EMI Test Report

Tested in accordance with
Federal Communications Commission (FCC)
Personal Communications Services
CFR 47 Parts 2, 22, 24 and 27
&
Industry Canada (IC) RSS-132, 133 and 139

A division of Research In Motion Limited

REPORT NO: RTS-2068-1004-48

PRODUCT MODEL NO:	RCZ31CW
TYPE NAME:	BlackBerry® smartphone
FCC ID:	L6ARCZ30CW
IC:	2503A–RCZ30CW
EMISSION DESIGNATOR:	IM29F9W

DATE: 30 April 2010

Statement of Performance:

The BlackBerry® smartphone, model RCZ31CW, part number CER-27171-003 Rev 1 and accessories performs within the requirements of the test standards when configured and operated per RIM's instructions.

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:

Fahd Faisal
Regulatory Compliance Associate
Date: 20 May 2010

Reviewed by:

Michael Cino
Regulatory Compliance Associate
Date: 20 May 2010

Reviewed and Approved by:

Masud S. Attayi, P.Eng.
Manager, Regulatory Compliance
Date: 21 May 2010

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, October 2009
- FCC CFR 47 Part 22, Subpart H, Cellular Radiotelephone Services, October 2009
- FCC CFR 47 Part 24 Subpart E, Broadband PCS, October 2009
- FCC CFR 47 Part 27, Subpart L, 1710-1755 MHz, 2110-2155 MHz, 2160-2180 MHz BandsOctober 2009
- Industry Canada, RSS-132 Issue 2, September 2005, Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz.
- Industry Canada, RSS-133 Issue 5, February 2009, 2 GHz Personal Communications Services.
- Industry Canada, RSS-GEN Issue 2, June 2007, General Requirements and Information for the Certification of Radiocommunication Equipment.
- Industry Canada, RSS 139, Issue 2, February 2009, Advanced Wireless Services Equipment Operating in the Bands 1710-1755 MHz and 2110-2155 MHz

B) Associated Documents

1) Test Report RTS-2068-0909-25 (FCC ID: L6ARCL20CW; IC: 2503A-RCL20CW)
2) RCL21CW_RCZ31CW_HW_Difference_Document_FINAL

C) Product Identification

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

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

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

RIM Testing Services EMI test facilities

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

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

The testing was performed from March 12 to April 30, 2010

The sample EUT included:

SAMPLE	MODEL	CER NUMBER	PIN
1	RCZ31CW	CER-27171-003 Rev 1	3156D4DB
2	RCZ31CW	CER-27171-003 Rev 1	3156E8EF

RF Radiated Emissions testing was performed on sample 1.
RF Conducted Emissions testing on CDMA AWS band was performed on sample 2.

D) Support Equipment Used for the Testing of the EUT

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

E) Test Voltage

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

F) Test Results Chart

SPECIFICATION		TEST TYPE	RESULT	TEST DATA APPENDIX
FCC CFR 47	IC			
Part 2.1051 Part 22.917 Part 22.901(d)	RSS-GEN, 4.9	CDMA Cell Conducted Spurious Emissions	See test report RTS-2068-0909-25 (FCC ID: L6ARCL20CW; IC: 2503A-RCL20CW)	-
Part 2.1051 Part 24.238(a)	RSS-GEN, 4.9	CDMA PCS Conducted Spurious Emissions	See test report RTS-2068-0909-25 (FCC ID: L6ARCL20CW; IC: 2503A-RCL20CW)	-
Part 2.1051 Part 27.53(8)	RSS-GEN, 4.9 RSS 139, 6.4	CDMA AWS Conducted Spurious Emissions	Pass	1
Part 2.202 Part 22.917	RSS-GEN, 4.6	CDMA Cell Occupied Bandwidth and Channel Mask	See test report RTS-2068-0909-25 (FCC ID: L6ARCL20CW; IC: 2503A-RCL20CW)	-
Part 2.202 Part 24.238	RSS-GEN, 4.6	CDMA PCS Occupied Bandwidth and Channel Mask	See test report RTS-2068-0909-25 (FCC ID: L6ARCL20CW; IC: 2503A-RCL20CW)	-
Part 2.202 Part 27.53(8)	RSS-GEN, 4.6 RSS 139, 2.3	CDMA AWS Occupied Bandwidth and Band Edge	Pass	1
Part 2.1046(a)	RSS-133, 6.4 RSS-132, 4.4	CDMA Conducted RF Output Power	Pass	2
Part 2.1055(a)(d) Part 22.917	RSS-132, 4.3	CDMA Cell Frequency Stability vs. Temperature and Voltage	See test report RTS-2068-0909-25 (FCC ID: L6ARCL20CW; IC: 2503A-RCL20CW)	-
Part 2.1055(a)(d) Part 24.235	RSS-132, 4.7	CDMA PCS Frequency Stability vs. Temperature and Voltage	See test report RTS-2068-0909-25 (FCC ID: L6ARCL20CW; IC: 2503A-RCL20CW)	-
Part 27.54	RSS 139, 6.3	CDMA AWS Frequency Stability vs. Temperature and Voltage	Pass	3
Part 22, Subpart H,	RSS-GEN, 4.9	CDMA Cell Radiated Spurious/ Harmonic Emissions, ERP	Pass	4
Part 24, Subpart E	RSS-GEN, 4.9	CDMA PCS Radiated Spurious/ Harmonic Emissions, EIRP	Pass	4
Part 27, Subpart L	RSS-GEN, 4.9	CDMA AWS Radiated Spurious/ Harmonic Emissions, EIRP	Pass	4

G) Summary of Results

1) Conducted Emission Measurements

a) The EUT met the requirements of the Conducted Spurious Emissions in the AWS band as per 47 CFR 27.53(8), CFR 2.1051 and RSS-139, 6.4. The EUT was measured in Loopback and 1xEVDO mode on the low, middle and high channels. See APPENDIX 1 for the test data.

b) The EUT met the requirements of the Occupied Bandwidth and Band Edge Compliance in the AWS band as per 47 CFR 2.202, CFR 27.53(8) and RSS-139, 6.4. The EUT was measured in Loopback and 1xEVDO mode on the low, middle and high channels.
See APPENDIX 1 for the test data.

c) The EUT met the requirements of the Conducted RF Output Power for AWS band. The EUT was measured in Loopback and 1xEVDO mode on the low, middle and high channels.
See APPENDIX 2 for the test data.

d) The EUT met the requirements of the Frequency Stability vs. Temperature and Voltage for AWS band as per 27.54 and RSS-139, 6.3.
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.

2) Radiated Spurious and harmonic Emissions

The radiated spurious emissions/harmonics and ERP/EIRP were measured for Cellular, PCS and AWS 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 following measurements were done in a semi-anechoic chamber (SAC) below 1 GHz and a fully-anechoic room (FAR) above 1 GHz. The SAC's FCC registration number is **778487** and the Industry Canada (IC) file number is **2503B-1**. The FAR's FCC registration number is **959115** and the IC file number is **2503C-1**. The BlackBerry® smartphone was measured on the low, middle and high channels.

The highest ERP measured in the Cellular band, Loopback Service mode, was 27.24 dBm (0.53 W) at 836.52 MHz (channel 384).

The highest ERP measured in the Cellular band, 1xEVDO mode, was 28.45 dBm (0.70 W) at 836.52 MHz (channel 384).

The highest EIRP measured in the PCS band, Loopback Service mode, was 28.08 dBm (0.64 W) at 1908.75 MHz (channel 1175).

The highest EIRP measured in the PCS band, 1xEVDO mode, was 30.29 dBm (1.07 W) at 1851.25 MHz (channel 25)

The highest EIRP measured in the AWS band, Loopback Service mode, was 27.23 dBm (0.53 W) at 1711.25 MHz (channel 25).

The highest EIRP measured in the AWS band, 1xEVDO mode, was 28.48 dBm (0.70 W) at 1711.25 MHz (channel 25)

The radiated carrier harmonics were measured up to the 10th harmonic for low, middle and high channels in the Cellular, PCS and AWS bands. Each band was measured in Loopback, Testdata, and 1xEVDO modes. Both the horizontal and vertical polarizations were measured.

b) Co-Location Measurements

The radiated emissions were measured up to 18 GHz for middle channels for simultaneous transmission in the following test configuration combinations: CDMA Cellular/Bluetooth/802.11b, CDMA PCS/Bluetooth/802.11g and CDMA AWS /Bluetooth/802.11b.
Both the horizontal and vertical polarizations were measured. The emissions due to different simultaneous transmission did not increase the amplitude of any emissions nor did it produce any new inter-modulation products as a result of mixing.

Sample Calculation:

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

Measurement Uncertainty ±4.6 dB

H) Compliance Test Equipment Used

UNIT	MANUFACTURER	MODEL	SERIAL NUMBER	CAL DUE DATE (YY MM DD)	USE
Preamplifier	Sonoma	310N/11909A	185831	10-11-14	Radiated Emissions
Preamplifier system	TDK RF Solutions	PA-02	080010	10-11-06	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA4-SP	001	11-02-17	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA-SP	001	11-02-19	Radiated Emissions
Hybrid Log Antenna	EMC Automation	HLP-3003C	017301	11-02-02	Radiated Emissions
Hybrid Log Antenna	EMC Automation	HLP-3003C	017401	10-09-26	Radiated Emissions
Horn Antenna	EMC Automation	HRN-0118	030101	10-07-22	Radiated Emissions
Horn Antenna	EMC Automation	HRN-0118	030201	11-03-12	Radiated Emissions
Horn Antenna	Emco	3117	47563	11-07-15	Radiated Emissions
Horn Antenna	CMT	LHA 0180	R52734-001	12-01-21	Radiated Emissions
Preamplifier	TDK RF Solutions	18-26	030002	10-11-06	Radiated Emissions
Dipole Antenna	Schwarzbeck	UHAP	1018	11-03-12	Radiated Emissions
Dipole Antenna	Schwarzbeck	UHAP	974	10-10-16	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	837493/073	10-11-30	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	112394	10-11-30	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	102204	10-11-25	RF Conducted Emissions
EMI Receiver	Rohde & Schwarz	ESIB-40	100255	10-11-30	Radiated Emissions
EMI Receiver	Rohde & Schwarz	ESU-40	100162	10-11-29	Radiated Emissions
Spectrum Analyzer	HP	8563E	3745A08112	11-09-30	RF Conducted Emissions
DC Power Supply	HP	6632B	US37472178	10-06-23	RF Conducted Emissions
Environment Monitor	Control Company	1870	230355190	11-01-08	Radiated Emissions

Compliance Test Equipment Used cont'd

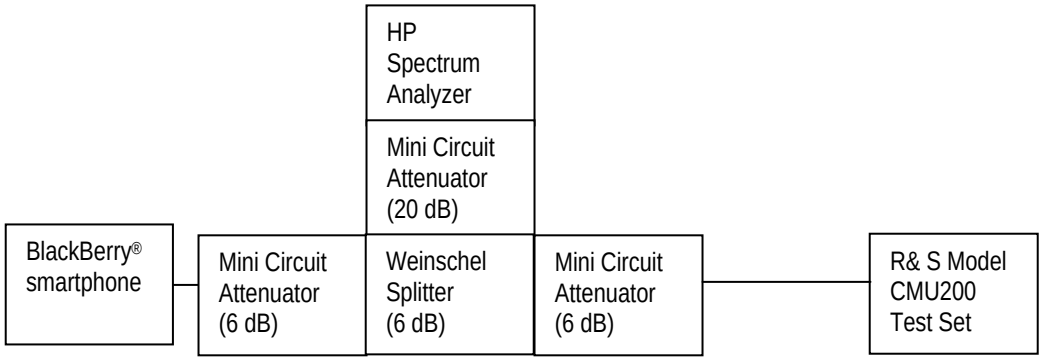
UNIT	MANUFACTURER	MODEL	SERIAL NUMBER	CAL DUE DATE (YY MM DD)	USE
Environment Monitor	Control Company	1870	230355189	11-01-08	RF Conducted Emissions
Environment Monitor	Control Company	1870	80117164	11-01-08	Radiated Emissions
Temperature Probe	Control Company	15-077-21	51129471	10-05-01	Frequency Stability
Environmental Chamber	ESPEC Corp.	SH-240S1	91007118	N/R	Frequency Stability
Signal Generator	Agilent	E8257D	MY45140527	11-11-05	Radiated Emissions
Signal Generator	Agilent	83630B	3844A00927	10-10-31	Radiated Emissions

APPENDIX 1 – CDMA AWS CONDUCTED RF EMISSIONS TEST DATA/PLOTS

GSM Conducted RF Emission Test Data

This appendix contains measurement data pertaining to conducted spurious emissions, –26 dBc bandwidth, 99% power bandwidth and the Band Edge Compliance for the BlackBerry® smartphone.

Test Setup Diagram



Date of Test: April 05, 2010

The environmental test conditions were:

Temperature: 26 ºC
Pressure: 1013 mb
Relative Humidity: 23 %

The following measurements were performed by Maurice Battler.

GSM Conducted RF Emission Test Data cont'd

The conducted spurious emissions – As per 47 CFR 2.1051, CFR 27.53(8), RSS-GEN, 4.9, CFR 22 Subpart H and RSS-132 were measured from 10 MHz to 20 GHz. The EUT emissions were in the noise floor.
See figures 1-1a to 1-12a for the plots of the conducted spurious emissions.

Occupied Bandwidth (99%)

For each carrier frequency of low, middle and high, the modulation spectrum was measured by the 99% power bandwidth method.
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.
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 CDMA AWS Loopback.

AWS Frequency (MHz)	99% Occupied Bandwidth (kHz)
1711.25	1.280
1732.50	1.290
1753.75	1.280

Test Data for CDMA AWS EVDO.

AWS Frequency (MHz)	99% Occupied Bandwidth (kHz)
1711.25	1.290
1732.50	1.280
1753.75	1.280

Measurement Plots for AWS band
Refer to the following measurement plots for more detail.
See Figures 1-13a to 1-24a for the plots of the 99% Occupied Bandwidth.
See Figures 1-25a to 1-28a for plots of the Band Edge results.

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

CDMA AWS Conducted RF Emission Test Data cont'd

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

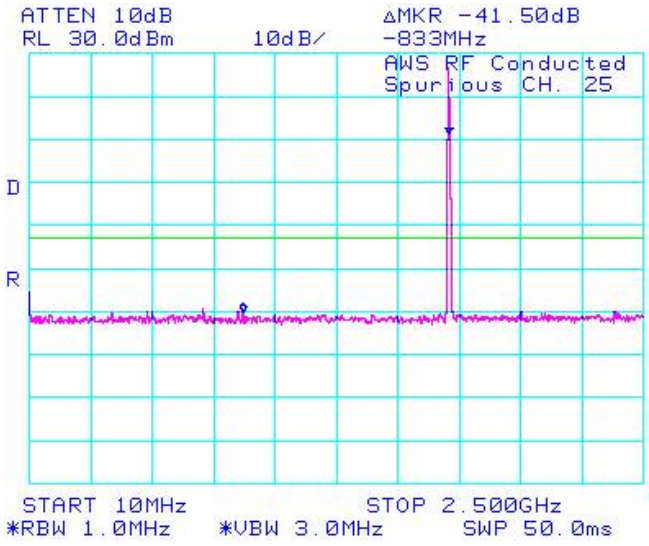


Figure 1-2a: AWS band, Spurious Conducted Emissions, Low channel

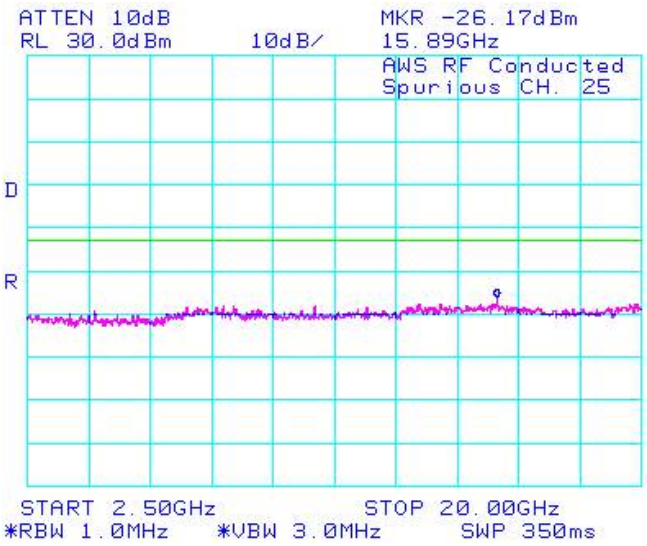


Figure 1-3a: AWS band, Spurious Conducted Emissions, Middle Channel

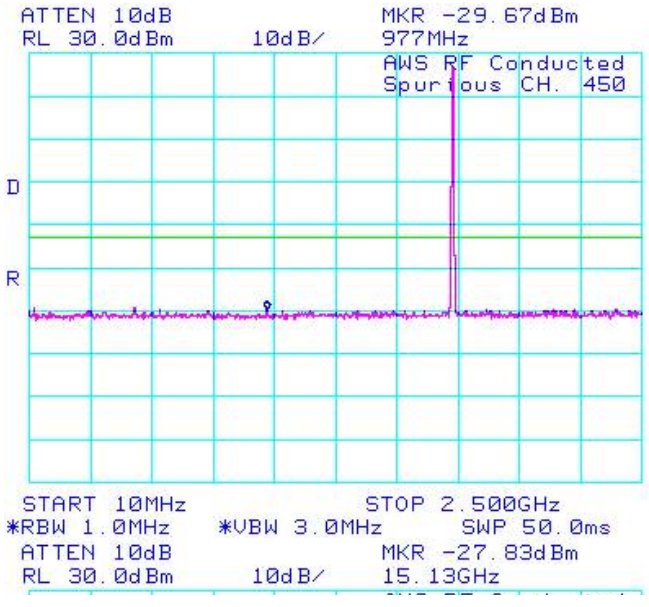
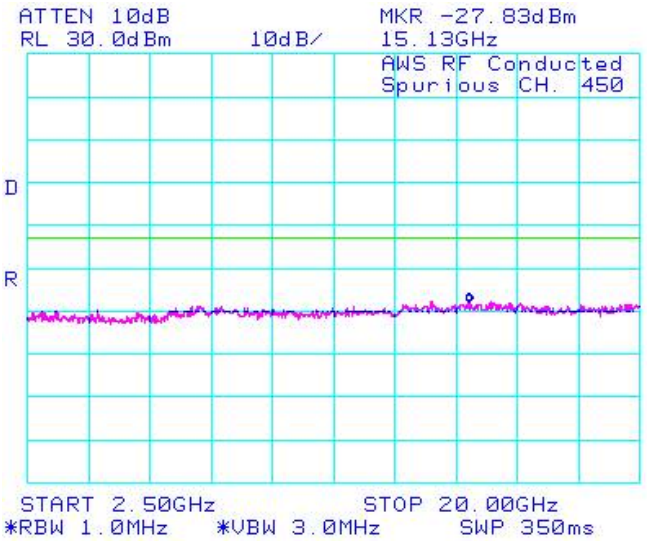


Figure 1-4a: AWS band, Spurious Conducted Emissions, Middle Channel



GSM Conducted RF Emission Test Data cont'd

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

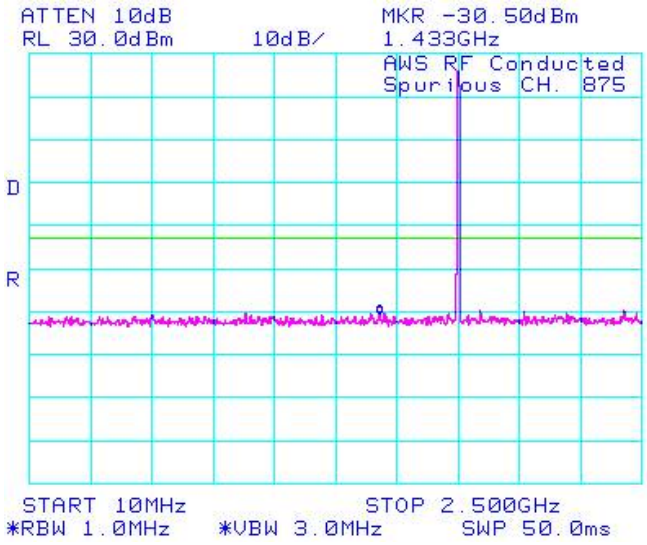


Figure 1-6a: AWS band, Spurious Conducted Emissions, High Channel

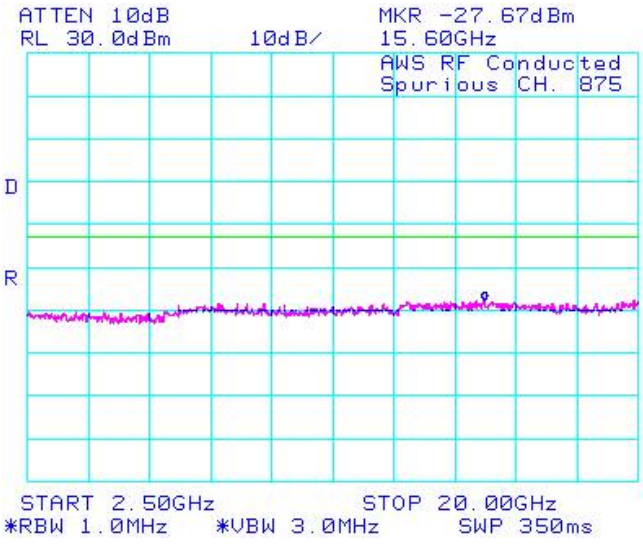


Figure 1-7a: AWS EVDO band, Spurious Conducted Emissions, Low Channel

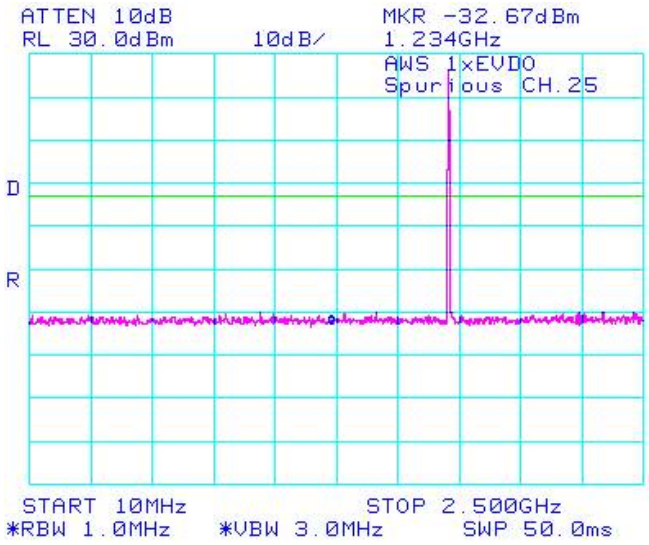
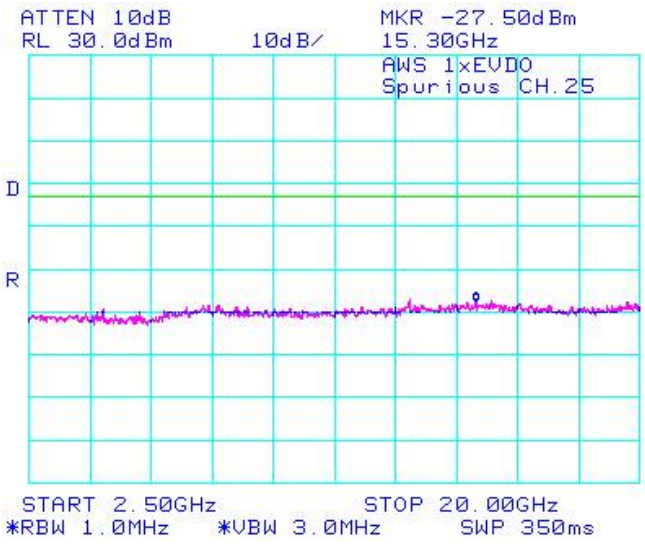


Figure 1-8a: AWS EVDO band, Spurious Conducted Emissions, Low Channel



GSM Conducted RF Emission Test Data cont'd

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

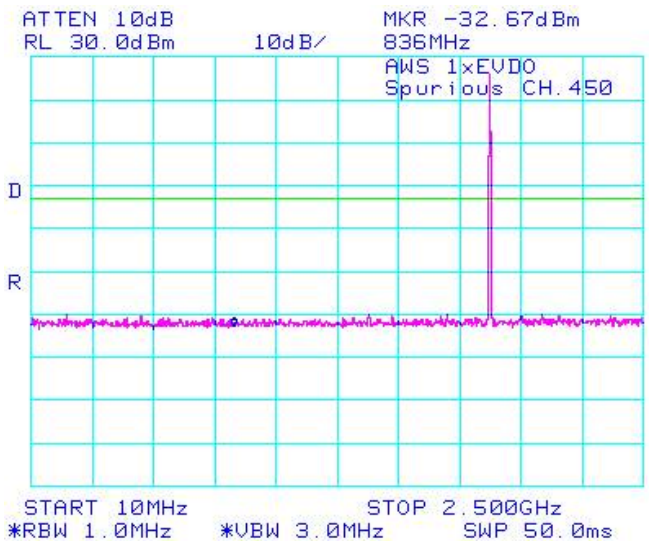


Figure 1-10a: AWS EVDO band, Spurious Conducted Emissions, Middle Channel

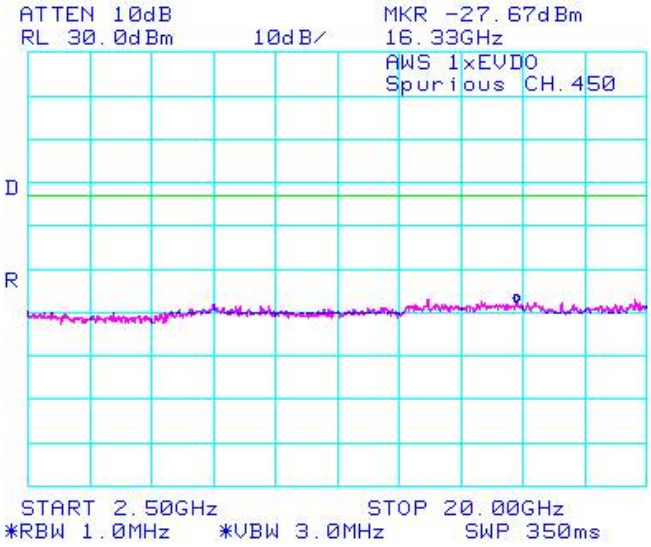


Figure 1-11a: AWS EVDO band, Spurious Conducted Emissions, High Channel

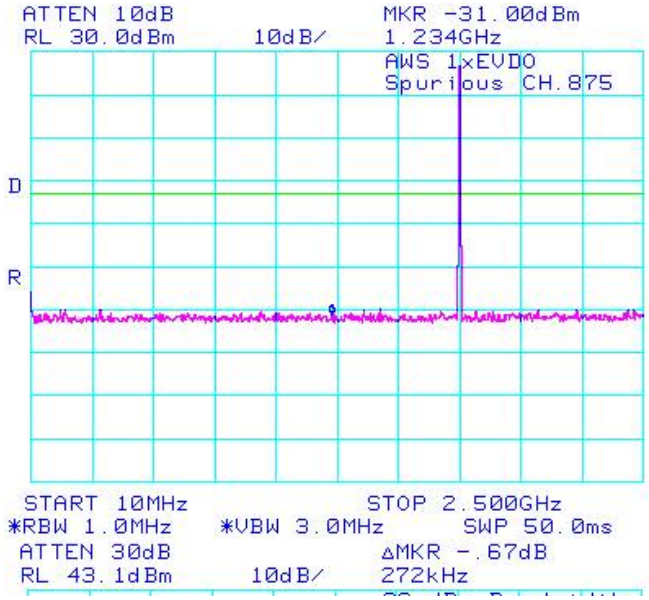
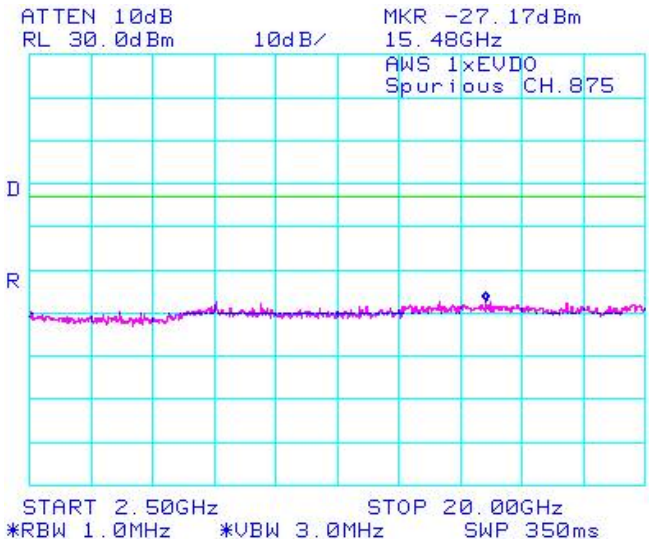


Figure 1-12a: AWS EVDO band, Spurious Conducted Emissions, High Channel



GSM Conducted RF Emission Test Data cont'd

Figure 1-13a Occupied Bandwidth, CDMA AWS band Low Channel

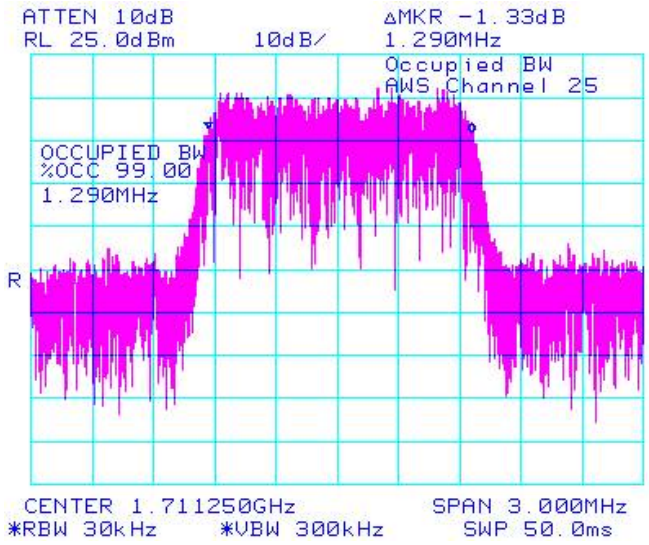


Figure 1-14a: Occupied Bandwidth, CDMA AWS band Mid Channel

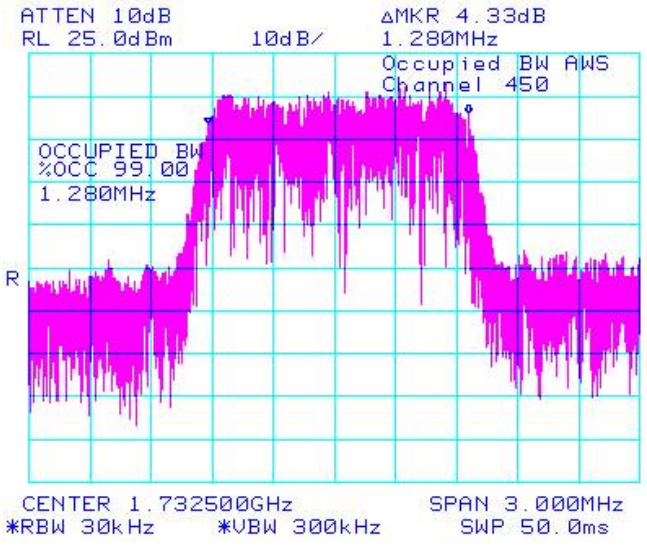


Figure 1-15a: Occupied Bandwidth, CDMA AWS band High Channel

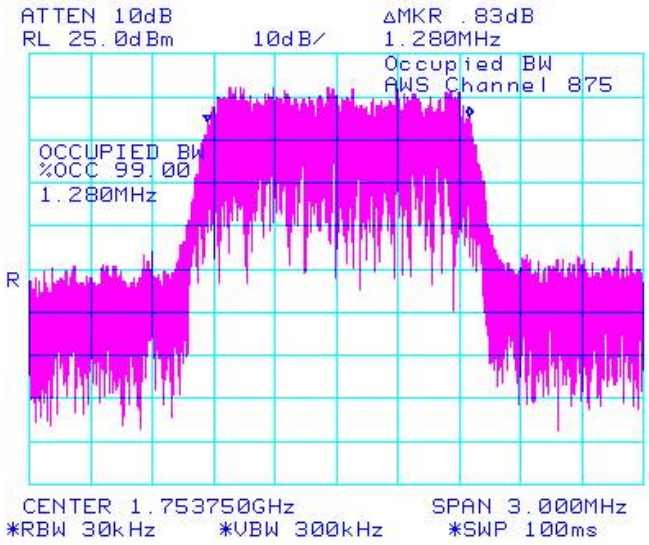
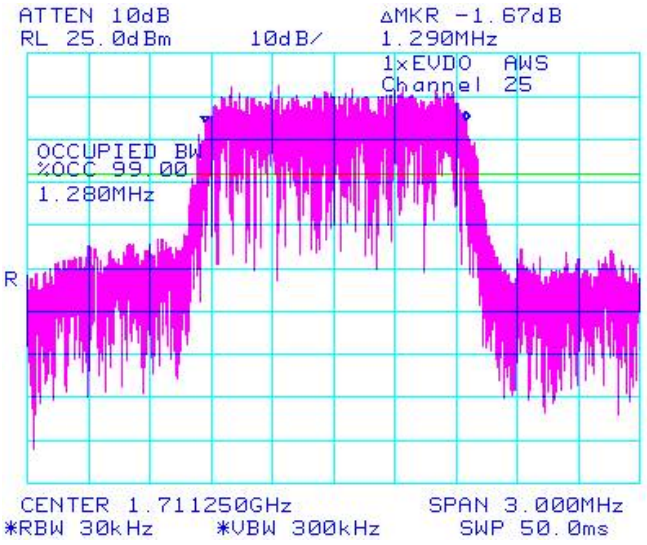


Figure 1-16a: Occupied Bandwidth, CDMA EVDO AWS band Low Channel



GSM Conducted RF Emission Test Data cont'd

Figure 1-17a Occupied Bandwidth, CDMA EVDO AWS band Mid Channel

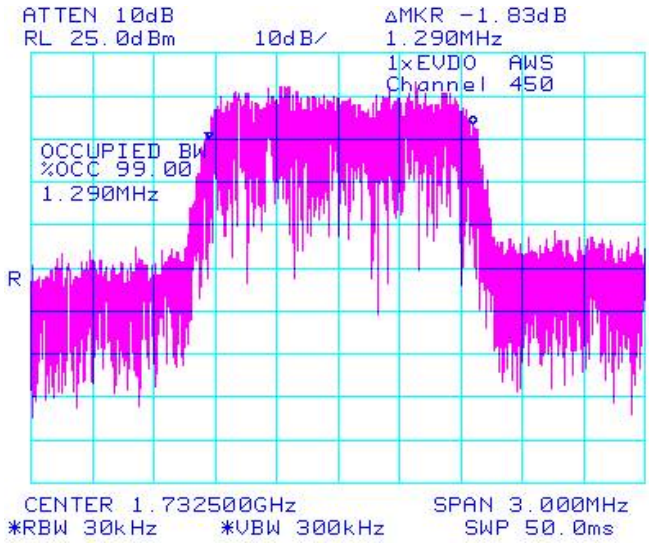


Figure 1-18a: Occupied Bandwidth, CDMA EVDO AWS band High Channel

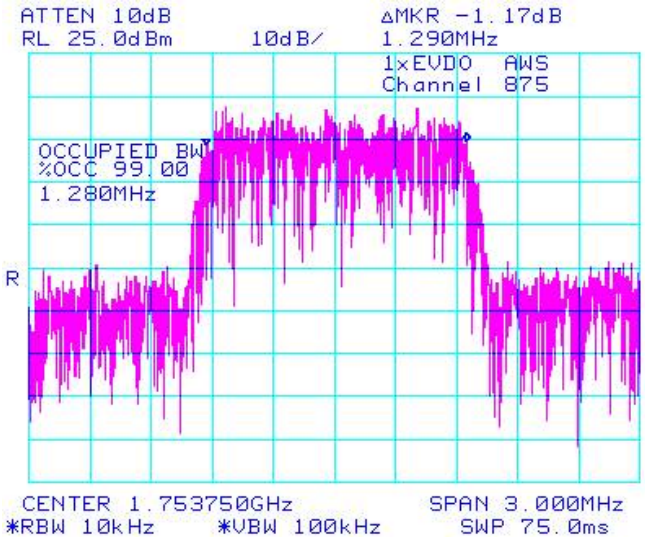


Figure 1-19a: CDMA AWS Band Edge Low Channel

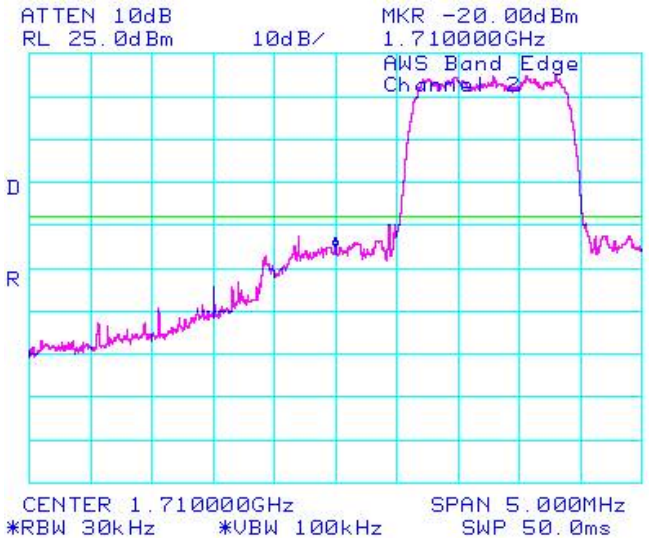
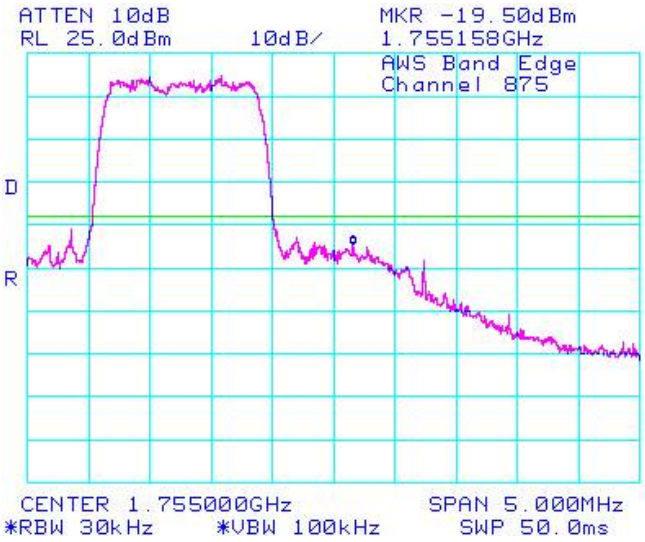


Figure 1-20a: CDMA AWS Band Edge High Channel



GSM Conducted RF Emission Test Data cont'd

Figure 1-21a CDMA AWS EVDO Band Edge Low Channel

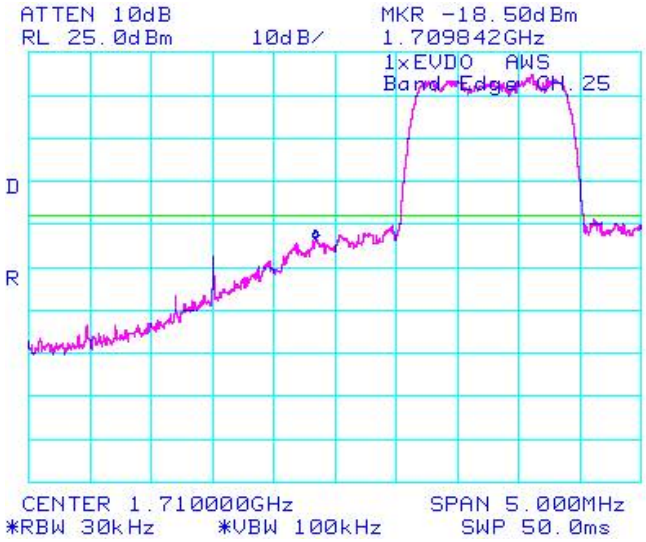
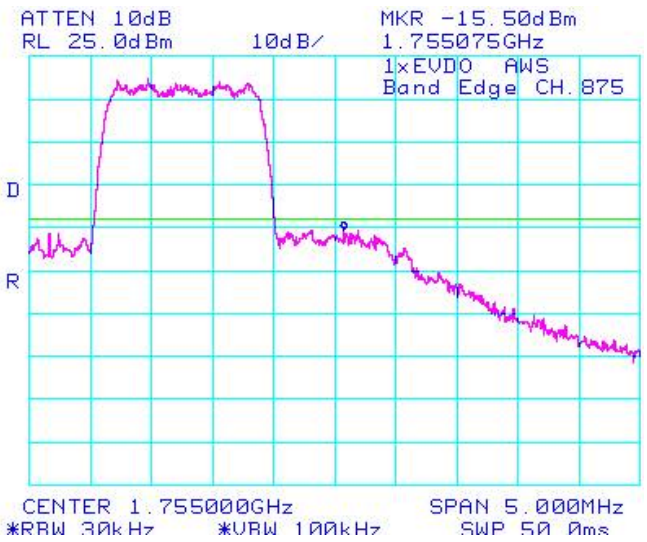


Figure 1-22a: CDMA AWS EVDO Band Edge High Channel



APPENDIX 2 – CDMA CONDUCTED RF OUTPUT POWER TEST DATA

GSM Conducted RF Output Power Test Data

The following measurements were performed by Daoud Attayi.

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 23.70 dBm ±0.5 dB for Cellular, 23.40 dBm ±0.5 dB for PCS and 23.80 dBm ±0.5 dB for AWS

Date of Test: April 9-12, 2010
The environmental test conditions were:

Temperature	22-23.5 ºC
Pressure	1007-1029 mb
Relative Humidity	23-25 %

Test Results

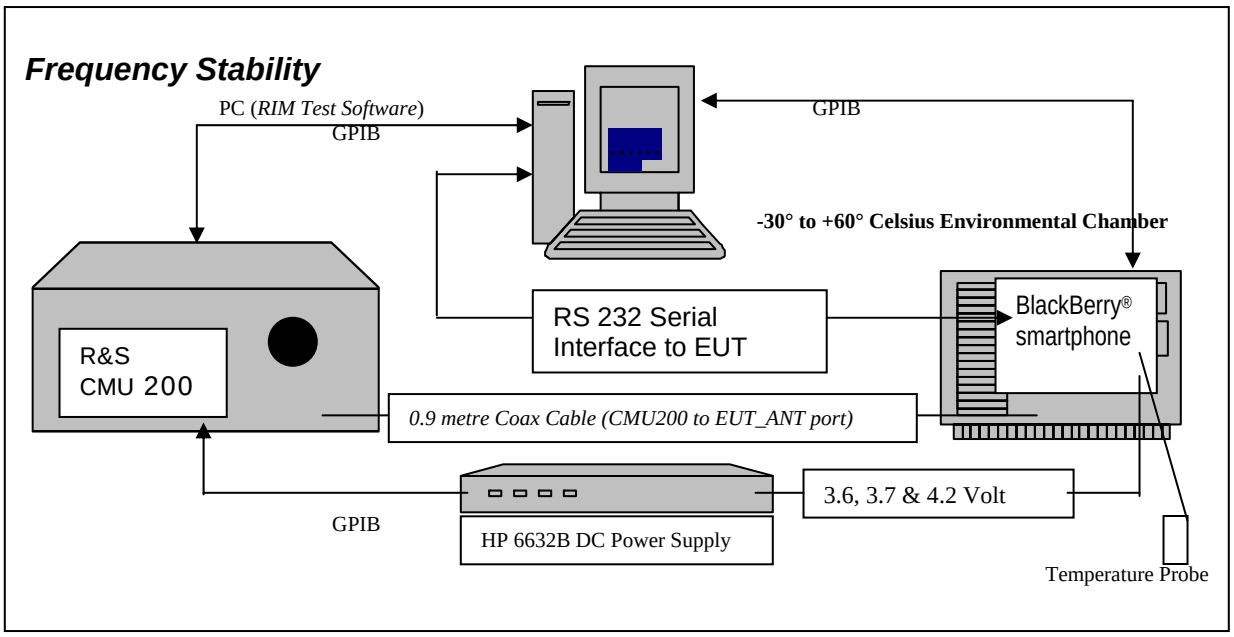
Band	Channel	1x EvDO (153.6kbps)		CDMA2000 RC	SO2 Loopback		SO55 Loopback		TDSO SO32	
		(dBm)	(Watts)		(dBm)	(Watts)	(dBm)	(Watts)	(dBm)	(Watts)
CDMA Cell	1013	23.5	0.25	RC1	23.7	0.23	23.7	0.23	N/A	-
				RC3	23.7	0.23	23.6	0.23	23.7	0.23
	384	23.5	0.22	RC1	23.6	0.23	23.6	0.23	N/A	-
				RC3	23.6	0.23	23.5	0.22	23.6	0.23
	777	23.4	0.22	RC1	23.4	0.22	23.4	0.22	N/A	-
				RC3	23.4	0.22	23.4	0.22	23.5	0.22

Band	Channel	1x EvDO (153.6kbps)		CDMA2000 RC	SO2 Loopback		SO55 Loopback		TDSO SO32	
		(dBm)	(Watts)		(dBm)	(Watts)	(dBm)	(Watts)	(dBm)	(Watts)
CDMA AWS	25	23.4	0.22	RC1	23.4	0.22	23.4	0.22	N/A	-
				RC3	23.3	0.21	23.4	0.22	23.4	0.22
	600	23.4	0.22	RC1	23.4	0.22	23.3	0.21	N/A	-
				RC3	23.4	0.22	23.4	0.22	23.4	0.22
	1175	23.3	0.21	RC1	23.3	0.21	23.3	0.21	N/A	-
				RC3	23.3	0.21	23.3	0.21	23.3	0.21

Band	Channel	1x EvDO (153.6kbps)		CDMA2000 RC	SO2 Loopback		SO55 Loopback		TDSO SO32	
		(dBm)	(Watts)		(dBm)	(Watts)	(dBm)	(Watts)	(dBm)	(Watts)
CDMA PCS	25	23.6	0.23	RC1	23.8	0.24	23.8	0.24	N/A	-
				RC3	23.7	0.23	23.6	0.23	23.7	0.23
	600	23.4	0.22	RC1	23.4	0.22	23.4	0.22	N/A	-
				RC3	23.4	0.22	23.4	0.22	23.4	0.22
	1175	23.3	0.21	RC1	23.3	0.21	23.3	0.21	N/A	-
				RC3	23.3	0.21	23.3	0.21	23.4	0.22

APPENDIX 3 – CDMA AWS FREQUENCY STABILITY TEST DATA

CDMA Frequency Stability Test Data



The following measurements were performed by Maurice Battler.

CFR 47 Chapter 1 - Federal Communications Commission Rules

Part 2 Required Measurements
2.1055 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 27.4 and RSS-139, 6.3 Frequency Stability.

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

Calibration for the Cable Loss was performed in the RF Laboratory using the Agilent power meter and Agilent Signal Generator.
The cable assembly from the RF input to the RF output was measured at the following Frequencies:

AWS Frequency (MHz)	Cable loss (dB)
1711.25	1.20
1732.50	1.20
1753.75	1.20

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 following 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 parametres recording temperature, voltage settings, and systematically selected frequencies. The power supply was cycled from minimum voltage 3.6 volts, to 3.7 volts to 4.2 volts maximum voltage. The frequency error was measured at a maximum output power and recorded by the automated system test software.

The EUT output power and frequency was measured at 3.6 volts, 3.7 volts and 4.2 volts. The transmit frequency was varied in 3 steps consisting of 1711.25, 1732.50 and 1753.75 MHz for the AWS band. This frequency was recorded in MHz and deviation from nominal, in Parts Per Million.
After the initial one-hour soak at the beginning of the tests, a period of thirty minutes soak was initialized between each ascending temperature step, before proceeding to the next measurement test cycle.

PROCEDURE:

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

1. Switch on the HP 6632B power supply; CMU 200 Communications test Set, and Environmental Chamber.
2. Start test program
3. Set the Temperature to –30°C and maintain a period of one- hour soak time, with the EUT supply voltage disabled.
4. Set power supply voltage to 3.6 volts.
5. Set up CMU 200 Radio Communication Tester.
6. Command the CMU 200 to switch to the low channel.
7. Enable the voltage to the EUT, and connect a link to the CMU 200 test set.
8. EUT is commanded to Transmit 100 Bursts.
9. Software logs the following data from the CMU 200, power supply and temperature chamber: Traffic Channel Number, Traffic Channel Frequency, Power Level, Chamber Temperature, Supply Voltage, Power and Frequency Error.
10. The CMU 200 commands the EUT to change frequency to the middle channel and high channel and repeats steps 7 to 9.
11. Repeat steps 5 to 10 changing the supply voltage to 3.7 Volts
12. Increase temperature by 10°C and soak for 1/2 hour.
13. Repeat steps 4 - 12 for temperatures –30°C to 60°C.
14. Repeat steps 5 to 10 changing the supply voltage to 4.2 volts

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

The maximum frequency error in the CDMA AWS band measured was **0.0026 PPM**.

CDMA AWS Channel results: channels 25, 450 and 875 @ 20°C maximum transmitted power

The BlackBerry® smartphone was tested on April 5, 2010.

Traffic Channel Number	AWS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
25	1711.25	3.6	20	1.03	0.0006
450	1732.50	3.6	20	4.47	0.0026
875	1753.75	3.6	20	2.58	0.0015

Traffic Channel Number	AWS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
25	1711.25	3.7	20	-4.27	-0.0025
450	1732.50	3.7	20	0.83	0.0005
875	1753.75	3.7	20	0.69	0.0004

Traffic Channel Number	AWS Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
25	1711.25	4.2	20	-0.78	-0.0005
450	1732.50	4.2	20	0.53	0.0003
875	1753.75	4.2	20	0.23	0.0001

AWS Band Results: channel 25 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
25	1711.25	3.6	-30	-6.87	-0.0040
25	1711.25	3.6	-20	-0.33	-0.0002
25	1711.25	3.6	-10	-2.11	-0.0012
25	1711.25	3.6	0	0.48	0.0003
25	1711.25	3.6	10	2.66	0.0016
25	1711.25	3.6	20	1.03	0.0006
25	1711.25	3.6	30	0.17	0.0001
25	1711.25	3.6	40	-0.09	-0.0001
25	1711.25	3.6	50	-1.68	-0.0010
25	1711.25	3.6	60	-0.59	-0.0003

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
25	1711.25	3.7	-30	-6.08	-0.0036
25	1711.25	3.7	-20	-0.23	-0.0001
25	1711.25	3.7	-10	-1.86	-0.0011
25	1711.25	3.7	0	0.18	0.0001
25	1711.25	3.7	10	2.14	0.0013
25	1711.25	3.7	20	-4.27	-0.0025
25	1711.25	3.7	30	-0.20	-0.0001
25	1711.25	3.7	40	-1.90	-0.0011
25	1711.25	3.7	50	-1.05	-0.0006
25	1711.25	3.7	60	-0.31	-0.0002

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
25	1711.25	4.2	-30	-2.06	-0.0012
25	1711.25	4.2	-20	-0.30	-0.0002
25	1711.25	4.2	-10	-1.58	-0.0009
25	1711.25	4.2	0	-0.06	0.0000
25	1711.25	4.2	10	-0.91	-0.0005
25	1711.25	4.2	20	-0.78	-0.0005
25	1711.25	4.2	30	-0.65	-0.0004
25	1711.25	4.2	40	-1.69	-0.0010
25	1711.25	4.2	50	-1.80	-0.0011
25	1711.25	4.2	60	-1.72	-0.0010

AWS Band Results: channel 450 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
450	1732.50	3.6	-30	-7.05	-0.0041
450	1732.50	3.6	-20	2.97	0.0017
450	1732.50	3.6	-10	-0.40	-0.0002
450	1732.50	3.6	0	3.15	0.0018
450	1732.50	3.6	10	6.56	0.0038
450	1732.50	3.6	20	4.47	0.0026
450	1732.50	3.6	30	2.73	0.0016
450	1732.50	3.6	40	2.90	0.0017
450	1732.50	3.6	50	2.23	0.0013
450	1732.50	3.6	60	3.24	0.0019

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
450	1732.50	3.7	-30	-3.42	-0.0020
450	1732.50	3.7	-20	1.00	0.0006
450	1732.50	3.7	-10	-3.21	-0.0019
450	1732.50	3.7	0	0.95	0.0005
450	1732.50	3.7	10	1.78	0.0010
450	1732.50	3.7	20	0.83	0.0005
450	1732.50	3.7	30	-0.25	-0.0001
450	1732.50	3.7	40	-0.13	-0.0001
450	1732.50	3.7	50	-0.16	-0.0001
450	1732.50	3.7	60	1.45	0.0008

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
450	1732.50	4.2	-30	0.68	0.0004
450	1732.50	4.2	-20	1.17	0.0007
450	1732.50	4.2	-10	0.27	0.0002
450	1732.50	4.2	0	1.59	0.0009
450	1732.50	4.2	10	1.44	0.0008
450	1732.50	4.2	20	0.53	0.0003
450	1732.50	4.2	30	-0.01	0.0000
450	1732.50	4.2	40	0.64	0.0004
450	1732.50	4.2	50	0.14	0.0001
450	1732.50	4.2	60	0.96	0.0006

AWS Band Results: channel 875 @ maximum transmitted power

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
875	1753.75	3.6	-30	-2.63	-0.0015
875	1753.75	3.6	-20	1.70	0.0010
875	1753.75	3.6	-10	-1.02	-0.0006
875	1753.75	3.6	0	3.12	0.0018
875	1753.75	3.6	10	3.29	0.0019
875	1753.75	3.6	20	2.58	0.0015
875	1753.75	3.6	30	2.27	0.0013
875	1753.75	3.6	40	1.47	0.0008
875	1753.75	3.6	50	1.32	0.0008
875	1753.75	3.6	60	2.70	0.0015

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
875	1753.75	3.7	-30	-1.28	-0.0007
875	1753.75	3.7	-20	1.49	0.0008
875	1753.75	3.7	-10	-0.48	-0.0003
875	1753.75	3.7	0	0.81	0.0005
875	1753.75	3.7	10	1.79	0.0010
875	1753.75	3.7	20	0.69	0.0004
875	1753.75	3.7	30	0.86	0.0005
875	1753.75	3.7	40	0.82	0.0005
875	1753.75	3.7	50	0.69	0.0004
875	1753.75	3.7	60	0.39	0.0002

Traffic Channel Number	Frequency (MHz)	Voltage (Volts)	Temperature (Celsius)	Frequency Error (Hz)	PPM
875	1753.75	4.2	-30	2.47	0.0014
875	1753.75	4.2	-20	0.23	0.0001
875	1753.75	4.2	-10	1.25	0.0007
875	1753.75	4.2	0	0.10	0.0001
875	1753.75	4.2	10	0.00	0.0000
875	1753.75	4.2	20	0.23	0.0001
875	1753.75	4.2	30	0.91	0.0005
875	1753.75	4.2	40	0.27	0.0002
875	1753.75	4.2	50	0.87	0.0005
875	1753.75	4.2	60	-0.03	0.0000

APPENDIX 4 – CDMA RADIATED EMISSIONS TEST DATA

Radiated Power Test Data Results

Date of test: April 26, 2010

The measurements were performed by Kevin Rose.

The environmental tests conditions were: Temperature: 24 °C
Pressure: 1022 mb
Relative Humidity: 30 %

The BlackBerry® smartphone was in standalone, USB up position.
Test distance is 3.0 metres

CDMA Cellular Band

Loopback 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) (dBm)	(W)	Limit (dBm)	Diff. To Limit (dB)
F0	1013	824.70	800	Dipole	V	62.97	81.21	V-V	8.36	26.49	0.45	39.00	-12.51
F0	1013	824.70	800	Dipole	H	81.21		H-H	6.36				
F0	384	836.52	800	Dipole	V	63.16	81.85	V-V	9.26	**27.24**	**0.53**	39.00	-11.76
F0	384	836.52	800	Dipole	H	81.85		H-H	6.92				
F0	777	848.32	800	Dipole	V	64.9	81.55	V-V	8.68	26.71	0.47	39.00	-12.29
F0	777	848.32	800	Dipole	H	81.55		H-H	15.91				

EVDO 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) (dBm)	(W)	Limit (dBm)	Diff. To Limit (dB)
F0	1013	824.70	800	Dipole	V	73.98	82.53	V-V	9.67	27.80	0.60	39.00	-11.20
F0	1013	824.70	800	Dipole	H	82.53		H-H	7.74				
F0	384	836.52	800	Dipole	V	74.55	83.01	V-V	10.47	**28.45**	**0.70**	39.00	-10.55
F0	384	836.52	800	Dipole	H	83.01		H-H	8.16				
F0	777	848.32	800	Dipole	V	77.57	82.94	V-V	10.18	28.21	0.66	39.00	-10.79
F0	777	848.32	850	Dipole	H	82.94		H-H	8.65				

Radiated Power Test Data Results cont'd

CDMA PCS Band

Loopback Mode

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method 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)
F0	25	1851.25	1900	Horn	V	85.23	87.06	V-V	-11.52	27.87	0.61	33.00	-5.13
F0	25	1851.25	1900	Horn	H	87.06		H-H	-10.54				
F0	600	1880.00	1900	Horn	V	84.05	87.23	V-V	-10.53	27.88	0.61	33.00	-5.12
F0	600	1880.00	1900	Horn	H	87.23		H-H	-9.85				
F0	1175	1908.75	1900	Horn	V	83.95	87.21	V-V	-10.85	**28.08**	**0.64**	33.00	-4.92
F0	1175	1908.75	1900	Horn	H	87.21		H-H	-9.69				

EVDO Mode

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method 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)
F0	25	1851.25	1900	Horn	V	82.16	89.5	V-V	-8.12	**30.29**	**1.07**	33.00	-2.71
F0	25	1851.25	1900	Horn	H	89.5		H-H	-8.80				
F0	600	1880.00	1900	Horn	V	82.35	88.79	V-V	-8.85	29.46	0.88	33.00	-3.54
F0	600	1880.00	1900	Horn	H	88.79		H-H	-8.27				
F0	1175	1908.75	1900	Horn	V	82.09	87.2	V-V	-10.86	28.09	0.64	33.00	-4.91
F0	1175	1908.75	1900	Horn	H	87.2		H-H	-9.68				

Radiated Power Test Data Results cont'd

CDMA AWS Band

Loopback Mode

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method 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)
F0	25	1711.25	1700	Horn	V	80.9	87.93	V-V	-11.98	**27.23**	**0.53**	33.00	-5.77
F0	25	1711.25	1700	Horn	H	87.93		H-H	-11.66				
F0	450	1732.50	1700	Horn	V	80.13	87.3	V-V	-12.70	26.59	0.46	33.00	-6.41
F0	450	1732.50	1700	Horn	H	87.3		H-H	-12.33				
F0	875	1753.75	1700	Horn	V	80.99	87.46	V-V	-12.14	27.07	0.51	33.00	-5.93
F0	875	1753.75	1700	Horn	H	87.46		H-H	-11.49				

EVDO Mode

EUT				Rx Antenna		Spectrum Analyzer		Substitution Method 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)
F0	25	1711.25	1700	Horn	V	84.15	89.12	V-V	-10.74	**28.48**	**0.70**	33.00	-4.52
F0	25	1711.25	1700	Horn	H	89.12		H-H	-10.41				
F0	450	1732.50	1700	Horn	V	81.47	88.66	V-V	-11.29	28.00	0.63	33.00	-5.00
F0	450	1732.50	1700	Horn	H	88.66		H-H	-10.92				
F0	875	1753.75	1700	Horn	V	81.95	88.59	V-V	-11.01	28.18	0.66	33.00	-4.82
F0	875	1753.75	1700	Horn	H	88.59		H-H	-10.38				

Radiated Emissions Test Data Results

CDMA Cellular

Loopback Mode

Date of Test: March 12, 2010

The measurements were performed by Fahd Faisal.

The environmental test conditions were: Temperature: 23 ºC
Pressure: 1012 mb
Relative Humidity: 31 %

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

The measurements were performed in CDMA Cell Tx mode on channels 1013, 384 and 777.

All emissions had a test margin greater than 25.0 dB.

Date of Test: March 12-14, 2010
The measurements were performed by Heng Lin.

The environmental test conditions were: Temperature: 26 ºC
Pressure: 1021 mb
Relative Humidity: 24 %

Test Distance was 3.0 metres with a height of 1.0 metre, 1 GHz to 9 GHz.
The BlackBerry® smartphone was in standalone, USB Up position.

The measurements were performed in CDMA Cell Tx mode on channels 1013, 384 and 777.

All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

CDMA Cellular

EVDO Mode

Date of Test: March 12, 2010

The environmental test conditions were: Temperature: 23 ºC
Pressure: 1012 mb
Relative Humidity: 31 %

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

The measurements were performed in CDMA Cell Tx mode on channels 1013, 384 and 777.

All emissions had a test margin greater than 25.0 dB.

Date of Test: March 12-14, 2010

The environmental test conditions were: Temperature: 26 ºC
Pressure: 1021 mb
Relative Humidity: 24 %

Test Distance was 3.0 metres with a height of 1.0 metre, 1 GHz to 9 GHz.
The BlackBerry® smartphone was in standalone, USB Up position.

The measurements were performed in CDMA Cell Tx mode on channels 1013, 384 and 777.

All emissions had a test margin greater than 25.0 dB.

CDMA PCS

Loopback Mode

Date of Tests: March 12 & March 31, 2010

The environmental test conditions were: Temperature: 22-23 ºC
Pressure: 996 -1009 mb
Relative Humidity: 22 %

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

The measurements were performed in CDMA PCS Tx mode on channels 25, 600 and 1175.

All emissions had a test margin greater than 25.0 dB.

Date of Tests: April 6 & April 13, 2010

The environmental test conditions were: Temperature: 26 ºC
Pressure: 1021 mb
Relative Humidity: 24%

Test Distance was 3.0 metres with a height of 1.0 metre, 1 GHz to 20 GHz.
The BlackBerry® smartphone was in standalone, USB Down position.

The measurements were performed in CDMA PCS Tx mode on channels 25, 600 and 1175.

All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

CDMA PCS

EVDO Mode

Date of Test: March 12 & March 31, 2010

The environmental test conditions were: Temperature: 24 ºC
Pressure: 1009 mb
Relative Humidity: 22 %

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

The measurements were performed in CDMA PCS EVDO Tx mode on channels 25, 600 and 1175.

All emissions had a test margin greater than 25.0 dB.

Date of Test: April 12, April 19 & April 30, 2010

The environmental test conditions were: Temperature: 24 ºC
Pressure: 1008 mb
Relative Humidity: 28 %

Test Distance was 3.0 metres with a height of 1.0 metre, 1 GHz to 20 GHz.
The BlackBerry® smartphone was in standalone, USB Down position.

The measurements were performed in CDMA PCS EVDO Tx mode on channels 25, 600 and 1175.

All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

CDMA AWS

Loopback Mode

Date of Test: March 31 - April 1, 2010

The environmental test conditions were: Temperature: 23 ºC
Pressure: 1012 mb
Relative Humidity: 31 %

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

The measurements were performed in CDMA AWS Tx mode on channels 25, 450 and 875.

All emissions had a test margin greater than 25.0 dB.

Date of Test: April 5 - 7, 2010

The environmental test conditions were: Temperature: 24 ºC
Pressure: 1008 mb
Relative Humidity: 28 %

Test Distance was 3.0 metres with a height of 1.0 metre, 1 GHz to 20 GHz.
The BlackBerry® smartphone was in standalone, USB Down position.

The measurements were performed in CDMA AWS Tx mode on channels 25, 450 and 875.

All emissions had a test margin greater than 25.0 dB.

Radiated Emissions Test Data Results cont'd

CDMA AWS

EVDO Mode

Date of Test: March 31 - April 1, 2010

The environmental test conditions were: Temperature: 23 ºC
Pressure: 1012 mb
Relative Humidity: 31 %

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

The measurements were performed in CDMA EVDO AWS Tx mode on channels 25, 450 and 875.

All emissions had a test margin greater than 25.0 dB.

Date of Test: April 12, April 23 & April 29, 2010

The environmental test conditions were: Temperature: 24 ºC
Pressure: 1008 - 1015 mb
Relative Humidity: 25 - 28 %

Test Distance was 3.0 metres with a height of 1.0 metre, 1 GHz to 20 GHz.
The BlackBerry® smartphone was in standalone, USB Down position.

The measurements were performed in CDMA EVDO AWS Tx mode on channels 25, 450 and 875.

All emissions had a test margin greater than 25.0 dB.