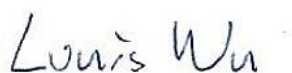


# FCC Test Report

APPLICANT : Brightstar Corporation  
EQUIPMENT : GSM&WCDMA mobile phone  
BRAND NAME : Avvio  
MODEL NAME : Avvio 814  
MARKETING NAME : Avvio 814  
FCC ID : WVBA814X  
STANDARD : FCC 47 CFR FCC Part 15 Subpart B  
CLASSIFICATION : Certification

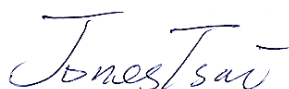
The product was received on Mar. 14, 2014 and testing was completed on Mar. 18, 2014. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown to be compliant with the applicable technical standards.

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



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Reviewed by: Louis Wu / Manager



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Approved by: Jones Tsai / Manager



## **SPORTON INTERNATIONAL (SHENZHEN) INC.**

**No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C.**

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## REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC431410	Rev. 01	Initial issue of report	Mar. 20, 2014

## SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.107	AC Conducted Emission	< 15.107 limits	PASS	Under limit 10.48 dB at 0.160 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 4.21 dB at 268.680 MHz for Quasi-Peak

## 1. General Description

### 1.1. Applicant

**Brightstar Corporation**

9725 NW 117th Ave., Miami, Florida, FL 33178, United States

### 1.2. Manufacturer

**KCMobile Co., Ltd.**

#502, Ace techno tower 8th, 191-7 Guro-dong, Guro-Gu, Seoul, South Korea

### 1.3. Feature of Equipment Under Test

Product Feature	
Equipment	GSM&WCDMA mobile phone
Brand Name	Avvio
Model Name	Avvio 814
Marketing Name	Avvio 814
FCC ID	WVBA814X
EUT supports Radios application	GSM/GPRS/WCDMA/HSPA/Bluetooth v2.1+EDR
HW Version	Galaxy1_MB_H401_PBF
SW Version	GALAXY1_AVVIO_CR_V0.0.7
EUT Stage	Production Unit

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 1.4. Product Specification of Equipment Under Test

Product Specification subjective to this standard	
<b>Tx Frequency</b>	GSM850 : 824.2 MHz ~ 848.8 MHz GSM1900 : 1850.2 MHz ~ 1909.8MHz WCDMA Band V : 826.4 MHz ~ 846.6 MHz Bluetooth: 2402 MHz ~ 2480 MHz
<b>Rx Frequency</b>	GSM850 : 869.2 MHz ~ 893.8 MHz GSM1900 : 1930.2 MHz ~ 1989.8 MHz WCDMA Band V : 871.4 MHz ~ 891.6 MHz Bluetooth: 2402 MHz ~ 2480 MHz
<b>Antenna Type</b>	WWAN : PIFA Antenna Bluetooth : Dipole Antenna
<b>Type of Modulation</b>	GSM: GMSK GPRS: GMSK WCDMA: QPSK (Uplink) HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink) Bluetooth v2.1 BR (1Mbps) : GFSK Bluetooth v2.1 EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth v2.1 EDR (3Mbps) : 8-DPSK

## 1.5. Modification of EUT

No modifications are made to the EUT during all test items.

## 1.6. Test Site

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.		
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL: +86-755- 3320-2398		
Test Site No.	Sporton Site No.		FCC Registration No.
	CO01-SZ	03CH01-SZ	831040

## 1.7. 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

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

## 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).

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.	Charging Mode (EUT with adapter)	☒	☒	Note 1
2.	Data application transferred mode (EUT connected with notebook)	☒	☒	☒

#### Abbreviations:

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

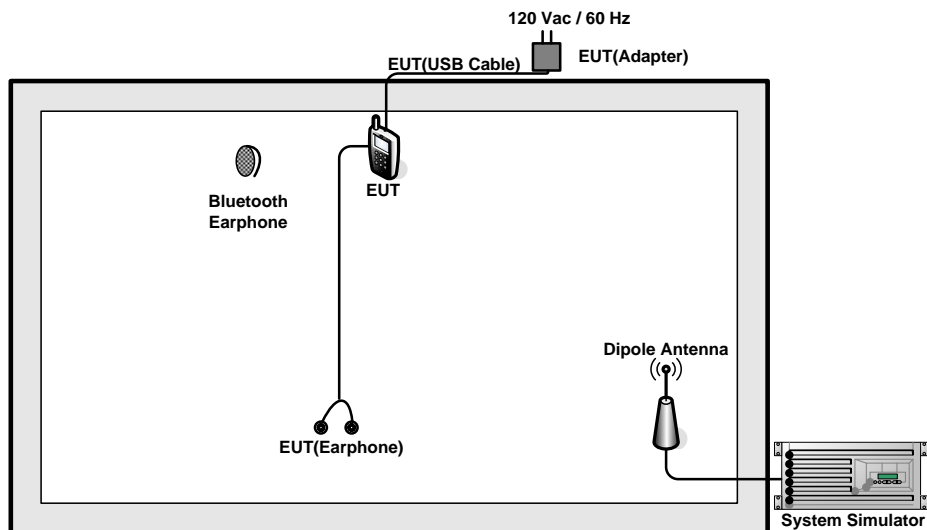
**Note 1:** Testing for this mode is not required or not the worst case.

**Remark:** For signal above 1GHz, the worst case was test item 2.

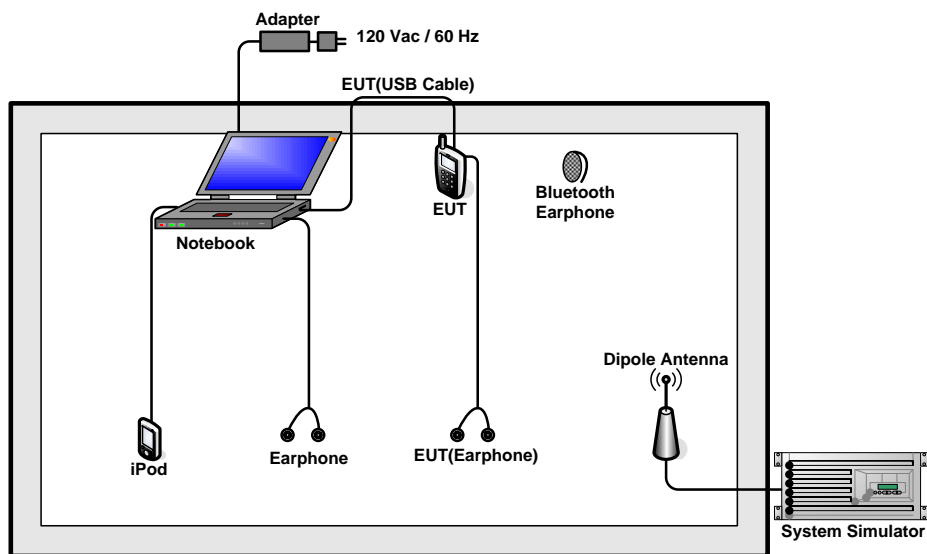


Test Items	EUT Configure Mode	Function Type
AC Conducted Emission	1/2	Mode 1 : GSM850 Idle + Bluetooth Idle + USB Cable (Charging from Adapter) + Earphone + Camera<Fig.1> Mode 2 : GSM1900 Idle + Bluetooth Idle + USB Cable (Charging from Adapter) + Earphone + MPEG4<Fig.1> Mode 3 : WCDMA Band V Idle +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

## 2.2. Connection Diagram of Test System



<Fig.1>



<Fig.2>

## 2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Agilent	E5515C	N/A	N/A	Unshielded, 1.8 m
2.	Bluetooth Earphone	Nokia	BH-108	PYAHS-107W	N/A	N/A
3.	Notebook	Lenovo	G480	N/A	N/A	AC I/P: Unshielded, 0.9 m DC O/P: Shielded, 1.8 m
4.	SD Card	SanDisk	4G class 4	FCC DoC	N/A	N/A
5.	iPod nano 8GB	Apple	MC690 ZP/A	FCC DoC	Shielded, 1.2m	N/A

## 2.4. EUT Operation Test Setup

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

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

1. Execute the program, "Winthrax" under WIN7 installed in notebook for files transfer with EUT via USB cable.
2. Execute "Video player" to play MPEG4 files.
3. Turn on camera to capture images.

### 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.

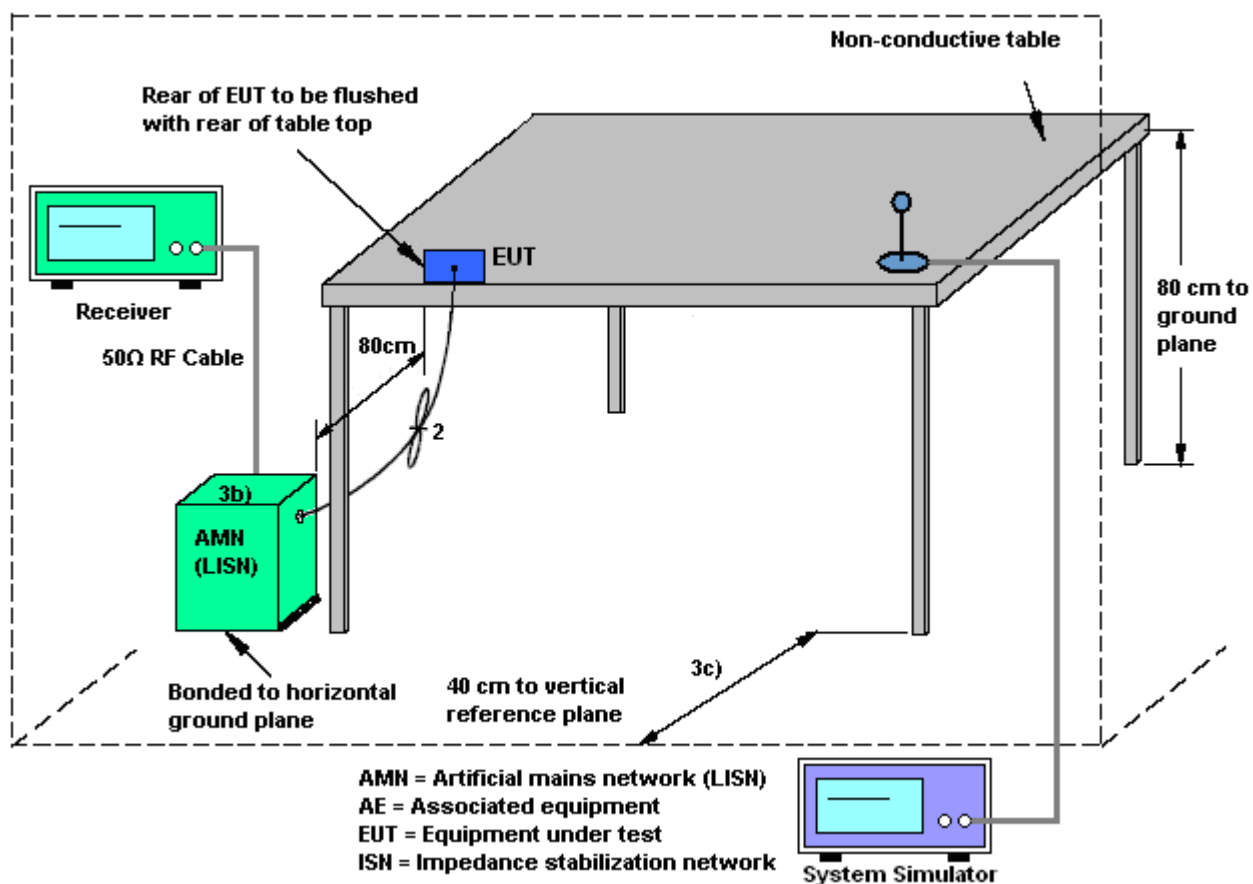
##### 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

##### 3.1.3 Test Procedure

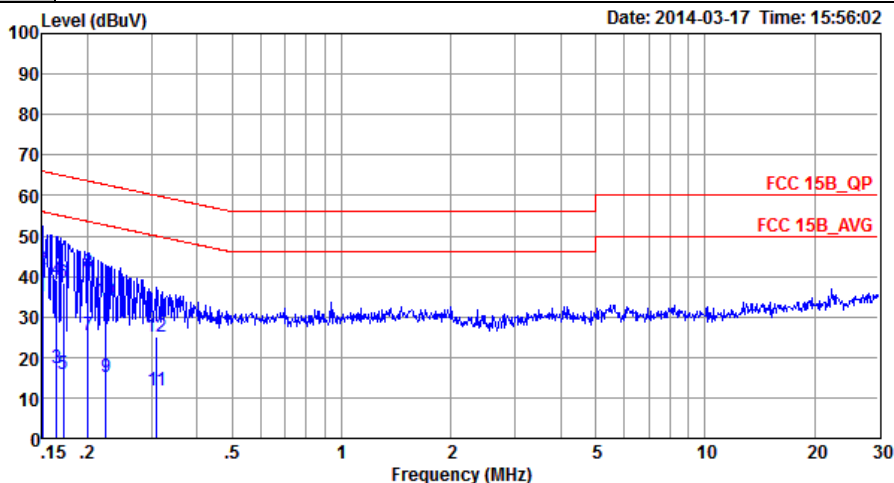
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
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

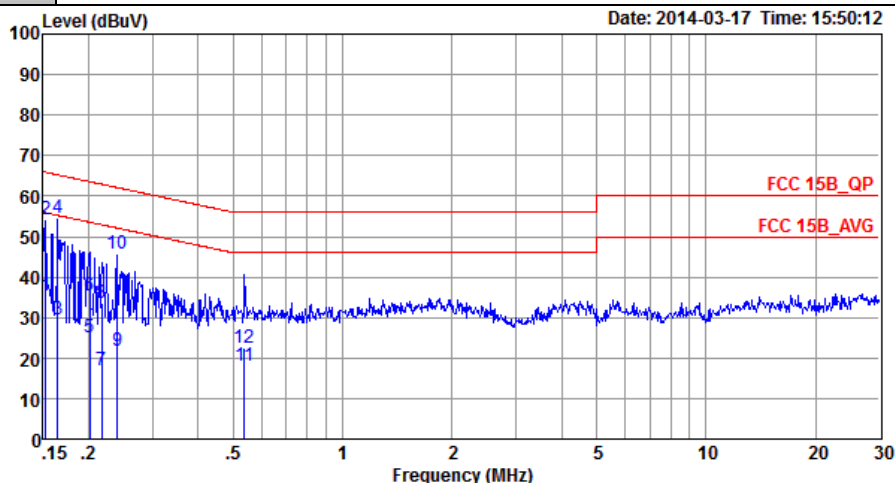
<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	21~22℃
<b>Test Engineer :</b>	Jack Tian	<b>Relative Humidity :</b>	41~42%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Line
<b>Function Type :</b>	WCDMA Band V Idle + Bluetooth Idle + USB Cable (Data Link with Notebook) + Earphone		



Site : C001-SZ  
Condition: FCC 15B\_QP LISN\_L\_20140304 LINE  
Project : (FC)431410  
Mode : Mode 3

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1 *	0.15	35.18	-20.82	56.00	24.60	0.22	10.36	Average
2	0.15	41.78	-24.22	66.00	31.20	0.22	10.36	QP
3	0.16	17.36	-37.89	55.25	6.80	0.22	10.34	Average
4	0.16	39.26	-25.99	65.25	28.70	0.22	10.34	QP
5	0.17	15.85	-39.05	54.90	5.30	0.22	10.33	Average
6	0.17	38.25	-26.65	64.90	27.70	0.22	10.33	QP
7	0.20	25.61	-27.97	53.58	15.10	0.22	10.29	Average
8	0.20	40.91	-22.67	63.58	30.40	0.22	10.29	QP
9	0.22	15.10	-37.56	52.66	4.60	0.23	10.27	Average
10	0.22	33.90	-28.76	62.66	23.40	0.23	10.27	QP
11	0.31	11.86	-38.11	49.97	1.40	0.26	10.20	Average
12	0.31	25.26	-34.71	59.97	14.80	0.26	10.20	QP

<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	21~22°C
<b>Test Engineer :</b>	Jack Tian	<b>Relative Humidity :</b>	41~42%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Neutral
<b>Function Type :</b>	WCDMA Band V Idle + Bluetooth Idle + USB Cable (Data Link with Notebook) + Earphone		



Site : C001-SZ  
 Condition: FCC 15B\_QP LISN\_N\_20140304 NEUTRAL  
 Project : (FC)431410  
 Mode : Mode 3

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15	35.49	-20.38	55.87	24.80	0.33	10.36	Average
2	0.15	54.19	-11.68	65.87	43.50	0.33	10.36	QP
3	0.16	29.37	-25.88	55.25	18.70	0.33	10.34	Average
4 *	0.16	54.77	-10.48	65.25	44.10	0.33	10.34	QP
5	0.20	25.21	-28.33	53.54	14.60	0.32	10.29	Average
6	0.20	35.31	-28.23	63.54	24.70	0.32	10.29	QP
7	0.22	17.10	-35.82	52.92	6.50	0.33	10.27	Average
8	0.22	33.50	-29.42	62.92	22.90	0.33	10.27	QP
9	0.24	21.79	-30.29	52.08	11.20	0.34	10.25	Average
10	0.24	45.59	-16.49	62.08	35.00	0.34	10.25	QP
11	0.54	17.93	-28.07	46.00	7.40	0.38	10.15	Average
12	0.54	22.33	-33.67	56.00	11.80	0.38	10.15	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

The measuring equipment is listed in the section 4 of this test report.

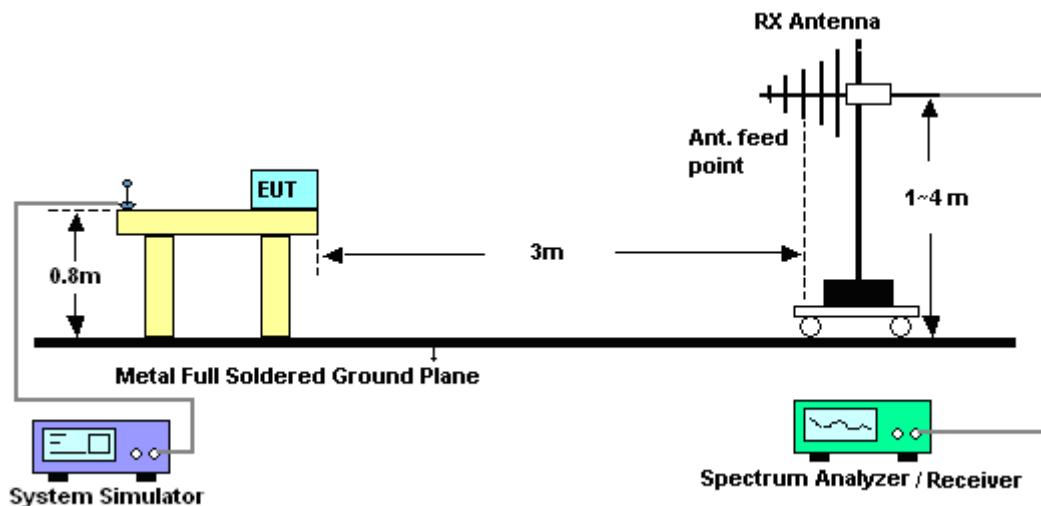
### 3.2.3. Test Procedures

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 (dB $\mu$ V/m) = 20 log Emission level ( $\mu$ V/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

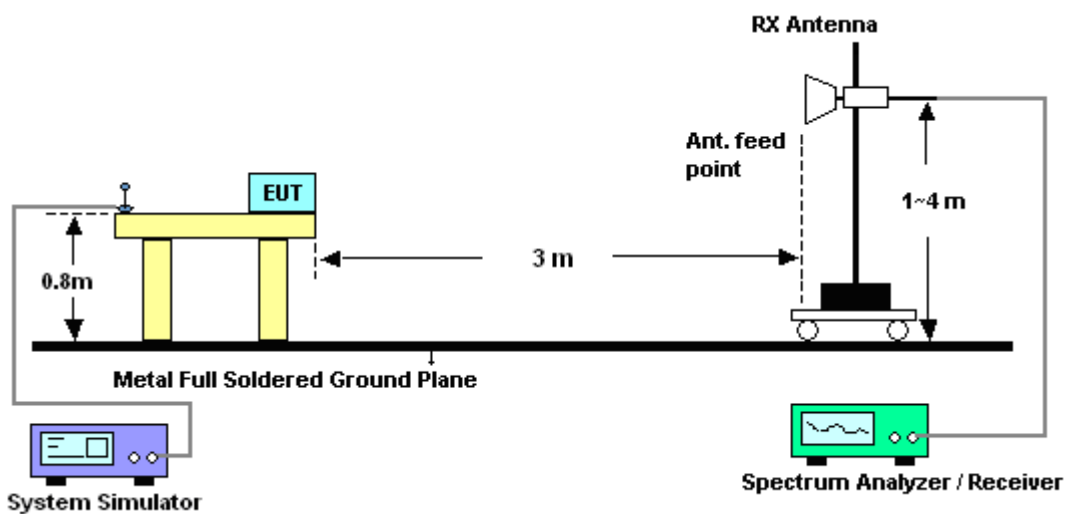


### 3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz

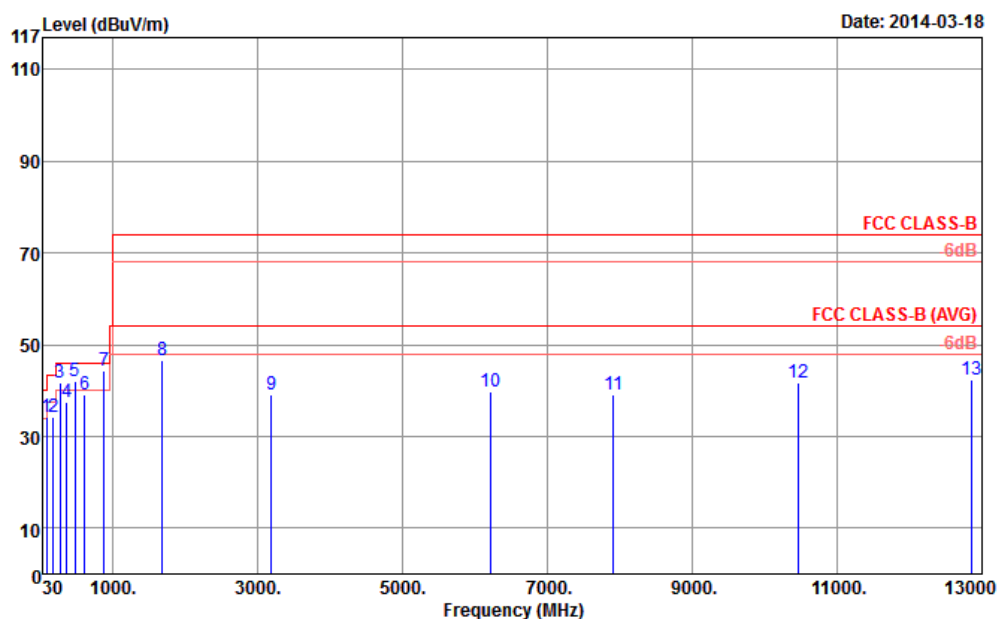


For radiated emissions above 1GHz



**3.2.5. Test Result of Radiated Emission**

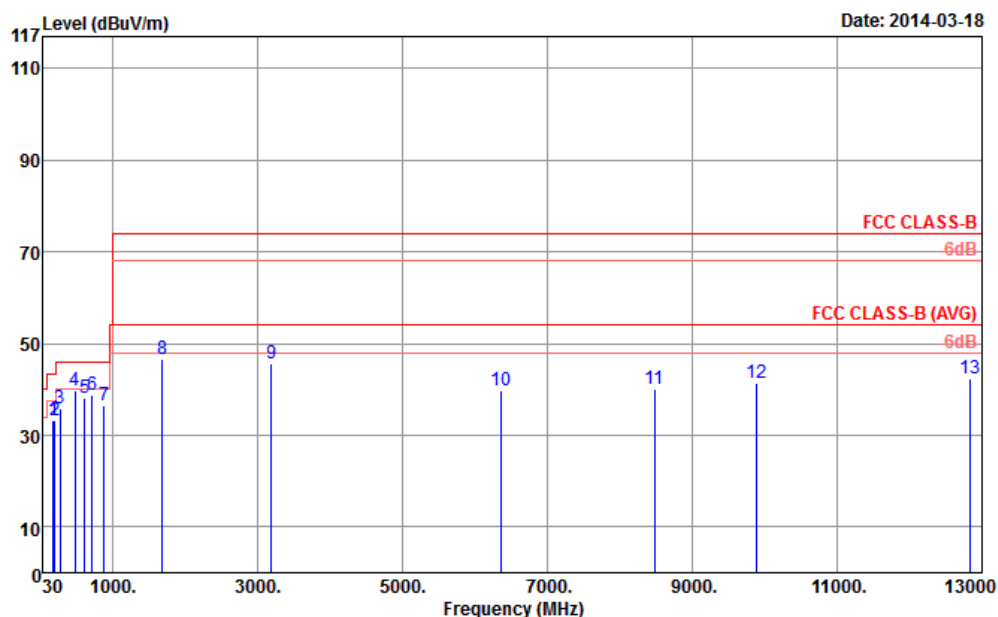
<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	24~25°C
<b>Test Engineer :</b>	Leo Liao	<b>Relative Humidity :</b>	48~49%
<b>Test Distance :</b>	3m	<b>Polarization :</b>	Horizontal
<b>Function Type :</b>	WCDMA Band V Idle + Bluetooth Idle + USB Cable (Data Link with Notebook) + Earphone		
<b>Remark :</b>	#7 is system simulator signal which can be ignored.		



Site : 03CH01-SZ  
Condition : FCC CLASS-B 3m LF\_ANT\_131026 HORIZONTAL  
Project : (FC)431410  
Mode : Mode 3

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	cm	deg
1	89.94	34.34	-9.16	43.50	53.78	9.30	1.20	29.94	---	Peak
2	179.04	34.13	-9.37	43.50	54.59	7.86	1.62	29.94	158	360 QP
3 Q	268.68	41.79	-4.21	46.00	57.66	12.15	1.91	29.93	150	207 QP
4	368.60	37.47	-8.53	46.00	49.90	15.29	2.21	29.93	---	Peak
5 I	479.90	42.20	-3.80	46.00	52.24	17.40	2.48	29.92	---	Peak
6	615.00	38.97	-7.03	46.00	47.49	18.60	2.80	29.92	---	Peak
7 P	881.66	44.38			50.47	20.56	3.29	29.94	---	Peak
8	1680.00	46.71	-27.29	74.00	70.86	28.23	4.65	57.03	100	156 Peak
9	3194.00	39.02	-34.98	74.00	56.70	33.04	6.57	57.29	---	Peak
10	6216.00	39.79	-34.21	74.00	52.48	34.00	9.52	56.21	---	Peak
11	7912.00	39.24	-34.76	74.00	50.30	34.75	10.59	56.40	---	Peak
12	10466.00	41.63	-32.37	74.00	48.89	36.72	12.90	56.88	---	Peak
13	12856.00	42.22	-31.78	74.00	45.54	38.53	14.31	56.16	---	Peak

<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	24~25°C
<b>Test Engineer :</b>	Leo Liao	<b>Relative Humidity :</b>	48~49%
<b>Test Distance :</b>	3m	<b>Polarization :</b>	Vertical
<b>Function Type :</b>	WCDMA Band V Idle + Bluetooth Idle + USB Cable (Data Link with Notebook) + Earphone		
<b>Remark :</b>	#7 is system simulator signal which can be ignored.		



Site : 03CH01-SZ  
 Condition : FCC CLASS-B 3m LF\_ANT\_131026 VERTICAL  
 Project : (FC)431410  
 Mode : Mode 3

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor			
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	179.31	33.14	-10.36	43.50	53.60	7.86	1.62	29.94	---	Peak
2	196.05	33.10	-10.40	43.50	52.42	8.94	1.68	29.94	---	Peak
3	267.87	35.75	-10.25	46.00	51.57	12.20	1.91	29.93	---	Peak
4 P	479.90	39.89	-6.11	46.00	49.93	17.40	2.48	29.92	100	240 Peak
5	615.00	37.98	-8.02	46.00	46.50	18.60	2.80	29.92	---	Peak
6	720.00	38.75	-7.25	46.00	46.39	19.30	2.99	29.93	---	Peak
7	881.66	36.64			42.73	20.56	3.29	29.94	---	Peak
8	1680.00	46.46	-27.54	74.00	70.61	28.23	4.65	57.03	132	230 Peak
9	3194.00	45.50	-28.50	74.00	63.18	33.04	6.57	57.29	---	Peak
10	6366.00	39.75	-34.25	74.00	52.56	34.00	9.66	56.47	---	Peak
11	8484.00	40.03	-33.97	74.00	48.97	35.77	11.02	55.73	---	Peak
12	9892.00	41.27	-32.73	74.00	48.73	36.86	12.49	56.81	---	Peak
13	12832.00	42.43	-31.57	74.00	45.78	38.50	14.31	56.16	---	Peak

## 4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
ESCIO TEST Receiver	R&S	1142.8007.03	100724	9kHz~3GHz	Mar. 29, 2013	Mar. 17, 2014	Mar. 28, 2014	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Mar. 28, 2013	Mar. 17, 2014	Mar. 27, 2014	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Mar. 28, 2013	Mar. 17, 2014	Mar. 27, 2014	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	N/A	Nov. 19, 2013	Mar. 17, 2014	Nov. 18, 2014	Conduction (CO01-SZ)
Spectrum Analyzer	Agilent Technologies	N9038A	MY52260185	20Hz~26.5GHz	Apr. 04, 2013	Mar. 18, 2014	Apr. 03, 2014	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	00119436	1GHz~18GHz	Oct. 26, 2013	Mar. 18, 2014	Oct. 25, 2014	Radiation (03CH01-SZ)
Bilog Antenna	SCHAFFNER	CBL6112B	2614	30MHz~2GHz	Dec. 25, 2013	Mar. 18, 2014	Dec. 24, 2014	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz-3000MHz GAIN 30db	Mar. 28, 2013	Mar. 18, 2014	Mar. 27, 2014	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	Mar. 28, 2013	Mar. 18, 2014	Mar. 27, 2014	Radiation (03CH01-SZ)
Turn Table	EM Electronics	EM 1000	N/A	0 ~ 360 degree	N/A	Mar. 18, 2014	N/A	Radiation (03CH01-SZ)
Antenna Mast	EM Electronics	EM 1000	N/A	1 m - 4 m	N/A	Mar. 18, 2014	N/A	Radiation (03CH01-SZ)

## 5. Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.31
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	3.90
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