

TEST REPORT

of

FCC Part 22, 24

Equipment Under Test : Countertop
Model Name : BIP-100
Serial No. : N/A
Applicant : BluebirdSoft., Inc.
Manufacturer : BluebirdSoft., Inc.
Date of Test(s) : 2008-07-21 ~ 2008-08-26
Date of Issue : 2008-08-28

In the configuration tested, the EUT complied with the standards specified above.

Tested By:**Date****2008-08-28**

Geoffrey Do**Approved By****Date****2008-08-28**

Jim Kim

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1. General information

1.1 Testing laboratory

SGS Testing Korea Co., Ltd.
 Wireless Div. 2FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040
www.electrolab.kr.sgs.com
 Telephone : +82 +31 428 5700
 FAX : +82 +31 427 2371

1.2 Details of applicant

Applicant : BluebirdSoft., Inc
 Address : 558-5, Sinsa-dong, Kangnam-gu, Seoul, Korea
 Contact Person : In-Gu Kim
 Phone No. : +82 +2 541 4002
 Fax No. : +82 +2 3444 3774

1.3 Description of EUT

Kind of Product	Countertop
Model Name	BIP-100
Serial Number	N/A
GSM module FCC ID	RI7GC864
Power Supply	AC 100 ~ 240 V
Frequency Range	2412 MHz ~ 2462 MHz(11b/g), 824.2 MHz ~ 848.8 MHz(GSM 850), 1850.2 MHz ~ 1909.8 MHz(GSM 1900)
GPRS Class	10(GSM 850&1900)
Modulation Technique	DSSS(11b), OFDM(11g), GMSK, 8-PSK
Number of Channels	11 CH(11b/g), 300(GSM 1900), 125(GSM 850)
Operating Conditions	-20 °C ~ 55 °C
Antenna Type	Fixed Type(GSM & WLAN)

1.4 Details of modification

-N/A

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1.5. Test equipment list

Equipment	Manufacturer	Model	Cal Due.
Signal Generator	Agilent	E4438C	May 09, 2009
Spectrum Analyzer	H.P	8565E	Dec. 31 2008
Mobile Test Unit	Agilent	E5515C	May 09, 2009
Attenuator	Agilent	8494B	May 09, 2009
Preamplifier	H.P.	8447F	Sep. 17, 2008
Preamplifier	Agilent	8449B	May 09, 2009
Test Receiver	R&S	ESVS10	Mar. 21, 2009
Band Reject Filter	Wainwright	WRCG824/849-814/85960/10SS	May 09, 2009
Highpass Filter	Wainwright	WHK3.0/18G-10SS	Dec.06, 2007
Ultra Broadband Antenna	R&S	HL562	Oct. 02, 2009
Horn Antenna	R&S	HF 906	Nov. 13, 2009
Horn Antenna	Schwarzbeck	BBHA9120D	Jul. 24, 2009
Communication Antenna	AR	AT 4002	N.C.R
Dipole Antenna	VHAP/UHAP	975/958	Oct. 26, 2009
3m Anechoic Chamber	SY Corporation	L x W x H (9.6 m x 6.4 m x 6.4 m)	Oct. 11, 2008

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1.6. Summary of test result

The EUT has been tested according to the following specifications:

Applied standard : FCC Part 22, 24		
Standard section	Test item	Result
§22.913 §24.232(b)	RF radiated output power	Complied
§22.917(e) §24.238(a)	Spurious radiated emission	Complied

1.7. Test report revision

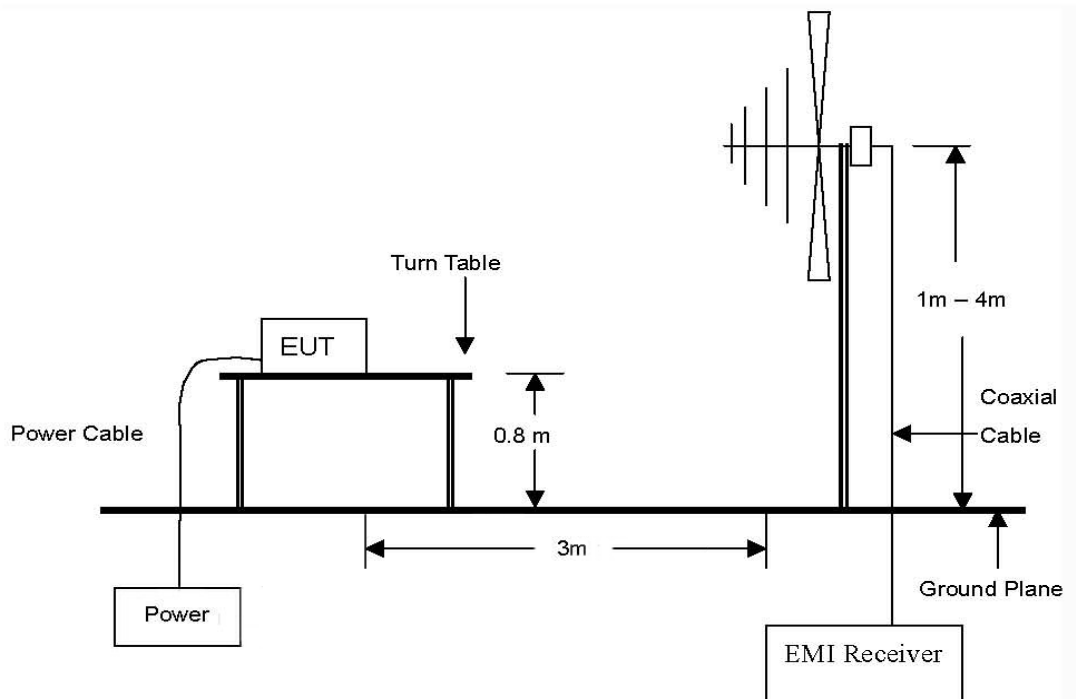
Revision	Report number	Description
0	F690501/RF-RTL002281	Initial

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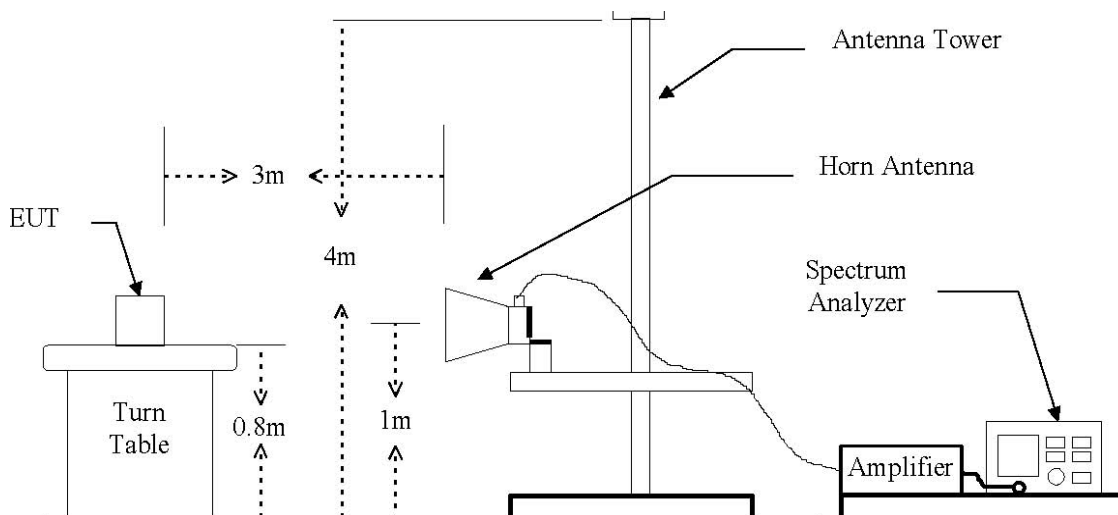
2. RF radiated output power & spurious radiated emission

2.1. Test setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.

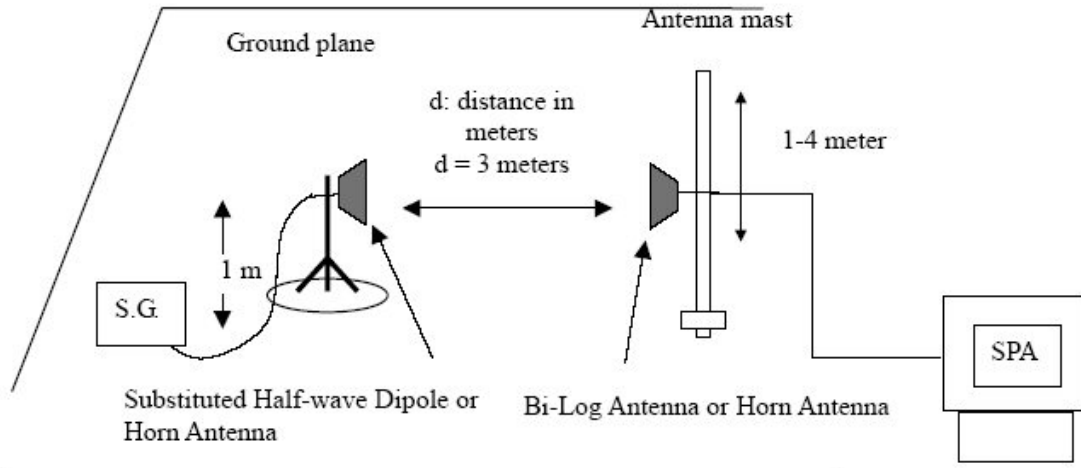


The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 18 GHz Emissions.



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The diagram below shows the test setup for substituted method



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2.2. Limit

FCC §22.913(a), the ERP of mobile transmitters must not exceed 7 watts. FCC §24.232(c) Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

2.3. Test procedure

1. On a test site, the EUT shall be placed at 80cm height on a turn table, and in the position closest to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3m from EUT to correspond to the fundamental frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. During the measurement of the EUT, the resolution bandwidth was to 1 MHz and the average bandwidth was set to 1 MHz.
5. The transmitter shall be switched on, the measuring receiver shall be tuned to the frequency of the transmitter under test.
6. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
7. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
8. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
9. The maximum signal level detected by the measuring receiver shall be noted.
10. The EUT was replaced by half-wave dipole(824~829 MHz) or horn antenna(1851.25~1910 MHz) connected to a signal generator.
11. In necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
12. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
13. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, which is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
14. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
15. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

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2.4. Test result for RF output power

Ambient temperature : 22 °C
 Relative humidity : 45 % R.H.

A. GSM 850

Frequency (MHz)	Ant. Pol. (H/V)	Amp-C.L (dB)	S.G Level (dBm)	Ant. Gain (dBd)	E.R.P.	
					(dBm)	(mW)
824.2	H	28.32	7.53	-10.44	25.41	347.67
836.6	H	28.31	8.48	-10.48	26.31	427.21
848.8	H	28.33	9.63	-10.53	27.43	553.59

B. GPRS 850

Frequency (MHz)	Ant. Pol. (H/V)	Amp-C.L (dB)	S.G Level (dBm)	Ant. Gain (dBd)	E.R.P.	
					(dBm)	(mW)
824.2	H	28.32	6.14	-10.44	24.02	252.45
836.6	H	28.31	8.02	-10.48	25.85	384.27
848.8	H	28.33	9.66	-10.53	27.46	557.43

■ E.R.P. = S.G Level(dBm) + Antenna Gain(dBd) + [Amp-C.L] (dB)

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C. GSM 1900

Frequency (MHz)	Ant. Pol. (H/V)	Amp-C.L (dB)	S.G Level (dBm)	Ant. Gain (dBi)	E.I.R.P.	
					(dBm)	(mW)
1850.2	V	35.64	-19.27	8.79	25.16	328.19
1880.0	V	35.63	-16.19	8.90	28.34	681.77
1909.8	V	35.56	-14.91	9.00	29.65	922.91

D. GPRS 1900

Frequency (MHz)	Ant. Pol. (H/V)	Amp-C.L (dB)	S.G Level (dBm)	Ant. Gain (dBi)	E.I.R.P.	
					(dBm)	(mW)
1850.2	V	35.64	-19.02	8.79	25.41	347.63
1880.0	V	35.63	-16.12	8.90	28.41	692.85
1909.8	V	35.56	-14.79	9.00	29.77	948.77

■ E.I.R.P. = S.G Level(dBm) + Antenna Gain(dBi) + [Amp-C.L] (dB)

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2.5. Test result for spurious radiated emission

Ambient temperature : 22 °C
 Relative humidity : 45 % R.H.

A. GSM 850

Channel	Freq. (MHz)	Ant. Pol. (H/V)	S.G Level (dBm)	C.L (dB)	Ant. Gain (dBd)	E.R.P. (dBm)	Limit (dBm)	Margin (dB)
Low	1648.4	H	-46.09	1.01	5.93	-41.17	-13.00	28.17
	2472.6	H	-51.77	1.33	7.76	-45.34	-13.00	32.34
	3296.8	H	-49.51	2.02	8.69	-42.84	-13.00	29.84
Middle	1673.20	H	-48.87	0.98	6.02	-43.83	-13.00	30.83
	2509.80	H	-50.12	1.37	7.81	-43.68	-13.00	30.68
	3346.4	H	-46.72	2.11	8.73	-40.10	-13.00	27.10
High	1697.60	H	-48.08	0.93	6.10	-42.91	-13.00	29.91
	2546.40	H	-49.93	1.30	7.85	-43.38	-13.00	30.38
	3395.2	H	-43.15	2.58	8.78	-36.95	-13.00	23.95

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B. GPRS 850

Channel	Freq. (MHz)	Ant. Pol. (H/V)	S.G Level (dBm)	C.L (dB)	Ant. Gain (dBd)	E.R.P. (dBm)	Limit (dBm)	Margin (dB)
Low	1648.4	H	-46.88	1.01	5.93	-41.96	-13.00	28.96
	2472.6	H	-51.95	1.33	7.76	-45.52	-13.00	32.52
	3296.8	H	-50.61	2.02	8.69	-43.94	-13.00	30.94
Middle	1673.20	H	-49.21	0.98	6.02	-44.17	-13.00	31.17
	2509.80	H	-50.00	1.37	7.81	-43.56	-13.00	30.56
	3346.4	H	-46.57	2.11	8.73	-39.95	-13.00	26.95
High	1697.60	H	-49.78	0.93	6.10	-44.61	-13.00	31.61
	2546.40	H	-52.36	1.30	7.85	-45.81	-13.00	32.81
	3395.2	H	-48.27	2.58	8.78	-42.07	-13.00	29.07

■ E.R.P. = S.G Level(dBm) + Antenna Gain(dBd) - C.L(dB)

■ Remark

1. No more harmonic above 4th harmonic for all channel.
- 2 The effective radiated power record the largest level between the two levels with Ant.Pol.(H/V)

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C. GSM 1900

Channel	Freq. (MHz)	Ant. Pol. (H/V)	S.G Level (dBm)	C.L (dB)	Ant. Gain (dBd)	E.I.R.P. (dBm)	Limit (dBm)	Margin (dB)
Low	3700.40	H	-46.44	2.26	11.20	-37.50	-13.00	24.50
	5550.60	H	-48.03	2.33	11.50	-38.86	-13.00	25.86
Middle	3760.00	H	-43.95	1.99	11.25	-34.69	-13.00	21.69
	5640.00	H	-48.24	2.58	11.56	-39.26	-13.00	26.26
High	3819.60	H	-40.40	2.02	11.31	-31.11	-13.00	18.11
	5729.40	H	-48.57	2.43	11.63	-39.37	-13.00	26.37

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D. GPRS 1900

Channel	Freq. (MHz)	Ant. Pol. (H/V)	S.G Level (dBm)	C.L (dB)	Ant. Gain (dBd)	E.I.R.P. (dBm)	Limit (dBm)	Margin (dB)
Low	3700.40	H	-46.37	2.26	11.20	-37.43	-13.00	24.43
	5550.60	H	-47.95	2.33	11.50	-38.78	-13.00	25.78
Middle	3760.00	H	-43.77	1.99	11.25	-34.51	-13.00	21.51
	5640.00	H	-48.14	2.58	11.56	-39.16	-13.00	26.16
High	3819.60	H	-40.28	2.02	11.31	-30.99	-13.00	17.99
	5729.40	H	-48.49	2.43	11.63	-39.29	-13.00	26.29

■ E.I.R.P. = S.G Level(dBm) + Antenna Gain(dBi) - C.L(dB)

■ Remark

1. No more harmonic above 4th harmonic for all channel.
- 2 The effective radiated power record the largest level between the two levels with Ant.Pol.(H/V)

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3. RF Exposure evaluation

According to FCC 1.1310 : The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in §1.1307(b)

Limits for maximum permissible exposure(MPE)

Frequency range (MHz)	Electric field strength(V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Average time
(A) Limits for occupational /Control exposures				
300 – 1500	--	--	F/300	6
1500 - 100000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
<u>300 – 1500</u>	--	--	<u>F/1500</u>	<u>6</u>
<u>1500 - 100000</u>	--	--	<u>1</u>	<u>30</u>

3.1. Friis transmission formula : $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

3.2. EUT operating condition

A software provided by client enabled the EUT to transmit and receive data at low, middle and high channel individually.

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3.3. Test result of RF Exposure evaluation

Test Item : RF Exposure evaluation data

Test Mode : Normal operation

3.3.1. Output power into antenna & RF Exposure evaluation distance :

Operating mode	Channel	Frequency (MHz)	E.R.P. or E.I.R.P. (dBm)	Antenna Gain (dBi)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
GSM850	Low	824.2	25.41	-0.5	0.06162	1
	Middle	836.6	26.31	-0.5	0.07581	
	High	848.8	27.43	-0.5	0.09811	
GSM850 (GPRS)	Low	824.2	24.02	-0.5	0.04474	1
	Middle	836.6	25.85	-0.5	0.06819	
	High	848.8	27.46	-0.5	0.09879	
GSM1900	Low	1850.2	25.16	4.47	0.18270	1
	Middle	1880.0	28.34	4.47	0.37995	
	High	1909.8	29.65	4.47	0.51372	
GSM1900 (GPRS)	Low	1850.2	25.41	4.47	0.19352	1
	Middle	1880.0	28.41	4.47	0.38613	
	High	1909.8	29.77	4.47	0.52812	

■ **Note**

The power density Pd (4th column) at a distance of 20cm calculated from the friis transmission formula is far below the limit of 1 mW/ cm².

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