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FCC TEST REPORT

of

CDMA1X WIRELESS CARD

FCC ID: Q78-MG166

Brand Name: ZTE 中兴

Model No.: MG166

Serial No.: 290522130495

Report No.: FCC05-8031

Date: October 8, 2005

Prepared for

ZTE Corporation

ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park,
Nanshan District, Shenzhen, Guangdong, P.R.China

Prepared by

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1 Test Report Certification

Product: CDMA1X WIRELESS CARD

FCC ID: Q78-MG166

Model No.: MG166

Applicant: ZTE Corporation

Applicant Address: ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R.China

Manufacturer: ZTE Corporation

Manufacturer Address: ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R.China

Test Standards: 47 CFR Part 2
47 CFR Part 24, Subpart E

Test Result: PASS

We, Shenzhen Electronic Product Quality Testing Center, hereby certify that the submitted samples of the above item, as detailed in chapter 2.1 of this report, has been tested in our facility. The test record, data evaluation and test configuration represented herein are true and accurate accounts of measurements of the sample's EMC characteristics under the conditions herein specified.

Tested by: Lin Xingsun, Date: Oct. 9, 2005
Lin Xingsun

Checked by: Smart Li, Date: Oct 9, 2005
Smart Li



Approved by: Wang Keqin, Date: Oct. 10, 2005
Wang Keqin

2 General Information

2.1 Description of EUT

Description:	CDMA1X WIRELESS CARD
Model No.:	MG166
Emission Designator:	1M25F9W
Modulation:	CDMA 1X
Frequency:	Tx: 1851.25-1908.75MHz; Rx: 1931.25-1988.75MHz
Power:	200mW (CDMA Class III)
Serial No.:	290522130495
Hardware Version:	050402
Software Version:	V0.21

NOTE:

1. The EUT is a model of CDMA 1X (PCS band) Mobile Station (MS). It is a computer wireless modem with a PCMCIA port.
2. Please refer to Appendix I for the photographs of the EUT. For a more detailed features description about the EUT, please refer to User's Manual.

2.2 Objective

Perform EMC test according to FCC rules Part 2 and Part 24 for FCC ID Certification.

2.3 Test Standards and Results

The EUT has been tested according to 47 CFR

- Part 2 Frequency Allocations and Radio Treaty Matters: General Rules and Regulations
- Part 24 Personal Communications Services

Test items and the results are as bellow:

No	FCC Rules	Test Type	Result
1	§2.106 §24.229	Frequencies	PASS
2	§2.1046 §24.232	Equivalent Isotropically Radiated Power (EIRP)	PASS
3	§2.1049	Occupied Bandwidth	PASS
4	§2.1051 §24.238	Conducted Spurious Emission at Antenna Terminal	PASS
5	§2.1053 §24.238	Radiated Spurious Emission	PASS
6	§2.1055 §24.235	Frequency Stability	PASS

2.4 List of Equipments Used

Description	Manufacturer	Model No.	Cal. Due Date	Serial No.
Test Receiver	Rohde & Schwarz	ESIB26	2006.06.10	A0304218
Ultra Broadband Ant.	Rohde & Schwarz	HL562	2006.06.05	A0304224
Horn Ant.	Rohde & Schwarz	HF906	2006.06.05	100150
Universal Radio Communication Tester	Rohde & Schwarz	CMU200	2006.05.31	A0304212
3G Communication Antenna	European Antennas	PSA 75301R/170	2006.04.10	A0304213
Mobile Phone Tester	Willtek	4403	2007.2.10	0811211
Temperature Chamber	JAPAN TABAI	PSL-4G	2006.02.05	A8708056
Shield Room	Nanbo Tech	Site 3	2006.03.18	A9901141
Anechoic Chamber	Albatross	EMC12.8×6.8× 6.4(m)	2006.04.18	A0304210

2.5 Test Facility

Shenzhen Electronic Product Quality Testing Center (SET) is a third party testing organization accredited by China National Accreditation Committee for Laboratories (CNACL) according to ISO/IEC 17025. The accreditation certificate number is **L1659**.

The EMC chamber site No.1 (EMC12.8×6.8×6.4(m)), and the radiated and conducted Emission test equipments of SET are constructed and calibrated to meet the FCC requirements ANSI C63.4:2001 and CISPR 22/EN 55022. The FCC Registration Number is **261302**.

The EMC chamber site No.1 (EMC12.8×6.8×6.4(m)) also complies with Canada standard RSS 212, and acceptable to Industry Canada for the performance of radiated measurements. The Industry Canada Registration Number is **IC 5915**.

2.6 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15-35°C
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

3 Frequencies

3.1 Frequency Blocks Available for Broadband PCS

According to FCC §24.229, the frequencies available in the Broadband PCS service are listed as bellow, in accordance with the frequency allocations table of FCC §2.106.

(a) The following frequency blocks are available for assignment on an MTA basis:

Block A: 1850–1865 MHz paired with 1930–1945 MHz; and

Block B: 1870–1885 MHz paired with 1950–1965 MHz.

(b) The following frequency blocks are available for assignment on a BTA basis:

Block C: 1895–1910 MHz paired with 1975–1990 MHz;

Block D: 1865–1870 MHz paired with 1945–1950 MHz;

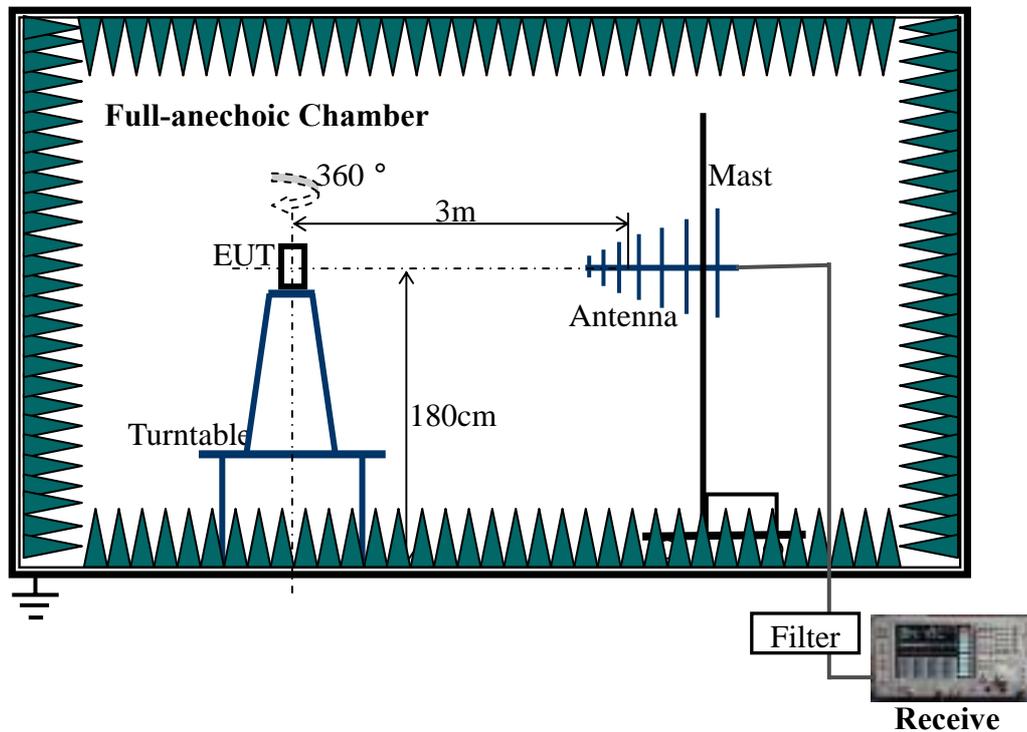
Block E: 1885–1890 MHz paired with 1965–1970 MHz; and

Block F: 1890–1895 MHz paired with 1970–1975 MHz.

3.2 Test Procedure

- a. The frequency measurement was performed in a full anechoic chamber using radiation measurement method. The air lost of the site and the factors of the test system is pre-calibrated using substitution method.
- b. The EUT was placed on the vertical axis of a turntable 1.8 meters above the ground.
- c. For the frequency range 30 MHz to 3 GHz, ultra-broadband bi-log antenna was used. For the frequency range above 3 GHz, horn antenna was used. The antenna was at the same height as the EUT. Since the there was no reflection from the chamber floor and the site was pre-calibrated, the antenna height need not to be changed as the open site method. The polarization of the receiving antenna was the same as that of the EUT transmitting antenna.
- d. The spectrum analyzer was set to Maxpeak Detector and Maximum Hold mode. The resolution bandwidth was set to at least 1% of the emission bandwidth. For GSM signal, VBW=RBW=3kHz; for CDMA signal, VBW=RBW=30kHz.

3.3 Test Setup



For the actual test configuration, please refer to the related item-Photographs of the Test Configuration.

3.4 EUT Setup and Operating Conditions

The EUT was installed in a notebook computer (Topstar, W800).

A communication link was established between the MS and a System Simulator (SS). The MS operated at the maximum output power. The CDMA 1X (PCS band) channel No.25 (low) and 1175 (high) were measured respectively.

3.5 Test Results

The transmitter frequency arrangement of the CDMA 1X (PCS band) is

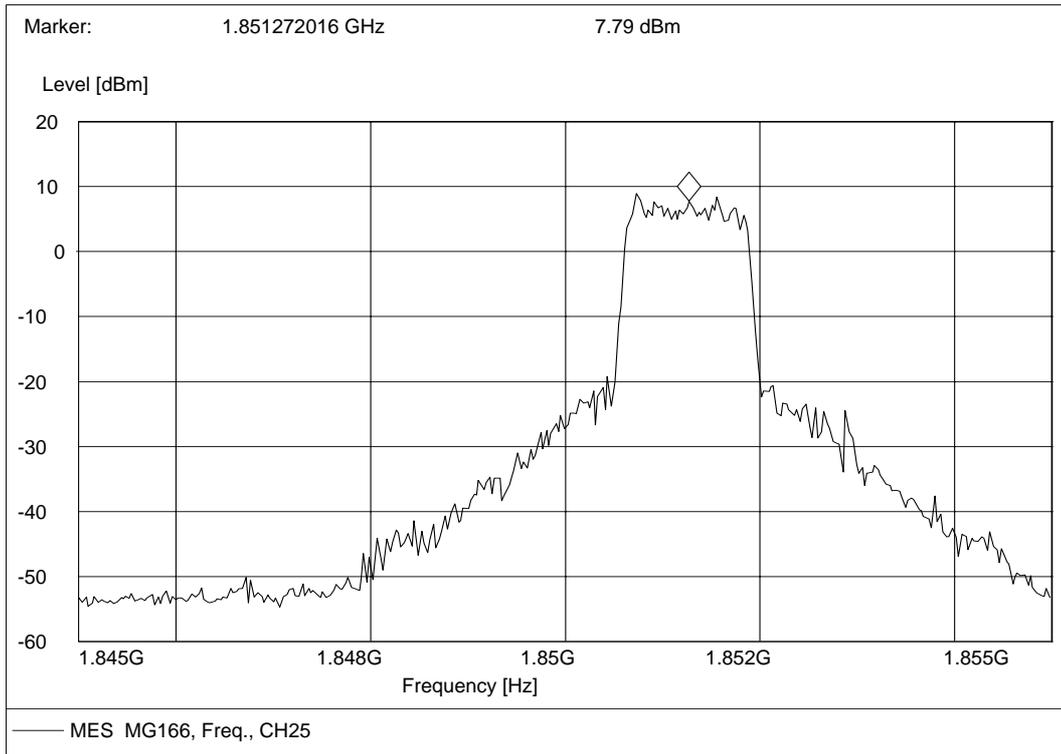
$$F(n) = 1850.000 + 0.050 * n, 0 \leq n \leq 1199$$

The transmitting frequency range of the EUT is from 1851.25MHz (Channel 25) to 1908.75MHz (Channel 1175).

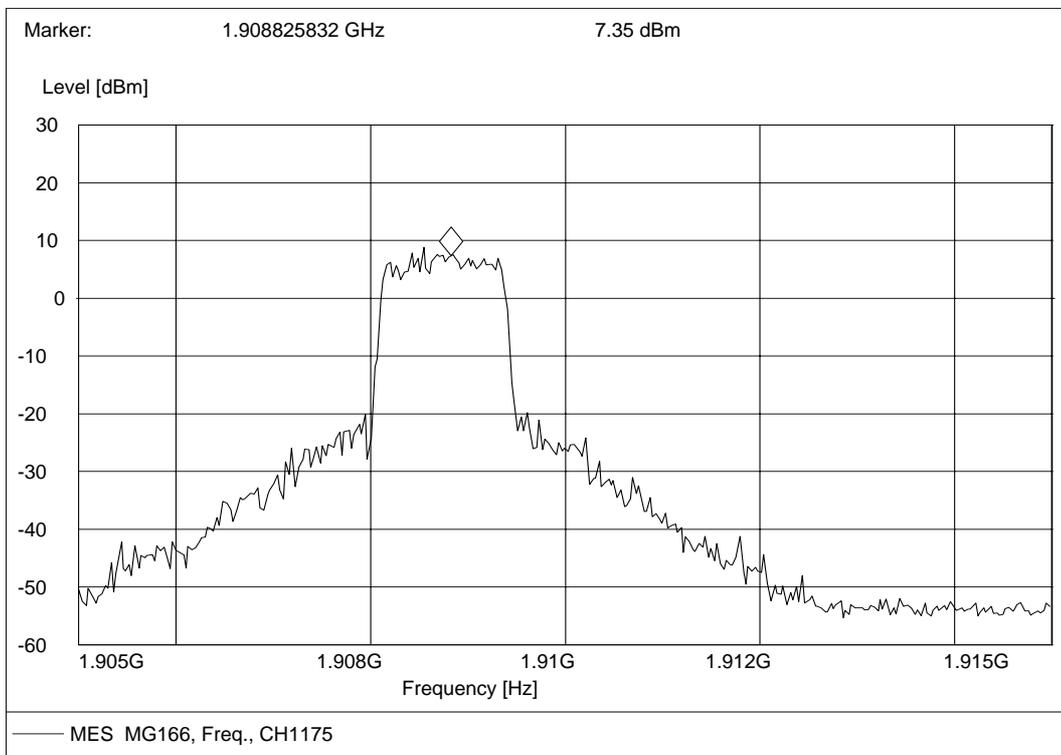
The measured frequencies are as the following plots.



1. Lowest channel No.25



2. Highest channel No.1175



4 Equivalent Isotropically Radiated Power (EIRP) Test

4.1 Limits of EIRP

According to FCC §24.232, the broadband PCS mobile stations are limited to 2 watts EIRP peak power.

4.2 Test Procedure

- a. The radiated power measurement was performed in a full anechoic chamber. The air lost of the site and the factors of the test system is pre-calibrated using substitution method.
- b. The EUT was placed on the vertical axis of a turntable 1.8 meters above the ground. The table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. In the frequency range 30 MHz to 3 GHz, ultra-broadband bi-log antenna was used. In the frequency range above 3 GHz, horn antenna was used. The antenna was at the same height as the EUT. Since the there was no reflection from the chamber floor and the site was pre-calibrated, the antenna height need not to be changed as the open site method. The polarization of the receiving antenna was the same as that of the EUT transmitting antenna.
- c. The spectrum analyzer was set to Maxpeak Detector and Maximum Hold mode. The resolution bandwidth was comparable to the emission bandwidth. For GSM signal, VBW=RBW=1MHz; for CDMA signal, VBW=RBW=3MHz.

4.3 Test Setup

Same as 3.3

4.4 EUT Setup and Operating Conditions

The EUT was installed in a notebook computer (Topstar, W800).

A communication link was established between the MS and a System Simulator (SS). The MS operated at the maximum output power. The CDMA 1X (PCS band) No.25 (low), 600 (mid), and 1175 (high) were measured respectively.

4.5 Test Results

No.	CDMA 1X (PCS Band) Channel No.	Frequency (MHz)	EIRP (dBm)	Limit (dBm)
1	25	1851.25	21.58	33
2	600	1880.00	20.34	33
3	1175	1908.75	20.80	33

5 Occupied Bandwidth

5.1 Definition

According to FCC §2.1049, the occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Occupied bandwidth is also known as the 99% emission bandwidth. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

5.2 Test Procedure

- a. The occupied bandwidth measurement was performed in a full anechoic chamber using radiation measurement method. The air loss of the site and the factors of the test system is pre-calibrated using substitution method.
- b. The EUT was placed on the vertical axis of a turntable 1.8 meters above the ground.
- c. For the frequency range 30 MHz to 3 GHz, ultra-broadband bi-log antenna was used. For the frequency range above 3 GHz, horn antenna was used. The antenna was at the same height as the EUT. Since there was no reflection from the chamber floor and the site was pre-calibrated, the antenna height need not to be changed as the open site method. The polarization of the receiving antenna was the same as that of the EUT transmitting antenna.
- d. The spectrum analyzer was set to Maxpeak Detector and Maximum Hold mode. The resolution bandwidth was set to at least 1% of the emission bandwidth. For GSM signal, VBW=RBW=3kHz; for CDMA signal, VBW=RBW=30kHz.

5.3 Test Setup

Same as 3.3

5.4 EUT Setup and Operating Conditions

The EUT was installed in a notebook computer (Topstar, W800).

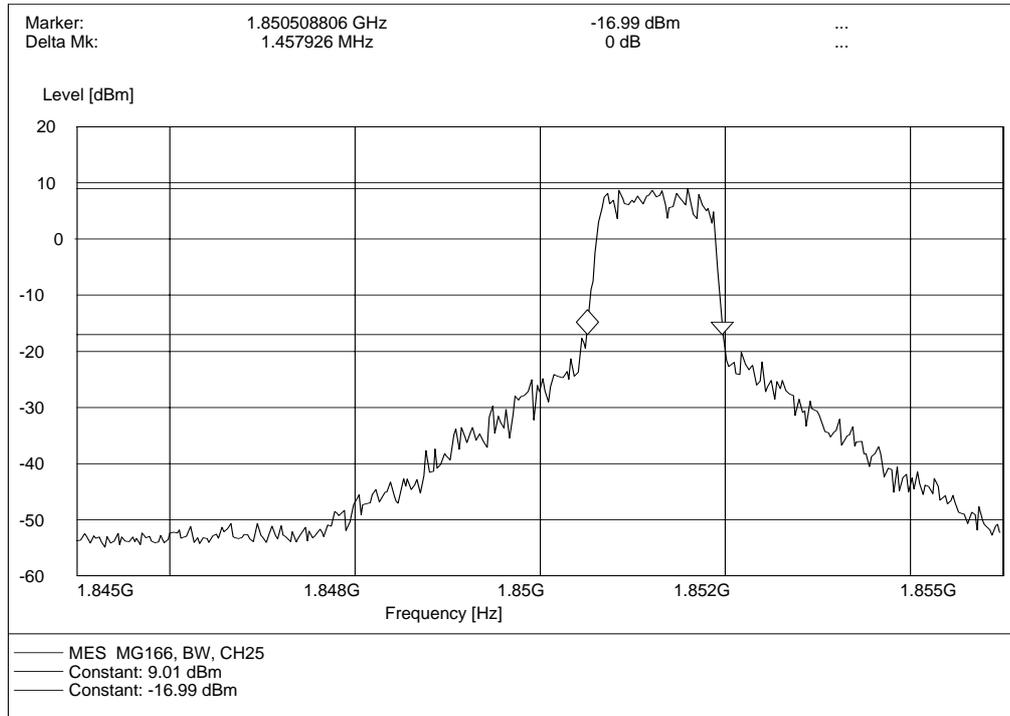
A communication link was established between the MS and a System Simulator (SS). The MS operated at the maximum output power. The CDMA 1X (PCS band) channel No.25 (low) and 1175 (high) were measured respectively.



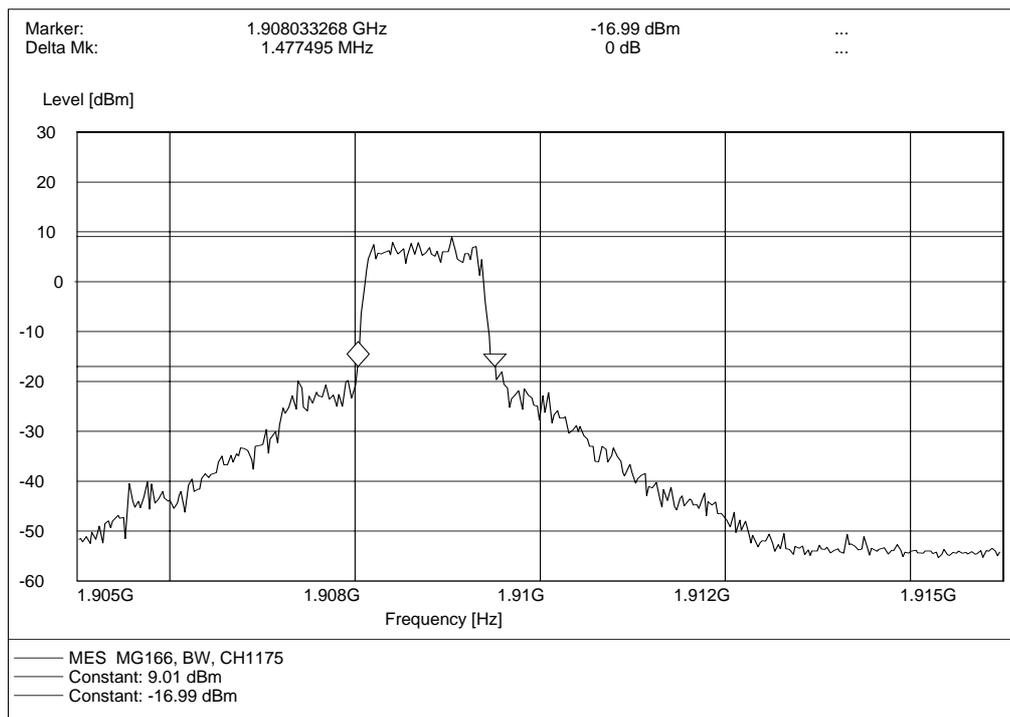
5.5 Test Results

The 26dB emission bandwidth is 1.46MHz at the lowest channel and 1.48MHz at the highest channel, as showed in the following plots.

1. Lowest channel No.25



2. Highest channel No.1175



6 Conducted Spurious Emission at the Antenna Terminal

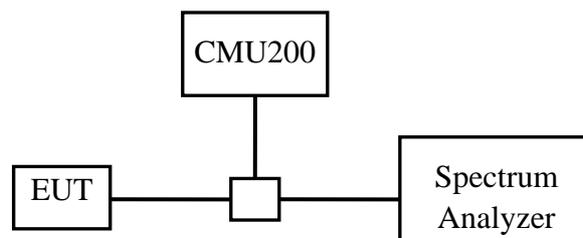
6.1 Limits of Spurious Radiation

According to FCC §24.238, on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log (P)$ dB.

6.2 Test Procedure

- The replaceable antenna of the EUT was removed. And the EUT was connected to the base simulator and the spectrum analyzer by RF cables. A communication link was established between the EUT and the base simulator. The MS operated at the maximum output power.
- The spectrum analyzer was set to Maxpeak Detector function and Maximum Hold mode. The resolution bandwidth was set to 1MHz. The measuring frequencies are from 9 kHz to 10th harmonic of the fundamental frequency.
- In the 1 MHz bands immediately outside and adjacent to the frequency block, the resolution bandwidth of the spectrum analyzer was set to at least 1% of the emission bandwidth of the fundamental emission of the transmitter. For GSM signal, the resolution bandwidth was 3kHz; for CDMA signal, the resolution bandwidth was 30kHz.

6.3 Test Setup



6.4 EUT Setup and Operating Conditions

The EUT was installed in a notebook computer (Topstar, W800).

A communication link was established between the MS and a System Simulator (SS). The MS operated at the maximum output power. The CDMA 1X (PCS band) No.25 (low) and 1175 (high) were measured respectively.

6.5 Test Results

No.	Frequency (MHz)	Emission Power (dBm)	Limit (dBm)
CDMA 1X(PCS Band) Channel No. 25 (1851.25 MHz)			
1	3702.50	-43.78	-13
2	5553.75	--	-13
3	7405.00	--	-13
4	9256.25	--	-13
5	11107.50	--	-13
6	12958.75	--	-13
7	14810.00	--	-13
8	16661.25	--	-13
9	18512.50	--	-13
CDMA 1X(PCS Band) Channel No. 1175 (1908.75 MHz)			
10	3817.50	-45.21	-13
11	5726.25	--	-13
12	7635.00	--	-13
13	9543.75	--	-13
14	11452.50	--	-13
15	13361.25	--	-13
16	15270.00	--	-13
17	17178.75	--	-13
18	19087.50	--	-13

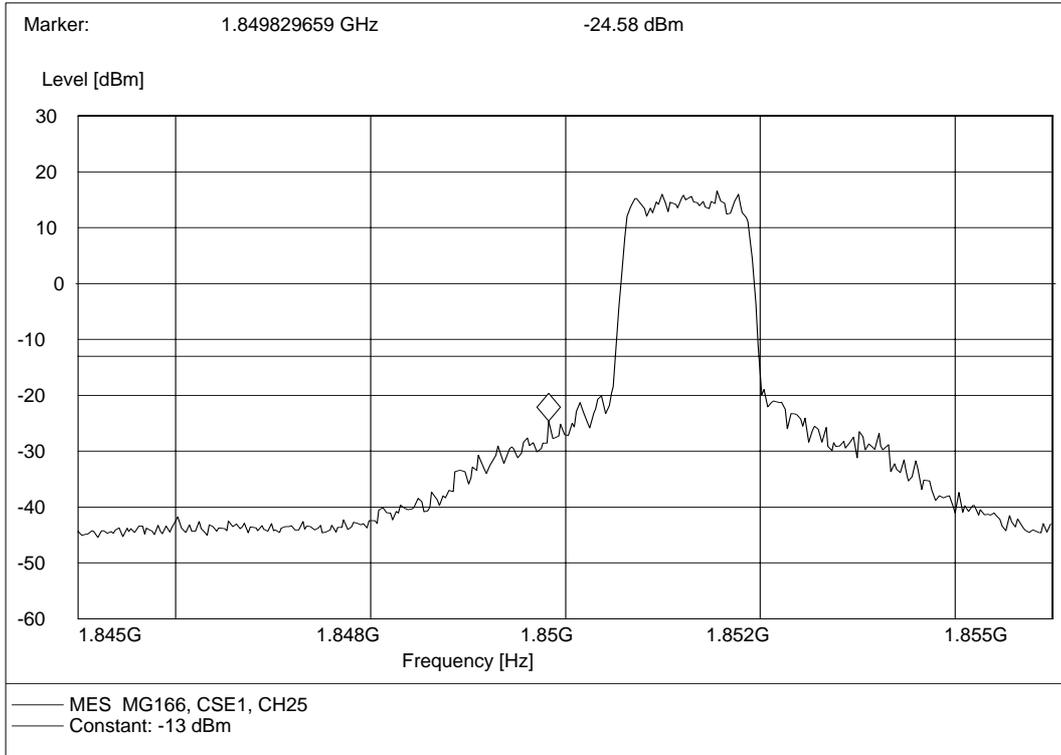
NOTE:

1. The spurious radiations from 9 kHz to 10th harmonic of the fundamental frequency are researched. Only the harmonics are record in the table above.
2. "--" in the table above means that the emissions are too small to be measured and are at least 12 dB below the limit.

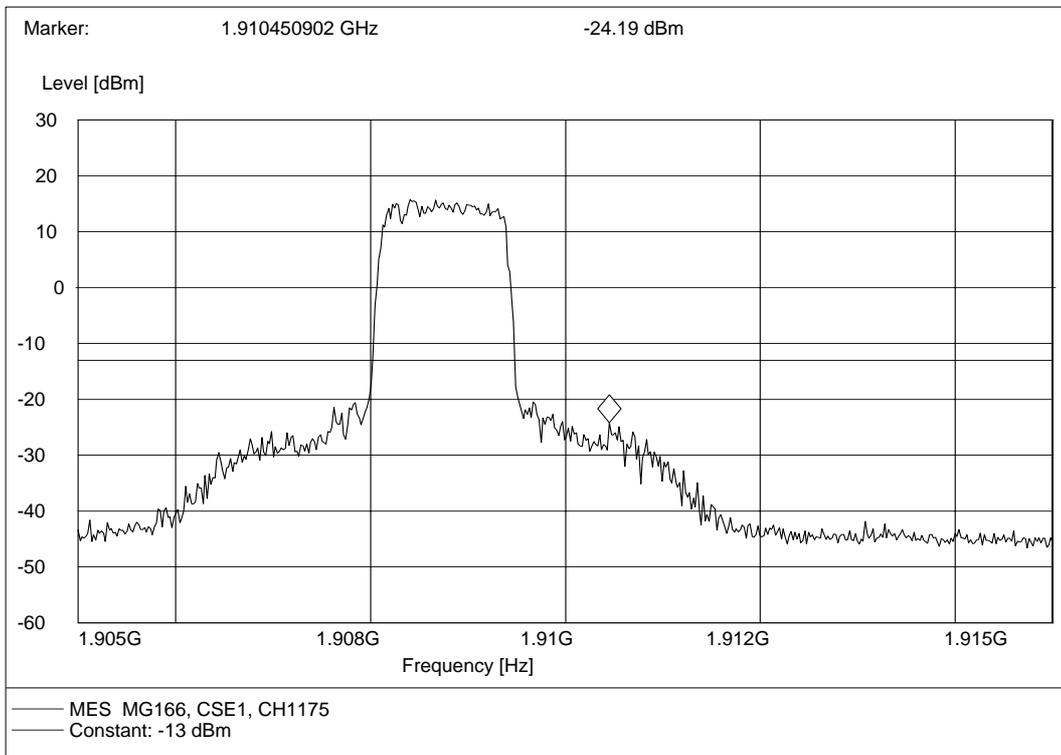


Plot of Out-of-Band Emission

1. Lowest channel No.25



2. Highest channel No.1175

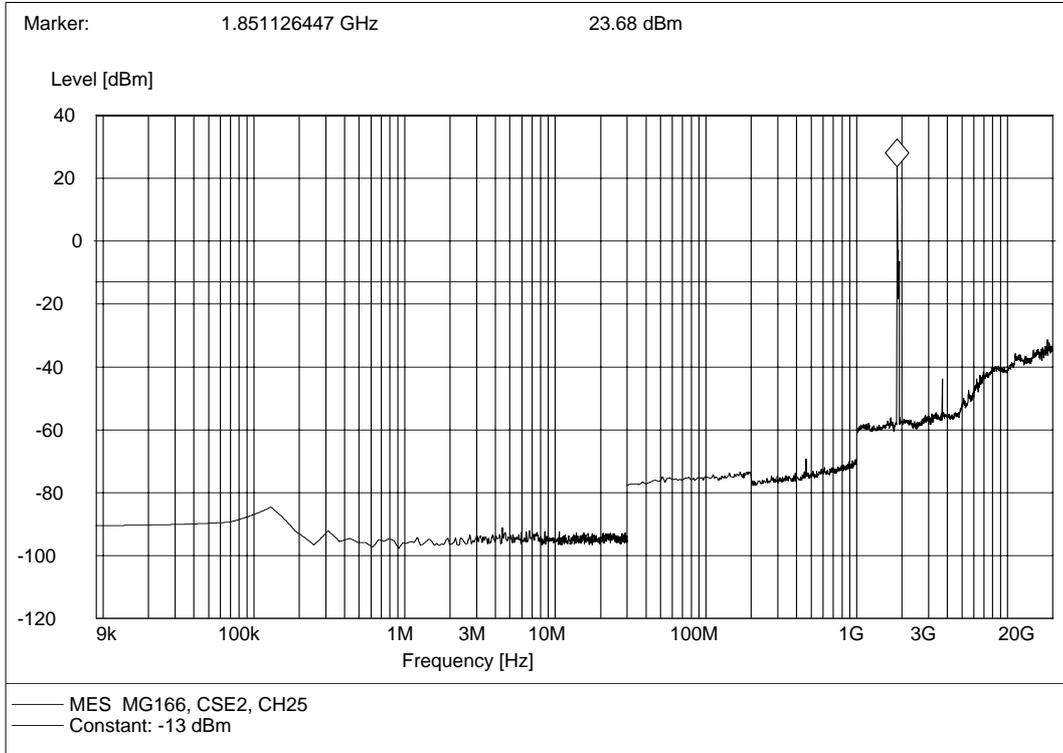




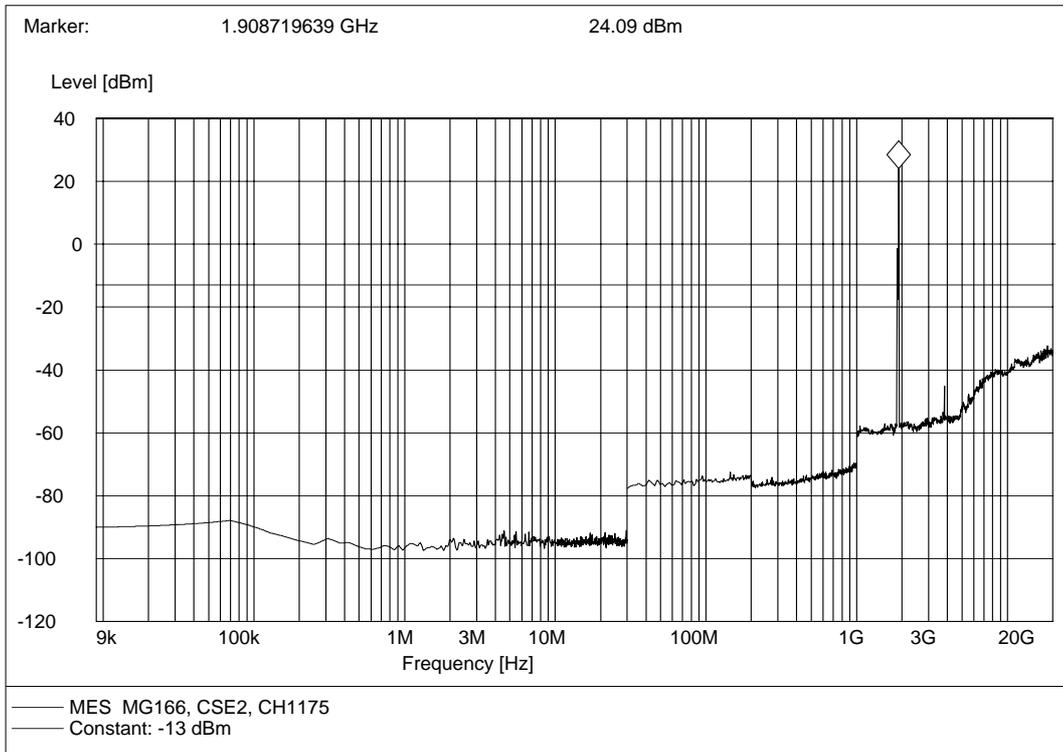
Plot of Conducted Spurious Emission

(Note: The marker point is the EUT transmitting frequency which should be ignored.)

1. Lowest channel No.25



2. Highest channel No.1175



7 Radiated Spurious Emission Test

7.1 Limits of Radiated Spurious Emission

According to FCC §24.238, on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB. This calculated to be -13dBm.

7.2 Test Procedure

- a. The radiated power measurement was performed in a full anechoic chamber. The air lost of the site and the factors of the test system is pre-calibrated using substitution method.
- b. The EUT was placed on the vertical axis of a turntable 1.8 meters above the ground. The table was turned from 0 degrees to 360 degrees to find the maximum reading.
- c. In the frequency range 30 MHz to 3 GHz, ultra-broadband bi-log antenna was used. In the frequency range above 3 GHz, horn antenna was used. The antenna was at the same height as the EUT. Since the there was no reflection from the chamber floor and the site was pre-calibrated, the antenna height need not to be changed as the open site method. The measurement was performed with the antenna at horizontal and vertical polarization respectively.
- d. The spectrum analyzer was set to Maxpeak Detector function and Maximum Hold mode. The resolution bandwidth was set to 1MHz. The measuring frequencies are from 30 MHz to 10th harmonic of the fundamental frequency.
- e. In the 1 MHz bands immediately outside and adjacent to the frequency block, the resolution bandwidth of the spectrum analyzer was set to at least 1% of the emission bandwidth of the fundamental emission of the transmitter. For GSM signal, the resolution bandwidth was 3kHz; for CDMA signal, the resolution bandwidth was 30kHz.

7.3 Test Setup

Same as 3.3

7.4 EUT Setup and Operating Conditions

The EUT was installed in a notebook computer (Topstar, W800).

A communication link was established between the MS and a System Simulator (SS). The MS operated at the maximum output power. The CDMA 1X (PCS band) No.25 (low) and 1175 (high) were measured respectively.

7.5 Test Results

No.	Frequency (MHz)	ERP (dBm)		Limit (dBm)
		Antenna: <u>V</u> ertical	Antenna: <u>H</u> orizontal	
PCS 1900 MHz: Channel No. 25 (1851.25 MHz)				
1	3702.50	-37.91	-39.95	-13
2	5553.75	-40.21	-46.30	-13
3	7405.00	--	--	-13
4	9256.25	--	--	-13
5	11107.50	--	--	-13
6	12958.75	--	--	-13
7	14810.00	--	--	-13
8	16661.25	--	--	-13
9	18512.50	--	--	-13
PCS 1900 MHz: Channel No. 1175 (1908.75 MHz)				
10	3817.50	-31.94	-35.10	-13
11	5726.25	-38.58	--	-13
12	7635.00	--	--	-13
13	9543.75	--	--	-13
14	11452.50	--	--	-13
15	13361.25	--	--	-13
16	15270.00	--	--	-13
17	17178.75	--	--	-13
18	19087.50	--	--	-13

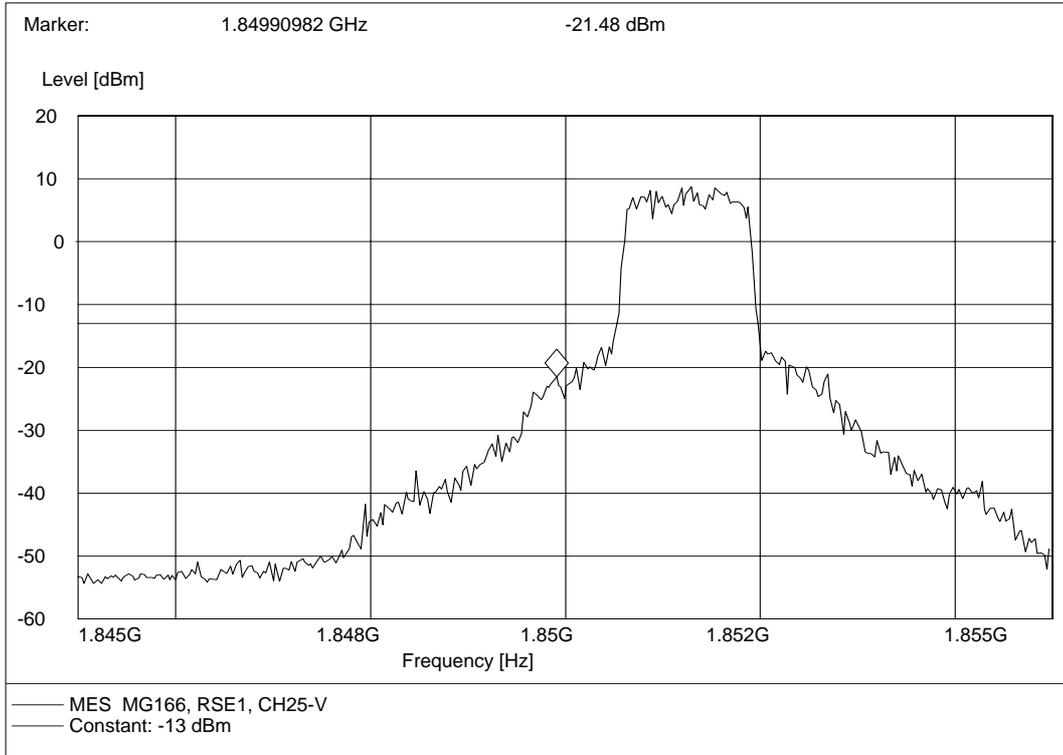
NOTE:

1. V and H are the antenna polarizations: Vertical and Horizontal.
2. The spurious radiations from 30 MHz to 10th harmonic of the fundamental frequency are researched. Only the harmonics are record in the table above.
3. "--" in the table above means that the emissions are too small to be measured and are at least 12 dB below the limit.

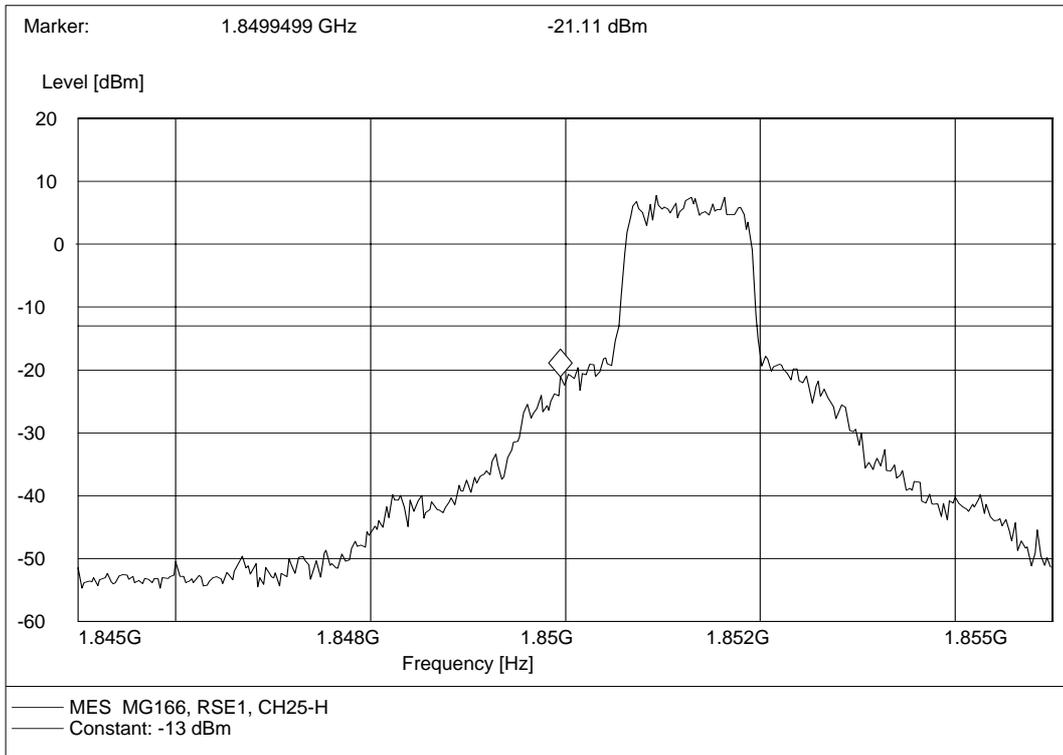


Plot of Out-of-Band Emission

1. Lowest channel No.25, antenna vertical

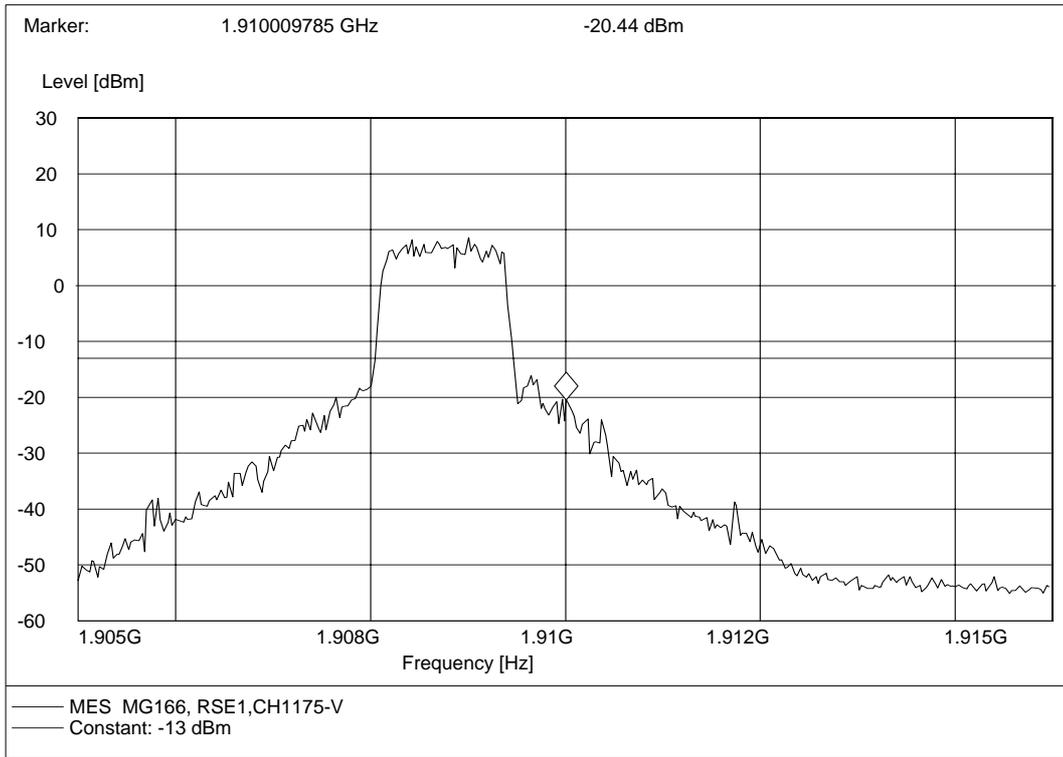


2. Lowest channel No.25, antenna horizontal

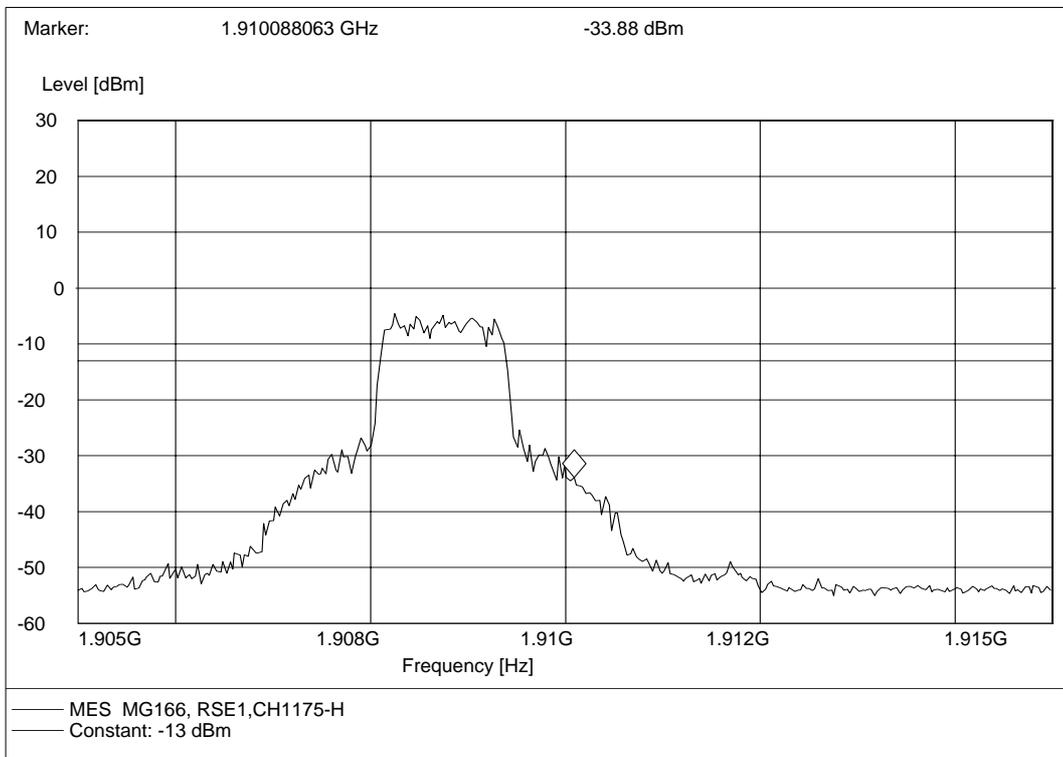




3. Highest channel No.1175, antenna vertical



4. Highest channel No.1175, antenna horizontal

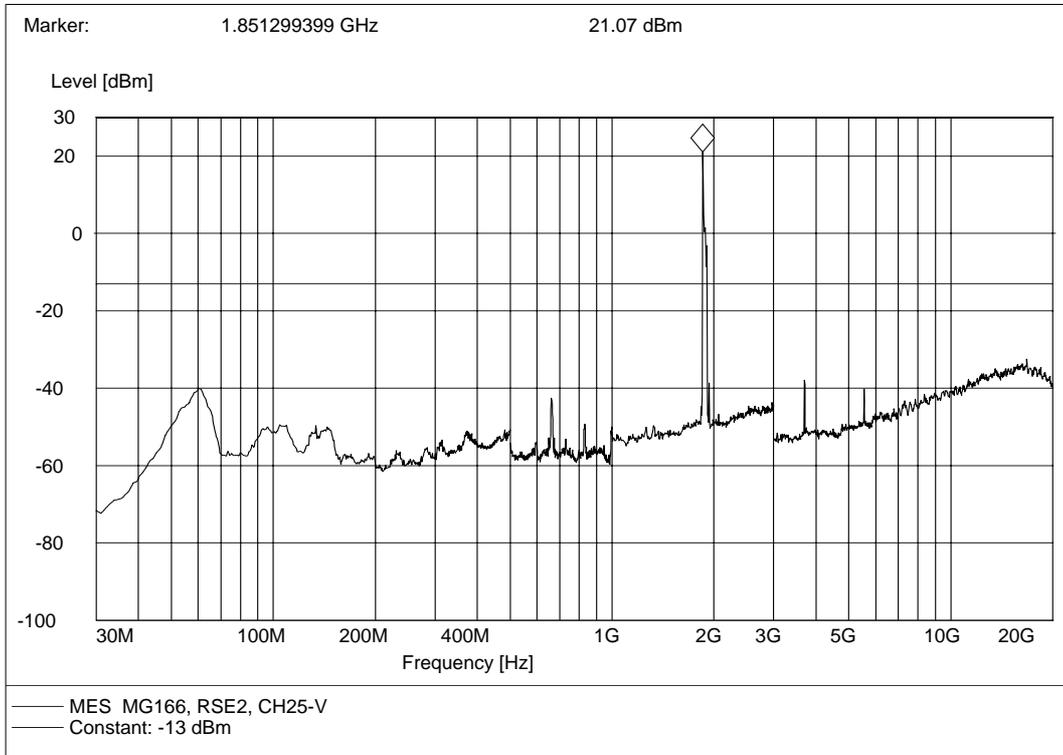




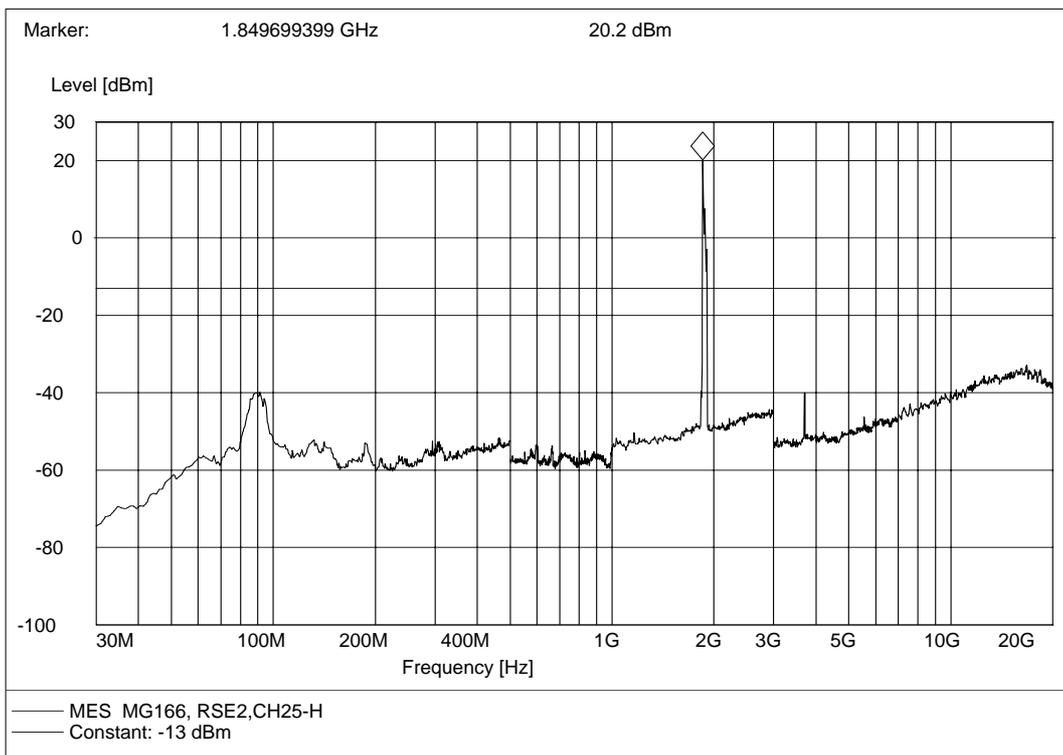
Plot of Spurious Radiation

(Note: The marker point is the MS transmitting frequencies which should be ignored)

1. Lowest channel No.25, antenna vertical

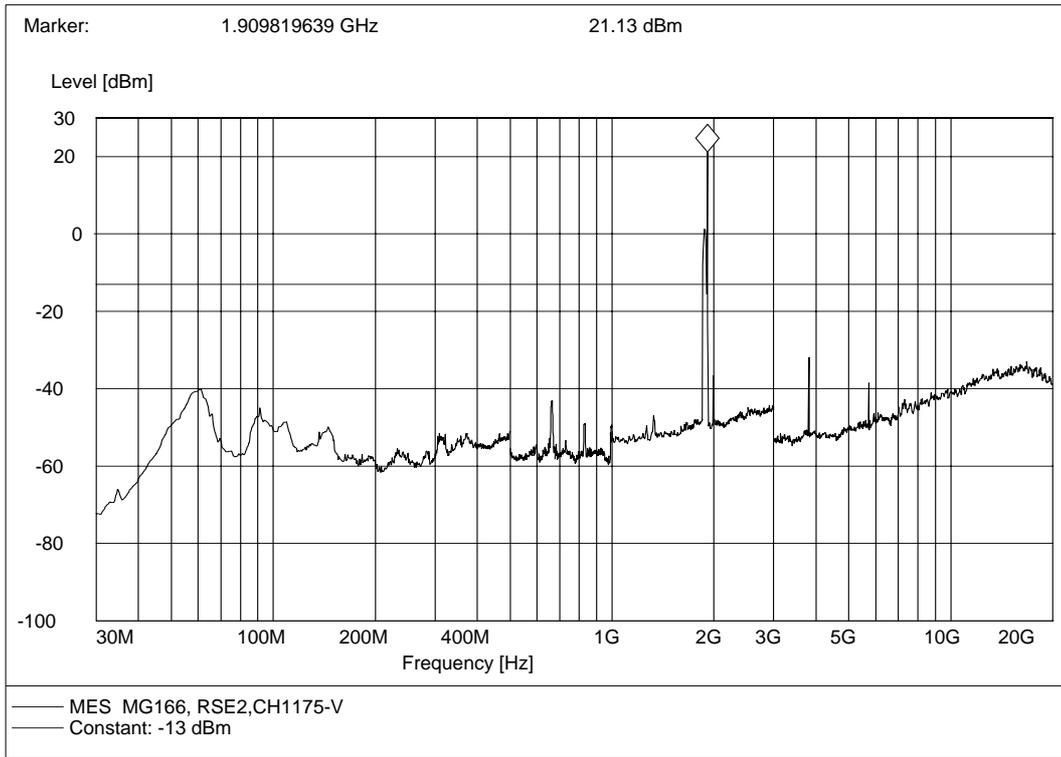


2. Lowest channel No.25, antenna horizontal

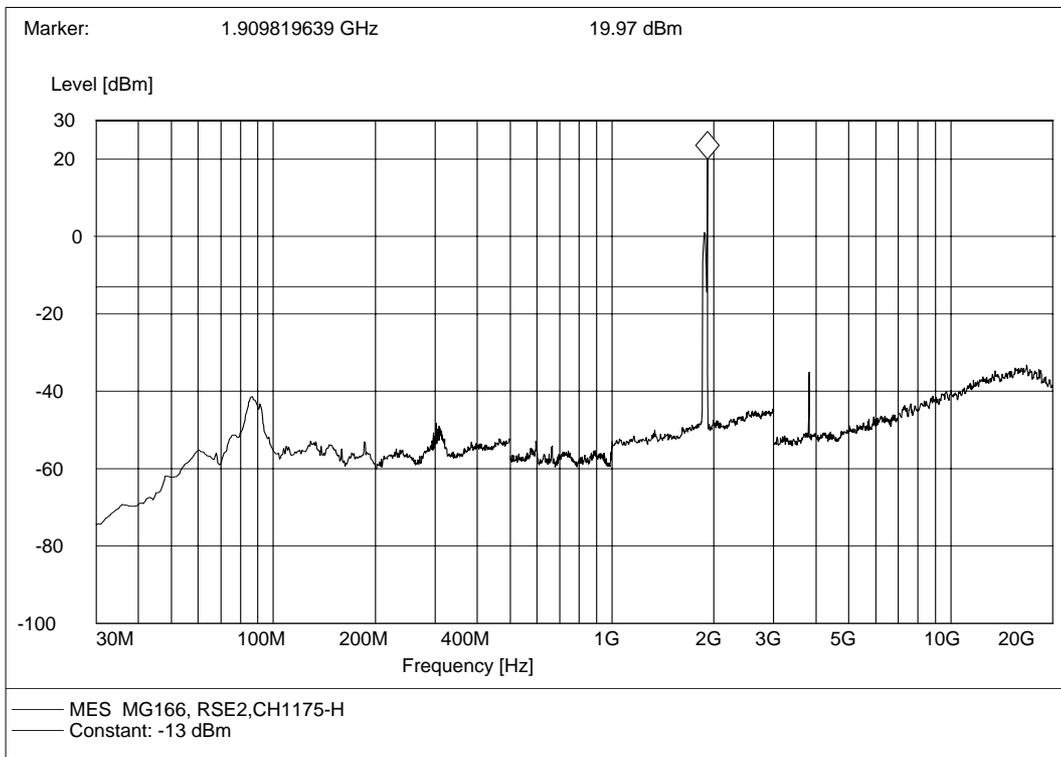




3. Highest channel No.1175, antenna vertical



4. Highest channel No.1175, antenna horizontal



8 Frequency Stability Test

8.1 Requirement of Frequency Stability

According to FCC §24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

The frequency stability of the transmitter shall be maintained within ± 0.1 ppm.

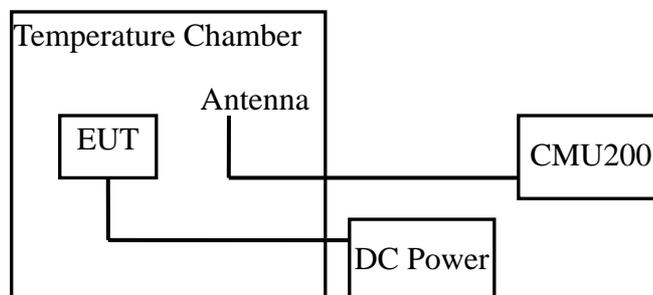
According to FCC §2.1055, the test conditions are:

- **Temperature:** The temperature is varied from -30°C to $+50^{\circ}\text{C}$ at intervals of not more than 10°C .
- **Primary Supply Voltage:** For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

8.2 Test Procedure

- a. The temperature was varied from -30°C to $+50^{\circ}\text{C}$ at intervals of 10°C . At each temperature level, the EUT was powered off and put in the temperature chamber for 2 hour.
- b. After sufficient stabilization, the EUT was turned on and a communication link was established. The frequency was measured within three minutes.
- c. For extreme supply voltage measurement, the EUT was tested at room temperature.

8.3 Test Setup



8.4 EUT Setup and Operating Conditions

The EUT was installed in a notebook computer (Topstar, W800).

A communication link was established between the MS and a System Simulator (SS). The MS operated at the maximum output power. The CDMA 1X (PCS band) channel No.25 (low), 600 (mid), and 1175 (high) were measured respectively.

8.5 Test Results

No.	Test Conditions		Frequency Deviation (Hz)			Limit (± 0.1ppm)
	Volatage	Temperature (°C)	25CH	600CH	1175CH	
1	V _{nom}	-30	-15	26	+18	25CH, ±185Hz 600CH, ±188Hz 1175CH, ±191Hz
2		-20	-8	-21	+2	
3		-10	-21	-7	-25	
4		0	+13	+25	-6	
5		+10	-2	-9	-12	
6		+20	+22	+27	+6	
7		+30	-18	-15	-19	
8		+40	-1	-3	-6	
9		+50	+16	+11	18	
10	V _{max}	+22	--	--	--	
11	V _{min}	+22	--	--	--	

NOTE:

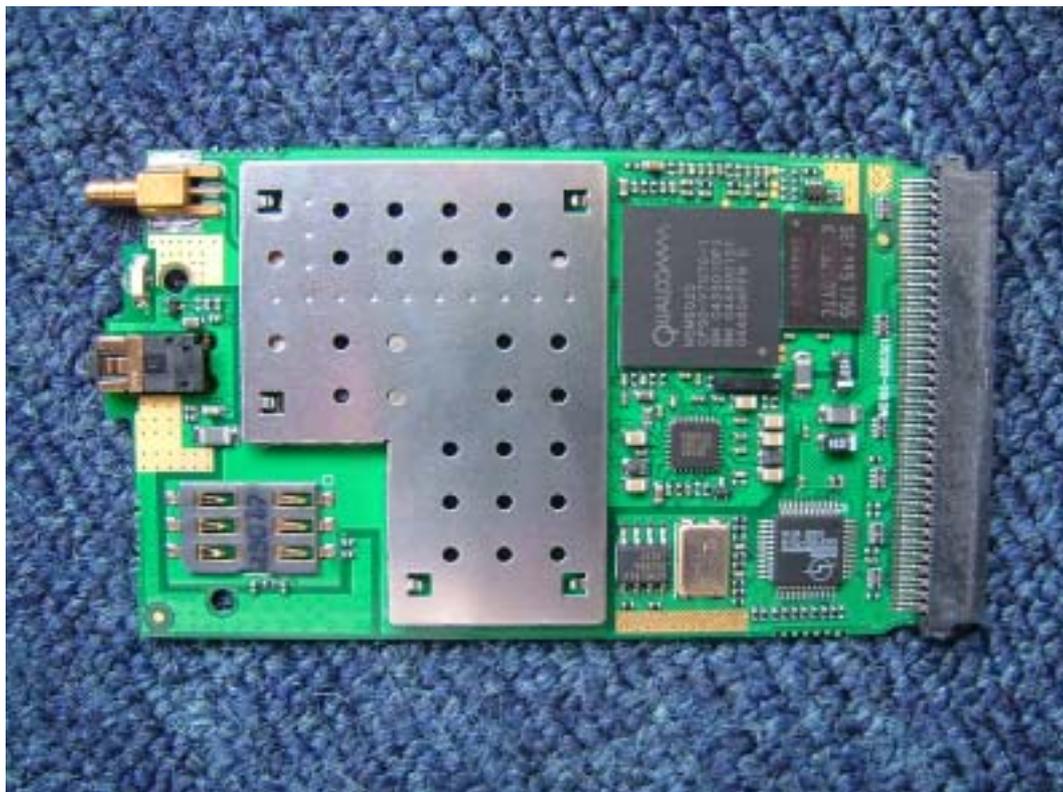
1. Frequency stability vs. voltage variation was not performed because the notebook computer feeds a constant voltage to the PCMCIA port where the EUT plugged. Changing the supply voltage of the notebook computer will not cause a supply voltage variation of the EUT.

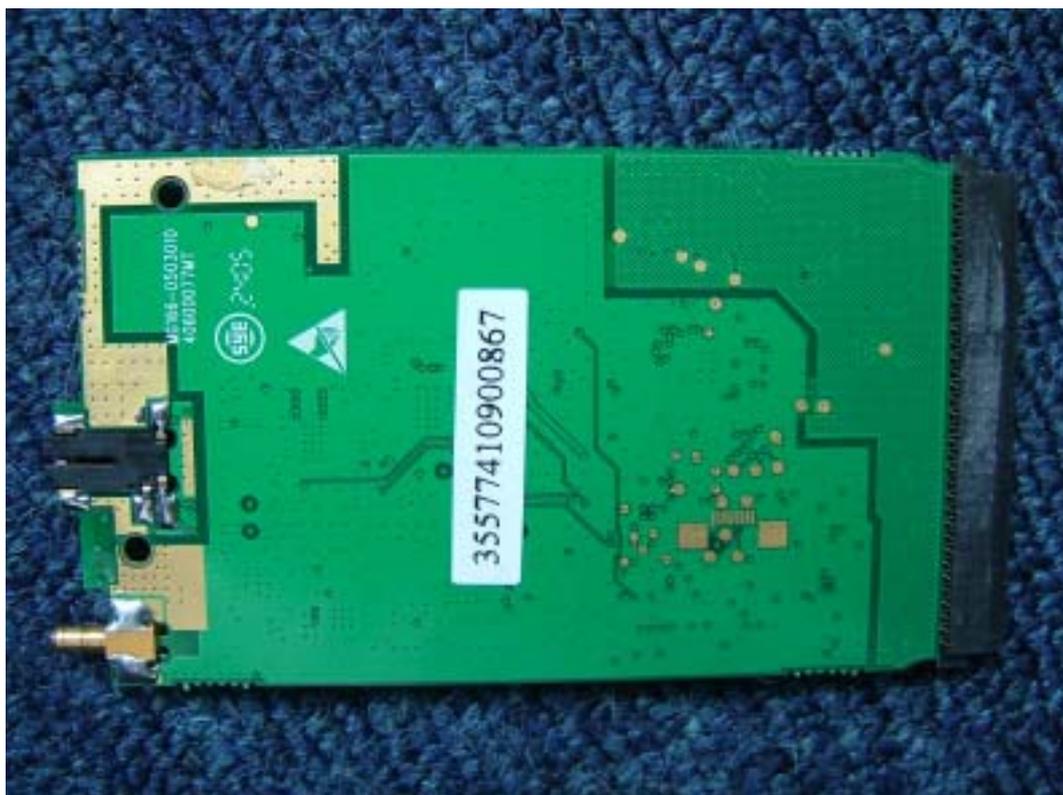
Appendix I : Photographs of the EUT

1. Appearance of the EUT



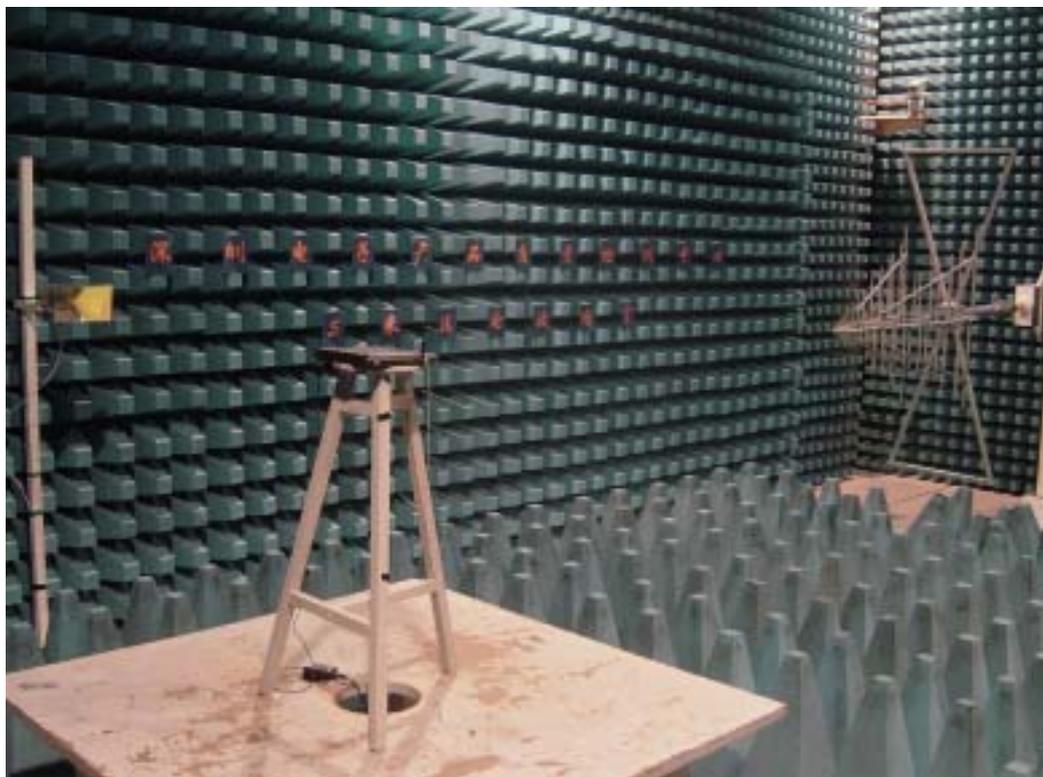
2. Inside of the MS





Appendix II : Photographs of the Test Configuration

1. EIRP and Spurious Radiation Measurement



2. Conducted Spurious Emission at Antenna Port

