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

TEST REPORT

For

Treo xxx

Trade Name: Palm

Model: Treo xxx

Issued to

Palm, Inc.
950 W Maude Ave, Sunnyvale, CA 94085

Issued by

Compliance Certification Services Inc.
No. 81-1, Lane 210, Bade Rd. 2, Luchu Hsiang,
Taoyuan Hsien, (338) Taiwan, R.O.C.
TEL: 886-3-324-0332
FAX: 886-3-324-5235

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1. TEST RESULT CERTIFICATION

Applicant:	Palm, Inc. 950 W Maude Ave, Sunnyvale, CA 94085
Equipment Under Test:	Treo xxx
Trade Name:	Palm
Model:	Treo xxx
Date of Test:	July 25 ~ August 02, 2005

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR PART 22 SUBPART H AND 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 ANSI/TIA/EIA-603-A-2001 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:

Harris W. Lai
Executive Vice President
Compliance Certification Services Inc.

Reviewed by:

Gavin Lim
Section Manager
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	Treo xxx
Trade Name	Palm
Model Number	Treo xxx
Model Discrepancy	N/A
Power Supply	Adapter: Trade / Model: palmOne / DSC-51F-52P US I/P: 100-240V, 50/60 Hz, 0.2A O/P: 5.2V, 1.0A Trade / Model: palm / PSA05R-050 (PA) I/P: 100-240V, 250mA, 50-60 Hz, 12-17VA O/P: 5V, 1A Trade / Model: SWITCHING / PSM06A-052 I/P: 100-240V, 50/60 Hz, 0.2A O/P: 5.2V, 1.0A Rechargeable Li-ion Battery: Trade / Model: palmOne / 157-10014-00
Earphone Cable	Unshielded, 1.2m
Frequency Range	TX: 824 ~ 849 MHz / 1850 ~ 1910 MHz RX: 869 ~ 894 MHz / 1930 ~ 1989.8 MHz
Transmit Power (ERP & EIRP Power)	850 MHz: 22.29 dBm 1900 MHz: 25.73 dBm
Cellular Phone Protocol	CDMA2000
Type of Emission	1M26GXW---
Antenna Gain	850 MHz: 0.6 dBi 1900 MHz: 0.7 dBi
Antenna Type	External Flex Antenna

Remark:

1. *The suffix of "X" (X= 0~9, A~Z or Blank) on model number is just for marketing purpose only.*
2. *This submittal(s) (test report) is intended for FCC ID: O8FJIMI 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 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: Treo xxx) comes with three adapters and three earphones. After the preliminary test, the EUT with adapter (palmOne / DSC-51F-52P US) and silvered-colored earphone was found to eliminate the worst emissions and had been tested under operating condition.

EUT staying in continuous transmitting mode was programmed. Channel Low, Mid and High were chosen for full testing.

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

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 lie-down position (Y axis) and the worst case was recorded.

4. 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.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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

☒ No. 81-1, Lane 210, Bade Rd. 2, Luchu Hsiang, Taoyuan Hsien, Taiwan, R.O.C.

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

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 LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200600-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (Registration no: 93105 and 90471).

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	NVLAP*	EN 55011, EN 55014-1, AS/NZS 1044, CNS 13783-1, EN 55022, CNS 13438, EN 61000-3-2, EN 61000-3-3, ANSI C63.4, FCC OST/MP-5, AS/NZS CISPR 22, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11	200600-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	93105, 90471
Japan	VCCI	4 3/10 meter Open Area Test Sites to perform conducted/radiated measurements	R-393/1066/725/879 C-402/747/912
Norway	NEMKO	EN 50081-1/2, EN 50082-1/2, IEC 61000-6-1/2, EN 50091-2, EN 50130-4, EN 55011, EN 55013, EN 55014-1/2, EN 55015, EN 55022, EN 55024, EN 61000-3-2/3, EN 61326-1, IEC 61000-4-2/3/4/5/6/8/11, EN 60601-1-2, EN 300 328-2, EN 300 422-2, EN 301 419-1, EN 301 489-01/03/07/08/09/17, EN 301 419-2/3, EN 300 454-2, EN 301 357-2	ELA 124a ELA 124b ELA 124c
Taiwan	CNLA	EN 300 328-1/2, EN 300 220-1/2/3, EN 300 440-1/2, EN 61000-3-2, EN 61000-3-3, 47 CFR FCC Part 15 Subpart C/D/E, EN 55013, CNS 13439, EN 55014-1, CNS 13783-1, EN 55022, CNS 13438, CISPR 22, AS/NZS 3548, EN 61000-4-2/3/4/5/6/8/11, ENV 50204, IEEE Std 1528, FCC OET Bulletin, 65+Supplement C, EN50360, EN50361, EN50371, RSS102	0363 ILAC MRA
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	SL2-IS-E-0014 SL2-IN-E-0014 SL2-A1-E-0014 SL2-R1-E-0014 SL2-R2-E-0014 SL2-L1-E-0014
Canada	Industry Canada	RSS212, Issue 1	IC 3991-3 IC 3991-4

** No part of this report may be used to claim or imply product endorsement by NVLAP 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 1 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.	Wireless Communication Test Set	Agilent	E5515C	GB44051665	N/A	N/A	N/A

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

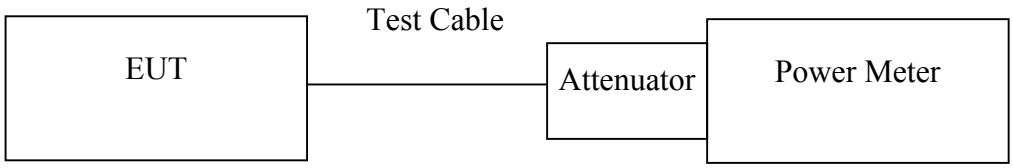
According to FCC §2.1046.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	Agilent	E4416A	GB41291611	06/01/2006
Power Sensor	Agilent	E9327A	VS40441097	03/15/2006
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006

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

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)	Power Meter Reading (dBm)	Attenuator (dB)	Average Power (dBm)
CDMA2000 / 850	363	835.89	3.67	20.5	24.17
	777	848.31	3.35		23.85
	1013	824.70	3.70		24.20

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

Test Mode	CH	Frequency (MHz)	Power Meter Reading (dBm)	Attenuator (dB)	Average Power (dBm)
CDMA2000 / 1900	25	1851.25	3.00	21.0	24.00
	600	1880.00	3.00		24.00
	1175	1908.75	2.50		23.50

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.

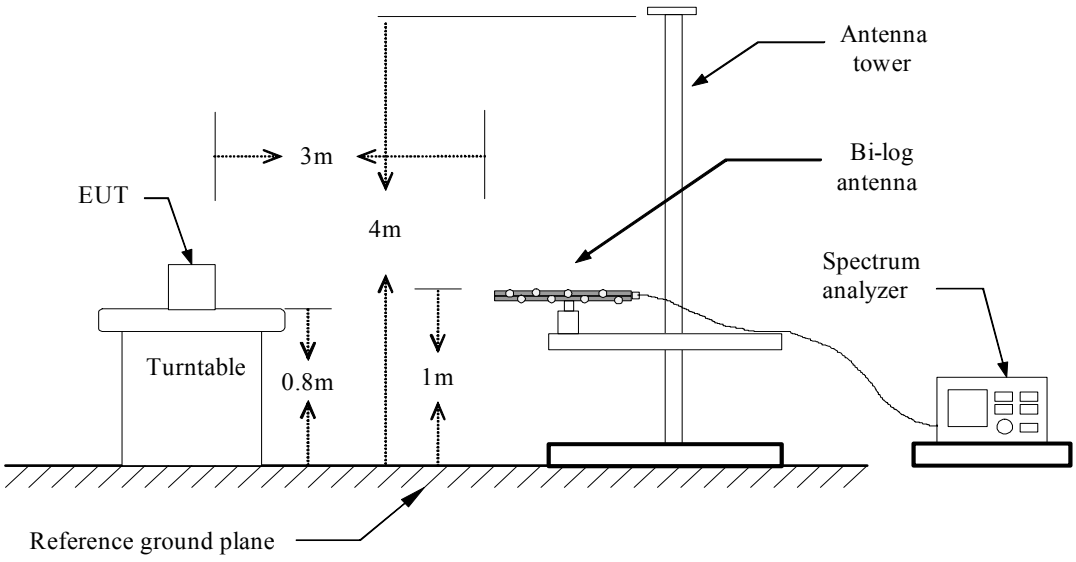
FCC 24.232(b): The equivalent Isotropic Radiated Power (EIRP) must not exceed 2 Watts.

MEASUREMENT EQUIPMENT USED

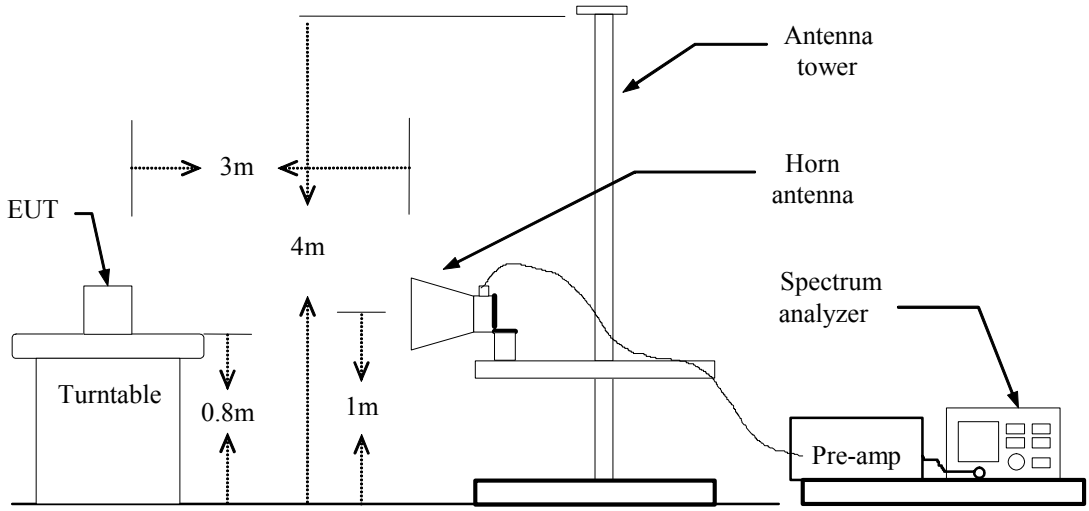
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006
Spectrum Analyzer	R&S	FSP30	100112	08/03/2006
Pre-Amplifier	HP	8447D	2944A09173	03/03/2006
Horn antenna	EMCO	3115	00022250	04/18/2006
Pre-Amplifier	HP	8449B	3008B00965	10/02/2005
Turn Table	EMCO	2081-1.21	9709-1885	N.C.R
Antenna Tower	EMCO	2075-2	9707-2060	N.C.R
Controller	EMCO	2090	9709-1256	N.C.R
Site NSA	C&C	N/A	N/A	09/06/2005
S.G.	HP	83630B	3844A01022	01/14/2006
Substituted Horn	EMCO	3115	00022257	12/12/2005

TEST CONFIGURATION

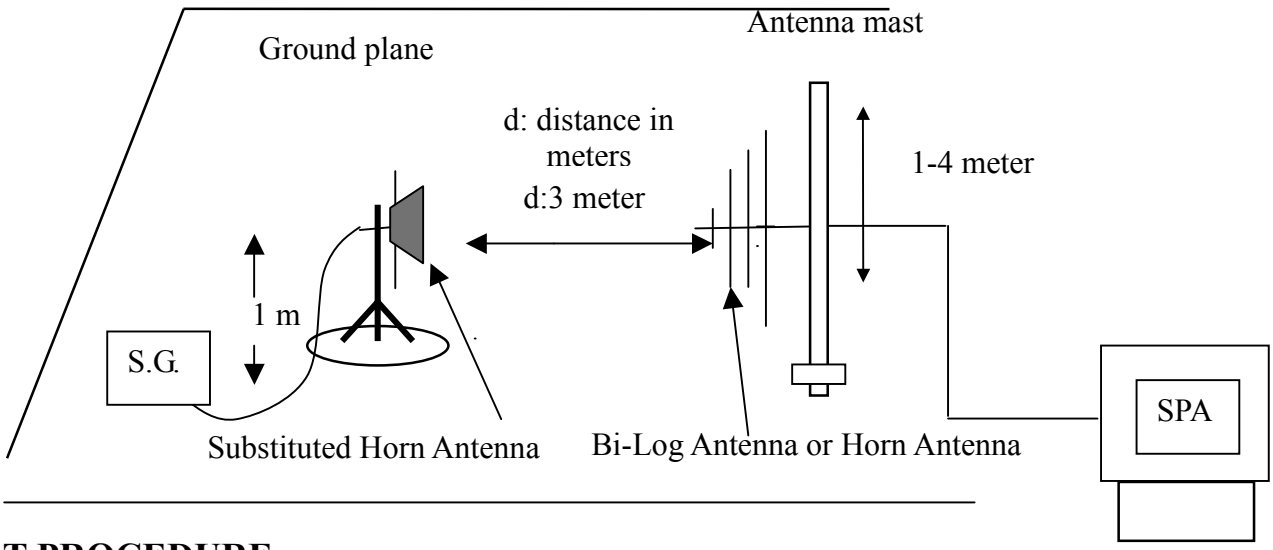
Below 1 GHz



Above 1 GHz



For Substituted Method Test Set-UP



TEST PROCEDURE

The EUT was placed on an 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:

ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable (dB)
EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable (dB)

TEST RESULTS

No non-compliance noted.

CDMA2000 / 850 Test Data

EUT Pol.	Channel	Frequency (MHz)	Reading level (dBuV)	Antenna Pol.	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBd)	Emission level (dBm)	Limit (dBm)	Margin (dB)
X	363	824.90	21.96	V	12.36	2.01	4.71	15.06	38.50	-23.44
		824.90	28.02	H	18.44	2.01	4.71	21.14	38.50	-17.36
	777	835.90	23.74	V	14.28	2.03	4.71	16.96	38.50	-21.54
		835.90	29.01	H	19.61	2.03	4.71	**22.29**	38.50	-16.21
	1013	848.30	21.62	V	12.32	2.05	4.70	14.97	38.50	-23.53
		848.30	27.54	H	18.34	2.05	4.70	20.99	38.50	-17.51
Y	363	824.90	21.31	V	11.71	2.01	4.71	14.41	38.50	-24.09
		824.90	24.39	H	14.81	2.01	4.71	17.51	38.50	-20.99
	777	835.90	24.18	V	14.72	2.03	4.71	17.40	38.50	-21.10
		835.90	27.07	H	17.67	2.03	4.71	20.35	38.50	-18.15
	1013	848.30	23.92	V	14.62	2.05	4.70	17.27	38.50	-21.23
		848.30	27.82	H	18.62	2.05	4.70	21.27	38.50	-17.23
Z	363	824.90	25.07	V	15.47	2.01	4.71	18.17	38.50	-20.33
		824.90	21.50	H	11.92	2.01	4.71	14.62	38.50	-23.88
	777	835.90	27.08	V	17.62	2.03	4.71	20.30	38.50	-18.20
		835.90	23.69	H	14.29	2.03	4.71	16.97	38.50	-21.53
	1013	848.30	27.51	V	18.21	2.05	4.70	20.86	38.50	-17.64
		848.30	22.88	H	13.68	2.05	4.70	16.33	38.50	-22.17

CDMA2000 / 1900 Test Data

EUT Pol.	Channel	Frequency (MHz)	Reading level (dBuV)	Antenna Pol.	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
X	25	1850.20	18.04	V	12.99	3.15	9.89	19.73	33.00	-13.27
		1850.20	24.04	H	18.99	3.15	9.89	**25.73**	33.00	-7.27
	600	1880.00	18.71	V	13.67	3.18	9.99	20.48	33.00	-12.52
		1880.00	23.57	H	18.53	3.18	9.99	25.34	33.00	-7.66
	1175	1909.80	19.74	V	14.71	3.20	10.06	21.57	33.00	-11.43
		1909.80	22.60	H	17.57	3.20	10.06	24.43	33.00	-8.57
Y	25	1850.20	23.34	V	18.29	3.15	9.89	25.03	33.00	-7.97
		1850.20	21.60	H	16.55	3.15	9.89	23.29	33.00	-9.71
	600	1880.00	23.86	V	18.82	3.18	9.99	25.63	33.00	-7.37
		1880.00	21.58	H	16.54	3.18	9.99	23.35	33.00	-9.65
	1175	1909.80	23.50	V	18.47	3.20	10.06	25.33	33.00	-7.67
		1909.80	20.46	H	15.43	3.20	10.06	22.29	33.00	-10.71
Z	25	1850.20	18.79	V	13.74	3.15	9.89	20.48	33.00	-12.52
		1850.20	19.48	H	14.43	3.15	9.89	21.17	33.00	-11.83
	600	1880.00	20.28	V	15.24	3.18	9.99	22.05	33.00	-10.95
		1880.00	19.99	H	14.95	3.18	9.99	21.76	33.00	-11.24
	1175	1909.80	19.38	V	14.35	3.20	10.06	21.21	33.00	-11.79
		1909.80	19.39	H	14.36	3.20	10.06	21.22	33.00	-11.78

7.3 OCCUPIED BANDWIDTH MEASUREMENT

LIMIT

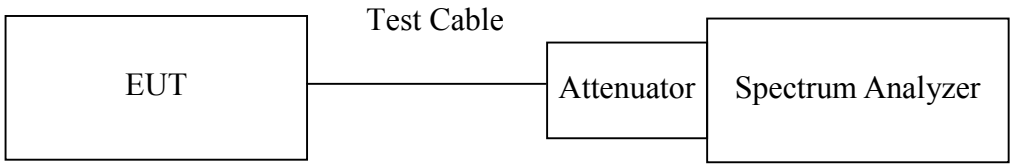
According to §FCC 2.1049.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006

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

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

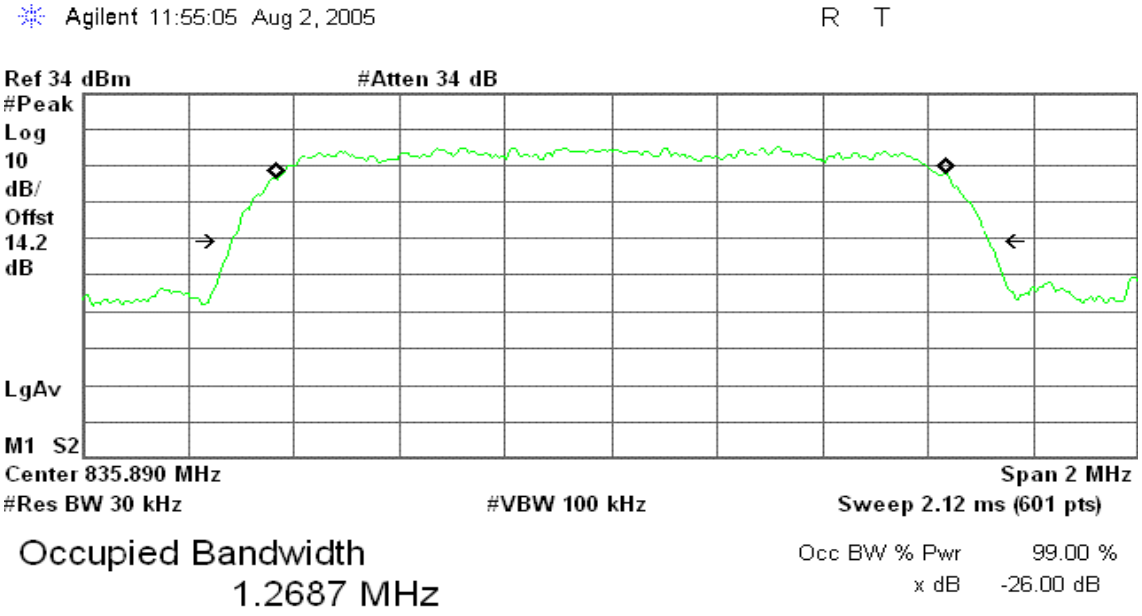
Test Data

Test Mode	CH	Frequency (MHz)	Bandwidth (kHz)
CDMA2000 / 850	363	824.90	1268.70
	777	835.90	1269.80
	1013	848.30	1260.80

Test Mode	CH	Frequency (MHz)	Bandwidth (kHz)
CDMA2000 / 1900	25	1850.20	1268.00
	600	1880.00	1264.50
	1175	1909.80	1269.40

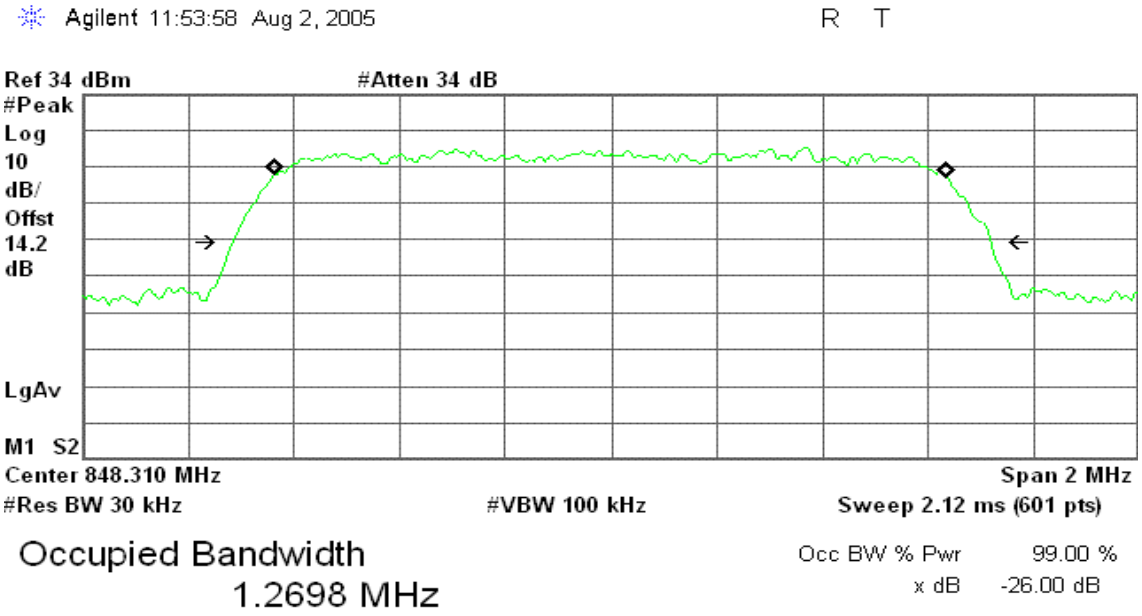
Test Plot

CDMA2000 / 850 (CH Low)



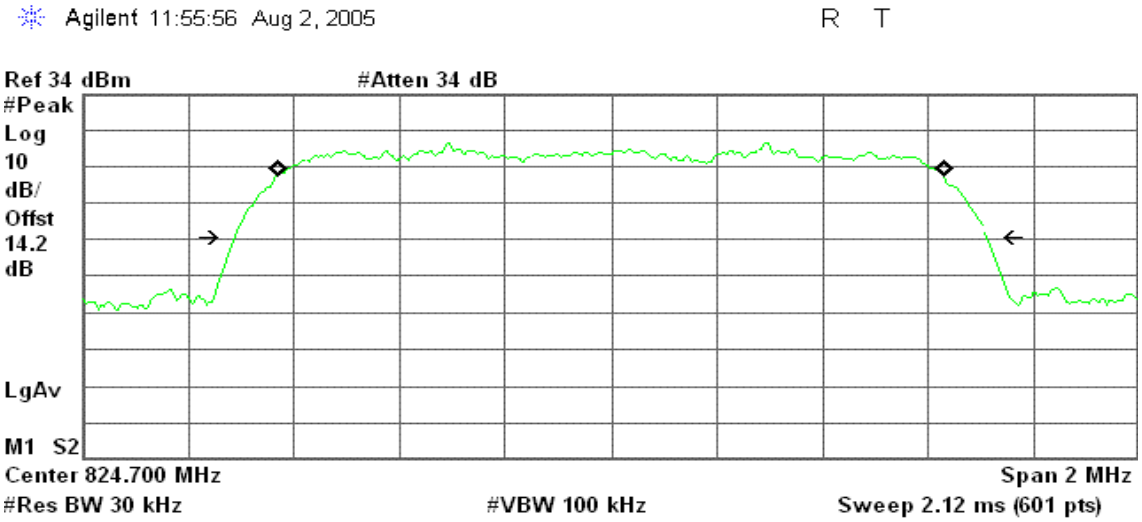
Transmit Freq Error	285.070 Hz
x dB Bandwidth	1.432 MHz

CDMA2000 / 850 (CH Mid)



Transmit Freq Error	-1.758 kHz
x dB Bandwidth	1.434 MHz

CDMA2000 / 850 (CH High)

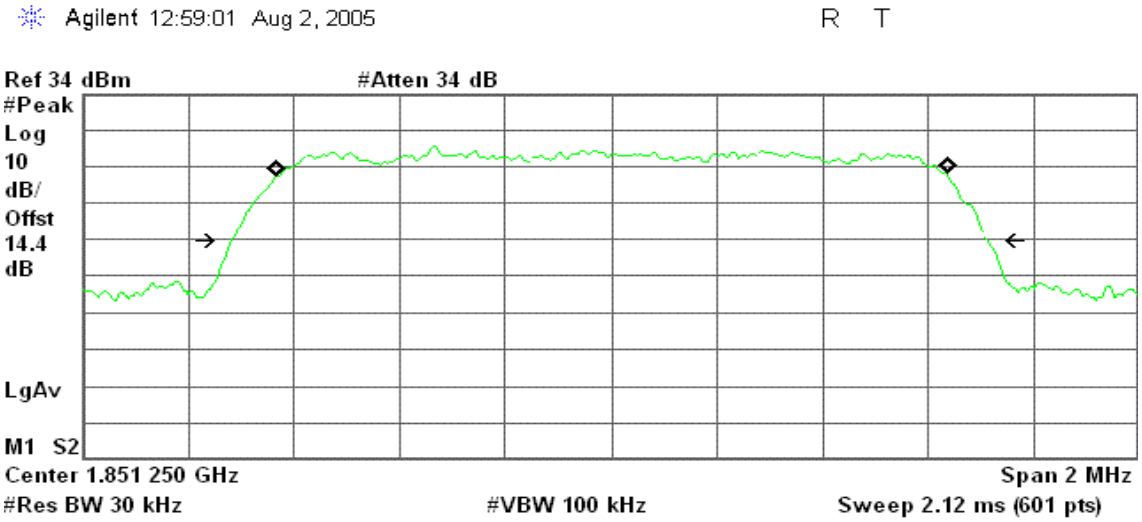


Occupied Bandwidth
1.2608 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error -353.536 Hz
x dB Bandwidth 1.422 MHz

CDMA2000 / 1900 (CH Low)

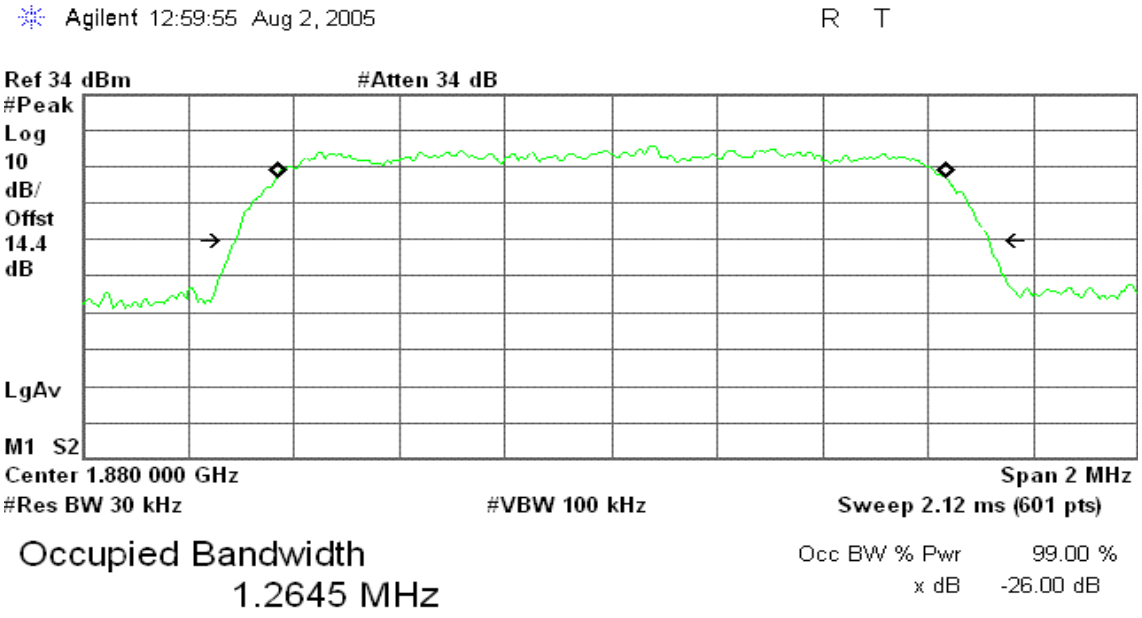


Occupied Bandwidth
1.2680 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

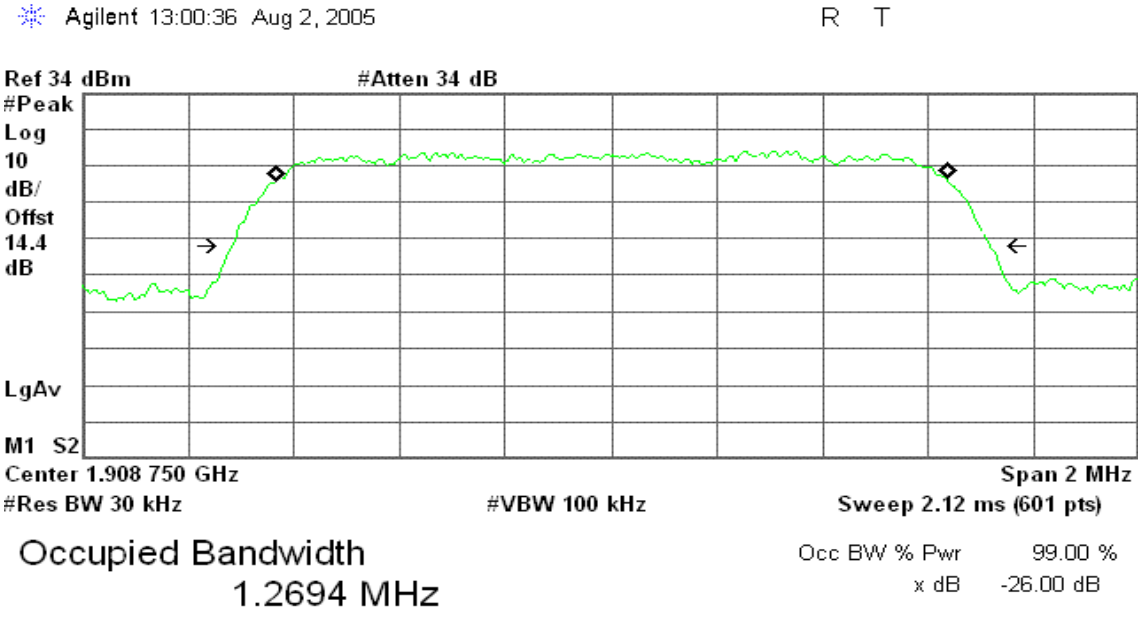
Transmit Freq Error 1.092 kHz
x dB Bandwidth 1.430 MHz

CDMA2000 / 1900 (CH Mid)



Transmit Freq Error	835.898 Hz
x dB Bandwidth	1.423 MHz

CDMA2000 / 1900 (CH High)



Transmit Freq Error	999.377 Hz
x dB Bandwidth	1.431 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 lease 43 + 10 log P dB.

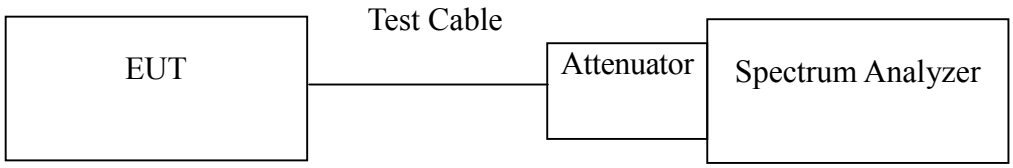
Mobile Emissions in Base Frequency Range: The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitters operated must be attenuated to a level not exceed –80 dBm at the transmit antenna connector.
Band Edge Requirements: In the 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at lease 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the Out of band Emission

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006

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 / 850	363	Figure 7-1	Conducted spurious emissions, 30MHz - 2.5GHz
		Figure 7-2	Conducted spurious emissions, 2.5GHz - 25GHz
	777	Figure 7-3	Conducted spurious emissions, 30MHz - 2.5GHz
		Figure 7-4	Conducted spurious emissions, 2.5GHz - 25GHz
	1013	Figure 7-5	Conducted spurious emissions, 30MHz - 2.5GHz
		Figure 7-6	Conducted spurious emissions, 2.5GHz - 25GHz

Mode	CH	Location	Description
CDMA2000 / 1900	25	Figure 8-1	Conducted spurious emissions, 30MHz - 2.5GHz
		Figure 8-2	Conducted spurious emissions, 2.5GHz – 20GHz
	600	Figure 8-3	Conducted spurious emissions, 30MHz - 2.5GHz
		Figure 8-4	Conducted spurious emissions, 2.5GHz – 20GHz
	1175	Figure 8-5	Conducted spurious emissions, 30MHz - 2.5GHz
		Figure 8-6	Conducted spurious emissions, 2.5GHz - 20GHz

Mode	CH	Location	Description
CDMA2000 / 850	363	Figure 9-1	Band Edge emissions
	1013	Figure 9-2	Band Edge emissions

Mode	CH	Location	Description
CDMA2000 / 1900	25	Figure 10-1	Band Edge emissions
	1175	Figure 10-2	Band Edge emissions

Test Plot

CDMA2000 / 850

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

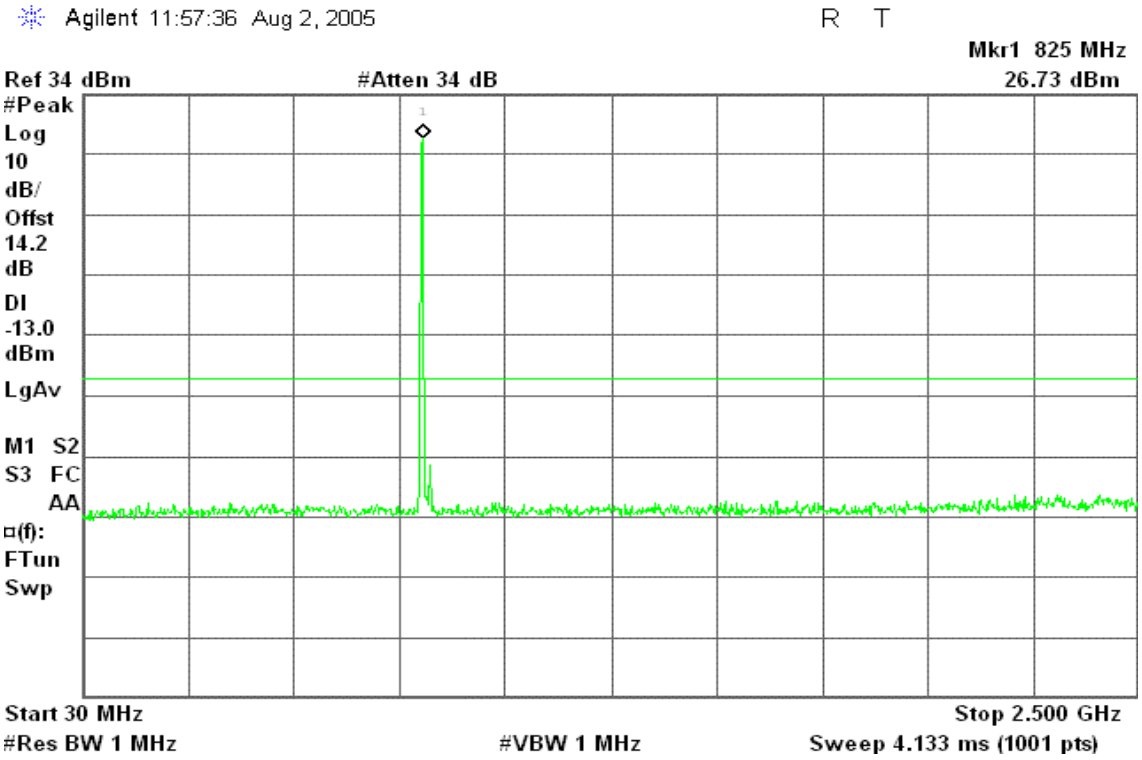


Figure 7-2: Out of Band emission at antenna terminals – CDMA2000 CH Low

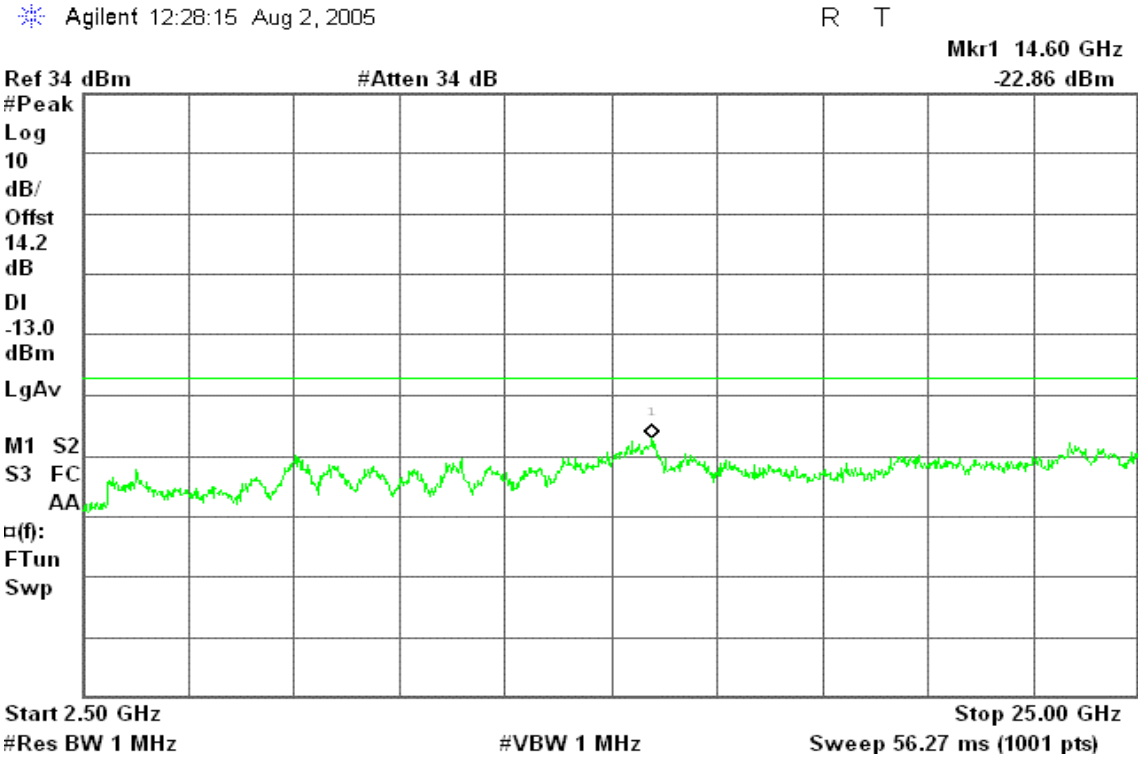


Figure 7-3: Out of Band emission at antenna terminals – CDMA2000 CH Mid

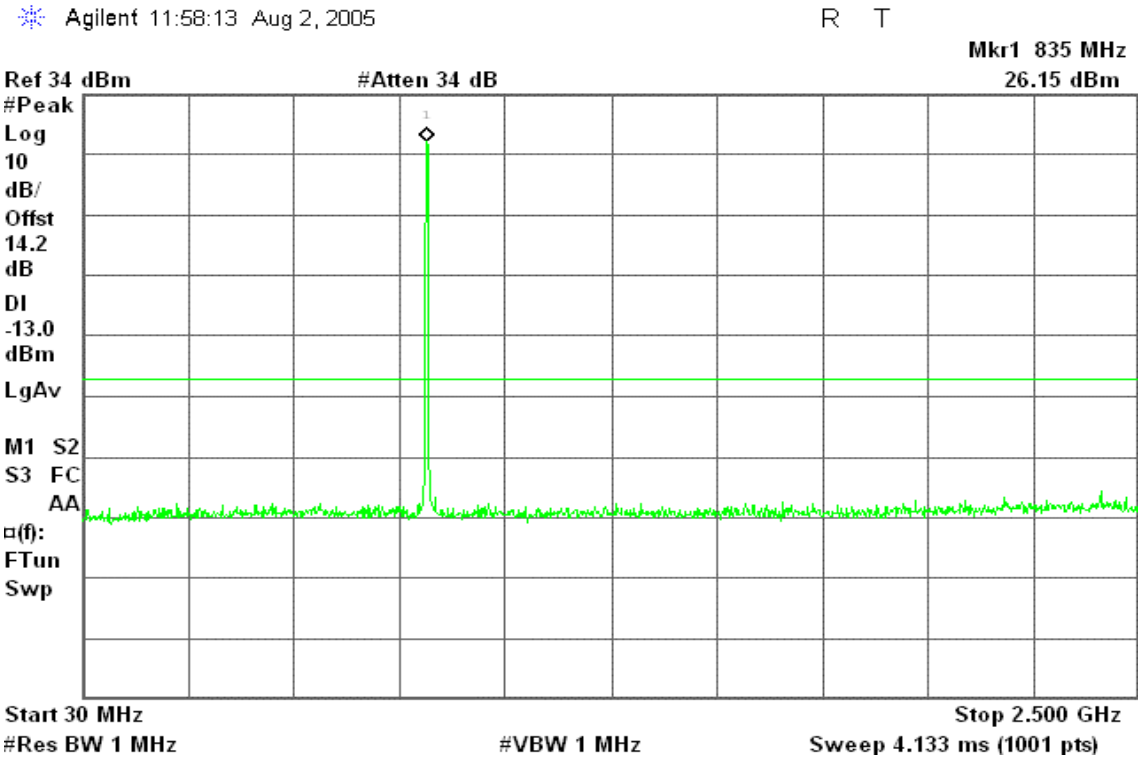


Figure 7-4: Out of Band emission at antenna terminals – CDMA2000 CH Mid

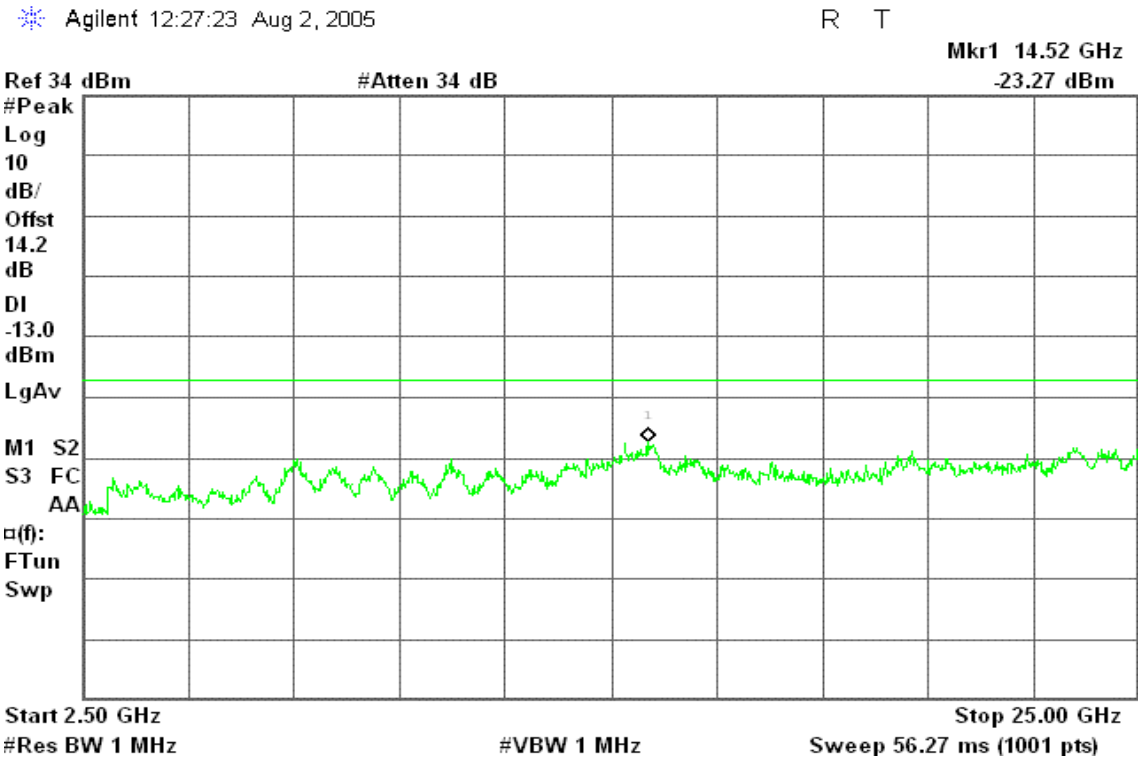


Figure 7-5: Out of Band emission at antenna terminals – CDMA2000 CH High

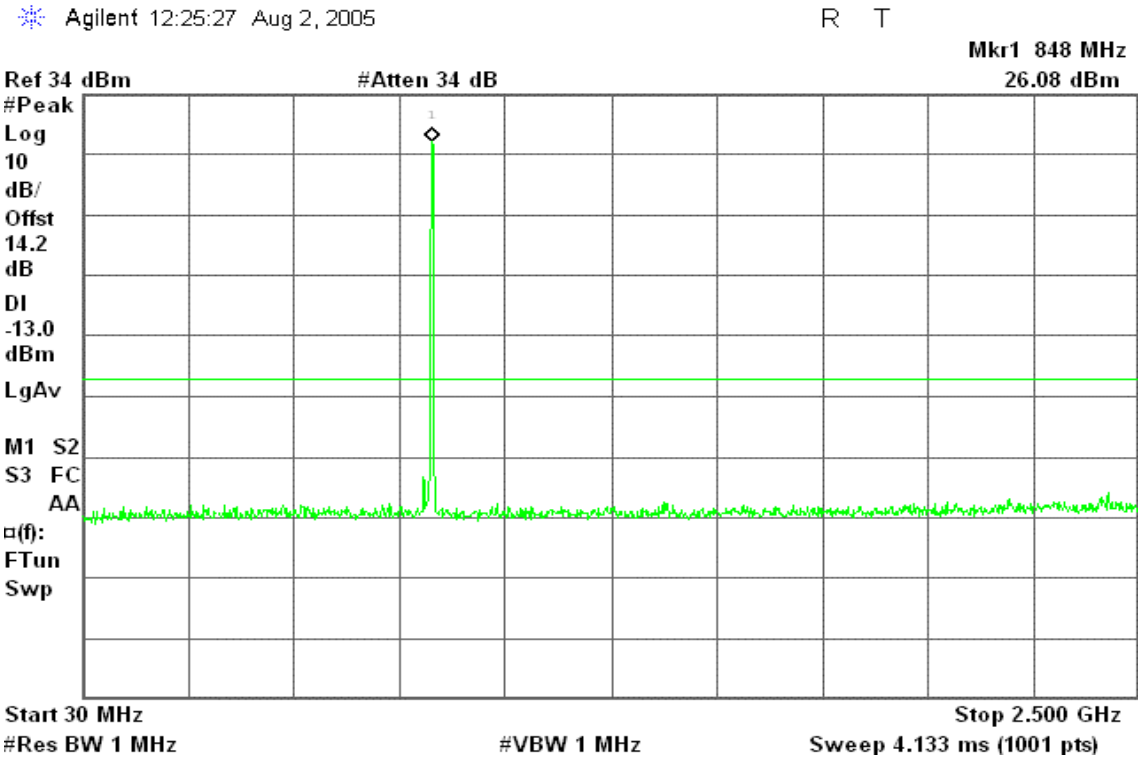
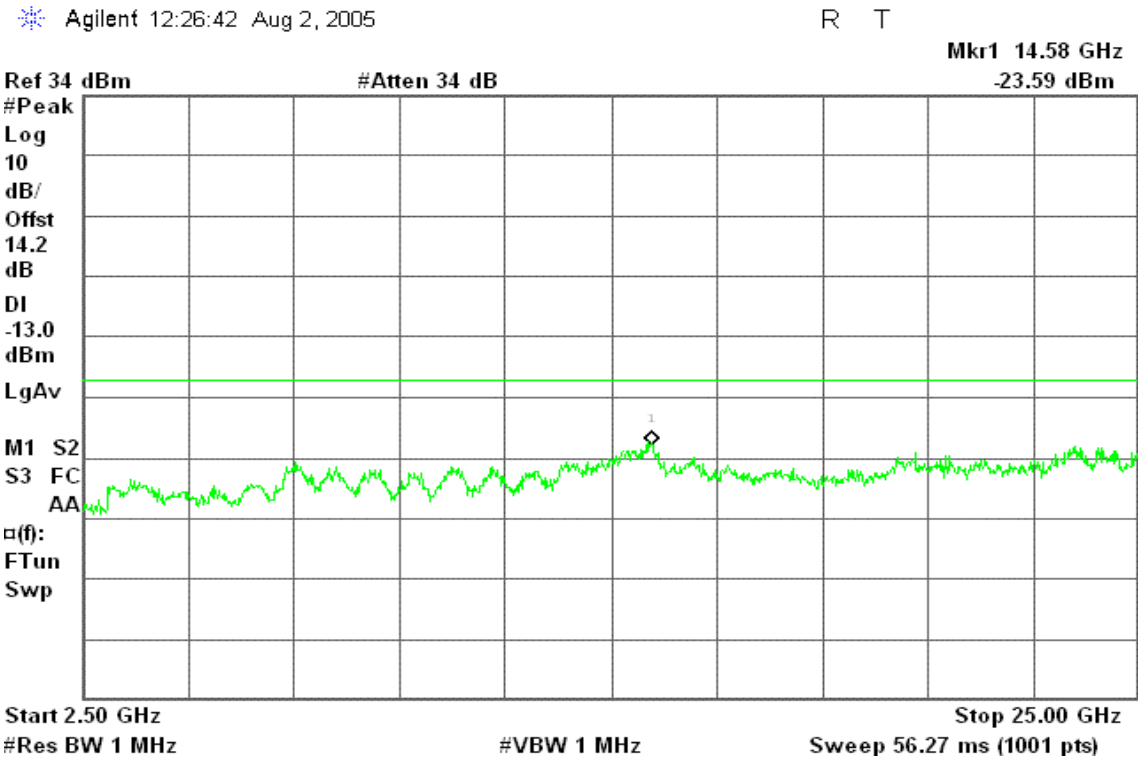


Figure 7-6: Out of Band emission at antenna terminals – CDMA2000 CH High



CDMA2000 / 1900

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

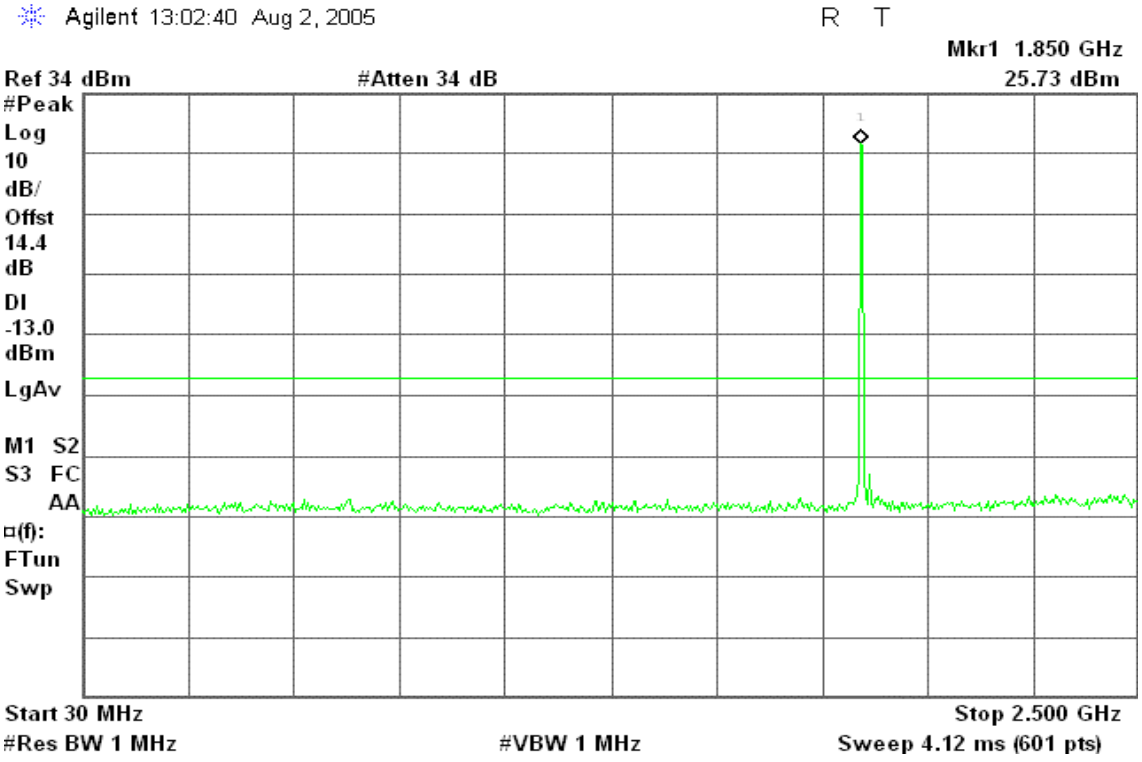


Figure 8-2: Out of Band emission at antenna terminals – CDMA2000 CH Low

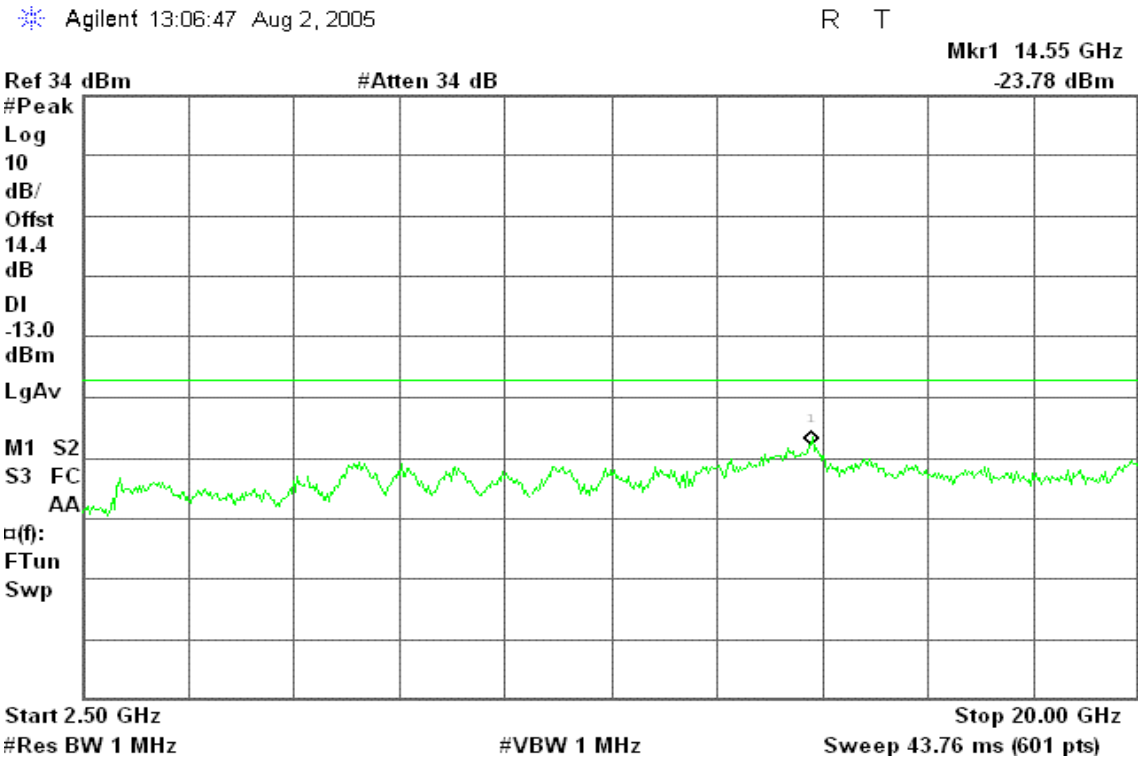


Figure 8-3: Out of Band emission at antenna terminals – CDMA2000 CH Mid

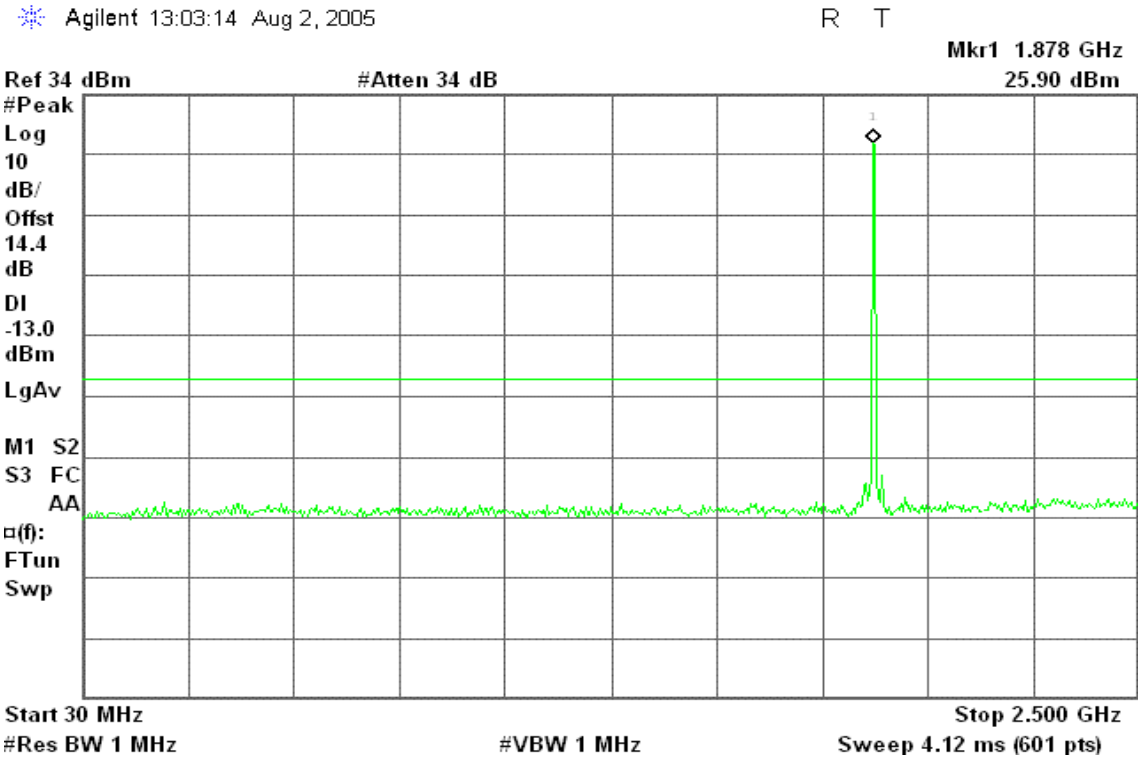


Figure 8-4: Out of Band emission at antenna terminals – CDMA2000 CH Mid

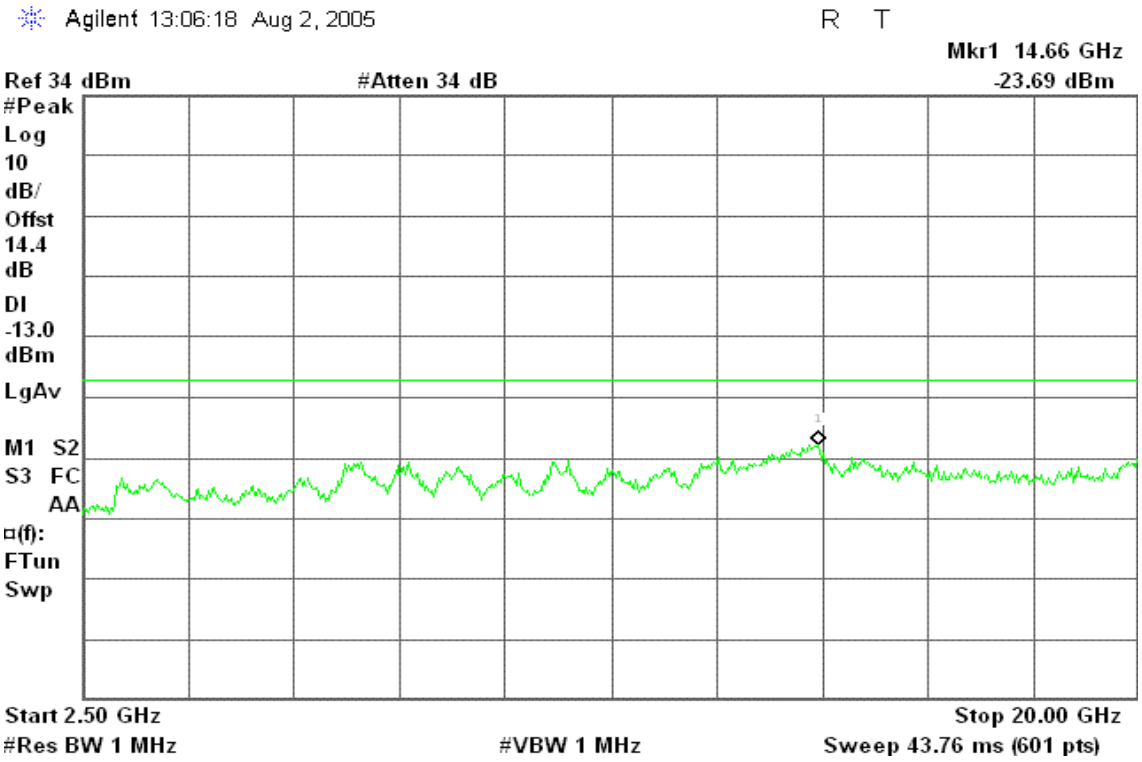


Figure 8-5: Out of Band emission at antenna terminals – CDMA2000 CH High

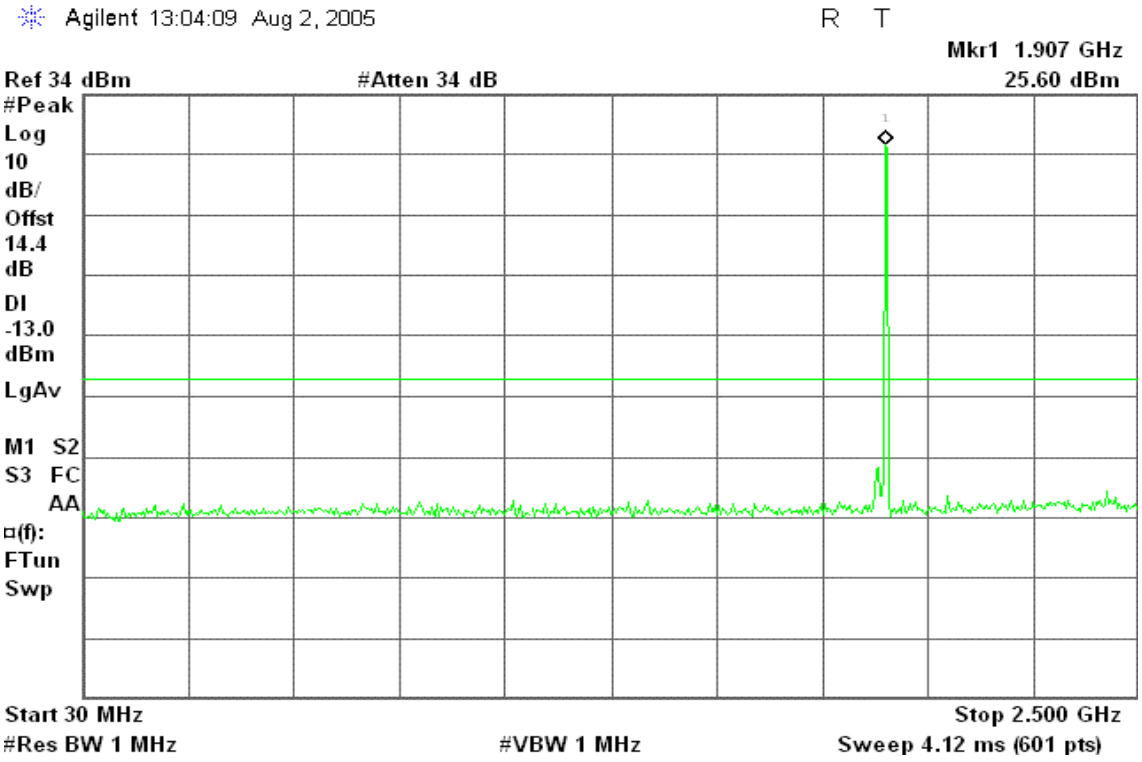
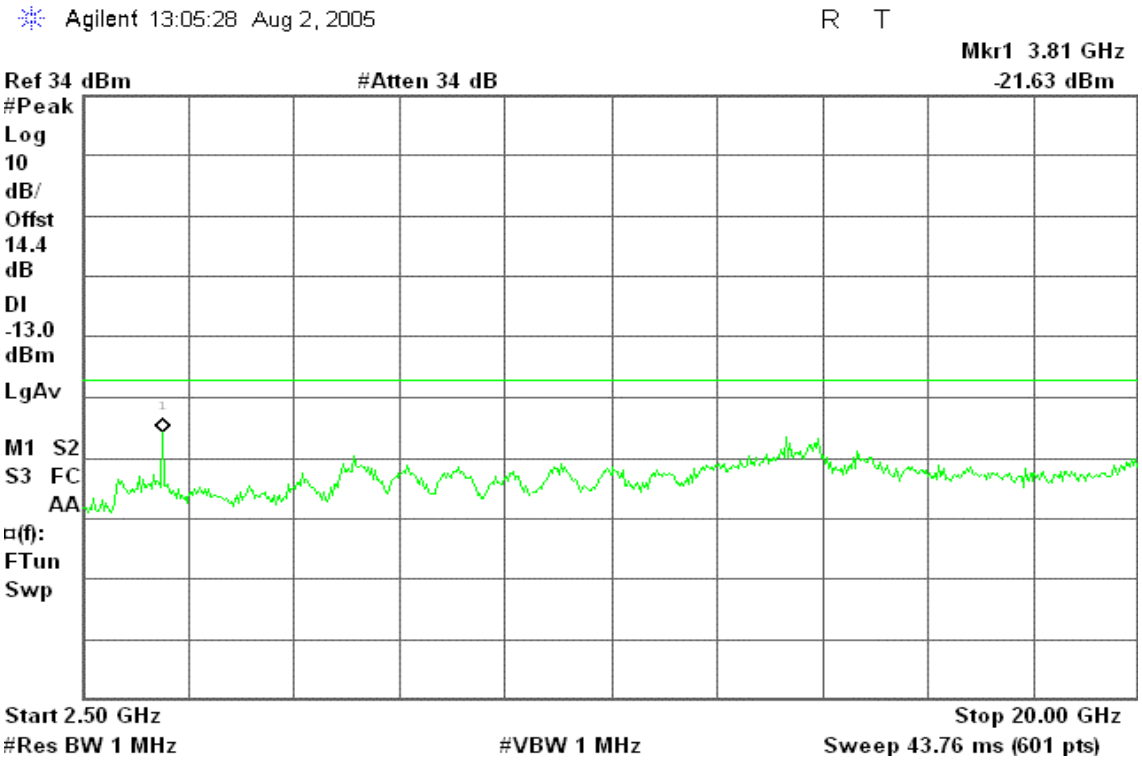


Figure 8-6: Out of Band emission at antenna terminals – CDMA2000 CH High



CDMA2000 / 850

Figure 9-1: Band Edge emissions – CDMA2000 CH Low

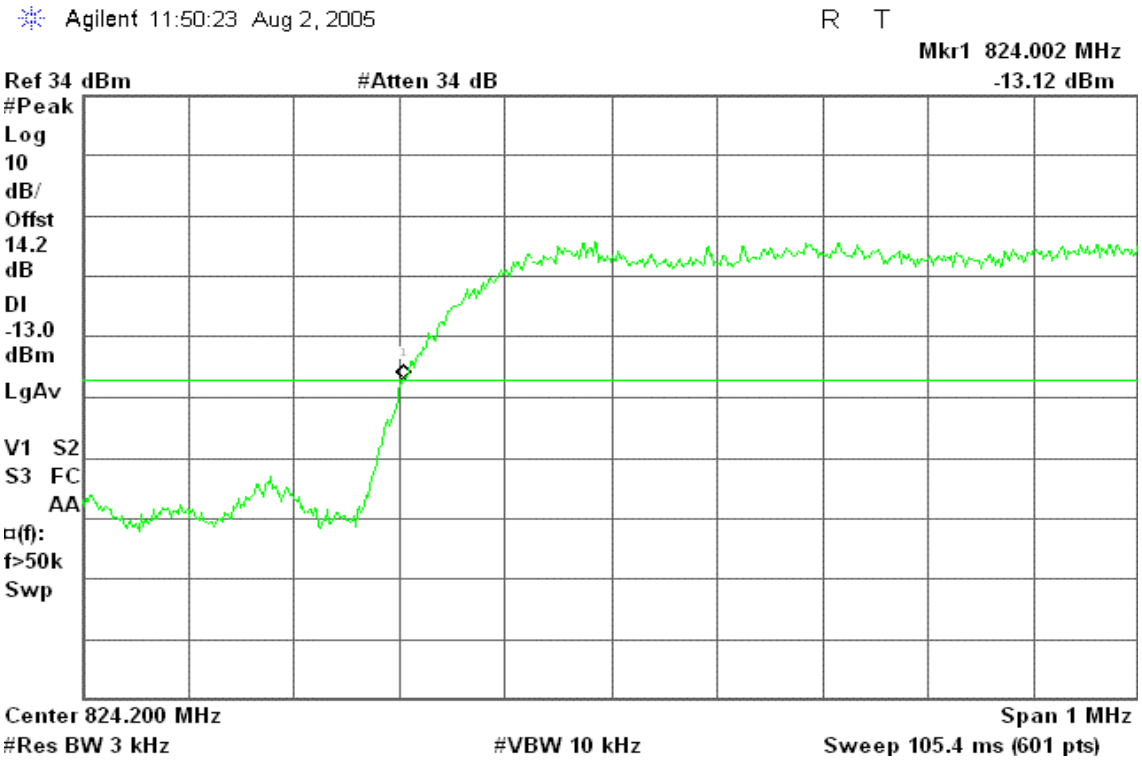
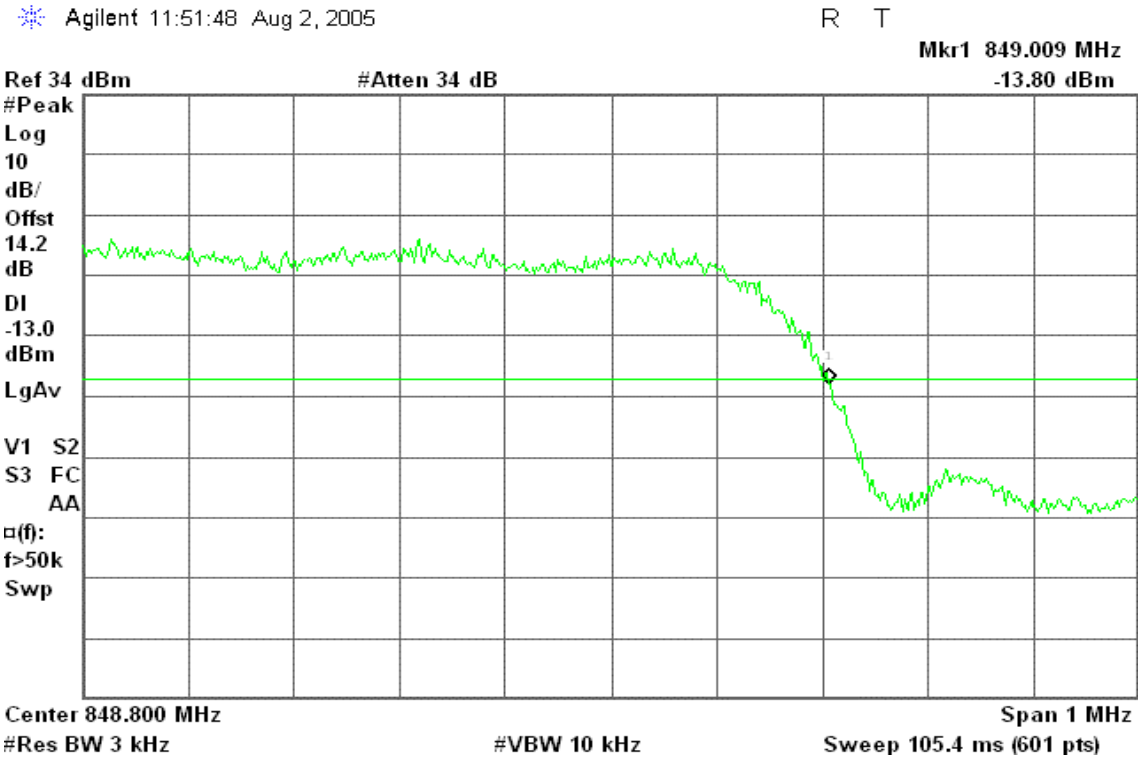


Figure 9-2: Band Edge emissions – CDMA2000 CH High



CDMA2000 / 1900

Figure 10-1: Band Edge emissions – CDMA2000 CH Low

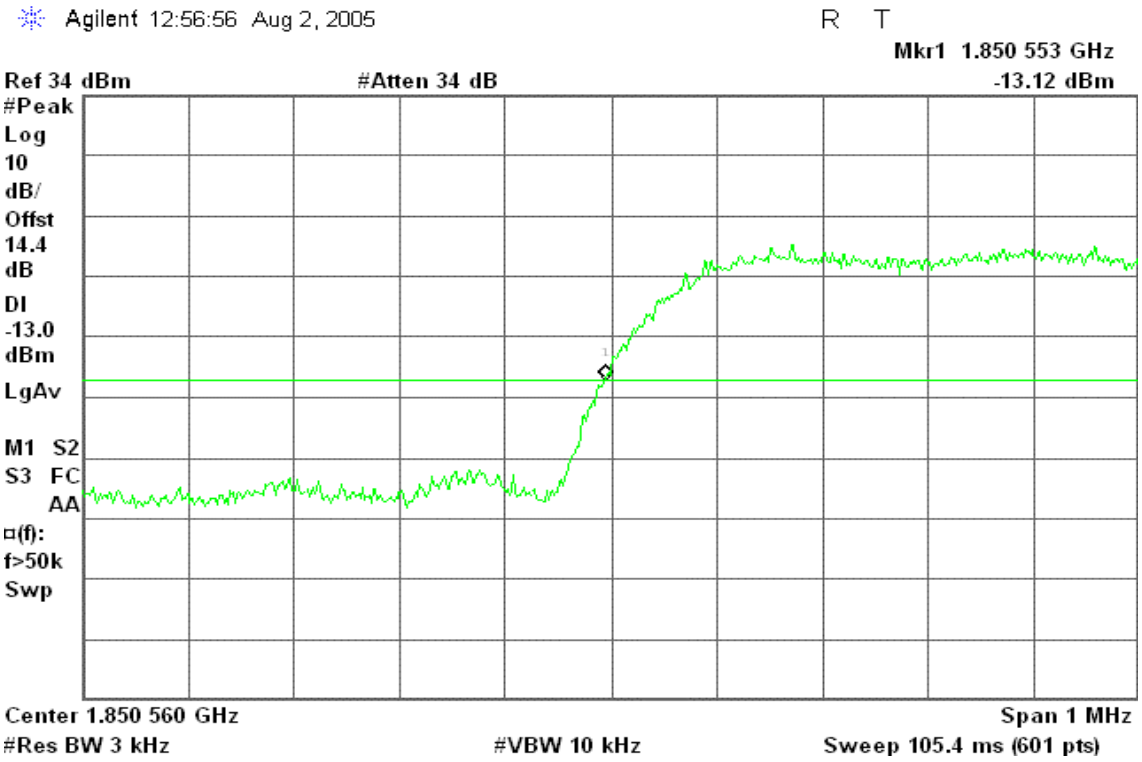
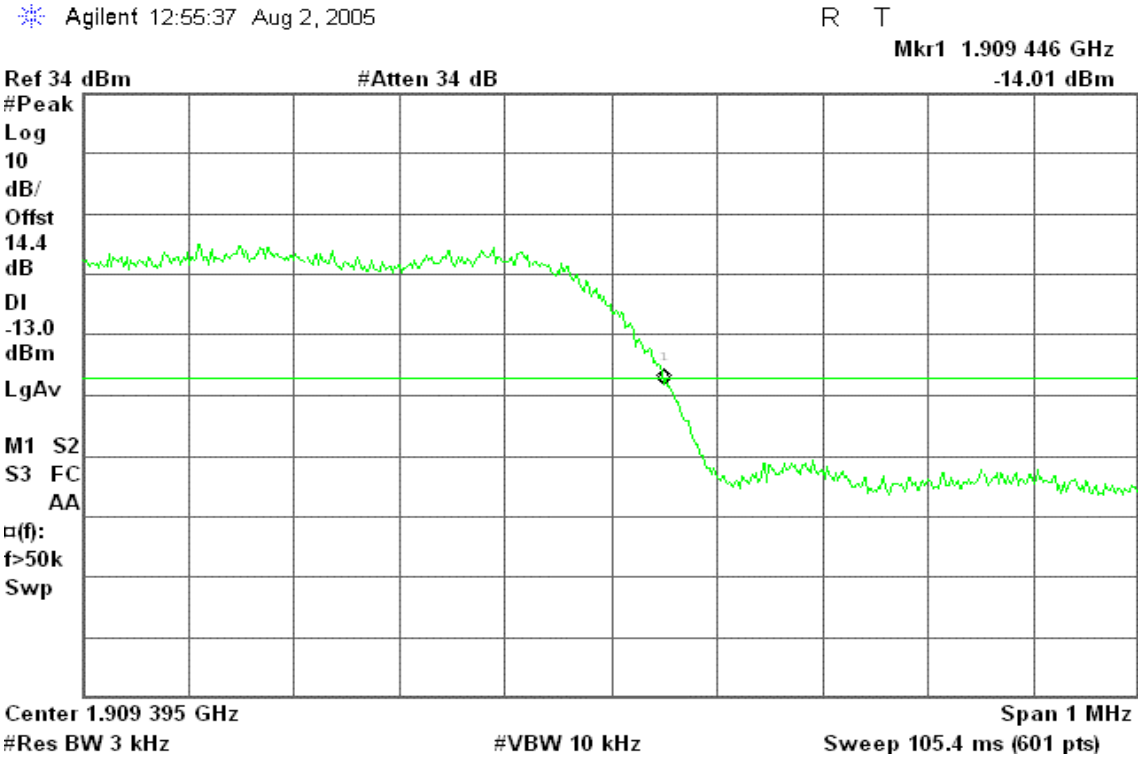


Figure 10-2: Band Edge emissions – CDMA2000 CH High



7.5 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

LIMIT

According to FCC §2.1053

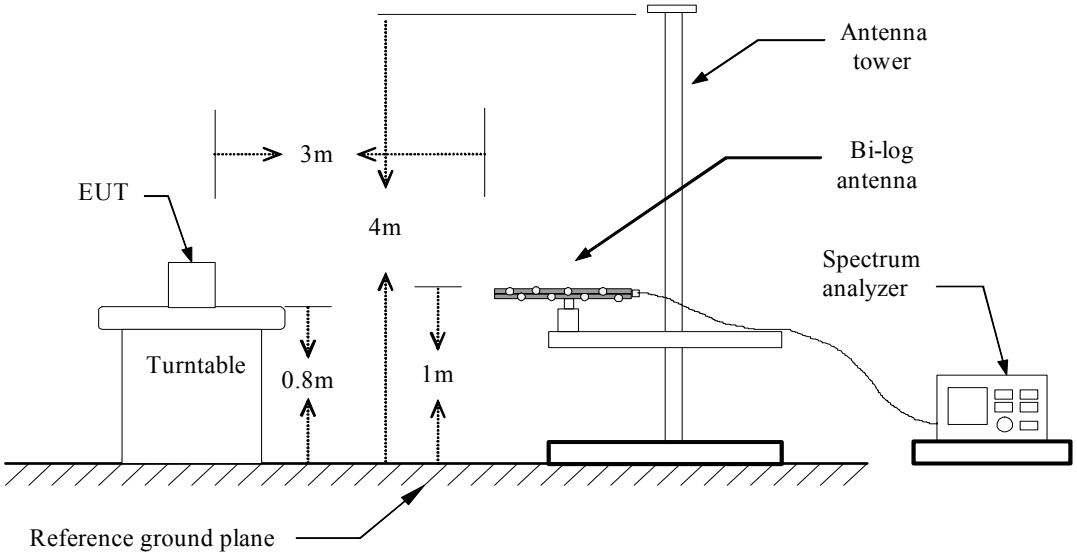
MEASUREMENT EQUIPMENT USED

Open Area Test Site # 3				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006
Spectrum Analyzer	R&S	FSP30	100112	08/03/2006
Pre-Amplifier	HP	8447D	2944A09173	03/03/2006
Bi-log Antenna	SCHWAZBECK	VULB9163	145	07/05/2006
Horn antenna	EMCO	3115	00022250	04/18/2006
Pre-Amplifier	HP	8449B	3008B00965	10/02/2005
Reject Filter	Micro-Tronics	HPM13194	003	04/27/2006
Turn Table	EMCO	2081-1.21	9709-1885	N.C.R
Antenna Tower	EMCO	2075-2	9707-2060	N.C.R
Controller	EMCO	2090	9709-1256	N.C.R
Site NSA	C&C	N/A	N/A	09/06/2005
S.G.	HP	83630B	3844A01022	01/14/2006
Substituted Dipole	SCHWAZBECK	VHAP/UHAP	998 +999/ 981+982	06/12/2006
Substituted Horn	EMCO	3115	00022257	12/12/2006

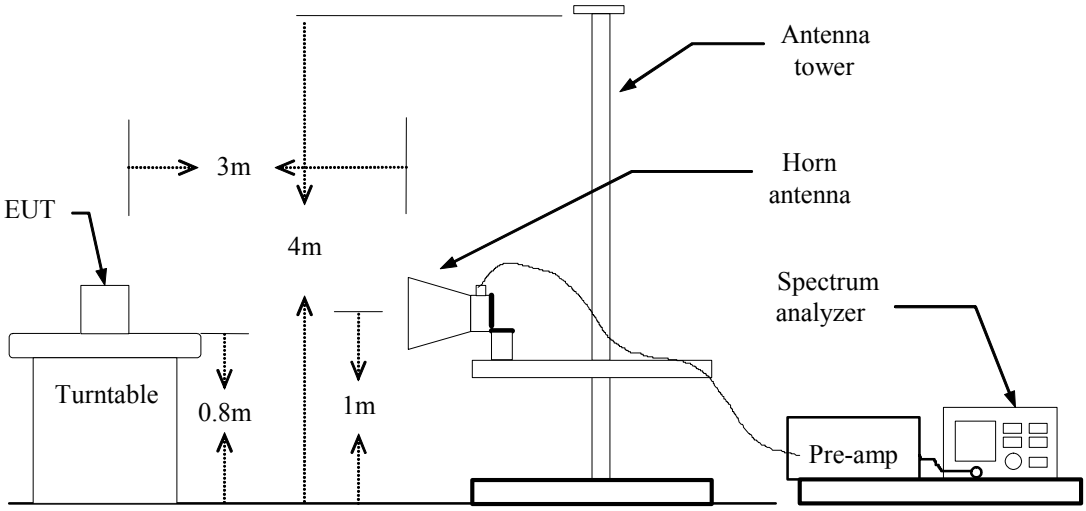
Remark: *Each piece of equipment is scheduled for calibration once a year.*

Test Configuration

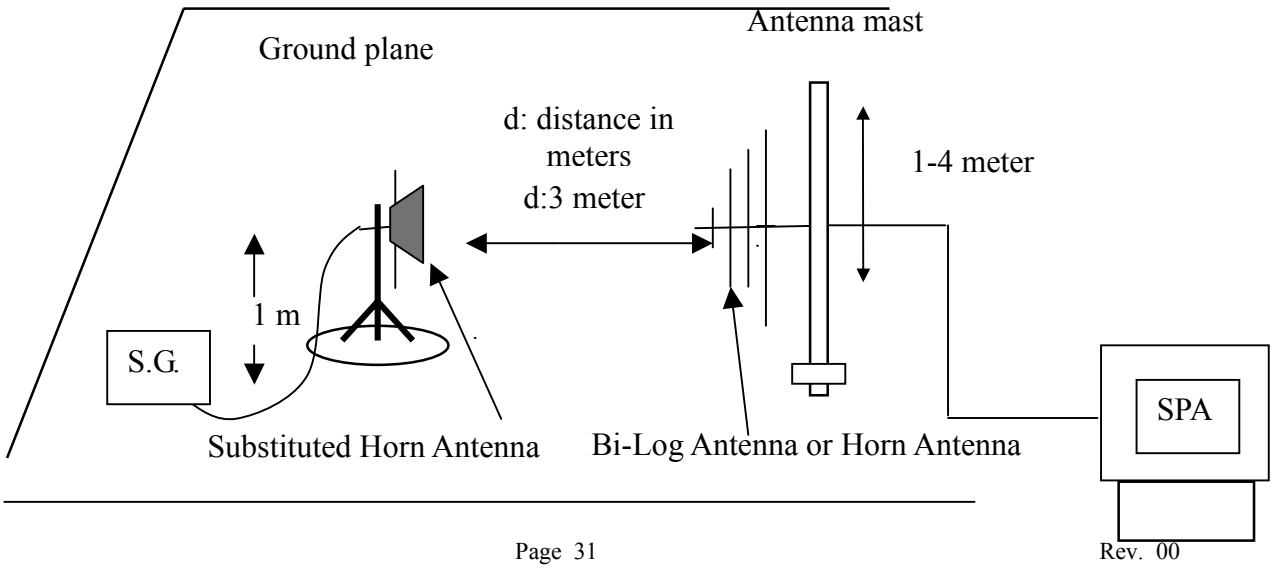
Below 1 GHz



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.

ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable (dB)

EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable (dB)

TEST RESULTS

Refer to the attached tabular data sheets.

Radiated Spurious Emission Measurement Result

Below 1GHz

Operation Mode: Normal Link **Test Date:** July 26, 2005

Temperature: 25°C **Tested by:** Bruce Chen

Humidity: 58 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Ant.Pol. (H/V)	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m comparison (dBuV/m)	Safe Margin (dB)
56.10	V	Peak	8.10	13.20	21.30	84.20	-62.90
62.85	V	Peak	6.20	12.70	18.90	84.20	-65.30
172.65	V	Peak	3.20	10.70	13.90	84.20	-70.30
432.00	V	Peak	-1.30	17.10	15.80	84.20	-68.40
540.00	V	Peak	-3.80	22.00	18.20	84.20	-66.00
726.00	V	Peak	-1.80	25.10	23.30	84.20	-60.90
57.00	H	Peak	-0.90	13.30	12.40	84.20	-71.80
102.00	H	Peak	0.30	14.20	14.50	84.20	-69.70
173.00	H	Peak	1.60	10.70	12.30	84.20	-71.90
453.00	H	Peak	4.20	17.50	21.70	84.20	-62.50
524.00	H	Peak	5.70	21.70	27.40	84.20	-56.80
842.20	H	Peak	-0.50	24.30	23.80	84.20	-60.40

Remark:

1. *Measuring frequencies from 30 MHz to the 1GHz.*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/Quasi-peak detector mode.*
3. *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.*
4. *The IF bandwidth of SPA between 30MHz and 1GHz was 100kHz.*
5. *–13 dBm + 95.2 dB = 82.2 dBuV/m, so limit is 82.2 dBuV/m for ERP, and 84.2 dBuV/m for EIRP.*

Above 1GHz

Operation Mode: CDMA2000 / 850 / TX / CH 363 **Test Date:** July 27, 2005

Temperature: 30°C **Tested by:** Jason Chang

Humidity: 65 % RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBd)	Emission level (dBm)	Limit (dBm)	Margin (dB)
1672.00	-52.00	V	-57.14	2.98	7.13	-52.99	-13.00	-39.99
N/A								
1672.00	-43.21	H	-48.35	2.98	7.13	-44.21	-13.00	-31.21
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:** July 27, 2005

Temperature: 30°C **Tested by:** Jason Chang

Humidity: 65 % RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBd)	Emission level (dBm)	Limit (dBm)	Margin (dB)
1700.00	-51.82	V	-56.95	3.01	7.23	-52.72	-13.00	-39.72
N/A								
1700.00	-46.88	H	-52.01	3.01	7.23	-47.78	-13.00	-34.78
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 1013 **Test Date:** July 27, 2005

Temperature: 30°C **Tested by:** Jason Chang

Humidity: 65 % RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBd)	Emission level (dBm)	Limit (dBm)	Margin (dB)
1651.00	-49.65	V	-54.81	2.96	7.06	-50.71	-13.00	-37.71
N/A								
1651.00	-43.52	H	-48.68	2.96	7.06	-44.58	-13.00	-31.58
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:** July 27, 2005

Temperature: 30°C **Tested by:** Jason Chang

Humidity: 65 % RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
3704.00	-57.58	V	-58.76	4.68	10.45	-52.98	-13.00	-39.98
5558.00	-59.35	V	-57.11	5.81	10.94	-51.98	-13.00	-38.98
7508.00	-61.96	V	-49.46	6.41	9.35	-46.52	-13.00	-33.52
N/A								
3704.00	-59.59	H	-60.77	4.68	10.45	-55.00	-13.00	-42.00
5552.00	-57.99	H	-55.75	5.81	10.94	-50.62	-13.00	-37.62
7820.00	-61.32	H	-48.13	7.25	9.22	-46.16	-13.00	-33.16
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:** July 27, 2005

Temperature: 30°C **Tested by:** Jason Chang

Humidity: 65 % RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
3758.00	-46.97	V	-48.03	4.66	10.45	-42.25	-13.00	-29.25
5642.00	-60.13	V	-57.64	5.89	10.92	-52.61	-13.00	-39.61
N/A								
3758.00	-47.81	H	-48.87	4.66	10.45	-43.08	-13.00	-30.08
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:** July 27, 2005

Temperature: 30°C **Tested by:** Jason Chang

Humidity: 65 % RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
3818.00	-33.86	V	-34.77	4.65	10.45	-28.97	-13.00	-15.97
N/A								
3818.00	-31.20	H	-32.11	4.65	10.45	-26.31	-13.00	-13.31
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.

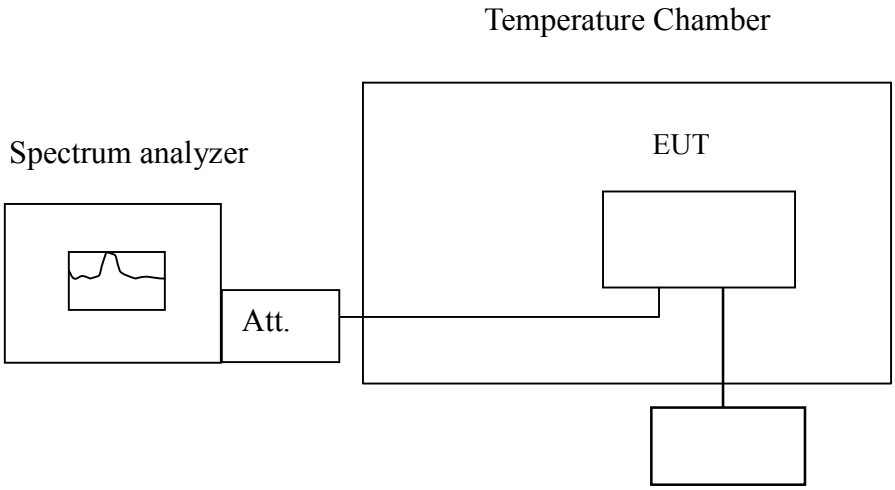
Frequency Tolerance: 2.5 ppm

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
DC Power Source	Agilent	E3640A	MY40001774	01/12/2006
Temperature Chamber	K.son	THS-M1	242	03/20/2006
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006

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

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: Mid Channel 836 MHz @ 20℃				
Limit: +/- 2.5 ppm = 2090 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
3.6	50	835999997.7	-34	2090
	40	835999996.4	-36	
	30	835999996.2	-36	
	20	836000032.0	0	
	10	835999995.7	-36	
	0	835999994.9	-37	
	-10	835999996.1	-36	
	-20	835999994.4	-38	
	-30	835999995.5	-37	

Reference Frequency: Mid Channel 1880 MHz @ 20℃				
Limit: +/- 2.5 ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
3.6	50	1879999993	-41	4700
	40	1879999993	-40	
	30	1879999994	-39	
	20	1880000033	0	
	10	1879999991	-42	
	0	1879999991	-42	
	-10	1879999992	-42	
	-20	1879999990	-43	
	-30	1879999988	-45	

7.7 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

LIMIT

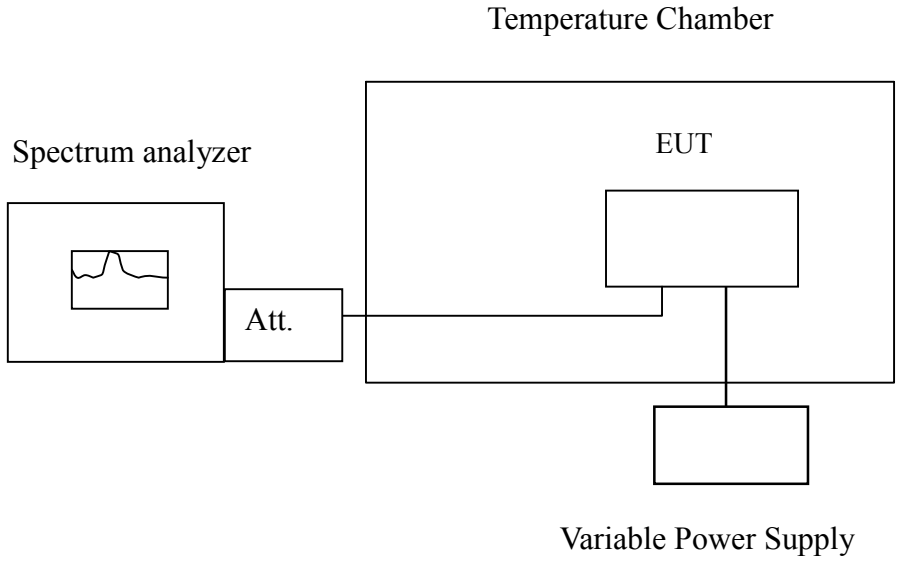
According to FCC §2.1055, FCC §24.235,
Frequency Tolerance: 2.5 ppm.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
DC Power Source	Agilent	E3640A	MY40001774	01/12/2006
Temperature Chamber	K.son	THS-M1	242	05/26/2006
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006

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

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 (± 15%) and endpoint, record the maximum frequency change.

TEST RESULTS

No non-compliance noted.

Reference Frequency: Mid Channel 836 MHz @ 20℃				
Limit: +/- 2.5 ppm = 2090 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
4.2	20	836000025	-7	2090
3.6		836000032	0	
3.3(END POINT)		836000044	12	

Reference Frequency: CDMA2000 Mid Channel 1880 MHz @ 20°C				
Limit: ± 2.5 ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
4.2	20	1880000023	-10	4700
3.6		1880000033	0	
3.3(END POINT)		1880000045	12	

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 (dBμV)	
	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.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI TEST RECEIVER 9kHz-30MHz	ROHDE & SCHWARZ	ESHS30	828144/003	09/24/2005
TWO-LINE V-NETWORK 9kHz-30MHz	SCHAFFNER	NNB41	03/10013	06/11/2006
LISN 10kHz-100MHz	EMCO	3825/2	9106-1809	02/17/2006

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

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

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Operation Mode:	Normal Link	**Test Date:**	July 25, 2005
Temperature:	25°C	**Tested by:**	Skyman.Tsai
Humidity:	55% RH		

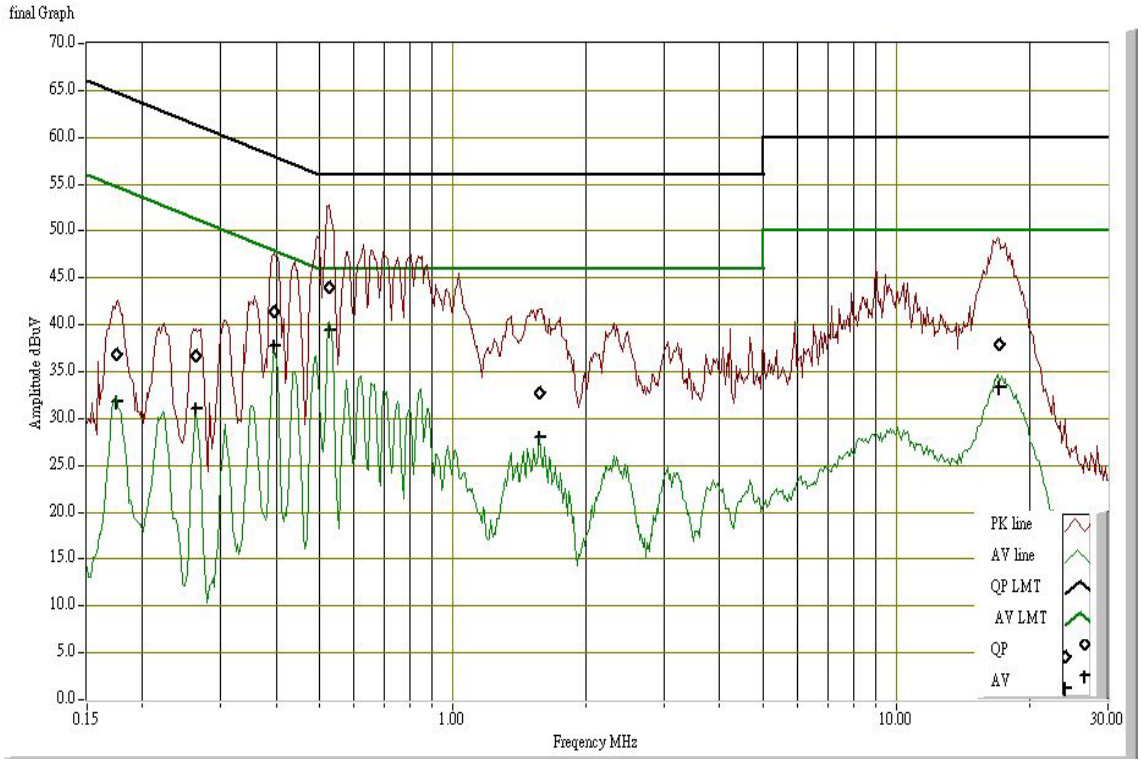
Freq. (MHz)	QP Reading	AV Reading	Corr. factor	QP Result	AV Result	QP Limit	AV Limit	QP Margin	AV Margin	Note
0.175	36.880	31.870	0.150	37.030	32.020	64.720	54.720	-27.690	-22.700	L1
0.264	36.630	30.980	0.100	36.730	31.080	61.305	51.305	-24.575	-20.225	L1
0.397	41.370	37.810	0.100	41.470	37.910	57.916	47.916	-16.446	-10.006	L1
0.528	44.040	39.410	0.100	44.140	39.510	56.000	46.000	-11.860	-6.490	L1
1.574	32.750	28.050	0.100	32.850	28.150	56.000	46.000	-23.150	-17.850	L1
17.047	37.920	33.330	0.964	38.884	34.294	60.000	50.000	-21.116	-15.706	L1
0.175	32.360	27.510	0.150	32.510	27.660	64.720	54.720	-32.210	-27.060	L2
0.264	27.330	23.760	0.100	27.430	23.860	61.305	51.305	-33.875	-27.445	L2
0.520	39.480	36.070	0.100	39.580	36.170	56.000	46.000	-16.420	-9.830	L2
1.612	34.580	29.600	0.100	34.680	29.700	56.000	46.000	-21.320	-16.300	L2
2.363	32.720	28.290	0.100	32.820	28.390	56.000	46.000	-23.180	-17.610	L2
16.912	39.030	33.910	0.953	39.983	34.863	60.000	50.000	-20.017	-15.137	L2

Remark:

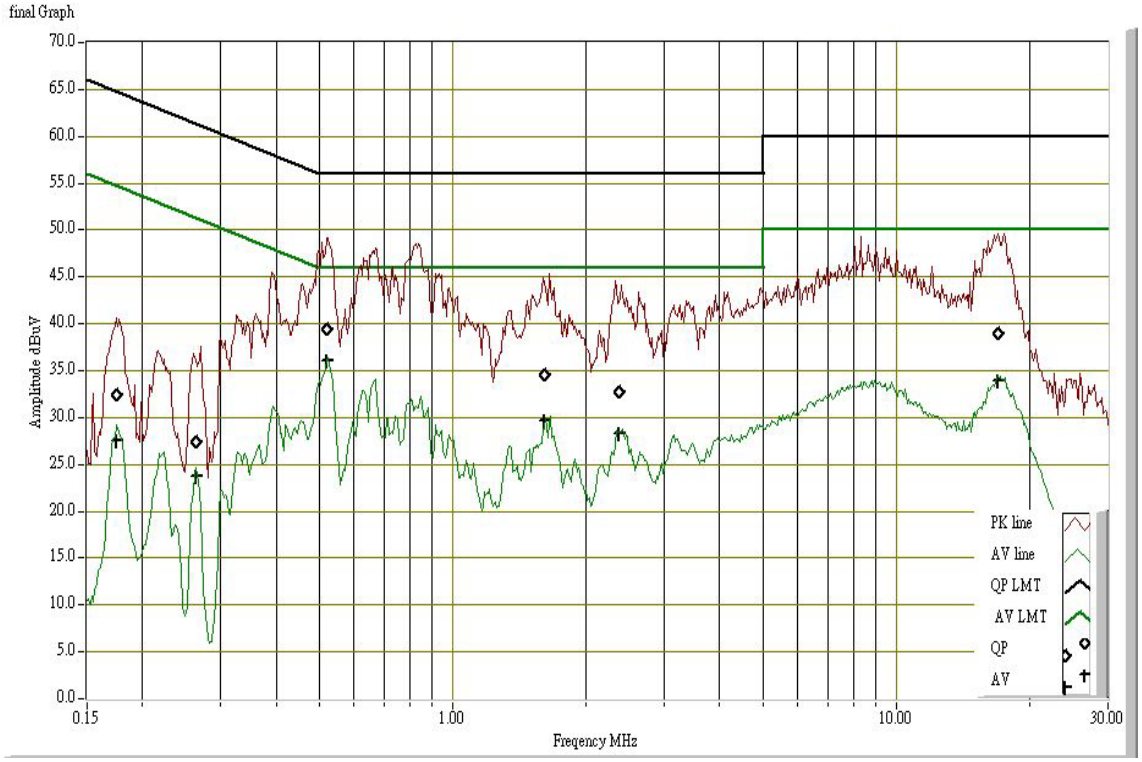
1. *Measuring frequencies from 0.15 MHz to 30MHz.*
2. *The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.*
3. *The IF bandwidth of SPA between 0.15MHz to 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9kHz;*
4. *L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)*

Test Plots

Conducted emissions (Line 1)

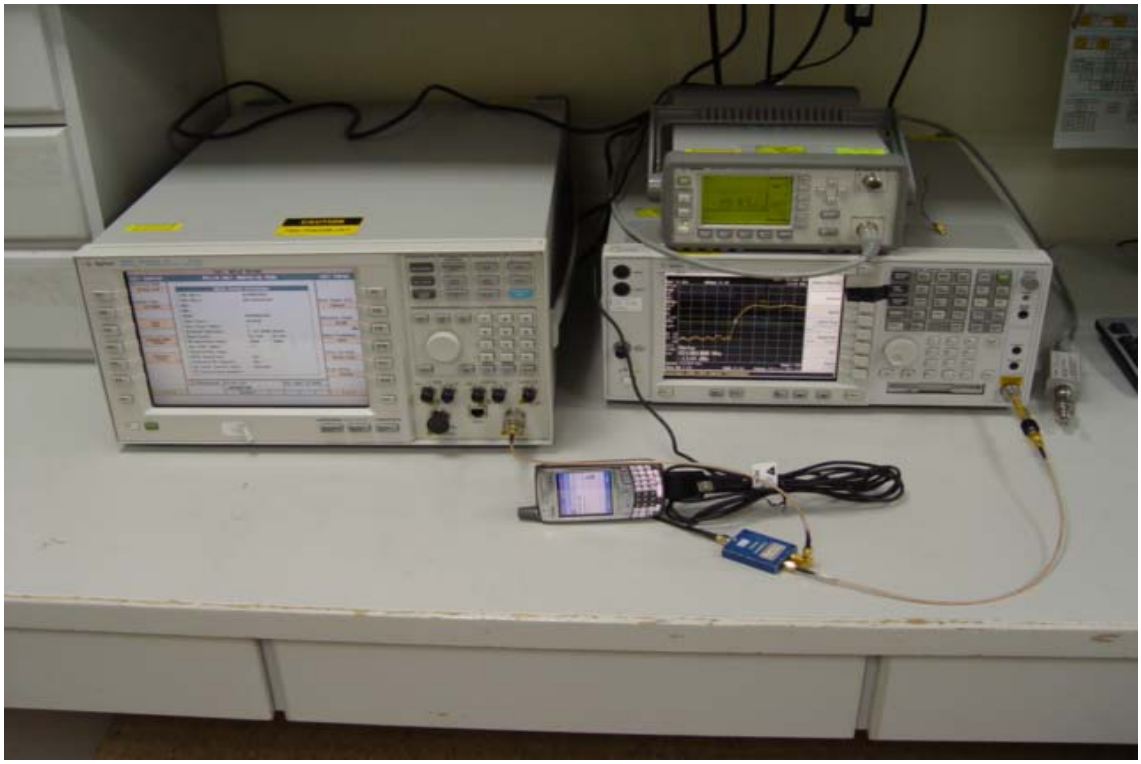


Conducted emissions (Line 2)



APPENDIX 1
PHOTOGRAPHS OF TEST SETUP

Conducted Emission Set Up Photo



Radiated Emission Set up Photos

Powerline Conducted Emissions Setup Photos