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FCC TEST REPORT

of

CDMA 1X Mobile Phone

FCC ID:	SG70512C1000
Brand Name:	HAIER
Model No.:	C1000
Serial No.:	0524008A (ESN)
Report No.:	FCC06-8006
Date:	January 17, 2006

Prepared for

Qingdao Haier Telecom Co., Ltd.
No.1, Haier Road, Qingdao 266101 P.R.China

Prepared by

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1 Test Report Certification

Product: CDMA 1X Mobile Phone

FCC ID: SG70512C1000

Model No.: C1000

Applicant: Qingdao Haier Telecom Co., Ltd.

Applicant Address: No.1, Haier Road, Qingdao 266101 P.R.China

Manufacturer: Qingdao Haier Telecom Co., Ltd.

Manufacturer Address: No.1, Haier Road, Qingdao 266101 P.R.China

Test Standards: 47 CFR Part 2
47 CFR Part 15, Subpart B
47 CFR Part 22, Subpart H

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: Jan. 17, 2006
Lin Xingsun

Checked by: Smart Li, Date: Jan. 18. 2006
Smart Li

Approved by: Keqin Wang, Date: Jan. 18, 2006
Wang Keqin

2 General Information

2.1 Description of EUT

EUT1	
Description:	CDMA 1X Mobile Phone
Model No.:	C1000
Emission Designator:	1M25F9W
Modulation:	CDMA 1X
Frequency:	Tx: 825.25-847.75MHz; Rx: 870.25-892.75MHz
Rated Power:	N.A.
Serial No.:	0524008A (ESN)
Hardware Version:	P1
Software Version:	R01.03
EUT2	
Description:	Lithium-ion Battery
Model No.:	H11052
Serial No.:	EB02Q000000E252G1314
Manufacturer:	BYD COMPANY LIMITED
Capacitance:	720mAh
Rated Voltage:	3.7V
Charge Limit:	4.2V
EUT3	
Description:	AC/DC Adaptor (Charger)
Model No.:	LSA80-A1
Serial No.:	N.A.
Manufacturer:	NINGBO LISHUNDA ELECTRON CO., LTD.
Rated Input:	a.c. 100-240V, 50/60Hz
Rated Output:	d.c. 4.8V, 500mA
Length of DC cable:	188cm

NOTE:

1. The EUT is a model of CDMA 1X mobile station operating in Cellular 850MHz band.
2. The EUT consists of Hand Telephone Set and normal options: Lithium Battery and Charger, as listed above.
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, and Part 22 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

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	Frequencies	PASS
4	§2.1046 §22.913	Transmitter Radiated Power (ERP)	PASS
5	§2.1049	Occupied Bandwidth	PASS
6	§2.1051 §2.1057 §22.917	Conducted Spurious Emission	PASS
7	§2.1053 §2.1057 §22.917	Radiated Spurious Emission	PASS
8	§2.1055	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	2007.2.10	0811211
3G Communication Antenna	European Antennas	PSA 75301R/170	2006.04.10	A0304213
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	2007.01.17	A0304188
Anechoic Chamber	Albatross	EMC12.8×6.8×6.4(m)	2006.04.18	A0304210

2.5 Test Facility

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

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

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

2.6 Environmental conditions

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

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

3 Conducted Emission Measurement

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

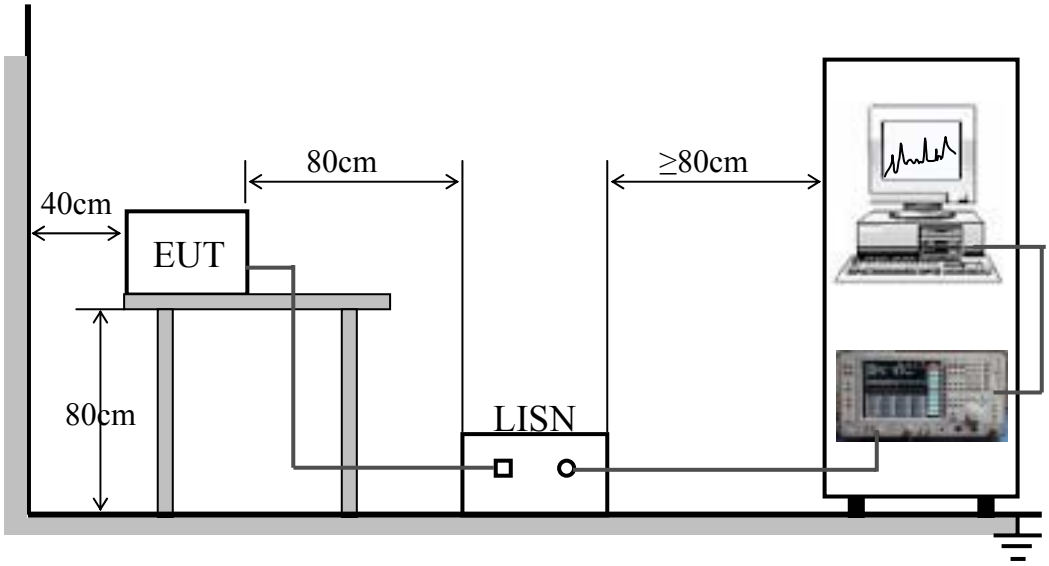
a. The EUT was placed on a 0.8m high insulating table and kept 0.4 meters from the conducting wall of shielded room.

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 maximum output power.

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

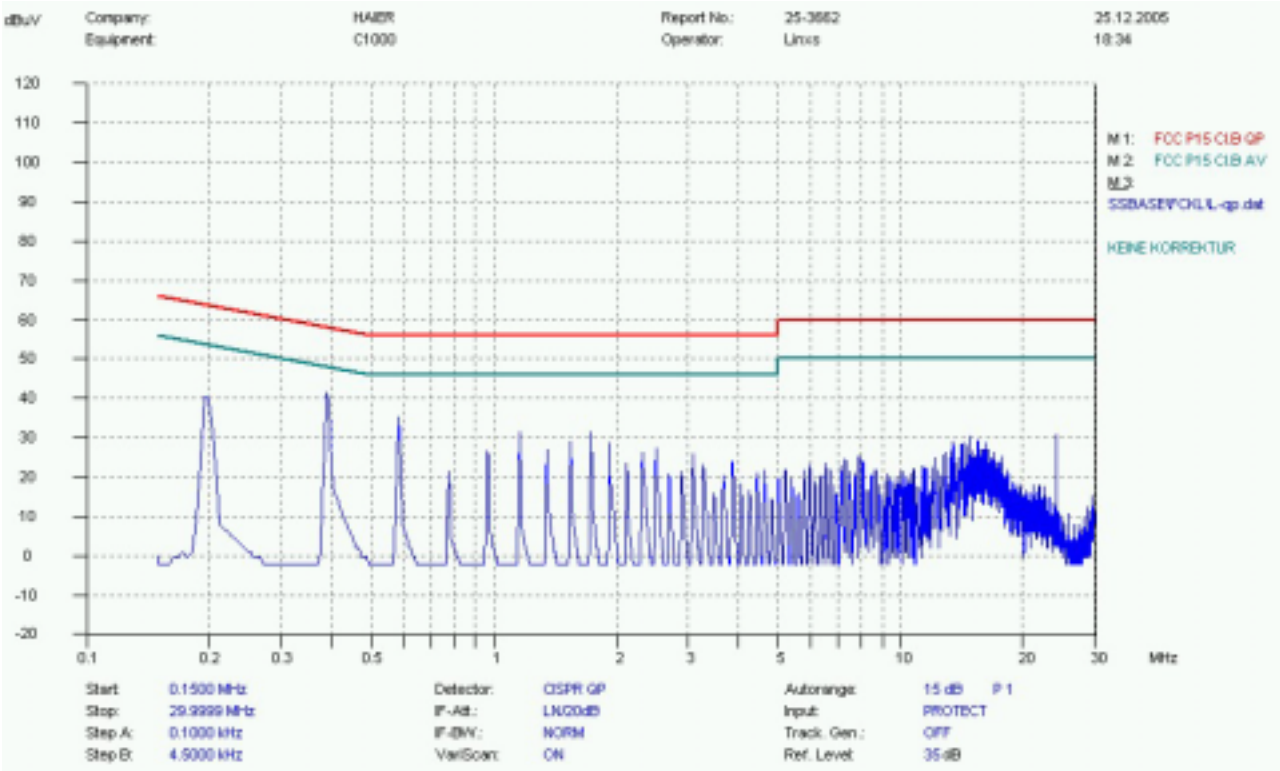
3.5 Test Results

No.	Freq. (MHz)	Limit Value (dBμV)		Emission Level (dBμV)	
		QP	AV	QP	AV
1	0.1950	63.8	53.8	40.4	--
2	0.3885	58.1	48.1	41.5	--
3	0.5820	56.0	46.0	35.3	--
4	1.1580	56.0	46.0	31.3	--
5	1.7340	56.0	46.0	31.4	--
6	14.7705	60.0	50.0	30.4	--

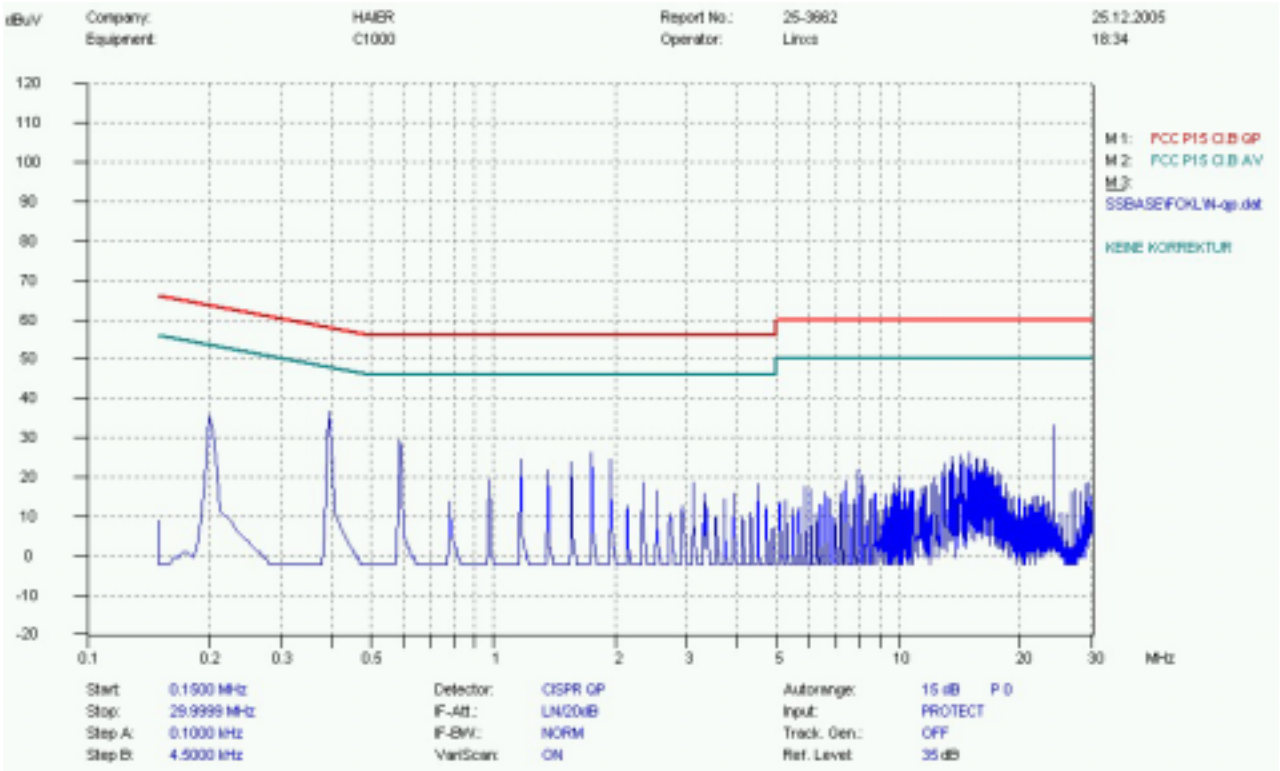
NOTE:

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.

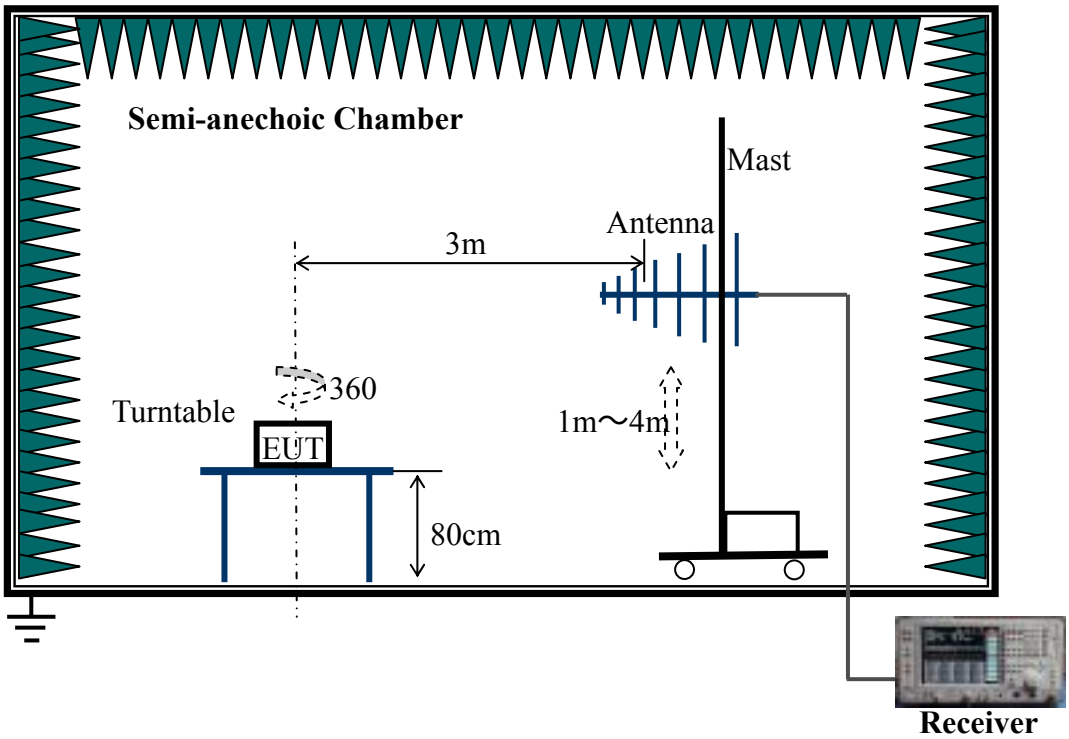
c. The antenna is a broadband antenna, and its height is varied from one meter to four meter above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

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.

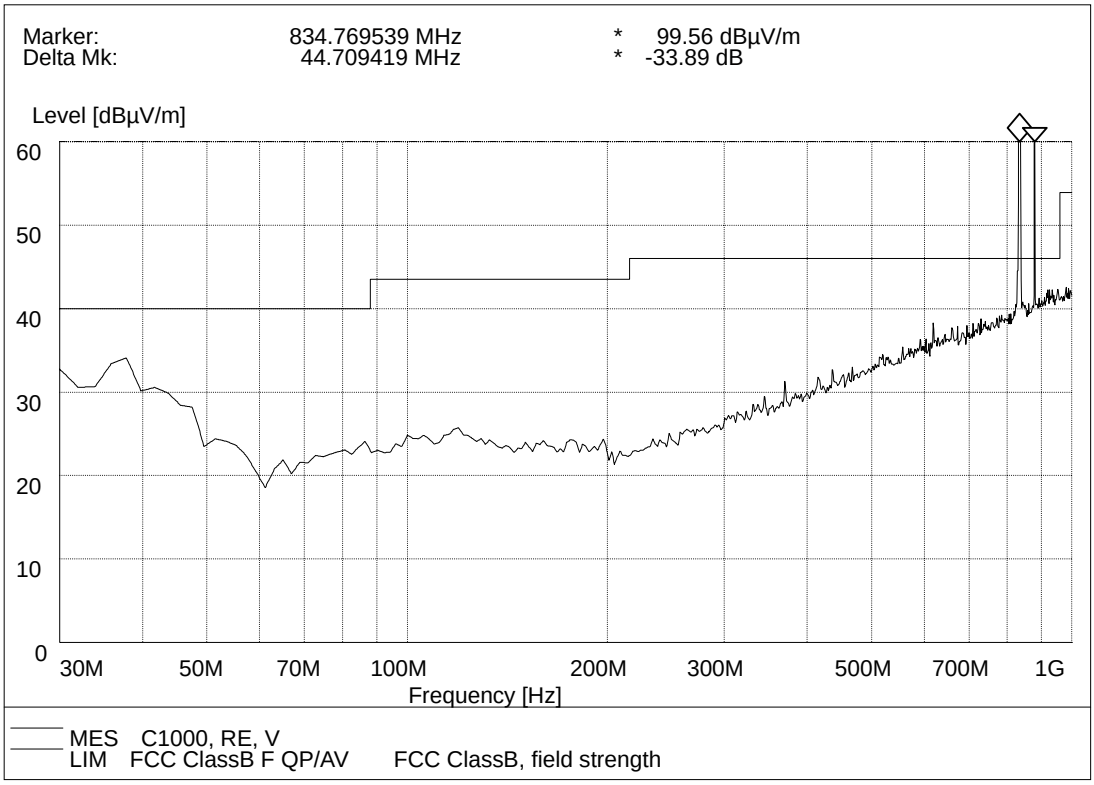
4.4 EUT Setup and Operating Conditions

Same as 3.4

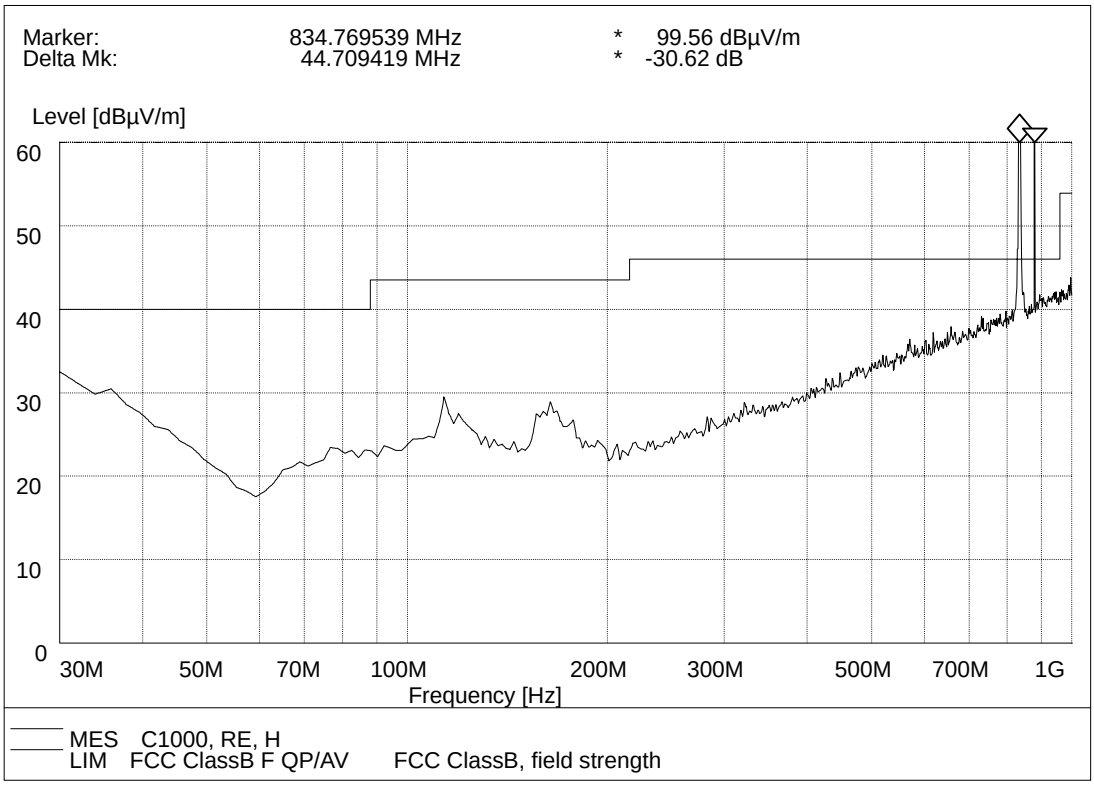
4.5 Test Results

No.	Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Table Angle (Degree)	QP Limits (dBμV/m)	Emission Level (dBμV/m)
1	38.00	Vertical	100	90	40	31.40
2	42.88	Vertical	100	90	40	25.28
3	47.12	Vertical	100	90	40	23.93
4	116.20	Horizontal	140	0	43.5	23.95
5	164.76	Horizontal	150	0	43.5	24.30

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 Test Procedure

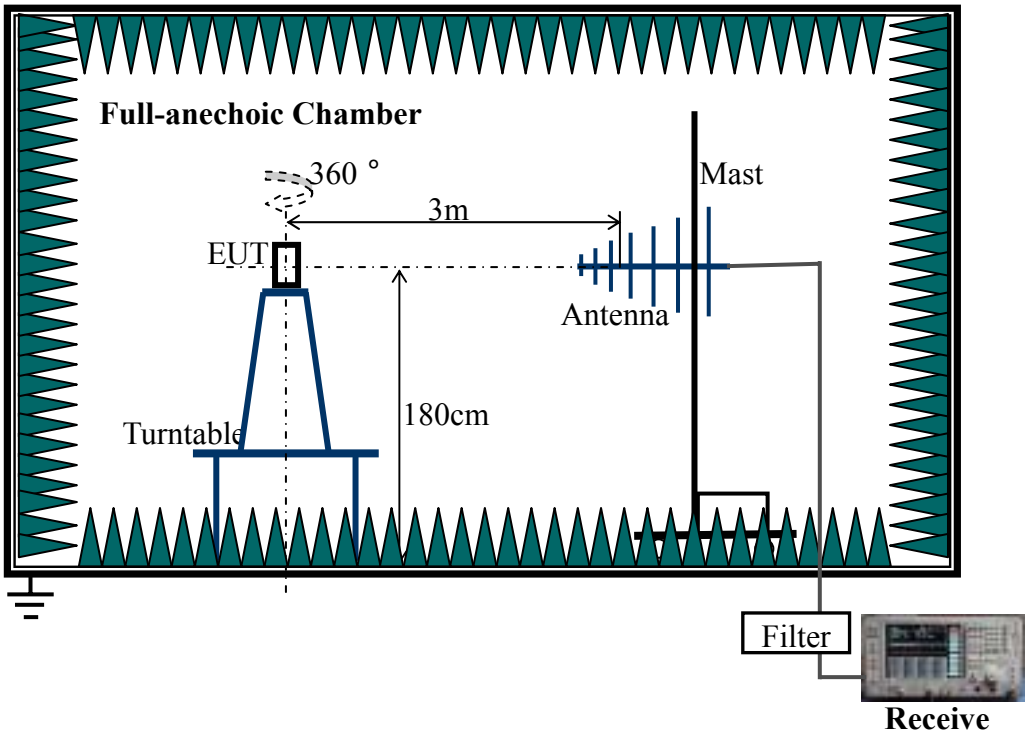
a. The frequency measurement was performed in a full anechoic chamber using radiation measurement method. The air lost of the site and the factors of the test system is pre-calibrated using substitution method.

b. The EUT was placed on the vertical axis of a turntable 1.8 meters above the ground.

c. For the frequency range 30 MHz to 3 GHz, ultra-broadband bi-log antenna was used. For the frequency range above 3 GHz, horn antenna was used. The antenna was at the same height as the EUT. Since the there was no reflection from the chamber floor and the site was pre-calibrated, the antenna height need not to be changed as the open site method. The polarization of the receiving antenna was the same as that of the EUT transmitting antenna.

d. The spectrum analyzer was set to Maxpeak Detector and Maximum Hold mode. The resolution bandwidth was set to at least 1% of the emission bandwidth. For GSM signal, VBW=RBW=3kHz; for CDMA signal, VBW=RBW=30kHz.

5.3 Test Setup



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

5.4 EUT Setup and Operating Conditions

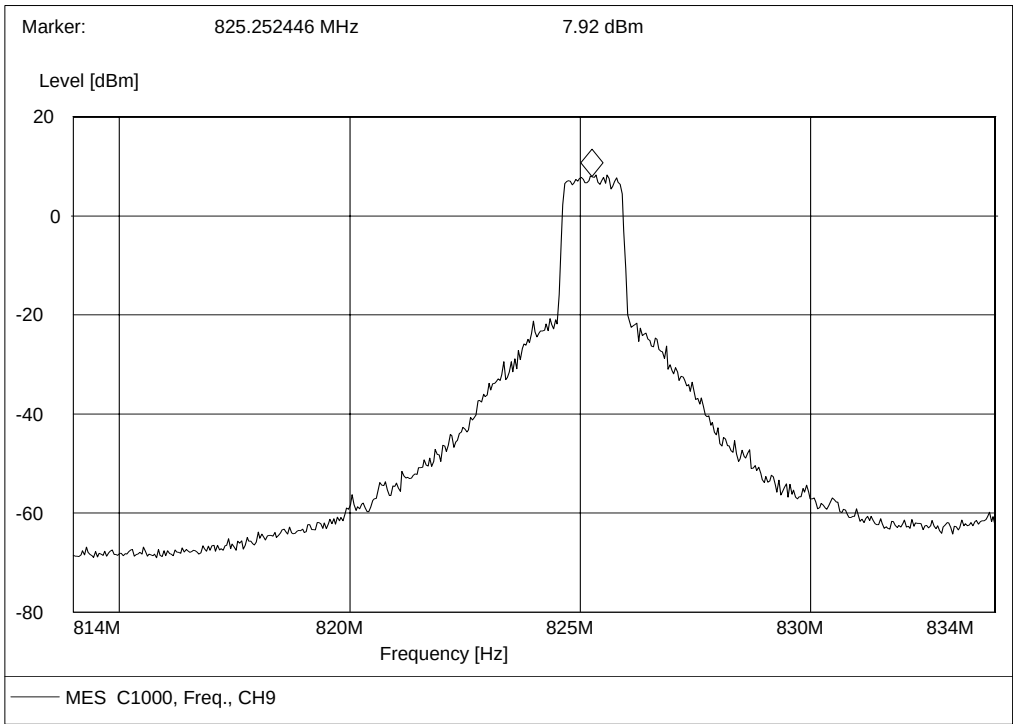
The EUT configuration of the emission tests was MS + Battery.

A communication link was established between the MS and a System Simulator (SS). The MS operated at the maximum output power. The CDMA 1X (Cellular band) channel No.9 (low) and 758 (high) were measured respectively.

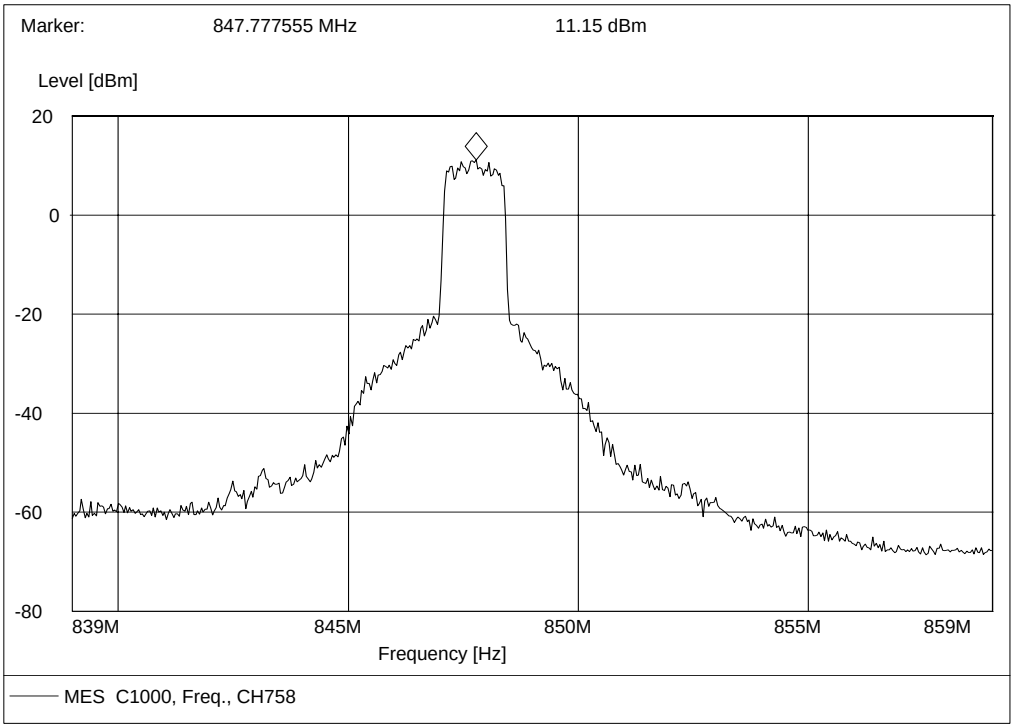
5.5 Test Results

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

1. Lowest channel No.9



2. Highest channel No.758



6 Transmitter Radiated Power (ERP) Test

6.1 Limits of ERP

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

6.2 Test Procedure

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

b. The EUT was placed on the vertical axis of a turntable 1.8 meters above the ground. The table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. In the frequency range 30 MHz to 3 GHz, ultra-broadband bi-log antenna was used. In the frequency range above 3 GHz, horn antenna was used. The antenna was at the same height as the EUT. Since the there was no reflection from the chamber floor and the site was pre-calibrated, the antenna height need not to be changed as the open site method. The polarization of the receiving antenna was the same as that of the EUT transmitting antenna.

c. The spectrum analyzer was set to Maxpeak Detector and Maximum Hold mode. The resolution bandwidth was comparable to the emission bandwidth. For GSM signal, VBW=RBW=1MHz; for CDMA signal, VBW=RBW=3MHz.

6.3 Test Setup

Same as 5.3

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. The CDMA 1X (Cellular band) channel No.9 (low), 384 (mid), and 758 (high) were measured respectively.

6.5 Test Results

No.	CDMA 1X Channel No.	Frequency (MHz)	ERP (dBm)	ERP (W)	Limit ERP (W)
1	9	825.27	22.08	0.161	7
2	384	836.52	23.10	0.204	7
3	758	847.74	24.31	0.270	7

7 Occupied Bandwidth

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

7.2 Test Procedure

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

b. The EUT was placed on the vertical axis of a turntable 1.8 meters above the ground.

c. For the frequency range 30 MHz to 3 GHz, ultra-broadband bi-log antenna was used. For the frequency range above 3 GHz, horn antenna was used. The antenna was at the same height as the EUT. Since the there was no reflection from the chamber floor and the site was pre-calibrated, the antenna height need not to be changed as the open site method. The polarization of the receiving antenna was the same as that of the EUT transmitting antenna.

d. The spectrum analyzer was set to Maxpeak Detector and Maximum Hold mode. The resolution bandwidth was set to at least 1% of the emission bandwidth. For GSM signal, VBW=RBW=3kHz; for CDMA signal, VBW=RBW=30kHz.

7.3 Test Setup

Same as 5.3

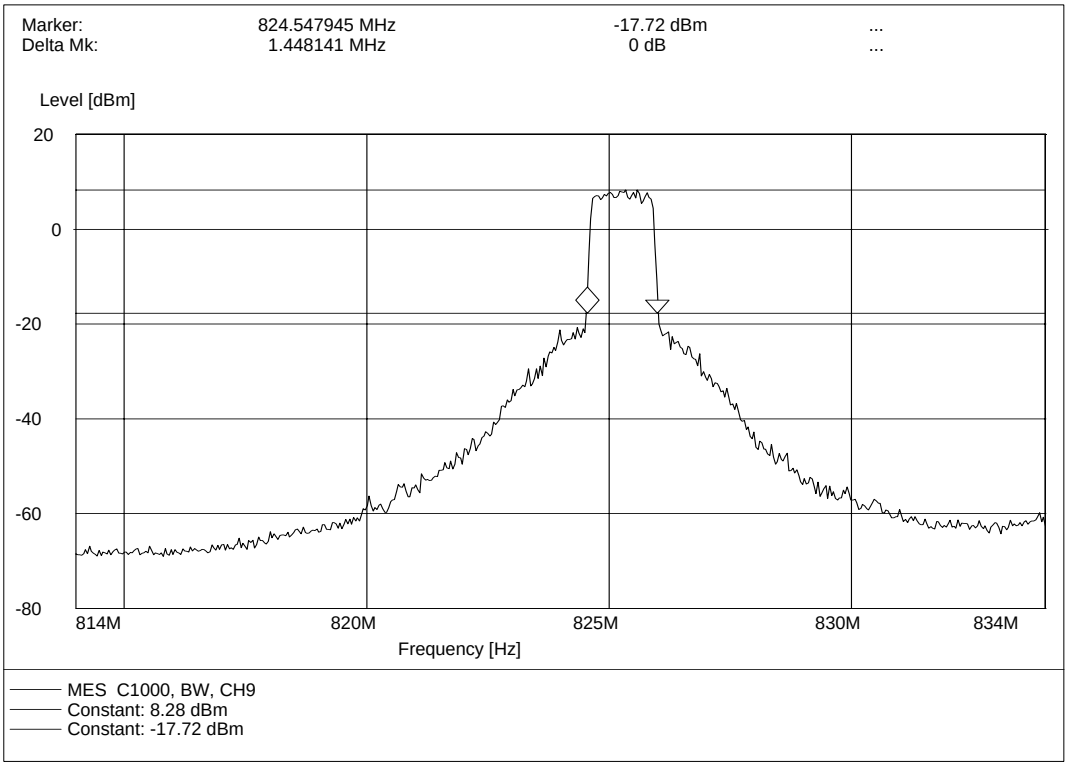
7.4 EUT Setup and Operating Conditions

Same as 5.5

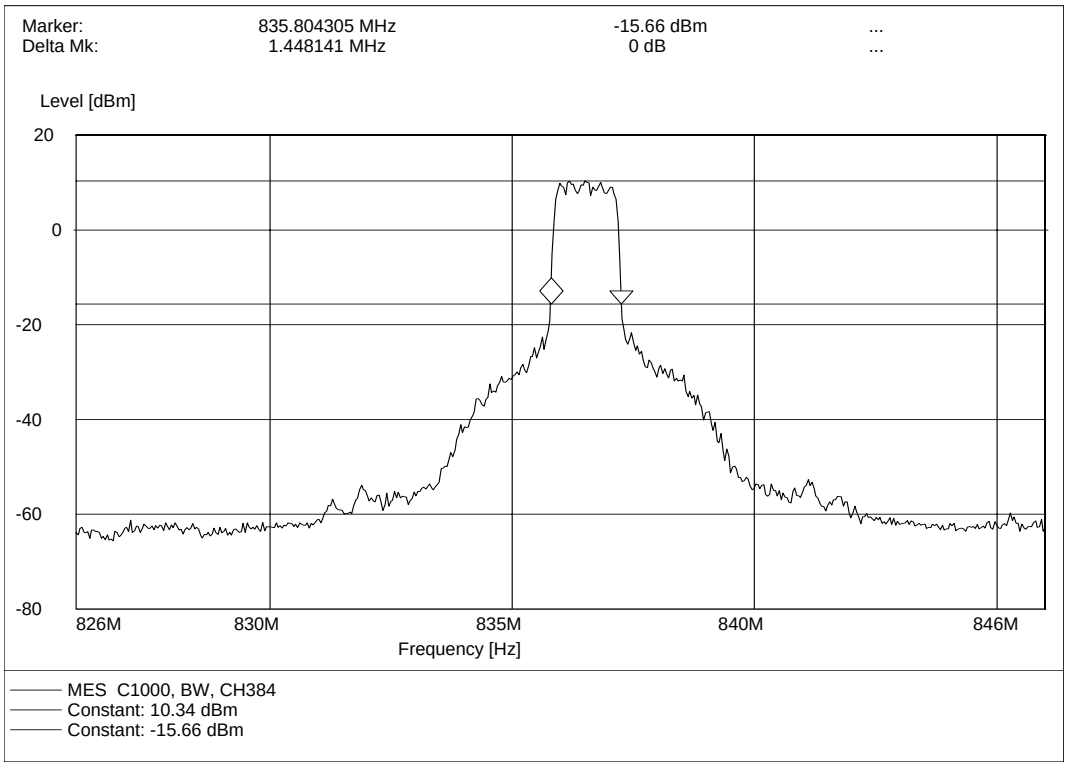
7.5 Test Results

The measured 26dB emission bandwidths at the low, middle and high channels are as the following plots.

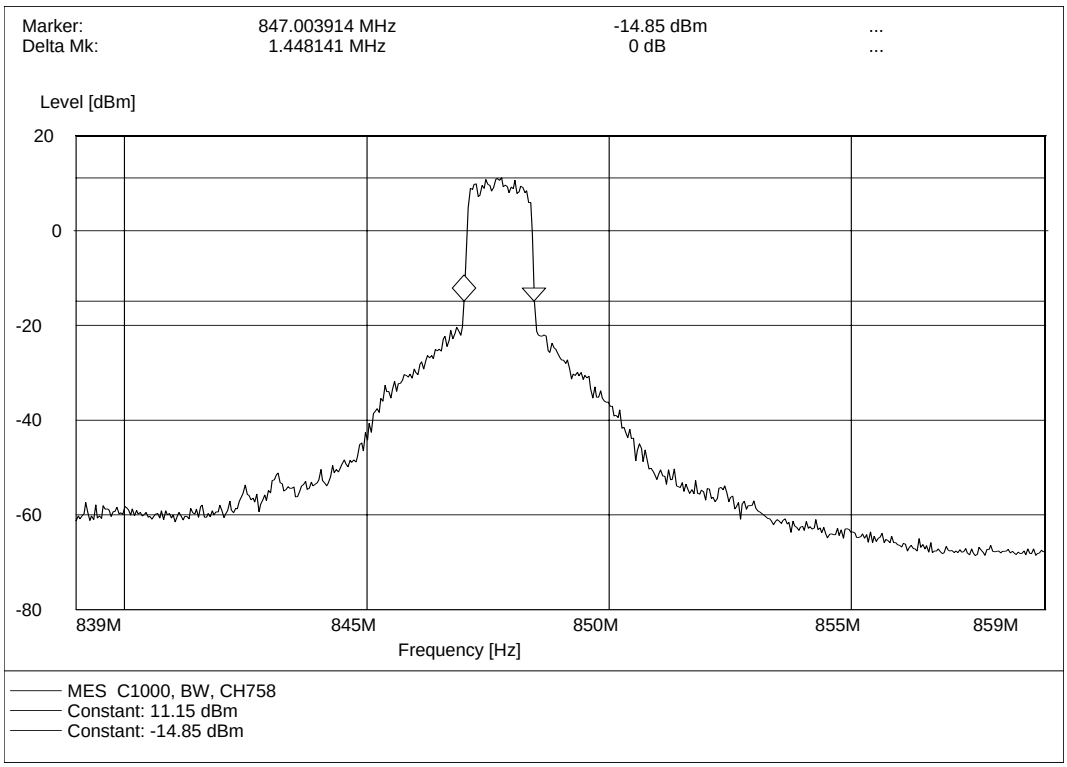
1. Lowest channel No.9



2. Middle channel No.384



3. Highest channel No.758



8 Conducted Spurious Emission Test

8.1 Limits of Conducted Spurious Emission

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. This calculated to be -13dBm. The mean power of any emissions appearing in the base station frequency range fro cellular mobile transmitters operated must be attenuated to a level not to exceed -80 dBm at the transmit antenna connector.

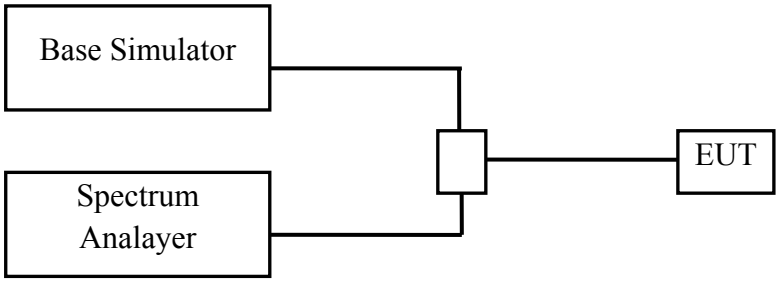
8.2 Test Procedure

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

8.3 Test Setup



8.4 EUT Setup and Operating Conditions

Same as 5.5

8.5 Test Results

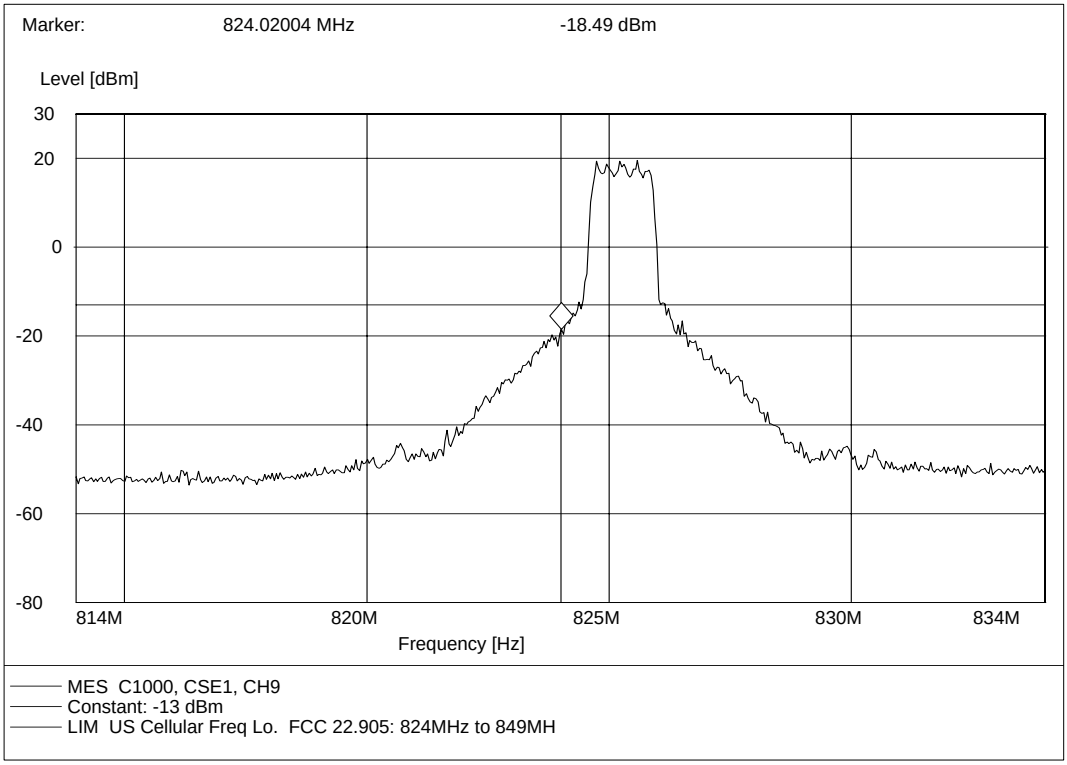
No.	Frequency (MHz)	Emission Power (dBm)	Limit (dBm)
Channel No. 9 (825.27 MHz)			
1	1650.54	-39.70	-13
2	2475.81	-30.81	-13
3	3301.08	-34.99	-13
4	4126.35	-35.82	-13
5	4951.62	-47.96	-13
6	5776.89	-46.34	-13
7	6602.16	--	-13
8	7427.43	--	-13
9	8252.70	--	-13
Channel No. 758 (847.74 MHz)			
10	1695.48	-34.40	-13
11	2543.22	-32.97	-13
12	3390.96	-33.65	-13
13	4238.70	-42.08	-13
14	5086.44	-42.48	-13
15	5934.18	--	-13
16	6781.92	--	-13
17	7629.66	--	-13
18	8477.40	--	-13

NOTE:

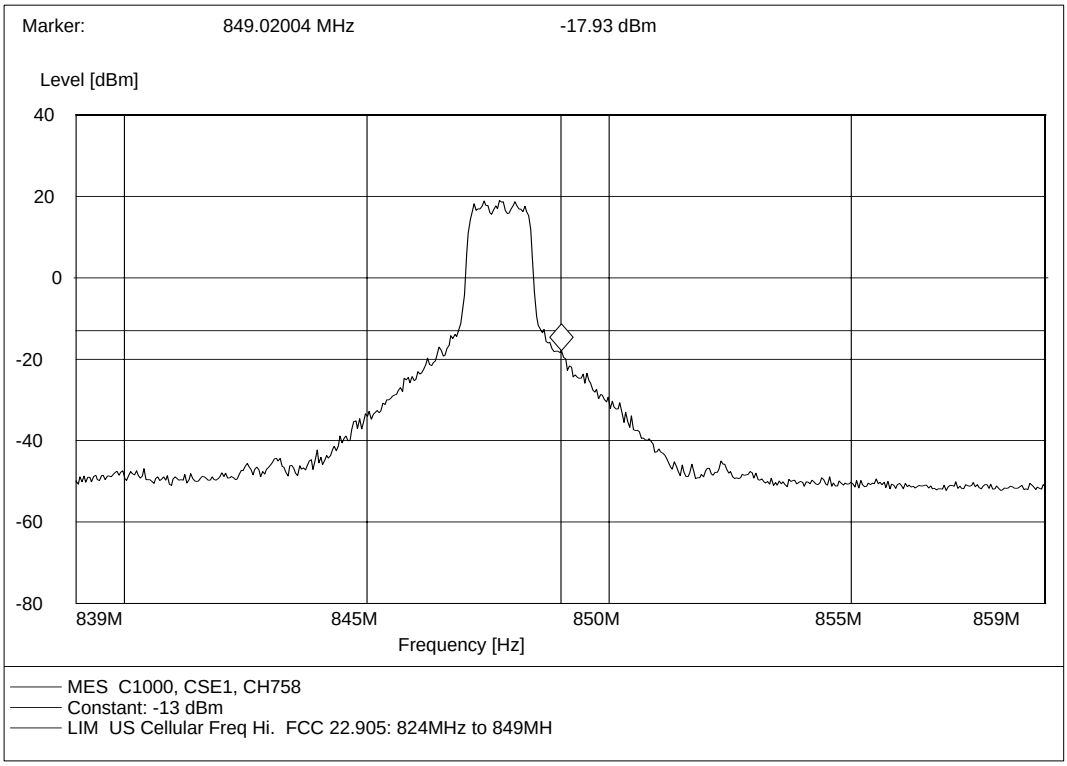
1. The spurious radiations from 9 kHz to 10th harmonic of the fundamental frequency are researched. Only the harmonics are record in the table above.
2. "--" in the table above means that the emissions are too small to be measured and are at least 12 dB below the limit.

Plot of Out-of-Band Emission

1. Lowest channel No.9



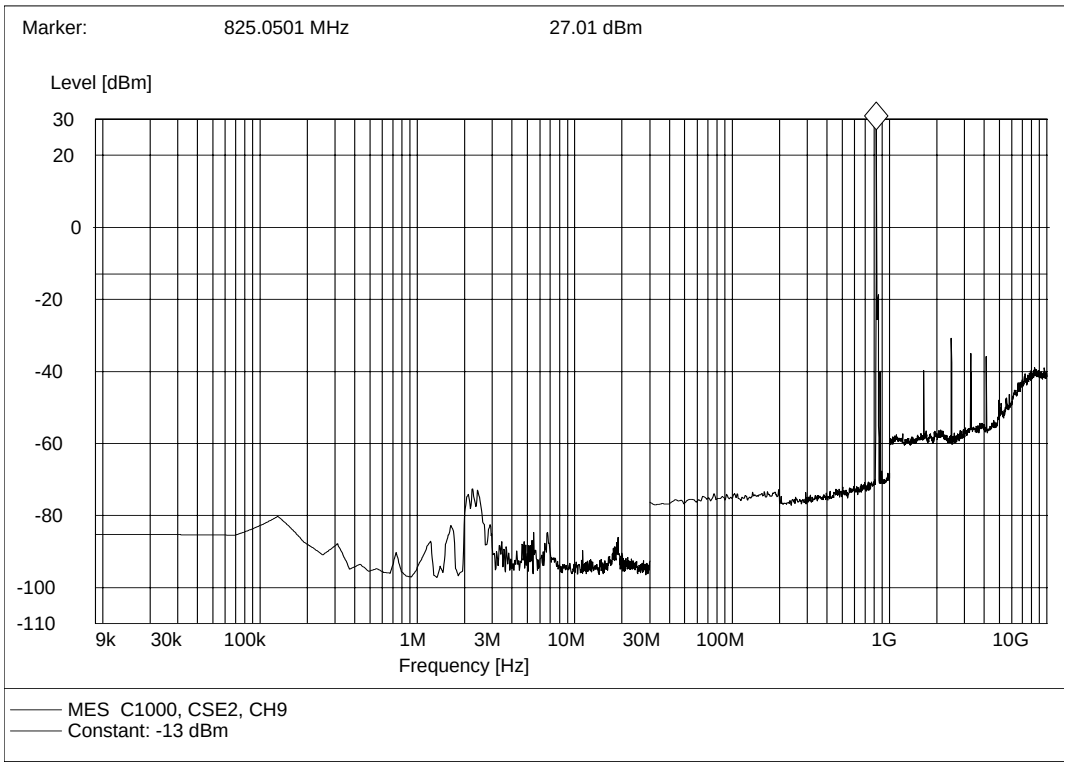
2. Highest channel No.758



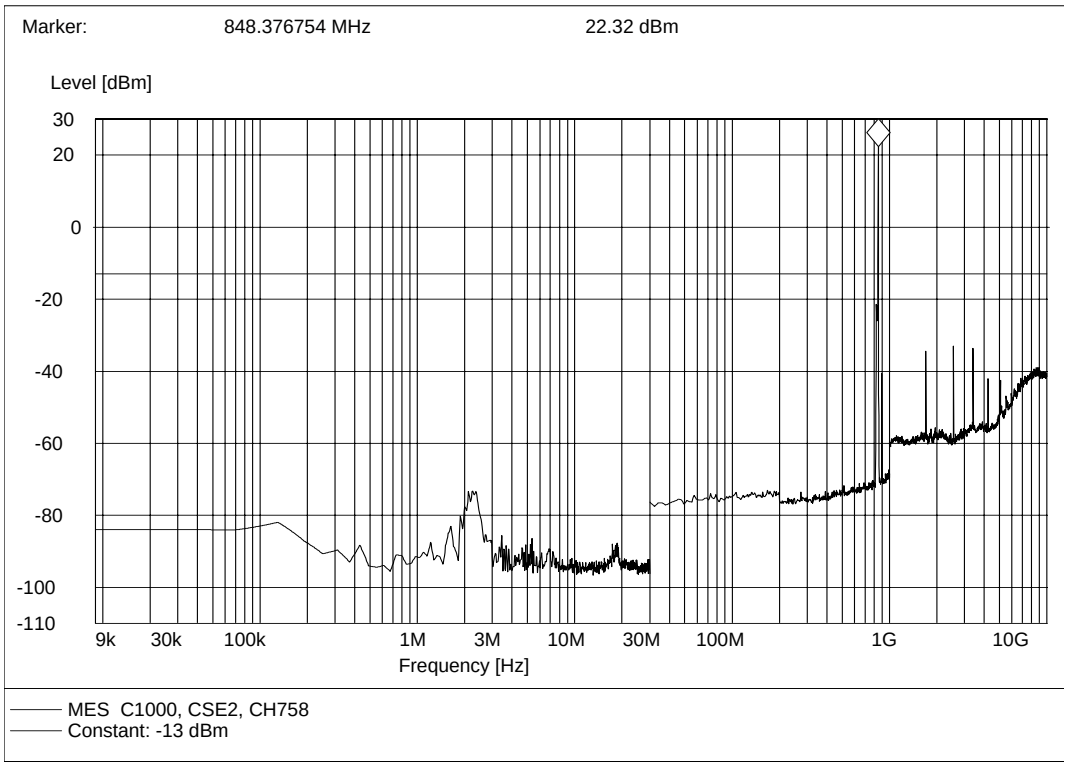
Plot of Spurious Emission

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

1. Lowest channel No.9

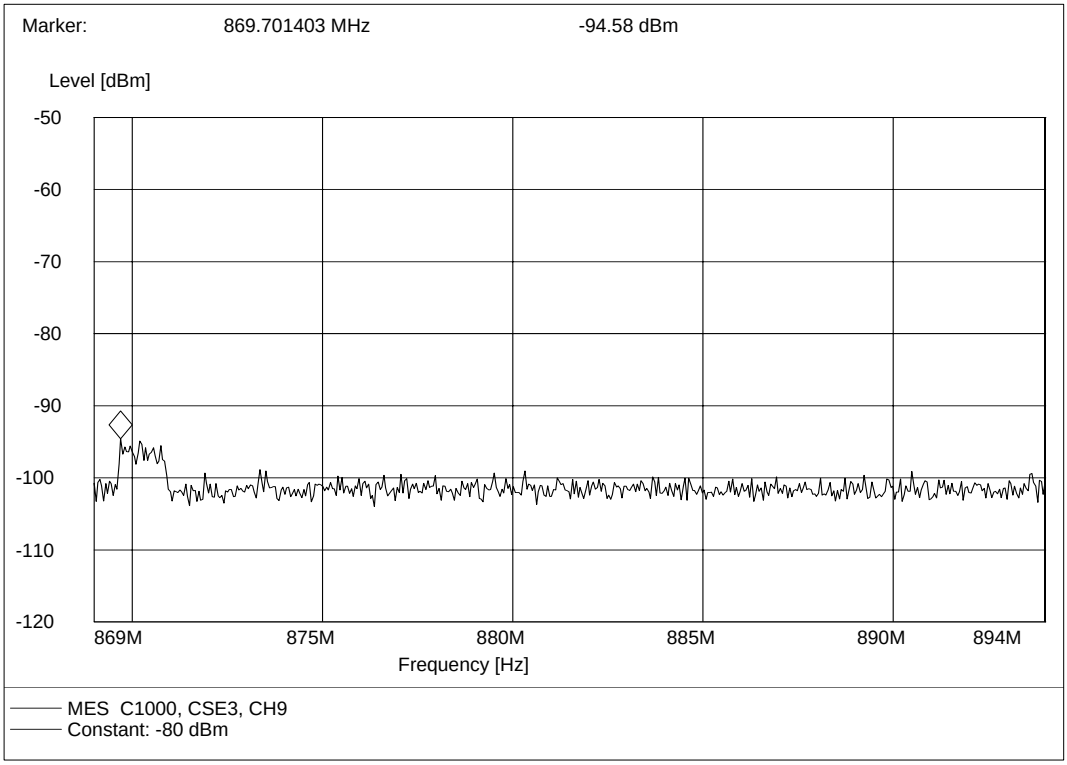


2. Highest channel No.758

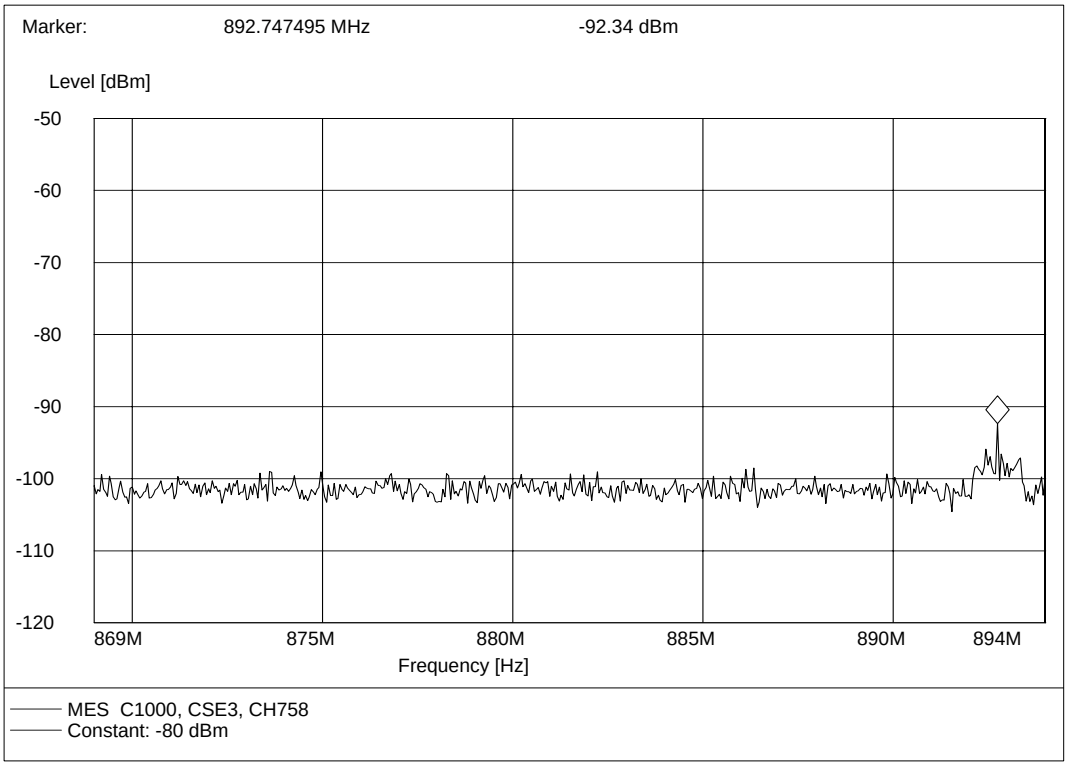


Plot of Mobile Station Emissions in the base station frequency range

1. Lowest channel No.9



2. Highest channel No.758



9 Radiated Spurious Emission Test

9.1 Limits of Radiated Spurious Emission

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. This calculated to be -13dBm.

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.

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.

9.3 Test Setup

Same as 5.3

9.4 EUT Setup and Operating Conditions

Same as 5.5

9.5 Test Results

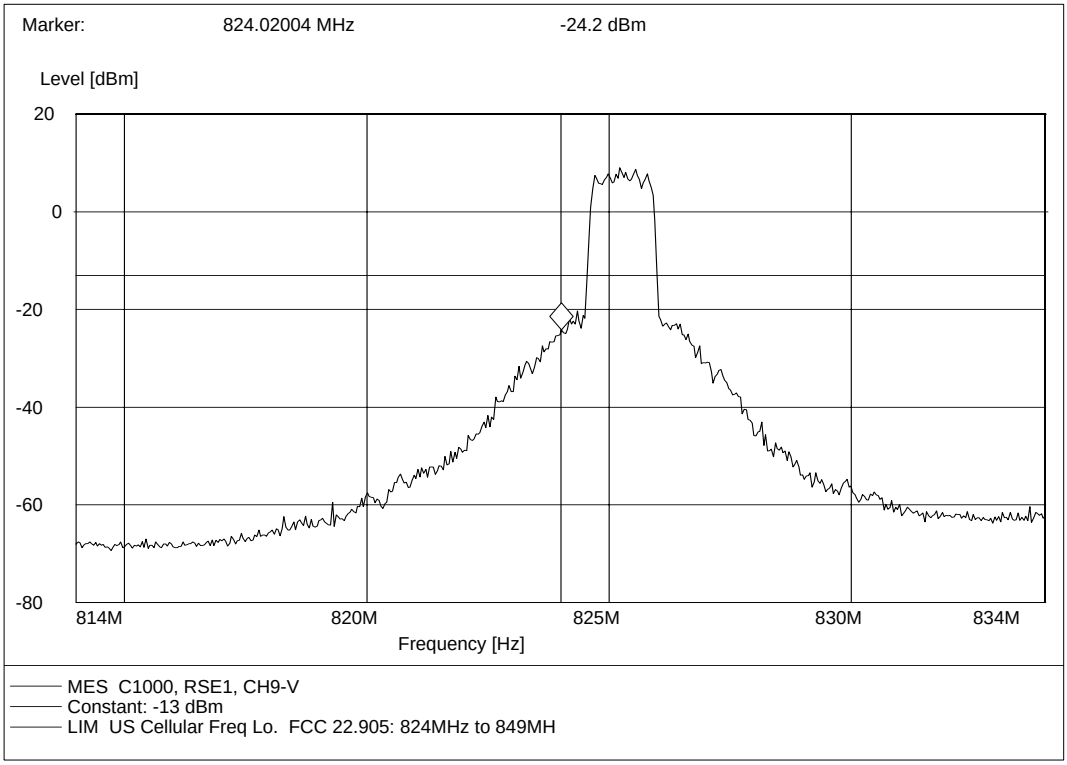
No.	Frequency (MHz)	ERP (dBm) Antenna: Vertical	ERP (dBm) Antenna: Horizontal	Limit (dBm)
Channel No. 9 (825.27 MHz)				
1	1650.54	-35.25	-36.34	-13
2	2475.81	-37.65	-36.58	-13
3	3301.08	-35.70	-35.13	-13
4	4126.35	-37.69	-42.76	-13
5	4951.62	-45.19	-47.75	-13
6	5776.89	-42.09	-43.55	-13
7	6602.16	--	--	-13
8	7427.43	--	--	-13
9	8252.70	--	--	-13
Channel No. 758 (847.74 MHz)				
10	1695.48	-38.90	-35.97	-13
11	2543.22	-40.34	-37.02	-13
12	3390.96	-37.43	-35.46	-13
13	4238.70	-39.24	-45.15	-13
14	5086.44	-37.99	-42.65	-13
15	5934.18	-41.86	-41.29	-13
16	6781.92	--	--	-13
17	7629.66	--	--	-13
18	8477.40	--	--	-13

NOTE:

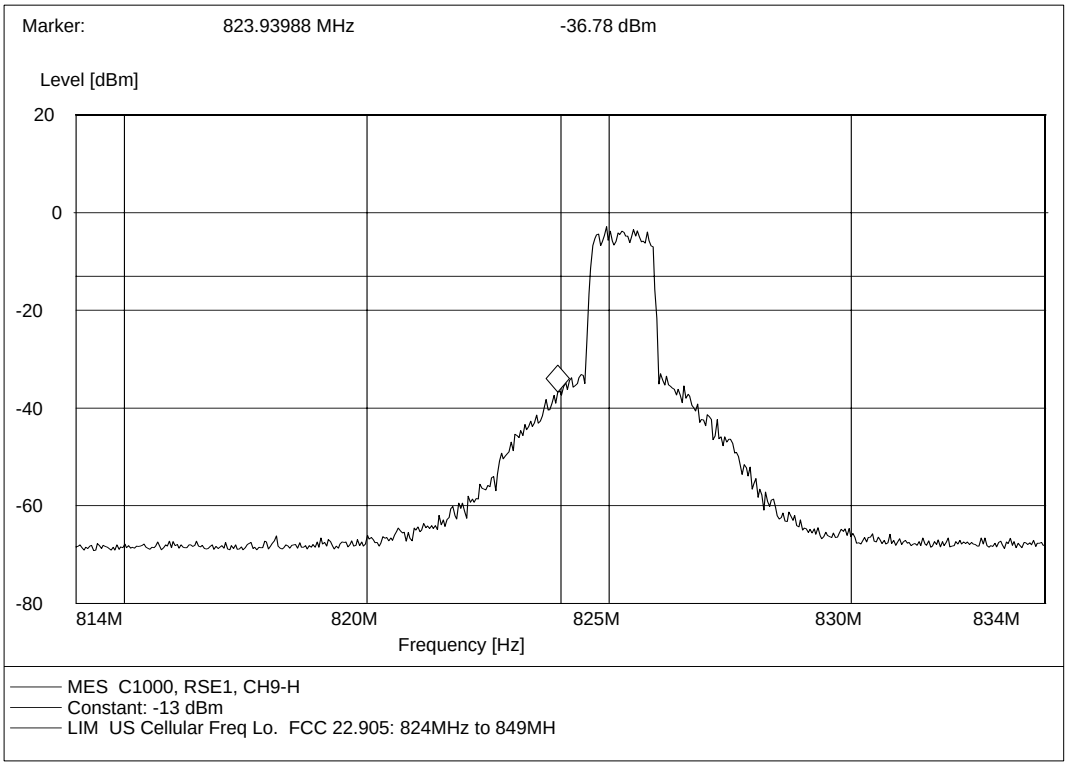
1. V and H are the antenna polarizations: Vertical and Horizontal.
2. The spurious radiations from 30 MHz to 10th harmonic of the fundamental frequency are researched. Only the harmonics are record in the table above.
3. "--" in the table above means that the emissions are too small to be measured and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

Plot of Out-of-Band Emission

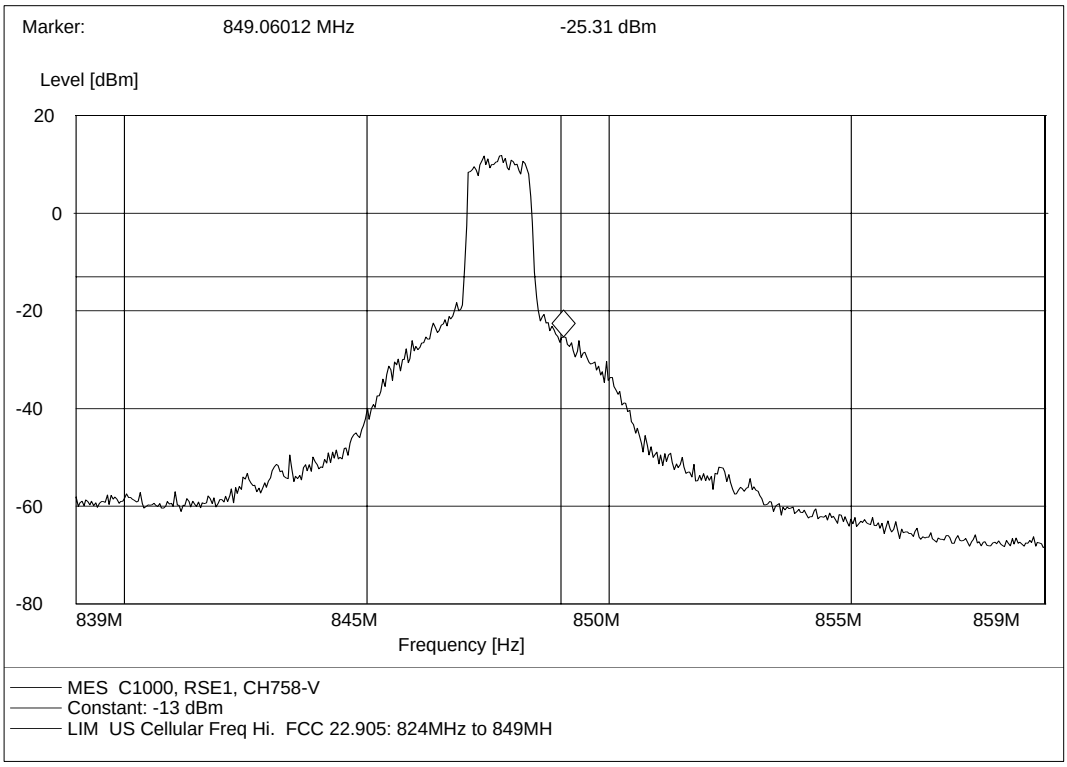
1. Lowest channel No.9, antenna vertical



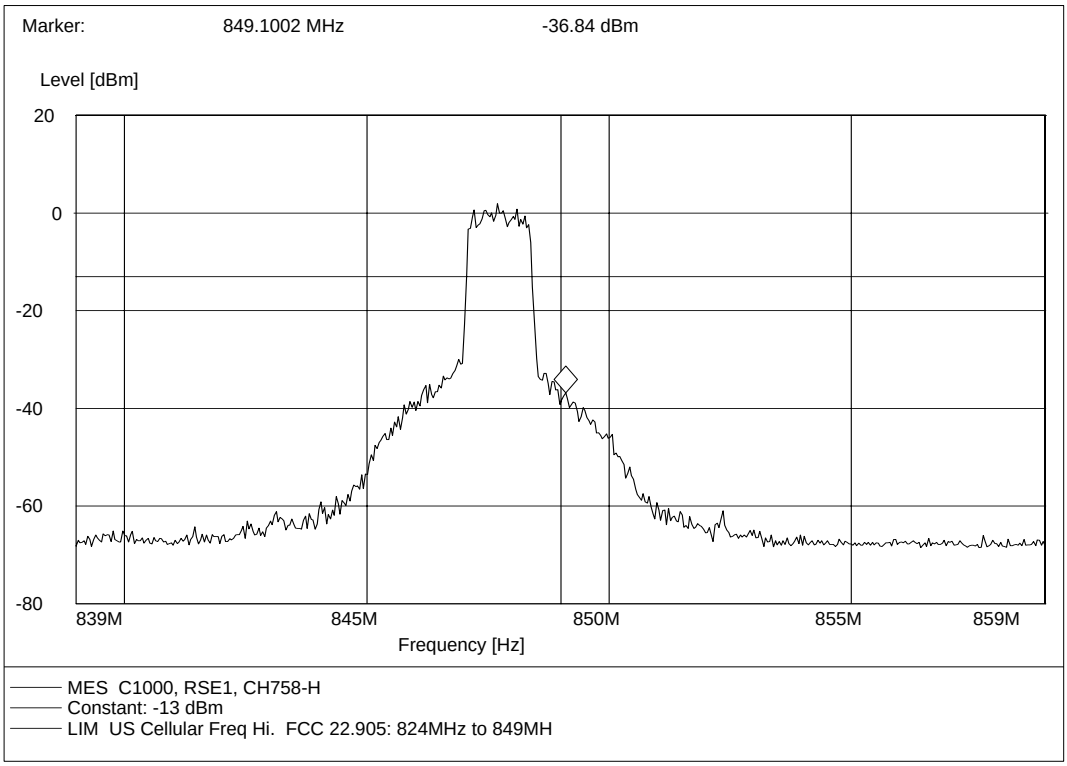
2. Lowest channel No.9, antenna horizontal



3. Highest channel No.758, antenna vertical



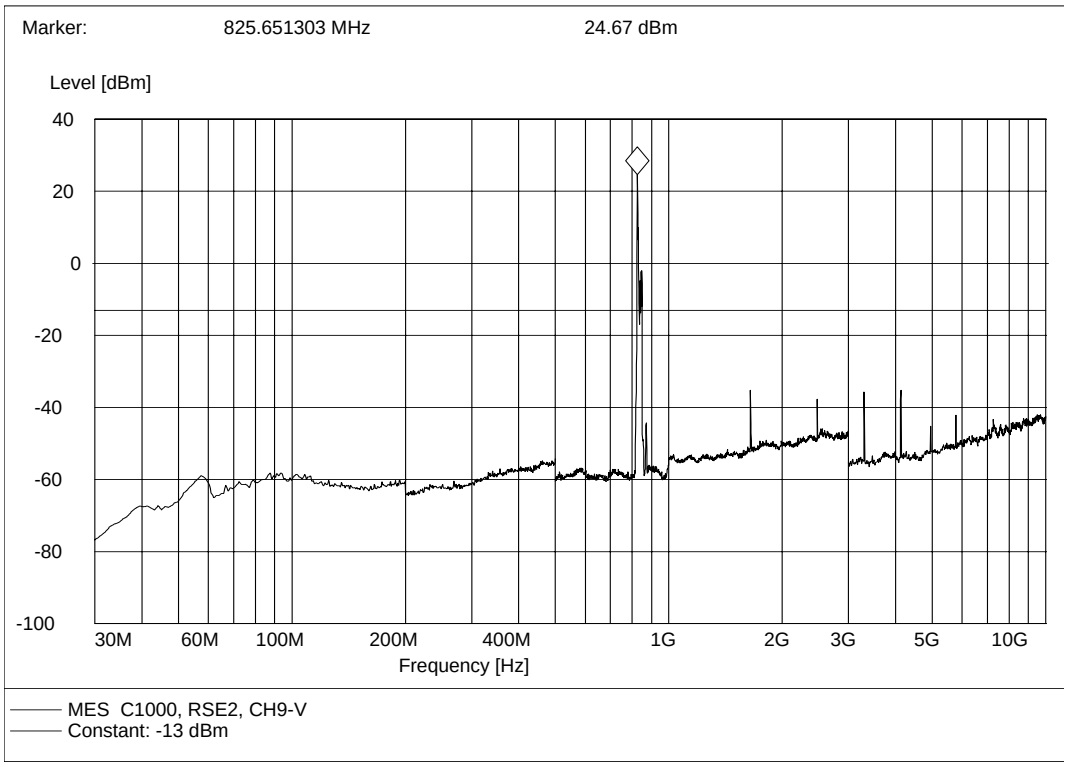
4. Highest channel No.758, antenna horizontal



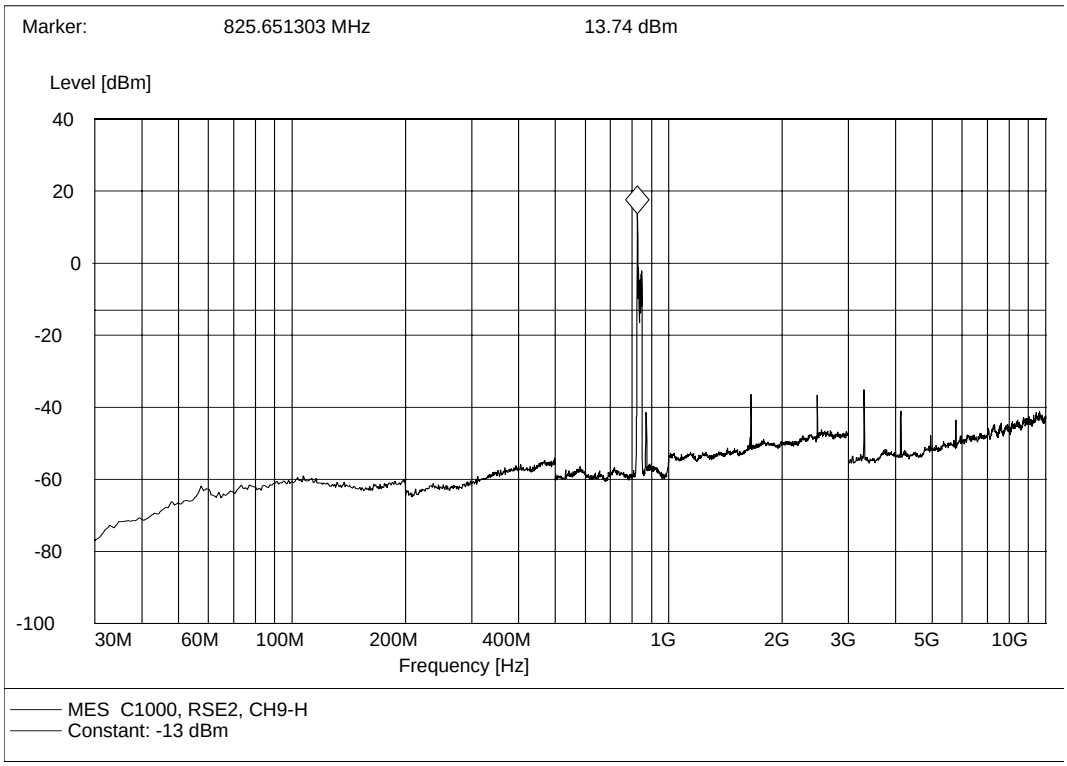
Plot of Spurious Emission

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

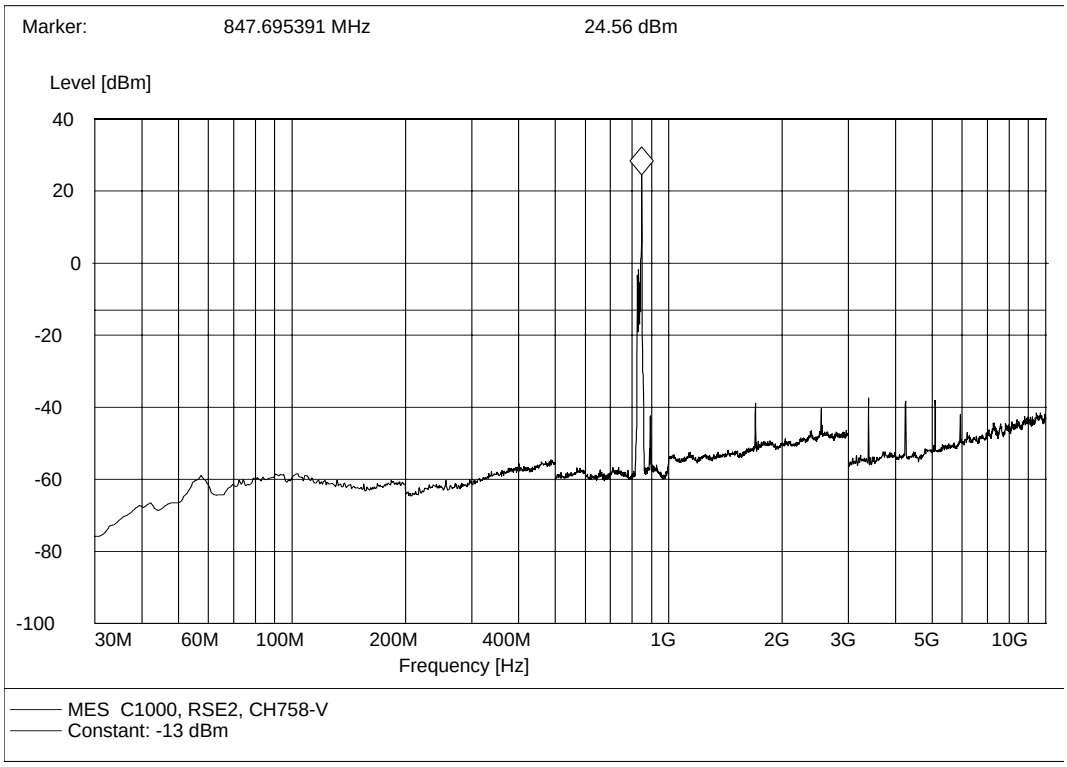
1. Lowest channel No.9, antenna vertical



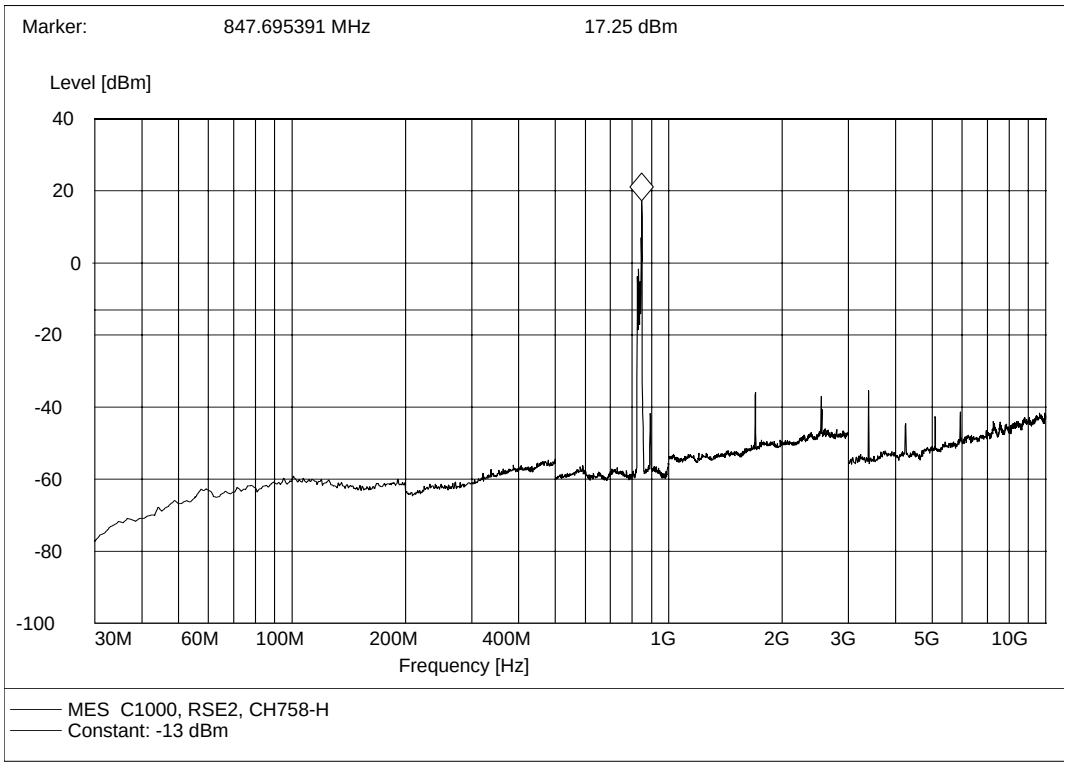
2. Lowest channel No.9, antenna horizontal



3. Highest channel No.758, antenna vertical



4. Highest channel No.758, antenna horizontal



10 Frequency Stability Test

10.1 Requirement of Frequency Stability

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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.

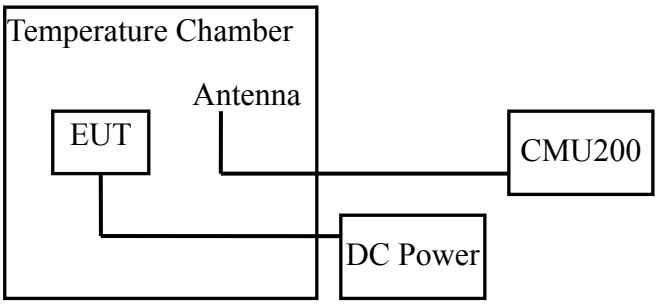
10.2 Test Procedure

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.

10.3 Test Setup



10.4 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. The CDMA 1X channel No.9 (low), 384 (mid), and 758 (high) were measured respectively.

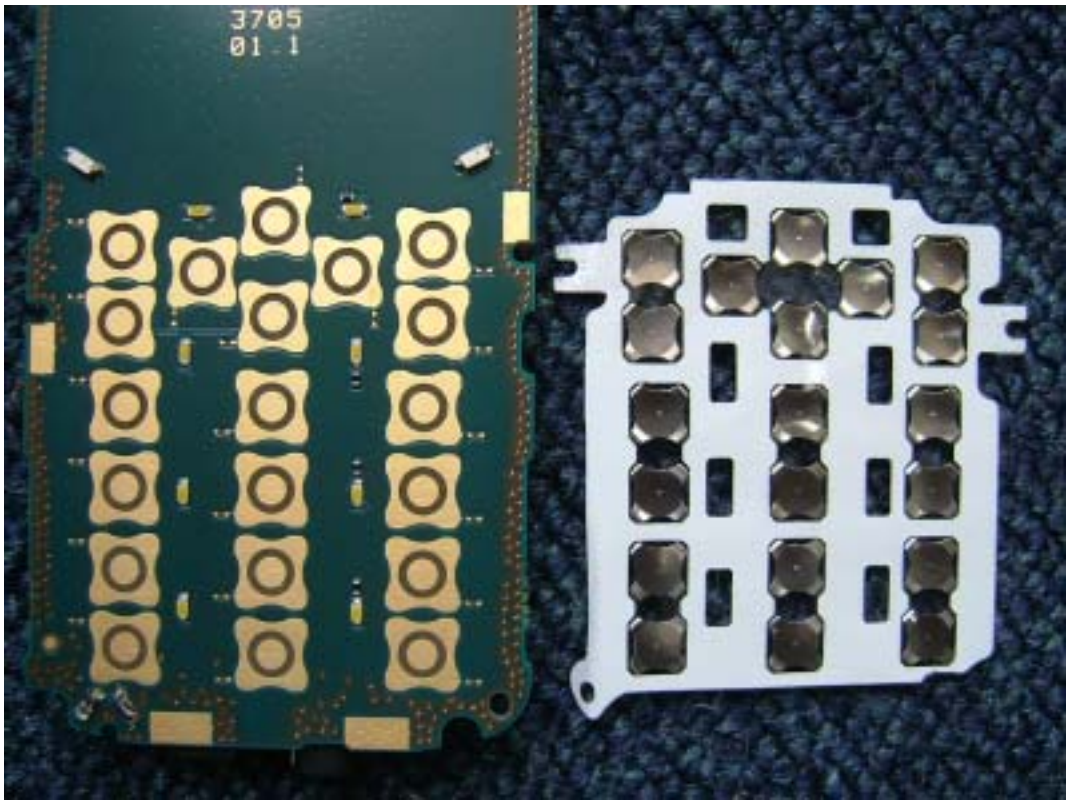
10.5 Test Results

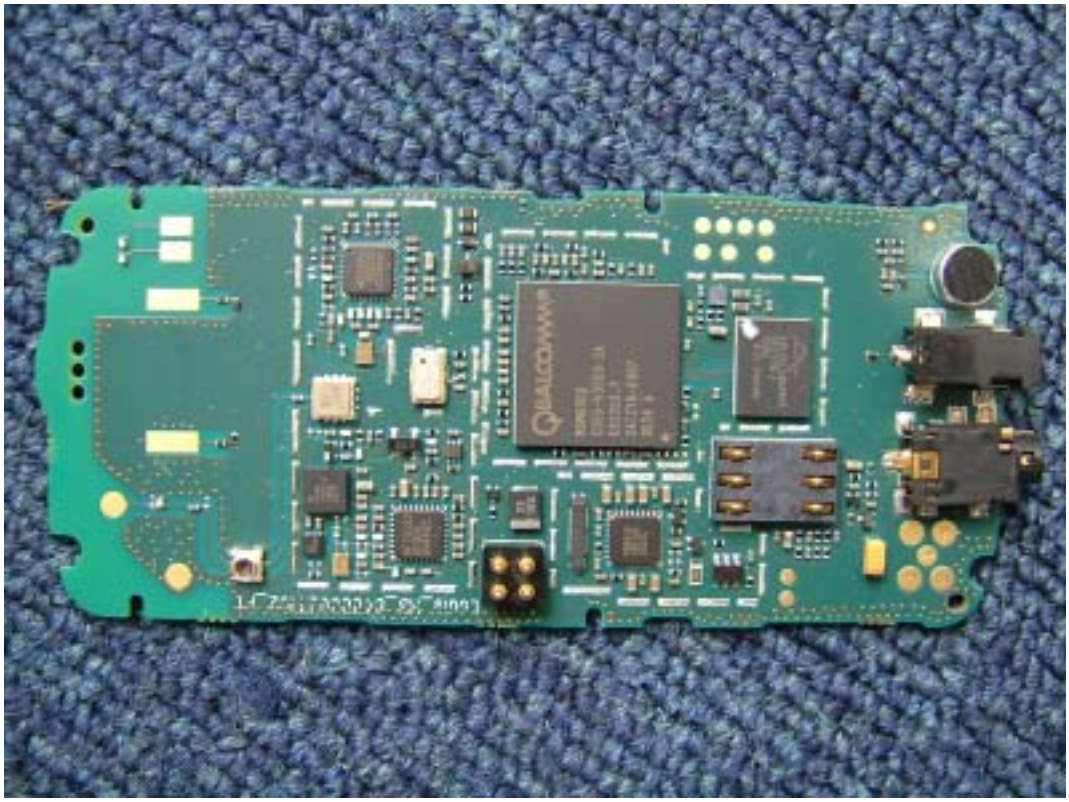
No.	Test Conditions		Frequency Deviation (Hz)			
	Volatage	Temperature (ºC)	9CH	384CH	758CH	Limit
1	3.7V (V_{nom})	-30	-9	-2	-6	±300Hz
2		-20	+11	-21	+2	
3		-10	+10	-27	-34	
4		0	-32	+33	+13	
5		+10	+22	-31	-18	
6		+20	-15	+4	-13	
7		+30	-17	-24	+2	
8		+40	+8	-3	-5	
9		+50	+3	0	-32	
10	4.2V (V_{max})	+22	-10	-3	-36	
11	3.4V (V_{min})	+22	+19	+18	+26	

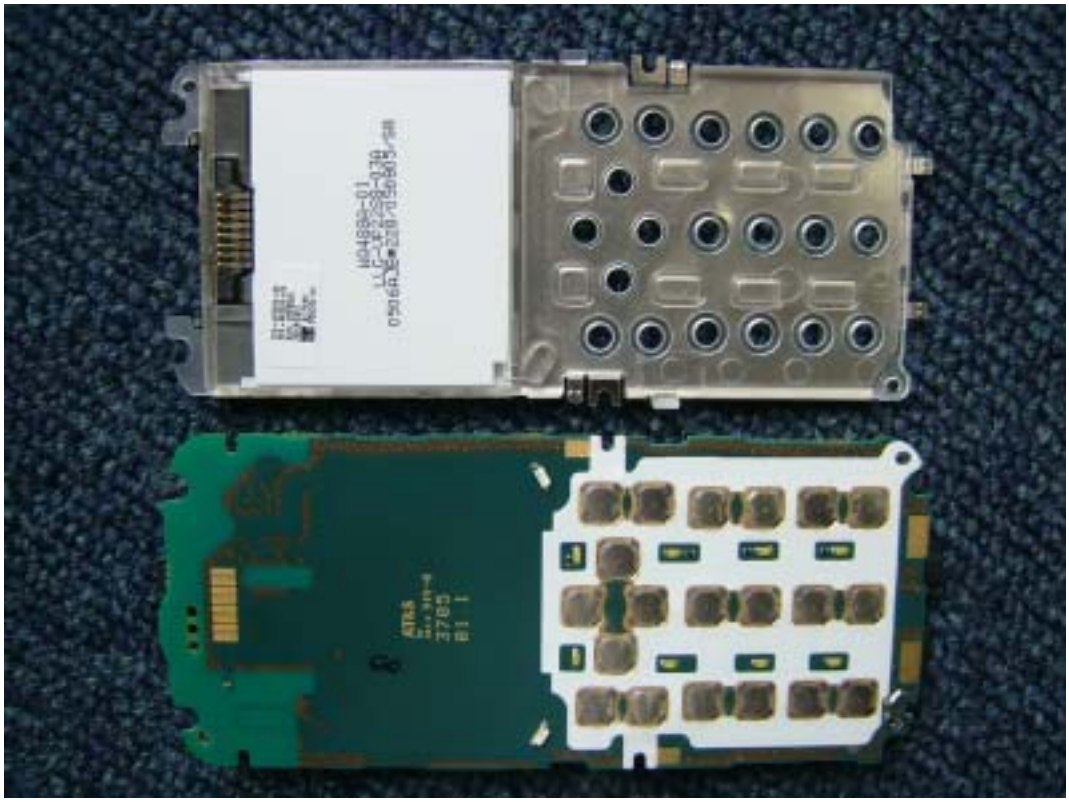
Appendix I：Photographs of the EUT

1. Appearance of the MS

2. Inside of the MS



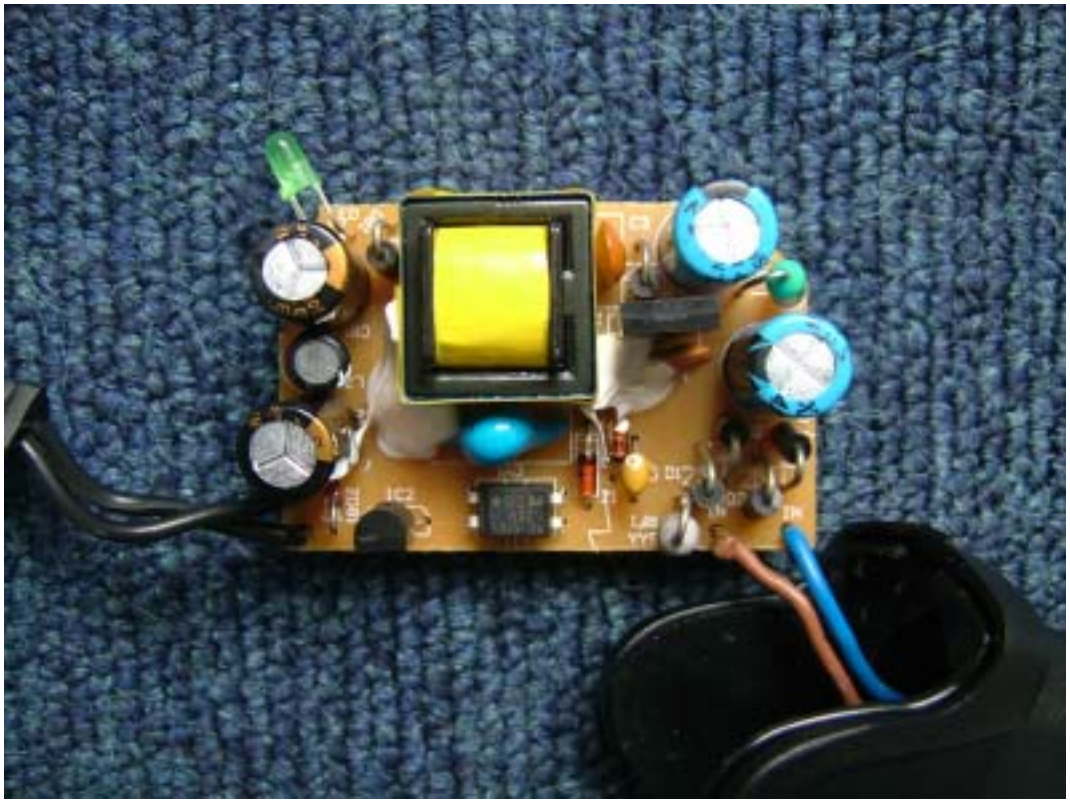


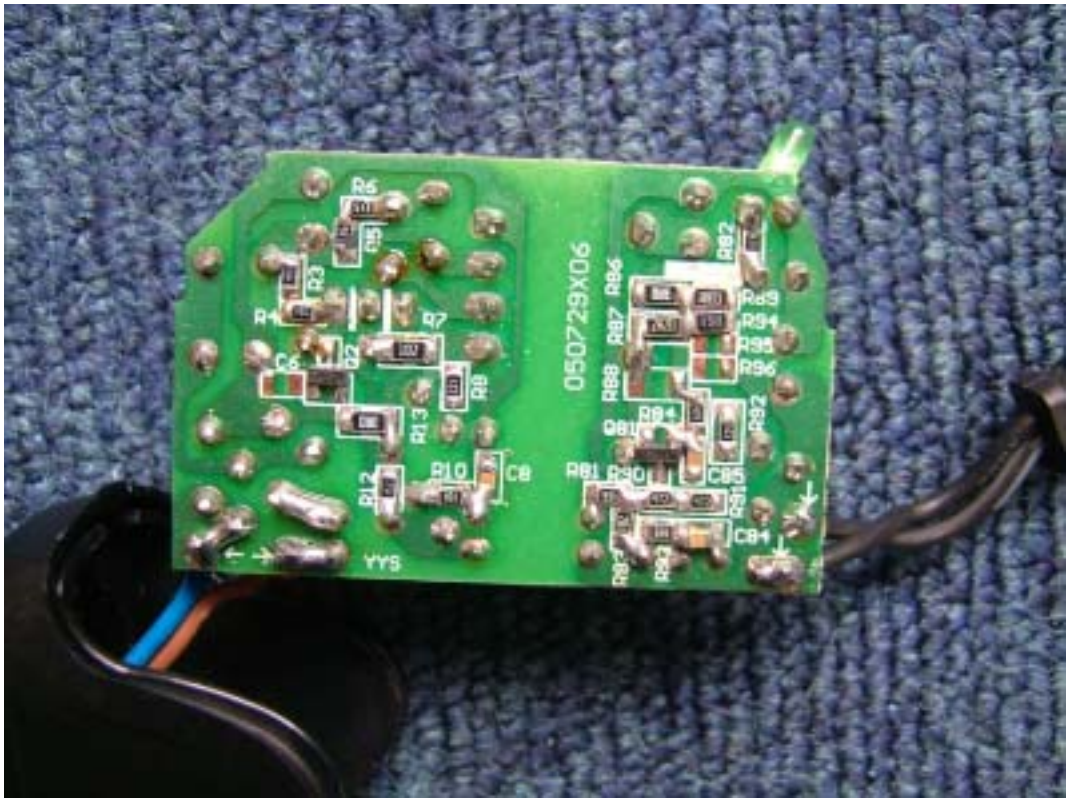


Haier
Haier

3. Appearance of the Charger

4. Inside of the Charger

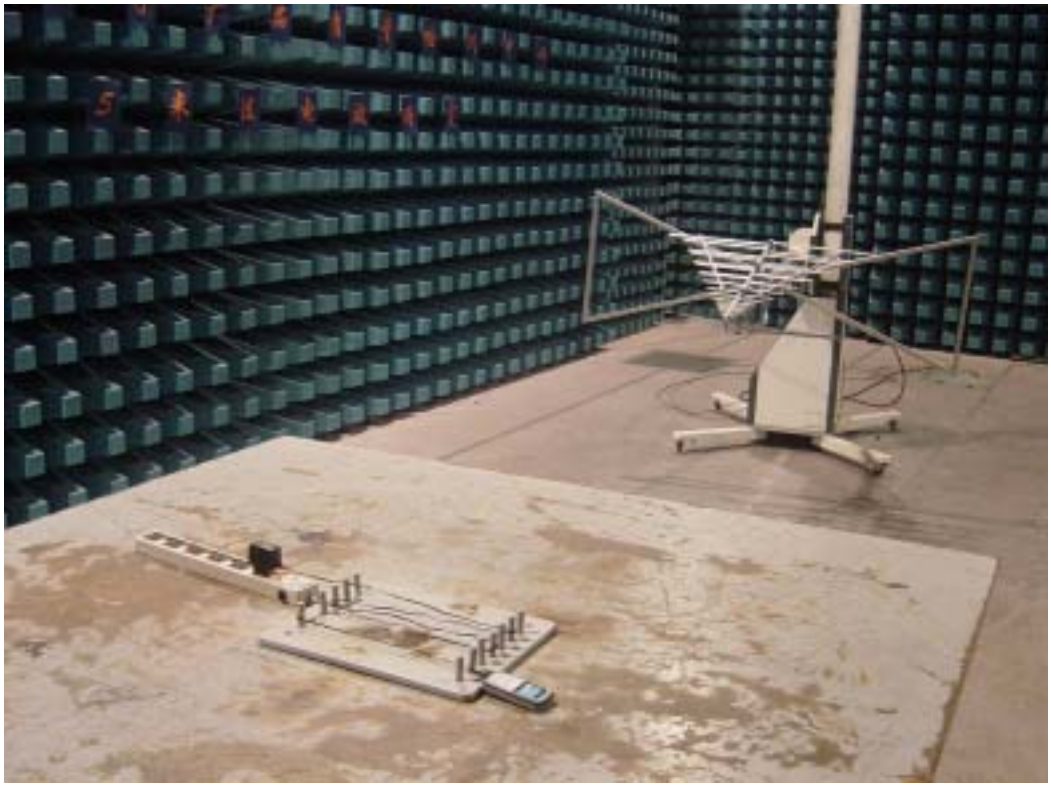



R6
R5
R3
R4
R7
C6
Q2
R8
R13
R12
R10
C8
050729X06
R82
R86
R87
R89
R94
R95
R96
R88
R84
Q81
R92
R81
R90
C85
R91
C84
R83
R93
YYS

Appendix II：Photographs of the Test Configuration

1. Conducted Emission Measurement

2. Radiated Emission Measurement



3. EIRP/ERP and Spurious Radiation Measurement

4. Conducted Emission at Antenna Port