

FCC Part 22H&24E TEST REPORT

of

GSM Dual-band Digital Mobile Phone

FCC ID : Q78-VDF225

Model No. : Vodafone 225

Serial No. : 357308010000269

Report No. : FCC07-8036

Date : July 10, 2007

Prepared for

ZTE Corporation

Zhongxing Bldg, Hi-Tech Park, Nanshan, Shenzhen, P.R.China

Prepared by

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1 Test Report Certification

Product: GSM Dual-band Digital Mobile Phone

FCC ID: Q78-VDF225

Model No.: Vodafone 225

Applicant: ZTE Corporation

Applicant Address: Zhongxing Bldg, Hi-Tech Park, Nanshan, Shenzhen, P.R.China

Manufacturer: ZTE Corporation

Manufacturer Address: Zhongxing Bldg, Hi-Tech Park, Nanshan, Shenzhen, P.R.China

Test Standards: 47 CFR Part 2

47 CFR Part 22, Subpart H

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: Sheng Yongpan, Date: July 10, 2007
Sheng Yongpan

Checked by: Smart Li, Date: July 10, 2007
Smart Li

Approved by: Wu Li An, Date: Jul. 10. 2007
Wu Li An

2 General Information

2.1 Description of EUT

Description:	GSM Dual-band Digital Mobile Phone
Model No.:	VODAFONE 225
Emission Designator:	300KGXW
Modulation:	GSM
Frequency:	GSM850, Tx: 824.20-848.80MHz; Rx: 869.20-893.80MHz GSM1900, Tx: 1850.20-1909.80MHz; Rx: 1930.20MHz-1989.80MHz
Power:	2W for GSM850; 1W for GSM1900
Serial No.:	N.A.
Hardware Version:	g3dB
Software Version:	P108A1V1.0.0B01
Battery Voltage:	Normal, 3.7V; High, 4.2V; Low, 3.6V

NOTE:

1. The EUT is Quad-band GSM mobile phone which supports GSM 850MHz and 1900MHz bands. Both Cellular 850MHz and PCS 1900MHz bands were tested in this report.
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.
3. VODAFONE 225 is identical to VODAFONE 125 except the LCD screen. The LCD screen of VODAFONE 125 is black and white, while it is colorful for VODAFONE 225. VODAFONE 125 has passed the FCC tests, please refer to the test report: **FCC07-8033** and **FCC07-8034**. EIRP and Radiated Spurious Emission were re-tested for VODAFONE 225.

2.2 Objective

Perform EMC test according to FCC rules Part 2, Part 22 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 (10-1-05 Edition)
- Part 22 Public Mobile Services (10-1-05 Edition)
- Part 24 Personal Communications Services (10-1-05 Edition)

Test items and the results are as bellow:

?	FCC Rules	Test Type	Result	Test Date
1	§22.913 §24.232	Transmitter Radiated Power (EIRP/ERP)	PASS	2007.6.4
2	§2.1053 §2.1057 §22.917 §24.238	Radiated Spurious Emission	PASS	2007.6.4

2.4 List of Equipments Used

Description	Manufacturer	Model No.	Cal. Due Date	Serial No.
Test Receiver	Rohde & Schwarz	ESIB26	2008.06.02	A0304218
Loop Antenna	Rohde & Schwarz	HFH2-Z2	2008.06.02	A0304220
Ultra Broadband Ant.	Rohde & Schwarz	HL562	2008.06.02	A0304224
Horn Ant.	Rohde & Schwarz	HF906	2008.06.02	100150
Universal Radio Communication Tester	Rohde & Schwarz	CMU200	2008.06.02	A0304212
Mobile Phone Tester	Willtek	4403	2008.02.10	0811211
3G Communication Antenna	European Antennas	PSA 75301R/170	2008.06.02	A0304213
Temperature Chamber	JAPAN TABAI	PSL-4G	2008.02.10	A8708056
Regulated DC Power Supply	Jiangbo	JB-305	--	A0412374
Shield Room	Nanbo Tech	Site 3	2008.01.04	A9901141
Shield Room	Nanbo Tech	Site 1	2008.01.04	A0304188
Anechoic Chamber	Albatross	EMC12.8×6.8×6.4m ³	2008.04.10	A0304210

2.5 Test Facility

Shenzhen Electronic Product Quality Testing Center (SET) is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS), 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 Transmitter Radiated Power (EIRP/ERP) Test

3.1 Limits of EIRP/ERP

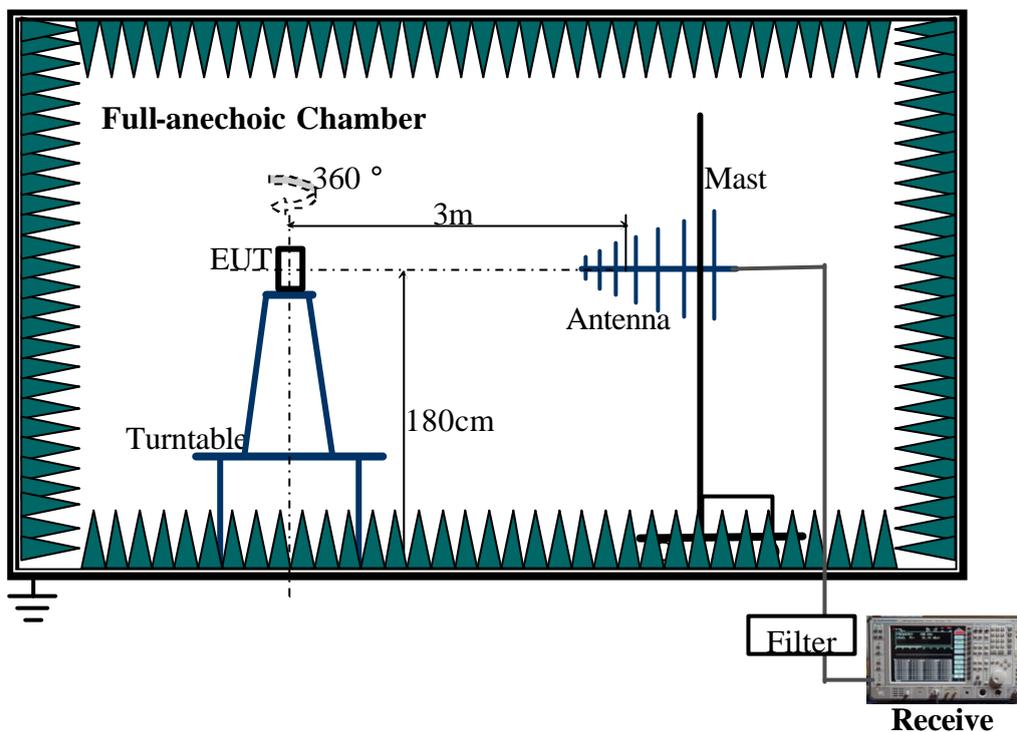
According to FCC §22.913, the **ERP** of Cellular mobile transmitters must not exceed 7 Watts (38.5dBm).

According to FCC §24.232, the broadband PCS mobile stations are limited to 2 watts (33dBm) **EIRP** peak power.

3.2 Test Procedure

- a. The radiated power measurement was performed in a full anechoic chamber. 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. The table was turned from 0 degrees to 360 degrees to find the maximum reading.
- a. 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 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.

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 configuration of the emission tests was MS + Battery.

A communication link was established between the MS and a System Simulator (SS).

The MS operated at the maximum output power: level 5 for GSM 850 MHz; level 0 for PCS 1900.

The low, middle and high channels were measured respectively: channel No.128 (low), 190 (middle) and 251 (high) for GSM 850 MHz; channel No.512 (low), 661 (middle) and 810 (high) for PCS 1900.



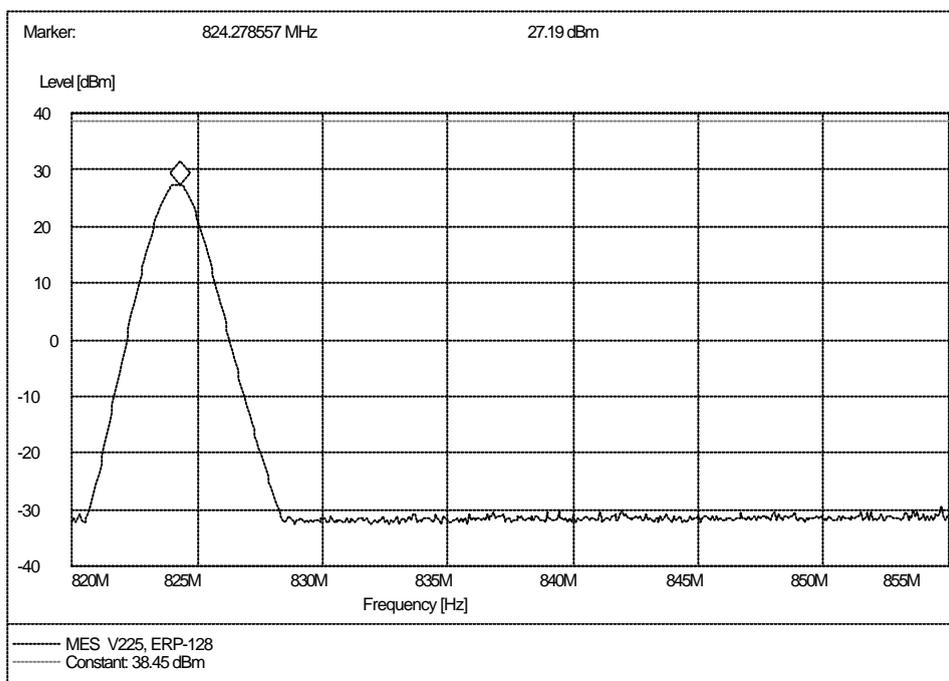
3.5 Test Results

I. GSM 850MHz Band

No.	GSM 850 Channel No.	Frequency (MHz)	ERP (dBm)	ERP (W)	Limit ERP (W)
1	128	824.28	27.19	0.524	7
2	190	836.62	28.46	0.701	7
3	251	848.90	28.86	0.769	7

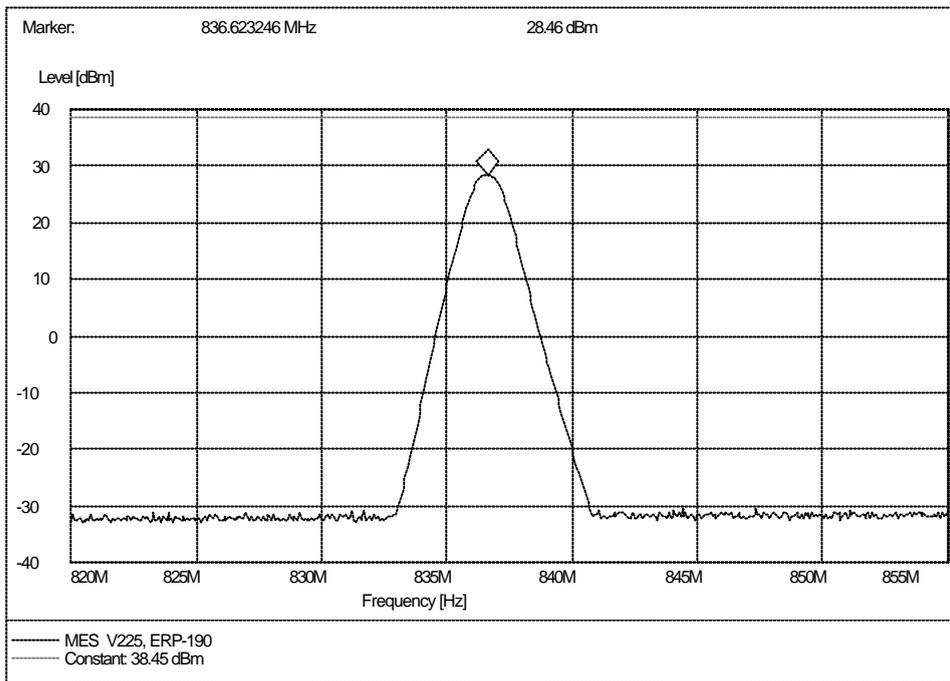
Test Plots

1. Lowest channel No.128

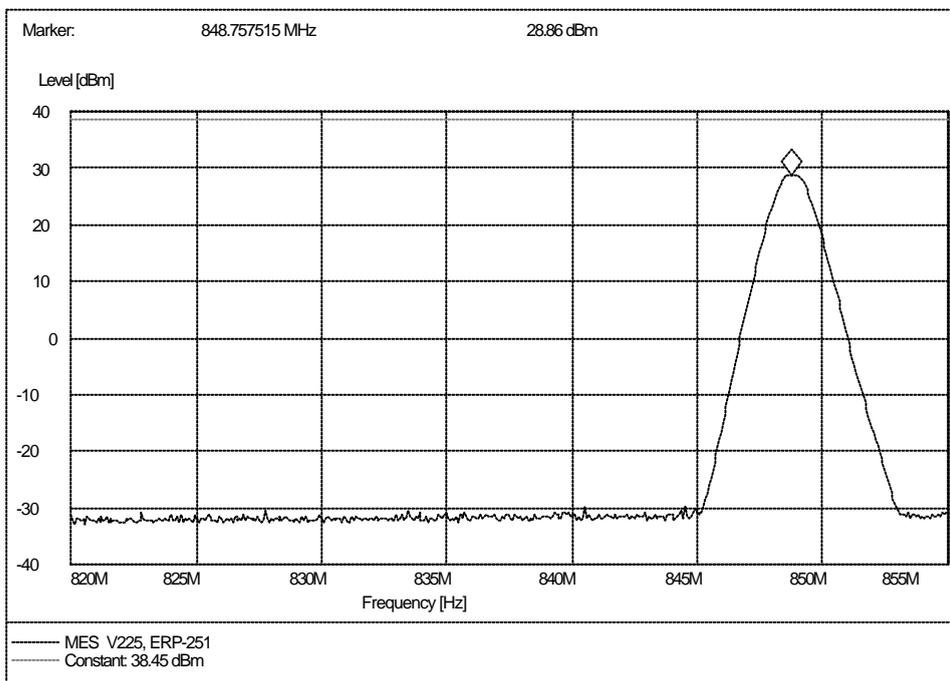




2. Middle channel No.190



3. Highest channel No.251



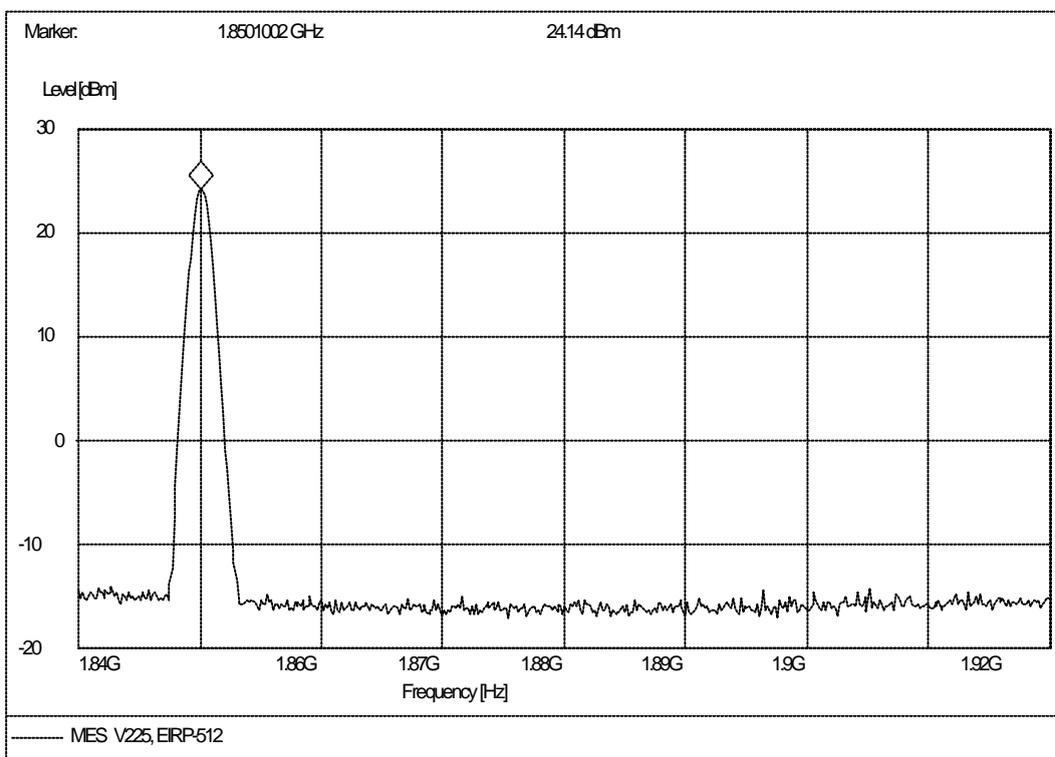


II. PCS 1900MHz Band

No.	PCS 1900 Channel No.	Frequency (MHz)	EIRP (dBm)	EIRP (W)	Limit EIRP (W)
1	512	1850.10	24.14	0.259	2
2	661	1880.08	25.96	0.394	2
3	810	1909.90	25.65	0.367	2

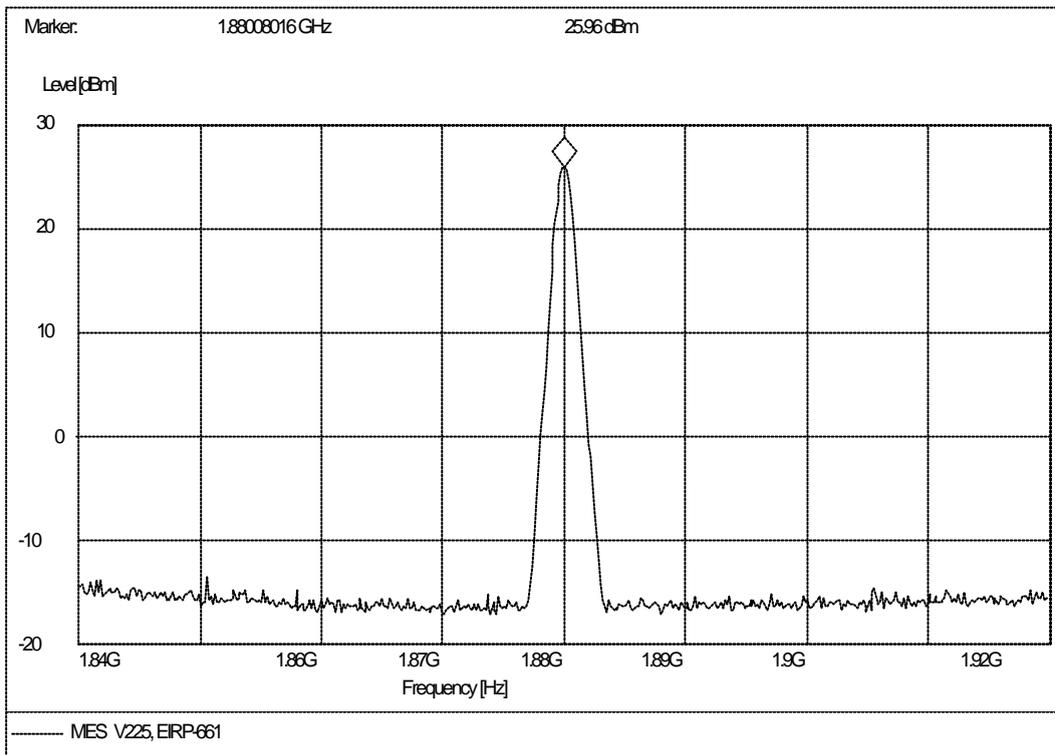
Test Plots

1. Lowest channel No.512

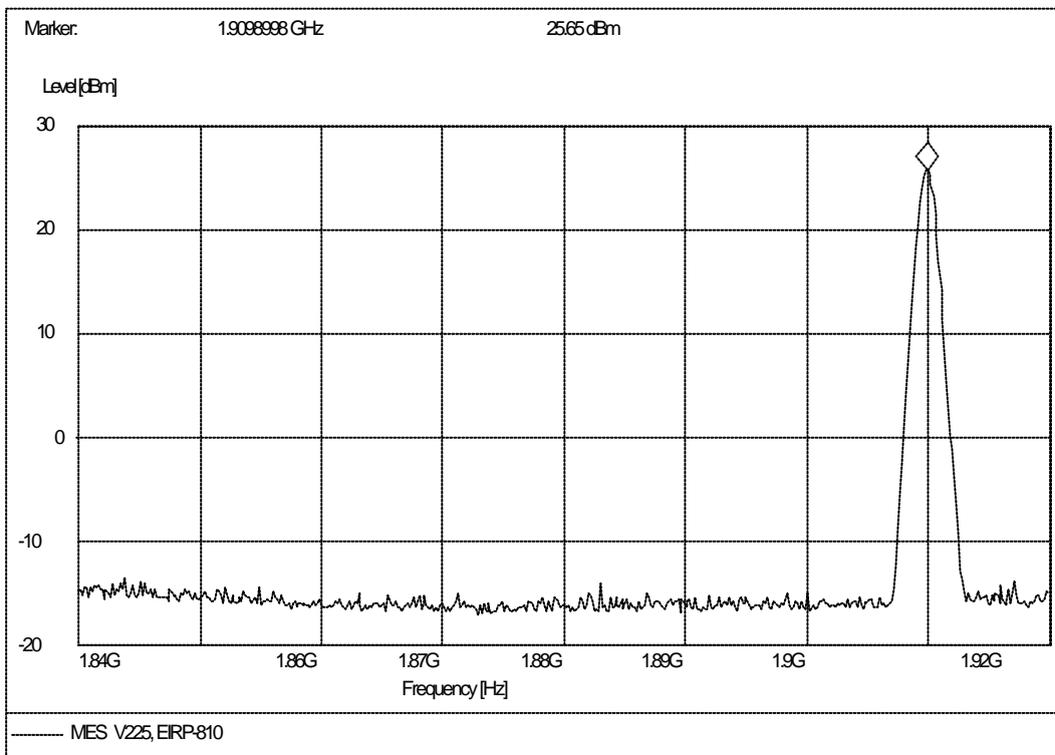




2. Middle channel No.661



3. Highest channel No.810



4 Radiated Spurious Emission Test

4.1 Limits of Radiated Spurious Emission

According to FCC §22.917 (a) and §24.238 (a), 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. This calculated to be -13dBm.

4.2 Test Procedure

- a. In the frequency range of 9 kHz to 30 MHz, magnetic field was measured with loop antenna. The antenna was positioned with its plane vertical at 1 m distance from the EUT. The center of the loop was 1 m above the ground. During the measurement the loop antenna rotated about its vertical axis for maximum response at each azimuth about the EUT.
- b. In the frequency range above 30MHz, 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.
- c. 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.
- d. 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.
- e. 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.

4.3 Test Setup

Same as 7.3

4.4 EUT Setup and Operating Conditions

The EUT configuration of the emission tests was MS + Battery.

A communication link was established between the MS and a System Simulator (SS). The MS operated at the maximum output power: level 5 for GSM 850 MHz; level 0 for PCS 1900.

The low, middle and high channels were measured respectively: channel No.128 (low) and 251 (high) for GSM 850 MHz; channel No.512 (low) and 810 (high) for PCS 1900.

4.5 Test Results

I. GSM 850MHz Band

No.	Frequency (MHz)	ERP (dB m)		Limit (dB m)
		Antenna: <u>V</u> ertical	Antenna: <u>H</u> orizontal	
GSM 850 MHz: Channel No. 128 (824.20 MHz)				
1	1648.40	--	--	-13
2	2472.60	--	--	-13
3	3296.80	--	--	-13
4	4121.00	--	--	-13
5	4945.20	--	--	-13
6	5769.40	--	--	-13
7	6593.60	--	--	-13
8	7417.80	--	--	-13
9	8242.00	--	--	-13
GSM 850 MHz: Channel No. 190 (836.60 MHz)				
10	1673.20	--	--	-13
11	2509.80	--	--	-13
12	3346.40	--	--	-13
13	4183.00	--	--	-13
14	5019.60	--	--	-13
15	5856.20	--	--	-13
16	6692.80	--	--	-13
17	7529.40	--	--	-13
18	8366.00	--	--	-13
GSM 850 MHz: Channel No. 251 (848.80 MHz)				
19	1697.60	--	--	-13
20	2546.40	--	--	-13
21	3395.20	--	--	-13
22	4244.00	--	--	-13
23	5092.80	--	--	-13
24	5941.60	--	--	-13
25	6790.40	--	--	-13
26	7639.20	--	--	-13
27	8488.00	--	--	-13

NOTE:

1. V and H are the antenna polarizations: Vertical and Horizontal.
2. The spurious radiations from 9 kHz 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.

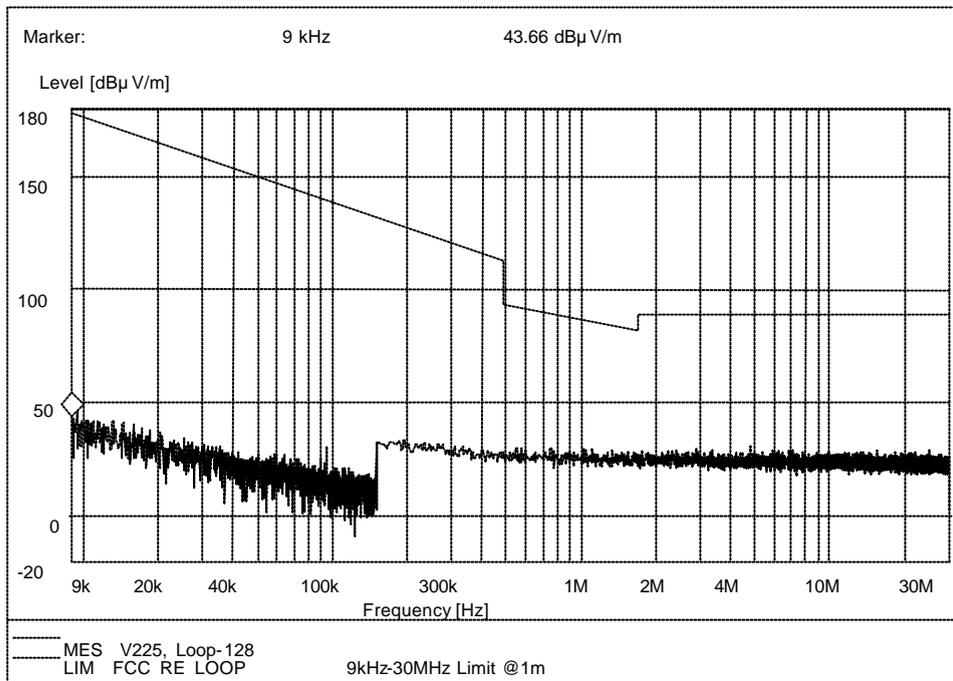


Plot of Spurious Emission

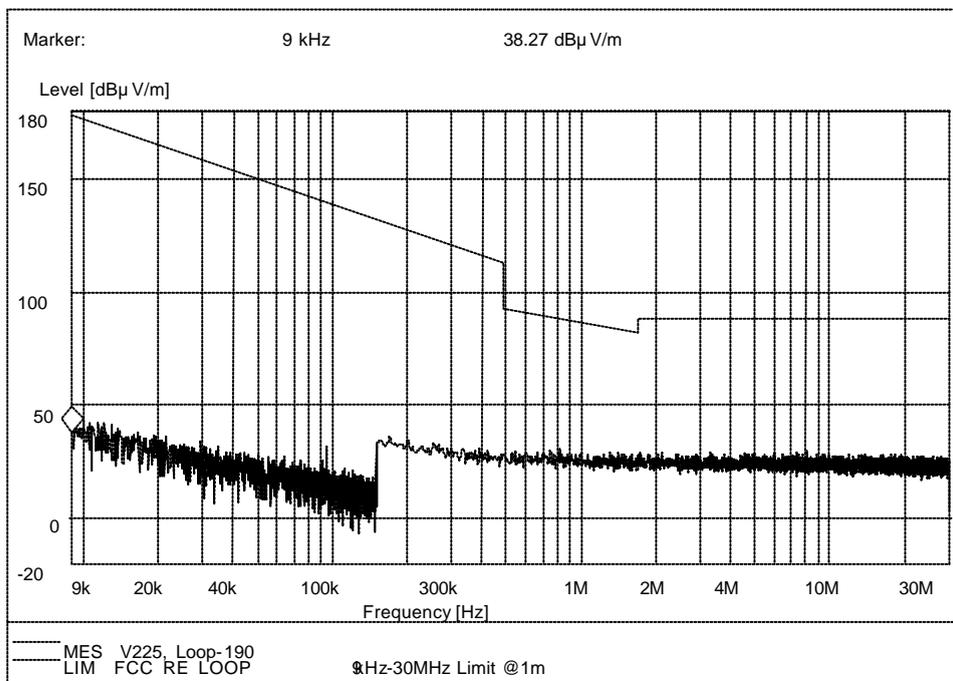
(Note: The marker point is the MS transmitting frequency which should be ignored.)

i. 9kHz to 30MHz

1. Lowest channel No.128

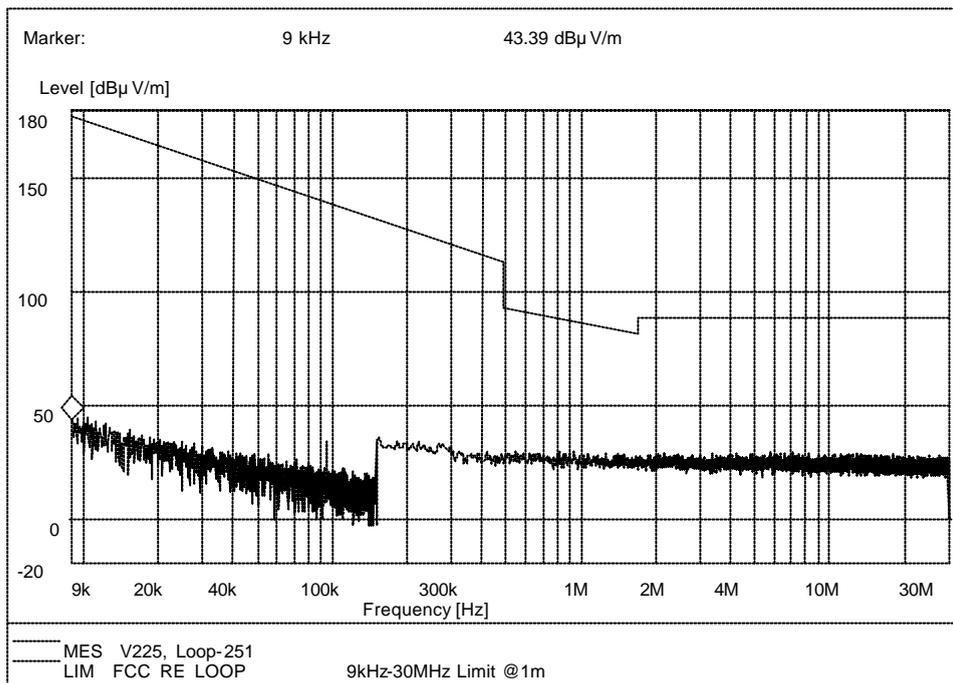


2. Middle channel No.190





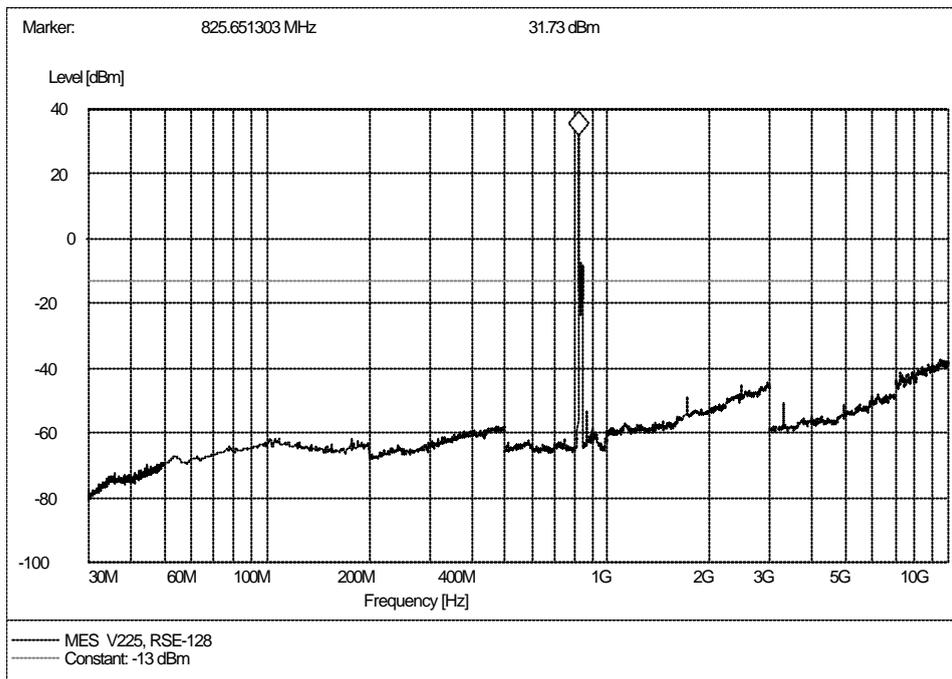
3. Highest channel No.251



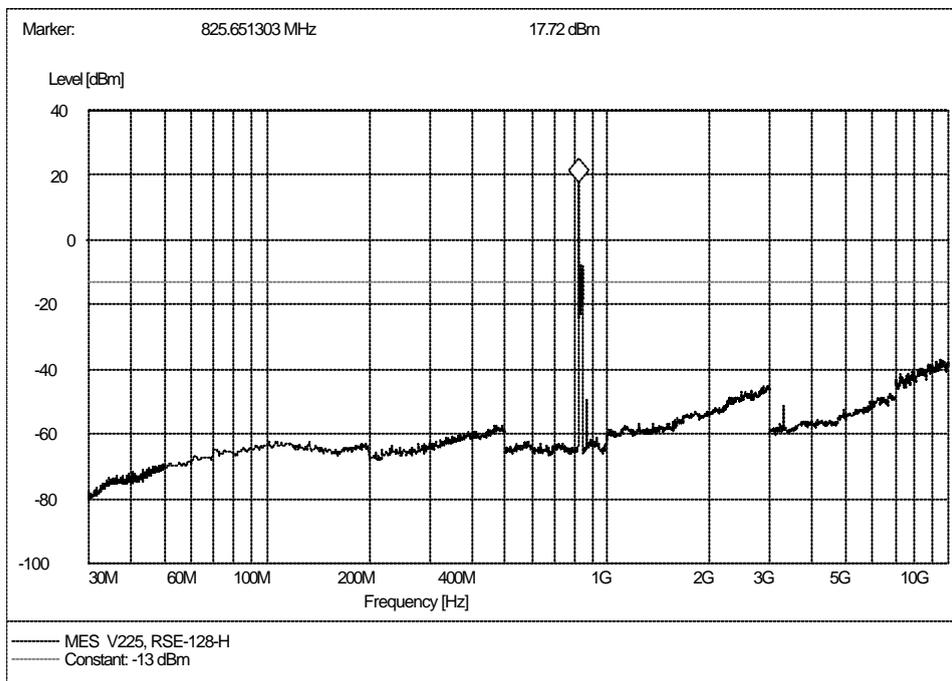


ii. Above 30MHz

1. Lowest channel No.128, antenna vertical

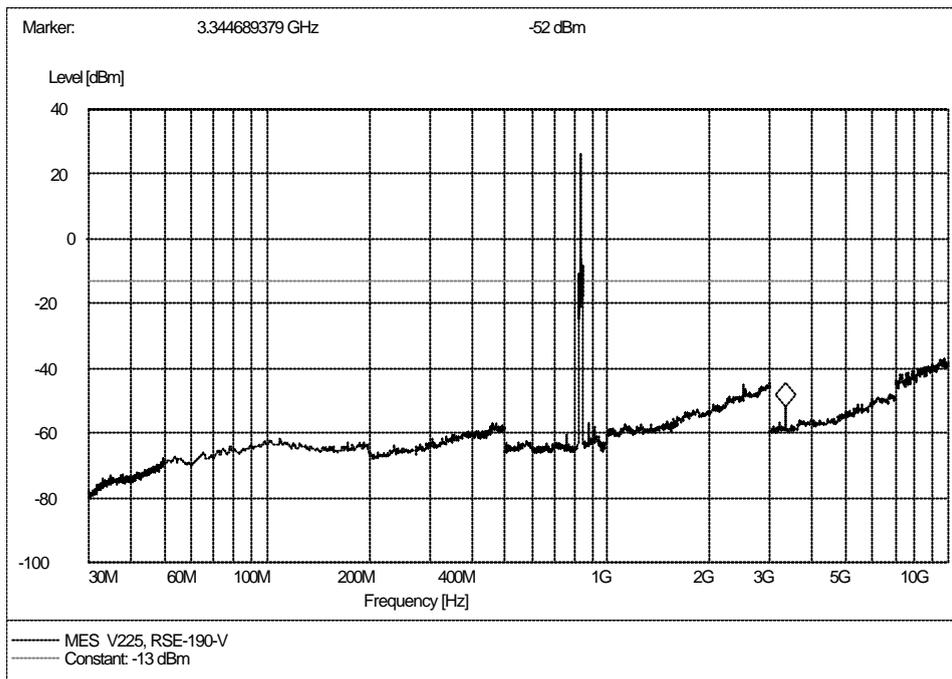


2. Lowest channel No.128, antenna horizontal

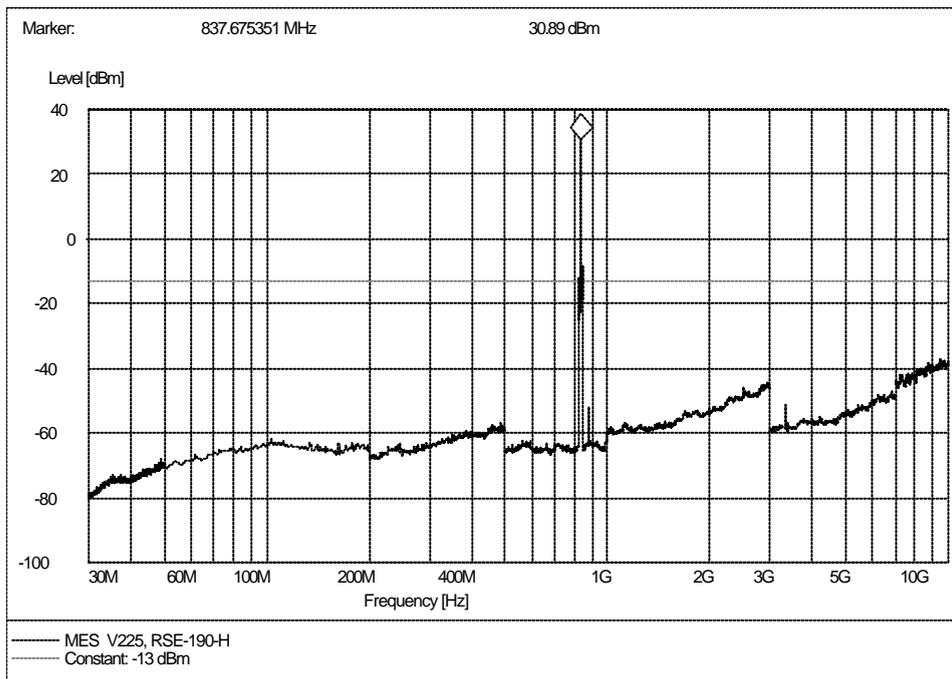




3. Middle channel No.190, antenna vertical

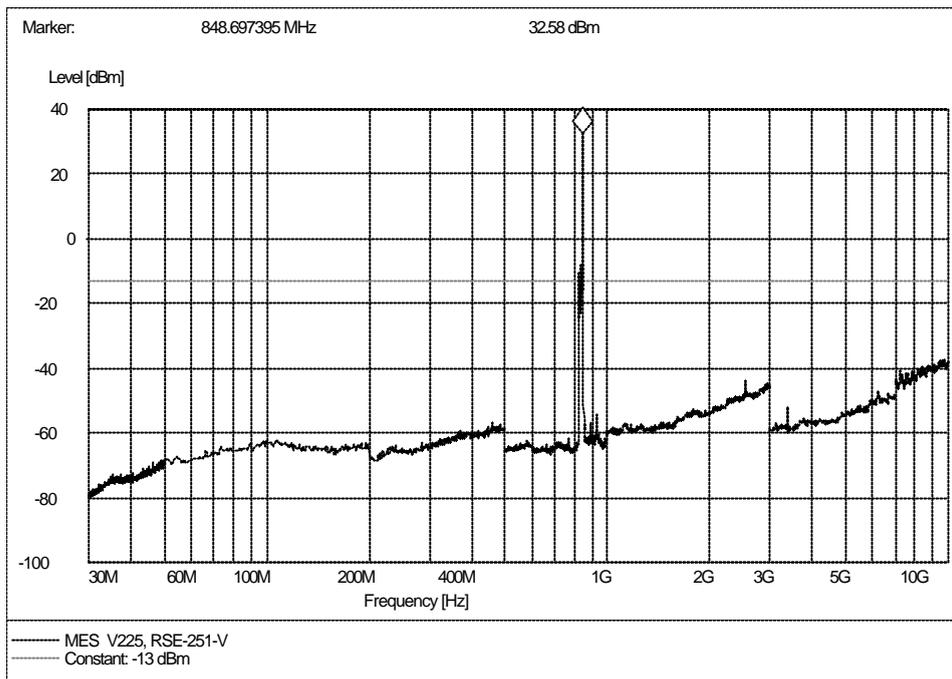


4. Middle channel No.190, antenna horizontal

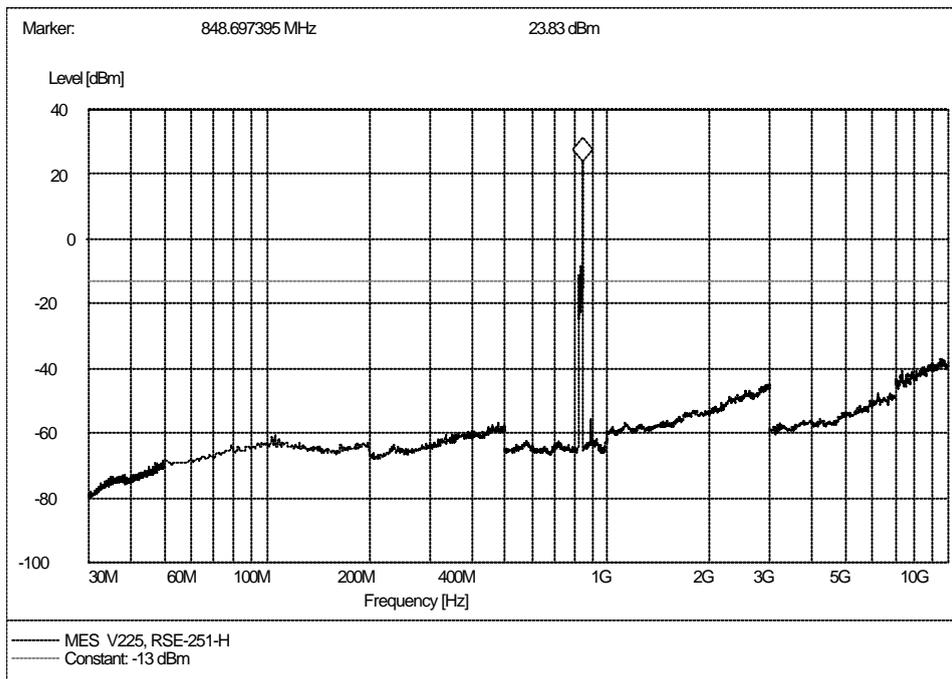




5. Highest channel No.251, antenna vertical



6. Highest channel No.251, antenna horizontal



II. PCS 1900MHz Band

No.	Frequency (MHz)	ERP (dB m)		Limit (dB m)
		Antenna: <u>V</u> ertical	Antenna: <u>H</u> orizontal	
PCS 1900 MHz: Channel No. 512 (1850.20 MHz)				
1	3700.40	--	--	-13
2	5550.60	--	--	-13
3	7400.80	--	--	-13
4	9251.00	--	--	-13
5	11101.20	--	--	-13
6	12951.40	--	--	-13
7	14801.60	--	--	-13
8	16651.80	--	--	-13
9	18502.00	--	--	-13
PCS 1900 MHz: Channel No. 661 (1880.00 MHz)				
10	3760.00	--	--	-13
11	5640.00	--	--	-13
12	7520.00	--	--	-13
13	9400.00	--	--	-13
14	11280.00	--	--	-13
15	13160.00	--	--	-13
16	15040.00	--	--	-13
17	16920.00	--	--	-13
18	18800.00	--	--	-13
PCS 1900 MHz: Channel No. 810 (1909.80 MHz)				
19	3819.60	--	--	-13
20	5729.40	--	--	-13
21	7639.20	--	--	-13
22	9549.00	--	--	-13
23	11458.80	--	--	-13
24	13368.60	--	--	-13
25	15278.40	--	--	-13
26	17188.20	--	--	-13
27	19098.00	--	--	-13

NOTE:

1. V and H are the antenna polarizations: Vertical and Horizontal.
2. The spurious radiations from 9 kHz 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.

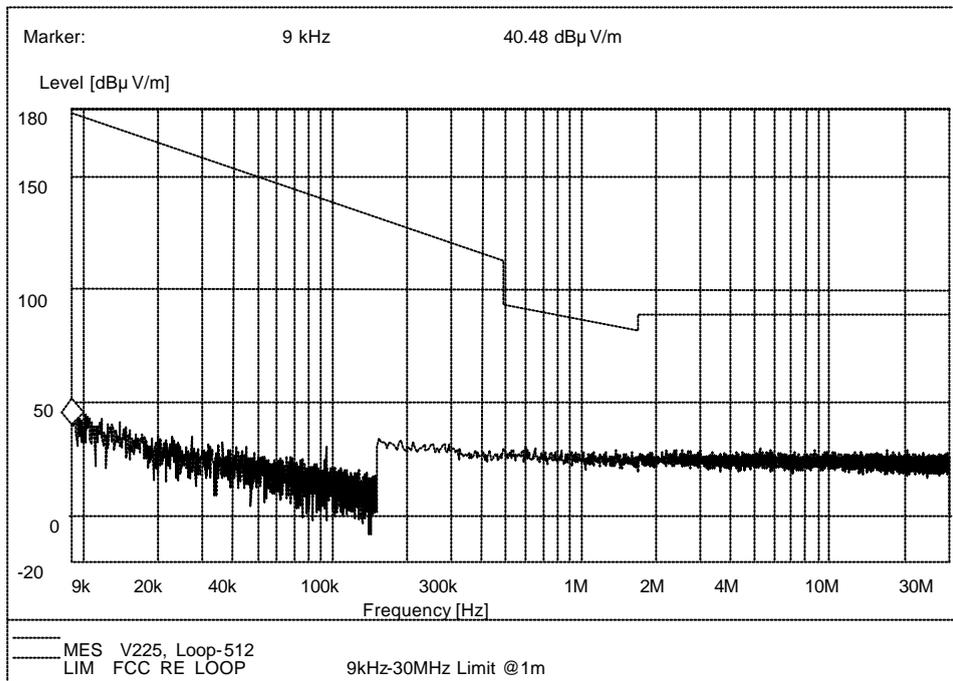


Plot of Spurious Emission

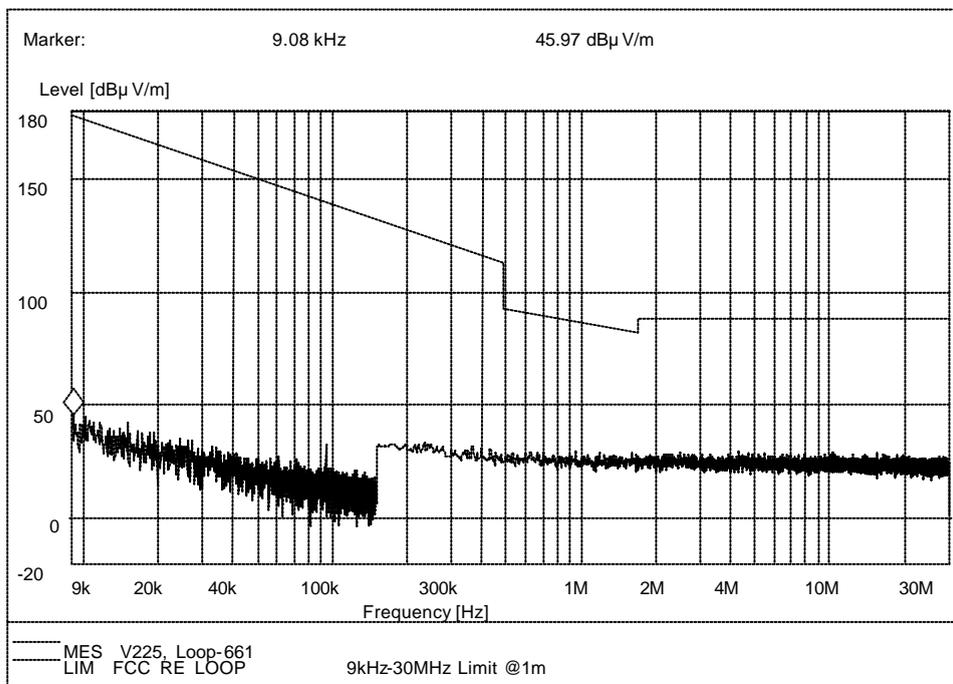
(Note: The marker point is the MS transmitting frequency which should be ignored.)

i. 9kHz to 30MHz

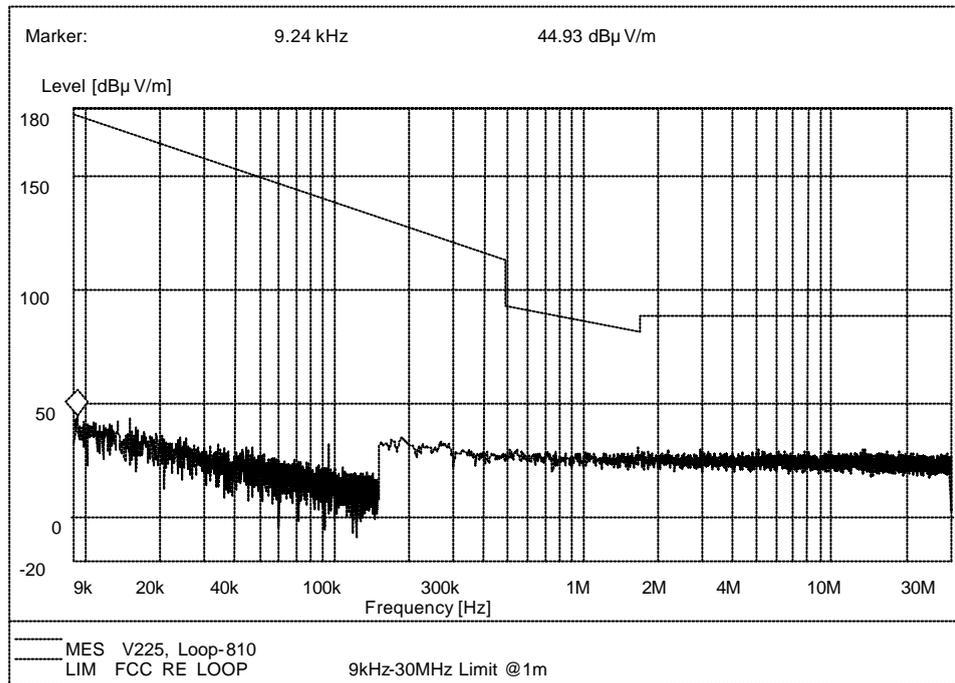
1. Lowest channel No.512



2. Middle channel No.661



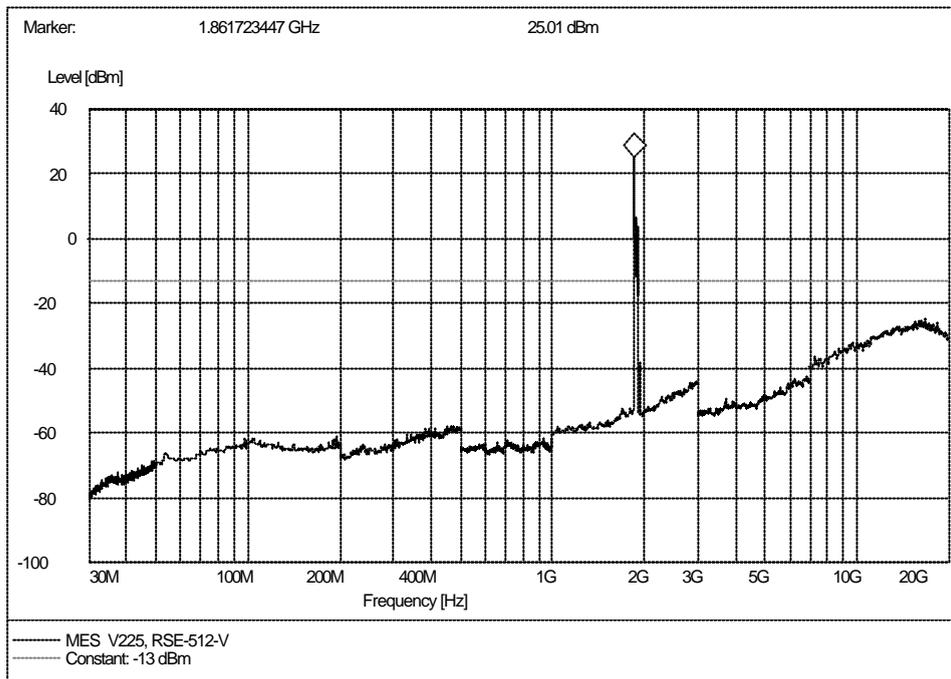
3. Highest channel No.810



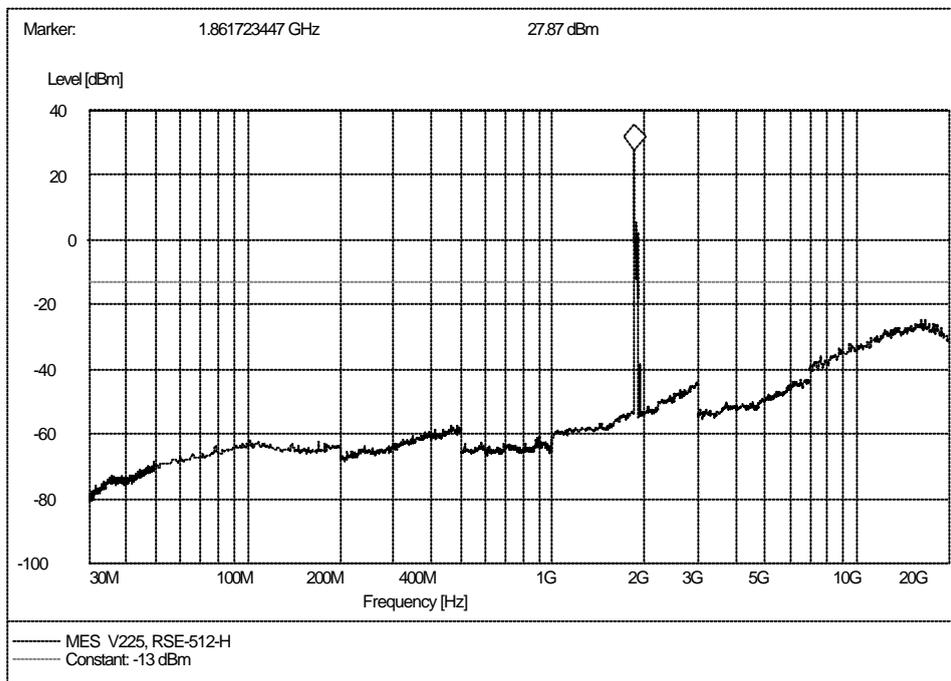


ii. Above 30MHz

1. Lowest channel No.512, antenna vertical

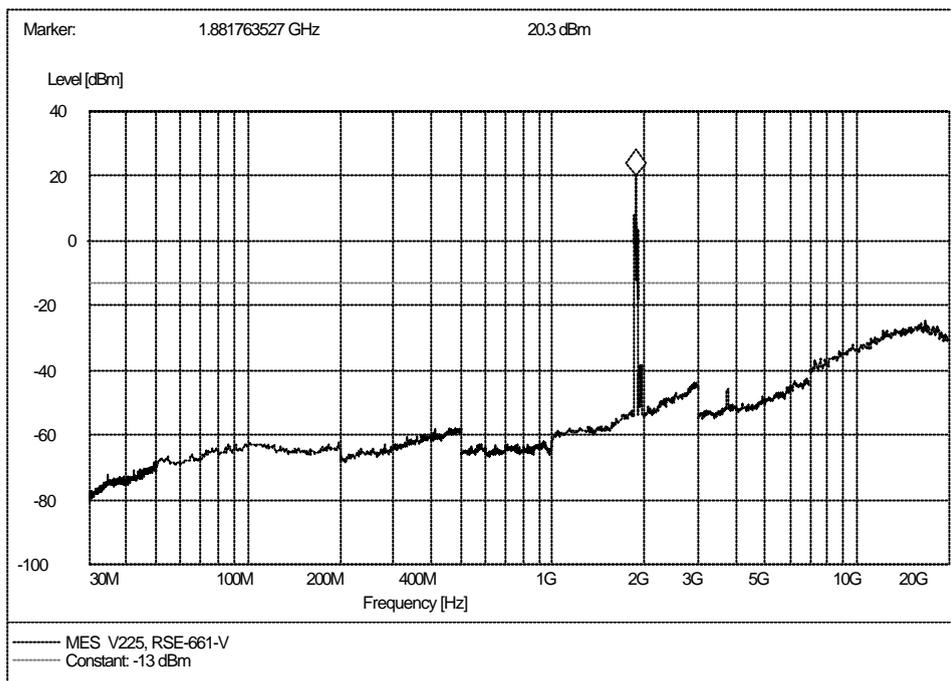


2. Lowest channel No.512, antenna horizontal

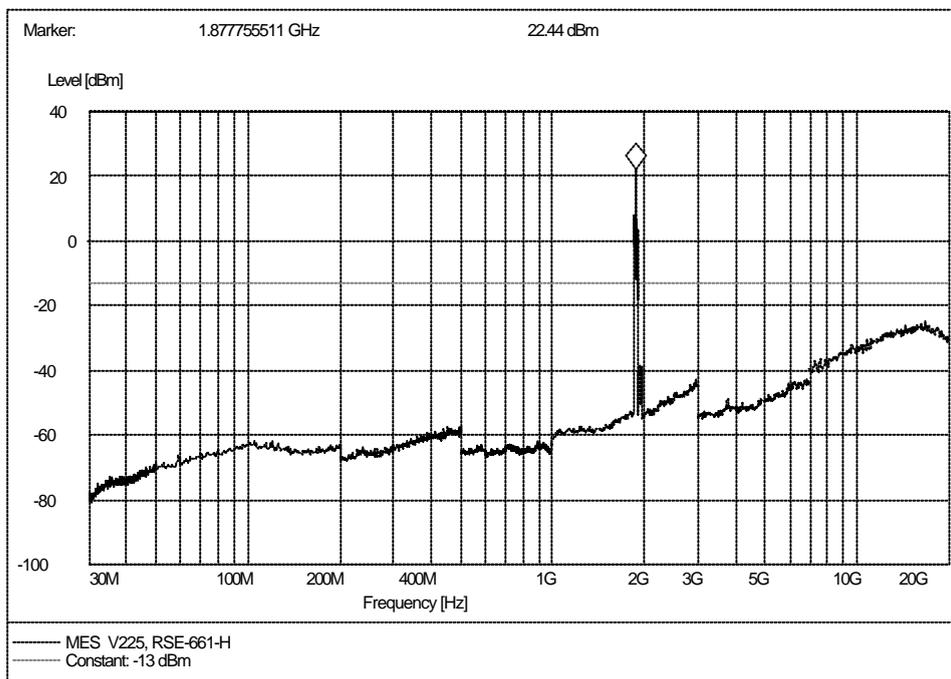




3. Middle channel No.661, antenna vertical

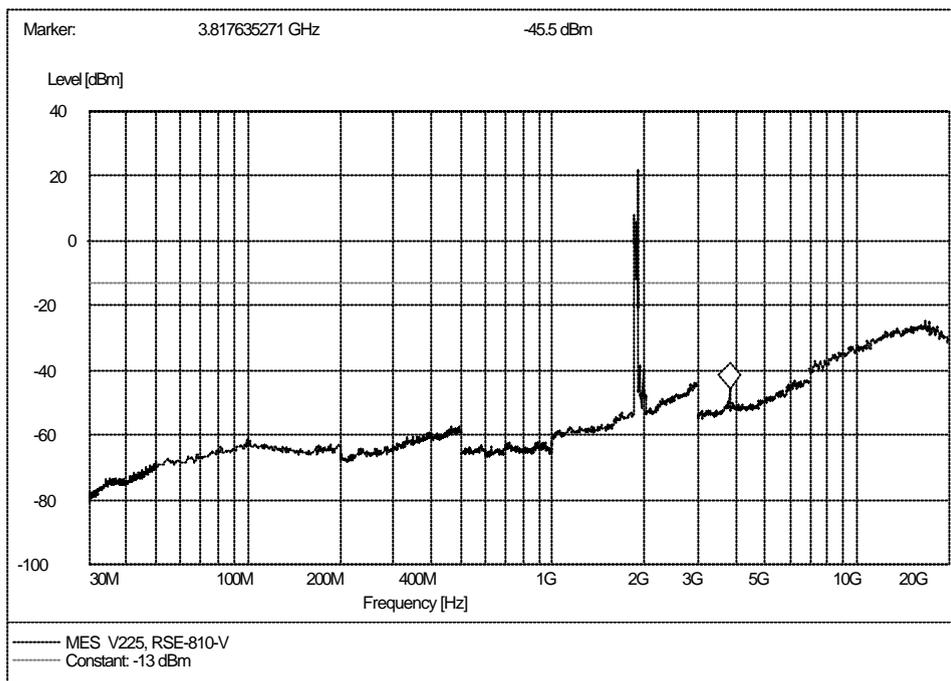


4. Middle channel No.661, antenna horizontal

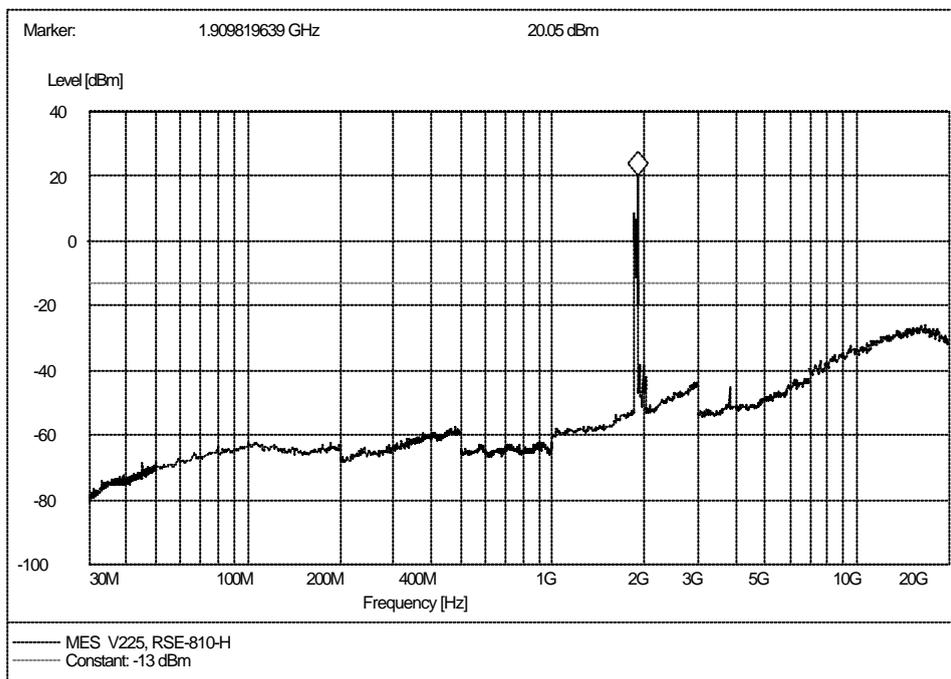




5. Highest channel No.810, antenna vertical



6. Highest channel No.810, antenna horizontal



Appendix I : Photographs of the EUT

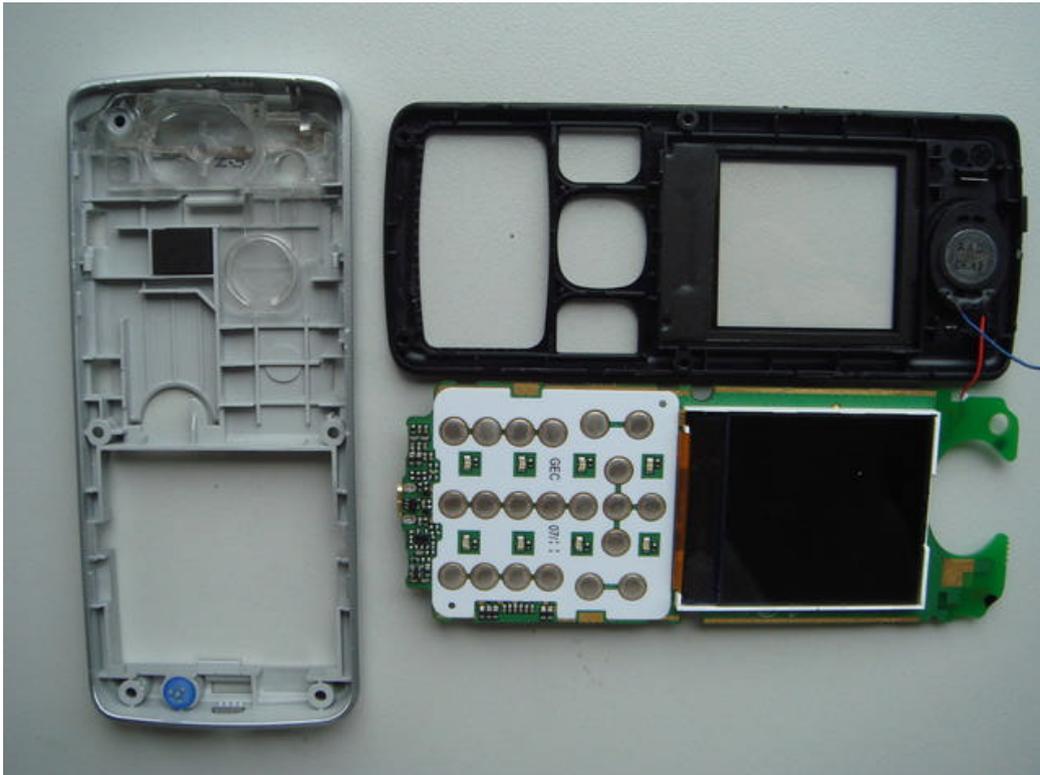
1. Appearance of the MS

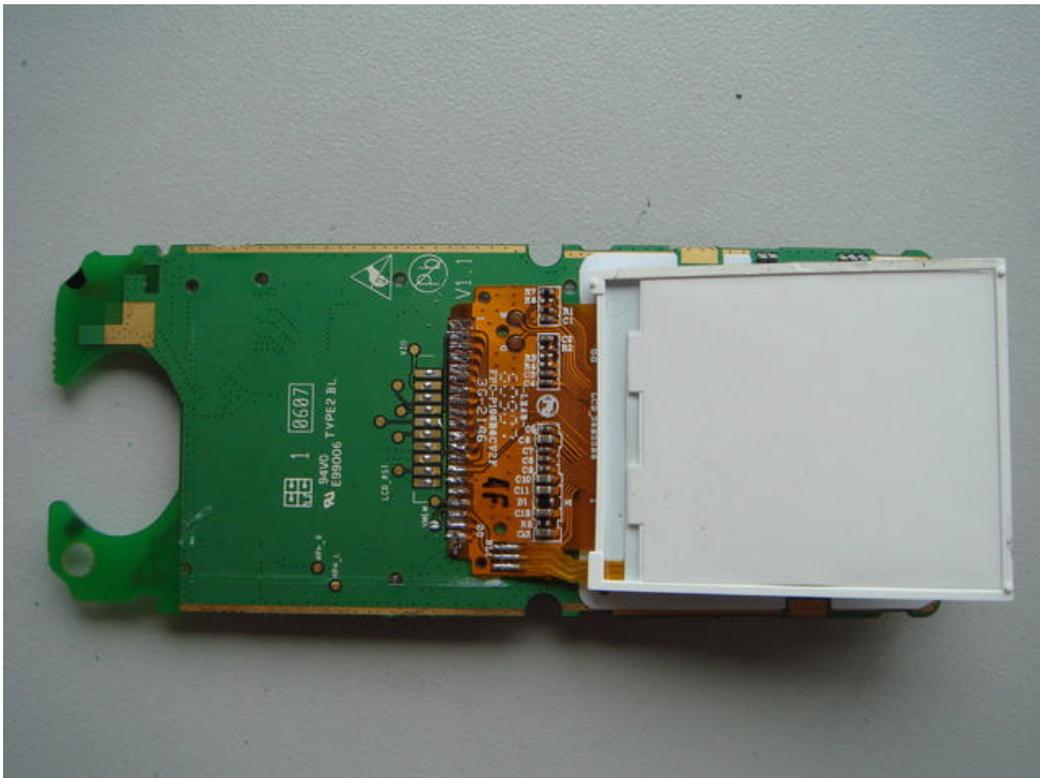


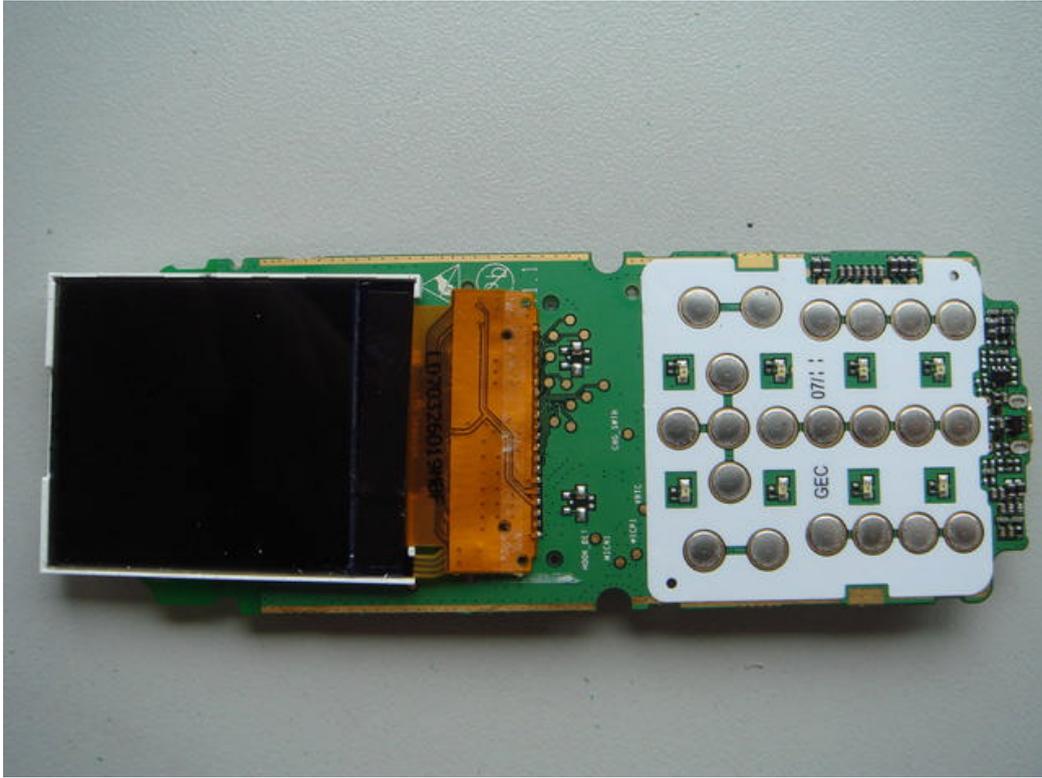


2. Inside of the MS



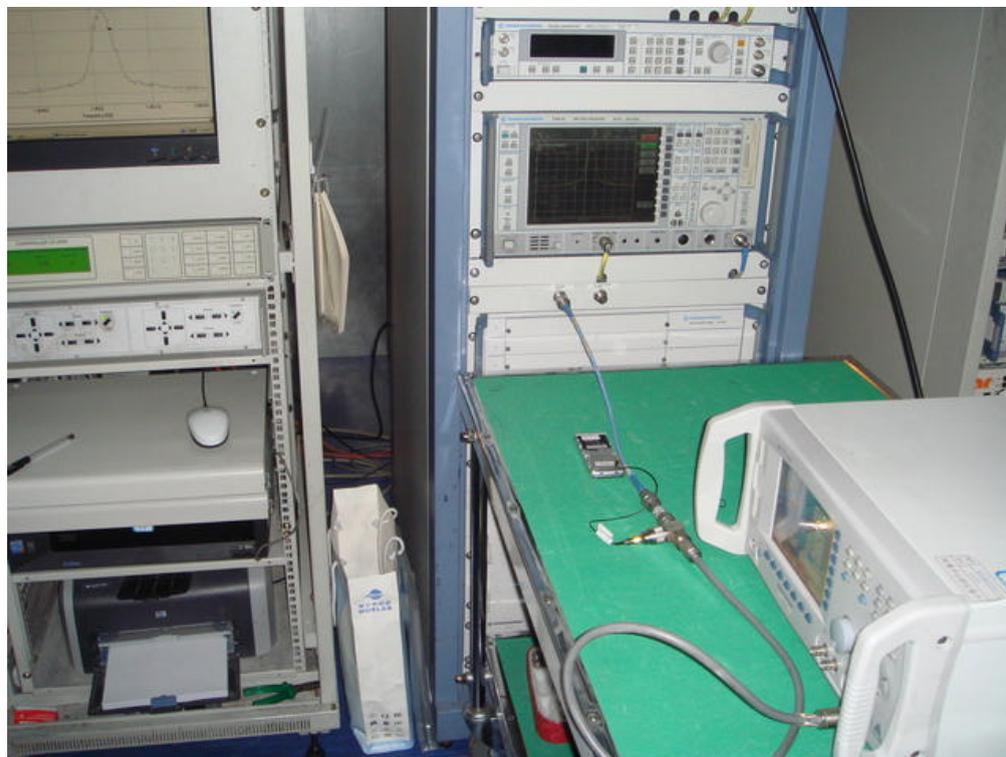




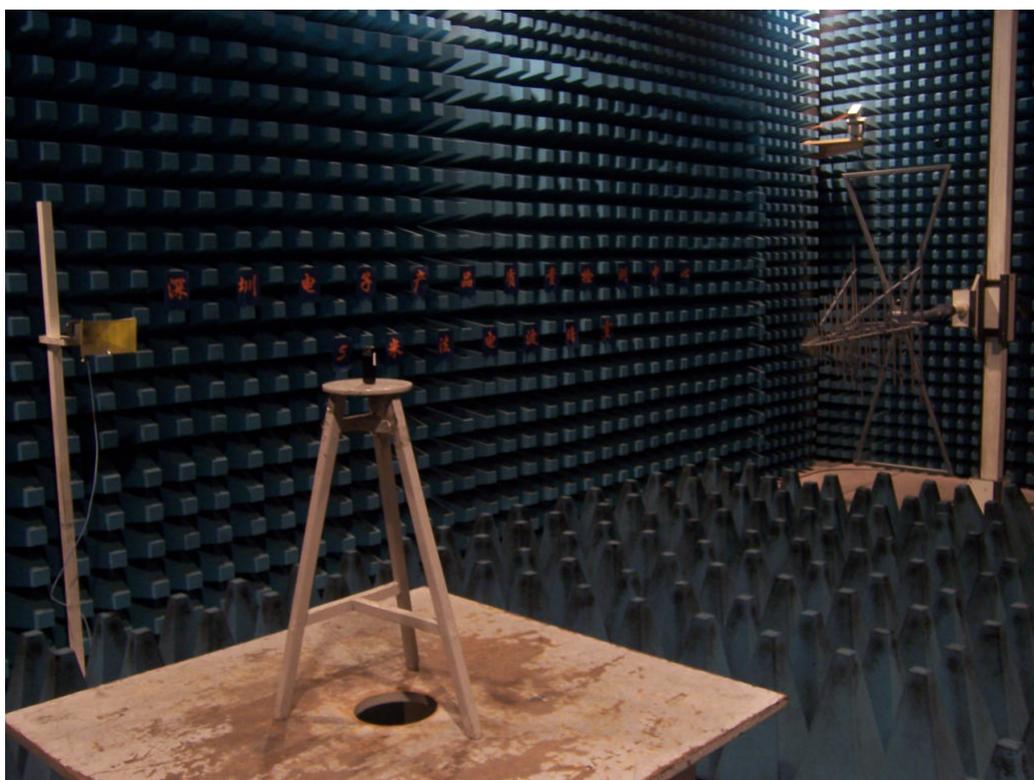


Appendix II : Photographs of the Test Configuration

1. Conducted RF Test



2. Radiated RF Test



3. Radiated RF Test (9kHz~30MHz)

