EMI Test Report

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

RIM Testing Services (RTS)

A division of Research In Motion Limited

REPORT NO.: RTS-0628-0702-10_rev2

PRODUCT MODEL NO: RBP41GW
TYPE NAME: BlackBerry
FCC ID: L6ARBP40GW
IC: 2503A-RBP40GW

DATE: 16 March 2007

Statement of Performance:

The BlackBerry Handheld, model RBP41GW, part number CER-14402-001 Rev 3 and accessories when configured and operated per RIM's operation instructions, performs within the requirements of the test standards.

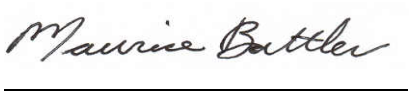
Declaration:

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:

Kevin Chow
Compliance Specialist
Date: 16 Mar 2007

Tested and reviewed by:



Maurice Battler
Compliance Specialist
Date: 16 Mar 2007

Tested and reviewed by:

Masud S. Attayi, P.Eng.
Team Lead, Regulatory Compliance
Date: 16 Mar 2007

Approved by:

Paul G. Cardinal, Ph.D.
Director
Date: 16 Mar 2007

Table of Contents

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, 2005
- FCC CFR 47 Part 24 Subpart E, Broadband PCS, Oct 1. 2005
- 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.

B. Associated Document

1. Document number RTS-0628-RBP41GW-01

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 February 5 to 12, 2007 and February 25 to March 7, 2007. The sample EUT included:

1. BlackBerry Handheld model RBP41GW, CER-14402-001 Rev 2, PIN 20583A5A
2. BlackBerry Handheld model RBP41GW, CER-14402-001 Rev 3, PIN 205A108A
3. BlackBerry Handheld model RBP41GW, CER-14402-001 Rev 3, PIN 205A106C

Conducted RF measurements were performed on handheld PIN 205A106C. Radiated Emission measurements were performed on handhelds PIN 20583A5A and 205A108A.

To view the differences between CER-14402-001 Rev 2 and CER-14402-001 Rev 3, see document number RTS-0628-RBP41GW-01.

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

D. Support Equipment Used for the Testing of the EUT

1) Communication Tester, Rohde & Schwarz, model CMU 200, serial number 837493/073
2) Communication Tester, Rohde & Schwarz, model CMU 200, serial number 100251
3) DC Power Supply, HP, model 6632B, serial number US37472178

E. Test Voltage

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

F. Test Results Chart

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

G. Modifications to EUT

No modifications were required on the EUT.

H. Summary of Results

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

1) The EUT met the requirements of the Tx Conducted Spurious Emissions requirements in the GSM850 band as per 47 CFR 2.1051, CFR 22.917, CFR 22.901(d) and RSS-132. The EUT was measured on the low, middle and high channels. The frequency range investigated was from 10 MHz to 10 GHz. See APPENDIX 1 for test data.

2) The EUT met the requirements of the Tx Conducted Spurious Emissions requirements in the PCS1900 band as per 47 CFR 2.1051, CFR 24.238(a) and RSS-133. 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-132. The EUT was measured in GSM and EDGE mode on the low, middle and high channels. See APPENDIX 1 for test data.

4) The EUT met the requirements of the Occupied Bandwidth and channel mask requirements in the PCS1900 band as per 47 CFR 2.202, CFR 24.238 and RSS-133. The EUT was measured in GSM and EDGE mode on the low, middle and high channels. See APPENDIX 1 for test data.

5) The EUT met the requirements of the Conducted RF Output Power requirements for both the GSM850 and PCS1900 bands as per 47 CFR 2.1046(a). The EUT was measured on the low, middle and high channels. See APPENDIX 2 for the test data.

6) 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. The temperature range was from -30°C to +60°C in 10° temperature steps. The EUT was measured on low, middle and high channels at each temperature step. The EUT was measured at low (3.6 volts), nominal (3.8 volts) and high (4.2 volts) dc input voltage at each temperature step and channel at maximum output power. See APPENDIX 3 for the test data.

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. The temperature range was from -30°C to +60°C in 10° temperature steps. The EUT was measured on low, middle and high channels at each temperature step. The EUT was measured at low (3.6

volts), nominal (3.8 volts) and high (4.2 volts) dc input voltage at each temperature step and channel at maximum output power.
See APPENDIX 3 for the test data.

8) The radiated spurious emissions/harmonics and ERP/EIRP were measured for both GSM850 and PCS bands. The results are within the limits. The EUT was placed on a nonconductive styrofoam table, 100 cm high that was positioned on a remotely controlled turntable. The test distance used between the EUT and the receiving antenna was three metres. Then the emissions were maximized by elevating the antenna in the range of 1 to 4 metres. The turntable was rotated to determine the azimuth of the peak emissions. The maximum emissions level was recorded. Both the horizontal and vertical polarisations of the emissions were measured. The maximum emissions level was recorded. The EUT was then substituted with an antenna placed in the same location as the EUT. A Dipole antenna was used for the ERP measurements and a Horn antenna was used for EIRP measurements. The substitution antenna was connected into a signal generator that was set to the test frequency. The emissions were maximized by elevating the antenna in the range of 1 to 4 metres. The signal generator output was then adjusted to match the Handheld output reading. The signal generator output was recorded. Both the horizontal and vertical polarisations of the emissions were measured.

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

   The highest ERP in the GSM850 band measured was 27.47 dBm (0.56 W) at 848.8 MHz (channel 251).
   The highest EIRP in the PCS band measured was 29.9 dBm (0.98 W) at 1880.0 MHz (channel 661).

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

   The worst test margin in the GSM850 band for GSM mode harmonic emissions measured was 17.50 dB below the limit at 1675.2 MHz, for

GPRS mode it was 23.46 dB below the limit at 1697.6 MHz, and for EDGE mode was 23.16 dB below the limit at 1697.6 MHz.

The worst test margin in the PCS band for GSM mode harmonic emissions measured was 25.27 dB below the limit at 3700.4 MHz, for GPRS mode it was 25.60 dB below the limit at 3760.0 MHz and in EDGE mode it was 24.20 dB below the limit at 3760.0 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

I. Compliance Test Equipment Used

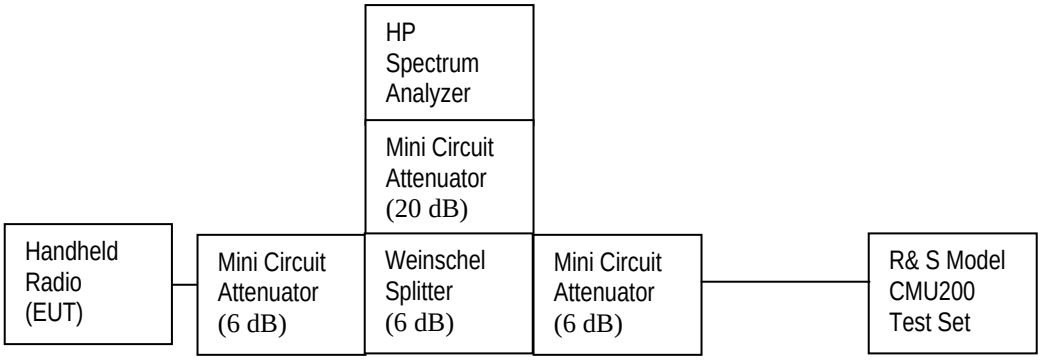
UNIT	MANUFACTURER	MODEL	SERIAL NUMBER	CAL DUE DATE (YY MM DD)	USE
Preamplifier	Sonoma	310N/11909A	185831	07-11-23	Radiated Emissions
Preamplifier system	TDK RF Solutions	PA-02	080010	07-11-22	Radiated Emissions
Hybrid Log Antenna	TDK	HLP-3003C	017401	08-08-04	Radiated Emissions
Horn Antenna	TDK	HRN-0118	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
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	837493/073	07-12-01	Radiated Emissions
EMI Receiver	Rohde & Schwarz	ESIB-40	100255	07-05-11	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	100251	07-04-23	RF Conducted Emissions
Spectrum Analyzer	HP	8563E	3745A08112	07-09-20	RF Conducted Emissions
DC Power Supply	HP	6632B	US37472178	07-09-14	RF Conducted Emissions
Environment Monitor	Control Company	1870	230355190	07-12-28	Radiated Emissions
Environment Monitor	Control Company	1870	230199533	07-12-01	RF Conducted Emissions
Temperature Probe	Hart Scientific	61161-302	21352860	07-08-31	Frequency Stability
Environmental Chamber	ESPEC Corp.	SH-240S1	91007118	N/R	Frequency Stability
Signal Generator	Agilent	8648C	4037U03155	07-09-13	Frequency Stability
Power Meter	Giga-tronics	8541C	1837762	07-12-15	Frequency Stability
Power Sensor	Giga-tronics	80401A	1835838	07-12-15	Frequency Stability

APPENDIX 1 - CONDUCTED RF EMISSIONS TEST DATA/PLOTS

Conducted RF Emission Test Data cont'd

This appendix contains measurement data pertaining to conducted spurious emissions, –26 dBc bandwidth, 99% power bandwidth and the channel mask on Handheld PIN 205A106C.

Test Setup Diagram



The environmental test conditions were:

Temperature	24ºC
Pressure	1028 mb
Relative Humidity	21%

Conducted RF Emission Test Data cont'd

The conducted spurious emissions – As per 47 CFR 2.1051, CFR 24.238(a), RSS-133, CFR 22 Subpart H and RSS-132 were measured from 10 MHz to 20 GHz. The EUT emissions were in the noise floor.
See figures 1 to 12 for the plots of the conducted spurious emissions.

Date of Test: March 06, 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 275.0 kHz, and for the PCS1900 band was measured to be 280.0 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	275	245.0
837.6	267	245.0
848.8	267	248.3

1900 band Frequency (MHz)	-26dBc Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
1850.2	280	245.0
1880.0	268	245.0
1909.8	270	245.0

Measurement Plots for GSM850 and PCS1900 in GSM mode
Refer to the following measurement plots for more detail.
See Figures 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: March 07, 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	246.7
837.6	243.3
848.8	245.0

1900 band Frequency (MHz)	99% Occupied Bandwidth (kHz)
1850.2	243.3
1880.0	240.0
1909.8	245.0

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

See Figures 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: March 06 - 07, 2007.

Conducted RF Emission Test Data cont'd

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

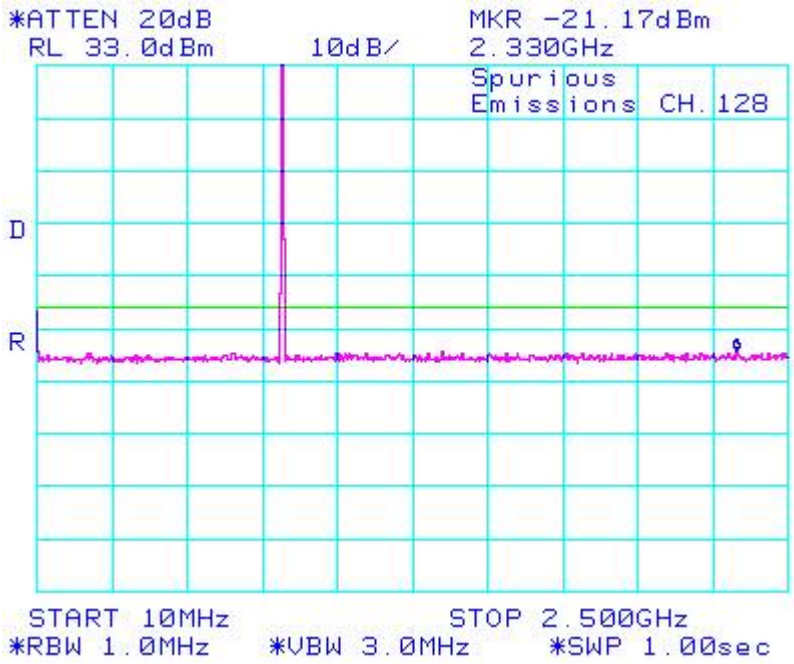
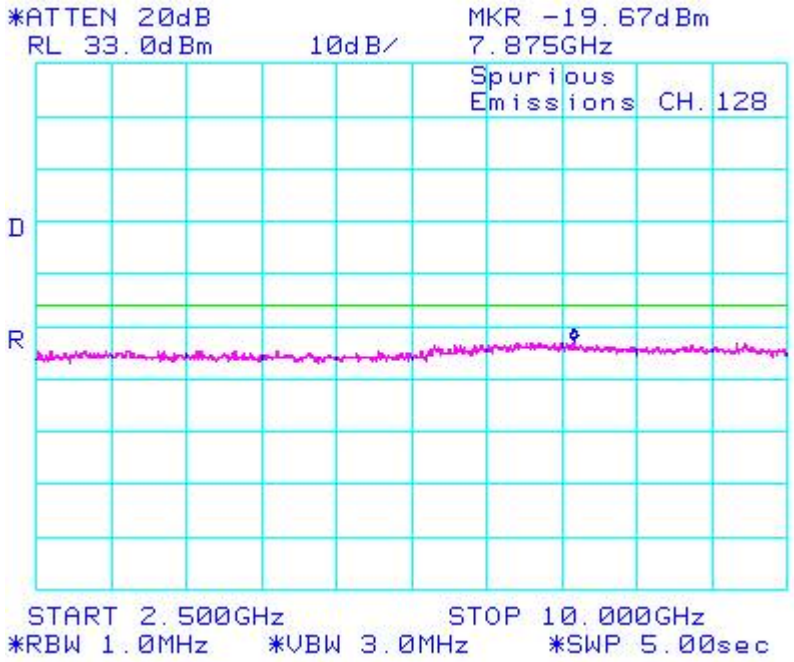


Figure 2: GSM850 band, Spurious Conducted Emissions, Low channel



Conducted RF Emission Test Data cont'd

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

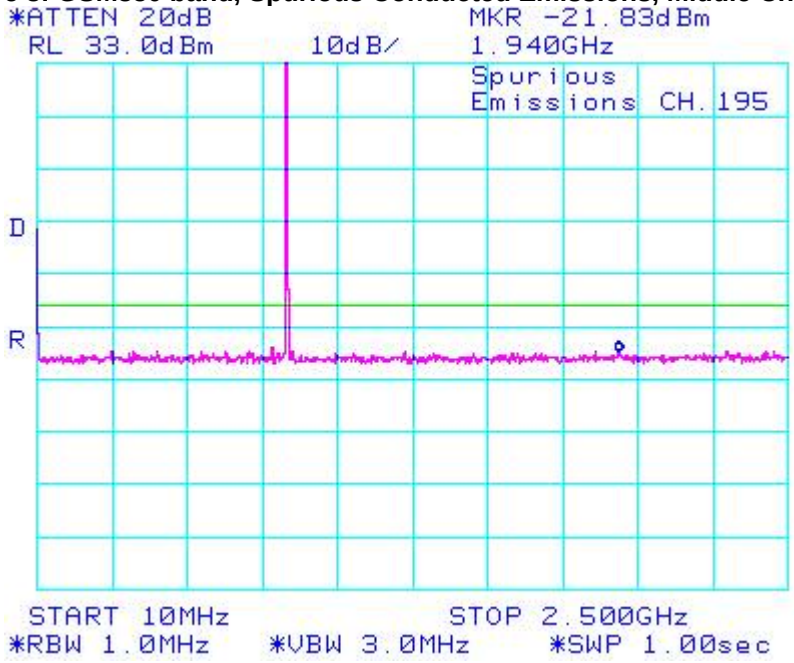
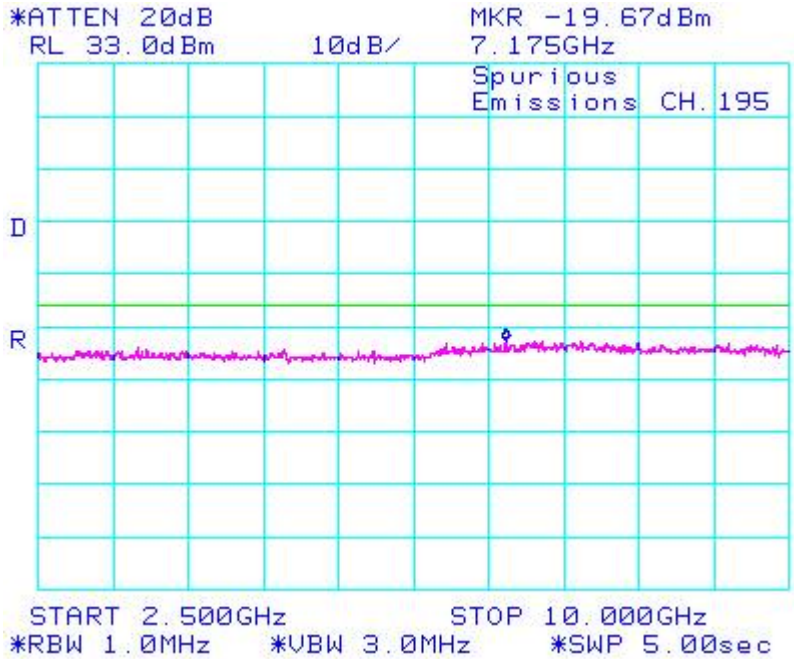


Figure 4: GSM850 band, Spurious Conducted Emissions, Middle Channel



Conducted RF Emission Test Data cont'd

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

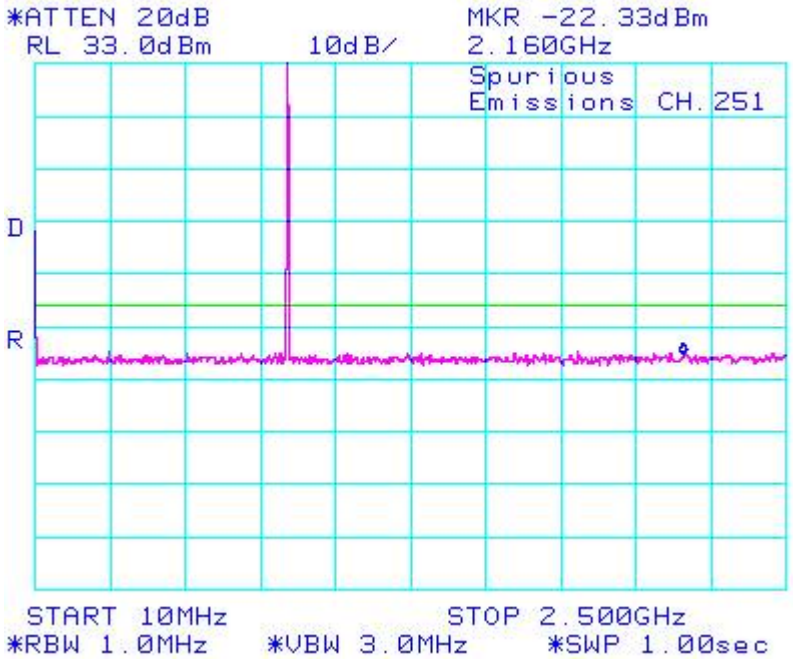
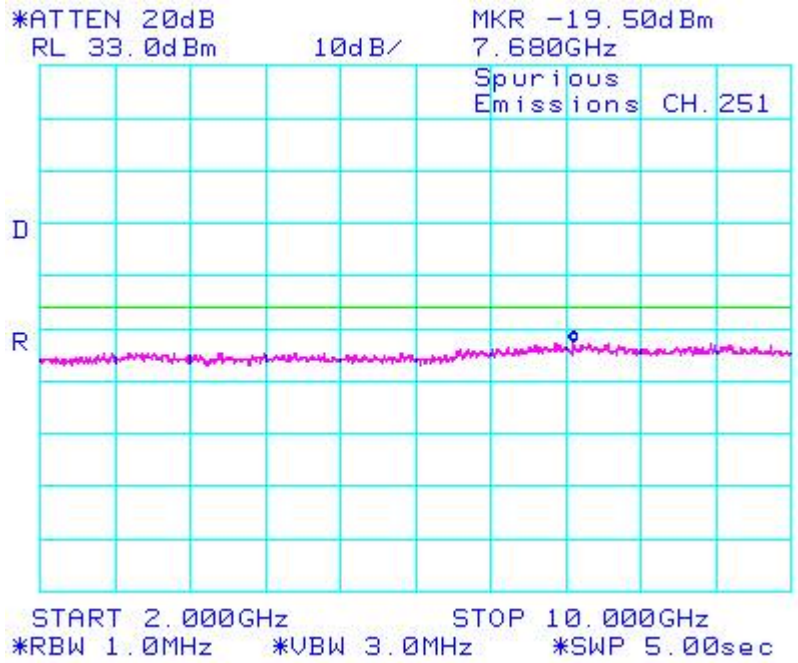


Figure 6: GSM850 band, Spurious Conducted Emissions, High Channel



Conducted RF Emission Test Data cont'd

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

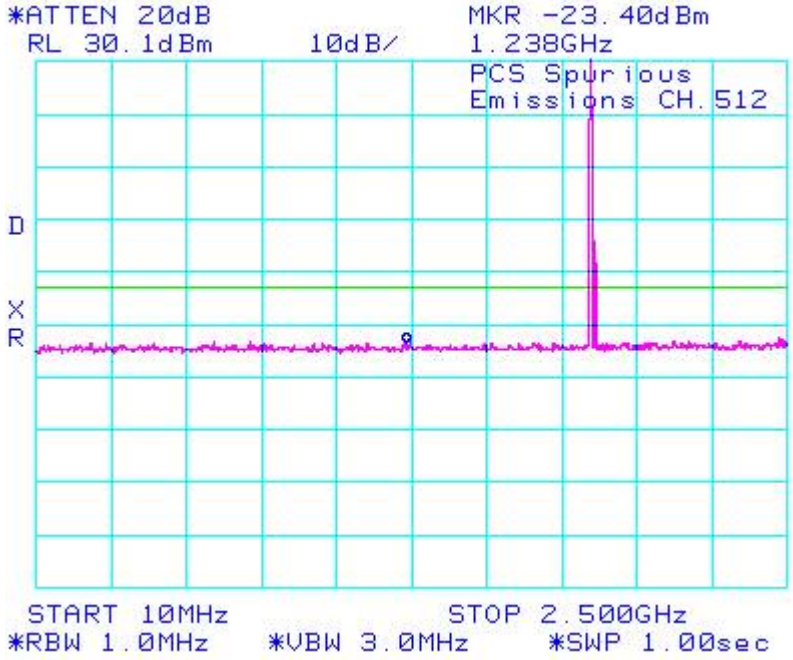
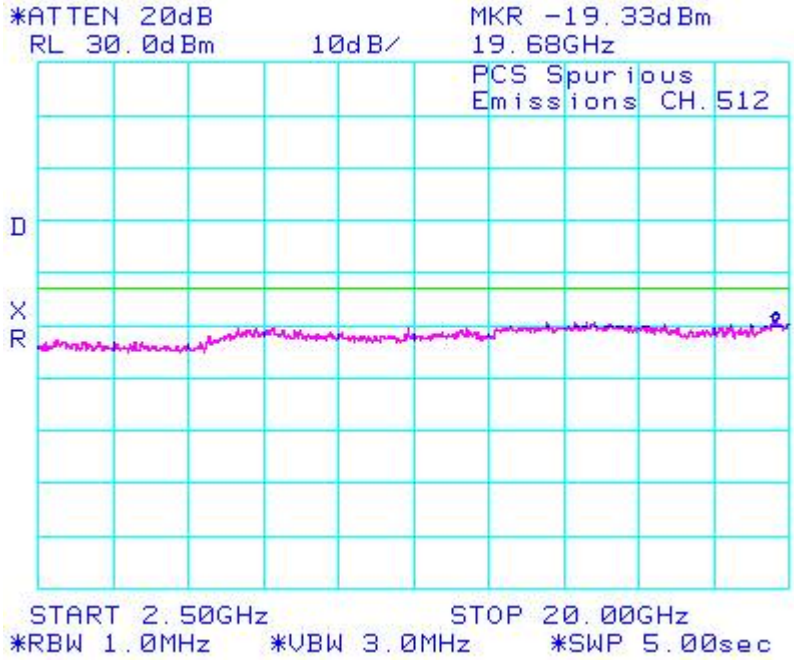


Figure 8: PCS1900 band, Spurious Conducted Emissions, Low Channel



Conducted RF Emission Test Data cont'd

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

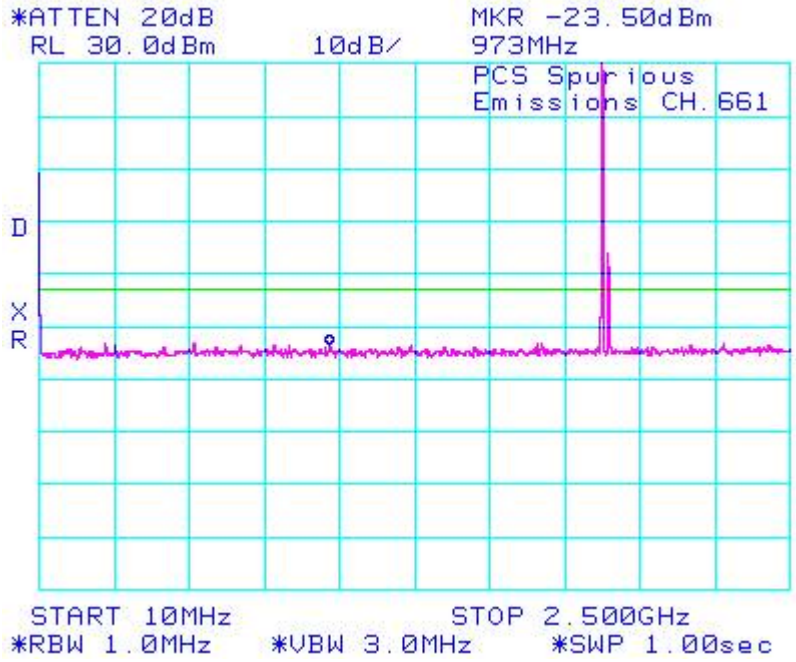
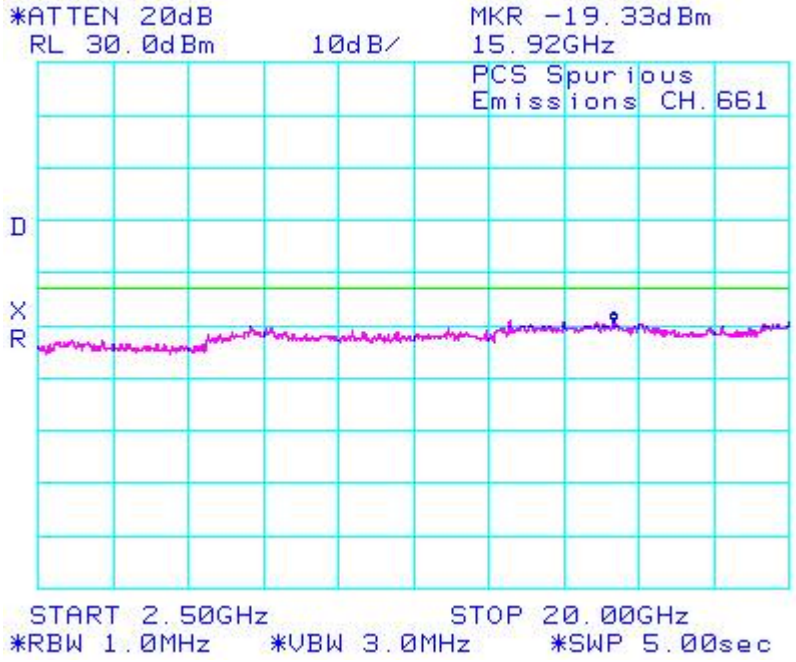


Figure 10: PCS1900 band, Spurious Conducted Emissions, Middle Channel



Conducted RF Emission Test Data cont'd

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

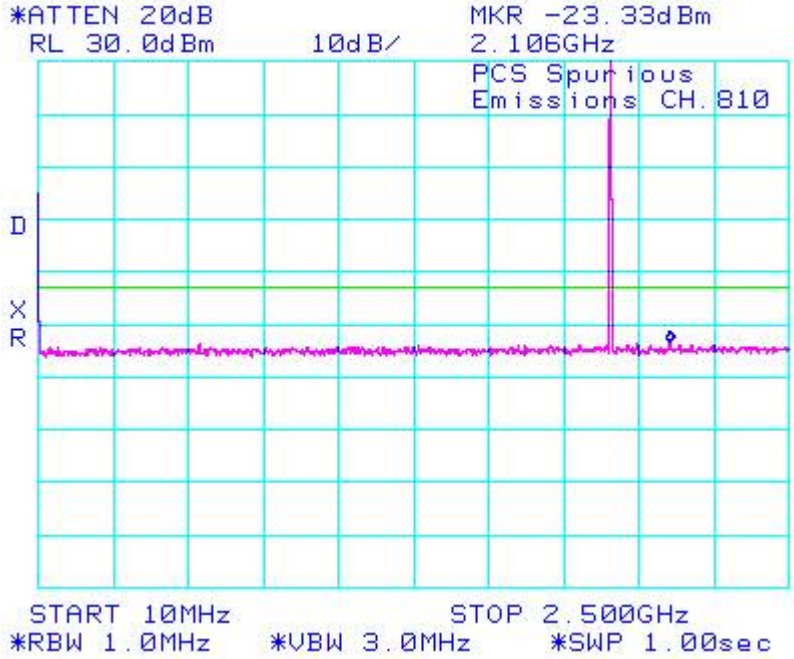
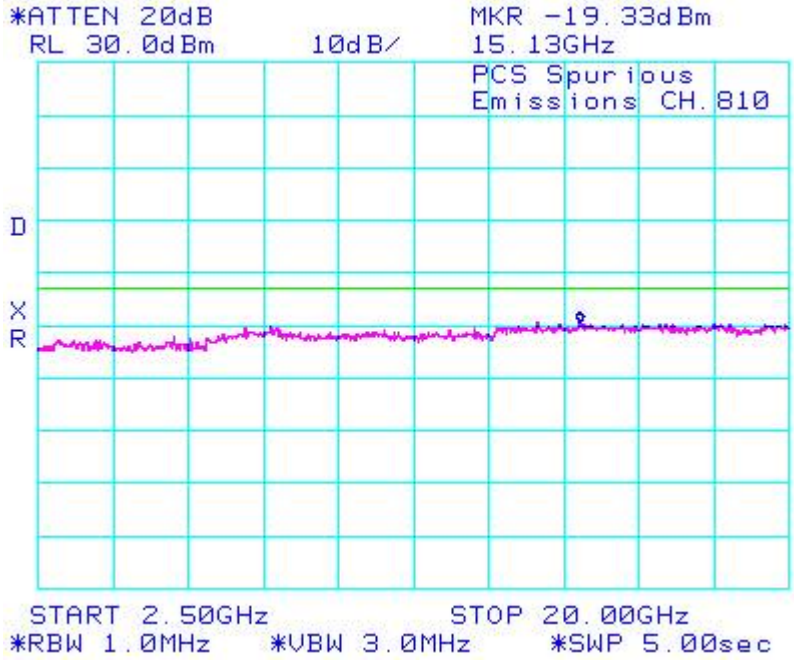


Figure 12: PCS1900 band, Spurious Conducted Emissions, High Channel



Conducted RF Emission Test Data cont'd

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

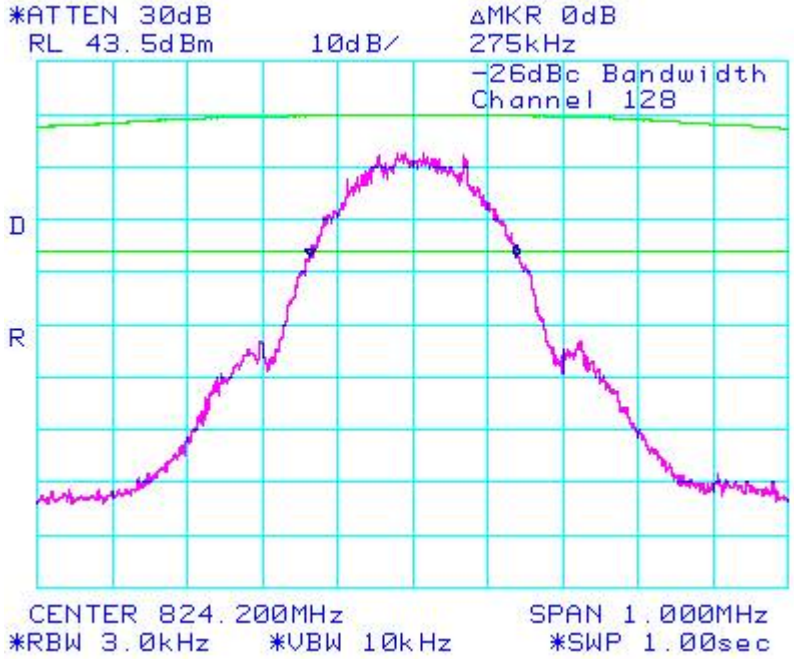
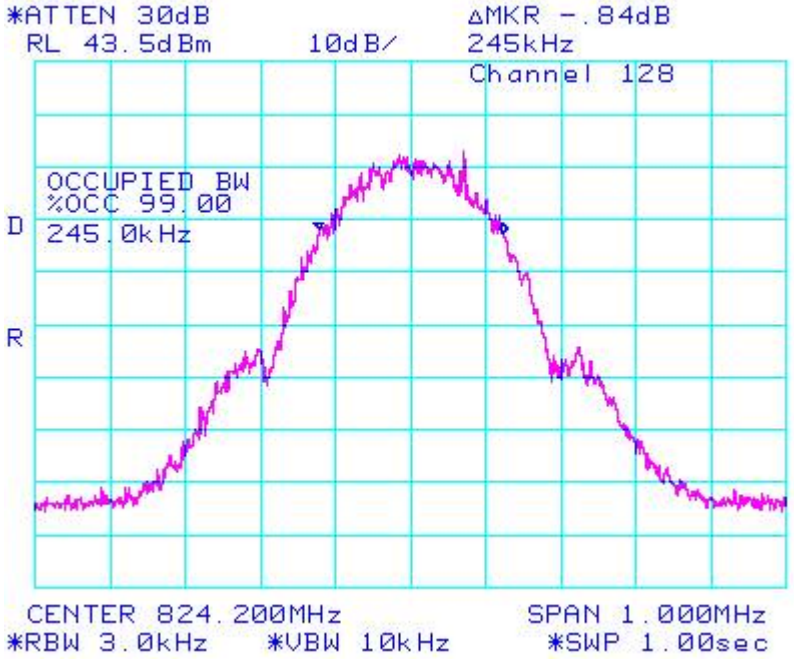


Figure 14: Occupied Bandwidth, GSM850 band Low Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

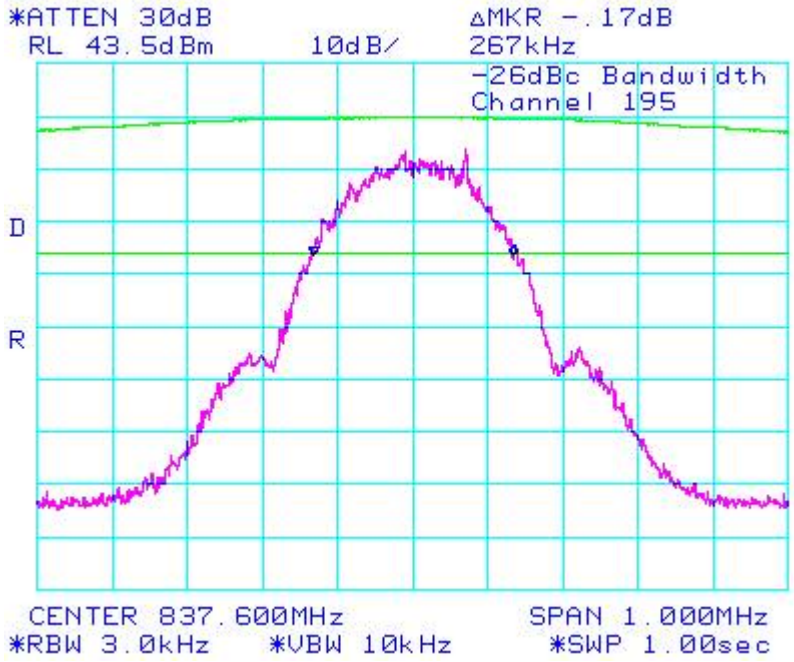
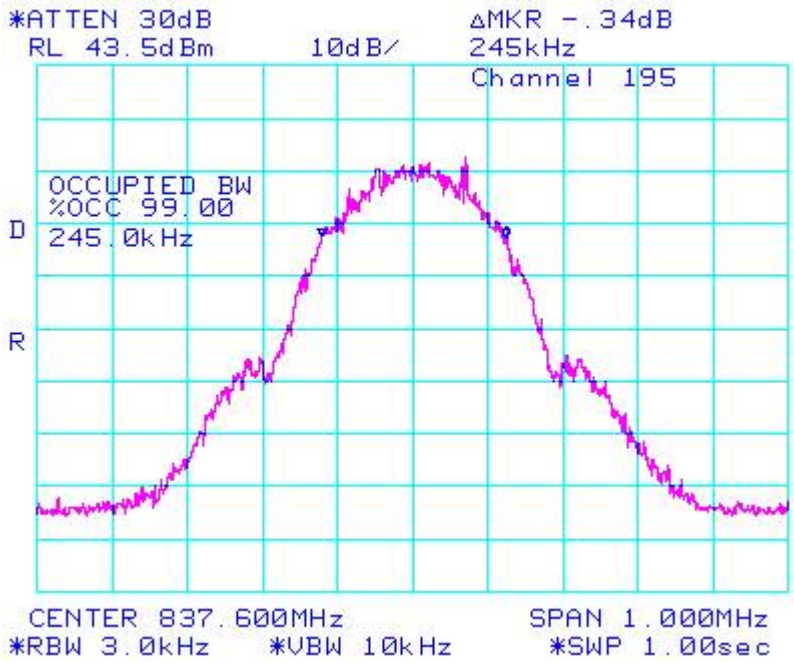


Figure 16: Occupied Bandwidth, GSM850 band Middle Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

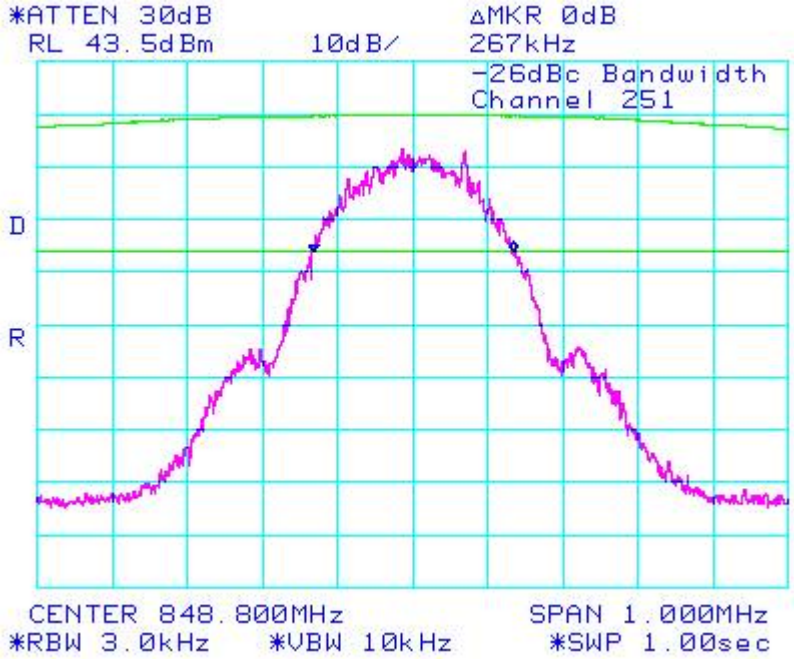
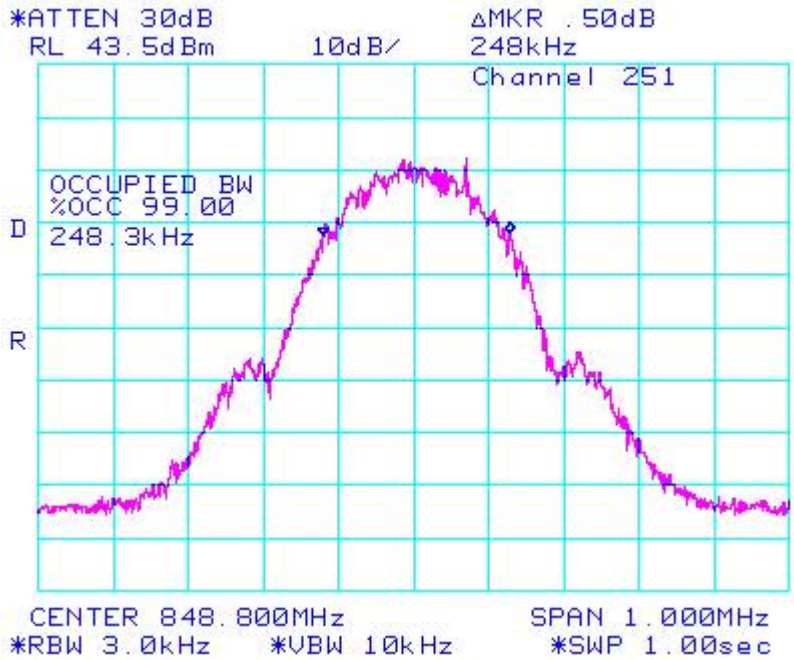


Figure 18: Occupied Bandwidth, GSM850 band High Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

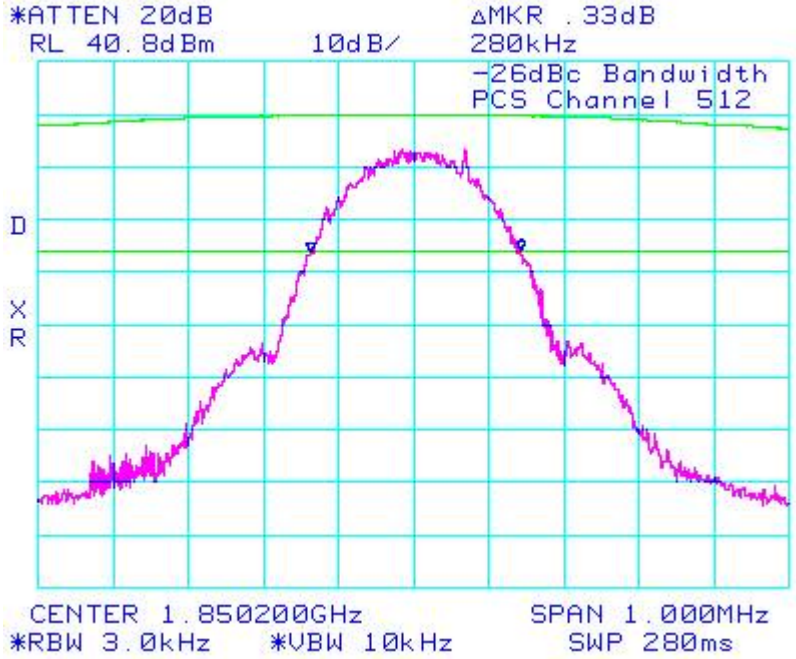
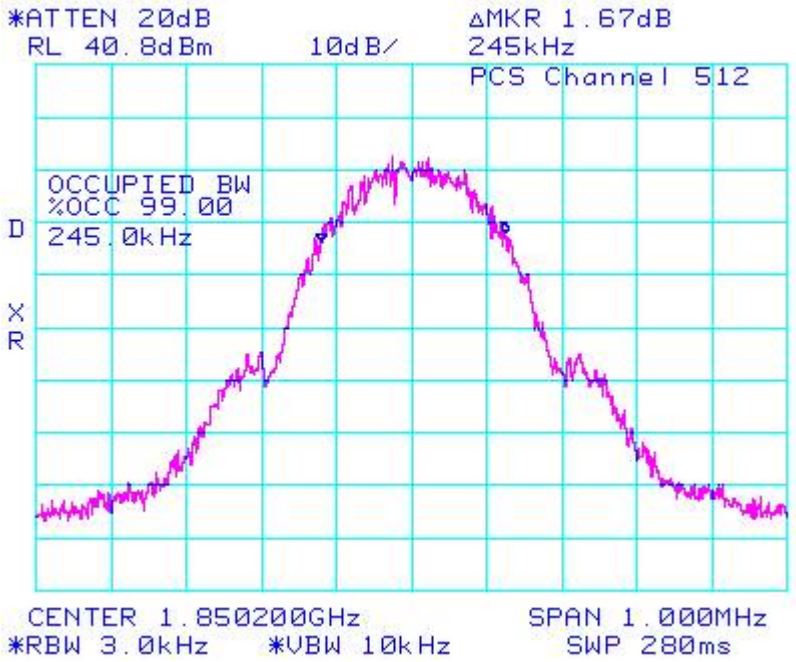


Figure 20: Occupied Bandwidth, PCS1900 Low Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

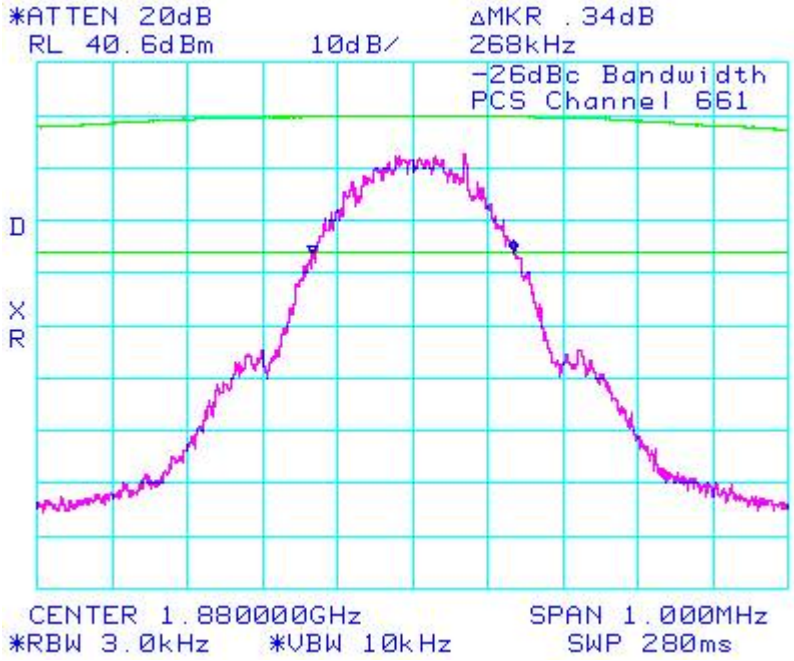
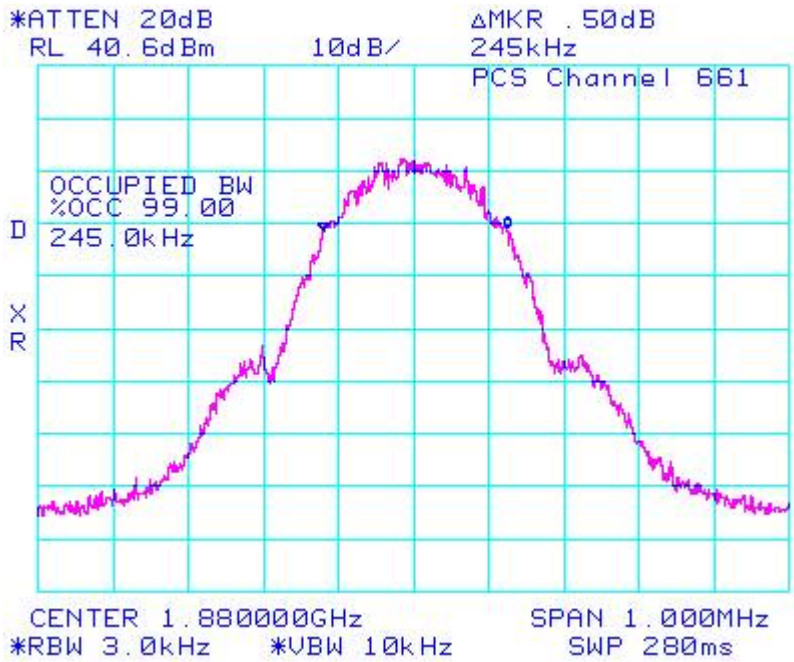


Figure 22: Occupied Bandwidth, PCS1900 Middle Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

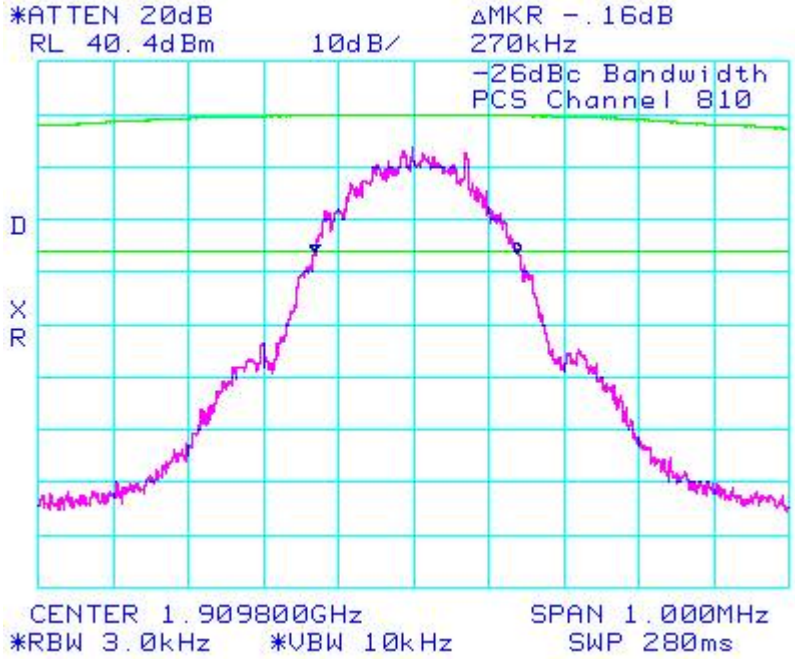
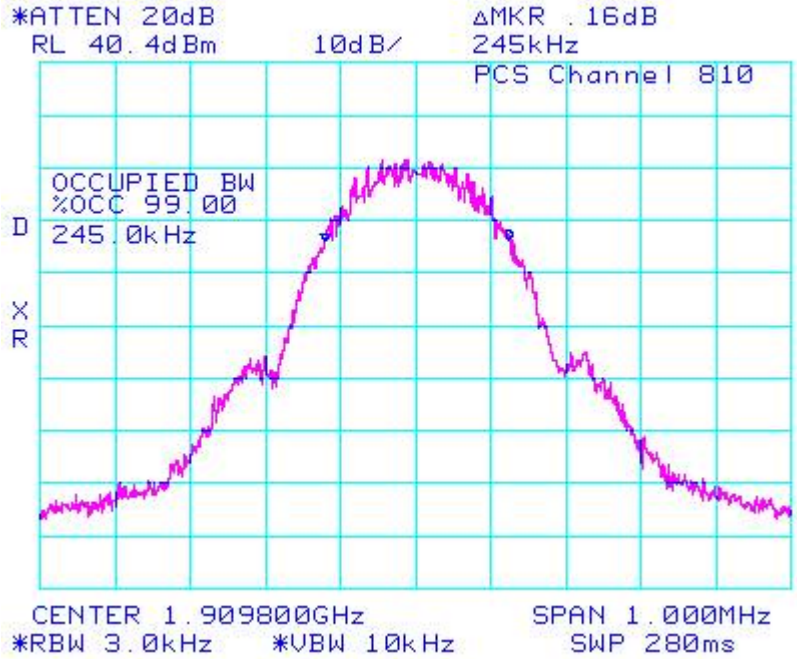


Figure 24: Occupied Bandwidth, PCS1900 High Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

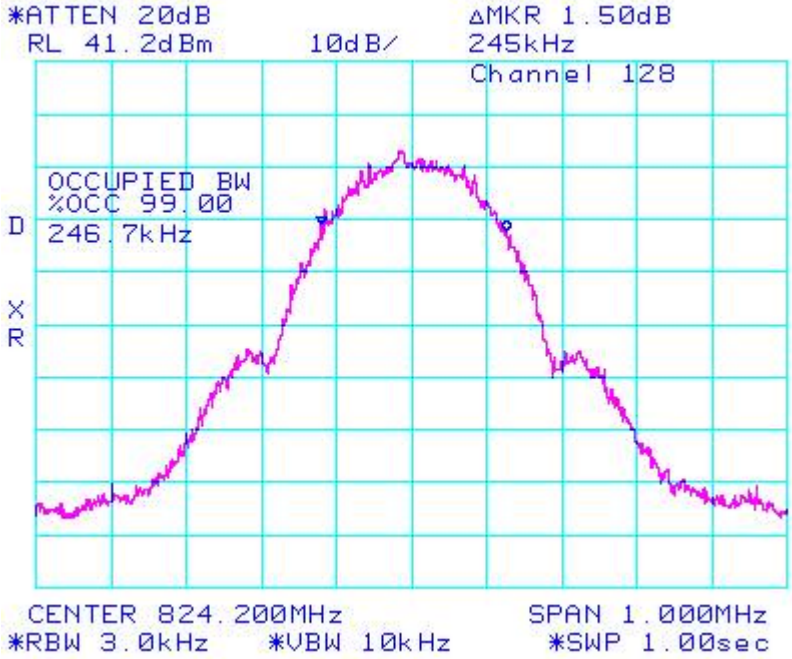
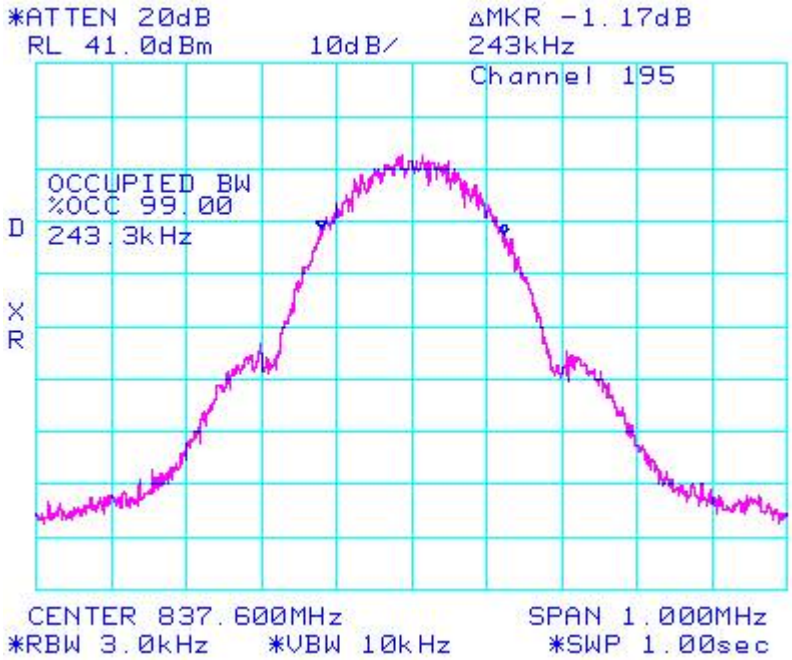


Figure 26: Occupied Bandwidth, GSM850 Band, Middle Channel in EDGE mode



Conducted RF Emission Test Data cont'd

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

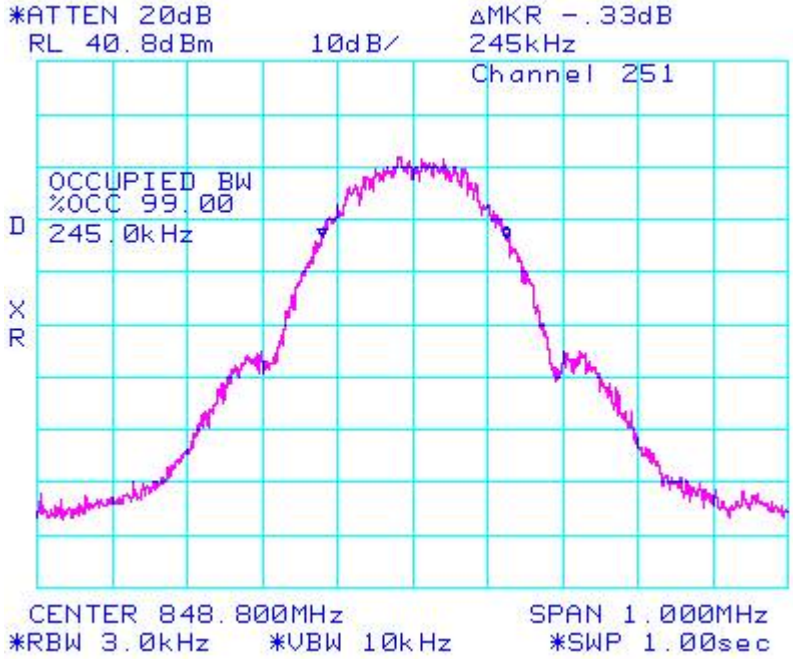
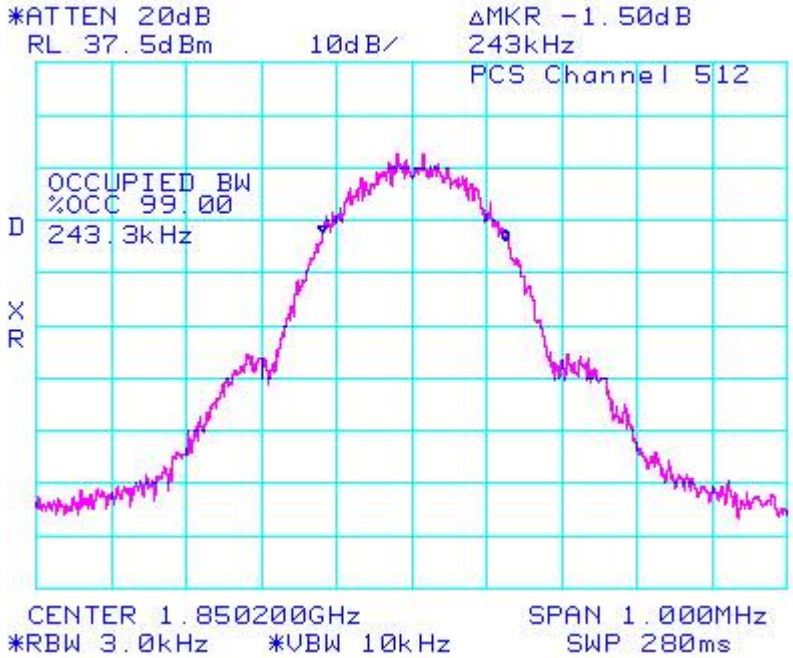


Figure 28: Occupied Bandwidth, PCS1900 Band, Low Channel in EDGE mode



Conducted RF Emission Test Data cont'd

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

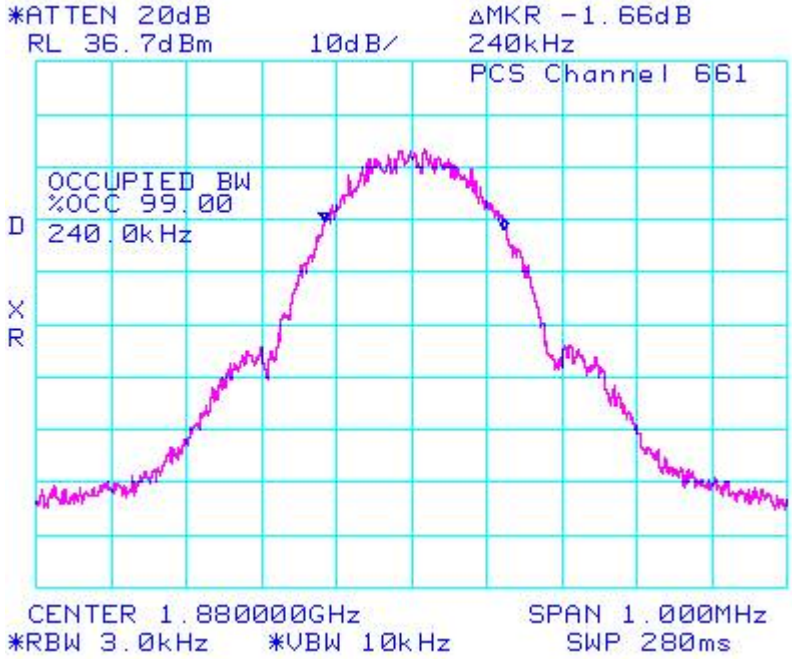
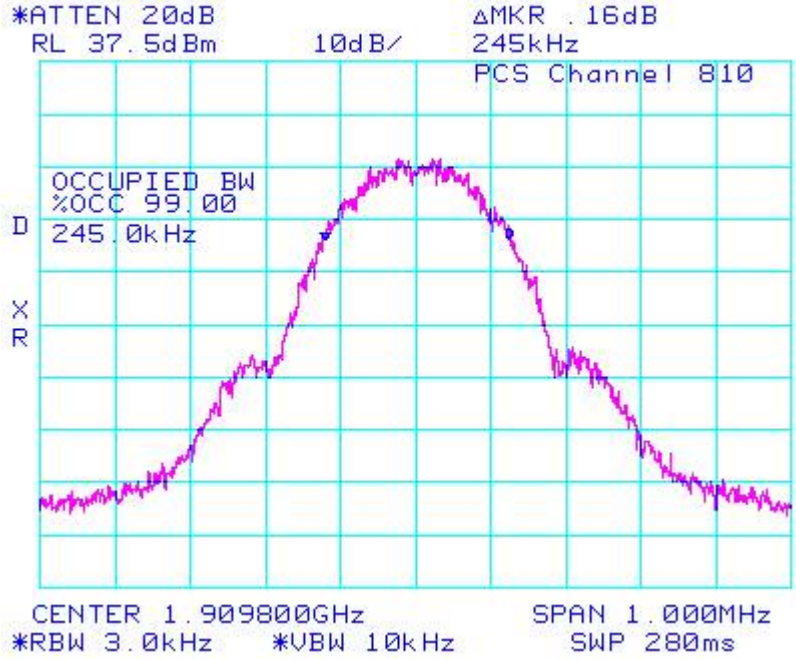


Figure 30: Occupied Bandwidth, PCS1900 Band, High Channel in EDGE mode



Conducted RF Emission Test Data cont'd

Figure 31: GSM850 band, Low Channel Mask

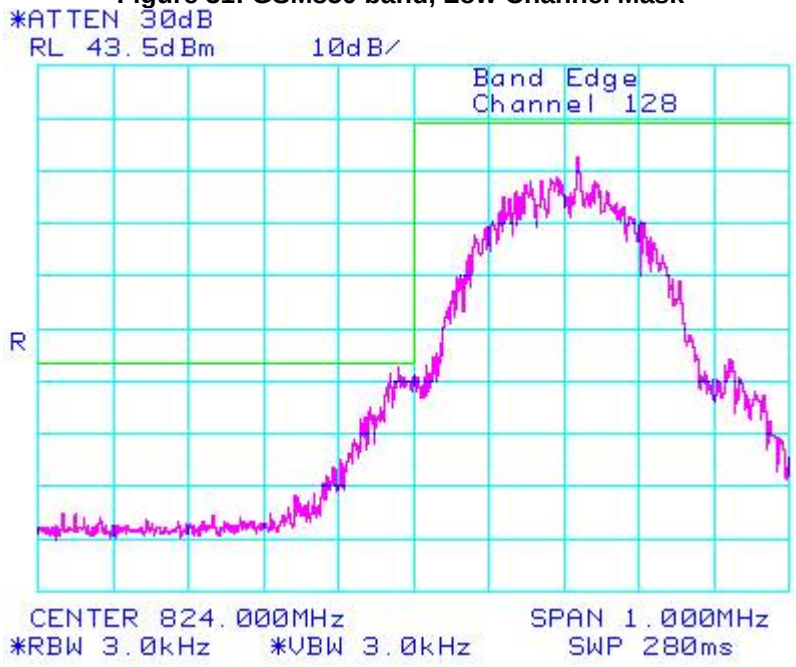
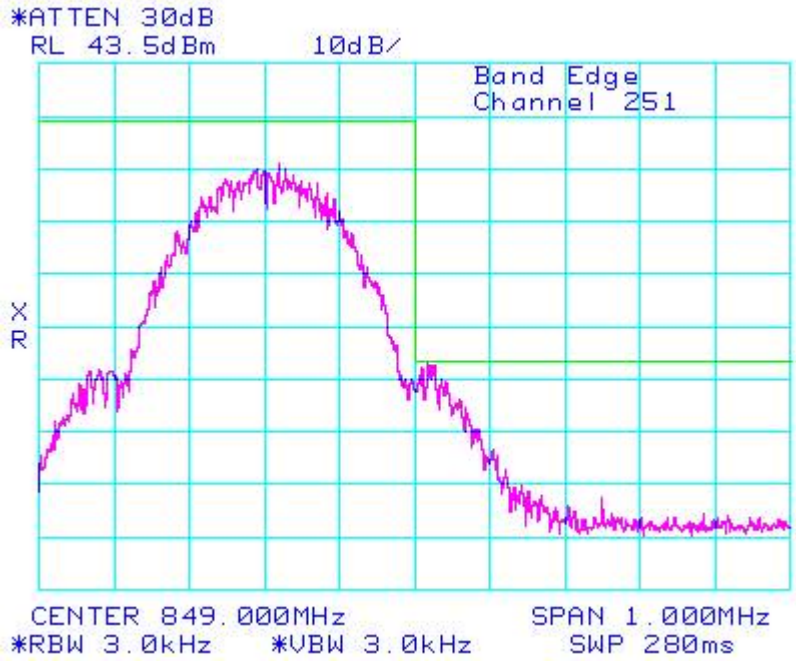


Figure 32: GSM850 band High Channel Mask



Conducted RF Emission Test Data cont'd

Figure 33: PCS1900, Low Channel Mask

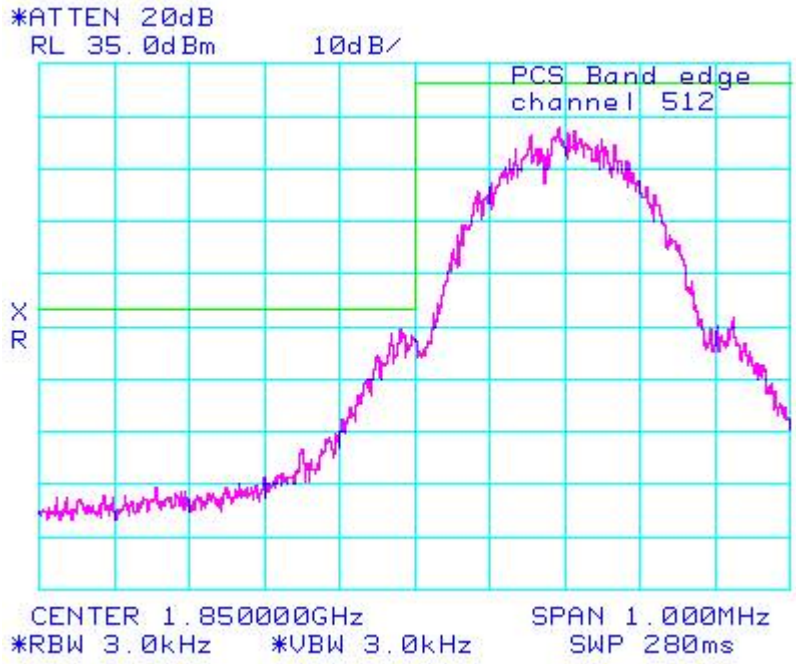
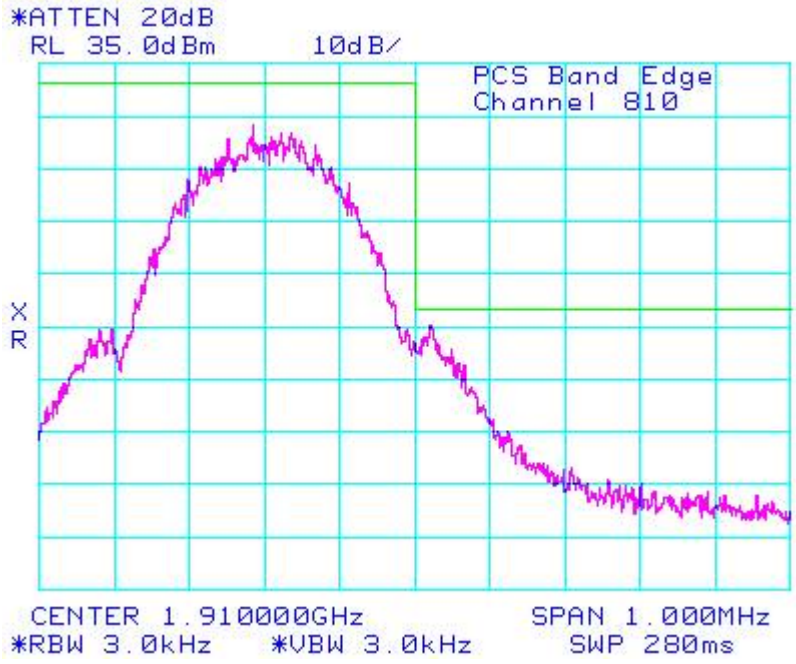


Figure 34: PCS1900, High Channel Mask



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 Handheld was compensated for in the measurements.
Peak nominal output power is 33.2 dBm ±0.5 dB for GSM850 and 30.5 dBm ±0.5 dB for PCS.

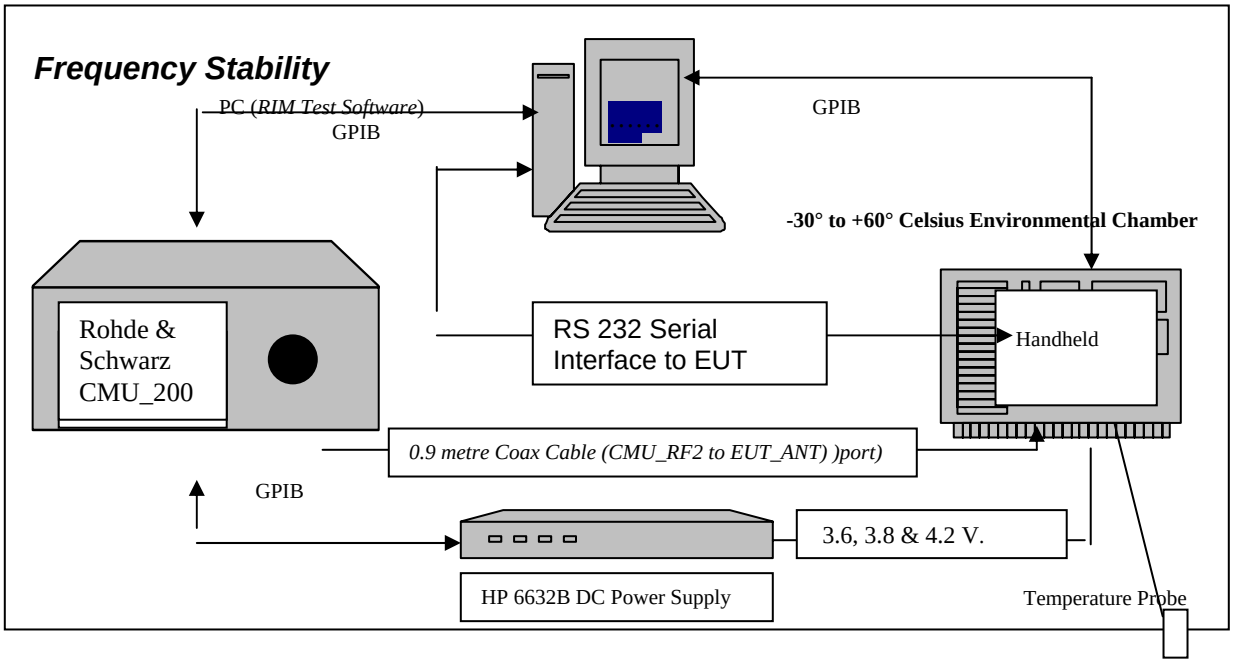
Date of Test: February 07, 2007

Test Results

Channel	Frequency (MHz)	Maximum Output Power (dBm)	Maximum Output Power (Watts)
GSM850			
128	824.20	**33.3**	**2.1379**
189	837.60	33.0	1.9952
251	848.80	33.1	2.0417
GSM850 EDGE/GPRS			
128	824.20	30.5	1.1220
189	837.60	30.2	1.0471
251	848.80	30.1	1.0233
PCS			
512	1850.2	**31.0**	**1.2589**
661	1880.0	30.8	1.2022
810	1909.8	30.6	1.1481
PCS EDGE/GPRS			
512	1850.2	27.5	0.5623
661	1880.0	27.3	0.5370
810	1909.8	27.2	0.5248

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 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 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	1.40
1880.0	1.40
1909.8	1.40

GSM 850 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 3.8 volts to 4.2 volts nominal voltage. The frequency error was measured at a maximum output power and recorded by the automated system test software.

The EUT output power and frequency was measured at 3.6 volts, 3.8 volts and 4.2 volts. The transmit frequency was varied in 3 steps consisting of 824.2, 836.4, and 848.6 MHz for the GSM850 band and 1850.2, 1880.0 and 1909.8 MHz for the PCS band. This frequency was recorded in MHz and deviation from nominal, in Parts Per Million.
After the initial one-hour soak at the beginning of the tests, a period of thirty minutes soak was initialized between each ascending temperature step, before proceeding to the next measurement test cycle.

PROCEDURE:

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

1. Switch on the HP 6632B power supply; CMU 200 Communications test Set, and Environmental Chamber.
2. Start test program
3. Set the Temperature to –30°C and maintain a period of one- hour soak time, with the EUT supply voltage disabled.
4. Set power supply voltage to 3.6 volts.
5. Set up CMU 200 Radio Communication Tester.
6. Command the CMU 200 to switch to the low channel.
7. Enable the voltage to the EUT, and connect a link to the CMU 200 test set.
8. EUT is commanded to Transmit 100 Bursts.
9. Software logs the following data from the CMU 200, power supply and temperature chamber: Traffic Channel Number, Traffic Channel Frequency, Power Level, Chamber Temperature, Supply Voltage, Power, Frequency Error.
10. The CMU 200 commands the EUT to change frequency to the middle channel and high channel and repeats steps 7 to 9.
11. Repeat steps 5 to 10 changing the supply voltage to 3.8 Volts
12. Increase temperature by 10°C and soak for 1/2 hour.
13. Repeat steps 4 - 12 for temperatures –30°C to 60°C.
14. Repeat steps 5 to 10 changing the supply voltage to 4.2 volts

Procedure 5 to 10 was repeated at room temperature (20°C) with the power supply voltage set to 3.6, 3.8 and 4.2 volts.
The maximum frequency error in the GSM850 band measured was -**0.0858 PPM**.
The maximum frequency error in the PCS band measured was **-0.0395 PPM**.

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

Date of Test: March 1, 2007

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.6	20	-17.69	-0.0215
189	836.40	3.6	20	-29.32	-0.0351
250	848.60	3.6	20	-37.52	-0.0442

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.8	20	-42.94	-0.0521
189	836.40	3.8	20	-16.08	-0.0192
250	848.60	3.8	20	-12.79	-0.0151

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	4.2	20	-12.20	-0.0148
189	836.40	4.2	20	19.37	0.0232
250	848.60	4.2	20	20.28	0.0239

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	-38.36	-0.0465
128	824.20	3.6	-20	-16.08	-0.0195
128	824.20	3.6	-10	-32.54	-0.0395
128	824.20	3.6	0	-21.24	-0.0258
128	824.20	3.6	10	-39.45	-0.0479
128	824.20	3.6	20	-17.69	-0.0215
128	824.20	3.6	30	-36.74	-0.0446
128	824.20	3.6	40	-67.74	-0.0822
128	824.20	3.6	50	-46.94	-0.0570
128	824.20	3.6	60	-70.71	**-0.0858**

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.8	-30	-33.38	-0.0405
128	824.20	3.8	-20	-44.49	-0.0540
128	824.20	3.8	-10	-47.40	-0.0575
128	824.20	3.8	0	-51.46	-0.0624
128	824.20	3.8	10	-38.36	-0.0465
128	824.20	3.8	20	-42.94	-0.0521
128	824.20	3.8	30	-44.62	-0.0541
128	824.20	3.8	40	-34.74	-0.0421
128	824.20	3.8	50	-35.39	-0.0429
128	824.20	3.8	60	-29.70	-0.0360

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	4.2	-30	-48.11	-0.0584
128	824.20	4.2	-20	-27.38	-0.0332
128	824.20	4.2	-10	-37.58	-0.0456
128	824.20	4.2	0	-29.90	-0.0363
128	824.20	4.2	10	-11.88	-0.0144
128	824.20	4.2	20	-12.20	-0.0148
128	824.20	4.2	30	-26.41	-0.0320
128	824.20	4.2	40	-24.92	-0.0302
128	824.20	4.2	50	-27.64	-0.0335
128	824.20	4.2	60	-23.12	-0.0281

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	-53.21	-0.0636
189	836.40	3.6	-20	-24.47	-0.0293
189	836.40	3.6	-10	-37.06	-0.0443
189	836.40	3.6	0	-36.55	-0.0437
189	836.40	3.6	10	-21.70	-0.0259
189	836.40	3.6	20	-29.32	-0.0351
189	836.40	3.6	30	-37.77	-0.0452
189	836.40	3.6	40	-35.00	-0.0418
189	836.40	3.6	50	-29.12	-0.0348
189	836.40	3.6	60	-24.41	-0.0292

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
189	836.40	3.8	-30	-33.32	-0.0398
189	836.40	3.8	-20	-24.67	-0.0295
189	836.40	3.8	-10	-33.64	-0.0402
189	836.40	3.8	0	-30.03	-0.0359
189	836.40	3.8	10	-11.75	-0.0140
189	836.40	3.8	20	-16.08	-0.0192
189	836.40	3.8	30	-22.79	-0.0272
189	836.40	3.8	40	-22.41	-0.0268
189	836.40	3.8	50	-21.70	-0.0259
189	836.40	3.8	60	-16.66	-0.0199

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
189	836.40	4.2	-30	-44.55	-0.0533
189	836.40	4.2	-20	10.85	0.0130
189	836.40	4.2	-10	-22.66	-0.0271
189	836.40	4.2	0	9.88	0.0118
189	836.40	4.2	10	-11.04	-0.0132
189	836.40	4.2	20	19.37	0.0232
189	836.40	4.2	30	-14.40	-0.0172
189	836.40	4.2	40	-21.05	-0.0252
189	836.40	4.2	50	-28.22	-0.0337
189	836.40	4.2	60	-26.22	-0.0313

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	-39.52	-0.0466
250	848.60	3.6	-20	-30.93	-0.0364
250	848.60	3.6	-10	-37.65	-0.0444
250	848.60	3.6	0	-42.75	-0.0504
250	848.60	3.6	10	-32.93	-0.0388
250	848.60	3.6	20	-37.52	-0.0442
250	848.60	3.6	30	-39.84	-0.0469
250	848.60	3.6	40	-32.61	-0.0384
250	848.60	3.6	50	-28.93	-0.0341
250	848.60	3.6	60	-21.24	-0.0250

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
250	848.60	3.8	-30	-27.31	-0.0322
250	848.60	3.8	-20	-23.31	-0.0275
250	848.60	3.8	-10	-31.32	-0.0369
250	848.60	3.8	0	-26.67	-0.0314
250	848.60	3.8	10	-9.88	-0.0116
250	848.60	3.8	20	-12.79	-0.0151
250	848.60	3.8	30	-20.28	-0.0239
250	848.60	3.8	40	-19.82	-0.0234
250	848.60	3.8	50	-21.37	-0.0252
250	848.60	3.8	60	-16.53	-0.0195

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
250	848.60	4.2	-30	-27.89	-0.0329
250	848.60	4.2	-20	14.01	0.0165
250	848.60	4.2	-10	-20.92	-0.0247
250	848.60	4.2	0	16.40	0.0193
250	848.60	4.2	10	-7.75	-0.0091
250	848.60	4.2	20	20.28	0.0239
250	848.60	4.2	30	-13.95	-0.0164
250	848.60	4.2	40	-26.80	-0.0316
250	848.60	4.2	50	-29.70	-0.0350
250	848.60	4.2	60	-26.22	-0.0309

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

Date of Test: February 28, 2007

Traffic Channel Number	PCS Frequency (MHz	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	*PPM*
512	1850.2	3.6	20	-38.74	-0.0209
661	1880.0	3.6	20	-62.83	-0.0334
810	1909.8	3.6	20	-64.57	-0.0338

Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	3.8	20	-25.51	-0.0138
661	1880.0	3.8	20	-35.39	-0.0188
810	1909.8	3.8	20	-47.01	-0.0246

Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	4.2	20	-28.02	-0.0151
661	1880.0	4.2	20	-55.47	-0.0295
810	1909.8	4.2	20	-57.99	-0.0304

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	-50.62	-0.0274
512	1850.2	3.6	-20	-62.63	-0.0339
512	1850.2	3.6	-10	-35.39	-0.0191
512	1850.2	3.6	0	-32.35	-0.0175
512	1850.2	3.6	10	-40.10	-0.0217
512	1850.2	3.6	20	-38.74	-0.0209
512	1850.2	3.6	30	-36.22	-0.0196
512	1850.2	3.6	40	-60.50	-0.0327
512	1850.2	3.6	50	-53.08	-0.0287
512	1850.2	3.6	60	-17.11	-0.0092

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	3.8	-30	-64.57	-0.0349
512	1850.2	3.8	-20	-56.24	-0.0304
512	1850.2	3.8	-10	-38.61	-0.0209
512	1850.2	3.8	0	-57.66	-0.0312
512	1850.2	3.8	10	-34.68	-0.0187
512	1850.2	3.8	20	-25.51	-0.0138
512	1850.2	3.8	30	-37.58	-0.0203
512	1850.2	3.8	40	-55.85	-0.0302
512	1850.2	3.8	50	-41.65	-0.0225
512	1850.2	3.8	60	-51.08	-0.0276

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	4.2	-30	-65.93	-0.0356
512	1850.2	4.2	-20	-32.61	-0.0176
512	1850.2	4.2	-10	-30.28	-0.0164
512	1850.2	4.2	0	-34.93	-0.0189
512	1850.2	4.2	10	-40.23	-0.0217
512	1850.2	4.2	20	-28.02	-0.0151
512	1850.2	4.2	30	-47.40	-0.0256
512	1850.2	4.2	40	-36.29	-0.0196
512	1850.2	4.2	50	-32.54	-0.0176
512	1850.2	4.2	60	-51.33	-0.0277

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	-32.54	-0.0173
661	1880	3.6	-20	-59.28	-0.0315
661	1880	3.6	-10	-68.38	-0.0364
661	1880	3.6	0	-68.70	-0.0365
661	1880	3.6	10	-39.84	-0.0212
661	1880	3.6	20	-62.83	-0.0334
661	1880	3.6	30	-55.98	0.0298
661	1880	3.6	40	-57.15	-0.0304
661	1880	3.6	50	-40.23	-0.0214
661	1880	3.6	60	-35.45	-0.0189

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880	3.8	-30	-68.38	-0.0364
661	1880	3.8	-20	-30.15	-0.0160
661	1880	3.8	-10	-25.05	-0.0133
661	1880	3.8	0	-38.81	-0.0206
661	1880	3.8	10	-47.59	-0.0253
661	1880	3.8	20	-35.39	-0.0188
661	1880	3.8	30	-58.44	-0.0311
661	1880	3.8	40	-36.48	-0.0194
661	1880	3.8	50	-26.22	-0.0139
661	1880	3.8	60	-32.41	-0.0172

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880	4.2	-30	-59.34	-0.0316
661	1880	4.2	-20	-39.84	-0.0212
661	1880	4.2	-10	-43.39	-0.0231
661	1880	4.2	0	-42.94	-0.0228
661	1880	4.2	10	-44.17	-0.0235
661	1880	4.2	20	-55.47	-0.0295
661	1880	4.2	30	-37.90	-0.0202
661	1880	4.2	40	-36.48	-0.0194
661	1880	4.2	50	-53.27	-0.0283
661	1880	4.2	60	-31.96	-0.0170

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	-72.84	-0.0381
810	1909.8	3.6	-20	-50.69	-0.0265
810	1909.8	3.6	-10	-63.34	-0.0332
810	1909.8	3.6	0	-55.66	-0.0291
810	1909.8	3.6	10	-35.26	-0.0185
810	1909.8	3.6	20	-64.57	-0.0338
810	1909.8	3.6	30	-38.74	-0.0203
810	1909.8	3.6	40	-73.22	-0.0383
810	1909.8	3.6	50	-43.78	-0.0229
810	1909.8	3.6	60	-39.45	-0.0207

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
810	1909.8	3.8	-30	-75.48	**-0.0395**
810	1909.8	3.8	-20	-42.68	-0.0223
810	1909.8	3.8	-10	-25.44	-0.0133
810	1909.8	3.8	0	-47.85	-0.0251
810	1909.8	3.8	10	-57.15	-0.0299
810	1909.8	3.8	20	-47.01	-0.0246
810	1909.8	3.8	30	-60.70	-0.0318
810	1909.8	3.8	40	-41.97	-0.0220
810	1909.8	3.8	50	-39.78	-0.0208
810	1909.8	3.8	60	-48.49	-0.0254

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
810	1909.8	4.2	-30	-65.28	-0.0342
810	1909.8	4.2	-20	-48.56	-0.0254
810	1909.8	4.2	-10	-45.33	-0.0237
810	1909.8	4.2	0	-39.65	-0.0208
810	1909.8	4.2	10	-49.91	-0.0261
810	1909.8	4.2	20	-57.99	-0.0304
810	1909.8	4.2	30	-44.49	-0.0233
810	1909.8	4.2	40	-39.58	-0.0207
810	1909.8	4.2	50	-62.76	-0.0329
810	1909.8	4.2	60	-38.87	-0.0204

APPENDIX 4 – RADIATED EMMISIONS TEST DATA

Radiated Emissions Test Data Results

The environmental tests conditions were: Temperature 23^0 C
Pressure 1004 mb
Relative Humidity 22%

Test distance is 3.0 metres

Date of test: February 25, 2007 to March 05, 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	79.0	88.0	V-V	13.2	26.97	0.4977	38.50	-11.53
F0	128	824.20	850	Dipole	H	88.0		H-H	11.7				
F0	195	837.60	850	Dipole	V	79.0	86.6	V-V	13.2	26.76	0.4742	38.50	-11.74
F0	195	837.60	850	Dipole	H	86.6		H-H	12.0				
F0	251	848.80	850	Dipole	V	77.5	86.7	V-V	14.1	27.47	0.5585	38.50	**-11.03**
F0	251	848.80	850	Dipole	H	86.7		H-H	11.9				

ERP = Tracking Generator Level + Antenna Gain – Cable Loss + Preamp

Radiated Emissions Test Data Results cont'd

Test distance is 3.0 metres.

Date of test: February 25, 2007 to March 05, 2007

GSM Mode

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) Handheld Standalone, Vertical **Low Channel –** 824.2 MHz												
2nd	128	1648.40	850	Horn	V	68.4	68.4	V-V	4.9	-31.27	-13	-18.27
2nd	128	1648.40	850	Horn	H	65.8		H-H	5.4			
3rd	128	2472.60	850	Horn	V	51.0	51.0	V-V	-1.7	-39.20	-13	-26.20
3rd	128	2472.60	850	Horn	H	47.2		H-H	-2.4			
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	68.9	68.9	V-V	5.8	-30.50	-13	**-17.50**
2nd	195	1675.20	850	Horn	H	66.0		H-H	6.3			
3rd	195	2512.80	850	Horn	V	44.7	44.7	V-V	-7.6	-45.20	-13	-32.20
3rd	195	2512.80	850	Horn	H	41.4		H-H	-8.7			
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	68.7	68.7	V-V	6.1	-30.76	-13	-17.76
2nd	251	1697.60	850	Horn	H	66.1		H-H	6.1			
3rd	251	2546.40	850	Horn	V	40.8	40.8	V-V	-12.8	-50.33	-13	-37.33
3rd	251	2546.40	850	Horn	H	NF		H-H	-13.4			
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

Test distance is 3.0 metres.

Date of test: February 25, 2007 to March 05, 2007

GPRS Mode

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) Handheld Standalone, Vertical **Low Channel –** 824.2 MHz												
2nd	128	1648.40	850	Horn	V	61.2	61.2	V-V	-2.6	-38.77	-13	-25.77
2nd	128	1648.40	850	Horn	H	60.3		H-H	-2.1			
3rd	128	2472.60	850	Horn	V	44.8	44.8	V-V	-8.7	-46.20	-13	-33.20
3rd	128	2472.60	850	Horn	H	40.9		H-H	-9.6			
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	63.1	63.1	V-V	-0.2	-36.50	-13	-23.50
2nd	195	1675.20	850	Horn	H	61.0		H-H	0.3			
3rd	195	2512.80	850	Horn	V	40.4	40.4	V-V	-13.5	-51.10	-13	-38.10
3rd	195	2512.80	850	Horn	H	NF		H-H	-14.6			
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	63.2	63.2	V-V	0.4	-36.46	-13	**-23.46**
2nd	251	1697.60	850	Horn	H	60.5		H-H	0.4			
3rd	251	2546.40	850	Horn	V	NF	NF	V-V	-	-	-13	-
3rd	251	2546.40	850	Horn	H	NF		H-H	-			
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

Test distance is 3.0 metres.

Date of test: February 25, 2007 to March 05, 2007

EDGE Mode

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) Handheld Standalone, Vertical **Low Channel –** 824.2 MHz												
2nd	128	1648.40	850	Horn	V	61.0	61.0	V-V	-2.8	-38.87	-13	-25.87
2nd	128	1648.40	850	Horn	H	60.8		H-H	-2.2			
3rd	128	2472.60	850	Horn	V	44.5	44.5	V-V	-9.0	-46.50	-13	-33.50
3rd	128	2472.60	850	Horn	H	40.4		H-H	-9.7			
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	63.0	63.0	V-V	-0.3	-36.60	-13	-23.60
2nd	195	1675.20	850	Horn	H	61.3		H-H	0.2			
3rd	195	2512.80	850	Horn	V	40.3	40.3	V-V	-13.9	-51.50	-13	-38.50
3rd	195	2512.80	850	Horn	H	NF		H-H	-14.7			
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	63.5	63.5	V-V	0.7	-36.16	-13	**-23.16**
2nd	251	1697.60	850	Horn	H	60.4		H-H	0.7			
3rd	251	2546.40	850	Horn	V	NF	NF	V-V	-	-	-13	-
3rd	251	2546.40	850	Horn	H	NF		H-H	-			
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

Test distance is 3.0 metres.

Date of test: February 25, 2007 to March 05, 2007

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to dipole)	Limit (dBm)	Diff to Limit (dB)
GSM BAND **RF Local Oscillator (LO_1)** Handheld Standalone, USB up **Low Channel (824.2 MHz)**												
F0	128	3296.8	850	Horn	V	NM	N/A	V-V	N/A	N/A	-	N/A
F0	128	3296.8	850	Horn	H	NM						
Emissions were in the NF. **High Channel (848.8 MHz)**												
F0	251	3395.2	850	Horn	V	NM	N/A	V-V	N/A	N/A	-	N/A
F0	251	3395.2	850	Horn	H	NM						
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

Test Distance was 3.0 metres. PCS Band

Date of test: February 25, 2007 to March 05, 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) Handheld Standalone, USB down													
F0	512	1850.20	1900	Horn	V	86.5	92.8	V-V	-6.1	29.7	0.9333	33	-3.3
F0	512	1850.20	1900	Horn	H	92.8		H-H	-5.2				
F0	661	1880.00	1900	Horn	V	85.3	92.0	V-V	-5.6	29.9	0.9772	33	**-3.1**
F0	661	1880.00	1900	Horn	H	92.0		H-H	-4.6				
F0	810	1909.80	1900	Horn	V	84.7	91.7	V-V	-5.8	29.2	0.8318	33	-3.8
F0	810	1909.80	1900	Horn	H	91.7		H-H	-5.0				

EIRP = Tracking Generator Level + Antenna Factor – Cable Loss + Preamp Gain

Radiated Emissions Test Data Results cont'd

Test Distance was 3.0 metres. PCS Band

Date of test: February 25, 2007 to March 05, 2007

GSM Mode

								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) Handheld Standalone, Horizontal **Low Channel** 1850.2 MHz												
2nd	512	3700.40	1900	Horn	V	42.2	44.5	V-V	-2.2	-38.27	-13	**-25.27**
2nd	512	3700.40	1900	Horn	H	44.5		H-H	-3.0			
3rd	512	5550.60	1900	Horn	V	NF	NF	V-V	-	-	-	-
3rd	512	5550.60	1900	Horn	H	NF		H-H	-			
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	43.4	V-V	-2.4	-38.50	-13	-25.50
2nd	661	3760.00	1900	Horn	H	43.4		H-H	-3.6			
3rd	661	5640.00	1900	Horn	V	NF	NF	V-V	-	-	-	-
3rd	661	5640.00	1900	Horn	H	NF		H-H	-			
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	43.4	V-V	-2.8	-38.93	-13	-25.93
2nd	810	3819.60	1900	Horn	H	43.4		H-H	-4.1			
3rd	810	5729.40	1900	Horn	V	NF	NF	V-V	-	-	-	-
3rd	810	5729.40	1900	Horn	H	NF		H-H	-			
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

Test Distance was 3.0 metres. PCS Band

Date of test: February 25, 2007 to March 05, 2007

GPRS Mode

								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) Handheld Standalone, Horizontal **Low Channel** 1850.2 MHz												
2nd	512	3700.40	1900	Horn	V	NF	43.2	V-V	-3.5	-39.57	-13	-26.57
2nd	512	3700.40	1900	Horn	H	43.2		H-H	-4.8			
3rd	512	5550.60	1900	Horn	V	NF	NF	V-V	-	-	-	-
3rd	512	5550.60	1900	Horn	H	NF		H-H	-			
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	43.3	V-V	-2.5	-38.60	-13	**-25.60**
2nd	661	3760.00	1900	Horn	H	43.3		H-H	-3.7			
3rd	661	5640.00	1900	Horn	V	NF	NF	V-V	-	-	-	-
3rd	661	5640.00	1900	Horn	H	NF		H-H	-			
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	41.9	V-V	-4.6	-40.73	-13	-27.73
2nd	810	3819.60	1900	Horn	H	41.9		H-H	-6.7			
3rd	810	5729.40	1900	Horn	V	NF	NF	V-V	-	-	-	-
3rd	810	5729.40	1900	Horn	H	NF		H-H	-			
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

Test Distance was 3.0 metres. PCS Band

Date of test: February 25, 2007 to March 05, 2007

EDGE Mode

								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) Handheld Standalone, Horizontal **Low Channel** 1850.2 MHz												
2nd	512	3700.40	1900	Horn	V	NF	42.4	V-V	-4.7	-40.77	-13	-27.77
2nd	512	3700.40	1900	Horn	H	42.4		H-H	-6.1			
3rd	512	5550.60	1900	Horn	V	NF	NF	V-V	-	-	-	-
3rd	512	5550.60	1900	Horn	H	NF		H-H	-			
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	44.4	V-V	-1.1	-37.2	-13	**-24.20**
2nd	661	3760.00	1900	Horn	H	44.4		H-H	-2.1			
3rd	661	5640.00	1900	Horn	V	NF	NF	V-V	-	-	-	-
3rd	661	5640.00	1900	Horn	H	NF		H-H	-			
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	43.3	V-V	-2.5	-38.63	-13	-25.63
2nd	810	3819.60	1900	Horn	H	43.3		H-H	-4.6			
3rd	810	5729.40	1900	Horn	V	NF	NF	V-V	-	-	-	-
3rd	810	5729.40	1900	Horn	H	NF		H-H	-			
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

Test Distance was 3.0 metres.

Date of test: February 25, 2007 to March 05, 2007

The measurements were performed in transmit mode with the handheld 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 . Handheld Standalone, Horizontal **Low Channel**													
F0	512	3700.4	1900	Horn	V	NM	N/A	N/A	V-V	N/A	N/A	-	N/A
F0	512	3700.4	1900	Horn	H	NM							
Emissions were in the NF.													
High Channel													
F0	810	3819.6	1900	Horn	V	NM	N/A	N/A	V-V	N/A	N/A	-	N/A
F0	810	3819.6	1900	Horn	H	NM							
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.													