



FCC 47 CFR PART 22 SUBPART H AND PART 24 SUBPART E

TEST REPORT

For

Computer

Trade Name: ADVANTECH

Model:

TREK-743XXXXXXXX(X=0-9; A-Z OR BLANK)

Issued to

**Advantech Co., Ltd.
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
Taipei 114, Taiwan, R.O.C.**

Issued by

**Compliance Certification Services Inc.
No. 11, Wu-Gong 6th Rd., Wugu Industrial Park,
Taipei Hsien 248, Taiwan (R.O.C.)
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Testing Laboratory
1309

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1. TEST RESULT CERTIFICATION

Applicant: Advantech Co., Ltd.
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
Taipei 114, Taiwan, R.O.C.

Equipment Under Test: Computer

Trade Name: ADVANTECH

Model: TREK-743XXXXXXXX(X=0-9; A-Z OR BLANK)

Date of Test: October 18 ~ 22, 2009

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 22 Subpart H & Part 24 Subpart E	No non-compliance noted

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA-603-C: 2004 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rule FCC PART 22 Subpart H and PART 24 Subpart E.

The test results of this report relate only to the tested sample identified in this report.

Approved by:

Rex Lai
Section Manager
Compliance Certification Services Inc.

Reviewed by:

Gina Lo
Section Manager
Compliance Certification Services Inc.



2. EUT DESCRIPTION

Product	Computer
Trade Name	ADVANTECH
Model Number	TREK-743XXXXXXXX(X=0-9; A-Z OR BLANK)
Model Discrepancy	All the specification and layout are identical except they come with different model numbers for marketing purposes.
Power Supply	Powered by host device
Frequency Range	TX: 824.7 ~ 848.31 MHz / 1851.25 ~ 1908.75 MHz RX: 869.7 ~ 893.31 MHz / 1931.25 ~ 1988.75 MHz
Transmit Power (ERP & EIRP Power)	CDMA2000 1xRTT 850 MHz: 23.12 dBm (0.2051W) 1900 MHz: 25.75 dBm (0.3758W) CDMA2000 1xEVDO 850 MHz: 24.36 dBm (0.2729W) 1900 MHz: 26.66 dBm (0.4634W)
Cellular Phone Protocol	CDMA2000 1xRTT CDMA2000 1xEVDO
Type of Emission	CDMA2000 1xRTT: 824.7 ~ 848.31 MHz: 1M28F9W--- 1851.25 ~ 1908.75 MHz: 1M28F9W--- CDMA2000 1xEVDO 824.7 ~ 848.31 MHz: 1M27F9W--- 1851.25 ~ 1908.75 MHz: 1M29F9W---
Antenna Gain	850 MHz: -7.66dBi 1900 MHz: -0.69dBi
Antenna Type	Dipole Antenna

Remark:

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **M82-TREK-743** filing to comply with Part 22 and Part 24 of the FCC 47 CFR Rules.



3. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures document on chapter 13 of ANSI C63.4: 2003, TIA/EIA-603-C: 2004 and FCC CFR 47, 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4.



3.4 DESCRIPTION OF TEST MODES

The EUT (model: TREK-743) had been tested under operating condition.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode only.

EUT staying in continuous transmitting mode was programmed.

Pre-scan was performed on RF conducted port to determine the worst-case scenario:

	Cellular Band	PCS Band
1xRTT RC3, SO2	24.65	22.98
1xRTT RC3, SO3	24.69	22.96
1xRTT RC3, SO55	24.72	23.02
1xRTT RC3, SO32(+F-SCH)	24.80	23.10
1xRTT RC3, SO32(+SCH)	24.70	23.01
1xEVDO	24.33	23.10

Based on the above results from the different modulations, CDMA2000 1xRTT RC3, SO32 (+F-SCH) and 1Xevdo, FTAP370 were determined to be the worst-case scenario for all tests.

The worst emission was found:

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.



4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.



4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Remark: Each piece of equipment is scheduled for calibration once a year.

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	03/05/2010
Power Meter	Agilent	E4416A	GB41291611	06/28/2010
Power Sensor	Agilent	E9327A	US40441097	06/28/2010
Temp. / Humidity Chamber	Terchy	MHG-150LF	930619	09/15/2010
DC Power Source	Agilent	E3640A	MY40001774	01/09/2010

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510252	10/25/2010
Test Receiver	Rohde & Schwarz	ESCI	100064	11/30/2009
Switch Controller	TRC	Switch Controller	SC94050010	05/02/2010
4 Port Switch	TRC	4 Port Switch	SC94050020	05/02/2010
Horn-Antenna	TRC	HA-0502	06	06/03/2010
Horn-Antenna	TRC	HA-0801	04	10/19/2010
Bilog- Antenna	Sunol Sciences	JB3	A030205	09/11/2010
Loop Antenna	EMCO	6502	8905/2356	05/28/2010
Turn Table	Max-Full	MFT-120S	T120S940302	N.C.R.
Antenna Tower	Max-Full	MFA-430	A440940302	N.C.R.
Controller	Max-Full	MF-CM886	CC-C-1F-13	N.C.R.
Site NSA	CCS	N/A	FCC MRA: TW1039 IC: IC 2324G-1/-2	10/17/2010 11/04/2010
Reject Filter	Micro-Tronics	HPM13194	003	04/23/2010
S.G.	HP	83630B	3844A01022	07/08/2010
Substituted Dipole	Schwazbeck	VHAP/UHAP	998 +999/ 981+982	06/08/2010
Substituted Horn	EMCO	3115	00022257	12/16/2009
Test S/W			LABVIEW (V 6.1)	



4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
3M Semi Anechoic Chamber / 30MHz ~ 1GHz	+/-3.7046
3M Semi Anechoic Chamber / Above 1GHz	+/-3.0958

Remark: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

No.11, Wugong 6th Rd., Wugu Industrial Park, Taipei Hsien 248, Taiwan

Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

No.81-1, Lane 210, Bade 2nd Rd., Luchu Hsiang, Taoyuan Hsien 338, Taiwan

Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."



5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method -47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	 Testing Laboratory 1309
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2

** No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.*



6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix I for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	8960 Series 10 Wireless Communication test set (Remote)	Agilent	E5515C	GB44051665	N/A	N/A	Unshielded, 1.8m

Remark:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

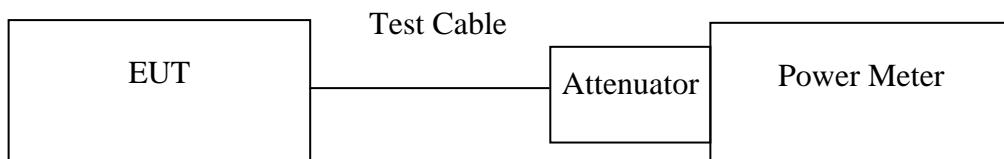
7. FCC PART 22 & 24 REQUIREMENTS

7.1 AVERAGE POWER

LIMIT

According to FCC §2.1046.

Test Configuration



Remark: Measurement setup for testing on Antenna connector

TEST PROCEDURE

The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the power meter reading.

TEST RESULTS

No non-compliance noted.

**Test Data**

Test Mode	CH	Frequency (MHz)	Average Power (dBm)
CDMA2000 1xRTT Cellular	1013	824.70	24.70
	384	836.52	24.80
	777	848.31	24.50
CDMA2000 1xEVDO Cellular	1013	824.70	24.26
	384	836.52	23.56
	777	848.31	24.33

Test Mode	CH	Frequency (MHz)	Average Power (dBm)
CDMA2000 1xRTT PCS	25	1851.25	22.90
	600	1880.00	23.10
	1175	1908.75	22.80
CDMA2000 1xEVDO PCS	25	1851.25	22.80
	600	1880.00	22.60
	1175	1908.75	23.10

Remark: The value of factor includes both the loss of cable and external attenuator

7.2 ERP & EIRP MEASUREMENT

LIMIT

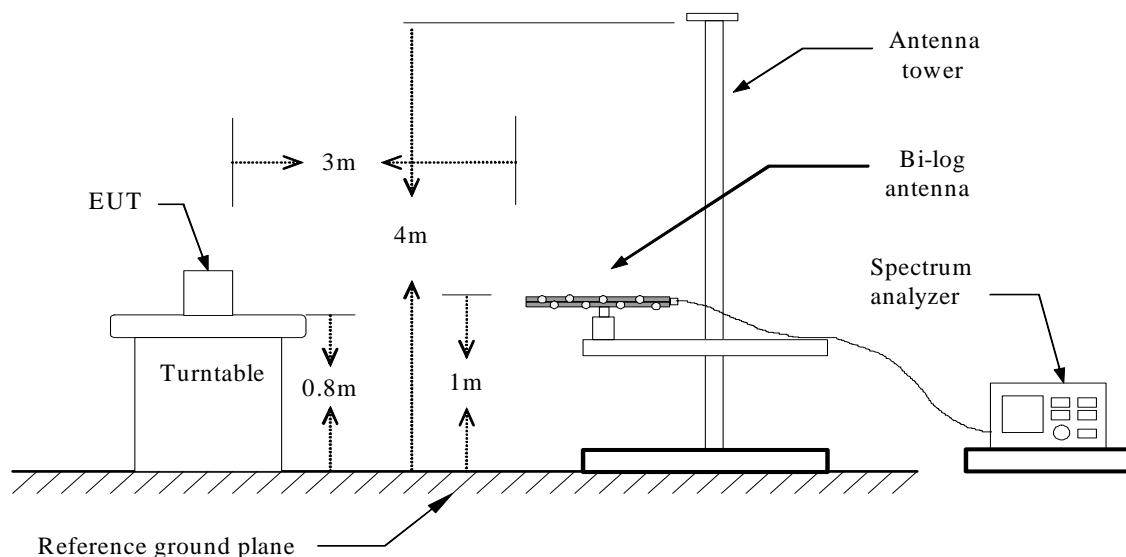
According to FCC §2.1046

FCC 22.913(b): The Effective Radiated Power (ERP) of mobile transmitters must not exceed 7 Watts.

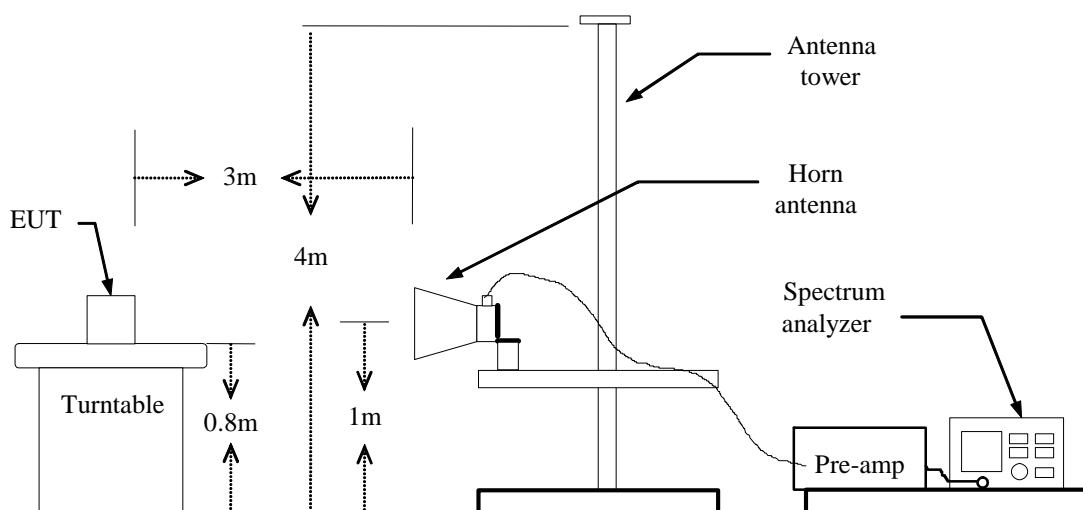
FCC 24.232(b): The equivalent Isotropic Radiated Power (EIRP) must not exceed 2 Watts.

TEST CONFIGURATION

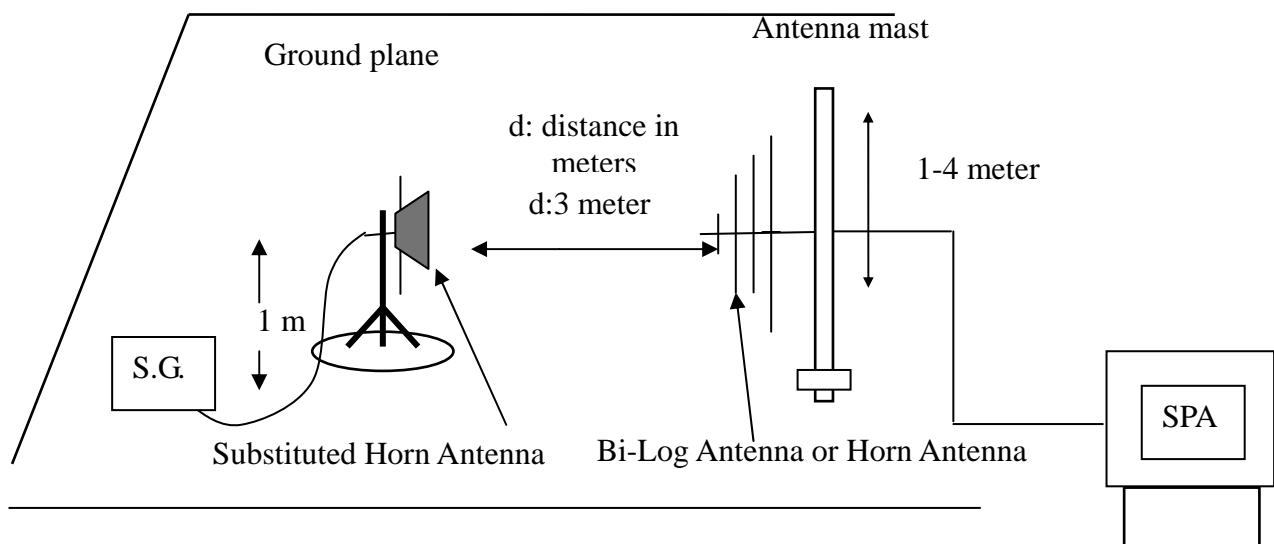
Below 1 GHz



Above 1 GHz



For Substituted Method Test Set-UP



TEST PROCEDURE

The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.

During the measurement of the EUT, the resolution bandwidth was set to 3MHz and the average bandwidth was set to 3MHz. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna. The reading was recorded and the field strength (E in dBuV/m) was calculated.

ERP in frequency band 824-849MHz, and EIRP in frequency band 1851.25 –1910MHz were measured using a substitution method. The EUT was replaced by half-wave dipole (824-849MHz) or horn antenna (1851.25-1910MHz) connected to a signal generator. The spectrum analyzer reading was recorded and ERP/EIRP was calculated as follows:

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable (dB)}$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)}$$



TEST RESULTS

No non-compliance noted.

CDMA2000 1xRTT Cellular Test Data

Channel	Frequency (MHz)	Reading level (dBuV)	Antenna Pol.	Correction Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)
1013	824.80	-20.15	V	34.61	14.46	38.50	-24.04
	824.80	-11.53	H	34.65	*23.12	38.50	-15.38
384	836.50	-19.02	V	34.53	15.50	38.50	-23.00
	836.50	-11.77	H	34.63	22.86	38.50	-15.64
777	848.40	-20.64	V	34.63	13.99	38.50	-24.51
	848.30	-13.66	H	34.74	21.09	38.50	-17.41

CDMA2000 1xEVDO Cellular Test Data

Channel	Frequency (MHz)	Reading level (dBuV)	Antenna Pol.	Correction Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)
1013	848.10	-19.09	V	34.61	15.52	38.50	-22.98
	848.10	-10.29	H	34.65	*24.36	38.50	-14.14
384	836.40	-18.08	V	34.53	16.44	38.50	-22.06
	836.40	-11.15	H	34.63	23.48	38.50	-15.02
777	848.20	-18.65	V	34.62	15.97	38.50	-22.53
	848.20	-12.51	H	34.74	22.22	38.50	-16.28

CDMA2000 1xRTT PCS Test Data

Channel	Frequency (MHz)	Reading level (dBuV)	Antenna Pol.	Correction Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)
25	1851.15	-15.43	V	41.17	*25.75	33.00	-7.25
	1851.15	-21.84	H	40.80	18.96	33.00	-14.04
600	1879.95	-15.69	V	41.23	25.54	33.00	-7.46
	1879.95	-21.12	H	41.14	20.02	33.00	-12.98
1175	1908.90	-16.69	V	41.30	24.61	33.00	-8.39
	1908.90	-20.79	H	41.38	20.59	33.00	-12.41

CDMA2000 1xEVDO PCS Test Data

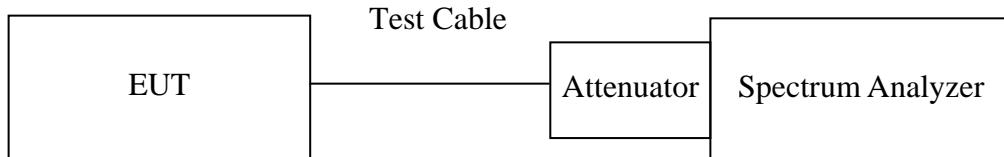
Channel	Frequency (MHz)	Reading level (dBuV)	Antenna Pol.	Correction Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)
25	1851.30	-14.51	V	41.17	*26.66	33.00	-6.34
	1851.30	-20.93	H	40.81	19.88	33.00	-13.12
600	1880.10	-14.57	V	41.23	26.66	33.00	-6.34
	1880.10	-19.89	H	41.15	21.26	33.00	-11.74
1175	1908.75	-15.52	V	41.30	25.78	33.00	-7.22
	1908.75	-19.74	H	41.38	21.64	33.00	-11.36

7.3 OCCUPIED BANDWIDTH MEASUREMENT

LIMIT

According to §FCC 2.1049.

Test Configuration



Remark: Measurement setup for testing on Antenna connector

TEST PROCEDURE

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW was set to about 1% of emission BW, VBW is set to 3 times the RBW, -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

TEST RESULTS

No non-compliance noted.

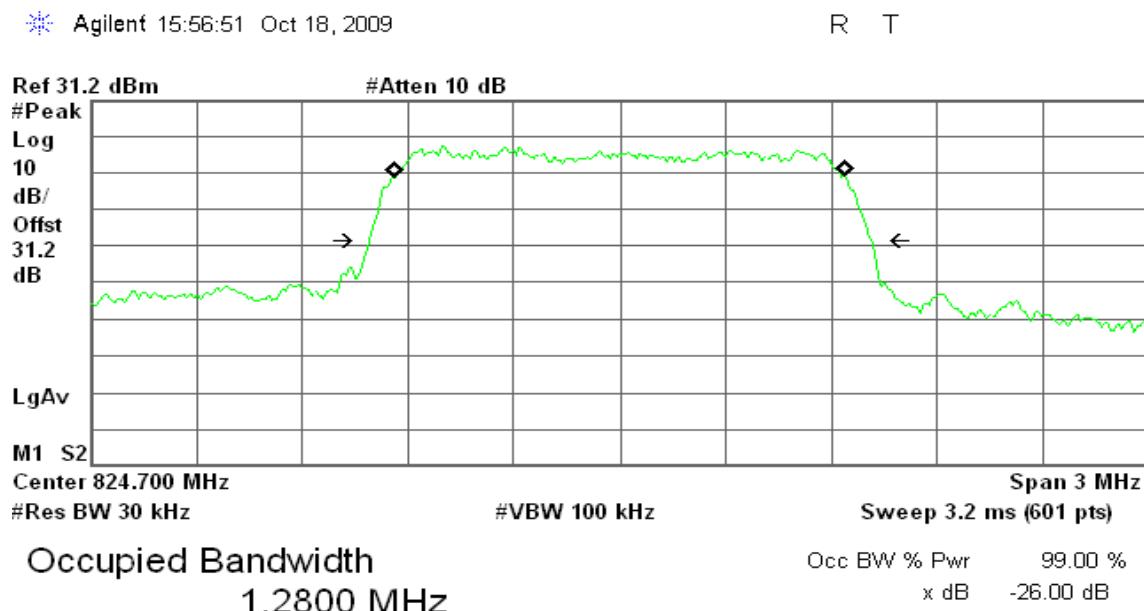
Test Data

Test Mode	CH	Frequency (MHz)	Bandwidth (MHz)
CDMA2000 1xRTT Cellular	1013	824.700	1.2800
	384	836.520	1.2775
	777	848.310	1.2772
CDMA2000 1xEVDO Cellular	1013	824.700	1.2785
	384	836.520	1.2780
	777	848.310	1.2787

Test Mode	CH	Frequency (MHz)	Bandwidth (MHz)
CDMA2000 1xRTT PCS	25	1851.250	1.2880
	600	1880.000	1.2835
	1175	1908.750	1.2794
CDMA2000 1xEVDO PCS	25	1851.250	1.2909
	600	1880.000	1.2875
	1175	1908.750	1.2972

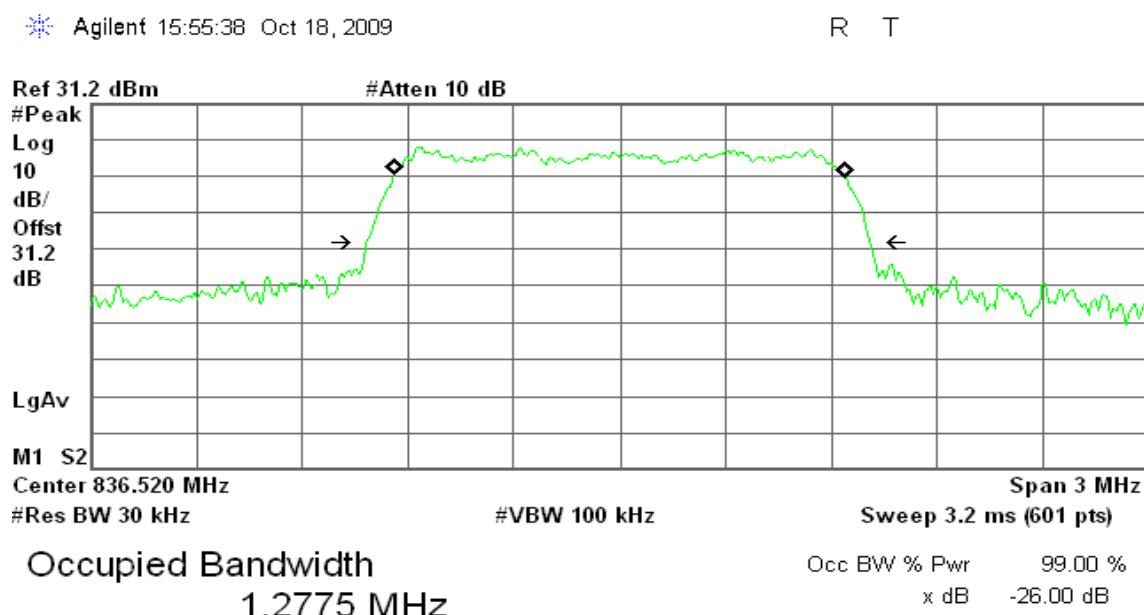
Test Plot

CDMA2000 1xRTT Cellular / CH Low



Transmit Freq Error -2.043 kHz
x dB Bandwidth 1.428 MHz

CDMA2000 1xRTT Cellular / CH Mid

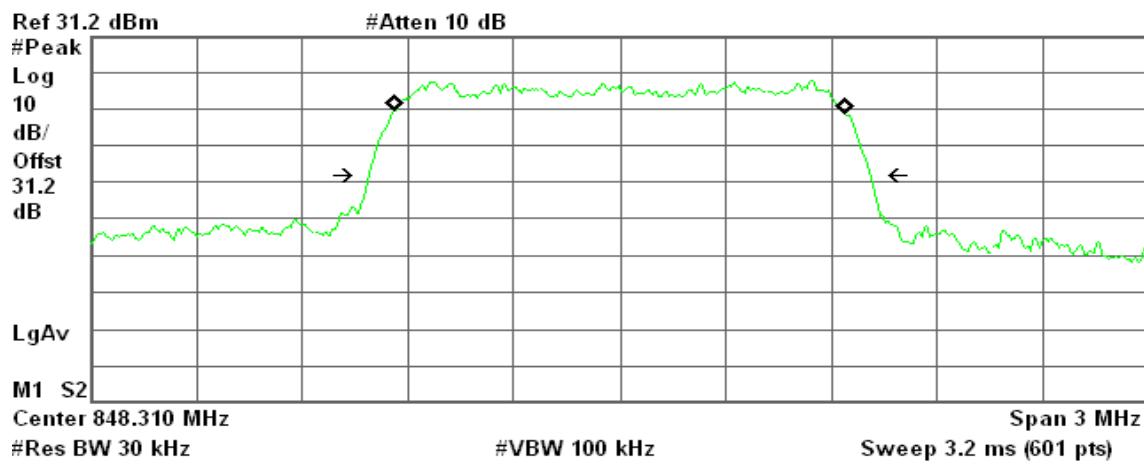


Transmit Freq Error 967.660 Hz
x dB Bandwidth 1.429 MHz

CDMA2000 1xRTT Cellular / CH High

Agilent 15:57:23 Oct 18, 2009

R T

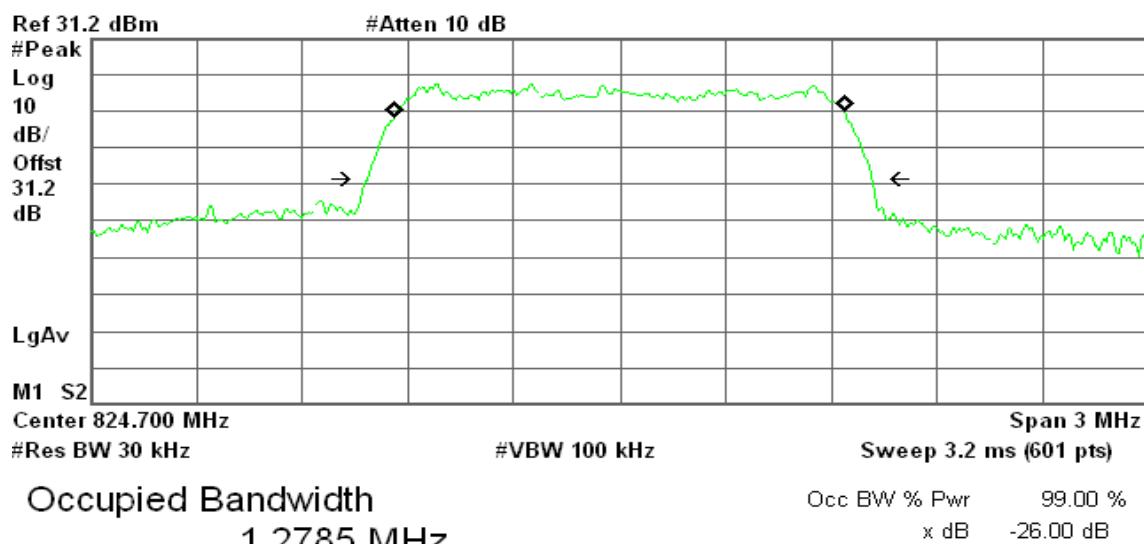


Transmit Freq Error 886.786 Hz
x dB Bandwidth 1.425 MHz

CDMA2000 1xEVDO Cellular / CH Low

Agilent 14:31:43 Oct 18, 2009

R T

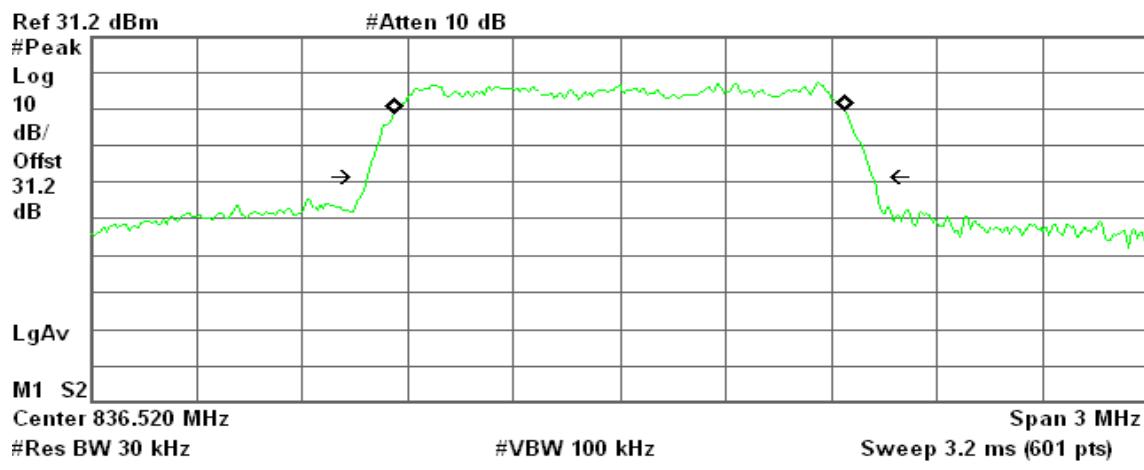


Transmit Freq Error 1.254 kHz
x dB Bandwidth 1.432 MHz

CDMA2000 1xEVDO Cellular / CH Mid

Agilent 14:29:57 Oct 18, 2009

R T

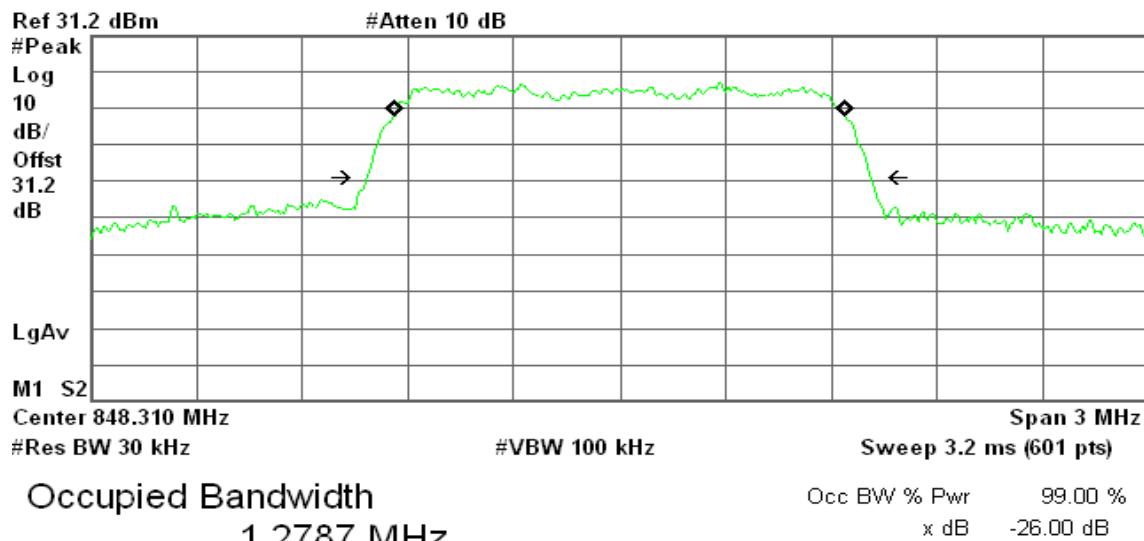


Transmit Freq Error -86.926 Hz
x dB Bandwidth 1.435 MHz

CDMA2000 1xEVDO Cellular / CH High

Agilent 14:32:13 Oct 18, 2009

R T

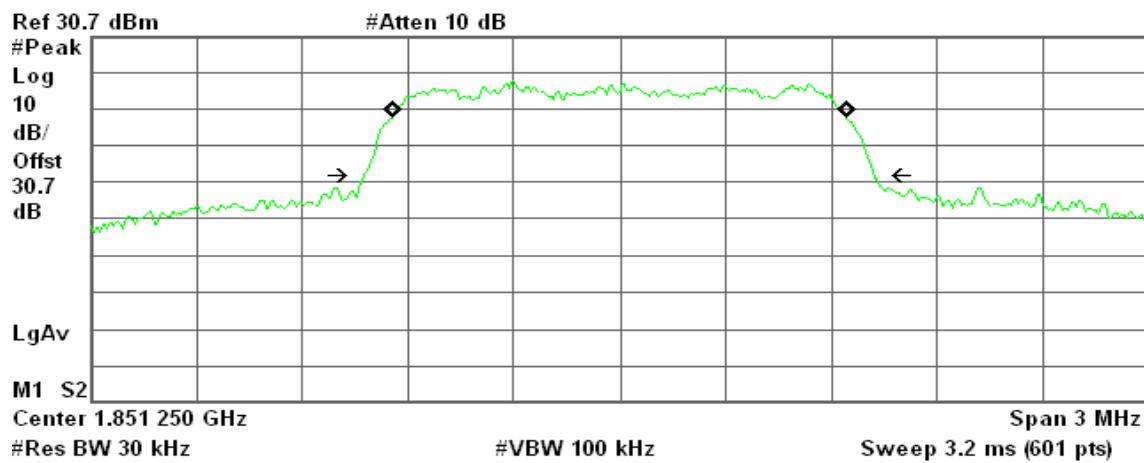


Transmit Freq Error -1.124 kHz
x dB Bandwidth 1.430 MHz

CDMA2000 1xRTT PCS / CH Low

Agilent 16:21:45 Oct 18, 2009

R T

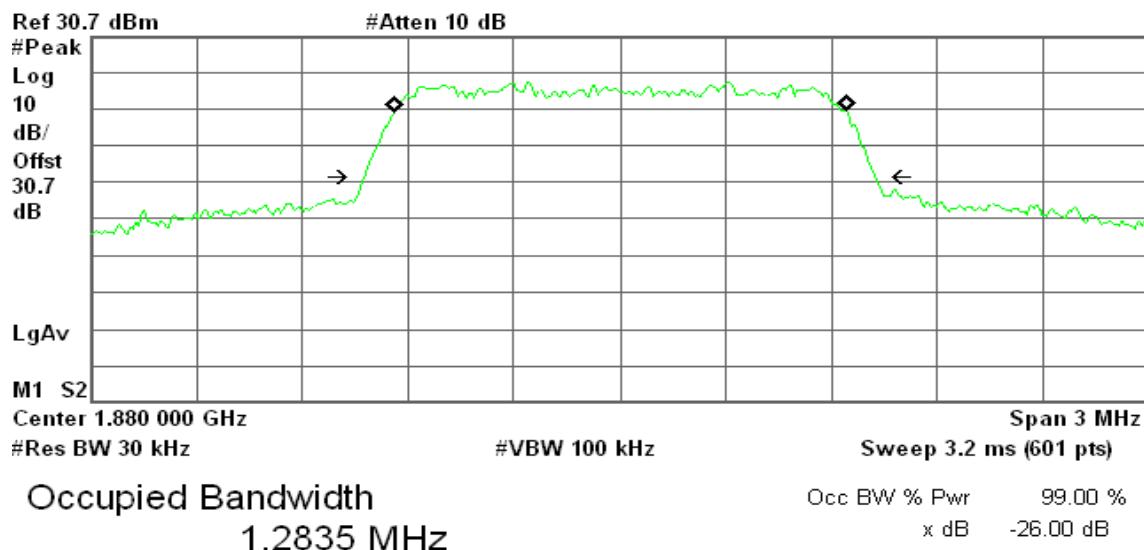


Transmit Freq Error 241.566 Hz
x dB Bandwidth 1.449 MHz

CDMA2000 1xRTT PCS / CH Mid

Agilent 16:22:17 Oct 18, 2009

R T

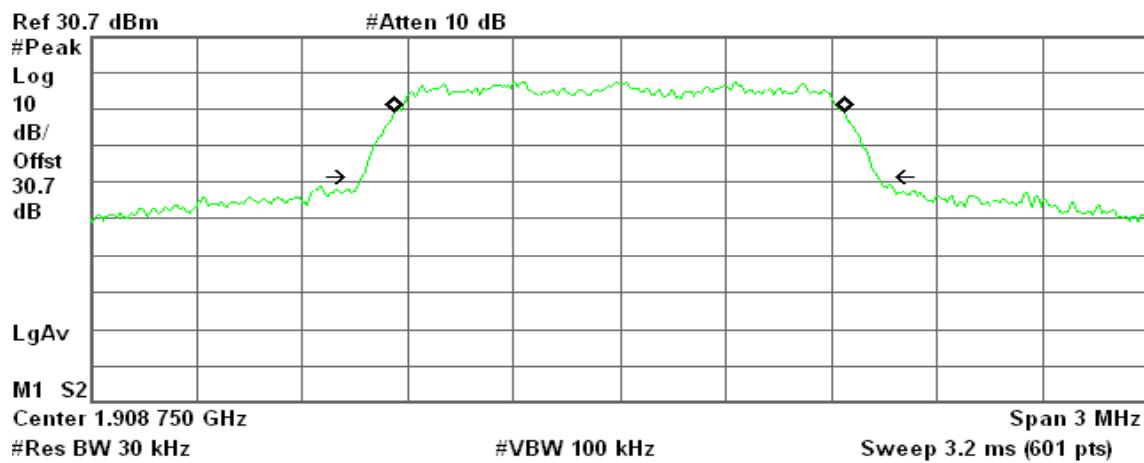


Transmit Freq Error 2.928 kHz
x dB Bandwidth 1.450 MHz

CDMA2000 1xRTT PCS / CH High

Agilent 16:20:09 Oct 18, 2009

R T

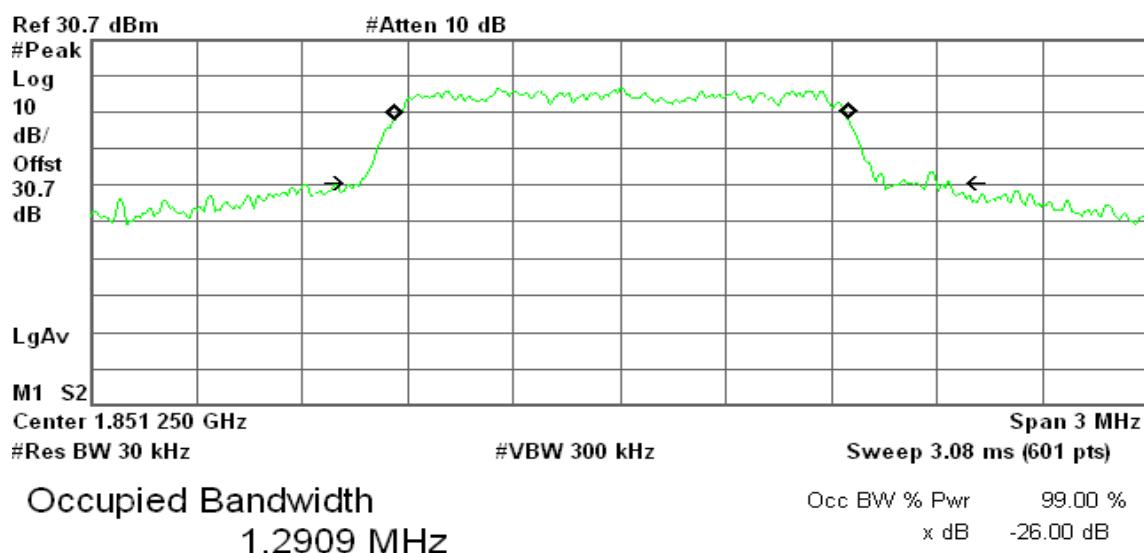


Transmit Freq Error 557.837 Hz
x dB Bandwidth 1.466 MHz

CDMA2000 1xEVDO PCS / CH Low

Agilent 15:17:34 Oct 18, 2009

R T

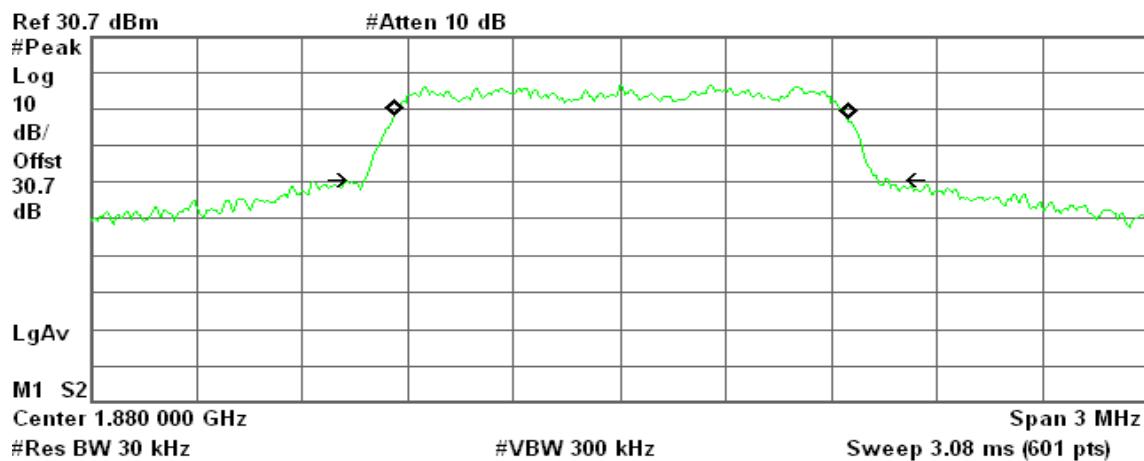


Transmit Freq Error 3.382 kHz
x dB Bandwidth 1.672 MHz

CDMA2000 1xEVDO PCS / CH Mid

Agilent 15:18:02 Oct 18, 2009

R T

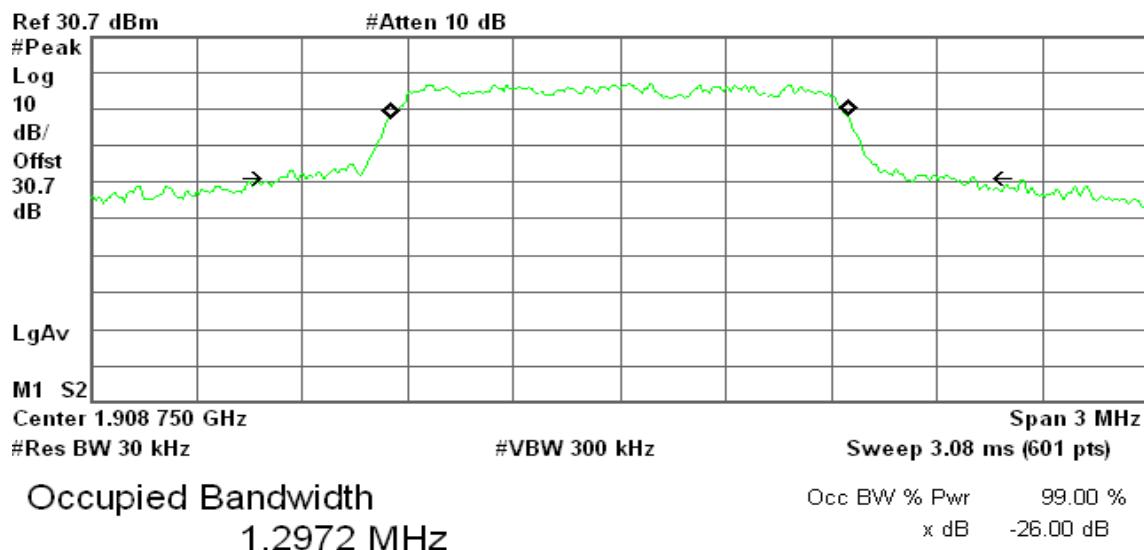


Transmit Freq Error 3.929 kHz
x dB Bandwidth 1.487 MHz

CDMA2000 1xEVDO PCS / CH High

Agilent 15:16:25 Oct 18, 2009

R T



Transmit Freq Error -864.016 Hz
x dB Bandwidth 1.971 MHz

7.4 OUT OF BAND EMISSION AT ANTENNA TERMINALS

LIMIT

According to FCC §2.1051, FCC §22.917, FCC §24.238(a).

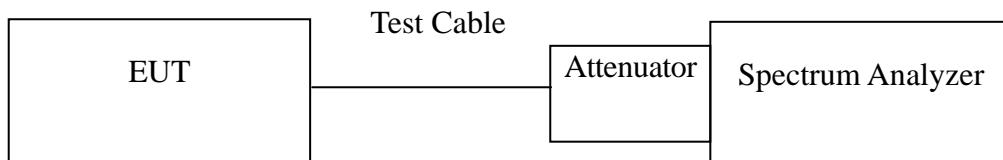
Out of Band Emissions: The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least $43 + 10 \log P$ dB.

Mobile Emissions in Base Frequency Range: The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitters operated must be attenuated to a level not exceed -80 dBm at the transmit antenna connector.

Band Edge Requirements: In the 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the Out of band Emission

TEST CONFIGURATION

Out of band emission at antenna terminals:



TEST PROCEDURE

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

For the out of band: Set the RBW, VBW = 1MHz, Start=30MHz, Stop= 10 th harmonic. Limit = -13dBm

Band Edge Requirements (824 MHz and 849 MHz /1850MHz and 1910MHz): In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions. Limit, -13dBm.



TEST RESULTS

No non-compliance noted.

Test Data

Mode	CH	Location	Description
CDMA2000 1xRTT Cellular	1013	Figure 7-1	Conducted spurious emissions, 30MHz - 20GHz
	777	Figure 7-2	Conducted spurious emissions, 30MHz - 20GHz
	384	Figure 7-3	Conducted spurious emissions, 30MHz - 20GHz
CDMA2000 1xEVDO Cellular	1013	Figure 8-1	Conducted spurious emissions, 30MHz - 20GHz
	777	Figure 8-2	Conducted spurious emissions, 30MHz - 20GHz
	384	Figure 8-3	Conducted spurious emissions, 30MHz - 20GHz
CDMA2000 1xRTT PCS	25	Figure 9-1	Conducted spurious emissions, 30MHz - 20GHz
	600	Figure 9-2	Conducted spurious emissions, 30MHz - 20GHz
	1175	Figure 9-3.	Conducted spurious emissions, 30MHz - 20GHz
CDMA2000 1xEVDO PCS	25	Figure 10-1	Conducted spurious emissions, 30MHz - 20GHz
	600	Figure 10-2	Conducted spurious emissions, 30MHz - 20GHz
	1175	Figure 10-3.	Conducted spurious emissions, 30MHz - 20GHz
CDMA2000 1xRTT Cellular	1013	Figure 11-1	Band Edge emissions
	384	Figure 11-2	Band Edge emissions
CDMA2000 1xEVDO Cellular	1013	Figure 12-1	Band Edge emissions
	384	Figure 12-2	Band Edge emissions
CDMA2000 1xRTT PCS	25	Figure 13-1	Band Edge emissions
	1175	Figure 13-2	Band Edge emissions
CDMA2000 1xEVDO PCS	25	Figure 14-1	Band Edge emissions
	1175	Figure 14-2	Band Edge emissions

Test Plot

CDMA2000 1xRTT Cellular

Figure 7-1: Out of Band emission at antenna terminals – CDMA2000 1xRTT / CH Low

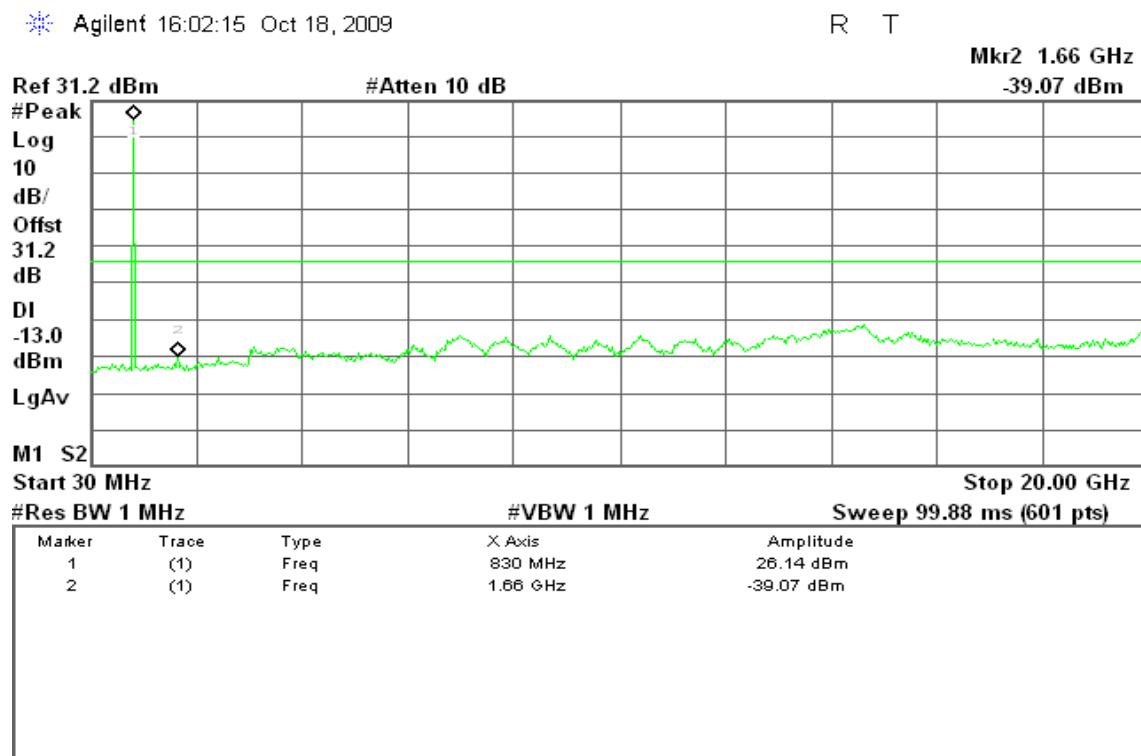


Figure 7-2: Out of Band emission at antenna terminals – CDMA2000 1xRTT / CH Mid

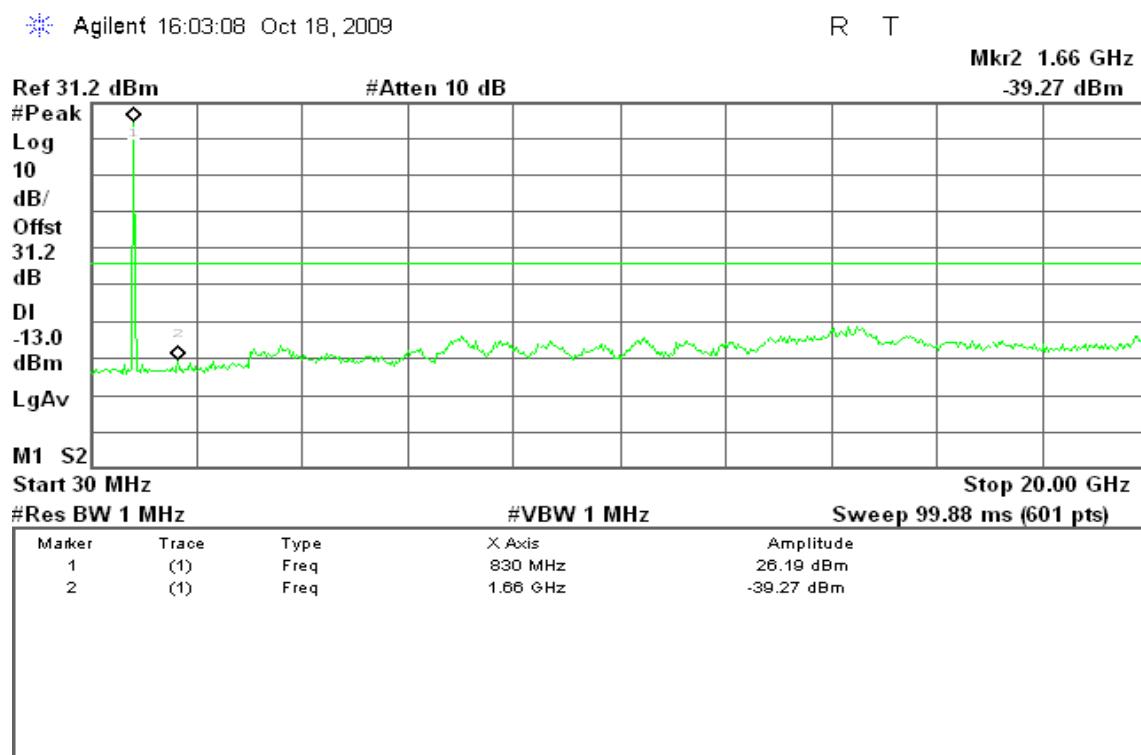
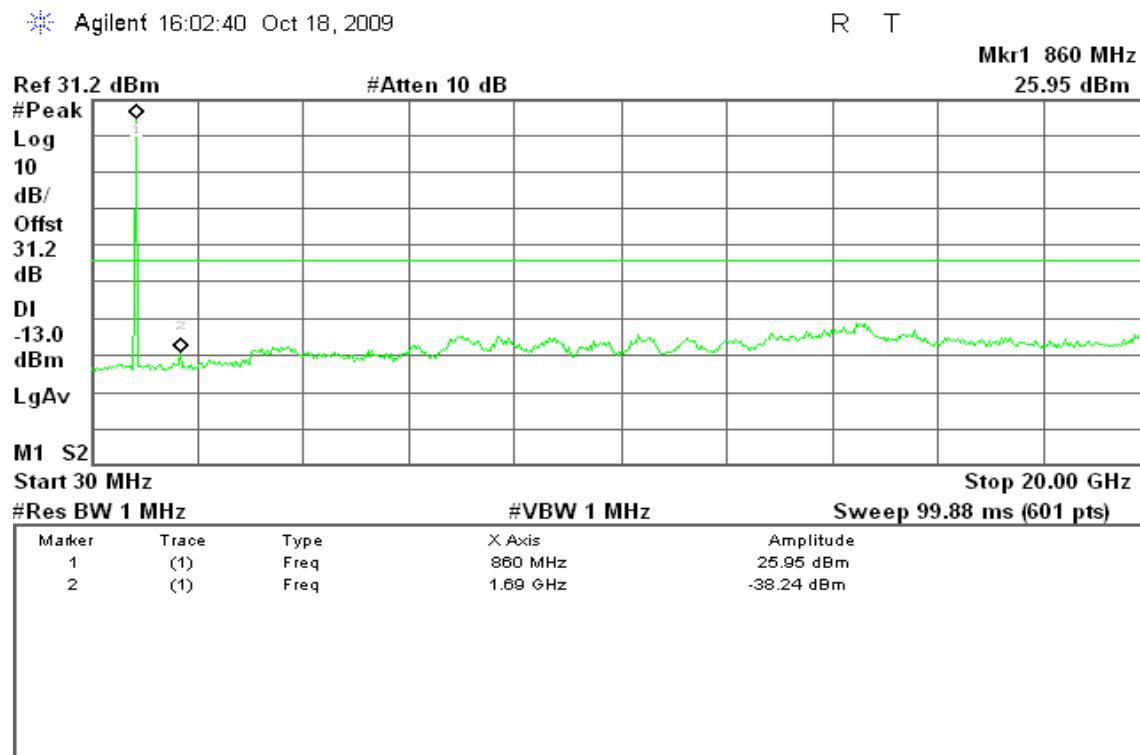


Figure 7-3: Out of Band emission at antenna terminals – CDMA2000 1xRTT / CH High



1xEVDO Cellular

Figure 8-1: Out of Band emission at antenna terminals – CDMA2000 1xEVDO / CH Low

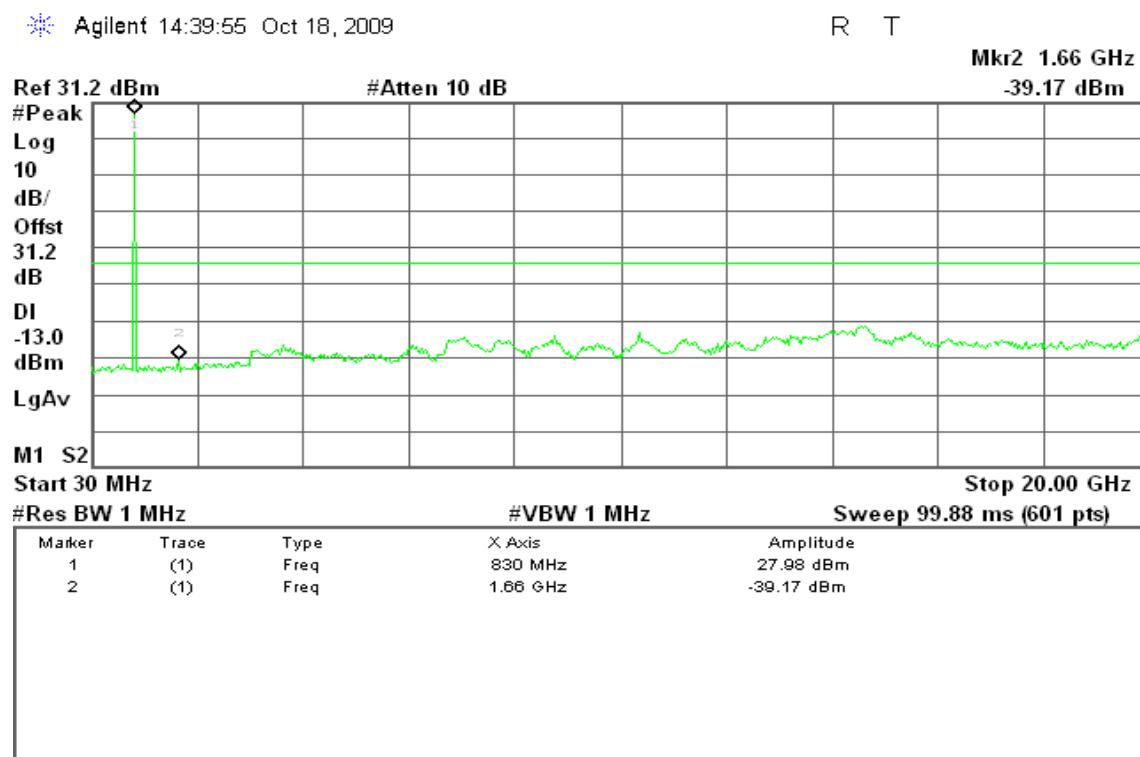


Figure 8-2: Out of Band emission at antenna terminals – CDMA2000 1xEVDO / CH Mid

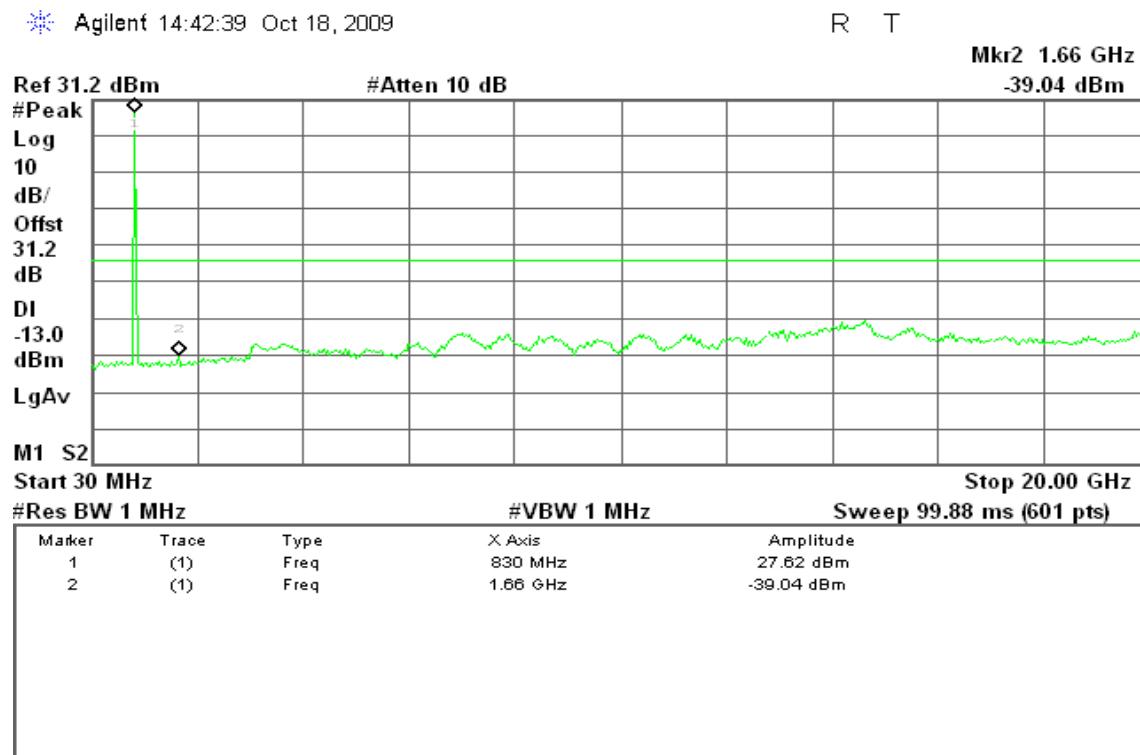
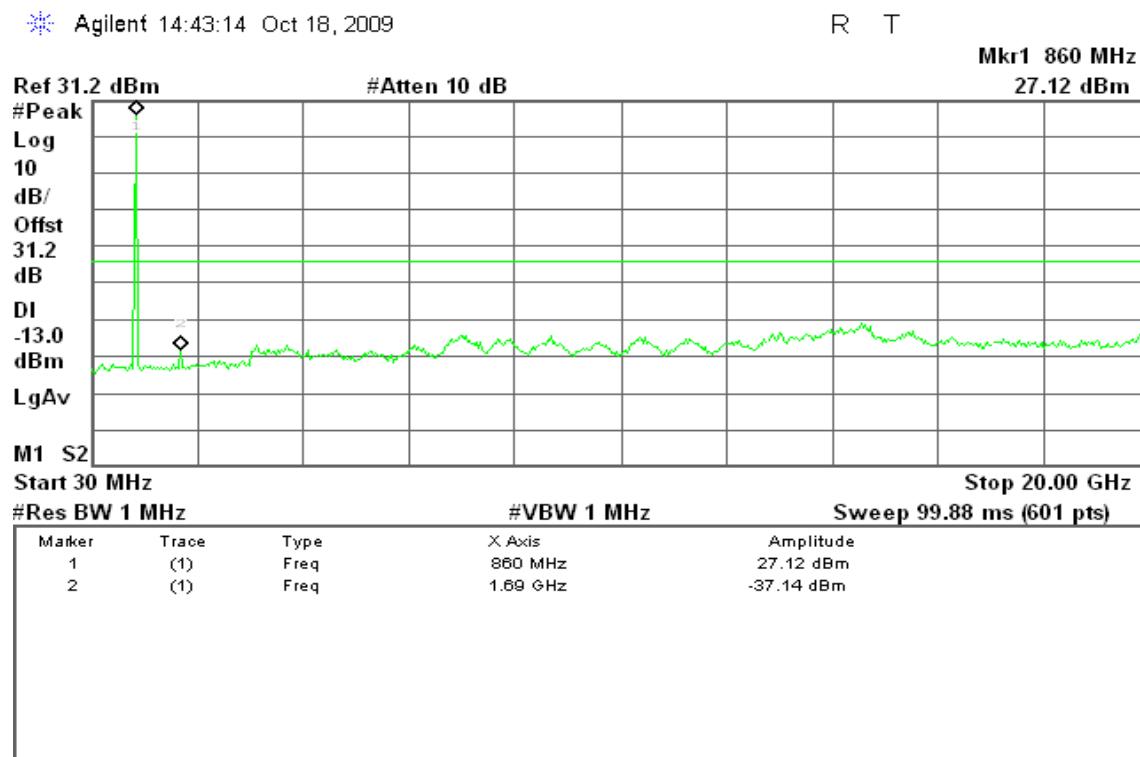


Figure 8-3: Out of Band emission at antenna terminals – CDMA2000 1xEVDO / CH High



CDMA2000 1xRTT PCS

Figure 9-1: Out of Band emission at antenna terminals – CDMA2000 1xRTT / CH Low

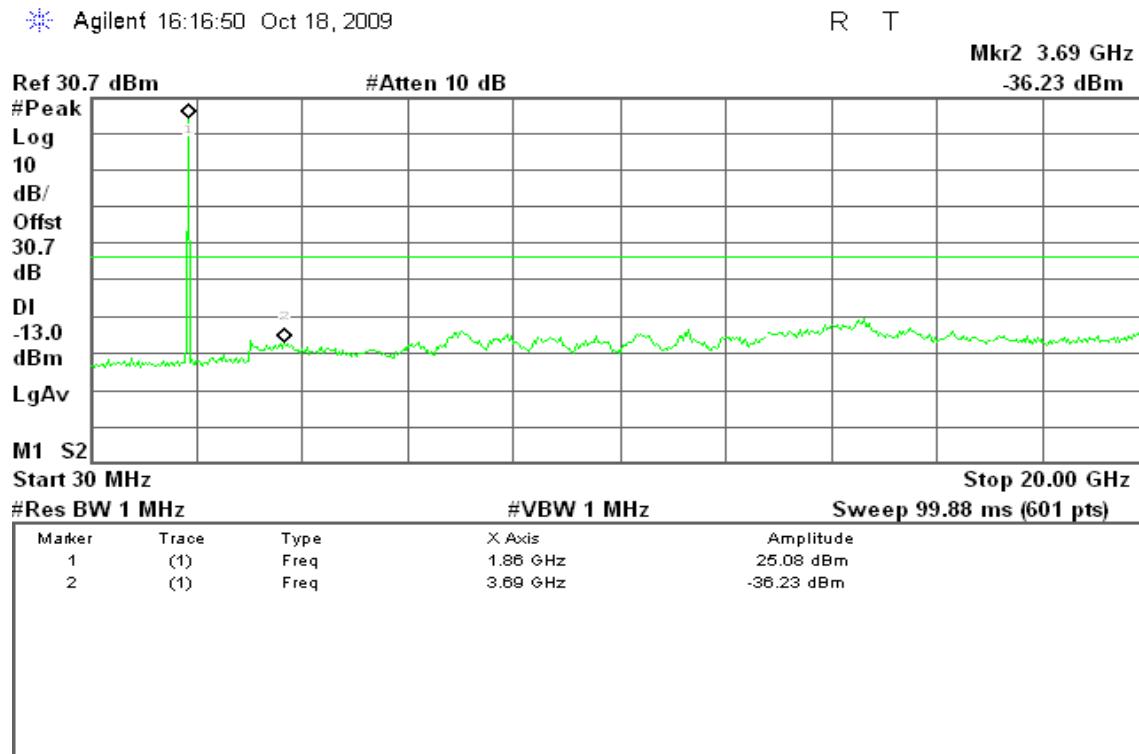


Figure 9-2: Out of Band emission at antenna terminals – CDMA2000 1xRTT / CH Mid

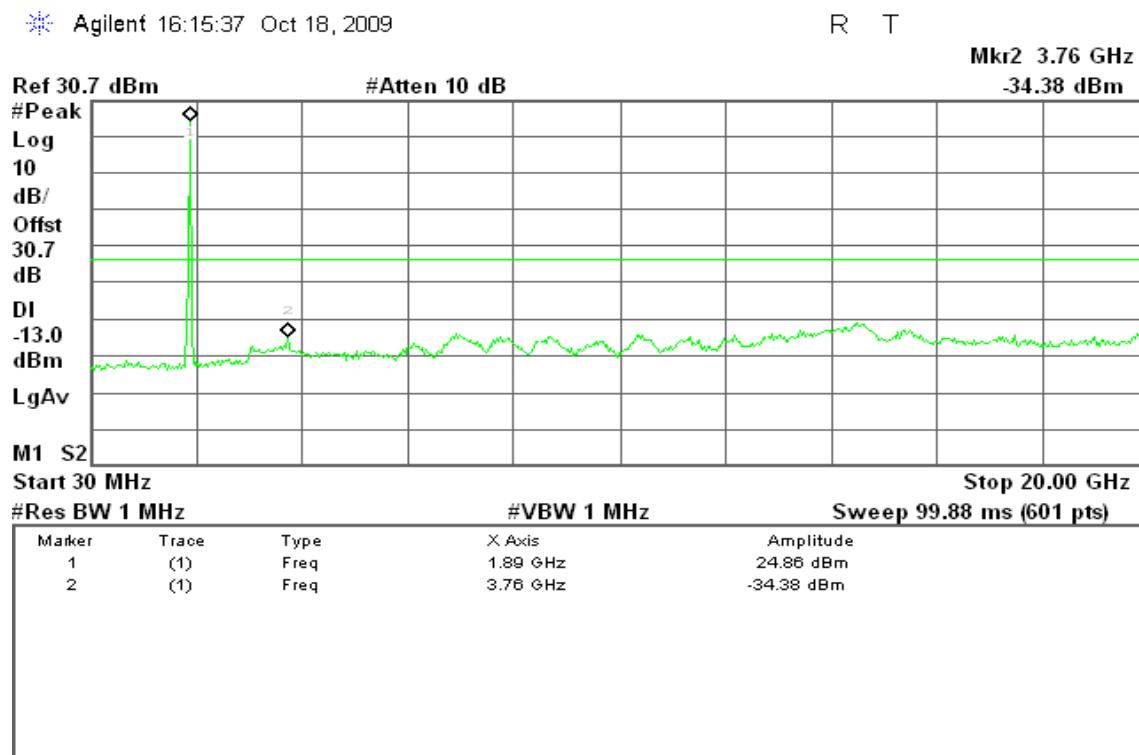
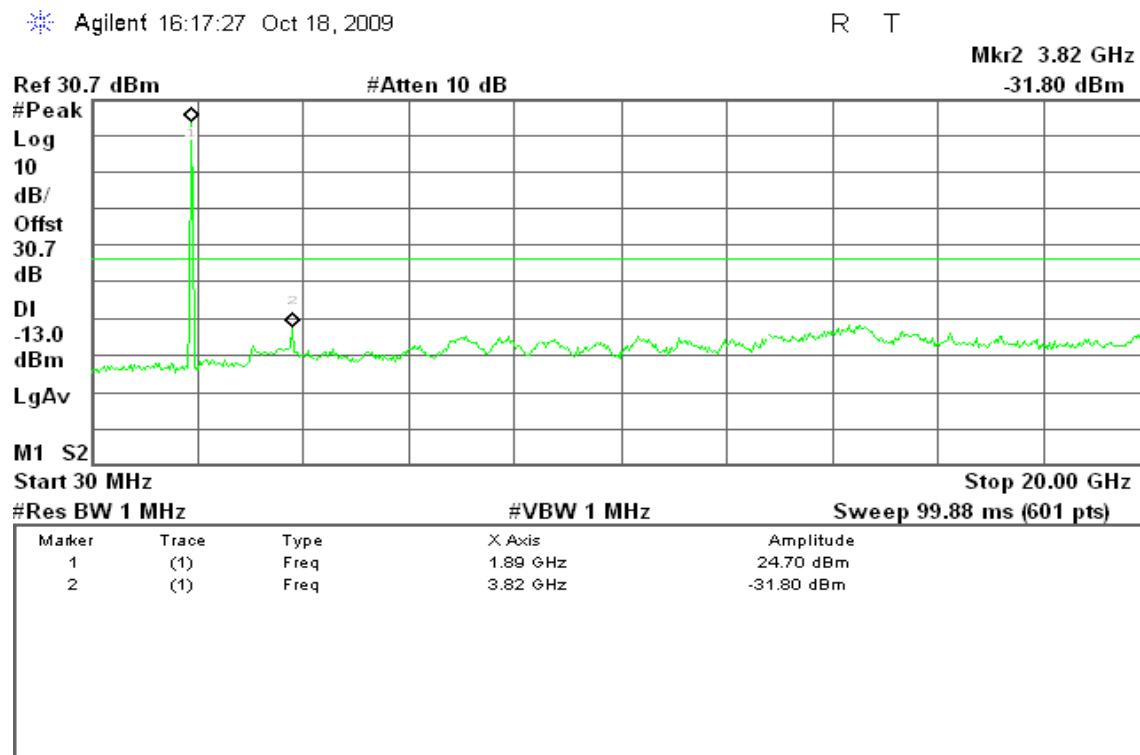


Figure 9-3: Out of Band emission at antenna terminals – CDMA2000 1xRTT / CH High



CDMA2000 1xEVDO PCS

Figure 10-1: Out of Band emission at antenna terminals – CDMA2000 1xEVDO / CH Low

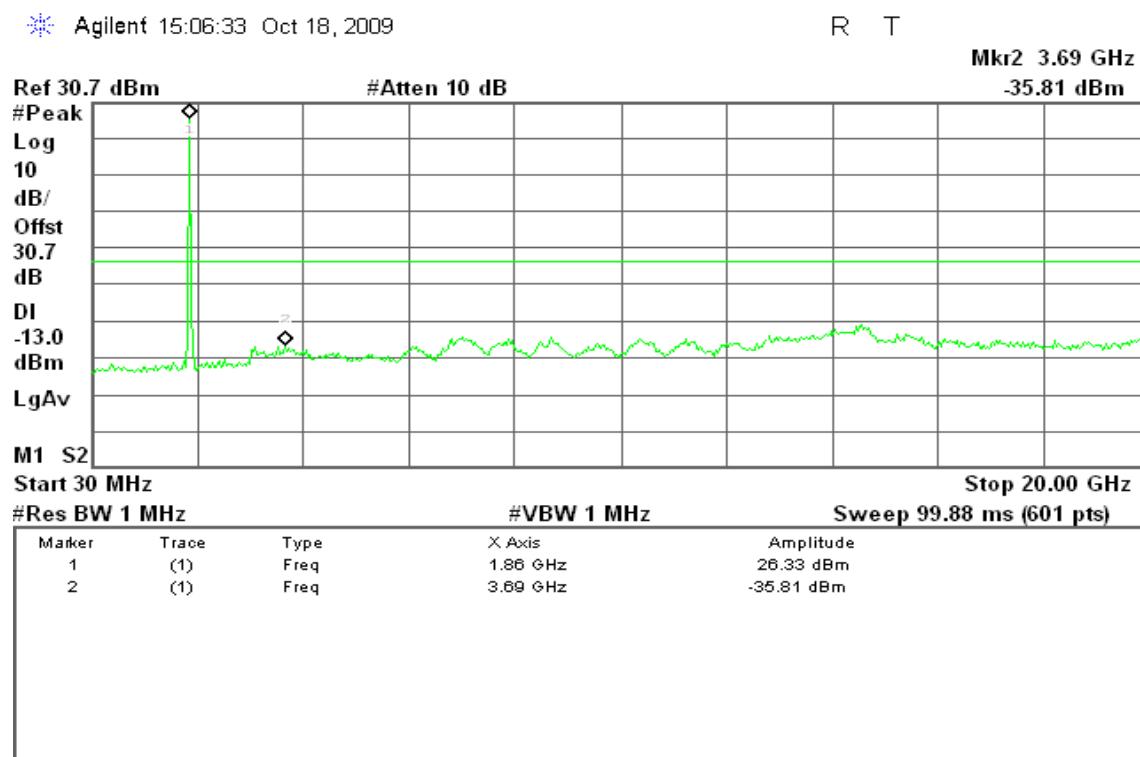


Figure 10-2: Out of Band emission at antenna terminals – CDMA2000 1xEVDO / CH Mid

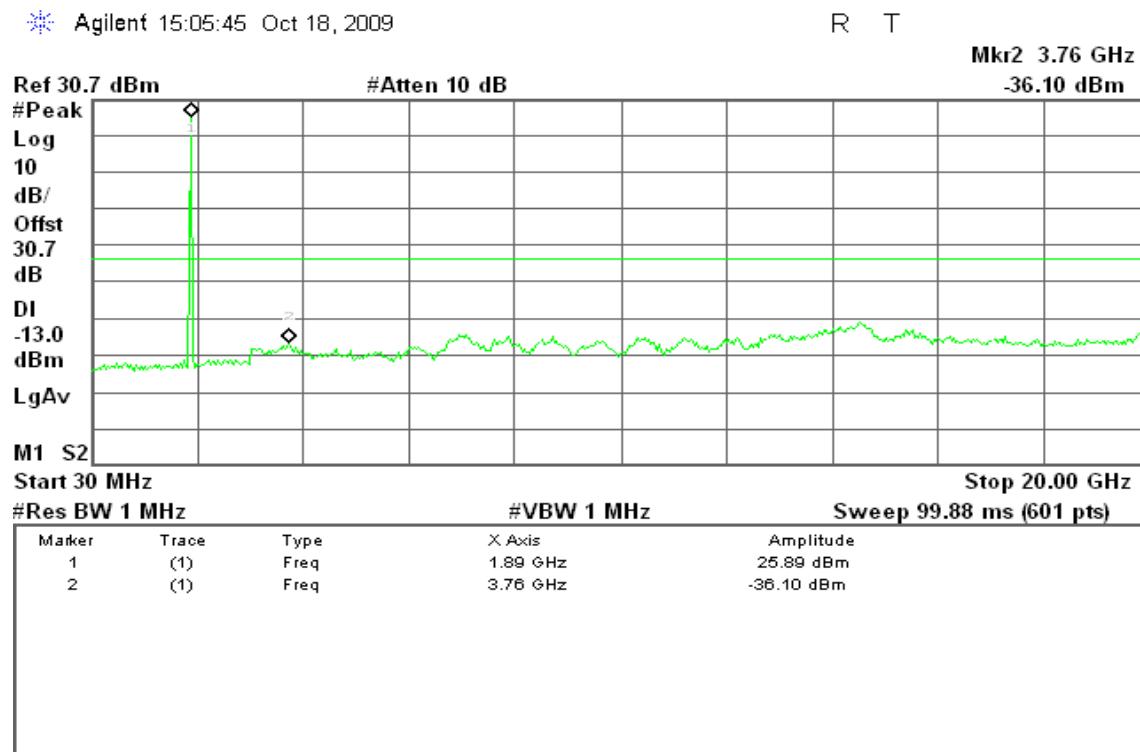
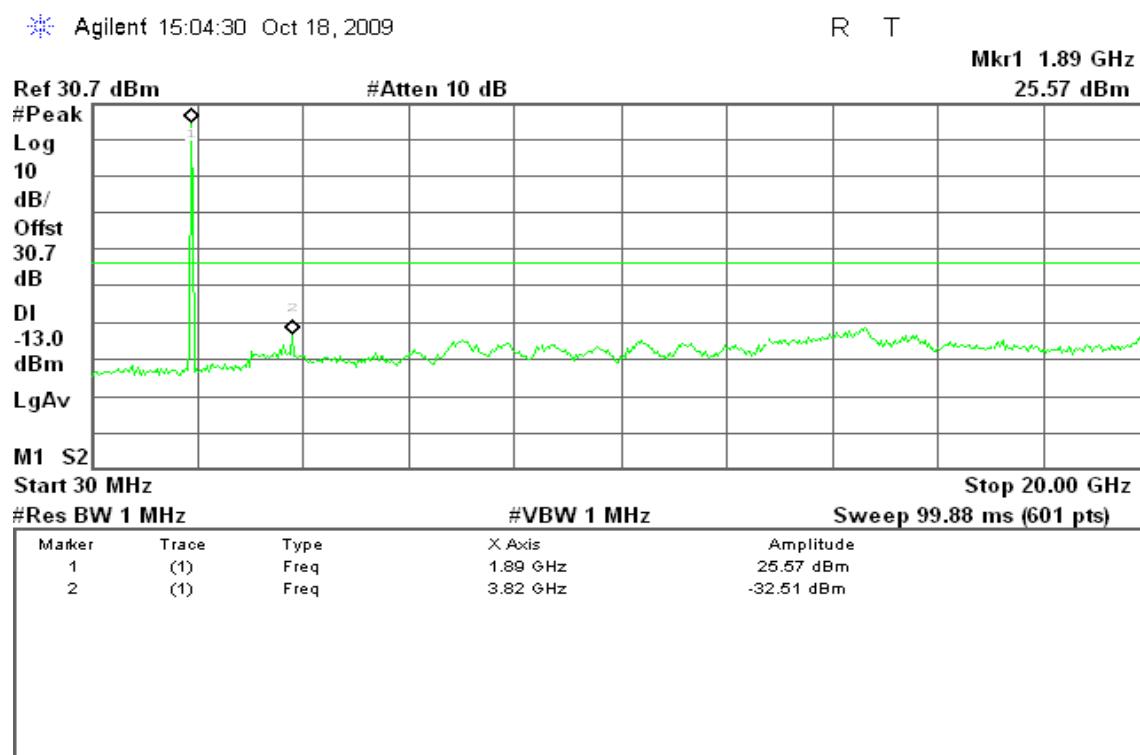


Figure 10-3: Out of Band emission at antenna terminals – CDMA2000 1xEVDO / CH High



CDMA2000 1xRTT Cellular

Figure 11-1: Band Edge emissions – CDMA2000 1xRTT / CH Low

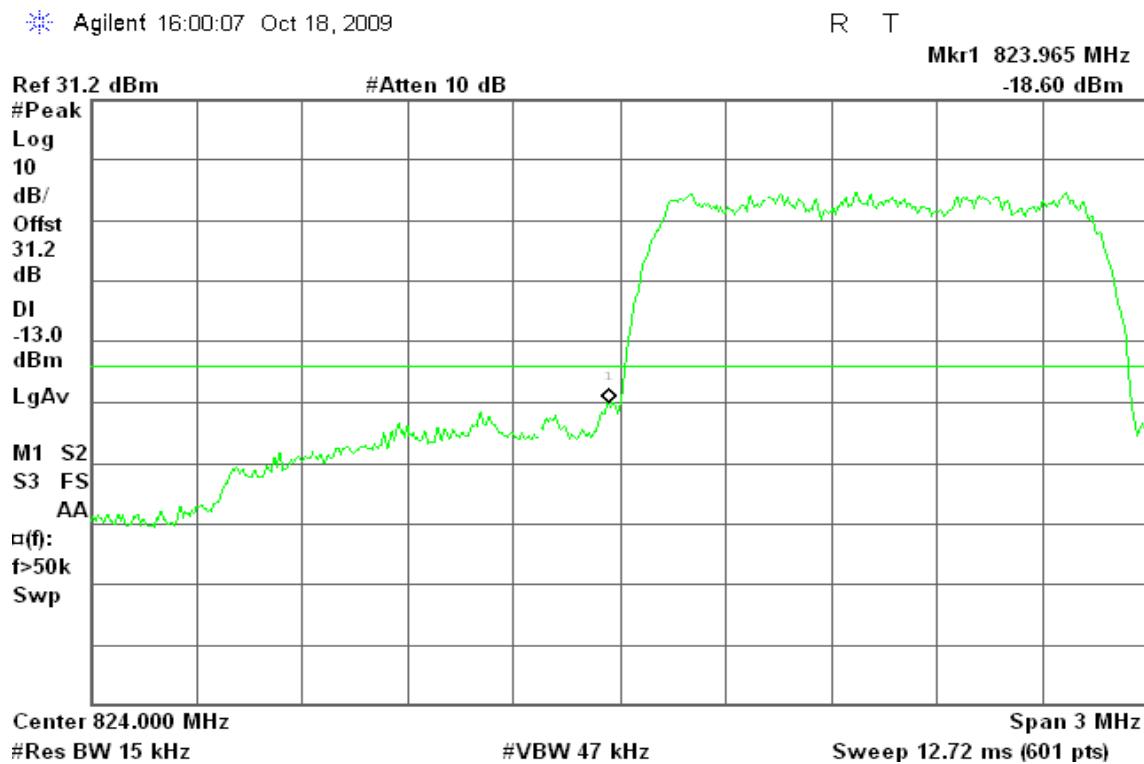
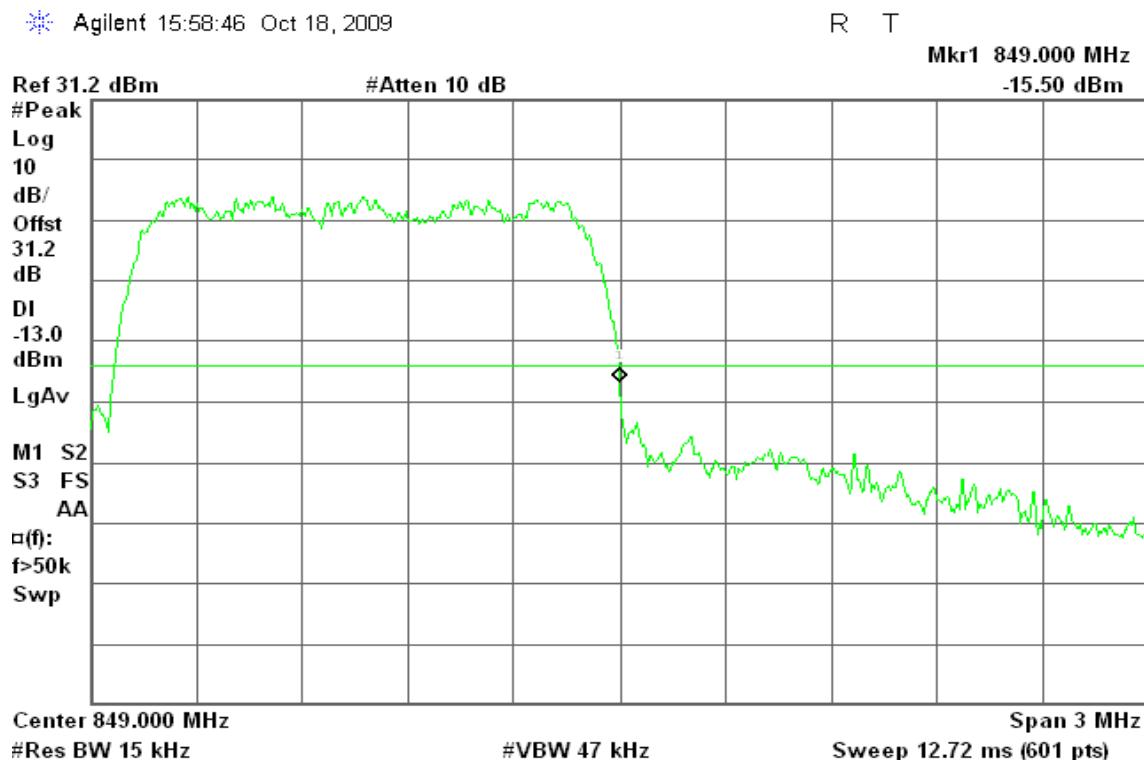


Figure 11-2: Band Edge emissions – CDMA2000 1xRTT / CH High



CDMA2000 1xEVDO Cellular

Figure 12-1: Band Edge emissions – CDMA2000 1xEVDO / CH Low

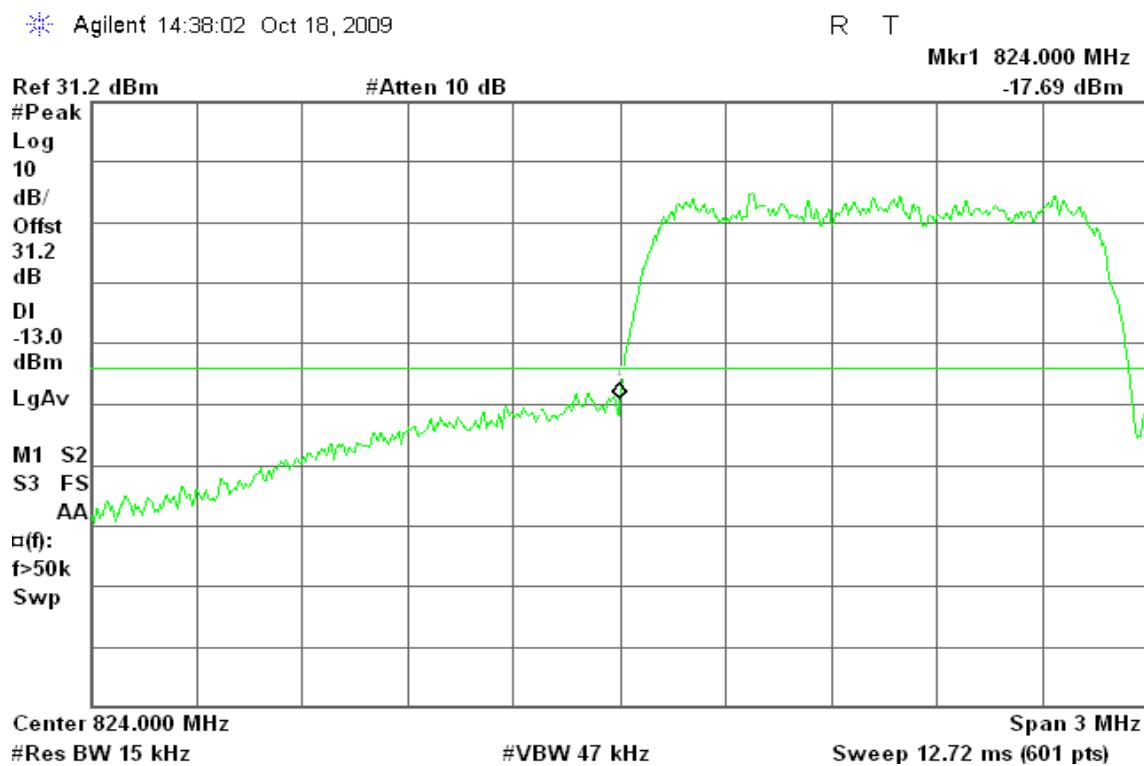
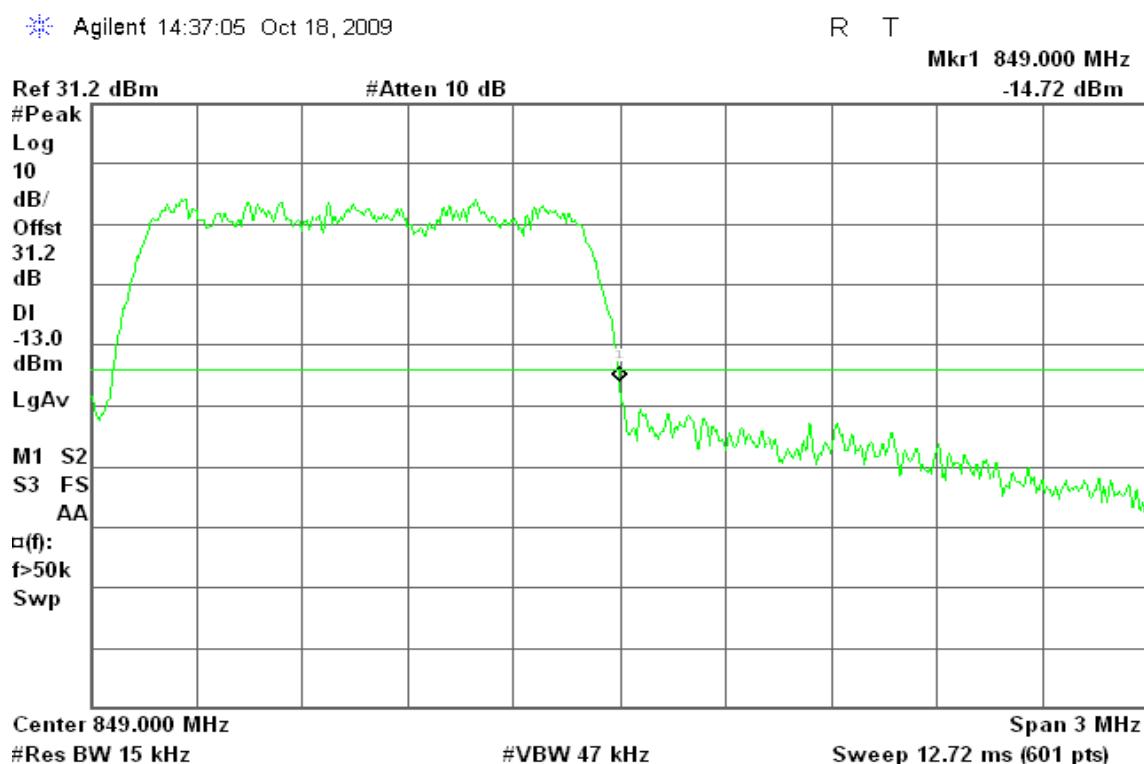


Figure 12-2: Band Edge emissions – CDMA2000 1xEVDO / CH High



CDMA2000 1xRTT PCS

Figure 13-1: Band Edge emissions – CDMA2000 1xRTT / CH Low

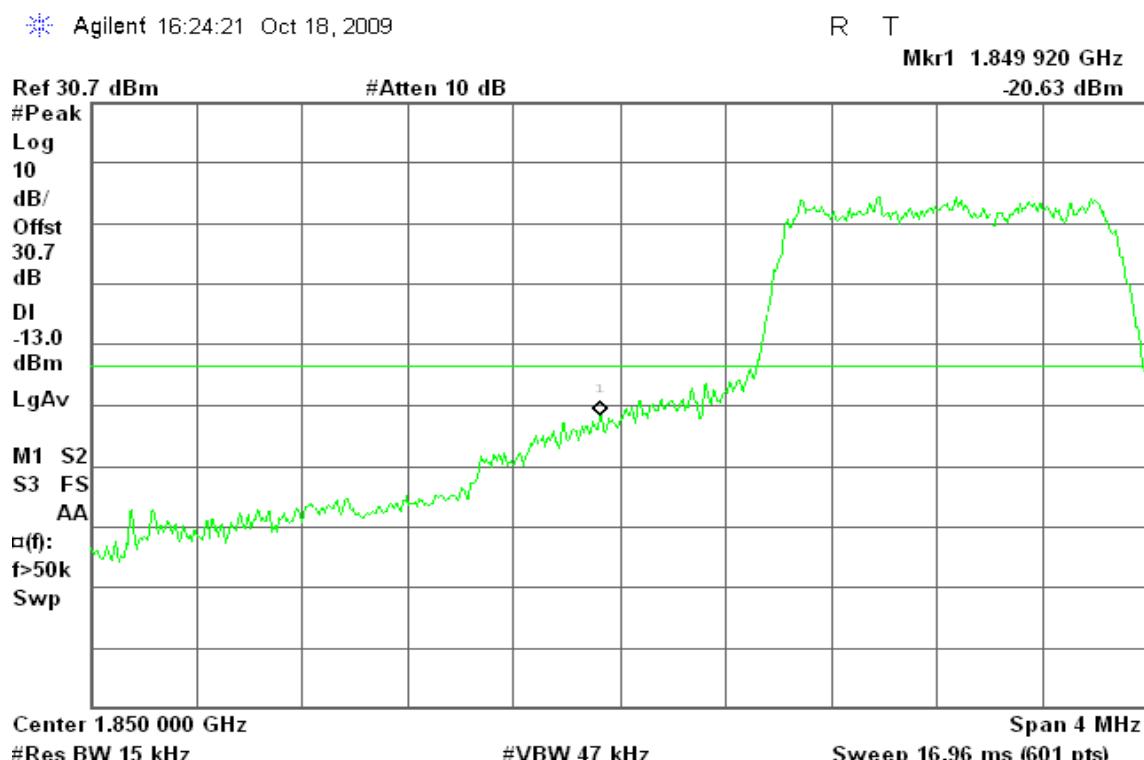
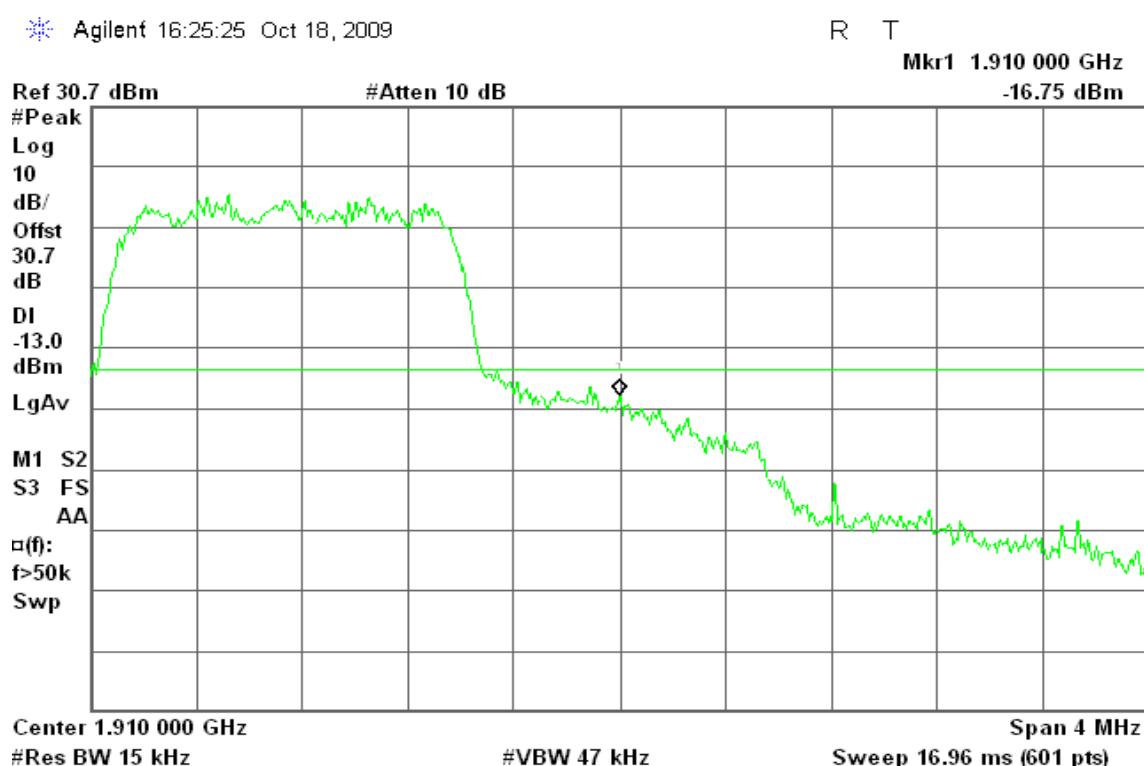


Figure 13-2: Band Edge emissions – CDMA2000 1xRTT / CH High



CDMA2000 1xEVDO PCS

Figure 14-1: Band Edge emissions – CDMA2000 1xEVDO / CH Low

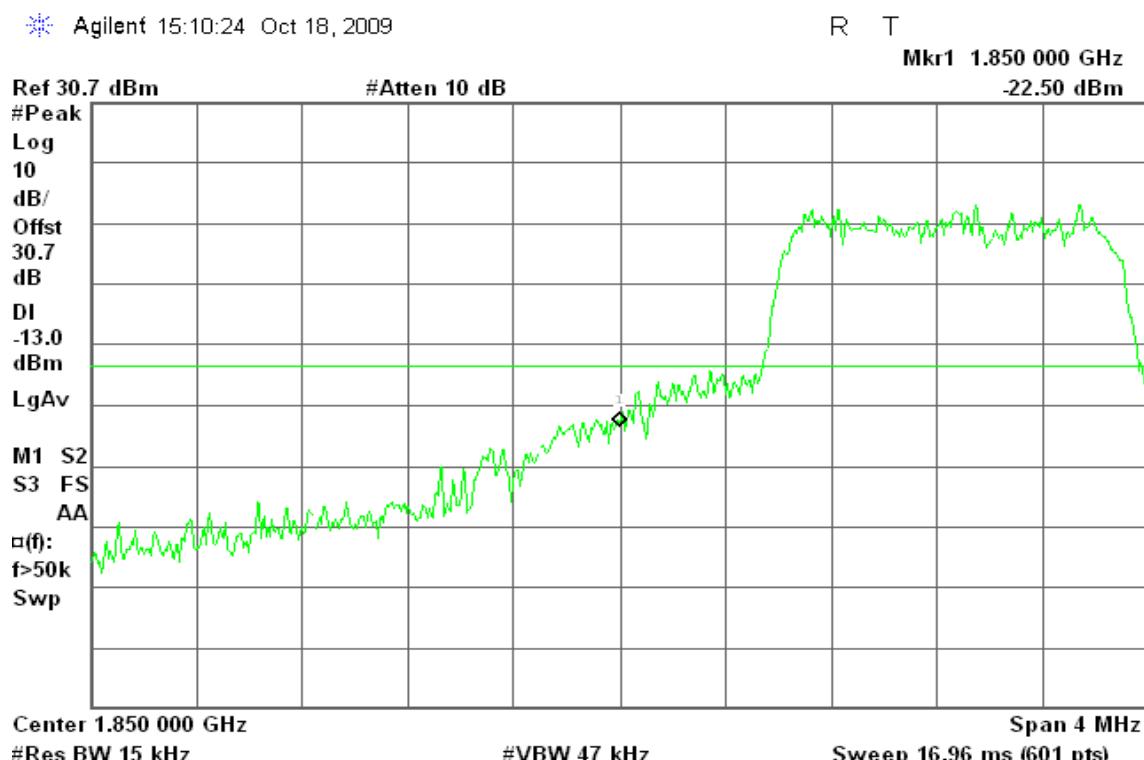
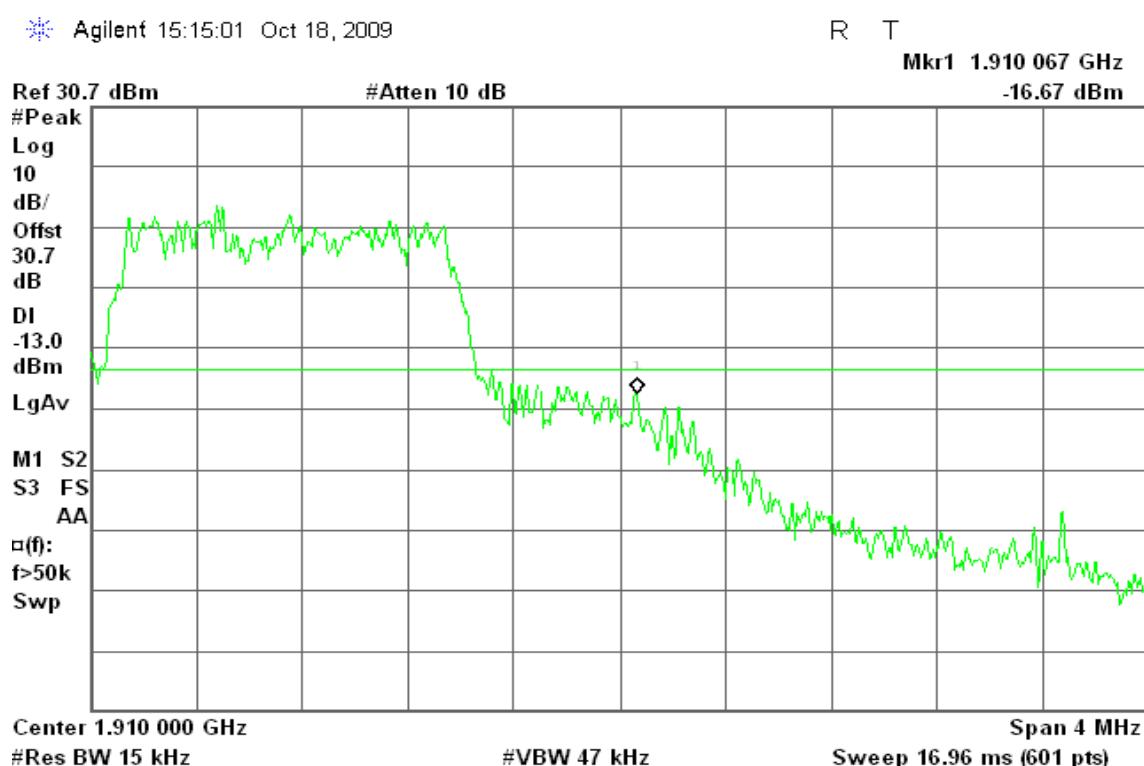


Figure 14-2: Band Edge emissions – CDMA2000 1xEVDO / CH High



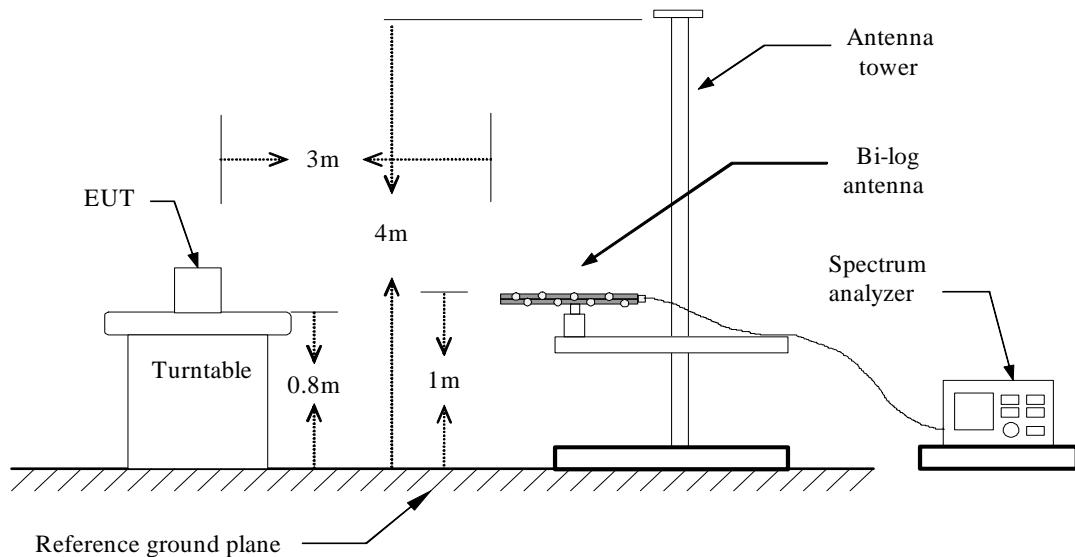
7.5 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

LIMIT

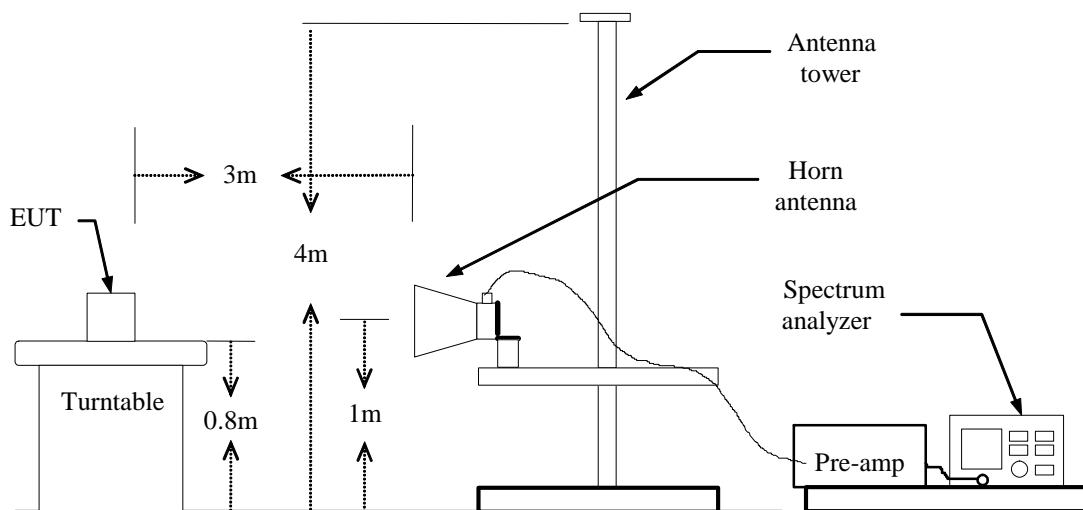
According to FCC §2.1053

Test Configuration

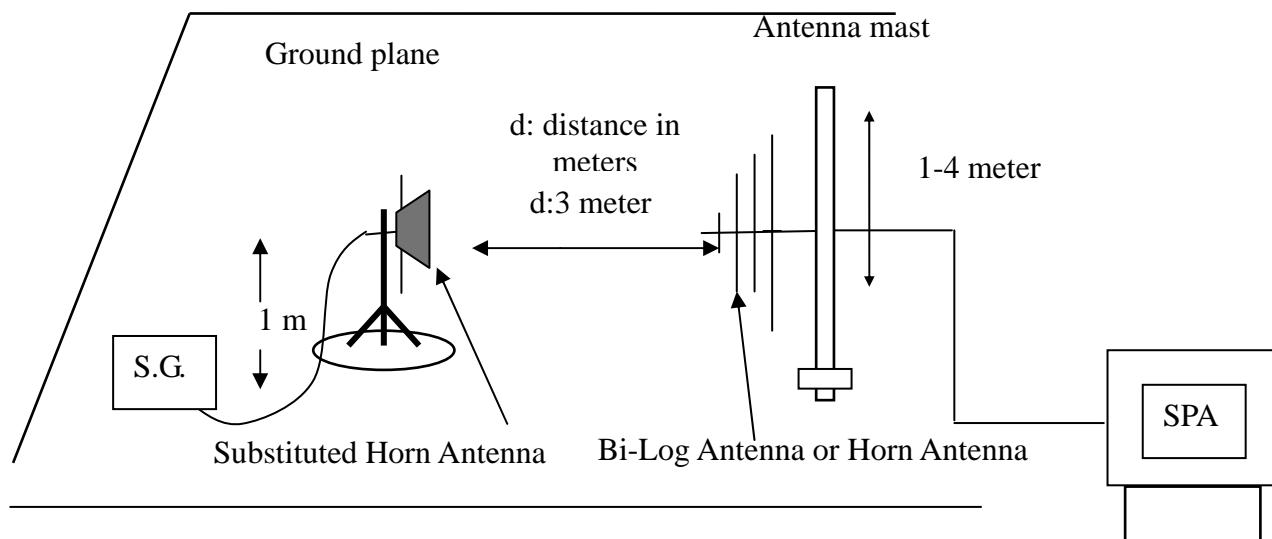
Below 1 GHz



Above 1 GHz



Substituted Method Test Set-up



TEST PROCEDURE

The EUT was placed on a non-conductive, the measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission were identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)}$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)}$$

TEST RESULTS

Refer to the attached tabular data sheets.

**Radiated Spurious Emission Measurement Result****Below 1GHz****Operation Mode:** CDMA2000 / 850 / TX / CH 1013**Test Date:** October 22, 2009**Temperature:** 24°C**Tested by:** Lawrence Lee**Humidity:** 46 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
57.16	V	-43.18	-15.54	-58.71	-13.00	-45.71
116.33	V	-57.23	-13.90	-71.13	-13.00	-58.13
166.77	V	-58.50	-13.96	-72.46	-13.00	-59.46
277.35	V	-61.40	-12.20	-73.59	-13.00	-60.59
514.03	V	-68.46	-8.17	-76.62	-13.00	-63.62
870.02	V	-61.38	-4.10	-65.48	-13.00	-52.48
57.16	H	-43.72	-15.41	-59.12	-13.00	-46.12
99.84	H	-51.67	-17.49	-69.16	-13.00	-56.16
166.77	H	-57.68	-13.91	-71.59	-13.00	-58.59
277.35	H	-62.72	-12.93	-75.65	-13.00	-62.65
410.24	H	-63.09	-10.51	-73.60	-13.00	-60.60
514.03	H	-65.39	-8.19	-73.58	-13.00	-60.58

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** CDMA2000 / 850 / TX / CH 384**Test Date:** October 22, 2009**Temperature:** 24°C**Tested by:** Lawrence Lee**Humidity:** 46 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
57.16	V	-43.88	-15.54	-59.42	-13.00	-46.42
116.33	V	-57.03	-13.90	-70.94	-13.00	-57.94
166.77	V	-57.67	-13.96	-71.63	-13.00	-58.63
277.35	V	-61.27	-12.20	-73.46	-13.00	-60.46
422.85	V	-67.35	-10.32	-77.67	-13.00	-64.67
632.37	V	-69.26	-6.44	-75.70	-13.00	-62.70
<hr/>						
57.16	H	-43.44	-15.41	-58.84	-13.00	-45.84
129.91	H	-49.82	-13.63	-63.45	-13.00	-50.45
166.77	H	-59.55	-13.91	-73.46	-13.00	-60.46
277.35	H	-62.40	-12.93	-75.33	-13.00	-62.33
453.89	H	-62.45	-9.60	-72.05	-13.00	-59.05
967.99	H	-66.26	-3.09	-69.34	-13.00	-56.34

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** CDMA2000 / 850 / TX / CH 777**Test Date:** October 22, 2009**Temperature:** 24°C**Tested by:** Lawrence Lee**Humidity:** 46 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
57.16	V	-43.72	-15.54	-59.25	-13.00	-46.25
116.33	V	-57.56	-13.90	-71.46	-13.00	-58.46
166.77	V	-57.51	-13.96	-71.47	-13.00	-58.47
277.35	V	-61.19	-12.20	-73.38	-13.00	-60.38
644.98	V	-66.61	-6.36	-72.97	-13.00	-59.97
771.08	V	-66.78	-5.31	-72.09	-13.00	-59.09
<hr/>						
57.16	H	-43.03	-15.41	-58.44	-13.00	-45.44
116.33	H	-56.98	-14.27	-71.25	-13.00	-58.25
166.77	H	-57.49	-13.91	-71.40	-13.00	-58.40
277.35	H	-61.19	-12.93	-74.11	-13.00	-61.11
452.92	H	-66.78	-9.64	-76.42	-13.00	-63.42
771.08	H	-64.82	-4.96	-69.78	-13.00	-56.78

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** CDMA2000 / 1900 / TX / CH 25**Test Date:** October 22, 2009**Temperature:** 24°C**Tested by:** Lawrence Lee**Humidity:** 46 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
57.16	V	-42.41	-15.54	-57.94	-13.00	-44.94
86.26	V	-53.47	-19.80	-73.28	-13.00	-60.28
116.33	V	-53.24	-13.90	-67.14	-13.00	-54.14
166.77	V	-55.78	-13.96	-69.74	-13.00	-56.74
277.35	V	-61.82	-12.20	-74.02	-13.00	-61.02
452.92	V	-71.43	-9.78	-81.21	-13.00	-68.21
<hr/>						
57.16	H	-42.88	-15.41	-58.28	-13.00	-45.28
116.33	H	-55.28	-14.27	-69.56	-13.00	-56.56
166.77	H	-55.02	-13.91	-68.94	-13.00	-55.94
199.75	H	-70.04	-12.52	-82.57	-13.00	-69.57
277.35	H	-61.77	-12.93	-74.70	-13.00	-61.70
452.92	H	-71.54	-9.64	-81.18	-13.00	-68.18

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Operation Mode:** CDMA2000 / 1900 / TX / CH 600**Test Date:** October 22, 2009**Temperature:** 24°C**Tested by:** Lawrence Lee**Humidity:** 46 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
57.16	V	-42.17	-15.54	-57.71	-13.00	-44.71
86.26	V	-53.93	-19.80	-73.73	-13.00	-60.73
116.33	V	-54.60	-13.90	-68.51	-13.00	-55.51
166.77	V	-55.23	-13.96	-69.18	-13.00	-56.18
277.35	V	-61.42	-12.20	-73.62	-13.00	-60.62
452.92	V	-71.69	-9.78	-81.47	-13.00	-68.47
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57.16	H	-41.99	-15.41	-57.39	-13.00	-44.39
86.26	H	-54.26	-20.59	-74.85	-13.00	-61.85
116.33	H	-54.87	-14.27	-69.14	-13.00	-56.14
166.77	H	-55.49	-13.91	-69.41	-13.00	-56.41
277.35	H	-61.62	-12.93	-74.55	-13.00	-61.55
452.92	H	-71.43	-9.64	-81.07	-13.00	-68.07

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Operation Mode:** CDMA2000 / 1900 / TX / CH 1175**Test Date:** October 22, 2009**Temperature:** 24°C**Tested by:** Lawrence Lee**Humidity:** 46 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
57.16	V	-41.95	-15.54	-57.48	-13.00	-44.48
86.26	V	-55.51	-19.80	-75.31	-13.00	-62.31
116.33	V	-54.97	-13.90	-68.87	-13.00	-55.87
166.77	V	-56.29	-13.96	-70.25	-13.00	-57.25
277.35	V	-61.61	-12.20	-73.81	-13.00	-60.81
452.92	V	-71.79	-9.78	-81.57	-13.00	-68.57
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57.16	H	-41.76	-15.41	-57.16	-13.00	-44.16
86.26	H	-54.68	-20.59	-75.27	-13.00	-62.27
116.33	H	-54.86	-14.27	-69.13	-13.00	-56.13
166.77	H	-55.20	-13.91	-69.11	-13.00	-56.11
277.35	H	-61.74	-12.93	-74.67	-13.00	-61.67
452.92	H	-71.26	-9.64	-80.90	-13.00	-67.90

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Operation Mode:** EVDO / 850 / TX / CH 1013**Test Date:** October 22, 2009**Temperature:** 25°C**Tested by:** Lawrence Lee**Humidity:** 50 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
57.16	V	-45.90	-15.54	-61.43	-13.00	-48.43
105.66	V	-39.78	-16.39	-56.17	-13.00	-43.17
418.97	V	-53.48	-10.41	-63.89	-13.00	-50.89
565.44	V	-54.23	-7.92	-62.15	-13.00	-49.15
630.43	V	-53.80	-6.49	-60.29	-13.00	-47.29
718.70	V	-60.92	-5.86	-66.79	-13.00	-53.79
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57.16	H	-44.83	-15.41	-60.24	-13.00	-47.24
106.63	H	-44.64	-16.15	-60.79	-13.00	-47.79
197.81	H	-53.57	-12.80	-66.37	-13.00	-53.37
502.39	H	-59.74	-8.25	-67.99	-13.00	-54.99
562.53	H	-59.39	-7.65	-67.03	-13.00	-54.03
629.46	H	-58.81	-6.51	-65.33	-13.00	-52.33

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** EVDO / 850 / TX / CH 384**Test Date:** October 22, 2009**Temperature:** 25°C**Tested by:** Lawrence Lee**Humidity:** 50 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
105.66	V	-38.84	-16.39	-55.23	-13.00	-42.23
132.82	V	-34.66	-12.50	-47.16	-13.00	-34.16
424.79	V	-53.27	-10.29	-63.56	-13.00	-50.56
565.44	V	-54.08	-7.92	-62.00	-13.00	-49.00
601.33	V	-52.58	-7.43	-60.01	-13.00	-47.01
629.46	V	-54.81	-6.51	-61.31	-13.00	-48.31
57.16	H	-47.32	-15.41	-62.73	-13.00	-49.73
121.18	H	-44.24	-13.58	-57.82	-13.00	-44.82
191.99	H	-56.29	-13.61	-69.90	-13.00	-56.90
418.00	H	-54.34	-10.18	-64.53	-13.00	-51.53
566.41	H	-59.04	-7.63	-66.66	-13.00	-53.66
629.46	H	-57.25	-6.51	-63.76	-13.00	-50.76

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** EVDO / 850 / TX / CH 777**Test Date:** October 22, 2009**Temperature:** 25°C**Tested by:** Lawrence Lee**Humidity:** 50 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
103.72	V	-41.40	-16.82	-58.22	-13.00	-45.22
144.46	V	-47.14	-12.73	-59.87	-13.00	-46.87
425.76	V	-48.77	-10.27	-59.04	-13.00	-46.04
566.41	V	-52.41	-7.92	-60.32	-13.00	-47.32
601.33	V	-51.02	-7.43	-58.45	-13.00	-45.45
630.43	V	-52.30	-6.49	-58.79	-13.00	-45.79
105.66	H	-39.80	-16.34	-56.13	-13.00	-43.13
153.19	H	-46.63	-13.43	-60.07	-13.00	-47.07
377.26	H	-48.85	-12.22	-61.08	-13.00	-48.08
418.00	H	-49.17	-10.18	-59.35	-13.00	-46.35
566.41	H	-54.90	-7.63	-62.53	-13.00	-49.53
629.46	H	-52.89	-6.51	-59.41	-13.00	-46.41

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** EVDO / 1900 / TX / CH 25**Test Date:** October 22, 2009**Temperature:** 25°C**Tested by:** Lawrence Lee**Humidity:** 50 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
100.81	V	-36.28	-17.46	-53.74	-13.00	-40.74
132.82	V	-41.44	-12.50	-53.94	-13.00	-40.94
425.76	V	-47.83	-10.27	-58.10	-13.00	-45.10
566.41	V	-50.75	-7.92	-58.67	-13.00	-45.67
601.33	V	-50.79	-7.43	-58.21	-13.00	-45.21
771.08	V	-61.14	-5.31	-66.45	-13.00	-53.45
112.45	H	-35.74	-15.02	-50.76	-13.00	-37.76
191.99	H	-48.90	-13.61	-62.51	-13.00	-49.51
469.41	H	-53.15	-8.98	-62.13	-13.00	-49.13
565.44	H	-51.47	-7.63	-59.10	-13.00	-46.10
630.43	H	-50.31	-6.50	-56.81	-13.00	-43.81
794.36	H	-57.04	-4.87	-61.91	-13.00	-48.91

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** EVDO / 1900 / TX / CH 600**Test Date:** October 22, 2009**Temperature:** 25°C**Tested by:** Lawrence Lee**Humidity:** 50 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
57.16	V	-45.40	-15.54	-60.94	-13.00	-47.94
104.69	V	-40.48	-16.60	-57.08	-13.00	-44.08
424.79	V	-49.80	-10.29	-60.09	-13.00	-47.09
562.53	V	-52.03	-7.93	-59.96	-13.00	-46.96
601.33	V	-51.01	-7.43	-58.44	-13.00	-45.44
630.43	V	-53.21	-6.49	-59.69	-13.00	-46.69
105.66	H	-35.41	-16.34	-51.75	-13.00	-38.75
159.98	H	-46.73	-14.19	-60.92	-13.00	-47.92
424.79	H	-50.25	-10.11	-60.36	-13.00	-47.36
565.44	H	-52.08	-7.63	-59.71	-13.00	-46.71
630.43	H	-51.11	-6.50	-57.61	-13.00	-44.61
683.78	H	-56.34	-6.13	-62.47	-13.00	-49.47

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Operation Mode:** EVDO / 1900 / TX / CH 1175**Test Date:** October 22, 2009**Temperature:** 25°C**Tested by:** Lawrence Lee**Humidity:** 50 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
57.16	V	-43.72	-15.54	-59.26	-13.00	-46.26
106.63	V	-41.87	-16.17	-58.04	-13.00	-45.04
153.19	V	-44.26	-12.74	-57.00	-13.00	-44.00
419.94	V	-50.70	-10.37	-61.07	-13.00	-48.07
566.41	V	-50.18	-7.92	-58.10	-13.00	-45.10
630.43	V	-52.55	-6.49	-59.04	-13.00	-46.04
112.45	H	-35.13	-15.02	-50.15	-13.00	-37.15
153.19	H	-42.78	-13.43	-56.22	-13.00	-43.22
377.26	H	-45.45	-12.22	-57.67	-13.00	-44.67
418.00	H	-46.64	-10.18	-56.82	-13.00	-43.82
521.79	H	-49.38	-8.15	-57.53	-13.00	-44.53
565.44	H	-50.51	-7.63	-58.15	-13.00	-45.15

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Above 1GHz****Operation Mode:** CDMA2000 / 850 / TX / CH 1013**Test Date:** October 22, 2009**Temperature:** 25°C**Tested by:** Lawrence Lee**Humidity:** 46 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
1651.00	V	-35.83	0.69	-35.14	-13.00	-22.14
2477.00	V	-31.19	3.52	-27.67	-13.00	-14.67
3296.00	V	-54.19	5.57	-48.62	-13.00	-35.62
5690.00	V	-55.95	9.95	-45.99	-13.00	-32.99
N/A						
1651.00	H	-36.20	0.80	-35.40	-13.00	-22.40
2477.00	H	-39.71	3.81	-35.90	-13.00	-22.90
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** CDMA2000 / 850 / TX / CH 384**Test Date:** October 22, 2009**Temperature:** 24°C**Tested by:** Lawrence Lee**Humidity:** 46 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
1672.00	V	-37.04	0.73	-36.31	-13.00	-23.31
2512.00	V	-32.34	3.66	-28.69	-13.00	-15.69
3345.00	V	-53.97	5.63	-48.33	-13.00	-35.33
5242.00	V	-52.45	9.79	-42.66	-13.00	-29.66
N/A						
1672.00	H	-34.20	0.84	-33.35	-13.00	-20.35
2512.00	H	-38.26	3.96	-34.30	-13.00	-21.30
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** CDMA2000 / 850 / TX / CH 777**Test Date:** October 22, 2009**Temperature:** 24°C**Tested by:** Lawrence Lee**Humidity:** 46 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
1700.00	V	-37.56	0.79	-36.77	-13.00	-23.77
2547.00	V	-34.83	3.77	-31.06	-13.00	-18.06
3303.00	V	-49.63	5.58	-44.06	-13.00	-31.06
7426.00	V	-57.59	15.19	-42.40	-13.00	-29.40
N/A						
1700.00	H	-32.98	0.90	-32.08	-13.00	-19.08
2547.00	H	-40.25	4.06	-36.18	-13.00	-23.18
4927.00	H	-41.08	10.11	-30.97	-13.00	-17.97
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** CDMA2000 / 1900 / TX / CH 25**Test Date:** October 22, 2009**Temperature:** 24°C**Tested by:** Lawrence Lee**Humidity:** 46 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
3702.00	V	-53.42	6.46	-46.96	-13.00	-33.96
5004.00	V	-50.79	9.68	-41.11	-13.00	-28.11
N/A						
3702.00	H	-58.35	7.85	-50.50	-13.00	-37.50
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** CDMA2000 / 1900 / TX / CH 600**Test Date:** October 22, 2009**Temperature:** 24°C**Tested by:** Lawrence Lee**Humidity:** 46 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
1882.00	V	-37.99	1.17	-36.82	-13.00	-23.82
3758.00	V	-48.77	6.63	-42.14	-13.00	-29.14
5641.00	V	-56.42	9.94	-46.48	-13.00	-33.48
N/A						
3758.00	H	-52.66	8.12	-44.54	-13.00	-31.54
6747.00	H	-60.55	13.08	-47.47	-13.00	-34.47
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Operation Mode:** CDMA2000 / 1900 / TX / CH 1175**Test Date:** October 22, 2009**Temperature:** 24°C**Tested by:** Lawrence Lee**Humidity:** 46 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
3814.00	V	-37.07	6.81	-30.26	-13.00	-17.26
5368.00	V	-54.67	9.85	-44.82	-13.00	-31.82
N/A						
3821.00	H	-43.69	8.44	-35.25	-13.00	-22.25
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Operation Mode:** EVDO / 850 / TX / CH 384**Test Date:** October 22, 2009**Temperature:** 24°C**Tested by:** Lawrence Lee**Humidity:** 46 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
1672.00	V	-37.96	0.73	-37.23	-13.00	-24.23
2512.00	V	-32.47	3.66	-28.81	-13.00	-15.81
3345.00	V	-51.74	5.63	-46.11	-13.00	-33.11
N/A						
1672.00	H	-33.34	0.84	-32.49	-13.00	-19.49
2512.00	H	-39.32	3.96	-35.36	-13.00	-22.36
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** EVDO / 850 / TX / CH 777**Test Date:** October 22, 2009**Temperature:** 24°C**Tested by:** Lawrence Lee**Humidity:** 46 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
1700.00	V	-37.02	0.79	-36.23	-13.00	-23.23
2547.00	V	-34.38	3.77	-30.62	-13.00	-17.62
3394.00	V	-57.10	5.70	-51.40	-13.00	-38.40
N/A						
1700.00	H	-34.04	0.90	-33.14	-13.00	-20.14
2547.00	H	-40.18	4.06	-36.12	-13.00	-23.12
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** EVDO / 850 / TX / CH 1013**Test Date:** October 22, 2009**Temperature:** 24°C**Tested by:** Lawrence Lee**Humidity:** 46 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
1651.00	V	-34.95	0.69	-34.26	-13.00	-21.26
2477.00	V	-31.74	3.52	-28.22	-13.00	-15.22
3303.00	V	-51.29	5.58	-45.72	-13.00	-32.72
N/A						
1651.00	H	-36.20	0.80	-35.40	-13.00	-22.40
2477.00	H	-38.77	3.81	-34.96	-13.00	-21.96
3296.00	H	-55.33	6.27	-49.06	-13.00	-36.06
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** EVDO / 1900 / TX / CH 25**Test Date:** October 22, 2009**Temperature:** 24°C**Tested by:** Lawrence Lee**Humidity:** 46 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
3219.00	V	-58.81	5.46	-53.35	-13.00	-40.35
3702.00	V	-55.16	6.46	-48.70	-13.00	-35.70
N/A						
3009.00	H	-59.57	5.48	-54.09	-13.00	-41.09
3702.00	H	-61.04	7.85	-53.19	-13.00	-40.19
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** EVDO / 1900 / TX / CH 600**Test Date:** October 22, 2009**Temperature:** 24°C**Tested by:** Lawrence Lee**Humidity:** 46 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
3758.00	V	-48.77	6.63	-42.13	-13.00	-29.13
5641.00	V	-56.84	9.94	-46.90	-13.00	-33.90
N/A						
3758.00	H	-55.33	8.12	-47.21	-13.00	-34.21
5641.00	H	-60.28	10.28	-50.00	-13.00	-37.00
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Operation Mode:** EVDO / 1900 / TX / CH 1175**Test Date:** October 22, 2009**Temperature:** 24°C**Tested by:** Lawrence Lee**Humidity:** 46 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
3821.00	V	-40.97	6.83	-34.14	-13.00	-21.14
5256.00	V	-57.80	9.80	-48.01	-13.00	-35.01
N/A						
2610.00	H	-56.53	4.26	-52.27	-13.00	-39.27
3821.00	H	-46.09	8.44	-37.66	-13.00	-24.66
N/A						

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

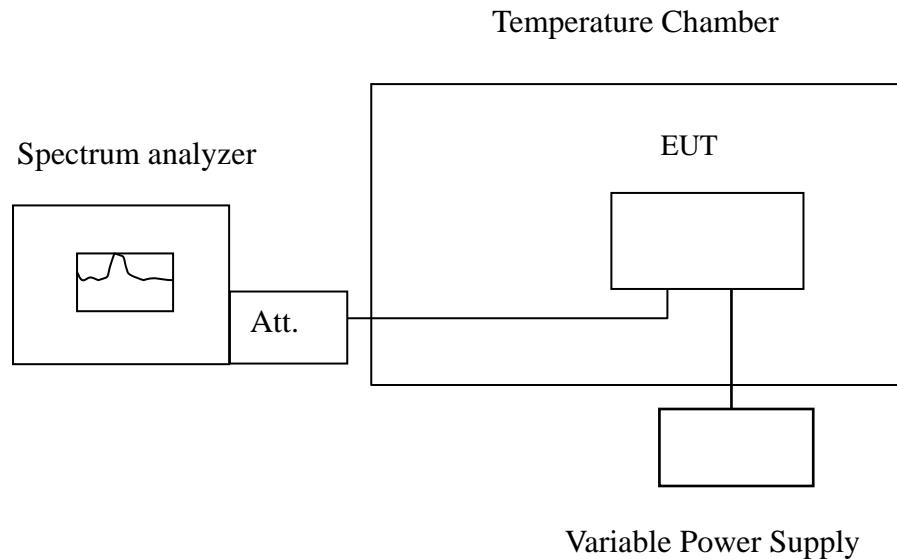
7.6 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

LIMIT

According to FCC §2.1055, FCC §24.235.

Frequency Tolerance: 2.5 ppm

Test Configuration



Remark: Measurement setup for testing on Antenna connector



TEST PROCEDURE

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

TEST RESULTS

No non-compliance noted.

Reference Frequency: CDMA2000 Mid Channel 836.52MHz @ 20°C				
Limit: +/- 2.5 ppm = 2091 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
110	50	83599999.8	-5	2090
	40	83599997.3	-8	
	30	83599998.1	-7	
	20	83600005	0	
	10	83600001.5	-4	
	0	83600000.5	-5	
	-10	83600002.3	-3	
	-20	83600005	0	
	-30	83600004	-1	

Reference Frequency: CDMA2000 Mid Channel 1880MHz @ 20°C				
Limit: +/- 2.5 ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
110	50	1879999978	-27	4700
	40	1879999990	-15	
	30	1879999970	-35	
	20	1880000005	0	
	10	1880000015	10	
	0	1880000012	7	
	-10	1879999983	-22	
	-20	1880000003	-2	
	-30	1880000025	20	



Reference Frequency: EVDO Mid Channel 836.52MHz @ 20°C				
Limit: +/- 2.5 ppm = 2091 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
110	50	83600011	12	2090
	40	83600010	11	
	30	83600010.5	11	
	20	83599999.5	0	
	10	83600011	12	
	0	83599998.89	-1	
	-10	83599988	-12	
	-20	83599990	-10	
	-30	83599999.2	0	

Reference Frequency: EVDO Mid Channel 1880MHz @ 20°C				
Limit: +/- 2.5 ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
110	50	1879999977	1	4700
	40	1880000020	44	
	30	1880000002	26	
	20	1879999976	0	
	10	1880000022	46	
	0	1879999997	21	
	-10	1880000003	27	
	-20	1880000008	32	
	-30	1880000020	44	

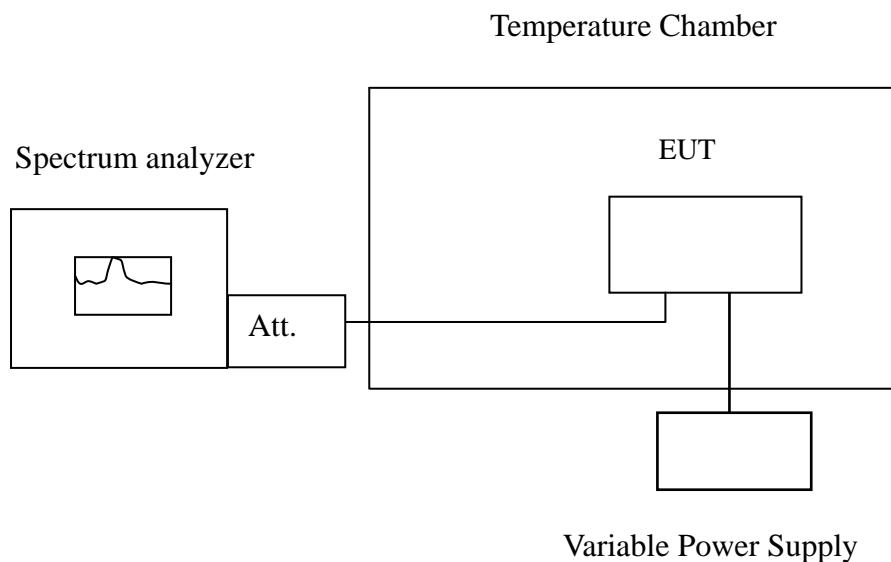
7.7 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

LIMIT

According to FCC §2.1055, FCC §24.235,

Frequency Tolerance: 2.5 ppm.

Test Configuration



Remark: Measurement setup for testing on Antenna connector.



TEST PROCEDURE

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ($\pm 10\%$) and endpoint, record the maximum frequency change.

TEST RESULTS

No non-compliance noted.

Reference Frequency: CDMA2000 Mid Channel 836.52MHz @ 20°C				
Limit: +/- 2.5 ppm = 2091 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
121	20	83600002	-3	2090
110		83600005	0	
99		83599998	-7	
END		83600026	21	

Reference Frequency: CDMA2000 Mid Channel 1880MHz @ 20°C				
Limit: ± 2.5 ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
121	20	1880000003	-2	4700
110		1880000005	0	
99		1880000005	0	
END		1880000180	175	



Reference Frequency: EVDO Mid Channel 836.52MHz @ 20°C				
Limit: +/- 2.5 ppm = 2091 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
121	20	83600011	11	2090
110		83600000	0	
99		83599995	-5	
END		83599944	-56	

Reference Frequency: EVDO Mid Channel 1880MHz @ 20°C				
Limit: ± 2.5 ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
121	20	1880000000	24	4700
110		1879999976	0	
99		1879999985	9	
END		1879999850	-126	



7.8 POWERLINE CONDUCTED EMISSIONS

LIMIT

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

TEST RESULTS

Not applicable, because EUT does not connect to AC Main Source direct.