(2004)量认(国)字(H2402)号 No.L1659

FCC TEST REPORT

of

850/900/1800/1900 Quad Band Handset

FCC ID:	S63MRBSC528
Brand Name:	AWG
Model No.:	SC528
Serial No.:	N.A.
Report No.:	FCC05-8005
Date:	May 16, 2005

Prepared for

Advanced Wireless Group Limited

Suite 2013, 20F., West Wing Grandtech Centre,
8 On Ping Street, Shaitin, N.T. Hong Kong

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

This test report consists of **36** pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by SET. The test results in the report only apply to the tested sample. The test report shall be invalid without all the signatures of testing engineers, reviewer and approver.

Table of Contents

1 Test Report Certification 4
2 General Information 5
2.1 Description of EUT 5
2.2 Objective 6
2.3 Test Standards and Results 6
2.4 List of Equipments Used 7
2.5 Test Facility 7
3 Conducted Emission Measurement 8
3.1 Limits of Conducted Emission 8
3.2 Test Procedure 8
3.3 Test Setup 9
3.4 EUT Setup and Operating Conditions 9
3.5 Test Results 9
4 Radiated Emission Test 11
4.1 Limits of Radiated Emission 11
4.2 Test Procedure 11
4.3 Test Setup 12
4.4 EUT Setup and Operating Conditions 12
4.5 Test Results 12
5 Frequencies 14
5.1 Frequency Blocks Available for Cellular Service 14
5.2 Frequency Blocks Available for Broadband PCS 14
5.3 Test Procedure 15
5.4 Test Setup 15
5.5 EUT Setup and Operating Conditions 15
5.6 Test Results 16
6 Occupied Bandwidth 18
6.1 Definition 18

6.2 Test Procedure 18
6.3 Test Setup 18
6.4 EUT Setup and Operating Conditions 18
6.5 Test Results 19
7 Effective Radiated Power (ERP) Test 21
7.1 Limits of ERP 21
7.2 Test Procedure 21
7.3 Test Setup 22
7.4 EUT Setup and Operating Conditions 22
7.5 Test Results 23
8 Spurious Radiation Test 24
8.1 Limits of Spurious Radiation 24
8.2 Test Procedure 24
8.3 Test Setup 24
8.4 EUT Setup and Operating Conditions 24
8.5 Test Results 25
9 Frequency Stability Test 27
9.1 Requirement of Frequency Stability 27
9.2 Test Procedure 27
9.3 Test Setup 27
9.4 EUT Setup and Operating Conditions 28
9.5 Test Results 28
Appendix I：Photographs of the EUT 30
Appendix II：Photographs of the Test Configuration 35

1 Test Report Certification

Product:	850/900/1800/1900 Quad Band Handset
FCC ID:	S63MRBSC528
Model No.:	SC528
Applicant:	Advanced Wireless Group Limited
Applicant Address:	Suite 2013, 20F., West Wing Grandtech Centre, 8 On Ping Street, Shaitin, N.T. Hong Kong
Manufacturer:	Advanced Wireless Group Limited
Manufacturer Address:	Blk B, 4/F Qian Jin Road 2, District 75, Liu Tang, Xi Xiang Bao An, ShenZhen. 518102, P.R.China
Test Standards:	47 CFR Part 2 47 CFR Part 22, Subpart H 47 CFR Part 24, Subpart E 47 CFR Part 15, Subpart B & Subpart C
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. 17. 2005
Lin Xingsun

Checked by: Smart Li, Date: May. 17. 2005
Smart Li

Approved by: Keqin Wang, Date: May. 17, 2005
Wang Keqin

2 General Information

2.1 Description of EUT

EUT1	
Description:	850/900/1800/1900 Quad Band Handset (MS)
Model No.:	SC528
Emission Designator:	200KGXW
Modulation:	GSM
Frequency:	GSM850, Tx: 824-849MHz; Rx: 869-894MHz GSM1900, Tx: 1850-1910MHz; Rx: 1930MHz-1990MHz
Power:	2W for GSM850; 1W for GSM1900
IMEI No.:	355851000003094
Serial No.:	B0504160003094
Hardware Version:	86512201_REV1.0
Software Version:	5AX1BCEZZ0205V4.14
EUT2	
Description:	Lithium-ion Battery
Model No.:	LISHEN - 383048
Serial No.:	N.A.
Manufacturer:	FuYu Moulding & Tooling (Dongguan) Co., Ltd
Capacitance:	580mAh
Rated Voltage:	3.7V
Charge Limit:	4.2V
EUT3	
Description:	AC Adaptor (Charger)
Model No.:	5AX2
Serial No.:	N.A.
Manufacturer:	Xinyima Industrial Co., Ltd.
Rated Input:	a.c. 100-240V, 0.55A, 47-63Hz
Rated Output:	d.c. 5V, 550mA
Length DC cable:	188cm

NOTE:

1. The EUT is a model of quad-band mobile station which supports 850MHz, 900MHz, 1800 MHz and 1900 MHz. It can be switched by software option between 850/1900MHz and 900/1800 MHz. In the United States, only 850 MHz (Cellular) and 1900 MHz (PCS) services

are available. So, only 850/1900MHz bands are tested in this report according to FCC rules.

2. The EUT consists of Hand Telephone Set and normal options: Lithium Battery, Charger, and earphones.
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 §15.207	Conducted Emission	PASS
2	§15.109	Radiated Emission	PASS
3	§2.106 §22.905 §24. 229	Frequencies	PASS
4	§2.1049	Occupied Bandwidth	PASS
5	§2.1046 §22.913 §24.232	Effective Radiated Power (ERP)	PASS
6	§2.1053 §22.917 §24.238	Spurious Radiation	PASS
7	§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	2005.06.10	A0304233
Ultra Broadband Ant	Rohde & Schwarz	HL562	2005.06.05	A0304224
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	2005.2.10	0811211
Temperature Chamber	JAPAN TABAI	PSL-4G	2006.02.05	A8708056
Regulated DC Power Supply	Jiangbo	JB-305	--	A0412374
Shield Room	Nanbo Tech	Site 3	2006.03.18	A9901141
Shield Room	Nanbo Tech	Site 1	2006.01.17	A0304188
Anechoic Chamber	Albatross	H-249	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 EMC chamber site No.1, 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 Registration Number is 261302.

3 Conducted Emission Measurement

3.1 Limits of Conducted Emission

According to FCC §15.107 and §15.207, 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

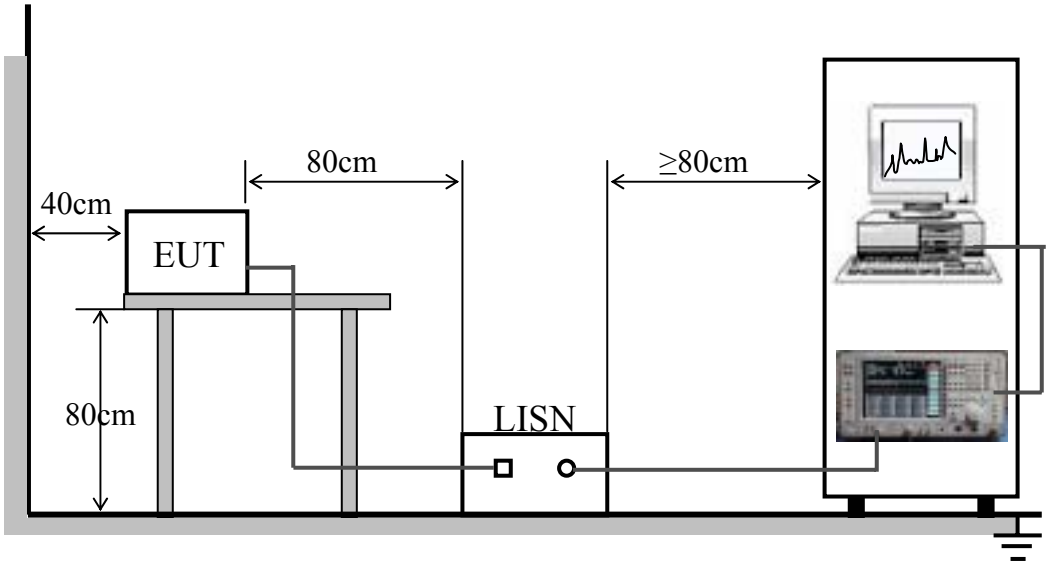
a. The EUT was placed on a 0.8m high insulating table and kept 0.4 meters from the conducting wall of shielded room.

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 lithium 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.

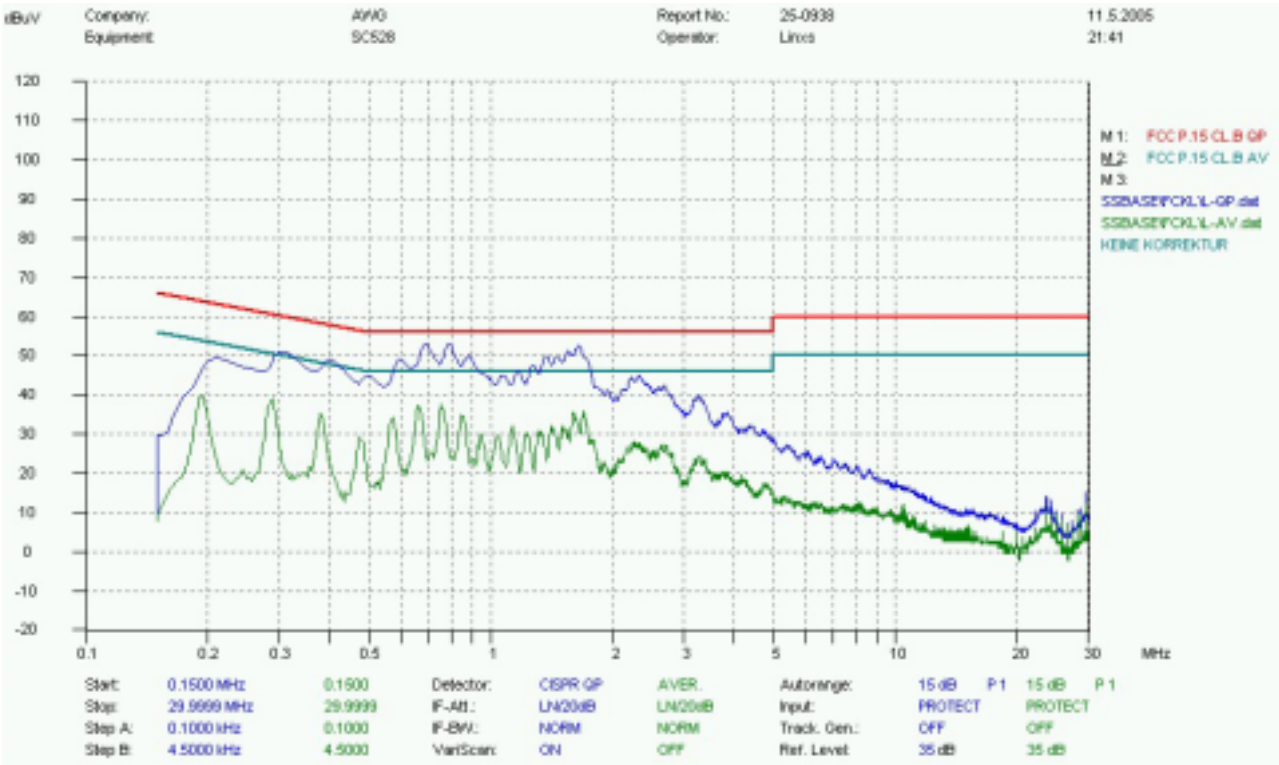
3.5 Test Results

No.	Freq. (MHz)	Limit Value (dBμV)		Emission Level (dBμV)	
		QP	AV	QP	AV
1	0.3030	60.2	50.2	51.0	36.4
2	0.4000	57.9	47.9	49.1	32.3
3	0.6900	56.0	46.0	53.1	33.5
4	0.7850	56.0	46.0	53.0	33.6
5	1.6485	56.0	46.0	52.7	32.4
6	2.3280	56.0	46.0	45.1	24.3

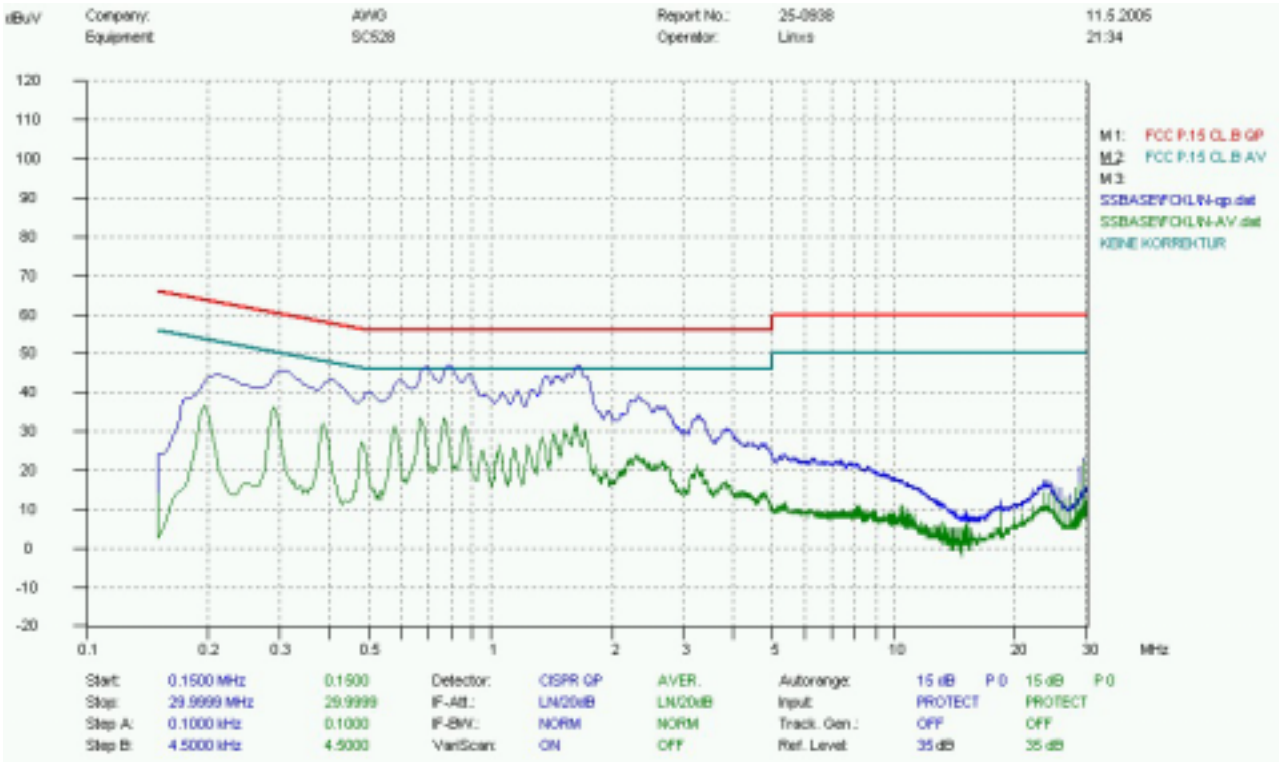
NOTE:

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.

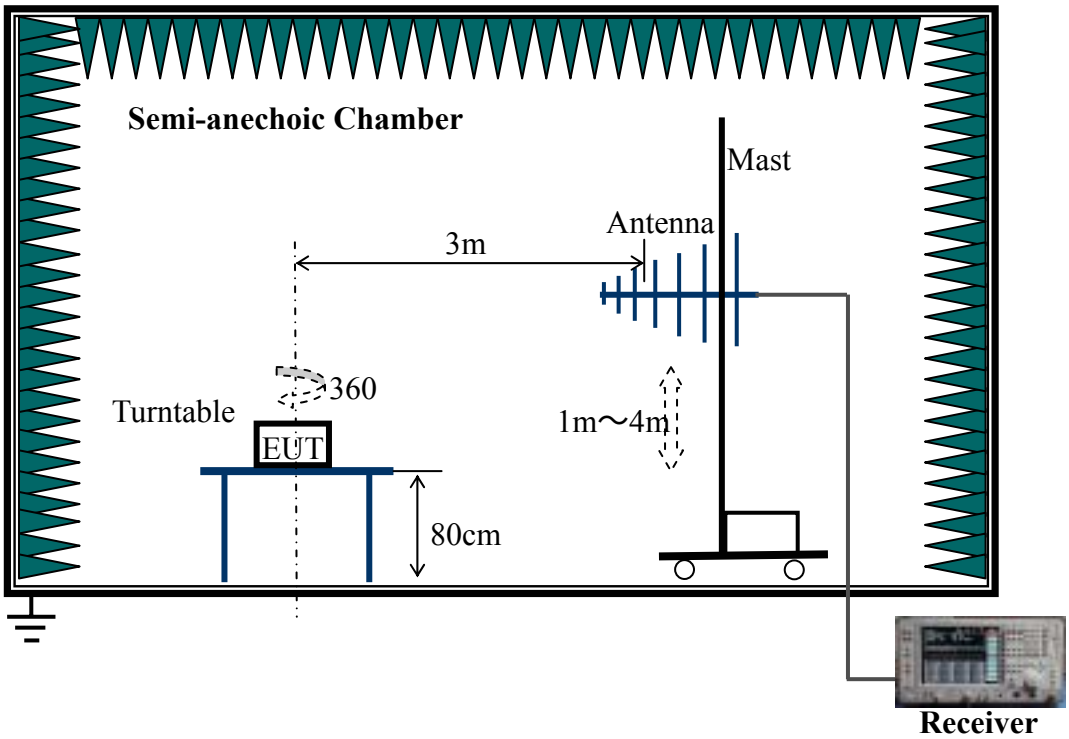
c. The antenna is a broadband antenna, and its height is varied from one meter to four meter above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

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

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

Before the measurement, the lithium battery was completely discharge.

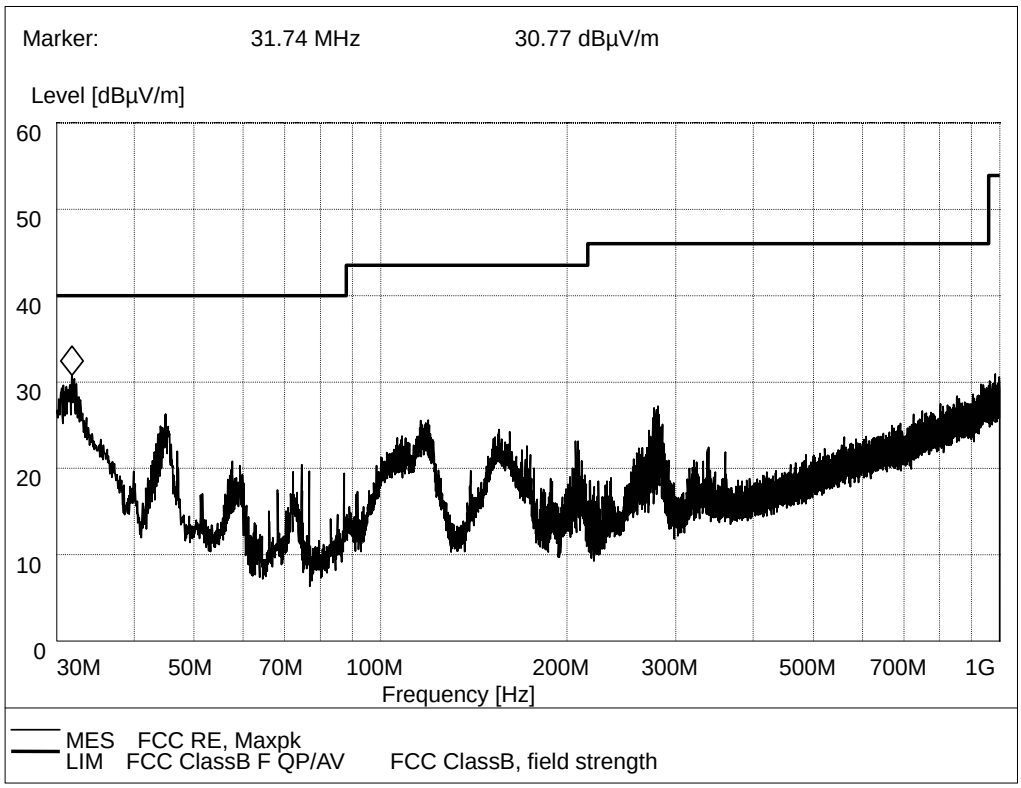
During the measurement, the lithium battery and the charger were installed, and the MS were in charging state. A communication link was established between the MS and a System Simulator (SS). The MS operated at PCS 1900MHz mid ARFCN (661) and maximum output power (level 0).

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

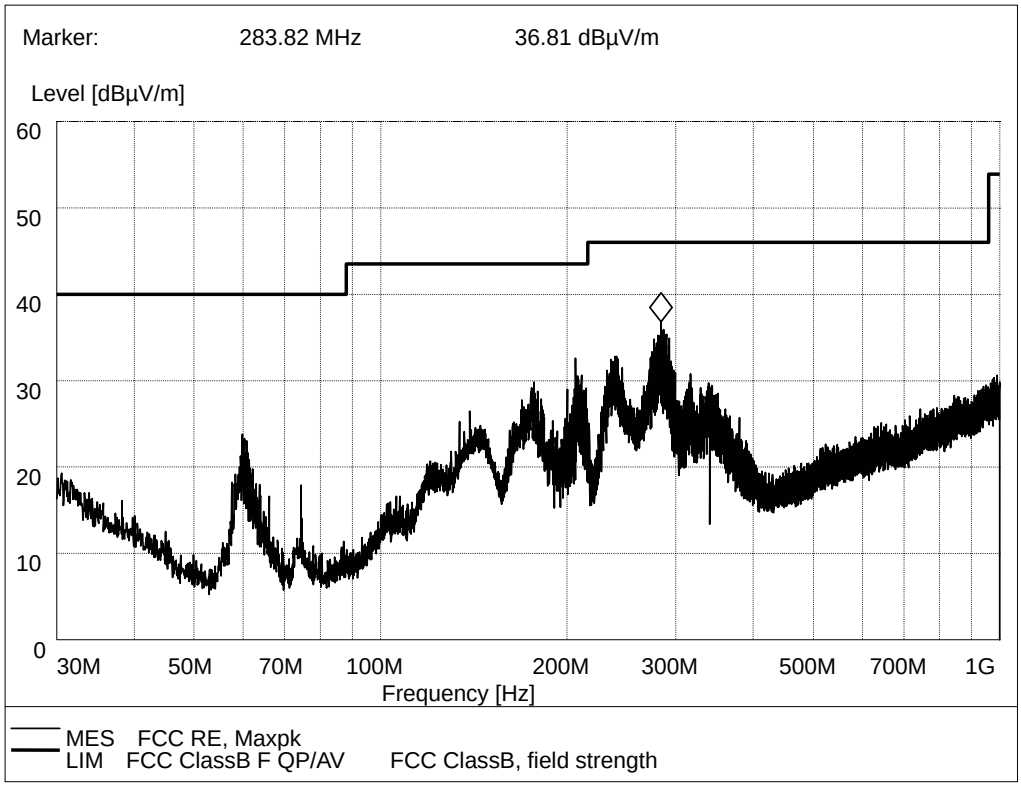
4.5 Test Results

No.	Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Table Angle (Degree)	QP Limits (dBμV/m)	Emission Level (dBμV/m)
1	31.74	Vertical	100	30	40	29.47
2	45.00	Vertical	100	10	40	24.56
3	280.94	Vertical	100	0	46	24.95
4	206.72	Horizontal	130	0	43.5	28.47
5	239.00	Horizontal	130	0	46	29.59
6	283.82	Horizontal	140	0	46	33.30

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.

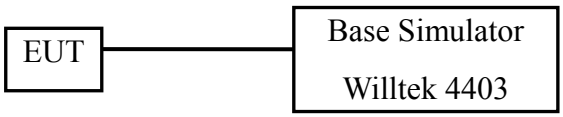
5.3 Test Procedure

a. The EUT was connected to the base simulator by an RF cable.

b. A communication link was established between the EUT and the base simulator. The MS operated at the maximum output power. The frequencies of the lowest channel and the highest channel were measured respectively.

c. The spectrum analyzer (within the base simulator) was set to Average mode. The resolution bandwidth was 5 kHz.

5.4 Test Setup



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.

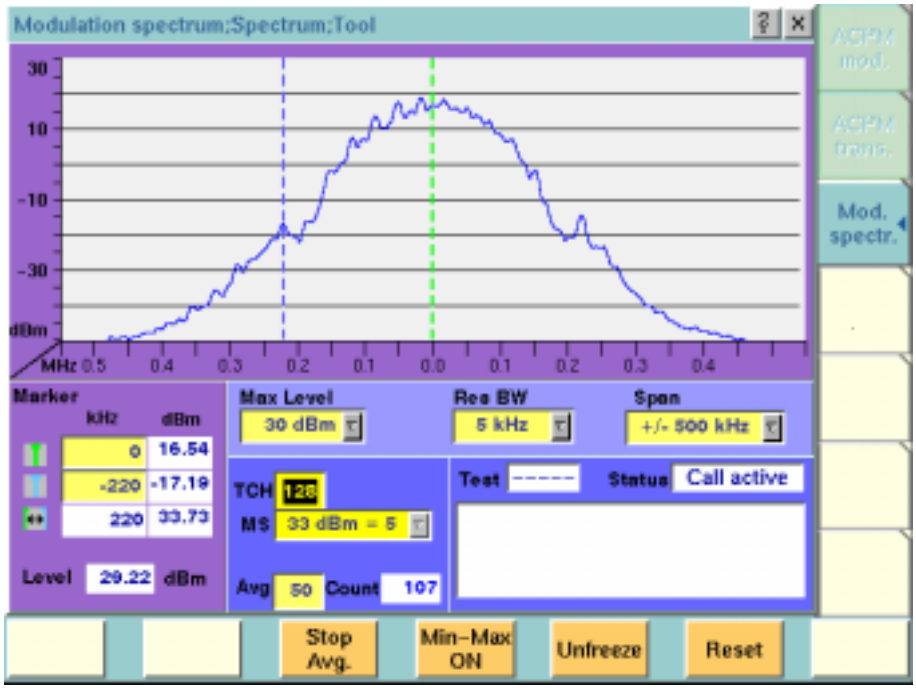
5.6 Test Results

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

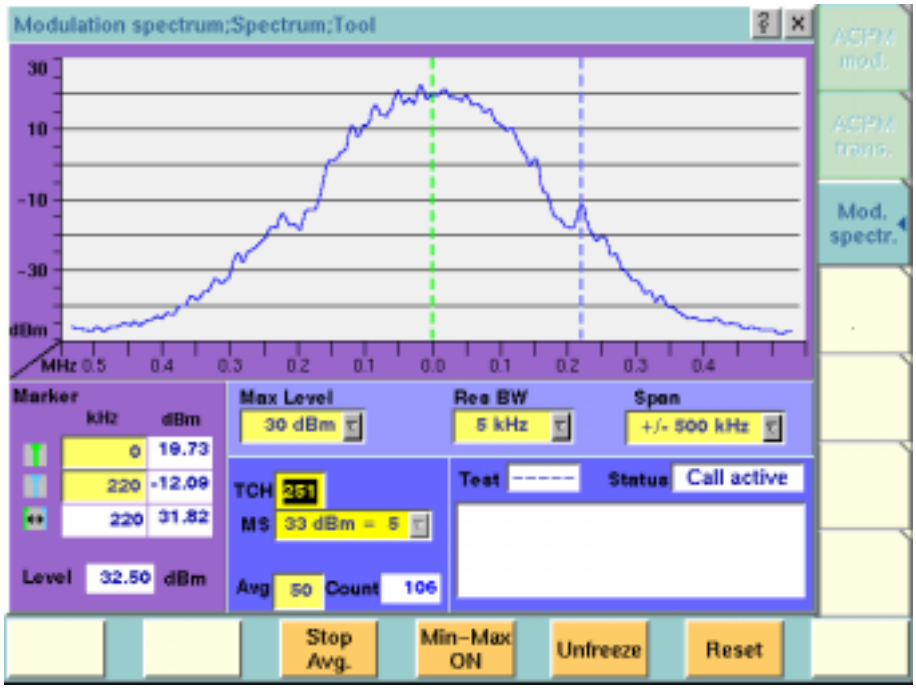
$Fl(n) = 824.2 + 0.2*(n-128),\ 128 \leqq n \leqq 251$

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

1. Lowest channel No.128, center frequency 824.20MHz



2. Highest channel No.251, center frequency 848.80MHz

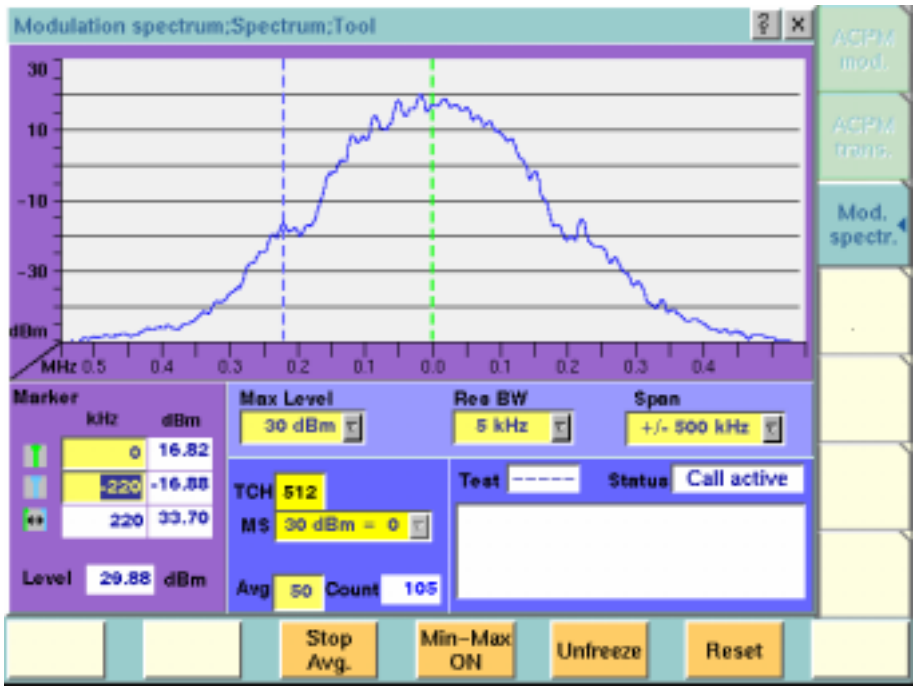


The mobile transmitter frequency arrangement of the PCS1900 band is

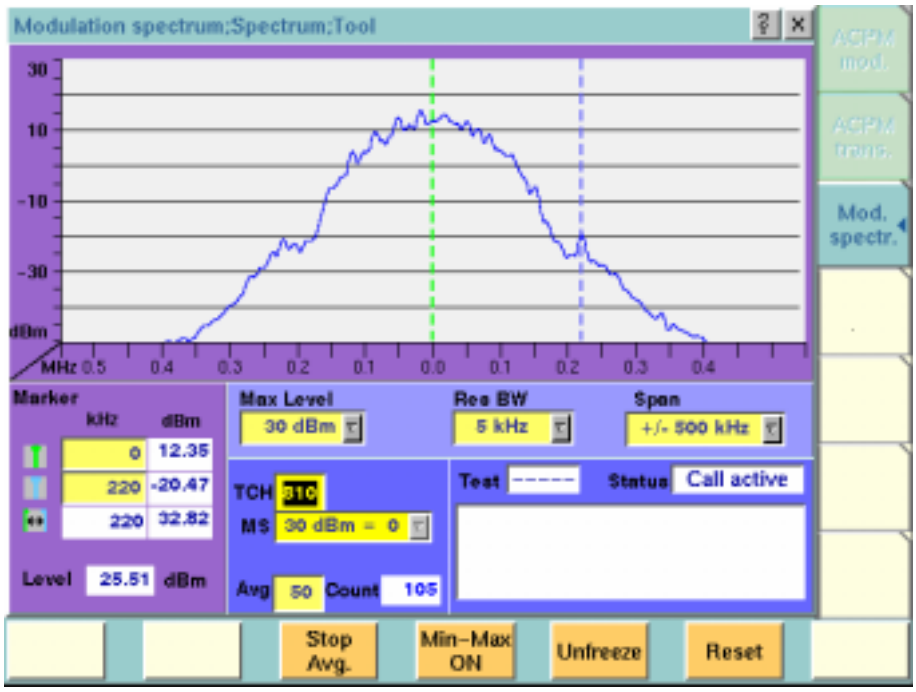
$$FI(n) = 1850.2 + 0.2*(n-512),\ 512 \leqq n \leqq 810$$

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

1. Lowest channel No.512, center frequency 1850.20MHz



2. Highest channel No.810, center frequency 1909.80MHz



6 Occupied Bandwidth

6.1 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.

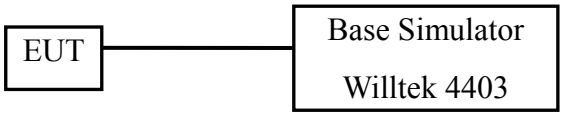
6.2 Test Procedure

a. The EUT was connected to the base simulator by an RF cable.

b. A communication link was established between the EUT and the base simulator. The MS operated at the maximum output power. The occupied bandwidth of the lowest channel and the highest channel were measured respectively.

c. The spectrum analyzer (within the base simulator) was set to Average mode. The resolution bandwidth was 10 kHz.

6.3 Test Setup



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.

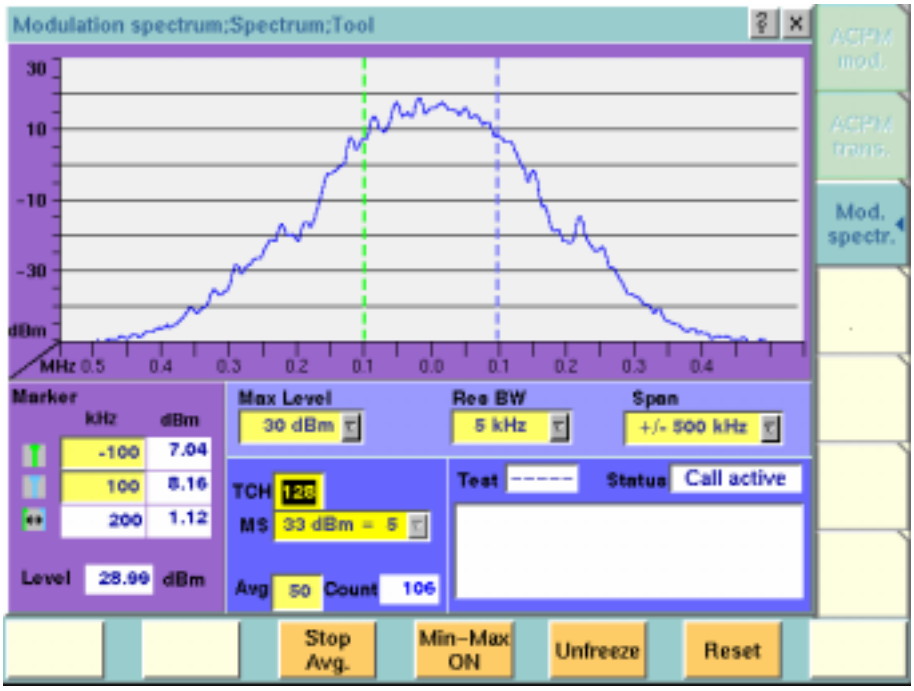
The lowest channel and the highest channel were measured respectively: channel No.128 (low) and 251 (high) for GSM 850 MHz; channel No.512 (low) and 810 (high) for PCS 1900 MHz.

6.5 Test Results

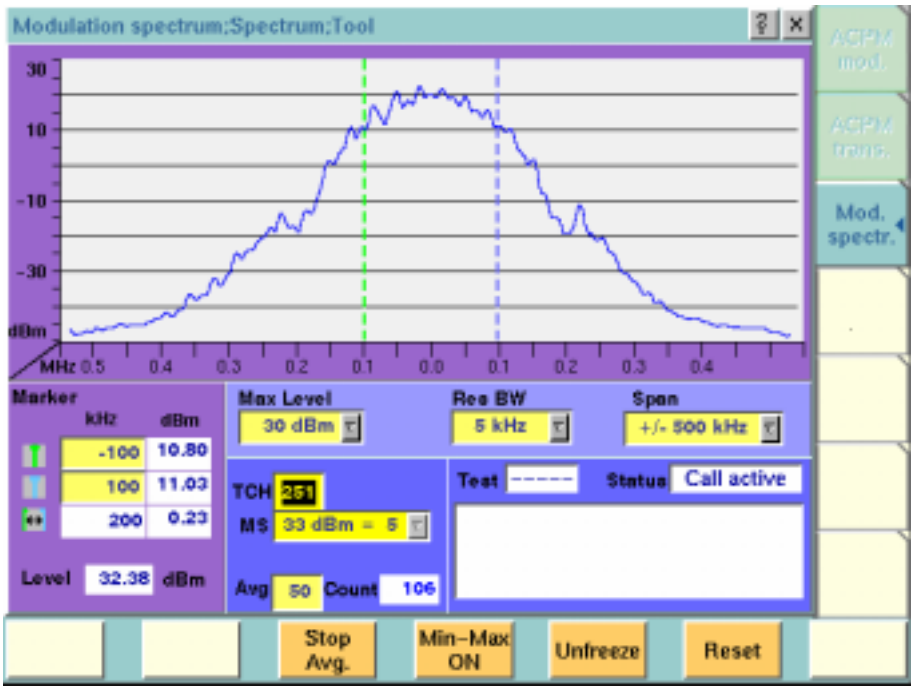
The transmitter occupied bandwidth of the GSM system is 200 kHz.

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

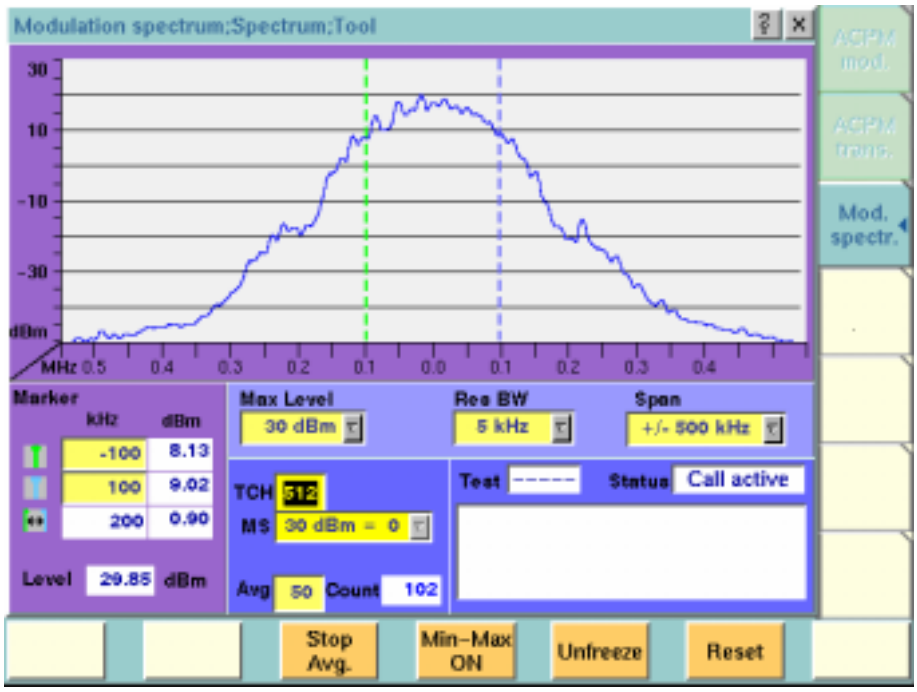
1. GSM 850MHz band, lowest channel No.128, center frequency 824.20MHz



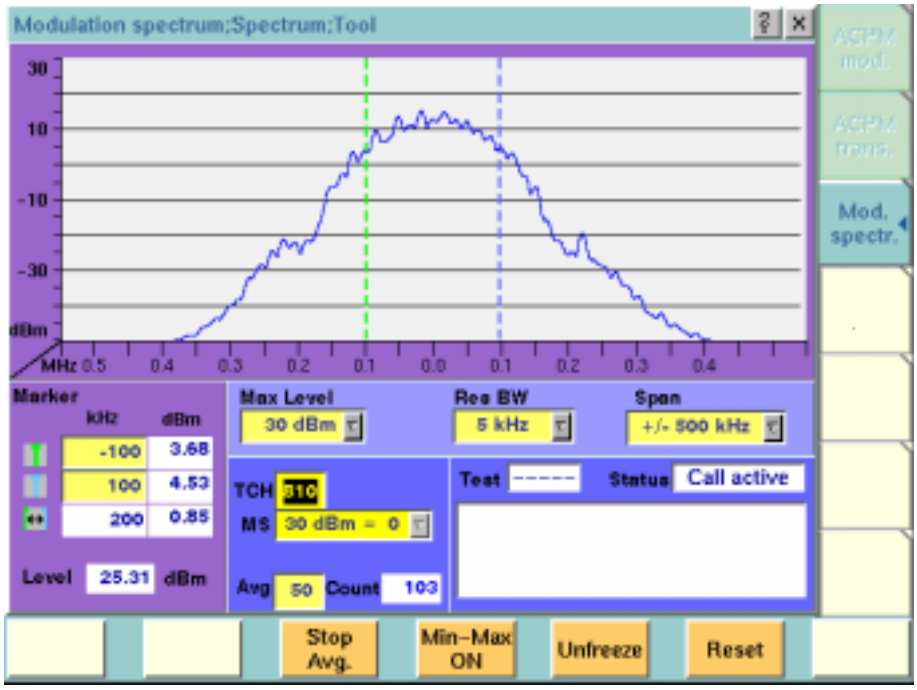
2. GSM 850MHz band, highest channel No.251, center frequency 848.80MHz



3. PCS 1900MHz band, lowest channel No.512, center frequency 1850.20MHz



4. PCS 1900MHz band, highest channel No.810, center frequency 1909.80MHz



7 Effective Radiated Power (ERP) Test

7.1 Limits of 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.

7.2 Test Procedure

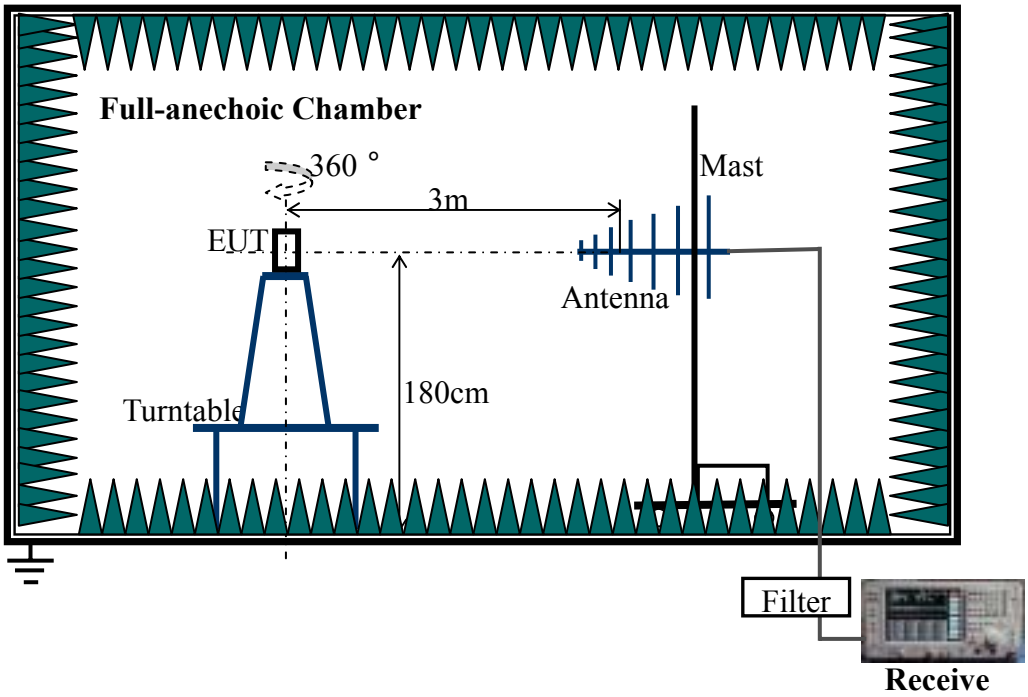
d. The radiated power measurement was performed in a full anechoic chamber. The air lost of the site and the factors of the test system is pre-calibrated using substitution method.

e. 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.

f. 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.

g. The test receiver was set to Maxpeak Detector function and Maximum Hold mode. The IF bandwidth and video bandwidth was both set to 1MHz.

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

1. GSM 850 MHz: Maximum power level 5 (33dBm).

No.	GSM 850 Channel No.	Frequency (MHz)	Antenna Polarization	ERP (dBm)	Limit (dBm)
1	128	824.20	Vertical	20.17	38.5
2			Horizontal	14.54	38.5
3	190	836.60	Vertical	23.18	38.5
4			Horizontal	16.37	38.5
5	251	848.80	Vertical	25.74	38.5
6			Horizontal	14.85	38.5

2. PCS 1900 MHz: Maximum power level 0 (30dBm).

No.	PCS 1900 Channel No.	Frequency (MHz)	Antenna Polarization	ERP (dBm)	Limit (dBm)
1	512	1850.20	Vertical	27.53	33
2			Horizontal	23.18	33
3	661	1880.00	Vertical	24.78	33
4			Horizontal	17.75	33
5	810	1909.80	Vertical	21.23	33
6			Horizontal	16.90	33

8 Spurious Radiation Test

8.1 Limits of Spurious Radiation

According to FCC §22.917, the out of band emission must be attenuated below the mean power of the unmodulated carrier (P) by at least 43 + 10 log (P) dB. For GSM 850 MHz band with a maximum power level of 2W (33dBm), the spurious radiation limit is -10dBm.

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. For PCS 1900 MHz band with a maximum power level of 1W (30dBm), the limit is -13 dBm.

8.2 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 test receiver was set to Maxpeak Detector function and Maximum Hold mode. Measuring frequencies are from 30 MHz to 10th harmonic of the fundamental frequency.

8.3 Test Setup

Same as 7.3

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 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 MHz.

8.5 Test Results

No.	Frequency (MHz)	ERP (dBm) V – E1	ERP (dBm) V – E2	ERP (dBm) H – E1	ERP (dBm) H – E2	Limit (dBm)
GSM 850 MHz: Channel No. 128 (824.20 MHz)						
1	1648.40	-45.67	-44.54	-45.58	-44.19	-10
2	2472.60	-46.42	-47.00	-47.12	-46.47	-10
3	3296.80	--	--	--	--	-10
4	4121.00	--	--	--	--	-10
5	4945.20	--	--	--	--	-10
6	5769.40	--	--	--	--	-10
7	6593.60	--	--	--	--	-10
8	7417.80	--	--	--	--	-10
9	8242.00	--	--	--	--	-10
GSM 850 MHz: Channel No. 190 (836.60 MHz)						
10	1673.20	-41.99	-41.21	-41.96	-41.44	-10
11	2509.80	-46.01	-44.37	-44.91	-45.02	-10
12	3346.40	--	--	--	--	-10
13	4183.00	--	--	--	--	-10
14	5019.60	--	--	--	--	-10
15	5856.20	--	--	--	--	-10
16	6692.80	--	--	--	--	-10
17	7529.40	--	--	--	--	-10
18	8366.00	--	--	--	--	-10
GSM 850 MHz: Channel No. 251 (848.80 MHz)						
19	1697.60	-39.60	-39.42	-41.08	-39.67	-10
20	2546.40	-43.09	-44.26	-45.27	-45.80	-10
21	3395.20	--	--	--	--	-10
22	4244.00	--	--	--	--	-10
23	5092.80	--	--	--	--	-10
24	5941.60	--	--	--	--	-10
25	6790.40	--	--	--	--	-10
26	7639.20	--	--	--	--	-10
27	8488.00	--	--	--	--	-10

NOTE:

1. V and H are the antenna polarizations: Vertical and Horizontal. E1 and E2 mean the EUT positions: stand-up and lie-on.
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 because the spurious radiations from other frequencies are even lower and are at least 20 dB below the limit.
3. "--" in the table above means that the emissions are too small to be measured and are at least 20 dB below the limit.

No.	Frequency (MHz)	ERP (dBm) V – E1	ERP (dBm) V – E2	ERP (dBm) H – E1	ERP (dBm) H – E2	Limit (dBm)
PCS 1900 MHz: Channel No. 512 (1850.20 MHz)						
1	3700.40	-45.31	-44.02	-43.46	-43.39	-13
2	5550.60	-46.72	-46.87	-46.93	-47.95	-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	-46.00	-44.05	-42.53	-45.68	-13
11	5640.00	-47.02	-46.57	-46.71	-47.36	-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	-46.52	-45.36	-44.23	-46.63	-13
20	5729.40	-47.24	-46.96	-47.34	-47.02	-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. E1 and E2 mean the EUT positions: stand-up and lie-on.
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 because the spurious radiations from other frequencies are even lower and are at least 20 dB below the limit.
3. "--" in the table above means that the emissions are too small to be measured and are at least 20 dB below the limit.

9 Frequency Stability Test

9.1 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.

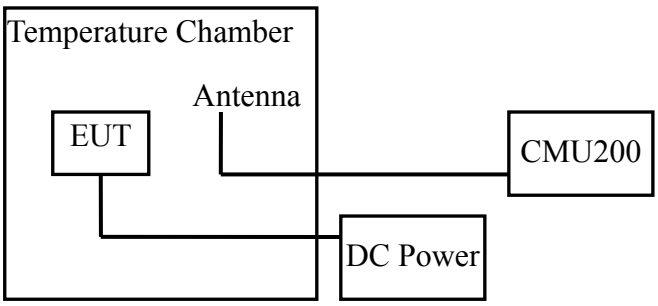
9.2 Test Procedure

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.

9.3 Test Setup



9.4 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 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 MHz.

9.5 Test Results

1. GSM 850 MHz

No.	Test Conditions		Frequency Deviation (Hz)			
	Volatage	Temperature (ºC)	128CH	190CH	251CH	Limit (±0.1ppm)
1	3.7V (V_{nom})	-30	-5	-53	+24	128CH, ±82Hz 190CH, ±84Hz 251CH, ±85Hz
2		-20	+19	-26	+41	
3		-10	+59	-19	-30	
4		0	+3	+6	-4	
5		+10	-2	-21	+6	
6		+20	+20	-19	-12	
7		+30	-48	+50	-35	
8		+40	-3	+46	-15	
9		+50	-25	-28	-36	
10	4.2V (V_{max})	+22	+26	-35	+10	
11	3.6V (V_{min})	+22	-53	-39	+49	

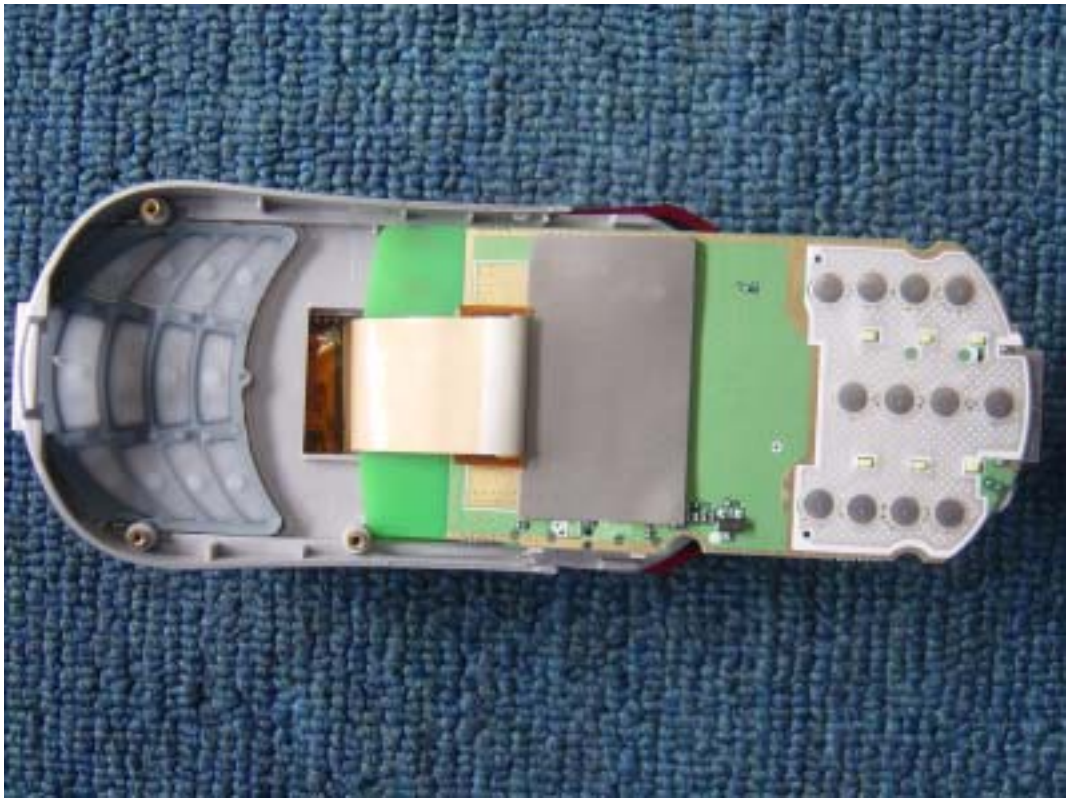
2. **PCS 1900 MHz**

No.	Test Conditions		Frequency Deviation (Hz)			
	Volatage	Temperature (°C)	512CH	661CH	810CH	Limit (±0.1ppm)
1	3.7V (V_{nom})	-30	-46	+13	+53	512CH, ±185Hz 661CH, ±188Hz 810CH, ±191Hz
2		-20	-12	+9	-21	
3		-10	-5	-43	-7	
4		0	-14	-55	-15	
5		+10	+22	-4	-36	
6		+20	+6	+41	+10	
7		+30	-32	-53	-14	
8		+40	-22	-46	-41	
9		+50	-13	-8	-6	
10	4.2V (V_{max})	+22	-47	+31	+36	
11	3.6V (V_{min})	+22	+33	-7	-45	

Appendix I：Photographs of the EUT

1. Appearance of the MS

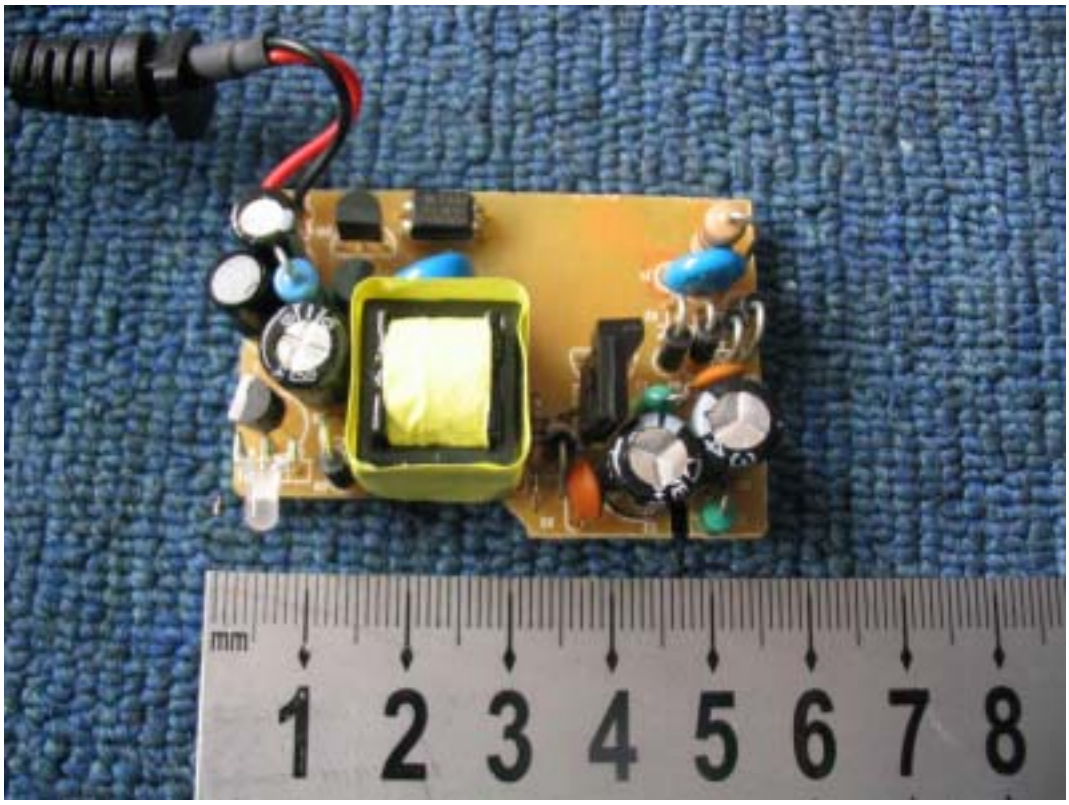
2. Inside of the MS

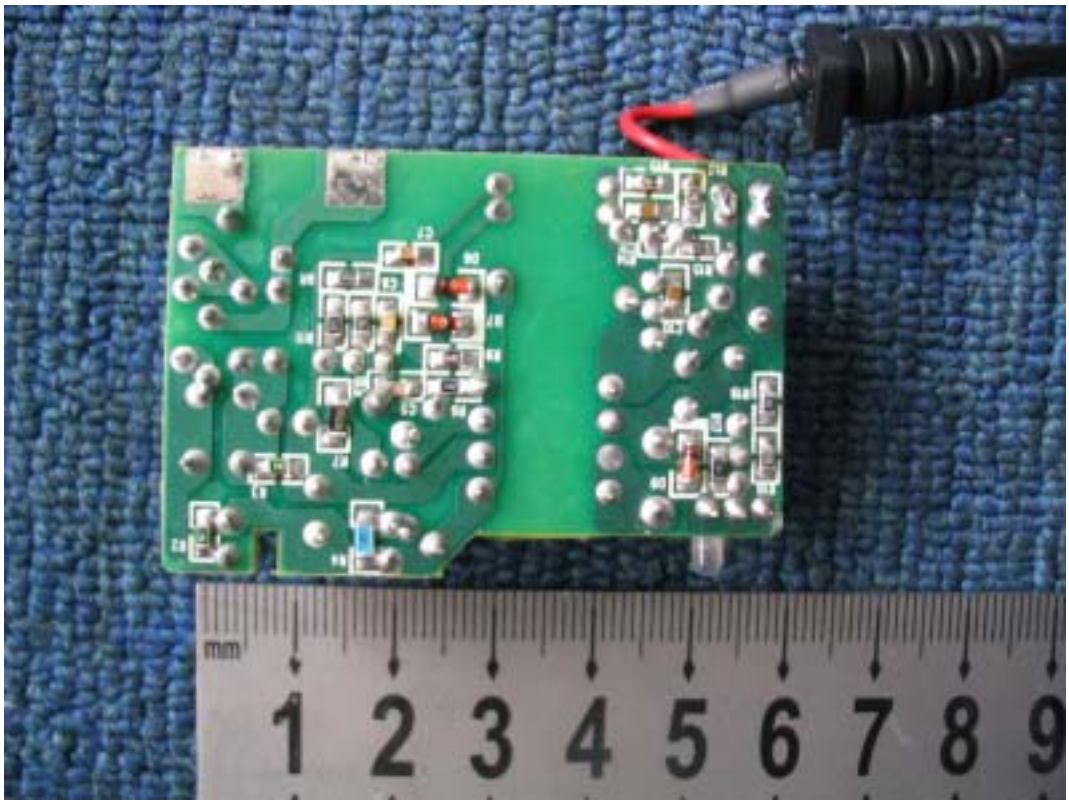


EPSON

3. Appearance of the Charger

4. Inside of the Charger

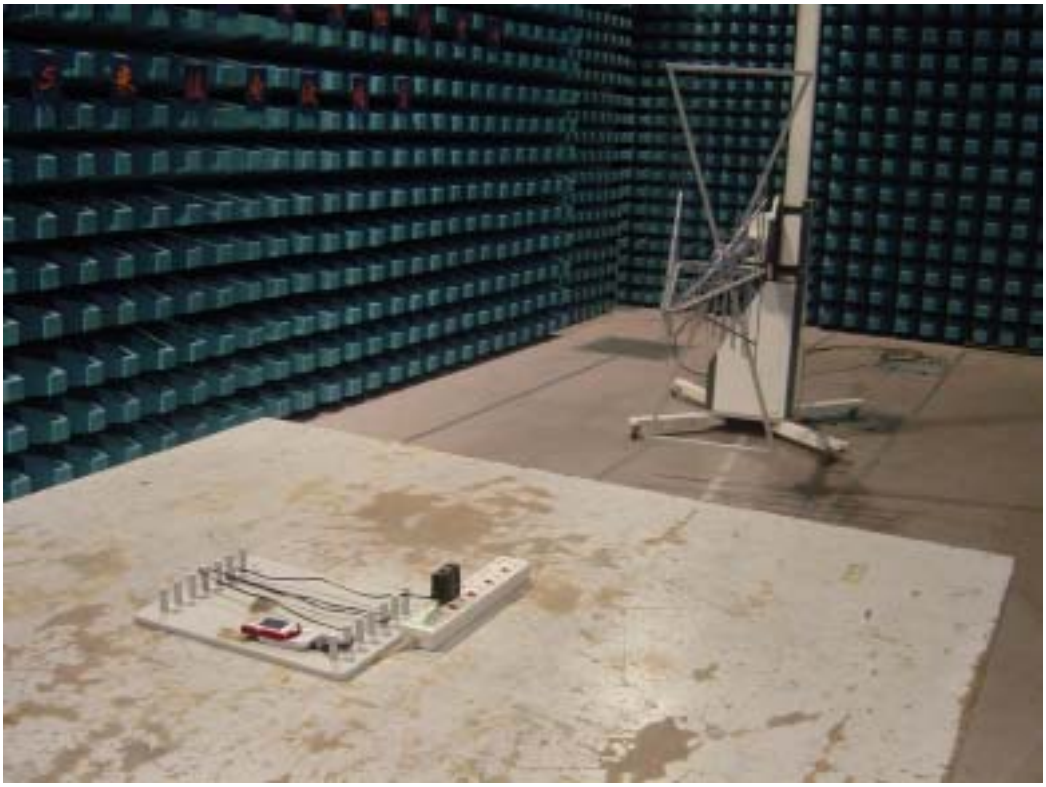




Appendix II：Photographs of the Test Configuration

1. Conducted Emission Measurement

2. Radiated Emission Measurement



3. ERP and Spurious Radiation Measurement