

Variant FCC RF Test Report

APPLICANT : Hewlett-Packard Company
EQUIPMENT : SmartBook
BRAND NAME : HP
MODEL NAME : HSTNH-F23C
MARKETING NAME : Compaq AirLife 100
FCC ID : B94HHF23C
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
WCDMA Band V : 826.4 ~ 846.6 MHz /
871.4 ~ 891.6 MHz
WCDMA Band II : 1852.4 ~ 1907.6 MHz /
1932.4 ~ 1987.6 MHz
MAX. ERP/EIRP POWER : GSM850 (GPRS 8) : 1.46 W
GSM850 (EDGE 8) : 0.46 W
GSM1900 (GPRS 8) : 1.33 W
GSM1900 (EDGE 8) : 0.59 W
WCDMA Band V (RMC 12.2Kbps) : 0.18 W
WCDMA Band II (RMC 12.2Kbps) : 0.35 W

This is a variant report which is only valid combined with the original report. The product was received on Mar. 03, 2010 and completely tested on Mar. 07, 2010. 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:



Roy Wu / Manager



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
FG9N1201-03	Rev. 01	This is a variant report which can be referred to appendix C for change notes. All the test cases were performed on original report which can be referred to Sporton Report Number FG9N1201-01 as appendix D. Based on the original report; only ERP/EIRP and worst mode of radiated emission was verified for HW and SW change.	Mar. 17, 2010

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	$< 43 + 10 \log_{10}(P[\text{Watts}])$	PASS	Under limit 22.59 dB at 3760 MHz



1 General Description

1.1 Applicant

Hewlett-Packard Company

10955 Tantau Ave., CupertinoCA, 95014-0770, USA

1.2 Manufacturer

FOXCONN Technology Group

4F., G5, No. 2, 2nd Donghuan Road, 10th Yousong Industrial District, Longhua, Baoan, Shenzhen City,
Guangdong Province, China 518109

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	SmartBook
Brand Name	HP
Model Name	HSTNH-F23C
Marketing Name	Compaq AirLife 100
FCC ID	B94HHF23C
Tx Frequency	GSM850 : 824 MHz ~ 849 MHz GSM1900 : 1850 MHz ~ 1910 MHz WCDMA Band V : 824 MHz ~ 849 MHz WCDMA Band II : 1850 MHz ~ 1910 MHz
Rx Frequency	GSM850 : 869 MHz ~ 894 MHz GSM1900 : 1930 MHz ~ 1990 MHz WCDMA Band V : 869 MHz ~ 894 MHz WCDMA Band II : 1930 MHz ~ 1990 MHz
Maximum ERP/EIRP	GSM850 (GPRS 8) : 1.46 W (31.64 dBm) GSM850 (EDGE 8) : 0.46 W (26.65 dBm) GSM1900 (GPRS 8) : 1.33 W (31.25 dBm) GSM1900 (EDGE 8) : 0.59 W (27.74 dBm) WCDMA Band V (RMC 12.2Kbps) : 0.18 W (22.61 dBm) WCDMA Band II (RMC 12.2Kbps) : 0.35 W (25.40 dBm)
Antenna Type	Fixed Internal Antenna
HW Version	PVT1.0
SW Version	001.156
Type of Modulation	GSM / GPRS : GMSK EDGE : 8PSK WCDMA : QPSK HSDPA : QPSK / 16QAM HSUPA : BPSK
EUT Stage	Production Unit

Remark:

1. For other wireless features of this EUT, the test report will be issued separately.
2. This test report recorded only product characteristics and test results of PCS Licensed Transmitter (PCB).
3. 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 1 st 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.
	03CH07-HY	TW1022/4086B-1

1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ Preliminary Guidance for Receiving Applications for Certification of 3G Device. May 9, 2006.
- ♦ 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 Test Configuration of Equipment Under Test

2.1 Test Mode

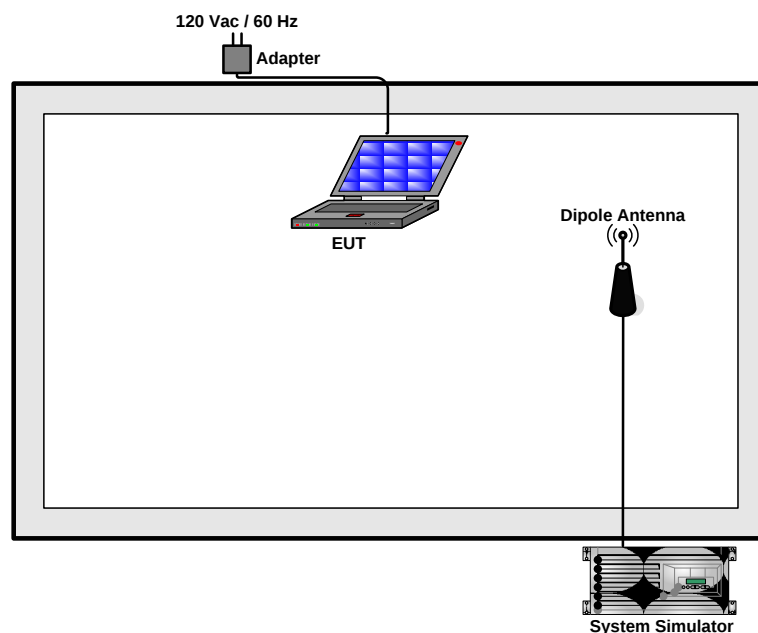
During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range.

Frequency range investigated for radiated emission is as follows:

1. 30 MHz to 9000 MHz for GSM850.
2. 30 MHz to 19000 MHz for WCDMA Band II.

Test Modes	
Band	Radiated TCs
GSM 850	■ GPRS 8 Link
WCDMA Band II	■ RMC 12.2Kbps Link

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.

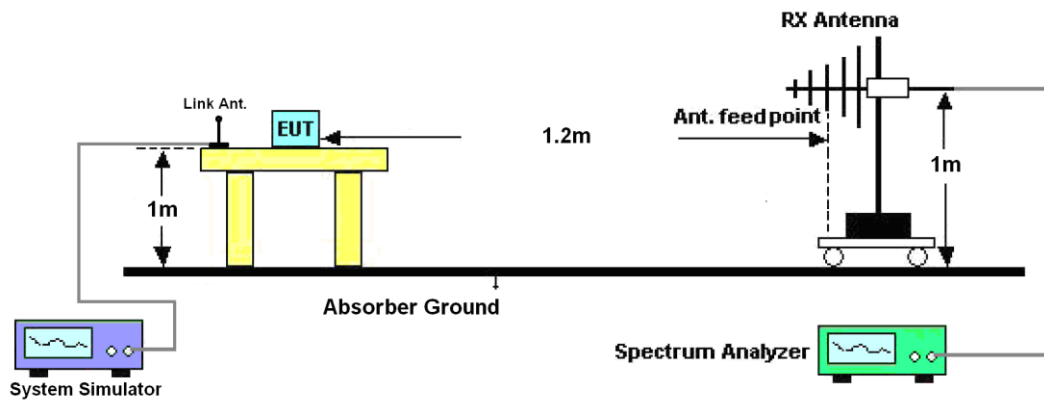
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The EUT was placed on 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. $ERP/EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$
 P_s (dBm) : Input power to substitution antenna.
 G_s (dBi or dBd) : Substitution antenna Gain.
 $E_t = R_t + AF$
 $E_s = R_s + AF$
 AF (dB/m) : Receive antenna factor
 R_t : The highest received signal in spectrum analyzer for EUT.
 R_s : 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	-15.40	-48.12	0.00	-1.08	31.64	1.46
836.40	-15.80	-48.28	0.00	-0.93	31.55	1.43
848.80	-16.59	-48.35	0.00	-0.76	31.00	1.26
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-16.27	-47.97	0.00	-1.08	30.62	1.15
836.40	-16.94	-48.01	0.00	-0.93	30.14	1.03
848.80	-17.08	-48.05	0.00	-0.76	30.21	1.05

GSM850 (EDGE 8) Radiated Power ERP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-20.39	-48.12	0.00	-1.08	26.65	0.46
836.40	-21.29	-48.28	0.00	-0.93	26.06	0.40
848.80	-22.14	-48.35	0.00	-0.76	25.45	0.35
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-21.77	-47.97	0.00	-1.08	25.12	0.33
836.40	-22.38	-48.01	0.00	-0.93	24.70	0.30
848.80	-22.61	-48.05	0.00	-0.76	24.68	0.29



WCDMA Band V (RMC 12.2Kbps) Radiated Power ERP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
826.40	-24.43	-48.12	0.00	-1.08	22.61	0.18
836.40	-25.56	-48.28	0.00	-0.93	21.79	0.15
846.60	-26.45	-48.35	0.00	-0.76	21.14	0.13
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
826.40	-25.63	-47.97	0.00	-1.08	21.26	0.13
836.40	-26.49	-48.01	0.00	-0.93	20.59	0.11
846.60	-26.88	-48.05	0.00	-0.76	20.41	0.11

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	-22.92	-51.88	0.00	1.96	30.92	1.24
1880.00	-23.97	-52.99	0.00	2.00	31.02	1.26
1909.80	-25.01	-54.28	0.00	1.98	31.25	1.33
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-26.03	-52.13	0.00	1.96	28.06	0.64
1880.00	-27.03	-53.17	0.00	2.00	28.14	0.65
1909.80	-27.53	-54.13	0.00	1.98	28.58	0.72

GSM1900 (EDGE 8) Radiated Power EIRP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-26.41	-51.88	0.00	1.96	27.43	0.55
1880.00	-27.48	-52.99	0.00	2.00	27.51	0.56
1909.80	-28.52	-54.28	0.00	1.98	27.74	0.59
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-29.46	-52.13	0.00	1.96	24.63	0.29
1880.00	-30.49	-53.17	0.00	2.00	24.68	0.29
1909.80	-31.00	-54.13	0.00	1.98	25.11	0.32



WCDMA Band II (RMC 12.2Kbps) Radiated Power EIRP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1852.40	-28.44	-51.88	0.00	1.96	25.40	0.35
1880.00	-30.08	-52.99	0.00	2.00	24.91	0.31
1907.60	-31.51	-54.28	0.00	1.98	24.75	0.30
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1852.40	-31.36	-52.13	0.00	1.96	22.73	0.19
1880.00	-33.04	-53.17	0.00	2.00	22.13	0.16
1907.60	-34.30	-54.13	0.00	1.98	21.81	0.15

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.

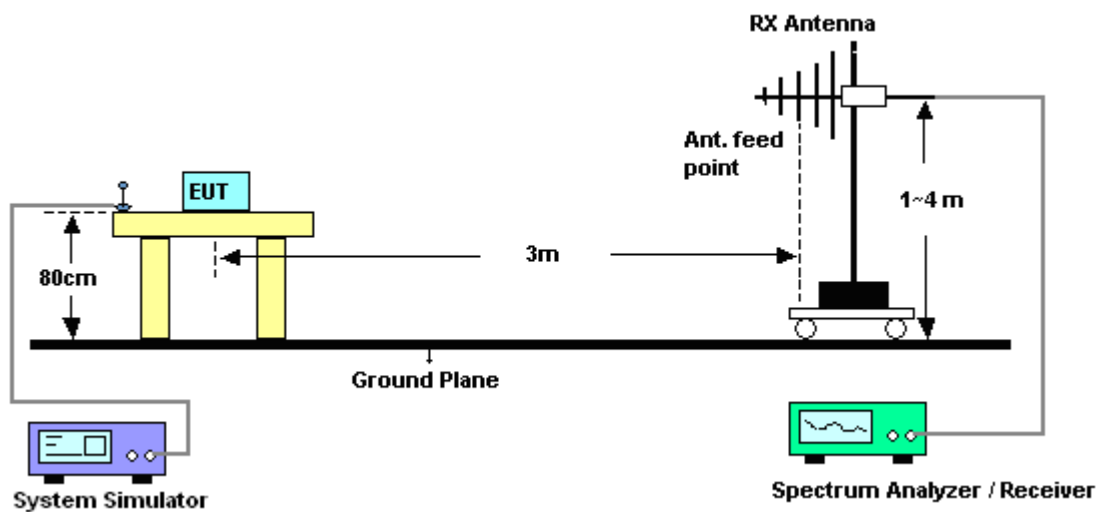
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

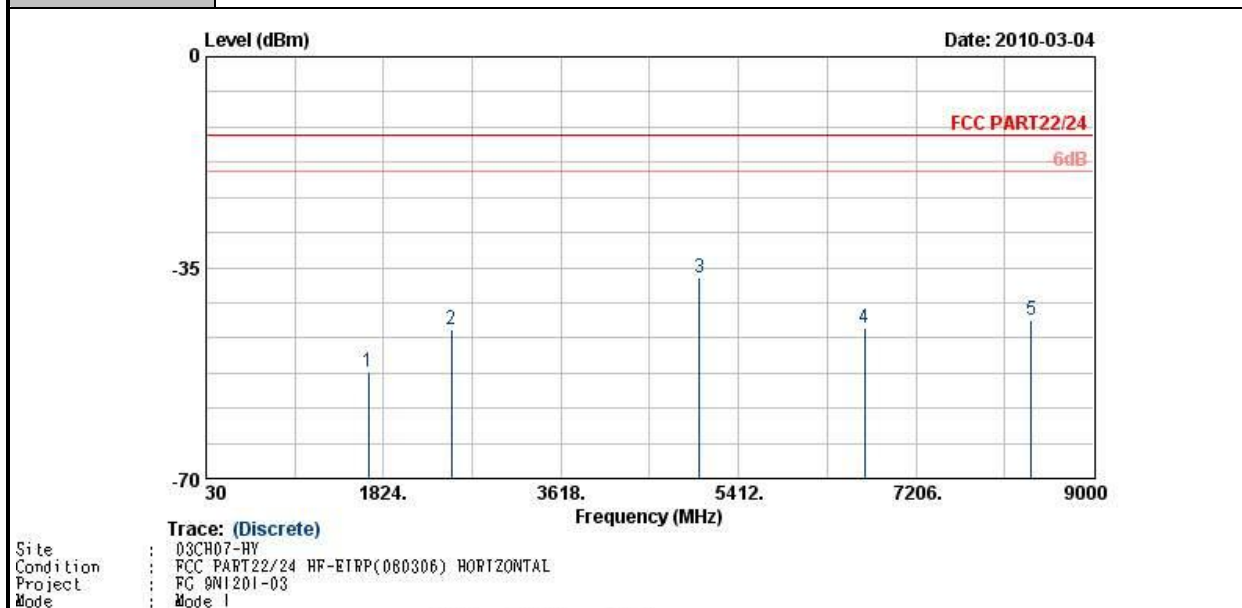
1. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving 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. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
11. $ERP \text{ (dBm)} = EIRP - 2.15$

3.2.4 Test Setup



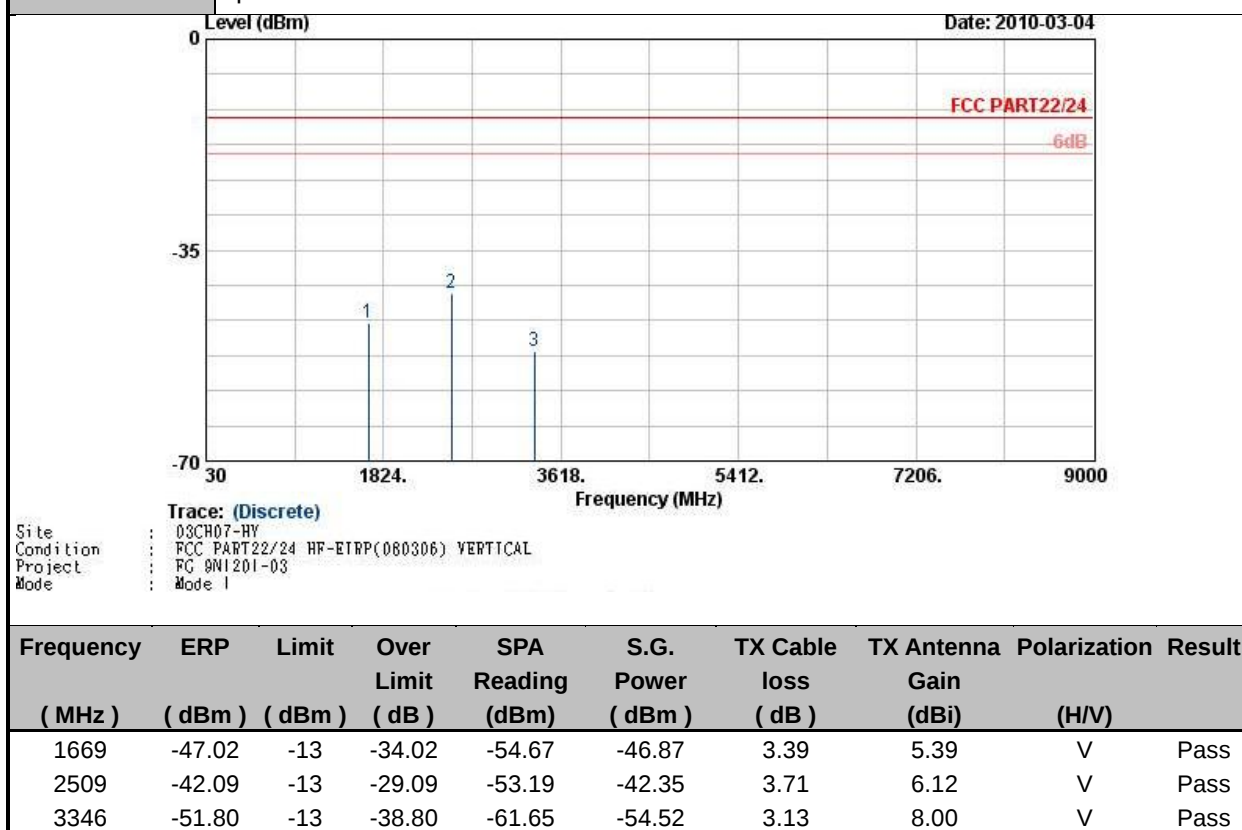
3.2.5 Test Result of Field Strength of Spurious Radiated

Band :	GSM850	Temperature :	24~26°C
Test Mode :	GPRS 8 Link	Relative Humidity :	40~43%
Test Engineer :	Ken Hsu	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



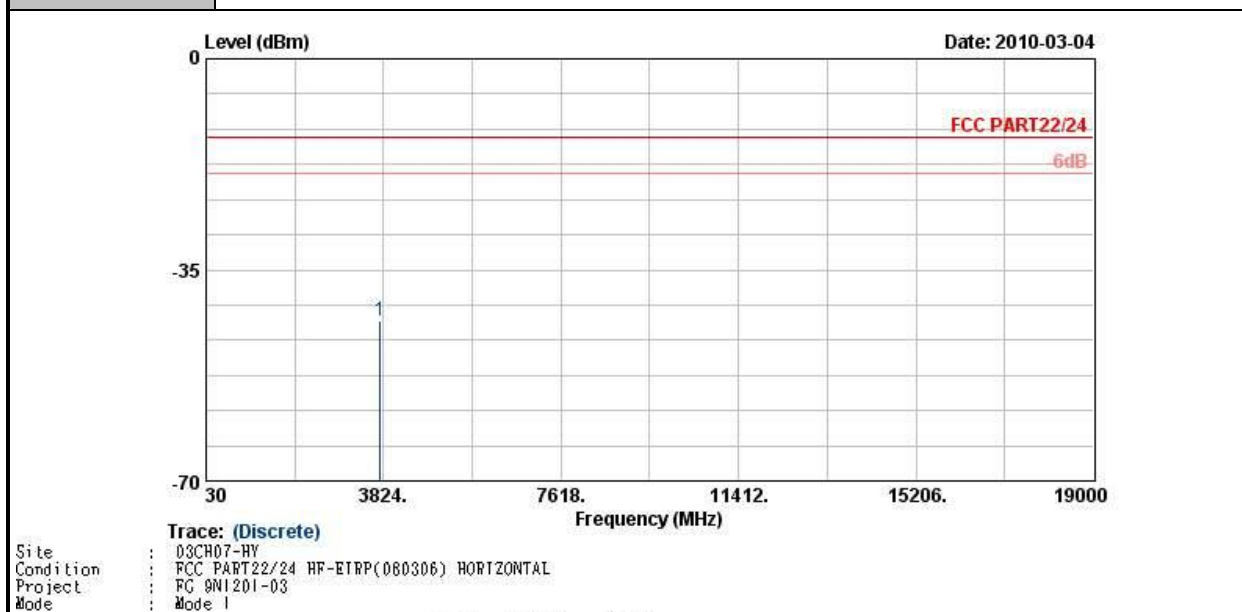
Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1669	-52.30	-13	-39.30	-58.83	-52.15	3.39	5.39	H	Pass
2509	-45.34	-13	-32.34	-52.06	-45.60	3.71	6.12	H	Pass
5015	-36.74	-13	-23.74	-52.53	-41.71	2.61	9.73	H	Pass
6690	-44.94	-13	-31.94	-63.85	-48.72	5.22	11.15	H	Pass
8370	-43.65	-13	-30.65	-64.45	-48.95	5.59	13.04	H	Pass

Band :	GSM850	Temperature :	24~26°C
Test Mode :	GPRS 8 Link	Relative Humidity :	40~43%
Test Engineer :	Ken Hsu	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		





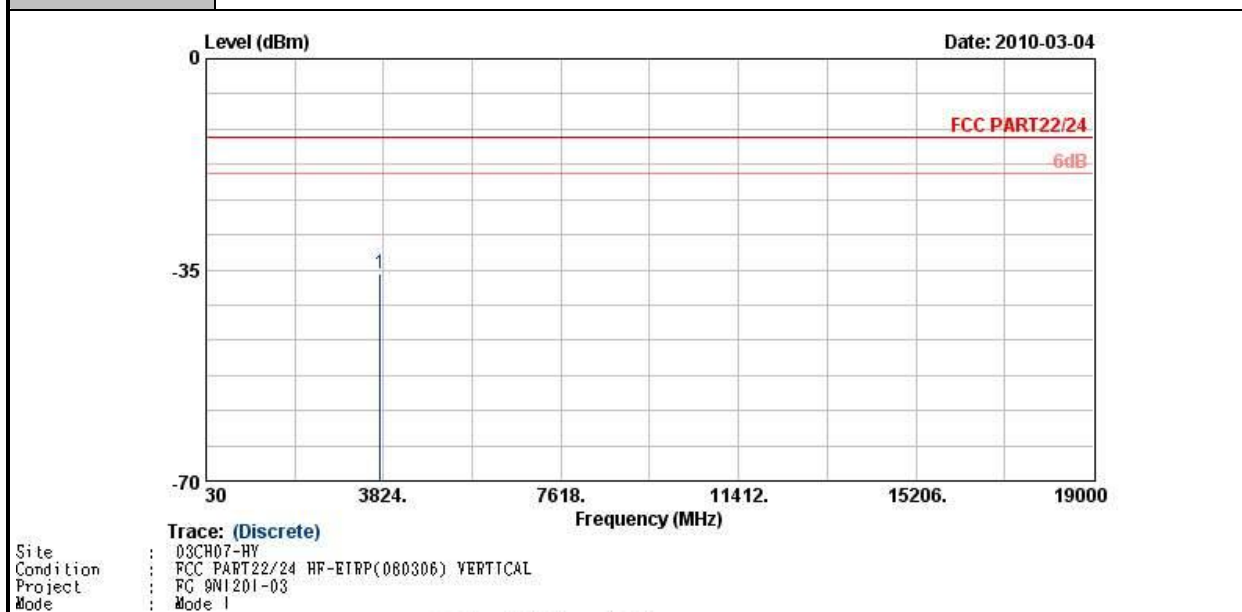
Band :	WCDMA Band II	Temperature :	24~26°C
Test Mode :	RMC 12.2Kbps Link	Relative Humidity :	40~43%
Test Engineer :	Ken Hsu	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



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	-43.49	-13	-30.49	-57.35	-46.01	4.88	7.40	H	Pass



Band :	WCDMA Band II	Temperature :	24~26°C
Test Mode :	RMC 12.2Kbps Link	Relative Humidity :	40~43%
Test Engineer :	Ken Hsu	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	-35.59	-13	-22.59	-52.91	-38.62	4.88	7.91	V	Pass

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2009	Oct. 30, 2010	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP	101067	9KHz ~ 30GHz	Dec. 04, 2009	Dec. 03, 2010	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 20, 2009	Aug. 19, 2010	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA917025 1	15GHz- 40GHz	Oct. 14, 2009	Oct. 13, 2010	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec.09,2009	Dec. 08, 2010	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32dB. GAIN	Mar. 27, 2009	Mar. 26, 2010	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 KHz~30 MHz	May 22, 2008	May 21, 2010	Radiation (03CH07-HY)
System Simulator	R&S	CMU200	117997	N/A	May 14, 2009	May 13, 2011	Radiation (03CH06-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 $U_c(y)$	1.27		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	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 $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\log(1-\Gamma_1\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty $U_c(y)$	2.36				
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.72				



Appendix A. Photographs of EUT

Please refer to Sporton report number EP9N1201-03 as below.



Appendix C. Change Notes

Please refer to change notes as below.



Appendix D. Original Report

Please refer to original report as below.