

Variant FCC RF Test Report

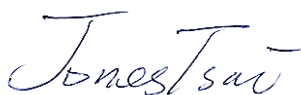
APPLICANT : BlackBerry Limited
EQUIPMENT : Smartphone
BRAND NAME : BlackBerry
MODEL NAME : RHF142LW
MARKETING NAME : SQC100-5
FCC ID : L6ARHF140LW
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)

This is a variant report which is only valid together with the original test report. The product was received on Aug. 21, 2014 and testing was completed on Dec. 13, 2014. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA / EIA-603-C-2004 and has been in 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: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG471526-02A	Rev. 01	This is a variant report which can be referred Product Equality Declaration. All the test cases were performed on original report which can be referred to Sporton Report Number FG471526A as appendix B.	Dec. 22, 2014



SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	§2.1046	RSS-132 (5.4) RSS-133 (6.4)	Conducted Output Power	N/A	PASS	-
3.2	§22.913(a)(2)	RSS-132(5.4) SRSP-503(5.1.3)	Effective Radiated Power	< 7 Watts	PASS	-
	§24.232(c)	RSS-133 (6.4) SRSP-510(5.1.2)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
3.3	§2.1053 §22.917(a) §24.238(a)	RSS-132 (5.5) RSS-133 (6.5)	Field Strength of Spurious Radiation	$< 43 + 10 \log_{10}(P[\text{Watts}])$	PASS	Under limit 23.71 dB at 3819.000 MHz



1 General Description

1.1 Applicant

BlackBerry Limited

2300 University Street East, Waterloo, ON., CAN, N2K1A0

1.2 Manufacturer

FIH Mobile Limited

No.4, Mingsheng St., Tu-Cheng Dist., New Taipei City 23679, Taiwan

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Smartphone
Brand Name	BlackBerry
Model Name	RHF142LW
Marketing Name	SQC100-5
FCC ID	L6ARHF140LW
EUT supports Radios application	CDMA/EV-DO/GSM/EGPRS/WCDMA/HSPA/LTE/NFC/WPC/PMA WLAN 11b/g/n (HT20) WLAN 11a/n (HT20/HT40) Bluetooth v4.0 EDR/LE
HW Version	PVT 2
SW Version	BlackBerry 10.3.1.1031 Radio 1032 /SR 10.3.1.663
EUT Stage	Identical Prototype

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

1.4 Product Specification subjective to this standard

Product Specification subjective to this standard	
Tx Frequency	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz CDMA2000 BC0: 824.70 MHz ~ 848.31 MHz CDMA2000 BC1: 1851.25 MHz ~ 1908.75 MHz
Rx Frequency	GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz WCDMA Band V: 871.4 MHz ~ 891.6 MHz WCDMA Band II: 1932.4 MHz ~ 1987.6 MHz CDMA2000 BC0: 869.70 MHz ~ 893.31 MHz CDMA2000 BC1: 1931.25 MHz ~ 1988.75 MHz
Maximum Output Power to Antenna	GSM850 : 32.08 dBm GSM1900 : 29.65 dBm
Antenna Type	Coupling type (LDS) Antenna
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE: GMSK / 8PSK WCDMA: QPSK (Uplink) HSDPA: 64QAM (Downlink) HSUPA: QPSK (Uplink) CDMA2000 : QPSK CDMA2000 1xEV-DO : QPSK/8PSK

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

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.	
	TH02-HY	03CH07-HY

1.7 Applicable 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
- FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02
- KDB 648474 D03 Handset Wireless Chargers Battery Covers v01r02

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, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r02 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

Radiated emissions were investigated as following frequency range:

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

All modes and data rates and positions were investigated, and found that EUT with the wireless power charger as the worst case test configuration.

Test modes are chosen to be reported as the worst case configuration below:

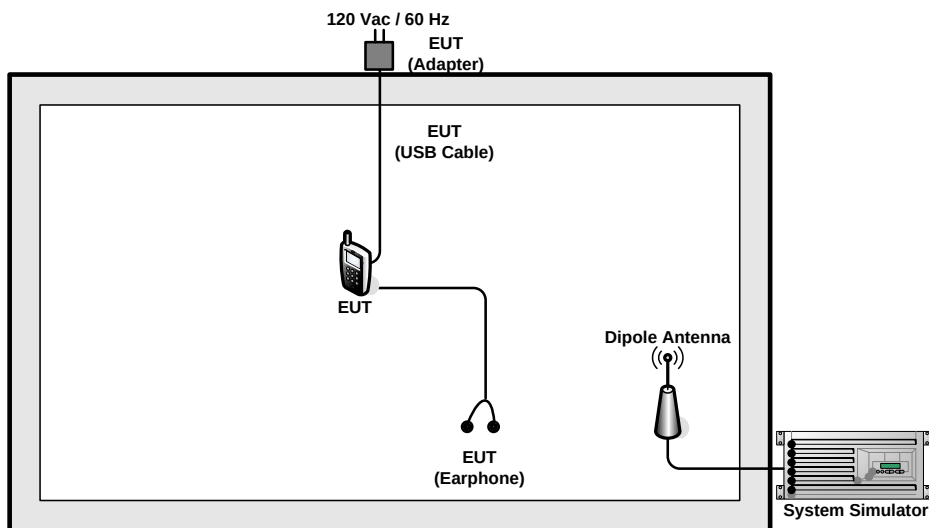
Test Modes	
Band	Radiated TCs
GSM 850	■ GPRS class 8 Link + USB Cable1 (Charging from Adapter 5)
GSM 1900	■ GPRS class 8 Link + USB Cable1 (Charging from Adapter 5) + Earphone 1

Conducted Power Measurement Results:

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	32.05	32.07	32.02	29.21	29.46	29.51
GPRS class 8	32.07	32.08	32.04	29.20	29.50	29.65
GPRS class 10	29.01	29.05	29.00	27.81	28.10	28.16
GPRS class 11	28.64	28.68	28.10	25.40	25.53	25.71
GPRS class 12	26.32	26.32	26.01	24.88	24.92	25.15
EGPRS class 8	25.62	25.58	25.51	25.01	25.12	25.29
EGPRS class 10	25.64	25.59	25.52	24.48	24.63	24.81
EGPRS class 11	24.11	24.05	24.04	23.47	23.60	23.78
EGPRS class 12	23.07	23.08	23.01	22.43	22.58	22.79

2.2 Connection Diagram of Test System

<EUT with Adapter Mode>



2.3 Support Unit used in test configuration

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m

3 Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

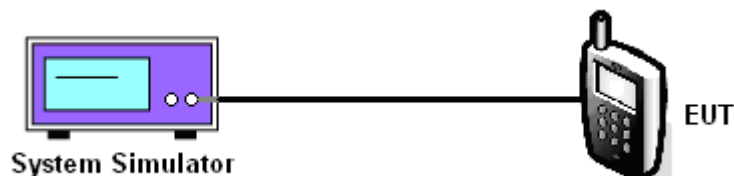
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.

3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

Cellular Band						
Modes	GSM850 (GPRS class 8)			GSM850 (EDGE class 8)		
Channel	128 (Low)	189 (Mid)	251 (High)	128 (Low)	189 (Mid)	251 (High)
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8
Conducted Power (dBm)	32.07	32.08	32.04	25.64	25.59	25.52

PCS Band						
Modes	GSM1900 (GPRS class 8)			GSM1900 (EDGE class 8)		
Channel	512 (Low)	661 (Mid)	810 (High)	512 (Low)	661 (Mid)	810 (High)
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8
Conducted Power (dBm)	29.20	29.50	29.65	25.01	25.12	25.29

Note: maximum burst average power for GSM, and maximum average power for WCDMA.



3.2 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

3.2.1 Description of the ERP/EIRP Measurement

The substitution method, in ANSI / TIA / EIA-603-C-2004, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r02. The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts.

3.2.2 Measuring Instruments

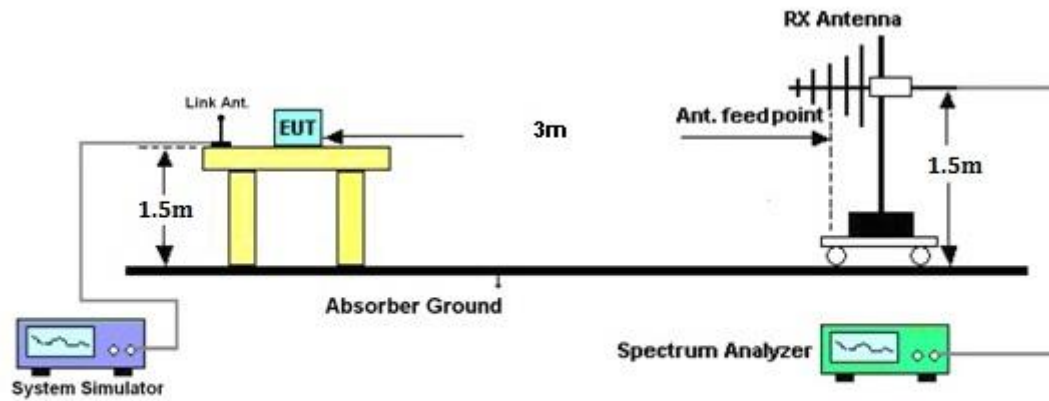
The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 5.2.1. (for CDMA/WCDMA), Section 5.2.2.2 (for GSM/GPRS/EDGE) and ANSI / TIA-603-C-2004 Section 2.2.17.
2. The EUT was placed on a turntable 1.5 meters high in a fully anechoic chamber.
3. The EUT was placed 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. GSM operating modes: Set RBW= 1MHz, VBW= 3MHz, RMS detector over burst;
UMTS operating modes: Set RBW= 100 kHz, VBW= 300 kHz, RMS detector over frame, and use channel power option with bandwidth=5MHz, per KDB 971168 D01.
5. The table was rotated 360 degrees to determine the position of the highest radiated power.
6. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.
7. Taking the record of maximum ERP/EIRP.
8. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
9. The conducted power at the terminal of the dipole antenna is measured.
10. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.
11. $ERP/EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$
 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.

	GSM/GPRS/EDGE	CDMA2000/EV-DO	WCDMA/HSPA
SPAN	500kHz	3MHz	10MHz
RBW	10kHz	30kHz	100kHz
VBW	30kHz	100kHz	300kHz
Detector	RMS	RMS	RMS
Trace	Average	Average	Average
Average Type	Power	Power	Power
Sweep Count	100	100	100

3.2.4 Test Setup



3.2.5 Test Result of ERP

GSM850 (GPRS class 8) Radiated Power ERP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-19.30	-48.12	0.00	-1.08	27.74	0.5936
836.40	-19.25	-48.28	0.00	-0.93	28.10	0.6455
848.80	-19.11	-48.35	0.00	-0.76	28.48	0.7044
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-27.44	-47.97	0.00	-1.08	19.45	0.0881
836.40	-27.63	-48.01	0.00	-0.93	19.45	0.0881
848.80	-28.14	-48.05	0.00	-0.76	19.15	0.0823

GSM850 (EDGE class 8) Radiated Power ERP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-25.74	-48.12	0.00	-1.08	21.30	0.1348
836.40	-26.11	-48.28	0.00	-0.93	21.24	0.1330
848.80	-25.99	-48.35	0.00	-0.76	21.60	0.1446
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-33.20	-47.97	0.00	-1.08	13.69	0.0234
836.40	-33.52	-48.01	0.00	-0.93	13.56	0.0227
848.80	-34.48	-48.05	0.00	-0.76	12.81	0.0191



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	-28.45	-48.12	0.00	-1.08	18.59	0.0722
836.40	-28.33	-48.28	0.00	-0.93	19.02	0.0798
846.60	-28.33	-48.35	0.00	-0.76	19.26	0.0844
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
826.40	-35.31	-47.97	0.00	-1.08	11.58	0.0144
836.40	-36.52	-48.01	0.00	-0.93	10.56	0.0114
846.60	-37.08	-48.05	0.00	-0.76	10.21	0.0105

CDMA2000 BC0 1xRTT_RC3+SO32 Radiated Power ERP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.70	-29.48	-48.12	0.00	-1.08	17.56	0.06
836.52	-30.47	-48.28	0.00	-0.93	16.88	0.05
848.31	-30.22	-48.35	0.00	-0.76	17.37	0.05
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.70	-34.15	-47.97	0.00	-1.08	12.74	0.02
836.52	-34.54	-48.01	0.00	-0.93	12.54	0.02
848.31	-34.82	-48.05	0.00	-0.76	12.47	0.02

3.2.6 Test Result of EIRP

GSM1900 (GPRS class 8) Radiated Power EIRP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-25.03	-51.88	0.00	1.96	28.81	0.7602
1880.00	-25.84	-52.99	0.00	2.00	29.15	0.8223
1909.80	-26.68	-54.28	0.00	1.98	29.58	0.9074
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-25.68	-52.13	0.00	1.96	28.41	0.6932
1880.00	-26.49	-53.17	0.00	2.00	28.68	0.7380
1909.80	-27.87	-54.13	0.00	1.98	28.24	0.6664

GSM1900 (EDGE class 8) Radiated Power EIRP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-29.36	-51.88	0.00	1.96	24.48	0.2803
1880.00	-30.23	-52.99	0.00	2.00	24.76	0.2992
1909.80	-31.39	-54.28	0.00	1.98	24.87	0.3069
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-29.63	-52.13	0.00	1.96	24.46	0.2794
1880.00	-30.49	-53.17	0.00	2.00	24.68	0.2940
1909.80	-32.92	-54.13	0.00	1.98	23.19	0.2084



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	-31.32	-51.88	0.00	1.96	22.52	0.1786
1880.00	-31.80	-52.99	0.00	2.00	23.19	0.2084
1907.60	-33.17	-54.28	0.00	1.98	23.09	0.2038
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1852.40	-31.52	-52.13	0.00	1.96	22.57	0.1806
1880.00	-32.36	-53.17	0.00	2.00	22.81	0.1912
1907.60	-33.51	-54.13	0.00	1.98	22.60	0.1818

CDMA2000 BC1 1xRTT_RC3+SO55 Radiated Power EIRP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1851.25	-31.30	-51.88	0.00	1.96	22.54	0.18
1880.00	-32.24	-52.99	0.00	2.00	22.75	0.19
1908.75	-33.50	-54.28	0.00	1.98	22.76	0.19
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1851.25	-33.28	-52.13	0.00	1.96	20.81	0.12
1880.00	-33.86	-53.17	0.00	2.00	21.31	0.14
1908.75	-34.95	-54.13	0.00	1.98	21.16	0.13

3.3 Field Strength of Spurious Radiation Measurement

3.3.1 Description of Field Strength of Spurious Radiated Measurement

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.

3.3.2 Measuring Instruments

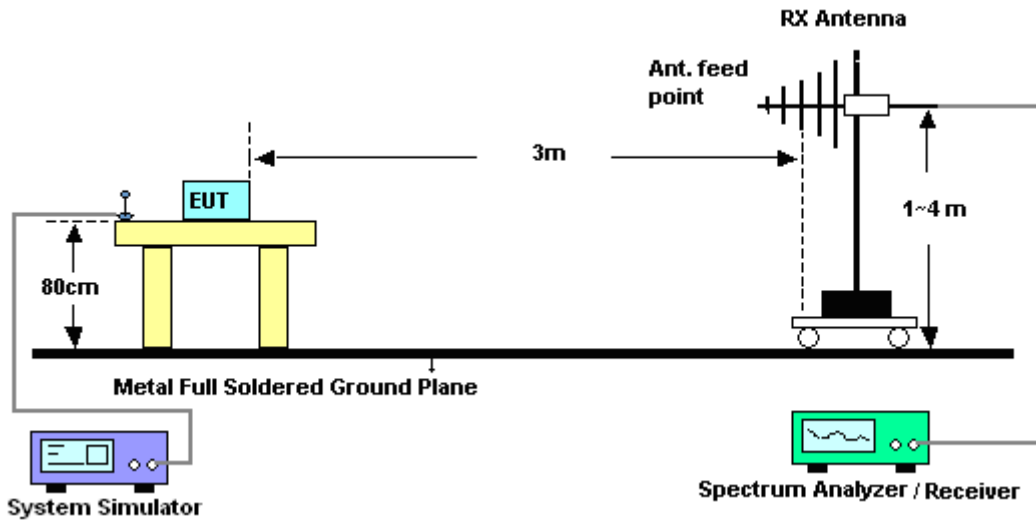
The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

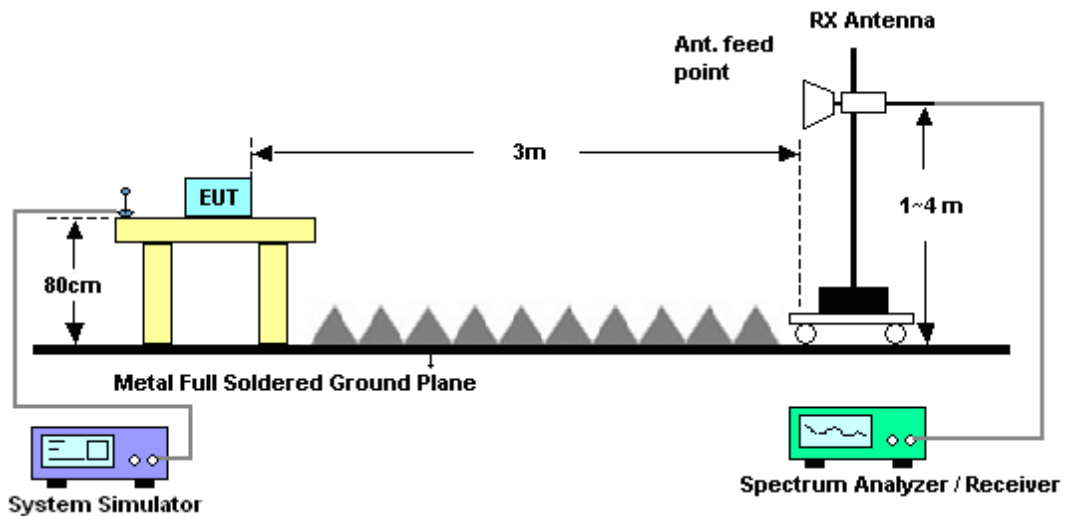
1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-C-2004 Section 2.2.12.
2. The EUT was placed on a rotatable wooden table 0.8 meters above the ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
12. $ERP \text{ (dBm)} = EIRP - 2.15$
13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
14. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$

3.3.4 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.3.5 Test Result of Field Strength of Spurious Radiated

<Low Channel>

Band :	GSM850	Temperature :	23~25°C						
Test Mode :	GPRS class 8 Link (GMSK)	Relative Humidity :	46~48%						
Test Engineer :	Eric Shih, Ken Wu and Derreck Chen	Polarization :	Horizontal						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit	Reading	Power	loss	Gain	(H/V)	
(dB)	(dB)	(dB)	(dB)	(dBm)	(dBm)	(dB)	(dBi)		
1648	-38.47	-13	-25.47	-51.05	-40.23	0.98	4.89	H	Pass
2472	-49.48	-13	-36.48	-67.17	-51.36	1.28	5.32	H	Pass
3298	-57.86	-13	-44.86	-77	-61.28	1.54	7.11	H	Pass

Band :	GSM850	Temperature :	23~25°C						
Test Mode :	GPRS class 8 Link (GMSK)	Relative Humidity :	46~48%						
Test Engineer :	Eric Shih, Ken Wu and Derreck Chen	Polarization :	Vertical						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit	Reading	Power	loss	Gain	(H/V)	
(dB)			(dB)	(dBm)	(dBm)	(dB)	(dBi)		
1648	-42.87	-13	-29.87	-54.24	-44.63	0.98	4.89	V	Pass
2472	-53.77	-13	-40.77	-69.14	-55.65	1.28	5.32	V	Pass
3298	-59.61	-13	-46.61	-77	-63.03	1.54	7.11	V	Pass



<Middle Channel>

Band :	GSM850					Temperature :	23~25°C		
Test Mode :	GPRS class 8 Link (GMSK)					Relative Humidity :	46~48%		
Test Engineer :	Eric Shih, Ken Wu and Derreck Chen					Polarization :	Horizontal		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1672	-41.95	-13	-28.95	-54.39	-43.63	0.99	4.82	H	Pass
2512	-49.52	-13	-36.52	-67.03	-51.49	1.29	5.41	H	Pass
3344	-58.47	-13	-45.47	-77.27	-62.08	1.56	7.31	H	Pass

Band :	GSM850					Temperature :	23~25°C		
Test Mode :	GPRS class 8 Link (GMSK)					Relative Humidity :	46~48%		
Test Engineer :	Eric Shih, Ken Wu and Derreck Chen					Polarization :	Vertical		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1672	-45.68	-13	-32.68	-57.11	-47.36	0.99	4.82	V	Pass
2512	-51.69	-13	-38.69	-67.73	-53.66	1.29	5.41	V	Pass
3344	-59.51	-13	-46.51	-77.24	-63.12	1.56	7.31	V	Pass



<High Channel>

Band :	GSM850	Temperature :	23~25°C						
Test Mode :	GPRS class 8 Link (GMSK)	Relative Humidity :	46~48%						
Test Engineer :	Eric Shih, Ken Wu and Derreck Chen	Polarization :	Horizontal						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1696	-46.76	-13	-33.76	-59.82	-48.36	1.00	4.75	H	Pass
2544	-54.33	-13	-41.33	-72.12	-56.31	1.30	5.44	H	Pass
3393	-58.51	-13	-45.51	-77.15	-62.32	1.57	7.53	H	Pass

Band :	GSM850	Temperature :	23~25°C						
Test Mode :	GPRS class 8 Link (GMSK)	Relative Humidity :	46~48%						
Test Engineer :	Eric Shih, Ken Wu and Derreck Chen	Polarization :	Vertical						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1696	-48.72	-13	-35.72	-60.2	-50.32	1.00	4.75	V	Pass
2544	-55.98	-13	-42.98	-71.58	-57.96	1.30	5.44	V	Pass
3393	-59.74	-13	-46.74	-77.18	-63.55	1.57	7.53	V	Pass



<Low Channel>

Band :	GSM1900					Temperature :	23~25°C		
Test Mode :	GPRS class 8 Link (GMSK)					Relative Humidity :	46~48%		
Test Engineer :	Eric Shih, Ken Wu and Derreck Chen					Polarization :	Horizontal		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3700	-43.82	-13	-30.82	-64.26	-50.39	1.67	8.24	H	Pass
5548	-47.20	-13	-34.20	-70.76	-54.27	2.65	9.72	H	Pass
7403	-40.48	-13	-27.48	-67.86	-49.63	2.46	11.61	H	Pass

Band :	GSM1900	Temperature :	23~25°C						
Test Mode :	GPRS class 8 Link (GMSK)	Relative Humidity :	46~48%						
Test Engineer :	Eric Shih, Ken Wu and Derreck Chen	Polarization :	Vertical						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over Limit	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	loss	Gain	(H/V)	
3700	-37.82	-13	-24.82	-57.04	-44.39	1.67	8.24	V	Pass
5548	-44.62	-13	-31.62	-67.96	-51.69	2.65	9.72	V	Pass
7403	-40.81	-13	-27.81	-66.06	-49.96	2.46	11.61	V	Pass



<Middle Channel>

Band :	GSM1900	Temperature :	23~25°C						
Test Mode :	GPRS class 8 Link (GMSK)	Relative Humidity :	46~48%						
Test Engineer :	Eric Shih, Ken Wu and Derreck Chen	Polarization :	Horizontal						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3756	-39.70	-13	-26.70	-59.97	-46.32	1.68	8.31	H	Pass
5639	-45.16	-13	-32.16	-68.81	-52.21	2.71	9.76	H	Pass
7522	-43.00	-13	-30.00	-70.52	-52.39	2.42	11.81	H	Pass

Band :	GSM1900	Temperature :	23~25°C						
Test Mode :	GPRS class 8 Link (GMSK)	Relative Humidity :	46~48%						
Test Engineer :	Eric Shih, Ken Wu and Derreck Chen	Polarization :	Vertical						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over Limit	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	loss	Gain	(H/V)	
3756	-38.77	-13	-25.77	-58.12	-45.39	1.68	8.31	V	Pass
5639	-41.27	-13	-28.27	-64.5	-48.32	2.71	9.76	V	Pass
7522	-42.26	-13	-29.26	-68.31	-51.65	2.42	11.81	V	Pass



<High Channel>

Band :	GSM1900					Temperature :	23~25°C		
Test Mode :	GPRS class 8 Link (GMSK)					Relative Humidity :	46~48%		
Test Engineer :	Eric Shih, Ken Wu and Derreck Chen					Polarization :	Horizontal		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3819	-58.50	-13	-45.50	-78.97	-65.18	1.70	8.38	H	Pass
5730	-50.60	-13	-37.60	-74.3	-57.63	2.76	9.79	H	Pass
7641	-49.02	-13	-36.02	-76.76	-58.52	2.38	11.88	H	Pass

Band :	GSM1900					Temperature :		23~25°C	
Test Mode :	GPRS class 8 Link (GMSK)					Relative Humidity :		46~48%	
Test Engineer :	Eric Shih, Ken Wu and Derreck Chen					Polarization :		Vertical	
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over Limit	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	(dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3819	-36.71	-13	-23.71	-56.28	-43.39	1.70	8.38	V	Pass
5730	-38.83	-13	-25.83	-61.41	-45.86	2.76	9.79	V	Pass
7641	-39.46	-13	-26.46	-65.43	-48.96	2.38	11.88	V	Pass



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
System Simulator	Rohde & Schwarz	CMU200	117995	N/A	Jul. 29, 2014	Nov. 22, 2014	Jul. 28, 2015	Conducted (TH02-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV30	101749	10Hz ~ 30GHz	Feb. 10, 2014	Dec. 13, 2014	Feb. 09, 2015	Radiation (03CH07-HY)
Bilog Antenna	Schaffner	CBL6111C	2726	30MHz ~ 1GHz	Sep. 27, 2014	Dec. 13, 2014	Sep. 26, 2015	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	75962	1GHz~18GHz	Aug. 19, 2014	Dec. 13, 2014	Aug. 18, 2015	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10 MHz ~ 1000MHz	Mar. 17, 2014	Dec. 13, 2014	Mar. 16, 2015	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1 GHz~26.5 GHz	Oct. 21, 2014	Dec. 13, 2014	Oct. 20, 2015	Radiation (03CH07-HY)
Turn Table	ChainTek	ChainTek 3000	N/A	0 ~ 360 degree	N/A	Dec. 13, 2014	N/A	Radiation (03CH07-HY)
Antenna Mast	ChainTek	M-400-0	114/8000604/	N/A	N/A	Dec. 13, 2014	N/A	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA917025 1	18GHz~40GHz	Oct. 02, 2014	Dec. 13, 2014	Oct. 01, 2015	Radiation (03CH07-HY)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.50
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Appendix B. Original Report

Please refer to Sporton report number FG471526A as below.