

# VARIANT FCC TEST REPORT (PART 90S)

REPORT NO.: RF120117C24B

**MODEL NO.:** PJ75100

**FCC ID:** NM8PJ75100

**RECEIVED:** May 02, 2012

**TESTED:** May 10, 2012

**ISSUED:** May 16, 2012

**APPLICANT:** HTC Corporation

ADDRESS: 23, Xinghua Rd., Taoyuan 330, 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
RF120117C24B	N/A	May 16, 2012

Report No.: RF120117C24-7 4 Report Format Version 4.0.0



## **CERTIFICATION**

**PRODUCT:** Smartphone

**MODEL:** PJ75100

**BRAND: HTC** 

**APPLICANT: HTC Corporation** 

**TESTED**: May 10, 2012

**TEST SAMPLE:** Production Unit

STANDARDS: FCC Part 90, Subpart S

This report is issued as a supplementary report of BVADT report no.: RF120117C24-7. This report shall be used by combining with its original report.

PREPARED BY : \_\_\_\_\_\_, DATE : \_\_\_\_\_\_ May 16, 2012

Gary Chang / Technical Manager , DATE : May 16, 2012 APPROVED BY



## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 90 & Part 2					
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK		
2.1046 90.635 (b)	Maximum Peak Output Power Limit: max. 100 watts e.r.p peak power	PASS	Meet the requirement of limit. Max. e.r.p is 20.04dBm at 684MHz.		
2.1055 90.213	Frequency Stability AFC Freq. Error vs. Voltage AFC Freq. Error vs. Temperature Limit: max. ±2.5ppm	PASS	Meet the requirement of limit.		
2.1049 90.209	Occupied Bandwidth (*)	PASS	Meet the requirement of limit.		
2.1051 90.691	Emission Masks	PASS	Meet the requirement of limit.		
2.1051 90.691	Conducted Spurious Emissions	PASS	Meet the requirement of limit.		
2.1053 90.691	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is –22.68dB at 38.37MHz.		

Note: (\*) The test case of bandwidth limitations is waiver, and please refer to appendix B.

## 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	
	30MHz ~ 200MHz	3.34 dB	
Dodiated emissions	200MHz ~1000MHz	3.35 dB	
Radiated emissions	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	Smartphone		
MODEL NO.	PJ75100		
POWER SUPPLY	5.0Vdc (adapter or host equipment) 3.7Vdc (Li-ion battery)		
MODULATION TYPE	CDMA QPSK, OQPSK, HPSK		
FREQUENCY RANGE	<b>CDMA</b> 817.9MHz ~ 823.1MHz		
MAX. ERP POWER	CDMA 0.10Watts		
ANTENNA TYPE	Fixed Internal antenna with -2dBi gain for CDMA Fixed Internal antenna with -3.5dBi gain for EVDO		
I/O PORTS	Refer to users' manual		
DATA CABLE	Refer to Note as below		
ACCESSORY DEVICES	Refer to I	Note as below	

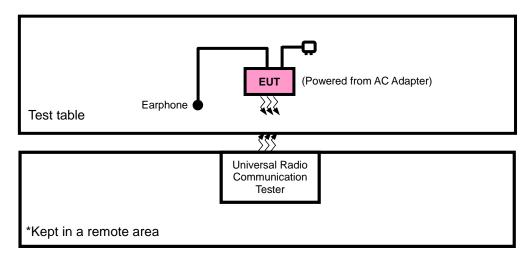
#### NOTE:

- 1. This report is prepared for FCC class II permissive change. The report is issued as a supplementary report of the original BVADT report no.: RF120117C24-7. The difference compared with the original report is extending the channel to Ch684.
- 2. The EUT's accessories list refers to EUT photo.
- 3. 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.

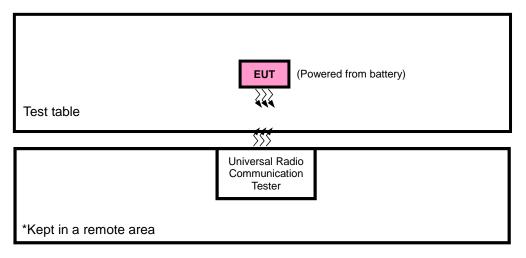


## 3.2 CONFIGURATION OF SYSTEM UNDER TEST

## FOR RADIATION EMISSION TEST



## **FOR E.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
2	Radio Communication Analyzer	Anritsu	MT8820C	6201010284	NA
3	Earphone	Merry	RC E190	NA	NA

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

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

NOTE 2: Item 1-2 acted as a communication partners to transfer data.

NOTE 3: Item 3 was provided by client.



## 3.4 DESCRIPTION OF TEST MODES

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 Z-axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
-	OUTPUT POWER	476 to 684	476, 580, 684	CDMA2000
-	FREQUENCY STABILITY	476 to 684	580	CDMA2000
-	OCCUPIED BANDWIDTH	476 to 684	580	CDMA2000
-	EMISSION MASKS	476 to 684	580	CDMA2000
-	CONDUCTED SPURIOUS EMISSION	476 to 684	580	CDMA2000
-	RADIATED SPURIOUS EMISSION	476 to 670	580	CDMA2000

## **TEST CONDITION:**

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
OUTPUT POWER	25deg. C, 53%RH	3.7Vdc	Phoenix Chen
CONDUCTED SPURIOUS EMISSION	25deg. C, 53%RH	3.7Vdc	Phoenix Chen
OCCUPIED BANDWIDTH	25deg. C, 53%RH	3.7Vdc	Phoenix Chen
EMISSION MASKS	25deg. C, 53%RH	3.7Vdc	Phoenix Chen
CONDUCTED SPURIOUS EMISSION	25deg. C, 53%RH	3.7Vdc	Phoenix Chen
RADIATED SPURIOUS EMISSION	25deg. 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 90
ANSI C63.4-2003
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

The radiated peak output power shall be according to the specific rule Part 90.635 that "Mobile station are limited to 100 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. RWB and VBW is 5MHz for CDMA mode.
- 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.

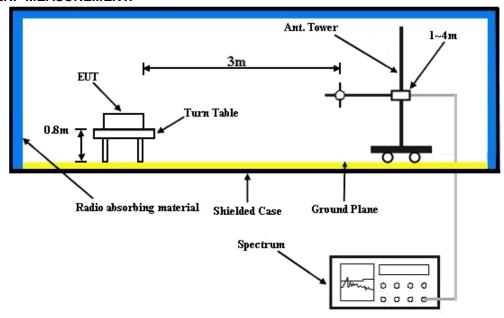
## **CONDUCTED POWER MEASUREMENT:**

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



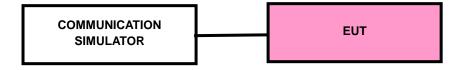
## 4.1.3 TEST SETUP

#### **EIRP / ERP MEASUREMENT:**



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	CDMA2000 BC0		
Channel	476	580	684
Frequency	817.9	820.5	823.1
RC1+SO55	25.03	24.98	24.89
RC3+SO55	25.04	25.02	24.86
RC3+SO32(+ F-SCH)	25.02	25.01	24.80
RC3+SO32(+SCH)	25.03	25.01	24.79
RTAP 153.6	24.06	24.04	23.83
RETAP 4096	23.96	23.96	23.99

## **ERP POWER**

## FOR CDMA MODE

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(W)	Polarization (H/V)
	476	817.9	-10.75	32.63	19.73	0.09	Н
Y	580	820.5	-10.90	32.74	19.69	0.09	Н
	684	823.1	-10.64	32.83	20.04	0.10	Н
	476	817.9	-18.67	32.77	11.95	0.02	V
	580	820.5	-18.85	32.61	11.61	0.01	V
	684	823.1	-18.00	32.72	12.57	0.02	V



## 4.2 FREQUENCY STABILITY MEASUREMENT

#### 4.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

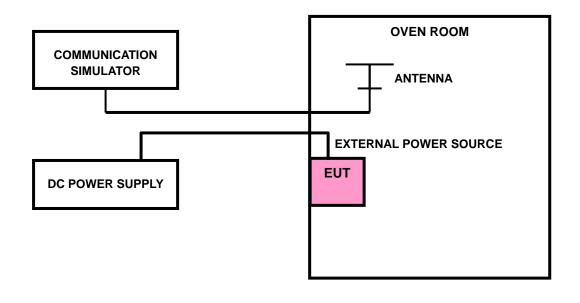
1.5 ppm for fixed and base station. 2.5 ppm is for mobile station

#### 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  $\pm 0.5$ °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



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## 4.2.4 TEST RESULTS

## FOR CDMA:

AFC FREQUENCY ERROR vs. VOLTAGE							
VOLTAGE (Volts)	FREQUENCY ERROR (Hz)	FREQUENCY ERROR (ppm)	LIMIT (ppm)				
3.8	9.12	0.01	2.5				
3.6	9.17	0.01	2.5				
4.2	9.95	0.01	2.5				

**NOTE:** The applicant defined the normal working voltage of the battery is from 3.6Vdc to 4.2Vdc.

AFC FREQUENCY ERROR vs. TEMP.							
TEMP. (°C)	FREQUENCY ERROR (Hz) FREQUENCY ERROR (ppm)		LIMIT (ppm)				
-10	9.61	0.01	2.5				
0	9.63	0.01	2.5				
10	9.17	0.01	2.5				
20	8.63	0.01	2.5				
30	9.35	0.01	2.5				
40	9.30	0.01	2.5				
50	9.68	0.01	2.5				
55	8.94	0.01	2.5				

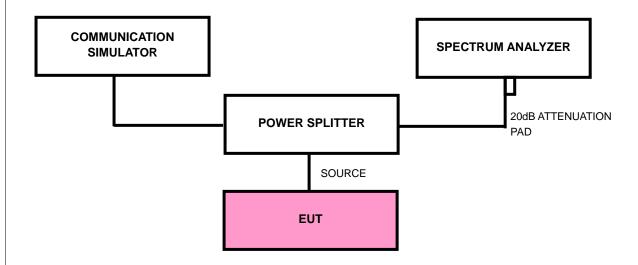


#### 4.3 OCCUPIED BANDWIDTH MEASUREMENT

## 4.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

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



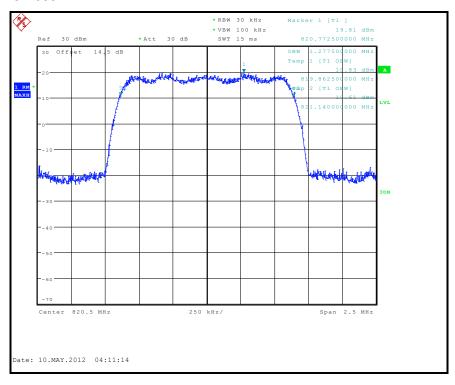


## 4.3.3 TEST RESULTS

## **FOR CDMA MODE**

CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)
580	820.5	1.2775

## **CH 580**



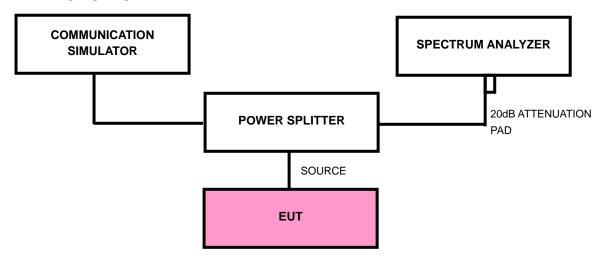


## 4.4 EMISSION MASK MEASUREMENT

## 4.4.1 LIMITS OF BAND EDGE MEASUREMENT

According to FCC part 90.691 shall be tested the emission mask. For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50 + 10 Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

## 4.4.2 TEST SETUP



## 4.4.3 TEST PROCEDURES

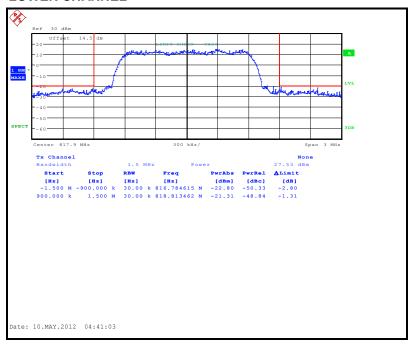
- a. The measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- b. Record the test plot.



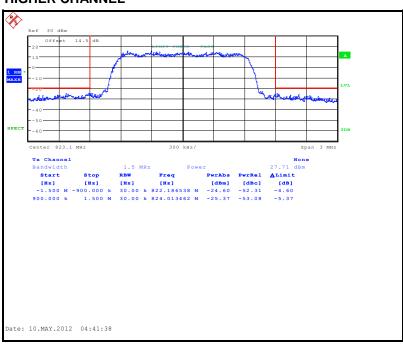
## 4.4.4 TEST RESULTS

## **FOR CDMA MODE**

## **LOWER CHANNEL**



## **HIGHER CHANNEL**





## 4.5 CONDUCTED SPURIOUS EMISSIONS

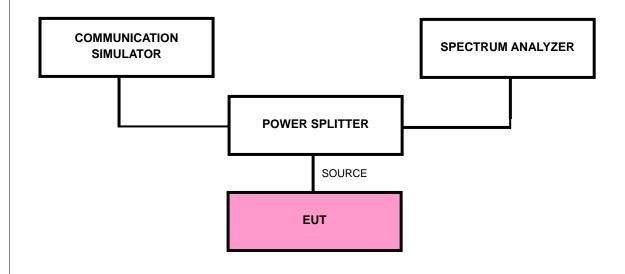
## 4.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

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 PROCEDURE

- a. All measurements were done at 3 channels, 476, 573 and 670 (low, middle and high operational frequency range.)
- 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.

## 4.5.3 TEST SETUP

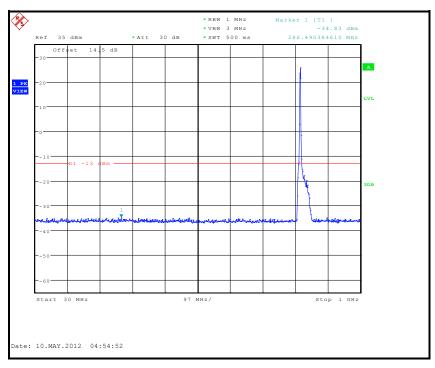




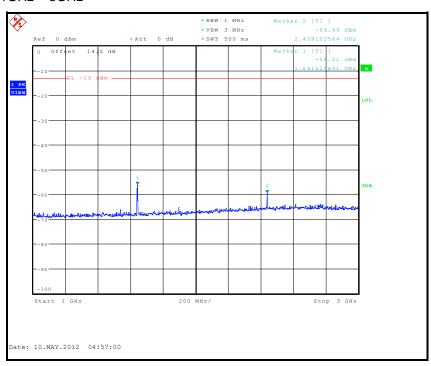
## 4.5.4 TEST RESULTS

## FOR CDMA:

**CH580:** 30MHz ~ 1GHz

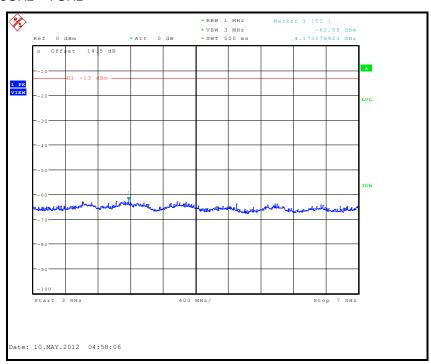


## 1GHz ~ 3GHz

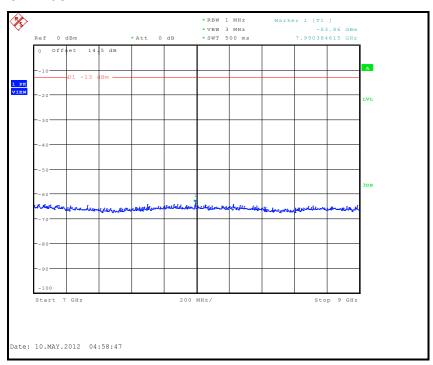




## 3GHz ~ 7GHz



## 7GHz ~ 9GHz





## 4.6 RADIATED EMISSION MEASUREMENT

## 4.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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.

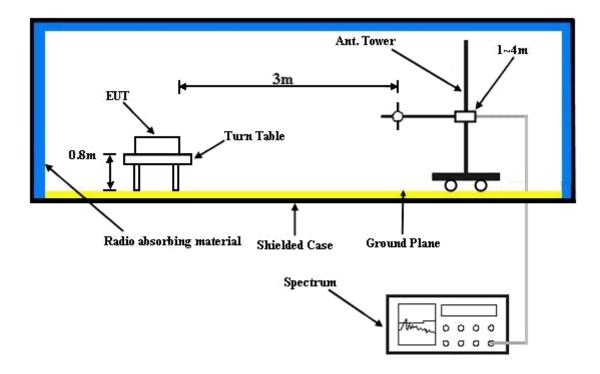
**NOTE:** The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

#### 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).

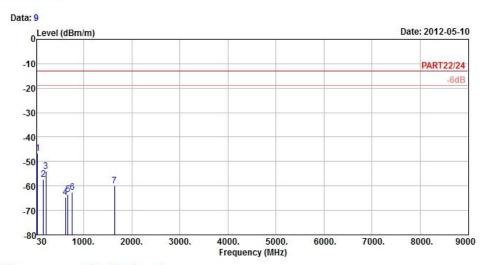


## 4.6.6 TEST RESULTS

#### **FOR CDMA:**



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 Chamber 5

Condition : PART22/24 3m EIRP\_RSE\_1G~19G\_3 HORIZONTAL

Brand/Model: PJ75100

: 1XRTT CH580 Link Remark

Tested by : Kay Wu Temprature : 25℃ Humidity : 65% Plane : X

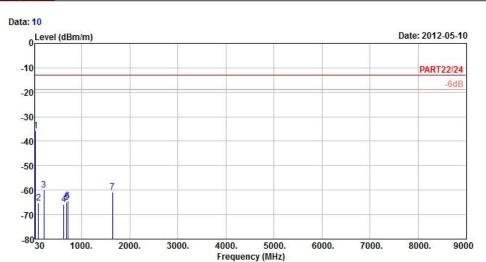
	Freq	Level	Level	Line	Limit	Factor	Remark
-	MHz	dBm/m	dBm	dBm/m	dB	dB/m	P <u></u>
1 pp	37.83	-46.68	-44.73	-13.00	-33.68	-1.95	Peak
2	161.22	-57.13	-50.60	-13.00	-44.13	-6.53	Peak
3	216.30	-54.03	-46.82	-13.00	-41.03	-7.21	Peak
4	620.60	-64.59	-64.61	-13.00	-51.59	0.02	Peak
5	673.80	-63.59	-64.57	-13.00	-50.59	0.98	Peak
6	760.60	-62.55	-64.41	-13.00	-49.55	1.86	Peak
7	1641.00	-59.87	-47.06	-13.00	-46.87	-12.81	Peak

Read Limit Over





## Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 Chamber 5

Condition : PART22/24 3m EIRP\_RSE\_1G~19G\_3 VERTICAL

Brand/Model: PJ75100

Remark : 1XRTT CH580 Link Tested by : Kay Wu

Tested by : Kay W Temprature : 25°C Humidity : 65% Plane : X

Lanc							
	Freq	Level	Read Level	Limit Line		Factor	Remark
8	MHz	dBm/m	dBm	dBm/m	dB	dB/m	<u> </u>
1 pp	38.37	-35.68	-33.94	-13.00	-22.68	-1.74	Peak
2	100.74	-65.37	-54.95	-13.00	-52.37	-10.42	Peak
3	215.22	-59.82	-52.57	-13.00	-46.82	-7.25	Peak
4	629.00	-65.93	-66.10	-13.00	-52.93	0.17	Peak
5	687.80	-64.99	-66.21	-13.00	-51.99	1.22	Peak
6	709.50	-64.24	-65.76	-13.00	-51.24	1.52	Peak
7	1641.00	-60.90	-48.09	-13.00	-47.90	-12.81	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: <a href="https://www.adt.com.tw/index.5.phtml">www.adt.com.tw/index.5.phtml</a>. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab: Hsin Chu EMC/RF Lab:

Tel: 886-2-26052180 Tel: 886-3-5935343 Fax: 886-2-26051924 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.



## 8 APPENDIX B - FCC Document

Please see OpDes (Waiver)\_NM8PJ75100.pdf

---END---