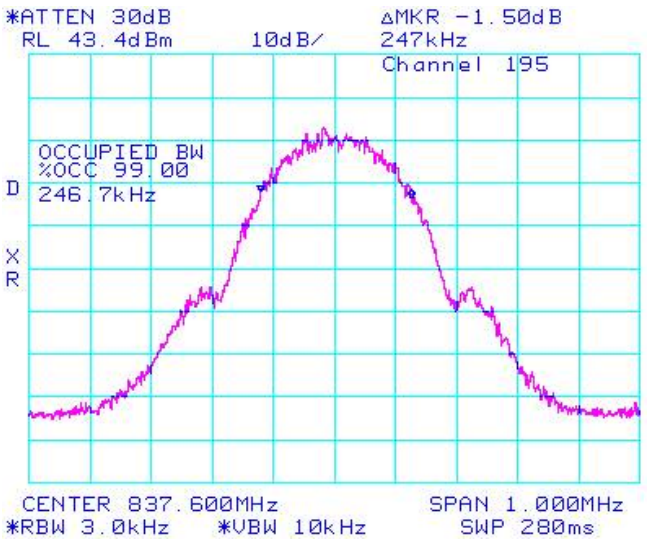


Figure 1-16a: Occupied Bandwidth, GSM850 band Middle Channel in GSM mode



GSM Conducted RF Emission Test Data cont'd

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

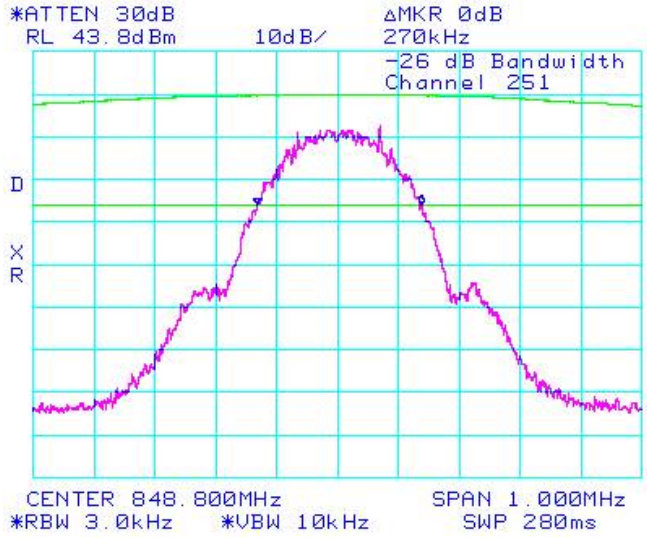


Figure 1-18a: Occupied Bandwidth, GSM850 band High Channel in GSM mode

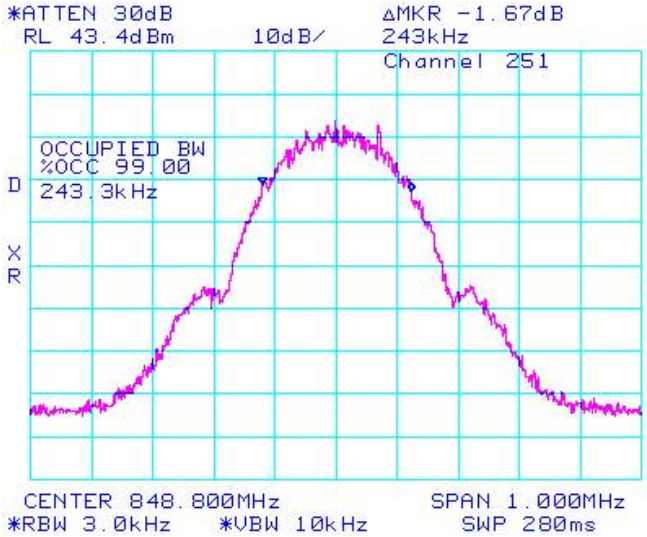


Figure 1-19a: -26dBc bandwidth, PCS1900 Low Channel in GSM mode

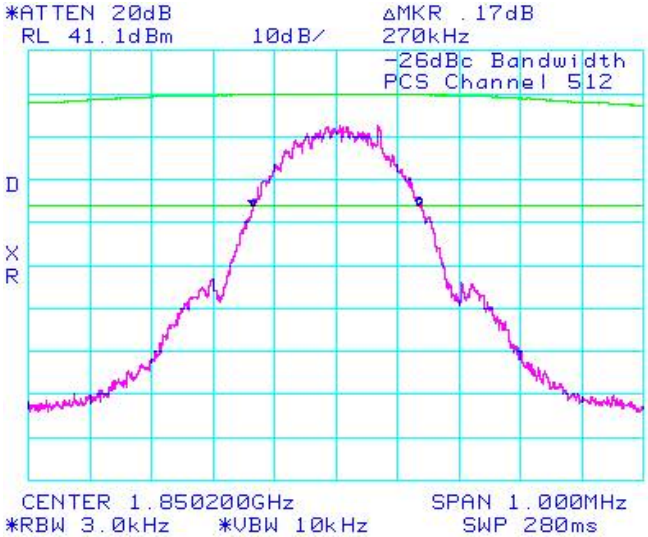
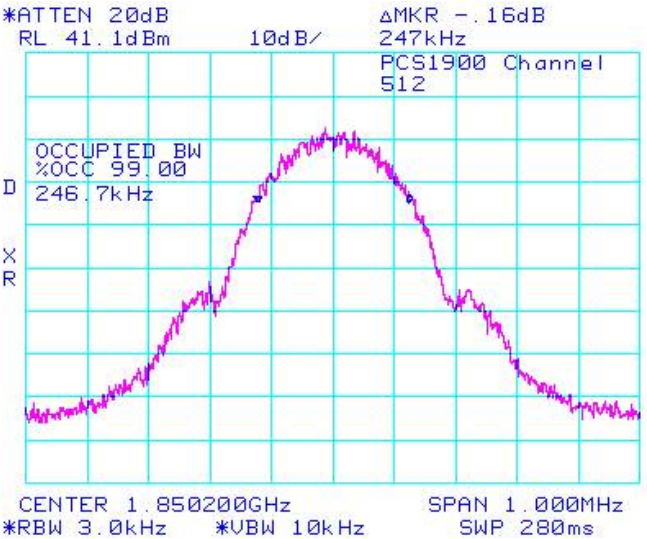


Figure 1-20a: Occupied Bandwidth, PCS1900 Low Channel in GSM mode



GSM Conducted RF Emission Test Data cont'd

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

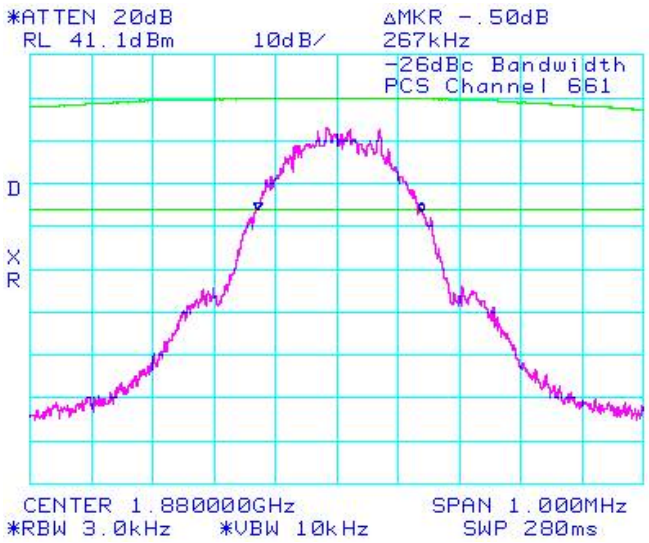


Figure 1-22a: Occupied Bandwidth, PCS1900 Middle Channel in GSM mode

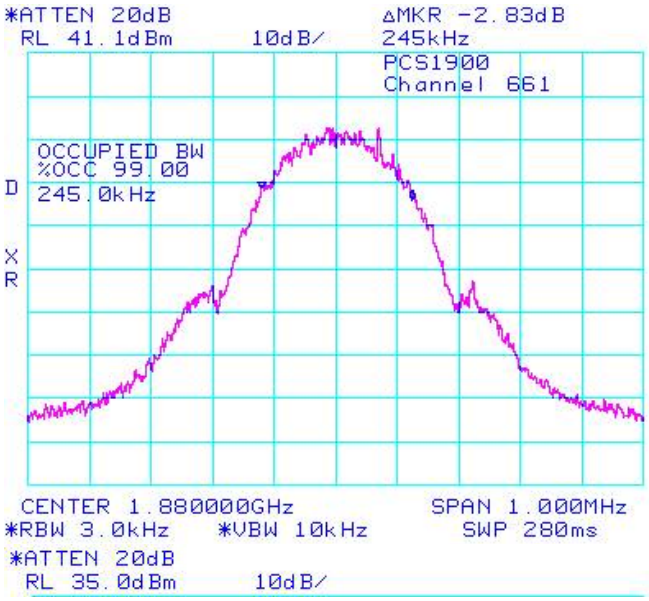


Figure 1-23a: -26dBc bandwidth, PCS1900 High Channel in GSM mode

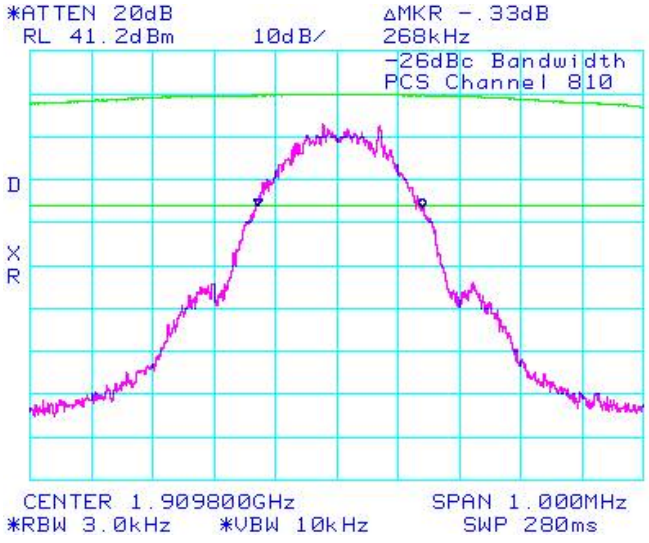
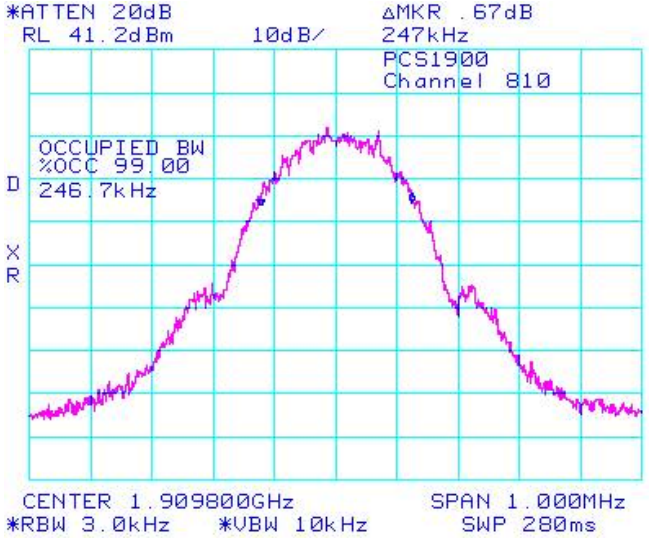


Figure 1-24a: Occupied Bandwidth, PCS1900 High Channel in GSM mode



GSM Conducted RF Emission Test Data cont'd

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

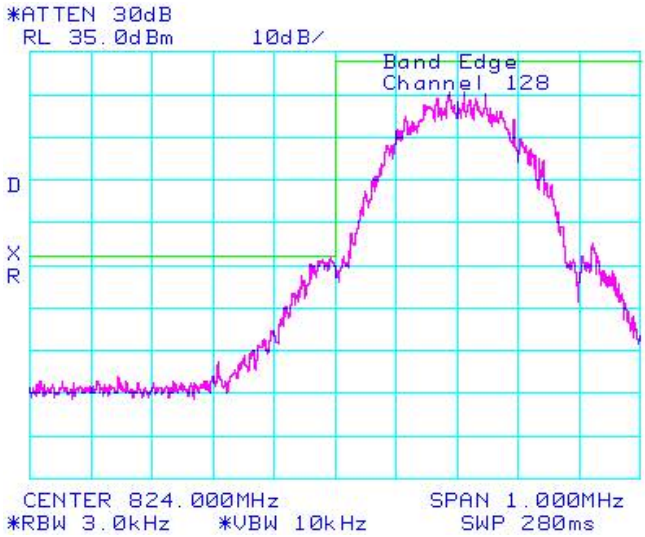


Figure 1-26a: GSM850 band High Channel Mask in GSM mode

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

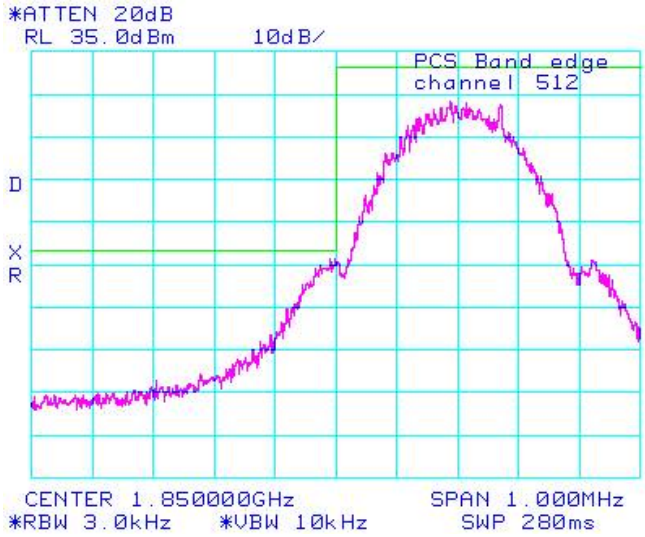
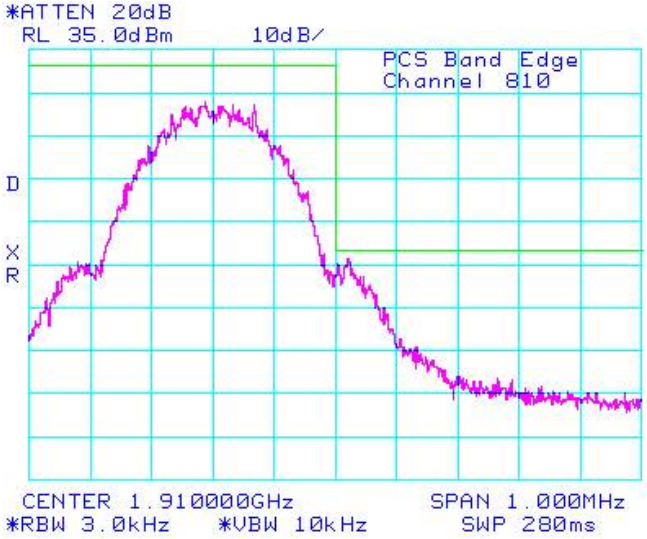


Figure 1-28a: PCS1900, High Channel Mask in GSM mode



GSM Conducted RF Emission Test Data cont'd

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

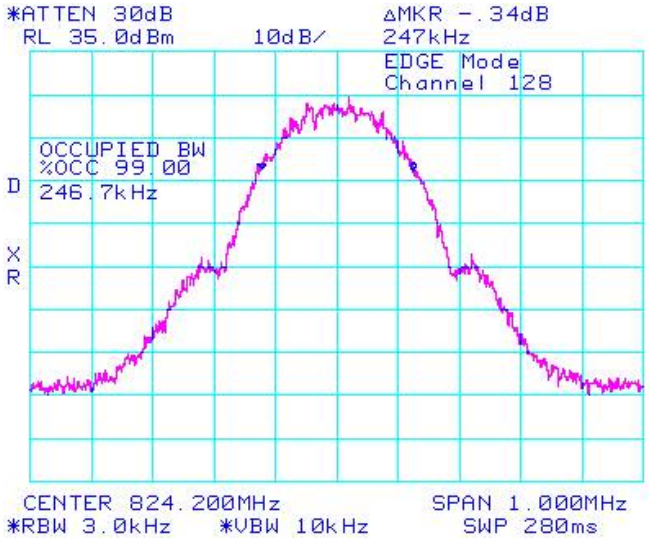


Figure 1-30a: Occupied Bandwidth, GSM850 Band, Middle Channel in EDGE mode

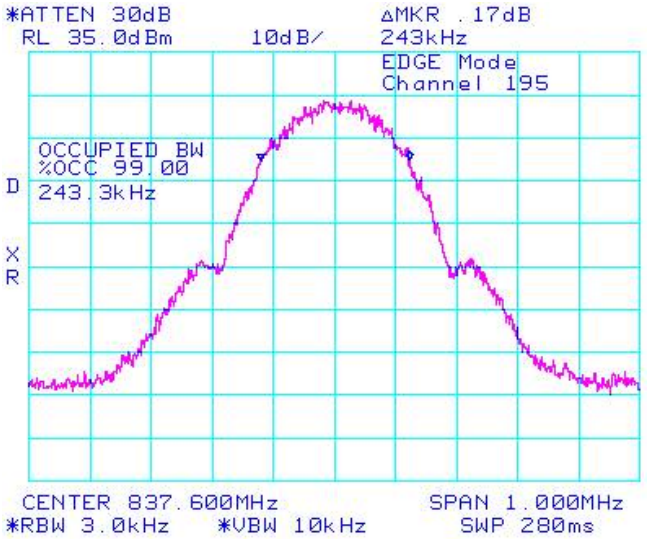


Figure 1-31a: Occupied Bandwidth, GSM850 band, High Channel in EDGE mode

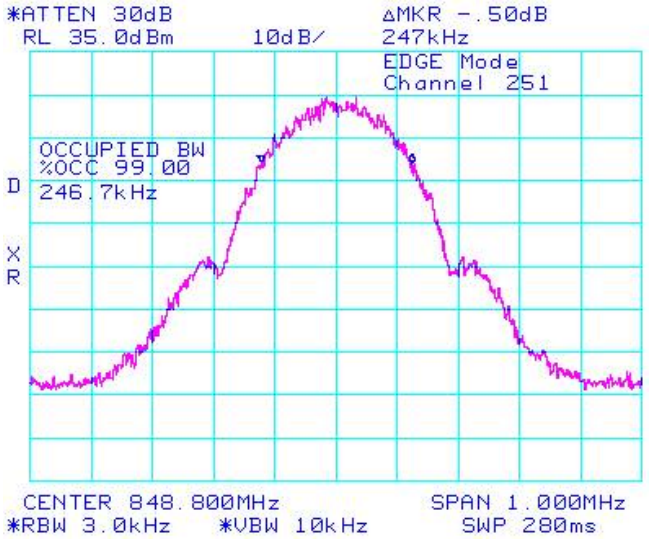
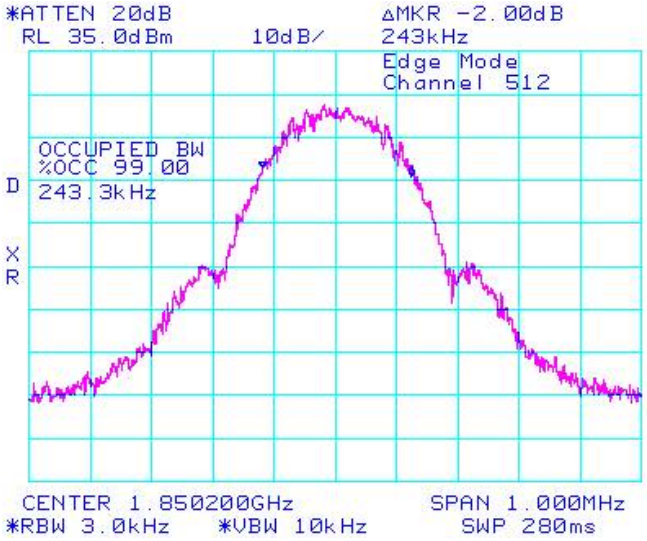


Figure 1-32a: Occupied Bandwidth, PCS1900 Band, Low Channel in EDGE mode



GSM Conducted RF Emission Test Data cont'd

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

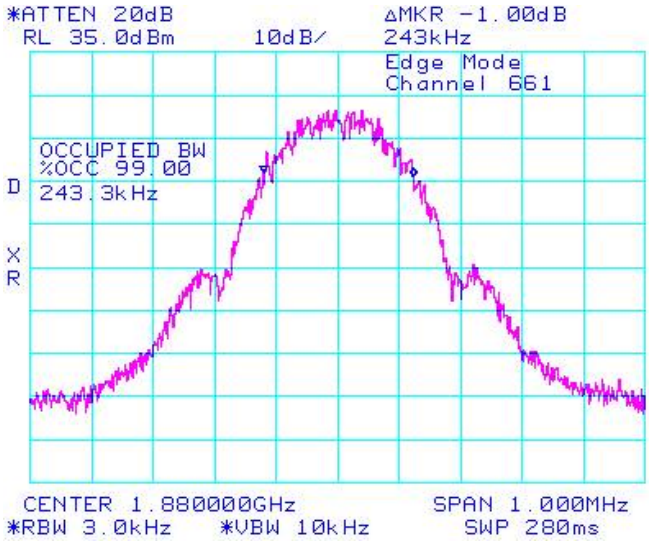
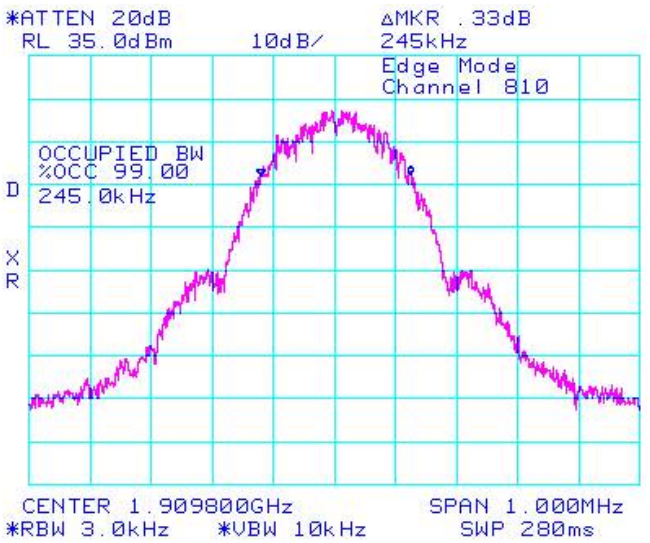


Figure 1-34a: Occupied Bandwidth, PCS1900 Band, High Channel in EDGE mode



GSM Conducted RF Emission Test Data cont'd

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

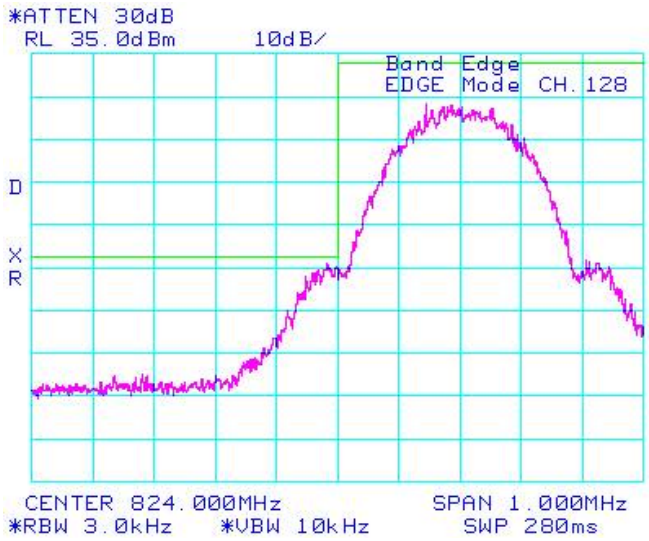


Figure 1-36a: GSM850 band High Channel Mask in EDGE mode

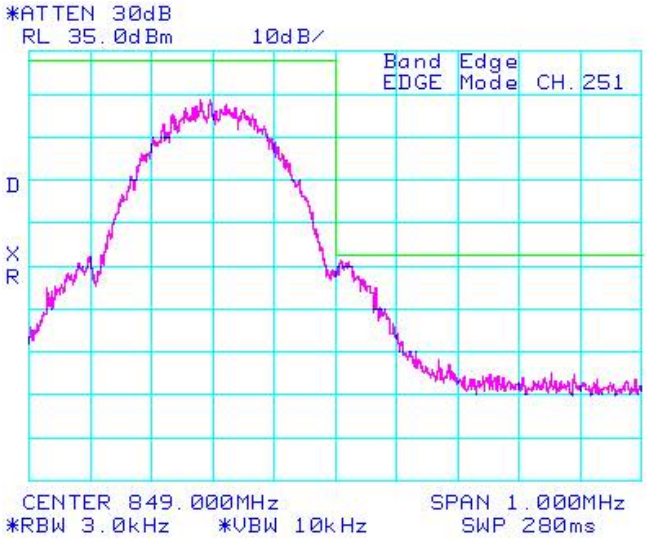


Figure 1-37a: PCS1900, Low Channel Mask in EDGE mode

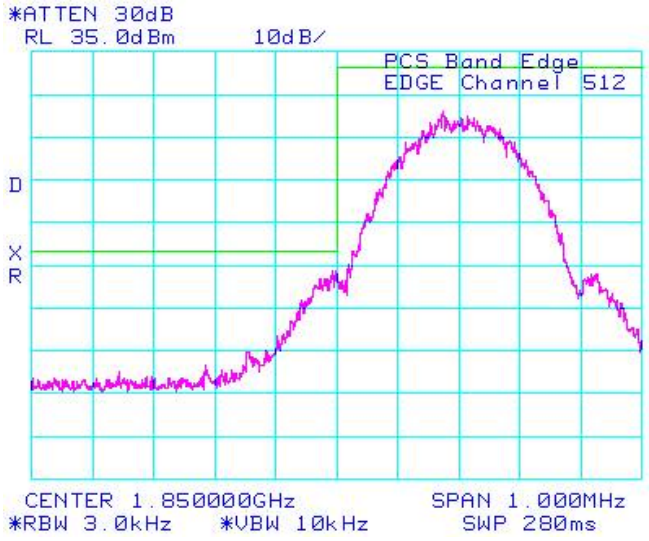
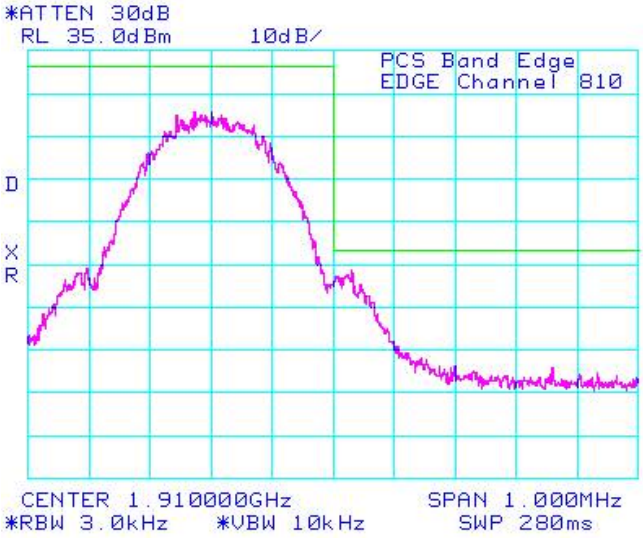


Figure 1-38a: PCS1900, High Channel Mask in EDGE mode



APPENDIX 2 CONDUCTED RF OUTPUT POWER TEST DATA

GSM Conducted RF Output Power Test Data

The conducted RF output power was measured on the BlackBerry® smartphone PIN 20E3AC4D 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 33.5 dBm ±0.5 dB for GSM850 and 30.5 dBm ±0.5 dB for PCS.
Peak nominal output power is 30.5 dBm ±0.5 dB for GSM850 EDGE Mode and 27.0 dBm ±0.5 dB for PCS EDGE Mode.

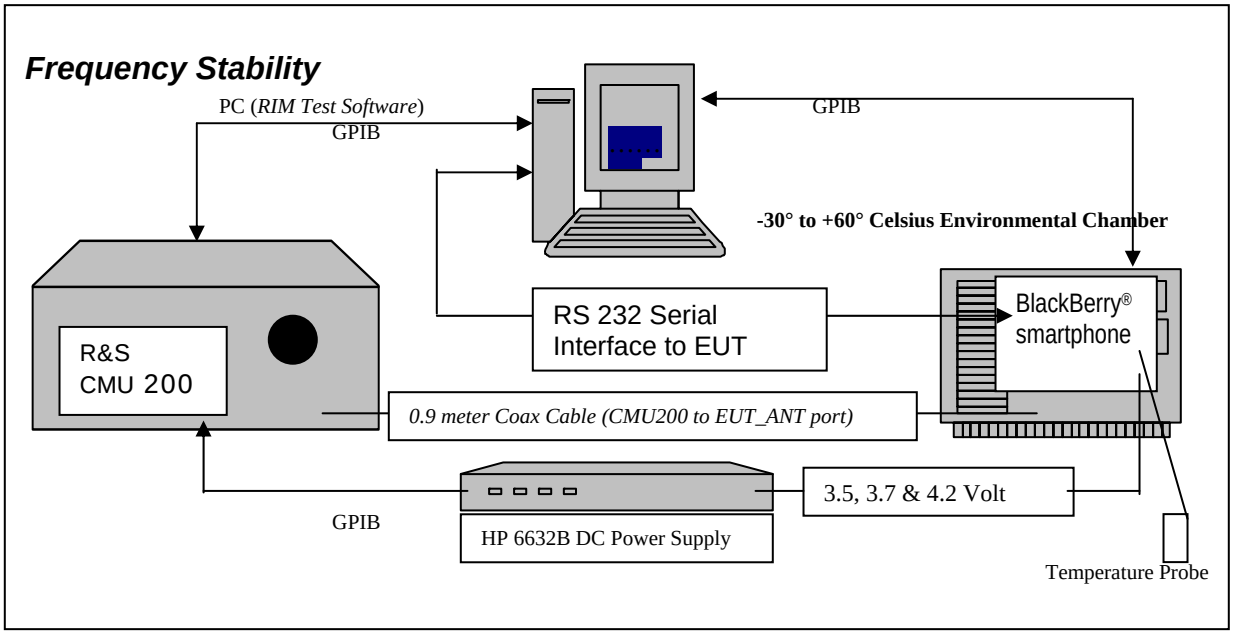
Date of Test: May 11, 2009

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	33.5	2.24	128	824.20	30.7	1.17
190	836.80	33.4	2.19	189	836.80	30.6	1.15
251	848.80	33.2	2.09	251	848.80	30.5	1.12
PCS				PCS EDGE/GPRS/GSM (2-timeslot)			
512	1850.2	30.6	1.15	512	1850.2	27.1	0.51
661	1880.0	30.5	1.12	661	1880.0	27.0	0.50
810	1909.8	29.9	0.98	810	1909.8	26.6	0.46

APPENDIX 3 FREQUENCY STABILITY TEST DATA

GSM 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, CFR 47 chapter 1, Section 22.917 and RSS-132, 4.3 Frequency Stability.

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

Calibration for the Cable Loss was performed in the RF Laboratory using the Agilent power meter and Agilent Signal Generator.
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, 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 **-0.0607 PPM**.
The maximum frequency error in the PCS1900 band measured was **-0.0387 PPM**.

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

The BlackBerry® smartphone PIN 20E3AC4D was tested on March 30, 2009 by Maurice Battler.

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.6	20	-34.03	-0.0413
189	836.40	3.6	20	-18.92	-0.0226
250	848.60	3.6	20	-14.53	-0.0171

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.7	20	-24.21	-0.0294
189	836.40	3.7	20	-17.31	-0.0207
250	848.60	3.7	20	-14.85	-0.0175

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	4.2	20	-10.33	-0.0125
189	836.40	4.2	20	-11.30	-0.0135
250	848.60	4.2	20	-9.94	-0.0117

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	-9.62	-0.0117
128	824.20	3.6	-20	7.81	0.0095
128	824.20	3.6	-10	-40.29	-0.0489
128	824.20	3.6	0	-33.00	-0.0400
128	824.20	3.6	10	-28.73	-0.0349
128	824.20	3.6	20	-34.03	-0.0413
128	824.20	3.6	30	-34.22	-0.0415
128	824.20	3.6	40	-51.08	-0.0620
128	824.20	3.6	50	-45.78	-0.0555
128	824.20	3.6	60	-50.04	**-0.0607**

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.7	-30	-22.41	-0.0272
128	824.20	3.7	-20	-7.30	-0.0089
128	824.20	3.7	-10	-40.55	-0.0492
128	824.20	3.7	0	-34.35	-0.0417
128	824.20	3.7	10	-31.25	-0.0379
128	824.20	3.7	20	-24.21	-0.0294
128	824.20	3.7	30	-21.37	-0.0259
128	824.20	3.7	40	-33.64	-0.0408
128	824.20	3.7	50	-41.13	-0.0499
128	824.20	3.7	60	-53.27	-0.0646

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	4.2	-30	6.78	0.0082
128	824.20	4.2	-20	8.46	0.0103
128	824.20	4.2	-10	-36.81	-0.0447
128	824.20	4.2	0	-28.02	-0.0340
128	824.20	4.2	10	-19.37	-0.0235
128	824.20	4.2	20	-10.33	-0.0125
128	824.20	4.2	30	-8.85	-0.0107
128	824.20	4.2	40	-11.49	-0.0139
128	824.20	4.2	50	-7.75	-0.0094
128	824.20	4.2	60	-6.26	-0.0076

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	-18.27	-0.0218
189	836.40	3.6	-20	-3.29	-0.0039
189	836.40	3.6	-10	-39.97	-0.0478
189	836.40	3.6	0	-32.09	-0.0384
189	836.40	3.6	10	-25.57	-0.0306
189	836.40	3.6	20	-18.92	-0.0226
189	836.40	3.6	30	-18.66	-0.0223
189	836.40	3.6	40	-27.83	-0.0333
189	836.40	3.6	50	-27.44	-0.0328
189	836.40	3.6	60	-38.81	-0.0464

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
189	836.40	3.7	-30	-19.89	-0.0238
189	836.40	3.7	-20	-5.68	-0.0068
189	836.40	3.7	-10	-41.71	-0.0499
189	836.40	3.7	0	-30.15	-0.0360
189	836.40	3.7	10	-24.73	-0.0296
189	836.40	3.7	20	-17.31	-0.0207
189	836.40	3.7	30	-14.59	-0.0174
189	836.40	3.7	40	-22.92	-0.0274
189	836.40	3.7	50	-19.82	-0.0237
189	836.40	3.7	60	-28.73	-0.0343

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
189	836.40	4.2	-30	10.40	0.0124
189	836.40	4.2	-20	9.43	0.0113
189	836.40	4.2	-10	-37.45	-0.0448
189	836.40	4.2	0	-27.18	-0.0325
189	836.40	4.2	10	-20.21	-0.0242
189	836.40	4.2	20	-11.30	-0.0135
189	836.40	4.2	30	-8.20	-0.0098
189	836.40	4.2	40	-11.49	-0.0137
189	836.40	4.2	50	7.17	0.0086
189	836.40	4.2	60	-4.00	-0.0048

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	-18.73	-0.0221
250	848.60	3.6	-20	-3.10	-0.0037
250	848.60	3.6	-10	-40.62	-0.0479
250	848.60	3.6	0	-30.48	-0.0359
250	848.60	3.6	10	-22.34	-0.0263
250	848.60	3.6	20	-14.53	-0.0171
250	848.60	3.6	30	-11.62	-0.0137
250	848.60	3.6	40	-20.53	-0.0242
250	848.60	3.6	50	-15.95	-0.0188
250	848.60	3.6	60	-21.18	-0.0250

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
250	848.60	3.7	-30	-18.34	-0.0216
250	848.60	3.7	-20	-6.13	-0.0072
250	848.60	3.7	-10	-40.03	-0.0472
250	848.60	3.7	0	-30.15	-0.0355
250	848.60	3.7	10	-26.73	-0.0315
250	848.60	3.7	20	-14.85	-0.0175
250	848.60	3.7	30	-12.01	-0.0142
250	848.60	3.7	40	-16.27	-0.0192
250	848.60	3.7	50	-13.62	-0.0160
250	848.60	3.7	60	-17.24	-0.0203

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
250	848.60	4.2	-30	12.66	0.0149
250	848.60	4.2	-20	9.43	0.0111
250	848.60	4.2	-10	-37.90	-0.0447
250	848.60	4.2	0	-26.41	-0.0311
250	848.60	4.2	10	-19.11	-0.0225
250	848.60	4.2	20	-9.94	-0.0117
250	848.60	4.2	30	-5.75	-0.0068
250	848.60	4.2	40	-8.59	-0.0101
250	848.60	4.2	50	5.10	0.0060
250	848.60	4.2	60	4.39	0.0052

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

The BlackBerry® smartphone PIN 20E3AC4D was tested on March 31, 2009 by Maurice Battler.

Traffic Channel Number	PCS Frequency (MHz	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	*PPM*
512	1850.2	3.6	20	-71.29	-0.0385
661	1880.0	3.6	20	-72.71	-0.0387
810	1909.8	3.6	20	-15.88	-0.0083

Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	3.7	20	-19.24	-0.0104
661	1880.0	3.7	20	-13.56	-0.0072
810	1909.8	3.7	20	-14.98	-0.0078

Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	4.2	20	-14.72	-0.0080
661	1880.0	4.2	20	6.39	0.0034
810	1909.8	4.2	20	6.78	0.0036

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	41.65	0.0225
512	1850.2	3.6	-20	10.78	0.0058
512	1850.2	3.6	-10	-34.68	-0.0187
512	1850.2	3.6	0	-43.39	-0.0235
512	1850.2	3.6	10	-36.22	-0.0196
512	1850.2	3.6	20	-71.29	-0.0385
512	1850.2	3.6	30	-29.25	-0.0158
512	1850.2	3.6	40	-11.49	-0.0062
512	1850.2	3.6	50	34.09	0.0184
512	1850.2	3.6	60	-27.77	-0.0150

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	3.7	-30	28.61	0.0155
512	1850.2	3.7	-20	-14.59	-0.0079
512	1850.2	3.7	-10	-41.65	-0.0225
512	1850.2	3.7	0	-52.43	-0.0283
512	1850.2	3.7	10	-48.88	-0.0264
512	1850.2	3.7	20	-19.24	-0.0104
512	1850.2	3.7	30	-38.61	-0.0209
512	1850.2	3.7	40	-24.34	-0.0132
512	1850.2	3.7	50	12.91	0.0070
512	1850.2	3.7	60	-47.85	-0.0259

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	4.2	-30	38.81	0.0210
512	1850.2	4.2	-20	8.78	0.0047
512	1850.2	4.2	-10	-39.00	-0.0211
512	1850.2	4.2	0	-48.43	-0.0262
512	1850.2	4.2	10	-38.29	-0.0207
512	1850.2	4.2	20	-14.72	-0.0080
512	1850.2	4.2	30	-32.29	-0.0175
512	1850.2	4.2	40	-12.66	-0.0068
512	1850.2	4.2	50	31.19	0.0169
512	1850.2	4.2	60	-26.41	-0.0143

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	46.81	0.0249
661	1880	3.6	-20	9.04	0.0048
661	1880	3.6	-10	-32.35	-0.0172
661	1880	3.6	0	-46.10	-0.0245
661	1880	3.6	10	-35.97	-0.0191
661	1880	3.6	20	-72.71	**-0.0387**
661	1880	3.6	30	-31.96	-0.0170
661	1880	3.6	40	-14.08	-0.0075
661	1880	3.6	50	29.90	0.0159
661	1880	3.6	60	-31.83	-0.0169

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880	3.7	-30	-9.81	-0.0052
661	1880	3.7	-20	-7.68	-0.0041
661	1880	3.7	-10	-35.13	-0.0187
661	1880	3.7	0	-51.72	-0.0275
661	1880	3.7	10	-42.17	-0.0224
661	1880	3.7	20	-13.56	-0.0072
661	1880	3.7	30	-35.64	-0.0190
661	1880	3.7	40	-17.37	-0.0092
661	1880	3.7	50	22.60	0.0120
661	1880	3.7	60	-38.29	-0.0204

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880	4.2	-30	-5.49	-0.0029
661	1880	4.2	-20	23.50	0.0125
661	1880	4.2	-10	-33.96	-0.0181
661	1880	4.2	0	-41.00	-0.0218
661	1880	4.2	10	-28.28	-0.0150
661	1880	4.2	20	6.39	0.0034
661	1880	4.2	30	-25.05	-0.0133
661	1880	4.2	40	8.39	0.0045
661	1880	4.2	50	-24.67	-0.0131
661	1880	4.2	60	-10.27	-0.0055

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	37.00	0.0194
810	1909.8	3.6	-20	-8.46	-0.0044
810	1909.8	3.6	-10	-40.23	-0.0211
810	1909.8	3.6	0	-49.91	-0.0261
810	1909.8	3.6	10	-42.10	-0.0220
810	1909.8	3.6	20	-15.88	-0.0083
810	1909.8	3.6	30	-35.45	-0.0186
810	1909.8	3.6	40	-16.98	-0.0089
810	1909.8	3.6	50	22.34	0.0117
810	1909.8	3.6	60	-45.39	-0.0238

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
810	1909.8	3.7	-30	-14.79	-0.0077
810	1909.8	3.7	-20	-7.94	-0.0042
810	1909.8	3.7	-10	-37.90	-0.0198
810	1909.8	3.7	0	-50.82	-0.0266
810	1909.8	3.7	10	-43.46	-0.0228
810	1909.8	3.7	20	-14.98	-0.0078
810	1909.8	3.7	30	-36.74	-0.0192
810	1909.8	3.7	40	-19.05	-0.0100
810	1909.8	3.7	50	20.60	0.0108
810	1909.8	3.7	60	-49.66	-0.0260

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
810	1909.8	4.2	-30	30.15	-11.56
810	1909.8	4.2	-20	30.33	19.82
810	1909.8	4.2	-10	30.39	-35.45
810	1909.8	4.2	0	30.50	-41.00
810	1909.8	4.2	10	30.61	-30.80
810	1909.8	4.2	20	30.73	6.78
810	1909.8	4.2	30	30.82	-26.09
810	1909.8	4.2	40	30.92	8.39
810	1909.8	4.2	50	31.02	-28.61
810	1909.8	4.2	60	31.07	-11.82

APPENDIX 4 RADIATED EMISSIONS TEST DATA

Radiated Power Test Data Results

GSM850 Band

GSM Mode

The measurements were performed by Andrew Fleming.
Date of test: June 15, 2009
The environmental tests conditions were: Temperature: 24°C
Pressure: 1016 mb
Relative Humidity: 23%

The BlackBerry® smartphone PIN 20EB5E4B was in standalone, USB down position.
Test distance is 3.0 metres.

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 20EB5E4B Standalone, USB down position													
F0	128	824.20	850	Dipole	V	77.23	88.65	V-V	16.40	**31.44**	1.39	38.50	-7.06
F0	128	824.20	850	Dipole	H	88.65		H-H	12.70				
F0	195	837.60	850	Dipole	V	78.29	87.65	V-V	13.90	28.94	0.78	38.50	-9.56
F0	195	837.60	850	Dipole	H	87.65		H-H	12.80				
F0	251	848.80	850	Dipole	V	76.83	87.31	V-V	15.20	30.13	1.03	38.50	-8.37
F0	251	848.80	850	Dipole	H	87.31		H-H	12.40				

Radiated Power Test Data Results, Cont'd

GSM850 Band

GPRS Mode

The measurements were performed by Andrew Fleming.
Date of test: June 15, 2009
The environmental tests conditions were: Temperature: 24°C
Pressure: 1016 mb
Relative Humidity: 23%

The BlackBerry® smartphone PIN 20EB5E4B was in standalone, USB down position.
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, PIN 20EB5E4B, Standalone, USB down position													
F0	128	824.20	850	Dipole	V	74.36	85.19	V-V	12.90	27.94	0.62	38.50	-10.56
F0	128	824.20	850	Dipole	H	85.19		H-H	9.30				
F0	195	837.60	850	Dipole	V	75.56	84.83	V-V	11.10	26.14	0.41	38.50	-12.36
F0	195	837.60	850	Dipole	H	84.83		H-H	9.80				
F0	251	848.80	850	Dipole	V	74.67	84.58	V-V	12.40	27.33	0.54	38.50	-11.17
F0	251	848.80	850	Dipole	H	84.58		H-H	9.70				

Radiated Power Test Data Results, Cont'd

GSM850 Band

EDGE Mode

The measurements were performed by Andrew Fleming.
Date of test: June 15, 2009
The environmental tests conditions were: Temperature: 24°C
Pressure: 1016 mb
Relative Humidity: 23%

The BlackBerry® smartphone PIN 20EB5E4B was in standalone, USB down position.
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, PIN 20EB5E4B, Standalone, USB down position													
F0	128	824.20	850	Dipole	V	75.15	84.70	V-V	12.40	27.44	0.55	38.50	-11.06
F0	128	824.20	850	Dipole	H	84.70		H-H	9.60				
F0	195	837.60	850	Dipole	V	76.15	84.79	V-V	11.00	26.04	0.40	38.50	-12.46
F0	195	837.60	850	Dipole	H	84.79		H-H	9.80				
F0	251	848.80	850	Dipole	V	74.15	85.50	V-V	13.50	**28.43**	0.70	38.50	-10.07
F0	251	848.80	850	Dipole	H	85.50		H-H	10.40				

Radiated Power Test Data Results cont'd

PCS1900 Band

GSM Mode

Date of test: May 04, 2009
The environmental test conditions were: Temperature: 25ºC
Pressure: 1010 mb
Relative Humidity: 31%

The BlackBerry® smartphone PIN 20EB5E4B was in standalone, Vertical down position.
Test Distance was 3.0 metres.

								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, PIN 20EB5E4B, Standalone, Vertical down position													
F0	512	1850.20	1900	Horn	V	93.30	93.30	V-V	-5.90	**31.28**	1.34	33	-1.72
F0	512	1850.20	1900	Horn	H	88.39		H-H	-5.10				
F0	661	1880.00	1900	Horn	V	92.70	92.70	V-V	-6.10	31.18	1.31	33	-1.82
F0	661	1880.00	1900	Horn	H	88.09		H-H	-5.10				
F0	810	1909.80	1900	Horn	V	92.50	92.50	V-V	-6.20	30.92	1.23	33	-2.08
F0	810	1909.80	1900	Horn	H	86.90		H-H	-5.40				

Radiated Power Test Data Results cont'd

PCS1900 Band

GPRS Mode

Date of test: May 04, 2009
The environmental test conditions were: Temperature: 25ºC
Pressure: 1010 mb
Relative Humidity: 31%

The BlackBerry® smartphone PIN 20EB5E4B was in standalone, Vertical down position.
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, PIN 20EB5E4B, Vertical down position													
F0	512	1850.20	1900	Horn	V	89.41	89.41	V-V	-9.80	27.28	0.53	33	-5.72
F0	512	1850.20	1900	Horn	H	85.18		H-H	-9.10				
F0	661	1880.00	1900	Horn	V	87.07	88.50	V-V	-9.80	27.38	0.55	33	-5.62
F0	661	1880.00	1900	Horn	H	84.71		H-H	-8.90				
F0	810	1909.80	1900	Horn	V	89.60	89.60	V-V	-9.10	28.02	0.63	33	-4.98
F0	810	1909.80	1900	Horn	H	84.17		H-H	-8.30				

Radiated Power Test Data Results cont'd

PCS1900 Band

EDGE Mode

Date of test: May 04, 2009
The environmental test conditions were: Temperature: 25ºC
Pressure: 1010 mb
Relative Humidity: 31%

The BlackBerry® smartphone PIN 20EB5E4B was in standalone, Vertical down position.
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, PIN 20EB5E4B, Vertical down position													
F0	512	1850.20	1900	Horn	V	89.46	89.46	V-V	-9.80	27.38	0.55	33	-5.62
F0	512	1850.20	1900	Horn	H	85.26		H-H	-9.00				
F0	661	1880.00	1900	Horn	V	89.60	89.60	V-V	-9.20	**28.08**	0.64	33	-4.92
F0	661	1880.00	1900	Horn	H	84.82		H-H	-8.20				
F0	810	1909.80	1900	Horn	V	87.43	88.34	V-V	-9.90	27.32	0.54	33	-5.68
F0	810	1909.80	1900	Horn	H	83.29		H-H	-9.00				

Radiated Emissions Test Data Results

GSM850

GSM Mode

The measurements were performed by Andrew Fleming and Heng Lin.
Date of Test: April 30 and May 01, 2009
The environmental test conditions were: Temperature: 24ºC
Pressure: 1027 mb
Relative Humidity: 22%

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 20EB5E4B was in standalone, USB down position.
The measurements were performed in GSM850 Tx mode, channel 128, 195 and 251.
All emissions had a test margin greater than 25.0 dB.

Date of Test: April 29 and May 04, 2009
The environmental test conditions were: Temperature: 24ºC
Pressure: 1028 mb
Relative Humidity: 27%

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 9 GHz.
The BlackBerry® smartphone PIN 20EB5E5E was in standalone, Vertical position.
The measurements were performed in GSM Tx mode, channel 128, 195 and 251.
All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

GSM850

GPRS Mode

Date of Test: May 06, 2009
The environmental test conditions were: Temperature: 23ºC
Pressure: 1009 mb
Relative Humidity: 27%

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 20EB5E4B was in standalone, USB down position.
The measurements were performed in GSM850 GPRS Tx mode, channel 195.
All emissions had a test margin greater than 25.0 dB.

Date of Test: May 04, 2009
The environmental test conditions were: Temperature: 24ºC
Pressure: 1028 mb
Relative Humidity: 27%

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 9 GHz.
The BlackBerry® smartphone PIN 20EB5E5E was in standalone, Vertical position.
The measurements were performed in GSM850 GPRS Tx mode, channel 195.
All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

GSM850

EDGE Mode

Date of Test: May 01 and May 04, 2009
The environmental test conditions were: Temperature: 24ºC
Pressure: 1027 mb
Relative Humidity: 22%

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 20EB5E4B was in standalone, USB down position.
The measurements were performed in GSM850 EDGE Tx mode, channel 128, 195 and 251.
All emissions had a test margin greater than 25.0 dB.

Date of Test: May 01 and May 04, 2009
The environmental test conditions were: Temperature: 24ºC
Pressure: 1028 mb
Relative Humidity: 27%

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 9 GHz.
The BlackBerry® smartphone PIN 20EB5E5E was in standalone, Vertical position.
The measurements were performed in GSM850 EDGE Tx mode, channels 128, 195 and 251.
All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

PCS1900

GSM Mode

Date of Test: April 29, 2009
The environmental test conditions were: Temperature: 22ºC
Pressure: 1017 mb
Relative Humidity: 24%

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 20EB5E4B was in standalone, Vertical down position
The measurements were performed in PCS1900 Tx mode, channels 512, 661 and 810.
All emissions had a test margin greater than 25.0 dB.

Date of Test: April 29, May 04 and May 05, 2009
The environmental test conditions were: Temperature: 25ºC
Pressure: 1027 mb
Relative Humidity: 27%

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 20 GHz.
The BlackBerry® smartphone PIN 20EB5E5E was in standalone, Horizontal down position.
The measurements were performed in PCS1900 Tx mode, channels 512, 661 and 810.
All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

PCS1900

GPRS Mode

Date of Test: April 29, 2009
The environmental test conditions were: Temperature: 23ºC
Pressure: 1013 mb
Relative Humidity: 28%

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 20EB5E4B was in standalone, Vertical down position
The measurements were performed in PCS1900 GPRS Tx mode, channel 661.
All emissions had a test margin greater than 25.0 dB.

Date of Test: May 04 and May 05, 2009
The environmental test conditions were: Temperature: 25ºC
Pressure: 1027 mb
Relative Humidity: 27%

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 20 GHz.
The BlackBerry® smartphone PIN 20EB5E5E was in standalone, Horizontal down position.
The measurements were performed in PCS1900 GPRS Tx mode, channel 661.
All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

PCS1900

EDGE Mode

Date of Test: April 29, 2009
The environmental test conditions were: Temperature: 23ºC
Pressure: 1013 mb
Relative Humidity: 28%

Test Distance was 3.0 metres with a height of 1.0 metres, 30 MHz to 1000 MHz.
The BlackBerry® smartphone PIN 20EB5E4B was in standalone, Vertical down position
The measurements were performed in PCS1900 EDGE Tx mode, channels 512, 661 and 810.
All emissions had a test margin greater than 25.0 dB.

Date of Test: May 01, May 04 and May 05, 2009
The environmental test conditions were: Temperature: 25ºC
Pressure: 1027 mb
Relative Humidity: 27%

Test Distance was 3.0 metres with a height of 1.0 metres, 1 GHz to 20 GHz.
The BlackBerry® smartphone PIN 20EB5E5E was in standalone, Horizontal down position.
The measurements were performed in PCS1900 EDGE Tx mode, channels 512, 661 and 810.
All emissions had a test margin greater than 25.0 dB.