

# FCC Test Report

APPLICANT : Huawei Technologies Co., Ltd.  
EQUIPMENT : Dual-Band GSM/GPRS Mobile Telephone  
BRAND NAME : HUAWEI  
MODEL NAME : HUAWEI G7600  
FCC ID : QISG7600  
STANDARD : FCC 47 CFR FCC Part 15 Subpart B  
CLASSIFICATION : Certification

The product was received on Oct. 30, 2009 and completely tested on Jan. 06, 2010. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:



Roy Wu / Manager



## **SPORTON INTERNATIONAL INC.**

**No. 52, Hwa Ya 1<sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.**



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### SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.107	7.2.2	AC Conducted Emission	< 15.107 limits < RSS-Gen table 2 limits	PASS	Under limit 8.7 dB at 0.63 MHz
3.2	15.109	7.2.3.2	Radiated Emission	< 15.109 limits or < RSS-Gen table 1 limits (Section 6)	PASS	Under limit 12.03 dB at 49.44 MHz



# 1. General Description

## 1.1. Applicant

Huawei Technologies Co., Ltd.

Huawei industrial Base, Bantian, Longgang, Shenzhen 518129, P.R. China

## 1.2. Manufacturer

Huawei Technologies Co., Ltd.

Huawei industrial Base, Bantian, Longgang, Shenzhen 518129, P.R. China

## 1.3. Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Dual-Band GSM/GPRS Mobile Telephone
Brand Name	HUAWEI
Model Name	HUAWEI G7600
FCC ID	QISG7600
Tx Frequency Range	GSM850 : 824 MHz ~ 849 MHz GSM1900 : 1850 MHz ~ 1910 MHz Bluetooth : 2400 MHz ~ 2483.5 MHz
Rx Frequency Range	GSM850 : 869 MHz ~ 894 MHz GSM1900 : 1930 MHz ~ 1990 MHz Bluetooth : 2400 MHz ~ 2483.5 MHz
Antenna Type	GSM : Fixed Internal Antenna Bluetooth : Monopole Antenna
HW Version	ORANGE-V3.0
SW Version	G7600CA_C63_M21_00_04
Type of Modulation	GSM / GPRS : GMSK Bluetooth : GFSK
EUT Stage	Identical Prototype

**List of Accessory:**

Specification of Accessory		
<b>AC Adapter</b>	<b>Brand Name</b>	HUAWEI
	<b>Model Name</b>	HS-050040U6
	<b>Power Rating</b>	I/P:100-240Vac, 50-60Hz, 0.2A; O/P: 5.0Vdc, 400mA
<b>Battery</b>	<b>Brand Name</b>	HUAWEI
	<b>Model Name</b>	HB4A3
	<b>Power Rating</b>	3.7Vdc, 800mAh
	<b>Type</b>	Li-ion
<b>Earphone</b>	<b>Signal Line Type</b>	1.6 meter non-shielded cable without ferrite core
<b>USB Cable</b>	<b>Signal Line Type</b>	0.87 meter shielded cable without ferrite core
<b>Camera</b>	<b>Brand Name</b>	Q Tech
	<b>Model Name</b>	WV113AQ
<b>LCD Panel</b>	<b>Brand Name</b>	Giantplus
	<b>Model Name</b>	KGM966A0

**Remark:**

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. For accessories equipped with this EUT, please refer to the appendix of the external photo.

### 1.4. Test Site

<b>Test Site</b>	SPORTON INTERNATIONAL INC.		
<b>Test Site Location</b>	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		<b>FCC/IC Registration No.</b>
	CO05-HY	03CH06-HY	TW1022/4086B-1

### 1.5. Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC 47 CFR FCC Part 15 Subpart B
- ANSI C63.4-2003
- IC RSS-Gen Issue 2

**Remark:** All test items were verified and recorded according to the standards and without any deviation during the test.

## 1.6. Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
3.	Bluetooth Earphone	Nokia	HS-12W	PYAHS-12W	N/A	N/A
4.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	LCD Monitor	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
6.	Monitor	Q-Bell	LC-91	FCC DoC	Shielded, 1.2 m	Unshielded, 1.8 m
7.	PC	DELL	MT320	FCC DoC	N/A	Unshielded, 1.8 m
8.	(USB) Mouse	Dell	MO56UC	FCC DoC	Shielded, 1.8 m	N/A
9.	(USB) Keyboard	Dell	L100	FCC DoC	Shielded, 1.8 m	N/A
10.	Print	HP	LaserJet 1018	FCC DoC	Shielded, 1.8 m	Unshielded, 1.8 m
11.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
12.	iPod	Apple	A1199	FCC DoC	Shielded, 1.2 m	N/A

## 2. Test Configuration of Equipment Under Test

### 2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: conduction (150 kHz to 30 MHz), radiation (30MHz to the 5th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

Pre-scanned tests were conducted to determine the final configuration from all possible combinations.

The following tables are showing the test modes as the worst cases and recorded in this report.

Item	EUT Configuration	Test Condition		
		EMI AC	EMI RE<1G	EMI RE≥1G
1.	Operating Mode (EUT with earphone)	Note 1	☒	Note 1
2.	Charging Mode (EUT with adapter)	☒	☒	☒
3.	Charging Mode (EUT with notebook or PC)	☒	☒	Note 1

**Abbreviations:**

- EMI AC: AC conducted emissions
- EMI RE ≥ 1G: EUT radiated emissions ≥ 1GHz
- EMI RE < 1G: EUT radiated emissions < 1GHz

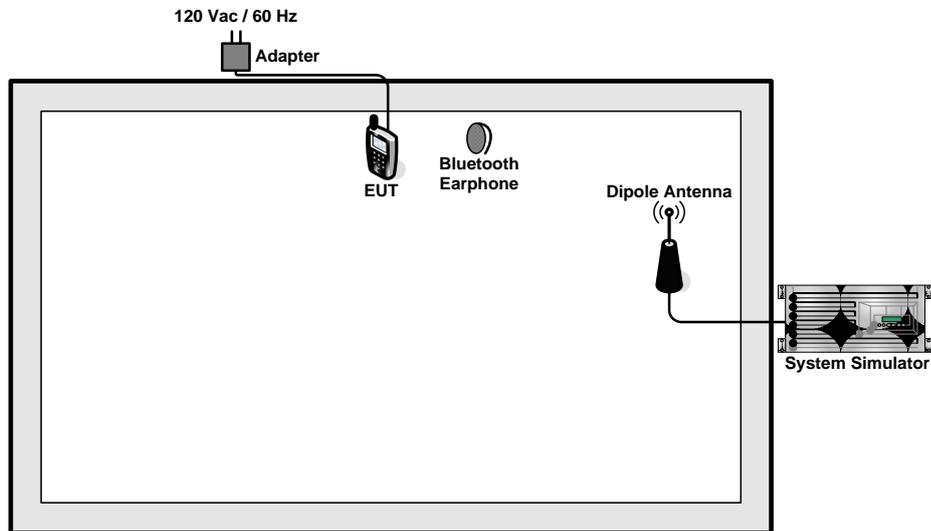
**Note 1:** Testing for this mode is not required or not the worst case.



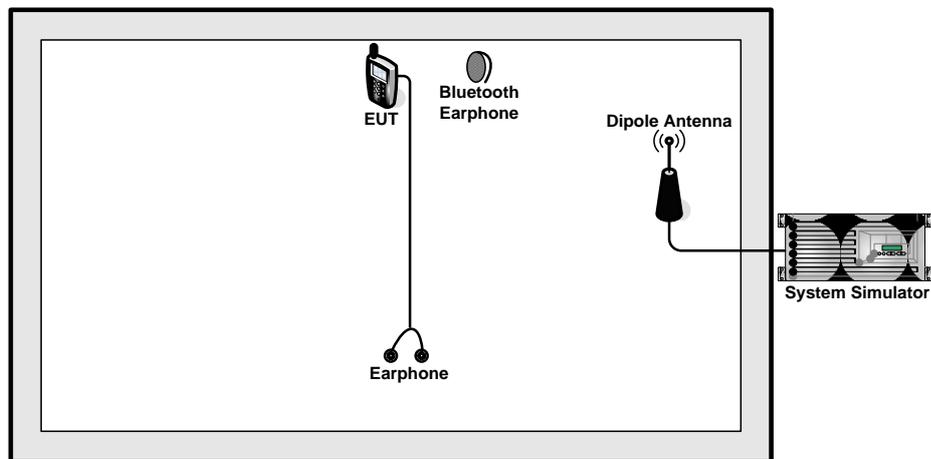
Test Items	EUT Configure Mode	Function Type
AC Conducted Emission	2/3	Mode 1 : GSM850 Idle + Bluetooth Idle + Camera + Adapter Mode 2 : GSM1900 Idle + Bluetooth Idle + MPEG4 + Adapter Mode 3 : GSM850 Idle + Bluetooth Idle + FM Rx + USB Cable (Link with Notebook)
Radiated Emissions < 1GHz	1/2/3	Mode 1 : GSM850 Idle + Bluetooth Idle + Camera + Earphone Mode 2 : GSM1900 Idle + Bluetooth Idle + MPEG4 + Adapter Mode 3 : GSM1900 Idle + Bluetooth Idle + FM Rx + USB Cable (Link with PC)
Radiated Emissions ≥ 1GHz	2	Mode 1 : GSM1900 Idle + Bluetooth Idle + MPEG4 + Adapter
<b>Remark:</b> <ol style="list-style-type: none"><li>1. The worst case of AC is mode 3; only the test data of this mode was reported.</li><li>2. The worst case of RE &lt; 1G is mode 2; only the test data of this mode was reported.</li></ol>		

## 2.2. Connection Diagram of Test System

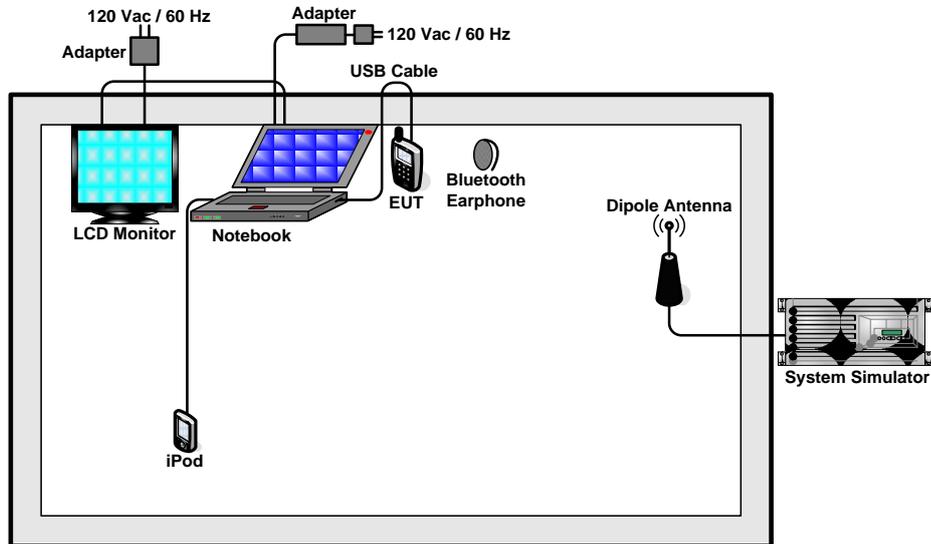
### <EUT with Adapter Mode>



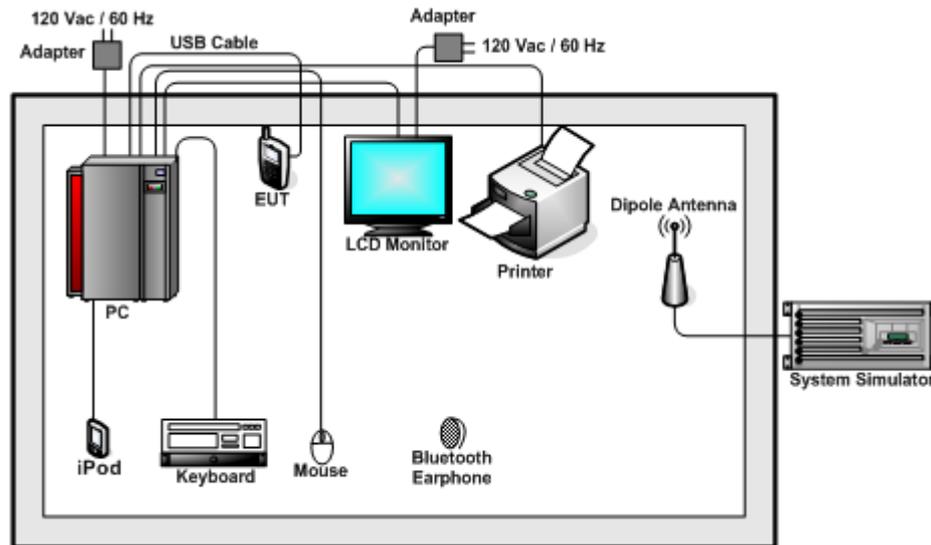
### <EUT with Earphone Mode>



**<EUT with USB Cable (Link with Notebook) Mode>**



**<EUT with USB Cable (Link with PC) Mode>**





## **2.3. Test Software**

The EUT was in GSM idle mode during the testing. The EUT was synchronized to the BCCH, and is in continuous receiving mode by setting system simulator's paging reorganization.

At the same time, the EUT was attached with the Bluetooth earphone, and the following programs installed in the EUT were programmed during the test.

1. Execute the program, "Winthrax" under WINXP installed in notebook for active sync files transfer with EUT via USB cable.
2. Turn on FM radio to make the EUT receive FM signals continuously.
3. Turn on camera to capture images
4. Execute Video player to play MPEG4 files.

### 3. Test Result

#### 3.1. Test of AC Conducted Emission Measurement

##### 3.1.1 Limits of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

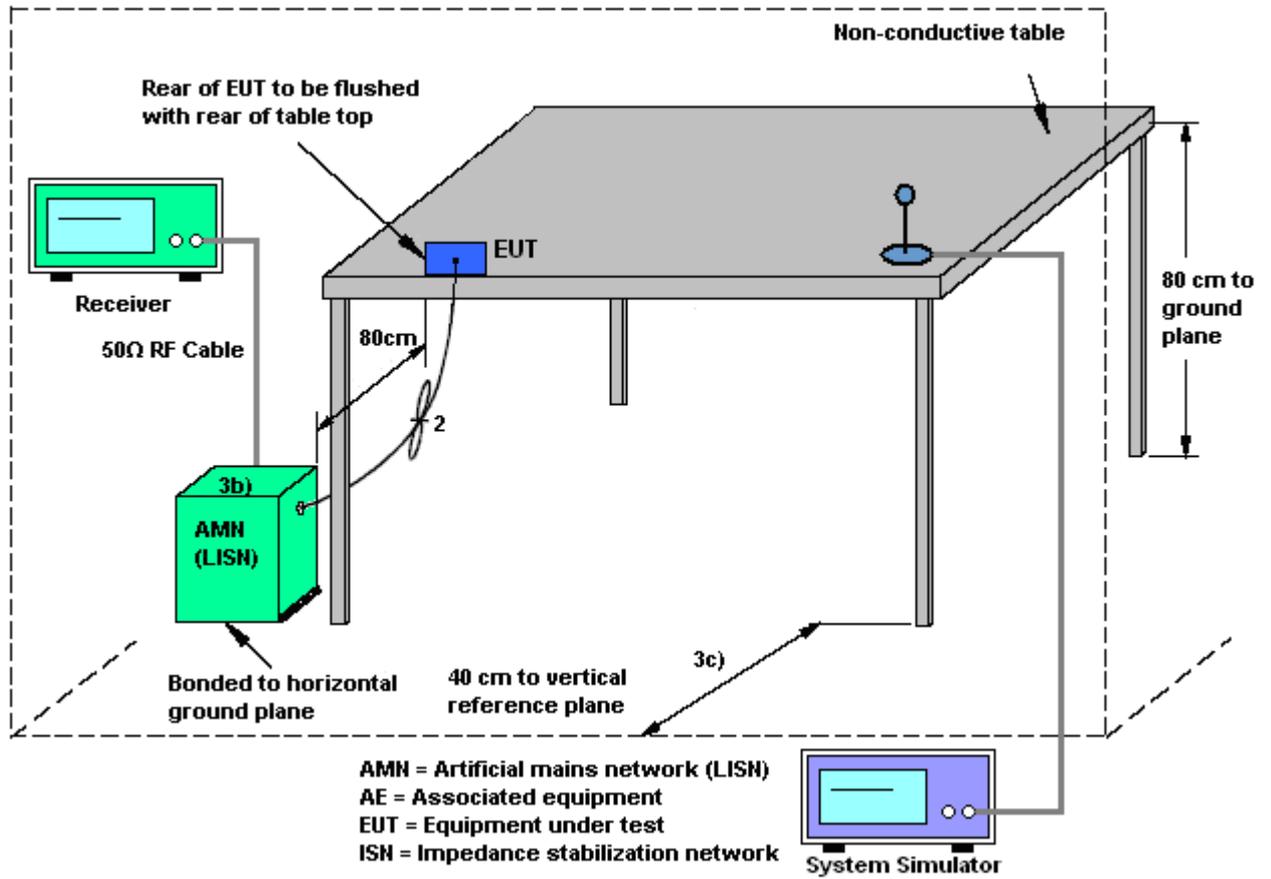
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedure

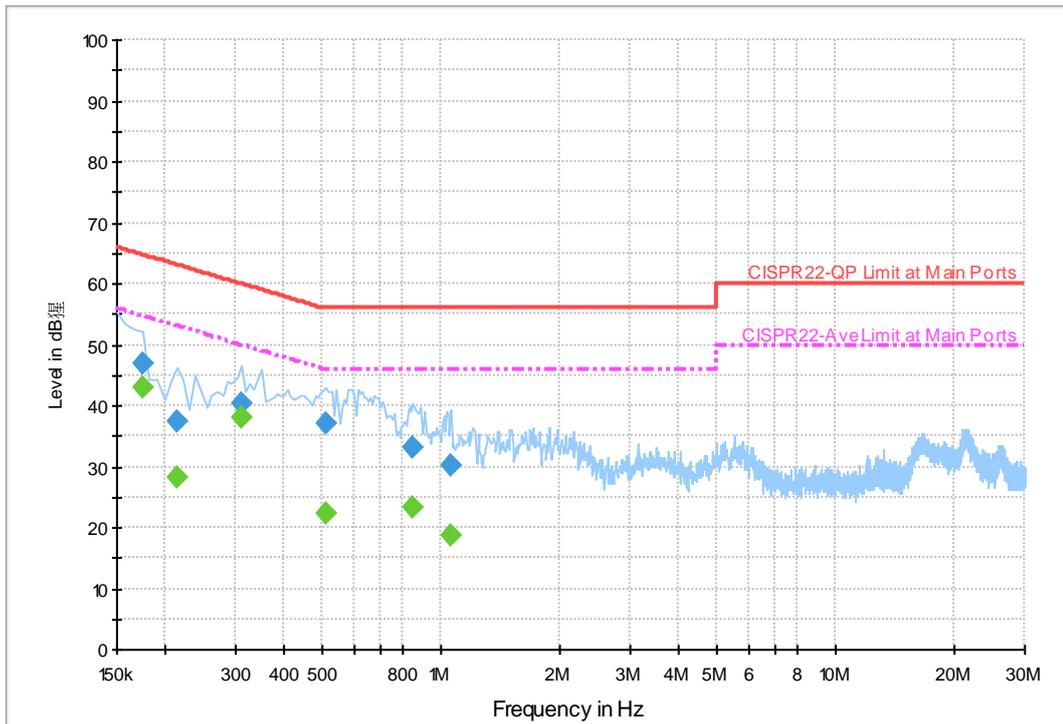
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

### 3.1.4 Test Setup



3.1.5 Test Result of AC Conducted Emission

Test Mode :	Mode 3	Temperature :	20~22°C
Test Engineer :	Hayden Wu	Relative Humidity :	43~46%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Idle + FM Rx + USB Cable (Link with Notebook)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result 1

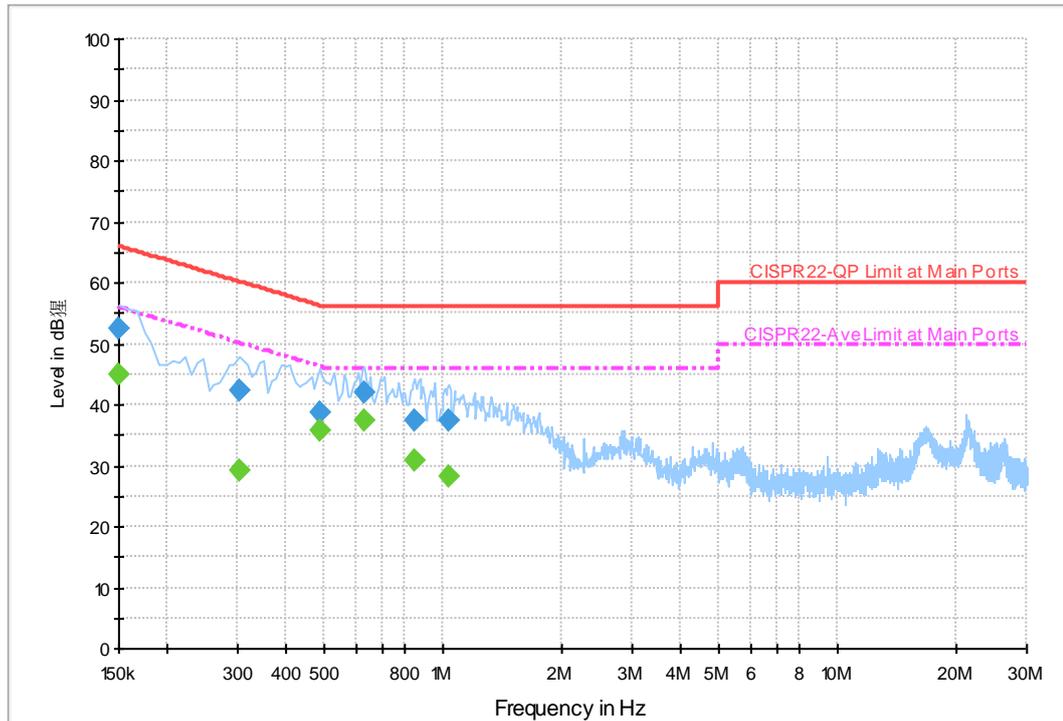
Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.174000	46.8	Off	L1	19.5	18.0	64.8
0.214000	37.5	Off	L1	19.5	25.5	63.0
0.310000	40.2	Off	L1	19.5	19.8	60.0
0.510000	37.0	Off	L1	19.4	19.0	56.0
0.846000	33.3	Off	L1	19.5	22.7	56.0
1.054000	30.1	Off	L1	19.5	25.9	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.174000	42.9	Off	L1	19.5	11.9	54.8
0.214000	28.2	Off	L1	19.5	24.8	53.0
0.310000	37.9	Off	L1	19.5	12.1	50.0
0.510000	22.3	Off	L1	19.4	23.7	46.0
0.846000	23.3	Off	L1	19.5	22.7	46.0
1.054000	18.6	Off	L1	19.5	27.4	46.0



Test Mode :	Mode 3	Temperature :	20~22°C
Test Engineer :	Hayden Wu	Relative Humidity :	43~46%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Idle + FM Rx + USB Cable (Link with Notebook)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	52.6	Off	N	19.5	13.4	66.0
0.302000	42.2	Off	N	19.4	18.0	60.2
0.486000	38.5	Off	N	19.4	17.7	56.2
0.630000	41.9	Off	N	19.5	14.1	56.0
0.846000	37.4	Off	N	19.4	18.6	56.0
1.030000	37.3	Off	N	19.4	18.7	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	44.9	Off	N	19.5	11.1	56.0
0.302000	29.2	Off	N	19.4	21.0	50.2
0.486000	35.7	Off	N	19.4	10.5	46.2
0.630000	37.3	Off	N	19.5	8.7	46.0
0.846000	30.9	Off	N	19.4	15.1	46.0
1.030000	28.3	Off	N	19.4	17.8	46.0

## 3.2. Test of Radiated Emission Measurement

### 3.2.1. Limit of Radiated Emission

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

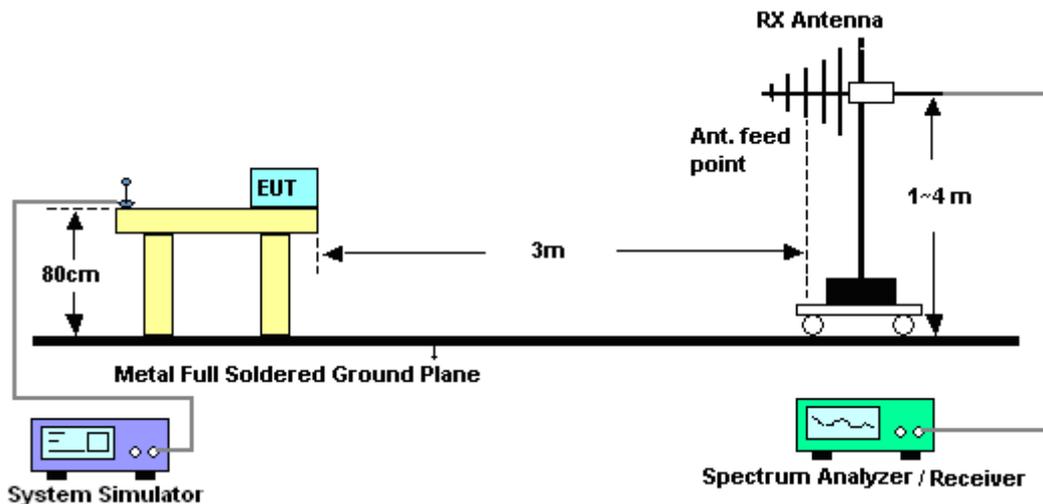
### 3.2.2. Measuring Instruments

See list of measuring instruments of this test report.

**3.2.3. Test Procedures**

1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the quasi-peak method and reported
8. Emission level (dBuV/m) = 20 log Emission level (uV/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

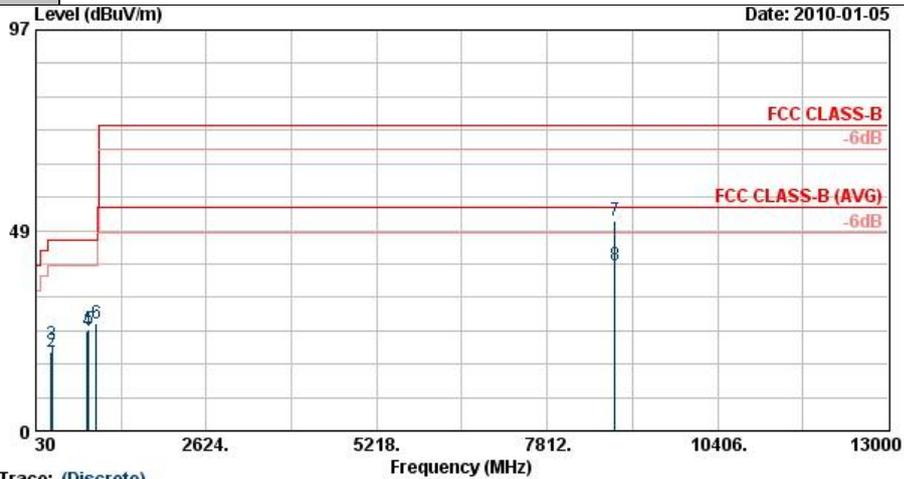
**3.2.4. Test Setup of Radiated Emission**





3.2.5. Test Result of Radiated Emission

Test Mode :	Mode 2	Temperature :	21~22°C
Test Engineer :	Mac Lin	Relative Humidity :	48~49%
Test Distance :	3m	Polarization :	Horizontal
Function Type :	GSM1900 Idle + Bluetooth Idle + MPEG4 + Adapter		

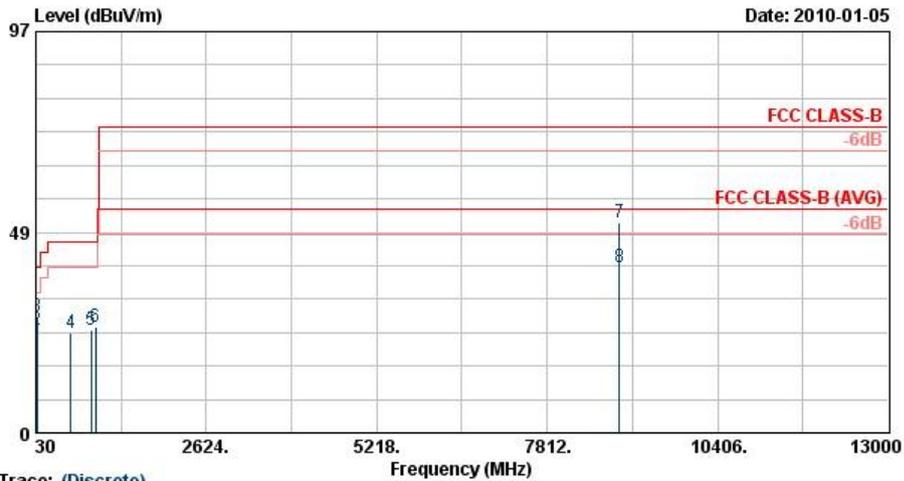


Trace: (Discrete)  
 Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m HF-ANT(8-18G)\_091111 HORIZONTAL  
 Project : FD 903011  
 Memo : Mode 2

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.00	16.63	-23.37	40.00	28.85	18.51	0.83	31.56	---	---	Peak
2	267.33	19.25	-26.75	46.00	35.79	12.57	2.80	31.92	---	---	Peak
3	272.73	20.94	-25.06	46.00	37.41	12.65	2.83	31.95	---	---	Peak
4	808.90	24.26	-21.74	46.00	31.21	20.13	5.15	32.22	---	---	Peak
5	833.40	24.58	-21.42	46.00	31.37	20.29	5.24	32.33	---	---	Peak
6	950.30	25.87	-20.13	46.00	30.78	20.94	5.56	31.42	100	221	Peak
7	8844.00	50.71	-23.29	74.00	43.96	35.97	7.62	36.84	100	223	Peak
8 @	8844.00	39.94	-14.06	54.00	33.19	35.97	7.62	36.84	100	223	Average



Test Mode :	Mode 2	Temperature :	21~22°C
Test Engineer :	Mac Lin	Relative Humidity :	48~49%
Test Distance :	3m	Polarization :	Vertical
Function Type :	GSM1900 Idle + Bluetooth Idle + MPEG4 + Adapter		



Trace: (Discrete)  
 Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m HF-ANT(8-18G)\_091111 VERTICAL  
 Project : FD 903011  
 Memo : Mode 2

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.00	18.72	-21.28	40.00	30.94	18.51	0.83	31.56	---	---	Peak
2	38.64	24.91	-15.09	40.00	42.25	13.42	0.96	31.72	---	---	Peak
3 @	49.44	27.97	-12.03	40.00	47.72	11.10	1.11	31.96	100	106	Peak
4	558.30	24.17	-21.83	46.00	33.92	18.20	4.18	32.13	---	---	Peak
5	875.40	24.76	-21.24	46.00	30.83	20.57	5.39	32.02	---	---	Peak
6	943.30	25.69	-20.31	46.00	30.69	20.91	5.55	31.46	---	---	Peak
7	8914.00	50.81	-23.19	74.00	43.93	36.03	7.71	36.86	100	351	Peak
8 @	8914.00	40.14	-13.86	54.00	33.26	36.03	7.71	36.86	100	351	Average

## 4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 05, 2009	Aug. 04, 2010	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9kHz~30MHz	Nov. 30, 2009	Nov. 29, 2010	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9kHz~30MHz	Nov. 23, 2009	Nov. 22, 2010	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
Spectrum Analyzer	Agilent	E4408B	MY44211030	9KHz-26.5GHz	Oct. 23, 2009	Oct. 22, 2010	Radiation (03CH06-HY)
Spectrum Analyzer	R&S	FSP40	100057	9KHz-40GHz	Oct. 20, 2009	Oct. 19, 2010	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESVS10	834468/003	20MHz-1000M Hz	Apr. 28, 2009	Apr. 27, 2010	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Oct. 31, 2009	Oct. 30, 2010	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz~18GHz	Aug. 20, 2009	Aug. 19, 2010	Radiation (03CH06-HY)
Double Ridge Horn Antenna	Training Research	AH-0801	95119	8GHz~18GHz	Nov. 02, 2009	Nov. 01, 2010	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA917025 1	15GHz- 40GHz	Oct. 14, 2009	Oct. 13, 2010	Radiation (03CH06-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz- 26.5GHz	Nov. 11, 2009	Nov. 10, 2010	Radiation (03CH06-HY)
Amplifier	Agilent	310N	186713	9KHz~1GHz	Apr. 20, 2009	Apr. 19, 2010	Radiation (03CH06-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9KHz~30MHz	May 22, 2008	May 21, 2010	Radiation (03CH06-HY)
System Simulator	R&S	CMU200	105934	N/A	Nov. 11, 2008	Nov. 10, 2010	-

## 5. Uncertainty of Evaluation

### Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Contribution	Uncertainty of $X_i$		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.10	Normal (k=2)	0.05
Cable Loss	0.10	Normal (k=2)	0.05
AMN Insertion Loss	2.50	Rectangular	0.63
Receiver Specification	1.50	Rectangular	0.43
Site Imperfection	1.39	Rectangular	0.80
Mismatch	+0.34 / -0.35	U-Shape	0.24
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>1.13</b>		
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>2.26</b>		

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Contribution	Uncertainty of $X_i$		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>1.27</b>		
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>2.54</b>		



**Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)**

Contribution	Uncertainty of $X_i$		$u(X_i)$	$C_i$	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	±0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	±1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	±0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site Imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\text{Log}(1-\Gamma_1*\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>2.36</b>				
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>4.72</b>				



## **Appendix A. Photographs of EUT**

Please refer to Sporton report number EP9O3011 as below.