EMI Test Report

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

RIM Testing Services (RTS)

A division of Research In Motion Limited

REPORT NO: RTS-0665-0710-12-Rev1

PRODUCT MODEL NO: RBQ41GW
TYPE NAME: BlackBerry® smartphone
FCC ID: L6ARBQ40GW
IC: 2503A-RBQ40GW
EMISSION DESIGNATOR (GSM): 245KG7W
EMISSION DESIGNATOR (EDGE): 247KGXW

This Rev1 test report supersedes the previous version RTS-0665-0710-12 dated 24th Oct, 2007

DATE: 04 January, 2008

Statement of Performance:

The BlackBerry® smartphone, model RBQ41GW, part number CER-16647-001 Rev. 1 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.

Document and Tested by:

Vimal Olaganathan
Compliance Specialist
Date: 04 Jan 2008

Reviewed by:

Maurice Battler
Compliance Specialist
Date: 04 Jan 2008

Tested and reviewed by:

Masud S. Attayi, P.Eng.
Team Lead, Regulatory Compliance
Date: 04 Jan 2008

Approved by:

Paul G. Cardinal, Ph.D.
Director
Date: 04 Jan 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 3, June 2005, 2 GHz Personal Communications Services.
- Industry Canada, RSS-GEN Issue 3, June 2007, General Requirements and Information for the Certification of Radiocommunication Equipment

B. Associated Document

1. None.

C. Product Identification

Manufactured by Research In Motion Limited located at:

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

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

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

The testing was performed on October 5 to 17, 2007.

The sample EUT included:

SAMPLE	MODEL	CER NUMBER	PIN
1	RBQ41GW	CER-16647-001 Rev. 1	20662E34
2	RBQ41GW	CER-16647-001 Rev. 1	20662E31

Conducted RF measurements were performed on BlackBerry® smartphone PIN 20662E31. Radiated Emission measurements were performed on BlackBerry® smartphone PIN 20662E34.

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. Modifications to EUT

No modifications were required on the EUT.

F. Summary of Results

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

1) The EUT met the requirements of the Tx Conducted Spurious Emissions requirements in the GSM850 band as per 47 CFR 2.1051, CFR 22.917, CFR 22.901(d) and RSS-GEN, 4.9. The EUT was measured on the low, middle and high channels. The frequency range investigated was from 10 MHz to 10 GHz.
   See APPENDIX 1 for test data.

2) The EUT met the requirements of the Tx Conducted Spurious Emissions requirements in the PCS1900 band as per 47 CFR 2.1051, CFR 24.238(a) and RSS-GEN, 4.9. The EUT was measured on the low, middle and high channels. The frequency range investigated was from 10 MHz to 20 GHz.
   See APPENDIX 1 for test data.

3) The EUT met the requirements of the Occupied Bandwidth and channel mask requirements in the GSM850 band as per 47 CFR 2.202, CFR 22.917 and RSS-GEN, 4.6. The EUT was measured in GSM and EDGE mode on the low, middle and high channels.
   See APPENDIX 1 for test data.

4) The EUT met the requirements of the Occupied Bandwidth and channel mask requirements in the PCS1900 band as per 47 CFR 2.202, CFR 24.238 and RSS-GEN, 4.6. The EUT was measured in GSM and EDGE mode on the low, middle and high channels.
   See APPENDIX 1 for test data.

5) The EUT met the requirements of the Conducted RF Output Power requirements for both the GSM850 and PCS1900 bands as per 47 CFR 2.1046(a), RSS-133, 4.3 and RSS-132, 4.4. The EUT was measured in GSM and EDGE mode on the low, middle and high channels.
   See APPENDIX 2 for the test data.

6) The EUT met the requirements of the Frequency Stability vs. Temperature and Voltage requirements for GSM850 band as per 47 CFR 2.1055(a), 2.1055(d), CFR 22.917 and RSS-132, 4.3. The temperature range was from -30°C to +60°C in 10° temperature steps. The EUT was measured on low, middle and high channels at each temperature step. The EUT was measured at low (3.6 volts), nominal (3.7 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 band as per 47 CFR 2.1055(a), 2.1055(d), 24.235 and RSS-133, 4.2. The temperature range was from -30°C to +60°C in 10° temperature steps. The EUT was measured on low, middle and high channels at each temperature step. The EUT was measured at low (3.6 volts), nominal (3.7 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 both GSM850 and PCS bands. The results are within the limits. The EUT was placed on a nonconductive Styrofoam table, 100 cm high that was positioned on a remotely controlled turntable. The test distance used between the EUT and the receiving antenna was three metres. Then the emissions were maximized by elevating the antenna in the range of 1 to 4 metres. The turntable was rotated to determine the azimuth of the peak emissions. The maximum emissions level was recorded. Both the horizontal and vertical 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 performed in a semi-anechoic chamber. The semi-anechoic chamber FCC registration number is **778487** and the Industry Canada file number is **IC4240**. The EUT was measured on the low, middle and high channels.

   The highest ERP in the GSM850 band measured was 29.47 dBm (0.885 W) in GSM mode and 27.23 dBm (0.528 W) in EDGE mode at 848.8 MHz (channel 251).
   The highest EIRP in the PCS band measured was 27.91 dBm (0.618 W) in GMS mode and 24.71 dBm (0.296 W) in EDGE mode at 1850.20 MHz (channel 512).

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

The worst test margin in the GSM850 band for GSM mode harmonic emissions measured was 29.0 dB below the limit at 1697.60 MHz, for GPRS mode it was 30.4 dB below the limit at 1697.60 MHz, and for EDGE mode was 31.4 dB below the limit at 1697.60 MHz.

The worst test margin in the PCS band for GSM mode harmonic emissions measured was 23.00 dB below the limit at 3760.00 MHz, for GPRS mode it was 28.67 dB below the limit at 3700.40 MHz and in EDGE mode it was 27.78 dB below the limit at 3819.60 MHz.

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

Sample Calculation:

Field Strength (dBµV/M) is calculated as follows:
FS = Measured Level (dBµV) + A.F. (dB/m) + Cable Loss (dB) - Preamp (dB) + Filter Loss (dB)

To view the test data see APPENDIX 4.

Measurement Uncertainty ±4.0 dB

G. Compliance Test Equipment Used

UNIT	MANUFACTURER	MODEL	SERIAL NUMBER	CAL DUE DATE (YY MM DD)	USE
Preamplifier	Sonoma	310N/11909A	185831	07-11-23	Radiated Emissions
Preamplifier system	TDK RF Solutions	PA-02	080010	07-11-22	Radiated Emissions
Hybrid Log Antenna	TDK	HLP-3003C	017401	08-08-04	Radiated Emissions
Horn Antenna	TDK	HRN-0118	030101	08-07-26	Radiated Emissions
Horn Antenna	TDK	HRN-0118	030201	09-01-17	Radiated Emissions
Horn Antenna	Emco	3116	2538	08-09-25	Radiated Emissions
Preamplifier	TDK	18-26	030002	07-11-23	Radiated Emissions
Dipole Antenna	Schwarzbeck	UHAP	973	08-12-18	Radiated Emissions
Dipole Antenna	Schwarzbeck	UHAP	974	08-09-28	Radiated Emissions
EMC Analyzer	Aglient	E7405A	US40240226	08-10-01	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	837493/073	07-12-01	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	102204	08-04-22	RF Conducted Emissions
Spectrum Analyzer	HP	8563E	3745A08112	08-09-22	RF Conducted Emissions
DC Power Supply	HP	6632B	US37472178	08-09-24	RF Conducted Emissions
Environment Monitor	Control Company	1870	230355190	07-12-28	Radiated Emissions
Environment Monitor	Control Company	1870	230199533	07-12-01	RF Conducted Emissions
Temperature Probe	Hart Scientific	61161-302	21352860	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
Power Meter	Giga-tronics	8541C	1837762	07-12-15	Frequency Stability
Power Sensor	Giga-tronics	80401A	1835838	07-12-15	Frequency Stability
EMI Receiver	Rohde & Schwarz	ESIB 40	100255	08-09-18	Conducted/Radiated Emissions

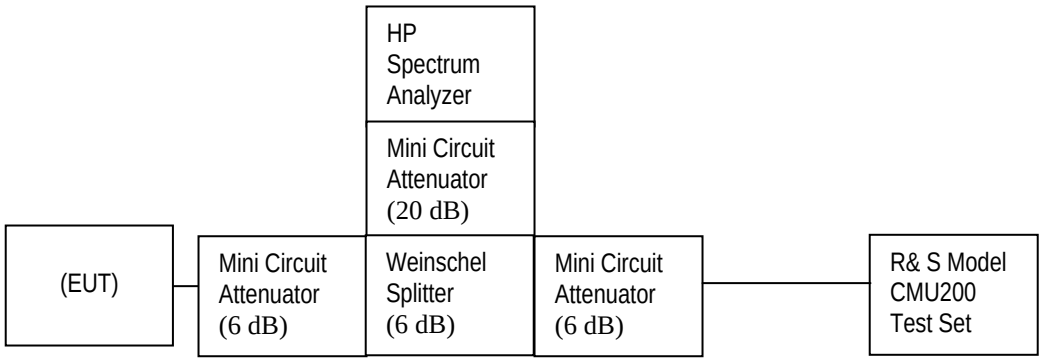
APPENDIX 1 - CONDUCTED RF EMISSIONS TEST DATA/PLOTS

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 20662E31.

The measurements were performed by Anas Hawari.

Test Setup Diagram



The environmental test conditions were:

Temperature	22ºC
Pressure	1017 mb
Relative Humidity	33%

Conducted RF Emission Test Data cont'd

The conducted spurious emissions – As per 47 CFR 2.1051, CFR 24.238(a), RSS-GEN, 4.9, CFR 22 Subpart H and RSS-132 were measured from 10 MHz to 20 GHz. The EUT emissions were in the noise floor.
See figures 1 to 12 for the plots of the conducted spurious emissions.

Date of Test: October 10, 2007

–26 dBc Bandwidth and Occupied Bandwidth (99%)

For each carrier frequency of low, middle and high, the modulation spectrum was measured by both methods of 99% power bandwidth and –26 dBc bandwidth.
The resolution bandwidth required for out-of-band emissions in the 1 MHz bands immediately outside and adjacent to the frequency block, was determined to be at least 1% of the emission bandwidth.
The worst case –26dBc bandwidth for the GSM850 band was measured to be 275 kHz, and for the PCS1900 band was measured to be 272 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	270	243.3
837.6	275	243.3
848.8	272	243.3

1900 band Frequency (MHz)	-26dBc Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
1850.2	270	243.3
1880.0	272	245.0
1909.8	272	243.3

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

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

Date of Test: October 10, 2007

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	243.3
837.6	241.7
848.8	243.3

1900 band Frequency (MHz)	99% Occupied Bandwidth (kHz)
1850.2	246.7
1880.0	243.3
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 25 to 30 for the plots of the 99% Occupied Bandwidth.
See Figures 31 to 34 for plots of the channel mask results.

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

Date of Test: October 10, 2007

Conducted RF Emission Test Data cont'd

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

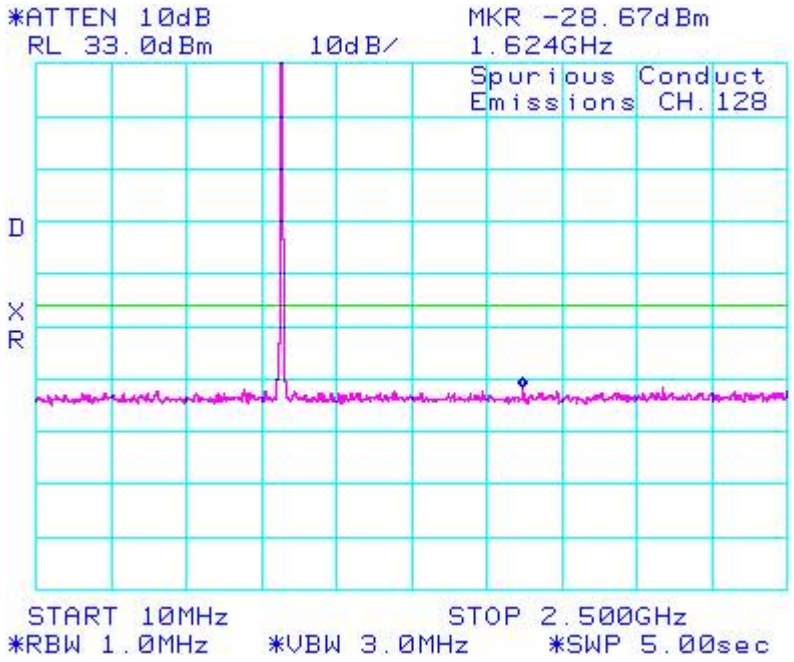
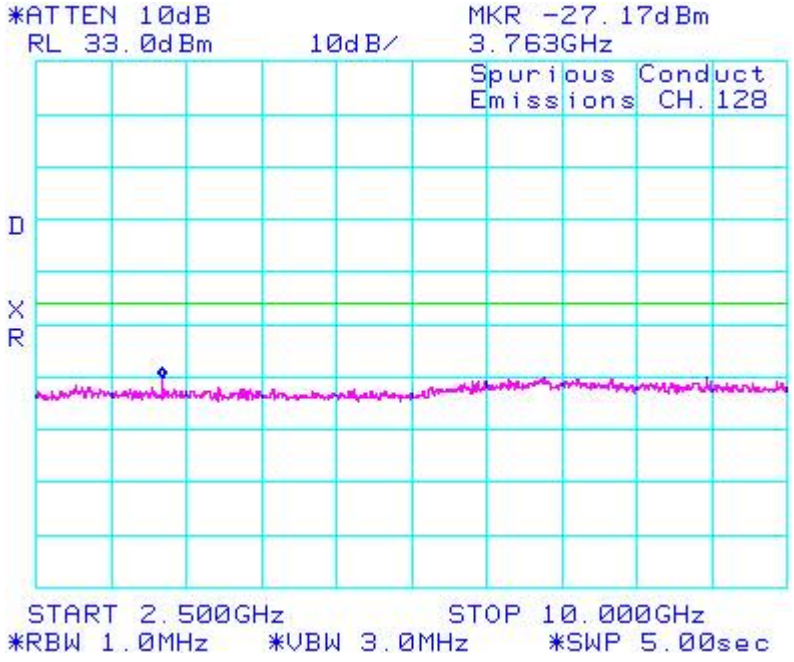


Figure 2: GSM850 band, Spurious Conducted Emissions, Low channel



Conducted RF Emission Test Data cont'd

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

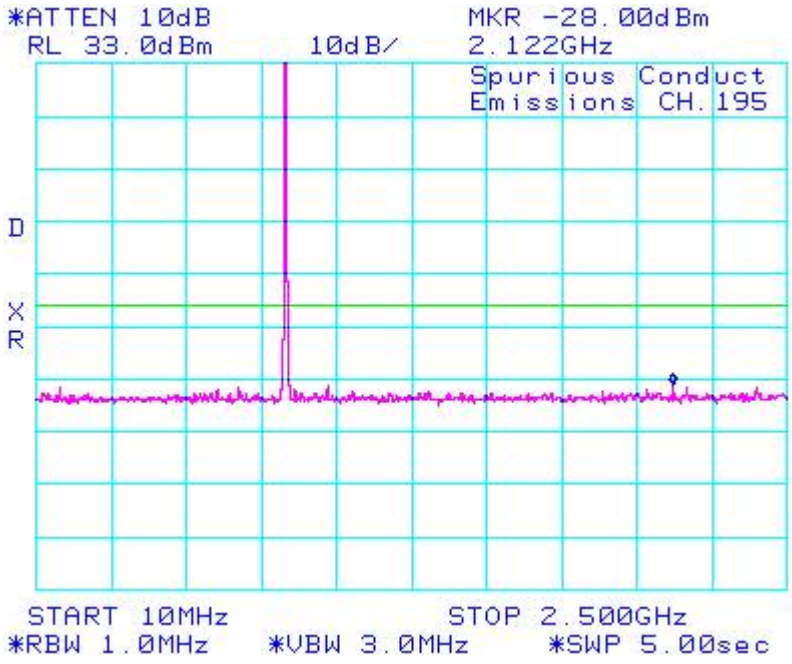
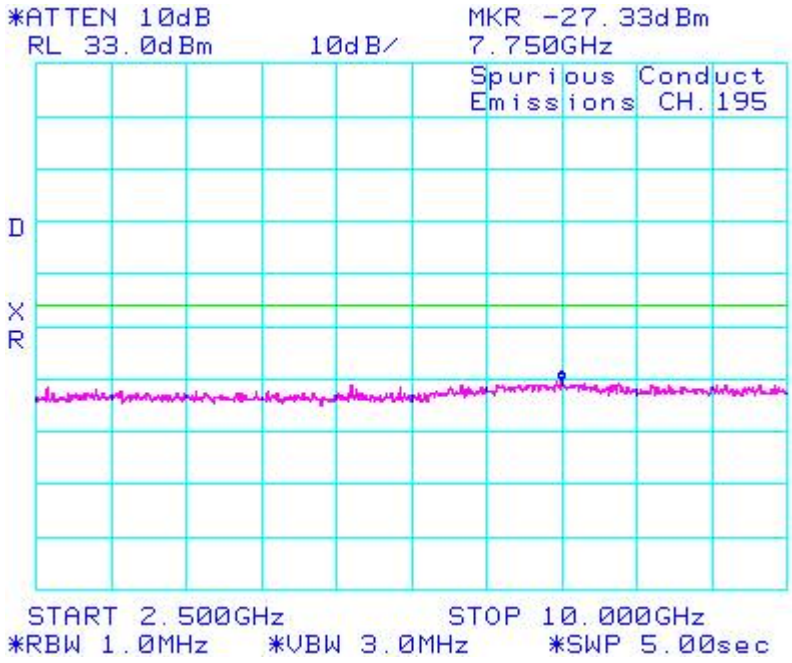


Figure 4: GSM850 band, Spurious Conducted Emissions, Middle Channel



Conducted RF Emission Test Data cont'd

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

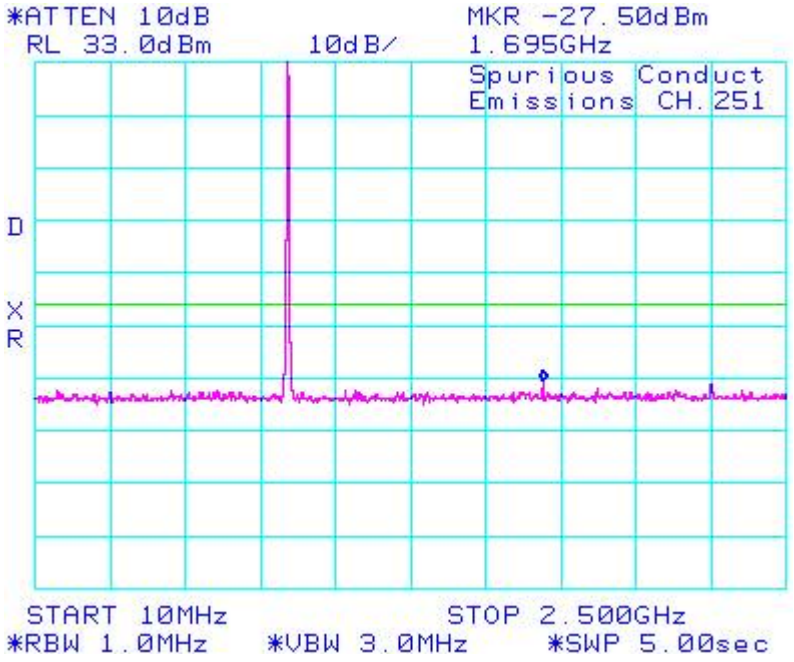
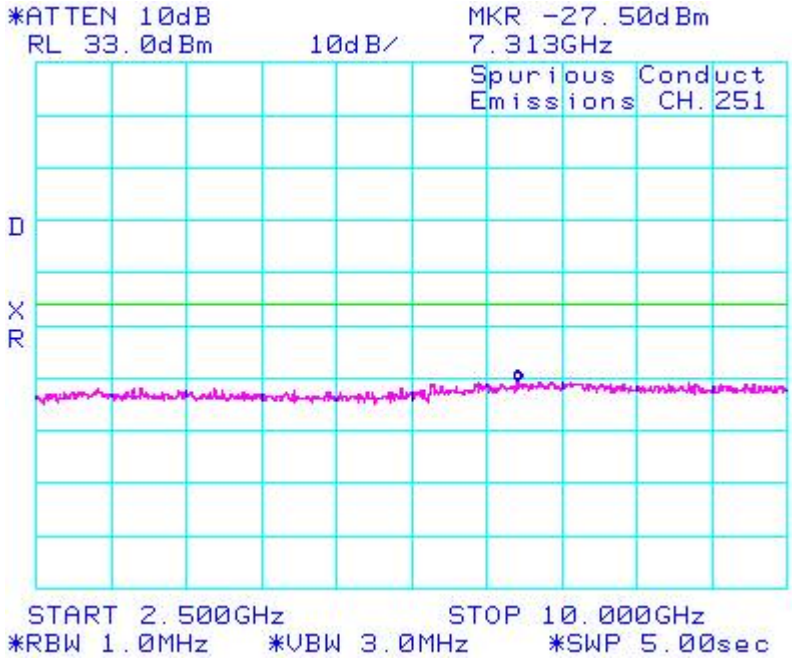


Figure 6: GSM850 band, Spurious Conducted Emissions, High Channel



Conducted RF Emission Test Data cont'd

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

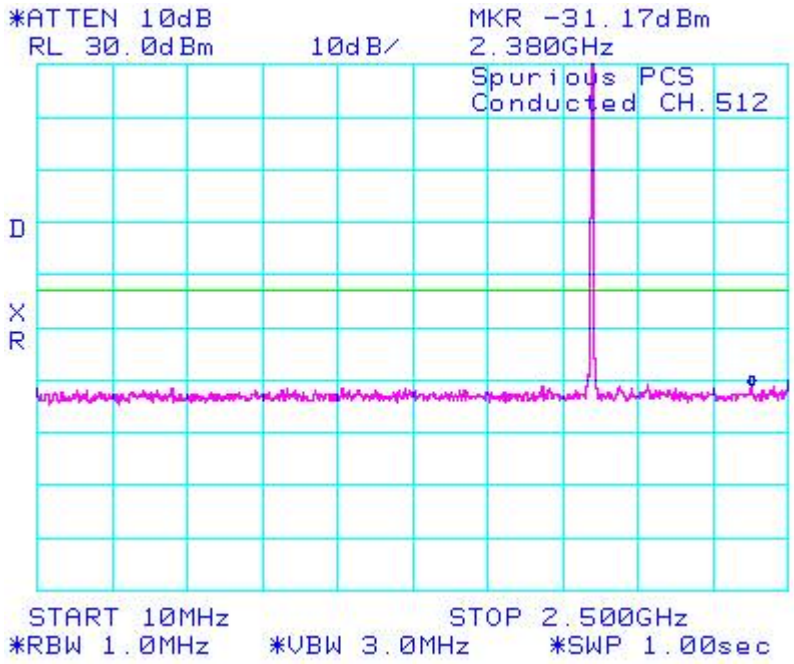
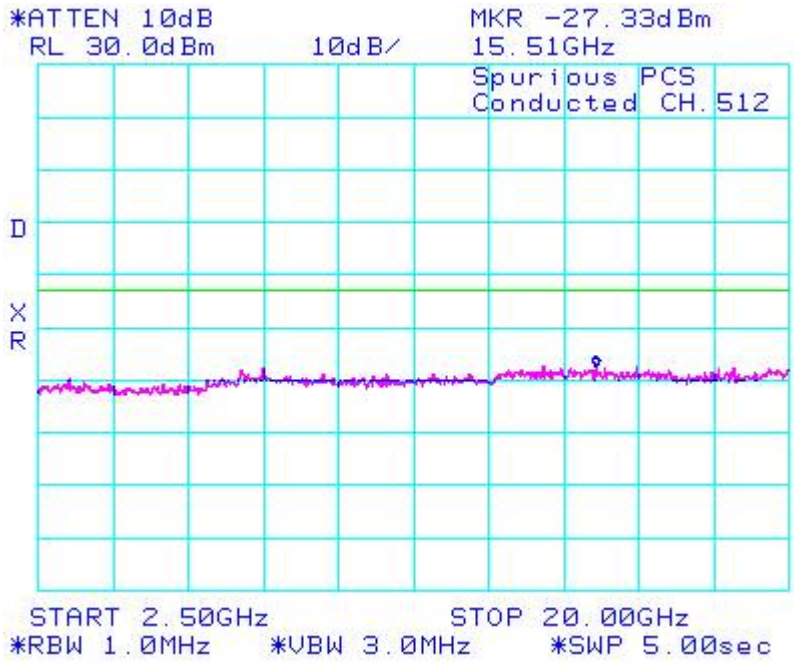


Figure 8: PCS1900 band, Spurious Conducted Emissions, Low Channel



Conducted RF Emission Test Data cont'd

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

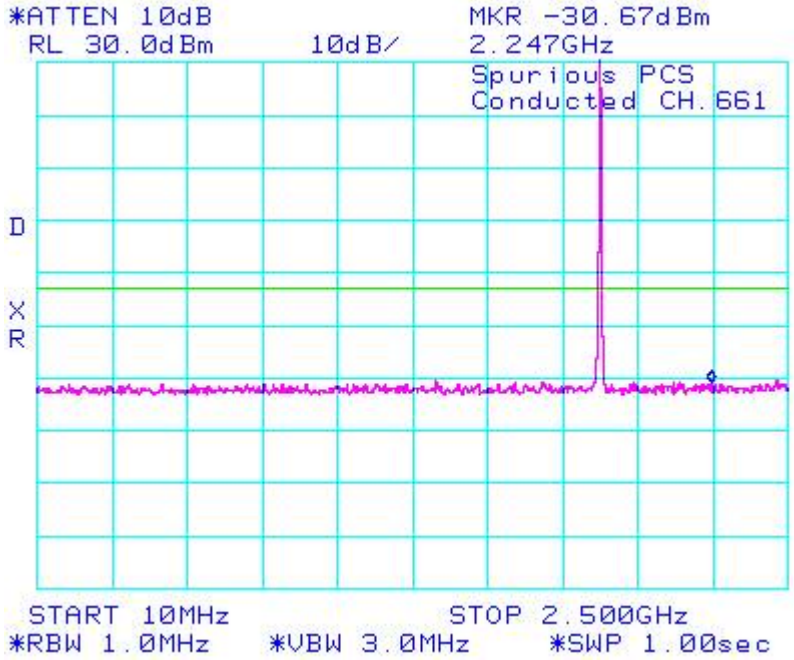
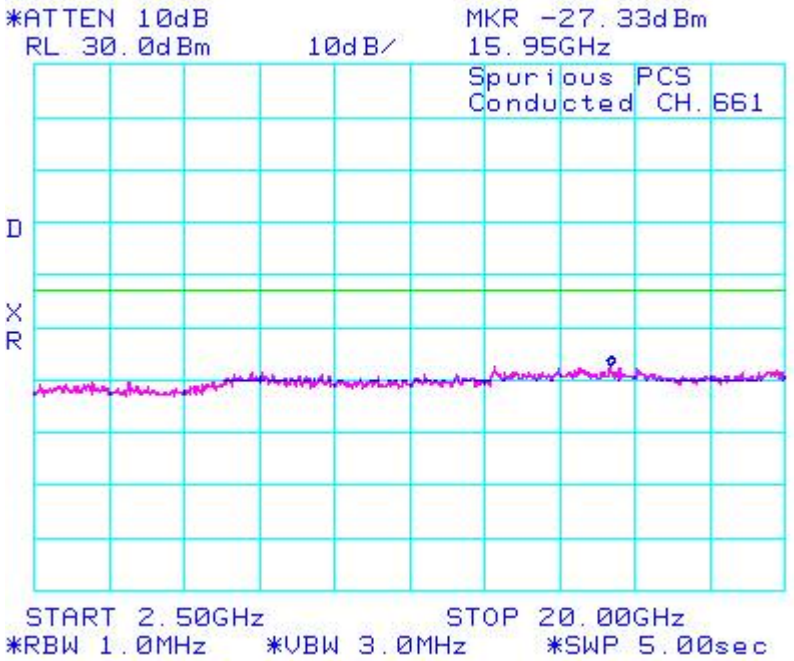


Figure 10: PCS1900 band, Spurious Conducted Emissions, Middle Channel



Conducted RF Emission Test Data cont'd

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

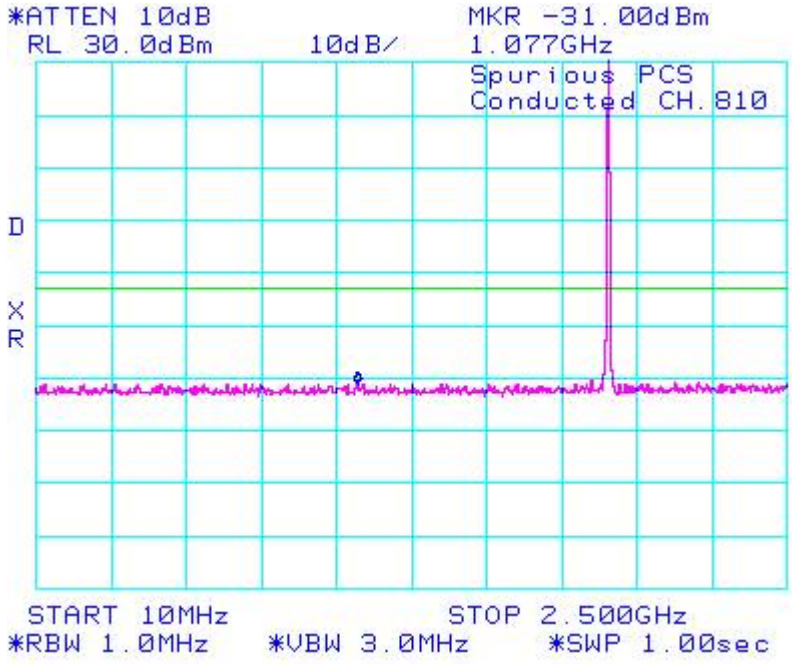
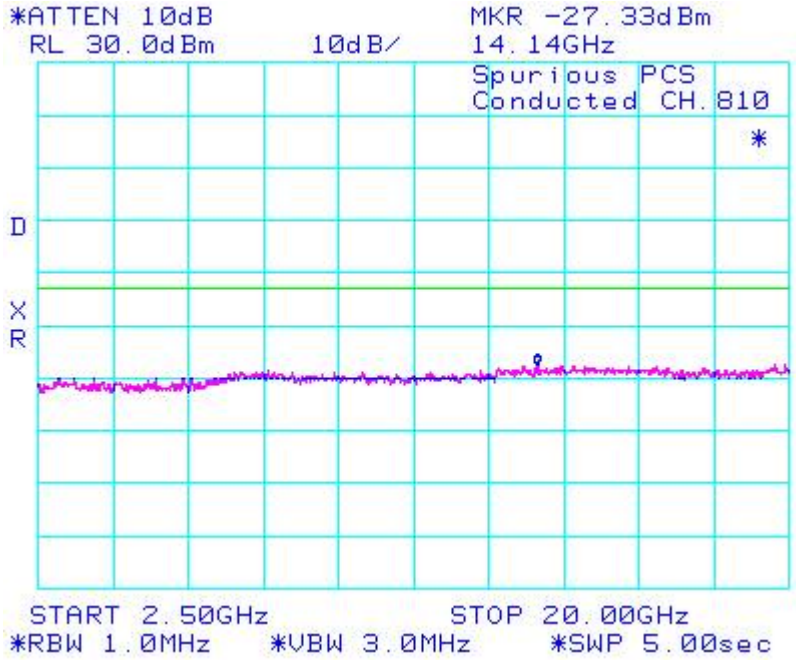


Figure 12: PCS1900 band, Spurious Conducted Emissions, High Channel



Conducted RF Emission Test Data cont'd

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

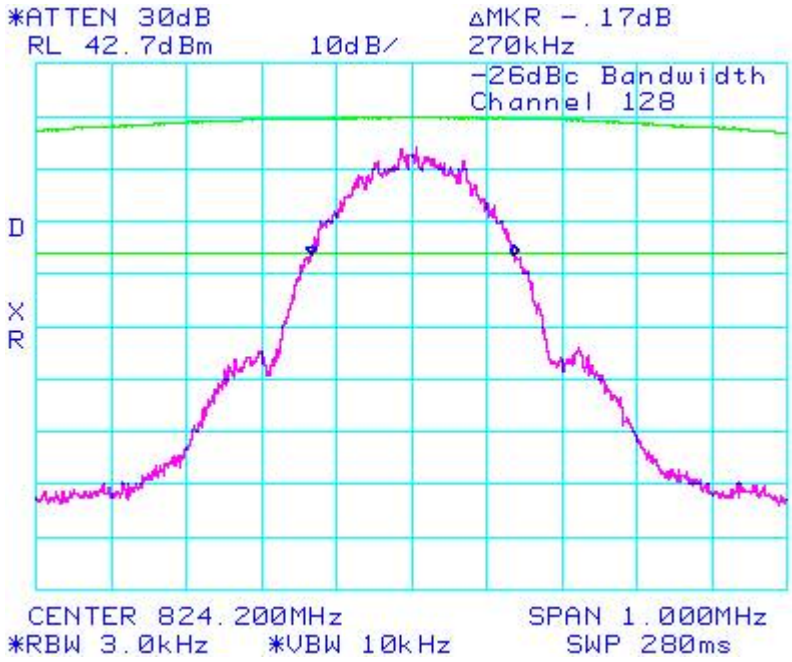
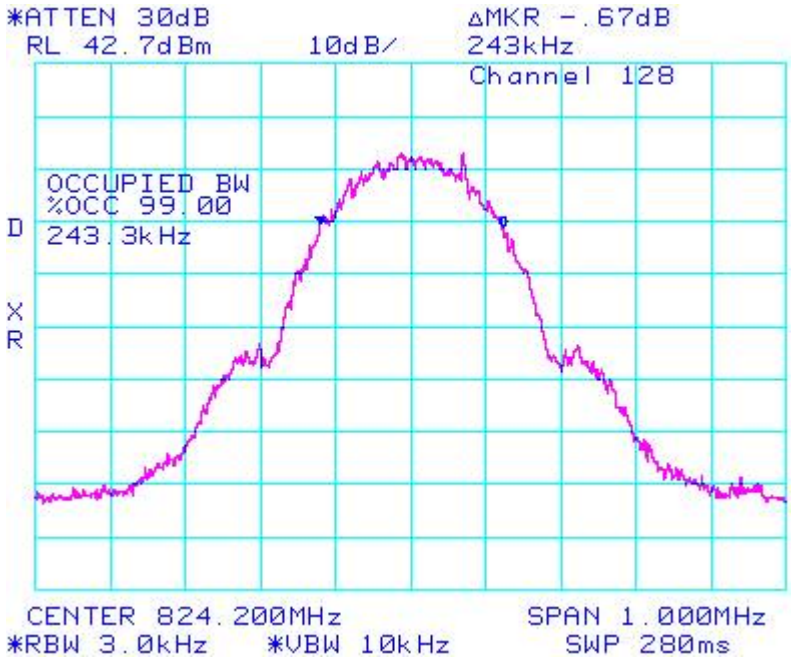


Figure 14: Occupied Bandwidth, GSM850 band Low Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

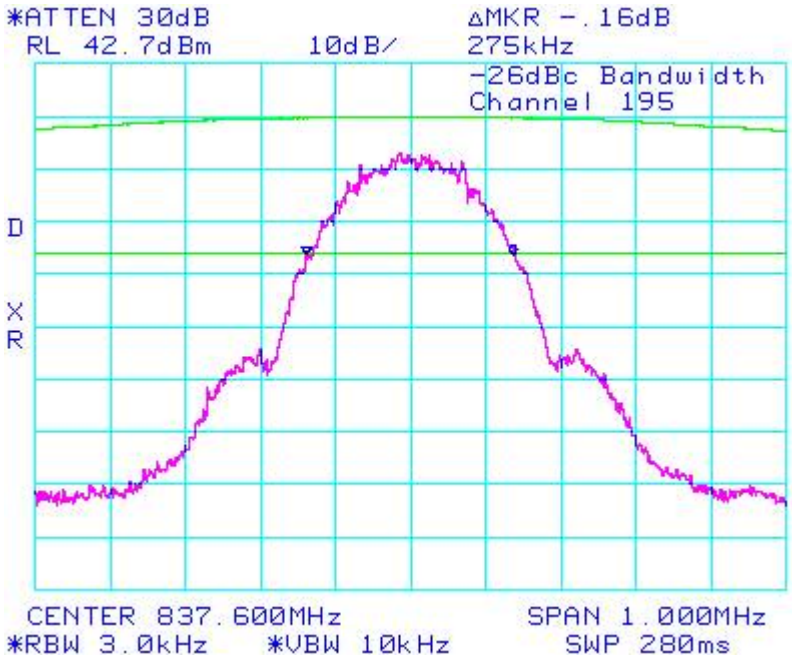
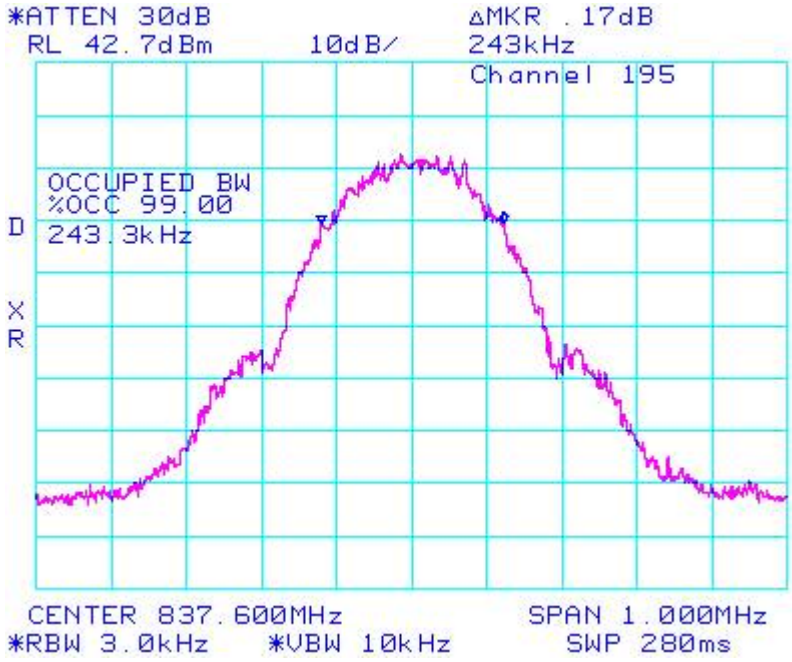


Figure 16: Occupied Bandwidth, GSM850 band Middle Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

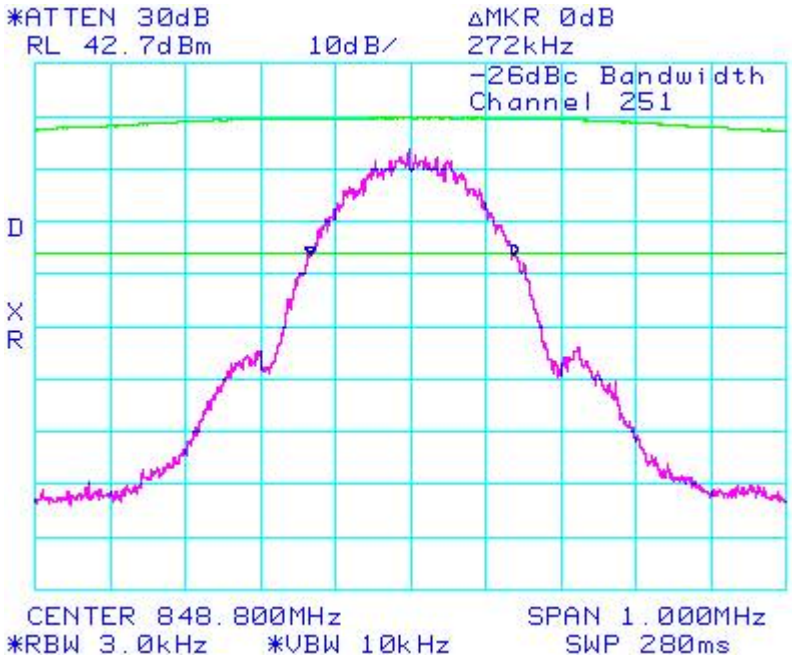
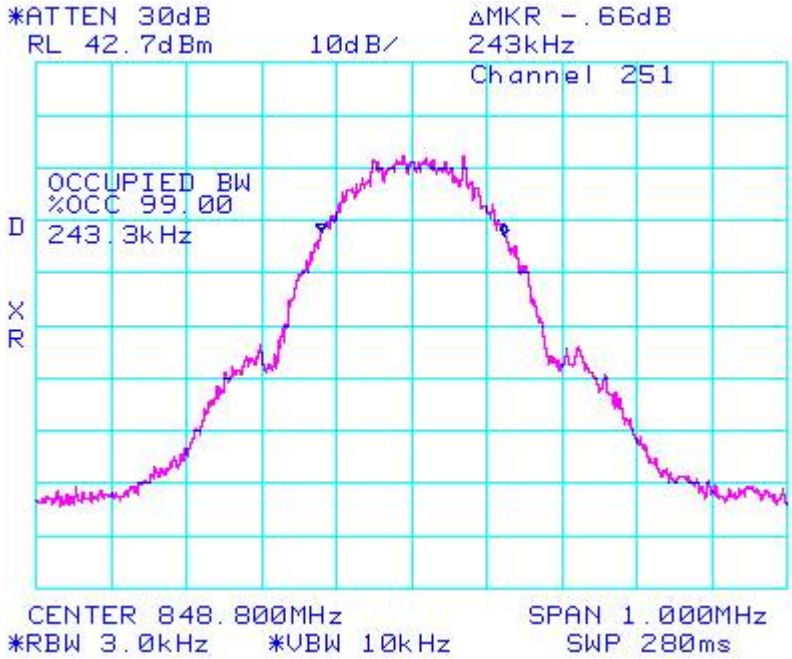


Figure 18: Occupied Bandwidth, GSM850 band High Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

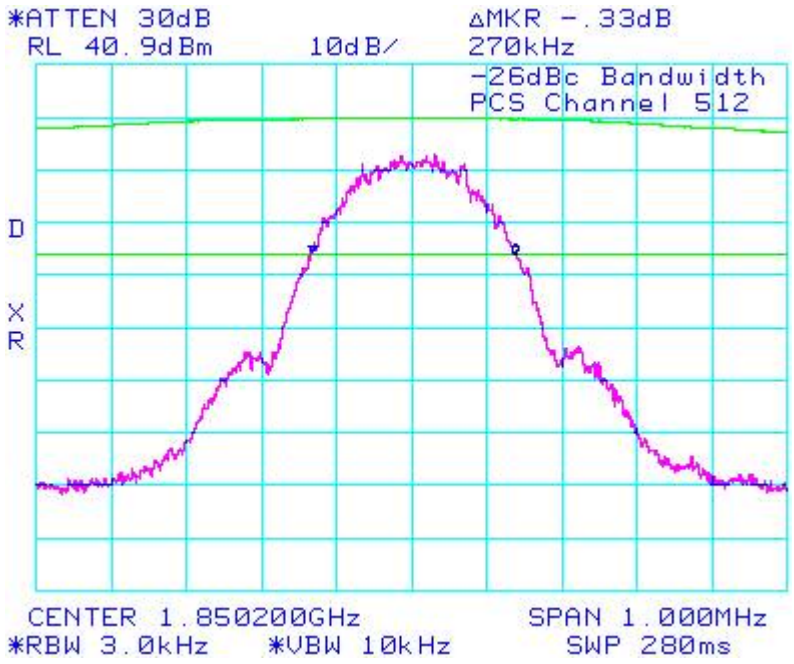
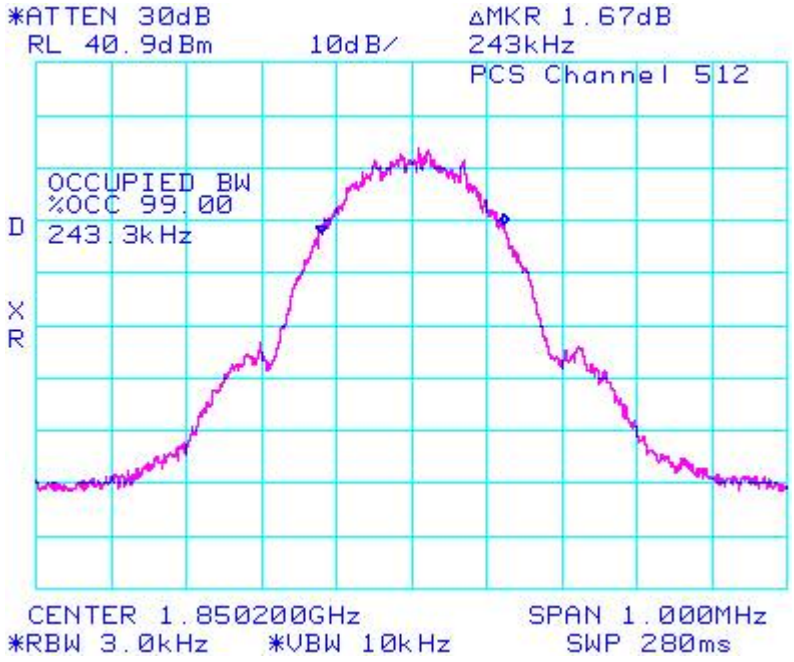


Figure 20: Occupied Bandwidth, PCS1900 Low Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

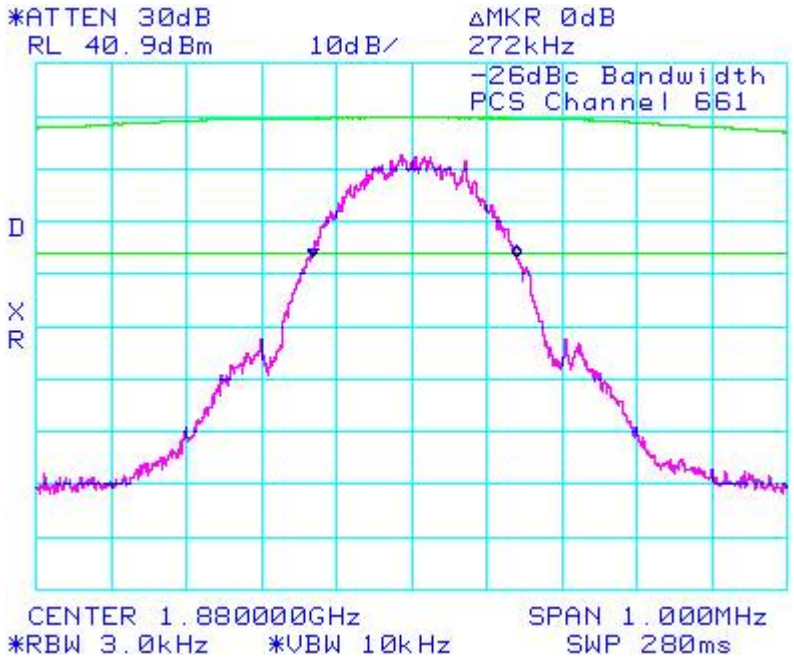
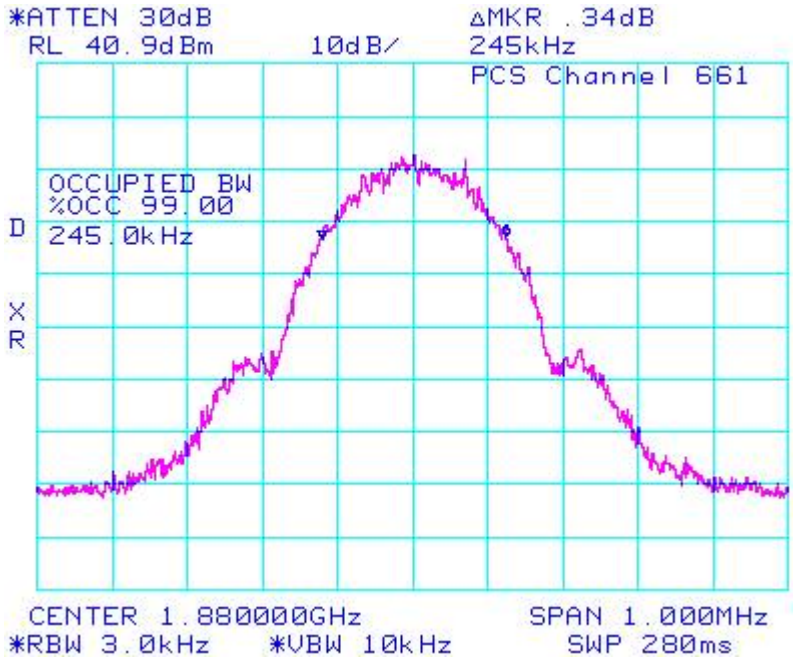


Figure 22: Occupied Bandwidth, PCS1900 Middle Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

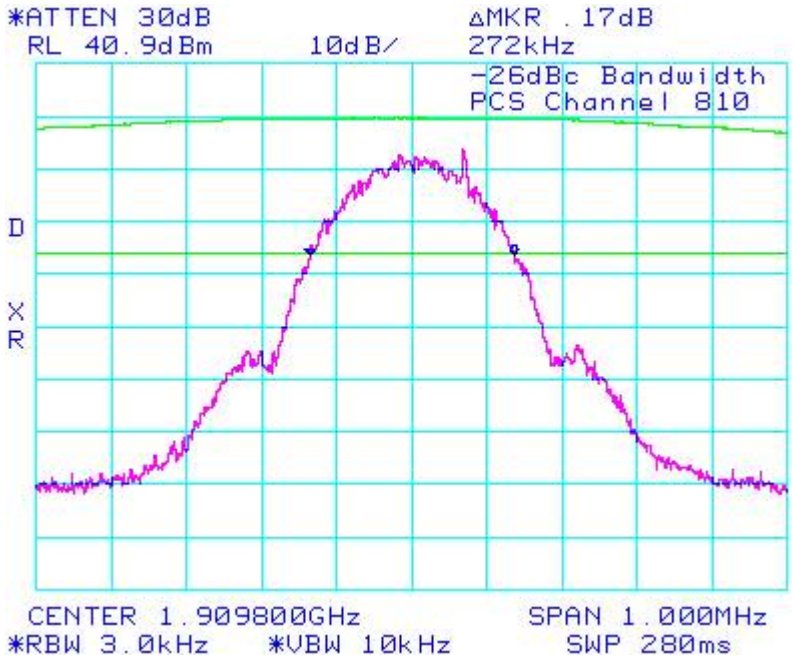
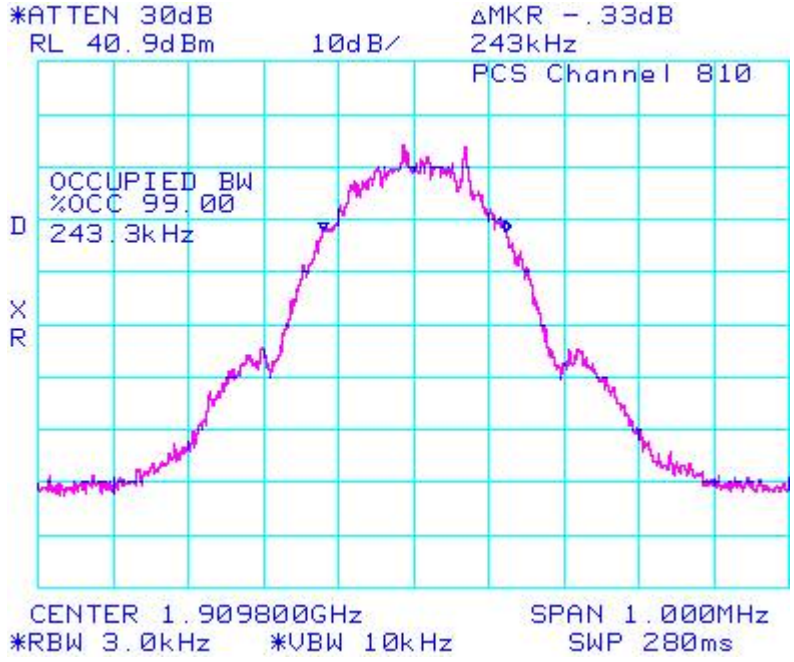


Figure 24: Occupied Bandwidth, PCS1900 High Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

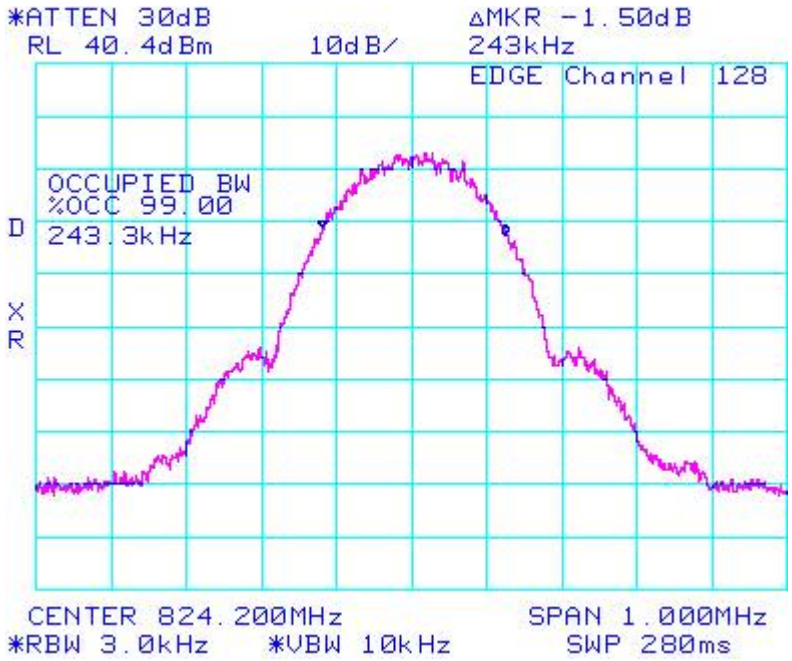
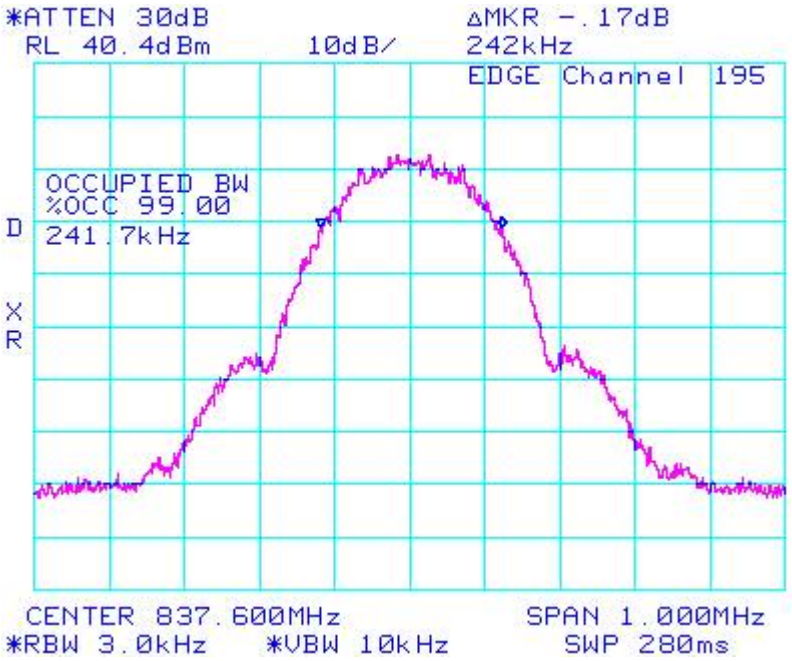


Figure 26: Occupied Bandwidth, GSM850 Band, Middle Channel in EDGE mode



Conducted RF Emission Test Data cont'd

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

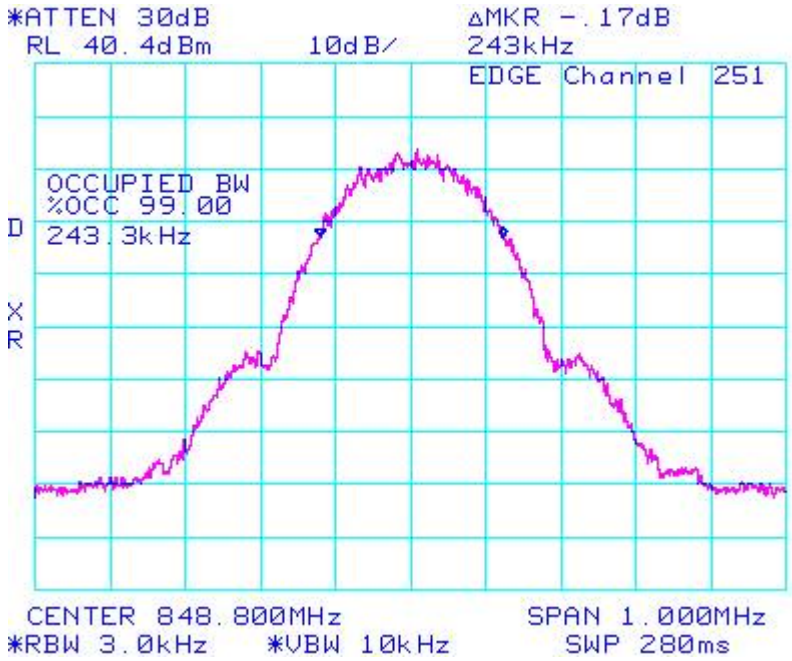
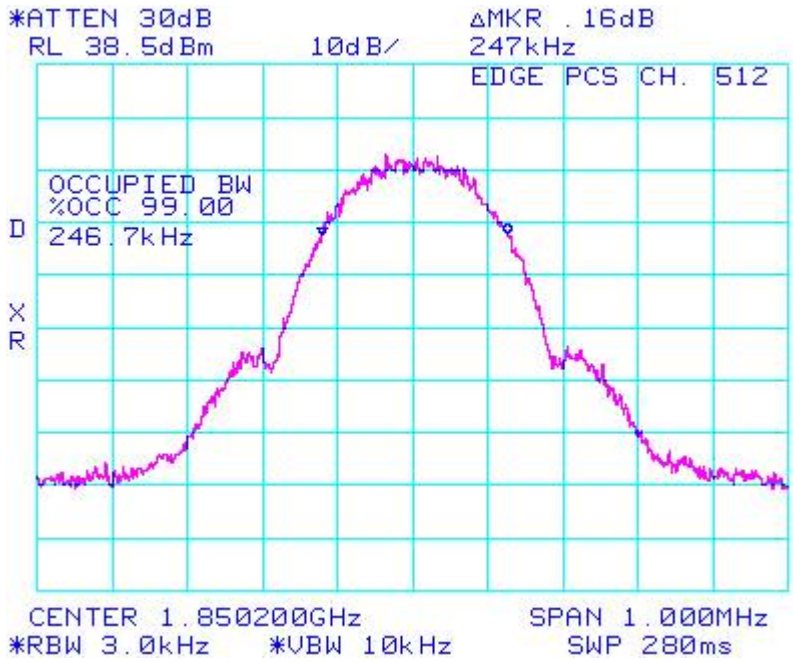


Figure 28: Occupied Bandwidth, PCS1900 Band, Low Channel in EDGE mode



Conducted RF Emission Test Data cont'd

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

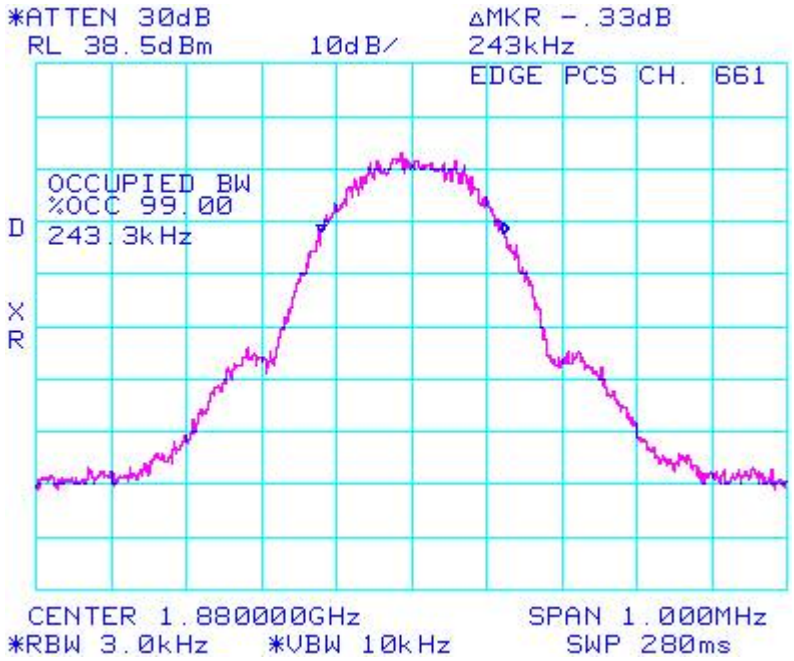
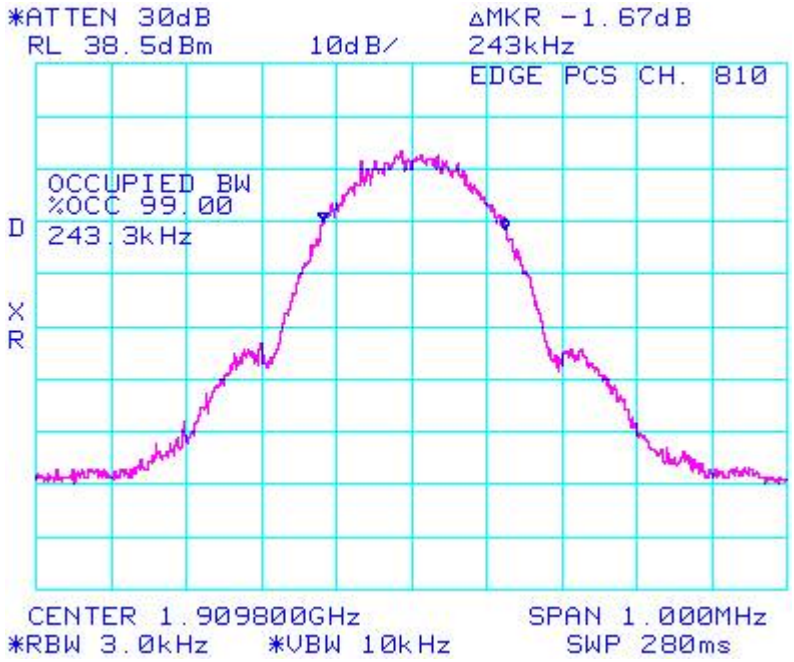


Figure 30: Occupied Bandwidth, PCS1900 Band, High Channel in EDGE mode



Conducted RF Emission Test Data cont'd

Figure 31: GSM850 band, Low Channel Mask

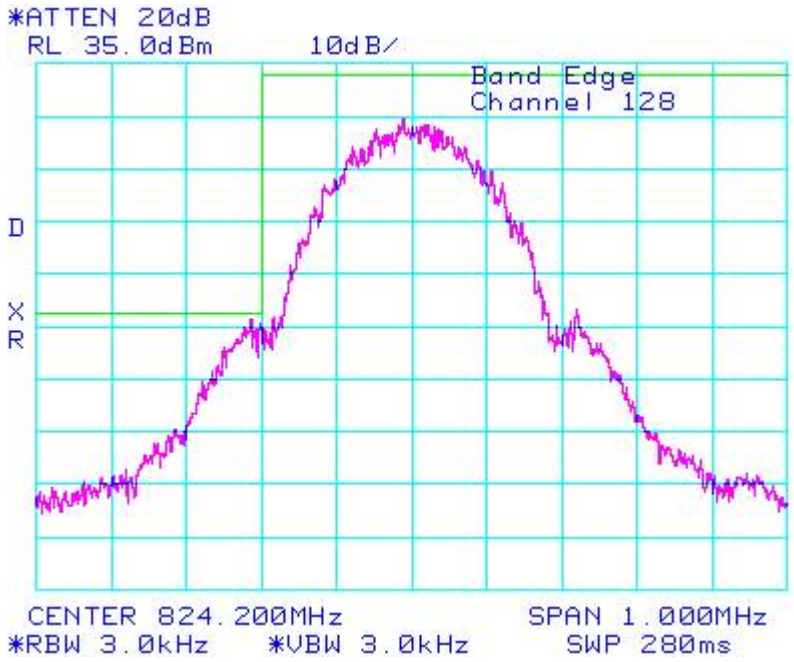
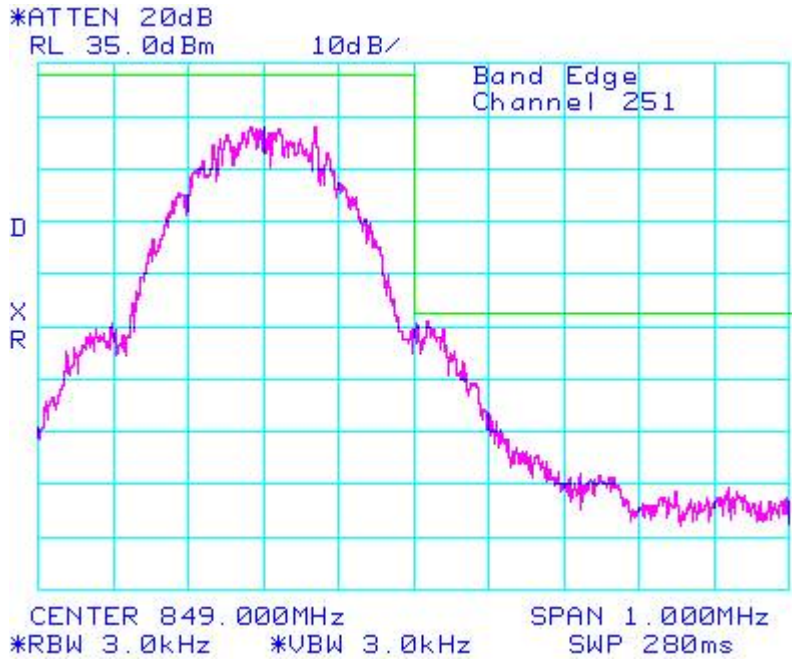


Figure 32: GSM850 band High Channel Mask



Conducted RF Emission Test Data cont'd

Figure 33: PCS1900, Low Channel Mask

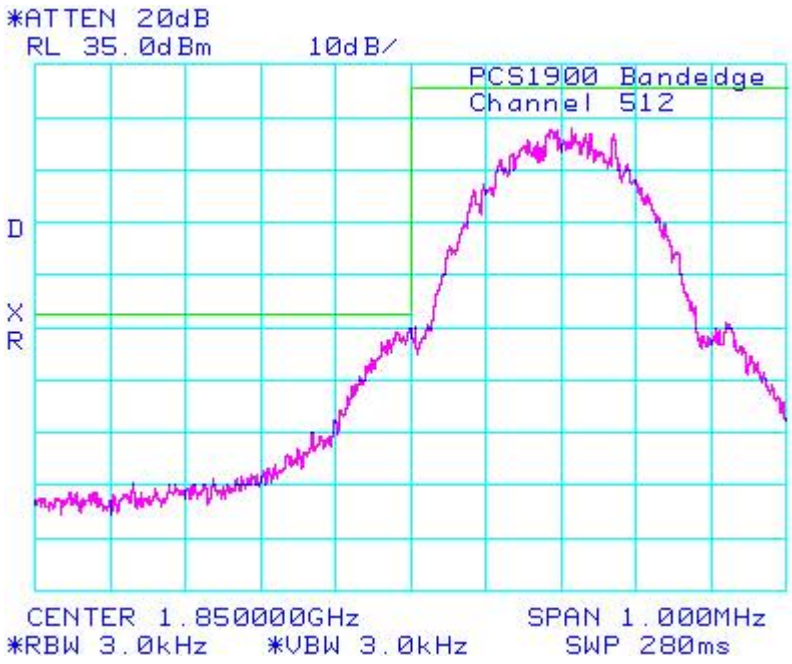
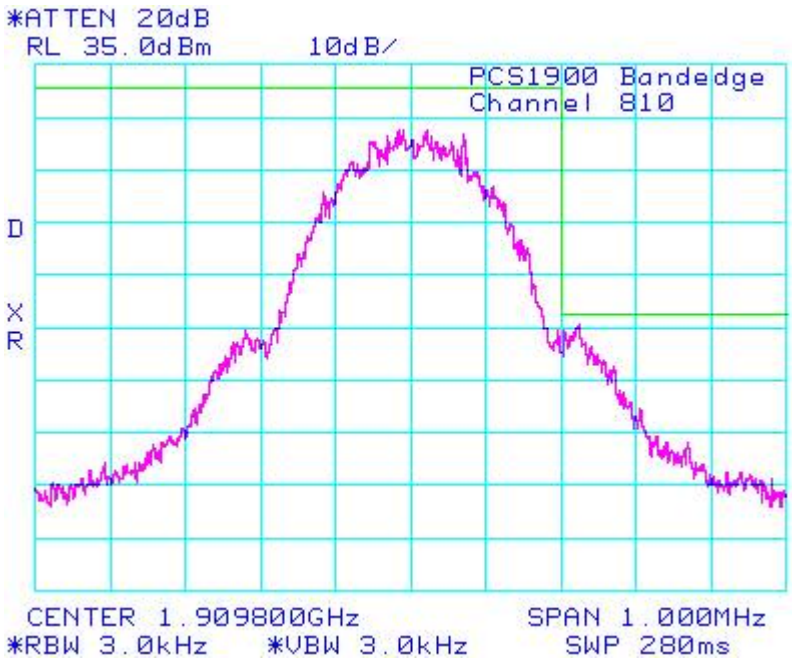


Figure 34: PCS1900, High Channel Mask



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 32.7 dBm ±0.5 dB for GSM850 and 30.5 dBm ±0.5 dB for PCS.

The measurements were performed by Anas Hawari.

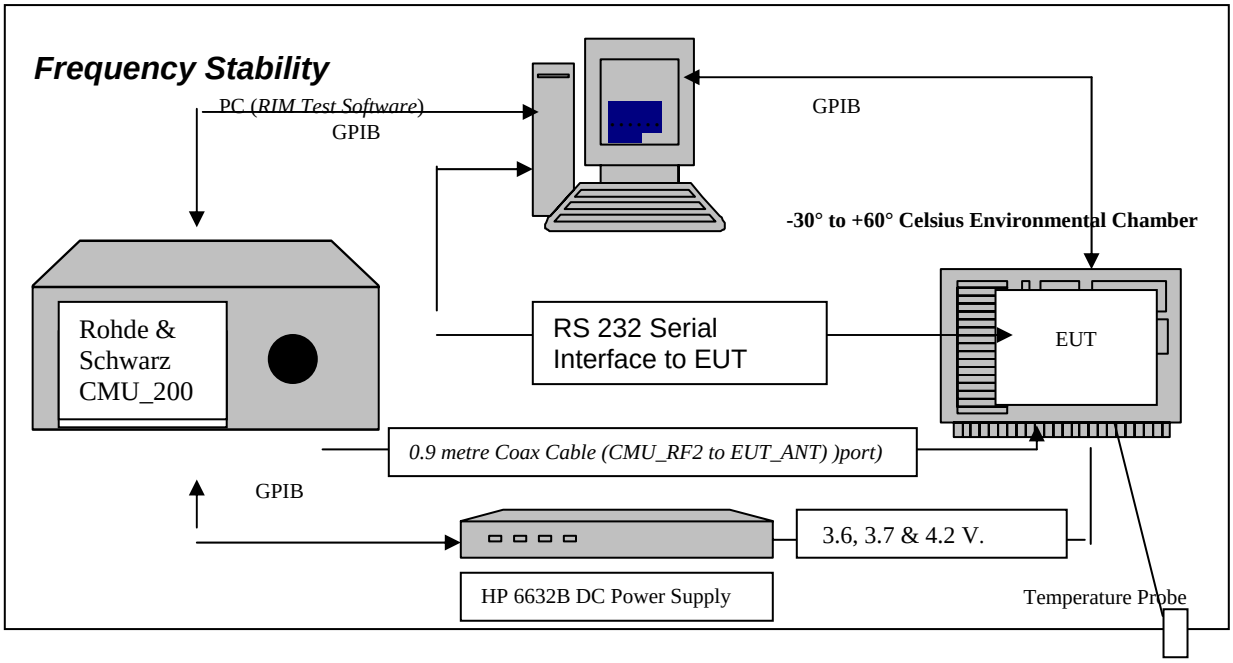
Date of Test: October 15, 2007

Test Results

Channel	Frequency (MHz)	Maximum Output Power (dBm)	Maximum Output Power (Watts)
GSM850			
128	824.20	**32.7**	1.86
189	836.60	32.5	1.78
251	848.80	32.4	1.74
GSM850 EDGE/GPRS/GSM (2-timeslot)			
128	824.20	30.2	1.05
189	836.60	30.1	1.02
251	848.80	30.0	1.00
PCS			
512	1850.2	30.2	1.05
661	1880.0	**30.5**	1.12
810	1909.8	30.5	1.12
PCS EDGE/GPRS/GSM (2-timeslot)			
512	1850.2	28.0	0.63
661	1880.0	28.3	0.68
810	1909.8	28.3	0.68

APPENDIX 3 – FREQUENCY STABILITY TEST DATA

Frequency Stability Test Data



CFR 47 Chapter 1 - Federal Communications Commission Rules

Part 2 Required Measurements
2.995 Frequency Stability - Procedures
(a,b) Frequency Stability - Temperature Variation
(d) Frequency Stability - Voltage Variation

24.235 *Frequency Stability*.

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

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

Frequency Stability measurement devices were configured as presented in the block diagram recording frequency, power, data, temperatures, and stepped voltages controlled via a GPIB interface linked to the Environmental chamber, a DC power supply, and the Communications Test Set. A 0.9-metre coax cable was calibrated to characterize the insertion loss for the transmitted frequencies between1 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 Giga-tronics power meter and Agilent Signal Generator.
The cable assembly from the RF input to the RF output was measured at the following Frequencies:

PCS Frequency (MHz)	Cable loss (dB)
1850.2	0.80
1880.0	0.80
1909.8	0.80

GSM 850 Frequency (MHz)	Cable loss (dB)
824.2	0.50
836.4	0.50
848.6	0.50

Procedure:

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

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

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

The EUT repetitively transmitted 100 bursts for each set of programmed parameters recording temperature, voltage settings, and systematically selected frequencies. The power supply was cycled from minimum voltage 3.6 volts, to 3.7 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 PCS band. This frequency was recorded in MHz and deviation from nominal, in Parts Per Million.
After the initial one-hour soak at the beginning of the tests, a period of thirty minutes soak was initialized between each ascending temperature step, before proceeding to the next measurement test cycle.

PROCEDURE:

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

1. Switch on the HP 6632B power supply; CMU 200 Communications test Set, and Environmental Chamber.
2. Start test program
3. Set the Temperature to –30°C and maintain a period of one- hour soak time, with the EUT supply voltage disabled.
4. Set power supply voltage to 3.6 volts.
5. Set up CMU 200 Radio Communication Tester.
6. Command the CMU 200 to switch to the low channel.
7. Enable the voltage to the EUT, and connect a link to the CMU 200 test set.
8. EUT is commanded to Transmit 100 Bursts.
9. Software logs the following data from the CMU 200, power supply and temperature chamber: Traffic Channel Number, Traffic Channel Frequency, Power Level, Chamber Temperature, Supply Voltage, Power, Frequency Error.
10. The CMU 200 commands the EUT to change frequency to the middle channel and high channel and repeats steps 7 to 9.
11. Repeat steps 5 to 10 changing the supply voltage to 3.7 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 **-0.0567 PPM**.
The maximum frequency error in the PCS band measured was **-0.0482 PPM**.

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

The measurements were performed by Anas Hawari

Date of Test: October 17, 2007

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.6	20	-46.75	**-0.0567**
189	836.40	3.6	20	-24.34	-0.0291
250	848.60	3.6	20	-34.68	-0.0409

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.7	20	-38.94	-0.0472
189	836.40	3.7	20	-42.36	-0.0506
250	848.60	3.7	20	-39.91	-0.0470

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	4.2	20	-20.15	-0.0244
189	836.40	4.2	20	-15.82	-0.0189
250	848.60	4.2	20	-14.66	-0.0173

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	12.66	0.0154
128	824.20	3.6	-20	-28.35	-0.0344
128	824.20	3.6	-10	-26.93	-0.0327
128	824.20	3.6	0	8.52	-0.0103
128	824.20	3.6	10	-30.15	-0.0366
128	824.20	3.6	20	-46.75	**-0.0567**
128	824.20	3.6	30	-23.12	-0.0281
128	824.20	3.6	40	-23.83	-0.0289
128	824.20	3.6	50	-27.44	-0.0333
128	824.20	3.6	60	-45.91	-0.0557

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.7	-30	-16.40	-0.0199
128	824.20	3.7	-20	-27.51	-0.0334
128	824.20	3.7	-10	-40.23	-0.0488
128	824.20	3.7	0	-39.20	-0.0476
128	824.20	3.7	10	-38.36	-0.0465
128	824.20	3.7	20	-38.94	-0.0472
128	824.20	3.7	30	-43.46	-0.0527
128	824.20	3.7	40	-21.50	-0.0261
128	824.20	3.7	50	-28.67	-0.0348
128	824.20	3.7	60	-42.36	-0.0514

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	4.2	-30	16.47	0.0200
128	824.20	4.2	-20	-12.79	-0.0155
128	824.20	4.2	-10	-34.87	-0.0423
128	824.20	4.2	0	10.53	0.0128
128	824.20	4.2	10	-22.08	-0.0268
128	824.20	4.2	20	-20.15	-0.0244
128	824.20	4.2	30	-31.51	-0.0382
128	824.20	4.2	40	18.02	0.0219
128	824.20	4.2	50	-18.66	-0.0226
128	824.20	4.2	60	-30.28	-0.0367

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	25.76	0.0308
189	836.40	3.6	-20	-20.79	-0.0249
189	836.40	3.6	-10	-37.13	-0.0444
189	836.40	3.6	0	-43.20	-0.0516
189	836.40	3.6	10	-24.15	-0.0289
189	836.40	3.6	20	-24.34	-0.0291
189	836.40	3.6	30	-35.00	-0.0418
189	836.40	3.6	40	-39.91	-0.0477
189	836.40	3.6	50	-16.47	-0.0197
189	836.40	3.6	60	-21.05	-0.0252

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
189	836.40	3.7	-30	-12.85	-0.0154
189	836.40	3.7	-20	-27.25	-0.0326
189	836.40	3.7	-10	-41.20	-0.0493
189	836.40	3.7	0	-37.84	-0.0452
189	836.40	3.7	10	-33.96	-0.0406
189	836.40	3.7	20	-42.36	-0.0506
189	836.40	3.7	30	-41.20	-0.0493
189	836.40	3.7	40	-14.40	-0.0172
189	836.40	3.7	50	-27.51	-0.0329
189	836.40	3.7	60	-40.29	-0.0482

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
189	836.40	4.2	-30	11.88	0.0142
189	836.40	4.2	-20	-8.01	-0.0096
189	836.40	4.2	-10	-30.80	-0.0368
189	836.40	4.2	0	19.89	0.0238
189	836.40	4.2	10	-14.98	-0.0179
189	836.40	4.2	20	-15.82	-0.0189
189	836.40	4.2	30	-34.61	-0.0414
189	836.40	4.2	40	20.60	0.0246
189	836.40	4.2	50	-9.10	-0.0109
189	836.40	4.2	60	-23.50	-0.0281

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	-20.79	-0.0245
250	848.60	3.6	-20	-28.99	-0.0342
250	848.60	3.6	-10	-38.42	-0.0453
250	848.60	3.6	0	-33.00	-0.0389
250	848.60	3.6	10	-34.48	-0.0406
250	848.60	3.6	20	-34.68	-0.0409
250	848.60	3.6	30	-43.33	-0.0511
250	848.60	3.6	40	-9.36	-0.0110
250	848.60	3.6	50	-26.41	-0.0311
250	848.60	3.6	60	-35.32	-0.0416

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
250	848.60	3.7	-30	-11.88	-0.0140
250	848.60	3.7	-20	-28.02	-0.0330
250	848.60	3.7	-10	-41.78	-0.0492
250	848.60	3.7	0	-39.52	-0.0466
250	848.60	3.7	10	-37.90	-0.0447
250	848.60	3.7	20	-39.91	-0.0470
250	848.60	3.7	30	-39.45	-0.0465
250	848.60	3.7	40	-18.21	-0.0215
250	848.60	3.7	50	-28.99	-0.0342
250	848.60	3.7	60	-41.91	-0.0494

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
250	848.60	4.2	-30	17.82	0.0210
250	848.60	4.2	-20	8.72	0.0103
250	848.60	4.2	-10	-37.00	-0.0436
250	848.60	4.2	0	28.80	0.0339
250	848.60	4.2	10	-17.24	-0.0203
250	848.60	4.2	20	-14.66	-0.0173
250	848.60	4.2	30	-27.96	-0.0329
250	848.60	4.2	40	27.38	0.0323
250	848.60	4.2	50	16.92	0.0199
250	848.60	4.2	60	-23.12	-0.0272

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

Date of Test: October 17, 2007

Traffic Channel Number	PCS Frequency (MHz	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	*PPM*
512	1850.2	3.6	20	-62.38	-0.0337
661	1880.0	3.6	20	-90.59	**-0.0482**
810	1909.8	3.6	20	-83.56	-0.0438

Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	3.7	20	-47.33	-0.0256
661	1880.0	3.7	20	-30.67	-0.0163
810	1909.8	3.7	20	-42.29	-0.0221

Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	4.2	20	-46.94	-0.0254
661	1880.0	4.2	20	-40.16	-0.0214
810	1909.8	4.2	20	-57.28	-0.0300

PCS 1900 Results: channel 512 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	3.6	-30	-51.33	-0.0277
512	1850.2	3.6	-20	-77.10	-0.0417
512	1850.2	3.6	-10	-78.33	-0.0423
512	1850.2	3.6	0	-61.28	-0.0331
512	1850.2	3.6	10	-65.09	-0.0352
512	1850.2	3.6	20	-62.38	-0.0337
512	1850.2	3.6	30	-42.81	-0.0231
512	1850.2	3.6	40	-82.14	-0.0444
512	1850.2	3.6	50	-73.10	-0.0395
512	1850.2	3.6	60	-78.26	-0.0423

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	3.7	-30	-48.24	-0.0261
512	1850.2	3.7	-20	-67.03	-0.0362
512	1850.2	3.7	-10	-74.19	-0.0401
512	1850.2	3.7	0	-56.31	-0.0304
512	1850.2	3.7	10	-81.30	-0.0439
512	1850.2	3.7	20	-47.33	-0.0256
512	1850.2	3.7	30	-60.63	-0.0328
512	1850.2	3.7	40	-76.07	-0.0411
512	1850.2	3.7	50	-55.60	-0.0301
512	1850.2	3.7	60	-41.52	-0.0224

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	4.2	-30	-54.95	-0.0297
512	1850.2	4.2	-20	-74.64	-0.0403
512	1850.2	4.2	-10	-48.56	-0.0262
512	1850.2	4.2	0	-39.84	-0.0215
512	1850.2	4.2	10	-73.10	-0.0395
512	1850.2	4.2	20	-46.94	-0.0254
512	1850.2	4.2	30	-61.08	-0.0330
512	1850.2	4.2	40	-53.47	-0.0289
512	1850.2	4.2	50	-70.84	-0.0383
512	1850.2	4.2	60	-55.60	-0.0301

PCS 1900 Results: channel 661 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880	3.6	-30	-27.18	-0.0145
661	1880	3.6	-20	-38.61	-0.0205
661	1880	3.6	-10	-48.49	-0.0258
661	1880	3.6	0	-54.69	-0.0291
661	1880	3.6	10	-77.29	-0.0411
661	1880	3.6	20	-90.59	**-0.0482**
661	1880	3.6	30	-67.86	-0.0361
661	1880	3.6	40	-47.27	-0.0251
661	1880	3.6	50	-84.33	-0.0449
661	1880	3.6	60	-52.30	-0.0278

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880	3.7	-30	-29.19	-0.0155
661	1880	3.7	-20	-56.11	-0.0298
661	1880	3.7	-10	-52.63	-0.0280
661	1880	3.7	0	-33.71	-0.0179
661	1880	3.7	10	-56.76	-0.0302
661	1880	3.7	20	-30.67	-0.0163
661	1880	3.7	30	-59.34	-0.0316
661	1880	3.7	40	-56.37	-0.0300
661	1880	3.7	50	-38.55	-0.0205
661	1880	3.7	60	-55.21	-0.0294

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880	4.2	-30	-43.97	-0.0234
661	1880	4.2	-20	-45.07	-0.0240
661	1880	4.2	-10	-47.52	-0.0253
661	1880	4.2	0	-36.16	-0.0192
661	1880	4.2	10	-44.62	-0.0237
661	1880	4.2	20	-40.16	-0.0214
661	1880	4.2	30	-52.76	-0.0281
661	1880	4.2	40	-68.90	-0.0366
661	1880	4.2	50	-37.00	-0.0197
661	1880	4.2	60	-71.16	-0.0379

PCS 1900 Results: channel 810 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
810	1909.8	3.6	-30	-45.65	-0.0239
810	1909.8	3.6	-20	-56.89	-0.0298
810	1909.8	3.6	-10	-65.99	-0.0346
810	1909.8	3.6	0	-76.00	-0.0398
810	1909.8	3.6	10	-64.77	-0.0339
810	1909.8	3.6	20	-83.56	-0.0438
810	1909.8	3.6	30	-81.68	-0.0428
810	1909.8	3.6	40	-73.74	-0.0386
810	1909.8	3.6	50	-87.49	-0.0458
810	1909.8	3.6	60	-74.84	-0.0392

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
810	1909.8	3.7	-30	-43.20	-0.0226
810	1909.8	3.7	-20	-59.34	-0.0311
810	1909.8	3.7	-10	-60.37	-0.0316
810	1909.8	3.7	0	-47.46	-0.0249
810	1909.8	3.7	10	-86.01	-0.0450
810	1909.8	3.7	20	-42.29	-0.0221
810	1909.8	3.7	30	-52.30	-0.0274
810	1909.8	3.7	40	-66.90	-0.0350
810	1909.8	3.7	50	-50.43	-0.0264
810	1909.8	3.7	60	-78.20	-0.0409

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
810	1909.8	4.2	-30	-47.52	-0.0249
810	1909.8	4.2	-20	-57.21	-0.0300
810	1909.8	4.2	-10	-37.26	-0.0195
810	1909.8	4.2	0	-40.68	-0.0213
810	1909.8	4.2	10	-56.11	-0.0294
810	1909.8	4.2	20	-57.28	-0.0300
810	1909.8	4.2	30	-47.14	-0.0247
810	1909.8	4.2	40	-72.58	-0.0380
810	1909.8	4.2	50	-45.01	-0.0236
810	1909.8	4.2	60	-72.64	-0.0380

APPENDIX 4 – RADIATED EMMISIONS TEST DATA

Radiated Emissions Test Data Results

GSM Mode

The measurements were performed by Vimal Olaganathan and Masud Attayi.

The environmental tests conditions were: Temperature 23ºC
Pressure 1018 mb
Relative Humidity 32%

The ERP measurements were performed for the GSM 850 band.

Test distance is 3.0 metres

Date of test: October 5, 2007

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method Tracking Generator					
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Dipole) (dBm)	(W)	Limit (dBm)	Diff. To Limit (dB)
GSM850 Band (ERP) BlackBerry® smartphone Standalone, USB down													
F0	128	824.20	850	Dipole	V	75.87	87.37	V-V	11.98	27.33	0.541	38.50	-11.17
F0	128	824.20	850	Dipole	H	87.37		H-H	11.36				
F0	195	837.60	850	Dipole	V	74.86	86.59	V-V	12.04	27.29	0.536	38.50	-11.21
F0	195	837.60	850	Dipole	H	86.59		H-H	11.88				
F0	251	848.80	850	Dipole	V	75.18	86.91	V-V	14.42				
F0	251	848.80	850	Dipole	H	86.91		H-H	12.20	**29.47**	**0.885**	38.50	-9.03

Radiated Emissions Test Data Results cont'd

EDGE Mode

The environmental tests conditions were: Temperature 23ºC
Pressure 1018 mb
Relative Humidity 32%

The ERP measurements were performed for the GSM 850 band.

Test distance is 3.0 metres

Date of test: October 5, 2007

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method Tracking Generator					
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Dipole) (dBm)	(W)	Limit (dBm)	Diff. To Limit (dB)
GSM850 Band (ERP) Handheld Standalone, USB down													
F0	128	824.20	850	Dipole	V	77.7	84.6	V-V	9.12	24.47	0.280	38.50	-14.03
F0	128	824.20	850	Dipole	H	84.6		H-H	8.62				
F0	195	837.60	850	Dipole	V	71.5	84.5	V-V	10.00	25.25	0.335	38.50	-13.25
F0	195	837.60	850	Dipole	H	84.5		H-H	9.84				
F0	251	848.80	850	Dipole	V	74.3	84.8	V-V	12.18				
F0	251	848.80	850	Dipole	H	84.8		H-H	9.86	**27.23**	**0.528**	38.50	-11.27

Radiated Emissions Test Data Results cont'd

GSM Mode

The environmental test conditions were:

Temperature	25ºC
Pressure	1001 mb
Relative Humidity	32%

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

Date of Test: October 10, 2007

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

Frequency	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		(PK or AVE)	(dBµV)	(dB/m)	(dBµV/m)	(dB)	(dB)
(MHz)	(V/H)	(metres)	(Deg.)						
-	-	-	-	-	-	-	-	-	-

All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

GSM Mode

The environmental tests conditions were: Temperature 24ºC
Pressure 1004 mb
Relative Humidity 30%

The Harmonics measurements were performed in the GSM 850 band.
Test distance is 3.0 metres. Harmonics were measured up to 9 GHz.
Date of test: October 9, 2007

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to dipole)	Limit (dBm)	Diff to Limit (dB)
GSM850 Band (Harmonics) BlackBerry® smartphone Standalone, USB Down												
Low Channel – 824.2 MHz												
2nd	128	1648.40	850	Horn	V	54.71	56.12	V-V	-8.76	-44.34	-13	-31.3
2nd	128	1648.40	850	Horn	H	56.12		H-H	-7.64			
3rd	128	2472.60	850	Horn	V	46.79	46.79	V-V	-4.90	-42.16	-13	-29.2
3rd	128	2472.60	850	Horn	H	44.41		H-H	-4.66			
The emissions were investigated up to the 10th harmonic. Emissions above the 3rd harmonic were in the noise floor (NF).												
Mid Channel – 837.6 MHz												
2nd	195	1675.20	850	Horn	V	54.93	55.44	V-V	-8.70	-45.18	-13	-32.2
2nd	195	1675.20	850	Horn	H	55.44		H-H	-8.38			
3rd	195	2512.80	850	Horn	V	46.88	46.88	V-V	-4.56	-42.06	-13	-29.1
3rd	195	2512.80	850	Horn	H	44.40		H-H	-4.68			
The emissions were investigated up to the 10th harmonic. Emissions above the 3rd harmonic were in the NF.												
High Channel – 848.8 MHz												
2nd	251	1697.60	850	Horn	V	56.95	57.83	V-V	-5.20	-42.00	-13	**-29.0**
2nd	251	1697.60	850	Horn	H	57.83		H-H	-5.74			
3rd	251	2546.40	850	Horn	V	46.45	46.45	V-V	-5.58	-43.07	-13	-30.1
3rd	251	2546.40	850	Horn	H	44.43		H-H	-6.42			
The emissions were investigated up to the 10th harmonic. Emissions above the 3rd harmonic were in the NF.												

Radiated Emissions Test Data Results cont'd
GPRS Mode

The environmental tests conditions were: Temperature 24ºC
Pressure 1004 mb
Relative Humidity 30%

The Harmonics measurements were performed in the GSM 850 band.
Test distance is 3.0 metres. Harmonics were measured up to 9 GHz.
Date of test: October 9, 2007

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to dipole)	Limit (dBm)	Diff to Limit (dB)
GSM850 Band (Harmonics) BlackBerry® smartphone Standalone, USB Down												
Low Channel – 824.2 MHz												
2nd	128	1648.40	850	Horn	V	52.32	54.36	V-V	-10.72	-46.18	-13	-33.2
2nd	128	1648.40	850	Horn	H	54.36		H-H	-9.48			
3rd	128	2472.60	850	Horn	V	44.18	44.18	V-V	-8.10	-45.34	-13	-32.3
3rd	128	2472.60	850	Horn	H	42.23		H-H	-7.84			
The emissions were investigated up to the 10th harmonic. Emissions above the 3rd harmonic were in the NF												
Mid Channel – 837.6 MHz												
2nd	195	1675.20	850	Horn	V	53.05	54.96	V-V	-9.32	-45.76	-13	-32.8
2nd	195	1675.20	850	Horn	H	54.96		H-H	-8.96			
3rd	195	2512.80	850	Horn	V	43.89	43.89	V-V	-8.36	-45.86	-13	-32.9
3rd	195	2512.80	850	Horn	H	42.33		H-H	-8.44			
The emissions were investigated up to the 10th harmonic. Emissions above the 3rd harmonic were in the NF.												
High Channel – 848.8 MHz												
2nd	251	1697.60	850	Horn	V	54.55	56.50	V-V	-6.58	-43.38	-13	**-30.4**
2nd	251	1697.60	850	Horn	H	56.5		H-H	-7.18			
3rd	251	2546.40	850	Horn	V	44.13	44.13	V-V	-8.38	-45.87	-13	-32.9
3rd	251	2546.40	850	Horn	H	42.03		H-H	-9.3			

The emissions were investigated up to the 10th harmonic.
Emissions above the 3rd harmonic were in the NF.

Radiated Emissions Test Data Results cont'd

EDGE Mode

The environmental test conditions were:

Temperature	25ºC
Pressure	1001 mb
Relative Humidity	32%

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

Date of Test: October 10, 2007

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

Frequency	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		(PK or AVE)	(dBµV)	(dB/m)	(dBµV/m)	(dB)	(dB)
(MHz)	(V/H)	(metres)	(Deg.)						
-	-	-	-	-	-	-	-	-	-

All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

EDGE Mode

The environmental tests conditions were: Temperature 24ºC
Pressure 1004 mb
Relative Humidity 30%

The Harmonics measurements were performed in the GSM 850 band.
Test distance is 3.0 metres. Harmonics were measured up to 9 GHz.
Date of test: October 9, 2007

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to dipole)	Limit (dBm)	Diff to Limit (dB)
GSM850 Band (Harmonics) BlackBerry® smartphone Standalone, Horizontal												
Low Channel – 824.2 MHz												
2nd	128	1648.40	850	Horn	V	52.28	52.28	V-V	-12.86	-48.42	-13	-35.4
2nd	128	1648.40	850	Horn	H	52.15		H-H	-11.72			
3rd	128	2472.60	850	Horn	V	44.18	44.18	V-V	-8.10	-45.34	-13	-32.3
3rd	128	2472.60	850	Horn	H	42.27		H-H	-7.84			
The emissions were investigated up to the 10th harmonic. Emissions above the 3rd harmonic were in the NF												
Mid Channel – 837.6 MHz												
2nd	195	1675.20	850	Horn	V	53.08	53.59	V-V	-10.88	-47.50	-13	-34.5
2nd	195	1675.20	850	Horn	H	53.59		H-H	-10.70			
3rd	195	2512.80	850	Horn	V	43.85	43.85	V-V	-8.66	-46.14	-13	-33.1
3rd	195	2512.80	850	Horn	H	42.38		H-H	-8.64			
The emissions were investigated up to the 10th harmonic. Emissions above the 3rd harmonic were in the NF.												
High Channel – 848.8 MHz												
2nd	251	1697.60	850	Horn	V	54.36	55.45	V-V	-7.60	-44.40	-13	**-31.4**
2nd	251	1697.60	850	Horn	H	55.45		H-H	-8.20			
3rd	251	2546.40	850	Horn	V	44.19	44.19	V-V	-8.38	-45.87	-13	-32.9
3rd	251	2546.40	850	Horn	H	41.62		H-H	-9.28			
The emissions were investigated up to the 10th harmonic. Emissions above the 3rd harmonic were in the NF.												

Radiated Emissions Test Data Results cont'd

The environmental tests conditions were: Temperature 24ºC
Pressure 1004 mb
Relative Humidity 30%

Test distance is 3.0 metres.
Date of test: October 9, 2007
The measurements were performed in transmit mode with the BlackBerry® smartphone in standalone position.

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	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	N/A	V-V	N/A	N/A	-	N/A
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	N/A	V-V	N/A	N/A	-	N/A
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	N/A	V-V	N/A	N/A	-	N/A
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	N/A	V-V	N/A	N/A	-	N/A
F0	251	3575.20	850	Horn	H	NF						
Emissions were in the NF.												

Radiated Emissions Test Data Results cont'd

GSM Mode

The environmental tests conditions were: Temperature 23ºC
Pressure 1018 mb
Relative Humidity 32%

The EIRP measurements were performed for the PCS band.

Test distance is 3.0 metres

Date of test: October 5, 2007

								Substitution Method					
EUT				Receive Antenna		Spectrum Analyzer		Tracking Generator					
										Corrected Reading (relative to Isotropic Radiator)			
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) dBuV	Pol. Tx-Rx	Reading (dBm)	(dBm)	(W)	Limit (dBm)	Diff to Limit (dB)
PCS BAND (EIRP) BlackBerry® smartphone Standalone, USB down													
F0	512	1850.20	1900	Horn	V	88.79	91.40	V-V	-8.20	**27.91**	**0.618**	33	-5.09
F0	512	1850.20	1900	Horn	H	91.40		H-H	-6.94				
F0	661	1880.00	1900	Horn	V	88.34	89.25	V-V	-9.10	26.93	0.493	33	-6.07
F0	661	1880.00	1900	Horn	H	89.25		H-H	-7.58				
F0	810	1909.80	1900	Horn	V	88.86	88.86	V-V	-9.58	26.16	0.413	33	-6.84
F0	810	1909.80	1900	Horn	H	88.73		H-H	-8.14				

Radiated Emissions Test Data Results cont'd

EDGE Mode

The environmental tests conditions were: Temperature 23ºC
Pressure 1018 mb
Relative Humidity 32%

The EIRP measurements were performed for the PCS band.

Test distance is 3.0 metres

Date of test: October 5, 2007

								Substitution Method					
EUT				Receive Antenna		Spectrum Analyzer		Tracking Generator					
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) dBuV	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Isotropic Radiator) (dBm)	(W)	Limit (dBm)	Diff to Limit (dB)
PCS BAND (EIRP) Handheld Standalone, USB down													
F0	512	1850.20	1900	Horn	V	86.52	88.23	V-V	-11.46	**24.71**	**0.296**	33	-8.29
F0	512	1850.20	1900	Horn	H	88.23		H-H	-10.14				
F0	661	1880.00	1900	Horn	V	85.99	87.07	V-V	-11.30	24.69	0.294	33	-8.31
F0	661	1880.00	1900	Horn	H	87.07		H-H	-9.82				
F0	810	1909.80	1900	Horn	V	86.75	86.75	V-V	-11.70	24.12	0.258	33	-8.88
F0	810	1909.80	1900	Horn	H	86.75		H-H	-10.18				

Radiated Emissions Test Data Results cont'd

GSM Mode

The environmental test conditions were:

Temperature	24ºC
Pressure	1004 mb
Relative Humidity	31%

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

Date of Test: October 10, 2007

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

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

All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

GSM Mode

The environmental tests conditions were:

Temperature	24ºC
Pressure	1013 mb
Relative Humidity	32%

The Harmonics measurements were performed in the PCS band.

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

Date of test: October 5, 2007

								Substitution Method				
EUT				Receive Antenna		Spectrum Analyzer		Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Pol. Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Isotropic Radiator) (dBm)	Limit (dBm)	Diff to Limit (dB)
PCS BAND (Harmonics) BlackBerry® smartphone Standalone, USB down **Low Channel** 1850.2 MHz												
2nd	512	3700.40	1900	Horn	V	42.96	45.17	V-V	-1.94	-48.01	-13	-25.01
2nd	512	3700.40	1900	Horn	H	45.17		H-H	-2.08			
The emissions were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF **Middle Channel** 1880.0 MHz												
2nd	661	3760.00	1900	Horn	V	42.56	46.04	V-V	-0.2	-36.00	-13	**-23.00**
2nd	661	3760.00	1900	Horn	H	46.04		H-H	0.2			
The emissions were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF **High Channel** 1909.8 MHz												
2nd	810	3819.60	1900	Horn	V	44.58	46.1	V-V	-0.04	-36.18	-13	-23.18
2nd	810	3819.60	1900	Horn	H	46.1		H-H	-0.06			
The emissions were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF												

Radiated Emissions Test Data Results cont'd

GPRS Mode

The environmental tests conditions were:

Temperature	24ºC
Pressure	1013 mb
Relative Humidity	32%

The Harmonics measurements were performed in the PCS band.

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

Date of test: October 5, 2007

								Substitution Method				
EUT				Receive Antenna		Spectrum Analyzer		Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Pol. Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Isotropic Radiator) (dBm)	Limit (dBm)	Diff to Limit (dB)
PCS BAND (Harmonics) BlackBerry® smartphone Standalone, USB up **Low Channel** 1850.2 MHz												
2nd	512	3700.40	1900	Horn	V	NF	42.66	V-V	-5.6	-41.67	-13	**-28.67**
2nd	512	3700.40	1900	Horn	H	42.66		H-H	-5.7			
The emissions were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF **Middle Channel** 1880.0 MHz												
2nd	661	3760.00	1900	Horn	V	NF	41.21	V-V	-7.3	-43.10	-13	-30.10
2nd	661	3760.00	1900	Horn	H	41.21		H-H	-6.9			
The emissions were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF **High Channel** 1909.8 MHz												
2nd	810	3819.60	1900	Horn	V	NF	41.12	V-V	-7.4	-43.54	-13	-30.54
2nd	810	3819.60	1900	Horn	H	41.12		H-H	-7.76			
The emissions were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF												

Radiated Emissions Test Data Results cont'd

EDGE Mode

The environmental test conditions were:

Temperature	24ºC
Pressure	1001 mb
Relative Humidity	32%

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

Date of Test: October 10, 2007

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

Frequency	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		(PK or AVE)	(dBµV)	(dB/m)	(dBµV/m)	(dB)	(dB)
(MHz)	(V/H)	(metres)	(Deg.)						
-	-	-	-	-	-	-	-	-	-

All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

EDGE Mode

The environmental tests conditions were:

Temperature	24ºC
Pressure	1013 mb
Relative Humidity	32%

The Harmonics measurements were performed in the PCS band.

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

Date of test: October 5, 2007

								Substitution Method				
EUT				Receive Antenna		Spectrum Analyzer		Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Pol. Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Isotropic Radiator) (dBm)	Limit (dBm)	Diff to Limit (dB)
PCS BAND (Harmonics) BlackBerry® smartphone Standalone, USB up **Low Channel** 1850.2 MHz												
2nd	512	3700.40	1900	Horn	V	NF	41.75	V-V	-6.90	-42.97	-13	-29.97
2nd	512	3700.40	1900	Horn	H	41.75		H-H	-7.14			
The emissions were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF **Middle Channel** 1880.0 MHz												
2nd	661	3760.00	1900	Horn	V	NF	41.92	V-V	-6.50	-41.90	-13	-28.90
2nd	661	3760.00	1900	Horn	H	41.92		H-H	-5.70			
The emissions were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF **High Channel** 1909.8 MHz												
2nd	810	3819.60	1900	Horn	V	NF	42.69	V-V	-5.14	-40.78	-13	**-27.78**
2nd	810	3819.60	1900	Horn	H	42.69		H-H	-4.64			
The emissions were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF												

Radiated Emissions Test Data Results cont'd

The environmental tests conditions were: Temperature 24ºC
Pressure 1013 mb
Relative Humidity 32

Test Distance was 3.0 metres.
Date of test: October 5, 2007
The measurements were performed in transmit mode with the BlackBerry® smartphone in standalone position.

EUT				Rx Antenna		Spectrum Analyzer			Substitution Method Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Corrected Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Isotropic Radiator) (dBm)	Limit (dBm)	Diff to Limit (dB)
RF LO_1 - BlackBerry® smartphone Standalone, Horizontal **Low Channel**													
F0	512	3700.4	1900	Horn	V	NF	N/A	N/A	V-V	N/A	N/A	-	N/A
F0	512	3700.4	1900	Horn	H	NF							
Emissions were in the NF. **High Channel**													
F0	810	3819.6	1900	Horn	V	NF	N/A	N/A	V-V	N/A	N/A	-	N/A
F0	810	3819.6	1900	Horn	H	NF							
Emissions were in the NF. **RF LO_2** **Low Channel**													
F0	512	3860.4	1900	Horn	V	NF	NF	N/A	V-V	N/A	N/A	-	N/A
F0	512	3860.4	1900	Horn	H	NF							
Emissions were in the NF. **High Channel**													
F0	810	3979.6	1900	Horn	V	NF	NF	N/A	V-V	N/A	N/A	-	N/A
F0	810	3979.6	1900	Horn	H	NF							
Emissions were in the NF.													