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-0671-0706-17

PRODUCT MODEL NO: RBN41GW
TYPE NAME: BlackBerry® smartphone
FCC ID: L6ARBN40GW
IC: 2503A-RBN40GW
EMISSION DESIGNATOR: 247KG7W

DATE: 20 June 2007

Statement of Performance:

The BlackBerry® smartphone, model RBN41GW, part number CER-15664-001 Rev. 3 and accessories when configured and operated per RIM's operation instructions, performs within the requirements of the test standards.

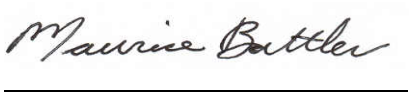
Declaration:

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:

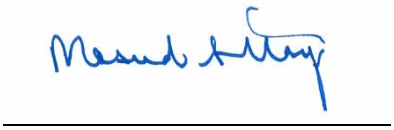
Kevin Chow
Compliance Specialist
Date: 20 Jun 2007

Reviewed by:



Maurice Battler
Compliance Specialist
Date: 21 Jun 2007

Reviewed by:



Masud S. Attayi, P.Eng.
Team Lead, Regulatory Compliance
Date: 24 Jun 2007

Approved by:

Paul G. Cardinal, Ph.D.
Director
Date: 25 Jun 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

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 May 31 to June 12, 2007.

The sample EUT included:

SAMPLE	MODEL	CER NUMBER	PIN
1	RBN41GW	CER-15664-001 Rev. 3	205DF476
2	RBN41GW	CER-15664-001 Rev. 3	205DFB15

Conducted RF measurements were performed on sample 1. Radiated Emission measurements were performed on sample 2.

D. Support Equipment Used for the Testing of the EUT

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

E. Test Voltage

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

F. 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	Caitlin O'Neill Vimal Olaganathan
FCC CFR 47 Part 2, Subpart J, Part 22, Subpart H IC RSS-132	Conducted Output Power, Conducted Emissions, Occupied Bandwidth, Frequency Stability	Yes	Anas Hawari
FCC CFR 47 Part 24, Subpart E IC RSS-133	Radiated Spurious/harmonic Emissions, EIRP, LO	Yes	Caitlin O'Neill Vimal Olaganathan
FCC CFR 47 Part 24, Subpart E IC RSS-133	Conducted Emissions, Occupied Bandwidth, Frequency Stability	Yes	Anas Hawari

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 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. 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 26.45 dBm (0.442 W) at 824.2 MHz (channel 128).
   The highest EIRP in the PCS band measured was 27.14 dBm (0.518 W) at 1880.0 MHz (channel 661).

The radiated carrier harmonics were measured up to the 10th harmonic for low, middle and high channels in the GSM850 and PCS bands. Each band was measured in GSM, GPRS, and EDGE mode, and also simultaneous GSM and Bluetooth transmit mode. Both the horizontal and vertical polarizations were measured. The harmonic emissions above the 5th 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 12.40 dB below the limit at 2472.6 MHz, for GPRS mode it was 17.00 dB below the limit at 2472.6 MHz, and for EDGE mode was 16.90 dB below the limit at 1648.4 MHz.

The worst test margin in the PCS band for GSM mode harmonic emissions measured was 15.19 dB below the limit at 3700.4 MHz, for GPRS mode it was 14.86 dB below the limit at 3700.4 MHz and in EDGE mode it was 16.00 dB below the limit at 3819.6 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

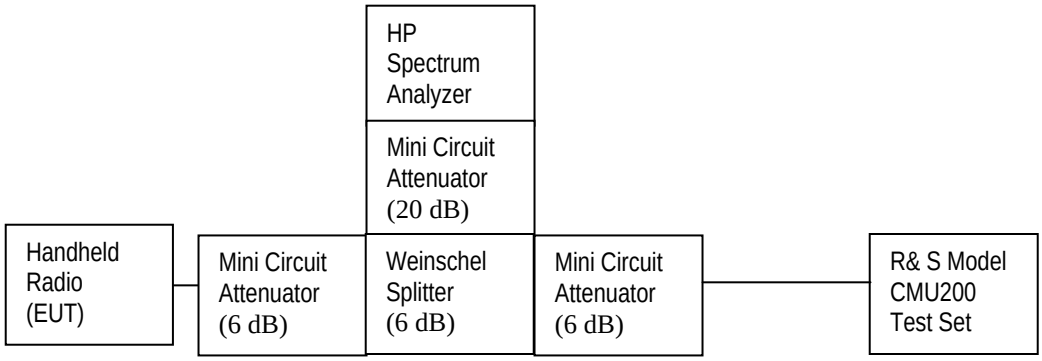
UNIT	MANUFACTURER	MODEL	SERIAL NUMBER	CAL DUE DATE (YY MM DD)	USE
Preamplifier	Sonoma	310N/11909A	185831	07-11-23	Radiated Emissions
Preamplifier system	TDK RF Solutions	PA-02	080010	07-11-22	Radiated Emissions
Hybrid Log Antenna	TDK	HLP-3003C	017401	08-08-04	Radiated Emissions
Horn Antenna	TDK	HRN-0118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

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 205DF476.

Test Setup Diagram



The environmental test conditions were:

Temperature	23ºC
Pressure	1014 mb
Relative Humidity	34%

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: June 01 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 273.0 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	267.0	245.0
837.6	272.0	245.0
848.8	275.0	246.7

.

1900 band Frequency (MHz)	-26dBc Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
1850.2	273.0	241.7
1880.0	273.0	241.7
1909.8	272.0	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: June 01 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	243.0
837.6	243.0
848.8	240.0

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: June 05 2007

Conducted RF Emission Test Data cont'd

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

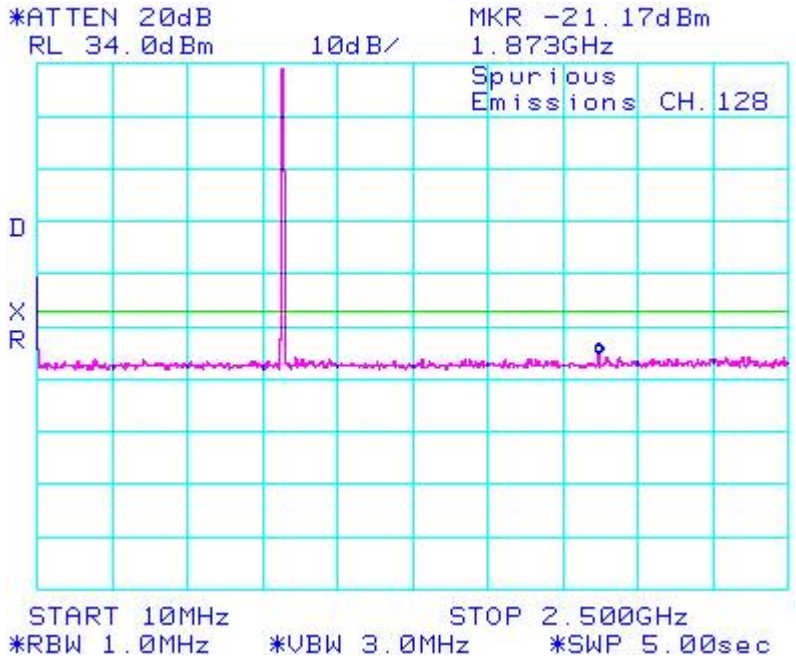
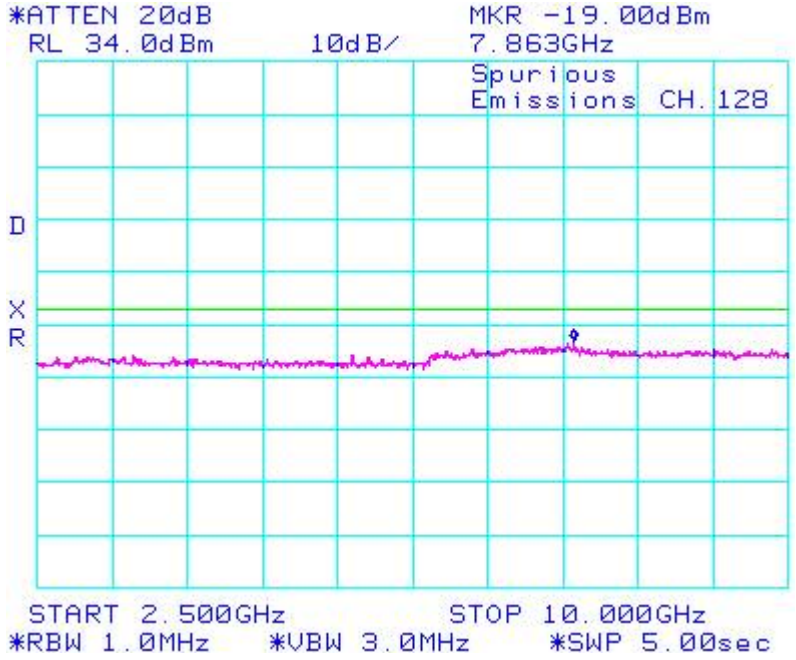


Figure 2: GSM850 band, Spurious Conducted Emissions, Low channel



Conducted RF Emission Test Data cont'd

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

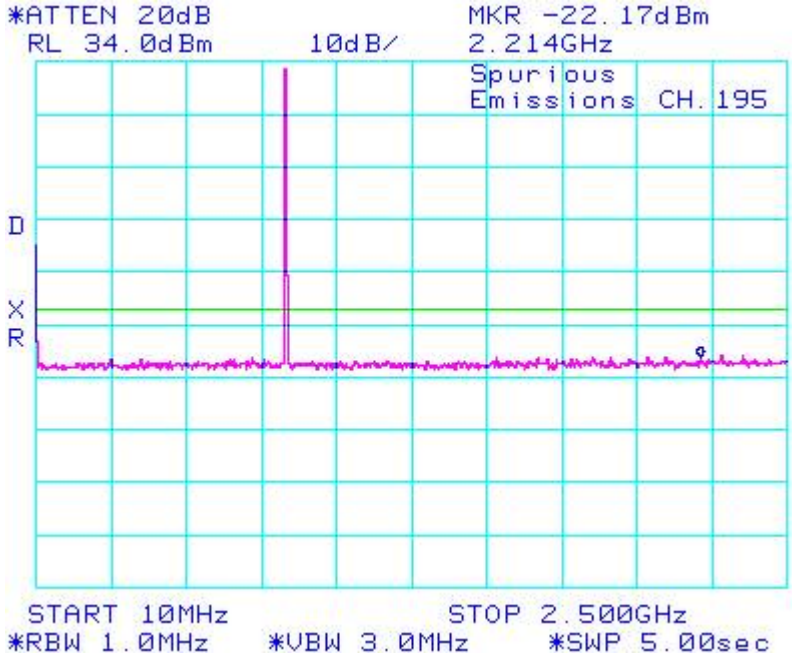
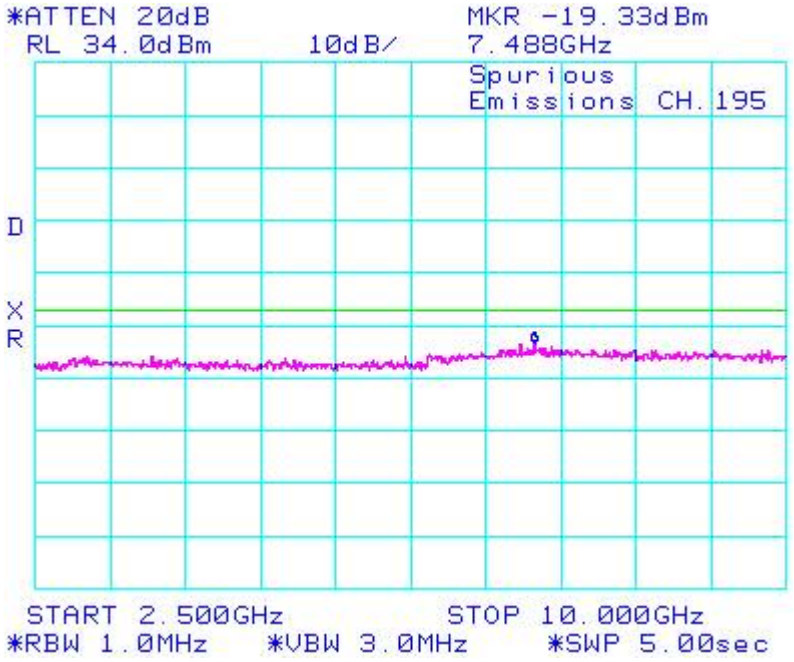


Figure 4: GSM850 band, Spurious Conducted Emissions, Middle Channel



Conducted RF Emission Test Data cont'd

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

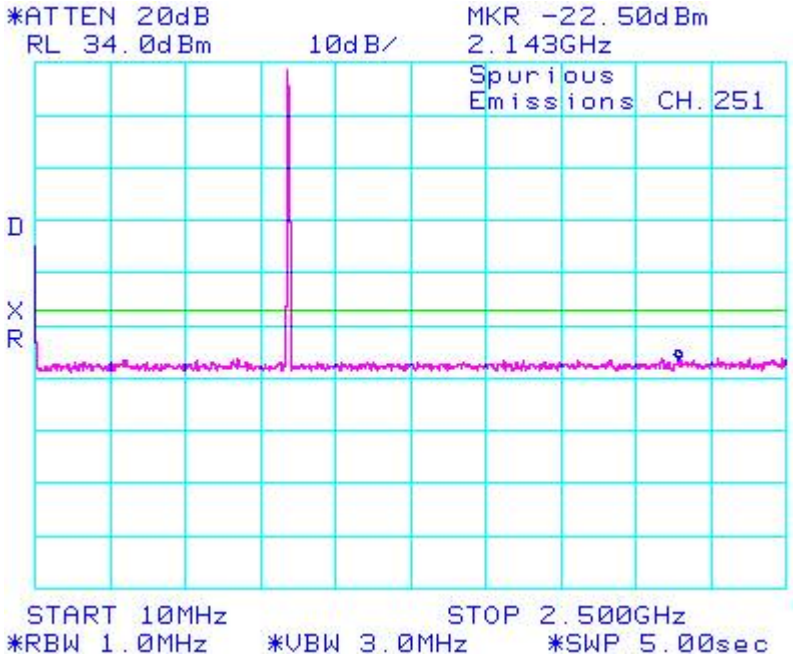
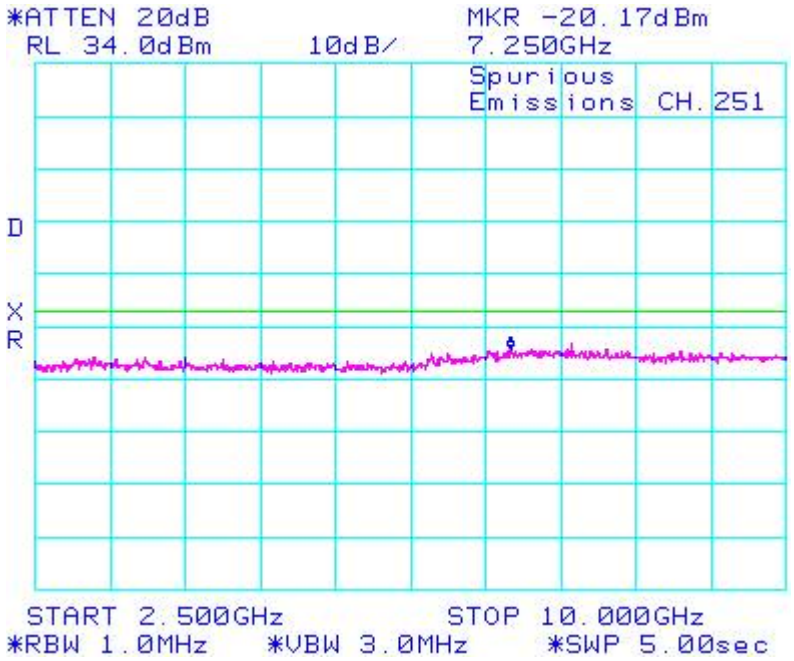


Figure 6: GSM850 band, Spurious Conducted Emissions, High Channel



Conducted RF Emission Test Data cont'd

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

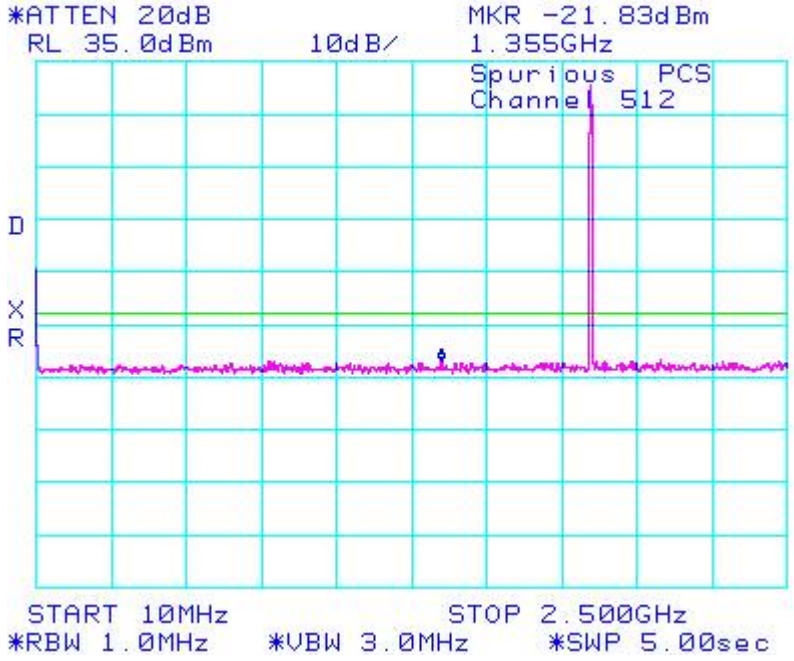
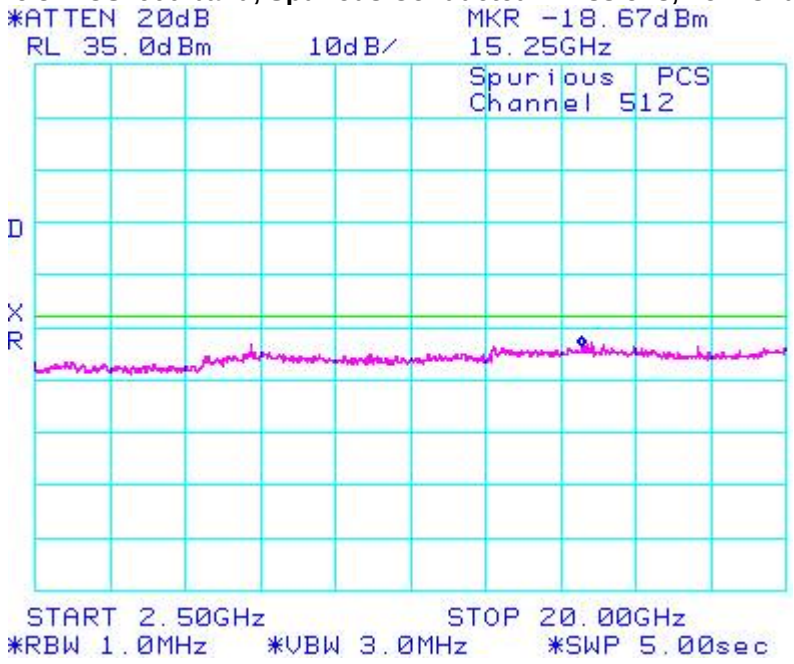


Figure 8: PCS1900 band, Spurious Conducted Emissions, Low Channel



Conducted RF Emission Test Data cont'd

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

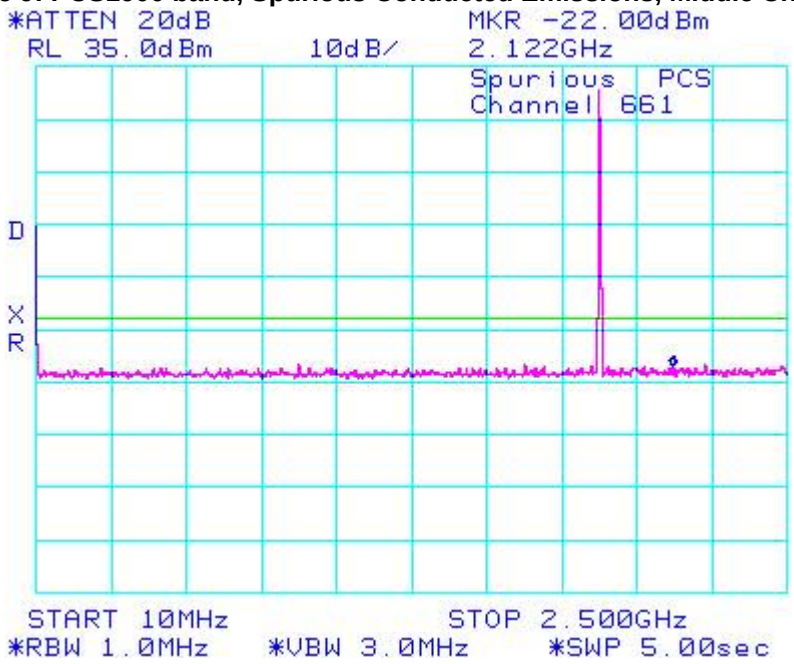
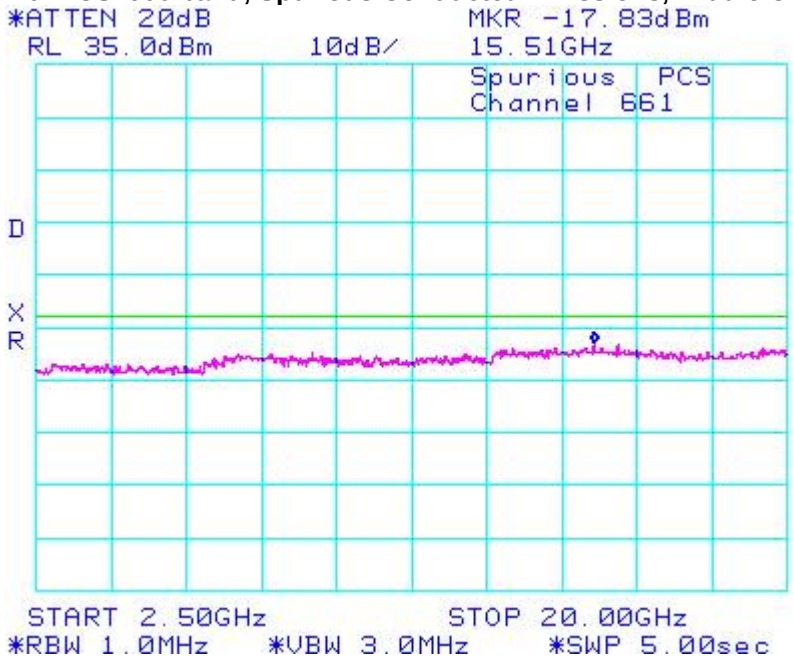


Figure 10: PCS1900 band, Spurious Conducted Emissions, Middle Channel



Conducted RF Emission Test Data cont'd

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

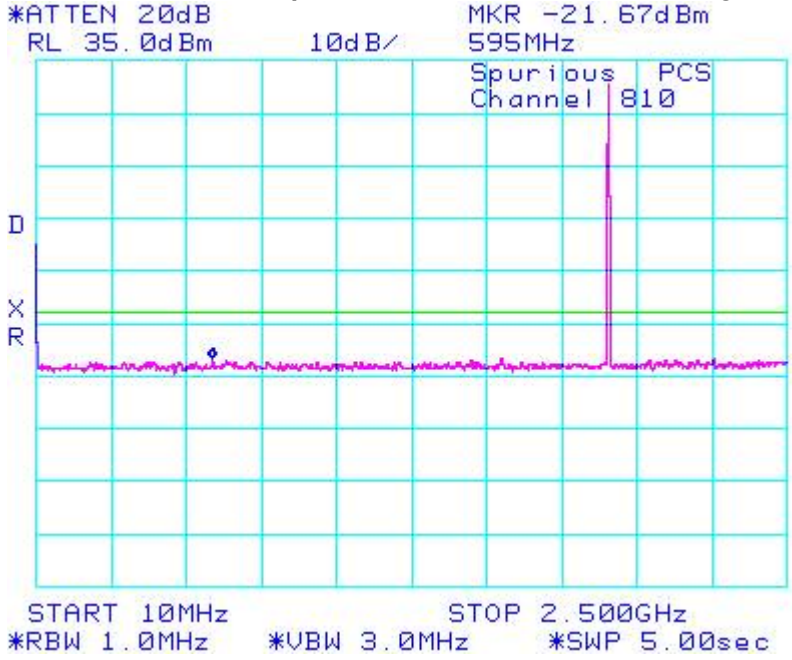
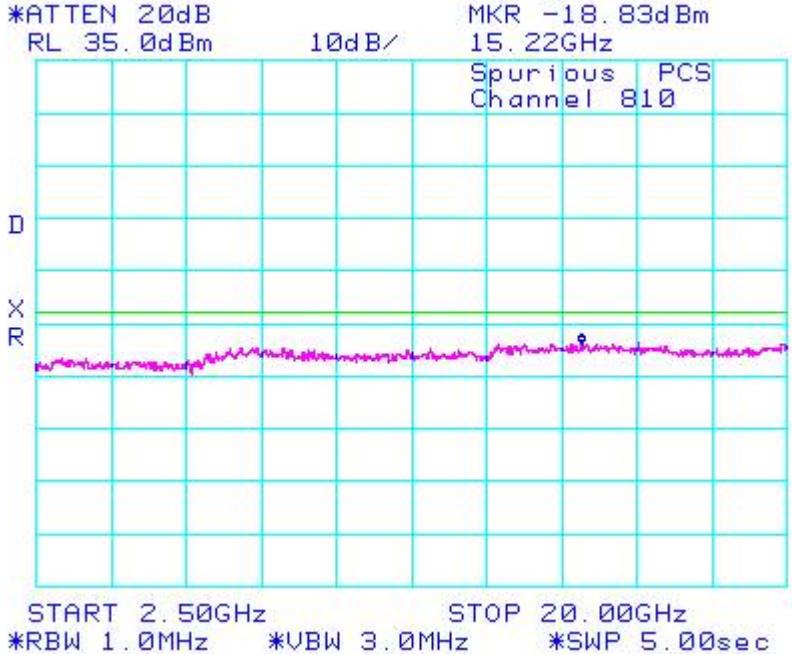


Figure 12: PCS1900 band, Spurious Conducted Emissions, High Channel



Conducted RF Emission Test Data cont'd

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

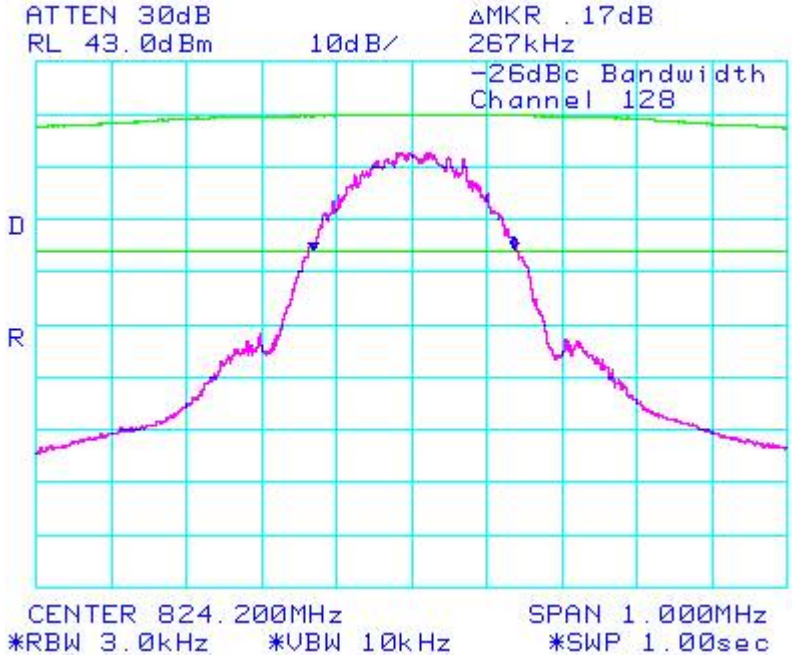
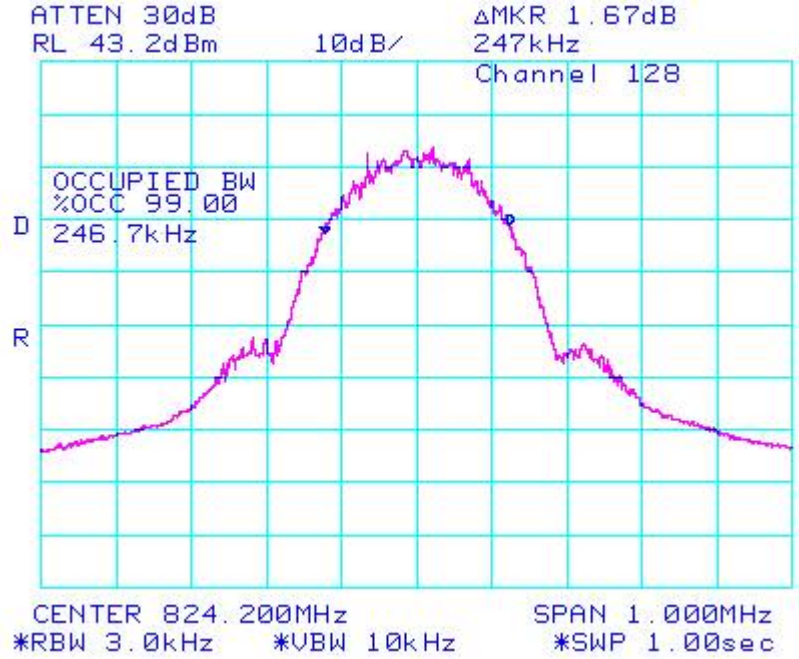


Figure 14: Occupied Bandwidth, GSM850 band Low Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

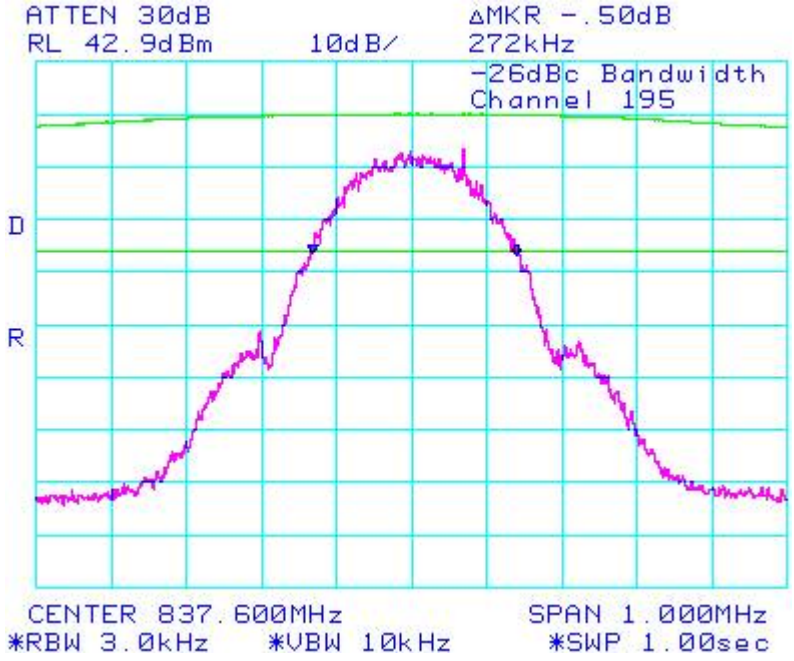
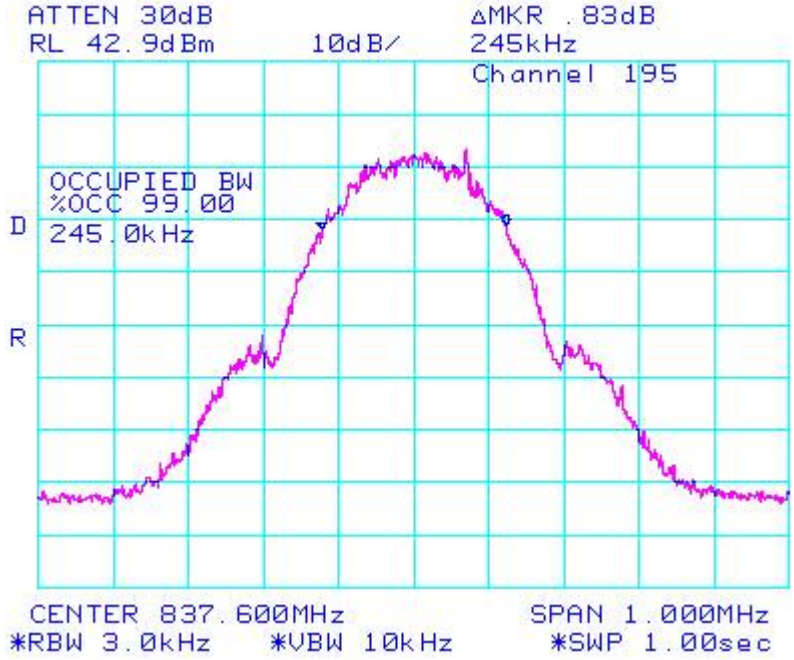


Figure 16: Occupied Bandwidth, GSM850 band Middle Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

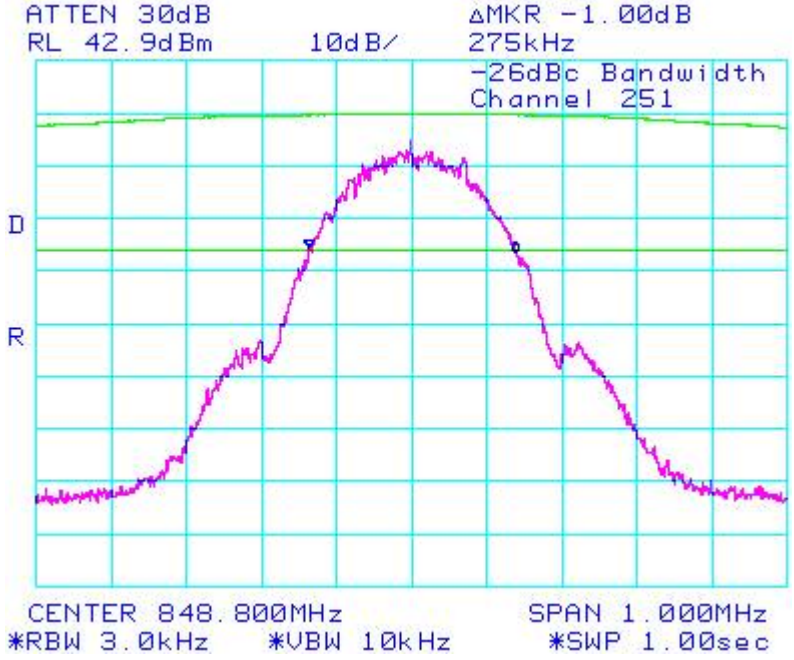
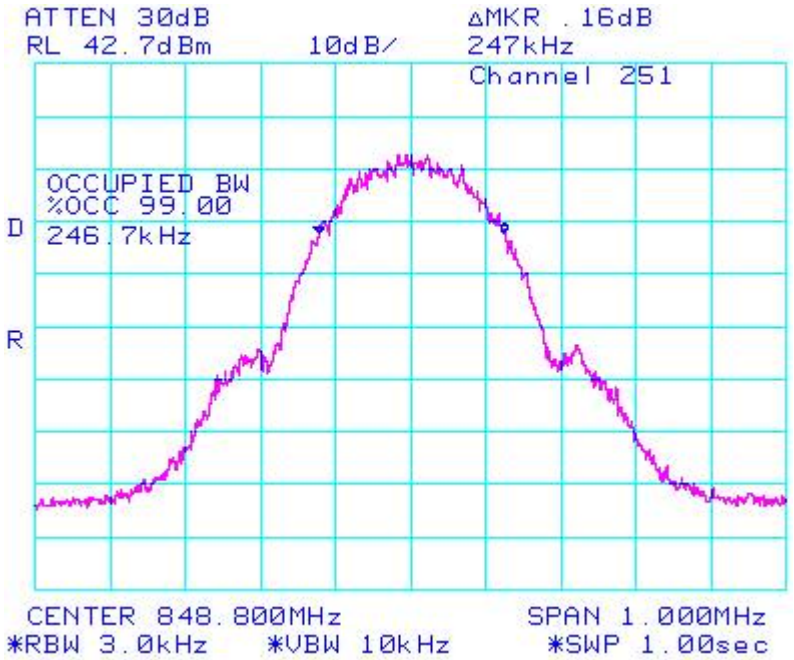


Figure 18: Occupied Bandwidth, GSM850 band High Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

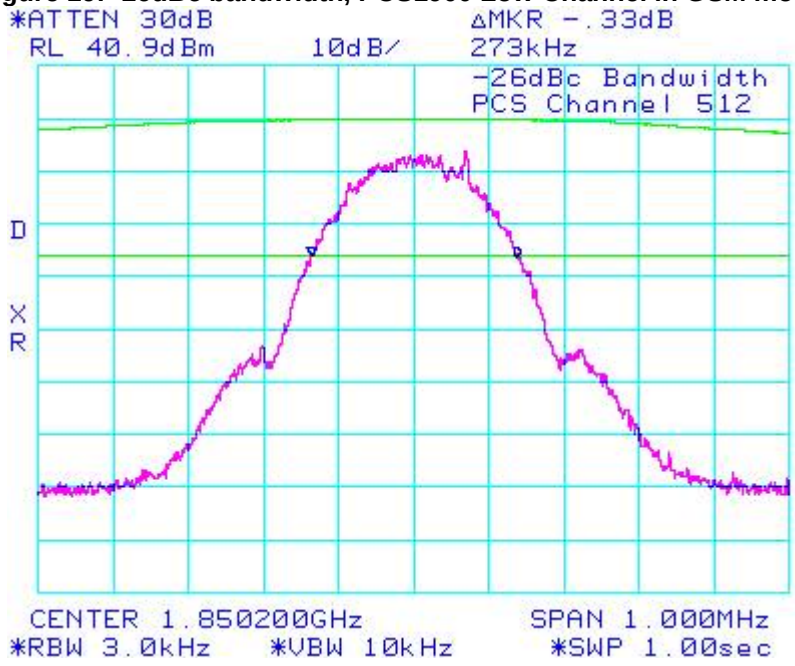
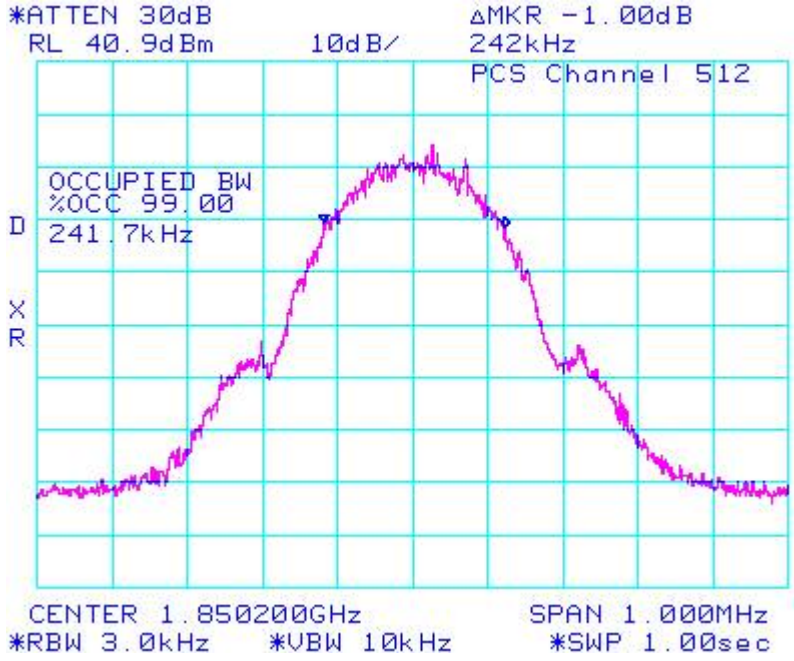


Figure 20: Occupied Bandwidth, PCS1900 Low Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

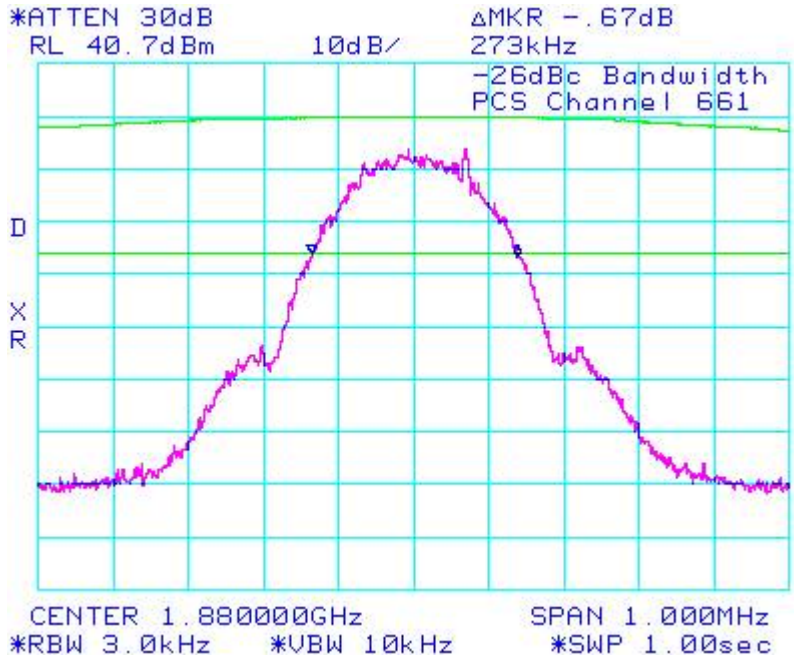
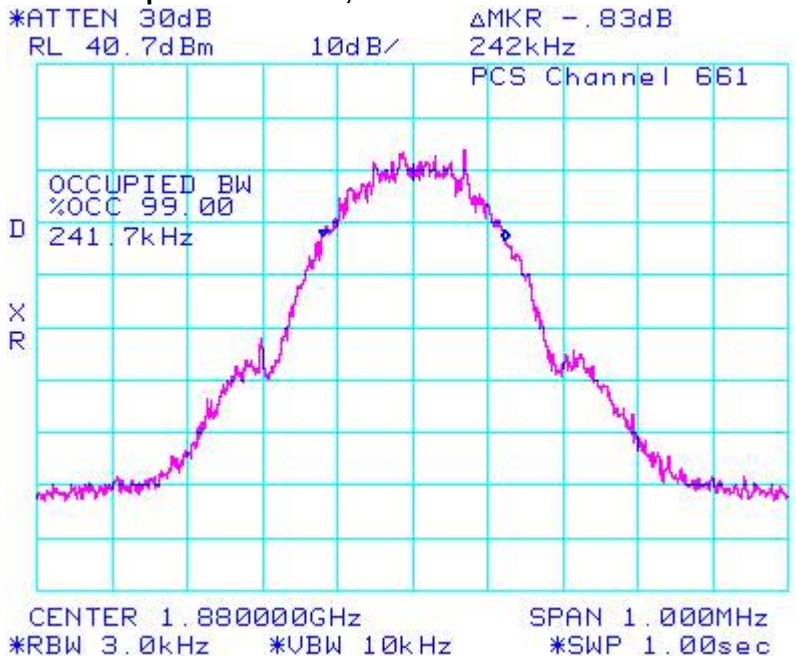


Figure 22: Occupied Bandwidth, PCS1900 Middle Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

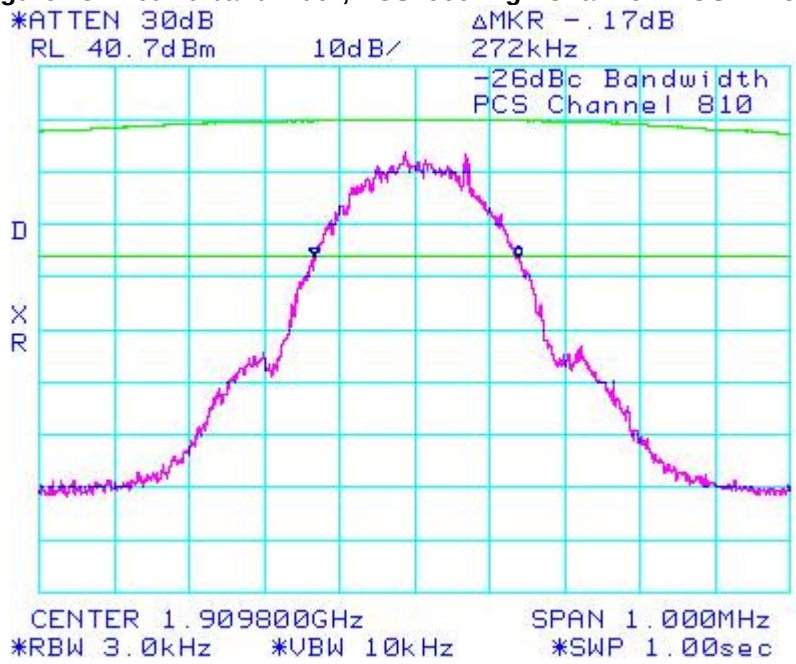
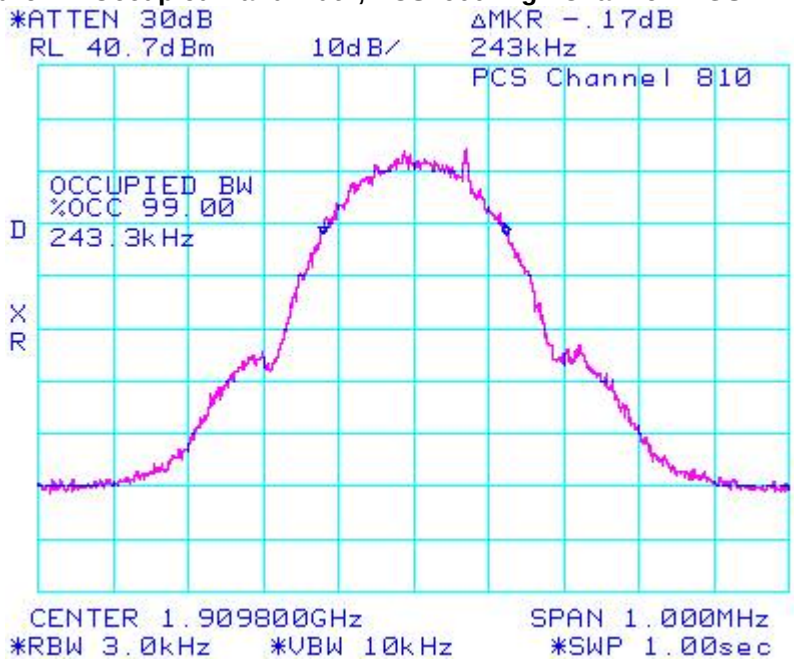


Figure 24: Occupied Bandwidth, PCS1900 High Channel in GSM mode



Conducted RF Emission Test Data cont'd

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

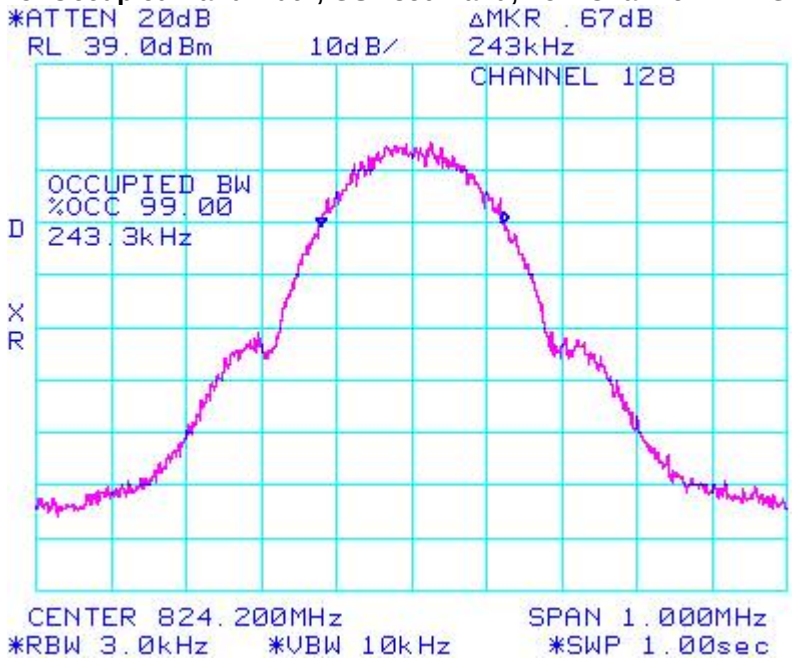
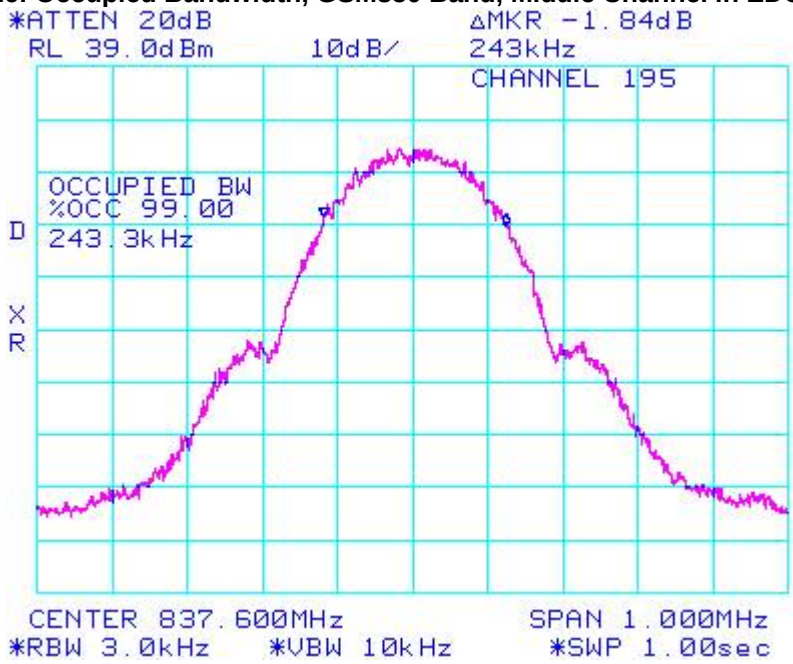


Figure 26: Occupied Bandwidth, GSM850 Band, Middle Channel in EDGE mode



Conducted RF Emission Test Data cont'd

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

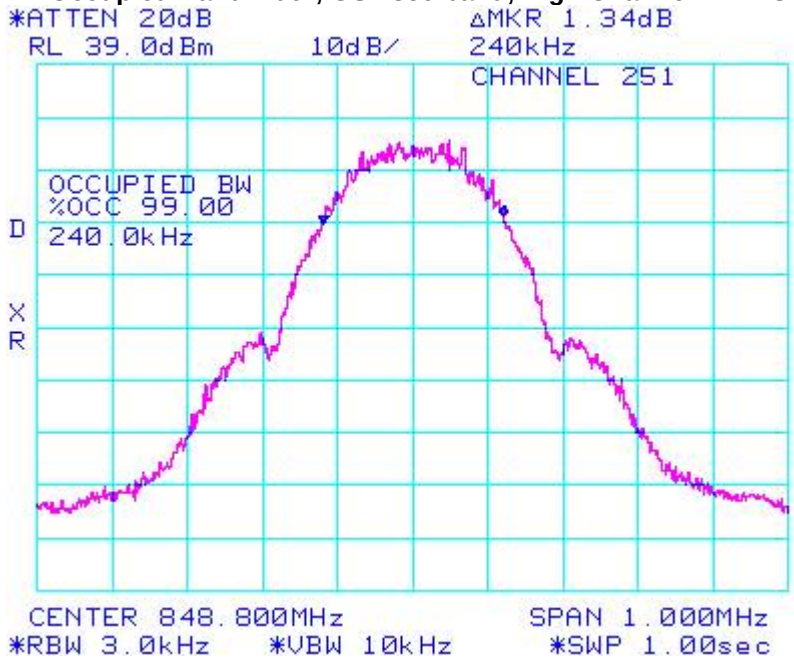
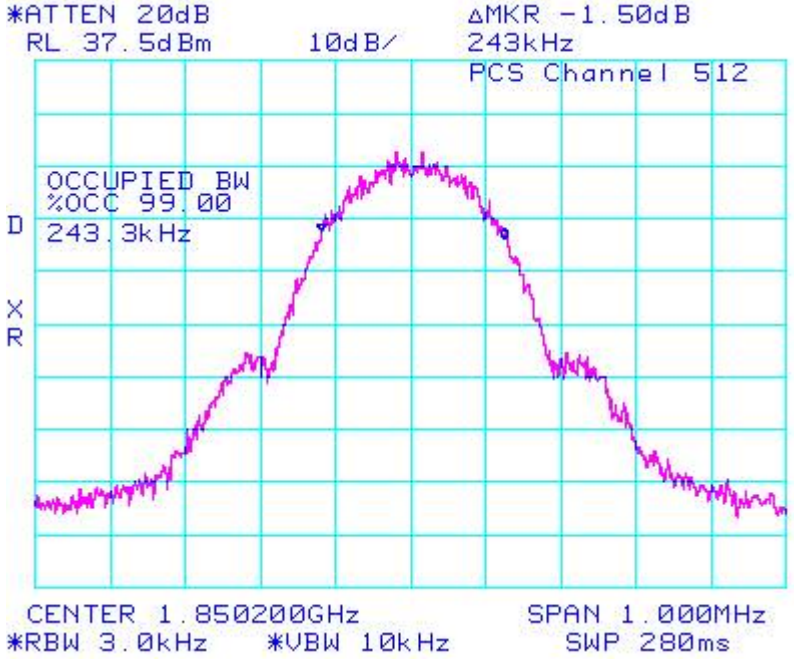


Figure 28: Occupied Bandwidth, PCS1900 Band, Low Channel in EDGE mode



Conducted RF Emission Test Data cont'd

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

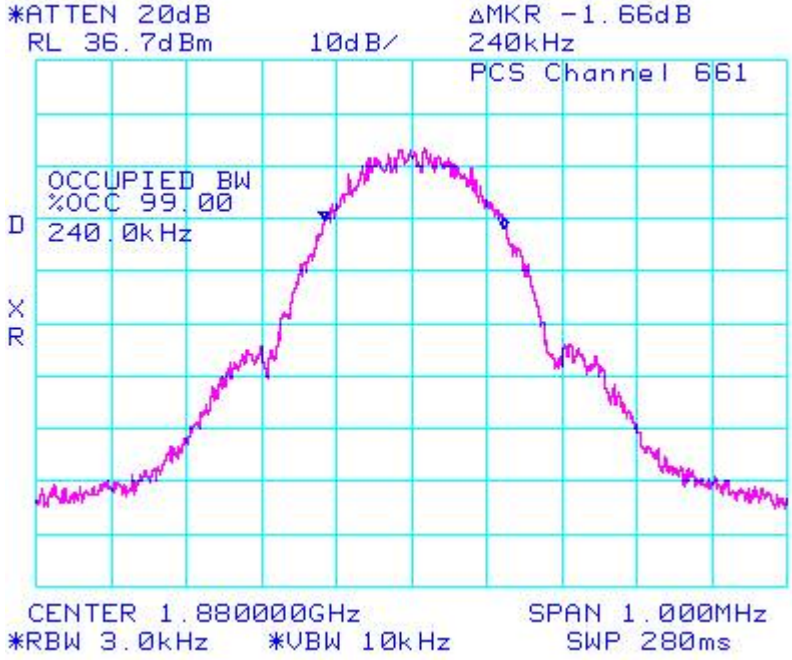
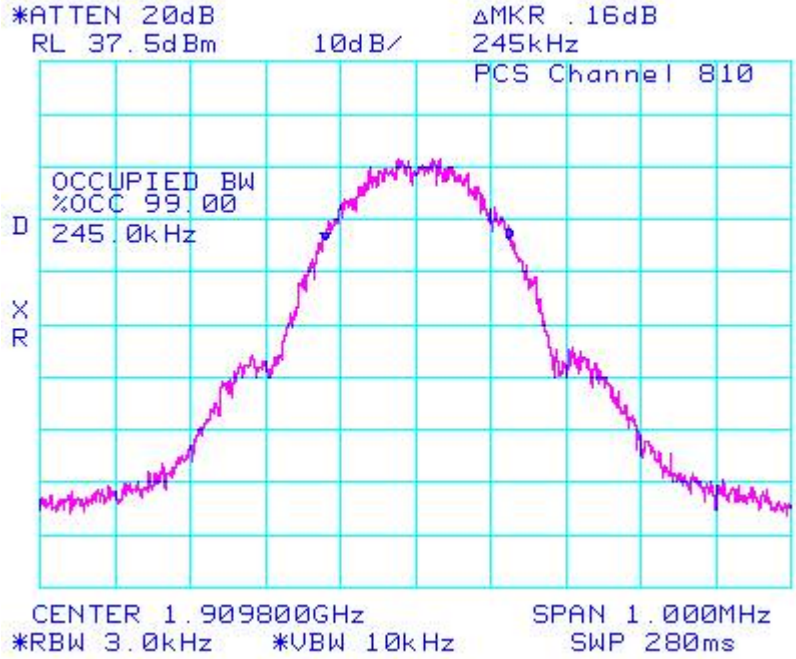


Figure 30: Occupied Bandwidth, PCS1900 Band, High Channel in EDGE mode



Conducted RF Emission Test Data cont'd

Figure 31: GSM850 band, Low Channel Mask

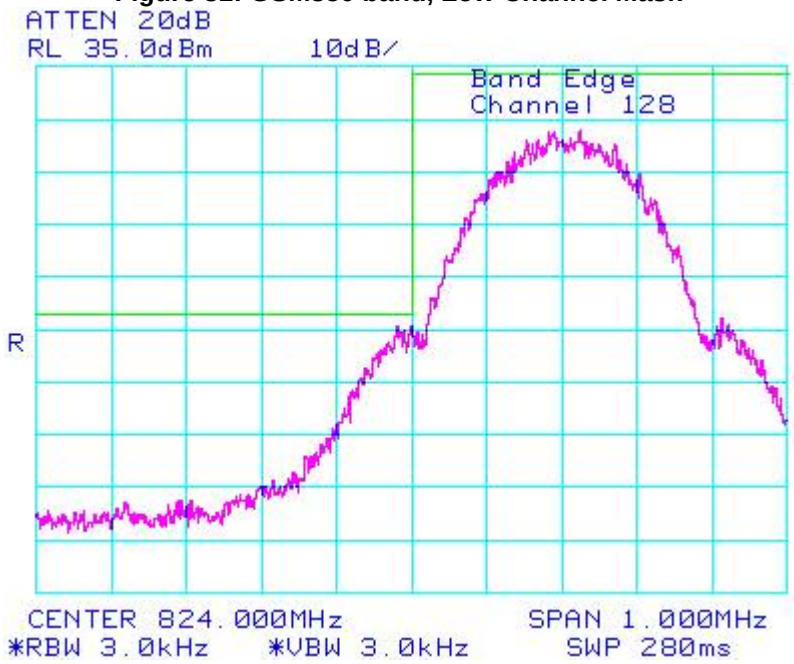
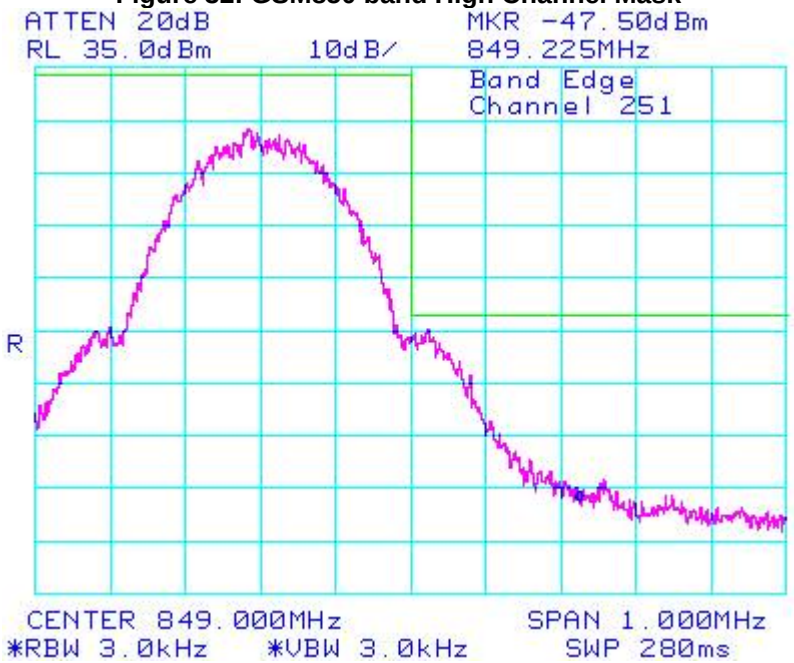


Figure 32: GSM850 band High Channel Mask



Conducted RF Emission Test Data cont'd

Figure 33: PCS1900, Low Channel Mask

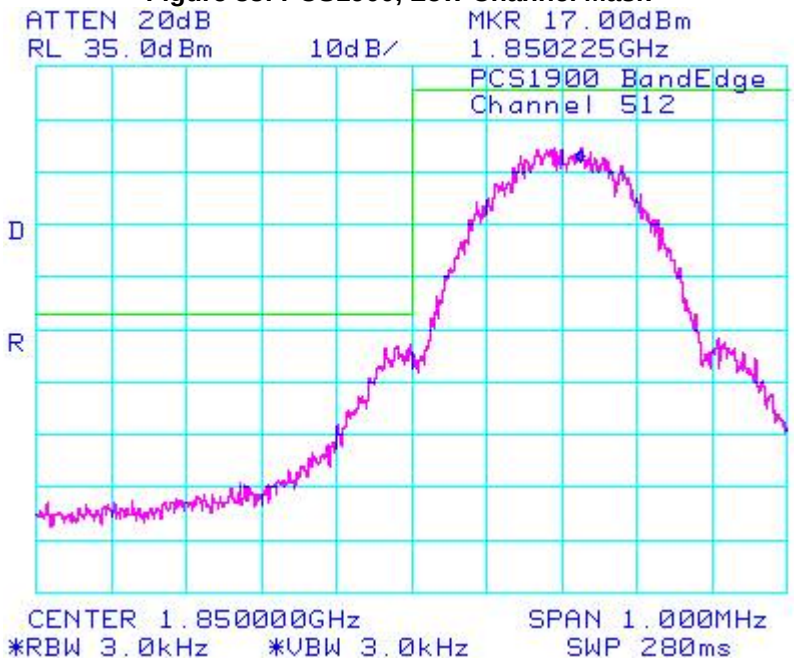
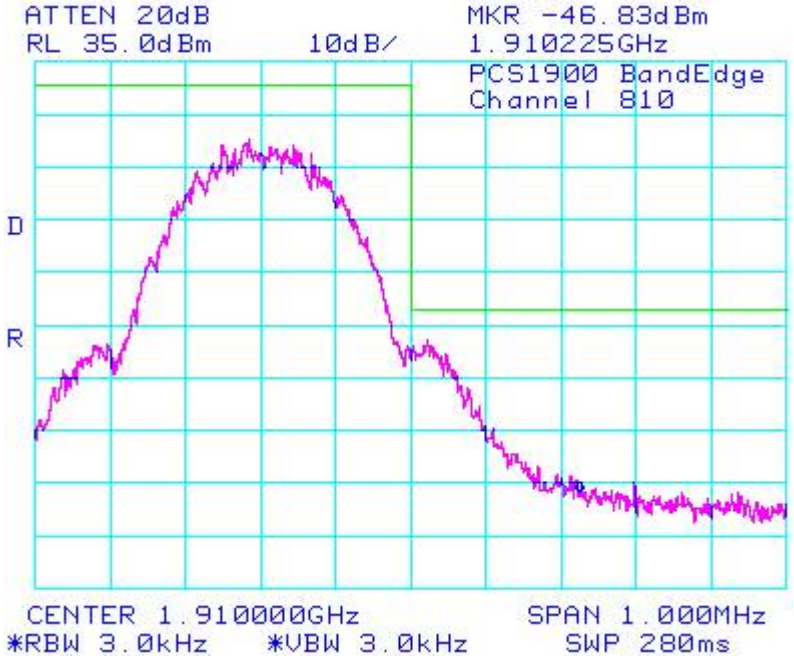


Figure 34: PCS1900, High Channel Mask



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

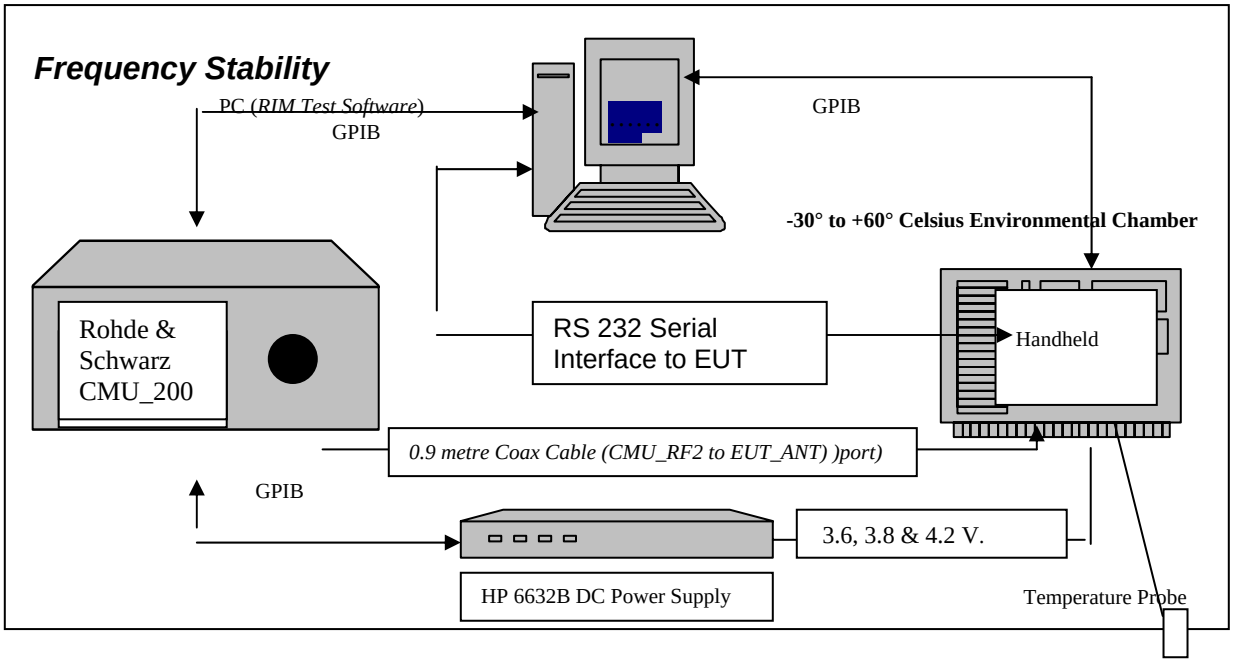
Date of Test: June 01, 2007

Test Results

Channel	Frequency (MHz)	Maximum Output Power (dBm)	Maximum Output Power (Watts)
GSM850			
128	824.20	**33.2**	**2.089**
189	837.60	32.9	1.950
251	848.80	32.7	1.862
GSM850 EDGE/GPRS (2-slot)			
128	824.20	30.9	1.230
189	837.60	30.5	1.122
251	848.80	30.4	1.096
PCS			
512	1850.2	**30.9**	**1.230**
661	1880.0	30.7	1.175
810	1909.8	30.7	1.175
PCS EDGE/GPRS (2-slot)			
512	1850.2	27.9	0.617
661	1880.0	27.8	0.603
810	1909.8	27.9	0.617

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 -**0.0664 PPM**.
The maximum frequency error in the PCS band measured was **-0.0433 PPM**.

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

Date of Test: June 07, 2007

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.6	20	15.05	0.0183
189	836.40	3.6	20	10.01	0.0120
250	848.60	3.6	20	-9.62	-0.0113

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.8	20	-17.05	-0.0207
189	836.40	3.8	20	-13.30	-0.0159
250	848.60	3.8	20	-14.72	-0.0173

Traffic Channel Number	GSM850 Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	4.2	20	-17.11	-0.0208
189	836.40	4.2	20	-12.20	-0.0146
250	848.60	4.2	20	-11.04	-0.0130

GSM850 Results: channel 128 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.6	-30	26.60	0.0323
128	824.20	3.6	-20	-31.96	-0.0388
128	824.20	3.6	-10	-29.32	-0.0356
128	824.20	3.6	0	22.92	0.0278
128	824.20	3.6	10	17.43	0.0211
128	824.20	3.6	20	15.05	0.0183
128	824.20	3.6	30	-54.76	**-0.0664**
128	824.20	3.6	40	20.73	0.0252
128	824.20	3.6	50	31.06	0.0377
128	824.20	3.6	60	14.27	0.0173

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	3.8	-30	11.04	0.0134
128	824.20	3.8	-20	-48.49	-0.0588
128	824.20	3.8	-10	-37.52	-0.0455
128	824.20	3.8	0	-22.92	-0.0278
128	824.20	3.8	10	-38.42	-0.0466
128	824.20	3.8	20	-17.05	-0.0207
128	824.20	3.8	30	-19.82	-0.0240
128	824.20	3.8	40	-18.92	-0.0230
128	824.20	3.8	50	11.75	0.0143
128	824.20	3.8	60	-15.63	-0.0190

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
128	824.20	4.2	-30	-19.05	-0.0231
128	824.20	4.2	-20	-44.30	-0.0537
128	824.20	4.2	-10	-39.39	-0.0478
128	824.20	4.2	0	-17.18	-0.0208
128	824.20	4.2	10	-23.76	-0.0288
128	824.20	4.2	20	-17.11	-0.0208
128	824.20	4.2	30	-23.76	-0.0288
128	824.20	4.2	40	-27.38	-0.0332
128	824.20	4.2	50	-10.01	-0.0121
128	824.20	4.2	60	-21.95	-0.0266

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	-16.14	-0.0193
189	836.40	3.6	-20	-33.38	-0.0399
189	836.40	3.6	-10	-34.09	-0.0408
189	836.40	3.6	0	8.52	0.0102
189	836.40	3.6	10	-17.11	-0.0205
189	836.40	3.6	20	10.01	0.0120
189	836.40	3.6	30	-12.66	-0.0151
189	836.40	3.6	40	-12.01	-0.0144
189	836.40	3.6	50	20.15	0.0241
189	836.40	3.6	60	-19.11	-0.0228

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
189	836.40	3.8	-30	12.33	0.0147
189	836.40	3.8	-20	-36.55	-0.0437
189	836.40	3.8	-10	-36.22	-0.0433
189	836.40	3.8	0	-16.66	-0.0199
189	836.40	3.8	10	-27.83	-0.0333
189	836.40	3.8	20	-13.30	-0.0159
189	836.40	3.8	30	-19.18	-0.0229
189	836.40	3.8	40	-19.18	-0.0229
189	836.40	3.8	50	13.30	0.0159
189	836.40	3.8	60	-10.53	-0.0126

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
189	836.40	4.2	-30	-24.28	-0.0290
189	836.40	4.2	-20	-37.26	-0.0445
189	836.40	4.2	-10	-36.42	-0.0435
189	836.40	4.2	0	10.98	0.0131
189	836.40	4.2	10	-13.30	-0.0159
189	836.40	4.2	20	-12.20	-0.0146
189	836.40	4.2	30	-17.56	-0.0210
189	836.40	4.2	40	-24.21	-0.0289
189	836.40	4.2	50	11.56	0.0138
189	836.40	4.2	60	-16.98	-0.0203

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	13.82	0.0163
250	848.60	3.6	-20	-35.51	-0.0418
250	848.60	3.6	-10	-34.48	-0.0406
250	848.60	3.6	0	-14.79	-0.0174
250	848.60	3.6	10	-27.18	-0.0320
250	848.60	3.6	20	-9.62	-0.0113
250	848.60	3.6	30	-18.21	-0.0215
250	848.60	3.6	40	-19.89	-0.0234
250	848.60	3.6	50	15.82	0.0186
250	848.60	3.6	60	8.85	0.0104

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
250	848.60	3.8	-30	12.07	0.0142
250	848.60	3.8	-20	-38.29	-0.0451
250	848.60	3.8	-10	-38.36	-0.0452
250	848.60	3.8	0	-17.56	-0.0207
250	848.60	3.8	10	-29.19	-0.0344
250	848.60	3.8	20	-14.72	-0.0173
250	848.60	3.8	30	-23.63	-0.0278
250	848.60	3.8	40	-18.02	-0.0212
250	848.60	3.8	50	9.62	0.0113
250	848.60	3.8	60	-14.33	-0.0169

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
250	848.60	4.2	-30	-23.25	-0.0274
250	848.60	4.2	-20	-37.06	-0.0437
250	848.60	4.2	-10	-40.03	-0.0472
250	848.60	4.2	0	14.21	0.0167
250	848.60	4.2	10	-9.10	-0.0107
250	848.60	4.2	20	-11.04	-0.0130
250	848.60	4.2	30	-17.63	-0.0208
250	848.60	4.2	40	-22.02	-0.0259
250	848.60	4.2	50	11.69	0.0138
250	848.60	4.2	60	-13.95	-0.0164

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

Date of Test: June 07, 2007

Traffic Channel Number	PCS Frequency (MHz	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	*PPM*
512	1850.2	3.6	20	-28.73	-0.0155
661	1880.0	3.6	20	-53.21	-0.0283
810	1909.8	3.6	20	-70.32	-0.0368

Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	3.8	20	-53.85	-0.0291
661	1880.0	3.8	20	-53.34	-0.0284
810	1909.8	3.8	20	-47.98	-0.0251

Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	4.2	20	-36.35	-0.0196
661	1880.0	4.2	20	-29.12	-0.0155
810	1909.8	4.2	20	-40.68	-0.0213

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	-56.31	-0.0304
512	1850.2	3.6	-20	-36.22	-0.0196
512	1850.2	3.6	-10	-39.00	-0.0211
512	1850.2	3.6	0	-55.40	-0.0299
512	1850.2	3.6	10	-49.20	-0.0266
512	1850.2	3.6	20	-28.73	-0.0155
512	1850.2	3.6	30	-56.31	-0.0304
512	1850.2	3.6	40	-58.24	-0.0315
512	1850.2	3.6	50	-41.20	-0.0223
512	1850.2	3.6	60	-36.87	-0.0199

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	3.8	-30	-45.85	-0.0248
512	1850.2	3.8	-20	-59.92	-0.0324
512	1850.2	3.8	-10	-51.85	-0.0280
512	1850.2	3.8	0	-66.51	-0.0359
512	1850.2	3.8	10	-57.34	-0.0310
512	1850.2	3.8	20	-53.85	-0.0291
512	1850.2	3.8	30	-48.30	-0.0261
512	1850.2	3.8	40	-44.88	-0.0243
512	1850.2	3.8	50	-42.04	-0.0227
512	1850.2	3.8	60	-41.65	-0.0225

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
512	1850.2	4.2	-30	-63.80	-0.0345
512	1850.2	4.2	-20	-56.82	-0.0307
512	1850.2	4.2	-10	-55.79	-0.0302
512	1850.2	4.2	0	-43.65	-0.0236
512	1850.2	4.2	10	-31.90	-0.0172
512	1850.2	4.2	20	-36.35	-0.0196
512	1850.2	4.2	30	-48.36	-0.0261
512	1850.2	4.2	40	-46.81	-0.0253
512	1850.2	4.2	50	-41.46	-0.0224
512	1850.2	4.2	60	-40.81	-0.0221

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	-34.80	-0.0185
661	1880	3.6	-20	-49.33	-0.0262
661	1880	3.6	-10	-44.30	-0.0236
661	1880	3.6	0	-75.68	-0.0403
661	1880	3.6	10	-56.24	-0.0299
661	1880	3.6	20	-53.21	-0.0283
661	1880	3.6	30	-81.49	**-0.0433**
661	1880	3.6	40	-67.35	-0.0358
661	1880	3.6	50	-61.28	-0.0326
661	1880	3.6	60	-58.50	-0.0311

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880	3.8	-30	-52.11	-0.0277
661	1880	3.8	-20	-54.11	-0.0288
661	1880	3.8	-10	-47.33	-0.0252
661	1880	3.8	0	-53.53	-0.0285
661	1880	3.8	10	-53.08	-0.0282
661	1880	3.8	20	-53.34	-0.0284
661	1880	3.8	30	-48.17	-0.0256
661	1880	3.8	40	-44.62	-0.0237
661	1880	3.8	50	-32.67	-0.0174
661	1880	3.8	60	-35.84	-0.0191

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
661	1880	4.2	-30	-71.48	-0.0380
661	1880	4.2	-20	-58.89	-0.0313
661	1880	4.2	-10	-53.34	-0.0284
661	1880	4.2	0	-28.73	-0.0153
661	1880	4.2	10	-49.66	-0.0264
661	1880	4.2	20	-29.12	-0.0155
661	1880	4.2	30	-38.23	-0.0203
661	1880	4.2	40	-36.10	-0.0192
661	1880	4.2	50	-25.89	-0.0138
661	1880	4.2	60	-24.15	-0.0128

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	-18.40	-0.0096
810	1909.8	3.6	-20	-54.11	-0.0283
810	1909.8	3.6	-10	-46.75	-0.0245
810	1909.8	3.6	0	-48.11	-0.0252
810	1909.8	3.6	10	-60.25	-0.0315
810	1909.8	3.6	20	-70.32	-0.0368
810	1909.8	3.6	30	-49.98	-0.0262
810	1909.8	3.6	40	-69.09	-0.0362
810	1909.8	3.6	50	-63.28	-0.0331
810	1909.8	3.6	60	-67.03	-0.0351

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
810	1909.8	3.8	-30	-43.72	-0.0229
810	1909.8	3.8	-20	-48.49	-0.0254
810	1909.8	3.8	-10	-39.65	-0.0208
810	1909.8	3.8	0	-47.91	-0.0251
810	1909.8	3.8	10	-41.20	-0.0216
810	1909.8	3.8	20	-47.98	-0.0251
810	1909.8	3.8	30	-44.10	-0.0231
810	1909.8	3.8	40	-39.52	-0.0207
810	1909.8	3.8	50	-24.02	-0.0126
810	1909.8	3.8	60	-31.38	-0.0164

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
810	1909.8	4.2	-30	-38.42	-0.0201
810	1909.8	4.2	-20	-42.42	-0.0222
810	1909.8	4.2	-10	-45.52	-0.0238
810	1909.8	4.2	0	-29.06	-0.0152
810	1909.8	4.2	10	-41.13	-0.0215
810	1909.8	4.2	20	-40.68	-0.0213
810	1909.8	4.2	30	-33.96	-0.0178
810	1909.8	4.2	40	-27.06	-0.0142
810	1909.8	4.2	50	-54.76	-0.0287
810	1909.8	4.2	60	-16.85	-0.0088

APPENDIX 4 – RADIATED EMMISIONS TEST DATA

Radiated Emissions Test Data Results

The environmental tests conditions were: Temperature 24^0 C
Pressure 1013 mb
Relative Humidity 32%

Test distance is 3.0 metres

Date of test: May 31 to June 12, 2007

GSM 850

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	77.74	87.65	V-V	12.62	**26.45**	**0.442**	38.50	-12.05
F0	128	824.20	850	Dipole	H	87.62		H-H	12.68				
F0	195	837.60	850	Dipole	V	77.15	85.88	V-V	11.46	25.38	0.345	38.50	-13.12
F0	195	837.60	850	Dipole	H	85.88		H-H	11.82				
F0	251	848.80	850	Dipole	V	76.76	86.15	V-V	12.26	26.05	0.403	38.50	-12.45
F0	251	848.80	850	Dipole	H	86.15		H-H	12.68				

Radiated Emissions Test Data Results cont'd

GSM Mode

The environmental test conditions were:

Temperature	26ºC
Pressure	1003 mb
Relative Humidity	34%

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

Date of Test: June 03 2007

Test Distance was 3.0 metres with a EUT height of 1.0 metres, 30 MHz to 1000 MHz.
The Handheld PIN 205DFB15 was in standalone, vertical position.

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

All emissions had a test margin greater than 25.0 dB.

Test Distance was 3.0 metres with a EUT height of 1.0 metres, 1 GHz to 9 GHz

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, USB up **Low Channel –** 824.2 MHz												
2nd	128	1648.40	850	Horn	V	70.03	70.03	V-V	6.26	-29.37	-13	-16.4
2nd	128	1648.40	850	Horn	H	64.47		H-H	7.30			
3rd	128	2472.60	850	Horn	V	64.31	64.31	V-V	12.08	-25.42	-13	**-12.4**
3rd	128	2472.60	850	Horn	H	53.89		H-H	11.46			
4th	128	3296.80	850	Horn	V	58.71	58.71	V-V	7.46	-27.83	-13	-14.8
4th	128	3296.80	850	Horn	H	56.33		H-H	8.30			
5th	128	4121.00	850	Horn	V	42.97	45.27	V-V	-4.20	-40.84	-13	-27.8
5th	128	4121.00	850	Horn	H	45.27		H-H	-3.84			
The emissions were investigated up to the 10th harmonic. Emissions above the 5th harmonic were in the noise floor (NF).												
Mid Channel – 837.6 MHz												
2nd	195	1675.20	850	Horn	V	68.02	68.02	V-V	5.26	-31.54	-13	-18.5
2nd	195	1675.20	850	Horn	H	62.72		H-H	5.13			
3rd	195	2512.80	850	Horn	V	59.53	59.53	V-V	8.10	-29.50	-13	-16.5
3rd	195	2512.80	850	Horn	H	50.67		H-H	7.34			
4th	195	3350.40	850	Horn	V	52.87	52.87	V-V	1.63	-36.75	-13	-23.8
4th	195	3350.40	850	Horn	H	50.58		H-H	1.48			
5th	195	4188.00	850	Horn	V	NF	NF	V-V	-	-	-13	-
5th	195	4188.00	850	Horn	H	NF		H-H	-			
The emissions were investigated up to the 10th harmonic. Emissions above the 5th harmonic were in the NF.												

Radiated Emissions Test Data Results cont'd

High Channel – 848.8 MHz												
2nd	251	1697.60	850	Horn	V	66.66	66.66	V-V	4.08	-32.78	-13	-19.8
2nd	251	1697.60	850	Horn	H	62.64		H-H	3.76			
3rd	251	2546.40	850	Horn	V	57.30	57.30	V-V	5.80	-31.73	-13	-18.7
3rd	251	2546.40	850	Horn	H	49.55		H-H	4.78			
4th	251	3395.20	850	Horn	V	52.67	52.67	V-V	1.64	-36.56	-13	-23.6
4th	251	3395.20	850	Horn	H	NF		H-H	1.82			
5th	251	4244.00	850	Horn	V	NF	NF	V-V	-	-	-13	-
5th	251	4244.00	850	Horn	H	NF		H-H	-			
The emissions were investigated up to the 10th harmonic. Emissions above the 5th harmonic were in the NF.												

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, USB up **Low Channel –** 824.2 MHz												
2nd	128	1648.40	850	Horn	V	66.05	66.05	V-V	2.08	-32.79	-13	-19.8
2nd	128	1648.40	850	Horn	H	58.89		H-H	3.88			
3rd	128	2472.60	850	Horn	V	60.02	60.02	V-V	7.52	-29.98	-13	**-17.0**
3rd	128	2472.60	850	Horn	H	52.76		H-H	6.94			
4th	128	3296.80	850	Horn	V	54.07	54.07	V-V	3.64	-32.49	-13	-19.5
4th	128	3296.80	850	Horn	H	52.74		H-H	3.52			
5th	128	4121.00	850	Horn	V	41.94	42.17	V-V	-7.02	-44.02	-13	-31.0
5th	128	4121.00	850	Horn	H	42.17		H-H	-7.38			
The emissions were investigated up to the 10th harmonic. Emissions above the 5th harmonic were in the noise floor (NF).												

Radiated Emissions Test Data Results cont'd

Mid Channel – 837.6 MHz												
2nd	195	1675.20	850	Horn	V	63.58	63.58	V-V	-0.10	-36.26	-13	-23.3
2nd	195	1675.20	850	Horn	H	58.08		H-H	0.54			
3rd	195	2512.80	850	Horn	V	55.21	55.21	V-V	3.76	-33.84	-13	-20.8
3rd	195	2512.80	850	Horn	H	48.37		H-H	3.04			
4th	195	3350.40	850	Horn	V	50.34	50.34	V-V	-1.00	-37.38	-13	-24.4
4th	195	3350.40	850	Horn	H	49.32		H-H	-1.12			
5th	195	4188.00	850	Horn	V	NF	NF	V-V	-	-	-13	-
5th	195	4188.00	850	Horn	H	NF		H-H	-			
The emissions were investigated up to the 10th harmonic. Emissions above the 5th harmonic were in the NF.												
High Channel – 848.8 MHz												
2nd	251	1697.60	850	Horn	V	58.05	60.35	V-V	-2.40	-39.26	-13	-26.3
2nd	251	1697.60	850	Horn	H	60.35		H-H	-2.44			
3rd	251	2546.40	850	Horn	V	54.67	54.67	V-V	2.56	-34.97	-13	-22.0
3rd	251	2546.40	850	Horn	H	48.62		H-H	2.28			
4th	251	3395.20	850	Horn	V	48.98	48.97	V-V	-3.14	-38.82	-13	-25.8
4th	251	3395.20	850	Horn	H	48.34		H-H	-2.44			
5th	251	4244.00	850	Horn	V	NF	NF	V-V	-	-	-13	-
5th	251	4244.00	850	Horn	H	NF		H-H	-			
The emissions were investigated up to the 10th harmonic. Emissions above the 5th harmonic were in the NF.												

Radiated Emissions Test Data Results cont'd

EDGE Mode

The environmental test conditions were:

Temperature	24ºC
Pressure	1010 mb
Relative Humidity	27%

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

Date of Test: June 07 2007

Test Distance was 3.0 metres with a EUT height of 1.0 metres, 30 MHz to 1000 MHz.
The Handheld PIN 205DFB15 was in standalone, vertical position.

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

All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

Test Distance was 3.0 metres with a EUT height of 1.0 metres, 1 GHz to 9 GHz

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, USB up **Low Channel –** 824.2 MHz												
2nd	128	1648.40	850	Horn	V	69.50	69.50	V-V	5.66	-29.89	-13	**-16.9**
2nd	128	1648.40	850	Horn	H	64.17		H-H	6.78			
3rd	128	2472.60	850	Horn	V	58.38	58.38	V-V	6.28	-31.22	-13	-18.2
3rd	128	2472.60	850	Horn	H	50.60		H-H	5.42			
4th	128	3296.80	850	Horn	V	54.90	54.90	V-V	-4.20	-31.99	-13	-19.0
4th	128	3296.80	850	Horn	H	51.56		H-H	4.14			
5th	128	4121.00	850	Horn	V	40.99	42.59	V-V	-7.60	-44.06	-13	-31.1
5th	128	4121.00	850	Horn	H	42.59		H-H	-7.06			
The emissions were investigated up to the 10th harmonic. Emissions above the 5th harmonic were in the noise floor (NF).												
Mid Channel – 837.6 MHz												
2nd	195	1675.20	850	Horn	V	69.26	69.26	V-V	5.92	-30.86	-13	-17.9
2nd	195	1675.20	850	Horn	H	66.54		H-H	5.94			
3rd	195	2512.80	850	Horn	V	52.96	52.96	V-V	1.40	-36.20	-13	-23.2
3rd	195	2512.80	850	Horn	H	48.07		H-H	0.30			
4th	195	3350.40	850	Horn	V	51.44	51.44	V-V	-1.20	-36.60	-13	-23.6
4th	195	3350.40	850	Horn	H	49.61		H-H	-0.22			
5th	195	4188.00	850	Horn	V	NF	NF	V-V	-	-	-13	-
5th	195	4188.00	850	Horn	H	NF		H-H	-			
The emissions were investigated up to the 10th harmonic. Emissions above the 5th harmonic were in the NF.												

Radiated Emissions Test Data Results cont'd

High Channel – 848.8 MHz												
2nd	251	1697.60	850	Horn	V	65.66	68.42	V-V	5.90	-30.96	-13	-18.0
2nd	251	1697.60	850	Horn	H	68.42		H-H	5.48			
3rd	251	2546.40	850	Horn	V	51.95	51.95	V-V	-0.46	-37.99	-13	-25.0
3rd	251	2546.40	850	Horn	H	47.90		H-H	-1.04			
4th	251	3395.20	850	Horn	V	50.01	50.01	V-V	-1.73	-37.78	-13	-24.8
4th	251	3395.20	850	Horn	H	49.12		H-H	-1.40			
5th	251	4244.00	850	Horn	V	NF	NF	V-V	-	-	-13	-
5th	251	4244.00	850	Horn	H	NF		H-H	-			
The emissions were investigated up to the 10th harmonic. Emissions above the 5th harmonic were in the NF.												

Test distance is 3.0 metres.

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to dipole)	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						

Emission were in the NF.

Radiated Emissions Test Data Results cont'd

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

PCS Band

The environmental tests conditions were: Temperature 24^0 C
Pressure 1013 mb
Relative Humidity 32%

Test Distance was 3.0 metres.

Date of test: May 31 to June 12, 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, Horizontal													
F0	512	1850.20	1900	Horn	V	81.44	88.85	V-V	-10.62	25.08	0.322	33	-7.92
F0	512	1850.20	1900	Horn	H	88.85		H-H	-9.82				
F0	661	1880.00	1900	Horn	V	80.31	89.45	V-V	-8.80	**27.14**	**0.518**	33	-5.86
F0	661	1880.00	1900	Horn	H	89.45		H-H	-7.36				
F0	810	1909.80	1900	Horn	V	80.92	89.39	V-V	-9.56	26.36	0.432	33	-6.64
F0	810	1909.80	1900	Horn	H	89.39		H-H	-7.84				

Radiated Emissions Test Data Results cont'd

GSM Mode

The environmental test conditions were:

Temperature	25ºC
Pressure	1007 mb
Relative Humidity	28%

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

Date of Test: June 06 2007

Test Distance was 3.0 metres with a EUT height of 1.0 metres, 30 MHz to 1000 MHz.
The Handheld PIN 205DFB15 was in standalone, vertical position.

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

All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

Test Distance was 3.0 metres with a EUT height of 1.0 metres, 1 GHz to 19 GHz

								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, Vertical **Low Channel** 1850.2 MHz												
2nd	512	3700.40	1900	Horn	V	48.52	54.51	V-V	7.88	-28.19	-13	**-15.19**
2nd	512	3700.40	1900	Horn	H	54.51		H-H	7.14			
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	56.22	51.95	V-V	6.60	-29.38	-13	-16.38
2nd	661	3760.00	1900	Horn	H	51.95		H-H	6.72			
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	49.22	53.86	V-V	7.68	-28.45	-13	-15.45
2nd	810	3819.60	1900	Horn	H	53.86		H-H	7.36			
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

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, Vertical **Low Channel** 1850.2 MHz												
2nd	512	3700.40	1900	Horn	V	47.21	54.26	V-V	7.84	-27.86	-13	**-14.86**
2nd	512	3700.40	1900	Horn	H	54.26		H-H	8.21			
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	44.76	50.93	V-V	5.86	-30.24	-13	-17.24
2nd	661	3760.00	1900	Horn	H	50.93		H-H	5.23			
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	48.49	53.64	V-V	7.40	-28.30	-13	-15.30
2nd	810	3819.60	1900	Horn	H	53.64		H-H	7.83			
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

EDGE Mode

The environmental test conditions were:

Temperature	25ºC
Pressure	1009 mb
Relative Humidity	27%

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

Date of Test: June 07 2007

Test Distance was 3.0 metres with a EUT height of 1.0 metres, 30 MHz to 1000 MHz.
The Handheld PIN 205DFB15 was in standalone, vertical position.

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

All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

Test Distance was 3.0 metres with a EUT height of 1.0 metres, 1 GHz to 19 GHz

								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, Vertical **Low Channel** 1850.2 MHz												
2nd	512	3700.40	1900	Horn	V	46.24	53.12	V-V	6.58	-29.36	-13	-16.36
2nd	512	3700.40	1900	Horn	H	53.12		H-H	6.71			
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	45.70	51.10	V-V	6.02	-30.08	-13	-17.08
2nd	661	3760.00	1900	Horn	H	51.10		H-H	5.62			
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	47.98	52.16	V-V	6.28	-29.00	-13	**-16.00**
2nd	810	3819.60	1900	Horn	H	52.16		H-H	7.13			
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.

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.													