Partial FCC RF Test Report

APPLICANT	:	SYSTEMS & TECHNOLOGY CORP.
EQUIPMENT	:	IntelliTrac
BRAND NAME	:	IntelliTrac
MODEL NAME	:	X1 Plus
FCC ID	:	RLS-STAVL1104
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 (GSM) : 0.25 W GSM1900 (GSM) : 0.09 W

This is a partial report which is only valid combined with the integrated the WWAN Module (Brand Name: SIMCOM / Model Name: SIM900B, FCC ID: UDV-1005242010007) Report.

The product was received on Jan. 12, 2011 and completely tested on Jan. 19, 2011. We, SPORTON INTERNATIONAL 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 INC., the test report shall not be reproduced except in full.

Reviewed by:

Anderson Chiu

Anderson Chiu / Deputy Manager

Testing Laboratory 1190

SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG111220	Rev. 01	Initial issue of report	Jan. 21, 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 25.39 dB at 2509 MHz

1 General Description

1.1 Applicant

SYSTEMS & TECHNOLOGY CORP.
18-5F., No. 79, Hsin Tai Wu Road, Sec. 1, Hsichih, Taipei Hsien, Taiwan, R.O.C.

1.2 Manufacturer

SYSTEMS & TECHNOLOGY CORP.
3F.-7, No. 79, Hsin Tai Wu Road, Sec. 1, Hsichih, Taipei County, Taiwan, R.O.C.

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	IntelliTrac
Brand Name	IntelliTrac
Model Name	X1 Plus
FCC ID	RLS-STAVL1104
Integrated Module	Brand Name : SIMCOM Model Name : SIM900B
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 Output Power to Antenna	GSM850 : 31.10 dBm GSM1900 : 28.41 dBm
Maximum ERP/EIRP	GSM850 (GSM) : 0.25 W (23.94 dBm) GSM1900 (GSM) : 0.09 W (19.65 dBm)
Antenna Type	Fixed External Antenna
HW Version	V1.02
SW Version	SIM900B R11.0
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 INC.	
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	**Sporton Site No.**	**FCC/IC Registration No.**
	03CH05-HY	722060/4086B-1

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.	Car Battery	GS	GTH60LS(55B24LS)	N/A	N/A	N/A

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	■ GSM Link
GSM 1900	■ GSM Link

Note:

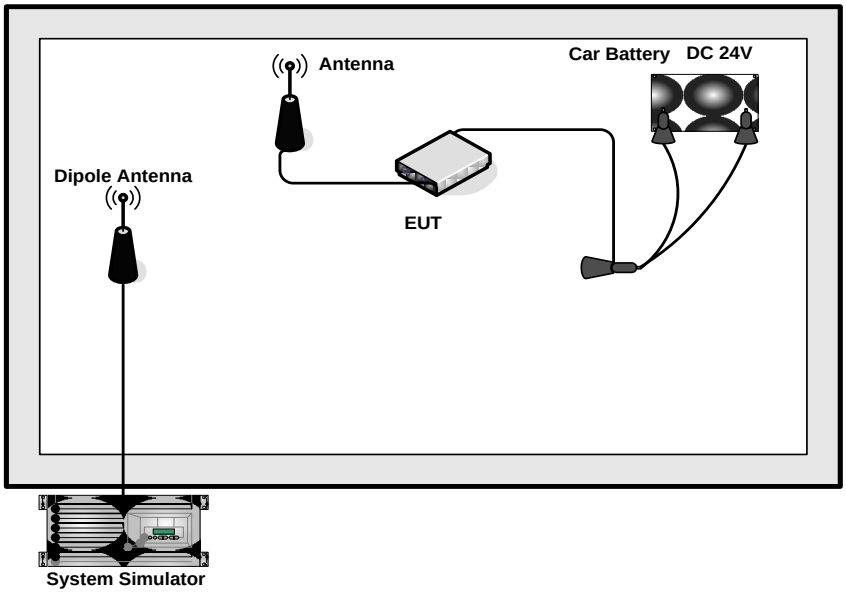
1. The maximum power levels are GSM mode for GMSK link, only these modes were used for all tests.

2. Only the radiated emission and ERP/EIRP tests of the WWAN Module was performed in this report and the conducted test cases can be referred to the integrated WWAN module (Brand Name: SIMCOM / Model Name: SIM900B, FCC ID: UDV-1005242010007) report.

The conducted power tables are as follows:

Conducted Power (*Unit: dBm)						
Band	**GSM850**			**GSM1900**		
Channel	**128**	**189**	**251**	**512**	**661**	**810**
Frequency	**824.2**	**836.4**	**848.8**	**1850.2**	**1880.0**	**1909.8**
GSM	31.04	**31.10**	31.07	28.14	28.20	**28.41**
GPRS 8	31.06	31.05	31.04	28.13	28.25	28.39
GPRS 10	30.98	30.96	30.98	28.08	28.24	28.38

2.2 Connection Diagram of Test System



3 Test Result

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.

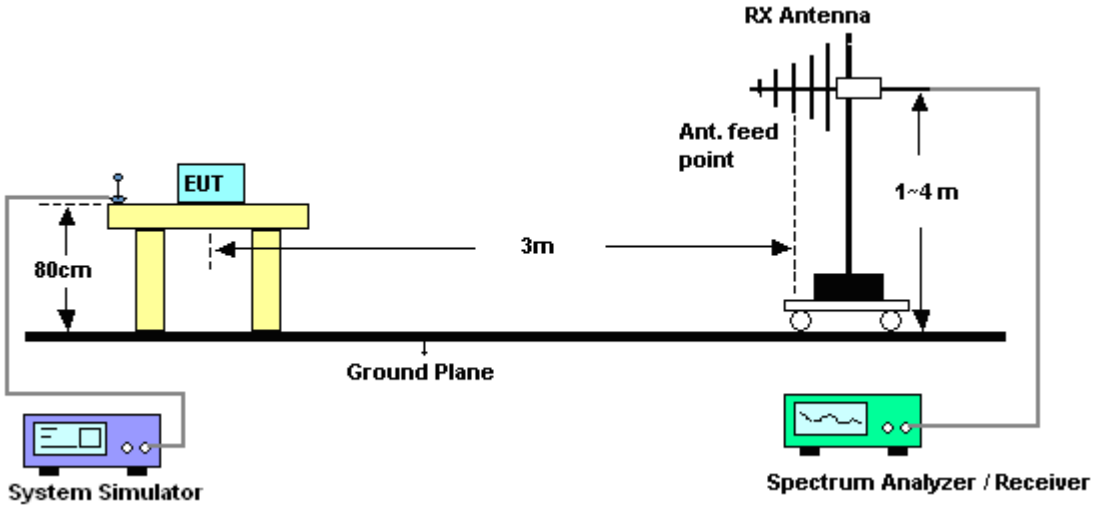
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The EUT was placed on an non-conductive rotating platform with 0.8 meter height in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RBW= 3MHz,VBW= 3MHz, and peak detector settings.
2. During the measurement, the EUT was enforced in maximum power and linked with a base station. The highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
3. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. The EUT was replaced by dipole antenna (substitution antenna) at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor, EIRP= LVL + Correction factor and ERP = EIRP – 2.15 .

3.1.4 Test Setup



3.1.5 Test Result of ERP

GSM850 (GSM) Radiated Power ERP				
Horizontal Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
824.2	-9.40	31.97	20.42	0.11
836.4	-6.35	32.44	23.94	0.25
848.8	-7.83	32.63	22.65	0.18
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
824.2	-13.95	35.39	19.29	0.08
836.4	-14.08	35.2	18.97	0.08
848.8	-12.07	35.69	21.47	0.14

* ERP = LVL (dBm) + Correction Factor (dB) – 2.15

3.1.6 Test Result of EIRP

GSM1900 (GSM) Radiated Power EIRP				
Horizontal Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
1850.2	-23.77	41.24	17.47	0.06
1880.0	-21.81	41.46	19.65	0.09
1909.8	-21.86	41.21	19.35	0.09
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
1850.2	-26.19	41.52	15.33	0.03
1880.0	-26.39	43.10	16.71	0.05
1909.8	-26.40	42.73	16.33	0.04

* EIRP = LVL (dBm) + Correction Factor (dB)

3.2 Field Strength of Spurious Radiation Measurement

3.2.1 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.

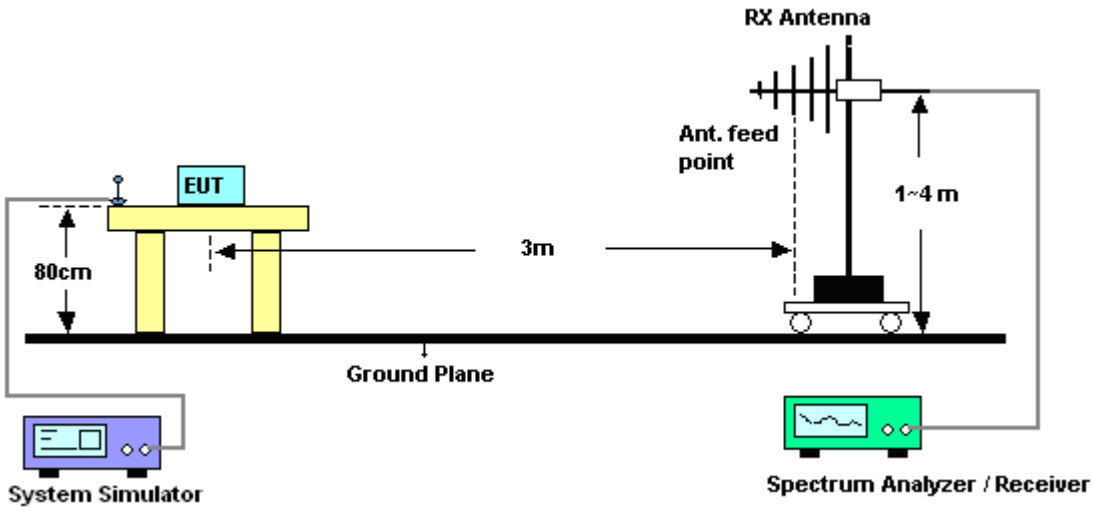
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

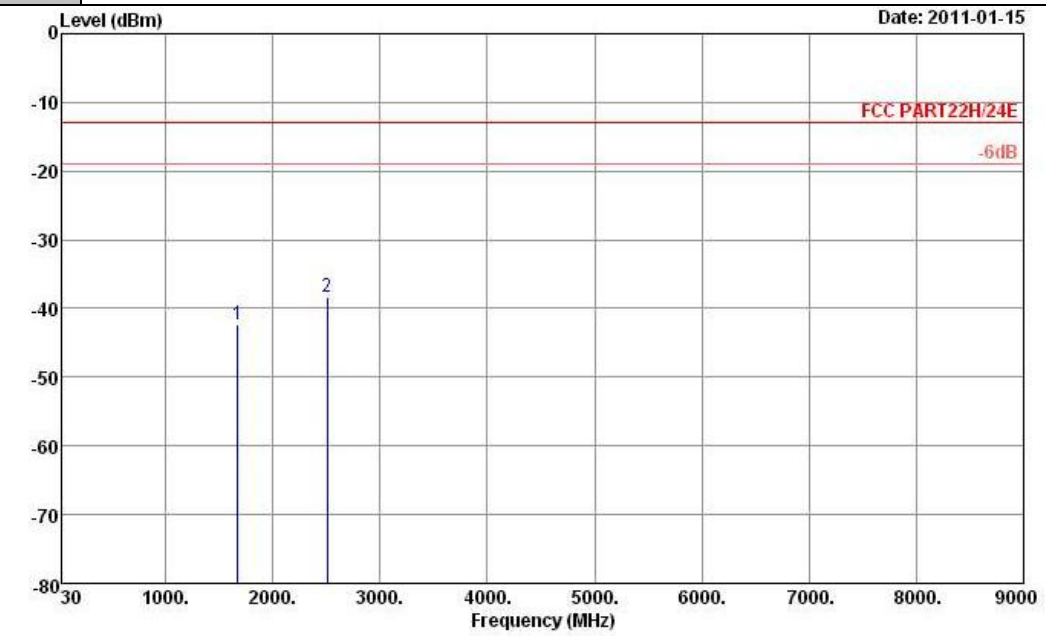
1. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving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

3.2.4 Test Setup



3.2.5 Test Result of Field Strength of Spurious Radiated

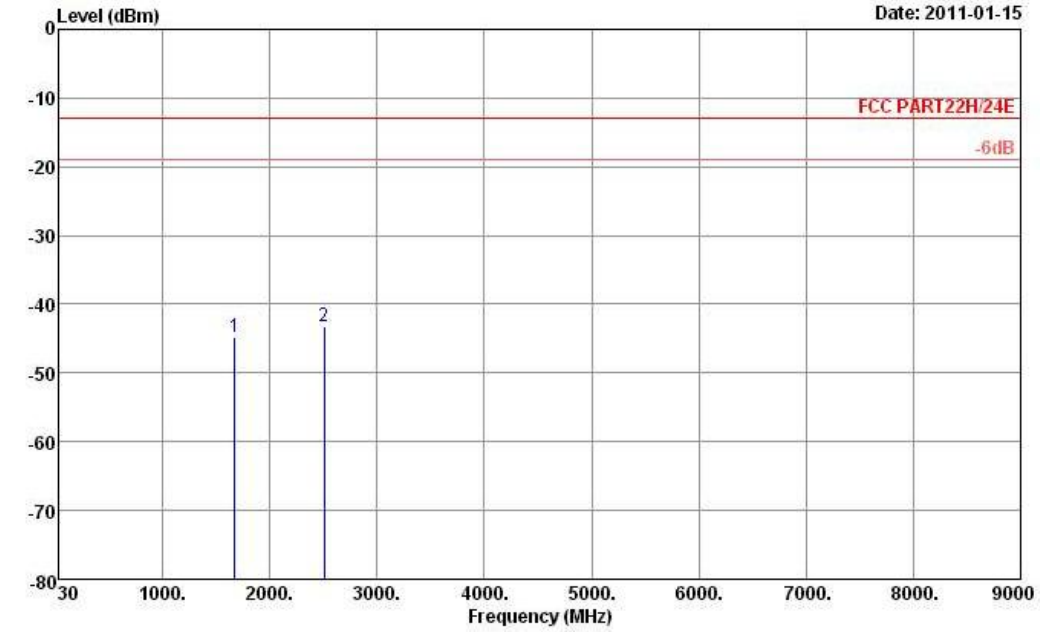
Band :	GSM850	**Temperature :**	22~25°C
Test Mode :	GSM Link	**Relative Humidity :**	51~53%
Test Engineer :	Wii Chang	**Polarization :**	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH05-HY
Condition : FCC PART22H/24E HF_EIRP_101221 HORIZONTAL
Project : FG 111220

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
1672	-42.27	-13	-29.27	-49.19	-45.61	2.15	5.49	H	Pass
2509	-38.39	-13	-25.39	-48.62	-42.43	2.38	6.41	H	Pass

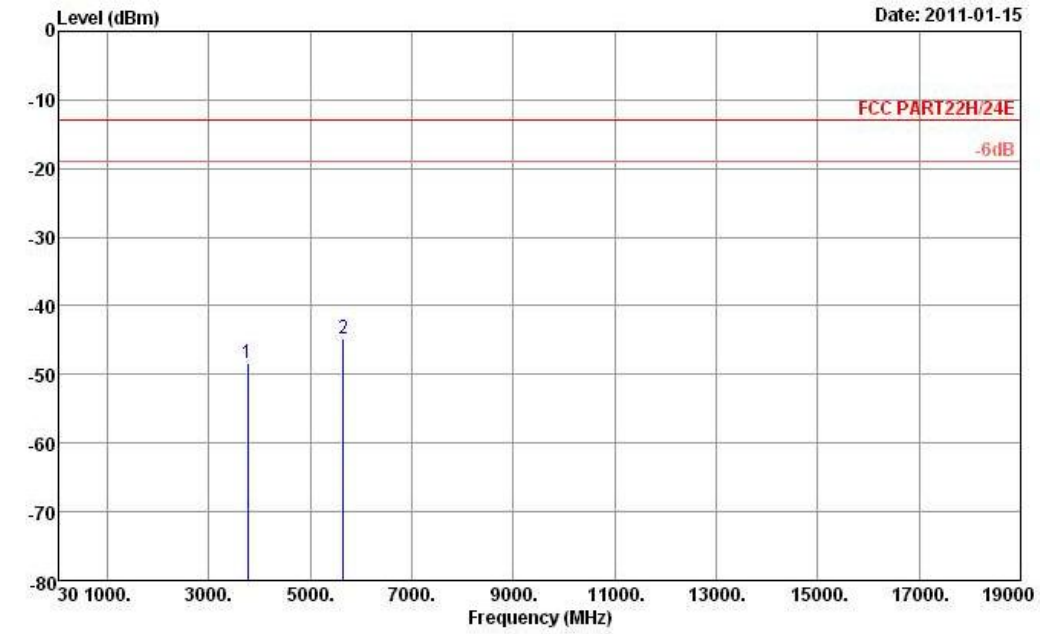
Band :	GSM850	Temperature :	22~25°C
Test Mode :	GSM Link	Relative Humidity :	51~53%
Test Engineer :	Wii Chang	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH05-HY
Condition : FCC PART22H/24E HF_EIRP_101221 VERTICAL
Project : FG 111220

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
1672	-44.68	-13	-31.68	-51.60	-48.02	2.15	5.49	V	Pass
2509	-43.34	-13	-30.34	-53.57	-47.38	2.38	6.41	V	Pass

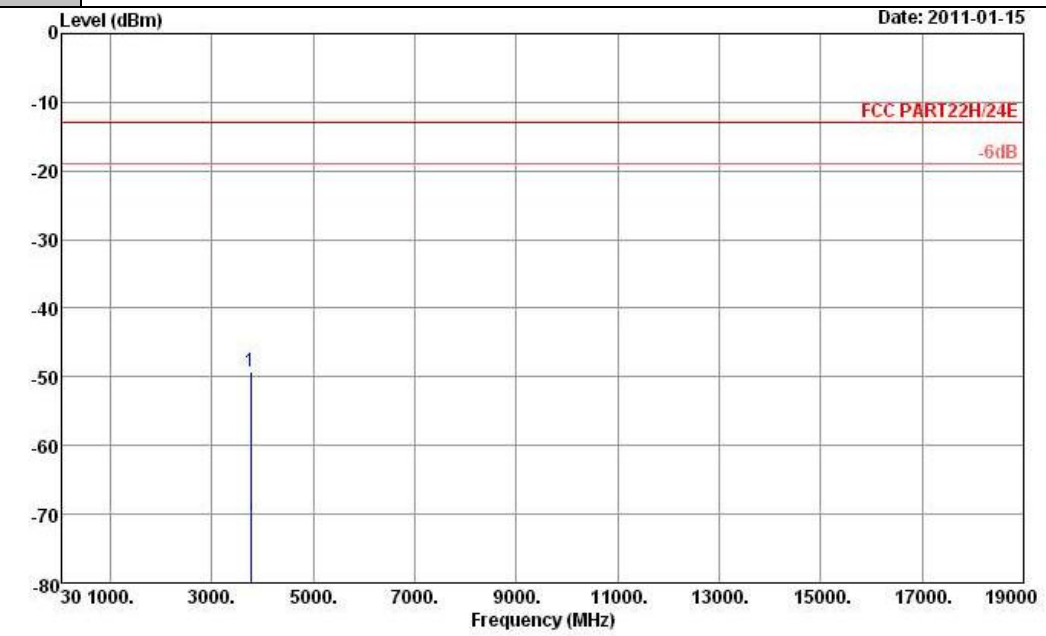
Band :	GSM1900	Temperature :	22~25°C
Test Mode :	GSM Link	Relative Humidity :	52~53%
Test Engineer :	Wii Chang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH05-HY
Condition : FCC PART22H/24E HF_EIRP_101221 HORIZONTAL
Project : FG 111220

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	-48.38	-13	-35.38	-62.78	-54.51	2.93	9.06	H	Pass
5640	-44.73	-13	-31.73	-64.54	-51.65	3.91	10.83	H	Pass

Band :	GSM1900	Temperature :	22~25°C
Test Mode :	GSM Link	Relative Humidity :	52~53%
Test Engineer :	Wii Chang	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	-49.21	-13	-36.21	-63.61	-55.34	2.93	9.06	V	Pass

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
System Simulator	R&S	CMU200	117995	N/A	Mar. 19, 2009	Mar. 18, 2011	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP30	101329	9kHz~30GHz	Apr. 26, 2010	Apr. 25, 2011	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 13, 2010	Sep. 12, 2011	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 14, 2010	Sep. 13, 2011	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D35P	TBN-930701	N/A	Jul. 30,2010	Jul. 29, 2011	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP30	101352	9KHz-40GHz	Nov. 03, 2010	Nov. 02, 2011	Radiation (03CH05-HY)
Amplifier	COM-POWER	PA-103	161069	1KHz - 1GHz	Mar. 29, 2010	Mar. 28, 2011	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2725	30MHz ~ 1GHz	Nov. 06, 2010	Nov. 05, 2011	Radiation (03CH05-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz- 26.5GHz	Apr. 15, 2010	Apr. 14, 2011	Radiation (03CH05-HY)
Turn Table	HD	Deis HD 2000	420/611	0 - 360 degree	N/A	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	MA 240	240/666	1 m - 4 m	N/A	N/A	Radiation (03CH05-HY)
Horn Antenna	ESCO	3117	00066584	1GHz ~ 18GHz	Aug. 05, 2010	Aug. 04, 2011	Radiation (03CH05-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH05-HY)
System Simulator	R&S	CMU200	117997	N/A	May 14, 2009	May 13, 2011	Radiation (03CH05-HY)

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 EP111220 as below.