Partial FCC RF Test Report

APPLICANT	:	OE Power Systems Inc.
EQUIPMENT	:	GPS Tracker
BRAND NAME	:	TracUSA
MODEL NAME	:	TL108
FCC ID	:	YEA TL108
STANDARD	:	FCC 47 CFR Part 2, 22(H), 24(E)
CLASSIFICATION	:	PCS Licensed Transmitter (PCB)
Tx/Rx FREQUENCY RANGE	:	GSM850 : 824.2 ~ 848.8 MHz / 869.2 ~ 893.8 MHz GSM1900 : 1850.2 ~ 1909.8 MHz / 1930.2 ~ 1989.8 MHz
MAX. ERP/EIRP POWER	:	GSM850 (GPRS 8) : 0.29 W GSM1900 (GPRS 8) : 0.15 W

This is a partial report which is only valid combined with the WWAN Module (Brand name: SIMCOM / Model name: SIM900, FCC ID: UDV-0912142009007) Report.

The product was received on Jun. 17, 2010 and completely tested on Feb. 18, 2011. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI / TIA / EIA-603-C-2004 and shown 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:

Roy Wu

Roy Wu / 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
FG061728	Rev. 01	Initial issue of report	Feb. 24, 2011

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	§22.913(a)(2)	RSS-132(4.4) SRSP-503(5.1.3)	Effective Radiated Power	< 7 Watts	PASS	-
3.1	§24.232(c)	RSS-133 (6.4) SRSP-510(5.1.2)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
3.2	§2.1053 §22.917(a) §24.238(a)	RSS-132 (4.5.1) RSS-133 (6.5.1)	Field Strength of Spurious Radiation	< $43+10\log_{10}$(P[Watts])	PASS	Under limit 29.65 dB at 1674 MHz

1 General Description

1.1 Applicant

OE Power Systems Inc.
5100 Poplar Ave Suite 2700 Memphis, TN 38137 USA

1.2 Manufacturer

Toplovo Industrial Co., Ltd.
No. 25, Caitain Road, Shatain Industrial Zone, Kengzi Town, Longgang District, Shenzhen, P.R.C.

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	GPS Tracker
Brand Name	TracUSA
Model Name	TL108
FCC ID	YEA TL108
Tx Frequency	GSM850 : 824 MHz ~ 849 MHz GSM1900 : 1850 MHz ~ 1910 MHz
Rx Frequency	GSM850 : 869 MHz ~ 894 MHz GSM1900 : 1930 MHz ~ 1990 MHz
Maximum ERP/EIRP	GSM850 (GPRS 8) : 0.29 W (24.59 dBm) GSM1900 (GPRS 8) : 0.15 W (21.81 dBm)
Antenna Type	Fixed External Antenna
HW Version	H-TL108.C
SW Version	S-N1.1
Type of Modulation	GMSK
EUT Stage	Identical Prototype

Remark:

1. This test report recorded only product characteristics and test results of PCS Licensed Transmitter (PCB).

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

1.4 Testing 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.**
	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 Part 2, 22(H), 24(E)
- ANSI / TIA / EIA-603-C-2004
- IC RSS-132 Issue 2
- IC RSS-133 Issue 5

Remark:

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

2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU200	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GW	GPC-60300	N/A	N/A	Unshielded, 1.8 m

2 Test Configuration of Equipment Under Test

2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range.

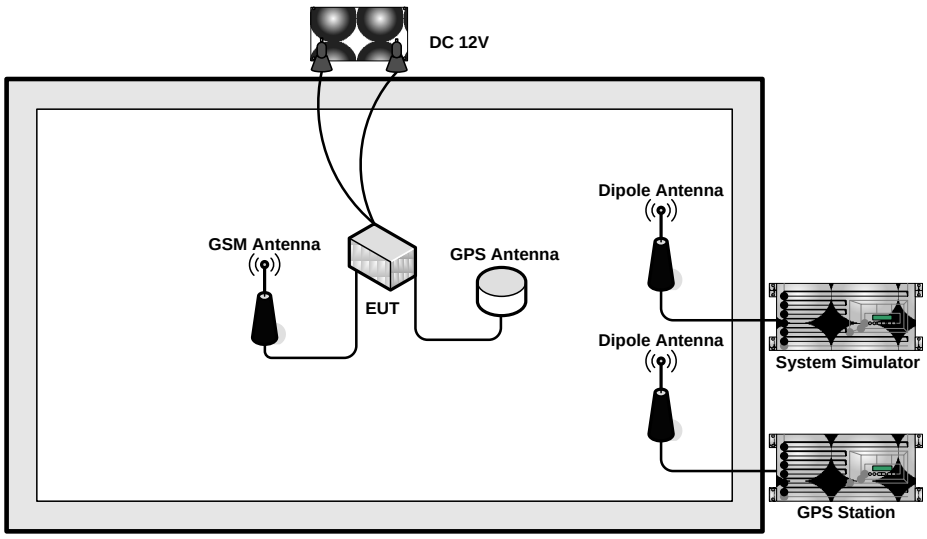
Frequency range investigated for radiated emission is as follows:

1. 30 MHz to 9000 MHz for GSM850.
2. 30 MHz to 19000 MHz for GSM1900.

Test Modes	
Band	**Radiated TCs**
GSM 850	■ GPRS 8 Link
GSM 1900	■ GPRS 8 Link
Remark: Only the radiated emission of the EUT was performed in this report, and the conducted test cases can be referred to SIMCOM module report (FCC ID: UDV-0912142009007).	

Note: The maximum power levels are GPRS multi-slot class 8 mode for GMSK link, only this mode was used for all tests.

2.2 Connection Diagram of Test System



3 Field Strength of Spurious Radiation Measurement

3.1 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

3.1.1 Description of the ERP/EIRP Measurement

ERP/EIRP is measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts.

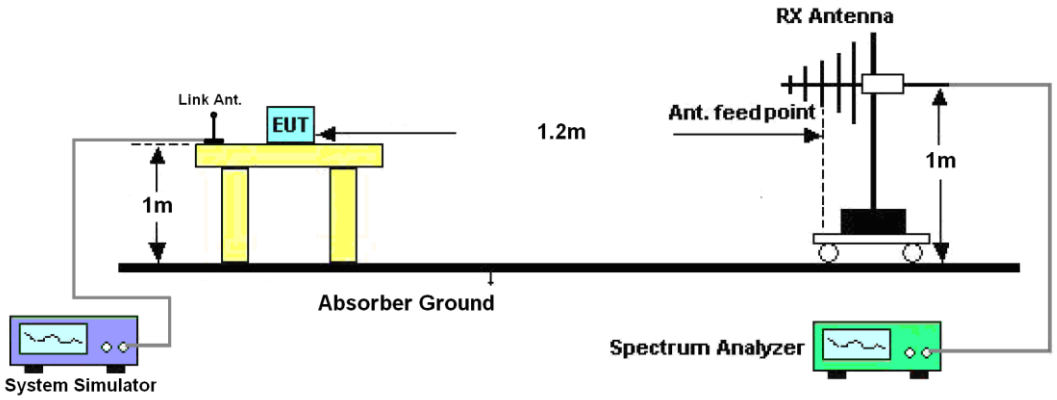
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The EUT was placed on a turntable with 1.0 meter height in a fully anechoic chamber.
2. The EUT was set at 1.2 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiated power.
4. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.
5. Taking the record of maximum ERP/EIRP.
6. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
7. The conducted power at the terminal of the dipole antenna is measured.
8. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.
9. ERP/EIRP = Ps + Et – Es + Gs = Ps + Rt – Rs + Gs
   Ps (dBm)：Input power to substitution antenna.
   Gs (dBi or dBd)：Substitution antenna Gain.
   Et = Rt + AF
   Es = Rs + AF
   AF (dB/m)：Receive antenna factor
   Rt：The highest received signal in spectrum analyzer for EUT.
   Rs：The highest received signal in spectrum analyzer for substitution antenna.

3.1.4 Test Setup



3.1.5 Test Result of ERP

GSM850 (GPRS 8) Radiated Power ERP						
Horizontal Polarization						
Frequency (MHz)	**Rt (dBm)**	**Rs (dBm)**	**Ps (dBm)**	**Gs (dBd)**	**ERP (dBm)**	**ERP (W)**
824.20	-24.43	-48.12	0.00	-1.08	22.61	0.18
836.40	-24.91	-48.28	0.00	-0.93	22.44	0.18
848.80	-23.00	-48.35	0.00	-0.76	24.59	0.29
Vertical Polarization						
Frequency (MHz)	**Rt (dBm)**	**Rs (dBm)**	**Ps (dBm)**	**Gs (dBd)**	**ERP (dBm)**	**ERP (W)**
824.20	-27.78	-47.97	0.00	-1.08	19.11	0.08
836.40	-29.83	-48.01	0.00	-0.93	17.25	0.05
848.80	-25.73	-48.05	0.00	-0.76	21.56	0.14

3.1.6 Test Result of EIRP

GSM1900 (GPRS 8) Radiated Power EIRP						
Horizontal Polarization						
Frequency (MHz)	**Rt (dBm)**	**Rs (dBm)**	**Ps (dBm)**	**Gs (dBi)**	**EIRP (dBm)**	**EIRP (W)**
1850.20	-33.37	-51.88	0.00	1.96	20.47	0.11
1880.00	-33.18	-52.99	0.00	2.00	21.81	0.15
1909.80	-35.40	-54.28	0.00	1.98	20.86	0.12
Vertical Polarization						
Frequency (MHz)	**Rt (dBm)**	**Rs (dBm)**	**Ps (dBm)**	**Gs (dBi)**	**EIRP (dBm)**	**EIRP (W)**
1850.20	-34.06	-52.13	0.00	1.96	20.03	0.10
1880.00	-36.21	-53.17	0.00	2.00	18.96	0.08
1909.80	-37.09	-54.13	0.00	1.98	19.02	0.08

3.2 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

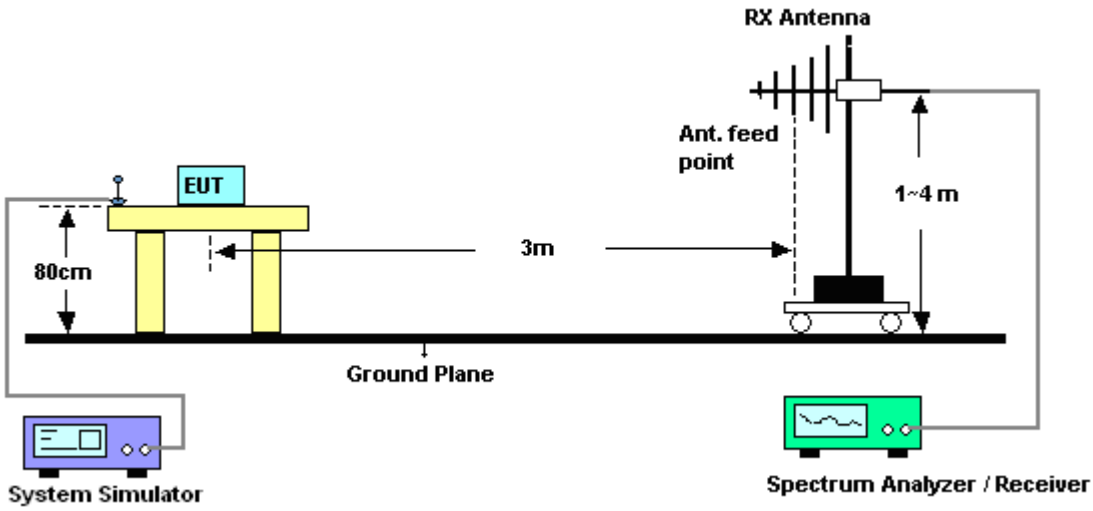
3.2.1 Measuring Instruments

See list of measuring instruments of this test report.

3.2.2 Test Procedures

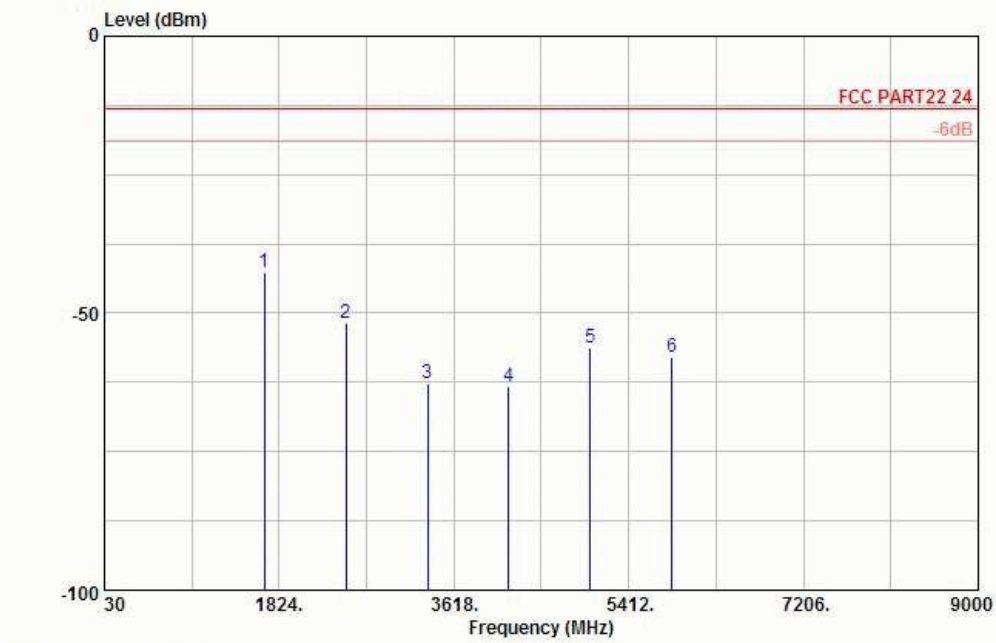
10. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
11. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
12. The table was rotated 360 degrees to determine the position of the highest spurious emission.
13. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
14. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
15. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
16. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
17. Taking the record of output power at antenna port.
18. Repeat step 7 to step 8 for another polarization.
19. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
20. ERP (dBm) = EIRP - 2.15

3.2.3 Test Setup



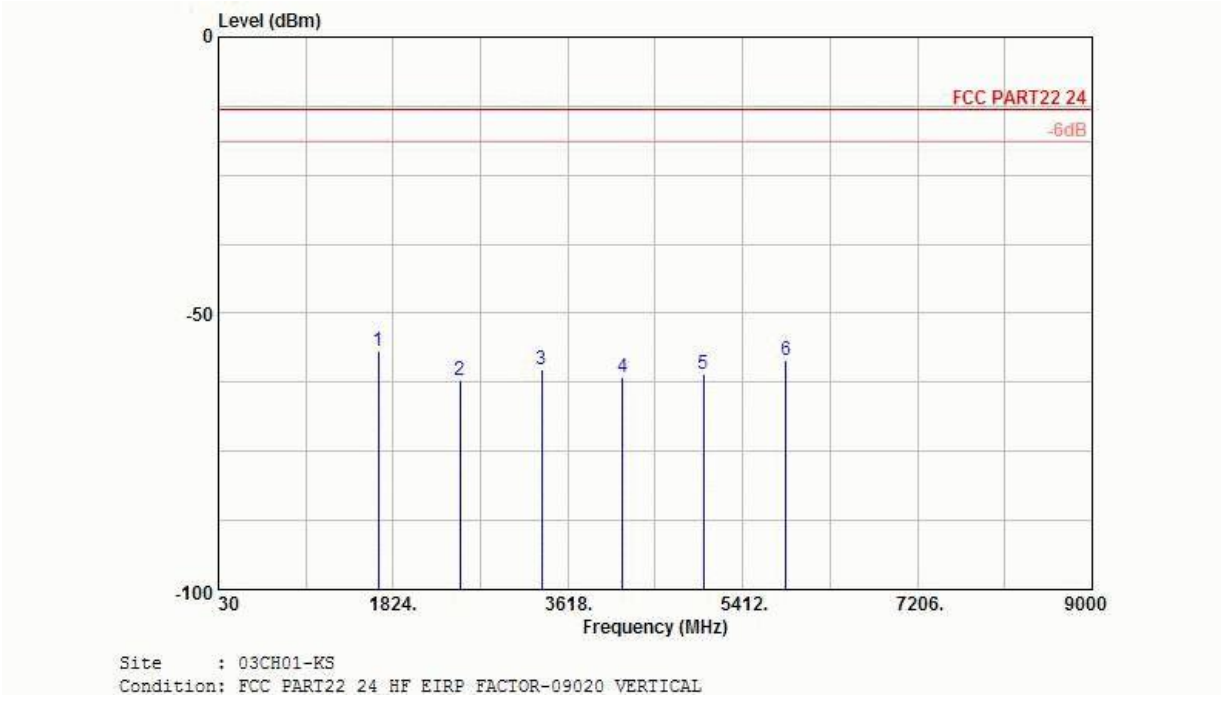
3.2.4 Test Result of Field Strength of Spurious Radiated

Band :	GSM850	**Temperature :**	22~23°C
Test Mode :	GPRS 8 Link	**Relative Humidity :**	41~42%
Test Engineer :	Feixiang Rui	**Polarization :**	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



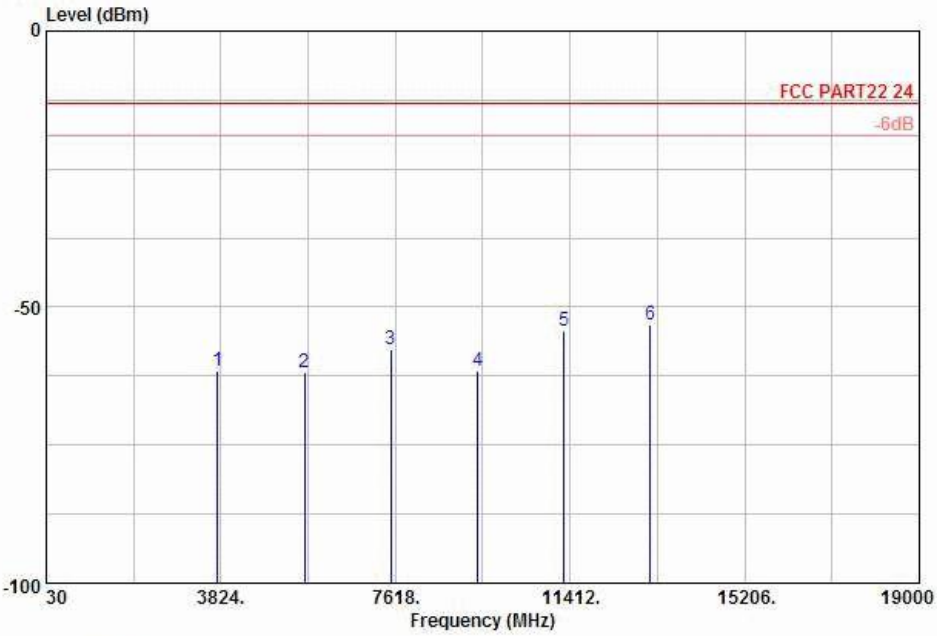
Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1674	-42.65	-13	-29.65	-42.61	-43.30	0.57	3.37	H	Pass
2510	-51.68	-13	-38.68	-53.93	-53.91	0.78	5.16	H	Pass
3345	-62.69	-13	-49.69	-64.63	-66.33	0.87	6.66	H	Pass
4182	-63.20	-13	-50.20	-65.94	-67.79	0.97	7.71	H	Pass
5020	-56.16	-13	-43.16	-65.25	-61.83	1.09	8.91	H	Pass
5854	-58.01	-13	-45.01	-66.72	-64.45	1.22	9.81	H	Pass

Band :	GSM850	Temperature :	22~23°C
Test Mode :	GPRS 8 Link	Relative Humidity :	41~42%
Test Engineer :	Feixiang Rui	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



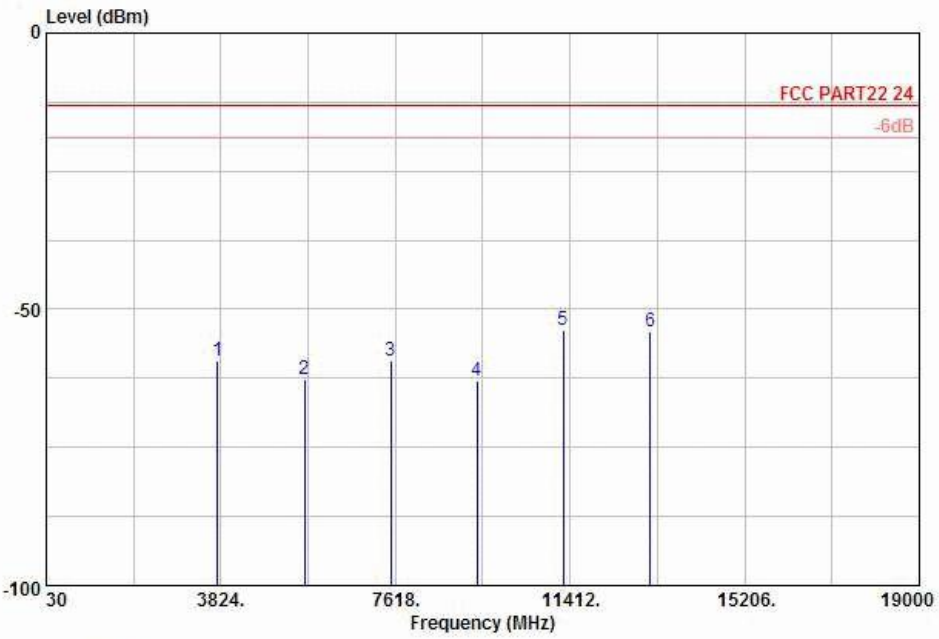
Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1674	-56.84	-13	-43.84	-55.26	-57.49	0.57	3.37	V	Pass
2510	-62.08	-13	-49.08	-65.19	-64.31	0.78	5.16	V	Pass
3346	-60.24	-13	-47.24	-62.22	-63.88	0.87	6.66	V	Pass
4182	-61.68	-13	-48.68	-65.52	-66.27	0.97	7.71	V	Pass
5012	-60.87	-13	-47.87	-65.81	-66.54	1.09	8.91	V	Pass
5856	-58.40	-13	-45.40	-66.39	-64.84	1.22	9.81	V	Pass

Band :	GSM1900	Temperature :	22~23°C
Test Mode :	GPRS 8 Link	Relative Humidity :	41~42%
Test Engineer :	Feixiang Rui	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-61.59	-13	-48.59	-62.56	-67.97	0.78	7.16	H	Pass
5636	-61.91	-13	-48.91	-66.09	-70.45	1.04	9.58	H	Pass
7520	-57.64	-13	-44.64	-62.77	-67.75	1.35	11.46	H	Pass
9400	-61.52	-13	-48.52	-64.78	-72.58	1.75	12.81	H	Pass
11280	-54.44	-13	-41.44	-65.93	-65.53	2	13.09	H	Pass
13155	-53.23	-13	-40.23	-64.53	-64.94	2.04	13.75	H	Pass

Band :	GSM1900	Temperature :	22~23°C
Test Mode :	GPRS 8 Link	Relative Humidity :	41~42%
Test Engineer :	Feixiang Rui	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-59.4	-13	-46.39	-60.76	-65.77	0.78	7.16	V	Pass
5648	-62.8	-13	-49.82	-66.04	-71.36	1.04	9.58	V	Pass
7520	-59.2	-13	-46.17	-63.66	-69.28	1.35	11.46	V	Pass
9387	-62.9	-13	-49.94	-64.16	-74.00	1.75	12.81	V	Pass
11271	-53.8	-13	-40.83	-65.07	-64.92	2	13.09	V	Pass
13161	-53.9	-13	-40.90	-65.09	-65.61	2.04	13.75	V	Pass

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
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. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 07, 2010	Dec. 06, 2011	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Jan. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Amplifier	Wireless	FPA-6592G	060004	30MHz~2GHz	Dec. 09, 2010	Dec. 08, 2011	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Jan. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Actice hore antenna	com-power	AHA-118	701023	1G-18GHz	Nov. 09, 2010	Nov. 08, 2011	Radiation (03CH01-KS)
Signal Generator	R&S	SMR40	100455	10MHz~40GHz	Jan. 06, 2011	Jan. 05, 2012	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15-40GHz	Oct. 15, 2010	Oct.14, 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. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)

5 Uncertainty of Evaluation

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 EP061728 as below.