FCC TEST REPORT

(PART 22 & 24)

REPORT NO.:	RF120208C13
MODEL NO.:	VX675
FCC ID:	B32VX675GPRSCTLS
RECEIVED:	Feb. 08, 2012
TESTED:	Feb. 09 ~ Feb. 14, 2012
ISSUED:	Feb. 20, 2012

APPLICANT:	VeriFone, Inc.
ADDRESS:	1400 West Stanford Ranch Road Suit 200 Rocklin CA 95765 USA

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
LAB ADDRESS:	No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)
TEST LOCATION:	No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	N/A	Feb. 20, 2012

1 CERTIFICATION

PRODUCT: Point of Sale Terminal
MODEL: VX675
BRAND: VeriFone
APPLICANT: VeriFone, Inc.
TESTED : Feb. 09 ~ Feb. 14, 2012
TEST SAMPLE: Production Unit
STANDARDS : FCC Part 22, Subpart H
FCC Part 24, Subpart E

The above equipment (model: VX675) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch,** and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : _____ , DATE : Feb. 20, 2012
Ivonne Wu / Senior Specialist

APPROVED BY : _____ , DATE : Feb. 20, 2012
Gary Chang / Technical Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 22 & Part 2			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
2.1046 22.913 (a)	Maximum Peak Output Power Limit: max. 7 watts e.r.p peak power	PASS	Meet the requirement of limit. Max. e.r.p is 29.79dBm at 836.4MHz.
2.1055	Frequency Stability AFC Freq. Error vs. Voltage AFC Freq. Error vs. Temperature Limit: max. ±2.5ppm	PASS	Meet the requirement of limit.
2.1049 (h)	Occupied Bandwidth	PASS	Meet the requirement of limit.
22.917	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 22.917	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 22.917	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is –21.78dB at 1672.8MHz.

APPLIED STANDARD: FCC Part 24 & Part 2			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
2.1046 24.232	Maximum Peak Output Power Limit: max. 2 watts e.i.r.p peak power	PASS	Meet the requirement of limit. Max. e.i.r.p is 29.95dBm at 1850.2MHz.
2.1055 24.235	Frequency Stability AFC Freq. Error vs. Voltage AFC Freq. Error vs. Temperature Limit: max. +/-2.5ppm	PASS	Meet the requirement of limit.
2.1049 24.238(b)	Occupied Bandwidth	PASS	Meet the requirement of limit.
24.238(b)	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 24.238	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 24.238	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is –25.60dB at 5640.0MHz.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.34 dB
	200MHz ~1000MHz	3.35 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Point of Sale Terminal
MODEL NO.	VX675
FCC ID	B32VX675GPRSCTLS
POWER SUPPLY	5.0Vdc (adapter) 3.6Vdc (battery)
MODULATION TYPE	GMSK
FREQUENCY RANGE	GSM850: 824.2MHz ~ 848.8MHz GSM1900: 1850.2MHz ~ 1909.8MHz
MAX. ERP POWER	GSM850: 0.95Watts GSM1900: 0.99Watts
MULTI-SLOTS CLASS	10
ANTENNA TYPE	Fixed Internal antenna with 0.27 dBi gain for GSM850 Fixed Internal antenna with 0.71 dBi gain for GSM1900
I/O PORTS	Refer to users' manual
DATA CABLE	NA
ACCESSORY DEVICES	Adapter, battery

NOTE:

1. 2G module (brand: Cinterion, model: BGS2-W) module is collocated in this EUT.
2. The EUT was powered by the following adapter.

Adapter	
Brand	VeriFone
Model	AU1050506u
Power Rating	I/P: 100-240Vac, 0.2A O/P: 5Vdc, 1A

3. The EUT uses following battery.

Battery	
Brand	VeriFone
Manufacturer	Sanyo
Model	BPK265-001
Power Rating	3.6Vdc, 2200mAh

4. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

For GSM850

124 channels are provided to this EUT. Therefore, the low, middle and high channels are chosen for testing.

	CHANNEL	FREQUENCY	TX MODE
LOW	128	824.2 MHz	GPRS
MIDDLE	189	836.4 MHz	GPRS
HIGH	251	848.8 MHz	GPRS

NOTE:

1. The channel 128, 189, and 251 were pre-tested in chamber. The channel 189 was chosen for final test.
2. The worst case for final test is chosen when the power control level set 5.
3. The channel space is 0.2MHz.
4. The EUT is a GPRS class 10 device (Multislot class: 10), which provide 2 up-link. After pre-tested 2 functions, found up-link with 1 time slot is worse, therefore, test results of output power, frequency stability, occupied bandwidth and band edge tests came out from this.

For GSM1900

299 channels are provided to this EUT. Therefore, the low, middle and high channels are chosen for testing.

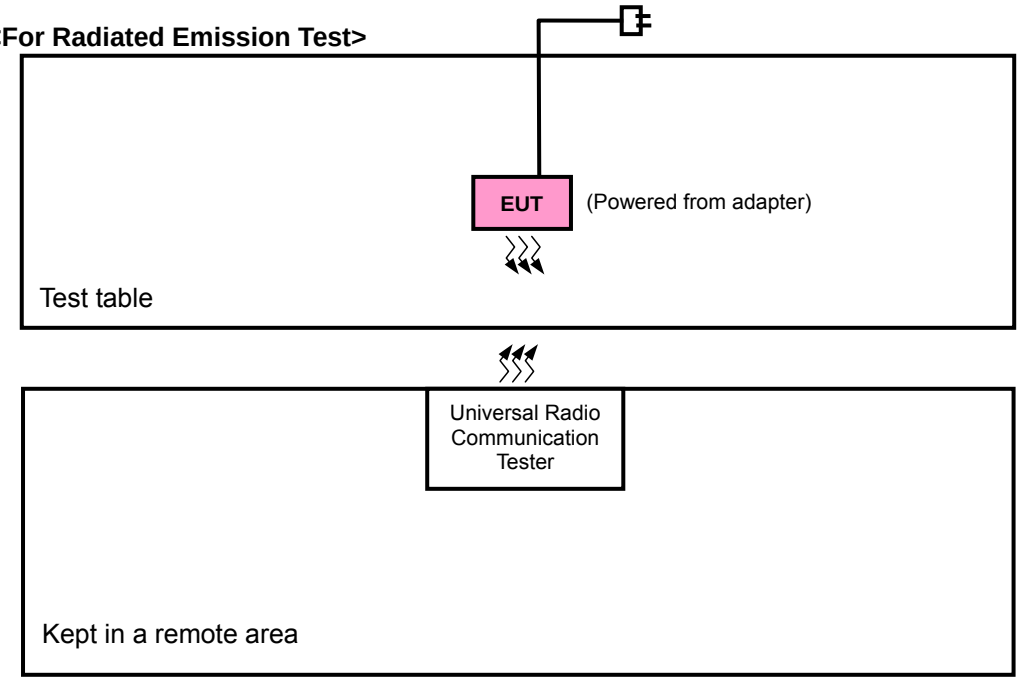
	CHANNEL	FREQUENCY	TX MODE
LOW	512	1850.2 MHz	GPRS
MIDDLE	661	1880.0 MHz	GPRS
HIGH	810	1909.8 MHz	GPRS

NOTE:

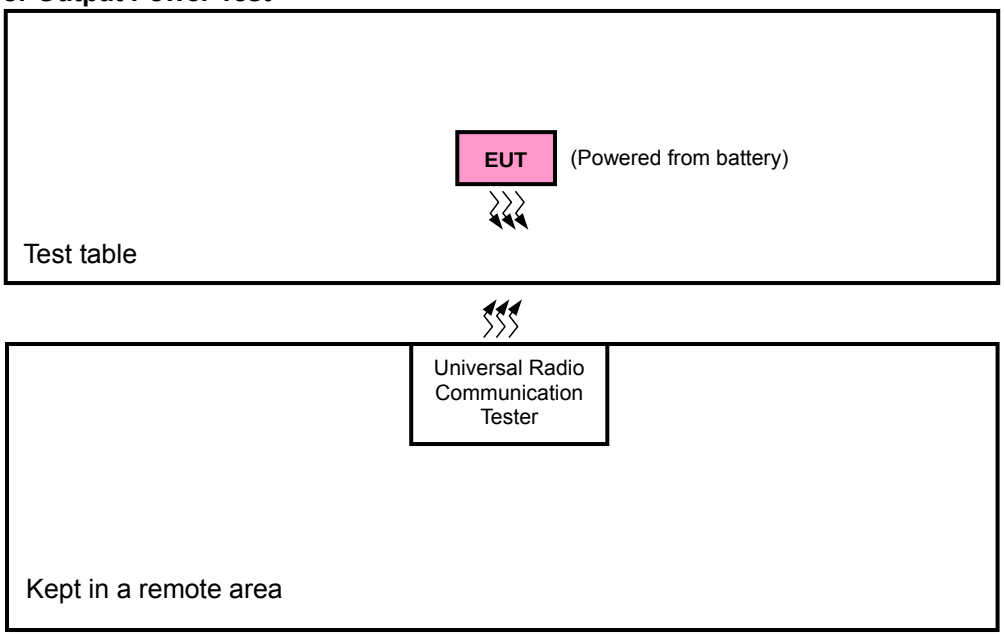
1. The channel 512, 661, and 810 were pre-tested in chamber. The channel 661 was chosen for final test.
2. The worst case for final test is chosen when the power control level set 0.
3. The channel space is 0.2MHz.
4. The EUT is a GPRS class 10 device (Multislot class: 10), which provide 2 up-link. After pre-tested 2 functions, found up-link with 1 time slot is worse, therefore, test results of output power, frequency stability, occupied bandwidth and band edge tests came out from this.

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST

<For Radiated Emission Test>



<For Output Power Test>



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO						DESCRIPTION
	OP	FS	OB	BE	CE	RE	
-	√	√	√	√	√	√	GPRS Link + Looping (Read data) + Adapter

Where **OP:** Output power **FS:** Frequency stability
OB: Occupied bandwidth **BE:** Band edge
CE: Conducted spurious emissions **RE:** Radiated emission

OUTPUT POWER MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	AXIS
128 to 251	128, 189, 251	GPRS	X
512 to 810	512, 661, 810	GPRS	X

FREQUENCY STABILITY MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
128 to 251	189	GPRS
512 to 810	661	GPRS

OCCUPIED BANDWIDTH MEASUREMENT:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
128 to 251	128, 189, 251	GPRS
512 to 810	512, 661, 810	GPRS

BAND EDGE MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
128 to 251	128, 251	GPRS
512 to 810	512, 810	GPRS

CONDUCTED SPURIOUS EMISSIONS MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
128 to 251	189	GPRS
512 to 810	661	GPRS

RADIATED EMISSION MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	AXIS
128 to 251	189	GPRS	Y
512 to 810	661	GPRS	X

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
OP	25deg. C, 57%RH	3.6Vdc	Phoenix Chen
FS	25deg. C, 57%RH	3.6Vdc	Phoenix Chen
OB	25deg. C, 57%RH	3.6Vdc	Phoenix Chen
EM	25deg. C, 57%RH	3.6Vdc	Phoenix Chen
BE	25deg. C, 57%RH	3.6Vdc	Phoenix Chen
CE	25deg. C, 57%RH	3.6Vdc	Phoenix Chen
RE	25deg. C, 65%RH	120Vac, 60Hz	Kay Wu

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2

FCC 47 CFR Part 22

FCC 47 CFR Part 24

ANSI C63.4-2003

ANSI/TIA/EIA-603-C 2004

NOTE: All test items have been performed and recorded as per the above standards.

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	UNIVERSAL RADIO COMMUNICATION TESTER	R&S	CMU200	104484	NA
2	Radio Communication Analyzer	Anritsu	MT8820C	6201010284	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA

NOTE:

1. All power cords of the above support units are non shielded (1.8m).
2. Item 1-2 acted as a communication partners to transfer data.

4 TEST TYPES AND RESULTS

4.1 OUTPUT POWER MEASUREMENT

4.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

The radiated peak output power shall be according to the specific rule Part 22.913 (a) that “Mobile / Portable station are limited to 7 watts e.r.p”.

The radiated peak output power shall be according to the specific rule Part 24.232(b) that “Mobile / Portable station are limited to 2 watts e.i.r.p” and 24.232(c) specific that “Peak transmit power must be measure over any interval of continuous transmission using instrumentation calibration in terms of rms-equivalent voltage.”

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver Agilent	N9038A	MY51210203	Dec. 22, 2011	Dec. 21, 2012
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 21, 2011	Dec. 20, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Dec. 20, 2011	Dec. 19, 2012
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Dec. 20, 2011	Dec. 19, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 20, 2011	Dec. 19, 2012
Preamplifier EMCI	EMC 012645	980115	Dec. 30, 2011	Dec. 29, 2012
Preamplifier EMCI	EMC 330H	980112	Dec. 30, 2011	Dec. 29, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4	Oct. 21, 2011	Oct. 20, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Jan. 02, 2012	Jan. 01, 2013
RF signal cable Worken	RG-213	NA	Jan. 02, 2012	Jan. 01, 2013
Software	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 9.

3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

4. The FCC Site Registration No. is 460141.

5. The IC Site Registration No. is IC 7450F-4.

4.1.3 TEST PROCEDURES

EIRP / ERP MEASUREMENT:

a. The power was measured with R&S Spectrum Analyzer. All measurements were done at channel 128, 189 & 251 for GSM850 and 512, 661 & 810 for PCS1900 (low, middle and high operational frequency range.) RWB and VBW is 1MHz for GPRS.

b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value“ of step c. Record the power level of S.G

d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

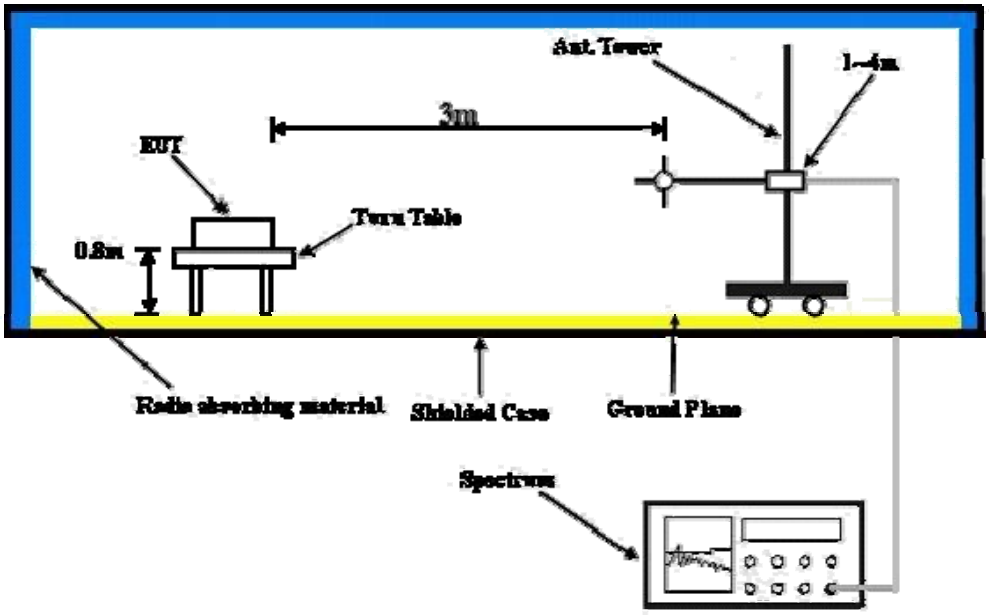
e. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.

CONDUCTED POWER MEASUREMENT:

a. The EUT was set up for the maximum power with GPRS link data modulation and link up with simulator.
b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

4.1.4 TEST SETUP

EIRP / ERP MEASUREMENT:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

CONDUCTED POWER MEASUREMENT:

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.5 EUT OPERATING CONDITIONS

a. The EUT makes a call to the communication simulator.

b. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

4.1.6 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm)

Band	GPRS850			GPRS1900		
Channel	128	189	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880	1909.8
GPRS 8	32.83	32.81	32.77	30.32	30.31	30.43
GPRS 10	32.57	32.55	32.75	30.31	30.30	30.42

ERP POWER

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(W)	Polarization (H/V)
X	128	824.2	-0.76	32.62	29.71	0.94	H
	189	836.4	-0.58	32.52	29.79	0.95	H
	251	848.8	-1.73	32.65	28.77	0.75	H
	128	824.2	-9.52	32.76	21.09	0.13	V
	189	836.4	-9.34	32.39	20.90	0.12	V
	251	848.8	-8.88	32.54	21.51	0.14	V

EIRP POWER

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(W)	Polarization (H/V)
X	512	1850.2	-8.24	38.19	29.95	0.99	H
	661	1880.0	-8.82	38.70	29.88	0.97	H
	810	1909.8	-9.59	39.35	29.76	0.95	H
	512	1850.2	-13.22	38.48	25.26	0.34	V
	661	1880.0	-12.71	38.59	25.88	0.39	V
	810	1909.8	-13.36	38.87	25.51	0.36	V

4.2 FREQUENCY STABILITY MEASUREMENT

4.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

According to the FCC part 22.863 & FCC part 24.235 shall be tested the frequency stability. The rule is defined that" The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The frequency error rate is according to the JTC standard that the frequency error rate shall be accurate to within 2.5ppm of the received frequency from the base station.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Spectrum Analyzer Agilent	E4446A	MY43360128	Feb. 22, 2011	Feb. 21, 2012
Hewlett Packard RF cable	8120-6192	01428251	NA	NA
RF cable	SUCOFLEX 104	257029	Sep. 11, 2011	Sep. 10, 2012
WIT Standard Temperature & Humidity Chamber	MHU-225AU	920842	Jun. 15, 2011	Jun. 14, 2012

NOTE: The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

4.2.3 TEST PROCEDURE

a. Because of the measure the carrier frequency under the condition of the AFC lock, it shall be used the mobile station in the GPRS link mode. This is accomplished with the use of the R&S CMU200 / JRC NJZ-2000 simulator station. The oven room could control the temperatures and humidity. The GPRS link channels are 189 and 661.

b. Power must be removed when changing from one temperature to another or one voltage to another voltage. Power warm up is at least 15 min and power applied should perform before recording frequency error.

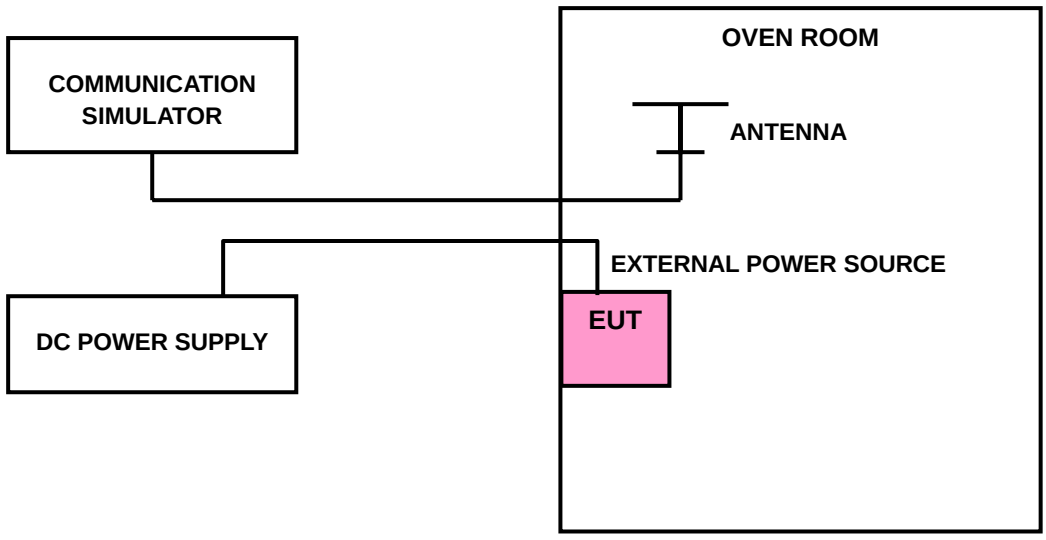
c. EUT is connected the external power supply to control the DC input power. The various Volts from the minimum 3.4Volts to 4.14Volts. Each step shall be record the frequency error rate.

d. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ during the measurement testing.

e. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

4.2.4 TEST SETUP



4.2.5 TEST RESULTS

For GSM850

AFC FREQUENCY ERROR vs. VOLTAGE			
VOLTAGE (Volts)	**FREQUENCY ERROR (Hz)**	**FREQUENCY ERROR (ppm)**	**LIMIT (ppm)**
3.6	-7	-0.01	2.5
3.4	-9	-0.01	2.5
4.14	-12	-0.01	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.4Vdc to 4.14Vdc.

AFC FREQUENCY ERROR vs. TEMP.			
TEMP. (℃)	**FREQUENCY ERROR (Hz)**	**FREQUENCY ERROR (ppm)**	**LIMIT (ppm)**
-20	-4	0.00	2.5
-10	-6	-0.01	2.5
0	-9	-0.01	2.5
10	-14	-0.02	2.5
20	-10	-0.01	2.5
30	-12	-0.01	2.5
40	-14	-0.02	2.5
50	-10	-0.01	2.5

For GSM1900

AFC FREQUENCY ERROR vs. VOLTAGE			
VOLTAGE (Volts)	**FREQUENCY ERROR (Hz)**	**FREQUENCY ERROR (ppm)**	**LIMIT (ppm)**
3.6	8	0.00	2.5
3.4	13	0.01	2.5
4.14	11	0.01	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.4Vdc to 4.14Vdc.

AFC FREQUENCY ERROR vs. TEMP.			
TEMP. (℃)	**FREQUENCY ERROR (Hz)**	**FREQUENCY ERROR (ppm)**	**LIMIT (ppm)**
-20	9	0.00	2.5
-10	11	0.01	2.5
0	15	0.01	2.5
10	13	0.01	2.5
20	17	0.01	2.5
30	13	0.01	2.5
40	15	0.01	2.5
50	21	0.01	2.5

4.3 OCCUPIED BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

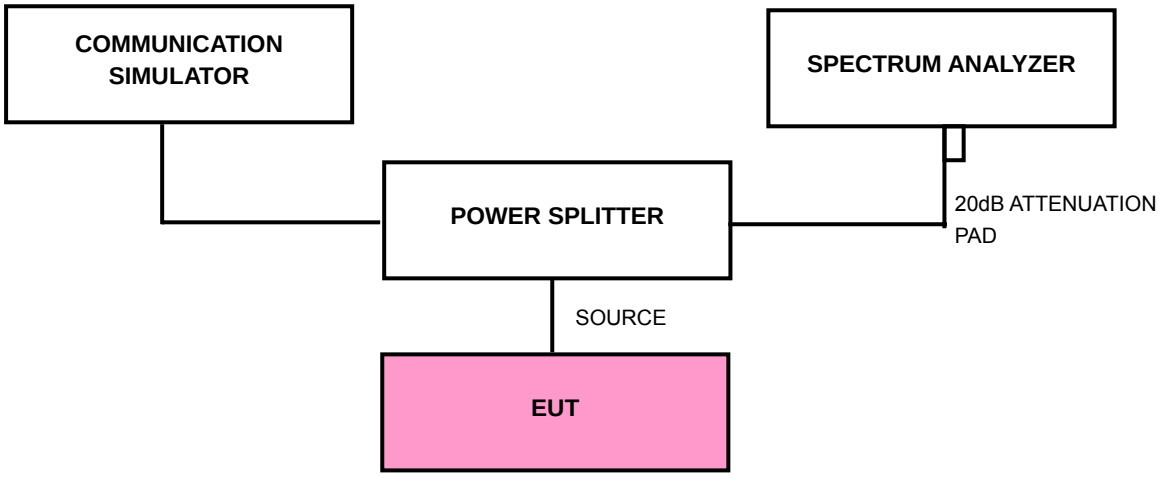
The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the totalmean power of a given emission.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Feb. 23, 2011	Feb. 22, 2012
Mini-Circuits Power Splitter	ZN2PD-9G	NA	May 25, 2011	May 24, 2012
RF cable	SUCOFLEX 104	274403/4	Aug. 20, 2011	Aug. 19, 2012
RF cable	SUCOFLEX 104	250729/4	Aug. 19, 2011	Aug. 18, 2012
RF cable	SUCOFLEX 104	214377/4	Aug. 19, 2011	Aug. 18, 2012
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA

NOTE: The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

4.3.3 TEST SETUP



4.3.4 TEST PROCEDURES

a. The EUT makes a call to the communication simulator. The power was measured with R&S Spectrum Analyzer. All measurements were done at channel 128, 189 & 251 for GSM850 and 512, 661 & 810 for GSM1900 (low, middle and high operational frequency range.)

b. The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

c. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.3.5 EUT OPERATING CONDITION

a. The EUT makes a call to the communication simulator.

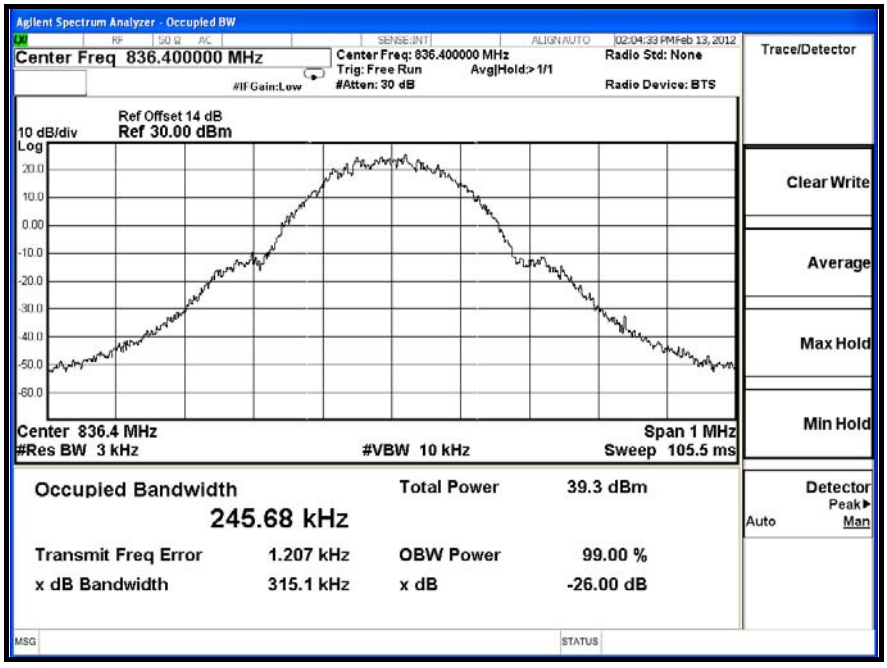
b. The communication simulator station system controlled a EUT to export maximum and minimum output power under transmission mode and specific channel frequency.

4.3.6 TEST RESULTS

FOR GSM850

CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (kHz)
128	824.2	243.95
189	836.4	245.68
251	848.8	242.89

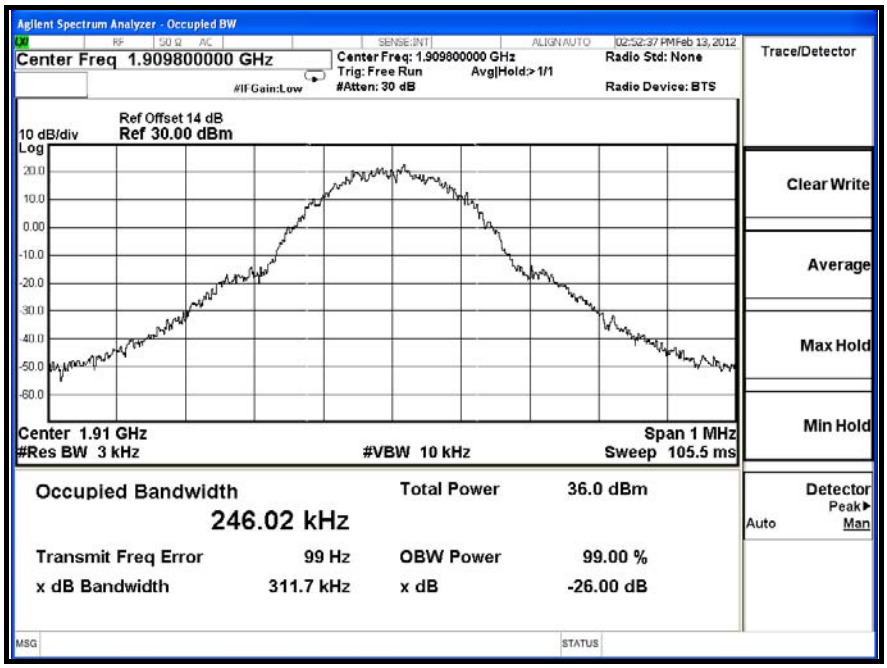
CH 189



FOR GSM1900

CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (kHz)
512	1850.2	243.11
661	1880.0	244.92
810	1909.8	246.02

CH 810



4.4 BAND EDGE MEASUREMENT

4.4.1 LIMITS OF BAND EDGE MEASUREMENT

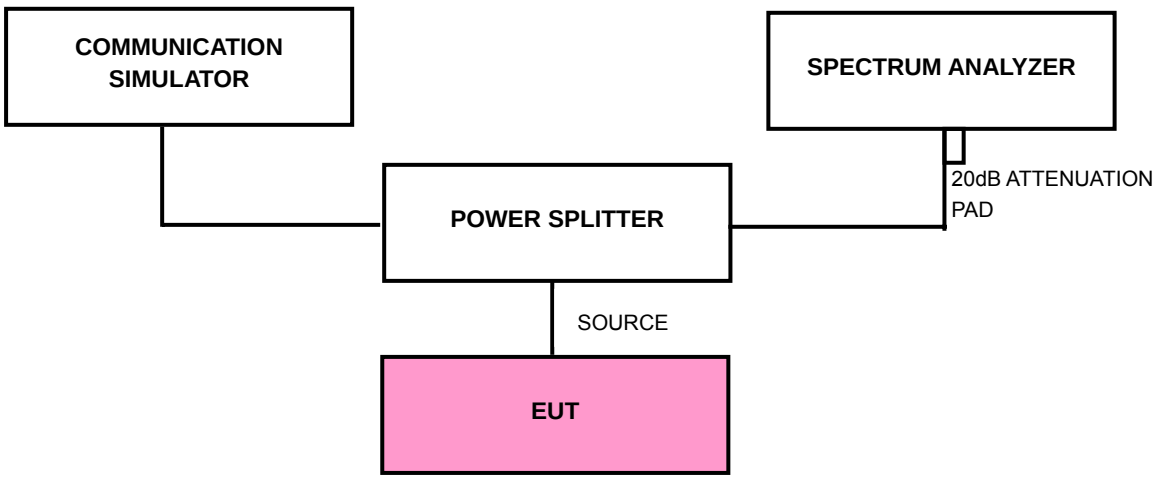
According to FCC 22.917 & FCC 24.238(a) specified that power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Feb. 23, 2011	Feb. 22, 2012
Mini-Circuits Power Splitter	ZN2PD-9G	NA	May 25, 2011	May 24, 2012
RF cable	SUCOFLEX 104	274403/4	Aug. 20, 2011	Aug. 19, 2012
RF cable	SUCOFLEX 104	250729/4	Aug. 19, 2011	Aug. 18, 2012
RF cable	SUCOFLEX 104	214377/4	Aug. 19, 2011	Aug. 18, 2012
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA

NOTE: The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

4.4.3 TEST SETUP



4.4.4 TEST PROCEDURES

a. The EUT makes a call to the communication simulator. The power was measured with R&S Spectrum Analyzer. All measurements were done at channel 128 & 251 for GSM850 and 512 & 810 for GSM1900 (low and high operational frequency range.)

b. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

c. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 3kHz and VB of the spectrum is 3kHz.

d. Record the max trace plot into the test report.

4.4.5 EUT OPERATING CONDITION

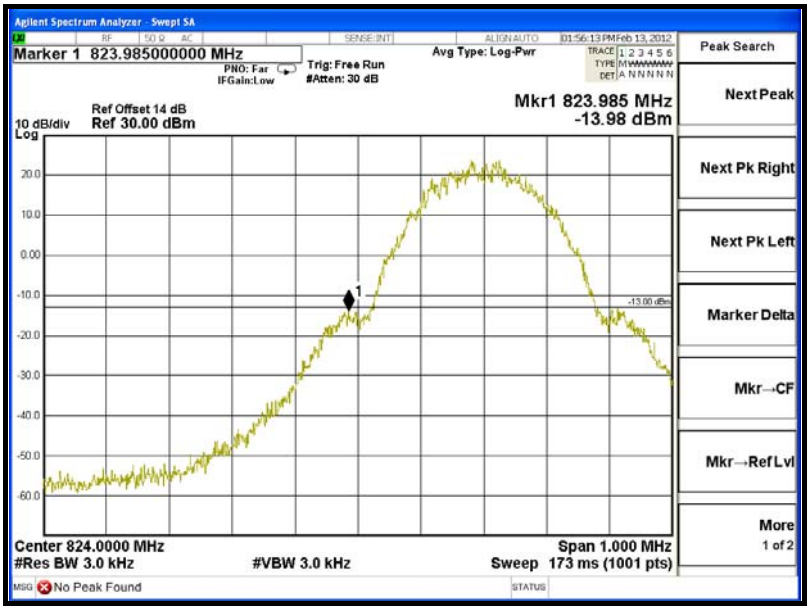
a. The EUT makes a phone call to the communication simulator.

b. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

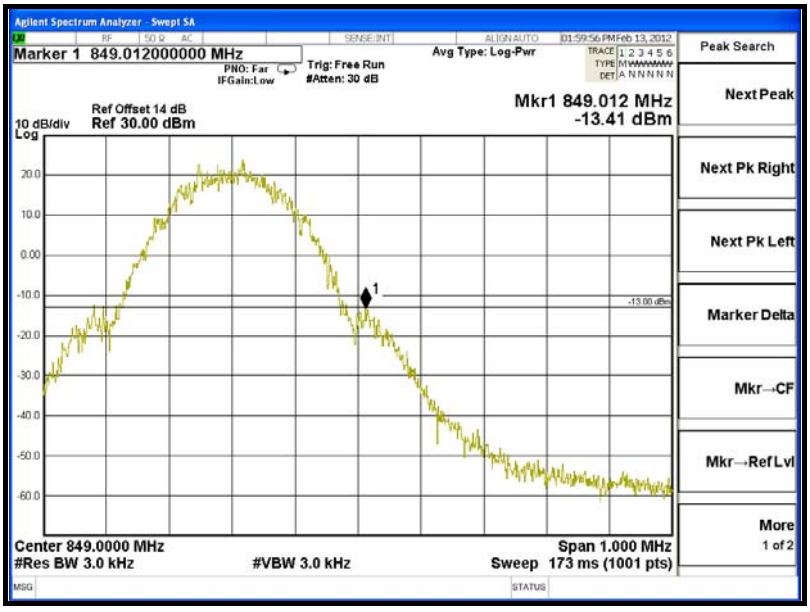
4.4.6 TEST RESULTS

FOR GSM850

LOWER BAND EDGE

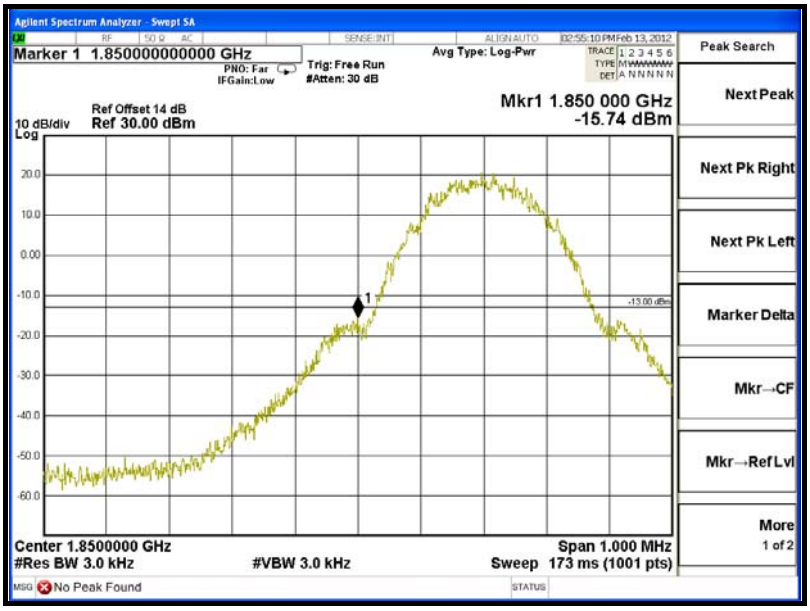


HIGHER BAND EDGE

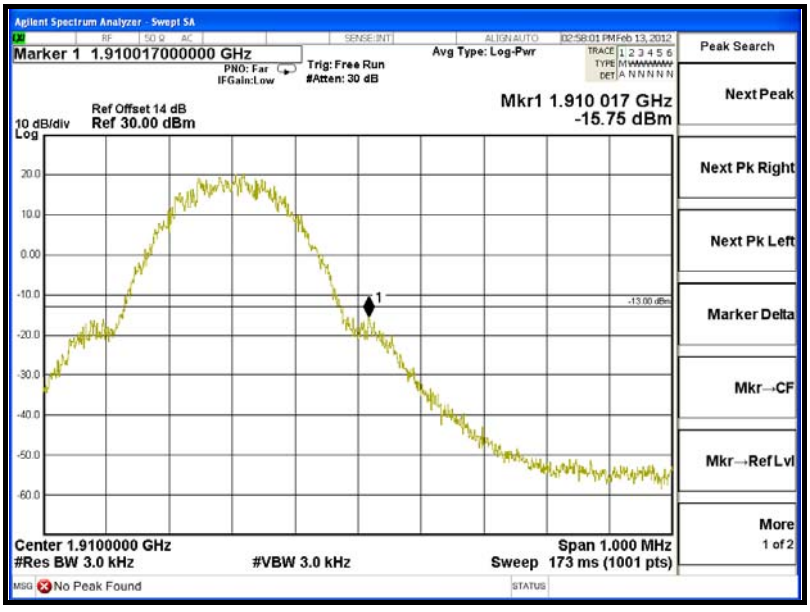


FOR GSM1900

LOWER BAND EDGE



HIGHER BAND EDGE



4.5 CONDUCTED SPURIOUS EMISSIONS

4.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

In the FCC 22.917 & FCC 24.238(a), On any frequency outside a licensee's frequency block within GPRS spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 +10 log (P) dB. The emission limit equal to –13dBm.

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
SPECTRUM ANALYZER R&S	FSP40	100039	Feb. 23, 2011	Feb. 22, 2012
Mini-Circuits Power Splitter	ZN2PD-9G	NA	May 25, 2011	May 24, 2012
RF cable	SUCOFLEX 104	274403/4	Aug. 20, 2011	Aug. 19, 2012
RF cable	SUCOFLEX 104	250729/4	Aug. 19, 2011	Aug. 18, 2012
RF cable	SUCOFLEX 104	214377/4	Aug. 19, 2011	Aug. 18, 2012
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA

NOTE: The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

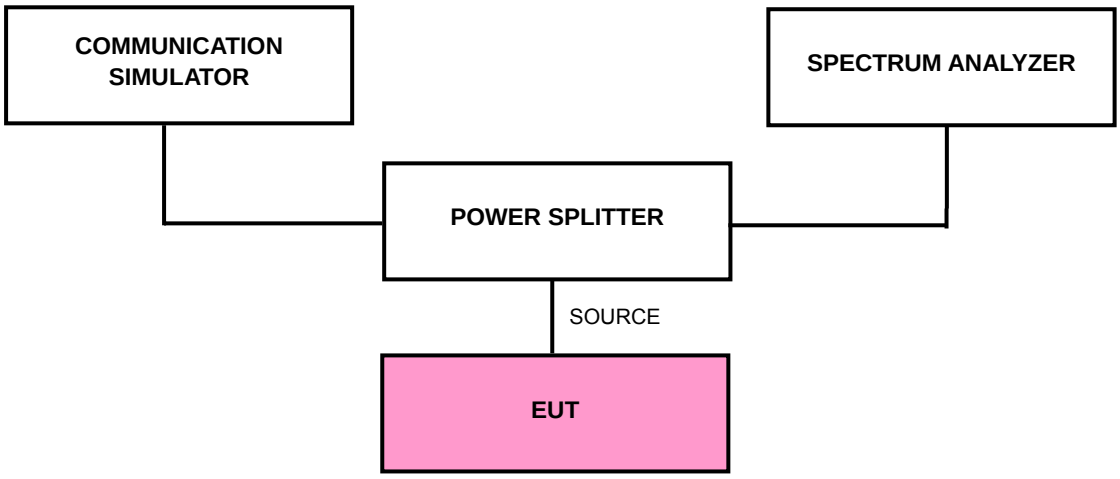
4.5.3 TEST PROCEDURE

a. The EUT makes a phone call to the communication simulator. The power was measured with R&S Spectrum Analyzer. All measurements were done at channel 189 for GSM850 and 661 for GSM1900.

b. The conducted spurious emission used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

c. Measuring frequency range is from 30 MHz to 9GHz. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

4.5.4 TEST SETUP



4.5.5 EUT OPERATING CONDITIONS

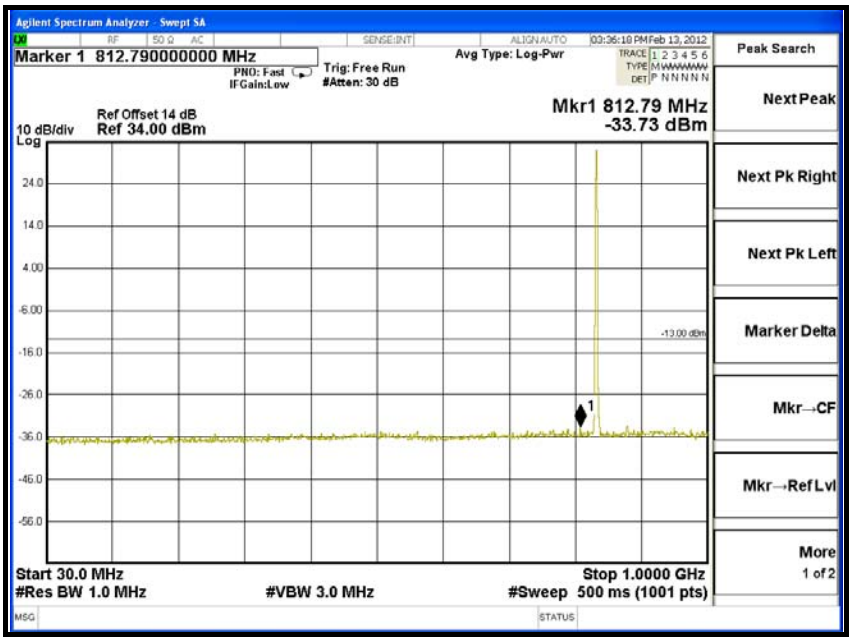
a. The EUT makes a call to the communication simulator.

b. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

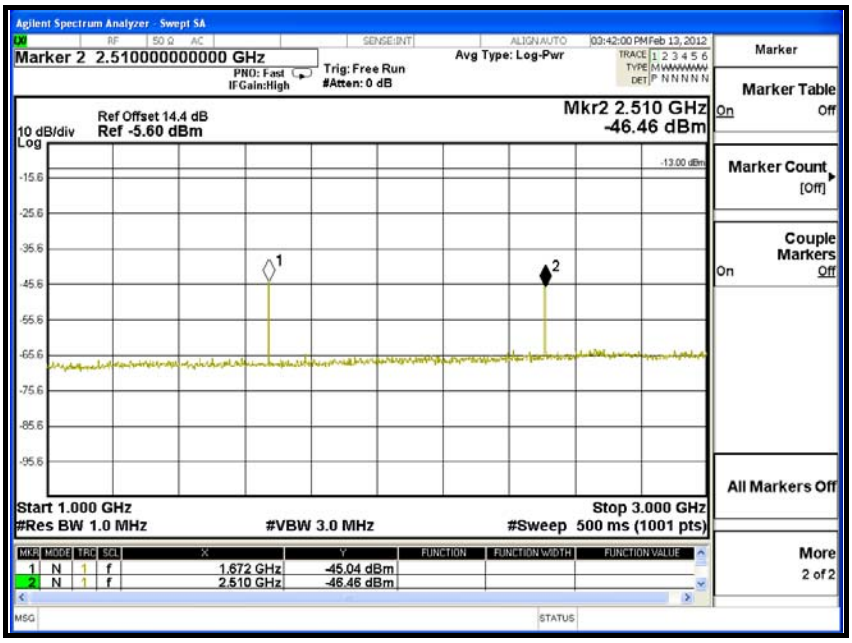
4.5.6 TEST RESULTS

FOR GSM850

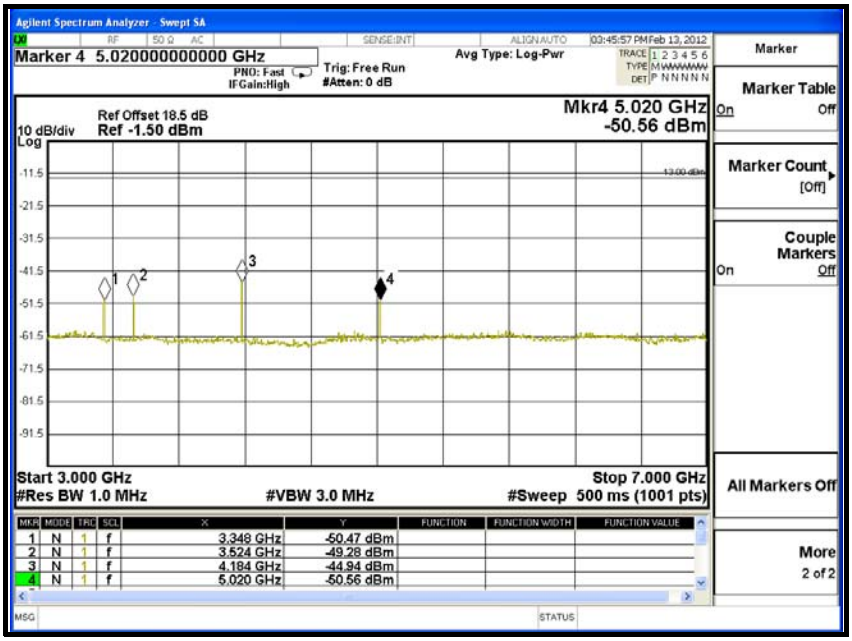
CH 189: 30MHz ~ 1GHz



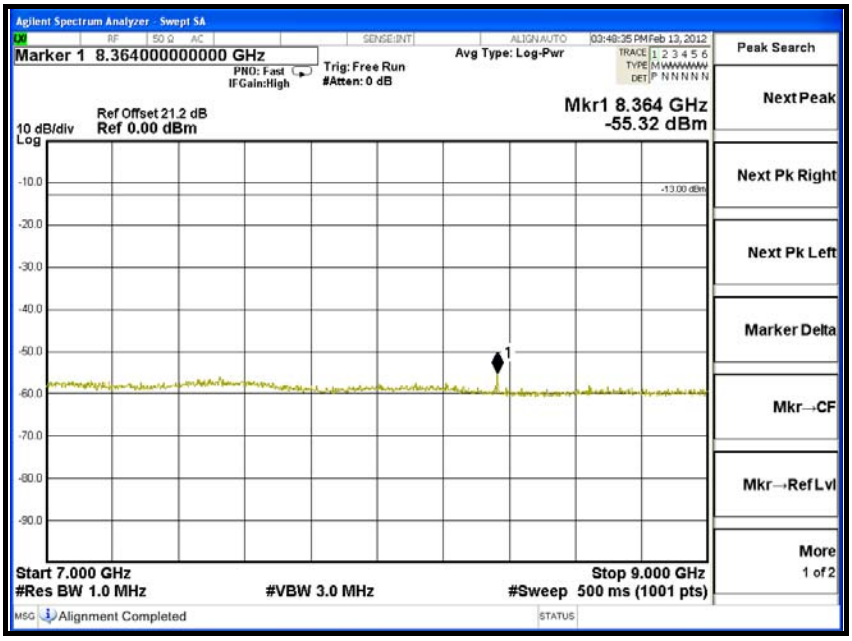
1GHz ~ 3GHz



3GHz ~ 7GHz

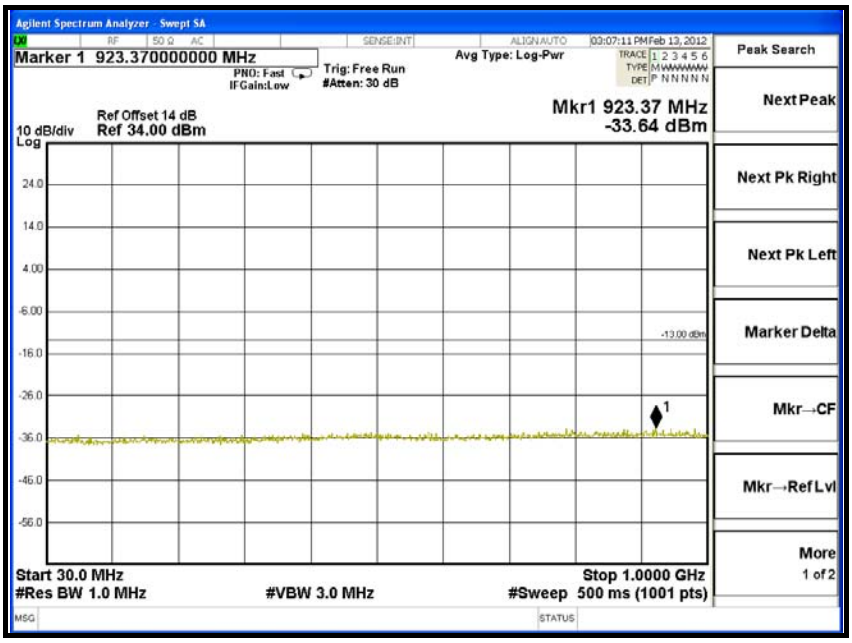


7GHz ~ 9GHz

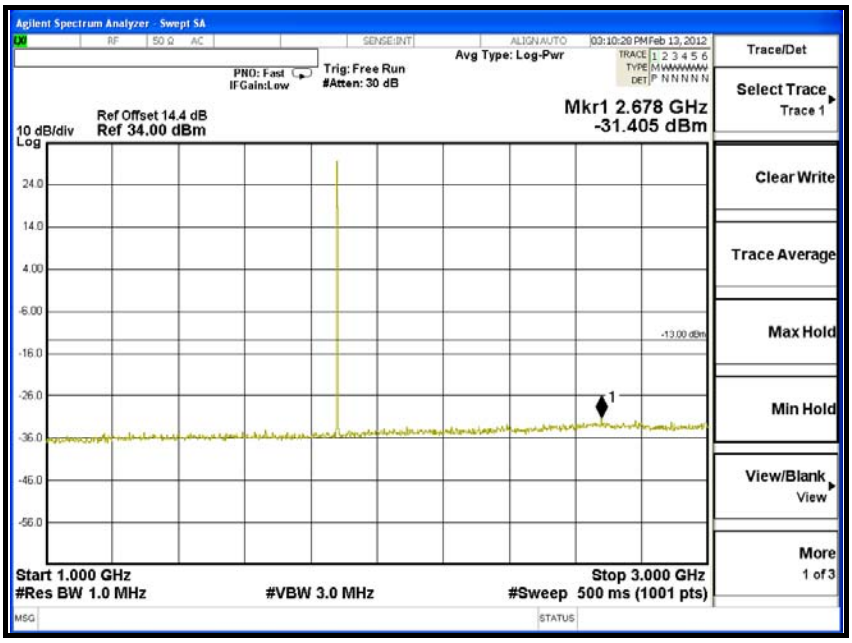


FOR GSM1900

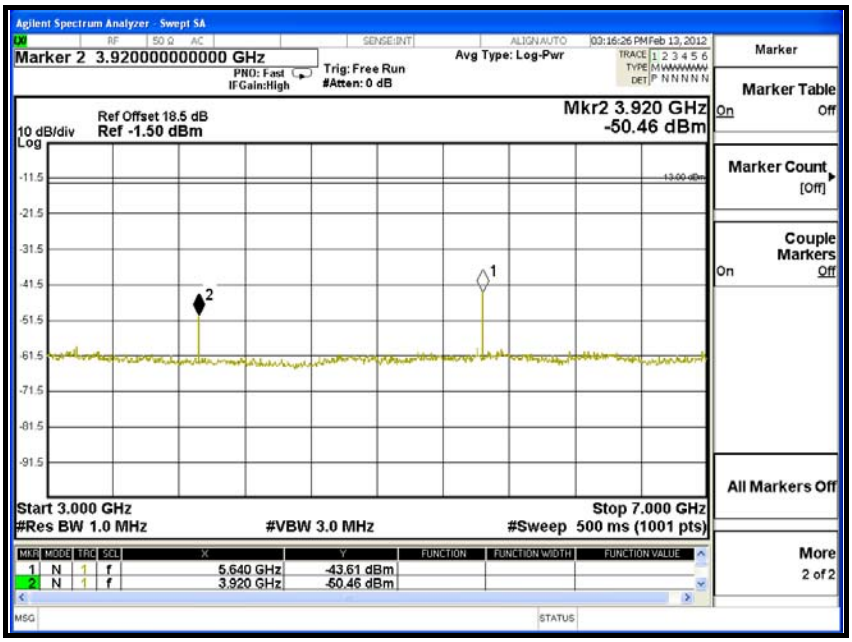
CH 661: 30MHz ~ 1GHz



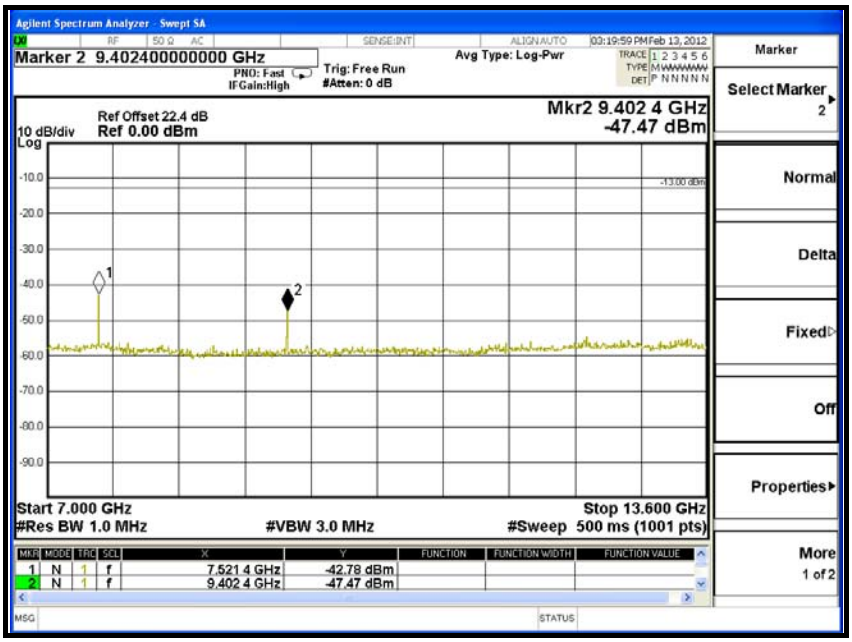
1GHz ~ 3GHz



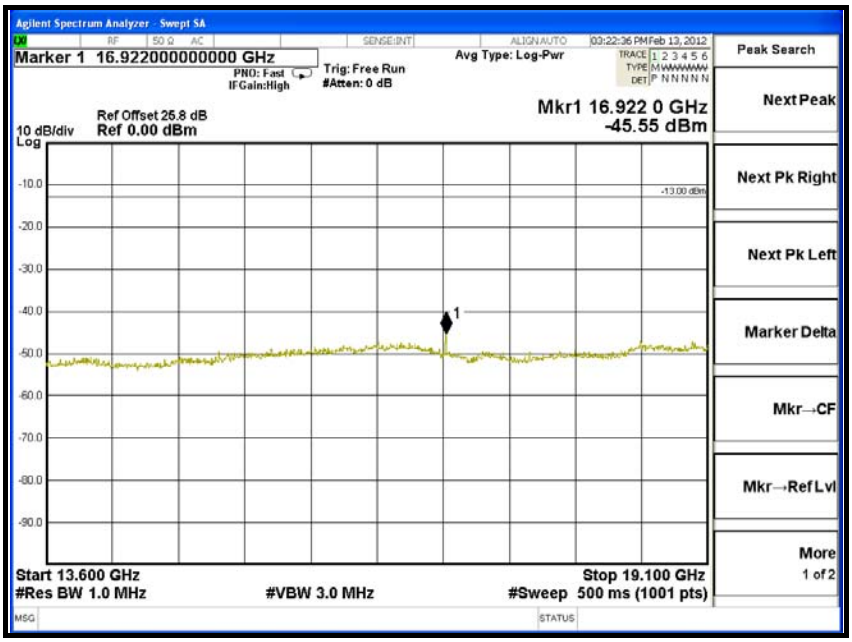
3GHz ~ 7GHz



7GHz ~ 13.6GHz



13.6GHz ~ 19.1GHz



4.6 RADIATED EMISSION MEASUREMENT

4.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

In the FCC 22.917 (a) & FCC 24.238(a), On any frequency outside a licensee's frequency block within USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB. The emission limit equal to –13dBm.

4.6.2 TEST INSTRUMENTS

Same as 4.1.2.

4.6.3 TEST PROCEDURES

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step a. Record the power level of S.G

c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

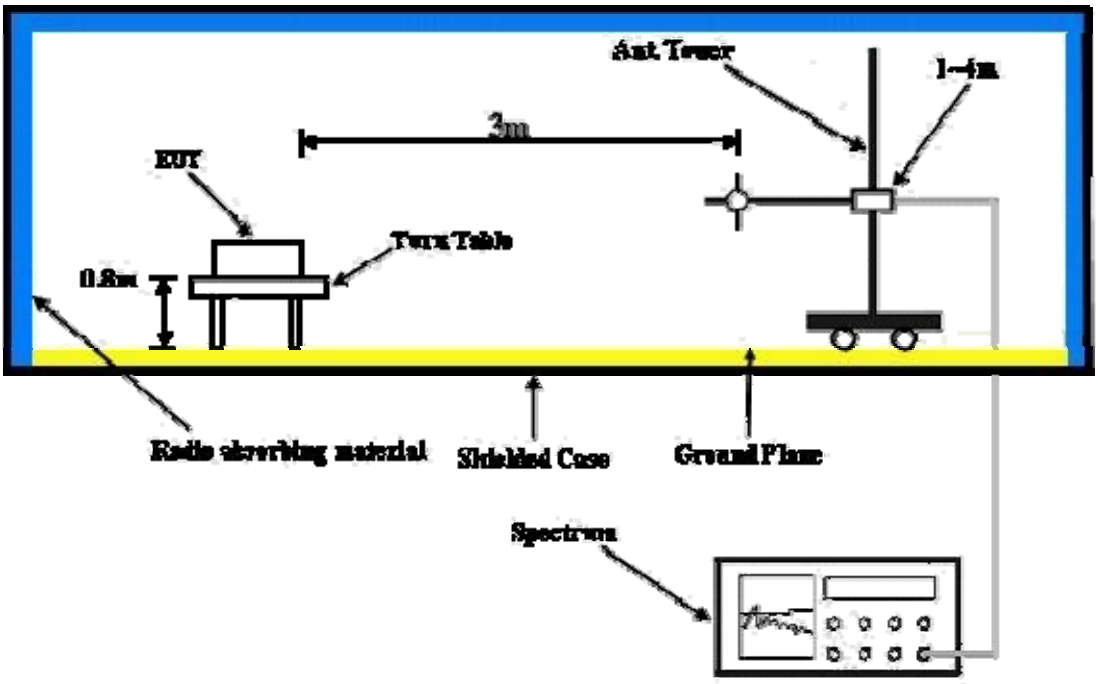
d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.

NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.6.6 EUT OPERATING CONDITIONS

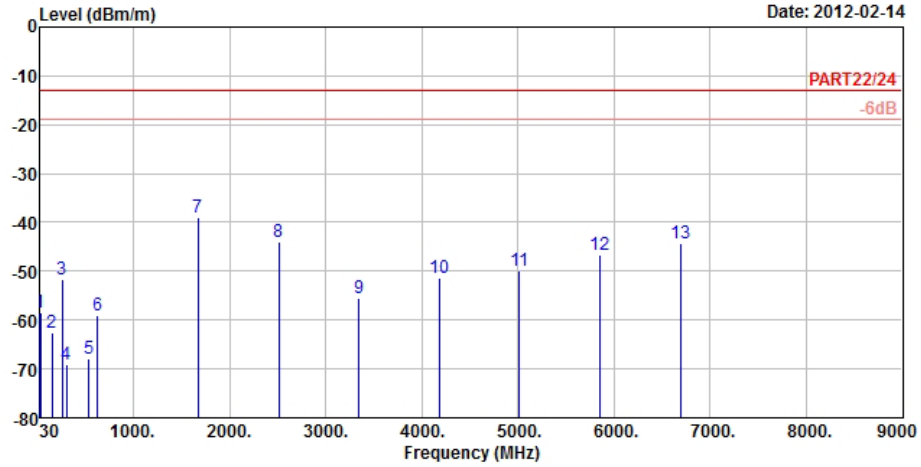
a. The EUT makes a call to the communication simulator.

b. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

4.6.7 TEST RESULTS

For GSM850

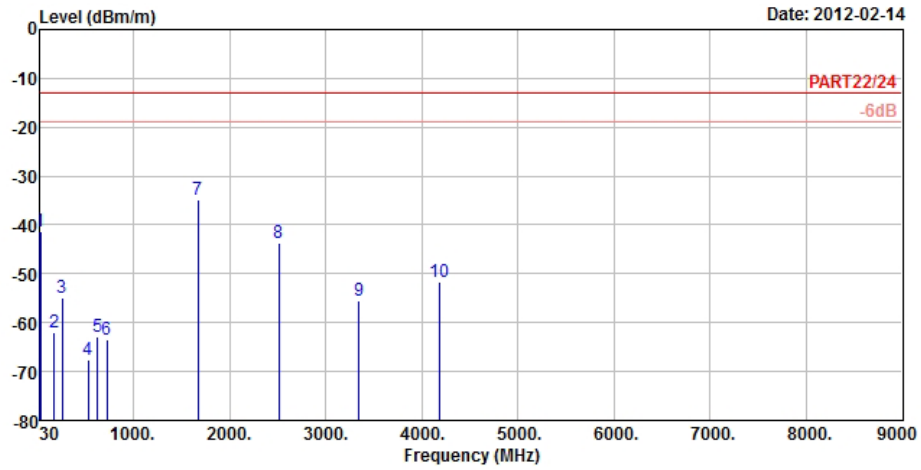
ENVIRONMENTAL CONDITIONS	25deg. C, 57%RH	INPUT POWER	120Vac, 60 Hz
TESTED BY	Kay Wu	POLARIZATION	Horizontal



Site : 966 Chamber 5
Condition : PART22/24 3m EIRP_RSE_1G~19G HORIZONTAL
Brand/Model: VX675
Remark : GSM850 Link
Tested by : David Huang
Temprature : 25C
Humidity : 65%
Plane : Y

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	33.78	-58.49	-56.65	-13.00	-45.49	-1.84	Peak
2	155.28	-62.54	-56.10	-13.00	-49.54	-6.44	Peak
3	255.45	-51.53	-45.78	-13.00	-38.53	-5.75	Peak
4	300.00	-69.14	-62.76	-13.00	-56.14	-6.38	Peak
5	538.70	-67.85	-65.80	-13.00	-54.85	-2.05	Peak
6	628.30	-59.01	-59.17	-13.00	-46.01	0.16	Peak
7 pp	1672.80	-38.98	-25.26	-13.00	-25.98	-13.72	Peak
8	2509.20	-44.10	-33.82	-13.00	-31.10	-10.28	Peak
9	3345.60	-55.49	-46.41	-13.00	-42.49	-9.08	Peak
10	4182.00	-51.49	-44.45	-13.00	-38.49	-7.04	Peak
11	5018.40	-49.85	-46.52	-13.00	-36.85	-3.33	Peak
12	5854.00	-46.53	-45.20	-13.00	-33.53	-1.33	Peak
13	6691.20	-44.18	-46.30	-13.00	-31.18	2.12	Peak

ENVIRONMENTAL CONDITIONS	25deg. C, 57%RH	**INPUT POWER**	120Vac, 60 Hz
TESTED BY	Kay Wu	**POLARIZATION**	Vertical

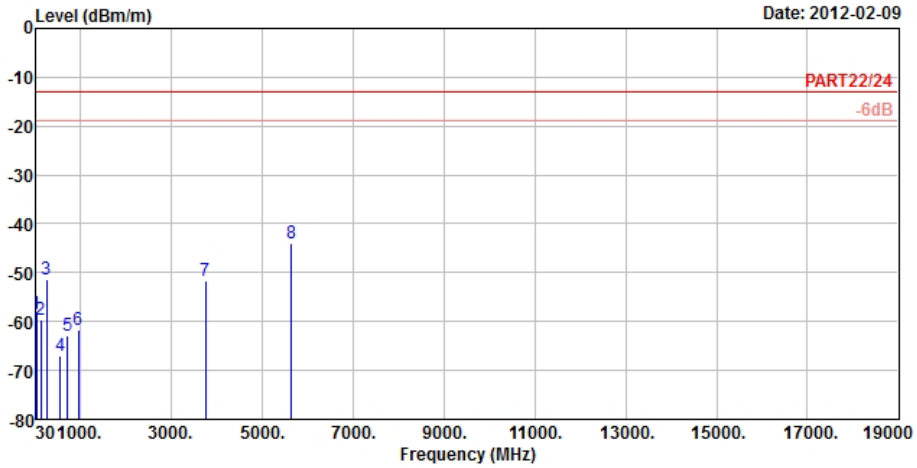


Site : 966 Chamber 5
Condition : PART22/24 3m EIRP_RSE_1G~19G VERTICAL
Brand/Model: VX675
Remark : GSM850 Link
Tested by : David Huang
Temprature : 25C
Humidity : 65%
Plane : Y

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	33.51	-41.27	-39.43	-13.00	-28.27	-1.84	Peak
2	178.77	-61.89	-55.85	-13.00	-48.89	-6.04	Peak
3	255.99	-55.05	-49.29	-13.00	-42.05	-5.76	Peak
4	526.80	-67.52	-65.15	-13.00	-54.52	-2.37	Peak
5	628.30	-62.88	-63.04	-13.00	-49.88	0.16	Peak
6	722.80	-63.41	-65.01	-13.00	-50.41	1.60	Peak
7 pp	1672.80	-34.78	-21.06	-13.00	-21.78	-13.72	Peak
8	2509.20	-43.82	-33.54	-13.00	-30.82	-10.28	Peak
9	3345.60	-55.37	-46.29	-13.00	-42.37	-9.08	Peak
10	4182.00	-51.70	-44.66	-13.00	-38.70	-7.04	Peak

For GSM1900

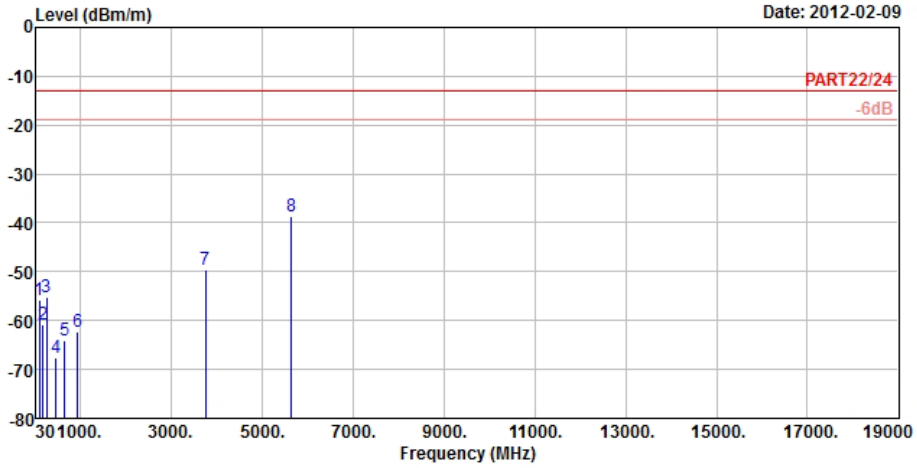
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	INPUT POWER	120Vac, 60 Hz
TESTED BY	Kay Wu	POLARIZATION	Horizontal



Site : 966 Chamber 5
Condition : PART22/24 3m EIRP_RSE _1G~19G HORIZONTAL
Brand/Model: VX675
Remark : PCS1900 Link
Tested by : David Huang
Temprature : 25C
Humidity : 65%
Plane : X

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	38.37	-58.51	-56.77	-13.00	-45.51	-1.74	Peak
2	137.46	-59.72	-53.53	-13.00	-46.72	-6.19	Peak
3	255.99	-51.50	-45.74	-13.00	-38.50	-5.76	Peak
4	555.50	-66.88	-65.31	-13.00	-53.88	-1.57	Peak
5	720.00	-62.77	-64.35	-13.00	-49.77	1.58	Peak
6	957.30	-61.76	-65.59	-13.00	-48.76	3.83	Peak
7	3760.00	-51.74	-43.66	-13.00	-38.74	-8.08	Peak
8 pp	5640.00	-44.04	-42.52	-13.00	-31.04	-1.52	Peak

ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	**INPUT POWER**	120Vac, 60 Hz
TESTED BY	Kay Wu	**POLARIZATION**	Vertical



Site : 966 Chamber 5
Condition : PART22/24 3m EIRP_RSE _1G~19G VERTICAL
Brand/Model: VX675
Remark : PCS1900 Link
Tested by : David Huang
Temprature : 25C
Humidity : 65%
Plane : X

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	103.71	-55.70	-45.22	-13.00	-42.70	-10.48	Peak
2	173.64	-60.71	-53.94	-13.00	-47.71	-6.77	Peak
3	255.45	-55.29	-49.54	-13.00	-42.29	-5.75	Peak
4	467.30	-67.55	-63.63	-13.00	-54.55	-3.92	Peak
5	652.10	-64.05	-64.63	-13.00	-51.05	0.58	Peak
6	935.60	-62.25	-65.66	-13.00	-49.25	3.41	Peak
7	3760.00	-49.51	-41.43	-13.00	-36.51	-8.08	Peak
8 pp	5640.00	-38.60	-37.08	-13.00	-25.60	-1.52	Peak

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

6 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

Copies of accreditation and authorization certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5.phtml. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050
Email: service.adt@tw.bureauveritas.com
Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also.

7 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END---