

# FCC Test Report

**APPLICANT** : Brightstar Coporation  
**EQUIPMENT** : GSM mobile phone  
**BRAND NAME** : Avvio  
**MODEL NAME** : Avvio 402S/Avvio 402  
**FCC ID** : WVBA402  
**STANDARD** : FCC 47 CFR FCC Part 15 Subpart B  
**CLASSIFICATION** : Certification

The product was received on Aug. 16, 2012 and completely tested on Sep. 14, 2012. We, SPORTON INTERNATIONAL (KUNSHAN) 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by:



Jones Tsai / Manager



**SPORTON INTERNATIONAL (KUNSHAN) INC.**  
**No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.**



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## REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC281601	Rev. 01	Initial issue of report	Sep. 20, 2012



### SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.107	7.2.4	AC Conducted Emission	< 15.107 limits < RSS-Gen table 2 limits	PASS	Under limit 13.62 dB at 0.220 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 3.10 dB at 263.770 MHz

# 1. General Description

## 1.1. Applicant

**Brightstar Coporation**  
 9725 NW 117th Ave., Miami, Florida, United States

## 1.2. Manufacturer

**Shanghai Huaqin Telecom Technology Co., Ltd.**  
 Building 12, 399 Keyuan Road, Pudong district, Shanghai, China

## 1.3. Feature of Equipment Under Test

Product Feature	
Equipment	GSM mobile phone
Brand Name	Avvio
Model Name	Avvio 402S/Avvio 402
FCC ID	WVBA402
EUT supports Radios application	GSM
HW Version	V186_MB_V2.0
SW Version	ZV186B_058A_V8_0_4
EUT Stage	Identical Prototype

**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. There are two different types of EUT. They are single SIM card mobile (Model Name: Avvio 402) and dual SIM card mobile (Model Name: Avvio 402S). The others are the same including circuit design, PCB board, structure and all components. It is special to declare. After pre-scan two types of EUT, we found test result of the sample that dual SIM was the worst, so we choose dual SIM card mobile to perform all tests.

Product Specification subjective to this standard	
Tx Frequency	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8MHz
Rx Frequency Range	GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz FM: 88 MHz ~ 108 MHz
Antenna Type	Dipole Antenna
Type of Modulation	GMSK FM

### 1.4. Test Site

<b>Test Site</b>	SPORTON INTERNATIONAL (KUNSHAN) INC.		
<b>Test Site Location</b>	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		<b>FCC/IC Registration No.</b>
	CO01-KS	03CH01-KS	149928/4086E-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 3

**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.	Signal Generator	R&S	SMR40	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
3.	PC	Dell	MT380	FCC DoC	N/A	Unshielded, 1.8 m
4.	PC	Dell	OPTIPLEX 390	FCC DoC	N/A	Unshielded, 1.8 m
5.	Monitor	Dell	E1910Hc	FCC DoC	Shielded, 1.2 m	Unshielded, 1.8 m
6.	Monitor	Dell	IN1930MWc	FCC DoC	Shielded, 1.2 m	Unshielded, 1.8 m
7.	(USB) Keyboard	Dell	SK-8115	FCC DoC	Shielded, 1.5 m	N/A
8.	(USB) Keyboard	Dell	SK-8120	FCC DoC	Shielded, 1.8 m	N/A
9.	(USB) Mouse	Dell	N231	FCC DoC	Shielded, 1.8 m	N/A
10.	(USB) Mouse	Dell	MS111-P	FCC DoC	Shielded, 1.8 m	N/A
11.	Printer	HP	Laser Jet 1018	FCC DoC	Shielded, 1.8 m	Unshielded, 1.8 m
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, whichever is lower).

The EUT uses a USB interface and microprocessor operating 104MHz which is the maximum frequency used.

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
1.	Charging Mode (EUT with adapter)	☒	☒
2.	Data application transferred mode (EUT with PC)	☒	☒

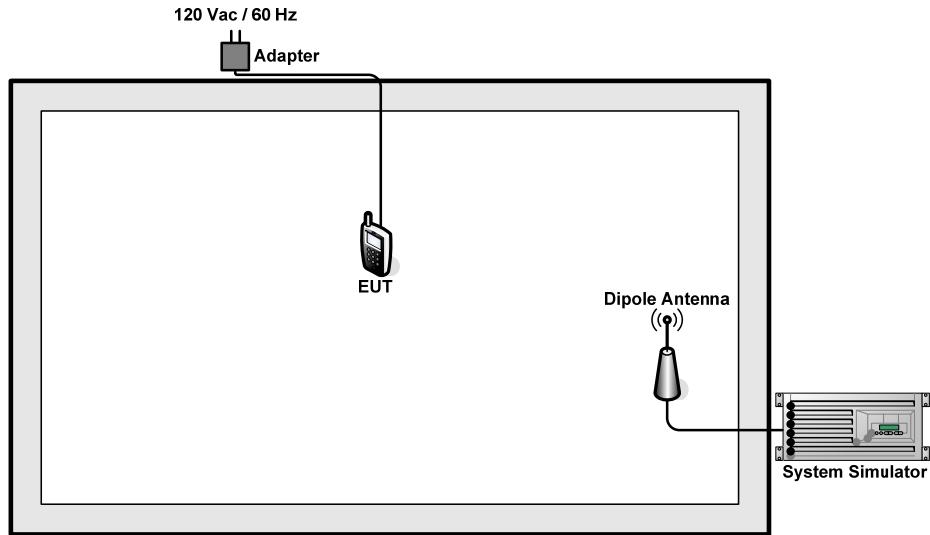
#### Abbreviations:

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

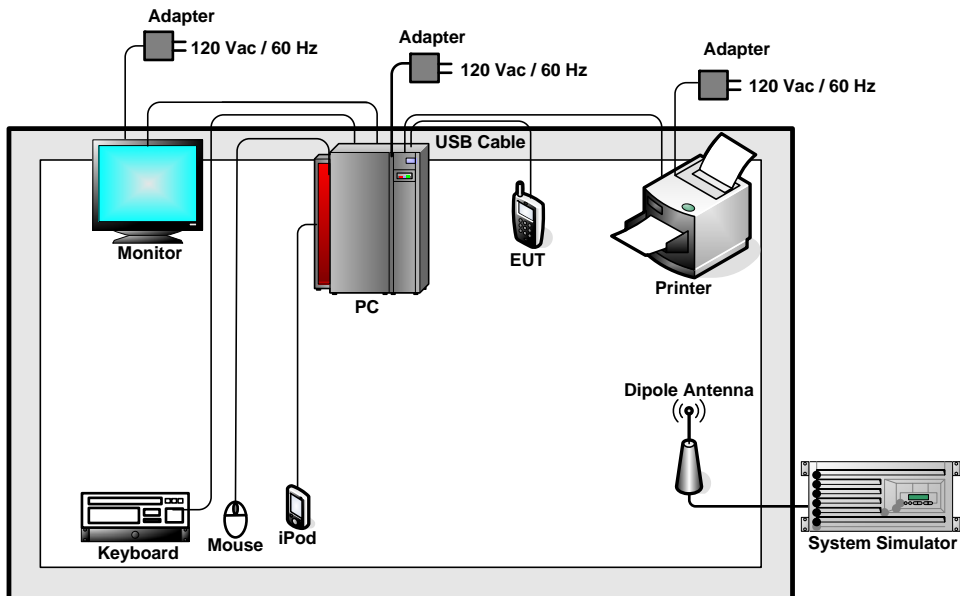
Test Items	EUT Configure Mode	Function Type
AC Conducted Emission	1/2	Mode 1: GSM850 Idle + USB Cable (Charging from Adapter) + Camera + SIM 1 <Fig. 1> Mode 2: GSM1900 Idle + USB Cable (Charging from Adapter) + MPEG4 + SIM 1 <Fig. 1> Mode 3: EUT + USB Cable (Data Link with PC) + SIM 1 <Fig. 2>
Radiated Emissions < 1GHz	1/2	Mode 1: GSM850 Idle + USB Cable (Charging from Adapter) + Camera + SIM 1 <Fig. 1> Mode 2: GSM1900 Idle + Earphone + FM Rx + SIM 1 <Fig. 3> Mode 3: GSM850 Idle + USB Cable (Charging from Adapter) + MPEG4 + SIM 1 <Fig. 1> Mode 4: EUT + USB Cable (Data Link with PC) + SIM 1 <Fig. 2>
<p><b>Remark:</b></p> <ol style="list-style-type: none"> <li>1. The worst case of AC Conducted Emission is mode 3; only the test data of this mode was reported.</li> <li>2. The worst case of Radiated Emissions is mode 4; only the test data of this mode was reported.</li> <li>3. Link with PC means data application transferred mode between EUT and PC.</li> </ol>		



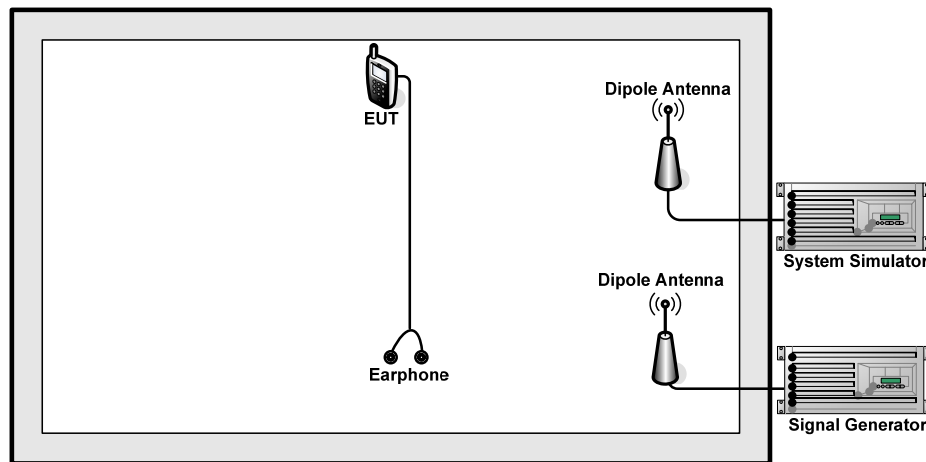
## 2.2. Connection Diagram of Test System



<Fig. 1>



<Fig. 2>



&lt;Fig. 3&gt;

## 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 following programs installed in the EUT were programmed during the test.

1. Turn on FM function to keep EUT receiving continuous signals from Signal Generator.
2. Execute "Windows Media Player" to play MPEG4 files.
3. Turn on camera to capture images.

PC executes the program, "Winthrax" installed under WIN7 OS for file transfer with EUT via USB cable, while EUT function should be turned off, and all the RF function are not in active.

### 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.

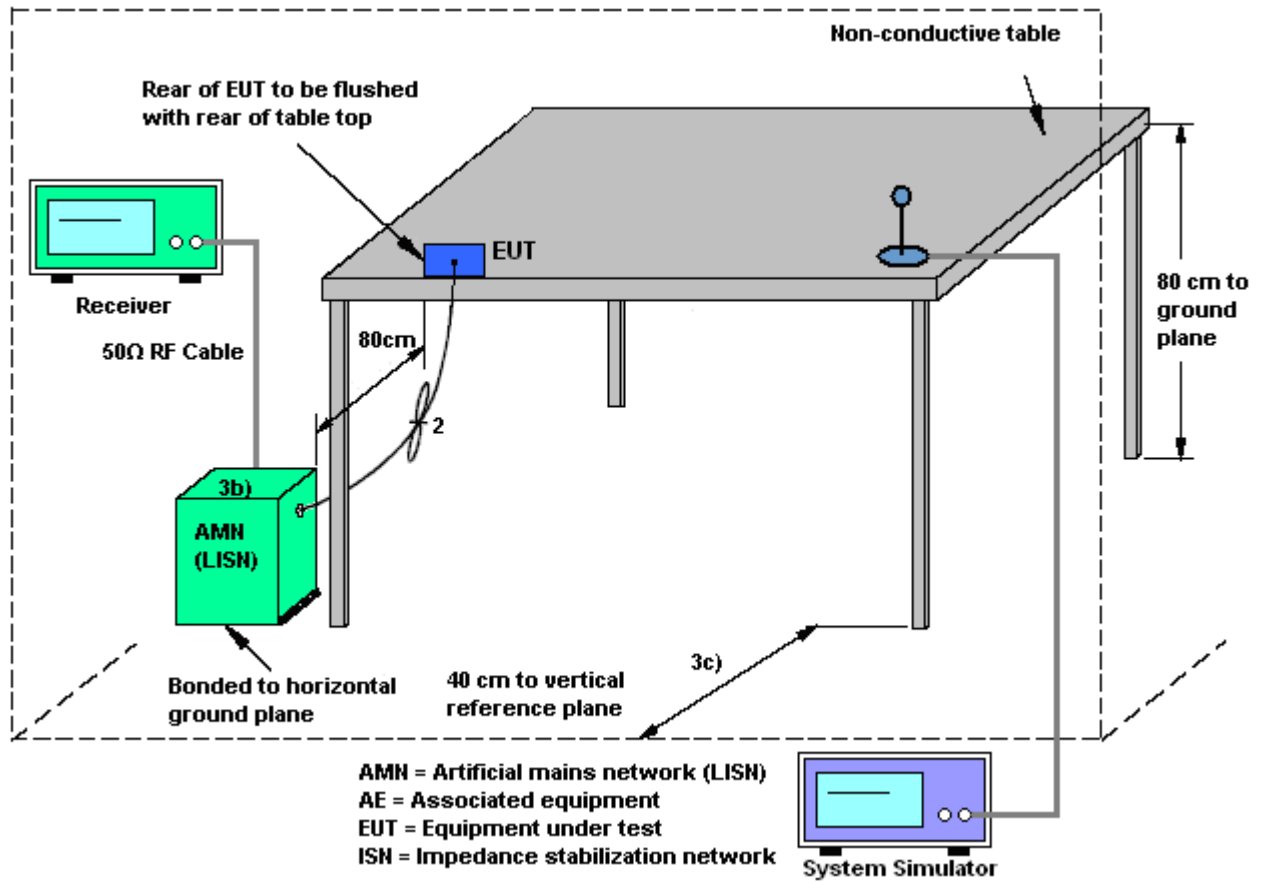
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedure

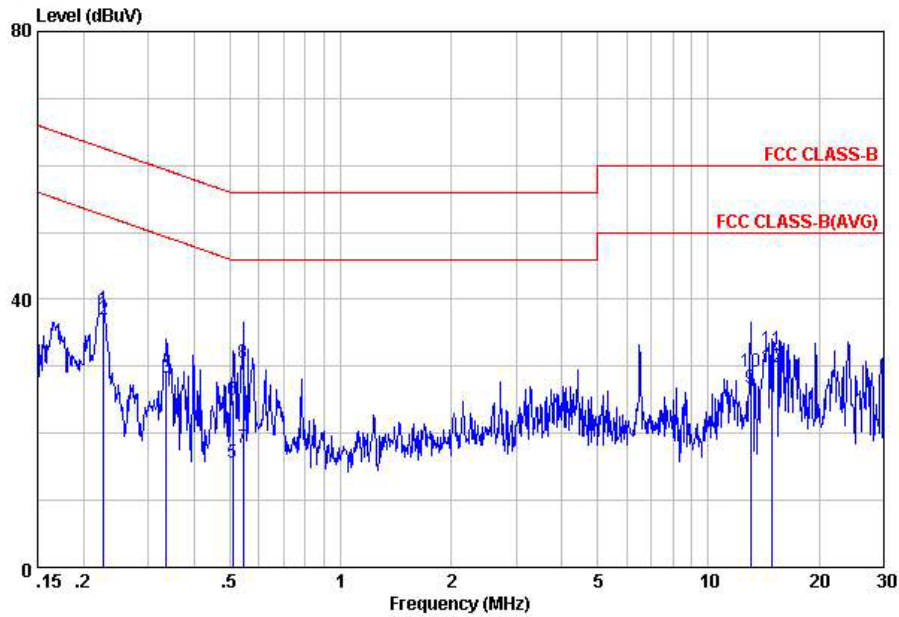
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
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 :	19~20°C
Test Engineer :	Tom Wang	Relative Humidity :	39~40%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	EUT + USB Cable (Data Link with PC) + SIM 1		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



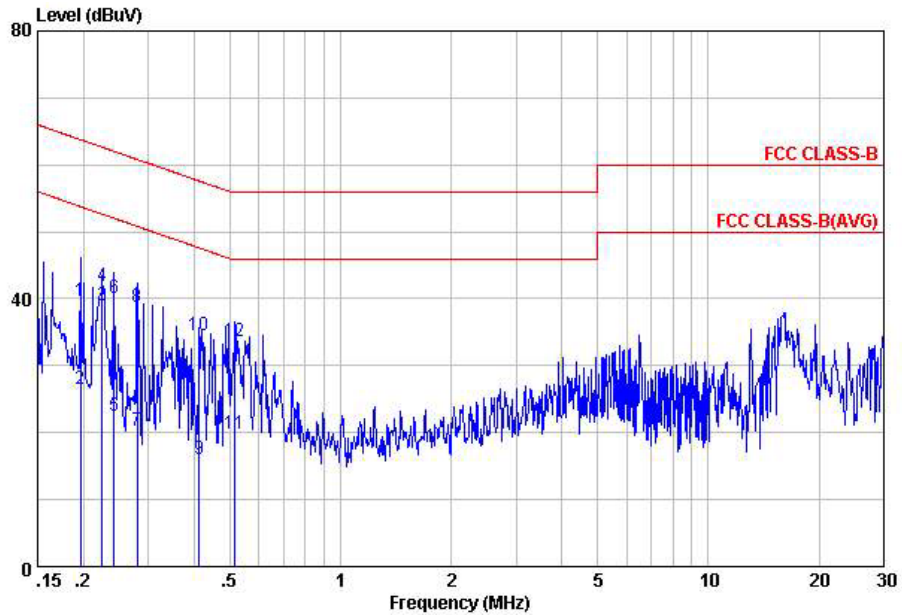
Site : C001-KS  
 Condition: FCC CLASS-B LISN-111230 LINE

mode : Mode 3

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.23	37.94	-24.63	62.57	27.50	-0.07	10.51	QP
2	0.23	36.94	-15.63	52.57	26.50	-0.07	10.51	Average
3	0.34	28.32	-20.99	49.31	17.80	-0.08	10.60	Average
4	0.34	29.42	-29.89	59.31	18.90	-0.08	10.60	QP
5	0.51	15.64	-30.36	46.00	5.09	-0.08	10.63	Average
6	0.51	25.04	-30.96	56.00	14.49	-0.08	10.63	QP
7	0.54	17.84	-28.16	46.00	7.29	-0.08	10.63	Average
8	0.54	30.44	-25.56	56.00	19.89	-0.08	10.63	QP
9	13.06	26.70	-23.30	50.00	15.80	-0.08	10.98	Average
10	13.06	29.10	-30.90	60.00	18.20	-0.08	10.98	QP
11	14.83	32.46	-27.54	60.00	21.50	-0.03	10.99	QP
12	14.83	29.86	-20.14	50.00	18.90	-0.03	10.99	Average



Test Mode :	Mode 3	Temperature :	19~20°C
Test Engineer :	Tom Wang	Relative Humidity :	39~40%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	EUT + USB Cable (Data Link with PC) + SIM 1		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : C001-KS  
 Condition: FCC CLASS-B LISN-111230 NEUTRAL  
 mode : Mode 3

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.20	39.62	-24.14	63.76	29.20	-0.07	10.49	QP
2	0.20	26.52	-27.24	53.76	16.10	-0.07	10.49	Average
3	0.22	39.04	-13.62	52.66	28.60	-0.07	10.51	Average
4	0.22	41.84	-20.82	62.66	31.40	-0.07	10.51	QP
5	0.24	22.45	-29.59	52.04	12.00	-0.07	10.52	Average
6	0.24	40.05	-21.99	62.04	29.60	-0.07	10.52	QP
7	0.28	20.28	-30.53	50.81	9.79	-0.07	10.56	Average
8	0.28	38.68	-22.13	60.81	28.19	-0.07	10.56	QP
9	0.41	15.94	-31.65	47.59	5.40	-0.08	10.62	Average
10	0.41	34.64	-22.95	57.59	24.10	-0.08	10.62	QP
11	0.52	19.85	-26.15	46.00	9.30	-0.08	10.63	Average
12	0.52	33.55	-22.45	56.00	23.00	-0.08	10.63	QP

## 3.2. Test of Radiated Emission Measurement

### 3.2.1. Limit of Radiated Emission

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

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

### 3.2.2. Measuring Instruments

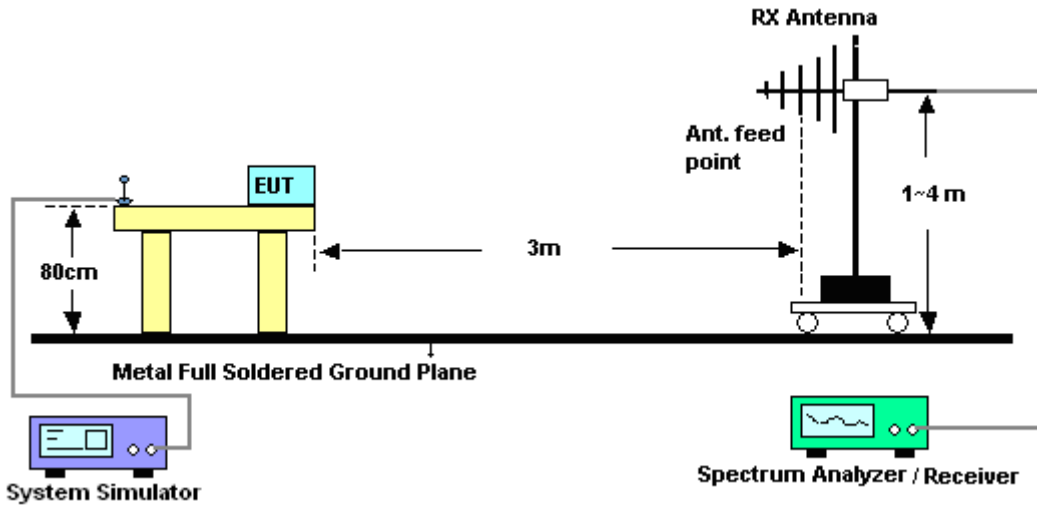
See list of measuring instruments of this test report.

### 3.2.3. Test Procedures

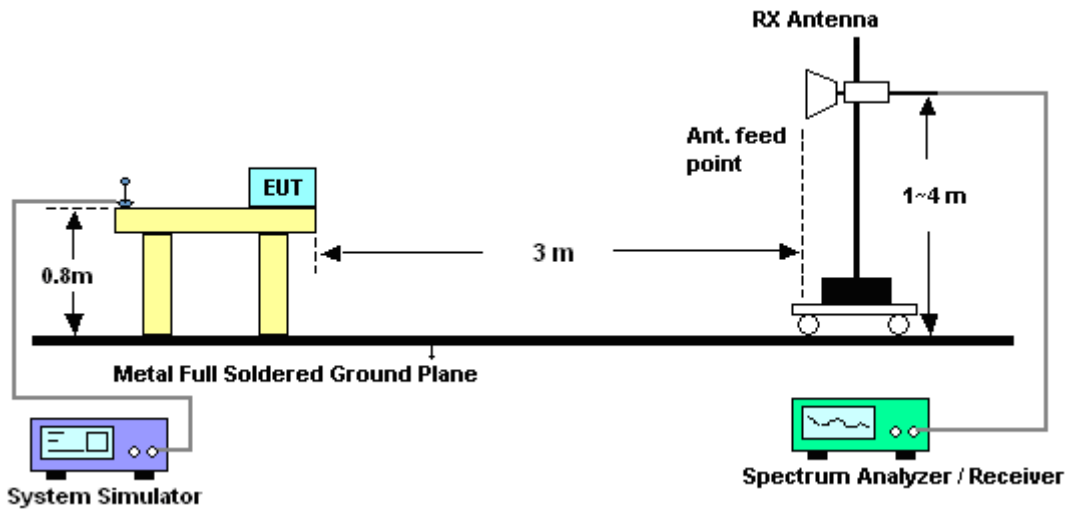
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna height is adjusted between one to 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, peak values of EUT will be reported. Otherwise, the emission will be repeated by 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

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

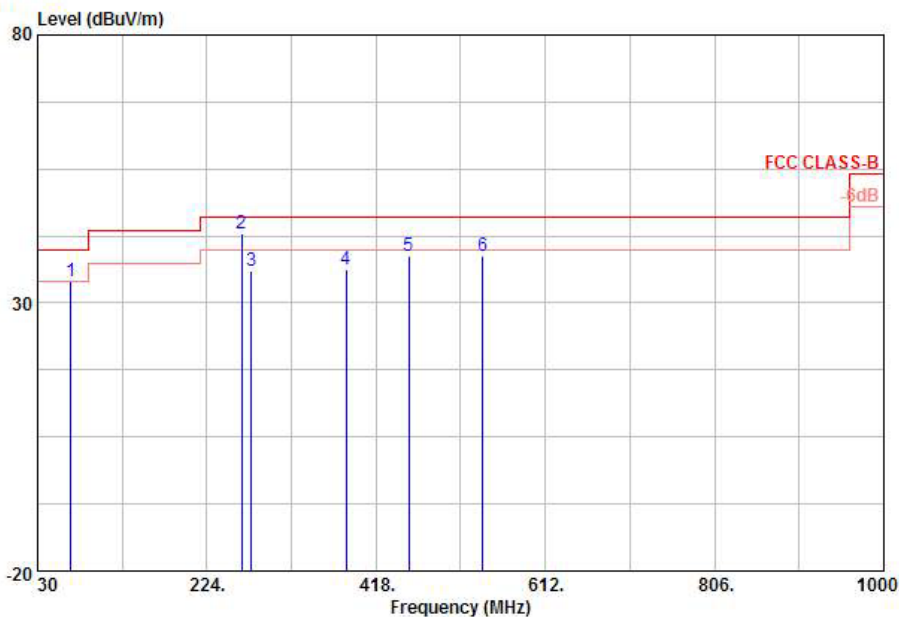






3.2.5. Test Result of Radiated Emission

Test Mode :	Mode 4	Temperature :	21~22°C
Test Engineer :	Chenmy Cheng	Relative Humidity :	45~46%
Test Distance :	3m	Polarization :	Horizontal
Function Type :	EUT + USB Cable (Data Link with PC) + SIM 1		



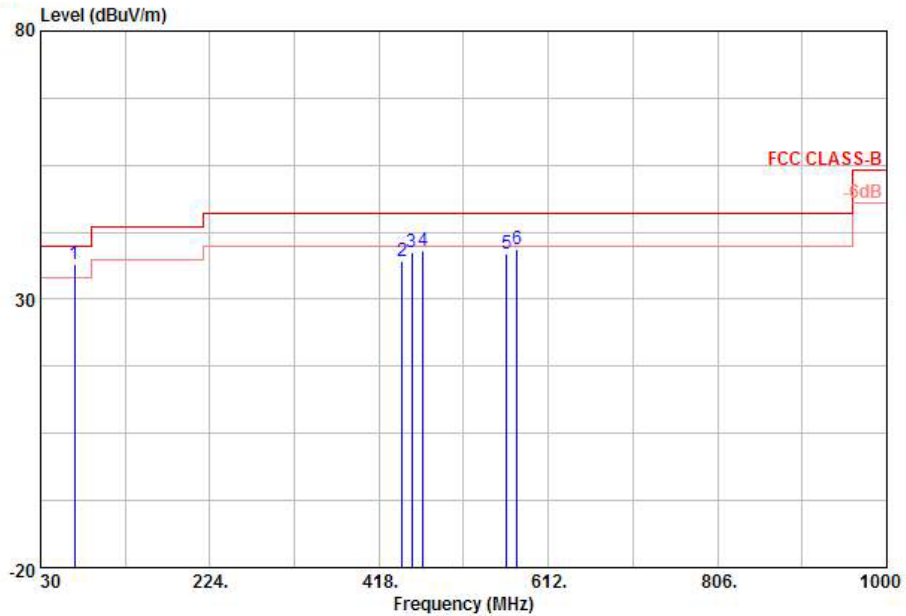
Site : 03CH01-KS  
 Condition: FCC CLASS-B 3m LF\_ANT\_100803 HORIZONTAL

Mode : mode 4

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB	dB	cm	deg	
1 !	67.83	34.02	-5.98	40.00	58.51	5.27	0.33	30.09	---	Peak
2 !	263.77	42.90	-3.10	46.00	59.86	12.23	0.68	29.87	125	200 Peak
3	275.41	35.89	-10.11	46.00	52.59	12.53	0.70	29.93	---	Peak
4	384.05	36.28	-9.72	46.00	49.72	15.59	0.83	29.86	---	Peak
5	455.83	38.71	-7.29	46.00	51.20	16.38	0.91	29.78	---	Peak
6	540.22	38.68	-7.32	46.00	49.07	18.31	0.99	29.69	---	Peak



Test Mode :	Mode 4	Temperature :	21~22°C
Test Engineer :	Chenmy Cheng	Relative Humidity :	45~46%
Test Distance :	3m	Polarization :	Vertical
Function Type :	EUT + USB Cable (Data Link with PC) + SIM 1		



Site : 03CH01-KS  
 Condition: FCC CLASS-B 3m LF\_ANT\_100803 VERTICAL

Mode : mode 4

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	68.80	36.58	-3.42	40.00	61.05	5.28	0.34	30.09	100	250	Peak
2	444.19	37.23	-8.77	46.00	49.86	16.27	0.89	29.79	---	---	Peak
3	455.83	38.87	-7.13	46.00	51.36	16.38	0.91	29.78	---	---	Peak
4	468.44	39.05	-6.95	46.00	51.31	16.59	0.92	29.77	---	---	Peak
5	564.47	38.39	-7.61	46.00	48.52	18.52	1.02	29.67	---	---	Peak
6	576.11	39.47	-6.53	46.00	49.53	18.55	1.04	29.65	---	---	Peak



### 4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	Jun. 01, 2012	Sep. 03, 2012	May 31, 2013	Conduction (CO01-KS)
LISN	MessTec	AN3016	60103	9kHz~30MHz	Dec. 30, 2011	Sep. 03, 2012	Dec. 29, 2012	Conduction (CO01-KS)
LISN	MessTec	AN3016	60105	9kHz~30MHz	Dec. 30, 2011	Sep. 03, 2012	Dec. 29, 2012	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000 811	N/A	Nov. 16, 2011	Sep. 03, 2012	Nov. 15, 2012	Conduction (CO01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 09, 2011	Sep. 14, 2012	Nov. 08, 2012	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 08, 2011	Sep. 14, 2012	Dec. 07, 2012	Radiation (03CH01-KS)
Amplifier	Wireless	FPA-6592G	060007	30MHz~2GHz	Dec. 30, 2011	Sep. 14, 2012	Dec. 29, 2012	Radiation (03CH01-KS)
Signal Generator	R&S	SMR40	100455	10MHz~40GHz	Dec. 30, 2011	Sep. 03,2012~ Sep. 14, 2012	Dec. 29, 2012	-
System Simulator	R&S	CMU200	837587/066	2G Full-Band	Dec. 30, 2011	Sep. 03,2012~ Sep. 14, 2012	Dec. 29, 2012	-

## 5. Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.26
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.54
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## **Appendix A. Photographs of EUT**

Please refer to Sporton report number EP281601 as below.