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FCC TEST REPORT

of

GSM 850/900/1800/1900 Mobile Terminal

FCC ID:	Q78-ZTEA15
Brand Name:	ZTE
Model No.:	ZTE A15
Serial No.:	N.A.
Report No.:	FCC06-8024
Date:	May 10, 2006

Prepared for

ZTE CORPORATION

ZhongXing Bldg., Hi-Tech Park, NanShan, ShenZhen, P.R.China

Prepared by

ShenZhen Electronic Product Quality Testing Center

Electronic Testing Building, Shahe Road, Xili, Nanshan District, ShenZhen, 518055, P.R.China

Tel: 86 755 26627338 Fax: 86 755 26627238

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1 Test Report Certification

Product:	GSM 850/900/1800/1900 Mobile Terminal
FCC ID:	Q78-ZTEA15
Model No.:	ZTE A15
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 15, Subpart B 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: Lin Xingsun, Date: May 10, 2006
Lin Xingsun

Checked by: Smart Li, Date: May. 10. 2006
Smart Li

Approved by: Wu Li An, Date: May. 10. 2006
Wu Li An

2 General Information

2.1 Description of EUT

EUT1	
Description:	GSM 850/900/1800/1900 Mobile Terminal
Model No.:	ZTE A15
Emission Designator:	200KGXW
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
IMEI No.:	358551000000000
Serial No.:	N.A.
Hardware Version:	g2uA
Software Version:	P103A1DV1.0.0B01
EUT2	
Description:	Lithium-ion Battery
Model No.:	Li3708T42p3h553762
Serial No.:	60030509090001216
Manufacturer:	ZTE CORPORATION
Capacitance:	800mAh
Rated Voltage:	3.7V
Charge Limit:	4.2V
EUT3	
Description:	AC/DC Adaptor (Charger)
Model No.:	STC-A22O50F18
Serial No.:	800604130000103
Manufacturer:	ZTE CORPORATION
Rated Input:	a.c. 100-240V, 50/60Hz, 200mA
Rated Output:	d.c. 5.0V, 700mA
Length of DC cable:	180cm

NOTE:

1. The EUT consists of Hand Telephone Set and normal options: Lithium Battery and Charger, as

listed above.

2. The EUT supports 850MHz, 900MHz, 1800 MHz and 1900 MHz bands. Only Cellular 850MHz and PCS 1900MHz bands were tested in this report.
3. 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, Part 15, 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
- Part 15 Radio Frequency Devices
- Part 22 Public Mobile Services
- Part 24 Personal Communications Services

Test items and the results are as bellow:

№	FCC Rules	Test Type	Result
1	§15.107	Conducted Emission (Charger AC mains port)	PASS
2	§15.109	Radiated Emission (Charger enclosure port)	PASS
3	§2.106 §22.905 §24. 229	Frequencies	PASS
4	§2.1046	Conducted RF Output Power at Antenna Terminal	PASS
5	§2.1049	Occupied Bandwidth	PASS
6	§2.1051 §2.1057 §22.917 §24.238	Conducted Spurious Emission at Antenna Terminal	PASS
7	§22.913 §24.232	Transmitter Radiated Power (EIRP/ERP)	PASS
8	§2.1053 §2.1057 §22.917 §24.238	Radiated Spurious Emission	PASS
9	§2.1055 §24.235	Frequency Stability	PASS

2.4 List of Equipments Used

Description	Manufacturer	Model No.	Cal. Due Date	Serial No.
Test Receiver	Schwarzbeck	FCKL1528	2006.06.10	A0304230
Test Receiver	Rohde & Schwarz	ESIB26	2006.06.10	A0304218
LISN	Schwarzbeck	NSLK8127	2006.06.10	A0304233
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
Mobile Phone Tester	Willtek	4403	2007.02.10	0811211
3G Communication Antenna	European Antennas	PSA 75301R/170	2007.04.10	A0304213
Temperature Chamber	JAPAN TABAI	PSL-4G	2007.02.05	A8708056
Regulated DC Power Supply	Jiangbo	JB-305	--	A0412374
Shield Room	Nanbo Tech	Site 3	2007.03.18	A9901141
Shield Room	Nanbo Tech	Site 1	2007.01.17	A0304188
Anechoic Chamber	Albatross	EMC12.8×6.8×6.4(m)	2007.04.25	A0304210

2.5 Test Facility

Shenzhen Electronic Product Quality Testing Center (SET) is a third party testing organization accredited by China National Accreditation Board for Laboratories (CNAL) 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: 15-35ºC
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

3 Conducted Emission Test

3.1 Limits of Conducted Emission

According to FCC §15.107, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dBμV), Class B digital device	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

NOTE:

1. The lower limit shall apply at the band edges.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

3.2 Test Procedure

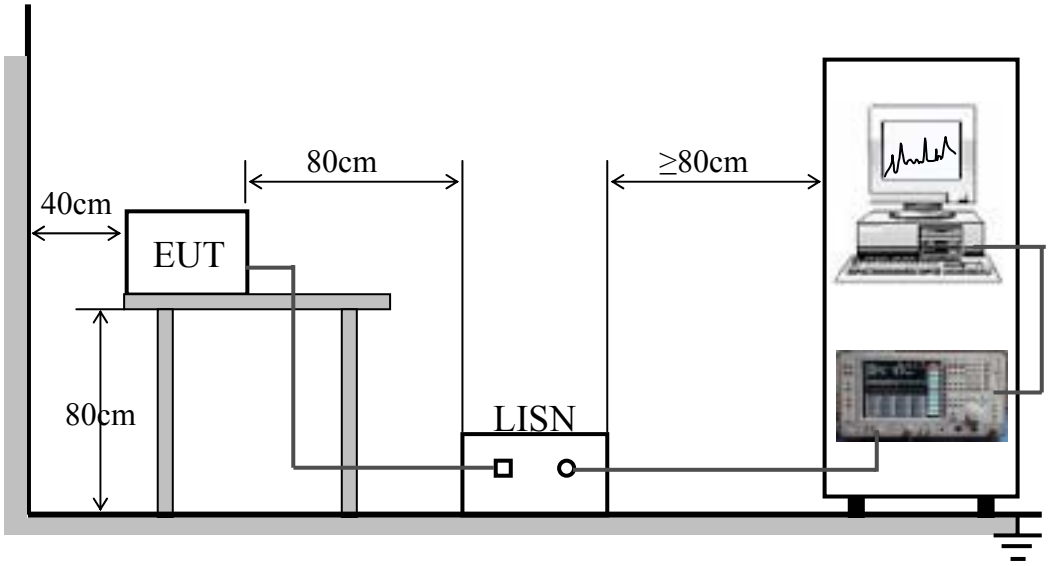
a. The EUT was placed on a 0.8m high insulating table and kept 0.4 meters from the conducting wall of shielded room.

b. The EUT was connected to the power mains through a line impedance stabilization network (LISN). The LISN provide 50Ω/50μH of coupling impedance for the measuring instrument.

c. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

d. The frequency range from 150 kHz to 30 MHz was searched using CISPR Quasi-Peak and Average detector.

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 + Charger.

Before the measurement, the battery was completely discharge.

During the measurement, the lithium battery and the charger were installed, and the MS were in charging state. A communication link was established between the MS and a System Simulator (SS). The MS operated at PCS 1900MHz mid ARFCN (661) and maximum output power (level 0).

The charger was powered by 120V 60Hz AC mains supply.

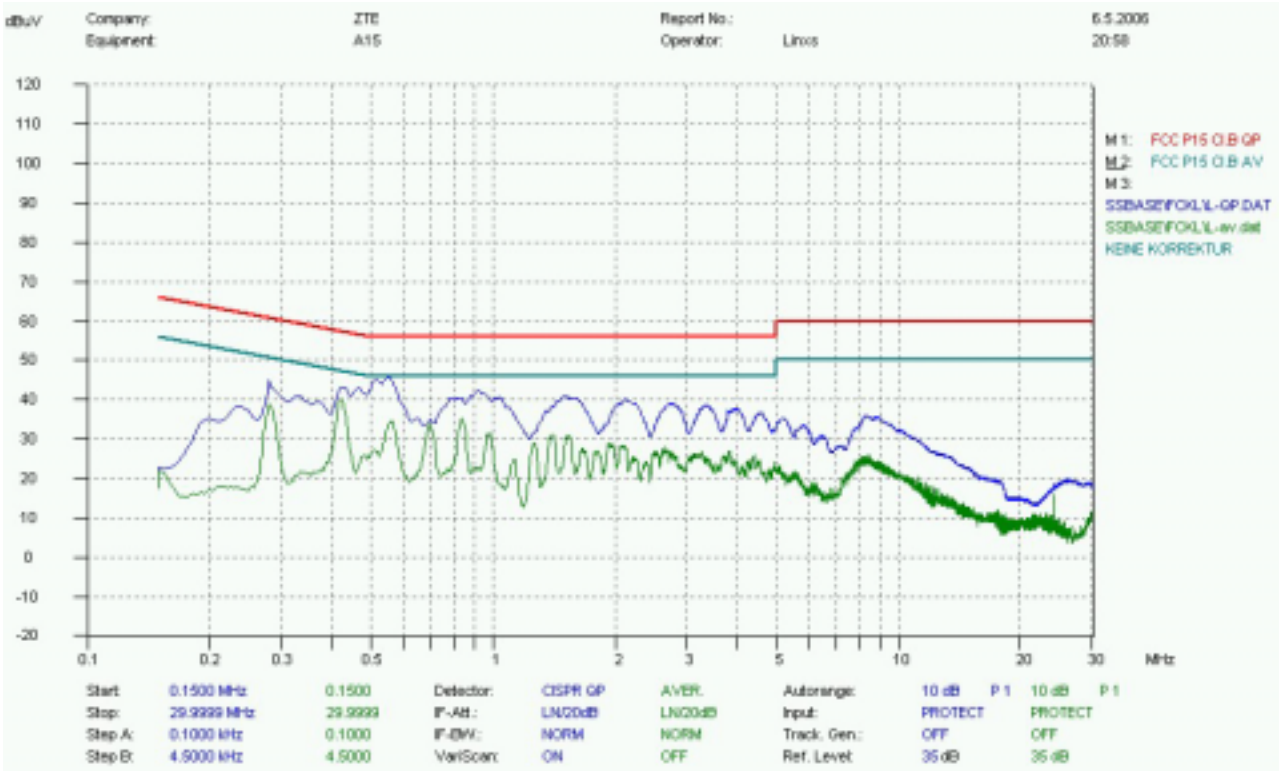
3.5 Test Results

No.	Freq. (MHz)	Limit Value (dBμV)		Emission Level (dBμV)	
		QP	AV	QP	AV
1	0.2805	60.8	50.8	45.1	38.7
2	0.4240	57.4	47.4	43.3	40.1
3	0.3300	59.5	49.5	41.0	34.8
4	0.9195	56.0	46.0	42.4	35.1
5	1.5270	56.0	46.0	40.4	31.2
6	2.1120	56.0	46.0	40.3	29.0

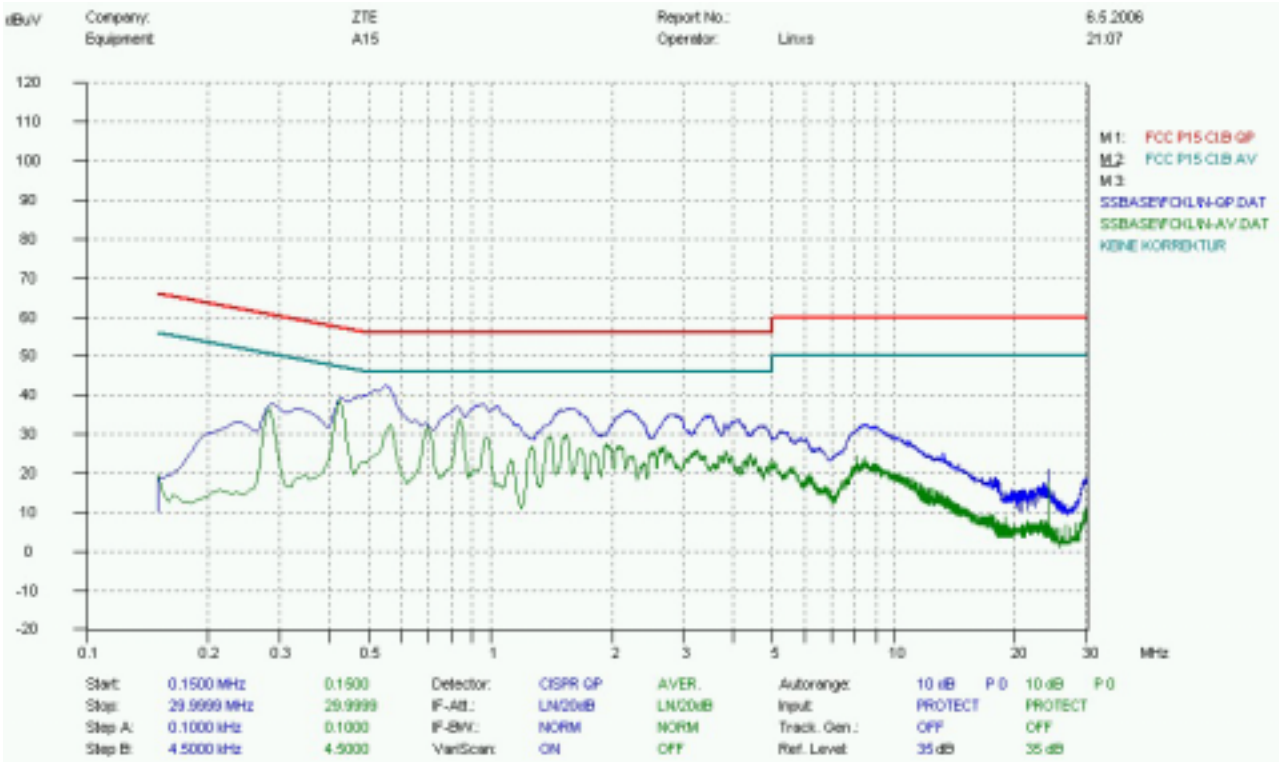
NOTE:

1. QP and AV are abbreviations of the quasi-peak and average individually.
2. If the emission levels measured with QP detector are lower than AV limits, there is unnecessary to measure with AV detector.
3. The emission levels recorded above is the larger ones of both L phase and N phase.

1. Mains terminal disturbance voltage, L phase



2. Mains terminal disturbance voltage, N phase



4 Radiated Emission Test

4.1 Limits of Radiated Emission

According to FCC §15.109, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of Emission (MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

NOTE:

1. Field Strength (dBμV/m) =20log Field Strength (μV/m).
2. In the emission tables above, the tighter limit applies at the band edges.

4.2 Test Procedure

a. The EUT was placed on the top of a ratable 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

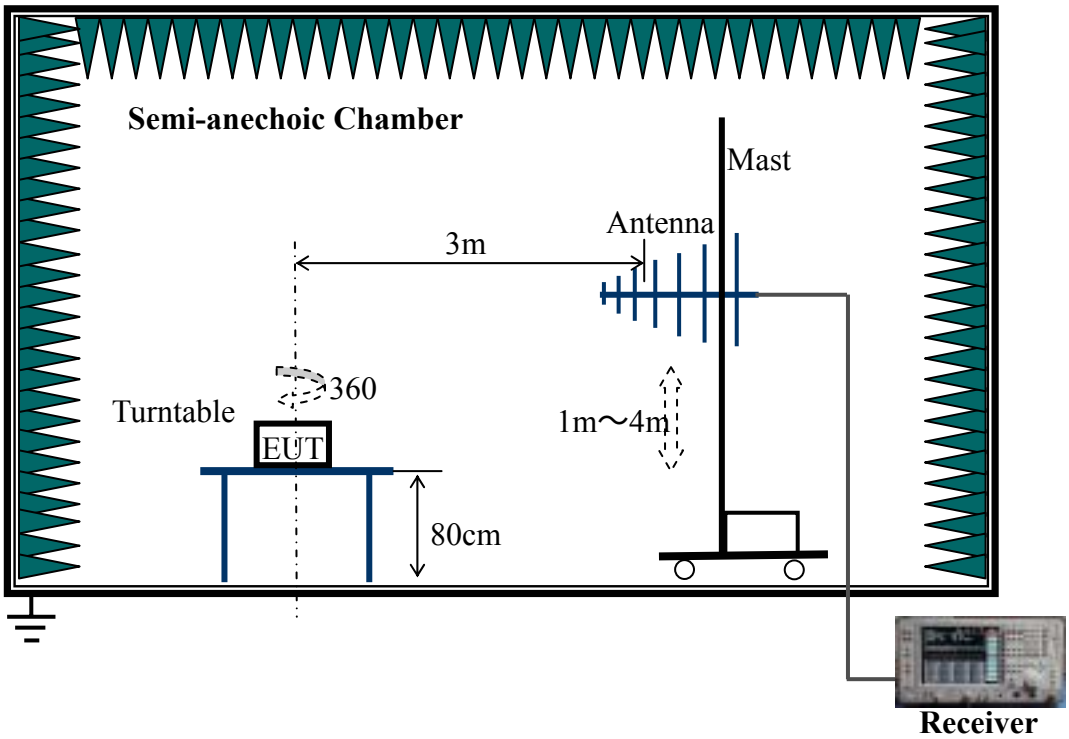
c. The antenna is a broadband antenna, and its height is varied from one meter to four meter above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to the heights from 1 to 4 meters and the ratable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detector Function and Specified Bandwidth with Maximum Hold Mode.

f. 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 emission that did not have 10 dB margins would be retested one by one using the quasi-peak method.

4.3 Test Setup



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

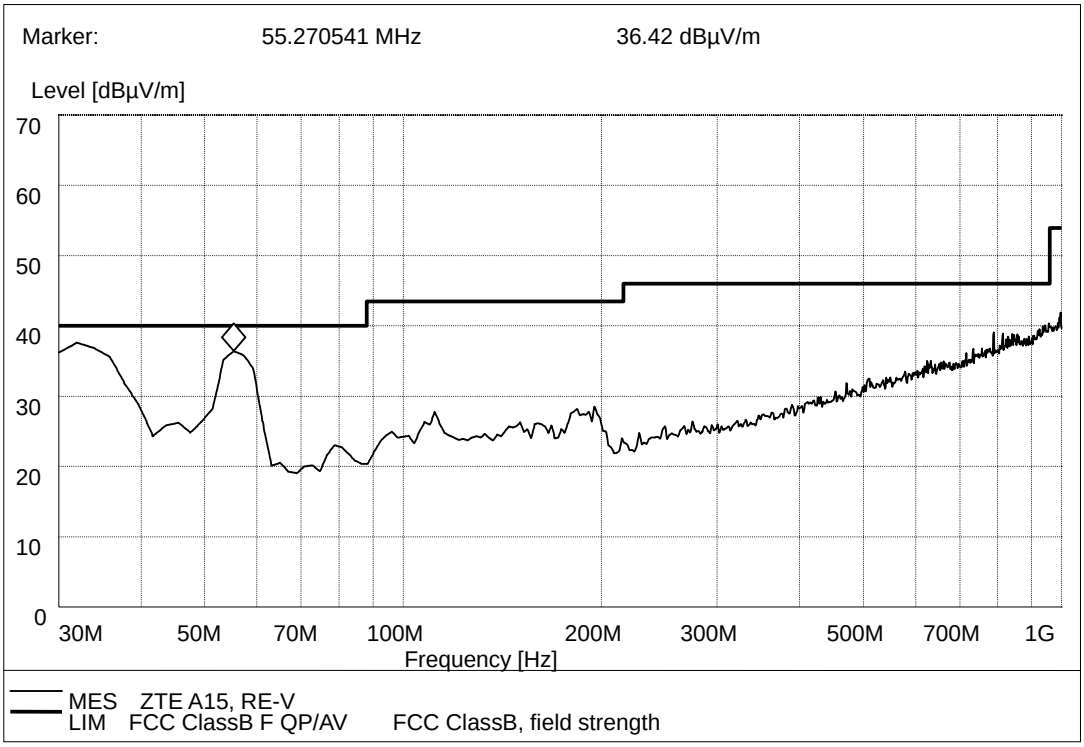
4.4 EUT Setup and Operating Conditions

Same as 3.4

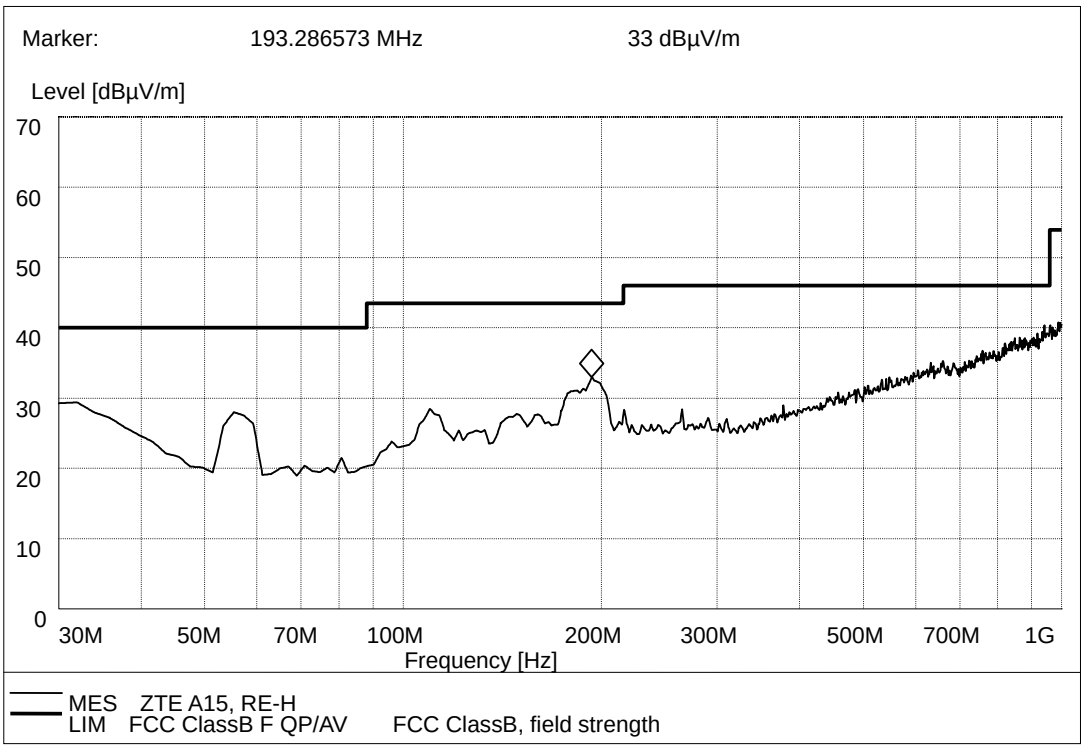
4.5 Test Results

No.	Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Table Angle (Degree)	QP Limits (dBμV/m)	Emission Level (dBμV/m)
1	32.58	Vertical	100	190	40	33.90
2	55.68	Vertical	100	190	40	32.45
3	108.06	Vertical	100	180	43.5	23.60
4	56.34	Horizontal	120	0	40	28.73
5	109.08	Horizontal	160	0	43.5	24.69
6	191.58	Horizontal	160	0	43.5	31.97

1. Radiation disturbances, maxpeak detector, antenna polarization: Vertical



2. Radiation disturbances, maxpeak detector, antenna polarization: Horizontal



5 Frequencies

5.1 Frequency Blocks Available for Cellular Service

According to FCC §22.905, the frequencies blocks assignment for the Cellular Radiotelephone Service are listed as bellow.

Block A: Mobile 824-835 MHz, Base 869-880 MHz;

Mobile 845-846.5 MHz, Base 891.5-894 MHz;

Block B: Mobile 835-845 MHz, Base 880-890 MHz;

Mobile 846.5-849 MHz, Base 891.5-894 MHz.

5.2 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: Mobile 1850–1865 MHz, Base 1930–1945 MHz;

Block B: Mobile 1870–1885 MHz, Base 1950–1965 MHz.

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

Block C: Mobile 1895–1910 MHz, Base 1975–1990 MHz;

Block D: Mobile 1865–1870 MHz, Base 1945–1950 MHz;

Block E: Mobile 1885–1890 MHz, Base 1965–1970 MHz;

Block F: Mobile 1890–1895 MHz, Base 1970–1975 MHz.

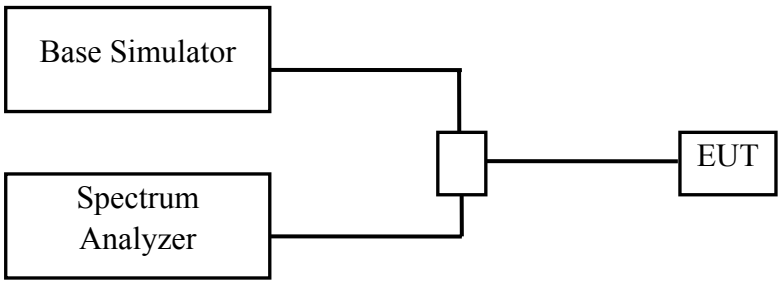
5.3 Test Procedure

a. The EUT was coupled to the spectrum analyzer and the base station simulator through a power divider. The lost of the cables the test system is calibrated to correct the reading.

b. The spectrum analyzer was set to Maxpeak Detector function and Maximum Hold mode.

c. 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, VBW=RBW=3 kHz; for CDMA signal, VBW=RBW=30 kHz.

5.4 Test Setup



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

5.5 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 lowest channel and the highest channel were measured respectively: channel No.128 (low) and 251 (high) for GSM 850 MHz; channel No.512 (low) and 810 (high) for PCS 1900 MHz.

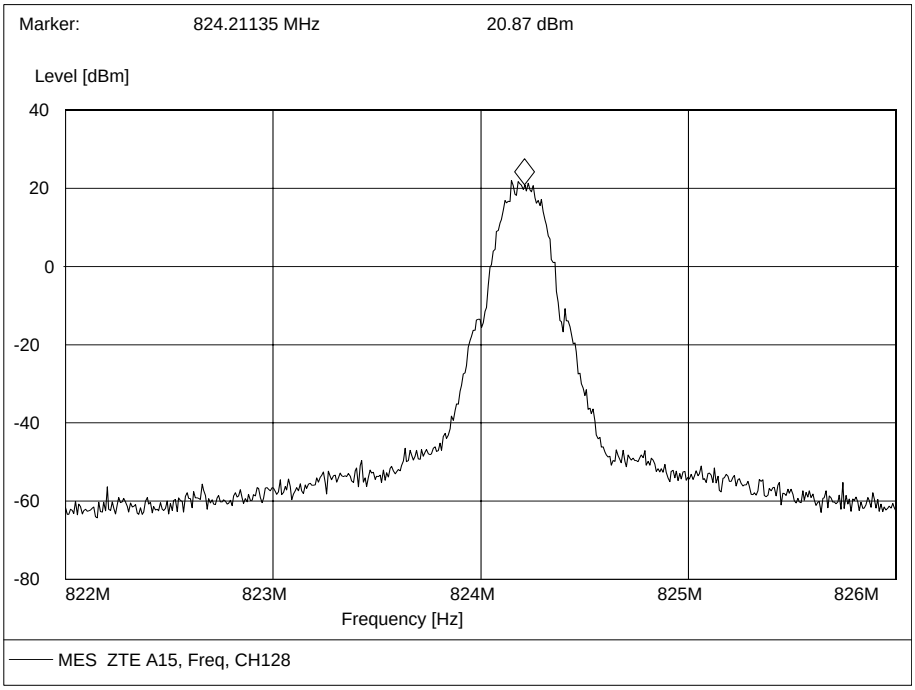
5.6 Test Results

The mobile transmitter frequency arrangement of the GSM 850 MHz band is

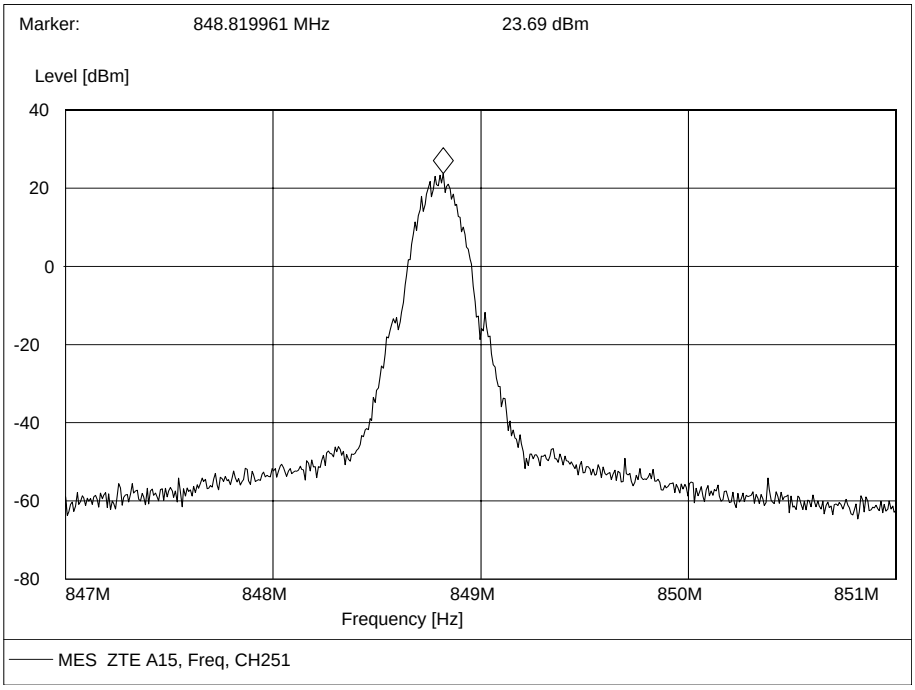
$Fl(n) = 824.2 + 0.2*(n-128),\ 128 \leqq n \leqq 251$

The frequencies of the lowest channel and the highest channel are as the following figures.

1. Lowest channel No.128



2. Highest channel No.251

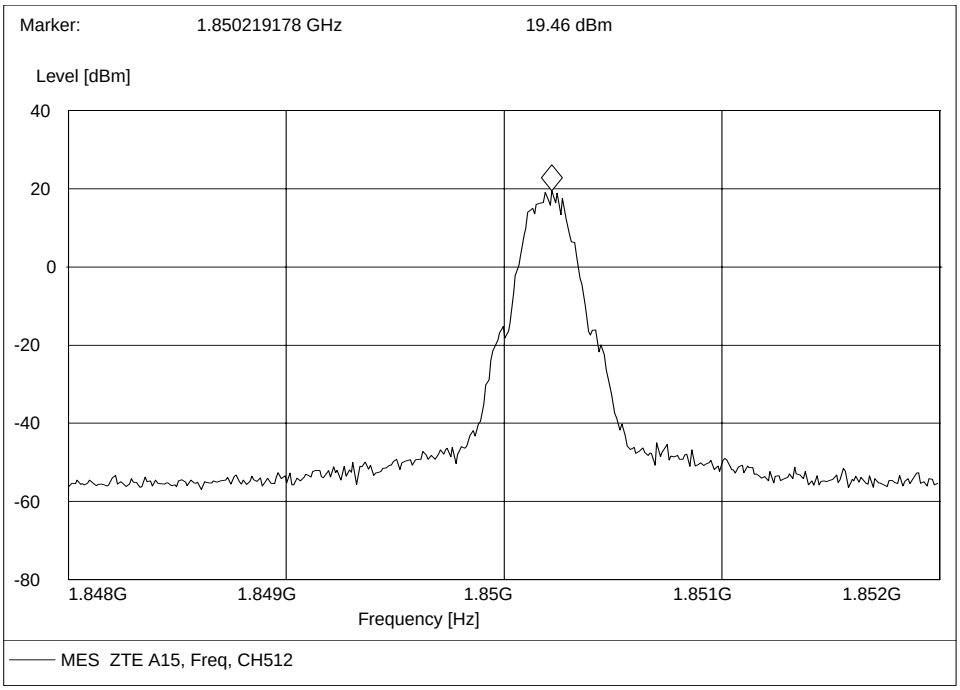


The mobile transmitter frequency arrangement of the PCS1900 band is

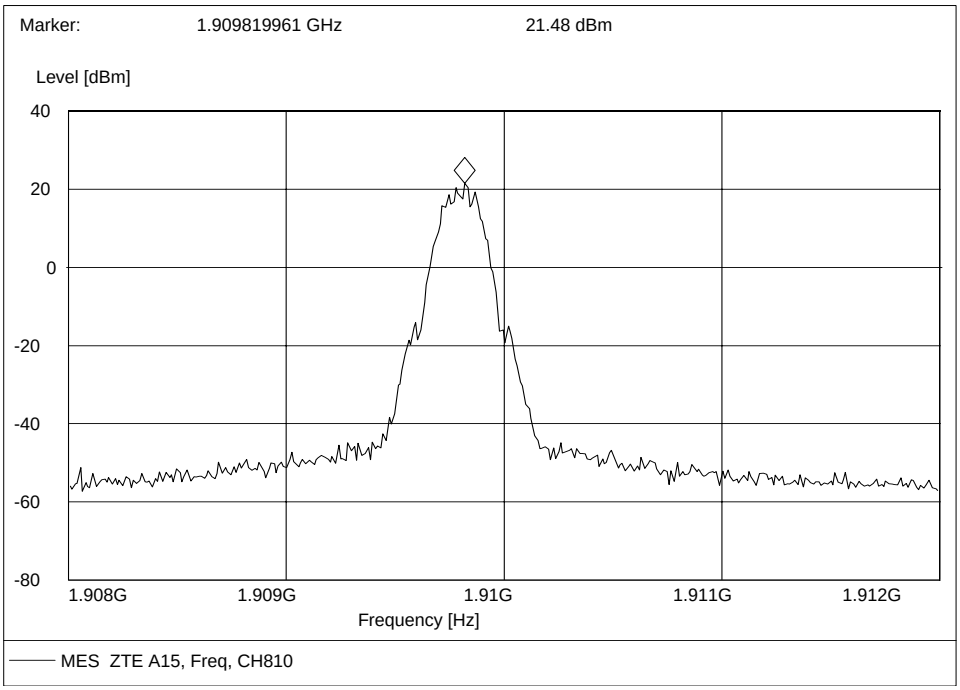
FI(n) = 1850.2 + 0.2*(n-512), 512≦n≦810

The frequencies of the lowest channel and the highest channel are as the following figures.

1. Lowest channel No.512



2. Highest channel No.810



6 Conducted RF Output Power Test

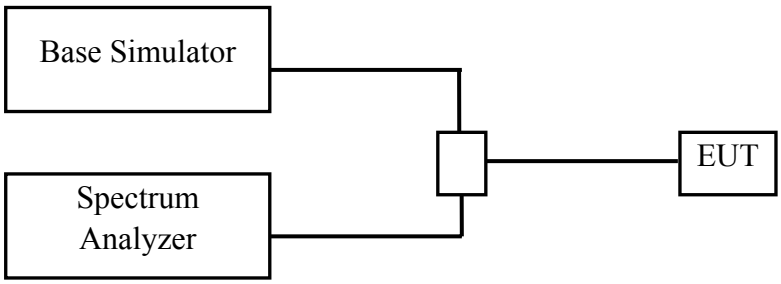
6.1 RF Power Output Test Requirement

According to FCC §2.1046 (a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

6.2 Test Procedure

a. The EUT was coupled to the spectrum analyzer and the base station simulator through a power divider. The radio frequency load attached to the EUT antenna terminal was 50 Ohm. The lost of the cables the test system is calibrated to correct the reading.
b. The spectrum analyzer was set to Maxpeak Detector function and Maximum Hold mode.
c. The resolution bandwidth of the spectrum analyzer was comparable to the emission bandwidth. For GSM signal, VBW=RBW=1 MHz; for CDMA signal, VBW=RBW=3 MHz.

6.3 Test Setup



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

6.4 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.

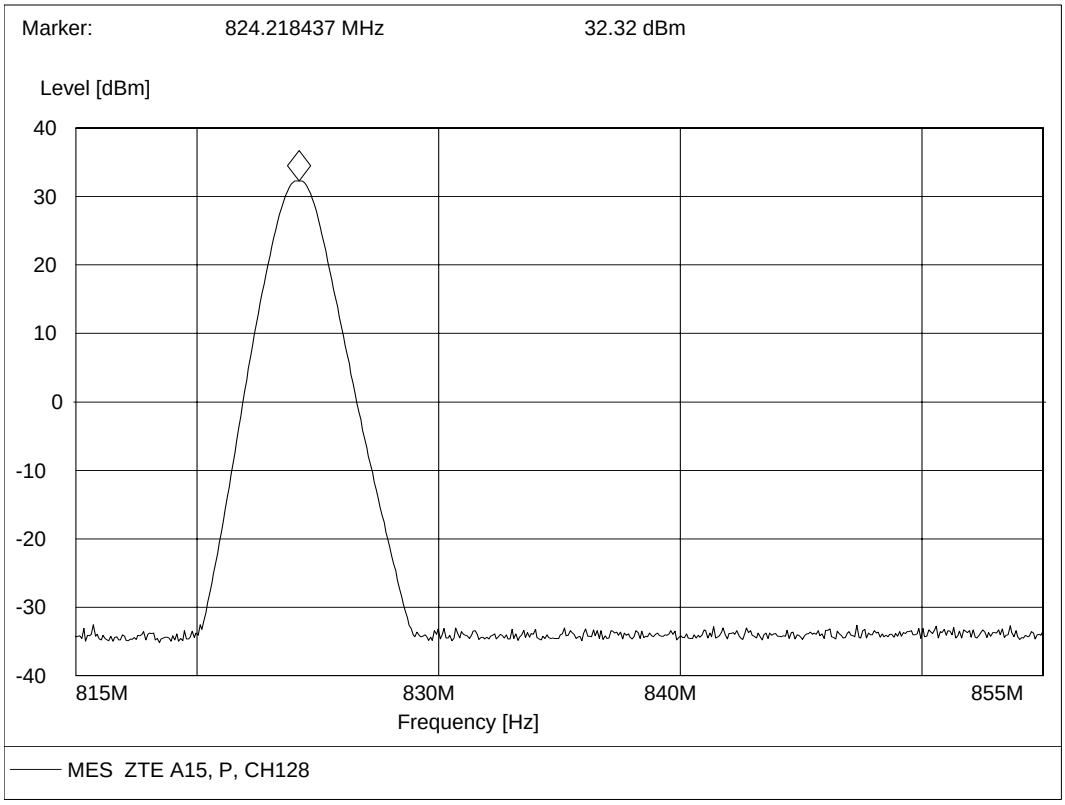
6.5 Test Results

I. GSM 850MHz Band

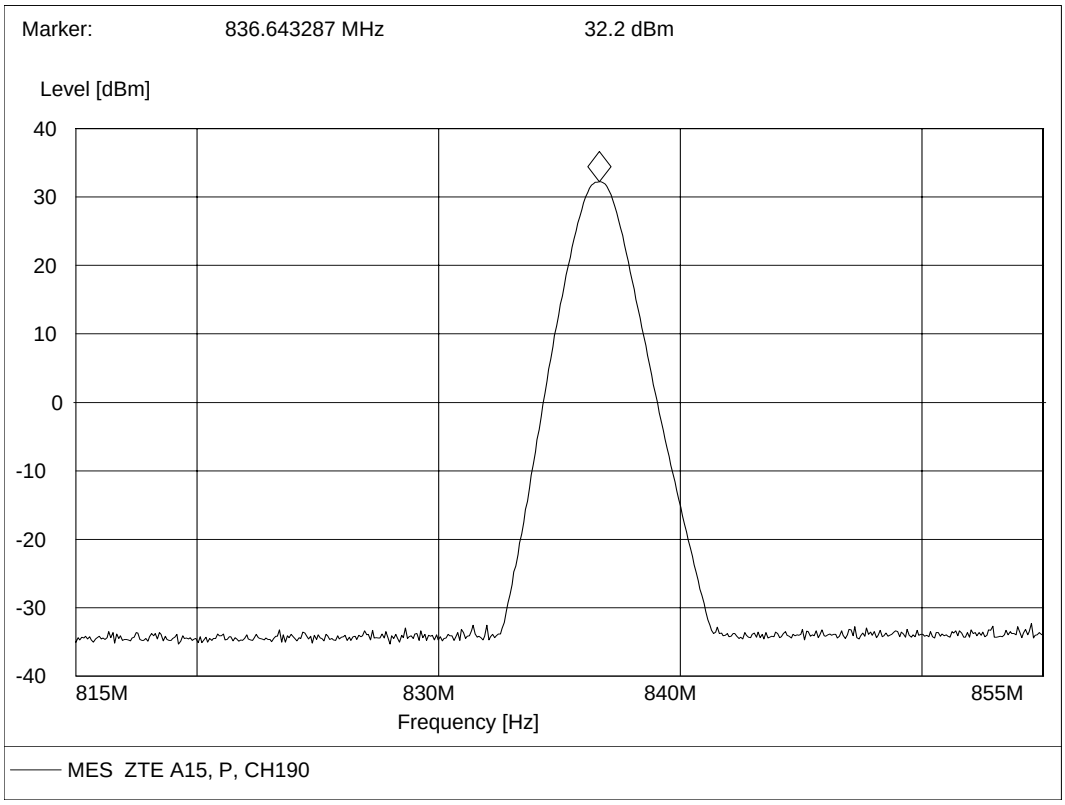
No.	GSM 850 Channel No.	Frequency (MHz)	Measured Power (dBm)	Rated Power (dBm)
1	128	824.20	32.32	33
2	190	836.60	32.20	33
3	251	848.80	32.21	33

Test Plots

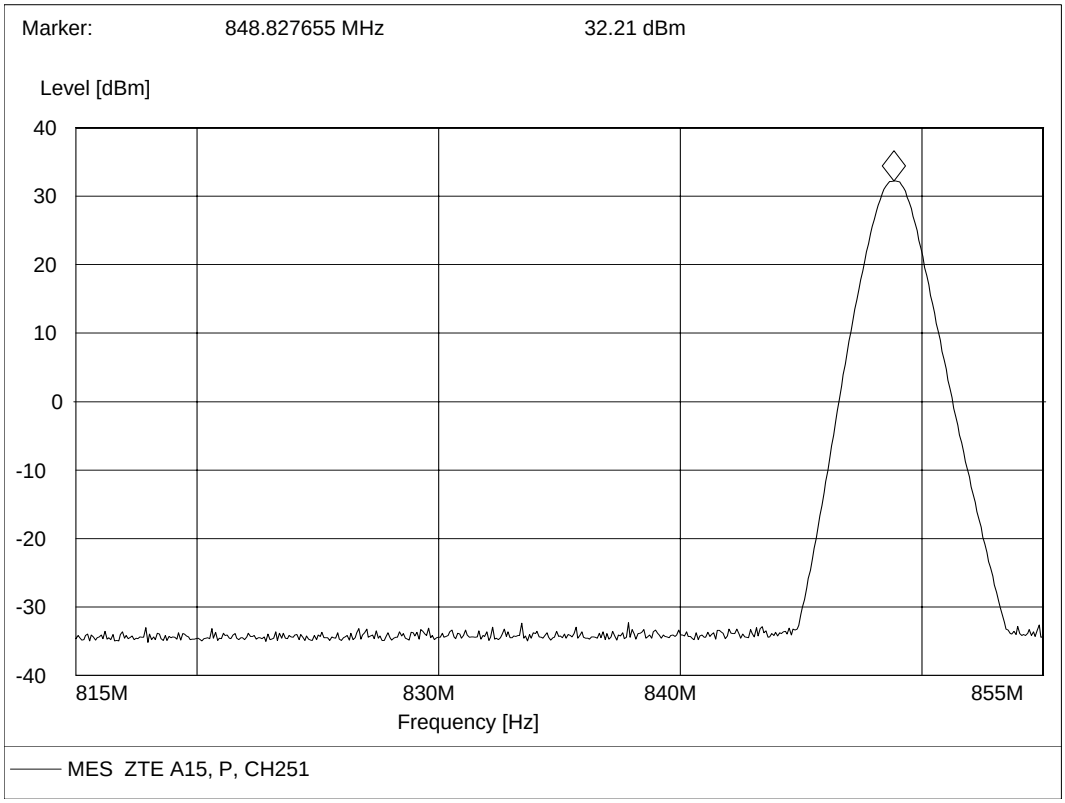
1. Lowest channel No.128



2. Middle channel No.190



3. Highest channel No.251

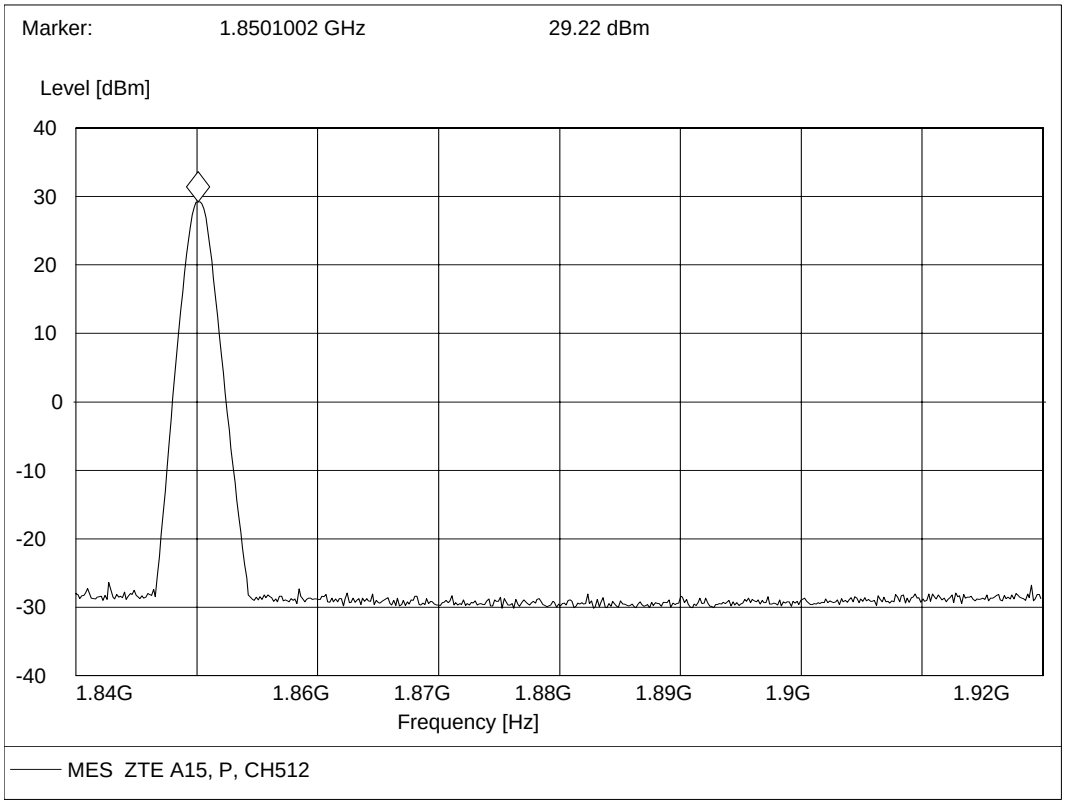


II. PCS 1900MHz Band

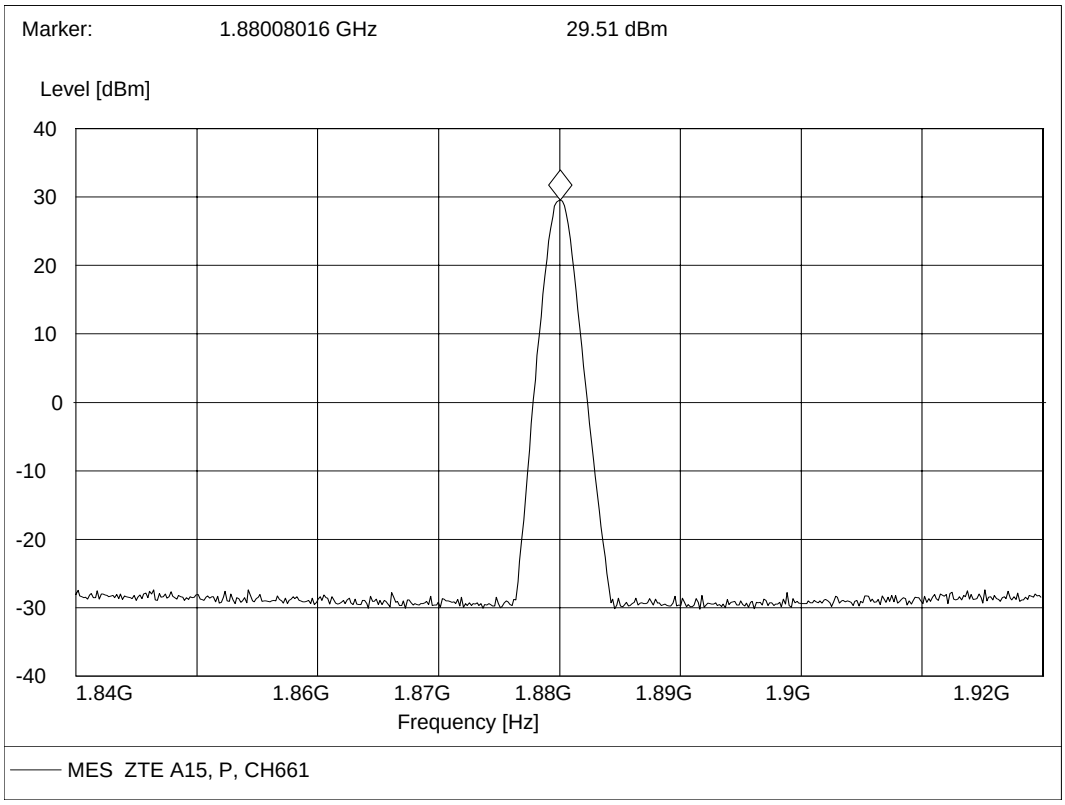
No.	PCS 1900 Channel No.	Frequency (MHz)	Measured Power (dBm)	Rated Power (dBm)
1	512	1850.20	29.22	30
2	661	1880.00	29.51	30
3	810	1909.80	29.58	30

Test Plots

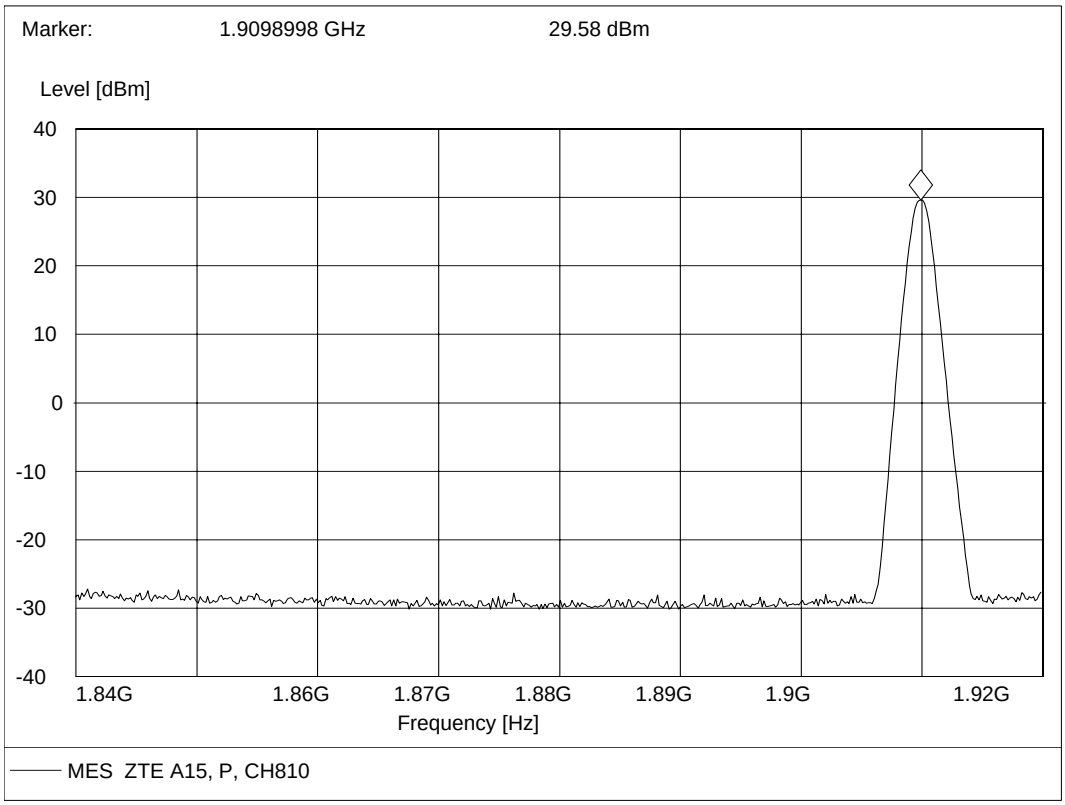
1. Lowest channel No.512



2. Middle channel No.661



3. Highest channel No.810



7 Occupied Bandwidth Test

7.1 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, or 20dB bandwidth (10log 1%=20dB) taking the total RF output power as reference.

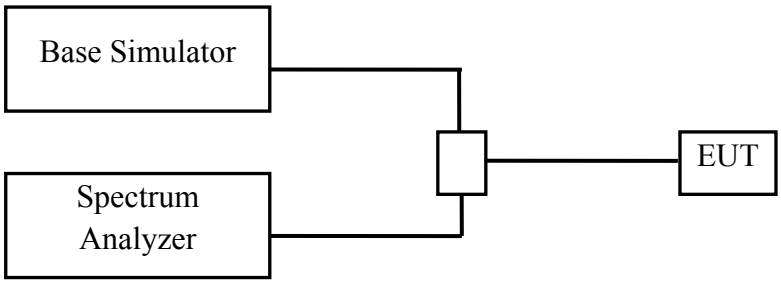
7.2 Test Procedure

a. The EUT was coupled to the spectrum analyzer and the base station simulator through a power divider. The lost of the cables the test system is calibrated to correct the reading.

b. The spectrum analyzer was set to Maxpeak Detector function and Maximum Hold mode.

c. The resolution bandwidth of the spectrum analyzer was set to at least 1% of the emission bandwidth. For GSM signal, VBW=RBW=3 kHz; for CDMA signal, VBW=RBW=30 kHz.

7.3 Test Setup



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

7.4 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).

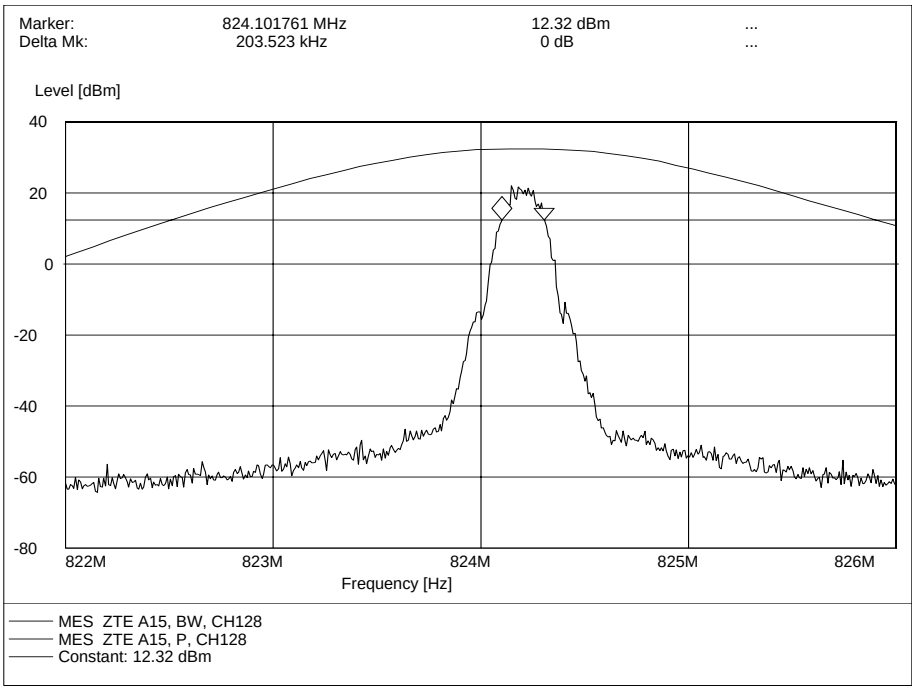
The MS operated at the maximum output power: level 5 for GSM 850 MHz; level 0 for PCS 1900.

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.

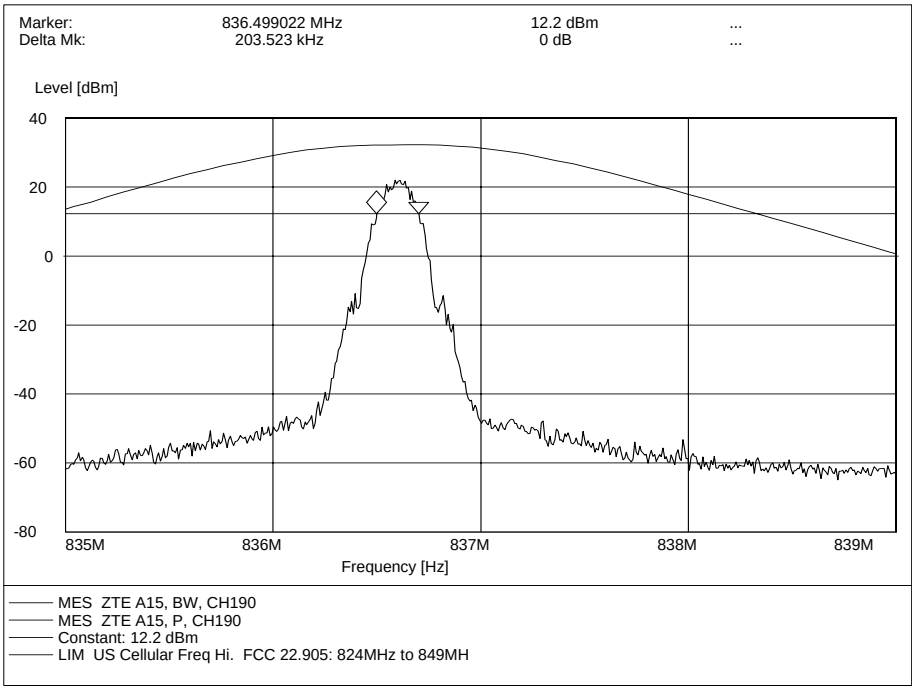
7.5 Test Results

The occupied bandwidth was measured to be about 200 kHz. Refer to the following plots. The 20dB reference trace is the RF output power measurement results in chapter 6.5 of this report.

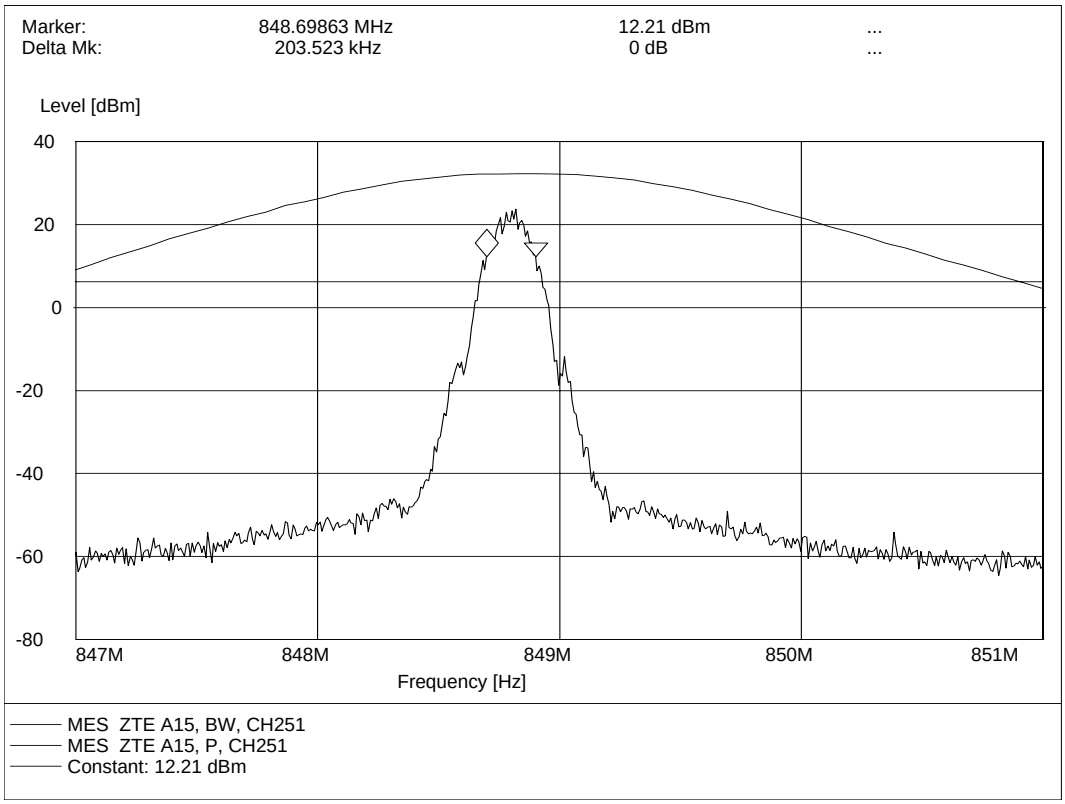
1. GSM 850MHz band, lowest channel No.128



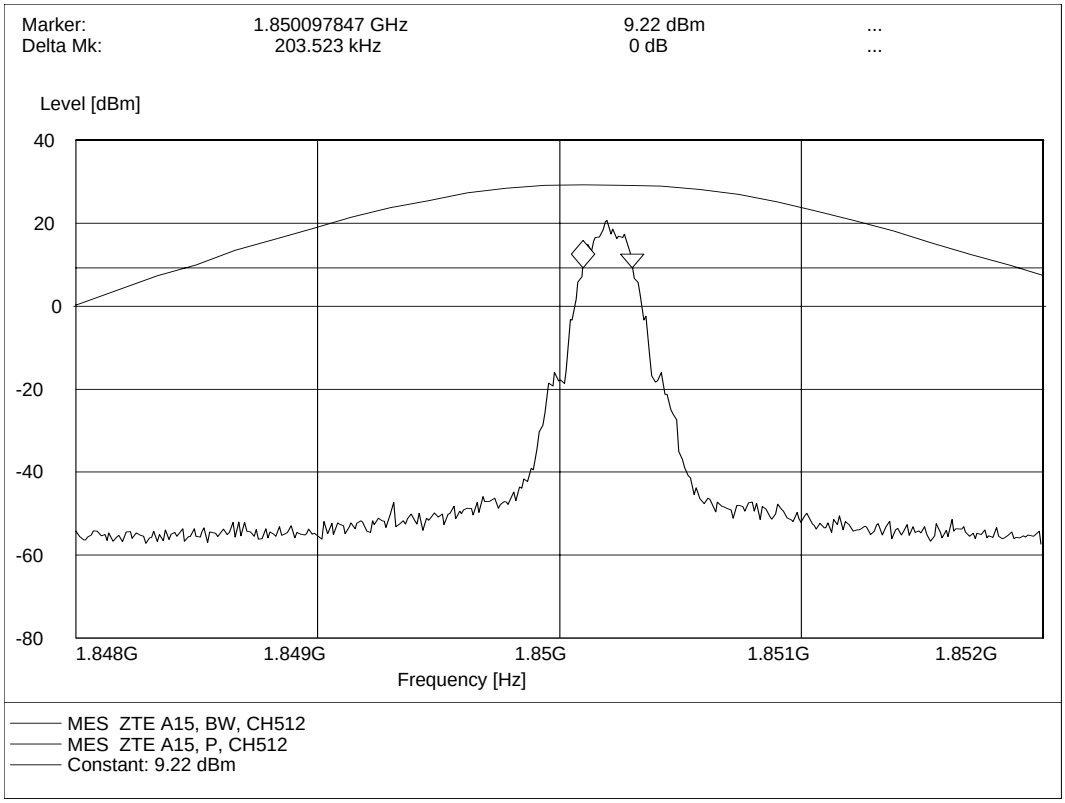
2. GSM 850MHz band, middle channel No.190



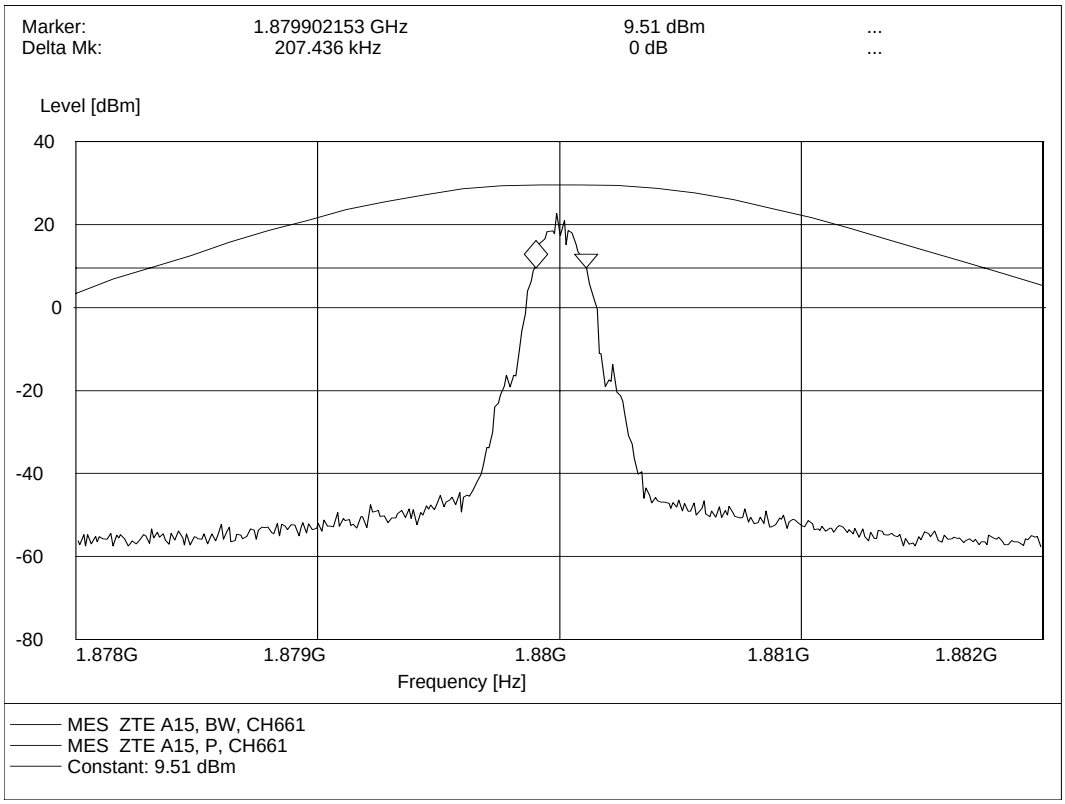
3. GSM 850MHz band, highest channel No.251



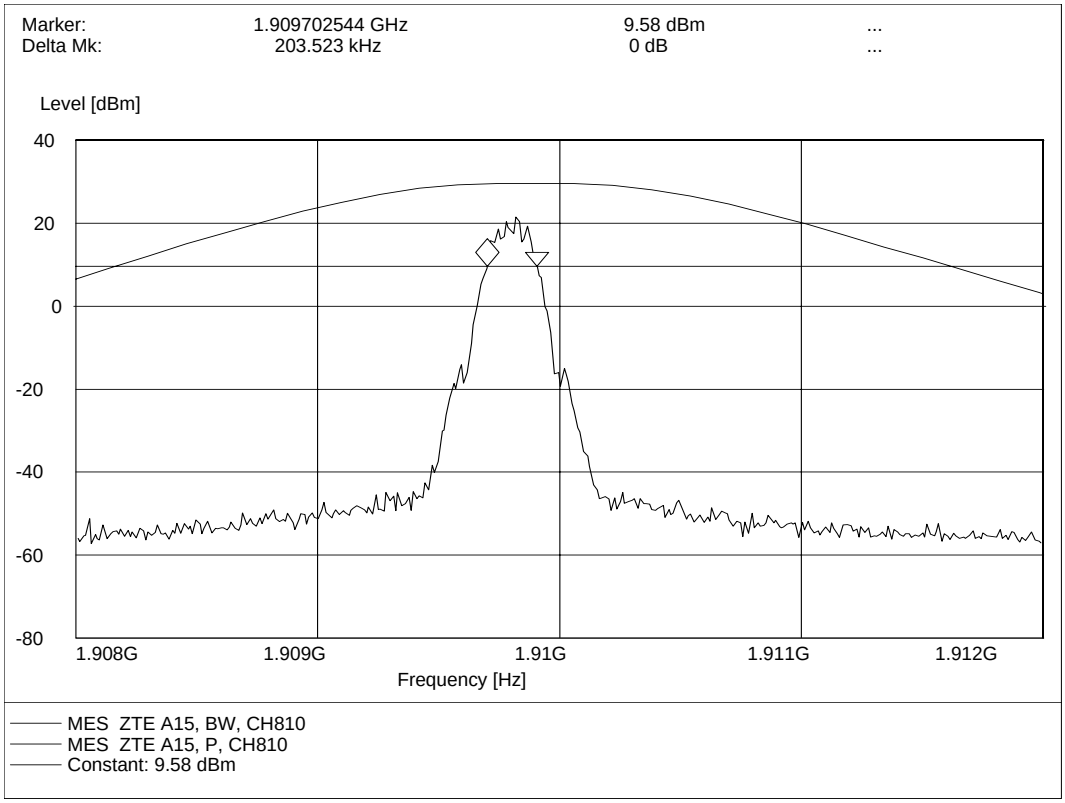
4. PCS 1900MHz band, lowest channel No.512



5. PCS 1900MHz band, middle channel No.661



6. PCS 1900MHz band, highest channel No.810



8 Conducted Spurious Emission Test

8.1 Limits of Conducted 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.

According to FCC §22.917 (b) and §24.238 (b), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. Thus the 26dB emission bandwidth is measurement for showing compliance at the band-edges

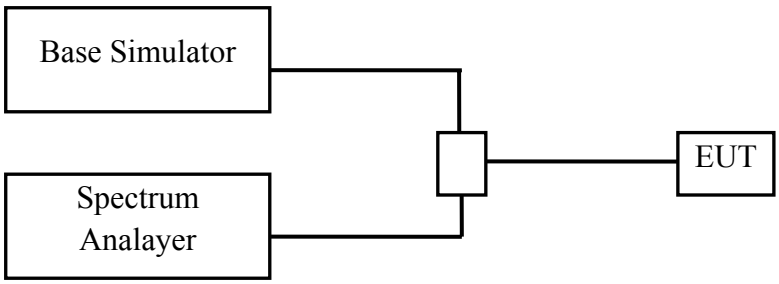
8.2 Test Procedure

a. The EUT was coupled to the spectrum analyzer and the base station simulator through a power divider. The lost of the cables the test system is calibrated to correct the reading.

b. 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.

c. 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 3 kHz; for CDMA signal, the resolution bandwidth was 30 kHz.

8.3 Test Setup



8.4 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 lowest channel and the highest channel were measured respectively: channel No.128 (low) and 251 (high) for GSM 850 MHz; channel No.512 (low) and 810 (high) for PCS 1900 MHz.

8.5 Test Results

I. GSM 850MHz Band

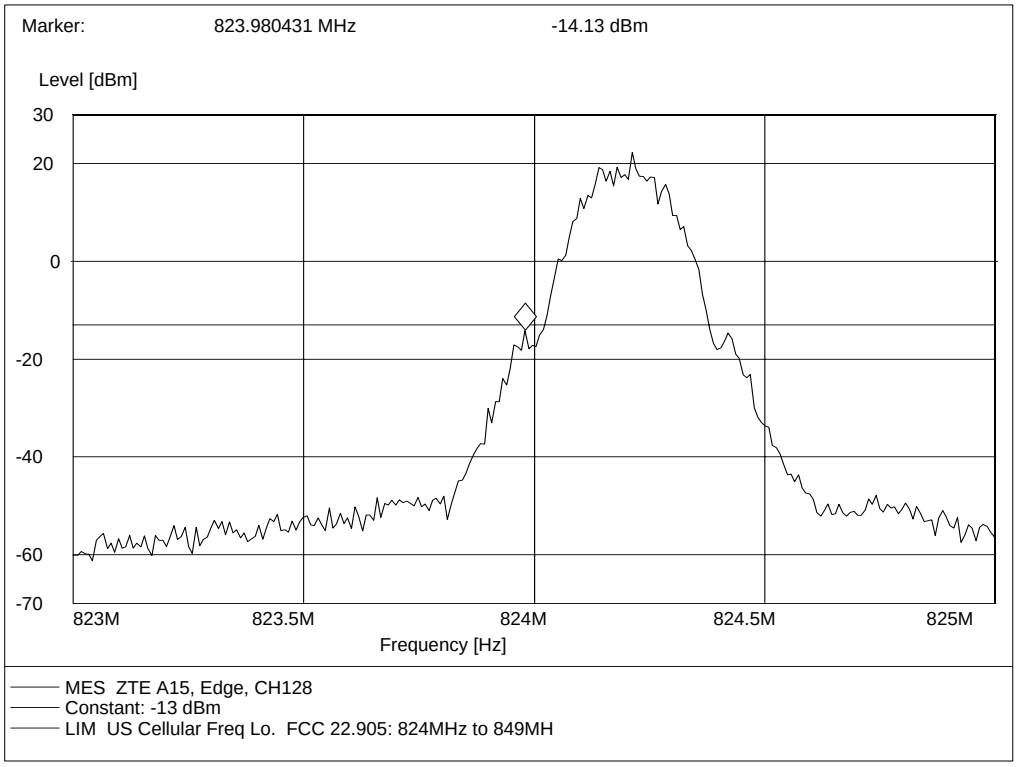
No.	Frequency (MHz)	Emission Power (dBm)	Limit (dBm)
GSM 850 MHz: Channel No. 128 (824.20 MHz)			
1	1648.40	-35.26	-13
2	2472.60	-43.19	-13
3	3296.80	-41.20	-13
4	4121.00	-51.87	-13
5	4945.20	--	-13
6	5769.40	--	-13
7	6593.60	--	-13
8	7417.80	--	-13
9	8242.00	--	-13
GSM 850 MHz: Channel No. 251 (848.80 MHz)			
10	1697.60	-42.21	-13
11	2546.40	-45.70	-13
12	3395.20	-48.79	-13
13	4244.00	-49.35	-13
14	5092.80	--	-13
15	5941.60	--	-13
16	6790.40	--	-13
17	7639.20	--	-13
18	8488.00	--	-13

NOTE:

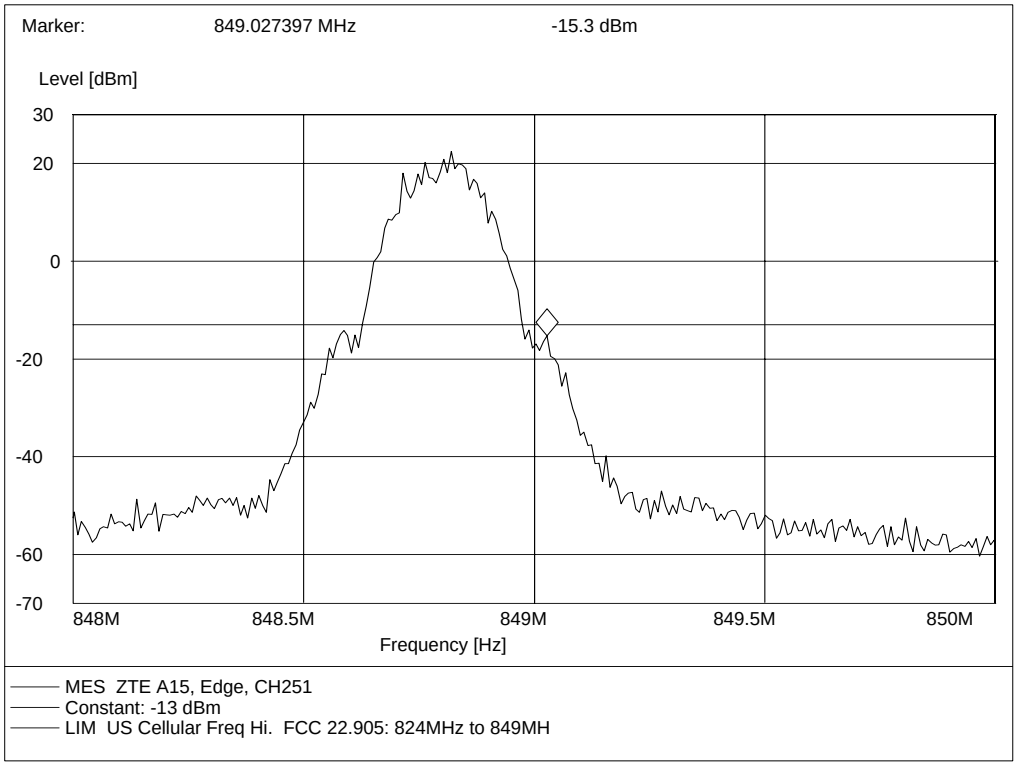
1. The spurious radiations from 9 kHz to 10th harmonic of the fundamental frequency are researched. Only the harmonics are record in the table above.
2. "--" in the table above means that the emissions are too small to be measured and are at least 12 dB below the limit.

Plot of Band Edge

1. Lowest channel No.128



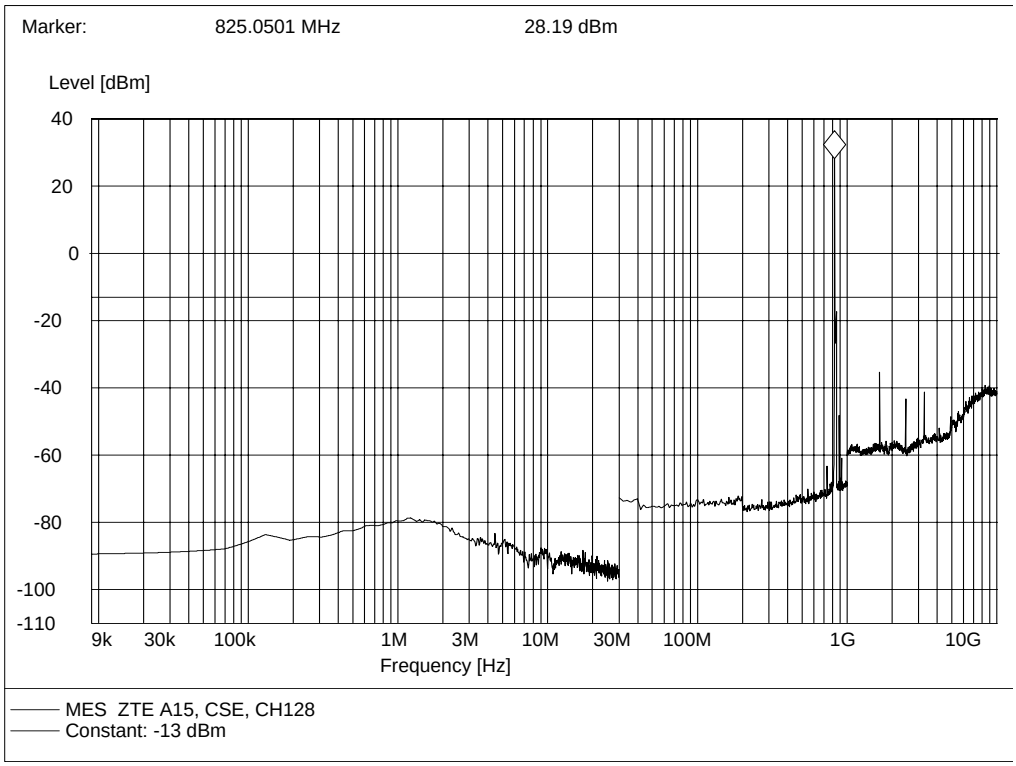
2. Highest channel No.251



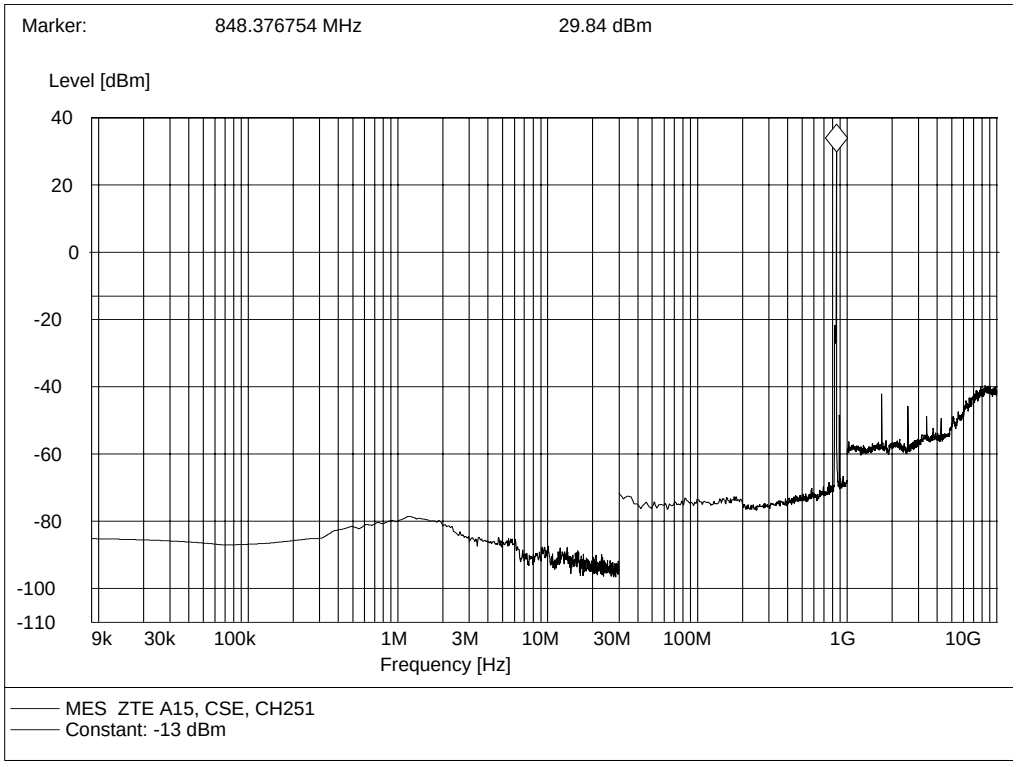
Plot of Spurious Emission

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

1. Lowest channel No.128



2. Highest channel No.251



II. PCS 1900MHz Band

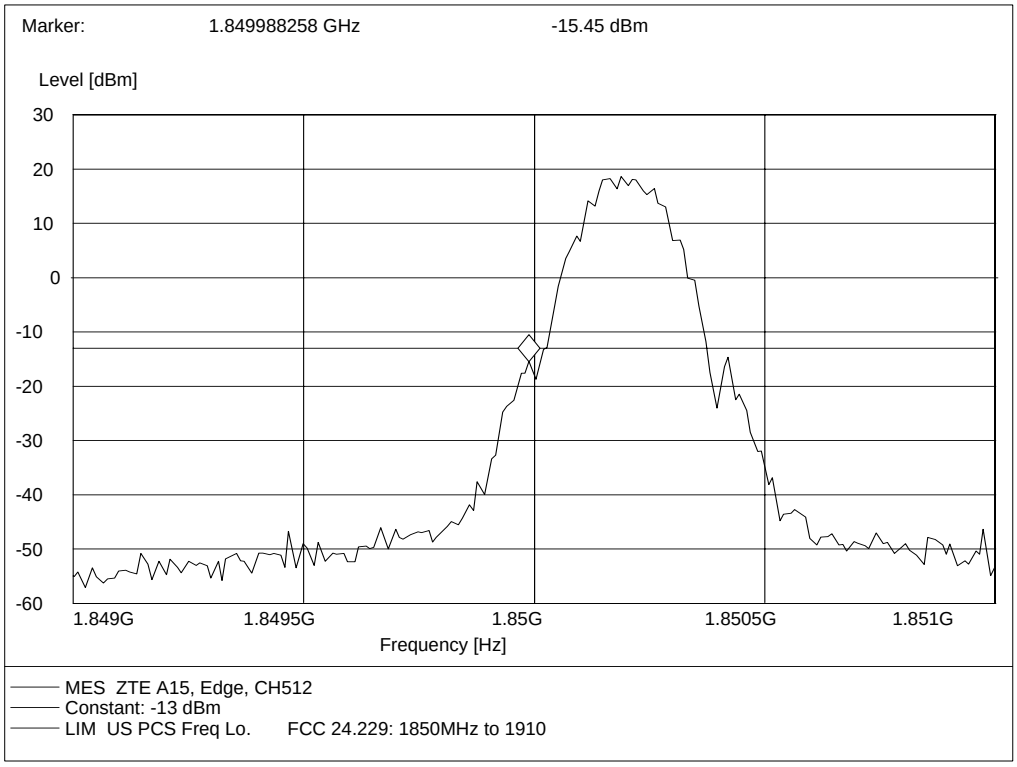
No.	Frequency (MHz)	Emission Power (dBm)	Limit (dBm)
PCS 1900 MHz: Channel No. 512 (1850.20 MHz)			
1	3700.40	-49.40	-13
2	5550.60	--	-13
3	7400.80	--	-13
4	9251.00	--	-13
5	11101.20	--	-13
6	12951.40	--	-13
7	14801.60	--	-13
8	16651.80	--	-13
9	18502.00	--	-13
PCS 1900 MHz: Channel No. 810 (1909.80 MHz)			
10	3819.60	-50.87	-13
11	5729.40	--	-13
12	7639.20	--	-13
13	9549.00	--	-13
14	11458.80	--	-13
15	13368.60	--	-13
16	15278.40	--	-13
17	17188.20	--	-13
18	19098.00	--	-13

NOTE:

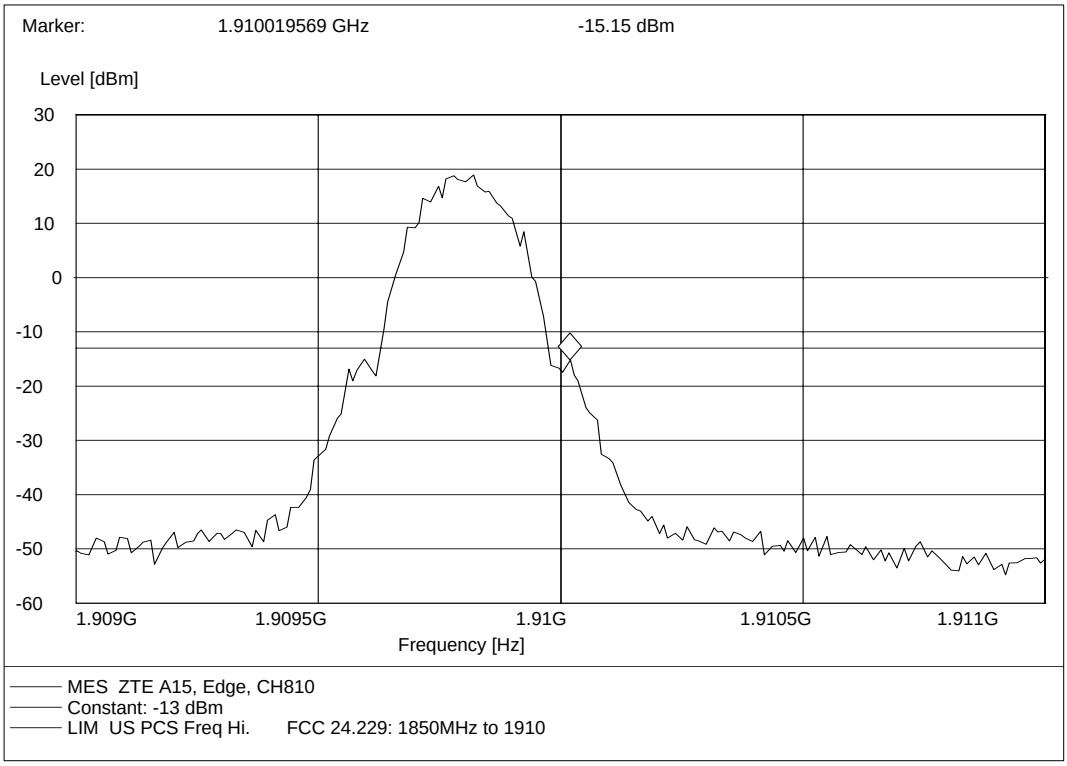
1. The spurious radiations from 9 kHz to 10th harmonic of the fundamental frequency are researched. Only the harmonics are record in the table above.
2. "--" in the table above means that the emissions are too small to be measured and are at least 12 dB below the limit.

Plot of Out-of-Band Emission

1. Lowest channel No.512



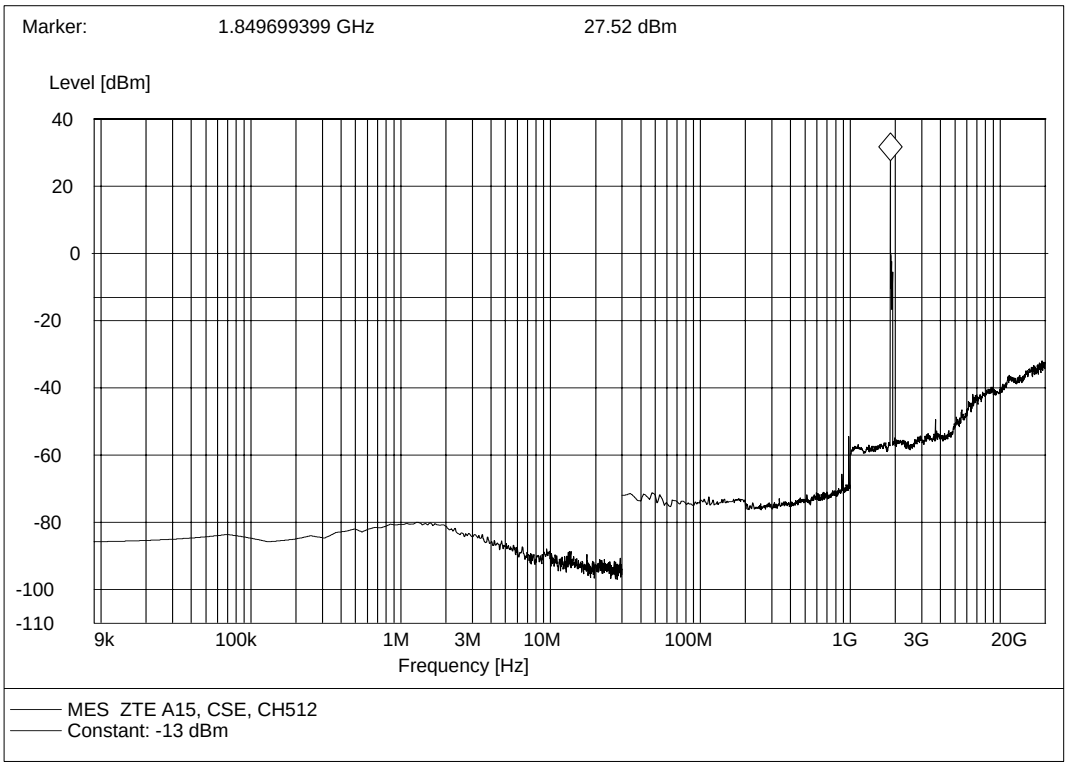
2. Highest channel No.810



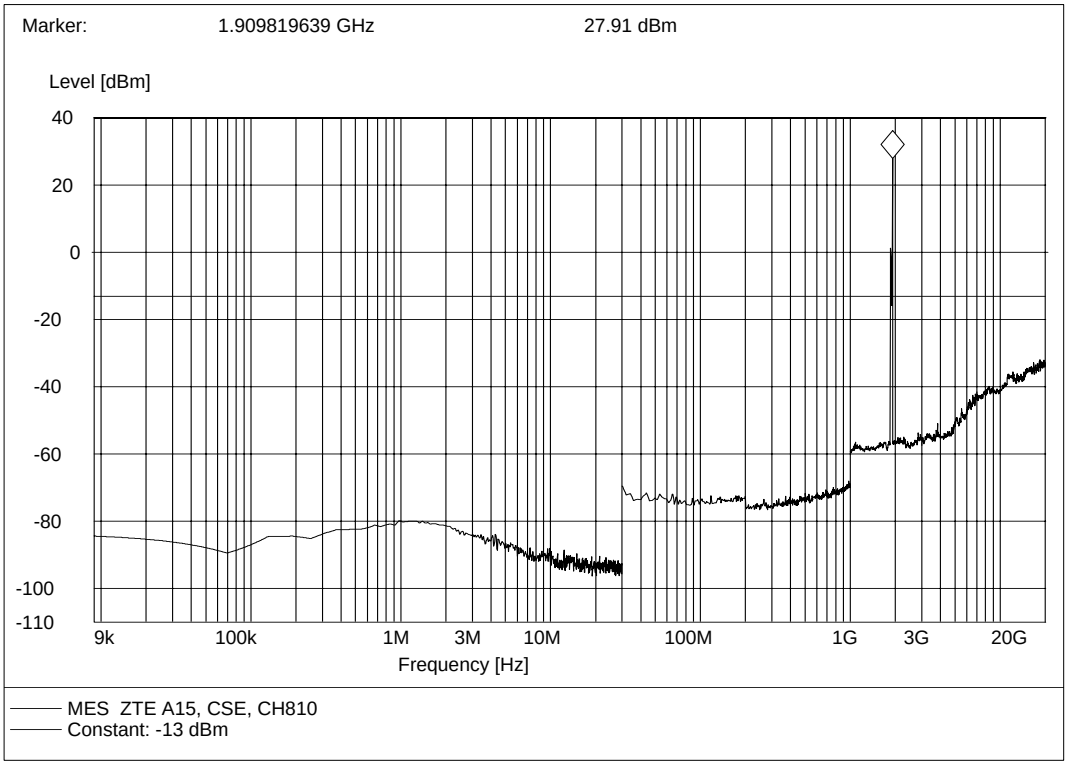
Plot of Spurious Emission

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

1. Lowest channel No.512



2. Highest channel No.810



9 Transmitter Radiated Power (EIRP/ERP) Test

9.1 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.

9.2 Test Procedure

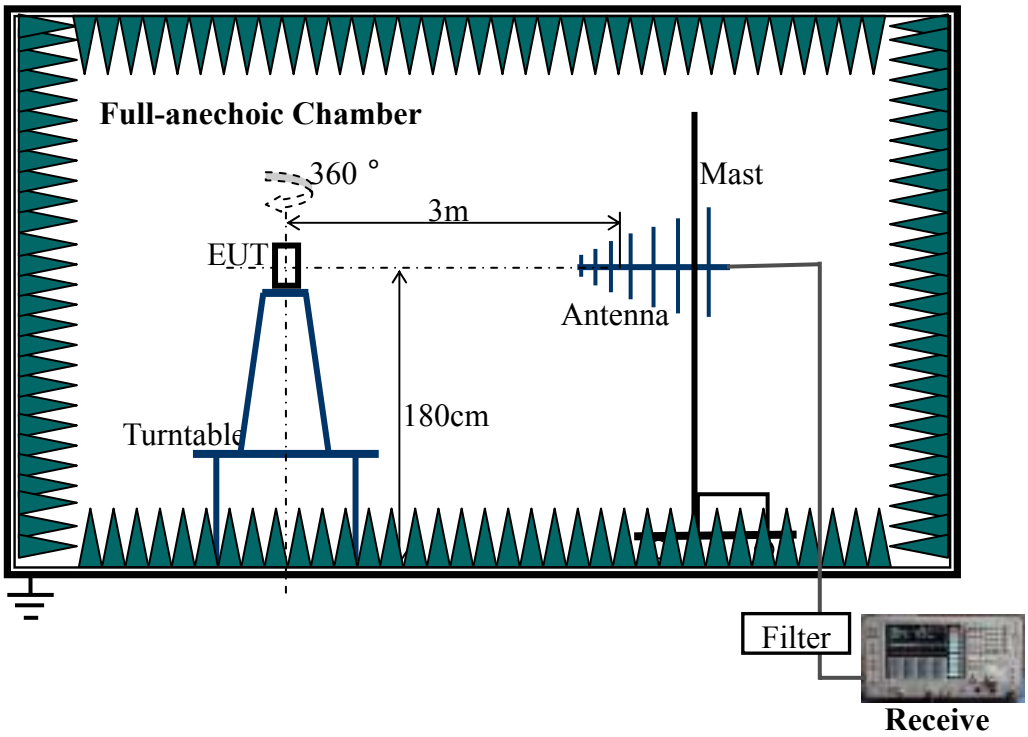
a. The radiated power measurement was performed in a full anechoic chamber. The air lost of the site and the factors of the test system is pre-calibrated using substitution method.

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.

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 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.

9.3 Test Setup



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

9.4 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.

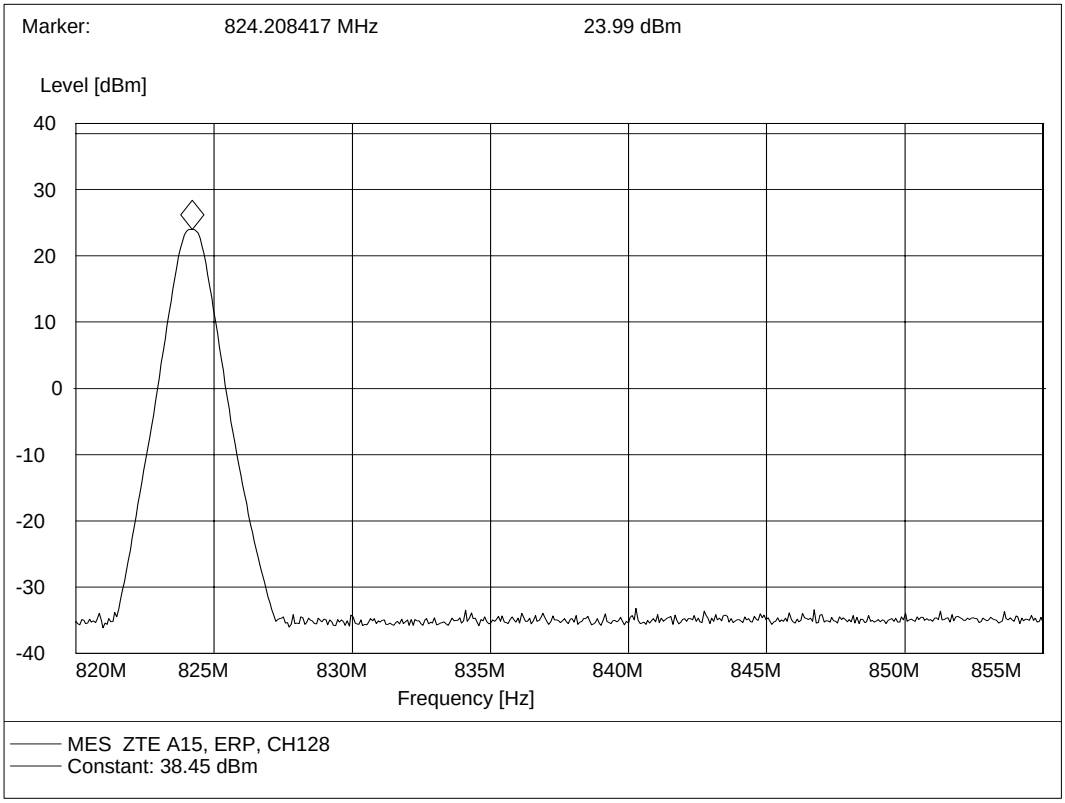
9.5 Test Results

I. GSM 850MHz Band

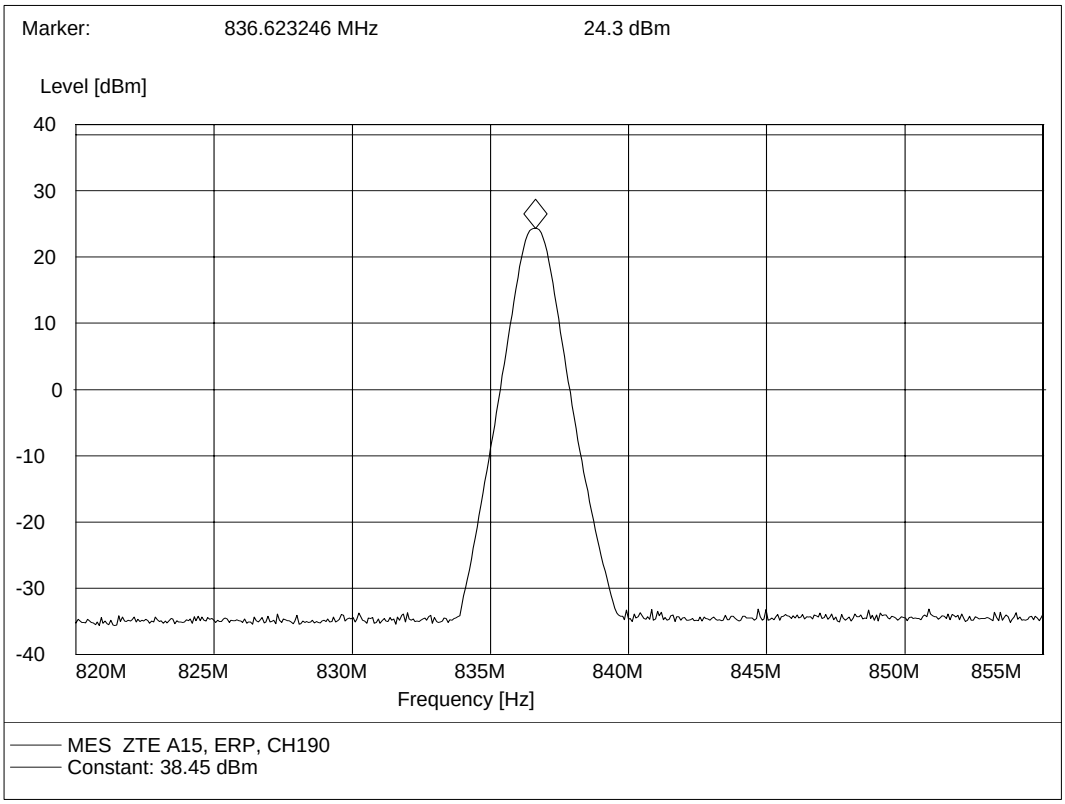
No.	GSM 850 Channel No.	Frequency (MHz)	ERP (dBm)	ERP (W)	Limit ERP (W)
1	128	824.20	23.99	0.251	7
2	190	836.60	24.70	0.295	7
3	251	848.80	23.77	0.238	7

Test Plots

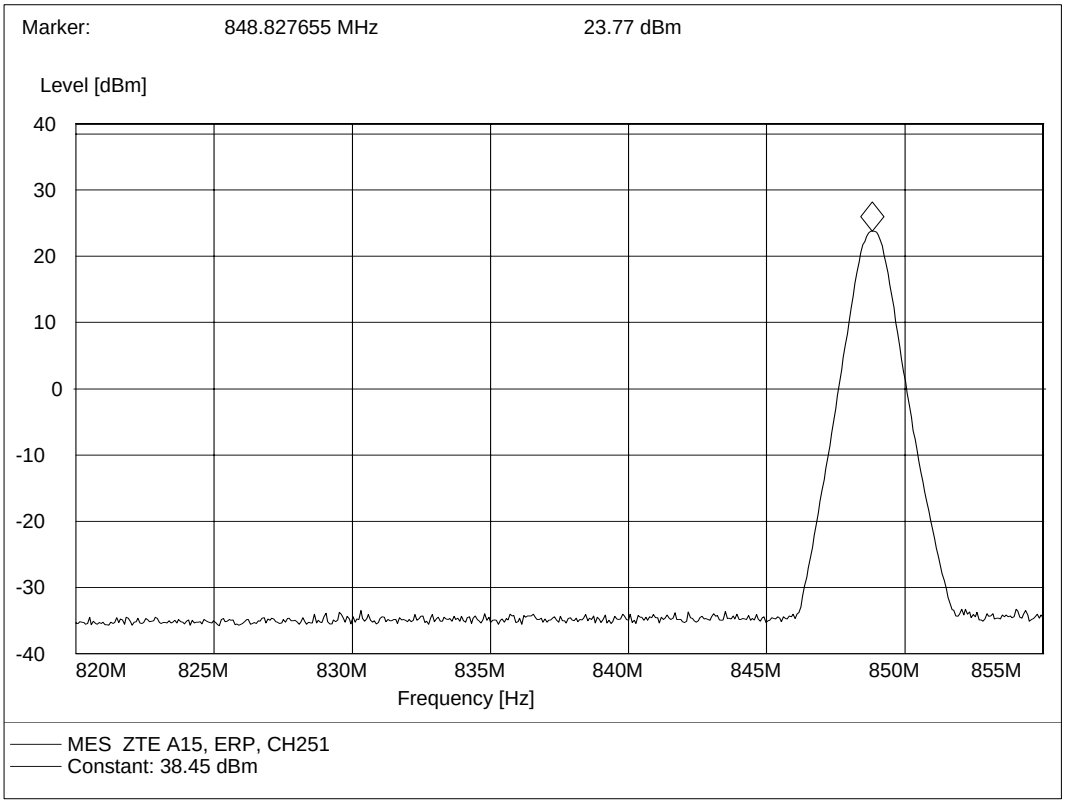
1. Lowest channel No.128



2. Middle channel No.190



3. Highest channel No.251

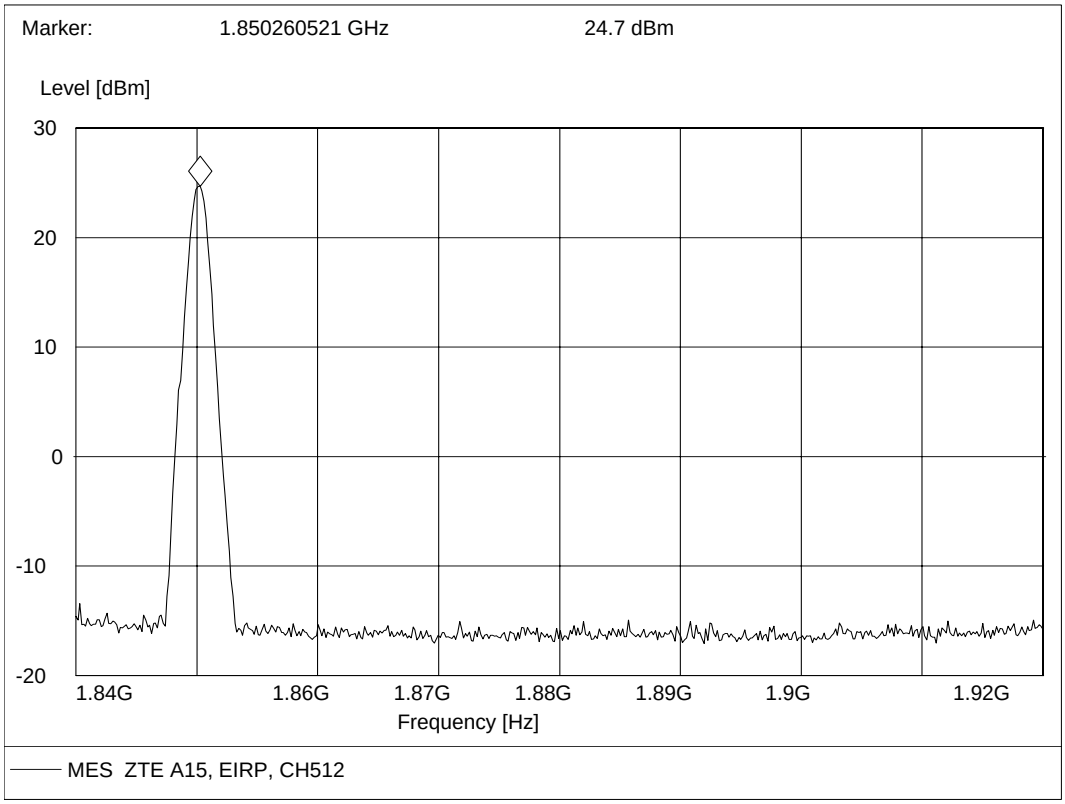


II. PCS 1900MHz Band

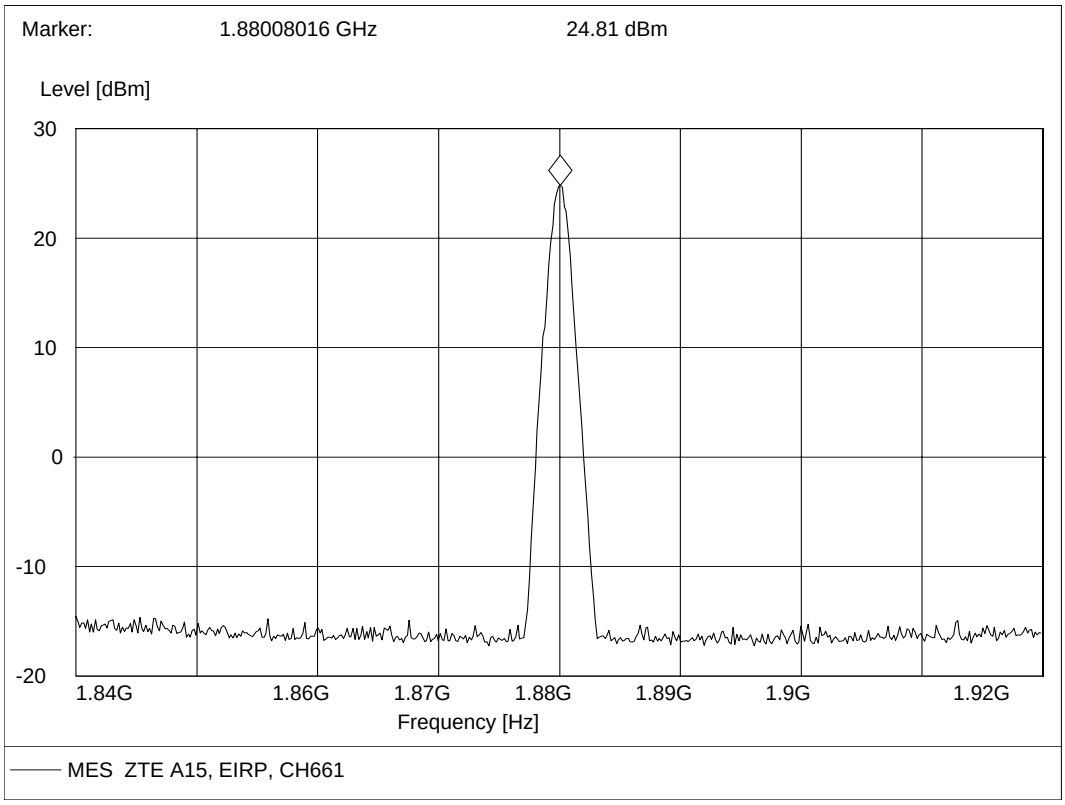
No.	PCS 1900 Channel No.	Frequency (MHz)	EIRP (dBm)	EIRP (W)	Limit EIRP (W)
1	512	1850.20	24.70	0.295	2
2	661	1880.00	24.81	0.303	2
3	810	1909.80	23.59	0.229	2

Test Plots

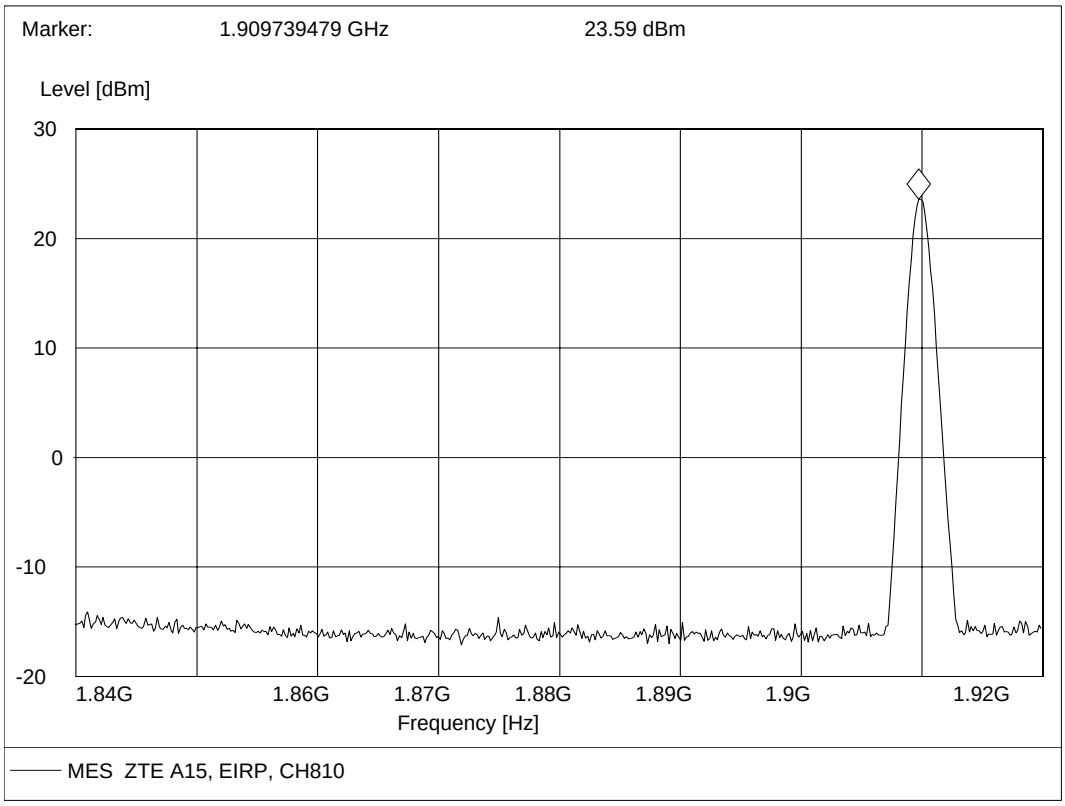
1. Lowest channel No.512



2. Middle channel No.661



3. Highest channel No.810



10 Radiated Spurious Emission Test

10.1 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.

10.2 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.

10.3 Test Setup

Same as 9.3

10.4 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.

10.5 Test Results

I. GSM 850MHz Band

No.	Frequency (MHz)	ERP (dBm) Antenna: Vertical	ERP (dBm) Antenna: Horizontal	Limit (dBm)
GSM 850 MHz: Channel No. 128 (824.20 MHz)				
1	1648.40	-48.22	-50.96	-13
2	2472.60	-44.42	-45.81	-13
3	3296.80	-49.50	-52.45	-13
4	4121.00	-47.88	-48.34	-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. 251 (848.80 MHz)				
10	1697.60	-40.08	-46.69	-13
11	2546.40	-46.49	-43.84	-13
12	3395.20	-50.12	-53.51	-13
13	4244.00	--	--	-13
14	5092.80	--	--	-13
15	5941.60	--	--	-13
16	6790.40	--	--	-13
17	7639.20	--	--	-13
18	8488.00	--	--	-13

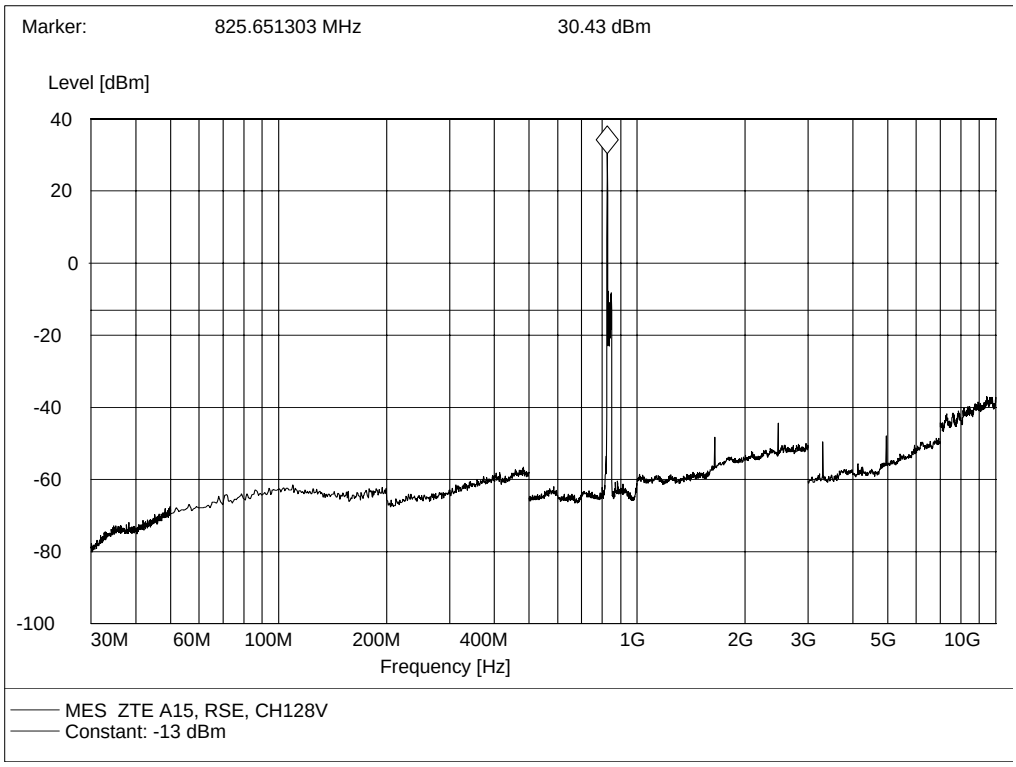
NOTE:

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.

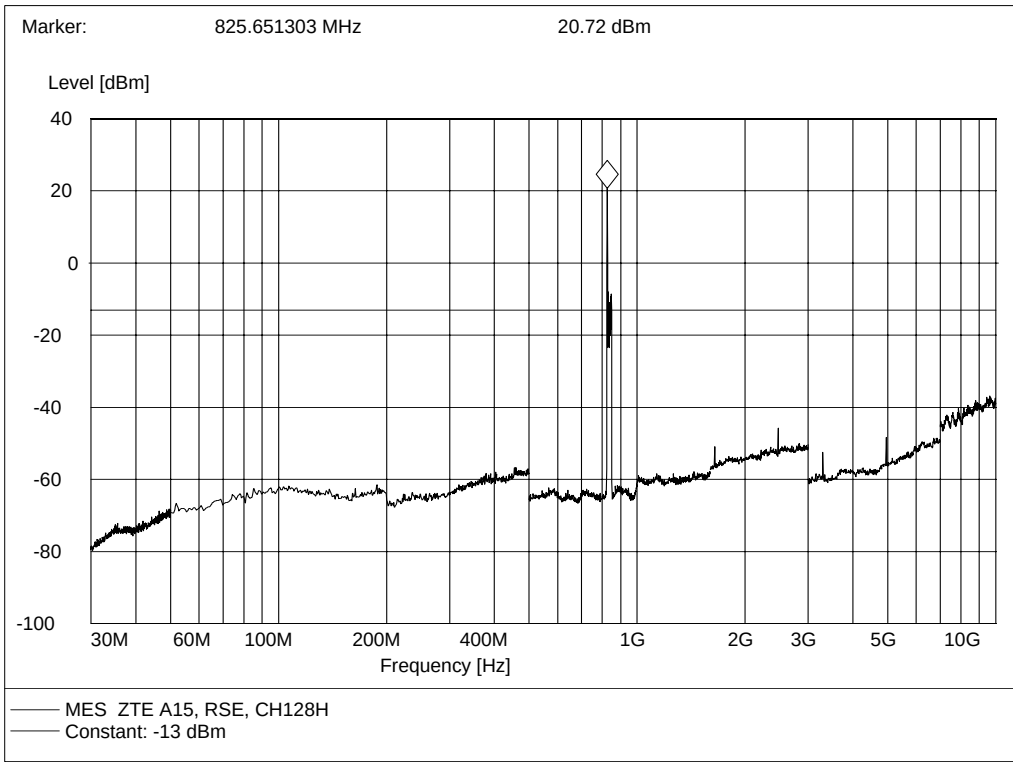
Plot of Spurious Emission

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

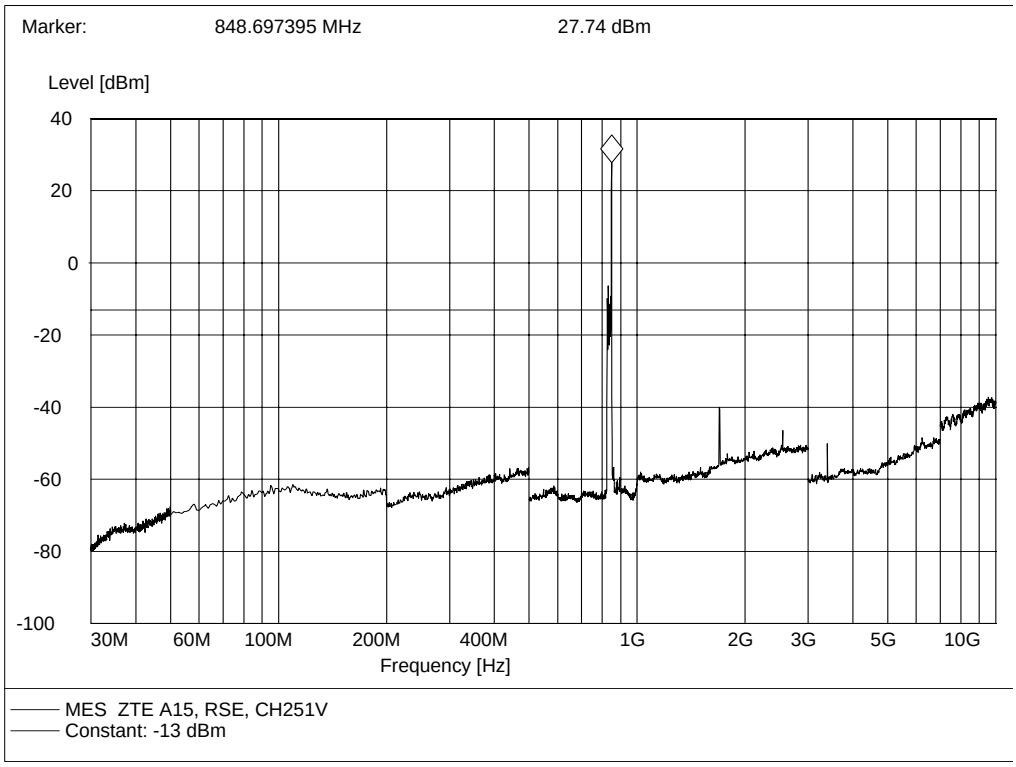
1. Lowest channel No.128, antenna vertical



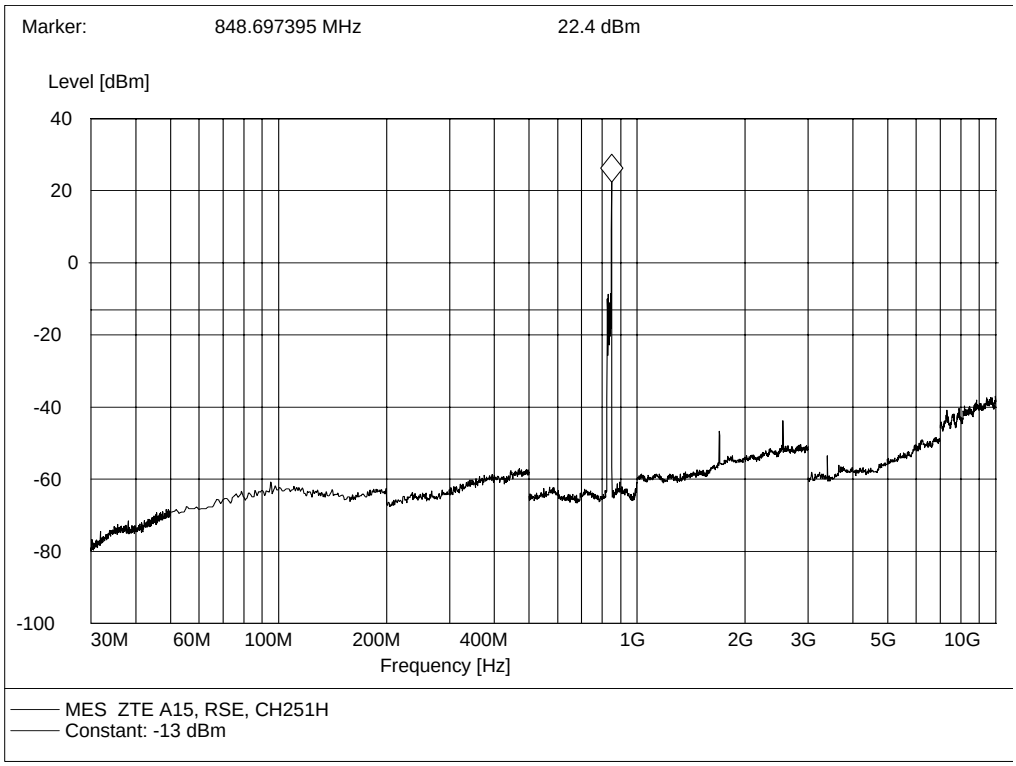
2. Lowest channel No.128, antenna horizontal



3. Highest channel No.251, antenna vertical



4. Highest channel No.251, antenna horizontal



II. PCS 1900MHz Band

No.	Frequency (MHz)	ERP (dBm) Antenna: Vertical	ERP (dBm) Antenna: Horizontal	Limit (dBm)
PCS 1900 MHz: Channel No. 512 (1850.20 MHz)				
1	3700.40	-26.82	-34.00	-13
2	5550.60	-39.24	-39.65	-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. 810 (1909.80 MHz)				
10	3819.60	-31.72	-33.34	-13
11	5729.40	-42.34	-40.39	-13
12	7639.20	--	--	-13
13	9549.00	--	--	-13
14	11458.80	--	--	-13
15	13368.60	--	--	-13
16	15278.40	--	--	-13
17	17188.20	--	--	-13
18	19098.00	--	--	-13

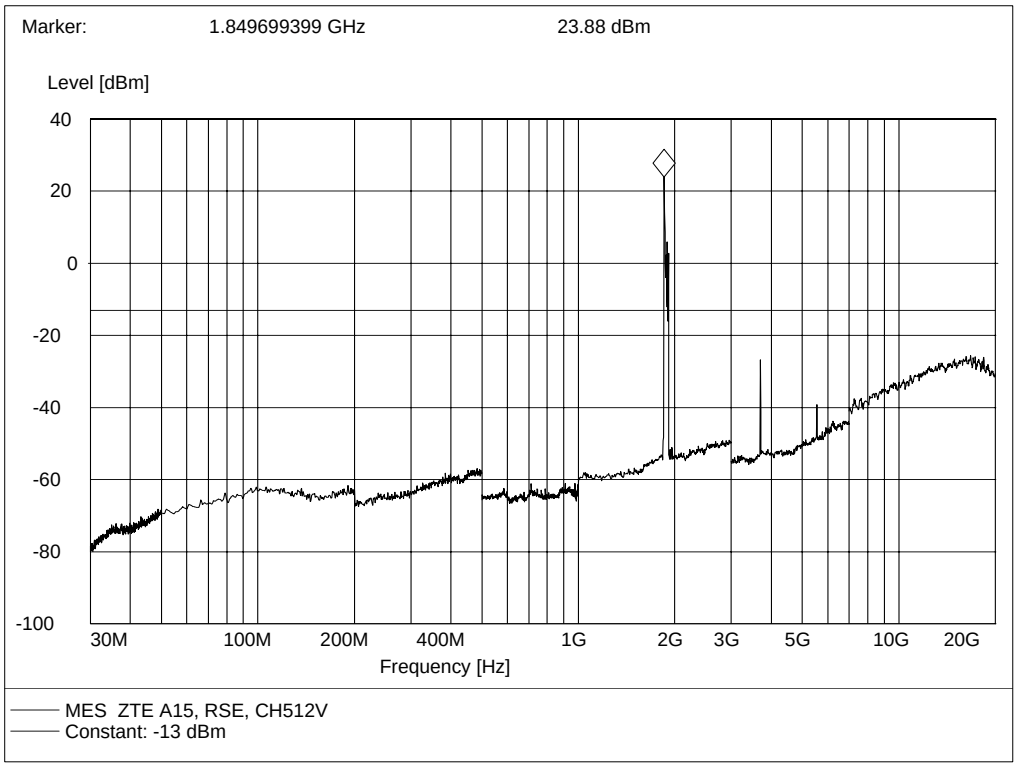
NOTE:

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.

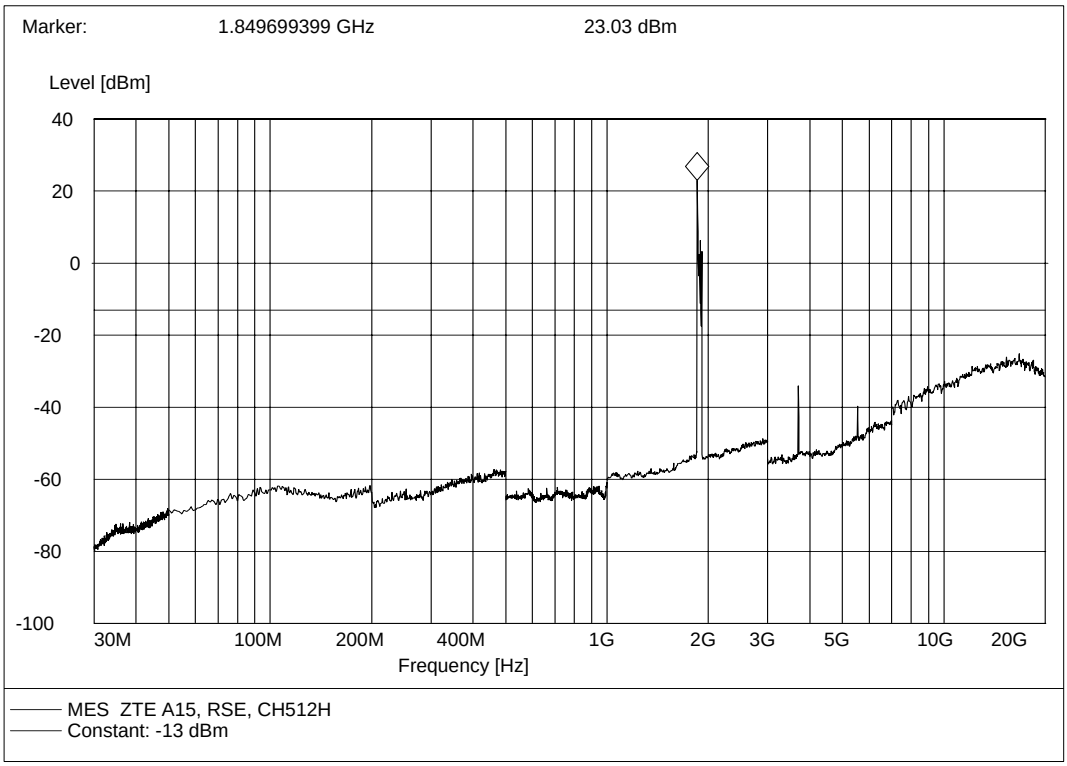
Plot of Spurious Emission

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

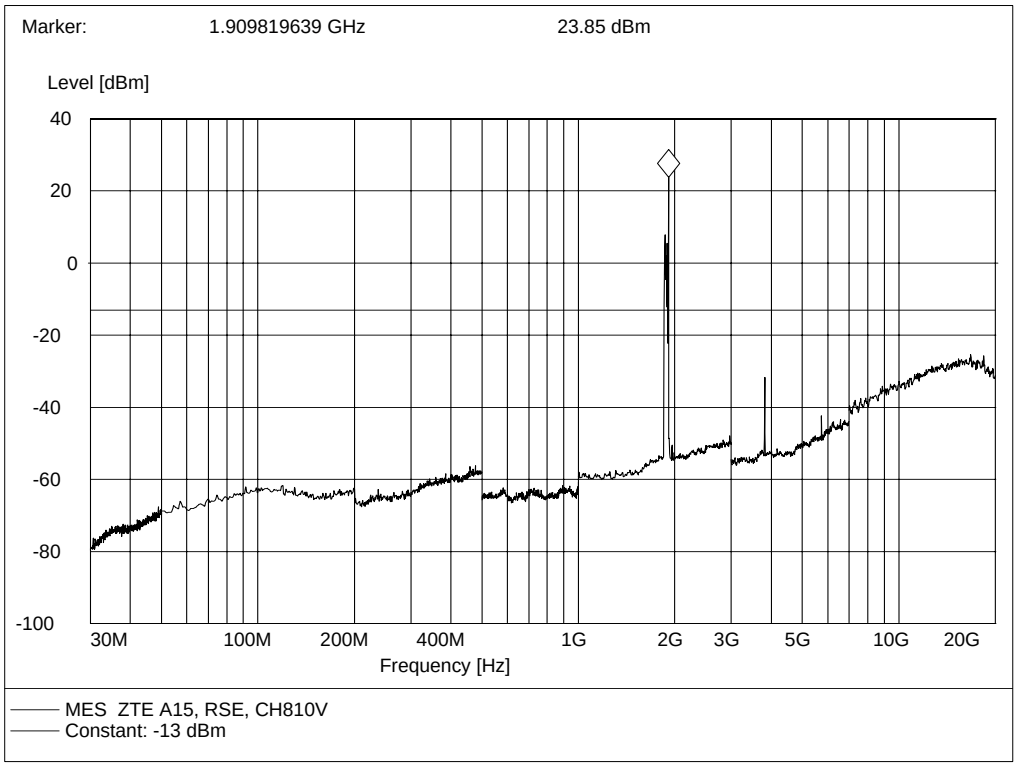
1. Lowest channel No.512, antenna vertical



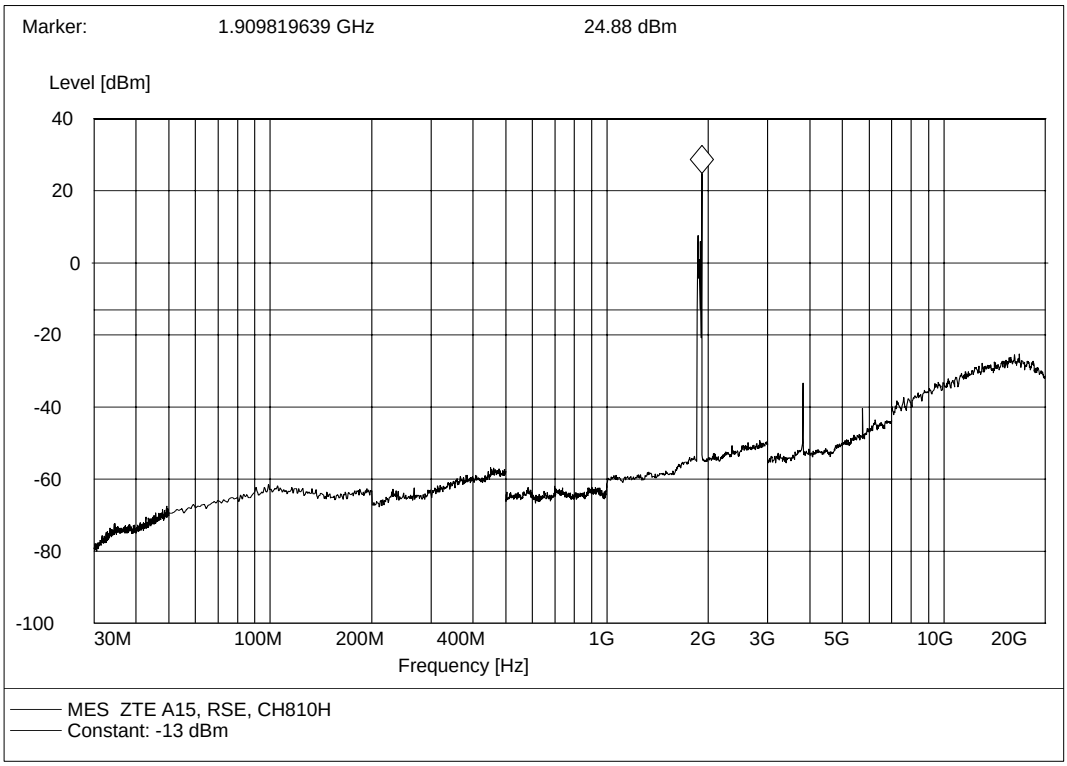
2. Lowest channel No.512, antenna horizontal



3. Highest channel No.810, antenna vertical



4. Highest channel No.810, antenna horizontal



11 Frequency Stability Test

11.1 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±0.1ppm.

According to FCC §2.1055, the test conditions are:

- **Temperature**: The temperature is varied from -30ºC to +50ºC at intervals of not more than 10ºC.
- **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.

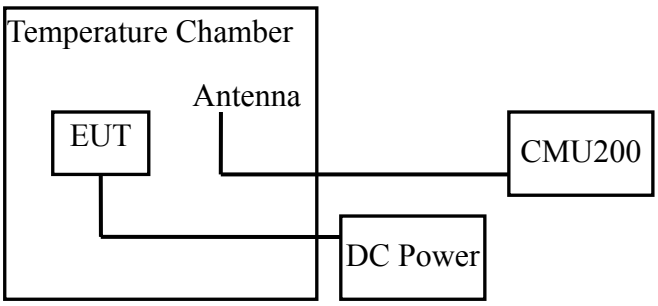
11.2 Test Procedure

a. The temperature was varied from -30ºC to +50ºC at intervals of 10ºC. 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.

11.3 Test Setup



11.4 EUT Setup and Operating Conditions

The EUT configuration of the emission tests was MS + DC power supply.

A communication link was established between the MS and a System Simulator (SS). The MS operated at the maximum output power (level 0). The PCS 1900 channel No.512 (low), 661 (mid), and 810 (high) were measured respectively.

11.5 Test Results

I. GSM 850 MHz Band

No.	Test Conditions		Frequency Deviation (Hz)			
	Volatage	Temperature (ºC)	128CH	190CH	251CH	Limit (±0.1ppm)
1	3.7V (V_{nom})	-30	15	-14	-13	128CH, ±82Hz 190CH, ±84Hz 251CH, ±85Hz
2		-20	4	12	7	
3		-10	-13	5	12	
4		0	14	-5	-2	
5		+10	-1	-19	4	
6		+20	1	2	-8	
7		+30	-13	-1	-8	
8		+40	9	-4	12	
9		+50	16	-3	7	
10	4.2V (V_{max})	+22	6	3	6	
11	3.4V (V_{min})	+22	19	-5	-9	

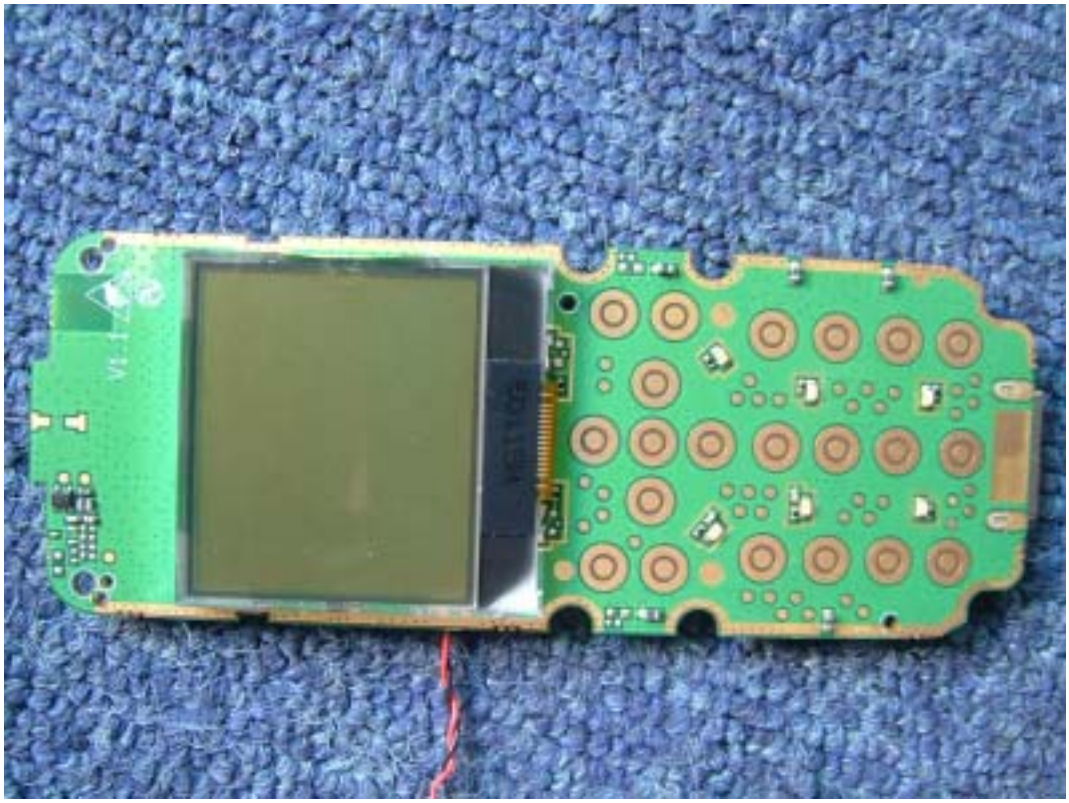
II. PCS 1900 MHz Band

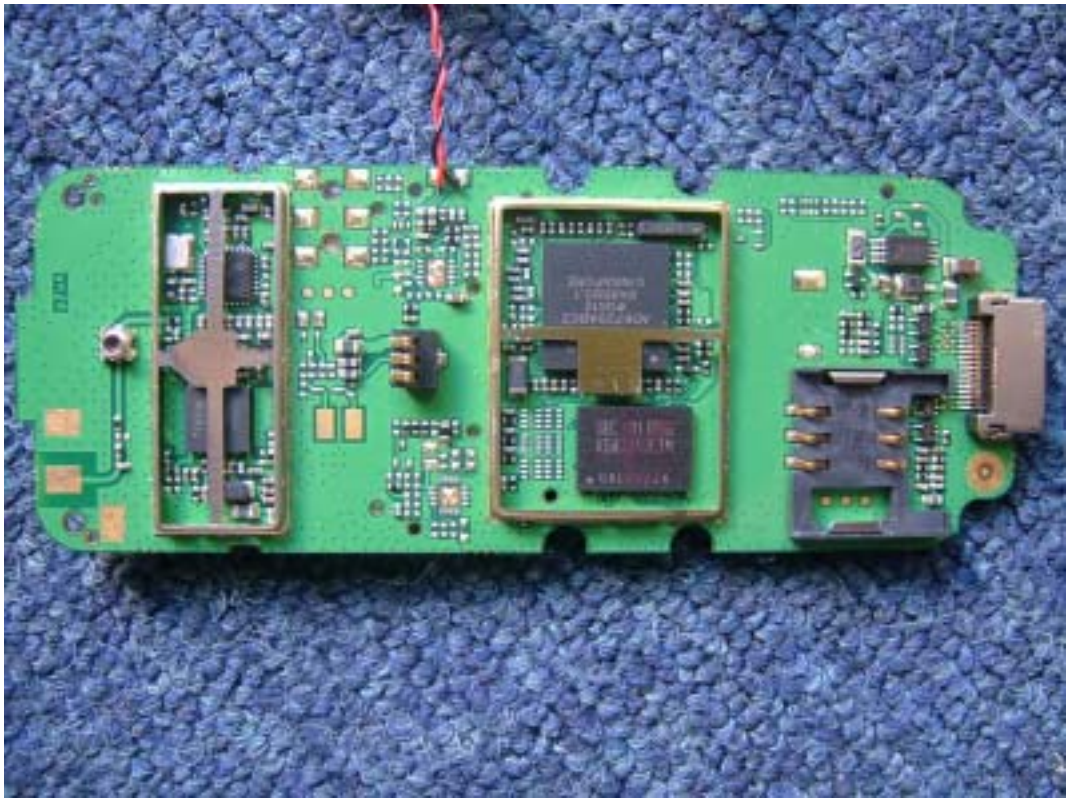
No.	Test Conditions		Frequency Deviation (Hz)			
	Volatage	Temperature (°C)	512CH	661CH	810CH	Limit (±0.1ppm)
1	3.7V (V_{nom})	-30	-18	21	1	512CH, ±185Hz 661CH, ±188Hz 810CH, ±191Hz
2		-20	11	19	20	
3		-10	3	13	9	
4		0	7	11	18	
5		+10	-8	11	-9	
6		+20	15	-15	0	
7		+30	5	18	0	
8		+40	-2	12	11	
9		+50	12	12	-5	
10	4.2V (V_{max})	+22	-13	-18	-3	
11	3.4V (V_{min})	+22	8	10	20	

Appendix I：Photographs of the EUT

1. Appearance of the MS

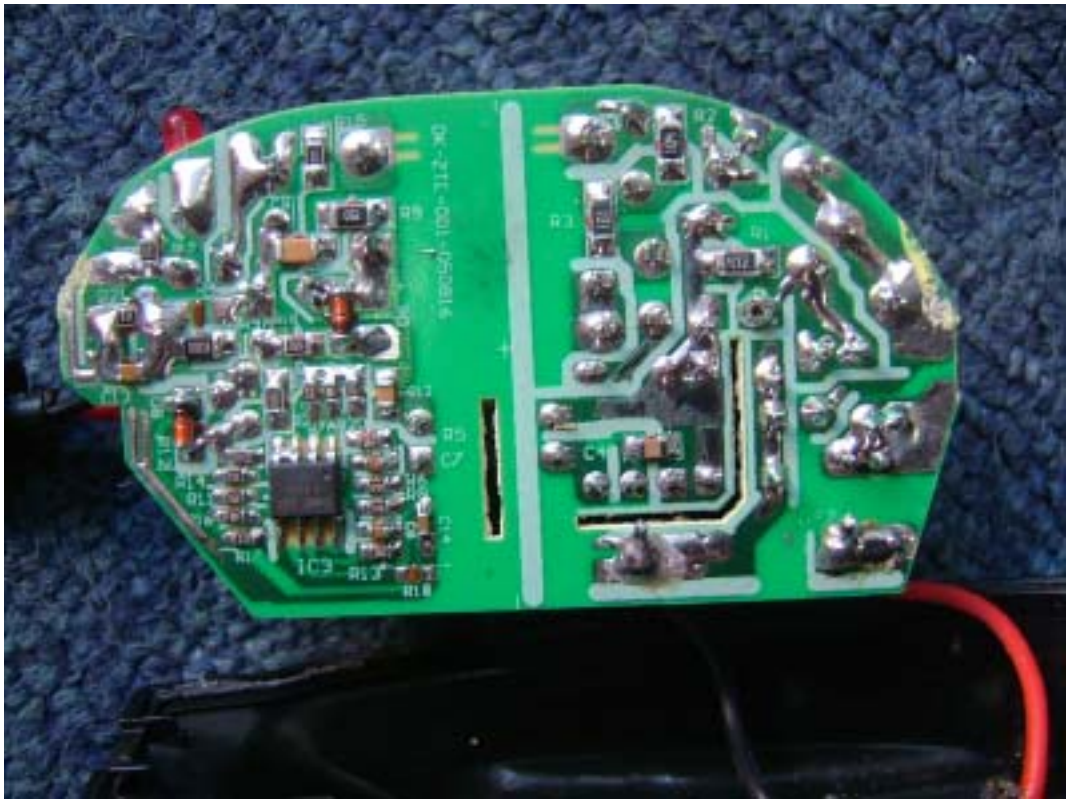
2. Inside of the MS





3. Appearance of the Charger

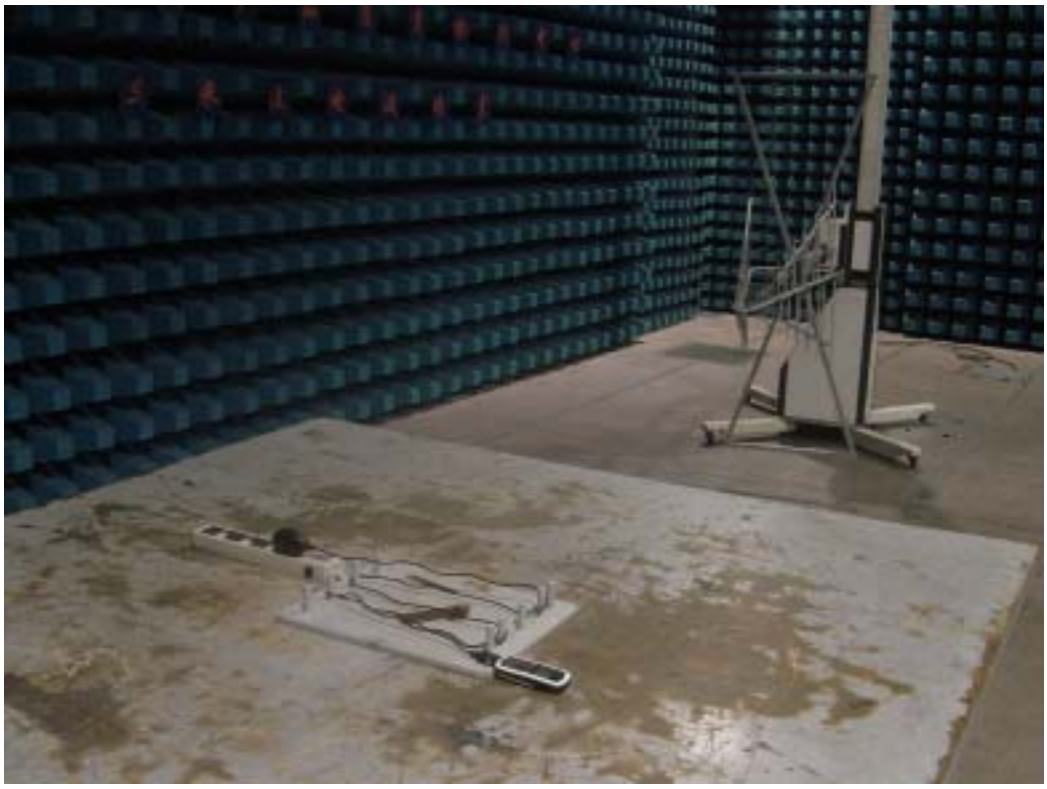
4. Inside of the Charger

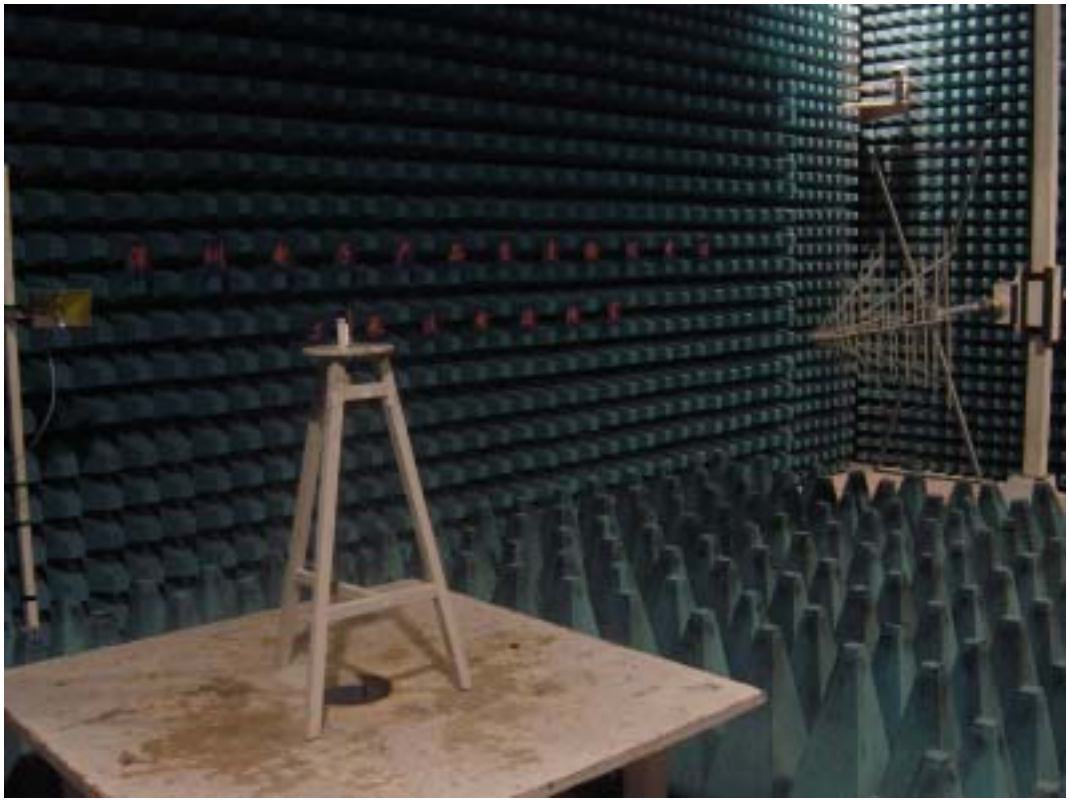


Appendix II：Photographs of the Test Configuration

1. Conducted Emission Test

2. Radiated Emission Test



3. Conducted RF Test

4. Radiated RF Test