FCC TEST REPORT

(PART 24)

REPORT NO.:	RF120321C23-1
MODEL NO.:	F-11D
FCC ID:	HFS-IS3
RECEIVED:	Mar. 21, 2012
TESTED:	Apr. 20, 2012
ISSUED:	May 08, 2012

APPLICANT:	Quanta Computer Inc.
ADDRESS:	No. 211, Wen Hwa 2nd Road, Kuei Shan Hsiang Tao Yuan Hsien, Taiwan R.O.C.

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
RF120321C23-1	Original release	May 08, 2012

1 CERTIFICATION

PRODUCT:	Smart Phone
MODEL:	F-11D
BRAND:	Fujitsu
APPLICANT:	Quanta Computer Inc.
TESTED:	Apr. 20, 2012
TEST SAMPLE:	Production Unit
STANDARDS:	**FCC Part 24, Subpart E**

The above equipment (model: F-11D) 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 : May 08, 2012
Pettie Chen / Specialist

APPROVED BY : _____ , DATE : May 08, 2012
Gary Chang / Technical Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 24 & Part 2			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**REMARK**
2.1046 24.232	Equivalent isotropically radiated power	PASS	Meet the requirement of limit.
2.1055 24.235	Frequency Stability	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 -28.73dB at 30.00MHz.

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	150kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 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.

2.2 TEST SITE AND 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
Mini-Circuits Power Splitter	ZN2PD-9G	NA	May 25, 2011	May 24, 2012
JFW 20dB attenuation	50HF-020-SMA	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.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Smart Phone
MODEL NO.	F-11D
POWER SUPPLY	5.0Vdc (adapter or host equipment) 3.8Vdc (battery)
MODULATION TYPE	**GSM, GPRS:** GMSK
FREQUENCY RANGE	**GSM, GPRS:** 1850.2MHz ~ 1909.8MHz
MAX. EIRP POWER	**GSM:** 0.54Watts
MULTI-SLOTS CLASS	12
ANTENNA TYPE	PIFA antenna with -3.54dBi gain
I/O PORTS	Refer to users' manual
DATA CABLE	Refer to Note as below
ACCESSORY DEVICES	Refer to Note as below

NOTE:

1. The EUT's accessories listed as below.

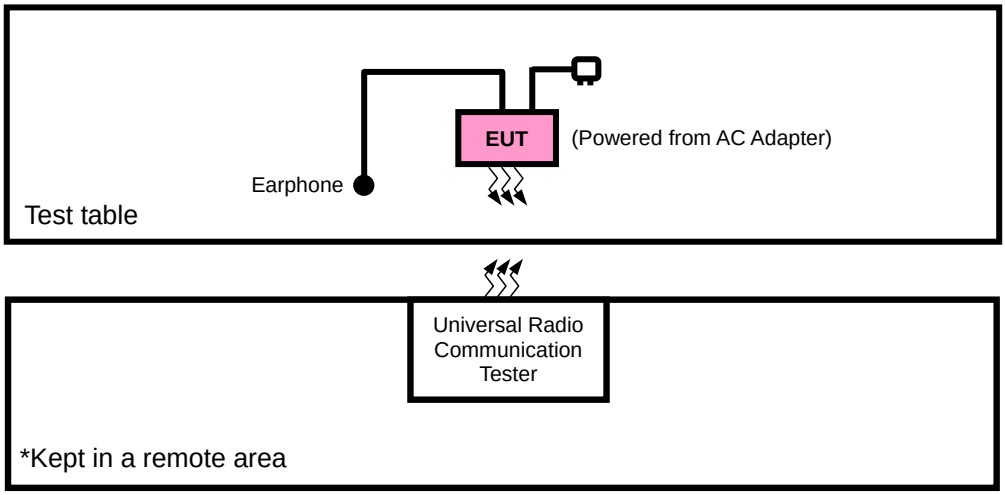
AC Adapter (not for sale)	**Brand Name**	TPT
	Model Name	MII050100
	Power Rating	I/P:100-240Vac, 50-60Hz, 13~17VA; 0.5A O/P: 5Vdc, 1A
	DC Power Cord Type	1.23 meter non-shielded cable without ferrite core
Battery	**Brand Name**	Fujitsu
	Model Name	IS3
	Power Rating	3.8Vdc, 1520mAh, 5.78Wh
	Type	Li-ion
Camera (Front)	**Brand Name**	None
	Model Name	None
Camera (Back)	**Brand Name**	MCNEX
	Model Name	IS3_5M_AF MC520B-2DB1E0149

*The AC adapter is for support unit only.

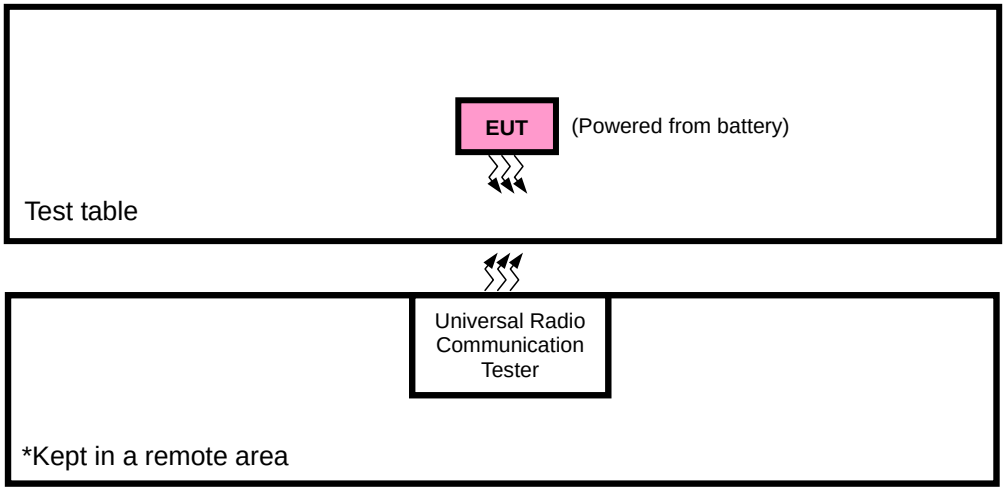
2. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST



FOR E.I.R.P. TEST



3.3 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

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

NOTE:

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

3.4 TEST ITEM AND TEST CONFIGURATION

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 on Y-plane for ERP and X-axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

GSM MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
-	EIRP	512 to 810	512, 661, 810	GSM
-	FREQUENCY STABILITY	512 to 810	661	GSM
-	OCCUPIED BANDWIDTH	512 to 810	512, 661, 810	GSM
-	BAND EDGE	512 to 810	512, 810	GSM
-	CONDCUDETED EMISSION	512 to 810	661	GSM
-	RADIATED EMISSION	512 to 810	661	GSM

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP	26deg. C, 65%RH	3.8Vdc	Phoenix Chen
FREQUENCY STABILITY	26deg. C, 65%RH	3.8Vdc	Phoenix Chen
OCCUPIED BANDWIDTH	26deg. C, 65%RH	3.8Vdc	Phoenix Chen
BAND EDGE	26deg. C, 65%RH	3.8Vdc	Phoenix Chen
CONDCUDETED EMISSION	26deg. C, 65%RH	3.8Vdc	Phoenix Chen
RADIATED EMISSION	26deg. C, 65%RH	120Vac, 60Hz	Kay Wu

3.5 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

3.6 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 24

ANSI/TIA/EIA-603-C 2004

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 and portable stations are limited to 2 watts EIRP

4.1.2 TEST PROCEDURES

EIRP MEASUREMENT:

a. All measurements were done at low, middle and high operational frequency range. RWB and VBW is 1MHz for GSM.

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 b. Record the power level of S.G

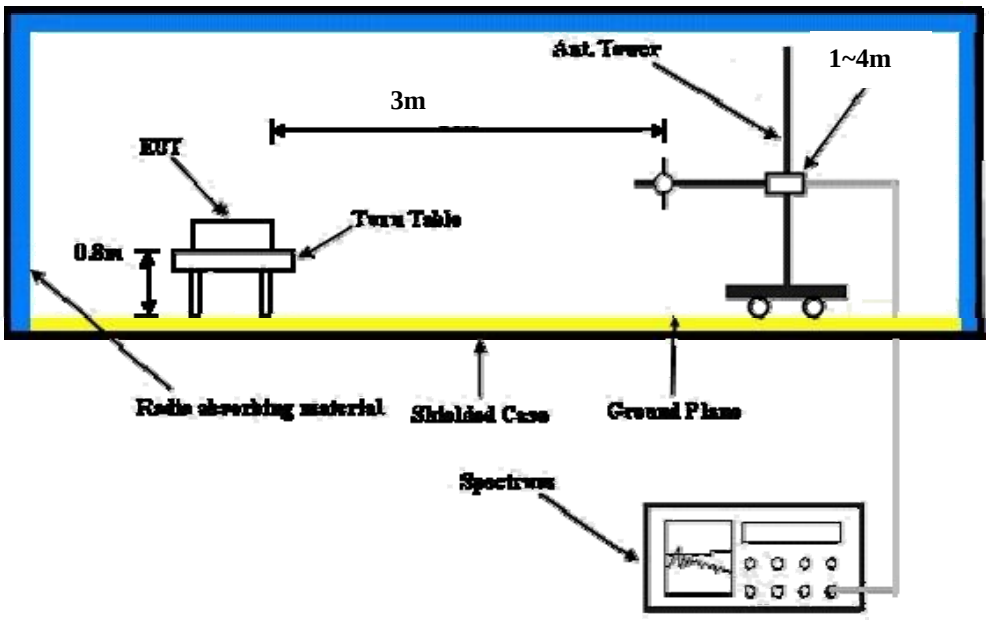
d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

CONDUCTED POWER MEASUREMENT:

The EUT was set up for the maximum power with GSM 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.

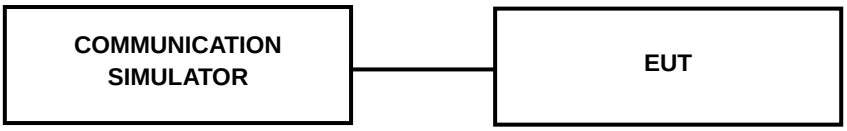
4.1.3 TEST SETUP

EIRP 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).

4.1.4 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm)

Band	GSM1900		
Channel	512	661	810
Frequency (MHz)	1850.2	1880.0	1909.8
GSM (GMSK, 1 slot)	28.35	28.21	28.36
GPRS 8 (GMSK, 1 slot)	27.98	28.71	27.95
GPRS 10 (GMSK, 2 slot)	25.88	25.81	25.87
GPRS 11 (GMSK, 3 slot)	24.76	24.46	24.31
GPRS 12 (GMSK, 4 slot)	24.48	24.09	24.44

EIRP POWER (dBm)

GSM 1900

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(W)	Polarization (H/V)
Y	512	1850.2	-21.09	38.19	17.10	0.05	H
	661	1880.0	-21.12	38.70	17.58	0.06	H
	810	1909.8	-21.01	39.35	18.34	0.07	H
	512	1850.2	-11.20	38.48	27.28	0.53	V
	661	1880.0	-11.25	38.59	27.34	0.54	V
	810	1909.8	-12.48	38.87	26.39	0.44	V

4.2 FREQUENCY STABILITY MEASUREMENT

4.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

4.2.2 TEST PROCEDURE

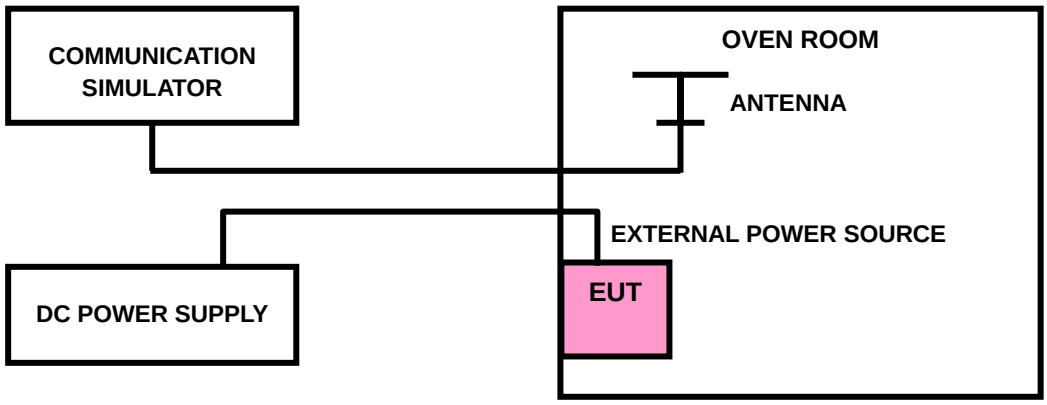
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

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℃ 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 (Volts)	FREQUENCY ERROR (ppm)	LIMIT (ppm)
	GSM	
3.8	-0.02	2.5
3.4	-0.02	2.5
4.35	-0.02	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.4Vdc to 4.35Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

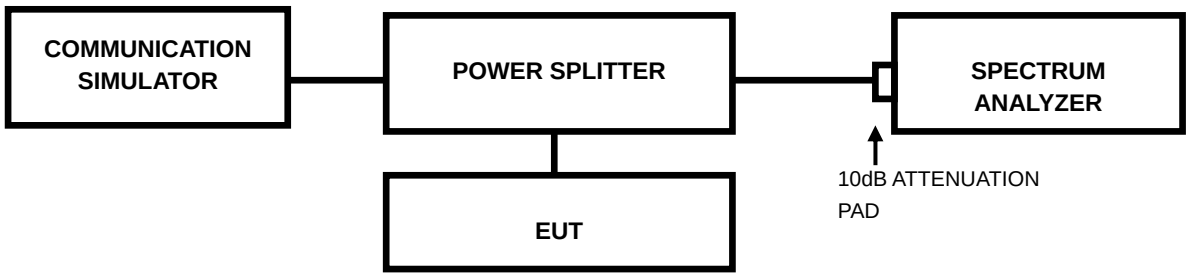
TEMP. (℃)	FREQUENCY ERROR (ppm)	LIMIT (ppm)
	GSM	
-10	-0.02	2.5
0	-0.02	2.5
10	-0.02	2.5
20	-0.02	2.5
30	-0.02	2.5
40	-0.02	2.5
50	-0.02	2.5
55	-0.02	2.5

4.3 OCCUPIED BANDWIDTH MEASUREMENT

4.3.1 TEST PROCEDURES

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.

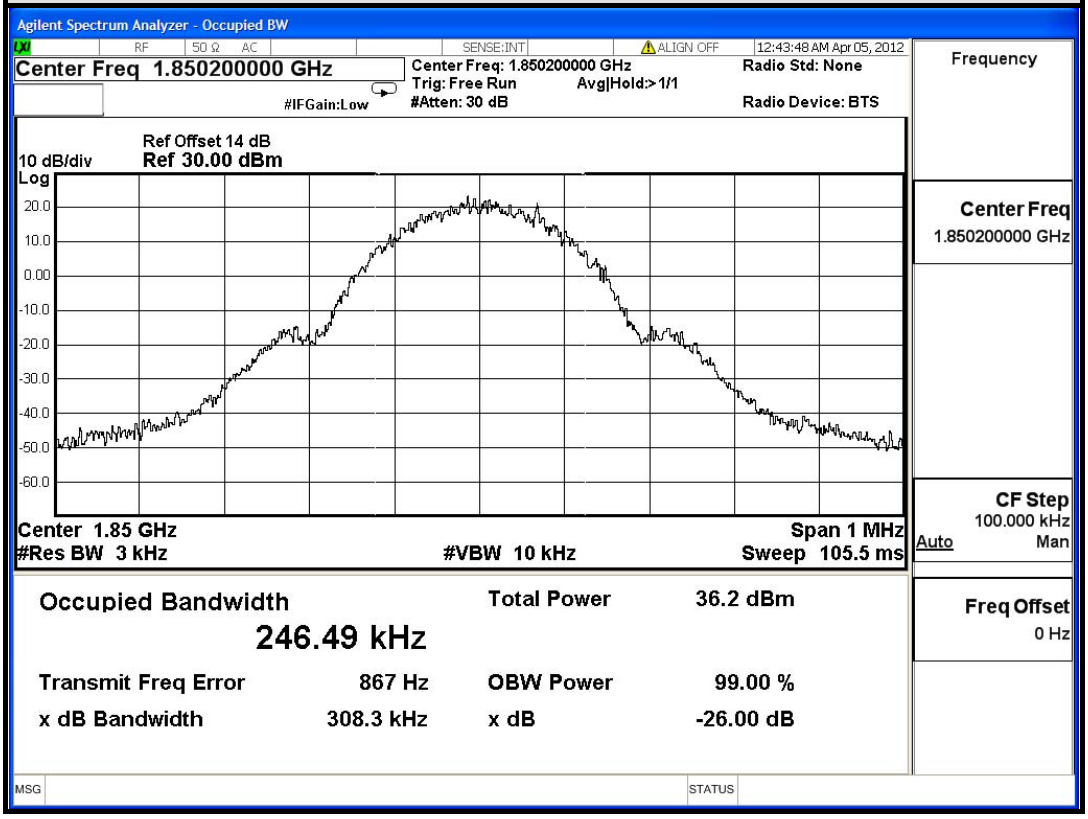
4.3.2 TEST SETUP



4.3.3 TEST RESULTS

CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (kHz)
		GSM
512	1850.2	246.49
661	1880.0	243.91
810	1909.8	245.81

SPECTRUM PLOT OF WORST VALUE
GSM

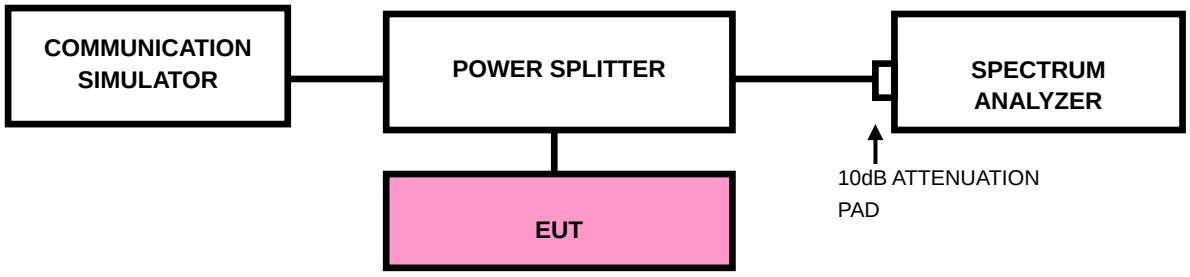


4.4 BAND EDGE MEASUREMENT

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

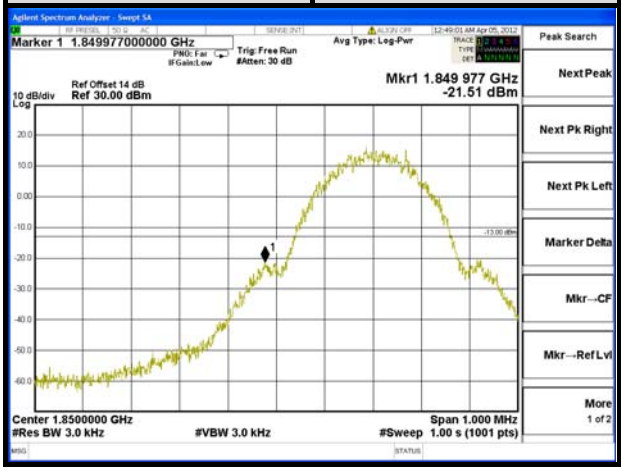
a. All measurements were done at low and high operational frequency range.

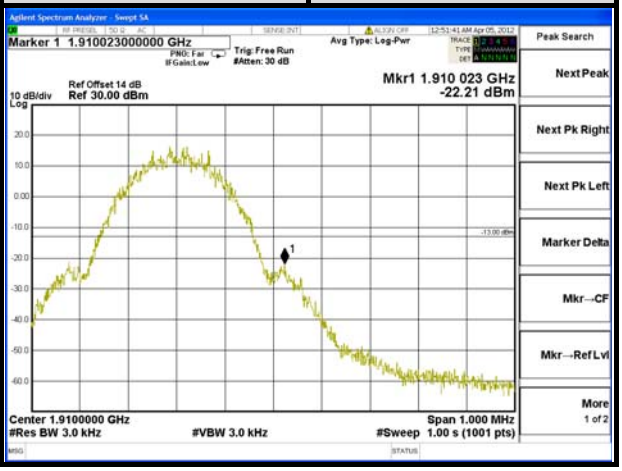
b. The center frequency of spectrum is the band edge frequency and span is 1.5 MHz. RB of the spectrum is 3kHz and VB of the spectrum is 3kHz (GSM).

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

4.4.4 TEST RESULTS

GSM			
CHANNEL	512	CHANNEL	810





4.5 CONDUCTED SPURIOUS EMISSIONS

4.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

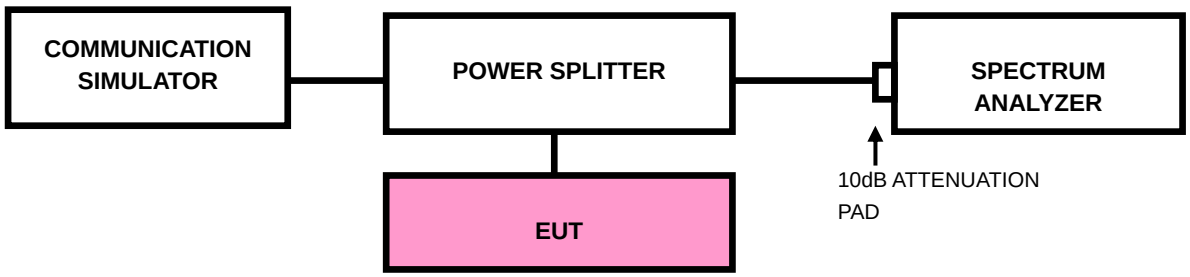
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

4.5.2 TEST PROCEDURE

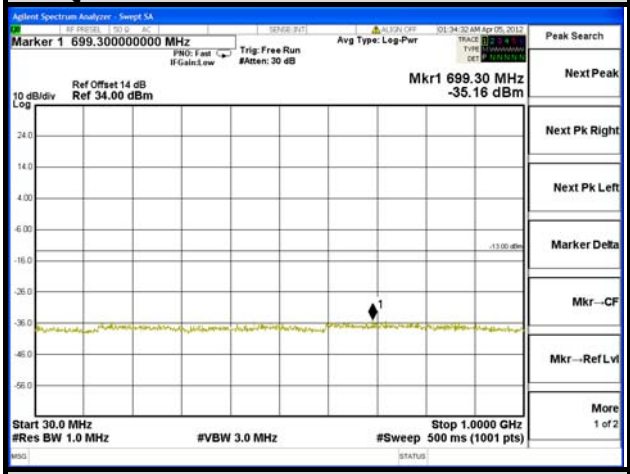
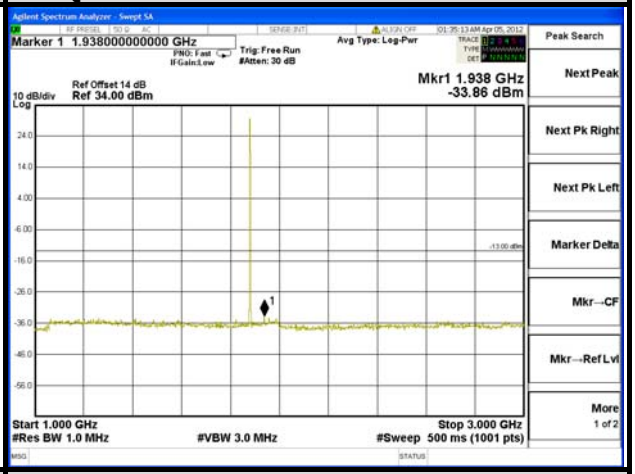
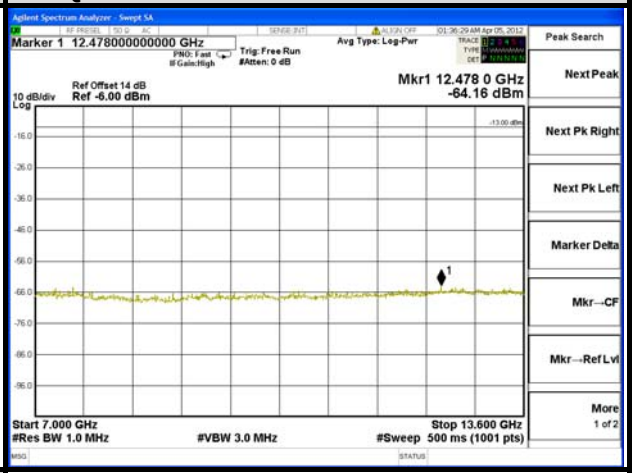
a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.

b. Measuring frequency range is from 30MHz to 19.1GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

4.5.3 TEST SETUP



4.5.4 TEST RESULTS

GSM	
CHANNEL 661	
FREQUENCY RANGE : 30MHz~1GHz	FREQUENCY RANGE : 1GHz~3GHz
	
FREQUENCY RANGE : 3GHz~7GHz	FREQUENCY RANGE :7GHz~13.6GHz
	
FREQUENCY RANGE :13.6GHz~19.1GHz	
	

4.6 RADIATED EMISSION MEASUREMENT

4.6.1 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 equal to –13dBm.

4.6.2 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.

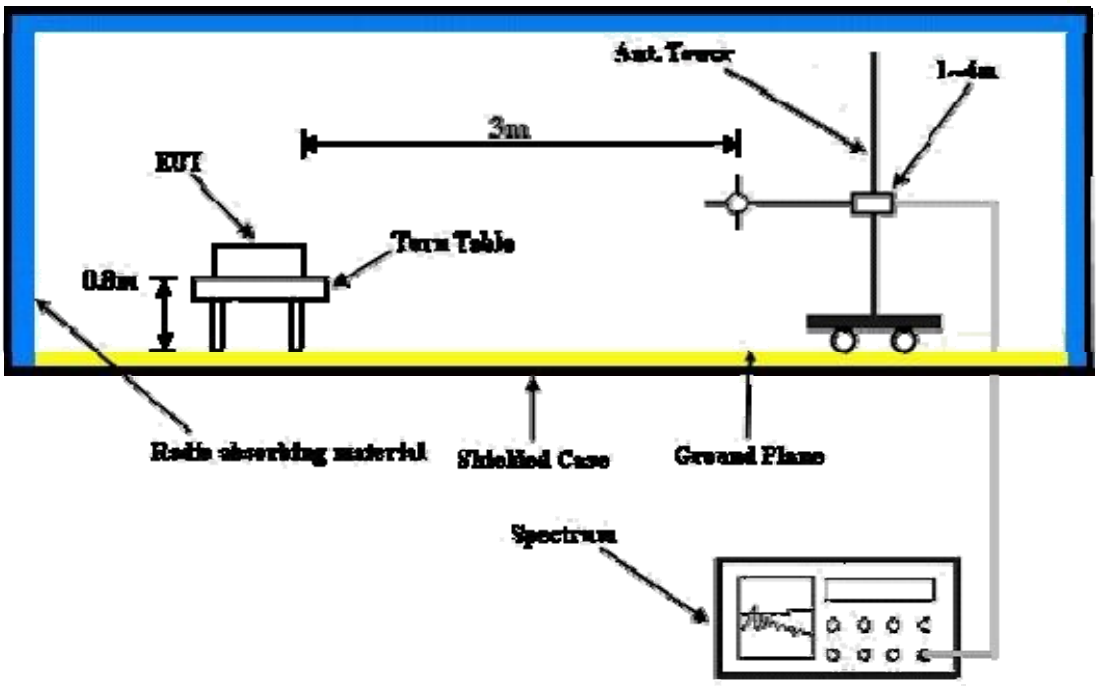
d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.

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

4.6.3 DEVIATION FROM TEST STANDARD

No deviation

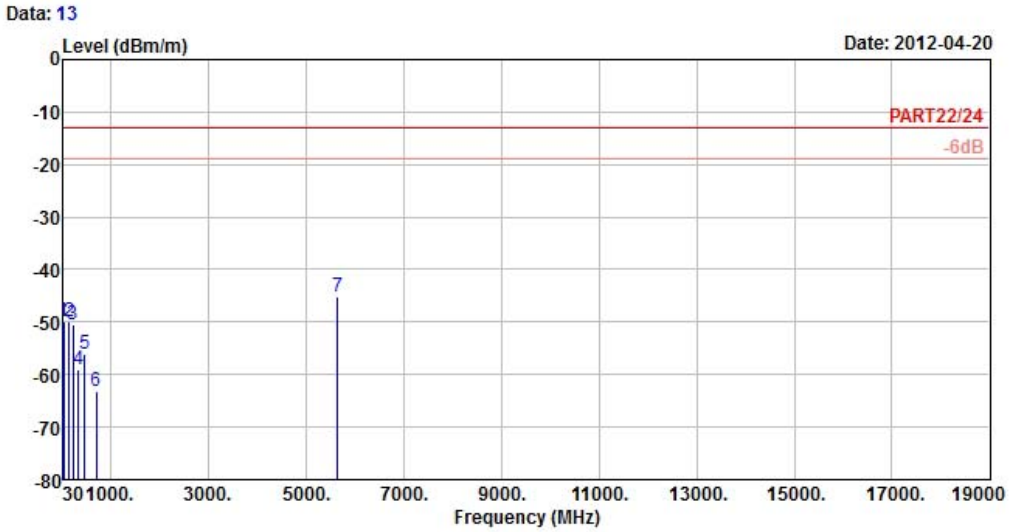
4.6.4 TEST SETUP



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

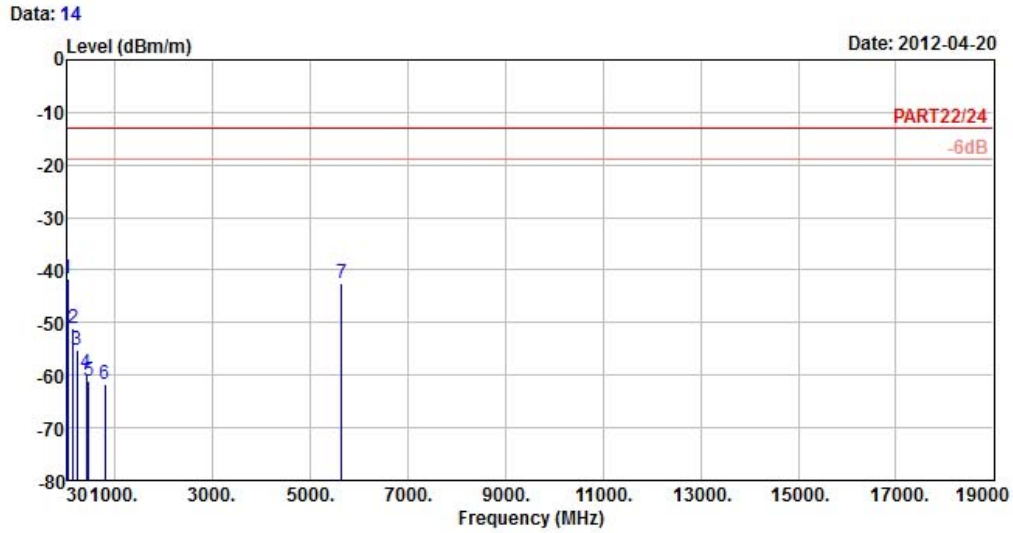
4.6.5 TEST RESULTS

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition : PART22/24 3m EIRP_RSE_1G~19G_3 HORIZONTAL
Brand/Model: **F-11D**
Remark : PCS1900 Link(Battery 2)
Tested by : Kay Wu
Temprature : 25℃
Humidity : 65%
Plane : X

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	30.00	-49.74	-50.81	-13.00	-36.74	1.07	Peak
2	140.70	-49.97	-44.24	-13.00	-36.97	-5.73	Peak
3	227.10	-50.49	-43.76	-13.00	-37.49	-6.73	Peak
4	330.80	-58.99	-52.84	-13.00	-45.99	-6.15	Peak
5	469.40	-56.13	-52.26	-13.00	-43.13	-3.87	Peak
6	703.20	-63.09	-64.56	-13.00	-50.09	1.47	Peak
7 pp	5640.00	-45.02	-45.23	-13.00	-32.02	0.21	Peak



Site : 966 Chamber 5
Condition : PART22/24 3m EIRP_RSE_1G~19G_3 VERTICAL
Brand/Model: **F-11D**
Remark : PCS1900 Link(Battery 2)
Tested by : Kay Wu
Temprature : 25℃
Humidity : 65%
Plane : X

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1 pp	30.00	-41.73	-42.80	-13.00	-28.73	1.07	Peak
2	140.16	-51.08	-45.35	-13.00	-38.08	-5.73	Peak
3	224.94	-55.14	-48.33	-13.00	-42.14	-6.81	Peak
4	410.60	-59.59	-54.22	-13.00	-46.59	-5.37	Peak
5	464.50	-61.04	-57.04	-13.00	-48.04	-4.00	Peak
6	794.90	-61.82	-63.92	-13.00	-48.82	2.10	Peak
7	5640.00	-42.57	-42.78	-13.00	-29.57	0.21	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: 886-3-3270892
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 any modifications are made to the EUT by the lab during the test.

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