TEST REPORT

OF

FCC Part 22H, Part 24E and Part 15

FCC ID : TARCDU-650

Equipment Under Test	:	Dual Band CDMA 1xEVDO Wireless Modem
Model Name	:	CDU-650
Serial No.	:	N/A
Applicant	:	C-motech Co., Ltd.
Manufacturer	:	C-motech Co., Ltd.
Date of Test(s)	:	2006-08-24~ 2006-09-29
Date of Issue	:	2006-09-29

In the configuration tested, the EUT complied with the standards specified above.

Tested By: **Date:** 2006-09-29

Feel Jeong

Approved By: **Date:** 2006-09-29

Albert Lim

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1. General Information

1-1. Testing Laboratory

SGS Testing Korea Co., Ltd.
Wireless Div. 2FL, 18-34, Sanbon-dong, Gunpo-Si, Gyeonggi-do, Korea 435-040
www.sgstesting.co.kr
Telephone : +82 +31 428 5700
FAX : +82 +31 427 2371

1-2. Details of Applicant

Applicant : C-motech Co., Ltd.
Address : 5F B/D. Etronix 17-10 Yoido-dong, Youngdungpo-gu, Seoul South Korea, 150-874
Contact Person : Bahn Gil-Sung
Phone No. : 82-2-785-5540
Fax No. : 82-2-785-2369

1-3. Description of EUT

Kind of Product	Dual Band CDMA 1xEVDO Wireless Modem
Model Name	CDU-650
Serial Number	N/A
Power Supply	DC 5V from USB Host connector
Frequency Range	TX: 824.70 ~ 848.31 MHz, 1851.25 ~ 1908.75 MHz RX: 869.70 ~ 893.31 MHz, 1931.25 ~ 1988.75 MHz
Transmit Power	CDMA : ERP 21.90 dBm (0.155 W) US PCS :EIRP 21.84 dBm (0.153 W)
Modulation Technique	OQPSK, QPSK
Number of Channels	20 CH for CDMA, 48 CH for US PCS
Emission Designation	1M42F9W
Operating Conditions	-30℃~60℃
Antenna Type	Monopole Antenna

1-4. Details of modification

-N/A

1.5. Test Equipment List

EQUIPMENT	MANUFACTURER	MODEL	CAL DUE.
Signal Generator	Agilent	E4438C	May 2007
Spectrum Analyzer	Agilent	E4440A	May 2007
Test Receiver	Rohde & Schwarz	ESVS 10	Mar.2007
Test Receiver	Rohde & Schwarz	ESHS 10	Aug.2007
Two-Line V-Network	Rohde & Schwarz	ENV216	Dec.2006
Pulse Limiter	EHS3-Z2	Rohde & Schwarz	Jan.2007
Test Receiver	Rohde & Schwarz	ESIB 26	Mar.2007
Preamplifier	Agilent	8449B	May 2007
Preamplifier	Agilent	8447F	Jun.2007
Log-periodic	Rohde & Schwarz	UHALP9107	Jan.2007
Biconical Antenna	Schwarzbeck	VHA9103	Mar.2007
Horn Antenna	Rohde & Schwarz	HF906	Mar.2007
Anechoic Chamber	SY Corporation	9.6m x 6.4m x 6.4m	Aug.2007
Test Receiver	R&S	ESIB 26	Apr.2007
Signal Generator	R&S	SMR 20	Dec.2006
Universal Radio communication Tester	R&S	CMU200	Mar.2007
Horn Antenna	R&S	HF906	Aug.2007
Ultra Broadband Antenna	R&S	HL562	Sep.2007
Biconical Antenna	Schwarzbeck ME	VUSA 9117	Nov.2006
Communication Antenna	EURPEAN	PSA-75301R/170	N.C.R
Turn Table	INN-CO	CT 0800	N.C.R
Antenna Mast	INN-CO	MA 2000	N.C.R
Turn Device	INN-CO	FSM 230-M	N.C.R
Controller	INN-CO	CO 2000	N.C.R
Fully Anechoic Chamber	SY Corporation	10m x 5m x 5m	Feb 2007

1.6. Summary of Test Results

Description of Test	FCC Rule	Result
AC Power Line Conducted Emissions	§15.207	Complies
Field Strength of Radiated Emission	§15.209(a) §22.917(a) §24.238(a)	Complies
Spurious Radiated Emission	§22.917(a) §24.238(a)	Complies
RF Radiated Output Power	§2.1046 §22.913(a) §24.232(c)	Complies
Conducted Output Power	§2.1046(a) §22.913(a) §24.232(c)	Complies
Occupied Bandwidth	§2.1049(h) (i)	Complies
Spurious Emission at Antenna Terminal	§2.1051 §22.917(a) §24.238(a)	Complies
Frequency Stability	§2.1055 §22.355 §24.235	Complies
Band Edge	§22.905 §24.229	Complies

1.7. Description of Support Units

Product	Model No.	Serial No.	Manufacturer
Note PC	R40e	99-F1442	LG IBM

2. AC Power Line Conducted Emissions

2.1. Limit

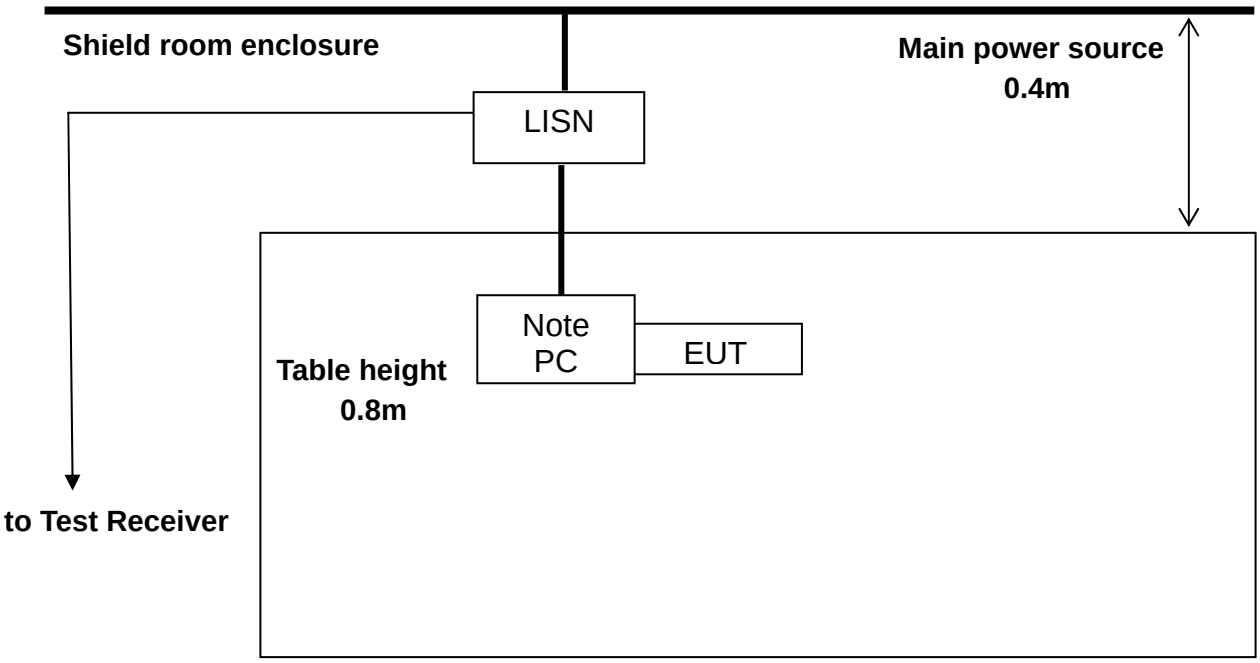
According to §15.207(a) for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 uH/50 ohm line impedance stabilization network(LISN).
Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted limit (dBμV)	
	Qausi-peak	Average
0.15 – 0.50	66-56*	56-46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

* Decreases with the logarithm of the frequency.

2.2. Test Procedure

The test procedure is performed in a 12 ft ×12 ft ×8 ft (L×W×H) shielded room. The EUT along with its peripherals were placed on a 1.0m(W)× 1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.



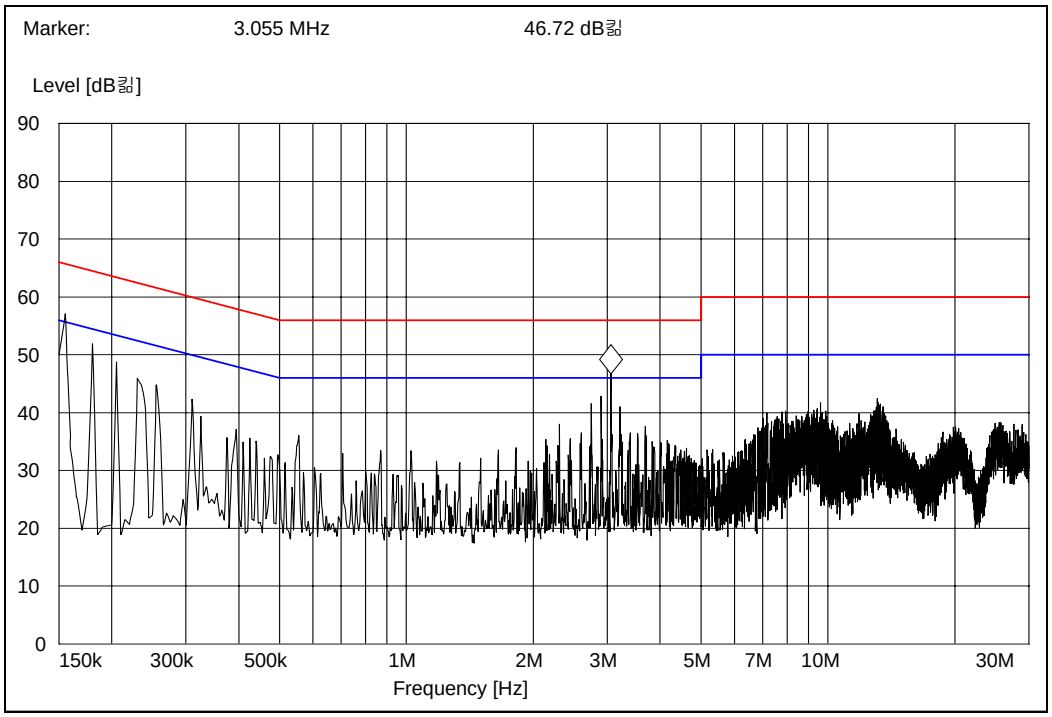
2.3. Test Result

CDMA 800

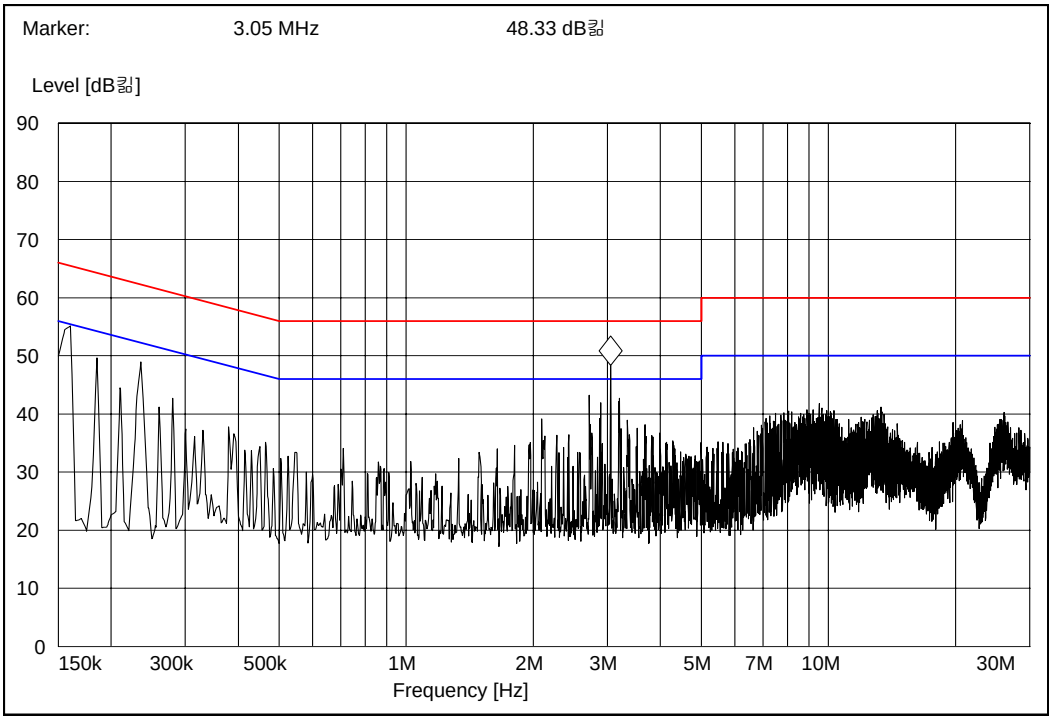
FREQ. (MHz)	LEVEL(dB μV)		LINE	LIMIT(dB μV)		MARGIN(dB)	
	Q-Peak	Average	LINE	Q-Peak	Average	Q-Peak	Average
0.160	52.3	41.4	H	65.5	55.5	13.2	14.1
0.185	44.5	20.3	H	64.3	53.3	19.8	34.0
0.235	43.4	42.8	H	62.3	52.3	18.9	9.5
2.715	42.7	25.7	H	56.0	46.0	13.3	20.3
3.050	46.1	30.3	H	56.0	46.0	9.9	15.7
3.190	40.5	28.4	H	56.0	46.0	15.5	17.6
0.155	53.1	43.3	N	65.7	55.7	12.6	12.4
0.180	43.6	20.5	N	64.5	54.5	20.9	34.0
0.205	41.0	17.4	N	63.4	53.4	22.4	36.0
2.900	43.7	29.3	N	56.0	46.0	12.3	16.7
3.053	37.2	23.7	N	56.0	46.0	18.8	22.3
3.210	34.9	28.1	N	56.0	46.0	21.1	17.9

Please refer to the following plots.

Neutral



HOT

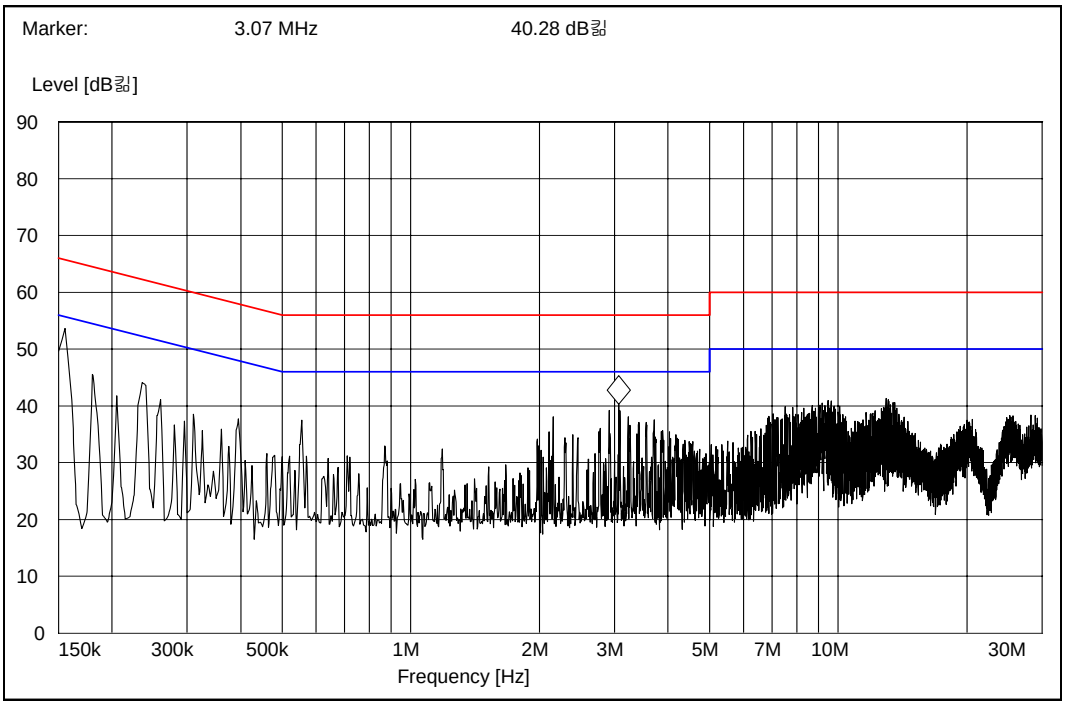


PCS 1900

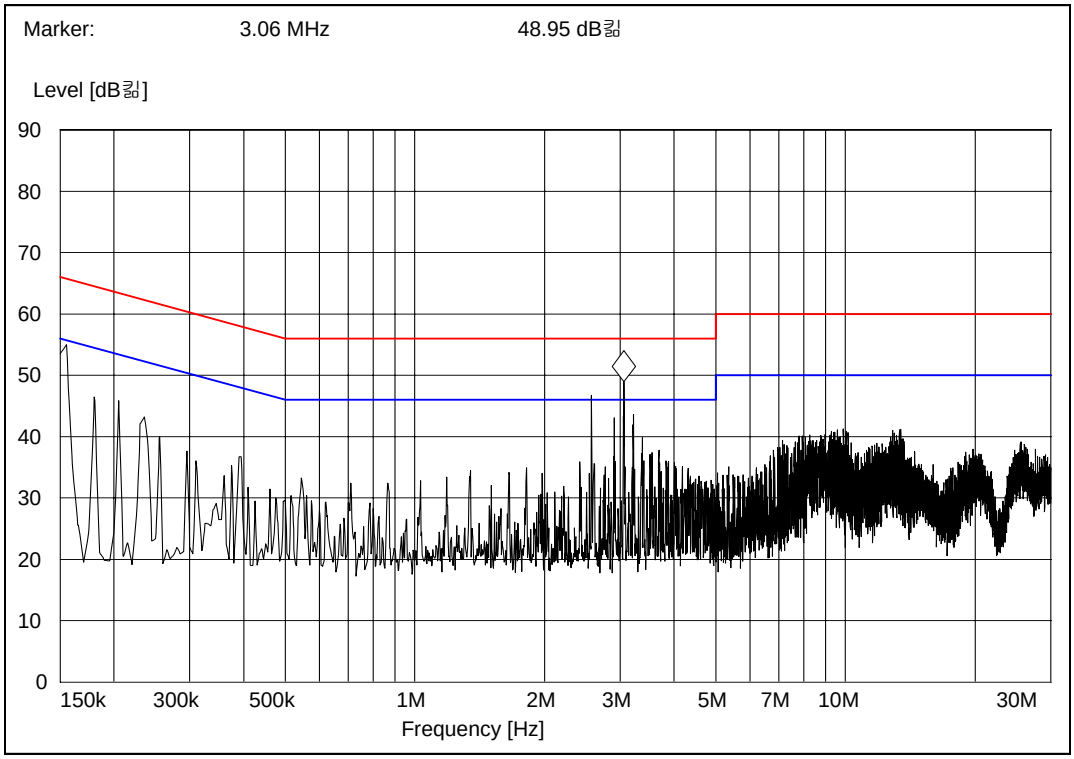
FREQ. (MHz)	LEVEL(dB μV)		LINE	LIMIT(dB μV)		MARGIN(dB)	
	Q-Peak	Average	LINE	Q-Peak	Average	Q-Peak	Average
0.155	53.1	43.4	H	65.7	55.7	12.6	12.3
0.180	43.9	20.8	H	64.5	54.5	20.6	33.7
0.205	41.8	20.0	H	63.4	53.4	21.6	33.4
2.570	41.4	22.2	H	56.0	46.0	14.6	23.8
3.060	46.3	31.3	H	56.0	46.0	9.7	14.7
3.220	40.8	27.8	H	56.0	46.0	15.2	18.2
0.155	52.8	41.3	N	65.7	55.7	12.9	14.4
0.180	41.6	20.2	N	64.5	54.5	22.9	34.3
0.205	38.1	20.4	N	63.4	53.4	25.3	33.0
0.555	33.8	32.0	N	56.0	46.0	22.2	14.0
2.910	45.3	28.6	N	56.0	46.0	10.7	17.4
3.070	45.4	30.7	N	56.0	46.0	10.6	15.3

Please refer to the following plots.

Neutral



HOT



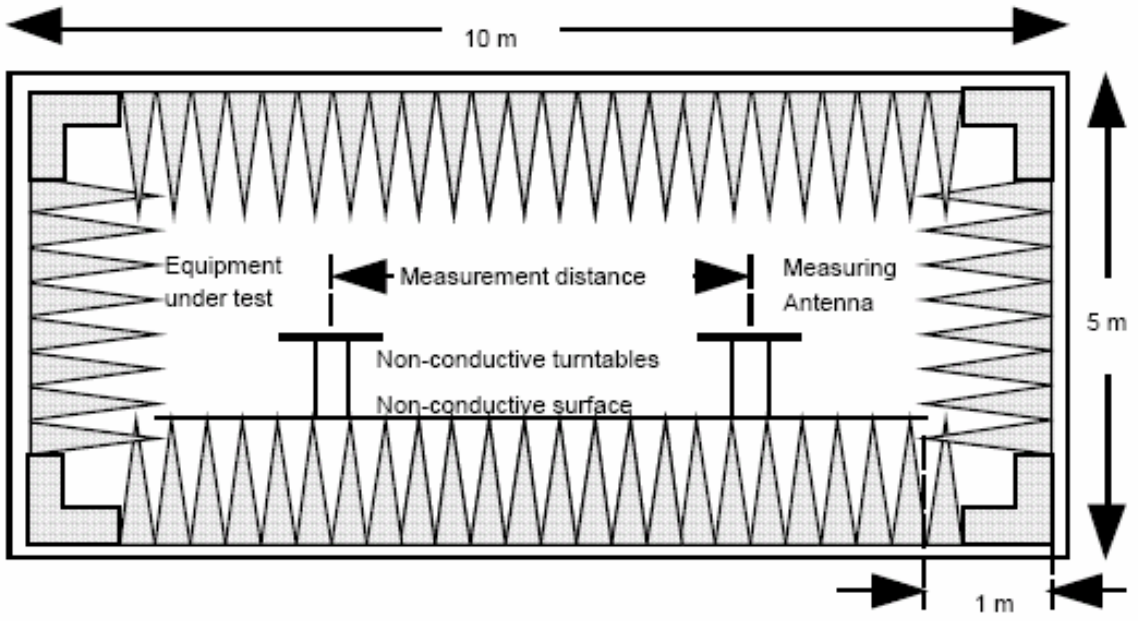
3. RF Radiated Output Power

3.1. Limit

FCC §22.913(a), the ERP of mobile transmitters must not exceed 7 watts. FCC §24.232(c) Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

3.2. Test Procedure

1. On a test site, the EUT shall be placed at 1.5m height on a turn table, and in the position closest to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3m from EUT to correspond to the frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. The transmitter shall be switched on, the measuring receiver shall be tuned to the frequency of the transmitter under test.
5. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
6. The transmitter shall then the rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
7. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
8. The maximum signal level detected by the measuring receiver shall be noted.
9. The transmitter shall be replaced by a horn (substitution antenna).
10. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
11. The substitution antenna shall be connected to a calibrated signal generator.
12. In necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase he sensitivity of the measuring receiver.
13. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
14. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring received, which is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
15. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
16. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
17. The measure of the effective radiated power is the large of the two levels recorded, at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.



Fully Anechoic Chamber

3.3. Test Results

ERP : CDMA 800

Frequency (MHz)	Ant. Pol. (H/V)	Amp-C.L (dB)	S.G Power Level (dBm)	Antenna Gain (dBd)	E. R. P.	
					dBm	mW
824.700	V	26.41	4.02	-8.53	21.90	154.88
	H	26.41	1.17	-8.53	19.05	80.35
835.890	V	26.41	2.52	-8.52	20.41	109.90
	H	26.41	-3.19	-8.52	14.70	29.51
848.310	V	26.41	3.52	-8.50	21.43	139.00
	H	26.41	-2.10	-8.50	15.81	38.11

Remake: 1. ERP= SG Reading +Amp-C.L. +Gain

EIRP : PCS 1900

Frequency (MHz)	Ant. Pol. (H/V)	Amp-C.L (dB)	S.G Power Level (dBm)	Antenna Gain (dBi)	E. I. R. P.	
					dBm	mW
1851.25	V	30.71	-17.89	9.02	21.84	152.76
	H	30.71	-28.38	9.02	11.35	13.65
1880.00	V	30.71	-19.26	9.06	20.51	112.46
	H	30.71	-27.70	9.06	12.07	16.11
1908.75	V	30.71	-19.94	9.09	19.86	96.83
	H	30.71	-31.06	9.09	8.74	7.48

Remake: 1. EIRP= SG Reading +Amp-C.L. +Gain

4. Spurious Radiated Emission

4.1. Limit

§ 22.917(a) and §24.238 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency must be attenuated below the transmitting (P) by a factor of at least 43+10log(P)dB.

4.2. Test Procedure

1. Initially the test antenna is closely coupled to the MS and any spurious emission radiated by the MS are detected by the test antenna and receiver in the range 30 MHz to 18 GHz.

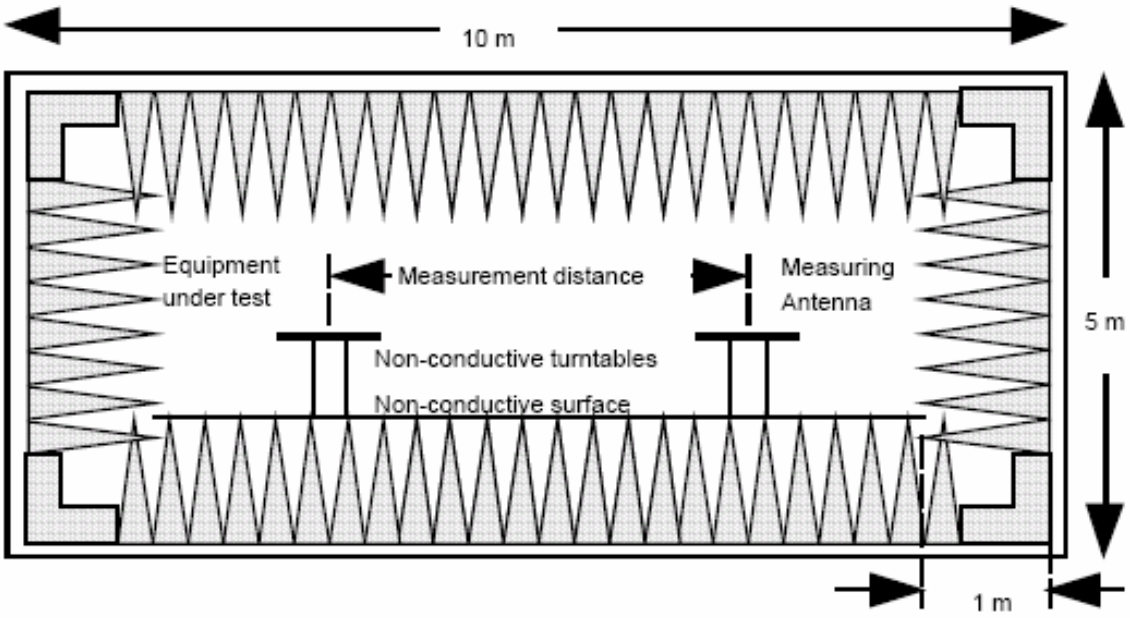
   NOTE 1: This is a qualitative step to identify the frequency and presence of spurious emissions which are to be measured in subsequent steps.

2. The test antenna separation is set to the appropriate measurement distance and at each frequency at which a spurious emission has been detected the MS is rotated to obtain a maximum response. The effective radiated power of the emission is determined by a substitution measurement. In case of an anechoic shielded chamber pre-calibration may be used instead of a substitution measurement.

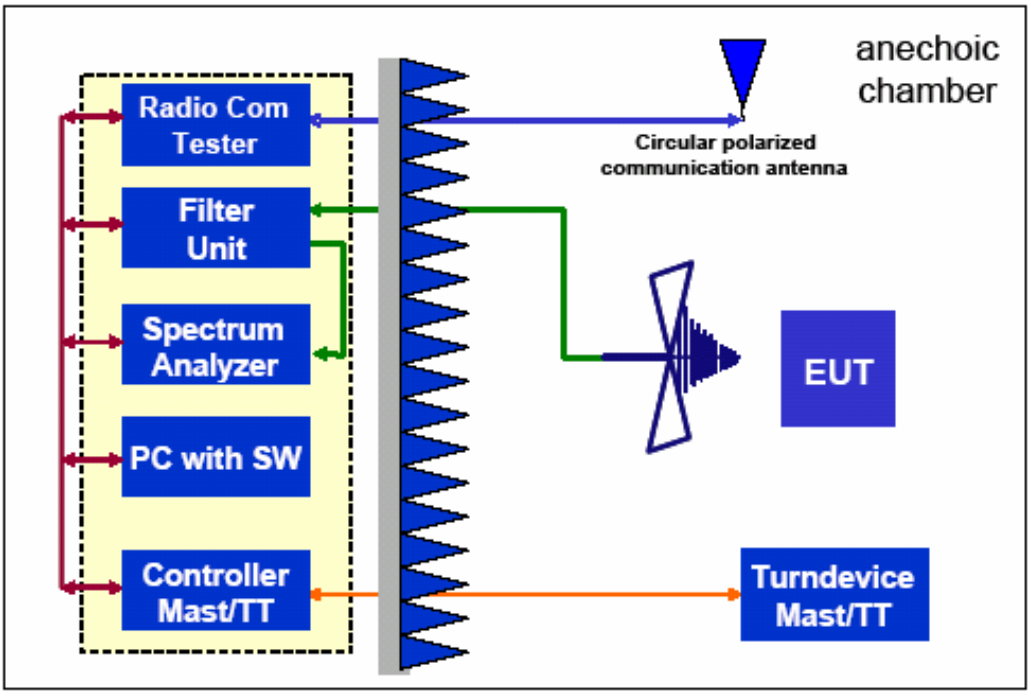
3. The measurement bandwidth based on a 5 pole synchronously tuned filter shall be according to the power indication is the peak power detected by the measuring system.
   The measurement time on any frequency shall be such that it includes the time during which the MS receives a CDMA frame containing the paging channel.

   NOTE 2: For these filter bandwidths some difficulties may be experienced with noise floor above required measurement limit. This will depend on the gain of the test antenna, and adjustment of the measuring system bandwidth is permissible. Alternatively, for test frequencies above 900 MHz, the test antenna separation from the MS may be reduced to 1 meter

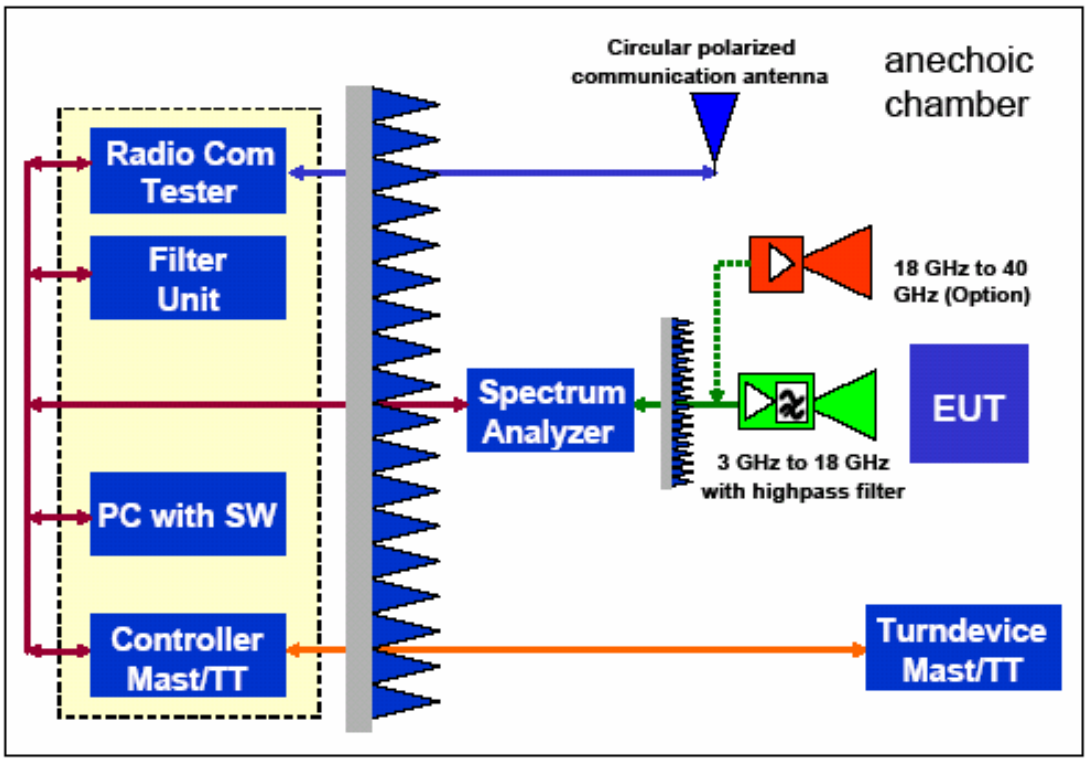
4. The measurements are repeated with the test antenna in the orthogonal polarization plane.
5. Spurious radiated emission was tested under RC5/SO55.



Fully Anechoic Chamber



System Configuration below 3GHz



System Configuration above 3GHz

4.3. Test Result

CDMA 800

Frequency (MHz)	Ant.Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
TX LOW channel (824.64 MHz)								
1648.00	H	-26.99	4.81	8.95	6.80	-25.00	-13	12.00
	V	-23.14	4.81	8.95	6.80	-21.15	-13	8.15
2474.10	H	-41.74	6.10	10.15	8.00	-39.84	-13	26.84
	V	-41.46	6.10	10.15	8.00	-39.56	-13	26.56
TX MID Channel (835.89 MHz)								
1671.78	H	-30.9	4.73	8.97	6.82	-28.00	-13	15.00
	V	-32.29	4.73	8.97	6.82	-30.20	-13	17.20
2507.67	H	-42.24	5.3	10.20	8.05	-39.49	-13	26.49
	V	-42.34	5.3	10.20	8.05	-39.59	-13	26.59
TX HIGH Channel (848.31 MHz)								
1696.62	H	-28.21	4.64	9.00	6.85	-26.00	-13	13.00
	V	-25.37	4.64	9.00	6.85	-23.16	-13	10.16
2544.93	H	-33.69	5.83	10.18	8.03	-31.49	-13	18.49
	V	-35.69	5.83	10.18	8.03	-33.06	-13	20.49

Remake: 1. No more harmonic above 3rd harmonic for all channel.
2. ERP= SG Reading –Cable Loss +Gain

PCS 1900

Frequency (MHz)	Ant.Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
TX LOW channel (1851.25 MHz)								
3702.50	H	-36.29	6.94	9.94	9.96	-35.42	-13	22.42
	V	-38.57	6.94	9.96	7.81	-37.70	-13	24.70
5553.75	H	-26.85	9.08	11.05	8.90	-27.03	-13	14.03
	V	-27.93	9.08	11.05	8.90	-28.11	-13	22.47
TX MID Channel (1880.00 MHz)								
3760.00	H	-36.34	6.93	9.95	7.80	-35.47	-13	22.47
	V	-38.80	6.93	9.95	7.80	-37.93	-13	24.93
5640.00	H	-35.77	9.00	11.14	8.99	-35.78	-13	22.78
	V	-35.22	9.00	11.14	8.99	-35.23	-13	22.23
TX HIGH Channel (1908.75 MHz)								
3817.50	H	-35.83	6.91	9.94	7.79	-34.95	-13	21.95
	V	-36.32	6.91	9.94	7.79	-35.44	-13	22.44
5726.25	H	-35.39	8.92	11.23	9.08	-35.23	-13	22.23
	V	-35.26	8.92	11.23	9.08	-35.10	-13	22.10

Remake: 1. No more harmonic above 3rd harmonic for all channel.
2. ERP= SG Reading –Cable Loss +Gain

5. Field Strength of Radiated Emissions

5.1. Limit

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
30 - 88	3	40.0	100
88 – 216	3	43.5	150
216 – 960	3	46.0	200
Above 960	3	54.0	500

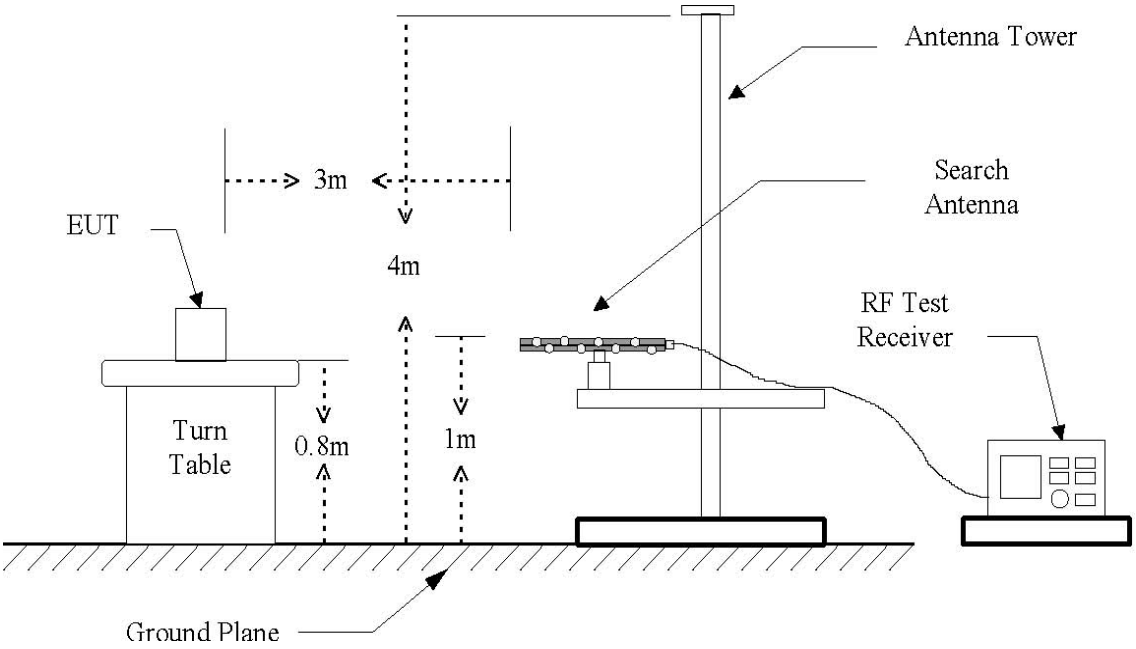
5.2. Test Procedure

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 1 meter away from the interference-receiving antenna.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

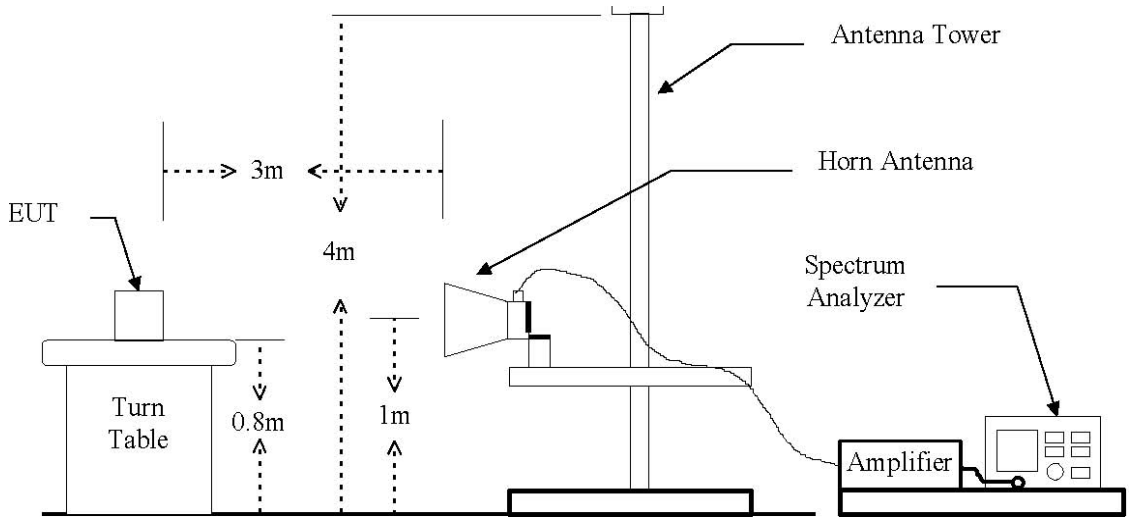
NOTE :

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz for Peak detection and frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1 GHz.

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 40 GHz Emissions.



Frequencies measured below 1 GHz configuration



Frequencies measured above 1 GHz configuration

5.3. Test Results

CDMA 800

FREQ. (MHz)	LEVEL (dB μV)	POL (H/V)	*AF (dB)	**CL+A (dB)	F/S (dB μV/m)	LIMIT (dB μV/m)	***MARGIN (dB μV)
268.94	45.0	H	17.64	25.58	37.08	46	8.92
402.12	45.5	H	16.74	25.85	36.41	46	9.59
666.38	44.4	V	22.18	25.75	40.79	46	5.21
1670	50.5	V	25.80	31.81	44.48	54	9.52
1762	50.7	V	26.10	31.71	45.06	54	8.94
3347	35.7	V	30.80	29.54	36.93	54	17.07

PCS 1900

FREQ. (MHz)	LEVEL (dB μV)	POL (H/V)	*AF (dB)	**CL+A (dB)	F/S (dB μV/m)	LIMIT (dB μV/m)	***MARGIN (dB μV)
145.03	48.5	H	12.76	26.68	34.58	43.5	8.92
399.84	47.9	H	16.65	25.84	38.67	46	7.33
666.38	40.5	H	22.18	25.75	36.94	46	9.06
1465	42.7	V	25.12	31.94	35.85	54	18.15
1860	52.5	V	26.43	31.45	47.48	54	6.52
1877	52.2	V	26.48	31.40	47.26	54	6.74

*AF = Antenna Factor.
**CL+A = Cable Loss +AMP
***Margin=Each Frequency Limit Level(dBuV) - (Level+AF-(CL+A))

6. Conducted Output Power

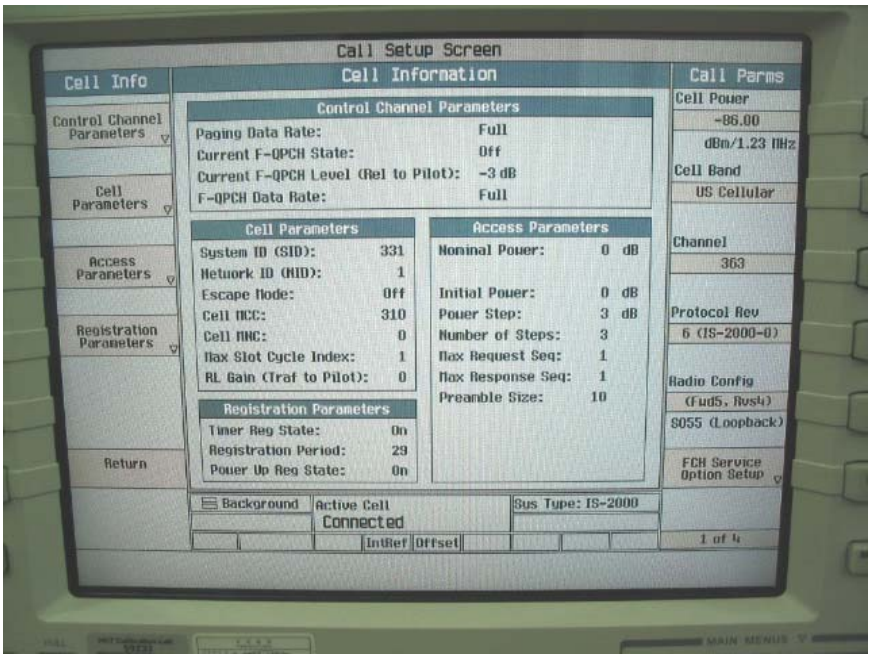
6.1. Limit

FCC §22.913(a), the ERP of mobile transmitters must not exceed 7 watts. FCC §24.232(c) Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

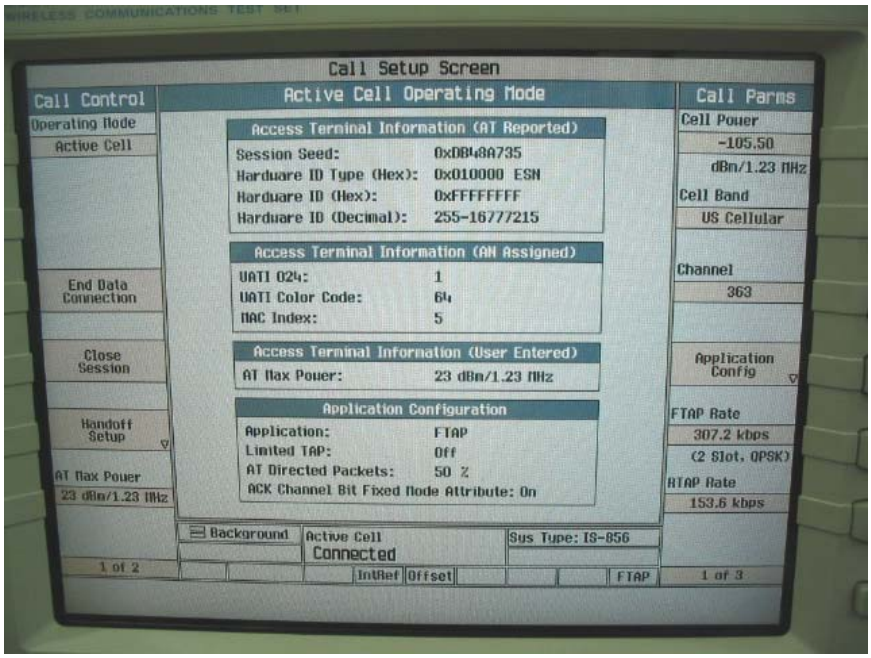
6.2. Test Procedure

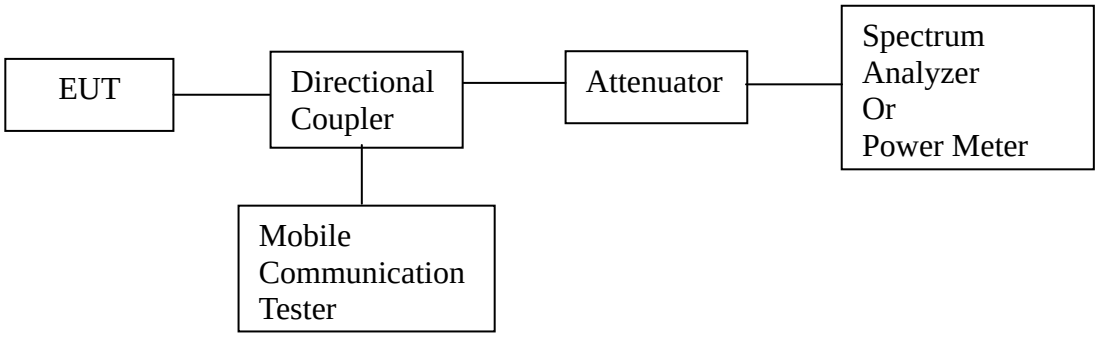
The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
See 3GPP2 C.S0011/TIA-98-E as recommended by "SAR Measurement Procedures for 3G Devices", May 2006. Maximum output power is verified on the High, Middle and Low channels according to procedures defined in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E. SO55 tests were measured with power control bits in “All Up” condition.

Test procedure refers to the picture below:



Maximum output power is verified on the High, Middle and Low channels according to procedures in section 3.1.2.3.4 of 3GPP2 C.S0033-0/TIA-866 for Rev. 0 and section 4.3.4 of 3GPP2 C.S0033-A for Rev. A. tests were measured with power control bits in “All Up” condition. Test procedure refers to the picture below:





6.3. Test Results

Average Power Output Table (CDMA 1x)

Band	Channel	CDMA2000 RC	S02 (dBm)	S09 (dBm)	S032(+SCH) (dBm)	S032(+F-SCH) (dBm)	S055 (dBm)
CDMA 800	363	RC1	22.91	-	-	-	22.98
		RC2	-	23.10	-	-	23.01
		RC3	23.14	-	23.01	23.10	23.00
		RC4	23.07	-	23.01	23.10	23.16
		RC5	-	22.72	-	-	23.49
Band	**Channel**	**CDMA2000 RC**	**S02 (dBm)**	**S09 (dBm)**	**S032(+SCH) (dBm)**	**S032(+F-SCH) (dBm)**	**S055 (dBm)**
PCS 1900	600	RC1	22.20	-	-	-	22.28
		RC2	-	22.25	-	-	22.07
		RC3	22.00	-	22.07	22.10	22.17
		RC4	22.10	-	22.21	22.18	22.10
		RC5	-	22.10	-	-	22.30

Peak Power Output Table (CDMA 1x)

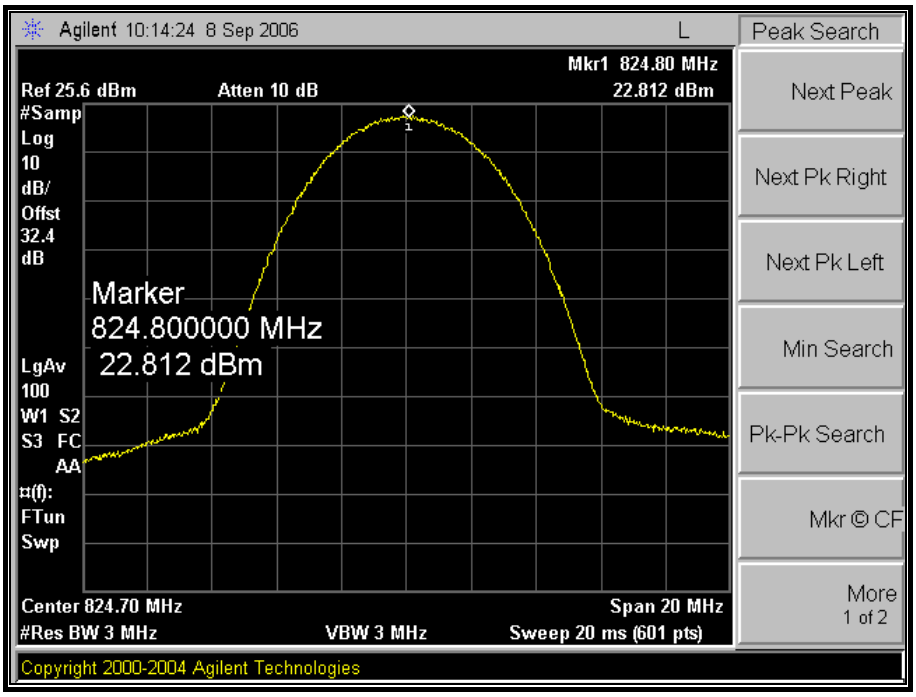
Band	Channel	CDMA2000 RC	S02 (dBm)	S09 (dBm)	S032(+SCH) (dBm)	S032(+F-SCH) (dBm)	S055 (dBm)
CDMA 800	363	RC1	26.31	-	-	-	26.78
		RC2	-	26.70	-	-	26.81
		RC3	26.64	-	26.41	26.80	26.80
		RC4	26.47	-	26.43	27.00	26.86
		RC5	-	26.12	-	-	27.19
Band	**Channel**	**CDMA2000 RC**	**S02 (dBm)**	**S09 (dBm)**	**S032(+SCH) (dBm)**	**S032(+F-SCH) (dBm)**	**S055 (dBm)**
PCS 1900	600	RC1	25.60	-	-	-	25.98
		RC2	-	25.85	-	-	25.87
		RC3	25.6	-	25.77	25.80	25.97
		RC4	25.5	-	26.01	25.98	25.80
		RC5	-	25.70	-	-	26.10

CDMA 800

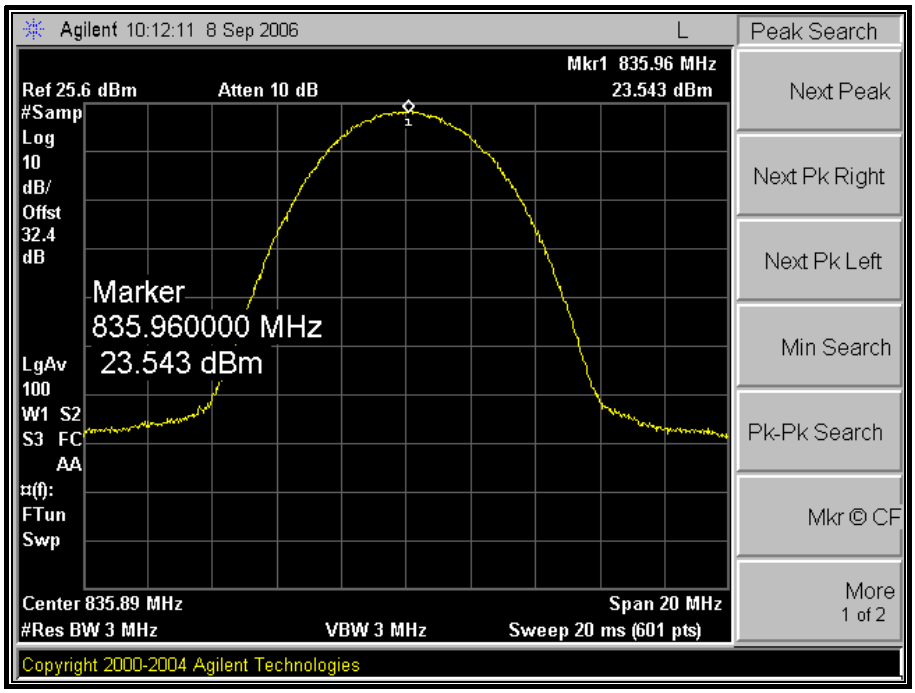
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Limit (W)
LOW	824.70	22.81	190	7
MIDDLE	835.89	23.54	226	7
HIGH	848.31	22.30	170	7

Please refer to the following plots.

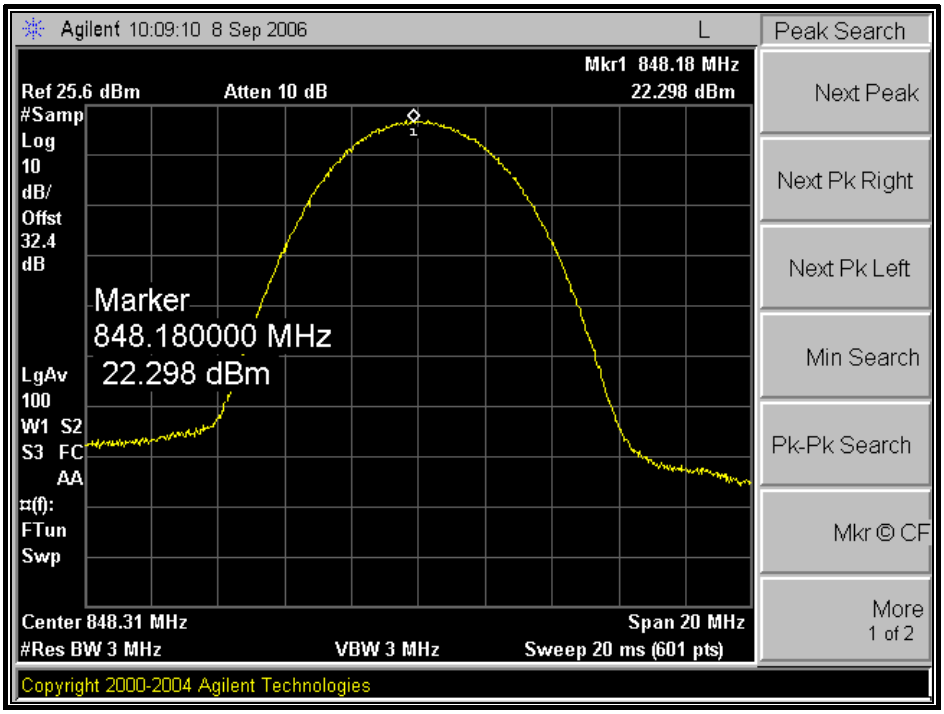
Low Channel



Middle Channel



High Channel

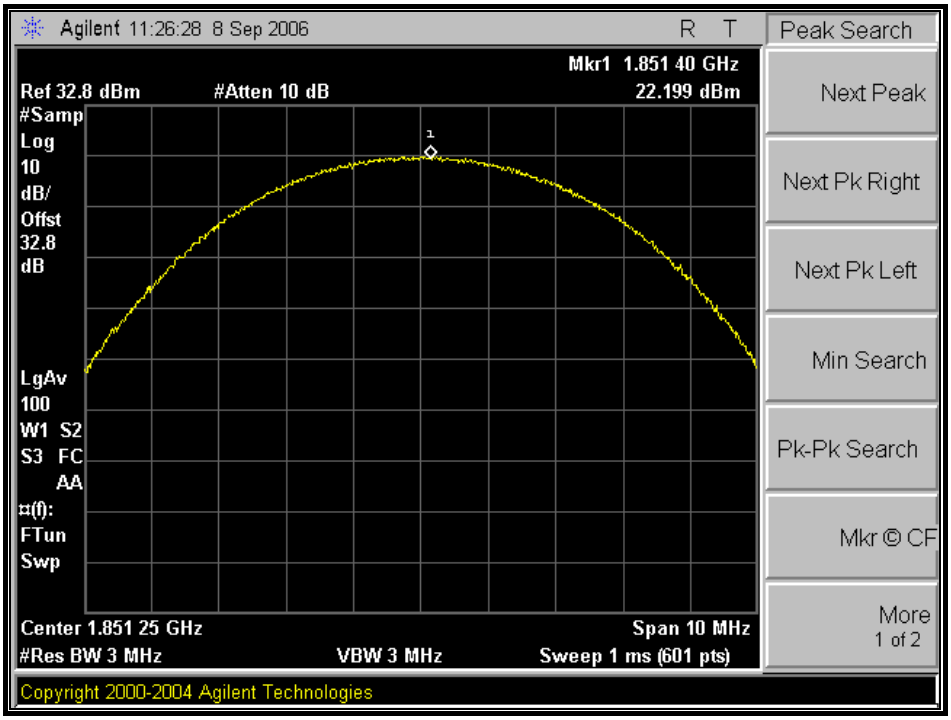


PCS 1900

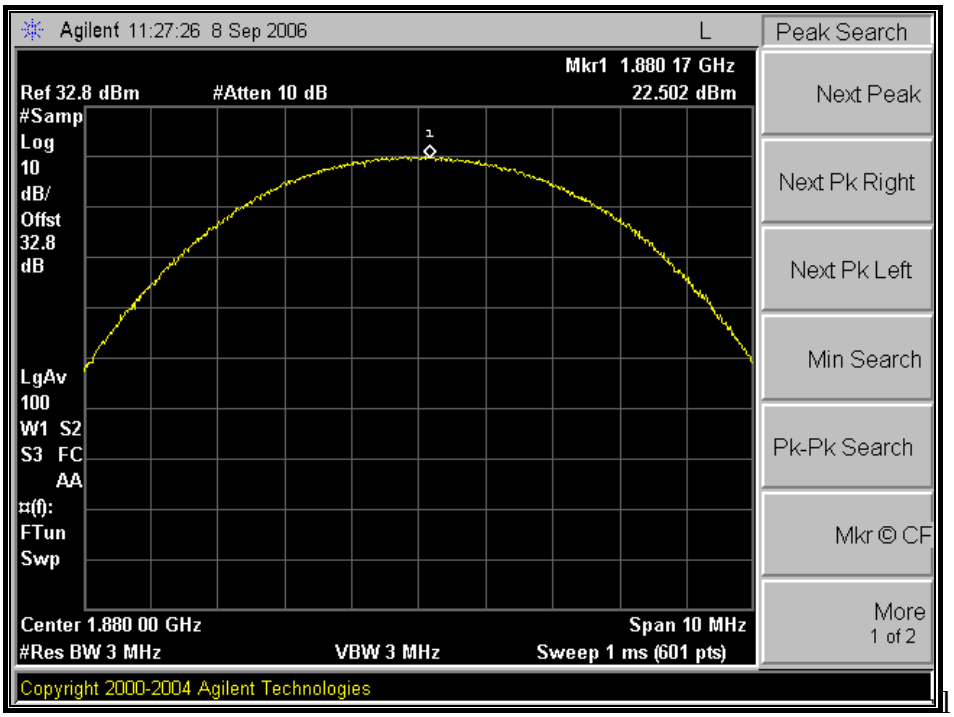
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Limit (W)
LOW	1851.25	22.20	166	7
MIDDLE	1880.00	22.50	179	7
HIGH	1908.75	21.82	152	7

Please refer to the following plots.

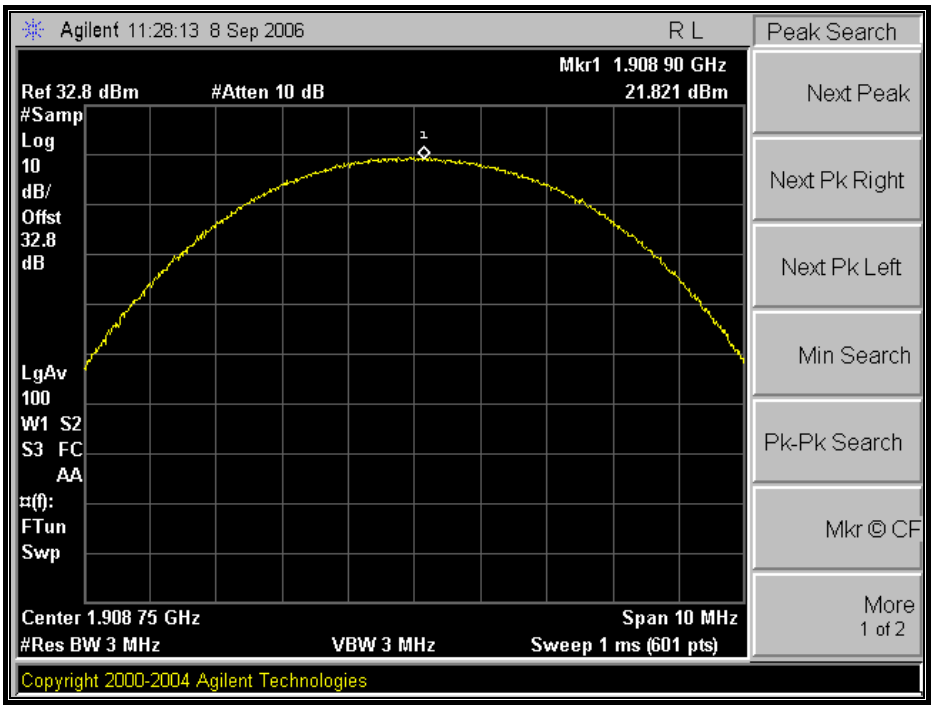
Low Channel



Middle Channel



High Channel



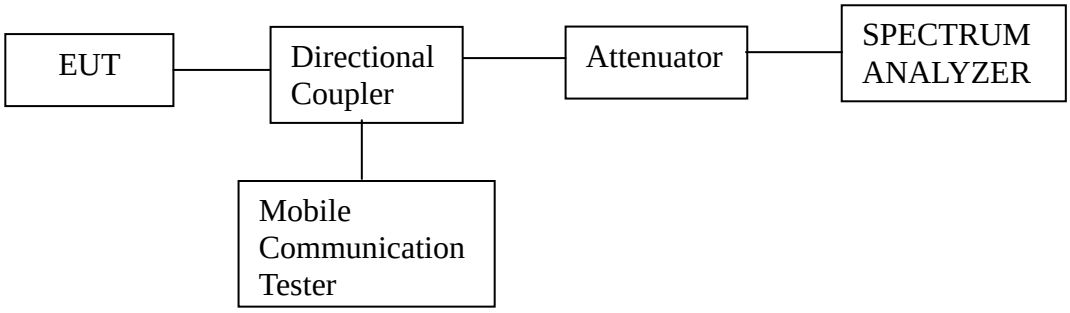
7. Occupied Bandwidth 26 dB

7.1. Limit

Requirements: CFR 47, Section §2.1049.

7.2. Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
The resolution bandwidth of the spectrum analyzer was set at 30 kHz.
Occupied Bandwidth 6 dB was tested under RC5/SO55.



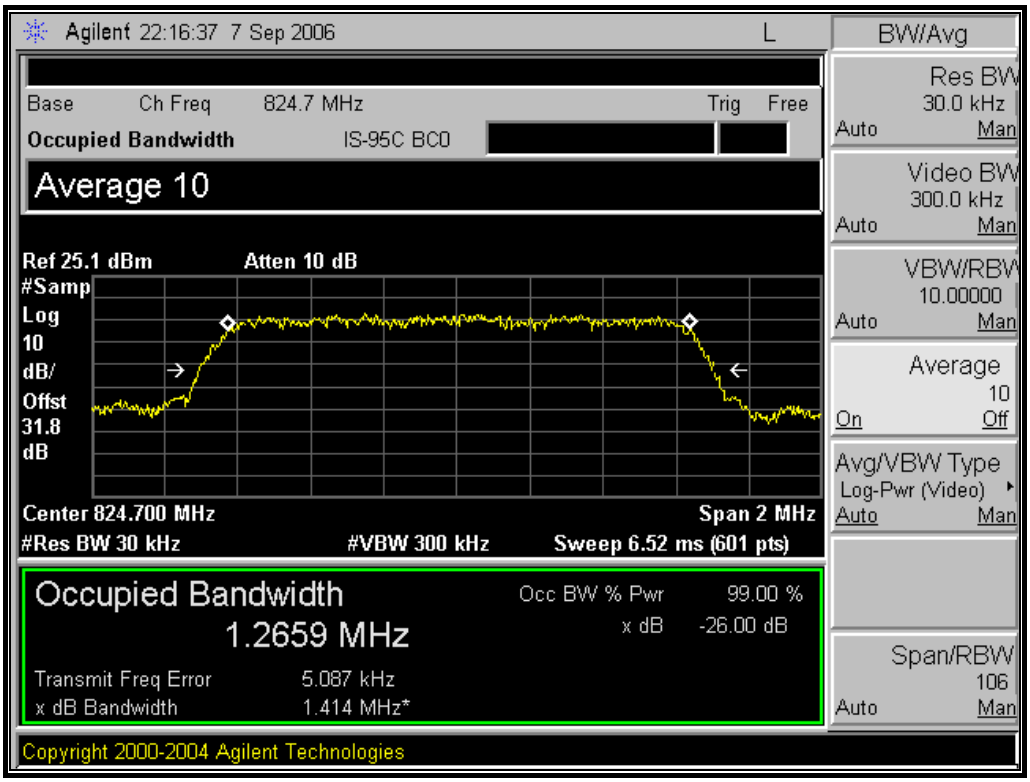
7.3 Test Results

CDMA 800

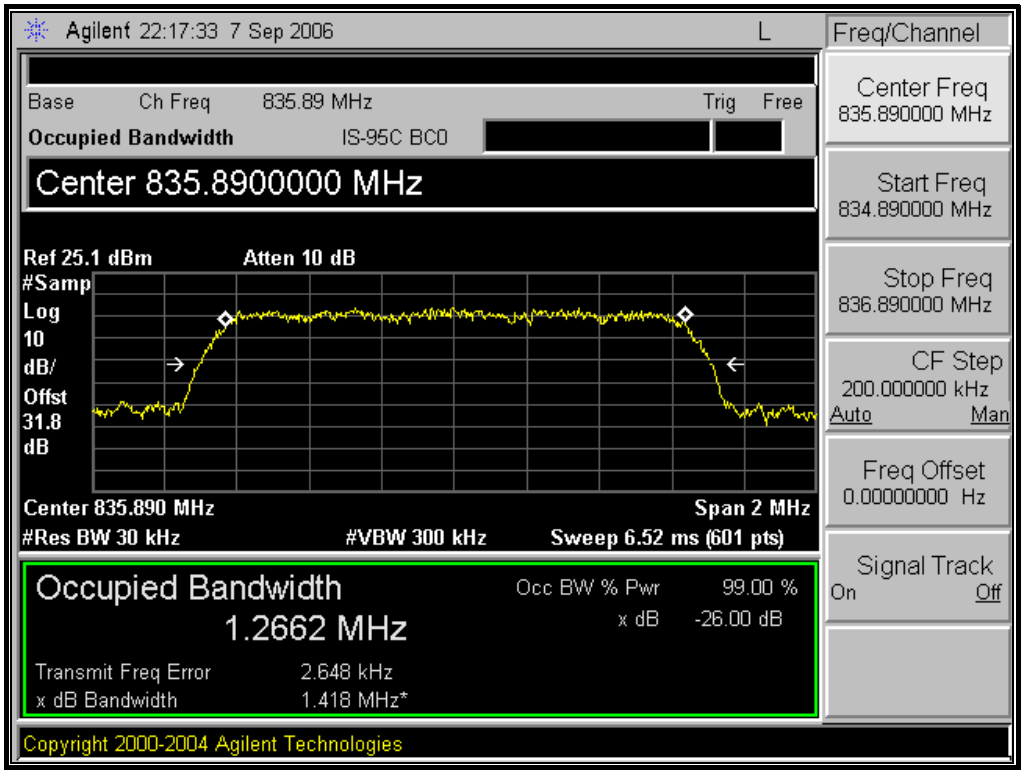
Channel	Frequency(MHz)	-26 dB Bandwidth(MHz)
LOW	824.70	1.414
MIDDLE	835.89	1.418
HIGH	848.31	1.405

Please refer to the following plots.

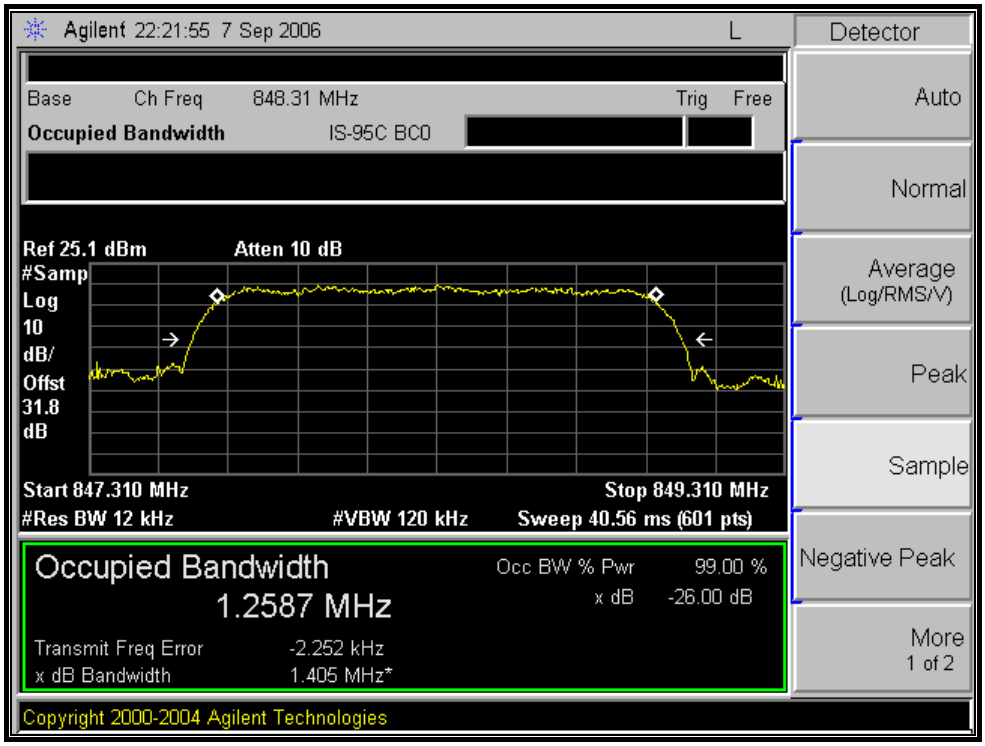
Low Channel



Middle Channel



High Channel

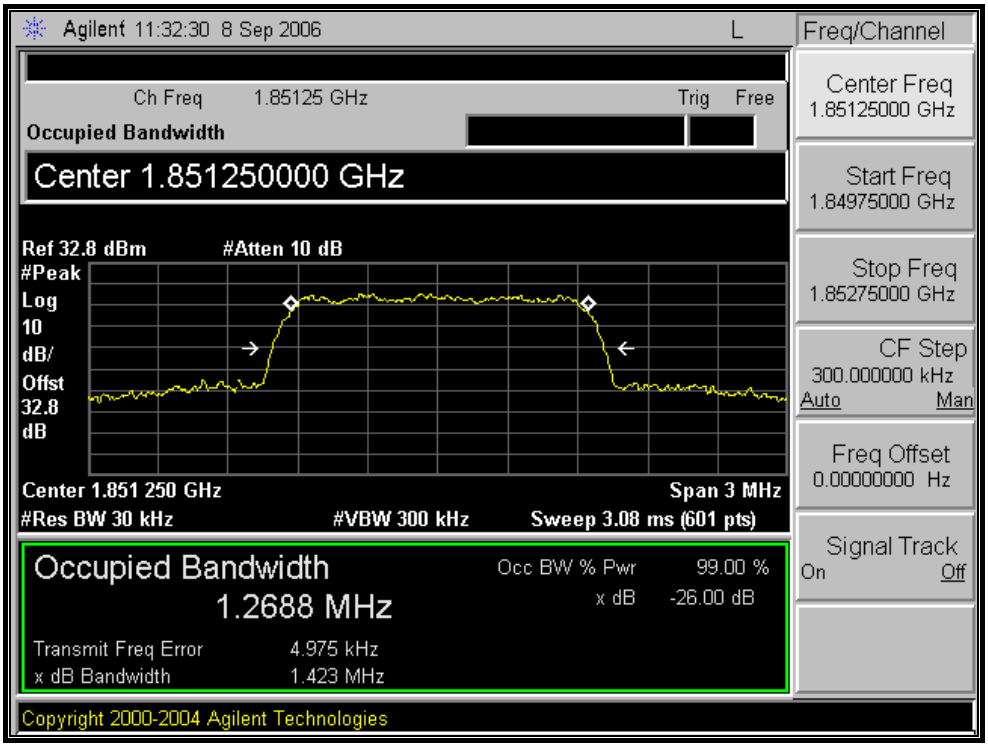


PCS 1900

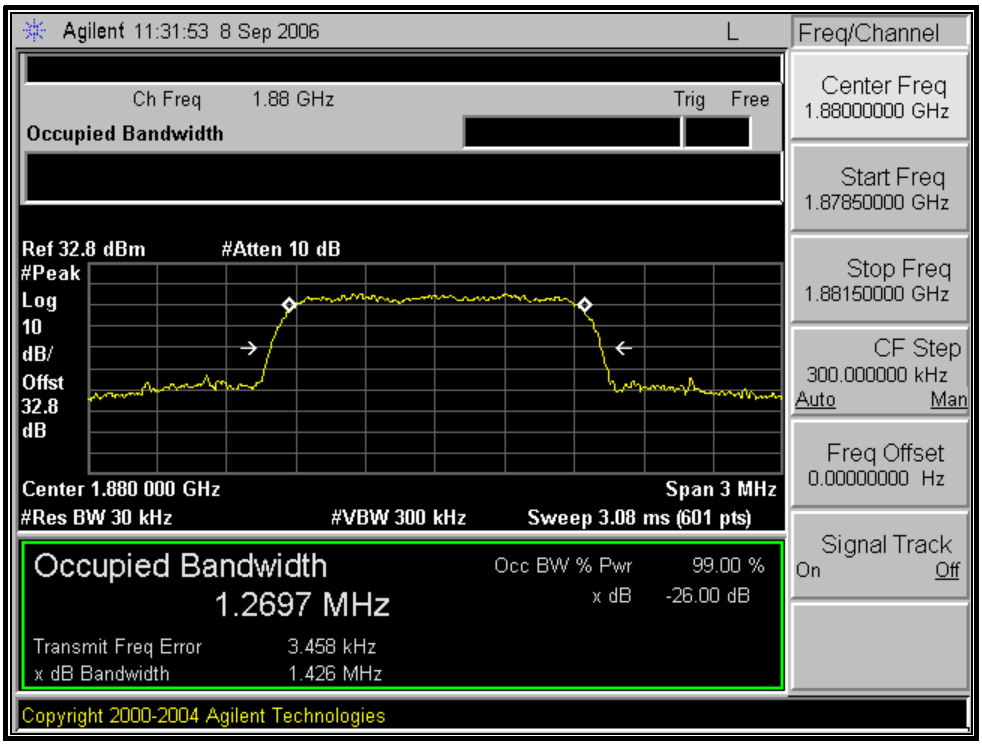
Channel	Frequency(MHz)	-26 dB Bandwidth(MHz)
LOW	1851.25	1.423
MIDDLE	1880.00	1.426
HIGH	1908.75	1.425

Please refer to the following plots.

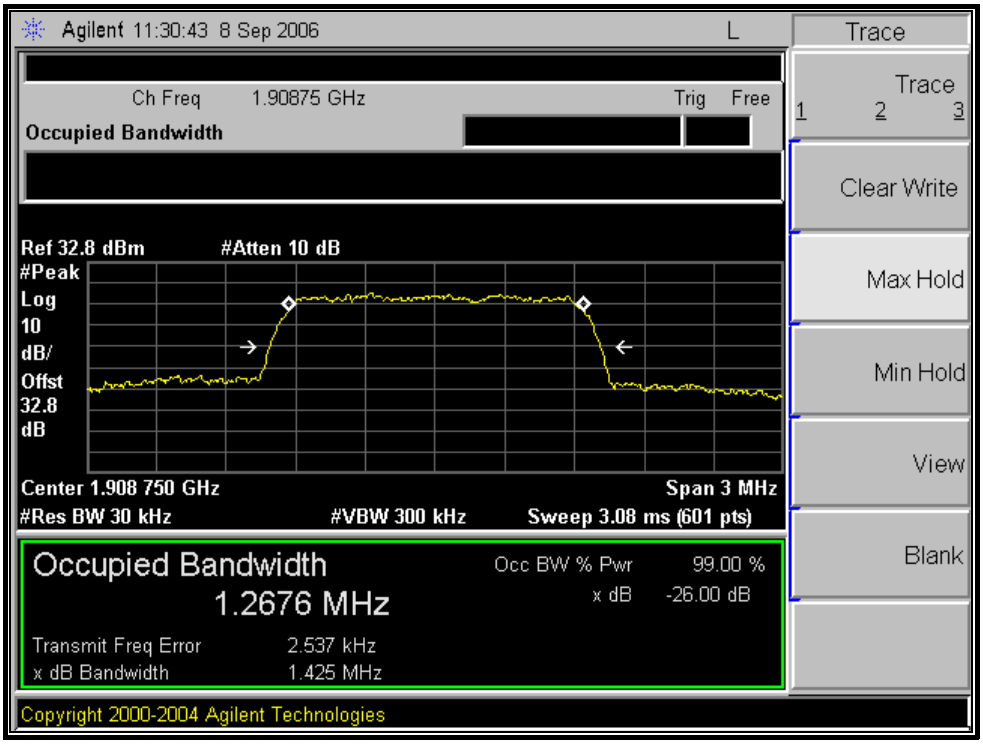
Low Channel



Middle Channel



High Channel



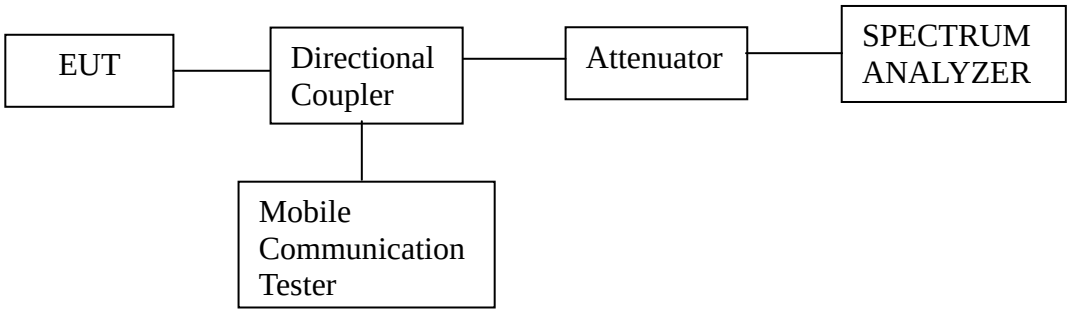
8. Spurious Emissions At Antenna Terminal

8.1. Limit

Requirements: CFR 47, § 2.1051. § 22.917 and §24.238 (a) Out of band emissions.
The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1057.

8.2. 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 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.
Spurious Emission was tested under RC5/SO55

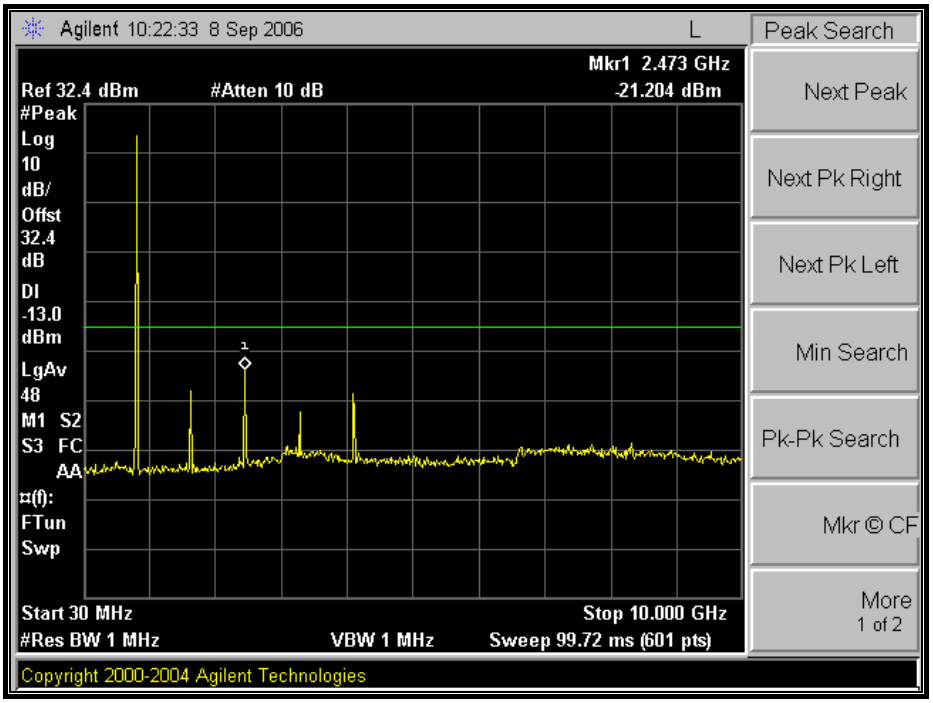


8.3. Test Results

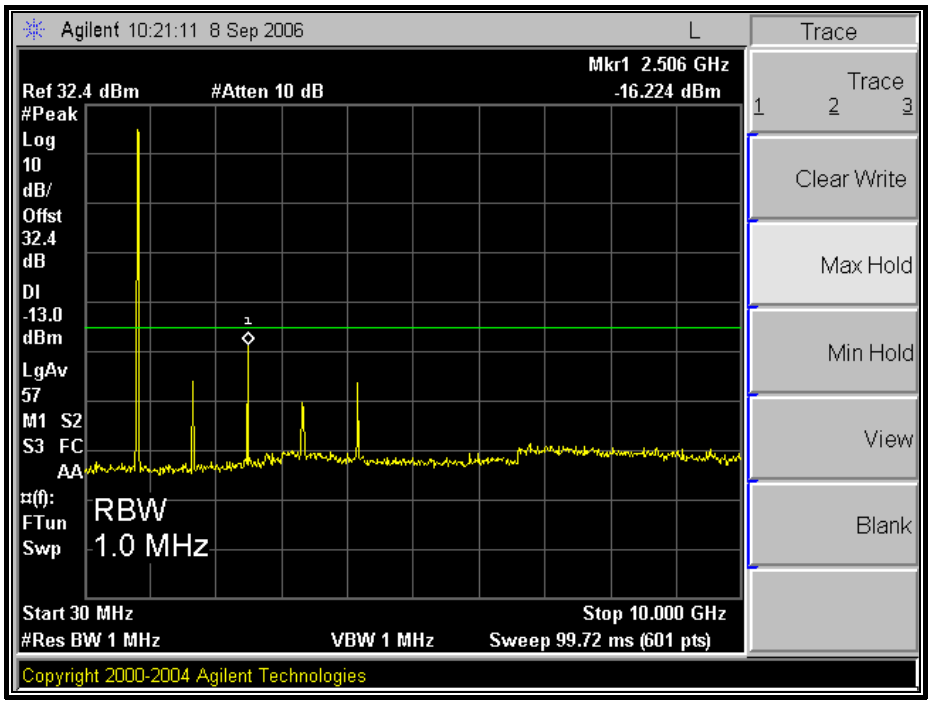
Please refer to the following plots.

CDMA 800

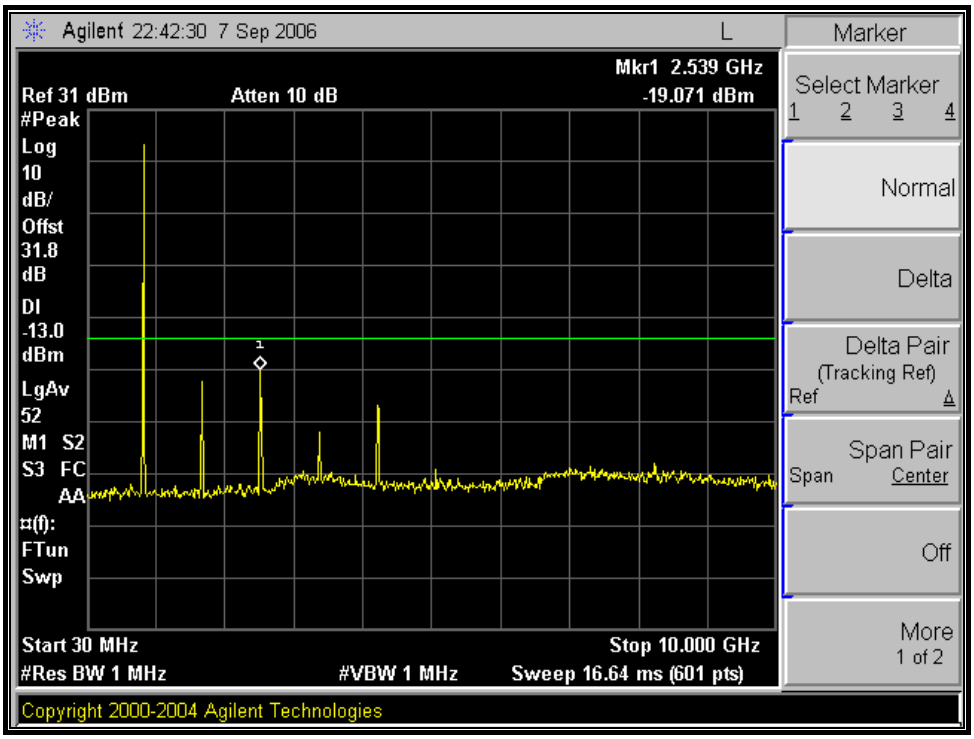
Low Channel



Middle Channel

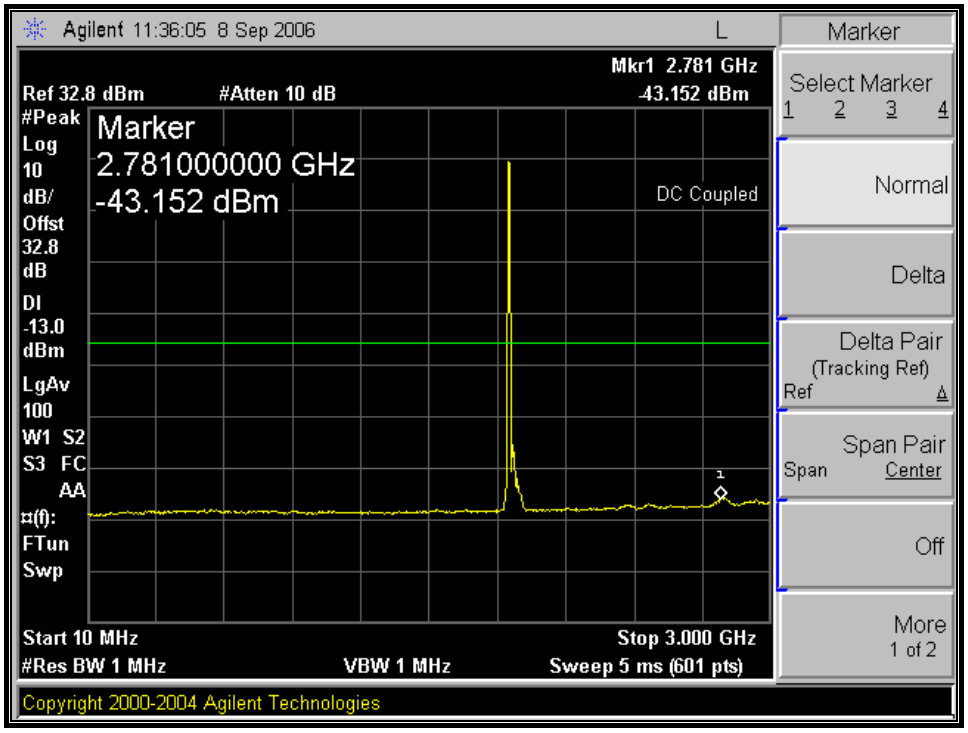


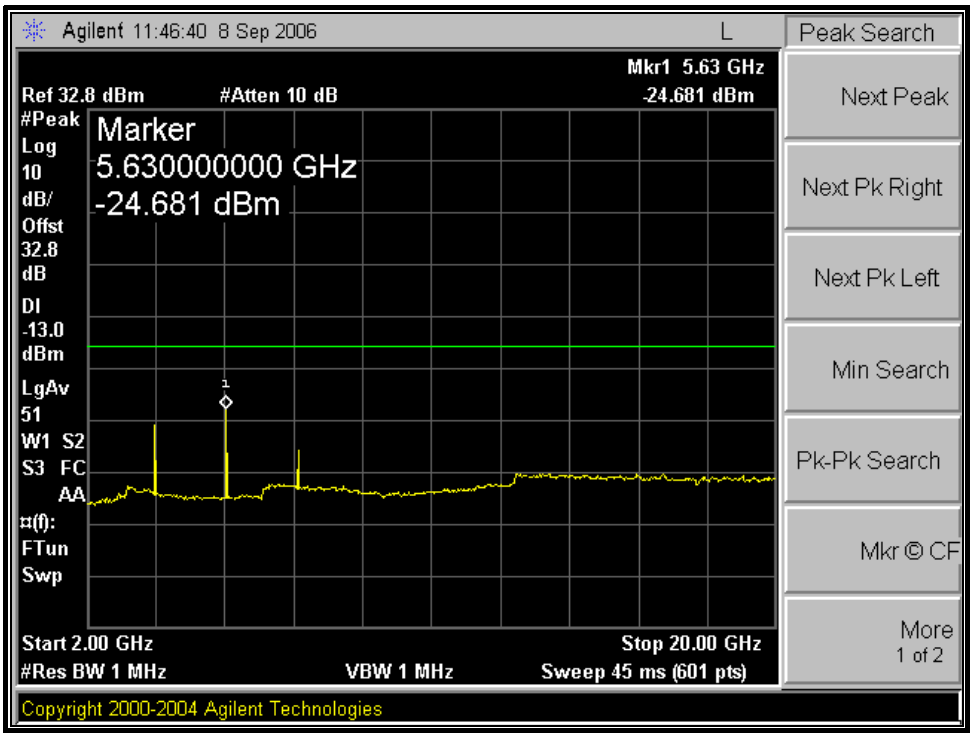
High Channel



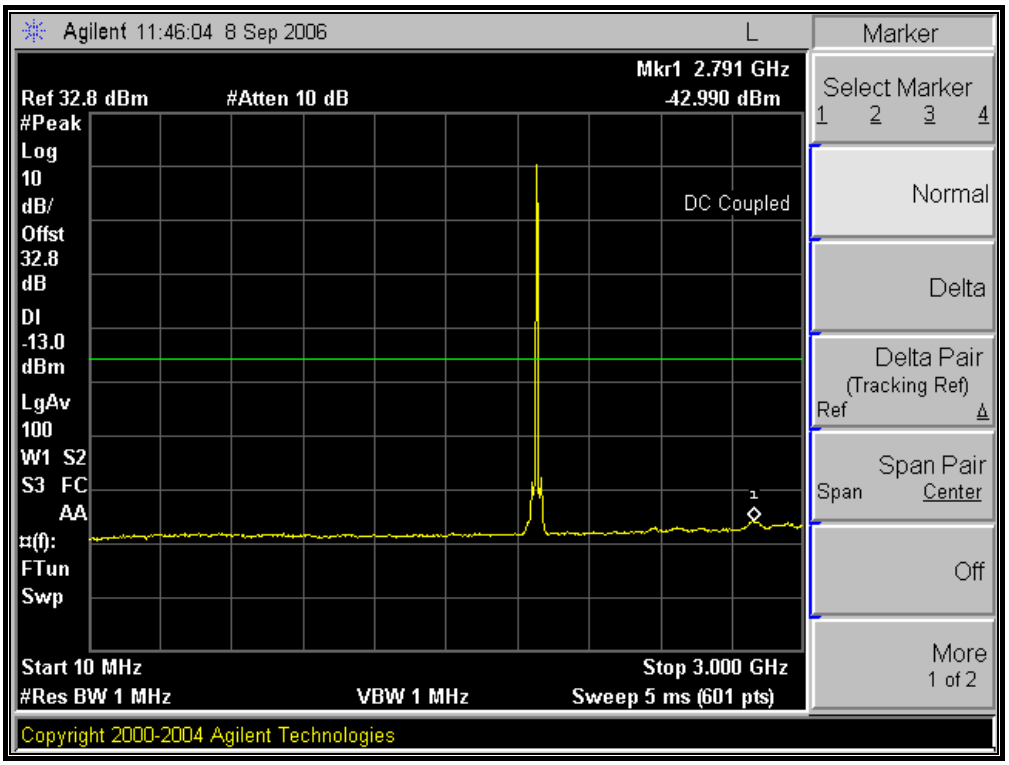
PCS 1900

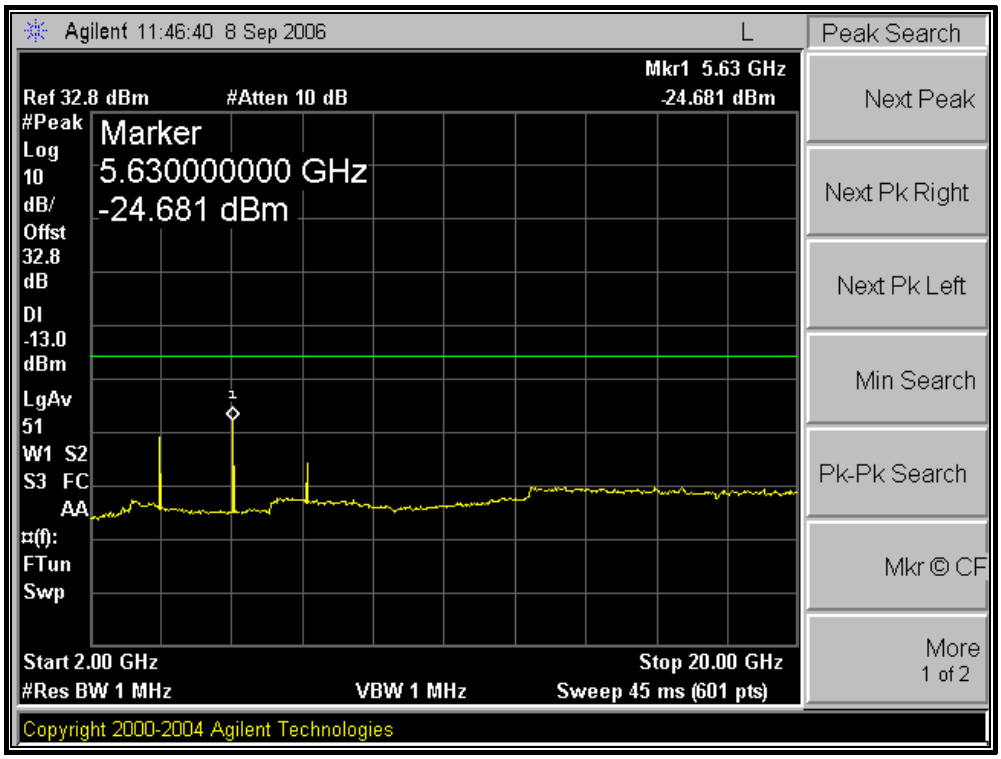
Low Channel



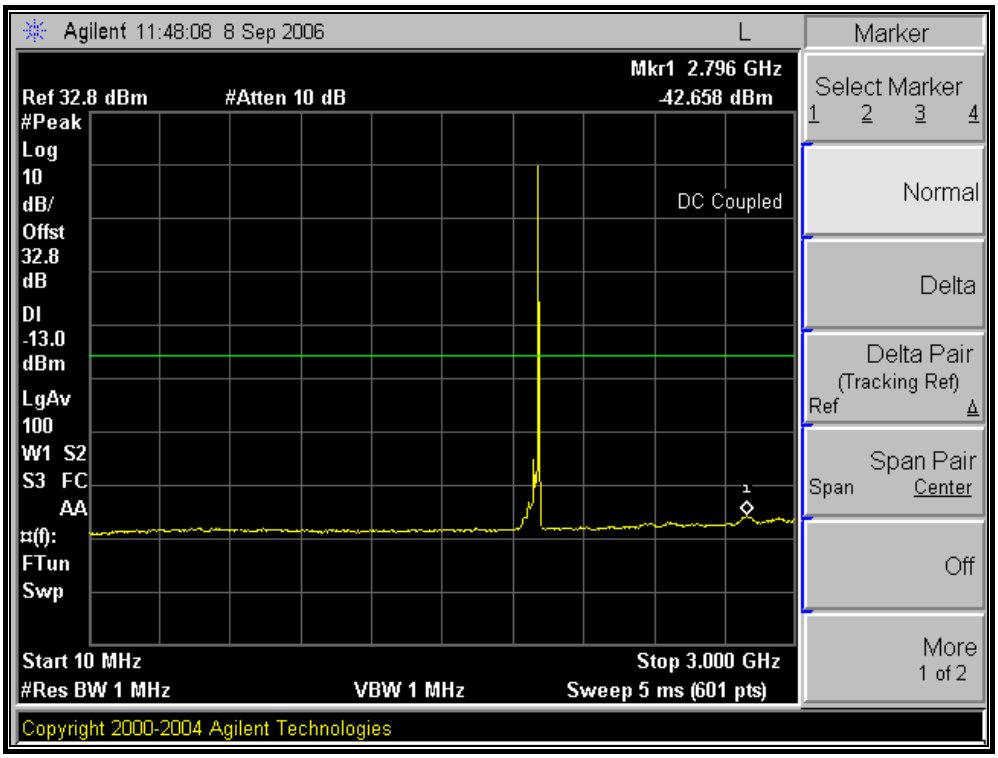


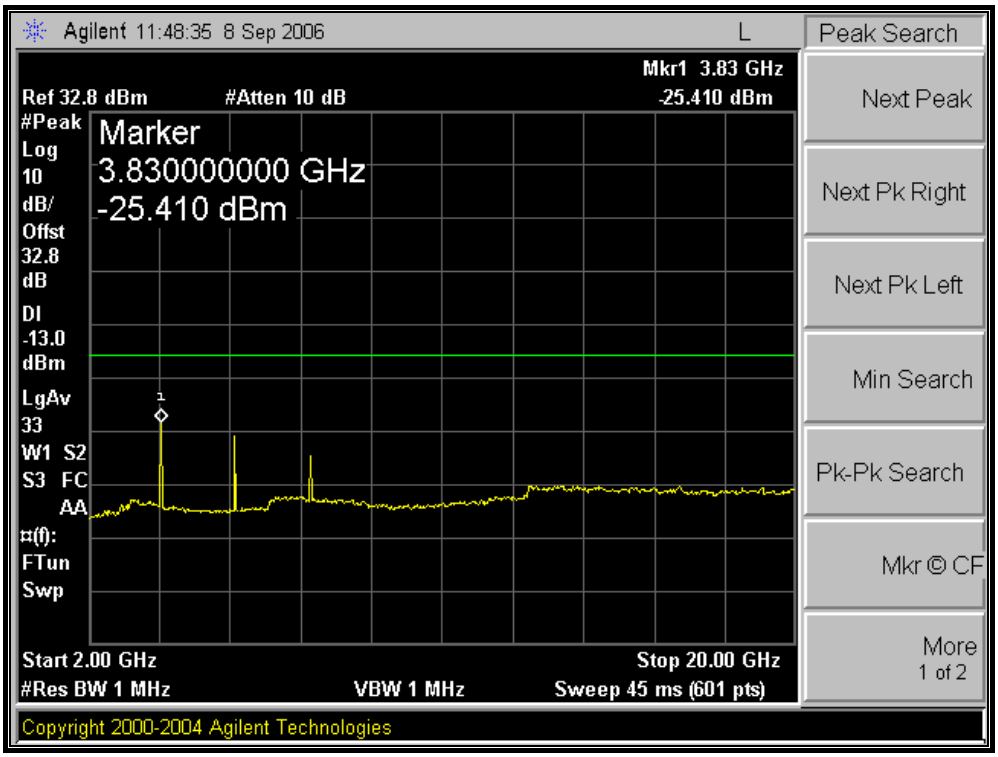
Middle Channel





High Channel





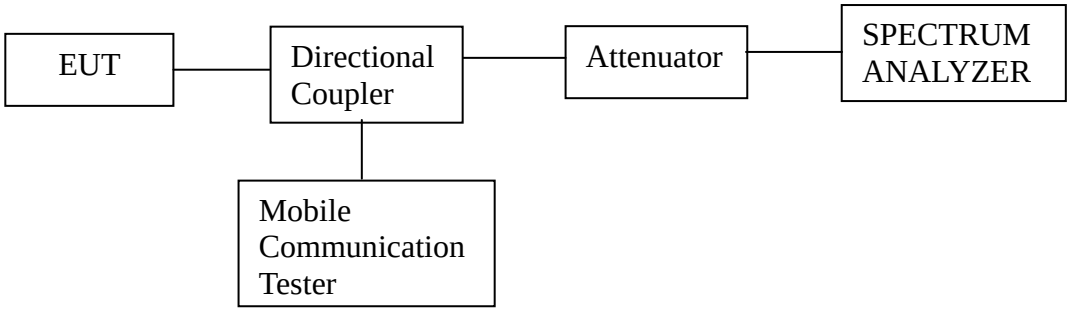
9. Band Edge

9.1. Limit

§ 22.917, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

9.2. Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
The center of the spectrum analyzer was set to block edge frequency, RBW set to 30 kHz.

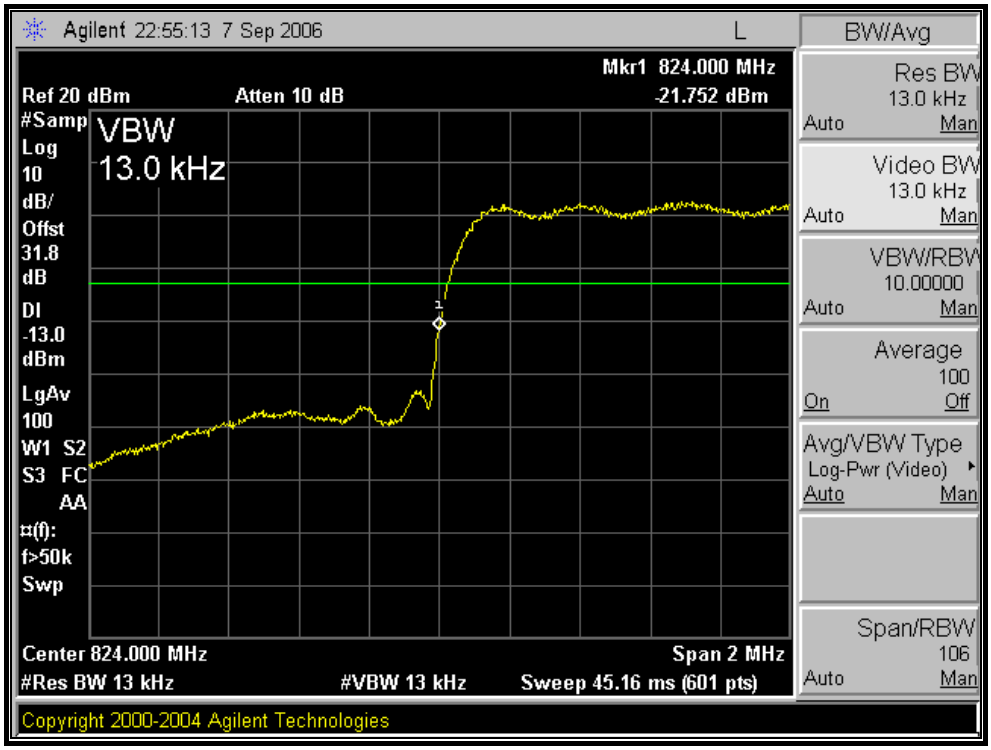


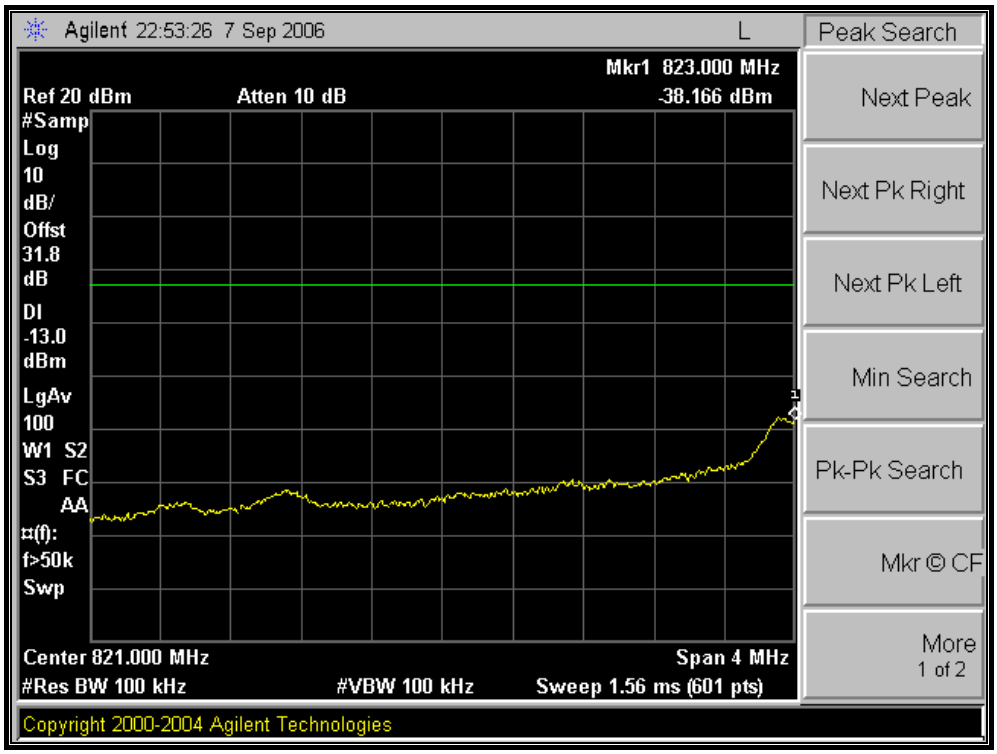
9.3. Test Results

Please refer to the following plots.

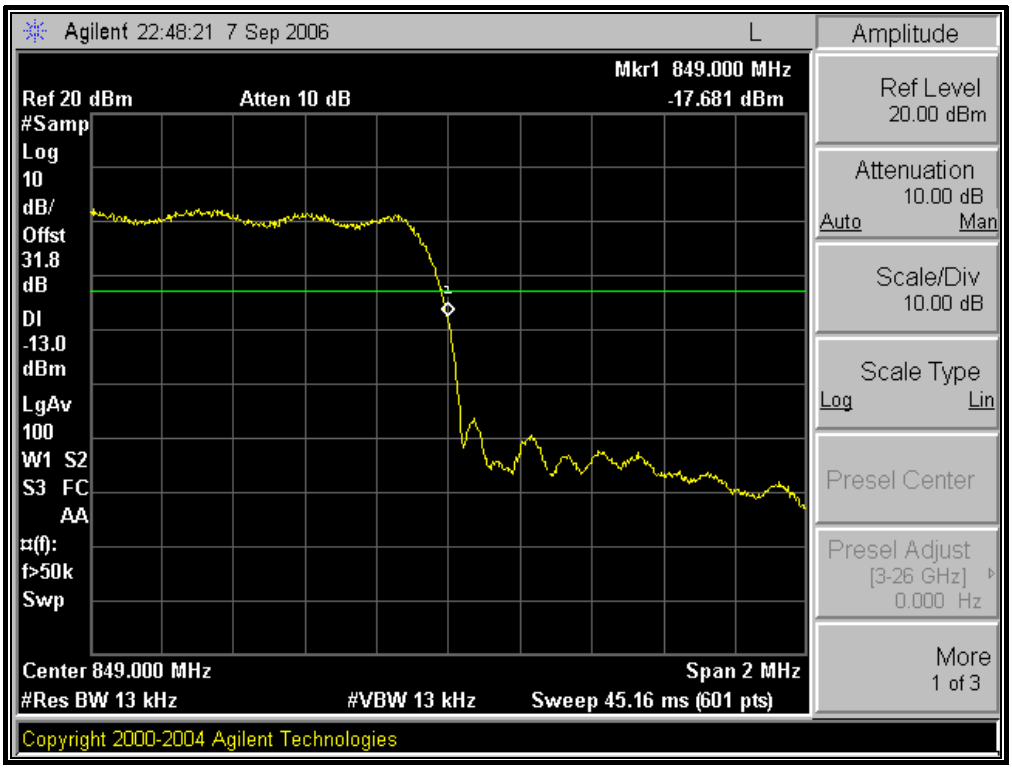
CDMA 800

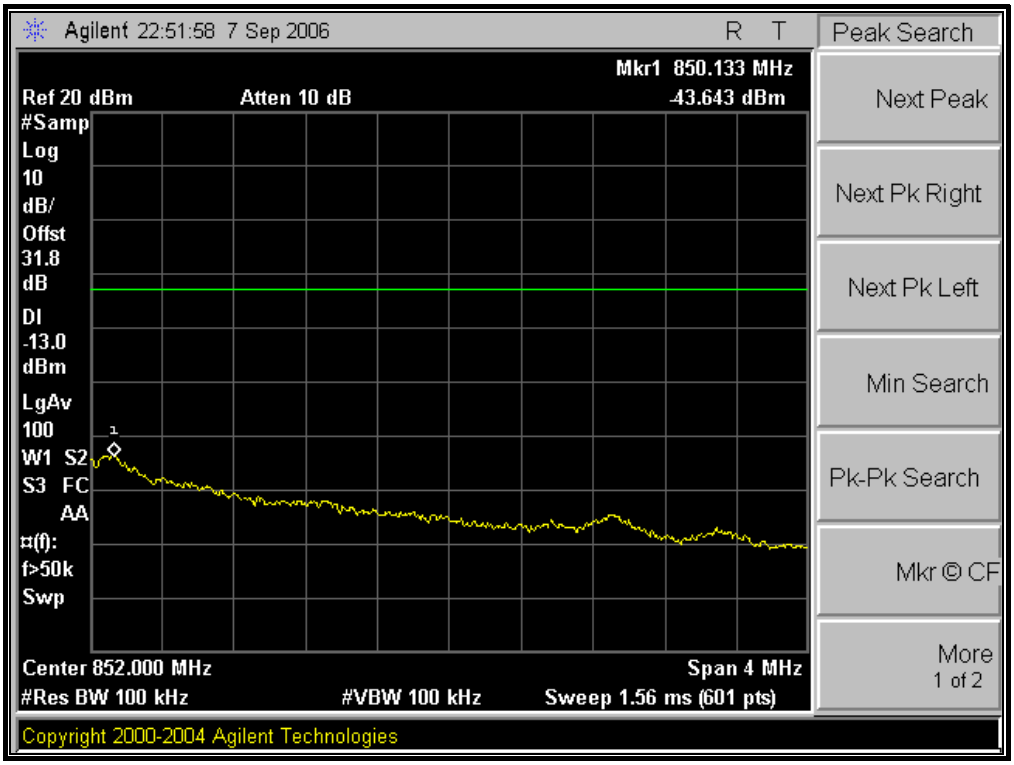
Low Channel





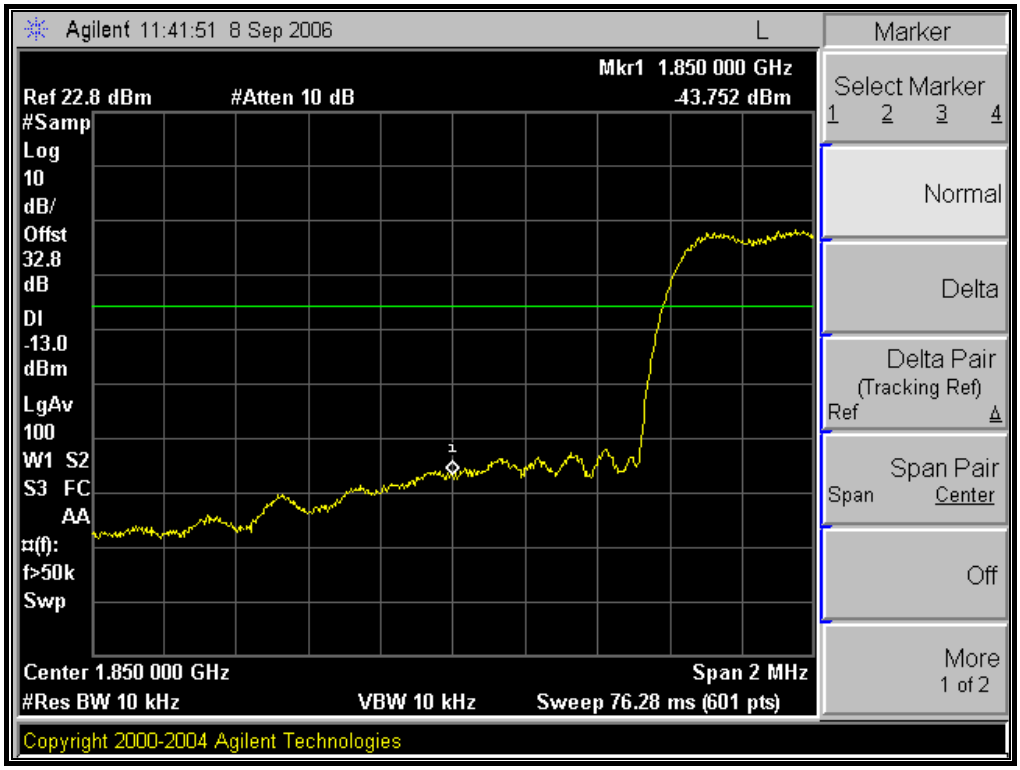
High Channel

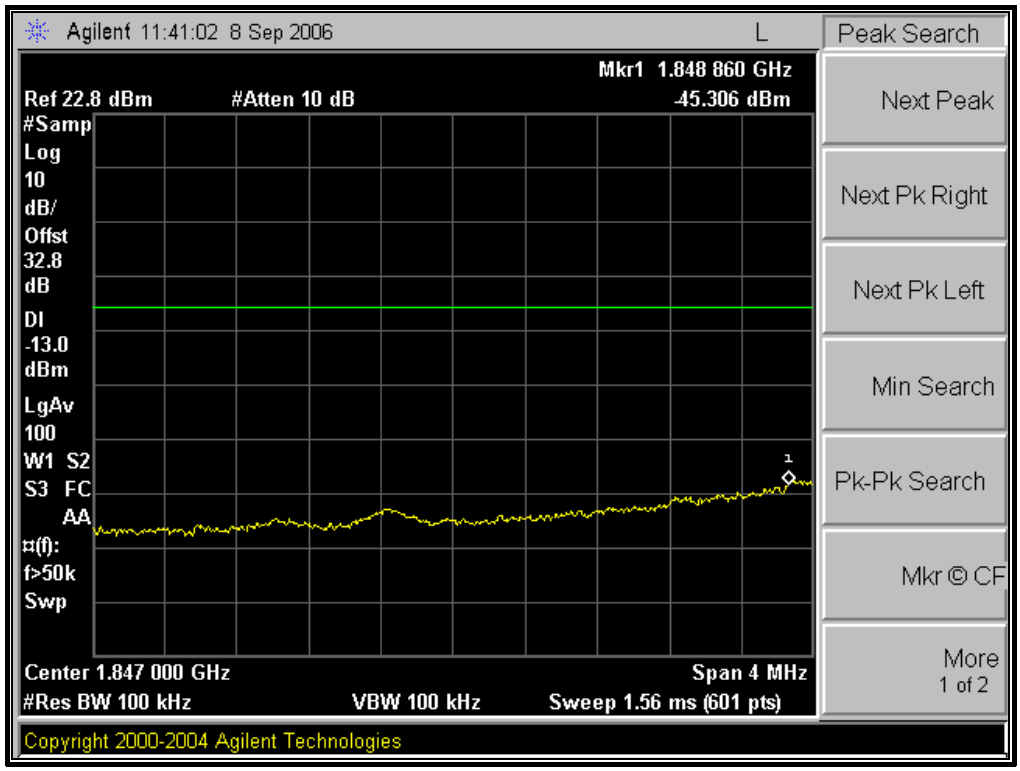




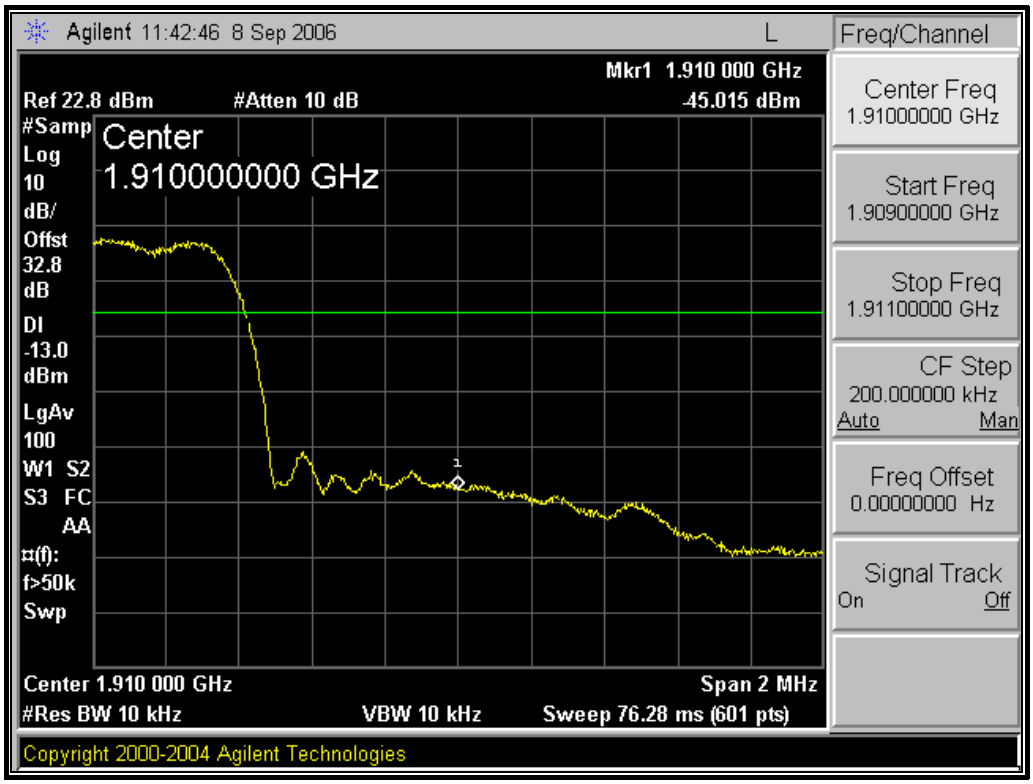
PCS 1900

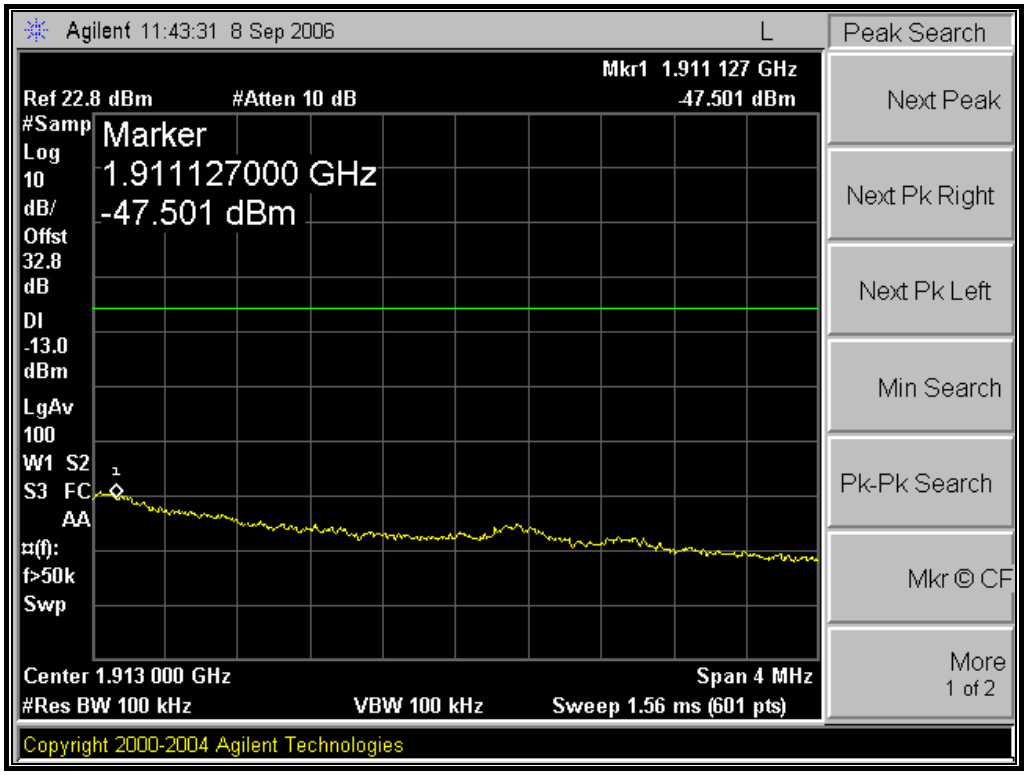
Low Channel





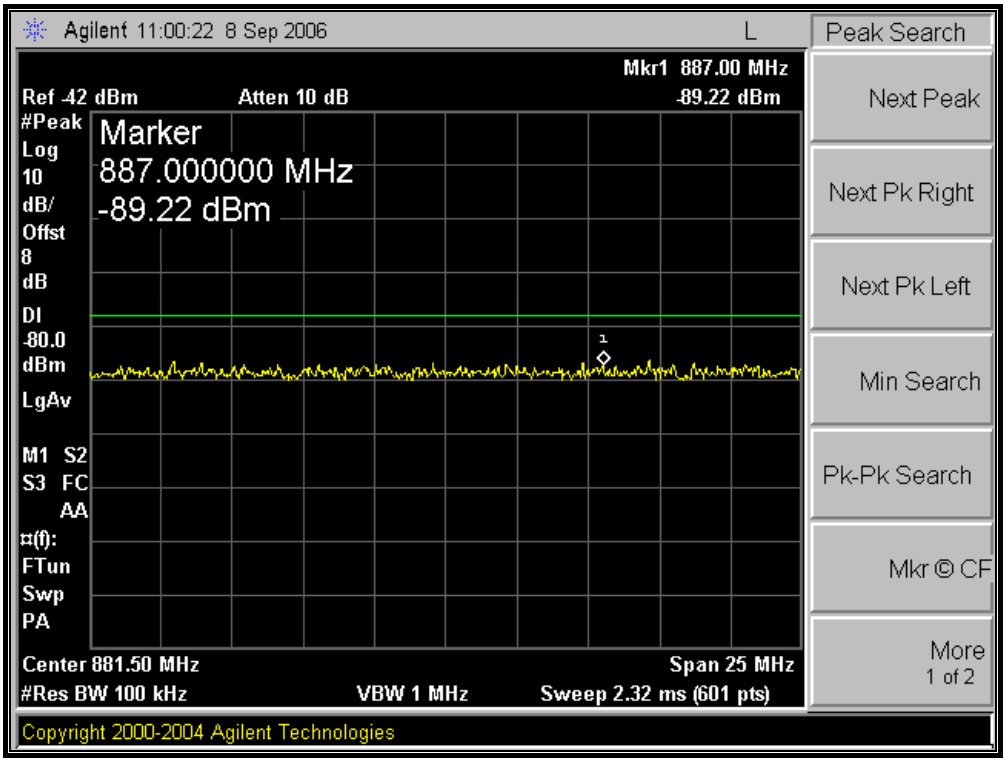
High Channel





10. Emission in Receiver Critical Band

CDMA 800



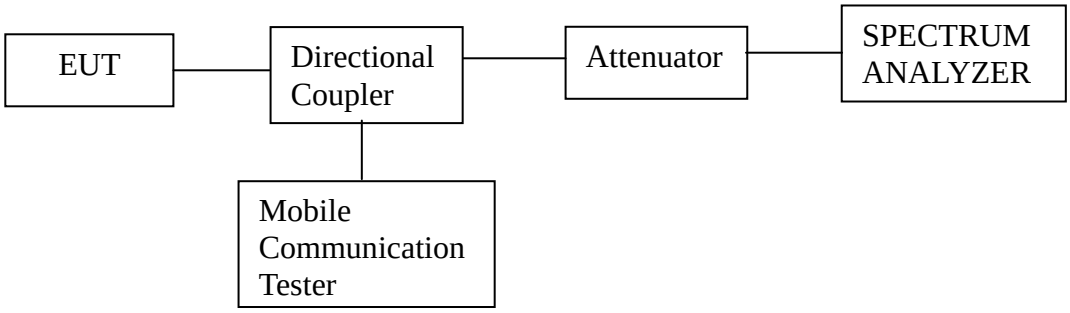
11. Frequency Stability

11.1. Limit

Requirements: FCC § 2.1055 (a), § 2.1055 (d) & following:
According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table of this section.
For Mobile devices operating in the 824 to 849 MHz band at a power level less than or equal to 3 Watts, the limit specified in Table C-1 is +/- 2.5 ppm.
§24.235 The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

11.2. Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a frequency counter via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.
After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the counter.
Frequency Stability vs. Voltage: An external variable DC power supply was connected to the battery terminals of the equipment under test. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.



11.3. Test Results

Frequency Stability Versus Temperature

CDMA 800

Reference Frequency: 835.89 MHz, Limit: 2.5 ppm			
Environment Temperature (℃)	Power Supplied (Vdc)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
22(Ref.)	5.0	-14	-0.017
60	5.0	-10	-0.012
50	5.0	-4	-0.005
40	5.0	6	0.007
30	5.0	-10	-0.012
20	5.0	-14	-0.017
10	5.0	-16	-0.019
0	5.0	-20	-0.024
-10	5.0	-21	-0.025
-20	5.0	-23	-0.028
-30	5.0	-27	-0.032

PCS 1900

Reference Frequency: 1880.00 MHz, Limit: 2.5 ppm			
Environment Temperature (℃)	Power Supplied (Vdc)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
22(Ref.)	5.0	-32	-0.017
60	5.0	-20	-0.011
50	5.0	-10	-0.005
40	5.0	-6	-0.003
30	5.0	-4	-0.002
20	5.0	-10	-0.005
10	5.0	-21	-0.011
0	5.0	-27	-0.014
-10	5.0	-20	-0.011
-20	5.0	-24	-0.013
-30	5.0	-28	-0.014

Frequency Stability Versus Battery Voltage

CDMA 800

Reference Frequency: 835.89 MHz, Limit: 2.5ppm			
Power Supplied (Vdc)	**Environment Temperature (℃)**	**Frequency Error (Hz)**	**ppm**
4.25	22	8	0.010
5.75	22	-15	-0.018

PCS 1900

Reference Frequency: MHz, Limit:2.5ppm			
Power Supplied (Vdc)	**Environment Temperature (℃)**	**Frequency Error (Hz)**	**ppm**
4.25	22	14	0.008
5.75	22	-40	-0.021

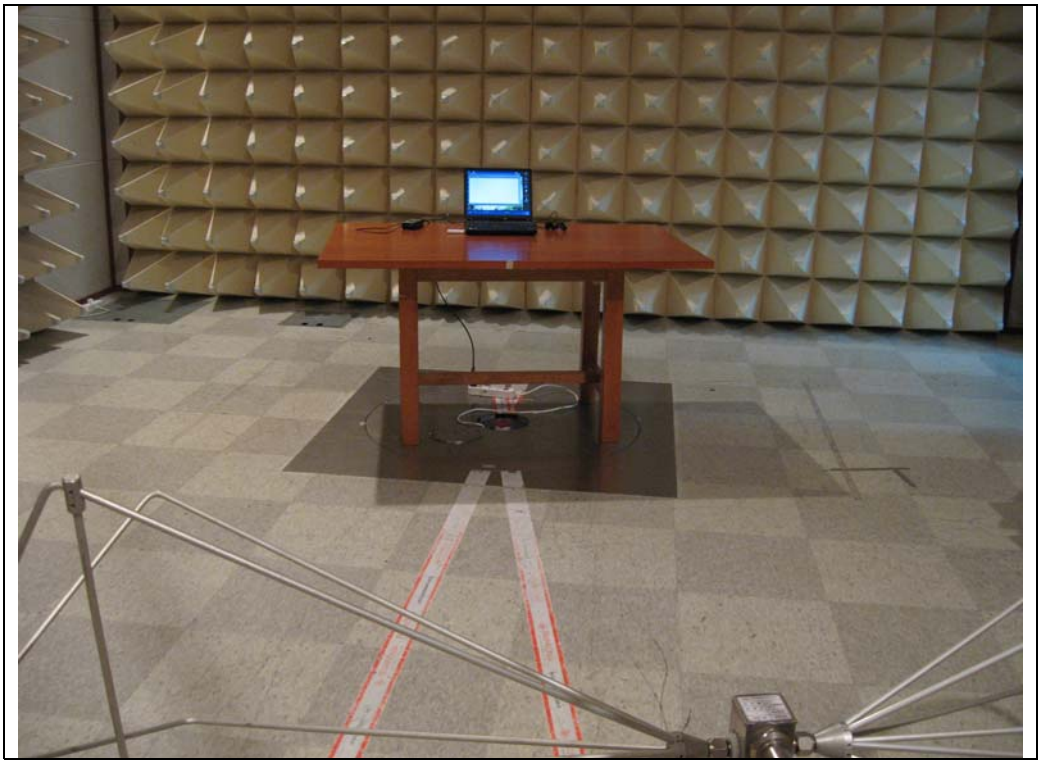
Appendix A. Photos of AC Power Line Conducted Emissions Test

Front View of Conducted Emission

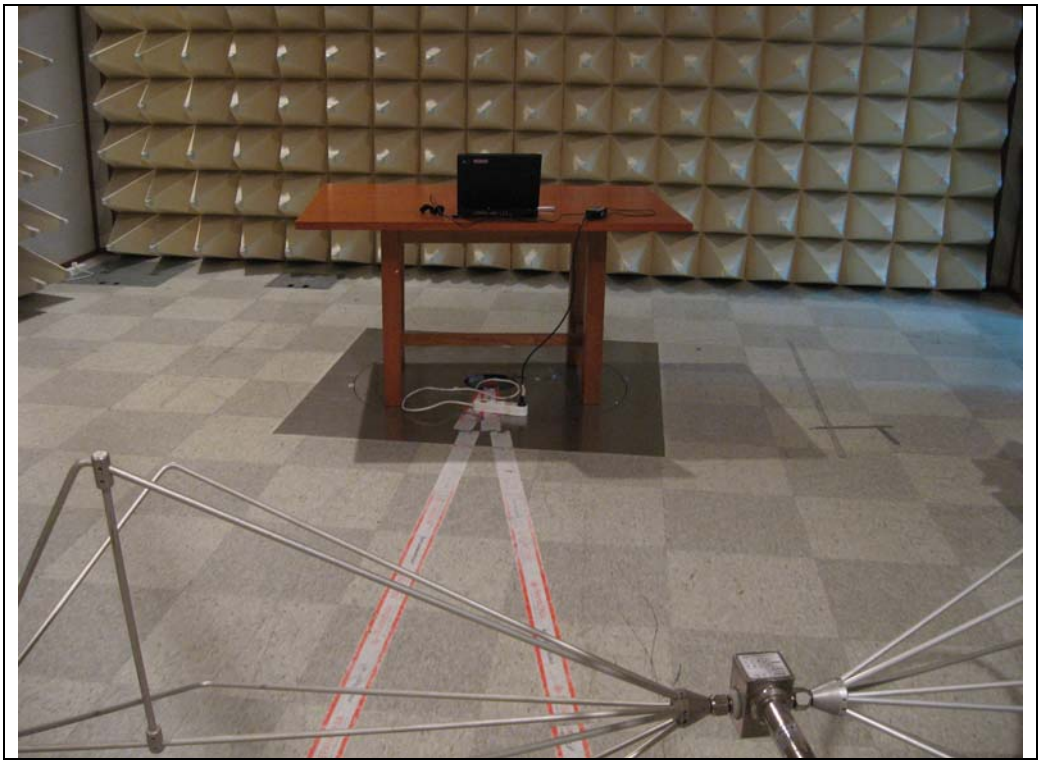
Rear View of Conducted Emission

Appendix B. Photos of Field Strength Radiated Emission Test

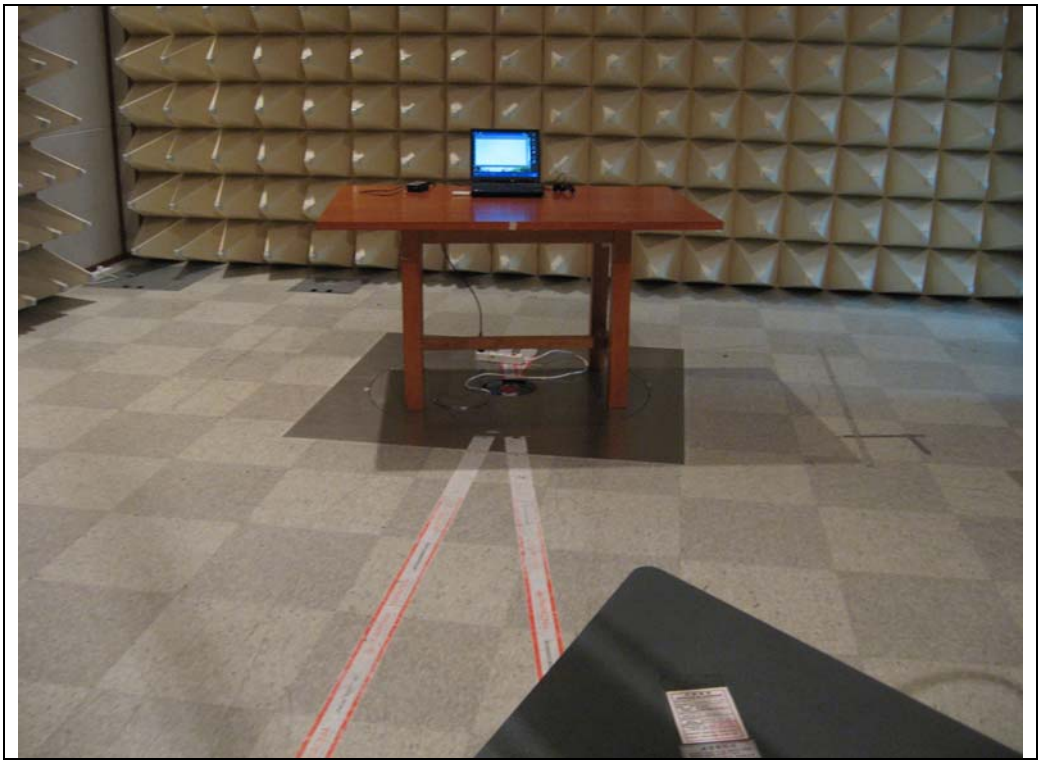
Front View (30 MHz ~ 300 MHz)



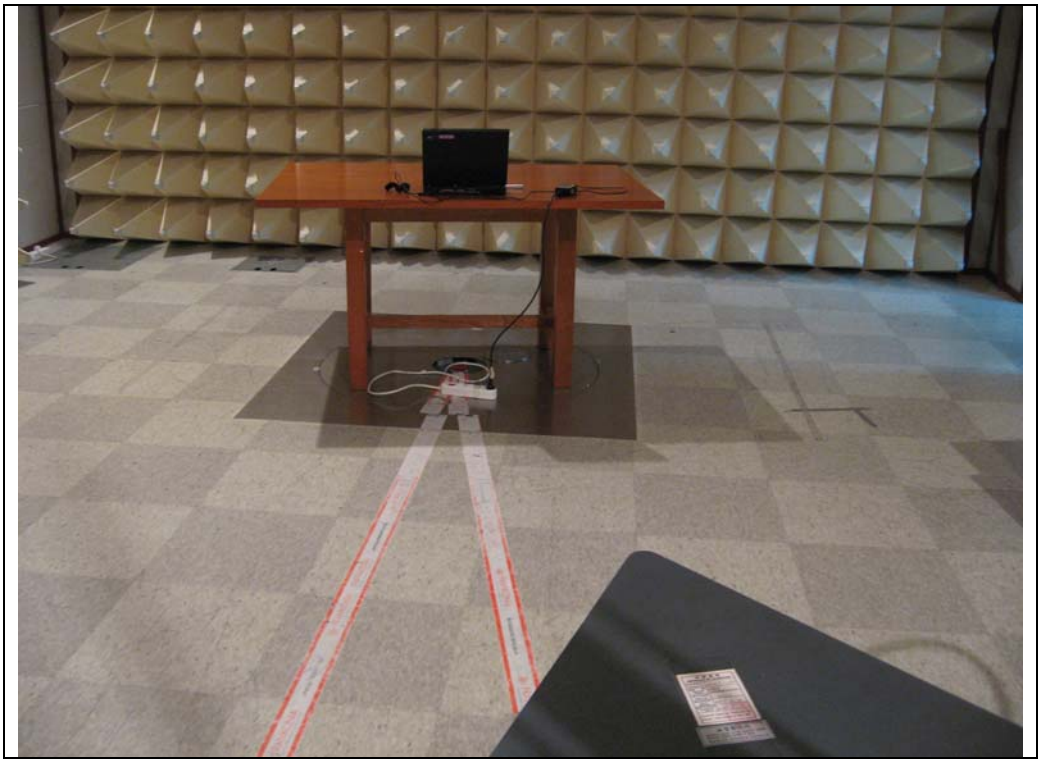
Rear View (30 MHz ~ 300 MHz)



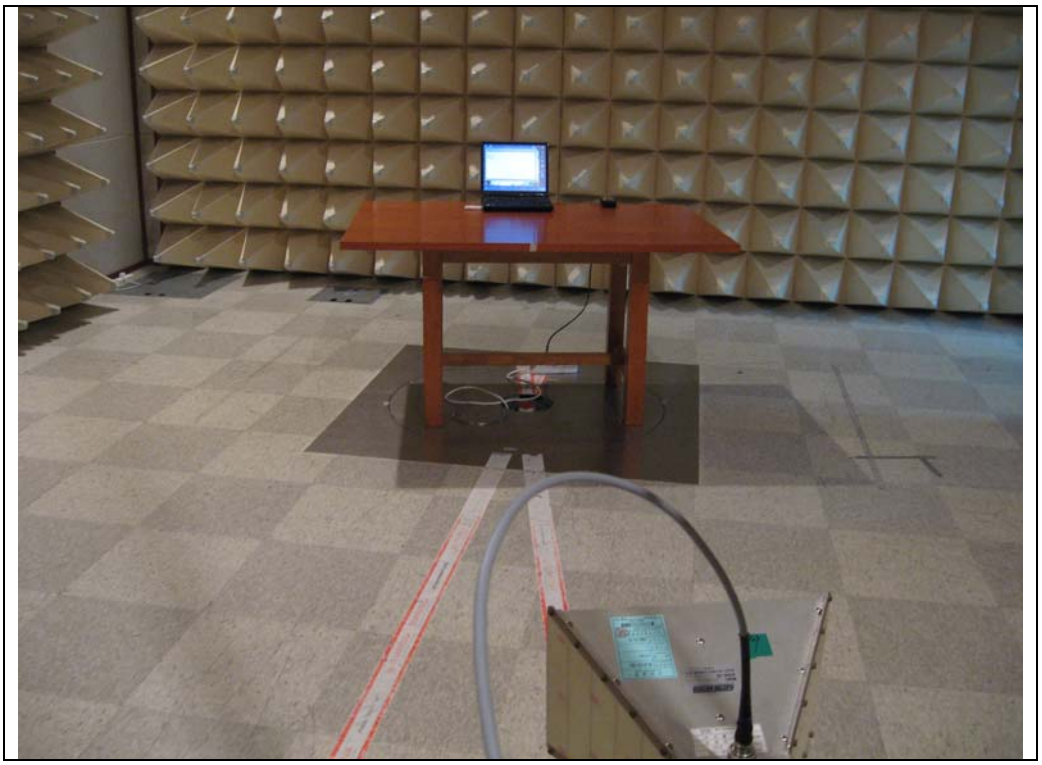
Front View (300 MHz ~ 1000 MHz)



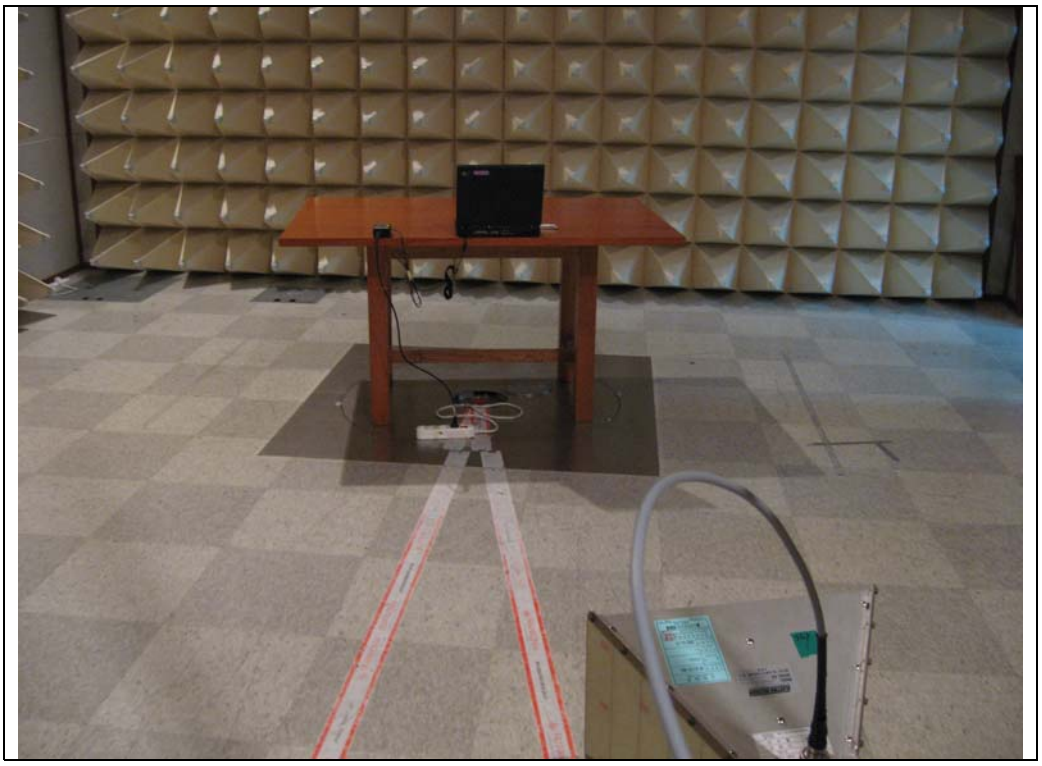
Rear View (300 MHz ~ 1000 MHz)



Front View (1000 MHz ~ 20000 MHz)



Rear View (1000 MHz ~ 20000 MHz)



Appendix C. Photos of RF Rated output power & Spurious Emission Test