FCC Test Report

APPLICANT	:	Brightstar Corp.
EQUIPMENT	:	CDMA 800MHz mobile phone
BRAND NAME	:	Avvio
MODEL NAME	:	Avvio1550
FCC ID	:	WVB-AVVIO1550
STANDARD	:	FCC 47 CFR FCC Part 15 Subpart B
CLASSIFICATION	:	Certification

The product was received on Oct. 13, 2010 and completely tested on Nov. 15, 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by:

Anderson Chiu

Anderson Chiu / Deputy Manager

Testing Laboratory
1190

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
FD0O1328	Rev. 01	Initial issue of report	Nov. 08, 2010
FD0O1328	Rev. 02	Update report for adding USB Cable	Nov. 15, 2010

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 9.92 dB at 0.41 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 3.45 dB at 31.35 MHz

1. General Description

1.1. Applicant

Brightstar Corp.
9725 NW 117th Ave, #300 - Miami - FL - 33178

1.2. Manufacturer

Brilliantel Communication Technology Co., Ltd.
No. 228, West Building4, AnHua industrial Region, Futian District, ShenZhen, China

1.3. Feature of Equipment Under Test

Product Feature & Specification	
Equipment	CDMA 800MHz mobile phone
Brand Name	Avvio
Model Name	Avvio1550
FCC ID	WVB-AVVIO1550
Tx Frequency Range	CDMA2000 BC0 : 824 MHz ~ 849 MHz
Rx Frequency Range	CDMA2000 BC0 : 869 MHz ~ 894 MHz
Antenna Type	Fixed Internal Antenna
Antenna Connector Type	N/A
HW Version	C155_Main_Rev1.5
SW Version	V3_MODEL 01_00000001
Type of Modulation	CDMA2000 : QPSK
EUT Stage	Identical Prototype

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. Test Site

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.	
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
Test Site No.	Sporton Site No.	
	CO01-KS	03CH01-KS

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. 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.	Operating Mode (EUT with earphone)	Note 1	☒	Note 1
2.	Charging Mode (EUT with adapter)	☒	☒	Note 1
3.	Charging Mode (EUT with PC)	☒	☒	☒

Abbreviations:

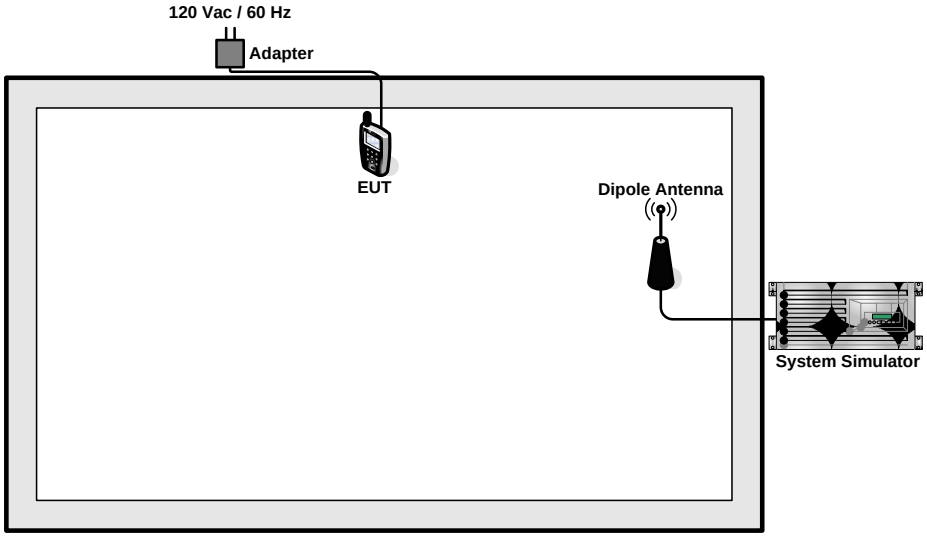
- EMI AC: AC conducted emissions
- EMI RE ≥ 1G: EUT radiated emissions ≥ 1GHz
- EMI RE < 1G: EUT radiated emissions < 1GHz

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

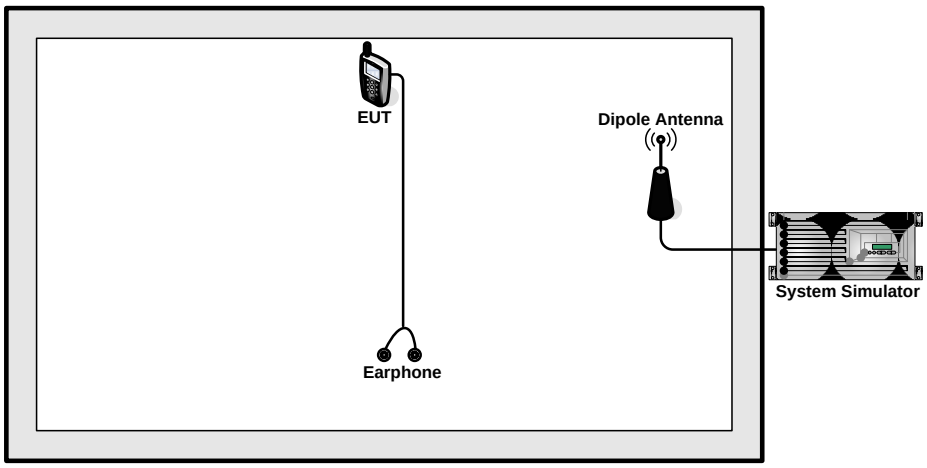
Test Items	EUT Configure Mode	Function Type
AC Conducted Emission	2/3	Mode 1: CDMA2000 BC0 Idle + Adapter Mode 2: CDMA2000 BC0 Idle + USB Cable (Link with PC)
Radiated Emissions < 1GHz	1/2/3	Mode 1: CDMA2000 BC0 Idle + Adapter Mode 2: CDMA2000 BC0 Idle + Earphone Mode 3: CDMA2000 BC0 Idle + USB Cable (Link with PC)
Radiated Emissions ≥ 1GHz	3	Mode 1: CDMA2000 BC0 Idle + USB Cable (Link with PC)
Remark: **1.** The worst case of AC is mode 1; only the test data of this mode was reported. **2.** The worst case of RE < 1G is mode 3; only the test data of this mode was reported.		

2.2. Connection Diagram of Test System

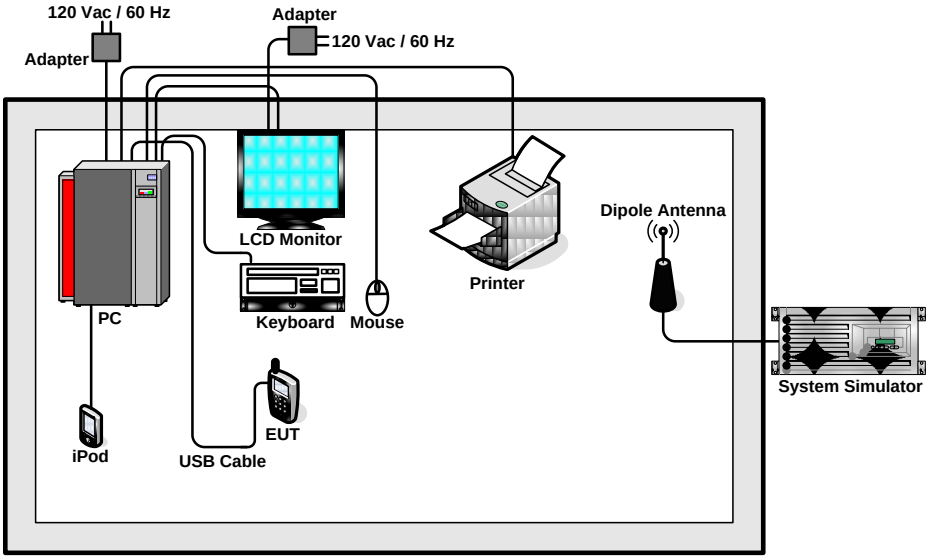
<EUT with Adapter Mode>



<EUT with Earphone Mode>



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



2.3. Test Software

The EUT was in CDMA2000 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, active sync files transfer with EUT and PC via USB cable.

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.

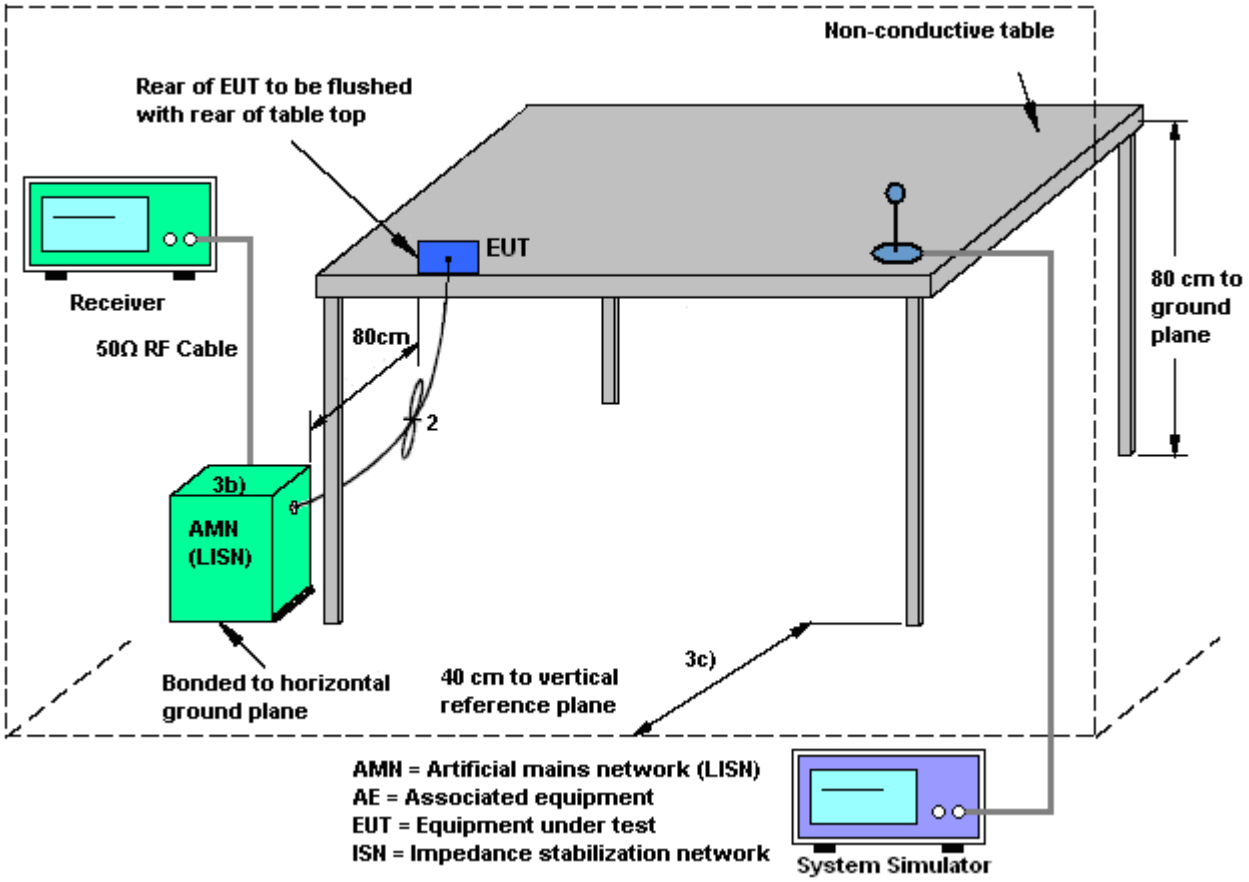
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

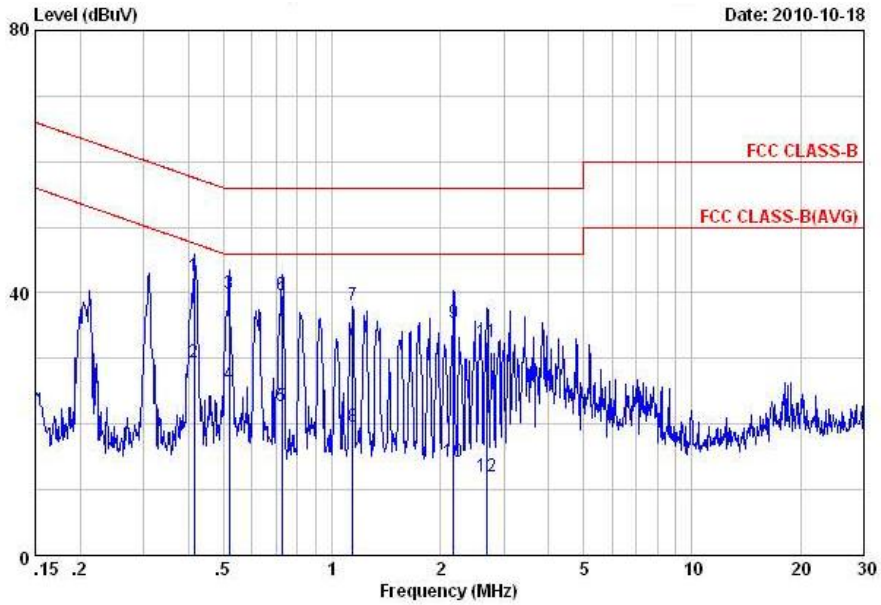
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
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 1	**Temperature :**	22~23℃
Test Engineer :	Rain Chou	**Relative Humidity :**	44~45%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	CDMA2000 BC0 Idle + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

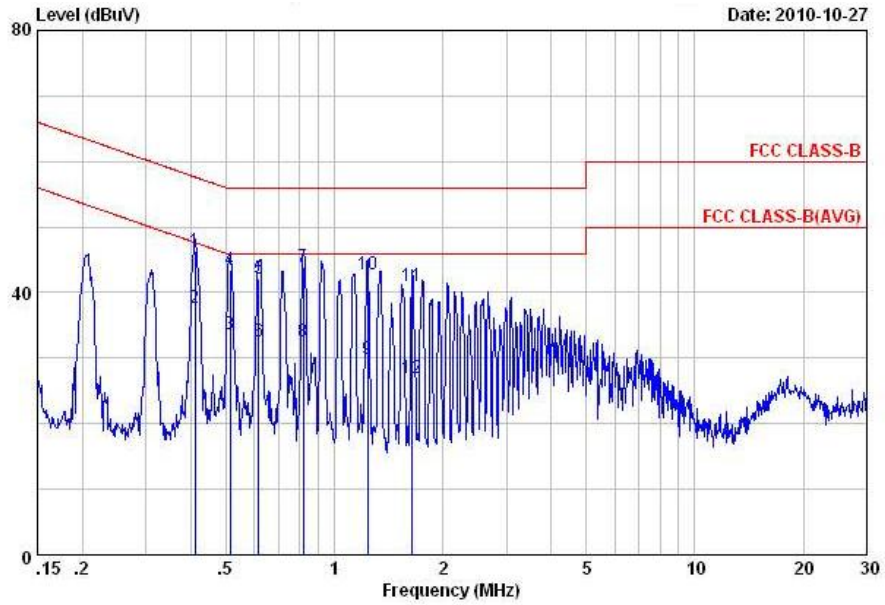


Site : C001-KS
Condition: FCC CLASS-B LISN-100807 LINE

mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.42	42.61	-14.94	57.55	32.50	-0.08	10.19	QP
2	0.42	29.41	-18.14	47.55	19.30	-0.08	10.19	Average
3	0.52	39.83	-16.17	56.00	29.70	-0.08	10.21	QP
4	0.52	26.13	-19.87	46.00	16.00	-0.08	10.21	Average
5	0.73	22.75	-23.25	46.00	12.60	-0.09	10.24	Average
6	0.73	39.75	-16.25	56.00	29.60	-0.09	10.24	QP
7	1.14	38.07	-17.93	56.00	27.90	-0.10	10.27	QP
8	1.14	19.67	-26.33	46.00	9.50	-0.10	10.27	Average
9	2.18	35.53	-20.47	56.00	25.30	-0.11	10.34	QP
10	2.18	14.23	-31.77	46.00	4.00	-0.11	10.34	Average
11	2.70	32.55	-23.45	56.00	22.30	-0.11	10.36	QP
12	2.70	12.05	-33.95	46.00	1.80	-0.11	10.36	Average

Test Mode :	Mode 1	**Temperature :**	22~23℃
Test Engineer :	Rain Chou	**Relative Humidity :**	44~45%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	CDMA2000 BC0 Idle + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : C001-KS
Condition: FCC CLASS-B LISN-100807 NEUTRAL

mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.41	46.41	-11.22	57.63	36.30	-0.08	10.19	QP
2	0.41	37.71	-9.92	47.63	27.60	-0.08	10.19	Average
3	0.51	33.73	-12.27	46.00	23.60	-0.08	10.21	Average
4	0.51	43.53	-12.47	56.00	33.40	-0.08	10.21	QP
5	0.62	42.04	-13.96	56.00	31.90	-0.08	10.22	QP
6	0.62	32.64	-13.36	46.00	22.50	-0.08	10.22	Average
7	0.82	43.96	-12.04	56.00	33.79	-0.08	10.25	QP
8	0.82	32.46	-13.54	46.00	22.29	-0.08	10.25	Average
9	1.23	29.89	-16.11	46.00	19.70	-0.09	10.28	Average
10	1.23	42.69	-13.31	56.00	32.50	-0.09	10.28	QP
11	1.65	41.10	-14.90	56.00	30.90	-0.11	10.31	QP
12	1.65	27.00	-19.00	46.00	16.80	-0.11	10.31	Average

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

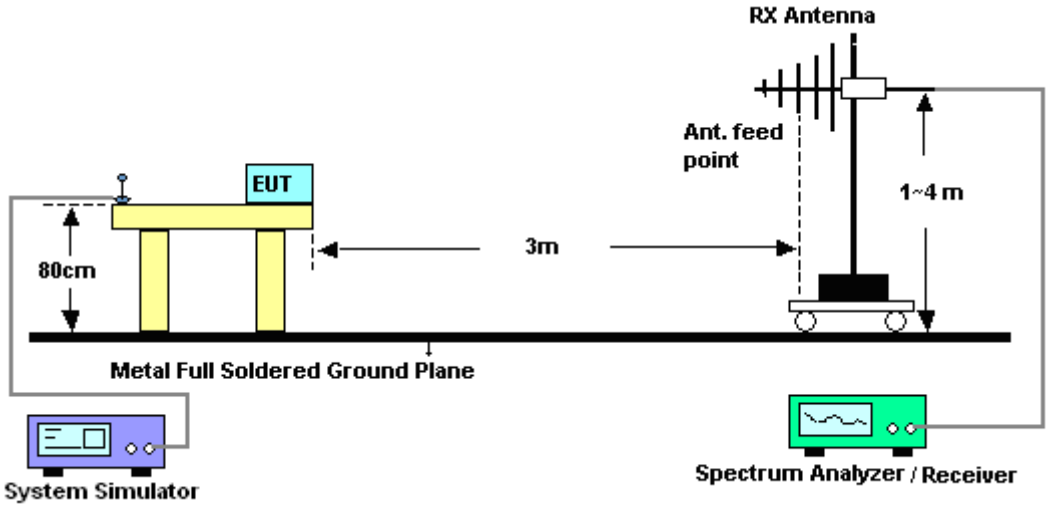
3.2.2. Measuring Instruments

See list of measuring instruments of this test report.

3.2.3. Test Procedures

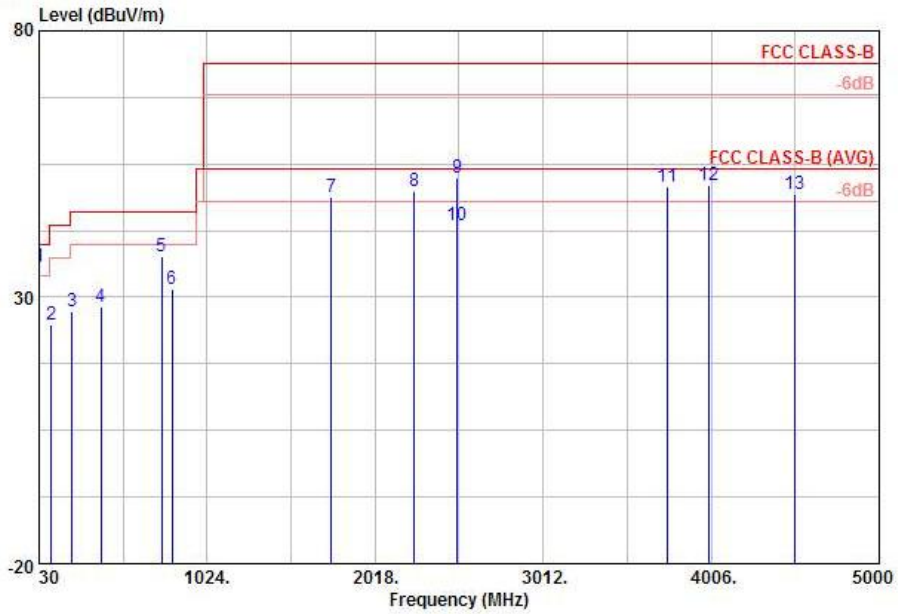
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna 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 3	Temperature :	22~23°C
Test Engineer :	Mark Qu	Relative Humidity :	41~42%
Test Distance :	3m	Polarization :	Horizontal
Function Type :	CDMA2000 BC0 Idle + USB Cable (Link with PC)		

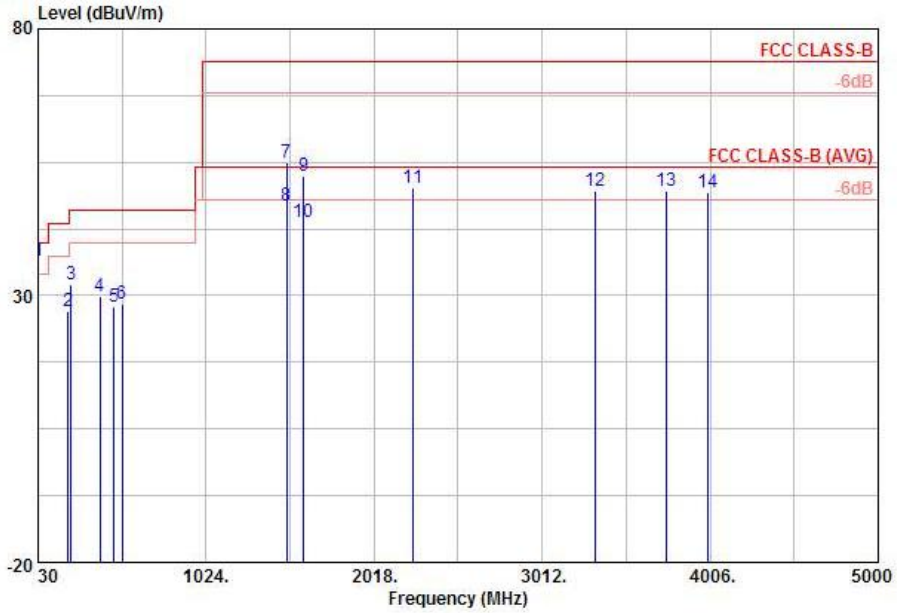


Site : 03CH01-KS
Condition: FCC CLASS-B 3m LF_ANT_100803 HORIZONTAL

Mode : mode 3
Power : From system

		Freq	Level	Over Limit	Limit Line	Read 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	!	30.54	35.82	-4.18	40.00	49.22	17.29	0.26	30.95	100	0	Peak
2		102.36	24.97	-18.53	43.50	44.24	10.87	0.44	30.58	---	---	Peak
3		226.83	27.38	-18.62	46.00	45.82	10.67	0.70	29.81	---	---	Peak
4		395.90	28.13	-17.87	46.00	41.83	15.91	0.88	30.49	---	---	Peak
5		756.40	37.53	-8.47	46.00	47.37	19.90	1.20	30.94	---	---	Peak
6		816.60	31.53	-14.47	46.00	40.59	20.03	1.24	30.33	---	---	Peak
7		1758.00	48.87	-25.13	74.00	49.40	31.67	2.67	34.87	---	---	Peak
8		2250.00	50.05	-23.95	74.00	49.21	32.67	3.04	34.87	---	---	Peak
9		2502.00	52.42	-21.58	74.00	51.09	33.05	3.21	34.93	---	---	Peak
10		2502.00	43.59	-10.41	54.00	42.26	33.05	3.21	34.93	100	0	Average
11		3750.00	50.83	-23.17	74.00	46.64	34.76	4.09	34.66	---	---	Peak
12		3994.00	50.92	-23.08	74.00	46.23	35.00	4.27	34.58	---	---	Peak
13		4496.00	49.45	-24.55	74.00	44.49	35.10	4.42	34.56	---	---	Peak

Test Mode :	Mode 3	Temperature :	22~23°C
Test Engineer :	Mark Qu	Relative Humidity :	41~42%
Test Distance :	3m	Polarization :	Vertical
Function Type :	CDMA2000 BC0 Idle + USB Cable (Link with PC)		



Site : 03CH01-KS
Condition: FCC CLASS-B 3m LF_ANT_100803 VERTICAL

Mode : mode 3
Power : From system

		Freq	Level	Over Limit	Limit Line	Read 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	!	31.35	36.55	-3.45	40.00	49.95	17.29	0.26	30.95	100	0	Peak
2		208.74	27.14	-16.36	43.50	47.00	9.39	0.67	29.92	---	---	Peak
3		226.29	32.13	-13.87	46.00	50.66	10.59	0.70	29.82	---	---	Peak
4		395.90	29.87	-16.13	46.00	43.57	15.91	0.88	30.49	---	---	Peak
5		479.90	27.84	-18.16	46.00	41.24	16.87	0.97	31.24	---	---	Peak
6		528.20	28.50	-17.50	46.00	40.95	17.99	1.00	31.44	---	---	Peak
7		1500.00	55.05	-18.95	74.00	57.40	30.35	2.46	35.16	---	---	Peak
8		1500.00	46.97	-7.03	54.00	49.32	30.35	2.46	35.16	106	191	Average
9		1600.00	52.49	-21.51	74.00	53.95	30.94	2.53	34.93	---	---	Peak
10		1600.00	43.87	-10.13	54.00	45.33	30.94	2.53	34.93	100	204	Average
11		2248.00	50.14	-23.86	74.00	49.33	32.64	3.04	34.87	---	---	Peak
12		3328.00	49.57	-24.43	74.00	46.42	34.06	3.79	34.70	---	---	Peak
13		3750.00	49.69	-24.31	74.00	45.50	34.76	4.09	34.66	---	---	Peak
14		3996.00	49.40	-24.60	74.00	44.71	35.00	4.27	34.58	---	---	Peak

4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
EMI Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 17, 2009	Nov. 16, 2010	Conduction (CO01-KS)
LISN	MessTec	AN3016	60103	9kHz~30MHz	Jan. 18, 2010	Jan. 17, 2011	Conduction (CO01-KS)
LISN	MessTec	AN3016	60105	9kHz~30MHz	Jan. 18, 2010	Jan. 17, 2011	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	N/A	Nov. 26, 2009	Nov. 25, 2010	Conduction (CO01-KS)
EMI Test Receiver	R&S	ESCI	100724	9kHz – 2.75GHz	Mar. 09, 2010	Mar. 08, 2011	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 18, 2010	Jan. 17, 2011	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Jan. 18, 2010	Jan. 17, 2011	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Jan. 18, 2010	Jan. 17, 2011	Radiation (03CH01-KS)
Amplifier	Wireless	FPA-6592G	060004	30MHz~2GHz	Feb. 02, 2010	Feb. 01, 2011	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Jan. 18, 2010	Jan. 17, 2011	Radiation (03CH01-KS)
Actice hore antenna	com-power	AHA-118	701023	1G-18GHz	Nov. 18, 2009	Nov. 17, 2010	Radiation (03CH01-KS)
Signal Generator	R&S	SMR40	100455	10MHz~40GHz	Jan. 18, 2010	Jan. 17, 2011	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH01-KS)
System Simulator	R&S	CMU200	837587/066	Full-Band	Jan. 08, 2009	Jan. 07, 2011	-

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
Combined Standard Uncertainty Uc(y)	**1.13**		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.26**		

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
Combined Standard Uncertainty Uc(y)	**1.27**		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.54**		

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 Γ1 = 0.197 Antenna VSWR Γ2 = 0.194 Uncertainty = 20Log(1-Γ1*Γ2)	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty Uc(y)	**2.36**				
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.72**				

Appendix A. Photographs of EUT

Please refer to Sporton report number EP0O1328 as below.