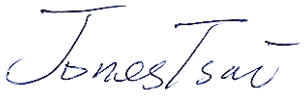
FCC RF Test Report

APPLICANT	:	Verifone, Inc.
EQUIPMENT	:	Point of Sales Terminal
BRAND NAME	:	Verifone
MODEL NAME	:	C680 3G-BT-WiFi
FCC ID	:	B32C6803GBTW
STANDARD	:	FCC 47 CFR Part 2, 22(H), 24(E)
CLASSIFICATION	:	PCS Licensed Transmitter (PCB)

The product was received on Sep. 21, 2016 and testing was completed on Oct. 09, 2016. 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-D-2010 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

Testing Laboratory 1190

SPORTON INTERNATIONAL INC.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG692114	Rev. 01	Initial issue of report	Oct. 24, 2016

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
3.5	§24.232(d)	Peak-to-Average Ratio	< 13 dB	PASS	-
3.6	§2.1049 §22.917(b) §24.238(b)	Occupied Bandwidth	Reporting Only	PASS	-
3.7	§2.1051 §22.917(a) §24.238(a)	Band Edge Measurement	< 43+10log10(P[Watts])	PASS	-
3.8	§2.1051 §22.917(a) §24.238(a)	Conducted Emission	< 43+10log10(P[Watts])	PASS	-
3.9	§2.1055 §22.355	Frequency Stability for Temperature & Voltage	< 2.5 ppm for Part 22	PASS	-
	§2.1055 §24.235		Within Authorized Band		
4.4	§22.913(a)(2)	Effective Radiated Power	< 7 Watts	PASS	-
	§24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
4.5	§2.1053 §22.917(a) §24.238(a)	Field Strength of Spurious Radiation	< 43+10log10(P[Watts])	PASS	Under limit 19.69 dB at 3816.000 MHz

1 General Description

1.1 Applicant

Verifone, Inc.
1400 West Stanford Ranch Road, Suite 100, 150 & 200, Rocklin CA 95765 USA

1.2 Manufacturer

Inventec Appliances (Pudong) Corporation
Building 1 - 3, No.789 Pu Xing Road, Caohejing Export Processing Zone, Shanghai, P.R.C.

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Point of Sales Terminal
Brand Name	Verifone
Model Name	C680 3G-BT-WiFi
FCC ID	B32C6803GBTW
EUT supports Radios application	GPRS/EGPRS/WCDMA/HSPA/RFID WLAN 11b/g/n HT20 WLAN 11a/n HT20/HT40 Bluetooth BR/EDR/LE
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.

Specification of Accessory		
AC Adapter 1	Brand Name	Verifone, Inc.
	Manufacturer	Elementech
	Model Name	A111-3050223U
	Power Rating	Input : 100-240 V AC 50/60Hz, 0.5A Output: 5.0V DC 2.2A
	Power Cord	1.8meter, non-shielded cable, without ferrite core
AC Adapter 2	Brand Name	Verifone, Inc.
	Manufacturer	PHIHONG
	Model Name	AM11A-050A-R
	Power Rating	Input : 100-240 V AC 50/60Hz, 0.5A Output: 5.0V DC 2.2A
	Power Cord	1.8meter, non-shielded cable, without ferrite core
Battery 1	Brand Name	Verifone, Inc.
	Manufacturer	Palladium Energy Inc.
	Model Name	BPK260-001
Battery 2	Brand Name	Verifone, Inc.
	Manufacturer	Panasonic Corporation
	Model Name	BPK260-001

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	**GPRS/EDGE:** 850: 824.2 MHz ~ 848.8 MHz 1900: 1850.2 MHz ~ 1909.8MHz **WCDMA:** Band V: 826.4 MHz ~ 846.6 MHz Band II: 1852.4 MHz ~ 1907.6 MHz
Rx Frequency	**GPRS/EDGE:** 850: 869.2 MHz ~ 893.8 MHz 1900: 1930.2 MHz ~ 1989.8 MHz **WCDMA:** Band V: 871.4 MHz ~ 891.6 MHz Band II: 1932.4 MHz ~ 1987.6 MHz
Maximum Output Power to Antenna	**GPRS/EDGE:** 850: 32.03 dBm 1900: 29.43 dBm **WCDMA:** Band V: 23.25 dBm Band II: 23.00 dBm
Antenna Type	PCB Antenna
Type of Modulation	GPRS: GMSK EDGE: GMSK / 8PSK WCDMA: BPSK (Uplink) HSDPA: 16QAM (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)	Frequency Tolerance (ppm)	Emission Designator
Part 22	GSM850 GPRS class 8	GMSK	1.0399	0.0060 ppm	245KGXW
Part 22	GSM850 EDGE class 8	8PSK	0.2877	0.0036 ppm	245KG7W
Part 22	WCDMA Band V RMC 12.2Kbps	BPSK	0.1413	0.0036 ppm	4M06F9W
Part 24	GSM1900 GPRS class 8	GMSK	1.1117	0.0170 ppm	248KGXW
Part 24	GSM1900 EDGE class 8	8PSK	0.4519	0.0032 ppm	250KG7W
Part 24	WCDMA Band II RMC 12.2Kbps	BPSK	0.2754	0.0032 ppm	4M08F9W

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 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	TH03-HY

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd. Guishan Dist, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH10-HY

1.8 Applicable Standards

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

- 47 CFR Part 2, 22(H), 24(E)
- ANSI / TIA / EIA-603-D-2010
- FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

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:

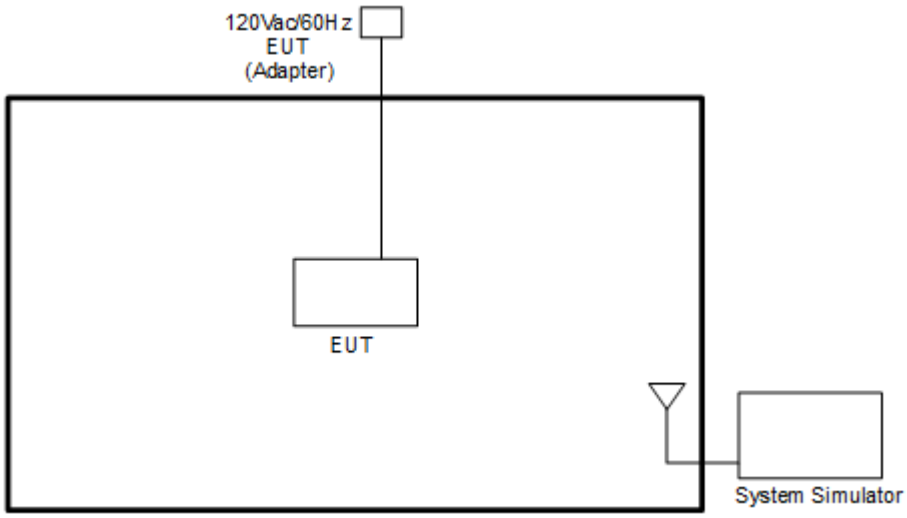
1. 30 MHz to 9000 MHz for GSM850 and WCDMA Band V.
2. 30 MHz to 19100 MHz for GSM1900 and WCDMA Band II.

All modes and data rates and positions were investigated.

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

Test Modes		
Band	**Radiated TCs**	**Conducted TCs**
GSM 850	■ GPRS class 8 Link ■ EDGE class 8 Link	■ GPRS class 8 Link ■ EDGE class 8 Link
GSM 1900	■ GPRS class 8 Link ■ EDGE class 8 Link	■ GPRS class 8 Link ■ EDGE class 8 Link
WCDMA Band V	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link
WCDMA Band II	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link
Remark: For Radiated TCs, the tests were performed with adapter 1 and battery 1.		

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

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

The following shows an offset computation example with RF cable loss 4.2 dB and a 10dB attenuator.

Example :

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

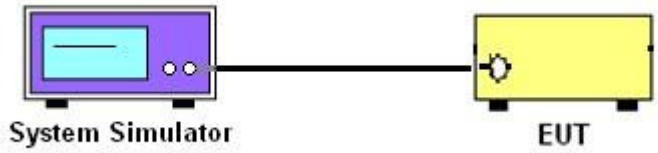
3 Conducted Test Result

3.1 Measuring Instruments

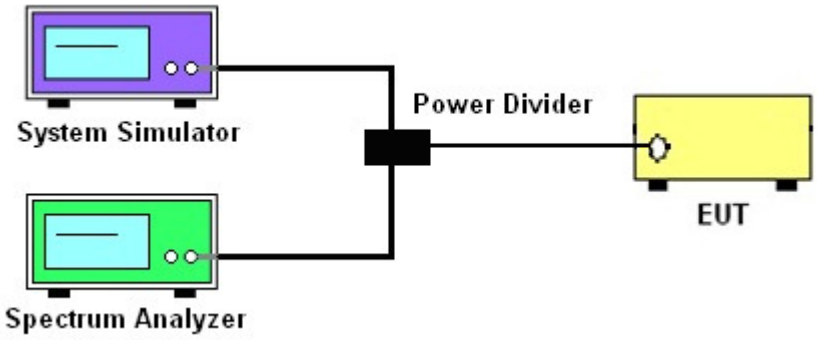
See list of measuring instruments of this test report.

3.2 Test Setup

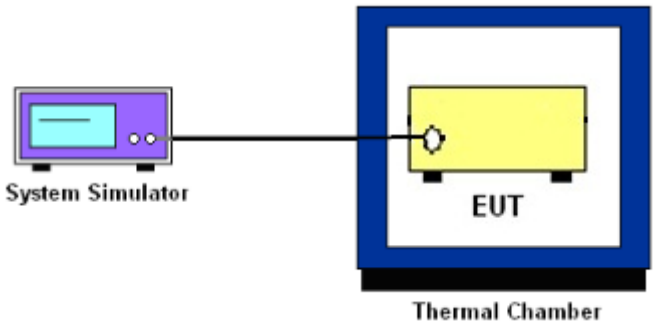
3.2.1 Conducted Output Power



3.2.2 Peak-to-Average Ratio, Occupied Bandwidth, Conducted Band-Edge and Conducted Spurious Emission



3.2.3 Frequency Stability



3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power

3.4.1 Description of the Conducted Output Power

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.

3.4.2 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.

3.5 Peak-to-Average Ratio

3.5.1 Description of the PAR Measurement

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.5.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 v02r02 Section 5.7.1.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. Set EUT to transmit at maximum output power.
4. When the duty cycle is less than 98%, then signal gating will be implemented on the spectrum analyzer by triggering from the system simulator.
5. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer. Record the maximum PAPR level associated with a probability of 0.1%.

3.6 99% Occupied Bandwidth and 26dB Bandwidth Measurement

3.6.1 Description of 99% Occupied Bandwidth and 26dB Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.6.2 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 4.2.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
4. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
5. Set the detection mode to peak, and the trace mode to max hold.
6. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)
7. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
8. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “–X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.7 Conducted Band Edge

3.7.1 Description of Conducted Band Edge Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

3.7.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 v02r02 Section 6.0.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The band edges of low and high channels for the highest RF powers were measured.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)
   =P(W) - [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
   = -13dBm.

3.8 Conducted Spurious Emission

3.8.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10^{th} harmonic.

3.8.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 v02r02 Section 6.0.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

= P(W) - [43 + 10log(P)] (dB)

= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)

= -13dBm.

3.9 Frequency Stability

3.9.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.

3.9.2 Test Procedures for Temperature Variation

1. The testing follows FCC KDB 971168 D01 v02r02 Section 9.0.
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C steps up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.9.3 Test Procedures for Voltage Variation

1. The testing follows FCC KDB 971168 D01 v02r02 Section 9.0.
2. The EUT was placed in a temperature chamber at 20±5° C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
4. The variation in frequency was measured for the worst case.

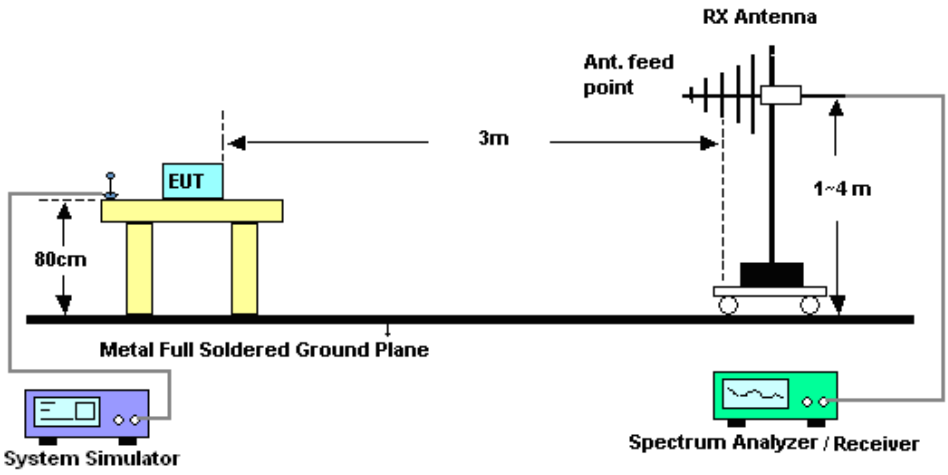
4 Radiated Test Items

4.1 Measuring Instruments

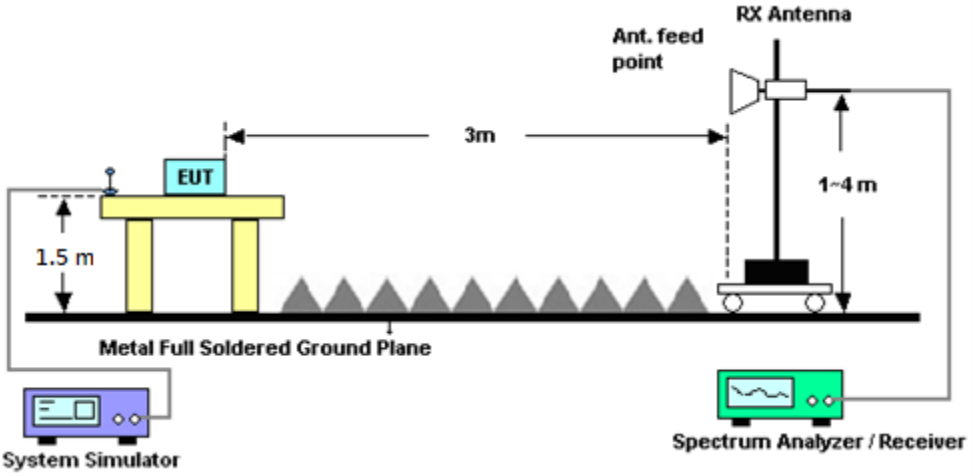
See list of measuring instruments of this test report.

4.2 Test Setup

4.2.1 For radiated test from 30MHz to 1GHz



4.2.2 For radiated test above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

4.4 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

4.4.1 Description of the ERP/EIRP Measurement

The substitution method, in ANSI / TIA / EIA-603-D-2010, 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 (Cellular Band) and the EIRP of mobile transmitters are limited to 2 Watts (PCS Band).

4.4.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 v02r02 Section 5.2.1. (for CDMA/WCDMA), Section 5.2.2.2 (for GSM/GPRS/EDGE) and ANSI / TIA-603-D-2010 Section 2.2.17.
2. The EUT was placed on a non-conductive rotating platform (0.8 meters for frequency below 1GHz and 1.5 meter for frequency above 1GHz) 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 RMS detector per section 5. of KDB 971168 D01.
3. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power. The maximum 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.
4. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-D. The EUT was replaced by the 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. Take the record of the output power at substitution antenna.

	GPRS/EDGE	WCDMA/HSPA
SPAN	500kHz	10MHz
RBW	10kHz	100kHz
VBW	30kHz	300kHz
Detector	RMS	RMS
Trace	Average	Average
Average Type	Power	Power
Sweep Count	100	100

4.5 Field Strength of Spurious Radiation Measurement

4.5.1 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.

4.5.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 v02r02 Section 5.8 and ANSI / TIA-603-D-2010 Section 2.2.12.
2. The EUT was placed on a rotatable wooden table 0.8 meters for frequency below 1GHz and 1.5 meter for frequency above 1GHz 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 (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
12. ERP (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 + 10log(P) dB below the transmitter power P(Watts)

    = P(W) - [43 + 10log(P)] (dB)

    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)

    = -13dBm.

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	Rohde & Schwarz	FSP30	101329	9kHz~30GHz	Jun. 27, 2016	Oct. 09, 2016	Jun. 26, 2017	Conducted (TH03-HY)
Temperature Chamber	ESPEC	SU-641	92013721	-30℃ ~70℃	Nov. 20, 2015	Oct. 09, 2016	Nov. 19, 2016	Conducted (TH03-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL883644	Voltage:0~20V;Current:0~5A	Nov. 26, 2015	Oct. 09, 2016	Nov. 25, 2016	Conducted (TH03-HY)
Base Station (Measure)	Rohde & Schwarz	CMU200	117995	GSM / GPRS / WCDMA / CDMA	Aug. 05, 2016	Oct. 09, 2016	Aug. 04, 2017	Conducted (TH03-HY)
Amplifier	SONOMA	310N	187311	9kHz~1GHz	Nov. 16, 2015	Oct. 07, 2016 ~ Oct. 08, 2016	Nov. 15, 2016	Radiation (03CH10-HY)
Bilog Antenna	TESEQ	CBL 6111D&008	35413&02	30MHz~1GHz	Jan. 13, 2016	Oct. 07, 2016 ~ Oct. 08, 2016	Jan. 12, 2017	Radiation (03CH10-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1325	1GHz ~ 18GHz	Sep. 30, 2016	Oct. 07, 2016 ~ Oct. 08, 2016	Sep. 29, 2017	Radiation (03CH10-HY)
Preamplifier	MITEQ	JS44-18004000-33-8P	1840917	18GHz ~ 40GHz	Jun. 14, 2016	Oct. 07, 2016 ~ Oct. 08, 2016	Jun. 13, 2017	Radiation (03CH10-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 02, 2015	Oct. 07, 2016 ~ Oct. 08, 2016	Nov. 01, 2016	Radiation (03CH10-HY)
Preamplifier	Keysight	83017A	MY53270078	1GHz~26.5GHz	Nov. 13, 2015	Oct. 07, 2016 ~ Oct. 08, 2016	Nov. 12, 2016	Radiation (03CH10-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200485	10Hz ~ 44GHz	Oct. 15, 2015	Oct. 07, 2016 ~ Oct. 08, 2016	Oct. 14, 2016	Radiation (03CH10-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Oct. 07, 2016 ~ Oct. 08, 2016	N/A	Radiation (03CH10-HY)
Turn Table	EMEC	TT 2200	N/A	0~360 Degree	N/A	Oct. 07, 2016 ~ Oct. 08, 2016	N/A	Radiation (03CH10-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1328	1GHz ~ 18GHz	Nov. 02, 2015	Oct. 07, 2016 ~ Oct. 08, 2016	Nov. 01, 2016	Radiation (03CH10-HY)
Bilog Antenna	TESEQ	CBL 6111D&N-6-	35414&AT-N0602	30MHz~1GHz	Nov. 17, 2016	Oct. 07, 2016 ~ Oct. 08, 2016	Nov. 16, 2017	Radiation (03CH10-HY)
Signal Generator	Rohde & Schwarz	SMF100A	101107	100kHz~40GHz	May. 19, 2016	Oct. 07, 2016 ~ Oct. 08, 2016	May. 18, 2017	Radiation (03CH10-HY)

6 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.17**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.48**

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.00**

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

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
GPRS class 8	32.01	32.03	31.92	29.34	29.43	29.41
GPRS class 10	29.21	29.21	29.09	26.49	26.57	26.55
GPRS class 11	27.42	27.42	27.30	24.69	24.78	24.74
GPRS class 12	26.28	26.28	26.16	23.51	23.60	23.55
EGPRS class 8	26.22	26.21	26.08	25.30	25.38	25.34
EGPRS class 10	23.24	23.25	23.12	22.31	22.38	22.34
EGPRS class 11	21.43	21.43	21.30	20.49	20.59	20.54
EGPRS class 12	20.22	20.23	20.10	19.32	19.41	19.37

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	1907.6
RMC 12.2K	23.25	23.13	23.08	22.97	23.00	22.60
HSDPA Subtest-1	22.04	21.97	21.94	22.41	22.38	22.16
HSDPA Subtest-2	22.02	21.93	21.93	22.29	22.28	22.06
HSDPA Subtest-3	22.05	21.96	21.92	22.20	22.26	21.97
HSDPA Subtest-4	22.04	21.96	21.92	22.16	22.21	21.95
HSUPA Subtest-1	21.79	21.71	21.63	22.02	22.00	21.74
HSUPA Subtest-2	20.54	20.47	20.43	20.91	20.87	20.57
HSUPA Subtest-3	21.54	21.37	21.36	21.75	21.72	21.41
HSUPA Subtest-4	20.77	20.70	20.64	20.92	21.00	20.70
HSUPA Subtest-5	22.62	22.51	22.36	22.55	22.57	22.17

Radiated Spurious Emission

GSM850 (GPRS class 8)									
Channel	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)
Lowest	1648	-47.46	-13	-34.46	-57.21	-49.22	0.98	4.89	H
	2472	-42.01	-13	-29.01	-55.69	-43.89	1.28	5.32	H
	4120	-51.61	-13	-38.61	-69.77	-56.25	1.83	8.62	H
	1648	-45.75	-13	-32.75	-55.37	-47.51	0.98	4.89	V
	2472	-40.99	-13	-27.99	-54.66	-42.87	1.28	5.32	V
	4120	-49.50	-13	-36.50	-68.48	-54.14	1.83	8.62	V
Middle	1672	-44.43	-13	-31.43	-54.32	-46.11	0.99	4.82	H
	2512	-43.88	-13	-30.88	-57.69	-45.85	1.29	5.41	H
	4184	-52.70	-13	-39.70	-70.88	-57.32	1.87	8.64	H
	1672	-43.47	-13	-30.47	-53.27	-45.15	0.99	4.82	V
	2512	-39.09	-13	-26.09	-52.95	-41.06	1.29	5.41	V
	4184	-48.57	-13	-35.57	-66.75	-53.19	1.87	8.64	V
Highest	1696	-42.09	-13	-29.09	-52.04	-43.69	1.00	4.75	H
	2544	-42.54	-13	-29.54	-56.55	-44.52	1.30	5.44	H
	4248	-51.63	-13	-38.63	-70.04	-56.23	1.90	8.65	H
	1696	-41.89	-13	-28.89	-51.77	-43.49	1.00	4.75	V
	2544	-37.39	-13	-24.39	-51.33	-39.37	1.30	5.44	V
	4248	-48.40	-13	-35.40	-66.6	-53	1.90	8.65	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

GSM850 (EDGE class 8)									
Channel	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)
Lowest	1648	-55.24	-13	-42.24	-64.96	-57	0.98	4.89	H
	2472	-48.55	-13	-35.55	-62.25	-50.43	1.28	5.32	H
	3296	-53.36	-13	-40.36	-69.21	-56.77	1.54	7.10	H
	1648	-52.29	-13	-39.29	-61.95	-54.05	0.98	4.89	V
	2472	-48.12	-13	-35.12	-61.92	-50	1.28	5.32	V
	3296	-54.60	-13	-41.60	-70.51	-58.01	1.54	7.10	V
Middle	1672	-52.18	-13	-39.18	-61.96	-53.86	0.99	4.82	H
	2512	-49.30	-13	-36.30	-63.1	-51.27	1.29	5.41	H
	3344	-54.05	-13	-41.05	-69.94	-57.66	1.56	7.31	H
	1672	-50.84	-13	-37.84	-60.63	-52.52	0.99	4.82	V
	2512	-45.26	-13	-32.26	-59.11	-47.23	1.29	5.41	V
	3344	-54.27	-13	-41.27	-70.37	-57.88	1.56	7.31	V
Highest	1696	-48.51	-13	-35.51	-58.45	-50.11	1.00	4.75	H
	2544	-43.49	-13	-30.49	-57.44	-45.47	1.30	5.44	H
	3392	-53.96	-13	-40.96	-70.06	-57.76	1.57	7.52	H
	1696	-50.03	-13	-37.03	-59.91	-51.63	1.00	4.75	V
	2544	-40.76	-13	-27.76	-54.7	-42.74	1.30	5.44	V
	3392	-53.33	-13	-40.33	-69.53	-57.13	1.57	7.52	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

GSM1900 (GPRS class 8)									
Channel	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)
Lowest	3702	-44.22	-13	-31.22	-61.07	-50.79	1.67	8.24	H
	5550	-47.18	-13	-34.18	-69.82	-54.25	2.65	9.72	H
	7400	-50.59	-13	-37.59	-77.66	-59.73	2.46	11.60	H
	3702	-40.11	-13	-27.11	-57.12	-46.68	1.67	8.24	V
	5550	-46.57	-13	-33.57	-69.04	-53.64	2.65	9.72	V
	7400	-50.31	-13	-37.31	-77.41	-59.45	2.46	11.60	V
Middle	3762	-49.29	-13	-36.29	-663.3	-55.92	1.69	8.31	H
	5640	-45.78	-13	-32.78	-68.56	-52.83	2.71	9.76	H
	7520	-49.96	-13	-36.96	-77.29	-59.35	2.42	11.81	H
	3762	-43.78	-13	-30.78	-60.92	-50.41	1.69	8.31	V
	5640	-48.47	-13	-35.47	-71.09	-55.52	2.71	9.76	V
	7520	-49.84	-13	-36.84	-77.28	-59.23	2.42	11.81	V
Highest	3822	-47.15	-13	-34.15	-64.37	-53.83	1.71	8.39	H
	5730	-45.36	-13	-32.36	-68.28	-52.39	2.76	9.79	H
	7639	-49.34	-13	-36.34	-76.8	-58.84	2.38	11.88	H
	3822	-46.46	-13	-33.46	-63.77	-53.14	1.71	8.39	V
	5730	-44.75	-13	-31.75	-67.53	-51.78	2.76	9.79	V
	7639	-49.47	-13	-36.47	-77	-58.97	2.38	11.88	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

GSM1900 (EDGE class 8)									
Channel	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)
Lowest	3702	-51.14	-13	-38.14	-67.99	-57.71	1.67	8.24	H
	5550	-52.71	-13	-39.71	-75.35	-59.78	2.65	9.72	H
	7400	-50.37	-13	-37.37	-77.44	-59.51	2.46	11.60	H
	3702	-46.32	-13	-33.32	-63.33	-52.89	1.67	8.24	V
	5550	-52.11	-13	-39.11	-74.58	-59.18	2.65	9.72	V
	7400	-50.06	-13	-37.06	-77.16	-59.2	2.46	11.60	V
Middle	3762	-53.50	-13	-40.50	-70.51	-60.13	1.69	8.31	H
	5640	-48.18	-13	-35.18	-70.96	-55.23	2.71	9.76	H
	7520	-49.81	-13	-36.81	-77.14	-59.2	2.42	11.81	H
	3762	-50.14	-13	-37.14	-67.28	-56.77	1.69	8.31	V
	5640	-49.13	-13	-36.13	-71.75	-56.18	2.71	9.76	V
	7520	-49.78	-13	-36.78	-77.22	-59.17	2.42	11.81	V
Highest	3822	-52.70	-13	-39.70	-69.92	-59.38	1.71	8.39	H
	5730	-48.85	-13	-35.85	-71.77	-55.88	2.76	9.79	H
	7639	-49.83	-13	-36.83	-77.29	-59.33	2.38	11.88	H
	3822	-51.99	-13	-38.99	-69.3	-58.67	1.71	8.39	V
	5730	-48.08	-13	-35.08	-70.86	-55.11	2.76	9.79	V
	7639	-49.76	-13	-36.76	-77.29	-59.26	2.38	11.88	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

WCDMA Band V (RMC 12.2Kbps)									
Channel	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)
Lowest	1648	-46.73	-13	-33.73	-56.45	-48.49	0.98	4.89	H
	2480	-50.16	-13	-37.16	-63.85	-52.07	1.28	5.34	H
	3304	-49.84	-13	-36.84	-65.84	-53.28	1.54	7.14	H
	1648	-41.92	-13	-28.92	-51.58	-43.68	0.98	4.89	V
	2480	-47.31	-13	-34.31	-61.04	-49.22	1.28	5.34	V
	3304	-51.31	-13	-38.31	-67.27	-54.75	1.54	7.14	V
Middle	1672	-47.18	-13	-34.18	-57.03	-48.86	0.99	4.82	H
	2512	-50.52	-13	-37.52	-64.36	-52.49	1.29	5.41	H
	3344	-53.18	-13	-40.18	-69.22	-56.79	1.56	7.31	H
	1672	-41.99	-13	-28.99	-51.78	-43.67	0.99	4.82	V
	2512	-45.81	-13	-32.81	-59.67	-47.78	1.29	5.41	V
	3344	-51.00	-13	-38.00	-67.05	-54.61	1.56	7.31	V
Highest	1696	-44.78	-13	-31.78	-54.72	-46.38	1.00	4.75	H
	2544	-48.49	-13	-35.49	-62.46	-50.47	1.30	5.44	H
	3392	-54.31	-13	-41.31	-70.41	-58.11	1.57	7.52	H
	1696	-40.66	-13	-27.66	-50.54	-42.26	1.00	4.75	V
	2544	-46.57	-13	-33.57	-60.53	-48.55	1.30	5.44	V
	3392	-52.67	-13	-39.67	-68.87	-56.47	1.57	7.52	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

WCDMA Band II (RMC 12.2Kbps)									
Channel	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)
Lowest	3702	-40.53	-13	-27.53	-57.38	-47.1	1.67	8.24	H
	5550	-55.41	-13	-42.41	-78.05	-62.48	2.65	9.72	H
	7400	-50.51	-13	-37.51	-77.58	-59.65	2.46	11.60	H
	3702	-39.31	-13	-26.31	-56.32	-45.88	1.67	8.24	V
	5550	-55.15	-13	-42.15	-77.62	-62.22	2.65	9.72	V
	7400	-50.36	-13	-37.36	-77.46	-59.5	2.46	11.60	V
Middle	3762	-47.33	-13	-34.33	-64.34	-53.96	1.69	8.31	H
	5640	-54.14	-13	-41.14	-76.92	-61.19	2.71	9.76	H
	7520	-50.01	-13	-37.01	-77.34	-59.4	2.42	11.81	H
	3762	-45.46	-13	-32.46	-62.6	-52.09	1.69	8.31	V
	5640	-54.22	-13	-41.22	-76.84	-61.27	2.71	9.76	V
	7520	-49.87	-13	-36.87	-77.31	-59.26	2.42	11.81	V
Highest	3816	-35.97	-13	-22.97	-53.18	-42.65	1.70	8.38	H
	5723	-53.76	-13	-40.76	-76.68	-60.8	2.75	9.79	H
	7630	-49.64	-13	-36.64	-77.08	-59.13	2.39	11.88	H
	3816	-32.69	-13	-19.69	-49.99	-39.37	1.70	8.38	V
	5723	-54.07	-13	-41.07	-76.85	-61.11	2.75	9.79	V
	7630	-49.60	-13	-36.60	-77.12	-59.09	2.39	11.88	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.