

FCC TEST REPORT

Report No. : F472211

Name of Test: Field Strength of Spurious Radiation
GSM 1900 (Channel 661)

Freq MHz	Pol	Substitution Antenna Input Power (dBm)	Substitution Antenna Gain (dBi)	Et (dBuV/m)	Es (dBuV/m)	Et - Es (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
141.78	H	-1.08	1.26	52.63	91.94	-39.31	-39.13	-13.0	-26.13
175.53	H	-1.06	1.72	23.90	90.57	-66.67	-66.01	-13.0	-53.01
269.49	H	-1.39	1.76	28.78	92.47	-63.69	-63.33	-13.0	-50.33
699.70	H	-2.35	1.41	38.94	94.89	-55.95	-56.89	-13.0	-43.89
831.30	H	-2.49	0.58	37.68	93.76	-56.08	-57.99	-13.0	-44.99
937.00	H	-2.64	0.79	38.47	93.01	-54.54	-56.39	-13.0	-43.39
1012.00	H	-2.67	4.45	43.47	97.69	-54.22	-52.43	-13.0	-39.43
1510.00	H	-3.45	6.50	44.56	102.38	-57.82	-54.77	-13.0	-41.77
3758.00	H	-5.25	7.45	66.29	99.07	-32.78	-30.58	-13.0	-17.58
5638.00	H	-6.67	8.44	58.54	98.79	-40.25	-38.48	-13.0	-25.48
7518.00	H	-8.44	8.52	62.10	94.67	-32.57	-32.49	-13.0	-19.49
9398.00	H	-9.78	8.94	65.04	95.76	-30.72	-31.57	-13.0	-18.57
141.78	V	-1.08	1.26	54.84	91.94	-37.10	-36.92	-13.0	-23.92
175.53	V	-1.06	1.72	23.01	90.57	-67.56	-66.90	-13.0	-53.90
272.46	V	-1.39	1.75	29.83	92.43	-62.60	-62.24	-13.0	-49.24
699.70	V	-2.35	1.41	39.45	94.89	-55.44	-56.38	-13.0	-43.38
800.50	V	-2.41	0.38	37.62	93.21	-55.59	-57.63	-13.0	-44.63
937.00	V	-2.64	0.79	39.58	93.01	-53.43	-55.28	-13.0	-42.28
1484.00	V	-3.41	6.43	41.12	102.25	-61.13	-58.11	-13.0	-45.11
1710.00	V	-3.63	6.58	44.69	101.98	-57.29	-54.34	-13.0	-41.34
3758.00	V	-5.25	7.45	49.57	99.07	-49.50	-47.30	-13.0	-34.30
5638.00	V	-6.67	8.44	54.33	98.79	-44.46	-42.69	-13.0	-29.69
7518.00	V	-8.44	8.52	61.82	94.67	-32.85	-32.77	-13.0	-19.77
9398.00	V	-9.78	8.94	62.94	95.76	-32.82	-33.67	-13.0	-20.67
11278.00	V	-11.60	9.71	55.20	94.43	-39.23	-41.11	-13.0	-28.11

SPORTON International Inc.

TEL : 886-2-2696-2468

FAX : 886-2-2696-2255

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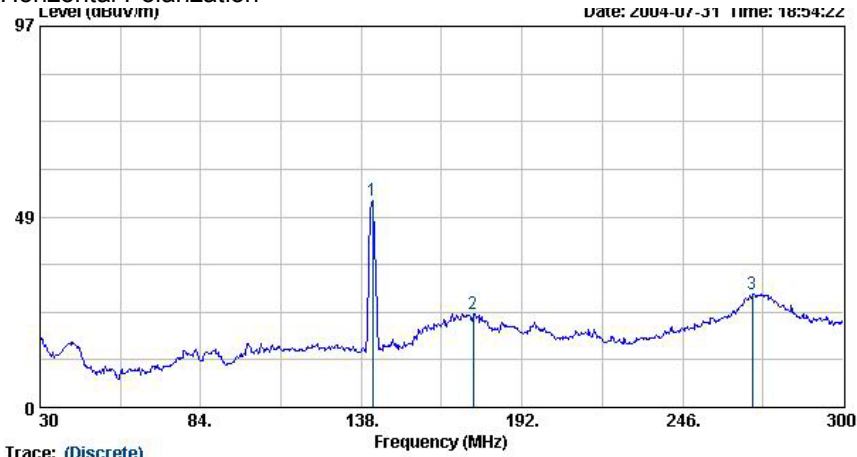
Aug. 05, 2004

FCC TEST REPORT

Report No. : F472211

Radiated Scanned Data

GSM1900, Horizontal Polarization



Site : 03CH06
Condition : 3m BI LOG 2004 0629 HORIZONTAL
EUT : GSM 900/1800/1900 GPRS PEN Phone
Power : 120Vac/60Hz
Model : Puccini
Memo : PCS Link Mode ; CH 661

	Freq	Level	Over	Limit	Antenna	Preamp	Cable	Remark	Ant	Table
	MHz	dBuV/m	Limit	Line	Factor	Factor	Loss		Pos	Pos
			dB	dBuV/m	dB/m	dB	dB		cm	deg
1	141.78	52.63	-----	-----	10.74	32.27	1.03	Peak	---	---
2	175.53	23.90	-----	-----	8.52	31.88	1.16	Peak	---	---
3	269.49	28.78	-----	-----	12.50	31.94	1.44	Peak	---	---

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FAX : 886-2-2696-2255

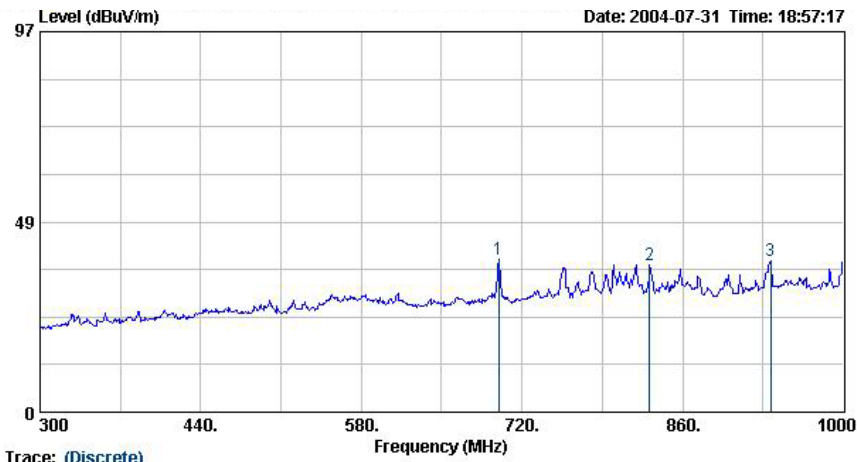
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FCC TEST REPORT

Report No. : F472211



Site : 03CH06
 Condition : 3m BI LOG 2004 0629 HORIZONTAL
 EUT : GSM 900/1800/1900 GPRS PEN Phone
 Power : 120Vac/60Hz
 Model : Puccini
 Memo : PCS Link Mode ; CH 661

	Freq	Level	Over Limit	Limit	Antenna Line Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB		cm	deg
1	699.70	38.94	-----	-----	19.10	31.45	2.57	Peak	---	---
2	831.30	37.68	-----	-----	20.33	31.82	2.98	Peak	---	---
3	937.00	38.47	-----	-----	20.77	31.03	3.09	Peak	---	---

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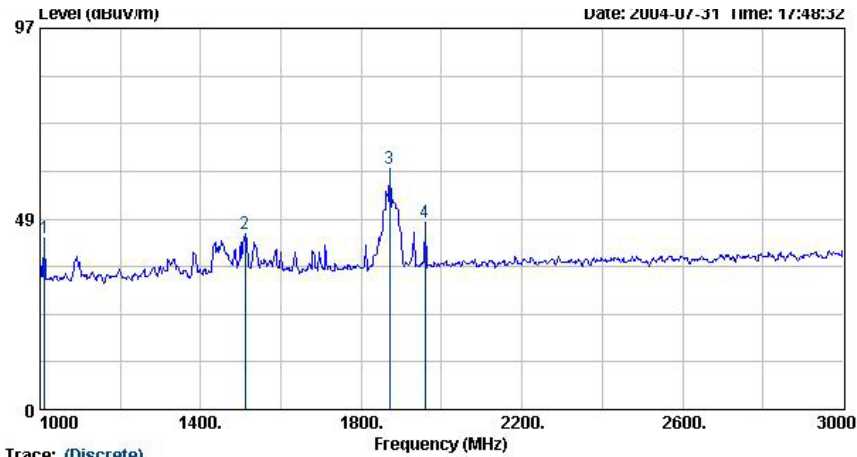
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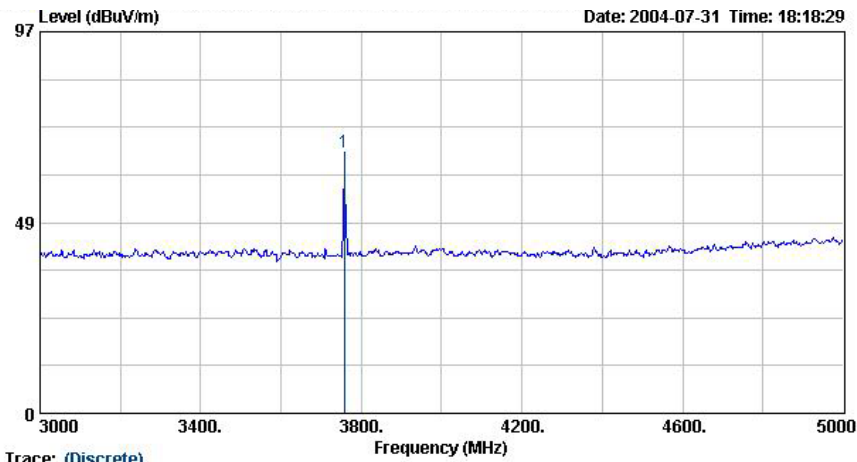
Site : 03CH06
 Condition : 3m HF-HORN AH-118 HORIZONTAL
 EUT : GSM 900/1800/1900 GPRS PEN Phone
 Power : 120Vac/60Hz
 Model : Puccini
 Memo : PCS Link Mode ; CH 661

	Freq	Level	Over	Limit	Antenna	Preamp	Cable	Remark	Ant	Table
	MHz	dBuV/m	Limit	dBuV/m	Factor	Factor	Loss		Pos	Pos
			dB		dB/m	dB	dB		cm	deg
1	1012.00	43.47	-----	-----	24.05	43.52	2.11	Peak	---	---
2	1510.00	44.56	-----	-----	25.58	44.11	2.64	Peak	---	---
3	1870.00	61.22	-----	-----	27.33	44.39	2.93	Peak	---	---
4	1958.00	47.56	-----	-----	27.75	44.46	3.00	Peak	---	---

Remark: #3 Fundamental
 #4 BCCH from CMU200

FCC TEST REPORT

Report No. : F472211



Site : 03CH06
 Condition : 3m HF-HORN AH-118 HORIZONTAL
 EUT : GSM 900/1800/1900 GPRS PEN Phone
 Power : 120Vac/60Hz
 Model : Puccini
 Memo : PCS Link Mode ; CH 661

	Freq	Level	Over Limit	LimitAntenna Line	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB		cm	deg
1	3758.00	66.29	-----	-----	30.26	44.76	4.21 Peak	---	---

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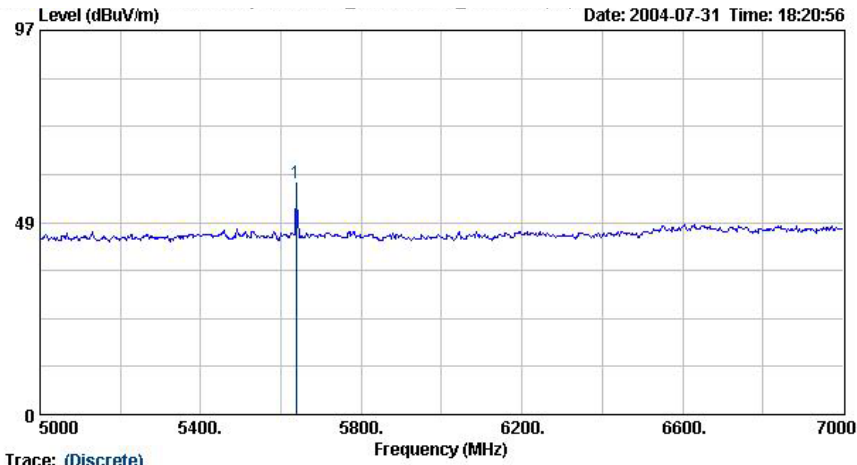
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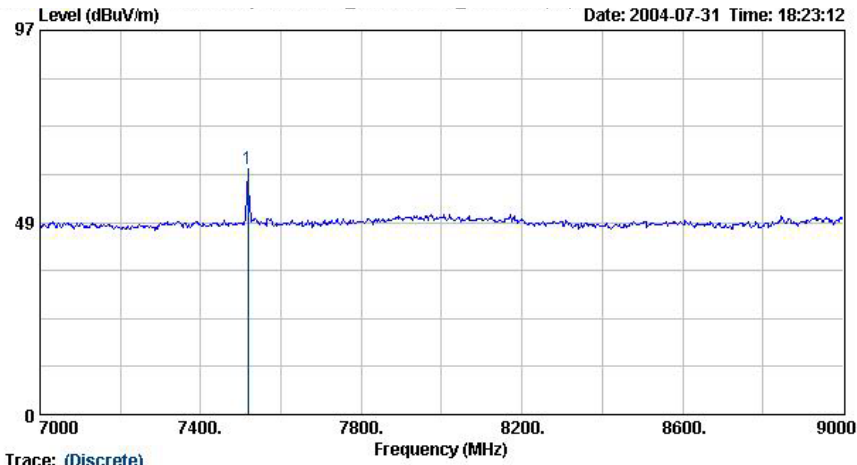


Site : 03CH06
 Condition : 3m HF-HORN AH-118 HORIZONTAL
 EUT : GSM 900/1800/1900 GPRS PEN Phone
 Power : 120Vac/60Hz
 Model : Puccini
 Memo : PCS Link Mode ; CH 661

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB		cm	deg
1	5638.00	58.54	-----	-----	34.01	46.54	5.34	Peak	---	---

FCC TEST REPORT

Report No. : F472211



Site : 03CH06
 Condition : 3m HF-HORN AH-118 HORIZONTAL
 EUT : GSM 900/1800/1900 GPRS PEN Phone
 Power : 120Vac/60Hz
 Model : Puccini
 Memo : PCS Link Mode ; CH 661

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB		cm	deg
1	7518.00	62.10	-----	-----	36.03	46.19	6.17	Peak	---	---

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FAX : 886-2-2696-2255

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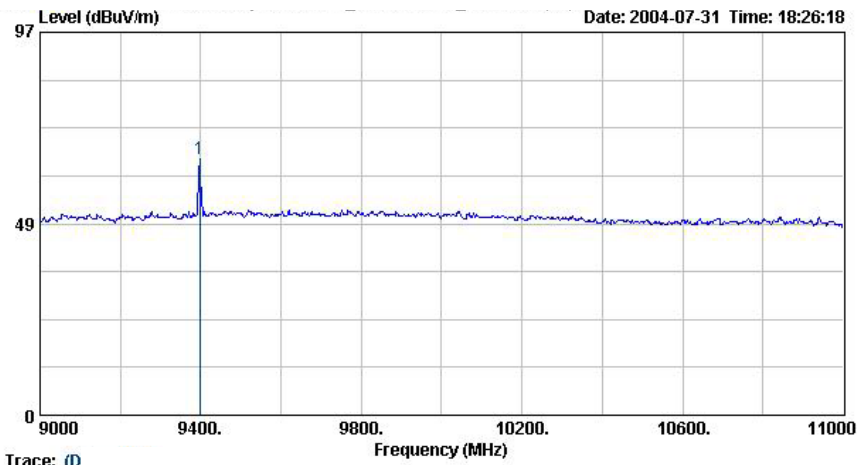
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Site : 03CH06
 Condition : 3m HF-HORN AH-118 HORIZONTAL
 EUT : GSM 900/1800/1900 GPRS PEN Phone
 Power : 120Vac/60Hz
 Model : Puccini
 Memo : PCS Link Mode ; CH 661

	Freq	Level	Over	Limit	Antenna	Preamp	Cable	Remark	Ant	Table
	MHz	dBuV/m	Limit	Line	Factor	Factor	Loss		Pos	Pos
			dB	dBuV/m	dB/m	dB	dB		cm	deg
1	9398.00	65.04	-----	-----	37.79	44.62	7.82	Peak	---	---

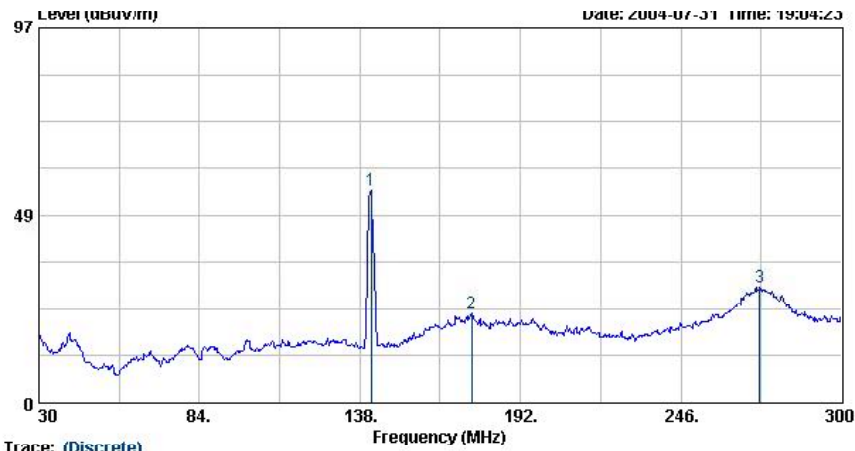
➤ Mark:

Frequency from 11000MHz to 19000MHz, the emission emitted by the EUT is too low to be measured.

FCC TEST REPORT

Report No. : F472211

GSM1900, Vertical Polarization



Site : 03CH06
 Condition : 3m BI LOG 2004 0629 VERTICAL
 EUT : GSM 900/1800/1900 GPRS PEN Phone
 Power : 120Vac/60Hz
 Model : Puccini
 Memo : PCS Link Mode ; CH 661

	Freq	Level	Over	Limit	Antenna	Preamp	Cable		Ant	Table
	MHz	dBuV/m	Limit	Line	Factor	Factor	Loss	Remark	Pos	Pos
			dB	dBuV/m	dB/m	dB	dB		cm	deg
1	141.78	54.84	-----	-----	10.74	32.27	1.03	Peak	---	---
2	175.53	23.01	-----	-----	8.52	31.88	1.16	Peak	---	---
3	272.46	29.83	-----	-----	12.50	31.95	1.45	Peak	---	---

SPORTON International Inc.

TEL : 886-2-2696-2468

FAX : 886-2-2696-2255

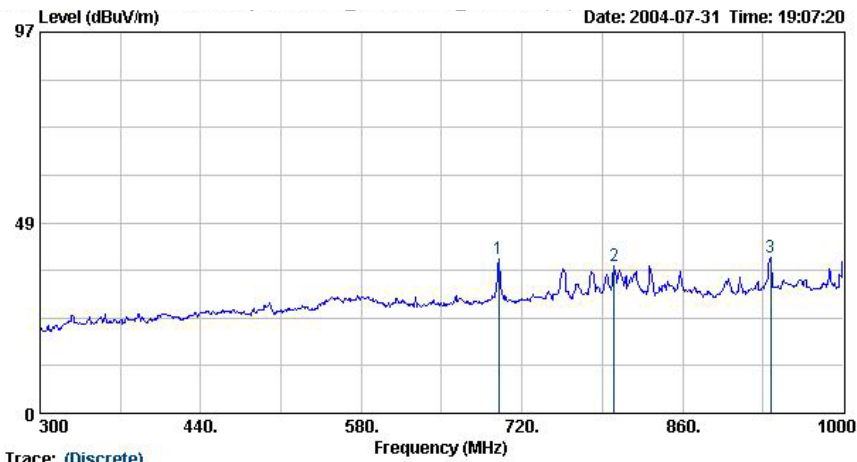
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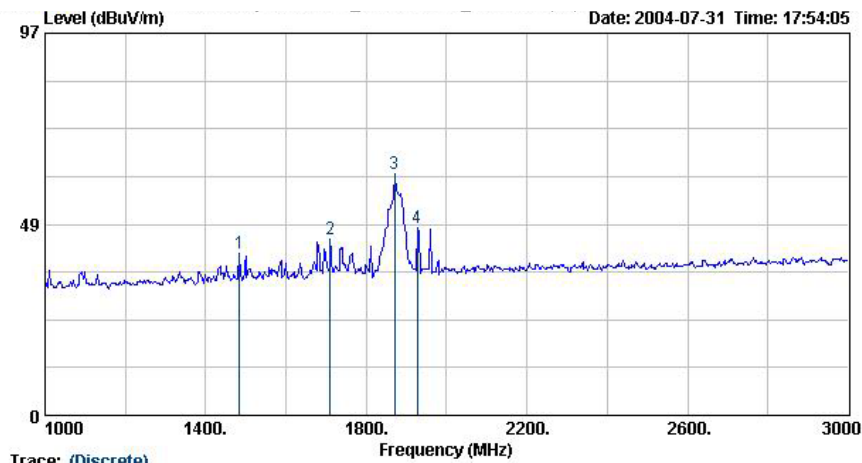


Site : 03CH06
 Condition : 3m BI LOG 2004 0629 VERTICAL
 EUT : GSM 900/1800/1900 GPRS PEN Phone
 Power : 120Vac/60Hz
 Model : Puccini
 Memo : PCS Link Mode ; CH 661

	Freq	Level	Over	Limit	Antenna	Preamp	Cable	Remark	Ant	Table
	MHz	dBuV/m	Limit	Line	Factor	Factor	Loss		Pos	Pos
			dB	dBuV/m	dB/m	dB	dB		cm	deg
1	699.70	39.45	-----	-----	19.10	31.45	2.57	Peak	---	---
2	800.50	37.62	-----	-----	20.20	31.46	2.89	Peak	---	---
3	937.00	39.58	-----	-----	20.77	31.03	3.09	Peak	---	---

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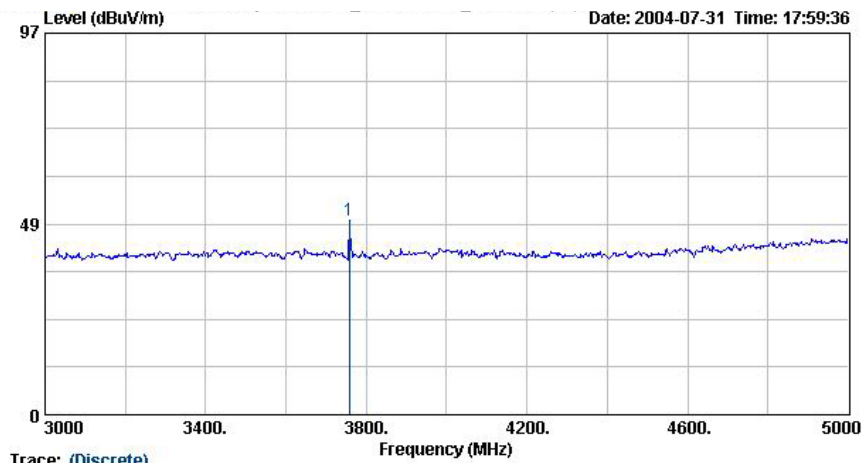
Site : 03CH06
 Condition : 3m HF-HORN AH-118 VERTICAL
 EUT : GSM 900/1800/1900 GPRS PEN Phone
 Power : 120Vac/60Hz
 Model : Puccini
 Memo : PCS Link Mode ; CH 661

	Freq	Level	Over	Limit	Antenna	Preamp	Cable	Remark	Ant	Table
	MHz	dBuV/m	Limit	dBuV/m	Factor	Factor	Loss		Pos	Pos
			dB		dB/m	dB	dB		cm	deg
1	1484.00	41.12	-----	-----	25.45	44.08	2.61	Peak	---	---
2	1710.00	44.69	-----	-----	26.58	44.27	2.81	Peak	---	---
3	1870.00	61.47	-----	-----	27.33	44.39	2.93	Peak	---	---
4	1926.00	47.47	-----	-----	27.58	44.43	2.97	Peak	---	---

Remark: #4 BCCH from CMU200

FCC TEST REPORT

Report No. : F472211



Site : 03CH06
 Condition : 3m HF-HORN AH-118 VERTICAL
 EUT : GSM 900/1800/1900 GPRS PEN Phone
 Power : 120Vac/60Hz
 Model : Puccini
 Memo : PCS Link Mode ; CH 661

	Freq	Level	Over Limit	LimitAntenna Line	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB		cm	deg
1	3758.00	49.57	-----	-----	30.26	44.76	4.21 Peak	---	---

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FAX : 886-2-2696-2255

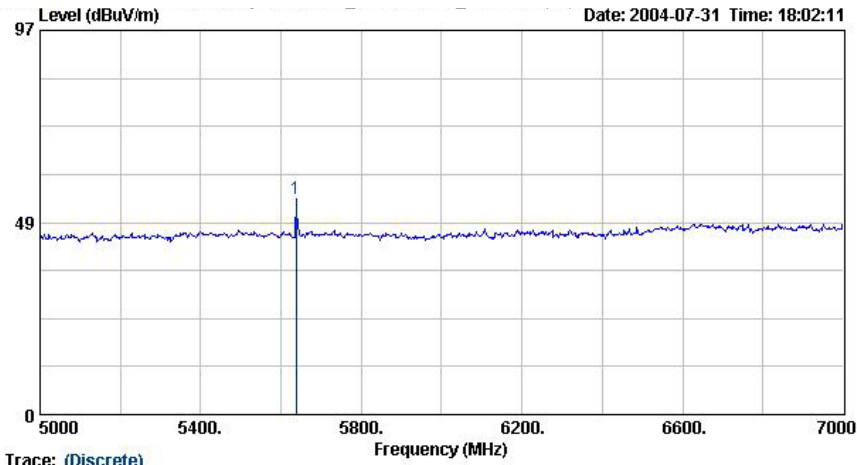
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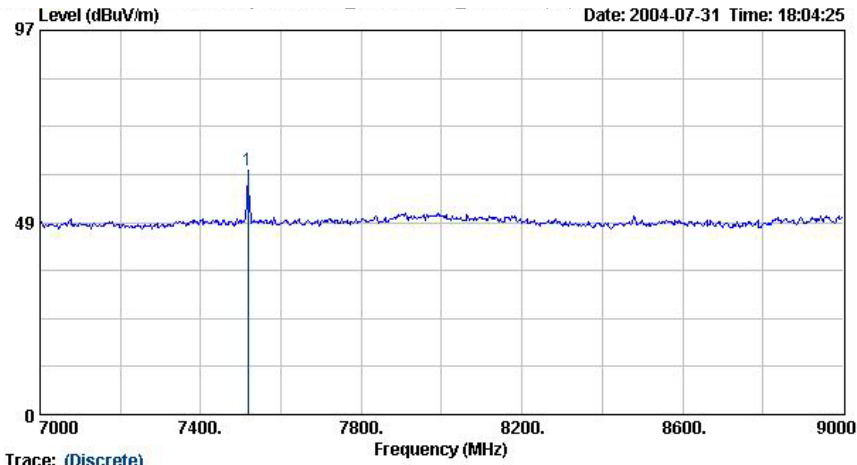


Site : 03CH06
 Condition : 3m HF-HORN AH-118 VERTICAL
 EUT : GSM 900/1800/1900 GPRS PEN Phone
 Power : 120Vac/60Hz
 Model : Puccini
 Memo : PCS Link Mode ; CH 661

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB		cm	deg
1	5638.00	54.33	-----	-----	34.01	46.54	5.34	Peak	---	---

FCC TEST REPORT

Report No. : F472211



Site : 03CH06
 Condition : 3m HF-HORN AH-118 VERTICAL
 EUT : GSM 900/1800/1900 GPRS PEN Phone
 Power : 120Vac/60Hz
 Model : Puccini
 Memo : PCS Link Mode ; CH 661

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB		cm	deg
1	7518.00	61.82	-----	-----	36.03	46.19	6.17	Peak	---	---

SPORTON International Inc.

TEL : 886-2-2696-2468

FAX : 886-2-2696-2255

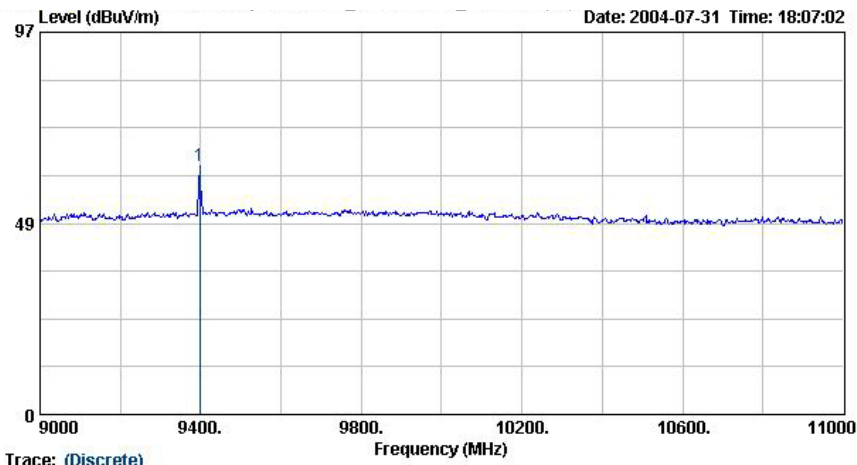
FCC ID SG70408000P7

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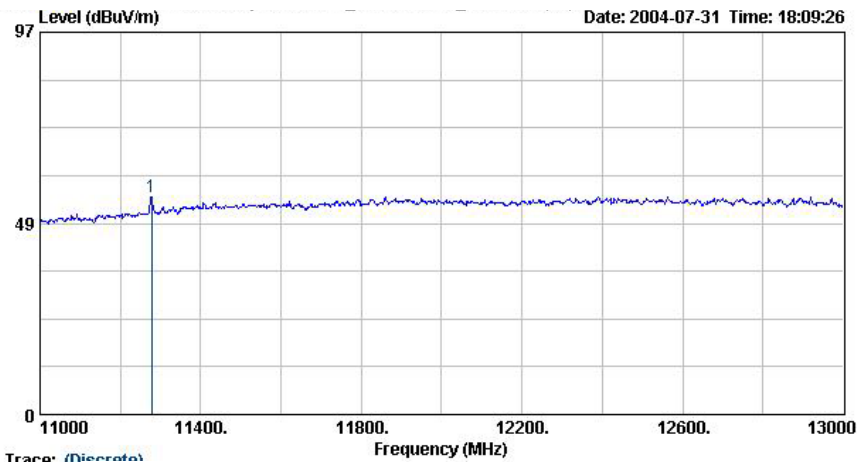


Site : 03CH06
 Condition : 3m HF-HORN AH-118 VERTICAL
 EUT : GSM 900/1800/1900 GPRS PEN Phone
 Power : 120Vac/60Hz
 Model : Puccini
 Memo : PCS Link Mode ; CH 661

	Freq	Level	Over Limit	Limit Line	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB		cm	deg
1	9398.00	62.94	-----	-----	37.79	44.62	7.82	Peak	---	---

FCC TEST REPORT

Report No. : F472211



Site : 03CH06
 Condition : 3m HF-HORN AH-118 VERTICAL
 EUT : GSM 900/1800/1900 GPRS PEN Phone
 Power : 120Vac/60Hz
 Model : Puccini
 Memo : PCS Link Mode ; CH 661

	Freq	Level	Over	Limit	Antenna	Preamp	Cable	Remark	Ant	Table
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB		cm	deg
1	11278.00	55.20	-----	-----	38.48	44.00	7.82	Peak	---	---

- Mark:
 Frequency from 13000MHz to 19000MHz, the emission emitted by the EUT is too low to be measured.

Name of Test: Frequency Stability (Temperature Variation)

Specification: 47 CFR 2.1055(a)(1)

Test Conditions: As Indicated

Test Equipment: As per previous page

Measurement Procedure

1. The EUT and test equipment were set up as shown on the following page.
2. With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute.
3. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.
4. The temperature tests were performed for the worst case.
5. Measurement Results: Attached



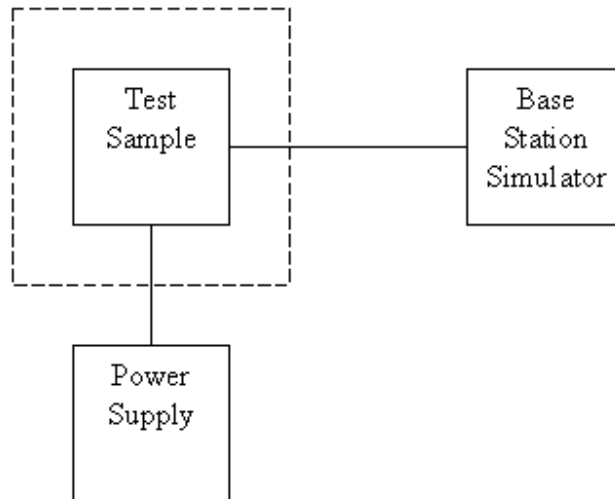
Tested By:

Tim Kao

Transmitter Test Set-Up

Frequency Stability: Temperature Variation

Frequency Stability: Voltage Variation



Asset	Model Name	S/N
Temperature & Humidity Controller	P-9000	612
AC/DC Power Source	HPA-500W	HPA0100024
Base Station Simulator	CMU200	102278
Base Station Simulator	E5515C	GB43460754

Name of Test: Frequency Stability (Temperature Variation)

GSM 1900 (Channel 661)

Temperature(°C)	Change, Hz	Change, ppm
-30	38	0.02
-20	30	0.02
-10	30	0.02
0	27	0.01
10	-24	-0.01
20	-20	-0.01
30	-23	-0.01
40	27	0.01
50	33	0.02

Name of Test: Frequency Stability (Voltage Variation)

Specification: 47 CFR 2.1055 (b)(1)

Test Equipment: As per previous page

Measurement Procedure

1. The EUT was placed in a temperature chamber at $25\pm 5^{\circ}\text{C}$ and connected as for "Frequency Stability - Temperature Variation" test.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

Results: Frequency Stability (Voltage Variation)

GSM1900 (Channel 661)

Nominal Value (Voltage) = 3.6

Battery End Point (Voltage) = 3.25

Voltage(Volt)	Change, Hz	Change, ppm
3.3	-23	-0.01
BEP	27	0.01
3.8	-28	-0.01

Limit: Must remain within authorized frequency block.

Tim Kao

Tested By:

Tim Kao

Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	15.35	4.50	1000	24.10	3.92
35	13.63	1.13	2000	27.40	5.66
40	11.11	1.18	3000	30.00	7.20
45	10.59	1.26	4000	32.60	9.36
50	6.47	1.31	5000	33.40	9.16
55	5.83	1.34	6000	34.20	10.70
60	5.18	1.43	7000	35.30	12.16
65	4.81	1.52	8000	36.90	13.12
70	4.43	1.56	9000	38.10	13.81
75	5.10	1.57	10000	39.00	14.83
80	5.91	1.60	11000	38.60	15.83
85	7.33	1.66	12000	39.50	17.11
90	8.74	1.75	13000	39.30	17.62
95	9.05	1.76	14000	41.60	18.37
100	9.36	1.83	15000	40.60	19.10
110	9.65	1.86	16000	37.20	19.72
120	9.97	1.92	17000	40.20	21.98
130	10.51	2.00	18000	48.90	21.22
140	10.32	2.11	19000	37.60	23.90
150	9.42	2.18	20000	37.30	24.07
160	8.09	2.22	21000	37.00	25.49
170	7.43	2.26	22000	38.00	24.92
180	7.60	2.31	23000	38.70	25.60
190	7.43	2.37	24000	38.60	25.70
200	7.26	2.43	25000	24.10	3.92
220	9.11	2.56	14000	27.40	5.66
240	10.88	2.70	15000	30.00	7.20
260	11.75	2.83	16000	32.60	9.36
280	11.55	2.93	17000	33.40	9.16
300	11.36	3.03	18000	34.20	10.70
320	12.03	3.13	19000	35.30	12.16
340	12.69	3.23	20000	36.90	13.12
360	13.33	3.32	21000	38.10	13.81
380	14.00	3.41	22000	39.00	14.83
400	14.63	3.48	23000	38.60	15.83
450	15.33	3.71	24000	39.50	17.11
500	16.03	3.85	25000	39.30	17.62
550	16.65	4.03			
600	17.29	4.32			
650	17.64	4.51			
700	18.00	4.54			
750	18.39	4.90			
800	18.79	5.04			
850	19.10	5.04			
900	19.42	5.20			
950	19.58	5.28			
1000	19.75	5.58			

List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum analyzer	R&S	FSP40	100057	9KHz-40GHz	Feb. 26, 2004	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Dec. 18, 2003	Radiation (03CH06-HY)
Horn Antenna	Com-Power	AH118	071025	1G-18G	Feb. 11, 2004	Radiation (03CH06-HY)
PreAmplifier	Com-Power	PA-103	161055	1MHz - 1000MHz	Apr. 26, 2004	Radiation (03CH06-HY)
HF Amplifier	MITEQ	AFS44	973248	0.1G - 26.5G	May. 20, 2004	Radiation (03CH06-HY)

- ※ Calibration Interval of instruments listed above is one year, except for Horn Antenna, BBHA9170.
※ Calibration Interval of Horn Antenna, BBHA9170, is three years.

Uncertainty of Test Site

Uncertainty of Radiated Emission Measurement (30MHz ~ 1000MHz) (03CH03)

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 Receiver VSWR $\Gamma_1 = 0.20$ Antenna VSWR $\Gamma_2 = 0.23$ Uncertainty = $20\log(1-\Gamma_1*\Gamma_2)$	+0.39/-0.41	U-shaped	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 (1GHz ~ 40GHz)

Contribution	Uncertainty of x_i		$u(x_i)$	C_i	$C_i * u(x_i)$
	dB	Probability Distribution			
Receiver reading	± 0.10	Normal(k=1)	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 = $20\log(1-\Gamma_1*\Gamma_2*\Gamma_3)$	+0.34/-0.35	U-shaped	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				

$$U = \sqrt{\{(1/2)^2 + (0.3/2)^2 + (2^2 + 0.5^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\}} = 2.2 \quad \text{for 10m test distance}$$

$$U = \sqrt{\{(1/2)^2 + (0.3/2)^2 + (2^2 + 3^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\}} = 2.7 \quad \text{for 3m test distance}$$

END OF TEST REPORT