



FCC RF Test Report

APPLICANT : BlackBerry Limited
EQUIPMENT : Smartphone
BRAND NAME : BlackBerry
MODEL NAME : RHE151LW
MARKETING NAME : SQC100-2
FCC ID : L6ARHE150LW
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Jul. 15, 2014 and testing was completed on Oct. 04, 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



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FCC ID : L6ARHE150LW

Page Number : 1 of 31

Report Issued Date : Nov. 11, 2014

Report Version : Rev. 01

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TABLE OF CONTENTS

REVISION HISTORY	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant.....	5
1.2 Manufacturer	5
1.3 Product Feature of Equipment Under Test	5
1.4 Product Specification subjective to this standard	6
1.5 Modification of EUT	6
1.6 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator	7
1.7 Testing Location	7
1.8 Applicable Standards	8
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	9
2.1 Test Mode.....	9
2.2 Connection Diagram of Test System	11
2.3 Support Unit used in test configuration	11
3 TEST RESULT	12
3.1 Effective Radiated Power and Effective Isotropic Radiated Power Measurement	12
3.2 Field Strength of Spurious Radiation Measurement	16
4 LIST OF MEASURING EQUIPMENT	30
5 UNCERTAINTY OF EVALUATION	31
APPENDIX A. SETUP PHOTOGRAPHS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG471524A	Rev. 01	Initial issue of report	Nov. 11, 2014



SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
-	§2.1046	RSS-132 (5.4) RSS-133 (6.4)	Conducted Output Power	N/A	Not Performed	Please refer to Sporton Report No. : FG471420A
-	§24.232(d)	RSS-132 (5.4) RSS-133(6.4)	Peak-to-Average Ratio	<13 dB	Not Performed	Please refer to Sporton Report No. : FG471420A
3.1	§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	-
-	§2.1049 §22.917(b) §24.238(b)	RSS-GEN(4.6.1) RSS-133(2.3)	Occupied Bandwidth	N/A	Not Performed	Please refer to Sporton Report No. : FG471420A
-	§2.1051 §22.917(a) §24.238(a)	RSS-132 (5.5) RSS-133 (6.5)	Band Edge Measurement	< 43+10log10(P[Watts])	Not Performed	Please refer to Sporton Report No. : FG471420A
-	§2.1051 §22.917(a) §24.238(a)	RSS-132 (5.5) RSS-133 (6.5)	Conducted Spurious Emission	< 43+10log10(P[Watts])	Not Performed	Please refer to Sporton Report No. : FG471420A
3.2	§2.1053 §22.917(a) §24.238(a)	RSS-132 (5.5) RSS-133 (6.5)	Field Strength of Spurious Radiation	< 43+10log10(P[Watts])	PASS	Under limit 15.30 dB at 7641.000 MHz
-	§2.1055 §22.355	RSS-132(5.3)	Frequency Stability for Temperature & Voltage	< 2.5 ppm for Part 22 Within Authorized Band	Not Performed	Please refer to Sporton Report No. : FG471420A
	§2.1055 §24.235	RSS-133(6.3)				



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	RHE151LW
Marketing Name	SQC100-2
FCC ID	L6ARHE150LW
IMEI Code	004401139984195
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA/LTE/NFC WLAN 11b/g/n HT20 WLAN 11a/n HT20/HT40 Bluetooth v4.0 EDR/LE
HW Version	PVT 2
SW Version	BlackBerry 10.3.1.565/566
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
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
Maximum Output Power to Antenna	GSM850 : 33.49 dBm GSM1900 : 30.50 dBm WCDMA Band V : 24.21 dBm WCDMA Band II : 24.12 dBm
Antenna Type	Coupling type (LDS) Antenna
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE: GMSK / 8PSK WCDMA: QPSK (Uplink) HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink)

1.5 Modification of EUT

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

1.6 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation	Maximum ERP/EIRP (W)
Part 22	GSM850 GPRS class 8	GMSK	0.65
Part 22	WCDMA Band V RMC 12.2Kbps	QPSK	0.09
Part 24	GSM1900 GPRS class 8	GMSK	0.85
Part 24	WCDMA Band II RMC 12.2Kbps	QPSK	0.24

1.7 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



1.8 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 v02r01
- ♦ 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 v02r01 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 and WCDMA Band V.
2. 30 MHz to 19000 MHz for GSM1900 and WCDMA Band II.

All modes and data rates and positions were investigated, and found that EUT without the wireless power charger as the worst case test configuration.

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

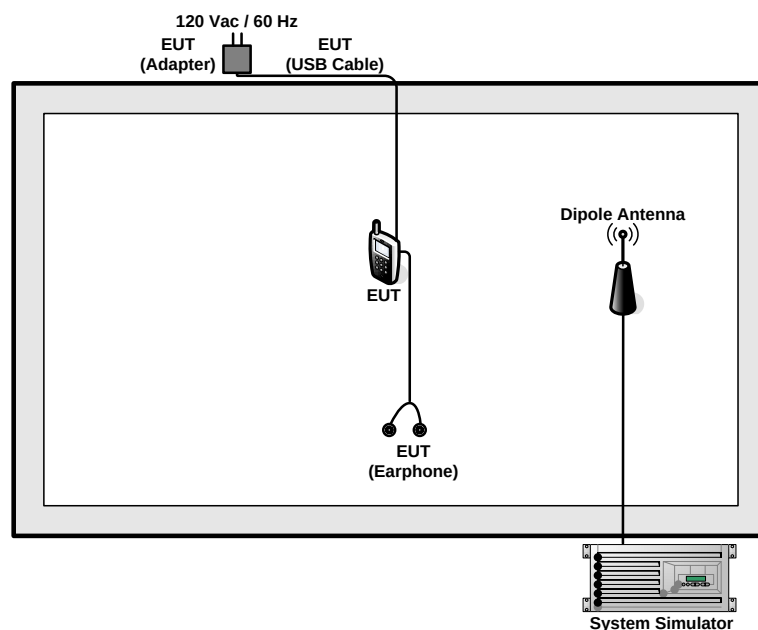
Test Modes	
Band	Radiated TCs
GSM 850	■ GPRS class 8 Link
GSM 1900	■ GPRS class 8 Link
WCDMA Band V	■ RMC 12.2Kbps Link
WCDMA Band II	■ RMC 12.2Kbps Link

**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	33.33	33.36	33.33	30.14	30.23	30.22
GPRS class 8	33.36	33.43	33.49	30.24	30.50	30.39
GPRS class 10	30.33	30.62	30.77	29.10	29.00	29.11
GPRS class 11	29.07	29.23	29.37	26.36	26.54	26.56
GPRS class 12	27.61	27.50	27.76	25.75	25.94	25.95
EGPRS class 8	27.29	27.32	27.37	26.40	26.62	26.76
EGPRS class 10	27.09	27.16	27.23	25.68	25.78	26.00
EGPRS class 11	25.27	24.40	25.53	24.64	24.72	24.96
EGPRS class 12	24.18	24.16	24.31	23.47	23.56	23.75

Conducted Power (*Unit: dBm)						
Band	WCDMA Band V			WCDMA Band II		
Channel	4132	4182	4233	9262	9400	9538
Frequency	826.4	836.4	846.6	1852.4	1880.0	1907.6
RMC 12.2K	24.09	23.99	24.21	24.12	23.78	23.98
HSDPA Subtest-1	23.97	24.07	24.15	24.06	24.09	24.08
HSDPA Subtest-2	23.25	23.26	23.41	23.66	24.08	23.90
HSDPA Subtest-3	23.29	23.26	23.37	23.74	24.04	23.88
HSDPA Subtest-4	22.79	22.70	22.87	23.25	23.58	23.38
HSUPA Subtest-1	22.62	23.20	22.64	23.43	23.40	23.43
HSUPA Subtest-2	21.80	21.53	22.12	22.31	22.32	22.55
HSUPA Subtest-3	21.90	21.50	21.64	22.00	22.00	22.07
HSUPA Subtest-4	22.32	22.24	22.25	22.54	23.10	22.67
HSUPA Subtest-5	22.81	22.86	23.06	23.30	23.64	23.58

2.2 Connection Diagram of Test System



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 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

3.1.1 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 v02r01. The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts.

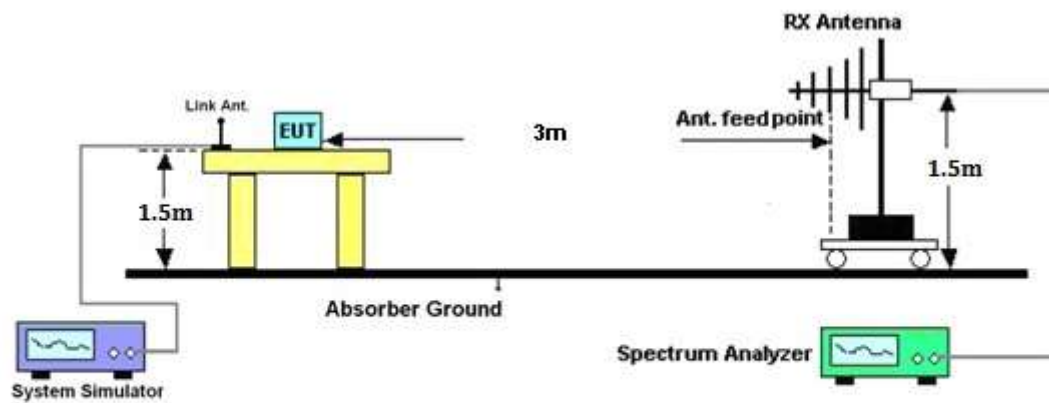
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r01 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.

3.1.4 Test Setup





3.1.5 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	-18.93	-48.12	0.00	-1.08	28.11	0.65
836.40	-19.50	-48.28	0.00	-0.93	27.85	0.61
848.80	-19.73	-48.35	0.00	-0.76	27.86	0.61
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-27.66	-47.97	0.00	-1.08	19.23	0.08
836.40	-27.77	-48.01	0.00	-0.93	19.31	0.09
848.80	-27.69	-48.05	0.00	-0.76	19.60	0.09

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	-27.53	-48.12	0.00	-1.08	19.51	0.09
836.40	-27.84	-48.28	0.00	-0.93	19.51	0.09
846.60	-27.92	-48.35	0.00	-0.76	19.67	0.09
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
826.40	-36.61	-47.97	0.00	-1.08	10.28	0.01
836.40	-37.02	-48.01	0.00	-0.93	10.06	0.01
846.60	-37.60	-48.05	0.00	-0.76	9.69	0.01



3.1.6 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	-25.02	-51.88	0.00	1.96	28.82	0.76
1880.00	-25.92	-52.99	0.00	2.00	29.07	0.81
1909.80	-26.98	-54.28	0.00	1.98	29.28	0.85
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-26.69	-52.13	0.00	1.96	27.40	0.55
1880.00	-27.69	-53.17	0.00	2.00	27.48	0.56
1909.80	-28.22	-54.13	0.00	1.98	27.89	0.62

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	-30.06	-51.88	0.00	1.96	23.78	0.24
1880.00	-31.21	-52.99	0.00	2.00	23.78	0.24
1907.60	-32.47	-54.28	0.00	1.98	23.79	0.24
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1852.40	-31.17	-52.13	0.00	1.96	22.92	0.20
1880.00	-32.34	-53.17	0.00	2.00	22.83	0.19
1907.60	-33.28	-54.13	0.00	1.98	22.83	0.19



3.2 Field Strength of Spurious Radiation Measurement

3.2.1 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.

3.2.2 Measuring Instruments

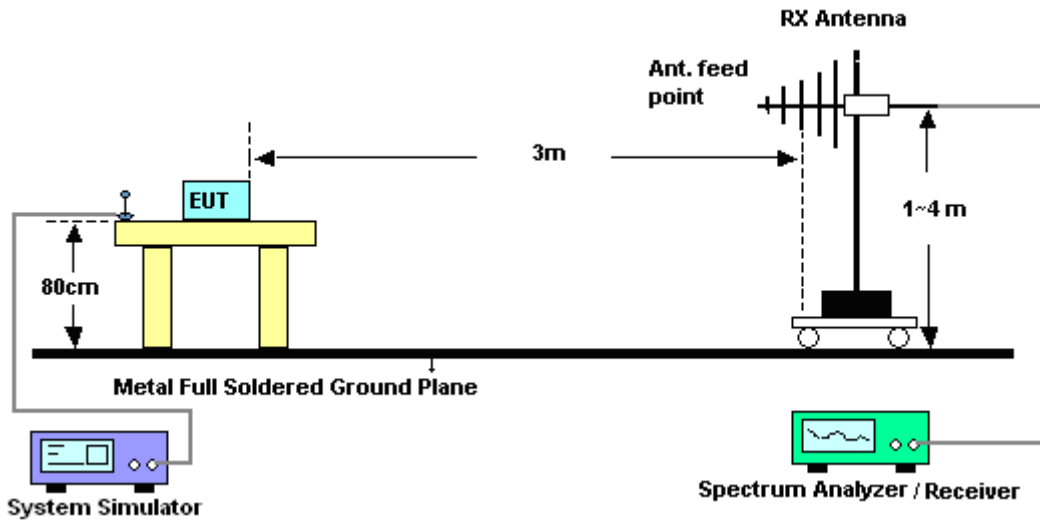
The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

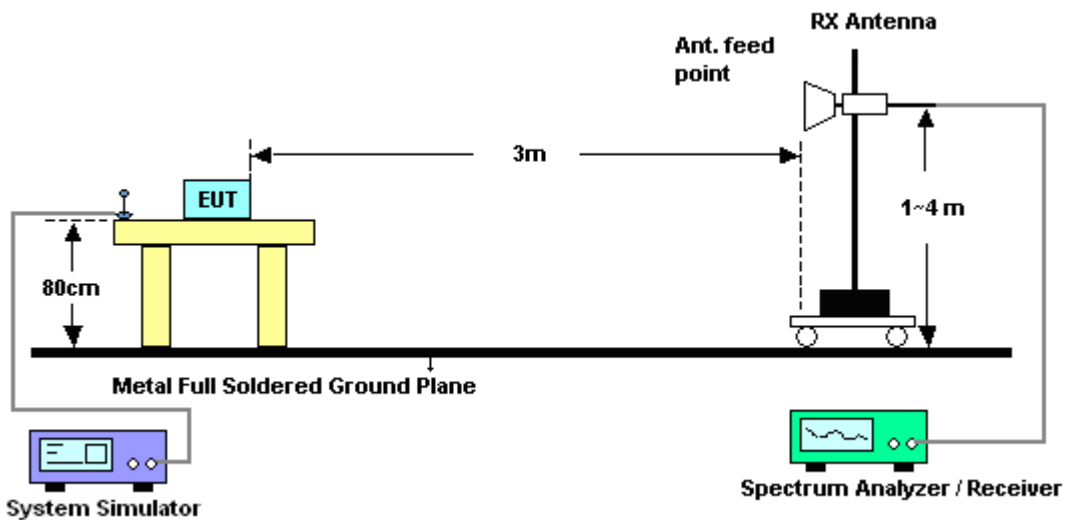
1. The testing follows FCC KDB 971168 v02r01 Section 5.8 and ANSI / TIA-603-C-2004 Section 2.2.12.
2. The EUT was placed on a rotatable wooden table 0.8 meters above the ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 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)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$

3.2.4 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





3.2.5 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 :	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
			Limit	Reading	Power	loss	Gain		
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
1648	-39.04	-13	-26.04	-50.34	-40.8	0.98	4.89	H	Pass
2472	-42.32	-13	-29.32	-58.61	-44.2	1.28	5.32	H	Pass
3298	-49.48	-13	-36.48	-66.24	-52.9	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 :	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)	
1648	-39.54	-13	-26.54	-53.08	-41.3	0.98	4.89	V	Pass
2472	-44.02	-13	-31.02	-60.19	-45.9	1.28	5.32	V	Pass
3298	-49.08	-13	-36.08	-67.42	-52.5	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 :	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	-40.82	-13	-27.82	-52.22	-42.5	0.99	4.82	H	Pass
2512	-43.93	-13	-30.93	-59.83	-45.9	1.29	5.41	H	Pass
3345	-49.89	-13	-36.89	-66.59	-53.5	1.56	7.32	H	Pass

Band :	GSM850					Temperature :	23~25°C		
Test Mode :	GPRS class 8 Link (GMSK)					Relative Humidity :	46~48%		
Test Engineer :	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	-39.22	-13	-26.22	-53.23	-40.9	0.99	4.82	V	Pass
2512	-45.53	-13	-32.53	-61.71	-47.5	1.29	5.41	V	Pass
3345	-48.89	-13	-35.89	-67.05	-52.5	1.56	7.32	V	Pass

**<High Channel>**

Band :	GSM850				Temperature :	23~25°C			
Test Mode :	GPRS class 8 Link (GMSK)				Relative Humidity :	46~48%			
Test Engineer :	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	-38.00	-13	-25.00	-49.71	-39.6	1.00	4.75	H	Pass
2544	-40.02	-13	-27.02	-55.91	-42	1.30	5.44	H	Pass
3393	-49.99	-13	-36.99	-66.87	-53.8	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 :	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	-36.90	-13	-23.90	-50.92	-38.5	1.00	4.75	V	Pass
2544	-44.22	-13	-31.22	-60.92	-46.2	1.30	5.44	V	Pass
3393	-47.99	-13	-34.99	-66.09	-51.8	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 :	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
			Limit	Reading	Power	loss	Gain		
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
3700	-47.73	-13	-34.73	-65.52	-54.3	1.67	8.24	H	Pass
5548	-43.23	-13	-30.23	-66.09	-50.3	2.65	9.72	H	Pass
7401	-36.36	-13	-23.36	-66.52	-45.5	2.46	11.60	H	Pass

Band :	GSM1900					Temperature :	23~25℃		
Test Mode :	GPRS class 8 Link (GMSK)					Relative Humidity :	46~48%		
Test Engineer :	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	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	-48.33	-13	-35.33	-66.97	-54.9	1.67	8.24	V	Pass
5551	-42.53	-13	-29.53	-65.12	-49.6	2.65	9.72	V	Pass
7403	-31.45	-13	-18.45	-60.9	-40.6	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 :	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)	
3760	-50.27	-13	-37.27	-68.22	-56.9	1.69	8.31	H	Pass
5639	-38.45	-13	-25.45	-61.71	-45.5	2.71	9.76	H	Pass
7522	-32.11	-13	-19.11	-62.45	-41.5	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 :	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)	
3760	-48.27	-13	-35.27	-67.52	-54.9	1.69	8.31	V	Pass
5639	-35.05	-13	-22.05	-58.09	-42.1	2.71	9.76	V	Pass
7522	-28.71	-13	-15.71	-58.28	-38.1	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 :	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
			Limit	Reading	Power	loss	Gain		
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
3819	-49.32	-13	-36.32	-67.64	-56	1.70	8.38	H	Pass
5730	-34.47	-13	-21.47	-58.2	-41.5	2.76	9.79	H	Pass
7641	-31.70	-13	-18.70	-60.56	-41.2	2.38	11.88	H	Pass

Band :	GSM1900				Temperature :	23~25℃			
Test Mode :	GPRS class 8 Link (GMSK)				Relative Humidity :	46~48%			
Test Engineer :	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	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	-48.82	-13	-35.82	-67.5	-55.5	1.70	8.38	V	Pass
5730	-33.57	-13	-20.57	-57.03	-40.6	2.76	9.79	V	Pass
7641	-28.30	-13	-15.30	-56.96	-37.8	2.38	11.88	V	Pass



<Low Channel>

Band :	WCDMA Band V					Temperature :	23~25°C		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	46~48%		
Test Engineer :	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
			Limit	Reading	Power	loss	Gain		
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
1648	-47.94	-13	-34.94	-59.21	-49.7	0.98	4.89	H	Pass
2479	-49.60	-13	-36.60	-65.34	-51.5	1.28	5.34	H	Pass
3305	-50.15	-13	-37.15	-66.91	-53.6	1.54	7.14	H	Pass

Band :	WCDMA Band V					Temperature :	23~25°C		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	46~48%		
Test Engineer :	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)	
1648	-44.54	-13	-31.54	-58.23	-46.3	0.98	4.89	V	Pass
2479	-49.90	-13	-36.90	-65.79	-51.8	1.28	5.34	V	Pass
3305	-49.05	-13	-36.05	-67.02	-52.5	1.54	7.14	V	Pass



<Middle Channel>

Band :	WCDMA Band V					Temperature :	23~25°C		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	46~48%		
Test Engineer :	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
			Limit	Reading	Power	loss	Gain		
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
1672	-50.32	-13	-37.32	-61.74	-52	0.99	4.82	H	Pass
2509	-50.14	-13	-37.14	-65.92	-52.1	1.29	5.41	H	Pass
3345	-50.99	-13	-37.99	-67.06	-54.6	1.56	7.32	H	Pass

Band :	WCDMA Band V					Temperature :	23~25℃		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	46~48%		
Test Engineer :	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	-47.62	-13	-34.62	-61.45	-49.3	0.99	4.82	V	Pass
2509	-49.84	-13	-36.84	-66.04	-51.8	1.29	5.41	V	Pass
3345	-47.69	-13	-34.69	-65.96	-51.3	1.56	7.32	V	Pass

**<High Channel>**

Band :	WCDMA Band V					Temperature :	23~25°C		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	46~48%		
Test Engineer :	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
			Limit	Reading	Power	loss	Gain		
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
1693	-45.89	-13	-32.89	-57.47	-47.5	1.00	4.76	H	Pass
2540	-50.22	-13	-37.22	-66.31	-52.2	1.30	5.43	H	Pass
3386	-50.32	-13	-37.32	-67.06	-54.1	1.57	7.50	H	Pass

Band :	WCDMA Band V					Temperature :	23~25°C		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	46~48%		
Test Engineer :	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)	
1688	-44.57	-13	-31.57	-58.24	-46.2	1.00	4.77	V	Pass
2540	-49.32	-13	-36.32	-65.61	-51.3	1.30	5.43	V	Pass
3386	-48.72	-13	-35.72	-66.96	-52.5	1.57	7.50	V	Pass



<Low Channel>

Band :	WCDMA Band II					Temperature :	23~25°C		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	46~48%		
Test Engineer :	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
			Limit	Reading	Power	loss	Gain		
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
3707	-47.72	-13	-34.72	-65.57	-54.3	1.67	8.25	H	Pass
5557	-45.44	-13	-32.44	-68.34	-52.5	2.66	9.72	H	Pass
7410	-37.64	-13	-24.64	-67.68	-46.8	2.46	11.62	H	Pass

Band :	WCDMA Band II					Temperature :	23~25℃		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	46~48%		
Test Engineer :	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	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3707	-45.02	-13	-32.02	-63.83	-51.6	1.67	8.25	V	Pass
5557	-45.74	-13	-32.74	-68.23	-52.8	2.66	9.72	V	Pass
7403	-34.15	-13	-21.15	-63.72	-43.3	2.46	11.61	V	Pass



<Middle Channel>

Band :	WCDMA Band II					Temperature :	23~25°C		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	46~48%		
Test Engineer :	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)	
3763	-49.27	-13	-36.27	-67.76	-55.9	1.69	8.32	H	Pass
5640	-43.15	-13	-30.15	-66.38	-50.2	2.71	9.76	H	Pass
7520	-37.71	-13	-24.71	-67.58	-47.1	2.42	11.81	H	Pass

Band :	WCDMA Band II					Temperature :	23~25°C		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	46~48%		
Test Engineer :	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)	
3763	-48.67	-13	-35.67	-67.66	-55.3	1.69	8.32	V	Pass
5640	-44.35	-13	-31.35	-67.48	-51.4	2.71	9.76	V	Pass
7520	-37.81	-13	-24.81	-67.67	-47.2	2.42	11.81	V	Pass



<High Channel>

Band :	WCDMA Band II					Temperature :	23~25°C		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	46~48%		
Test Engineer :	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
			Limit	Reading	Power	loss	Gain		
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
3812	-49.43	-13	-36.43	-67.7	-56.1	1.70	8.37	H	Pass
5723	-44.16	-13	-31.16	-67.79	-51.2	2.75	9.79	H	Pass
7630	-39.81	-13	-26.81	-68.31	-49.3	2.39	11.88	H	Pass

Band :	WCDMA Band II					Temperature :	23~25℃		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	46~48%		
Test Engineer :	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	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3812	-48.93	-13	-35.93	-67.5	-55.6	1.70	8.37	V	Pass
5723	-45.46	-13	-32.46	-68.37	-52.5	2.75	9.79	V	Pass
7630	-40.71	-13	-27.71	-68.8	-50.2	2.39	11.88	V	Pass



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	Rohde & Schwarz	FSV30	101749	10Hz ~ 30GHz	Feb. 10, 2014	Oct. 03, 2014~ Oct. 04, 2014	Feb. 09, 2015	Radiation (03CH07-HY)
Bilog Antenna	Schaffner	CBL6111C	2726	30MHz ~ 1GHz	Oct. 10, 2013	Oct. 03, 2014~ Oct. 04, 2014	Oct. 09, 2014	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	75962	1GHz~18GHz	Aug. 19, 2014	Oct. 03, 2014~ Oct. 04, 2014	Aug. 18, 2015	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10 MHz ~ 1000MHz	Mar. 17, 2014	Oct. 03, 2014~ Oct. 04, 2014	Mar. 16, 2015	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1 GHz~26.5 GHz	Nov. 29, 2013	Oct. 03, 2014~ Oct. 04, 2014	Nov. 28, 2014	Radiation (03CH07-HY)
Turn Table	ChainTek	ChainTek 3000	N/A	0 ~ 360 degree	N/A	Oct. 03, 2014~ Oct. 04, 2014	N/A	Radiation (03CH07-HY)
Antenna Mast	ChainTek	M-400-0	114/8000604	N/A	N/A	Oct. 03, 2014~ Oct. 04, 2014	N/A	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA91702 51	18GHz~40GHz	Oct. 02, 2014	Oct. 03, 2014~ Oct. 04, 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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