

FCC Test Report

(PART 22)

Report No.: RF151214C23

FCC ID: B32E265G

Test Model: e265G

Received Date: Dec. 14, 2015

Test Date: Dec. 18, 2015 ~ Dec. 30, 2015

Issued Date: Jan. 05, 2016

Applicant: Verifone, Inc.

Address: 1400 West Stanford Ranch Road Suite 200 Rocklin CA 95765 USA

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specification, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies

Test Location: No. 19, Hwa Ya 2nd Rd, Wen Hwa Vil, Kwei Shan Dist., Taoyuan City 33383, Taiwan (R.O.C)



Table of Contents

Re	Release Control Record 3				
1	Cer	tificate of Conformity	4		
2	Sur	nmary of Test Results	5		
		Measurement Uncertainty			
		Test Site and Instruments			
3	Ger	neral Information	7		
	3.1	General Description of EUT	7		
	3.2	Configuration of System under Test			
		3.2.1 Description of Support Units			
		Test Mode Applicability and Tested Channel Detail			
		EUT Operating Conditions General Description of Applied Standards			
4	Tes	t Types and Results	.11		
	4.1	Output Power Measurement			
		4.1.1 Limits of Output Power Measurement			
		4.1.2 Test Procedures			
		4.1.3 Test Setup			
	4.0	4.1.4 Test Results			
	4.2	Frequency Stability Measurement			
		4.2.2 Test Procedure			
		4.2.3 Test Setup			
		4.2.4 Test Results			
	4.3	Occupied Bandwidth Measurement	16		
		4.3.1 Test Procedure			
		4.3.2 Test Setup			
		4.3.3 Test Result			
	4.4	Band Edge Measurement			
		4.4.1 Limits of Band Edge Measurement4.4.2 Test Setup			
		4.4.2 Test Setup			
		4.4.4 Test Results			
	4.5	Peak to Average Ratio			
		4.5.1 Limits of Peak to Average Ratio Measurement	18		
		4.5.2 Test Setup			
		4.5.3 Test Procedures			
		4.5.4 Test Results			
	4.6	Conducted Spurious Emissions			
		4.6.1 Limits of Conducted Spurious Emissions Measurement4.6.2 Test Setup			
		4.6.3 Test Procedure			
		4.6.4 Test Results			
	4.7	Radiated Emission Measurement			
		4.7.1 Limits of Radiated Emission Measurement			
		4.7.2 Test Procedure			
		4.7.3 Deviation from Test Standard			
		4.7.4 Test Setup			
		4.7.5 Test Results			
5	Pic	ures of Test Arrangements	23		
Ap	ppendix – Information on the Testing Laboratories				



Release Control Record Issue No. Description Date Issued Original Release Jan. 05, 2016 RF151214C23



1 Certificate of Conformity

Product:	Point of Sale Terminal
Brand:	Verifone
Test Model:	e265G
Sample Status:	Identical Prototype
Applicant:	Verifone, Inc.
Test Date:	Dec. 18, 2015 ~ Dec. 30, 2015
Standards:	FCC Part 22, Subpart H

The above equipment 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.

hen ona

Prepared by :

Rona Chen / Specialist

Date: Jan. (

Jan. 05, 2016

luang

Date: Jan. 05, 2016

Approved by :

David Huang / Project Engineer



	Applied Standard: FCC Part 22 & Part 2						
FCC Clause	Test Item	Result	Remarks				
2.1046 22.913 (a)	Effective Radiated Power	Pass	Meet the requirement of limit.				
	Peak to Average Ratio	Pass	Meet the requirement of limit.				
2.1055 22.355	Frequency Stability	Pass	Meet the requirement of limit.				
2.1049	2.1049 Occupied Bandwidth		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 -23.56 dB at 1672.80 MHz.				

2 Summary of Test Results

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	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.93 dB
Hadiated Emissions up to 1 GHz	200 MHz ~1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB



2.2 Test Site and Instruments

Description & Manaufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Jan. 21, 2015	Jan. 21, 2016
Spectrum Analyzer Agilent	N9010A	MY52220314	Sep. 03, 2015	Sep. 02, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2015	Dec. 16, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Feb. 04, 2015	Feb. 04, 2016
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Feb. 09, 2015	Feb. 09, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Feb. 04, 2015	Feb. 04, 2016
Loop Antenna	EM-6879	269	Jul. 31, 2015	Jul. 30, 2016
Preamplifier Agilent	8449B	3008A01962	Oct. 15, 2015	Oct. 14, 2016
Preamplifier EMCI	EMC 184045	980116	Jan. 09, 2015	Jan. 08, 2016
Preamplifier	EMC 330H	980112	Dec. 27, 2014	Dec. 26, 2015
EMCI	ENC 330H	900112	Dec. 28, 2015	Dec. 27, 2016
Power Meter Anritsu	ML2495A	1232002	Sep. 21, 2015	Sep. 20, 2016
Power Sensor Anritsu	MA2411B	1207325	Sep. 21, 2015	Sep. 20, 2016
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 12, 2015	Oct. 11, 2016
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 12, 2015	Oct. 11, 2016
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 12, 2015	Oct. 11, 2016
Software BV ADT	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
Radio Communication Analyzer	MT8820C	6201300640	Aug. 10, 2015	Aug. 09, 2017

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 10.
- 3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
- 4. The FCC Site Registration No. is 690701.
- 5. The IC Site Registration No. is IC7450F-10.



3 General Information

3.1 General Description of EUT

Product	Point of Sale Terminal
Brand	Verifone
Test Model	e265G
Status of EUT	Identical Prototype
Dower Cumuly Dating	5.0 Vdc (adapter or host equipment)
Power Supply Rating	3.8 Vdc (Li-ion battery)
Modulation Type	GMSK
Frequency Range	824.2 ~ 848.8 MHz
Max. ERP Power	816.58 mW
Emission Designator	246KGXW
Antenna Type	Fixed Internal Antenna
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

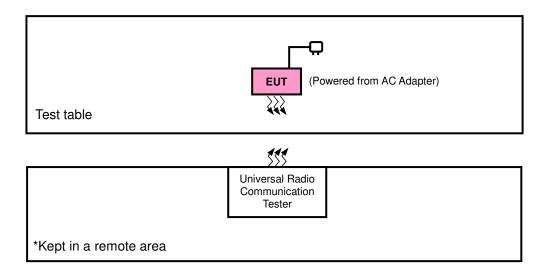
1. The EUT contains following accessory devices.

Product	Brand	Model	Description
			I/P: 100-240 Vac, 50-60 Hz, 0.15 A
Adapter 1	Verifone	SC1402	O/P: 5 Vdc, 1 A
/ dapter 1	Venione	001402	1.8m non-shielded cable w/o core
			5W adaptor of Salcomp - DoE VI
			I/P: 100-240 Vac, 50/60 Hz, 0.18 A
Adapter 2	Verifone	MU06-E050100-A1	O/P: 5 Vdc, 1 A
Adapter 2		M000-2030100-A1	1.8m non-shielded cable w/o core
			5W adaptor of leader - DoE VI
	Verifone	MU12AF050200-A1	I/P: 100-240 Vac, 50/60 Hz, 0.3 A
Adapter 3			O/P: 5 Vdc, 2 A
Adapter 5			1.8m non-shielded cable w/o core
			10W adaptor of leader - DoE VI
Battony 1	Verifone		3.8 Vdc, 1960 mAh
Battery 1	venione	BPK087-500	Manufacturer: Palladium
Pottony 2	Verifone		3.8 Vdc, 1960 mAh
Battery 2	venione	BPK087-500	Manufacturer: TWS

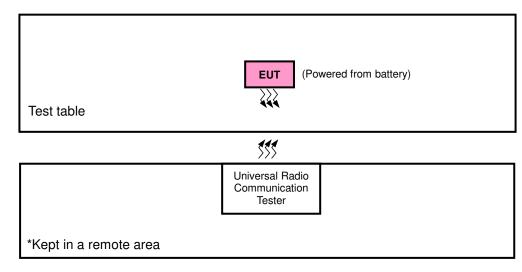
2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test

<Radiated Emission Test>



<E.R.P. Test>



3.2.1 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	123295	N/A

No.	Signal Cable Description Of The Above Support Units
1.	N/A

Note:

1. All power cords of the above support units are non-shielded (1.8m).

2. Items 1 acted as communication partners to transfer data.



3.3 Test Mode Applicability and Tested Channel Detail

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.

The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below:

Band	ERP	Radiated Emission	
GSM	Y-plane	Y-axis	

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	ERP	128 to 251	128, 189, 251	GSM
-	Frequency Stability	128 to 251	189	GSM
-	Occupied Bandwidth	128 to 251	128, 189, 251	GSM
-	Band Edge	128 to 251	128, 251	GSM
-	Peak to Average Ratio	128 to 251	128, 189, 251	GSM
-	Condcudeted Emission	128 to 251	189	GSM
-	Radiated Emission	128 to 251	189	GSM

GSM

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP	25 deg. C, 65 % RH	3.8 Vdc	Taylor Liu
Frequency Stability	25 deg. C, 65 % RH	3.8 Vdc	Taylor Liu
Occupied Bandwidth	25 deg. C, 65 % RH	3.8 Vdc	Taylor Liu
Band Edge	25 deg. C, 65 % RH	3.8 Vdc	Taylor Liu
Peak to Average Ratio	25 deg. C, 65 % RH	3.8 Vdc	Taylor Liu
Condcudeted Emission	25 deg. C, 65 % RH	3.8 Vdc	Taylor Liu
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Gavin Wu

3.4 EUT Operating Conditions

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



3.5 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 KDB 971168 D01 Power Meas License Digital Systems v02r02 ANSI/TIA/EIA-603-D 2010

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



4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

Mobile / Portable station are limited to 7 watts e.r.p.

4.1.2 Test Procedures

EIRP / ERP Measurement:

- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1 MHz for GSM, GPRS & EDGE, and 5 MHz for WCDMA and CDMA, and 10 MHz for LTE mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m 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 1 m to 4 m 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 b. Record the power level of S.G.
- d. EIRP = Output power level of S.G TX cable loss + Antenna gain of substitution horn.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 2.15 dBi.

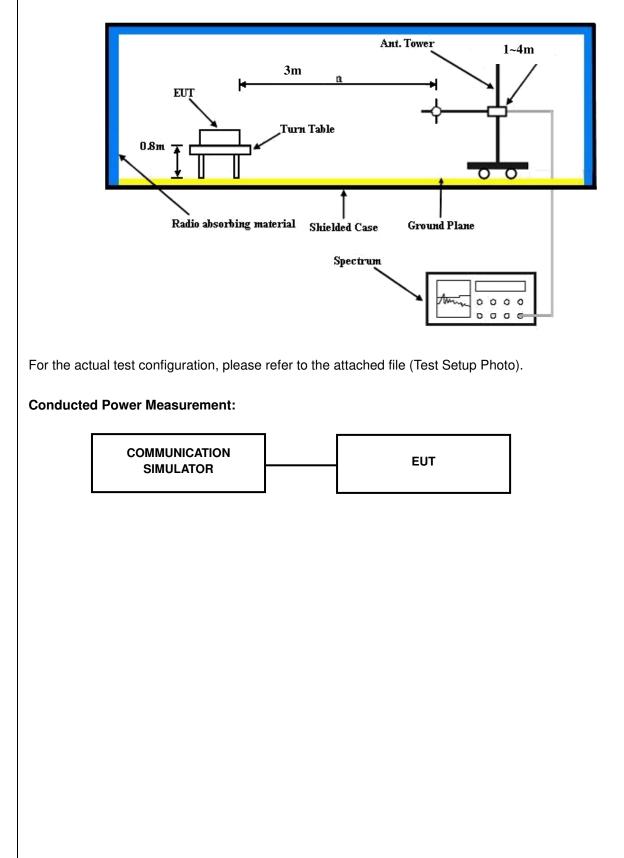
Conducted Power Measurement:

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



4.1.3 Test Setup

EIRP / ERP Measurement:





4.1.4 Test Results

Conducted Output Power (dBm)

Band	GSM850			
Channel	128 189 251			
Frequency (MHz)	824.2	836.4	848.8	
GSM	32.52	32.50	32.46	
GPRS 8	32.51	32.49	32.45	
GPRS 10	32.50	32.48	32.44	

ERP Power (dBm)

				GSM			
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
	128	824.2	-1.54	32.62	28.93	781.63	
	189	836.4	-1.25	32.52	29.12	816.58	Н
Y	251	848.8	-1.87	32.65	28.63	729.46	
r	128	824.2	-8.85	32.76	21.76	149.97	
	189	836.4	-8.21	32.39	22.03	159.59	V
	251	848.8	-8.92	32.54	21.47	140.28	

4.2 Frequency Stability Measurement

4.2.1 Limits of Frequency Stabiliity Measurement

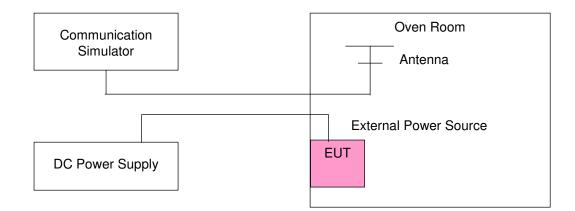
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

4.2.2 Test Procedure

- a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ± 0.5 °C during the measurement testing. 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.

4.2.3 Test Setup





4.2.4 Test Results

Frequency Error vs. Voltage

Voltage	Frequency Error (ppm)	Limit (nnm)	
(Volts)	GSM	Limit (ppm)	
3.8	0.003	2.5	
3.3	0.002	2.5	
4.2	0.001	2.5	

NOTE: The applicant defined the normal working voltage of the battery is from 3.3 Vdc to 4.2 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	Frequency Error (ppm)	Limit (ppm)	
	GSM		
-30	0.002	2.5	
-20	-0.003	2.5	
-10	-0.004	2.5	
0	-0.001	2.5	
10	-0.002	2.5	
20	-0.002	2.5	
30	0.004	2.5	
40	0.003	2.5	
50	0.002	2.5	

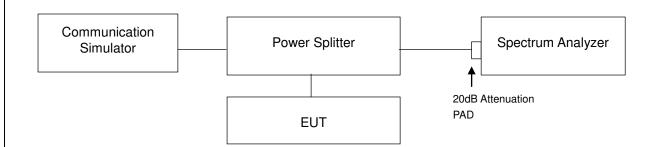


4.3 Occupied Bandwidth Measurement

4.3.1 Test Procedure

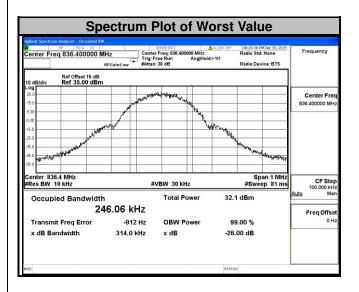
The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.3.2 Test Setup



4.3.3 Test Result

Channel	Frequency	99 % Occupied Bandwidth (kHz)
	(MHz) GSN	
128	824.2	244.76
189	836.4	246.06
251	848.8	245.82



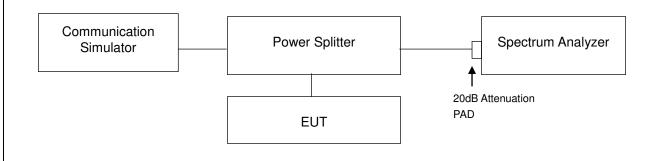


4.4 Band Edge Measurement

4.4.1 Limits of Band Edge Measurement

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.

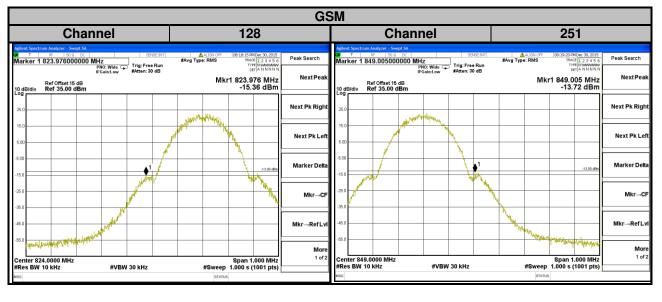
4.4.2 Test Setup



4.4.3 Test Procedures

- a. All measurements were done at low and high operational frequency range.
- b. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 3.9 kHz and VB of the spectrum is 12 kHz (GSM/GPRS/EDGE).
- c. Record the max trace plot into the test report.

4.4.4 Test Results



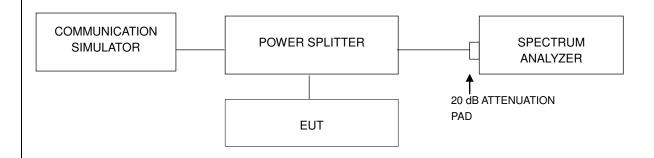


4.5 Peak to Average Ratio

4.5.1 Limits of Peak to Average Ratio Measurement

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

4.5.2 Test Setup



4.5.3 Test Procedures

- 1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
- 2. Set the number of counts to a value that stabilizes the measured CCDF curve;
- 3. Record the maximum PAPR level associated with a probability of 0.1 %.

4.5.4 Test Results

Channel	Frequency	Peak to Average Ratio (dB)	
	(MHz)	GSM	
128	824.2	0.16	
189	836.4	0.16	
251	848.8	0.15	

pilent Spectrum Analyzer - Power Stat Co RF S0 R DC	CDF	SENSE: IN	TI I	ALIGN OFF	08:22:08 PMDec 30, 2015	
enter Freq 824.200000 M	Hz	Center Freq: 8 Trig: Video	24.200000 MHz		Radio Std: None	Frequency
	#IFGain:Low	#Atten: 30 dB				
Average Power	100 %					
32.03 dBm	100 //) I				Center Fre
						824.200000 MH
96.63 % at 0dB	10 %					
	1%					
10.0 % 0.13 dB						
10.0 % 0.13 dB 1.0 % 0.15 dB	0.1 %		+ +	+ + -		
0.1% 0.16 dB						CF Ste
0.01 % 0.16 dB	0.01 %					5.000000 MH Auto Ma
0.001 % 0.16 dB						F 0//-
0.0001 % 0.16 dB	0.001 %					Freq Offs 0 H
Peak 0.16 dB						
32.19 dBm	0.0001 %					
		dB fo BW 5.000			1 dB	

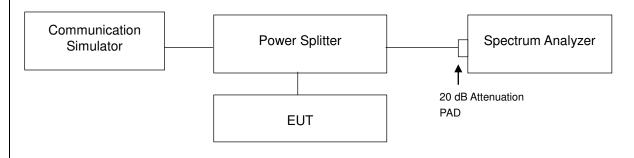


4.6 Conducted Spurious Emissions

4.6.1 Limits of Conducted Spurious Emissions Measurement

The 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 $43 + 10 \log(P) dB$. The emission limit equal to -13 dBm.

4.6.2 Test Setup



4.6.3 Test Procedure

- a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 9 GHz. 20 dB attenuation pad is connected with spectrum. RBW=1 MHz and VBW=3 MHz is used for conducted emission measurement.

4.6.4 Test Results





4.7 Radiated Emission Measurement

4.7.1 Limits of Radiated Emission Measurement

The 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 $43 + 10 \log(P) dB$. The emission limit is equal to -13 dBm.

4.7.2 Test Procedure

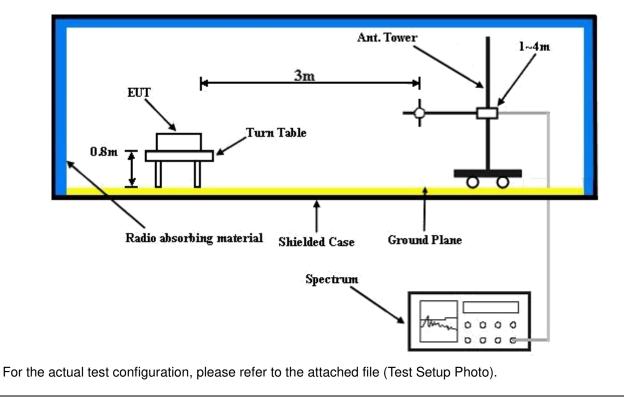
- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height 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 2.15 dBi.

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

4.7.3 Deviation from Test Standard

No deviation.

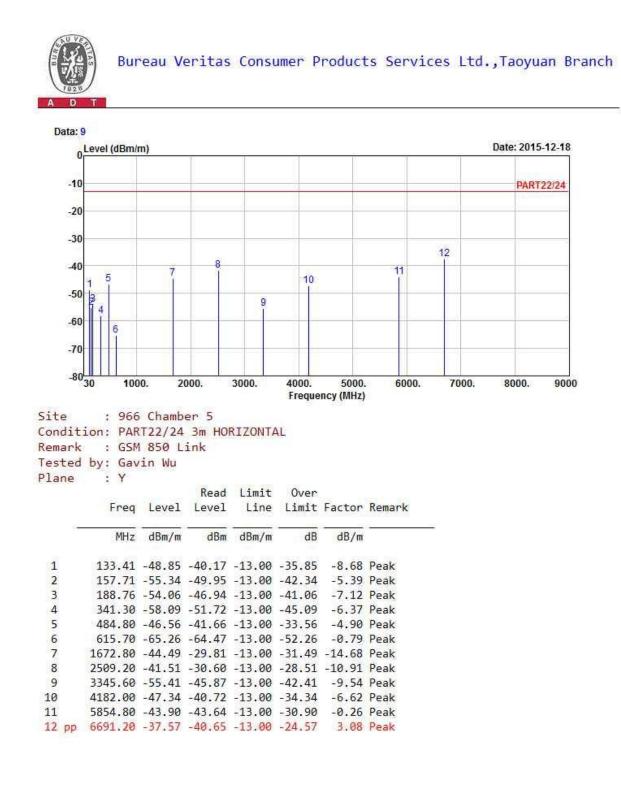
4.7.4 Test Setup





4.7.5 Test Results

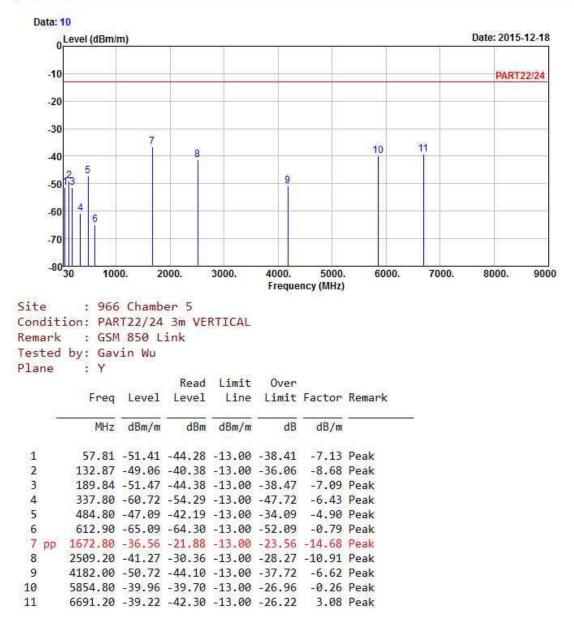
GSM:







Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch





5 Pictures of Test Arrangements

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



Appendix – 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.

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/Telecom Lab Tel: 886-3-6668565 Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Tel: 886-3-3183232 Fax: 886-3-3270892

Email: <u>service.adt@tw.bureauveritas.com</u> Web Site: <u>www.bureauveritas-adt.com</u>

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

--- END ---