EMI Test Report

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

RIM Testing Services (RTS)

A division of Research In Motion Limited

REPORT NO.: RTS-0943-0801-17_Rev1

PRODUCT MODEL NO.: RBU21CW
TYPE NAME: BlackBerry® smartphone
FCC ID: L6ARBU20CW
IC: 2503A-RBU20CW
EMISSION DESIGNATOR: 1M29F9W

This Rev1 test report supersedes the previous version RTS-0943-0801-17 dated 5th February 2008.

DATE: 21 March 2008

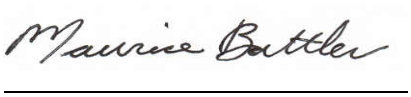
Statement of Performance:

The BlackBerry® smartphone, model RBU21CW, part number CER-16579-001 Rev. 2, 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.

Tested and Documented by:



Maurice Battler
Compliance Specialist
Date: 21 Mar. 2008

Tested By:

Vimal Olaganathan
Compliance Specialist
Date: 21 Mar. 2008

Reviewed by:

Masud S. Attayi, P.Eng.
Team Lead, Regulatory Compliance
Date:21 Mar. 2008

Approved by:

Paul G. Cardinal, Ph.D.
Director
Date: 21 Mar. 2008

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, 2006
- FCC CFR 47 Part 24 Subpart E, Broadband PCS, Oct 1. 2006
- Industry Canada, RSS-132 Issue 2, September 2005, Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz.
- Industry Canada, RSS-133 Issue 3, June 2005, 2 GHz Personal Communications Services.
- Industry Canada, RSS-GEN Issue 2, June 2007, General Requirements and Information for the Certification of Radiocommunication Equipment

B. Associated Documents

1. Document number CER-16579-001-Rev 2-Hardware-Change Notification.doc

C. Product Identification

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

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

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

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

The testing was performed December 17, 2007 to January 31, 2008.

The sample BlackBerry® smartphones tested were:

SAMPLE NO.	MODEL	CER NUMBER
3	RBU21CW	CER-16579-001 Rev 1
6	RBU21CW	CER-16597-001 Rev 1
7	RBU21CW	CER-16597-001 Rev 2

Conducted RF measurements were performed on BlackBerry® smartphone Sample 3. Radiated Emission measurements were performed on BlackBerry® smartphones Sample 6 and 7.

To view the differences between CER-16579-001 Rev 1 to CER-16579-001 Rev 2, see document number CER-16579-001-Rev 2-Hardware-Change Notification.doc

Only the characteristics 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, Aglient, model 8960, Serial number US41070110
3) DC Power Supply, HP, model 6632B, serial number US37472178

E. Modifications to EUT

No modifications were required on the EUT.

F. Summary of Results

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

1) The EUT met the requirements of the Conducted Spurious Emissions in the Cellular band as per 47 CFR 22.917, CFR 22.901(d) and RSS-132. The EUT was measured in CDMA2000 and 1xEVDO mode on the low, middle and high channels. The frequency range investigated was from 10 MHz to 20 GHz.
See APPENDIX 1 for the test data.

2) The EUT met the requirements of the Conducted Spurious Emissions in the PCS band as per 47 CFR 2.1057, CFR 24.238 and RSS-133. The EUT was measured in CDMA2000 and 1xEVDO mode on the low, middle and high channels. The frequency range investigated was from 10 MHz to 26 GHz.
See APPENDIX 1 for the test data.

3) The EUT met the requirements of the Occupied Bandwidth in the Cellular band as per 47 CFR 2.202, CFR 22.917 and RSS-132. The channels were measured in CDMA2000 and 1xEVDO mode on the low, middle and high channels.
See APPENDIX 1 for the test data.

4) The EUT met the requirements of the Occupied Bandwidth and channel mask in the PCS band as per 47 CFR 2.202, CFR 24.238 and RSS-133. The channels were measured in CDMA2000 and 1xEVDO mode on the low, middle and high channels.
See APPENDIX 1 for the test data.

5) The EUT met the requirements of the Conducted RF Output Power for both the Cellular and PCS bands. The channels were measured in CDMA2000 and 1xEVDO 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 for Cellular band as per 22.917 and RSS-132.
The maximum frequency error measured was less than 0.1 ppm.
The temperature range was from -30°C to +60°C in 10° temperature steps. The EUT was measured on low, middle and high channels at each temperature step. The EUT was measured at low (3.6 volts), nominal (3.7 volts) and high (4.2 volts) dc input voltage at each temperature step and channel at maximum output power.
See APPENDIX 3 for the test data.

7) The EUT met the requirements of the Frequency Stability vs. Temperature and Voltage requirements for the PCS band as per 24.235 and RSS-133. The maximum frequency error measured was less than 0.1 ppm.
The temperature range was from -30°C to +60°C in 10 degree temperature steps. The EUT was measured on low, middle and high channels at each temperature step. The EUT was measured at low (3.6 volts), nominal (3.7 volts) and high (4.2 volts) dc input voltage at each temperature step and channel at maximum output power. See APPENDIX 3 for the test data.

8) The radiated spurious emissions/harmonics and ERP/EIRP were measured for both Cellular 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 remote 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. The measurements were performed in a semi-anechoic chamber. The semi-anechoic chamber FCC registration number is **778487** and the Industry Canada site number is **2503B-1**. The EUT was measured on the low, middle and high channels.

   The highest ERP in the Cellular band measured was 23.36 dBm at 824.70 MHz (channel 1013).
   The highest EIRP in the PCS band measured was 23.7 dBm at 1880.00 MHz (channel 600).

   The radiated spurious emissions were measured up to the 10th harmonic for low, middle and high channels in the Cellular and PCS bands.
   The lowest test margin for the cellular band was 23.8 dB below the limit at 2474.10 MHz.
   The lowest test margin for the PCS band was 8.3 dB below the limit at 3817.50 MHz.

   The EUT's RF local oscillator emissions were measured in the Cellular band on the low, middle and high channels (1013, 384 and 777) in the standalone vertical position. Both the horizontal and vertical antenna polarizations were measured. The Cellular RF local oscillator emissions were in the noise floor (NF).

   The EUT's RF local oscillator emissions were measured in the PCS band on the low, middle and high channels (25, 600 and 1175) in the standalone Horizontal position. Both the horizontal and vertical antenna polarizations were measured. The PCS RF local oscillator 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)

Measurement Uncertainty ±4.0 dB

To view the test data see APPENDIX 4.

H. Compliance Test Equipment Used

UNIT	MANUFACTURER	MODEL	SERIAL NUMBER	CAL DUE DATE (YY MM DD)	USE
Preamplifier	Sonoma	310N/11909A	185831	08-11-21	Radiated Emissions
Preamplifier system	TDK RF Solutions	PA-02	080010	08-11-16	Radiated Emissions
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	08-11-20	Radiated Emissions
Dipole Antenna	Schwarzbeck	UHAP	973	08-12-18	Radiated Emissions
Dipole Antenna	Schwarzbeck	UHAP	974	08-09-28	Radiated Emissions
EMC Analyzer	Aglient	E7405A	US40240226	08-10-01	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	837493/073	08-12-06	Radiated Emissions
Spectrum Analyzer	HP	8563E	3745A08112	08-09-22	RF Conducted Emissions
DC Power Supply	HP	6632B	US37472178	08-09-24	RF Conducted Emissions
Environment Monitor	Control Company	1870	230355190	08-12-11	Radiated Emissions
Environment Monitor	Control Company	1870	230199533	08-12-11	RF Conducted Emissions
Universal Radio Communication Tester	Agilent	8960	US41070110	08-08-31	Frequency Stability, RF Conducted Emissions
Temperature Probe	Control Company	15-077-21	51129471	08-05-22	Frequency Stability
Environmental Chamber	ESPEC Corp.	SH-240S1	91007118	N/R	Frequency Stability
Signal Generator	Agilent	8648C	4037U03155	09-09-20	Frequency Stability
Power Meter	Giga-tronics	8541C	1837762	08-12-31	Frequency Stability
Power Sensor	Giga-tronics	80401A	1835838	08-12-31	Frequency Stability

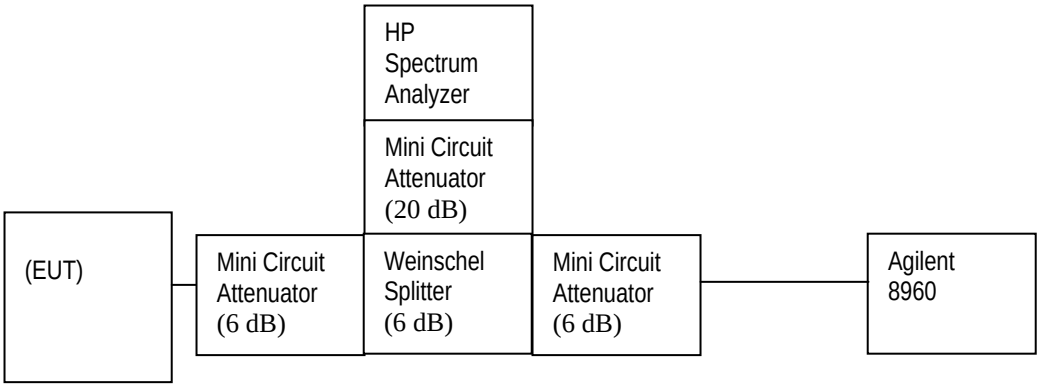
APPENDIX 1 - CONDUCTED RF EMISSIONS TEST DATA/PLOTS

Conducted RF Emission Test Data

This appendix contains measurement data pertaining to conducted spurious emissions, 99% power bandwidth and the channel mask on BlackBerry® smartphone Sample 3.

The measurements were performed by Maurice Battler.

Test Setup Diagram



The environmental test conditions were:

Temperature	24ºC
Pressure	1001 mb
Relative Humidity	22%

Conducted RF Emission Test Data cont'd

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

Date of Test: December 17, 2007

Test Data for Cellular and PCS selected Frequencies in CDMA2000 mode

Cellular Frequency (MHz)	99% Occupied Bandwidth (MHz)
824.700	1.28
836.520	1.27
848.310	1.27

PCS Frequency (MHz)	99% Occupied Bandwidth (MHz)
1851.200	1.27
1880.000	1.28
1908.750	1.29

Measurement Plots for Cellular and PCS in CDMA2000 mode
Refer to the following measurement plots for more detail.

See Figures 13 to 18 for the plots of the 99% Occupied Bandwidth.
See Figures 19 to 22 for plots of the channel mask results.

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

Conducted Emission Test Results cont'd

Figure 1: Cellular, Spurious Conducted Emissions, Low channel

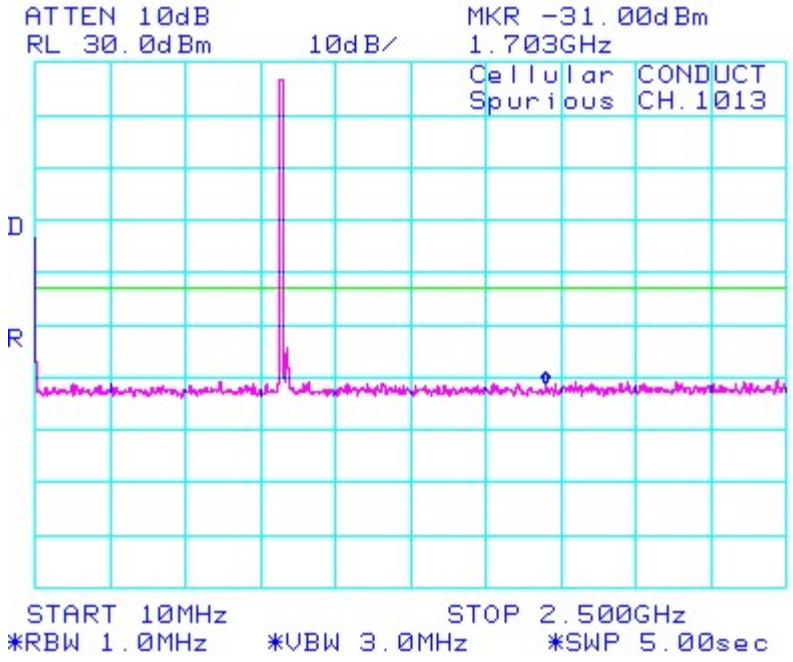
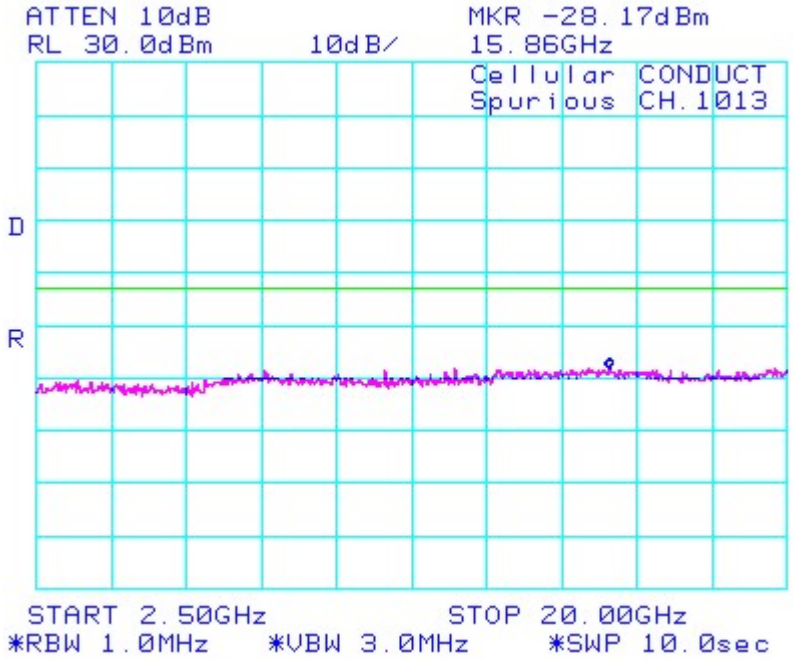


Figure 2: Cellular, Spurious Conducted Emissions, Low channel



Conducted Emission Test Results cont'd

Figure 3: Cellular, Spurious Conducted Emissions, Middle Channel

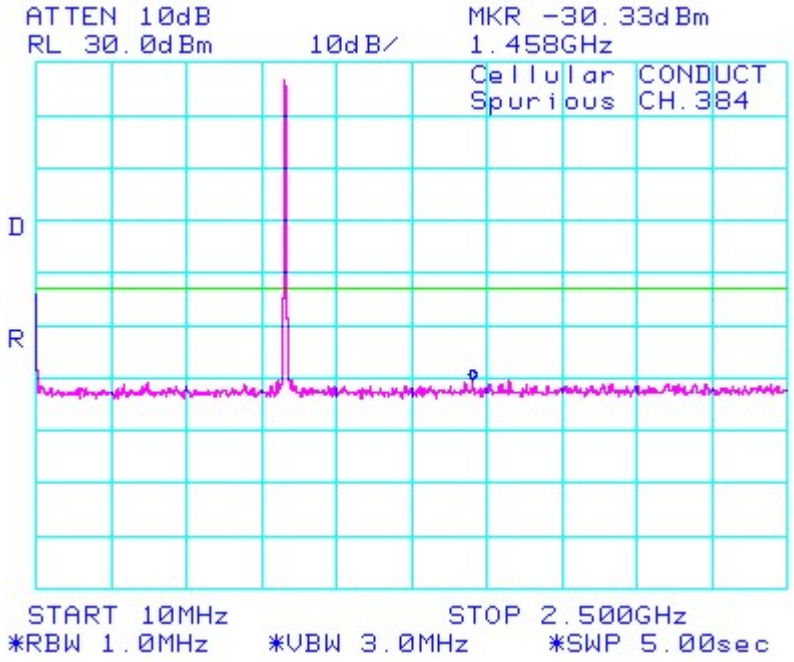
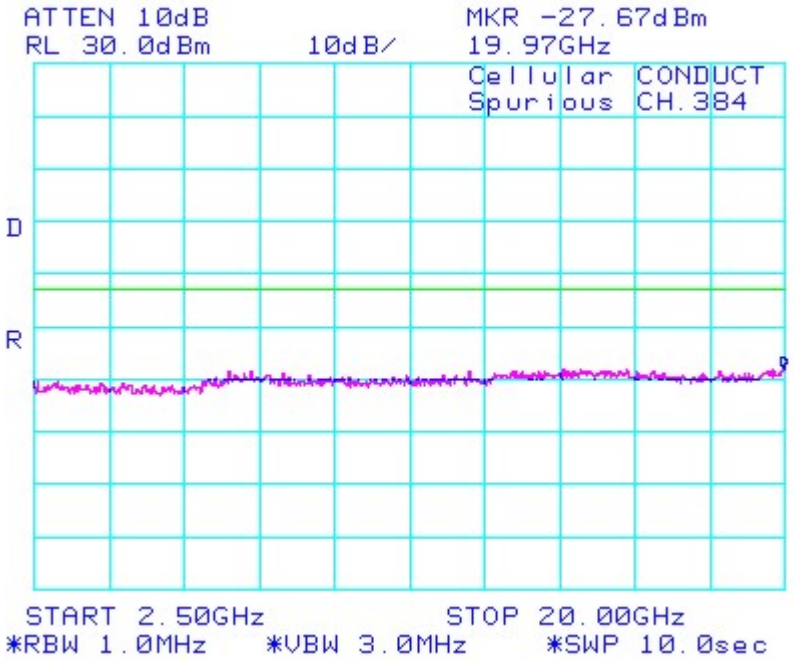


Figure 4: Cellular, Spurious Conducted Emissions, Middle Channel



Conducted Emission Test Results cont'd

Figure 5: Cellular, Spurious Conducted Emissions, High Channel

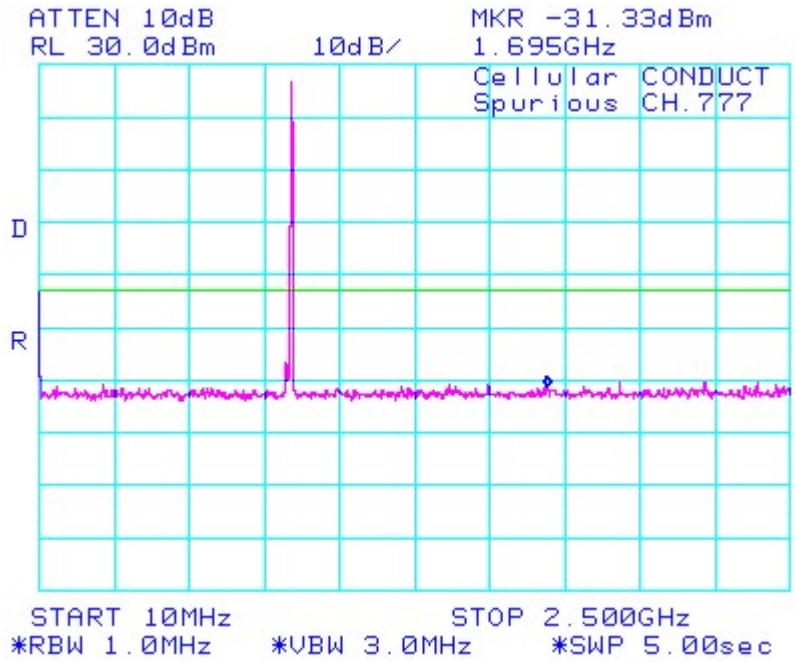
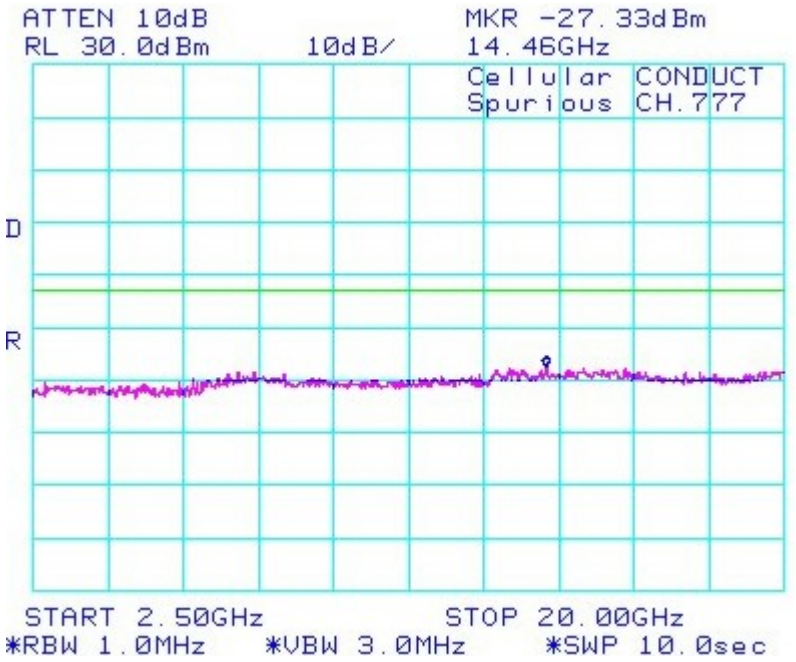


Figure 6: Cellular, Spurious Conducted Emissions, High Channel



Conducted Emission Test Results cont'd

Figure 7: PCS, Spurious Conducted Emissions, Low Channel

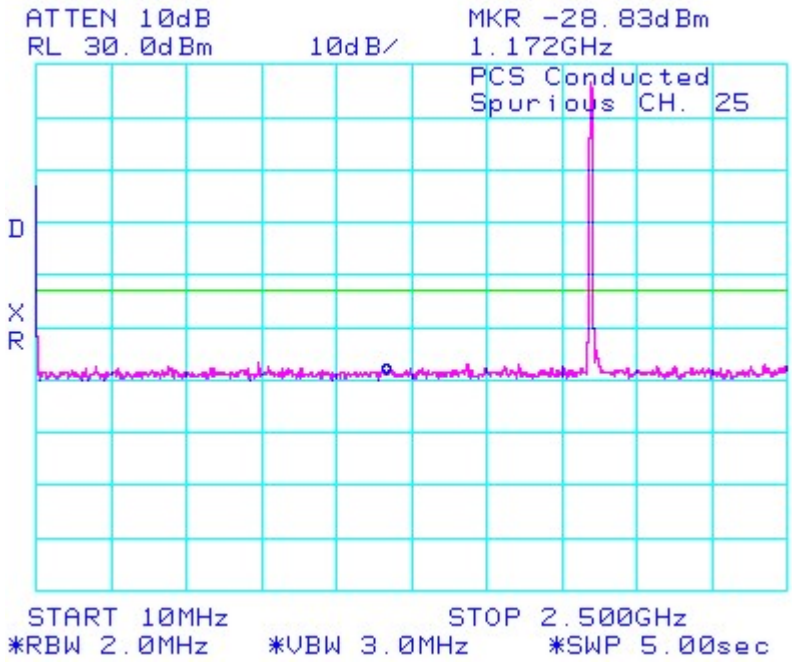
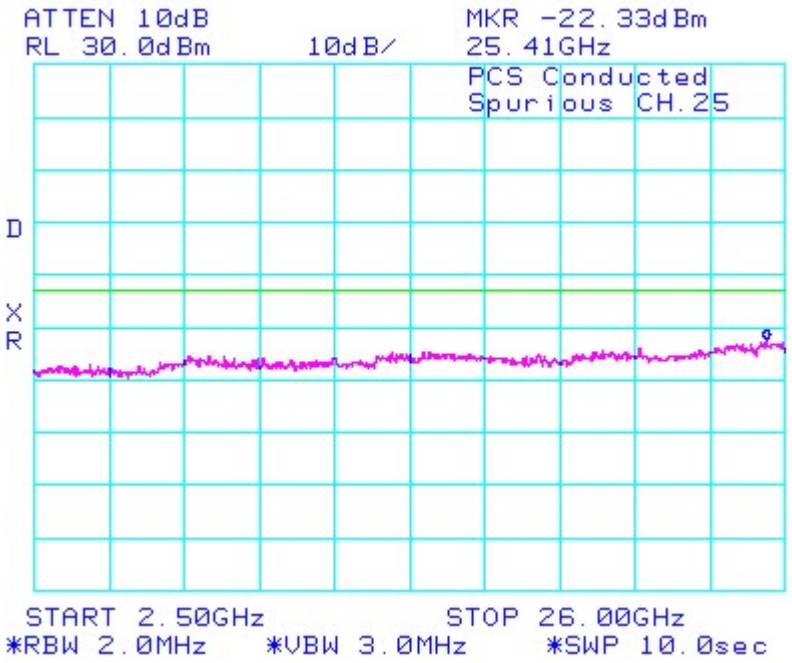


Figure 8: PCS, Spurious Conducted Emissions, Low Channel



Conducted Emission Test Results cont'd

Figure 9: PCS, Spurious Conducted Emissions, Middle Channel

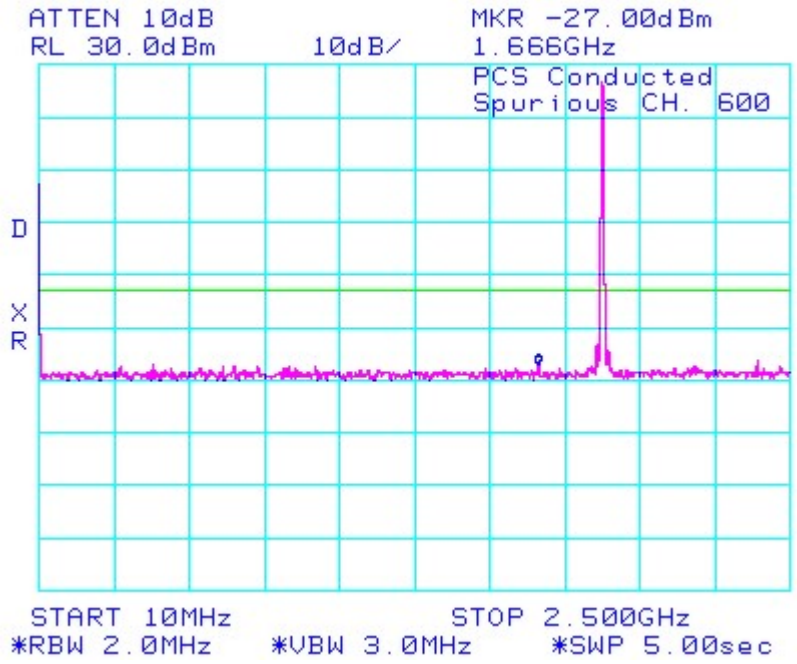
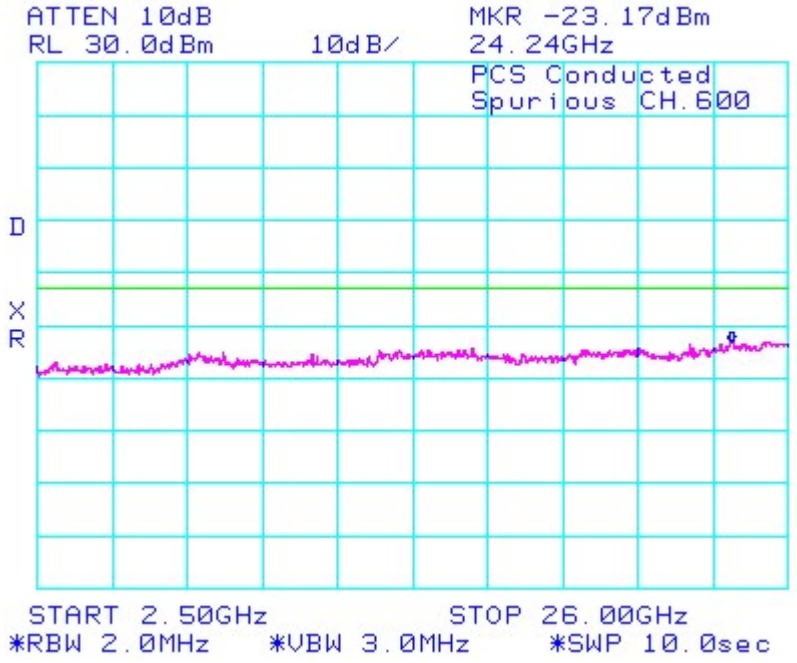


Figure 10: PCS, Spurious Conducted Emissions, Middle Channel



Conducted Emission Test Results cont'd

Figure 11: PCS, Spurious Conducted Emissions, High Channel

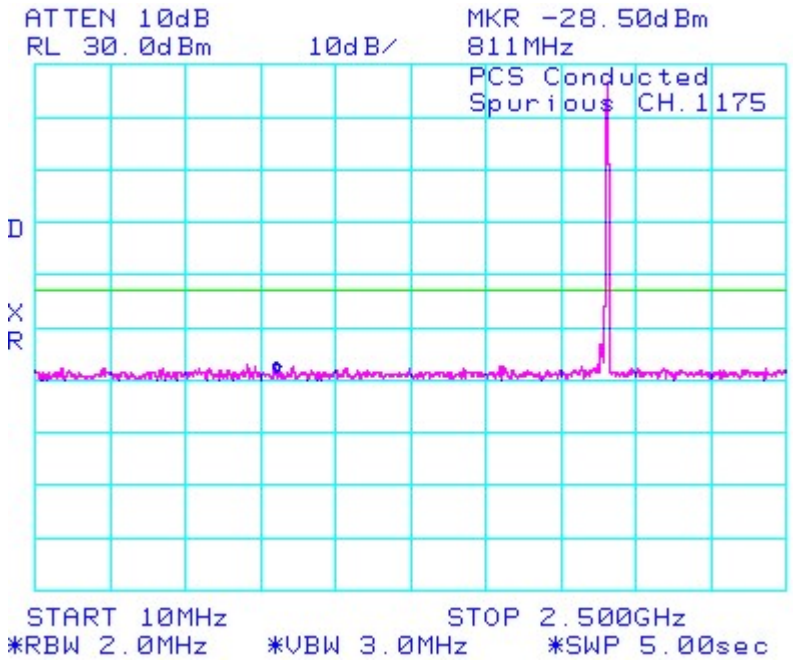
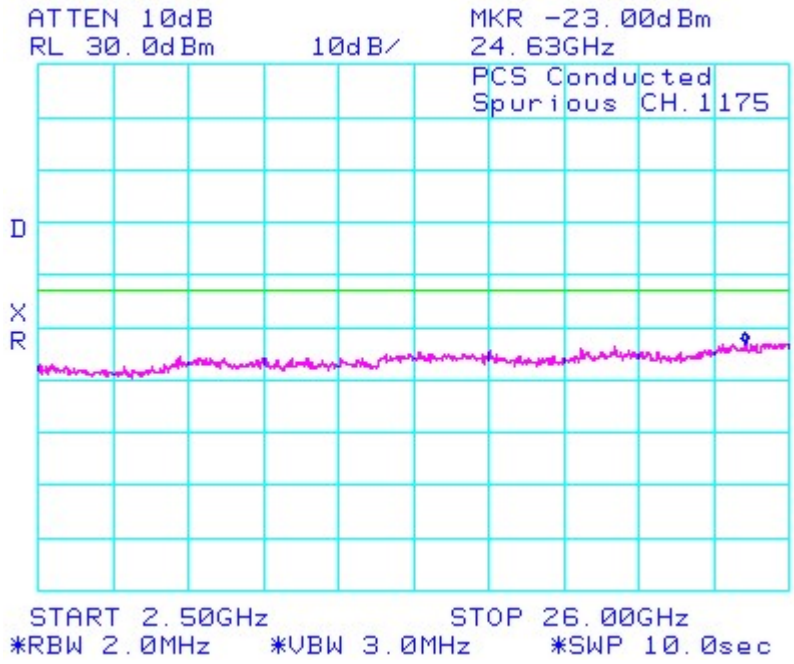


Figure 12: PCS, Spurious Conducted Emissions, High Channel



Conducted Emission Test Results cont'd

Figure 13: Occupied Bandwidth, Cellular Low Channel

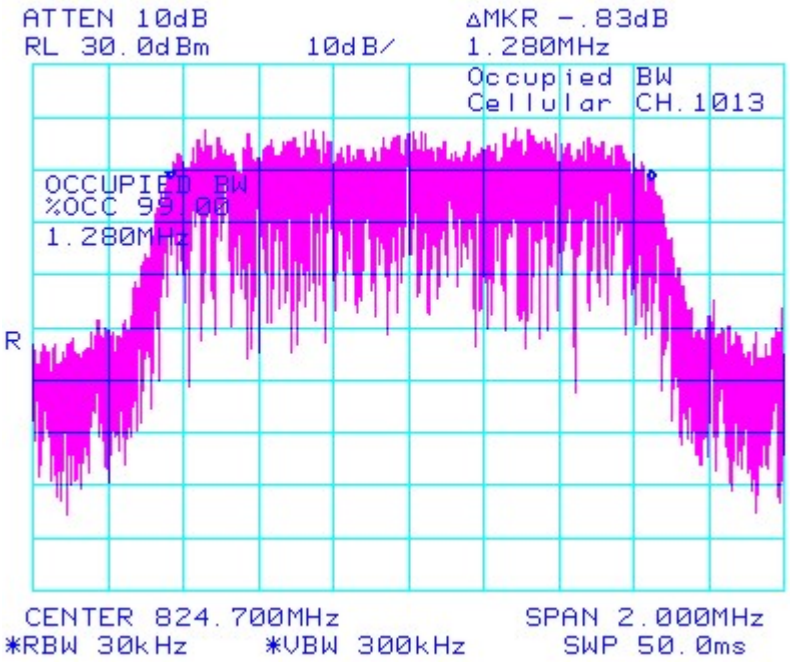
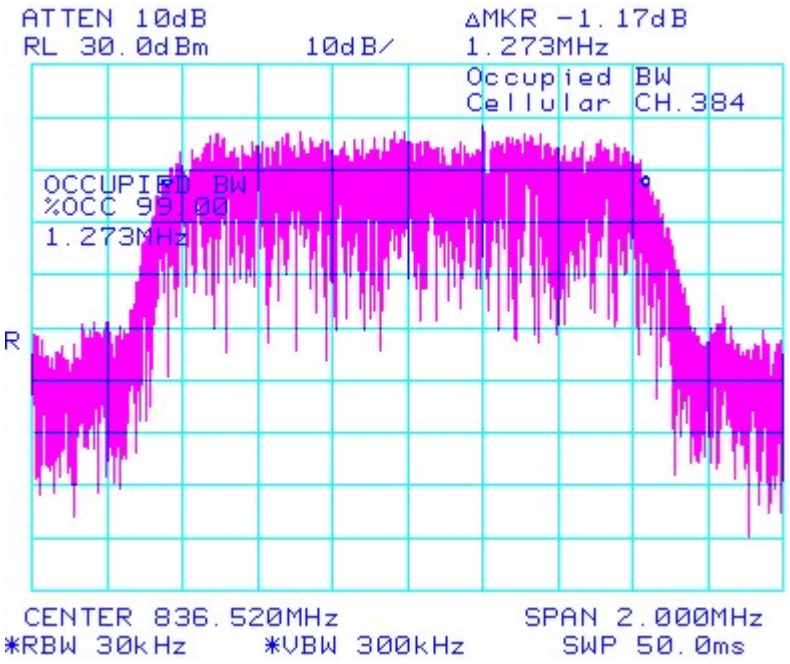


Figure 14: Occupied Bandwidth, Cellular Middle Channel



Conducted Emission Test Results cont'd

Figure 15: Occupied Bandwidth, Cellular High Channel

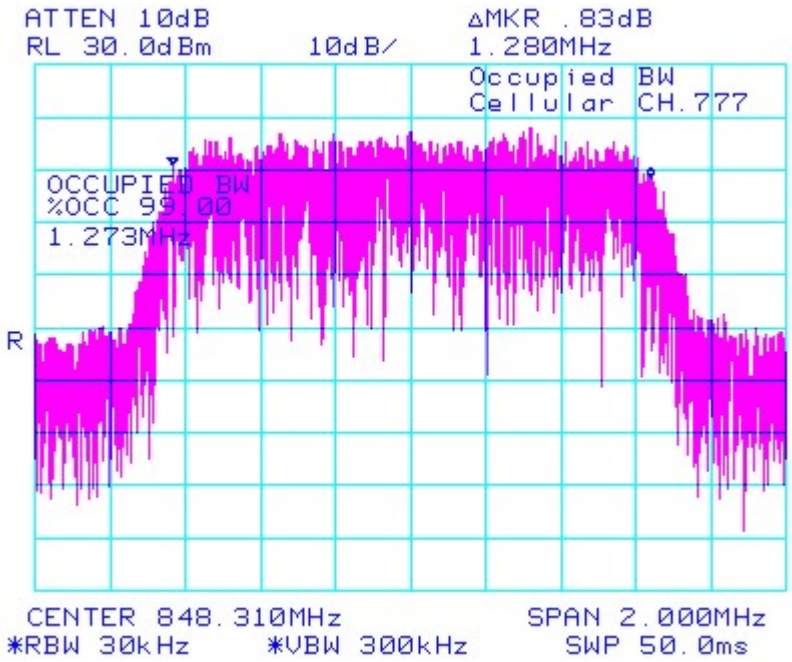
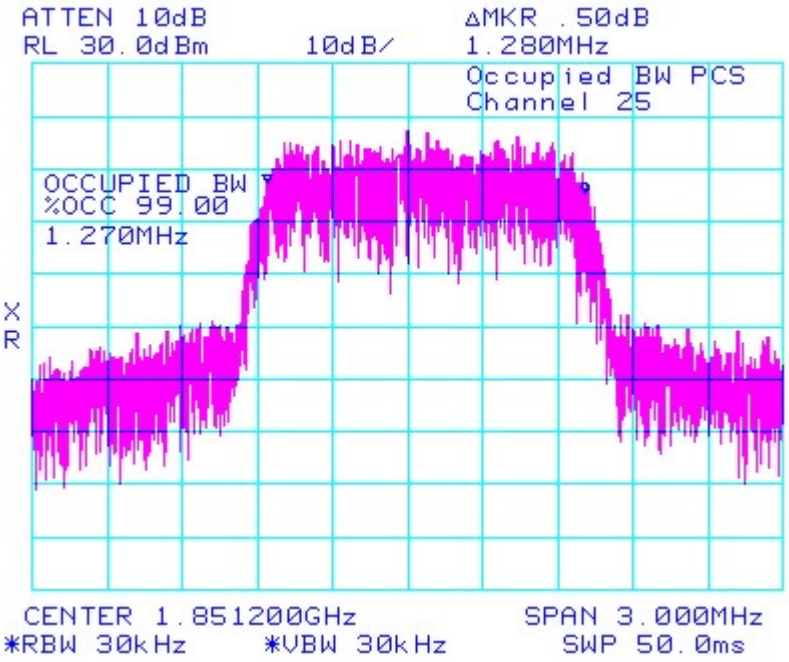


Figure 16: Occupied Bandwidth, PCS Low Channel



Conducted Emission Test Results cont'd

Figure 17: Occupied Bandwidth, PCS Middle Channel

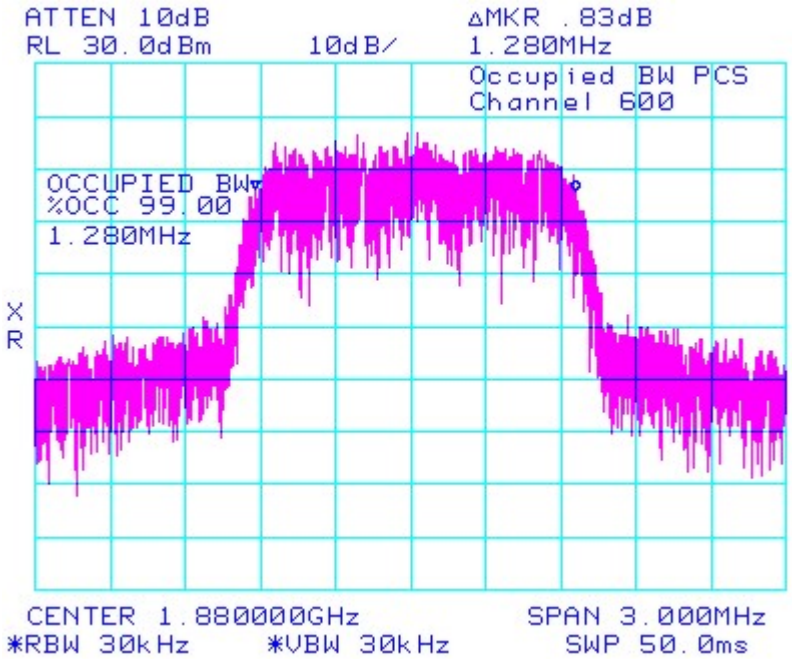
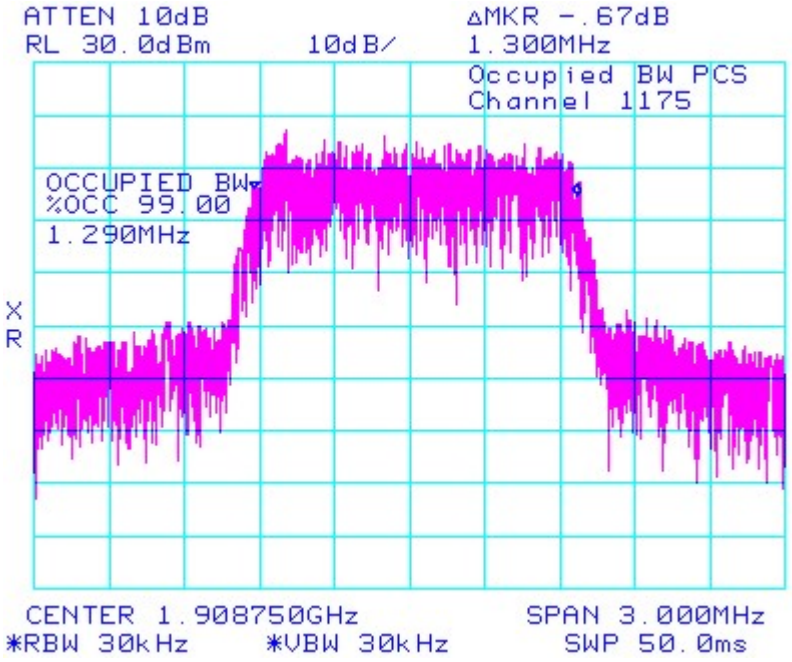


Figure 18: Occupied Bandwidth, PCS High Channel



Conducted Emission Test Results cont'd

Figure 19a: Cellular CDMA2000, Low Channel Mask

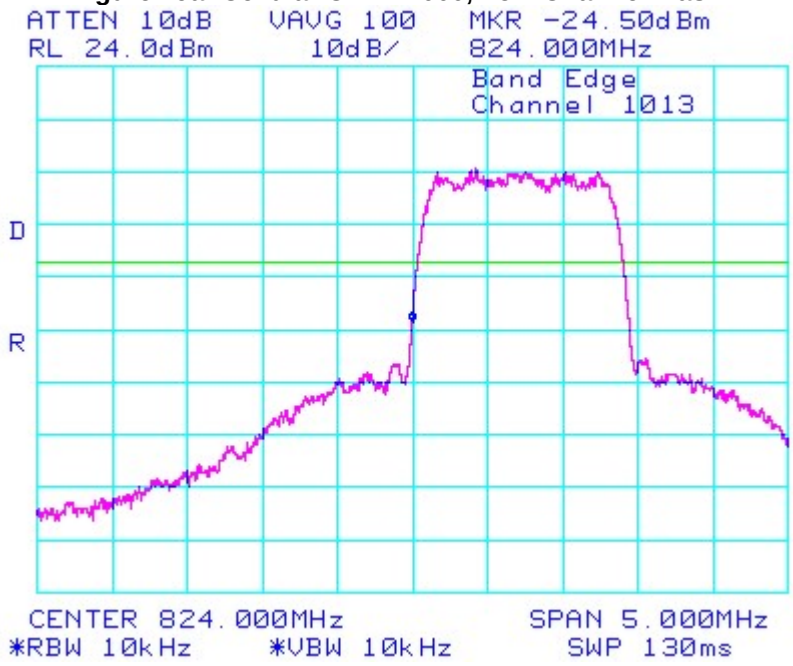
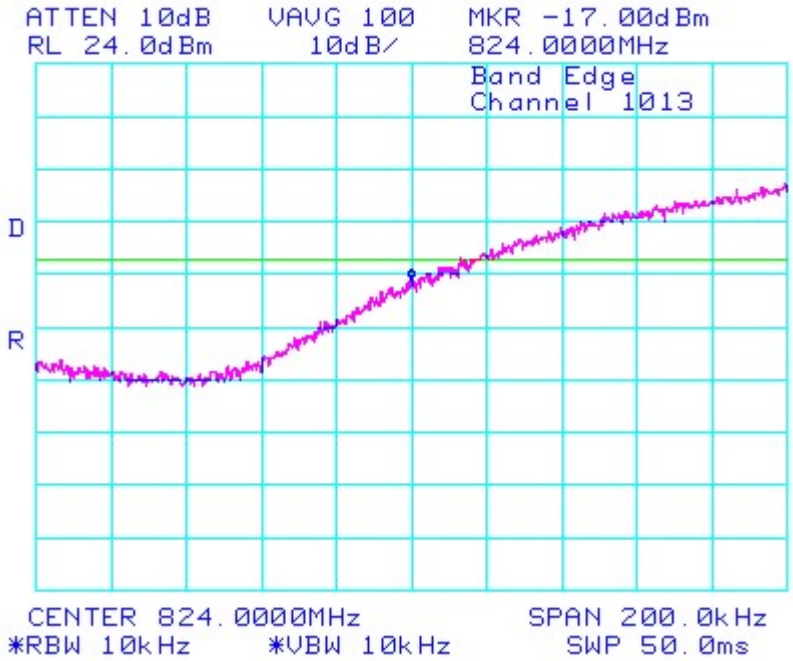


Figure 19b: Cellular CDMA2000, Low Channel Mask



Conducted Emission Test Results cont'd

Figure 20a: Cellular CDMA2000, High Channel Mask

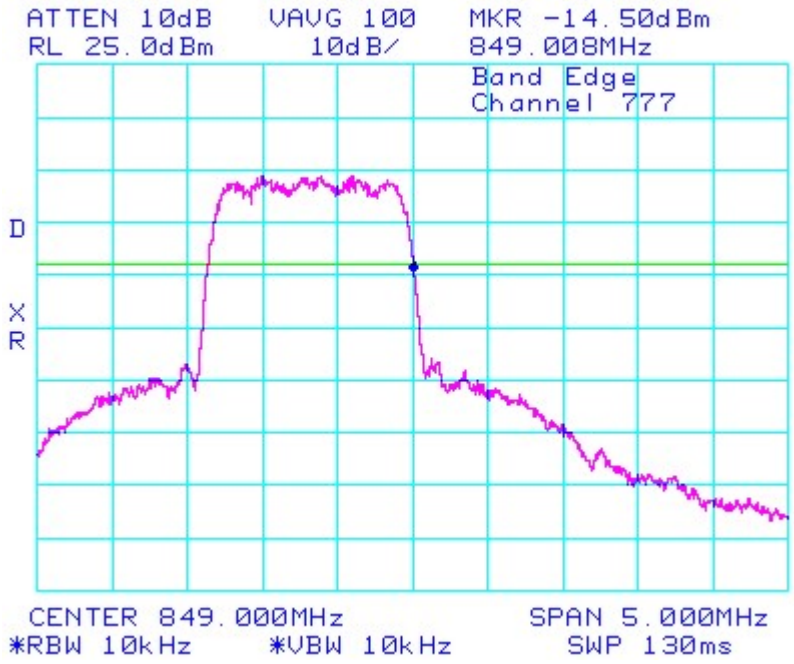
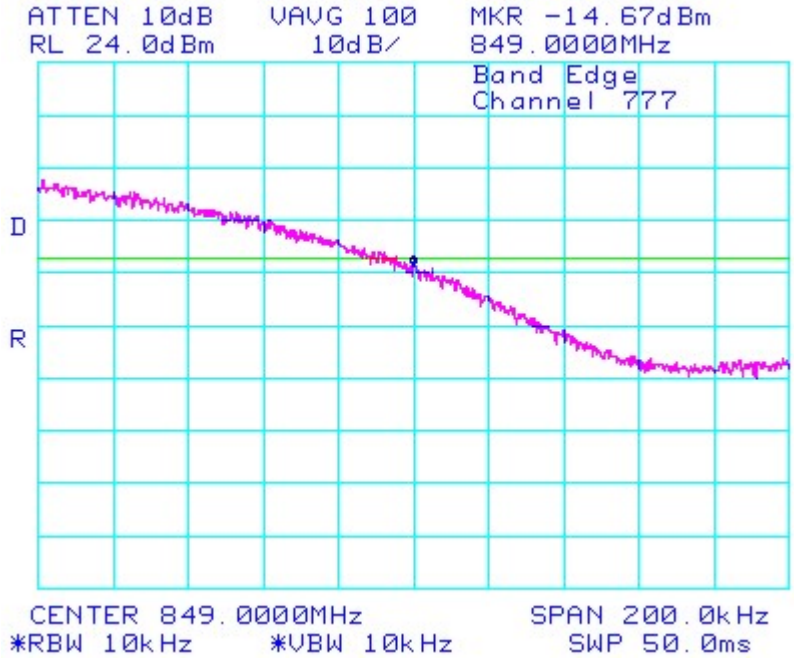


Figure 20b: Cellular CDMA2000, Low Channel Mask



Conducted Emission Test Results cont'd

Figure 21: PCS, Low Channel Mask

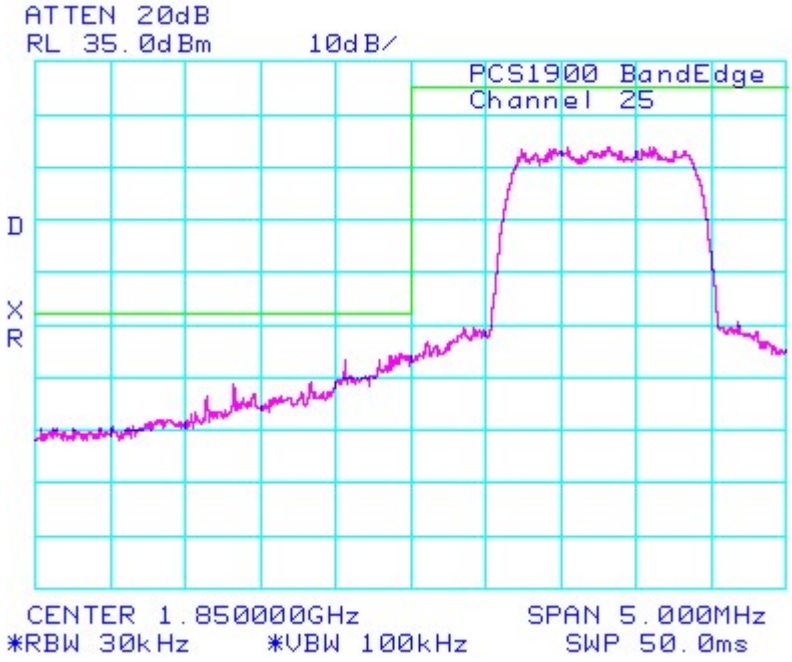
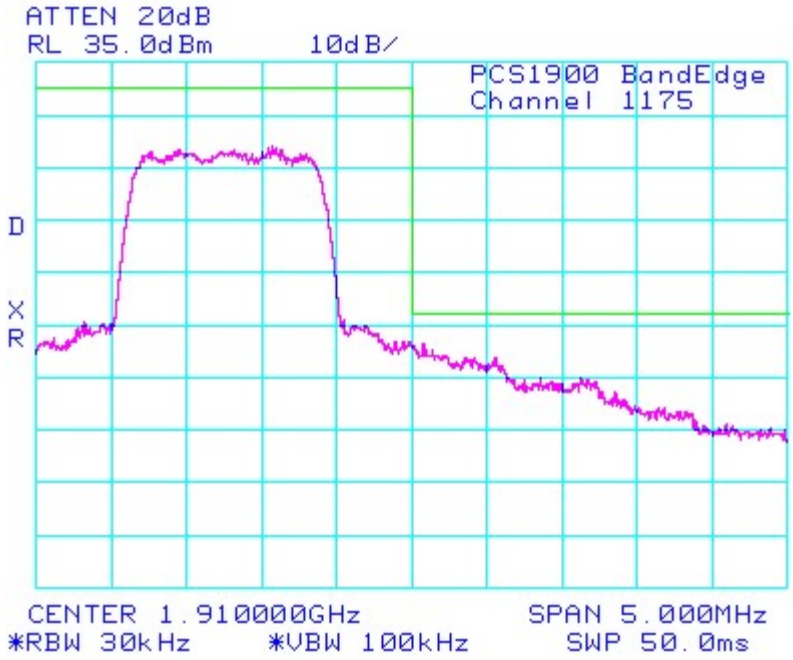


Figure 22: PCS, High Channel Mask



Conducted RF Emission Test Data cont'd

The conducted spurious emissions – As per 47 CFR 2.1051, CFR 24.238(a), RSS-GEN, 4.9, CFR 22 Subpart H and RSS-132 were measured from 10 MHz to 20 GHz. The EUT emissions were in the NF.
See figures 23 to 34 for the plots of the conducted spurious emissions.
Date of Test: December 18, 2007

The environmental test conditions were:

Temperature	24ºC
Pressure	1010 mb
Relative Humidity	22%

Test Data for Cellular and PCS selected Frequencies in 1xEVDO mode

Cellular Frequency (MHz)	99% Occupied Bandwidth (MHz)
824.700	1.273
836.520	1.280
848.310	1.273

PCS Frequency (MHz)	99% Occupied Bandwidth (MHz)
1851.200	1.290
1880.000	1.280
1908.750	1.280

Measurement Plots for Cellular and PCS in 1xEVDO mode
Refer to the following measurement plots for more detail.

See Figures 35 to 40 for the plots of the 99% Occupied Bandwidth.
See Figures 41 to 44 for plots of the channel mask results.

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

Conducted Emission Test Results cont'd

Figure 23: Cellular, Spurious Conducted Emissions, Low channel

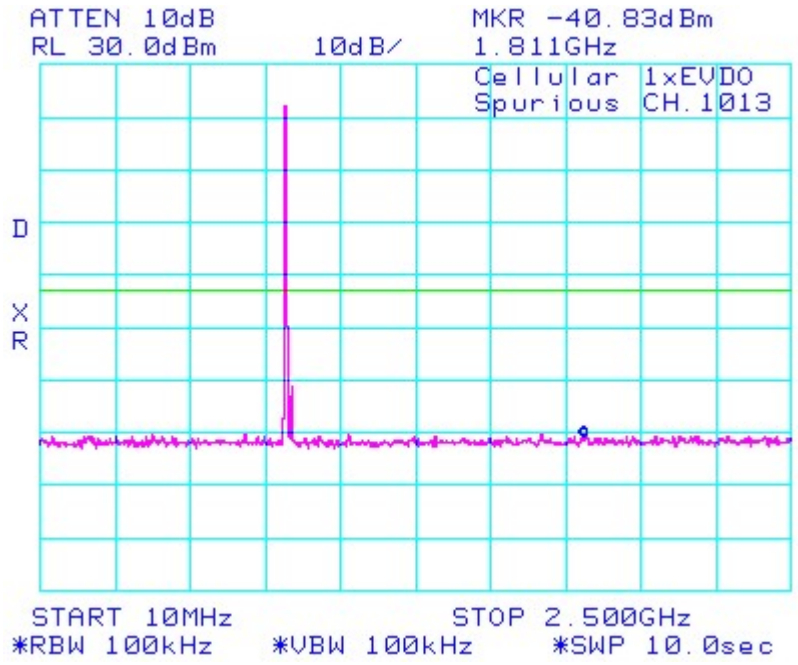
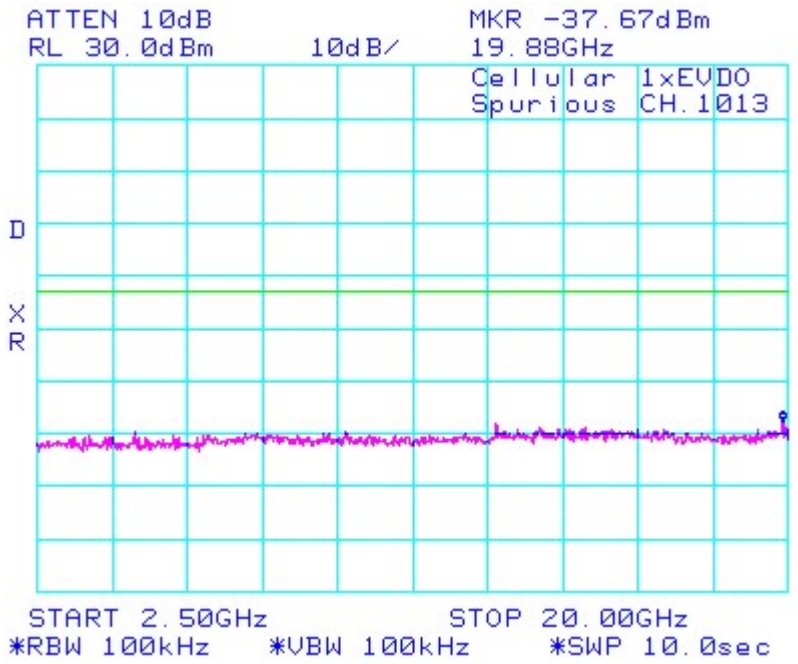


Figure 24: Cellular, Spurious Conducted Emissions, Low channel



Conducted Emission Test Results cont'd

Figure 25: Cellular, Spurious Conducted Emissions, Middle Channel

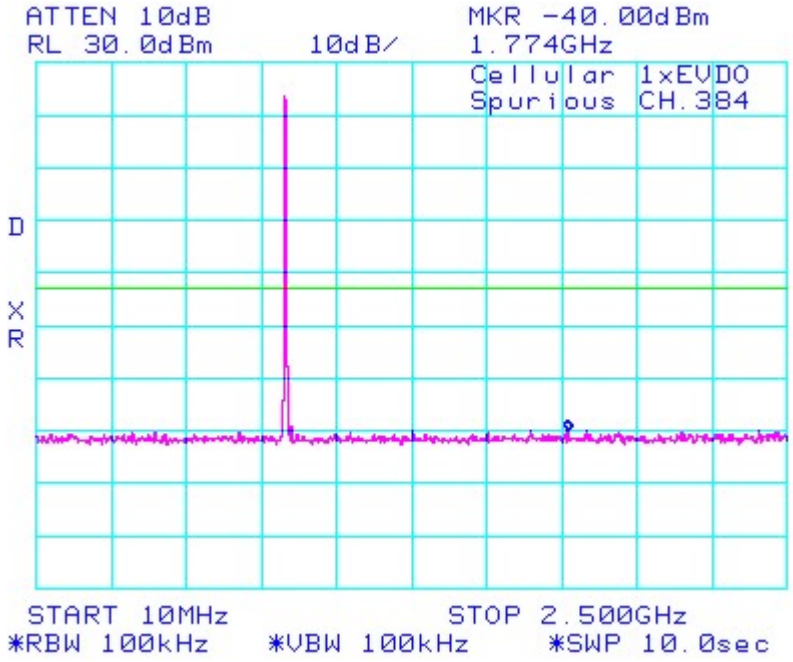
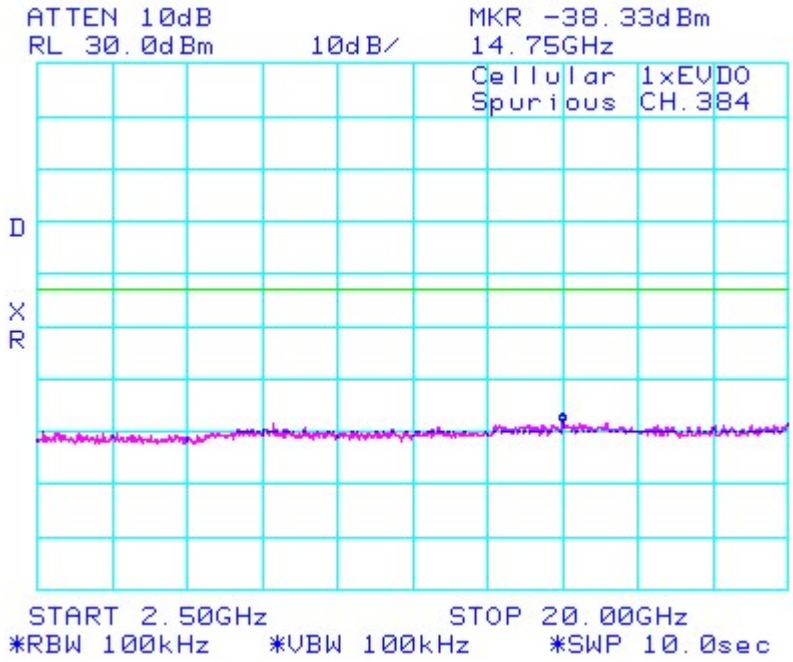


Figure 26: Cellular, Spurious Conducted Emissions, Middle Channel



Conducted Emission Test Results cont'd

Figure 27: Cellular, Spurious Conducted Emissions, High Channel

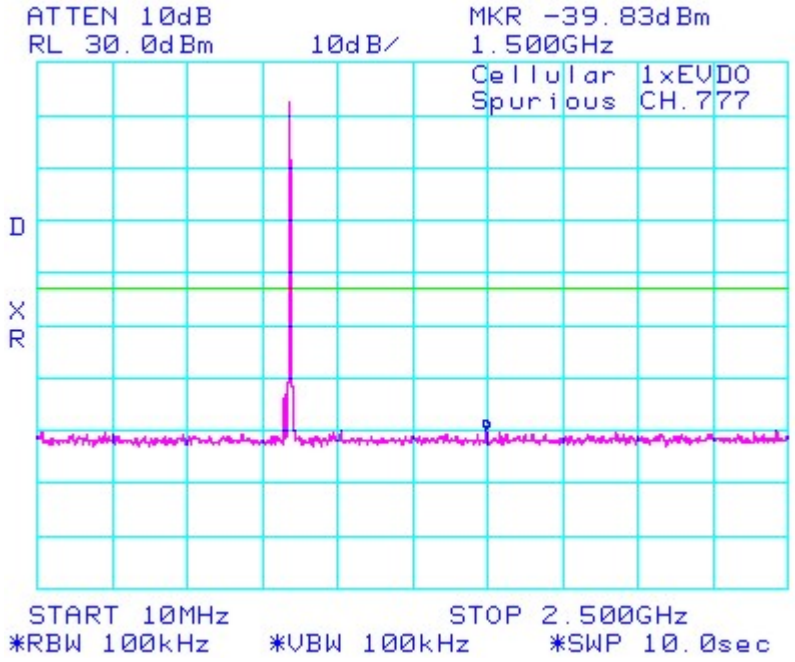
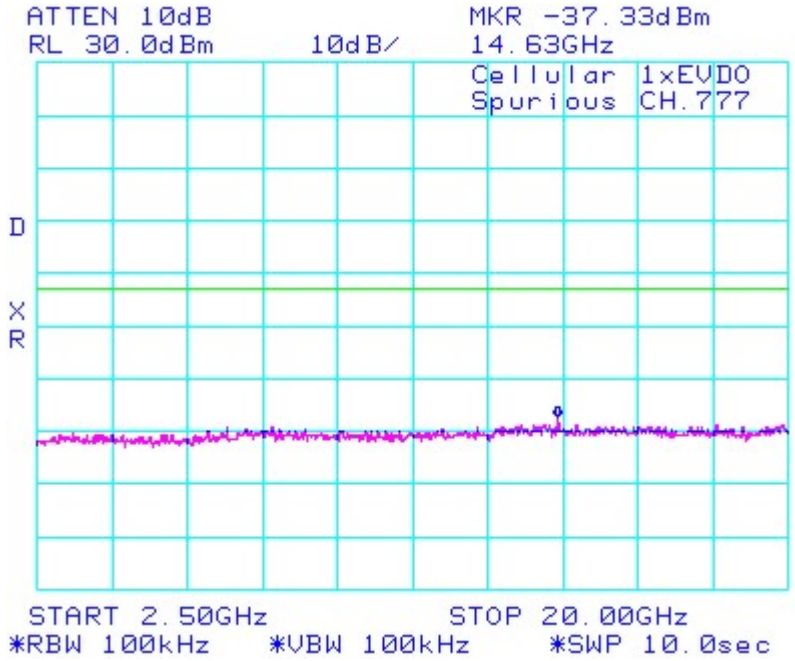


Figure 28: Cellular, Spurious Conducted Emissions, High Channel



Conducted Emission Test Results cont'd

Figure 29: PCS, Spurious Conducted Emissions, Low Channel

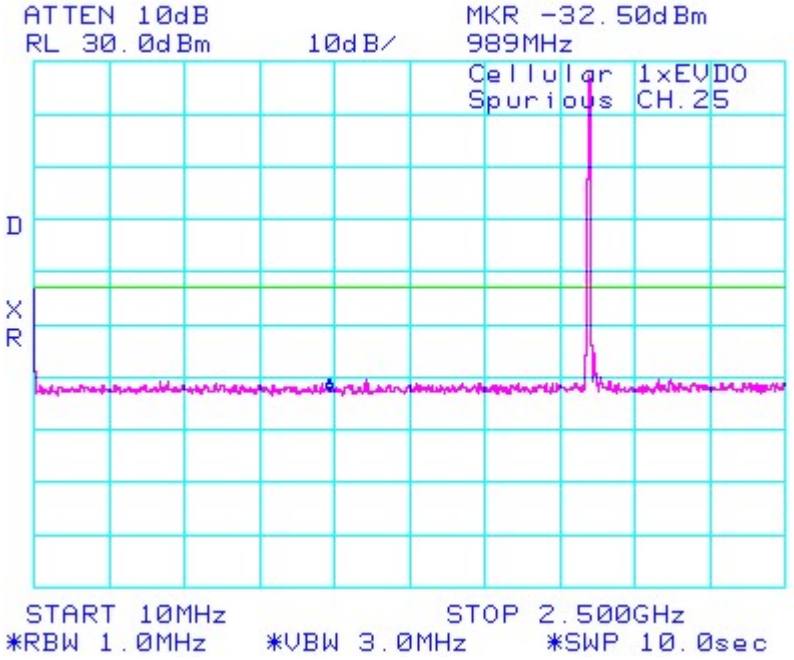
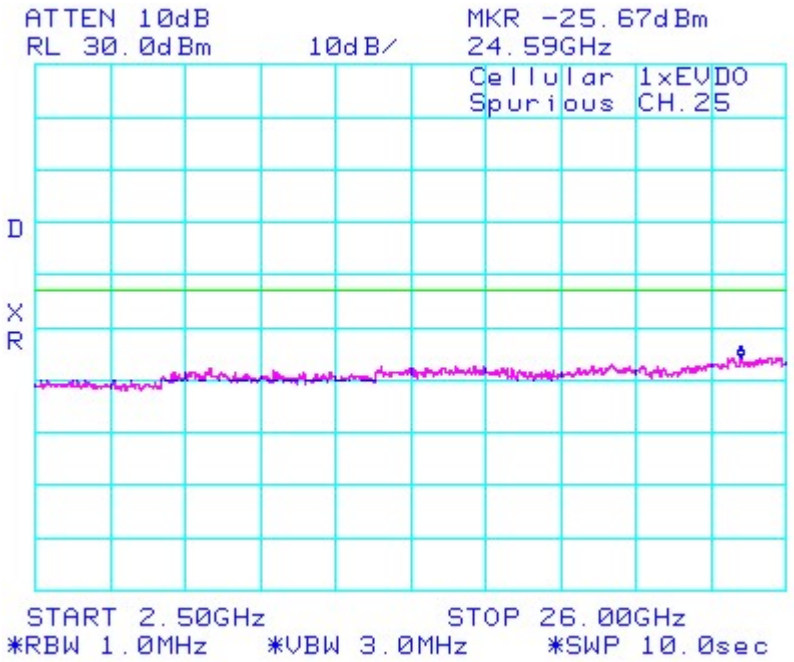


Figure 30: PCS, Spurious Conducted Emissions, Low Channel



Conducted Emission Test Results cont'd

Figure 31: PCS, Spurious Conducted Emissions, Middle Channel

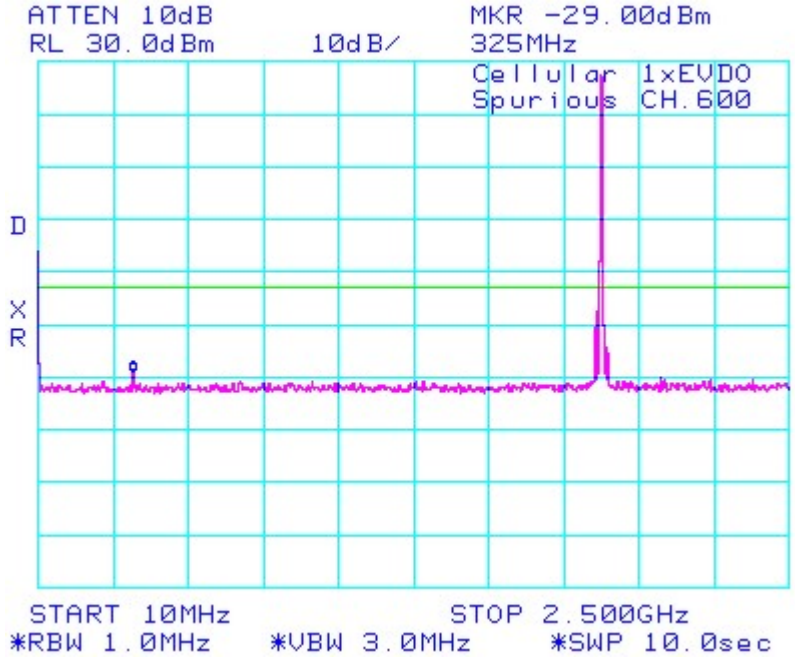
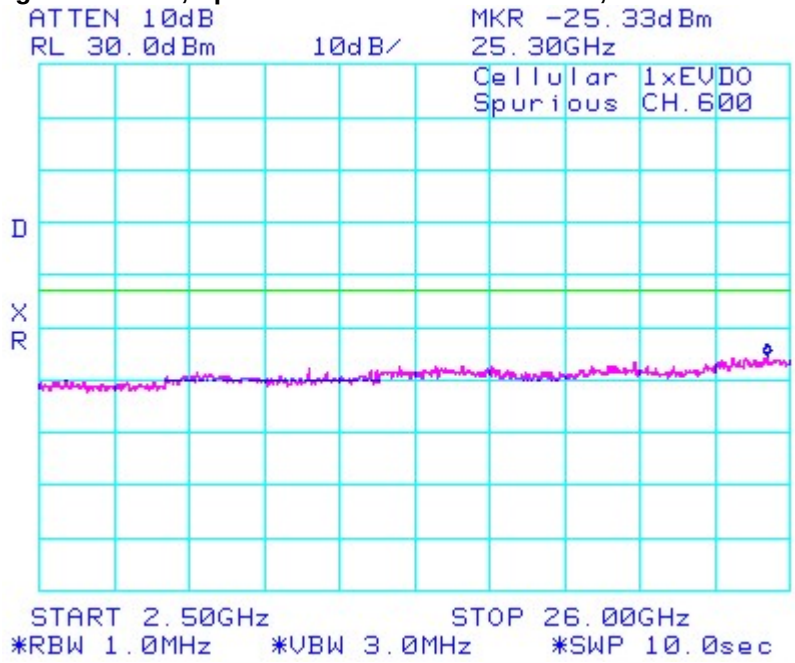


Figure 32: PCS, Spurious Conducted Emissions, Middle Channel



Conducted Emission Test Results cont'd

Figure 33: PCS, Spurious Conducted Emissions, High Channel

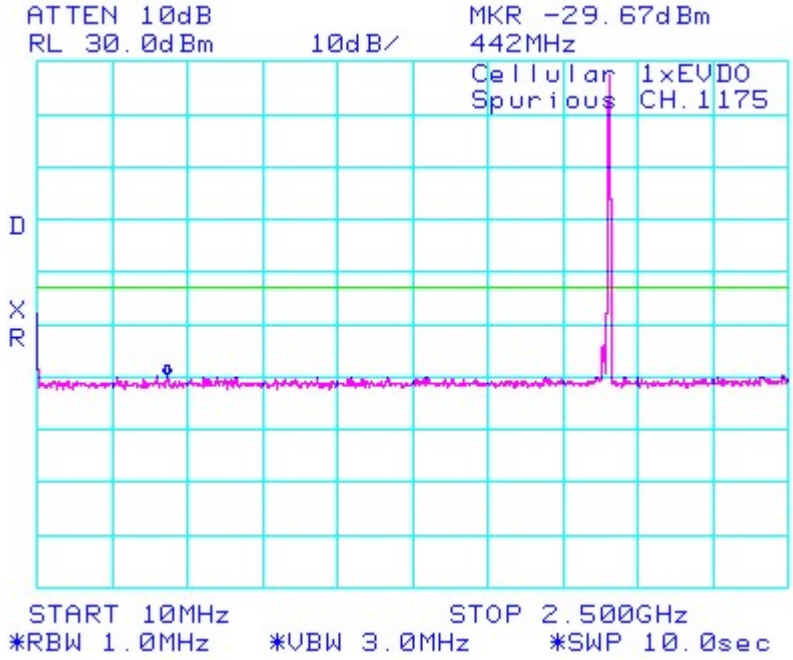
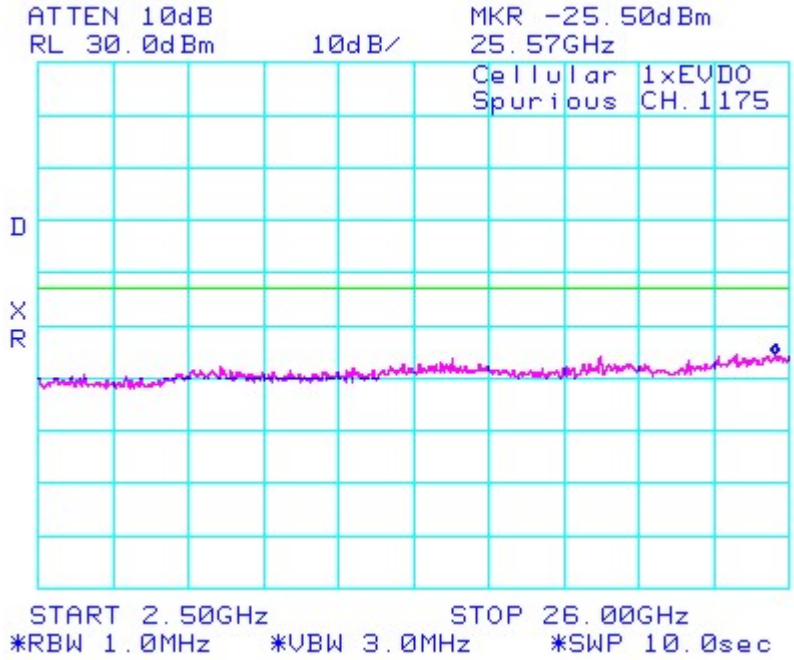


Figure 34: PCS, Spurious Conducted Emissions, High Channel



Conducted Emission Test Results cont'd

Figure 35: Occupied Bandwidth, Cellular Low Channel

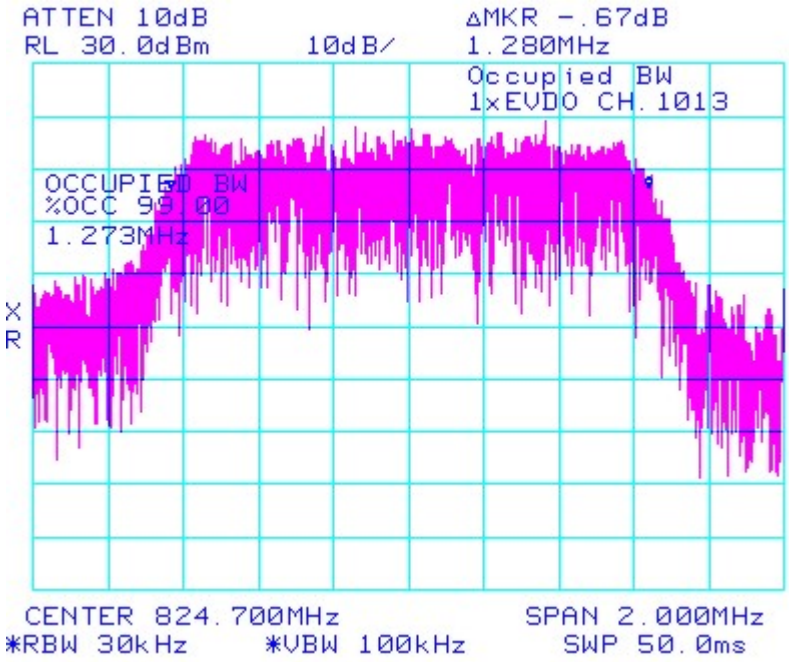
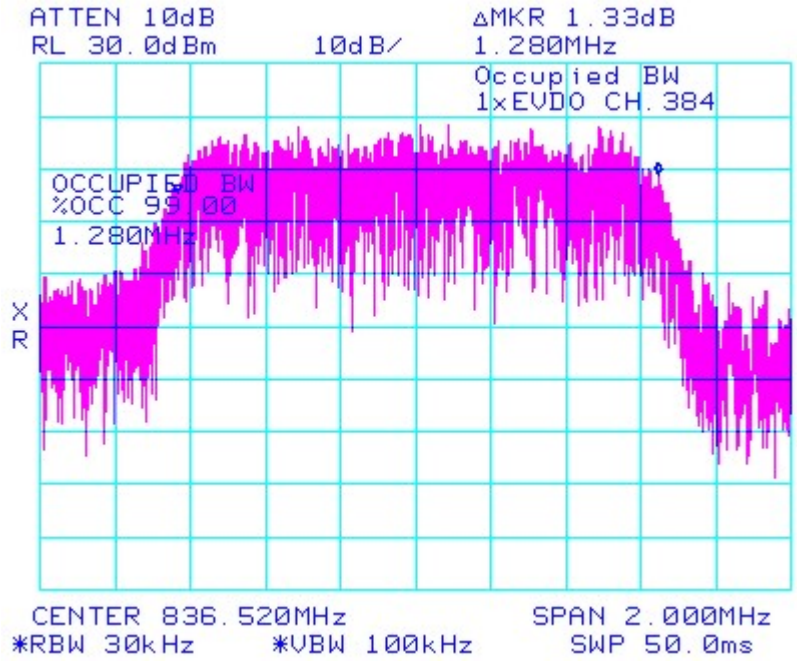


Figure 36: Occupied Bandwidth, Cellular Middle Channel



Conducted Emission Test Results cont'd

Figure 37: Occupied Bandwidth, Cellular High Channel

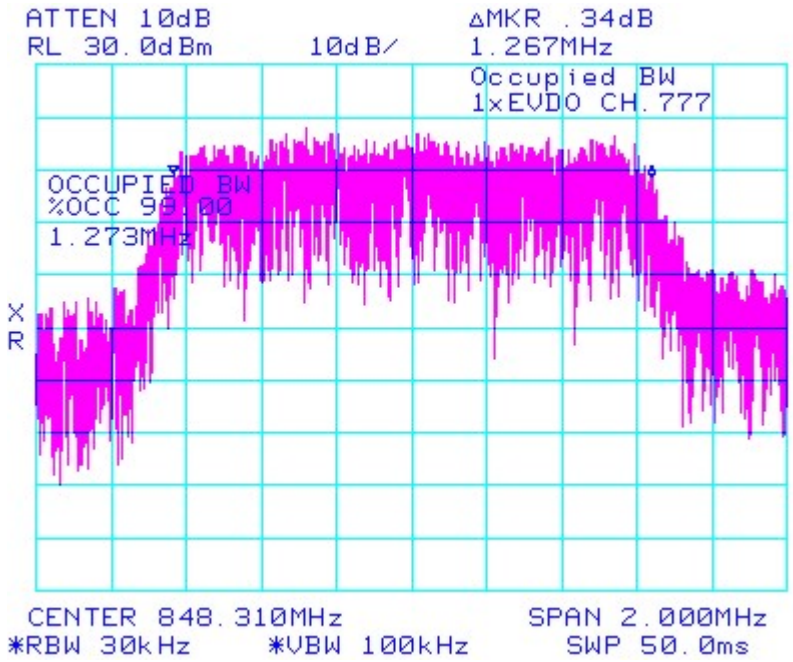
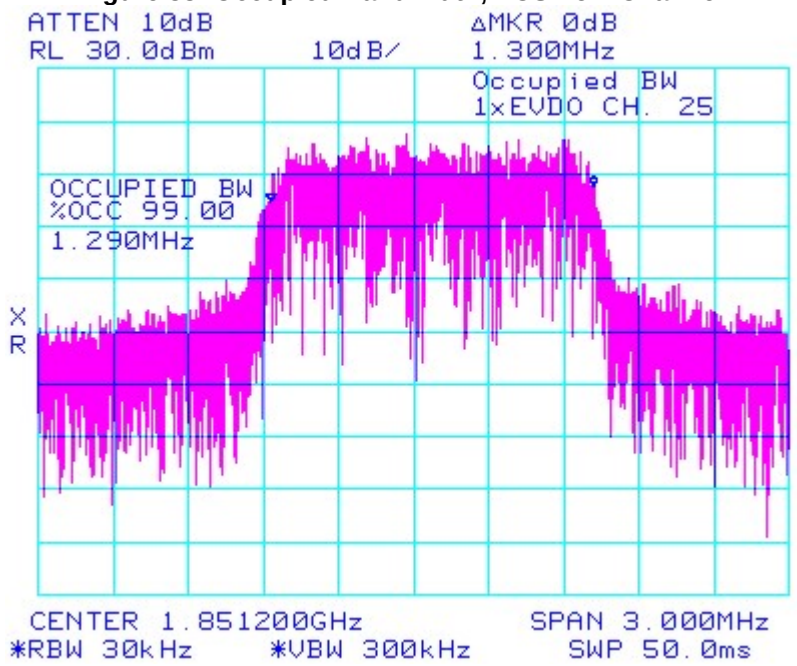


Figure 38: Occupied Bandwidth, PCS Low Channel



Conducted Emission Test Results cont'd

Figure 39: Occupied Bandwidth, PCS Middle Channel

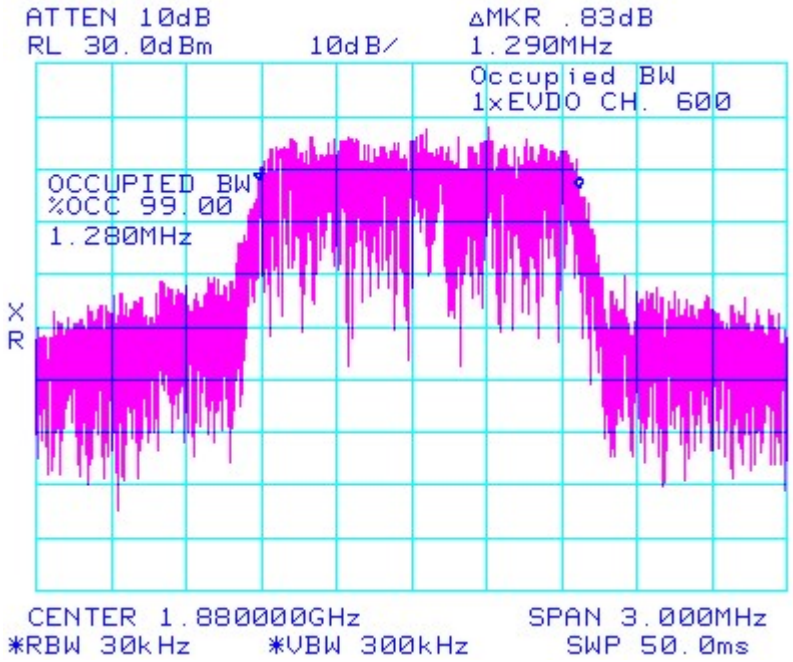
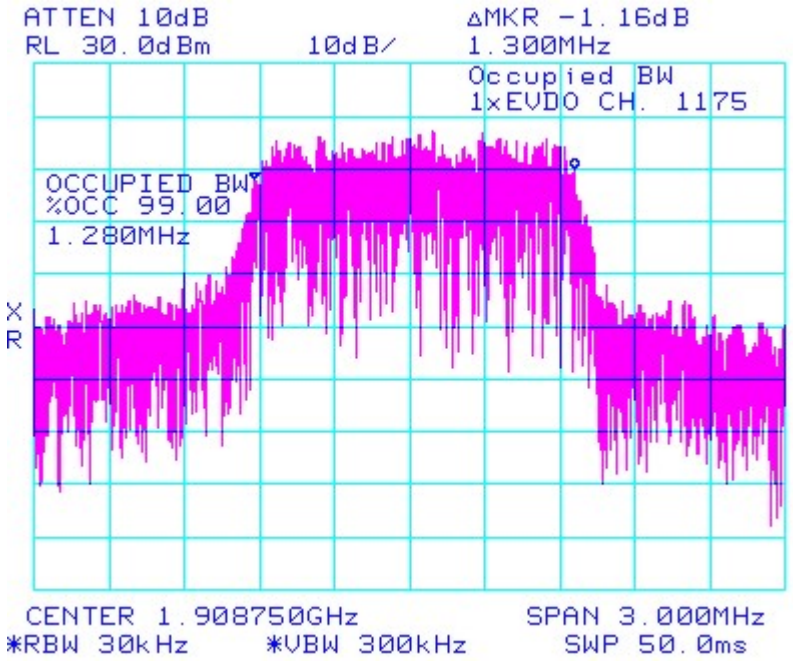


Figure 40: Occupied Bandwidth, PCS High Channel



Conducted Emission Test Results cont'd

Figure 41a: Cellular 1xEVDO, Low Channel Mask

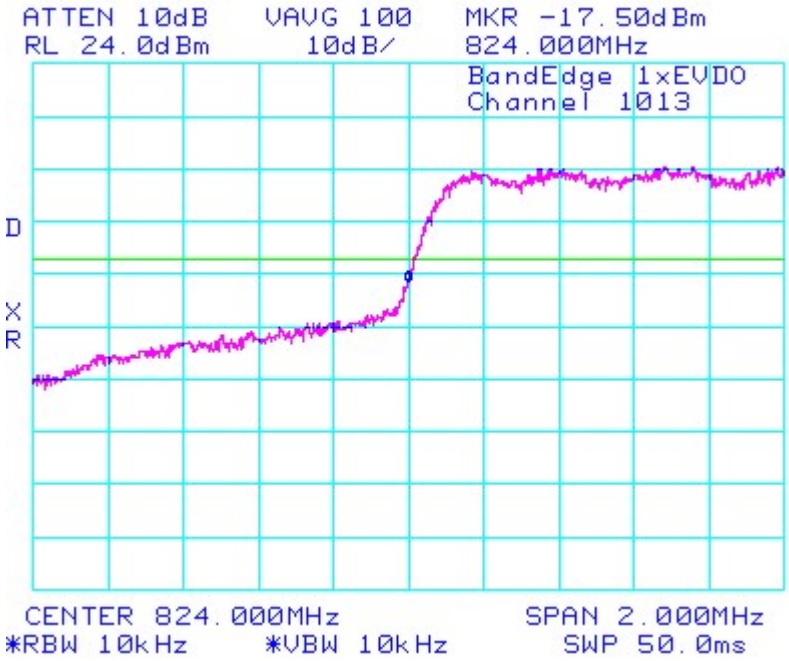
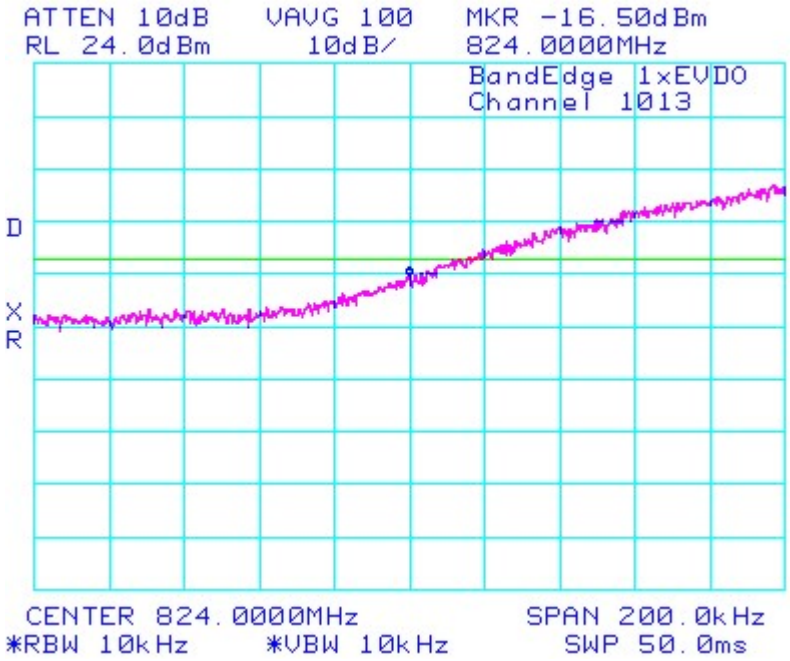


Figure 41b: Cellular 1xEVDO, Low Channel Mask



Conducted Emission Test Results cont'd

Figure 42a: Cellular 1xEVDO, High Channel Mask

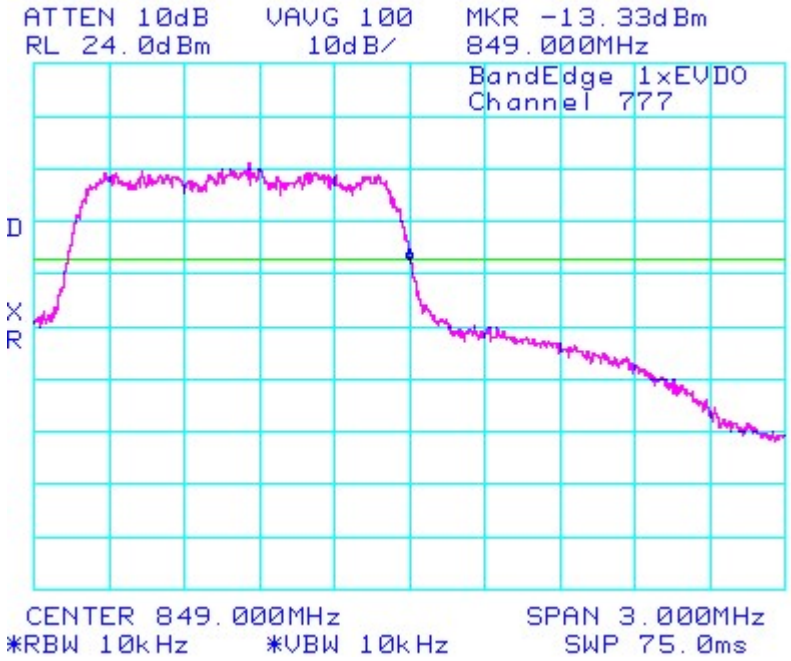
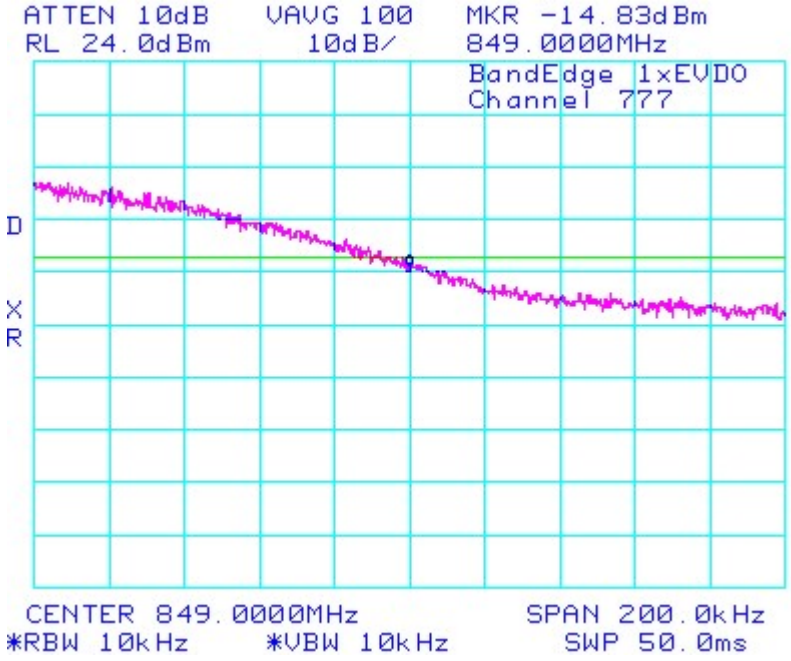


Figure 42b: Cellular 1xEVDO, Low Channel Mask



Conducted Emission Test Results cont'd

Figure 43: PCS, Low Channel Mask

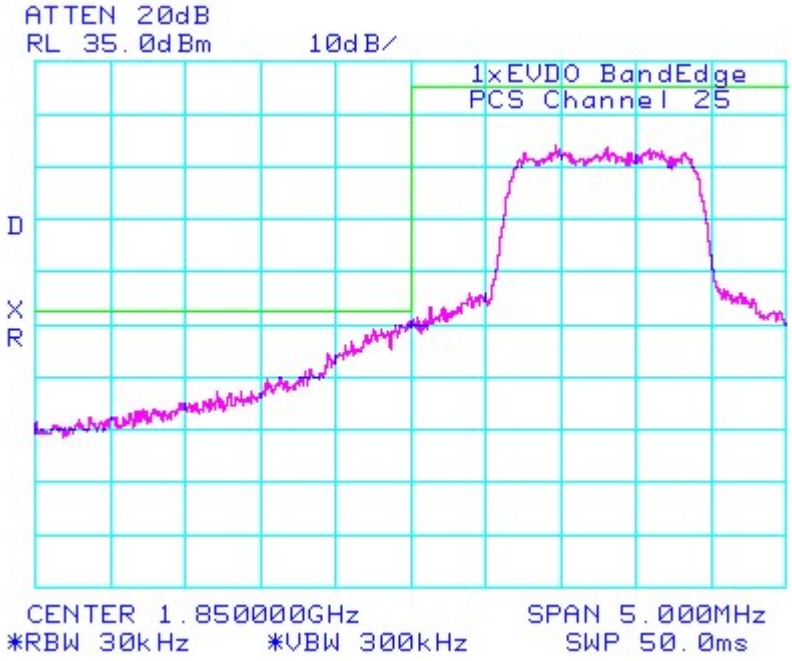
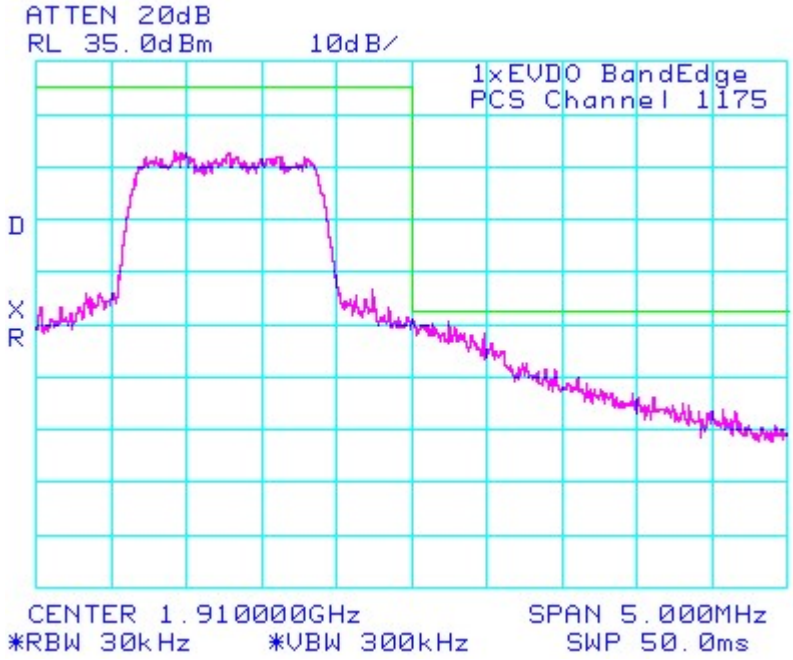


Figure 44: PCS, High Channel Mask



APPENDIX 2 – CONDUCTED RF OUTPUT POWER TEST DATA

Conducted RF Output Power Test Data

The measurements were performed by Maurice Battler.

The conducted RF output power was measured using the CDMA base station simulator. Low, middle and high channels were measured at maximum radio output power at different service options and modes.
Peak nominal output power is 24.50 dBm ±0.5 dB for Cellular and 23.50 dBm ±0.5 dB for PCS.

Date of Test: January 02, 2008

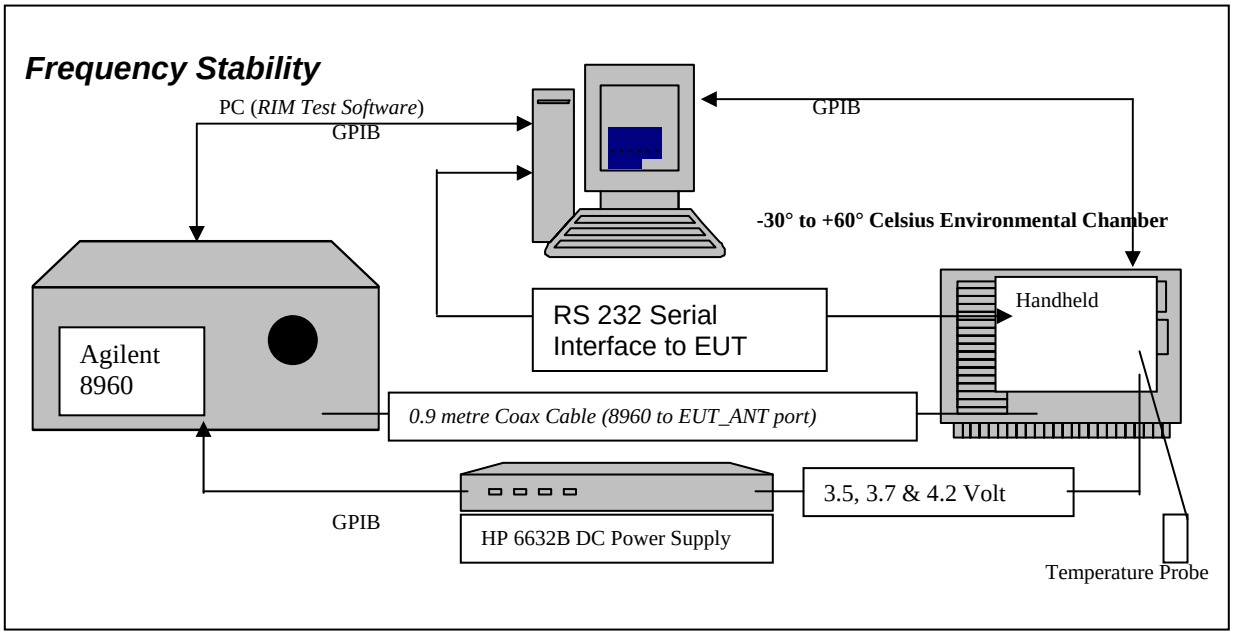
Test Results

Band	Channel	1x EvDO (153.6kbps)		CDMA2000 RC	SO2 Loopback		SO55 Loopback		TDSO SO32	
		(dBm)	(Watts)		(dBm)	(Watts)	(dBm)	(Watts)	(dBm)	(Watts)
CDMA 800	1013	24.1	0.257	RC1	23.90	0.245	23.97	0.249	-	-
				RC3	23.99	0.251	23.99	0.251	24.02	0.252
	384	24.1	0.257	RC1	23.93	0.247	23.94	0.248	-	-
				RC3	23.97	0.249	23.95	0.248	23.94	0.248
	777	24.0	0.251	RC1	24.11	0.258	24.10	0.257	-	-
				RC3	24.15	0.260	24.15	0.260	24.16	0.261

Band	Channel	1x EvDO (153.6kbps)		CDMA2000 RC	SO2 Loopback		SO55 Loopback		TDSO SO32	
		(dBm)	(Watts)		(dBm)	(Watts)	(dBm)	(Watts)	(dBm)	(Watts)
CDMA 1900	25	23.3	0.214	RC1	23.71	0.235	23.75	0.237	-	-
				RC3	23.80	0.240	23.78	0.239	23.71	0.235
	600	23.2	0.209	RC1	23.77	0.238	23.80	0.240	-	-
				RC3	23.81	0.240	23.89	0.245	23.82	0.241
	1175	23.4	0.219	RC1	23.79	0.239	23.84	0.242	-	-
				RC3	23.84	0.242	23.90	0.245	23.84	0.242

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 RBU21CW BlackBerry® smartphone, (referred as EUT herein and after) transmitted frequencies are less than 0.1 ppm of the received frequency from the Agilent 8960 CDMA Base Station Simulator

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 baste station simulator and the EUT antenna port; located inside the environmental chamber.

Calibration for the Cable Loss was performed in the RF Laboratory using the Giga-tronics power metre 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)
1851.20	1.10
1880.00	1.10
1908.75	1.10

Cellular Frequency (MHz)	Cable loss (dB)
824.70	0.50
836.52	0.50
848.31	0.50

Procedure:

The EUT was placed in the Temperature chamber and connected to the Agilent 8960 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 base station simulator via the GPIB Bus. The Environmental Chamber was instructed through an RS-232 serial line. The EUT dialogue was passed through a serial connection.

The EUT repetitively transmitted 100 bursts for each set of programmed parameters recording temperature, voltage settings, and systematically selected frequencies. The power supply was cycled from minimum voltage 3.6 volts, to 3.7 volts nominal voltage to 4.2 volts maximum voltage. The frequency error was measured at a maximum output power and recorded by the automated system test software.

The EUT output power and frequency was measured at 3.6 volts, 3.7 volts and 4.2 volts. The transmit frequency was varied in 3 steps consisting of 824.70, 836.52, and 848.31 MHz for the cellular band and 1851.20, 1880.00 and 1908.75 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; AGILENT 8960, 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 base station simulator.
6. Command the base station simulator to switch to the low channel.
7. Enable the voltage to the EUT, and connect a link to the base station simulator.
8. EUT is commanded to Transmit 100 Bursts.
9. Software logs the following data from the base station simulator, power supply and temperature chamber: Traffic Channel Number, Traffic Channel Frequency, Power Level, Chamber Temperature, Supply Voltage, Power, Frequency Error.
10. The base station simulator commands the EUT to change frequency to the middle channel and high channel and repeats steps 7 to 9.
11. Repeat steps 5 to 10 changing the supply voltage to 3.7 Volts
12. Increase temperature by 10°C and soak for 1/2 hour.
13. Repeat steps 4 - 12 for temperatures –30°C to 60°C.
14. Repeat steps 5 to 10 changing the supply voltage to 4.2 volts

Procedure 5 to 10 was repeated at room temperature (20°C) with the power supply voltage set to 3.6, 3.7 and 4.2 volts.

The maximum frequency error in the Cellular band measured was **-0.0043 PPM.**
The maximum frequency error in the PCS band measured was **0.0044 PPM**.

Date of test, December 21, 2007.

The measurements were performed by Maurice Battler.

Cellular Channel results: channels 1013, 384 and 777 @ 20°C maximum transmitted power

Traffic Channel Number	Cellular Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	*PPM*
1013	824.700	3.6	20	-0.12	-0.0002
384	836.520	3.6	20	1.65	0.0020
777	848.310	3.6	20	1.93	0.0023

Traffic Channel Number	Cellular Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
1013	824.700	3.7	20	1.49	0.0018
384	836.520	3.7	20	1.65	0.0020
777	848.310	3.7	20	1.31	0.0015

Traffic Channel Number	Cellular Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
1013	824.700	4.2	20	0.31	0.0004
384	836.520	4.2	20	0.27	0.0003
777	848.310	4.2	20	0.11	0.0001

Cellular Results: channel 1013 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
1013	824.700	3.6	-30	-0.92	-0.0011
1013	824.700	3.6	-20	-1.49	-0.0018
1013	824.700	3.6	-10	-0.28	-0.0003
1013	824.700	3.6	0	0.06	0.0001
1013	824.700	3.6	10	0.24	0.0003
1013	824.700	3.6	20	-0.12	-0.0002
1013	824.700	3.6	30	-1.45	-0.0018
1013	824.700	3.6	40	-1.67	-0.0020
1013	824.700	3.6	50	-2.32	-0.0028
1013	824.700	3.6	60	-1.50	-0.0018

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
1013	824.700	3.7	-30	-1.65	-0.0020
1013	824.700	3.7	-20	-0.36	-0.0004
1013	824.700	3.7	-10	0.84	0.0010
1013	824.700	3.7	0	1.27	0.0015
1013	824.700	3.7	10	2.64	0.0032
1013	824.700	3.7	20	1.49	0.0018
1013	824.700	3.7	30	-0.08	-0.0001
1013	824.700	3.7	40	-0.77	-0.0009
1013	824.700	3.7	50	-0.90	-0.0011
1013	824.700	3.7	60	-0.03	0.0000

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
1013	824.700	4.2	-30	-0.03	0.0000
1013	824.700	4.2	-20	0.71	0.0009
1013	824.700	4.2	-10	0.52	0.0006
1013	824.700	4.2	0	1.13	0.0014
1013	824.700	4.2	10	0.62	0.0008
1013	824.700	4.2	20	0.31	0.0004
1013	824.700	4.2	30	-0.27	-0.0003
1013	824.700	4.2	40	-0.38	-0.0005
1013	824.700	4.2	50	-0.37	-0.0005
1013	824.700	4.2	60	0.83	0.0010

Cellular Results: channel 384 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
384	836.520	3.6	-30	-1.44	-0.0017
384	836.520	3.6	-20	-0.32	-0.0004
384	836.520	3.6	-10	1.29	0.0015
384	836.520	3.6	0	2.25	0.0027
384	836.520	3.6	10	3.61	**0.0043**
384	836.520	3.6	20	1.65	0.0020
384	836.520	3.6	30	0.77	0.0009
384	836.520	3.6	40	-0.46	-0.0005
384	836.520	3.6	50	-0.61	-0.0007
384	836.520	3.6	60	0.92	0.0011

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
384	836.520	3.7	-30	-1.07	-0.0013
384	836.520	3.7	-20	0.50	0.0006
384	836.520	3.7	-10	0.69	0.0008
384	836.520	3.7	0	1.61	0.0019
384	836.520	3.7	10	2.15	0.0026
384	836.520	3.7	20	1.65	0.0020
384	836.520	3.7	30	0.52	0.0006
384	836.520	3.7	40	-0.78	-0.0009
384	836.520	3.7	50	-0.77	-0.0009
384	836.520	3.7	60	0.29	0.0003

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
384	836.520	4.2	-30	0.22	0.0003
384	836.520	4.2	-20	0.35	0.0004
384	836.520	4.2	-10	-0.28	-0.0003
384	836.520	4.2	0	0.12	0.0001
384	836.520	4.2	10	0.73	0.0009
384	836.520	4.2	20	0.27	0.0003
384	836.520	4.2	30	0.08	0.0001
384	836.520	4.2	40	0.20	0.0002
384	836.520	4.2	50	0.19	0.0002
384	836.520	4.2	60	0.88	0.0011

Cellular Results: channel 777 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
777	848.310	3.6	-30	-1.80	-0.0021
777	848.310	3.6	-20	0.14	0.0002
777	848.310	3.6	-10	0.69	0.0008
777	848.310	3.6	0	1.68	0.0020
777	848.310	3.6	10	3.16	0.0037
777	848.310	3.6	20	1.93	0.0023
777	848.310	3.6	30	-0.21	-0.0002
777	848.310	3.6	40	-1.18	-0.0014
777	848.310	3.6	50	-0.78	-0.0009
777	848.310	3.6	60	0.46	0.0005

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
777	848.310	3.7	-30	-1.11	-0.0013
777	848.310	3.7	-20	0.04	0.0000
777	848.310	3.7	-10	0.63	0.0007
777	848.310	3.7	0	1.14	0.0013
777	848.310	3.7	10	2.05	0.0024
777	848.310	3.7	20	1.31	0.0015
777	848.310	3.7	30	0.19	0.0002
777	848.310	3.7	40	-0.23	-0.0003
777	848.310	3.7	50	-0.38	-0.0004
777	848.310	3.7	60	0.60	0.0007

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
777	848.310	4.2	-30	-0.26	-0.0003
777	848.310	4.2	-20	0.41	0.0005
777	848.310	4.2	-10	-0.12	-0.0001
777	848.310	4.2	0	0.40	0.0005
777	848.310	4.2	10	0.76	0.0009
777	848.310	4.2	20	0.11	0.0001
777	848.310	4.2	30	-0.68	-0.0008
777	848.310	4.2	40	-0.23	-0.0003
777	848.310	4.2	50	-0.11	-0.0001
777	848.310	4.2	60	0.13	0.0002

PCS Channel results: channels 25, 600, & 1175 @ 20°C maximum transmitted power

Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
25	1851.20	3.6	20	-2.5	-0.0014
600	1880.00	3.6	20	3.5	0.0018
1175	1908.75	3.6	20	5.0	0.0026

Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
25	1851.20	3.7	20	3.5	0.0019
600	1880.00	3.7	20	2.5	0.0013
1175	1908.75	3.7	20	3.6	0.0019

Traffic Channel Number	PCS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
25	1851.20	4.2	20	-1.0	-0.0006
600	1880.00	4.2	20	0.9	0.0005
1175	1908.75	4.2	20	-1.1	-0.0006

PCS Results: channel 25 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
25	1851.20	3.6	-30	-6.7	-0.0036
25	1851.20	3.6	-20	-5.6	-0.0030
25	1851.20	3.6	-10	-2.6	-0.0014
25	1851.20	3.6	0	-1.7	-0.0009
25	1851.20	3.6	10	-1.0	-0.0005
25	1851.20	3.6	20	-2.5	-0.0014
25	1851.20	3.6	30	-4.4	-0.0024
25	1851.20	3.6	40	-6.7	-0.0036
25	1851.20	3.6	50	-5.9	-0.0032
25	1851.20	3.6	60	-3.4	-0.0018

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
25	1851.20	3.7	-30	-5.2	-0.0028
25	1851.20	3.7	-20	2.0	0.0011
25	1851.20	3.7	-10	3.1	0.0017
25	1851.20	3.7	0	3.6	0.0019
25	1851.20	3.7	10	7.0	0.0038
25	1851.20	3.7	20	3.5	0.0019
25	1851.20	3.7	30	0.4	0.0002
25	1851.20	3.7	40	-1.7	-0.0009
25	1851.20	3.7	50	-1.2	-0.0007
25	1851.20	3.7	60	2.3	0.0012

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
25	1851.20	4.2	-30	0.5	0.0002
25	1851.20	4.2	-20	0.7	0.0004
25	1851.20	4.2	-10	-0.7	-0.0004
25	1851.20	4.2	0	1.8	0.0010
25	1851.20	4.2	10	0.4	0.0002
25	1851.20	4.2	20	-1.0	-0.0006
25	1851.20	4.2	30	1.2	0.0006
25	1851.20	4.2	40	1.2	0.0006
25	1851.20	4.2	50	0.5	0.0003
25	1851.20	4.2	60	2.8	0.0015

PCS Results: channel 600 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
600	1880.00	3.6	-30	-5.6	-0.0030
600	1880.00	3.6	-20	-1.1	-0.0006
600	1880.00	3.6	-10	2.4	0.0013
600	1880.00	3.6	0	4.2	0.0022
600	1880.00	3.6	10	7.9	0.0042
600	1880.00	3.6	20	3.5	0.0018
600	1880.00	3.6	30	0.5	0.0003
600	1880.00	3.6	40	-1.2	-0.0006
600	1880.00	3.6	50	-2.6	-0.0014
600	1880.00	3.6	60	0.3	0.0002

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
600	1880.00	3.7	-30	-3.3	-0.0018
600	1880.00	3.7	-20	0.2	0.0001
600	1880.00	3.7	-10	1.8	0.0010
600	1880.00	3.7	0	2.9	0.0015
600	1880.00	3.7	10	4.9	0.0026
600	1880.00	3.7	20	2.5	0.0013
600	1880.00	3.7	30	-0.8	-0.0004
600	1880.00	3.7	40	-2.2	-0.0012
600	1880.00	3.7	50	-0.2	-0.0001
600	1880.00	3.7	60	2.6	0.0014

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
600	1880.00	4.2	-30	-1.6	-0.0008
600	1880.00	4.2	-20	-1.2	-0.0006
600	1880.00	4.2	-10	0.0	0.0000
600	1880.00	4.2	0	0.7	0.0004
600	1880.00	4.2	10	-0.4	-0.0002
600	1880.00	4.2	20	0.9	0.0005
600	1880.00	4.2	30	-0.9	-0.0005
600	1880.00	4.2	40	-3.0	-0.0016
600	1880.00	4.2	50	-0.5	-0.0002
600	1880.00	4.2	60	0.7	0.0004

PCS Results: channel 1175 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
1175	1908.75	3.6	-30	-5.0	-0.0026
1175	1908.75	3.6	-20	-0.4	-0.0002
1175	1908.75	3.6	-10	3.5	0.0018
1175	1908.75	3.6	0	5.3	0.0028
1175	1908.75	3.6	10	8.3	**0.0044**
1175	1908.75	3.6	20	5.0	0.0026
1175	1908.75	3.6	30	0.5	0.0002
1175	1908.75	3.6	40	-3.7	-0.0019
1175	1908.75	3.6	50	-2.3	-0.0012
1175	1908.75	3.6	60	3.1	0.0016

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
1175	1908.75	3.7	-30	-5.2	-0.0027
1175	1908.75	3.7	-20	1.1	0.0006
1175	1908.75	3.7	-10	0.5	0.0003
1175	1908.75	3.7	0	0.8	0.0004
1175	1908.75	3.7	10	6.0	0.0031
1175	1908.75	3.7	20	3.6	0.0019
1175	1908.75	3.7	30	-0.7	-0.0003
1175	1908.75	3.7	40	-1.2	-0.0006
1175	1908.75	3.7	50	-1.7	-0.0009
1175	1908.75	3.7	60	0.8	0.0004

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
1175	1908.75	4.2	-30	-1.2	-0.0006
1175	1908.75	4.2	-20	0.4	0.0002
1175	1908.75	4.2	-10	0.7	0.0004
1175	1908.75	4.2	0	1.5	0.0008
1175	1908.75	4.2	10	3.1	0.0016
1175	1908.75	4.2	20	-1.1	-0.0006
1175	1908.75	4.2	30	-1.1	-0.0006
1175	1908.75	4.2	40	-3.5	-0.0018
1175	1908.75	4.2	50	1.4	0.0007
1175	1908.75	4.2	60	-1.9	-0.0010

APPENDIX 4 - RADIATED EMISSIONS TEST DATA

Radiated Emissions Test Data Results

Cellular Band Loopback Service

The measurements were performed by Vimal Olaganathan and Anas Hawari.

The environmental test conditions were: Temperature 22ºC
Pressure 1005mb
Relative Humidity 24%

Dates of test: January 31, 2008

Test distance was 3.0 metres. BlackBerry® smartphone sample 7

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)	(Watts)	Limit (dBm)	Diff to Limit (dBm)
Cellular Band (ERP), CDMA2000, (RC3, SO55), CH 1013, CH 384, CH 777 BlackBerry® smartphone Standalone, USB up													
F0	1013	824.70	800	Dipole	V	69.42	80.41	V V	5.51	**23.36**	0.217	39.00	-15.6
F0	1013	824.70	800	Dipole	H	80.41		H H	6.36				
F0	384	836.52	800	Dipole	V	69.37	79.88	V V	7.10	22.78	0.190	39.00	-16.2
F0	384	836.52	800	Dipole	H	79.88		H H	5.14				
F0	777	848.32	800	Dipole	V	69.94	80.17	V V	6.39	21.88	0.154	39.00	-17.1
F0	777	848.32	800	Dipole	H	80.17		H H	5.45				

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

Radiated Emissions Test Data Results cont'd

Cellular Band Loopback Service

The environmental test conditions were: Temperature 24ºC
Pressure 1005 mb
Relative Humidity 22%

Date of Test: January 17, 2008

Test Distance was 3.0 metres with a EUT height of 1.0 metres, sweep frequency of 30 MHz to 1.0 GHz.
The BlackBerry® smartphone Sample 7 was in standalone, vertical position.

The frequency sweep spurious measurements were performed in CDMA2000 (RC3, SO55) mode, channel 384.

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

All emissions were in the NF.

Radiated Emissions Test Data Results cont'd

Cellular Band Loopback Service

The environmental test conditions were: Temperature 24 ºC
Pressure 1005 mb
Relative Humidity 22 %

Date of test: January 30, 2008
The harmonic measurements were performed in CDMA2000 (RC 3, Loopback SO 55) 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 (dBm)
Cellular Band (Harmonics) CDMA2000, (RC3, Loopback, SO55), CH 1013, CH 384, CH 777 BlackBerry® smartphone Standalone, USB down **Low Channel –** 824.70 MHz												
2nd	1013	1649.40	800	Horn	V	47.20	48.44	V-V	-15.67	-51.52	-13	-38.5
2nd	1013	1649.40	800	Horn	H	48.44		H-H	-14.84			
3rd	1013	2474.10	800	Horn	V	53.25	53.25	V-V	0.73	-36.96	-13	-24.0
3rd	1013	2474.10	800	Horn	H	46.02		H-H	-0.1			
4th	1013	3298.80	800	Horn	V	46.99	46.99	V-V	-4.06	-40.36	-13	-27.4
4th	1013	3298.80	800	Horn	H	46.06		H-H	-4.51			
The emissions were investigated up to the 10th harmonic. Emissions above the 4th harmonic were in the NF. **Middle Channel** – 836.52 MHz												
2nd	384	1673.04	800	Horn	V	48.38	49.16	V-V	-15.20	-51.19	-13	-38.2
2nd	384	1673.04	800	Horn	H	49.16		H-H	-14.36			
3rd	384	2509.56	800	Horn	V	51.39	51.39	V-V	-0.57	-38.10	-13	-25.1
3rd	384	2509.56	800	Horn	H	45.37		H-H	-1.03			
4th	384	3346.08	800	Horn	V	46.18	46.18	V-V	-4.90	-41.09	-13	-28.1
4th	384	3346.08	800	Horn	H	45.51		H-H	-5.27			
The emissions were investigated up to the 10th harmonic. Emissions above the 4th harmonic were in the NF.												

Radiated Emissions Test Data Results cont'd

Cellular Band Loopback Service

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 (dBm)
High Channel – 848.32 MHz												
2nd	777	1696.64	800	Horn	V	49.20	50.72	V-V	-13.26	-48.84	-13	-35.8
2nd	777	1696.64	800	Horn	H	50.72		H-H	-11.82			
3rd	777	2544.96	800	Horn	V	49.75	49.75	V-V	-2.17	-39.65	-13	-26.7
3rd	777	2544.96	800	Horn	H	44.70		H-H	-2.66			
4th	777	3393.28	800	Horn	V	45.58	45.58	V-V	-5.13	-41.45	-13	-28.5
4th	777	3393.28	800	Horn	H	44.98		H-H	-6.09			
The emissions were investigated up to the 10th harmonic. Emissions above the 4th harmonic were in the NF.												

Cellular Band Test Data Service

Date of Test: January 17, 2008

Test Distance was 3.0 metres with a EUT height of 1.0 metres, sweep frequency of 30 MHz to 1.0 GHz.
The BlackBerry® smartphone Sample 7 was in standalone, vertical position.

The frequency sweep spurious measurements were performed in CDMA2000 (RC3; TDS S0 32) mode, channel 384.

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

All emissions were in the NF.

Radiated Emissions Test Data Results cont'd

Cellular Band Test Data Service

The environmental test conditions were: Temperature 24ºC
Pressure 1005mb
Relative Humidity 22%

Date of test: January 30, 2008
The harmonic measurements were performed in CDMA 2000 (RC 3, TDS SO 32) mode. The BlackBerry® smartphone Sample 7 was in standalone, USB down position.

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to dipole)	Limit (dBm)	Diff to Limit (dBm)
Cellular Band (Harmonics) CDMA2000, (RC3, TDSO SO32), CH 1013, CH 384, CH 777 BlackBerry® smartphone Standalone, USB down **Low Channel –** 824.70 MHz												
2nd	1013	1649.40	800	Horn	V	47.64	47.64	V-V	-17.03	-52.55	-13	-39.6
2nd	1013	1649.40	800	Horn	H	47.02		H-H	-15.87			
3rd	1013	2474.10	800	Horn	V	53.26	53.26	V-V	0.74	-36.95	-13	-24.0
3rd	1013	2474.10	800	Horn	H	46.23		H-H	-0.09			
4th	1013	3298.80	800	Horn	V	45.96	46.23	V-V	-5.48	-41.49	-13	-28.5
4th	1013	3298.80	800	Horn	H	46.23		H-H	-5.19			
The emissions were investigated up to the 10th harmonic. Emissions above the 4th harmonic were in the NF.												
Middle Channel – 836.52 MHz												
2nd	384	1673.04	800	Horn	V	49.26	49.26	V-V	-15.1	-51.09	-13	-38.1
2nd	384	1673.04	800	Horn	H	48.65		H-H	-14.26			
3rd	384	2509.56	800	Horn	V	51.72	51.72	V-V	0.05	-37.48	-13	-24.5
3rd	384	2509.56	800	Horn	H	45.69		H-H	-0.85			
4th	384	3346.08	800	Horn	V	46.15	46.15	V-V	-4.96	-41.15	-13	-28.2
4th	384	3346.08	800	Horn	H	45.65		H-H	-5.30			
The emissions were investigated up to the 10th harmonic. Emissions above the 4th harmonic were in the NF.												

Radiated Emissions Test Data Results cont'd

Cellular Band Loopback Service

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 (dBm)
High Channel – 848.32 MHz												
2nd	777	1696.64	800	Horn	V	48.65	49.69	V-V	-14.68	-50.25	-13	-37.3
2nd	777	1696.64	800	Horn	H	49.69		H-H	-13.23			
3rd	777	2544.96	800	Horn	V	49.63	49.63	V-V	-2.47	-39.95	-13	-27.0
3rd	777	2544.96	800	Horn	H	44.66		H-H	-2.94			
4th	777	3393.28	800	Horn	V	45.82	45.82	V-V	-4.90	-41.22	-13	-28.2
4th	777	3393.28	800	Horn	H	45.58		H-H	-5.94			
The emissions were investigated up to the 10th harmonic. Emissions above the 4th harmonic were in the NF.												

Cellular Band EVDO

Date of Test: January 17, 2008

Test Distance was 3.0 metres with a EUT height of 1.0 metres, sweep frequency of 30 MHz to 1.0 GHz.
The BlackBerry® smartphone Sample 7 was in standalone, vertical position.

The frequency sweep spurious measurements were performed in 1xEVDO mode, channel 384.

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

All emissions were in the NF.

Radiated Emissions Test Data Results cont'd

Cellular Band EVDO

The environmental test conditions were: Temperature 24ºC
Pressure 1005mb
Relative Humidity 22%

Date of test: January 30, 2008

The harmonic measurements were performed in 1xEVDO (153.6 Kbps) mode. The BlackBerry® smartphone Sample 7 was in standalone, USB down position.

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to dipole)	Limit (dBm)	Diff to Limit (dBm)
Cellular Band (Harmonics) 1xEVDO, CH 1013, CH 384, CH 777 BlackBerry® smartphone Standalone, USB down **Low Channel –** 824.70 MHz												
2nd	1013	1649.40	800	Horn	V	47.63	47.63	V-V	-17.04	-52.56	-13	-39.6
2nd	1013	1649.40	800	Horn	H	47.12		H-H	-15.88			
3rd	1013	2474.10	800	Horn	V	53.51	53.51	V-V	0.92	-36.77	-13	**-23.8**
3rd	1013	2474.10	800	Horn	H	46.95		H-H	-0.03			
4th	1013	3298.80	800	Horn	V	45.90	45.90	V-V	-5.75	-41.89	-13	-28.9
4th	1013	3298.80	800	Horn	H	45.88		H-H	-5.59			
The emissions were investigated up to the 10th harmonic. Emissions above the 4th harmonic were in the NF.												
Middle Channel – 836.52 MHz												
2nd	384	1673.04	800	Horn	V	47.95	48.62	V-V	-15.98	-52.03	-13	-39.0
2nd	384	1673.04	800	Horn	H	48.62		H-H	-15.20			
3rd	384	2509.56	800	Horn	V	51.95	51.95	V-V	0.09	-37.44	-13	-24.4
3rd	384	2509.56	800	Horn	H	45.66		H-H	-0.52			
4th	384	3346.08	800	Horn	V	46.28	46.28	V-V	-4.85	-41.04	-13	-28.0
4th	384	3346.08	800	Horn	H	46.06		H-H	-5.22			
The emissions were investigated up to the 10th harmonic. Emissions above the 4th harmonic were in the NF.												

Radiated Emissions Test Data Results cont'd

Cellular Band EVDO

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 (dBm)
High Channel – 848.32 MHz												
2nd	777	1696.64	800	Horn	V	49.20	50.55	V-V	-13.79	-49.34	-13	-36.3
2nd	777	1696.64	800	Horn	H	50.55		H-H	-12.32			
3rd	777	2544.96	800	Horn	V	50.19	50.19	V-V	-1.94	-39.42	-13	-26.4
3rd	777	2544.96	800	Horn	H	45.26		H-H	-2.02			
4th	777	3393.28	800	Horn	V	46.05	46.05	V-V	-4.53	-40.85	-13	-27.9
4th	777	3393.28	800	Horn	H	45.76		H-H	-5.53			
The emissions were investigated up to the 10th harmonic. Emissions above the 4th harmonic were in the NF.												

Radiated Emissions Test Data Results cont'd

Cellular Band

The environmental test conditions were: Temperature 22ºC
Pressure 1005mb
Relative Humidity 24%

Date of test: January 30, 2008

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)	Limit (dBm)	Diff to Limit (dB)
Cellular BAND **RF Local Oscillator (LO)** BlackBerry® smartphone Standalone, vertical position **Low Channel**												
F0	1013	1739.40	800	Horn	V	NF	-	V-V	-	-	-	-
F0	1013	1739.40	800	Horn	H	NF		H-H	-			
Emissions were in the NF. **Middle Channel**												
F0	384	1763.04	800	Horn	V	NF	-	V-V	-	-	-	-
F0	384	1763.04	800	Horn	H	NF		H-H	-			
Emissions were in the NF. **High Channel**												
F0	777	1786.62	800	Horn	V	NF	-	V-V	-	-	-	-
F0	777	1786.62	800	Horn	H	NF		H-H	-			
Emissions were in the NF.												

All emissions were in the NF.

Radiated Emissions Test Data Results

PCS Band Loopback Service

The environmental test conditions were: Temperature 24ºC
Pressure 1005mb
Relative Humidity 21%

Date of test: January 31, 2008. BlackBerry® smartphone sample 7

								Substitution Method					
EUT				Receive Antenna		Spectrum Analyzer		Tracking Generator					
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) dBuV	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Isotropic Radiator) (dBm)	Corrected Reading (relative to Isotropic Radiator) (Watts)	Limit (dBm)	Diff to Limit (dBm)
PCS BAND (EIRP), CDMA2000, (RC3, SO55) - CH 25, CH 600, CH 1175 BlackBerry® smartphone, Standalone, USB down													
F0	25	1851.25	1900	Horn	V	86.10	86.10	V-V	-13.19	22.9	0.195	33	-10.1
F0	25	1851.25	1900	Horn	H	84.06		H-H	-12.18				
F0	600	1880.00	1900	Horn	V	85.59	85.59	V-V	-12.70	**23.7**	0.234	33	-9.4
F0	600	1880.00	1900	Horn	H	84.16		H-H	-11.28				
F0	1175	1908.75	1900	Horn	V	85.38	85.38	V-V	-12.52	23.2	0.209	33	-9.8
F0	1175	1908.75	1900	Horn	H	84.70		H-H	-11.19				

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

Radiated Emissions Test Data Results cont'd

PCS Band Loopback Service

The environmental test conditions were: Temperature 23ºC
Pressure 1005mb
Relative Humidity 23%

Date of Test: January 17, 2008

Test Distance was 3.0 metres with a EUT height of 1.0 metres, sweep frequency of 30 MHz to 1000 MHz.
The BlackBerry® smartphone Sample 6 was in standalone, vertical position.

The frequency sweep spurious measurements were performed in CDMA2000 (RC3, SO55) mode, channel 600.

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

All emissions were in the NF.

Radiated Emissions Test Data Results cont'd

PCS Band Loopback Service

The environmental test conditions were: Temperature 24ºC
Pressure 1005mb
Relative Humidity 22%

Date of test: January 30, 2008
The harmonic measurements were performed in CDMA2000 (RC3, Loopback, SO55) 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 (dBm)
PCS BAND (Harmonics) CDMA2000, (RC3, SO55) - CH 25, CH 600, CH 1175 BlackBerry® smartphone Standalone, Horizontal												
Low Channel 1851.25 MHz												
2nd	25	3702.50	1900	Horn	V	52.93	52.93	V-V	7.77	-28.37	-13	-15.4
2nd	25	3702.50	1900	Horn	H	48.73		H-H	7.43			
The emissions were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF.												
Middle Channel 1880.00 MHz												
2nd	600	3760.00	1900	Horn	V	54.43	54.43	V-V	10.58	-25.55	-13	-12.6
2nd	600	3760.00	1900	Horn	H	51.40		H-H	10.53			
3rd	600	5640.00	1900	Horn	V	NF	39.81	V-V	-1.73	-39.12	-13	-26.1
3rd	600	5640.00	1900	Horn	H	39.81		H-H	0.45			
The emissions were investigated up to the 10th harmonic. Emissions above the 3rd harmonic were in the NF.												
High Channel 1908.75 MHz												
2nd	1175	3817.50	1900	Horn	V	57.80	57.80	V-V	13.03	-23.11	-13	-10.1
2nd	1175	3817.50	1900	Horn	H	57.37		H-H	13.10			
3rd	1175	5726.25	1900	Horn	V	43.94	43.94	V-V	8.12	-30.05	-13	-17.1
	1175	5726.25	1900	Horn	H	43.83		H-H	9.55			
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

PCS Band Test Data Service

The environmental test conditions were: Temperature 23ºC
Pressure 1005mb
Relative Humidity 23%

Date of Test: January 17, 2008

Test Distance was 3.0 metres with a EUT height of 1.0 metres, sweep frequency of 30 MHz to 1000 MHz.
The BlackBerry® smartphone Sample 6 was in standalone, vertical position.

The frequency sweep spurious measurements were performed in CDMA2000 (TDS, RC3, SO32) mode, channel 600.

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

All emissions were in the NF.

Radiated Emissions Test Data Results cont'd

PCS Band Test Data Service

The environmental test conditions were: Temperature 24ºC
Pressure 1005mb
Relative Humidity 22%

Date of test: January 31, 2008
The harmonics measurements were performed in CDMA2000 (RC3, TDS, SO32)

								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 (dBm)
PCS BAND (Harmonics) CDMA2000, (RC3, TDSO SO32) - CH 25, CH 600, CH 1175 BlackBerry® smartphone Standalone, Horizontal **Low Channel** 1851.25 MHz												
2nd	25	3702.50	1900	Horn	V	51.77	51.77	V-V	6.36	-29.78	-13	-16.8
2nd	25	3702.50	1900	Horn	H	48.76		H-H	6.21			
The emissions were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF. **Middle Channel** 1880.00 MHz												
2nd	600	3760.00	1900	Horn	V	54.64	54.64	V-V	10.96	-25.17	-13	-12.2
2nd	600	3760.00	1900	Horn	H	50.49		H-H	10.49			
3ed	600	5640.00	1900	Horn	V	43.56	43.56	V-V	5.05	-32.86	-13	-19.9
3ed	600	5640.00	1900	Horn	H	43.36		H-H	6.71			
The emissions were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF **High Channel** 1908.75 MHz												
2nd	1175	3817.50	1900	Horn	V	59.59	59.59	V-V	14.89	-21.26	-13	**-8.3**
2nd	1175	3817.50	1900	Horn	H	55.23		H-H	14.95			
3ed	1175	5726.25	1900	Horn	V	43.89	44.11	V-V	8.47	-29.84	-13	-16.8
3ed	1175	5726.25	1900	Horn	H	44.11		H-H	9.76			
The emissions were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF												

Radiated Emissions Test Data Results cont'd

PCS Band EVDO

The environmental test conditions were: Temperature 24ºC
Pressure 1023mb
Relative Humidity 21%

Date of Test: January 21, 2008

Test Distance was 3.0 metres with a EUT height of 1.0 metres, sweep frequency of 30 MHz to 1000 MHz.
The BlackBerry® smartphone Sample 6 was in standalone, vertical position.

The frequency sweep spurious measurements were performed in 1xEVDO mode, channel 600.

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

All emissions were in the NF.

Radiated Emissions Test Data Results cont'd

PCS Band EVDO

The environmental test conditions were: Temperature 24ºC
Pressure 1005mb
Relative Humidity 22%

Date of test: January 31, 2008
The harmonic measurements were performed in 1xEVDO (153.6 Kbps) 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) 1xEVDO - CH 25, CH 600, CH 1175 BlackBerry® smartphone Standalone, Horizontal												
Low Channel 1851.25 MHz												
2nd	25	3702.50	1900	Horn	V	51.48	51.48	V-V	6.06	-30.08	-13	-17.1
2nd	25	3702.50	1900	Horn	H	48.00		H-H	5.83			
The emissions were investigated up to the 10th harmonic. All emissions were in the NF.												
Middle Channel 1880.00 MHz												
2nd	600	3760.00	1900	Horn	V	55.17	55.17	V-V	11.52	-24.61	-13	-11.6
2nd	600	3760.00	1900	Horn	H	51.51		H-H	10.97			
3ed	600	5640.00	1900	Horn	V	43.17	44.1	V-V	5.97	-31.89	-13	-18.9
3ed	600	5640.00	1900	Horn	H	44.10		H-H	7.68			
The emissions were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF.												
High Channel 1908.75 MHz												
2nd	1175	3817.50	1900	Horn	V	56.59	57.55	V-V	12.75	-23.31	-13	-10.3
2nd	1175	3817.50	1900	Horn	H	57.55		H-H	12.90			
3ed	1175	5726.25	1900	Horn	V	43.35	44.11	V-V	8.47	-29.84	-13	-16.8
3ed	1175	5726.25	1900	Horn	H	44.11		H-H	9.76			
The emissions were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF.												

Radiated Emissions Test Data Results cont'd

PCS Band

The environmental test conditions were: Temperature 24ºC
Pressure 1005mb
Relative Humidity 22%

Date of test: January 31, 2008

								Substitution Method				
EUT				Receive Antenna		Spectrum Analyzer		Tracking Generator				
Type	Ch	Frequency (MHz)	Band	Type	Pol.	Reading (dBuV)	Max (V,H) (dBuV)	Pol. Tx-Rx	Reading (dBm)	Corrected Reading (relative to Isotropic Radiator) (dBm)	Limit (dBm)	Diff to Limit (dB)
PCS Band – RF LO Transmit mode with the BlackBerry® smartphone in standalone Horizontal position.												
Low Channel												
F0	25	1716.67	1900	Horn	V	NF	-	V-V	-	-	-	-
F0	25	1716.67	1900	Horn	H	NF		H-H	-			
Emissions were in the NF.												
Middle Channel												
F0	600	1742.22	1900	Horn	V	NF	-	V-V	-	-	-	-
F0	600	1742.22	1900	Horn	H	NF		H-H	-			
Emissions were in the NF.												
High Channel												
F0	1175	1767.78	1900	Horn	V	NF	-	V-V	-	-	-	-
F0	1175	1767.78	1900	Horn	H	NF		H-H	-			
Emissions were in the NF.												