



# FCC TEST REPORT (PART 27)

**REPORT NO.:** RF110330C13A

**MODEL NO.:** PG86300

**FCC ID:** NM8PG86300

**RECEIVED:** Mar. 30, 2011

**TESTED:** Apr. 27 ~ May 10, 2011

**ISSUED:** May 16, 2011

**APPLICANT:** HTC Corporation

**ADDRESS:** No. 23, Xinghua Rd., Taoyuan City, Taoyuan, 330  
Taiwan

**ISSUED BY:** Bureau Veritas Consumer Products Services  
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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	NA	May 16, 2011



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## 1 CERTIFICATION

**PRODUCT** : Smart Phone

**BRAND** : hTC

**MODEL** : PG86300

**APPLICANT** : HTC Corporation

**TESTED** : Apr. 27 ~ May 10, 2011

**TEST SAMPLE** : Production Unit

**TEST STANDARDS** : FCC Part 27, Subpart C, L

**FCC Part 2**

ANSI C63.4-2003

The above equipment (model: PG86300) 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** : Ivy Lin , **DATE**: May 16, 2011  
Ivy Lin / Specialist

**APPROVED BY** : Gary Chang , **DATE**: May 16, 2011  
Gary Chang / Assistant Manager

## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

OPERATING BAND: 1710~1755 MHz			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
2.1046 27.50(d)(4)	Maximum Peak Output Power Limit: max. 1 watts e.i.r.p peak power	PASS	Meet the requirement of limit. Minimum passing margin is 21.1dBm at 1732.4MHz.
2.1055 27.54	Frequency Stability	PASS	Meet the requirement of limit.
2.1049 27.53(h)	Occupied Bandwidth	PASS	Meet the requirement of limit.
27.50(d)(5)	Peak to average ratio	PASS	Meet the requirement of limit.
27.53(h)	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 27.53(h)	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 27.53(h)	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -14.7dB at 3424.8MHz.

### 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
Radiated emissions	30MHz ~ 200MHz	3.19 dB
	200MHz ~1000MHz	3.21 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

<b>PRODUCT</b>	Smart Phone
<b>MODEL NO.</b>	PG86300
<b>FCC ID</b>	NM8PG86300
<b>POWER SUPPLY</b>	3.7Vdc (Rechargeable lithium battery) 3.8Vdc (Rechargeable lithium battery) 5.0Vdc (Power adapter) 5.0Vdc (host equipment)
<b>OPERATION TEMPERATURE RANGE</b>	-20°C ~ 55°C
<b>MODULATION TECHNOLOGY</b>	BPSK
<b>FREQUENCY RANGE</b>	1712.4MHz ~1752.6MHz
<b>MAX. EIRP POWER (W)</b>	0.129W
<b>WCDMA RELEASE VERSION</b>	6
<b>ANTENNA TYPE</b>	Fixed internal antenna with -2.0dBi gain
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	Refer to user's manual
<b>ACCESSORY DEVICES</b>	Refer to note as below

**NOTE:**

1. The EUT is a Smart Phone. The functions of EUT listed as below:

	TEST STANDARD	REFERENCE REPORT
<b>WLAN 802.11b/g/n</b>	FCC Part 15, Subpart C (Section 15.247)	RF110330C13
<b>BLUETOOTH V3.0</b>		RF110330C13-1
<b>GSM 850</b>	FCC Part 22	RF110330C13-2
<b>GSM 1900</b>	FCC Part 24	RF110330C13-3
<b>WCDMA</b>	FCC Part 27	RF110330C13A

2. The communicated functions of EUT listed as below:

		850MHz	1700MHz	1900MHz	With 802.11b/g/n + Bluetooth + GPS
2G	GSM	√		√	
	GPRS	√		√	
	E-GPRS	√		√	
3G	WCDMA		√		
	HSDPA		√		
	HSUPA		√		

3. IMEI code: 35687104\*\*\*\*\*



4. The EUT has following accessories.

NO.	PRODUCT	BRAND	MODEL	DESCRIPTION
1	Power Adapter	hTC	TC X250 (X= U, B, E, C, A)	I/P: 100-240Vac, 200mA, 50-60Hz O/P: 5Vdc, 1A Manufacture: Emerson
2				I/P: 100-240Vac, 200mA, 50-60Hz O/P: 5Vdc, 1A Manufacture: Delta
3				I/P: 100-240Vac, 200mA, 50-60Hz O/P: 5Vdc, 1A Manufacture: Phihong
4	Battery	hTC	BG86100	Rating: 3.8Vdc, 1730mAh, 6.57Whr Manufacture: HT ENERGY
5				Rating: 3.7Vdc, 1730mAh, 6.40Whr Manufacture: HT ENERGY
6	USB cable	Chant Sincere Co., LTD (COXOC)	DC M410	1.30m non-shielded cable w/o core
7				1.27m non-shielded cable w/o core
8		Foxlink		1.25m non-shielded cable w/o core
9		MEC		1.27m non-shielded cable w/o core
10	Earphone cable	Merry	RC E160	1.23m non-shielded cable without core

5. The EUT configured with the following accessories is worst combination for final test.

ACCESSORY	BRAND	MANUFACTURE	MODEL	REMARK
Battery	hTC	HT ENERGY	BG86100	3.8Vdc
USB cable	Chant Sincere Co., LTD (COXOC)	-	DC M410	1.27m cable
Earphone cable	Merry	-	RC E160	-

6. 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.

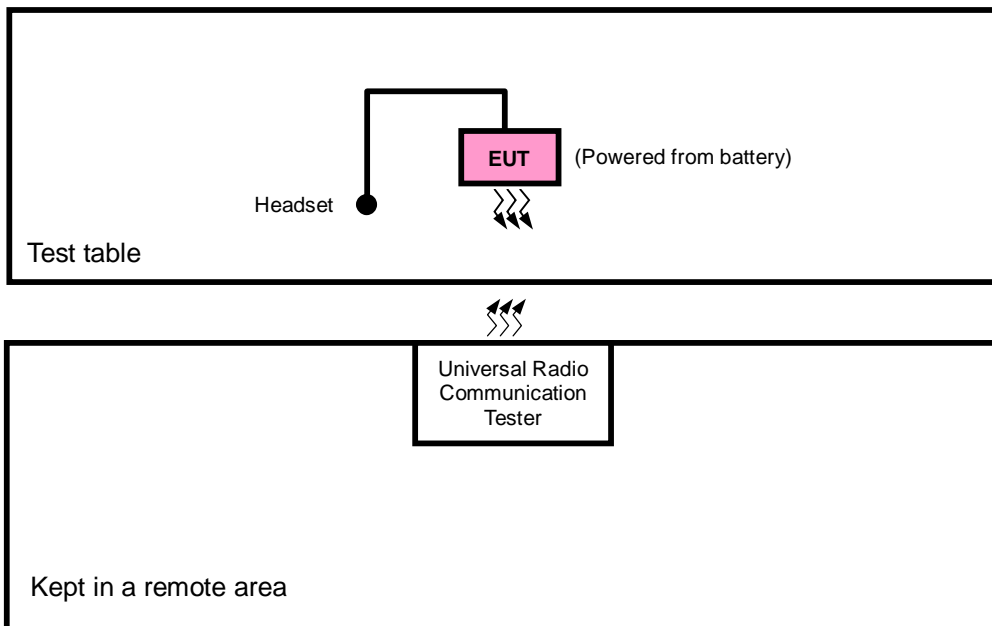


### 3.2 DESCRIPTION OF TEST MODES

Three channels had been tested.

	Channel	Frequency(MHz)
Low channel (L)	1312	1712.4
Middle channel (M)	1412	1732.4
High channel (H)	1513	1752.6

#### 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



### 3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO								DESCRIPTION
	OP	FS	OB	PA	BE	CE	RE<1G	RE>1G	
-	V	V	V	V	V	V	V	V	-

Where **OP**: Output power **FS**: Frequency stability  
**OB**: Occupied bandwidth **PA**: Peak to Average Ratio  
**BE**: Band edge **CE**: Conducted spurious emissions  
**RE<1G**: Radiated emission below 1GHz **RE>1G**: Radiated emission above 1GHz

**NOTE:** After pretest of conducted power and spurious emission for WCDMA-RMC, HSDPA and HSUPA mode, the worst is WCDMA-RMC is the worst mode. Therefore, only WCDMA-RMC is selected to do all test.

#### **OUTPUT POWER MEASUREMENT:**

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

EUT CONFIGURE MODE	OPERATING BAND	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	AXIS
-	WCDMA AWS Band	1312 to 1513	1312, 1412, 1513	BPSK	Z

#### **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.

EUT CONFIGURE MODE	OPERATING BAND	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
-	WCDMA AWS Band	1312 to 1513	1412	BPSK

**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.

EUT CONFIGURE MODE	OPERATING BAND	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
-	WCDMA AWS Band	1312 to 1513	1312, 1412, 1513	BPSK

**PEAK TO AVERAGE RATIO:**

- 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, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	OPERATING BAND	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
-	WCDMA AWS Band	1312 to 1513	1312, 1412, 1513	BPSK

**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.

EUT CONFIGURE MODE	OPERATING BAND	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
-	WCDMA AWS Band	1312 to 1513	1312, 1513	BPSK

**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.

EUT CONFIGURE MODE	OPERATING BAND	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
-	WCDMA AWS Band	1312 to 1513	1312, 1412, 1513	BPSK

**RADIATED EMISSION MEASUREMENT (BELOW 1 GHz):**

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

EUT CONFIGURE MODE	OPERATING BAND	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	AXIS
-	WCDMA AWS Band	1312 to 1513	1312	BPSK	Z

**RADIATED EMISSION MEASUREMENT (ABOVE 1 GHz):**

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

EUT CONFIGURE MODE	OPERATING BAND	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	AXIS
-	WCDMA AWS Band	1312 to 1513	1312, 1412, 1513	BPSK	Z

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
OP	25deg. C, 65%RH, 1003 hPa	120Vac, 60Hz	Brad Wu
FS	25deg. C, 65%RH, 1003 hPa	120Vac, 60Hz	Brad Wu
OB	25deg. C, 65%RH, 1003 hPa	120Vac, 60Hz	Brad Wu
PA	25deg. C, 65%RH, 1003 hPa	120Vac, 60Hz	Brad Wu
BE	25deg. C, 65%RH, 1003 hPa	120Vac, 60Hz	Brad Wu
CE	25deg. C, 65%RH, 1003 hPa	120Vac, 60Hz	Brad Wu
RE < 1G	25deg. C, 64%RH, 1008 hPa	120Vac, 60Hz	David Huang
RE <sup>≥</sup> 1G	25deg. C, 64%RH, 1008 hPa	120Vac, 60Hz	David Huang

### 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 27**

**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

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 partner to transfer data.

## 4 TEST TYPES AND RESULTS

### 4.1 OUTPUT POWER MEASUREMENT

#### 4.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

Portable stations (hand-held devices) operating in the 698–746 MHz band are limited to 3 watts ERP

#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Dec. 27, 2010	Dec. 26, 2011
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	100115	Aug. 02, 2010	Aug. 01, 2011
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Apr. 12, 2011	Apr. 11, 2012
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-408	Jan. 06, 2011	Jan. 05, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 27, 2010	Dec. 26, 2011
Preamplifier Agilent	8449B	3008A01961	Nov. 02, 2010	Nov. 01, 2011
Preamplifier Agilent	8447D	2944A10738	Nov. 02, 2010	Nov. 01, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	274041/4	Aug. 21, 2010	Aug. 20, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	283397/4	Aug. 21, 2010	Aug. 20, 2011
Software ADT.	ADT_Radiated_V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table ADT.	TT100.	TT93021704	NA	NA
Turn Table Controller ADT.	SC100.	SC93021704	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 4.
  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 988962.
  5. The IC Site Registration No. is IC7450F-4.

### 4.1.3 TEST PROCEDURES

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

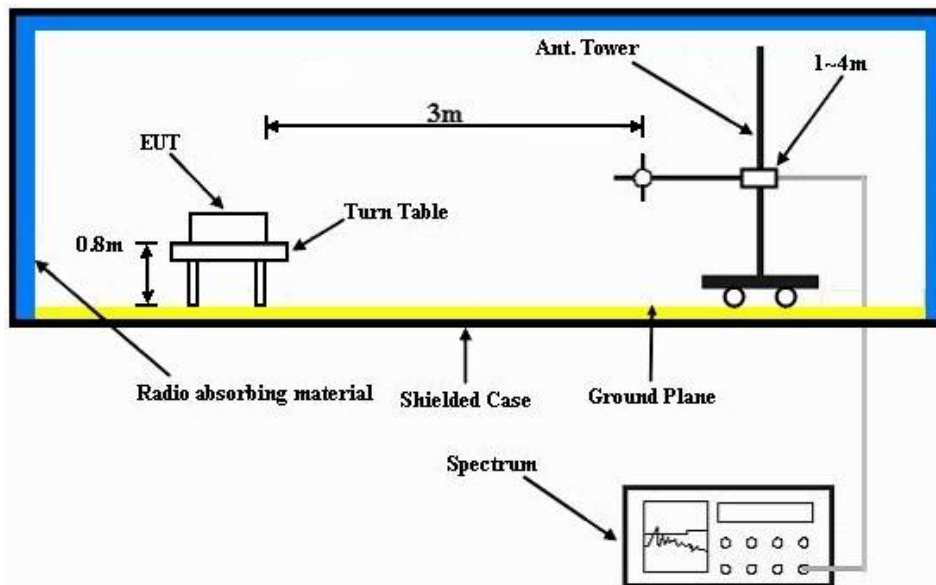
- a. The EUT was set up for the maximum power with WCDMA link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high operational frequency range).
- b. E.I.R.P power measurement. In the semi-anechoic chamber, EUT placed on the 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 a. Record the power level of S.G
- d.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$
- e.  $E.R.P = E.I.R.P - 2.15 \text{ dB}$

#### **CONDUCTED POWER MEASUREMENT:**

- a. The EUT was set up for the maximum power with WCDMA 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.

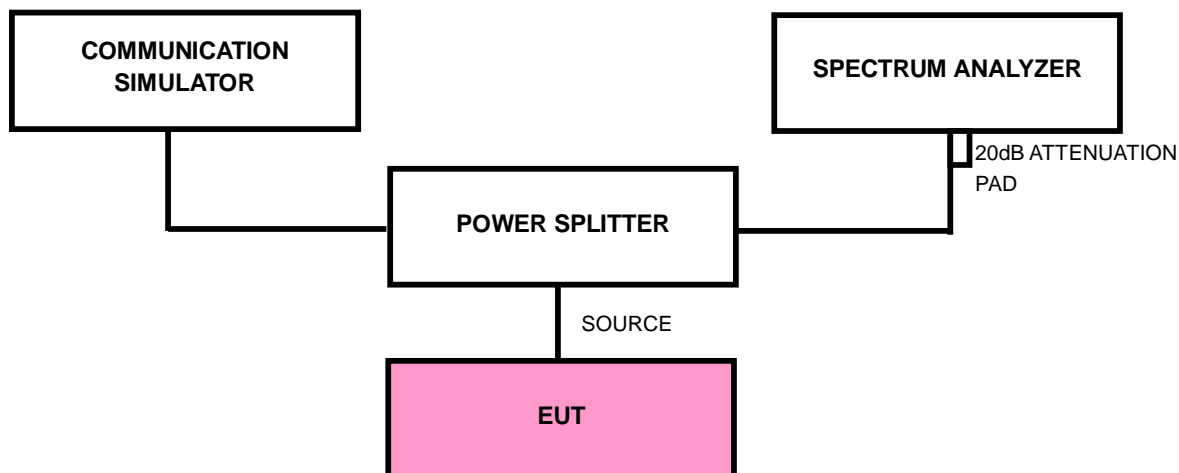
#### 4.1.4 TEST SETUP

##### 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 an EUT to export maximum output power under transmission mode and specific channel frequency.



#### 4.1.6 TEST RESULTS

CONDUCTED OUTPUT POWER (WCDMA-AMR)					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	OUTPUT POWER	
				dBm	mW
1312	1712.4	-1.94	24.90	22.96	198.0
1412	1732.4	-1.75	24.90	23.15	207.0
1513	1752.6	-1.87	24.90	23.03	201.0

CONDUCTED OUTPUT POWER (WCDMA-RMC)					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	OUTPUT POWER	
				dBm	mW
1312	1712.4	-1.64	24.90	23.26	212.0
1412	1732.4	-1.46	24.90	23.44	221.0
1513	1752.6	-1.68	24.90	23.22	210.0

**NOTE:** Refer to SAR of WWAN test report to check conducted power of HSDPA and HSUPA.

EIRP POWER (WCDMA-RMC)					
CHANNEL NO.	FREQUENCY (MHz)	S.G LEVEL (dBm)	CORRECTION FACTOR (dB)	OUTPUT POWER	
				dBm	mW
1312	1712.4	12.8	8.0	20.8	120.0
<b>1412</b>	<b>1732.4</b>	<b>13.0</b>	<b>8.1</b>	<b>21.1</b>	<b>129.0</b>
1513	1752.6	12.4	8.2	20.6	115.0

**REMARKS:** 1. Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).  
 2. Correction Factor (dB) = S.G Level + Gain of Substitution horn + TX cable loss.  
 3. The value in bold is the worst.

## 4.2 FREQUENCY STABILITY MEASUREMENT

### 4.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

According to the FCC part 27.54 shall be tested the frequency stability. The rule is defined that "The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation. The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with the 2.1055(a)(1)  $-30^{\circ}\text{C} \sim 50^{\circ}\text{C}$ .

### 4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
* Hewlett Packard RF cable	8120-6192	274388	Oct. 22, 2010	Oct. 21, 2011
* Suhner RF cable	Sucoflex104	246272	May 14, 2010	May 13, 2011
* WIT Standard Temperature & Humidity Chamber	TH-4S-C	W981030	Jun. 28, 2010	Jun. 27, 2011

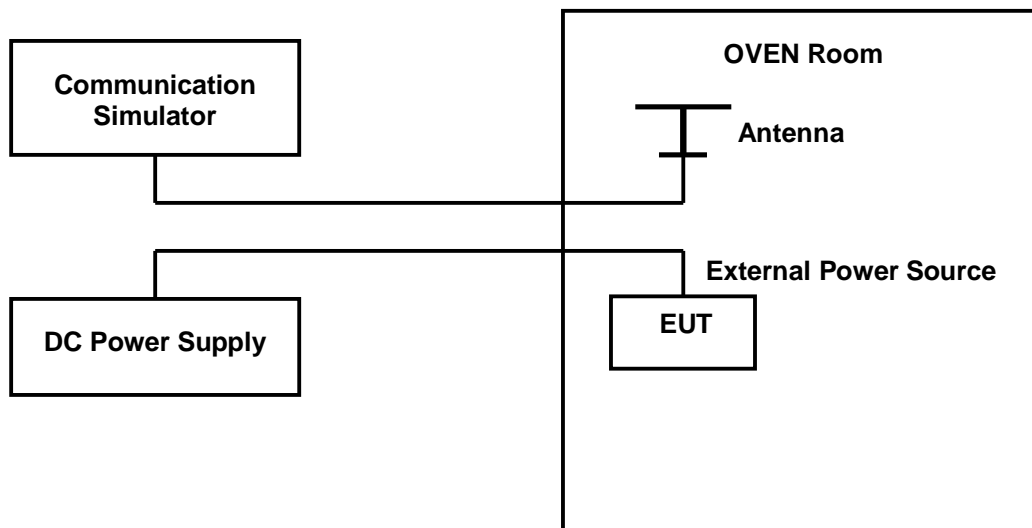
- NOTE:**
1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.
  2. "\*" = These equipments are used for the final measurement.
  3. The test was performed in ADT RF OVEN room.

### 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 WCDMA link mode. This is accomplished with the use of the communication simulator station. The oven room could control the temperatures and humidity.
- 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. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5^{\circ}\text{C}$  during the measurement testing.
- d. 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

AFC FREQUENCY ERROR vs. VOLTAGE			
VOLTAGE (Volts)	FREQUENCY ERROR (Hz)	FREQUENCY ERROR (ppm)	LIMIT (ppm)
4.2	-8	-0.005	2.5
3.6	-5	-0.003	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)
50	14	0.008	2.5
40	12	0.007	2.5
30	-11	-0.006	2.5
20	6	0.003	2.5
10	8	0.005	2.5
0	11	0.006	2.5
-10	-5	-0.003	2.5
-20	-8	-0.005	2.5
-30	9	0.005	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 total mean power of a given emission.

#### 4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
* Mini-Circuits Power Splitter	ZAPD-4	NA	Jun. 29, 2010	Jun. 28, 2011
* Hewlett Packard RF cable	8120-6192	274388	Oct. 22, 2010	Oct. 21, 2011
* JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
* Suhner RF cable	Sucoflex104	246272	May 14, 2010	May 13, 2011
* ROHDE & SCHWARZ Spectrum Analyzer	E4446A	MY44360128	Feb. 23, 2010	Feb. 22, 2011

**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. "\*" = These equipments are used for the final measurement.

#### 4.3.3 TEST SETUP

Same as Item 4.1.4 (Conducted Power Setup)

#### 4.3.4 TEST PROCEDURES

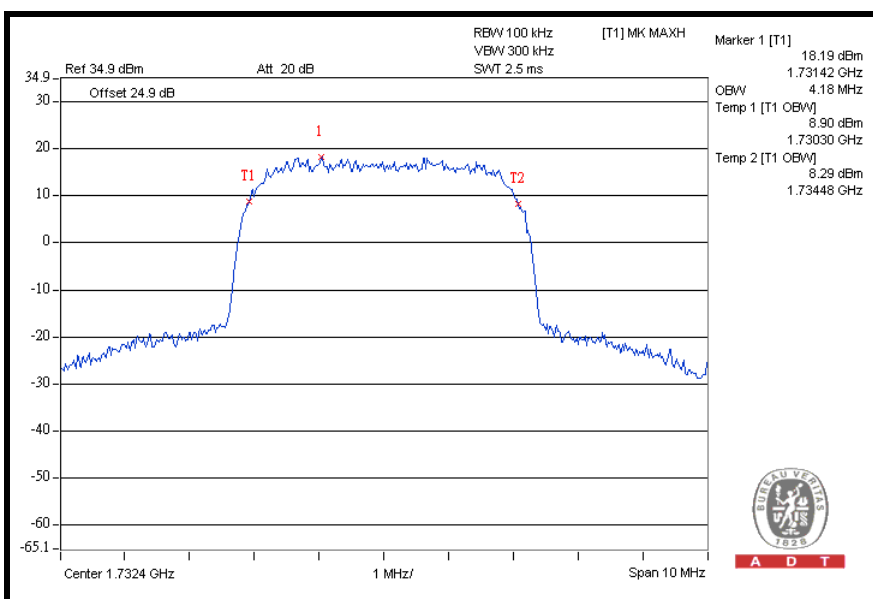
- a. The EUT makes a phone call to the communication simulator. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels. (low, middle and high operational frequency range.)
- b. The conducted occupied bandwidth used the power splitter via EUT RF power connector between 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 TEST RESULTS

#### WCDMA

FREQUENCY (MHz)	MAX. OUTPUT POWER -26 dBc BANDWIDTH (MHz)
1712.4	4.16
1732.4	4.18
1752.6	4.16

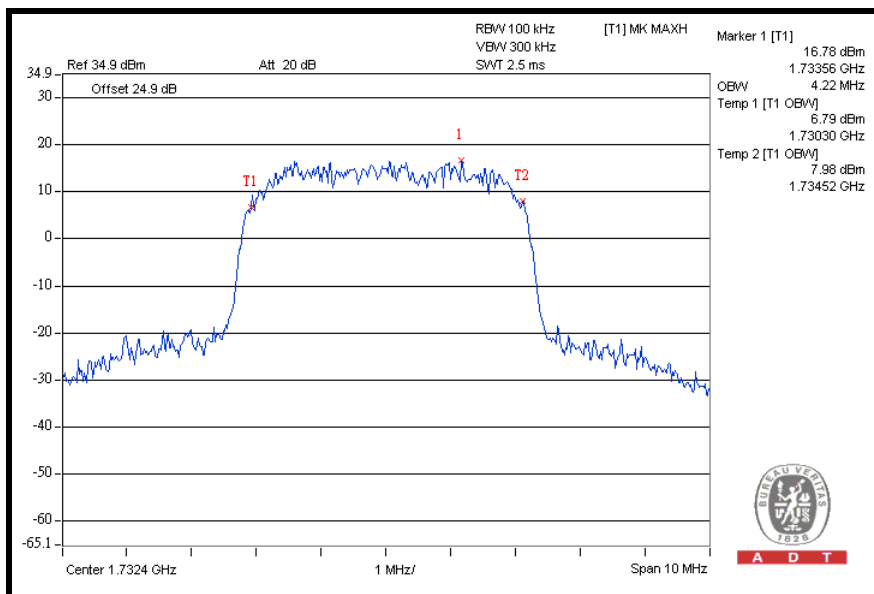
#### CH1412



### HSDPA

FREQUENCY (MHz)	MAX. OUTPUT POWER -26 dBc BANDWIDTH (MHz)
1712.4	4.18
1732.4	4.22
1752.6	4.20

### CH 1412

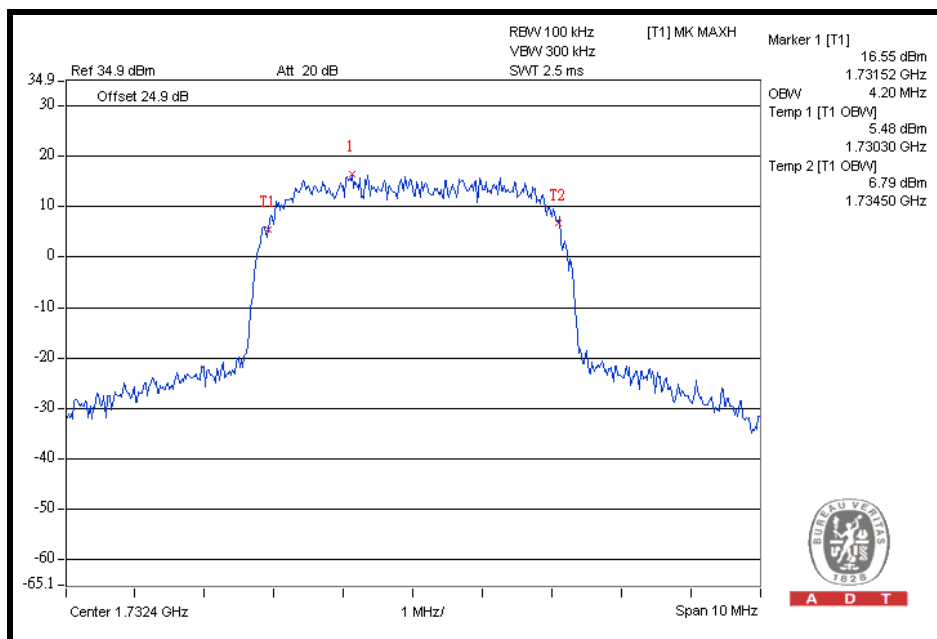




### HSUPA

FREQUENCY (MHz)	MAX. OUTPUT POWER -26 dBc BANDWIDTH (MHz)
1712.4	4.16
1732.4	4.20
1752.6	4.16

### CH 1412



## 4.4 PEAK TO AVERAGE RATIO

### 4.4.1 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

### 4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
* ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100041	Jul. 09, 2010	Jul. 08, 2011
* Mini-Circuits Power Splitter	ZN2PD-9G	NA	Mar. 24, 2011	Mar. 23, 2012
* Hewlett Packard RF cable	8120-6192	274388	Oct. 22, 2010	Oct. 21, 2011
* JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
* Suhner RF cable	Sucoflex104	246272	May 14, 2010	May 13, 2011

**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. "\*" = These equipments are used for the final measurement.

### 4.4.3 TEST SETUP

Same as Item 4.2.4 (Conducted Power Setup)

#### 4.4.4 TEST PROCEDURES

1. Set resolution/measurement bandwidth  $\geq$  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%.

#### 4.4.5 EUT OPERATING CONDITION

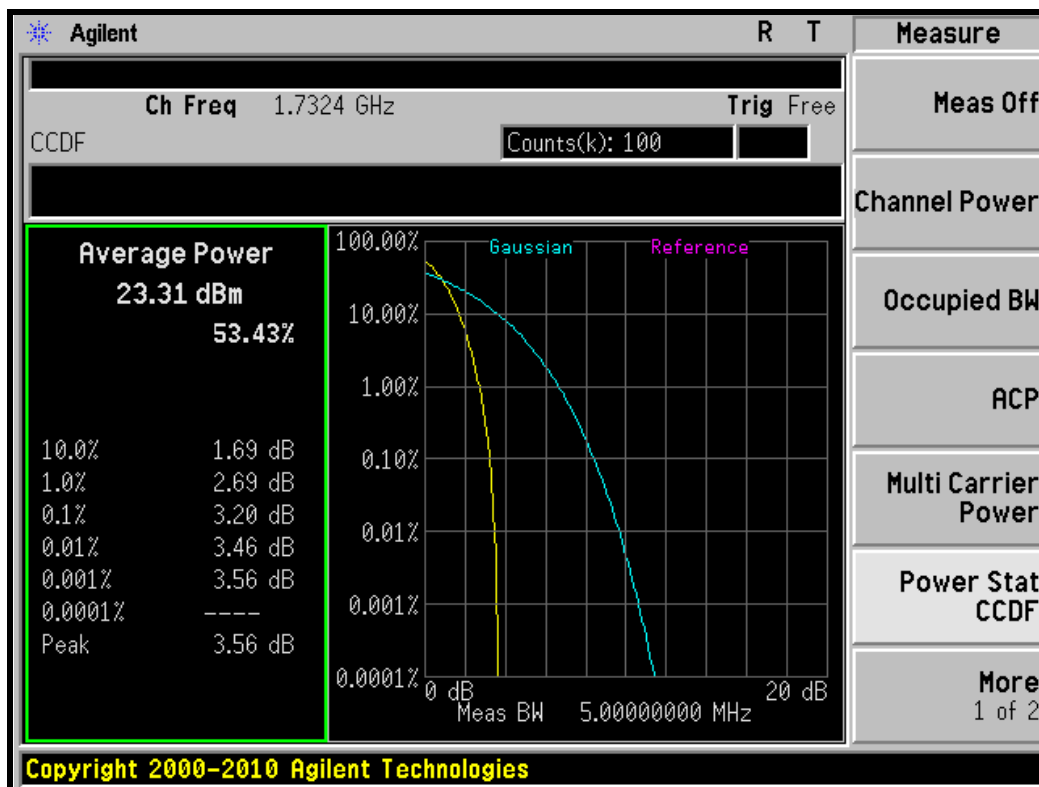
Same as Item 4.1.5

#### 4.4.6 TEST RESULTS

#### WCDMA

FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
1712.4	3.13
1732.4	3.20
1752.6	3.02

#### CH 1412



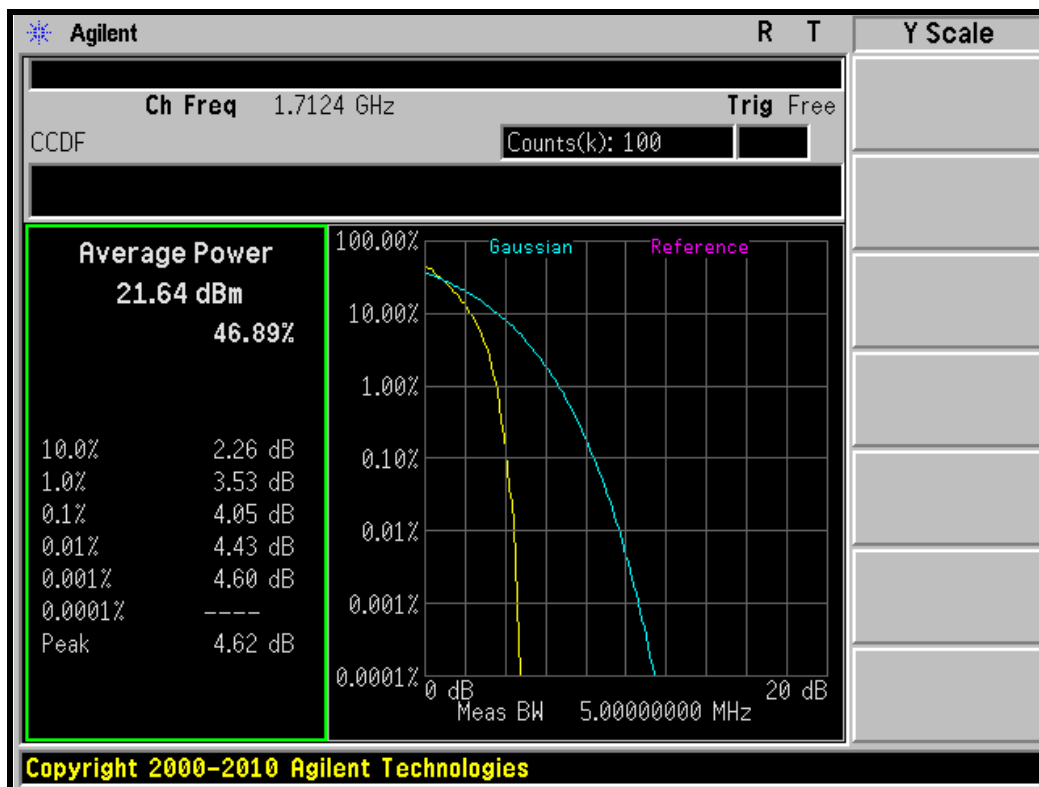


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### HSDPA

FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
1712.4	4.05
1732.4	3.87
1752.6	3.85

### CH 1312



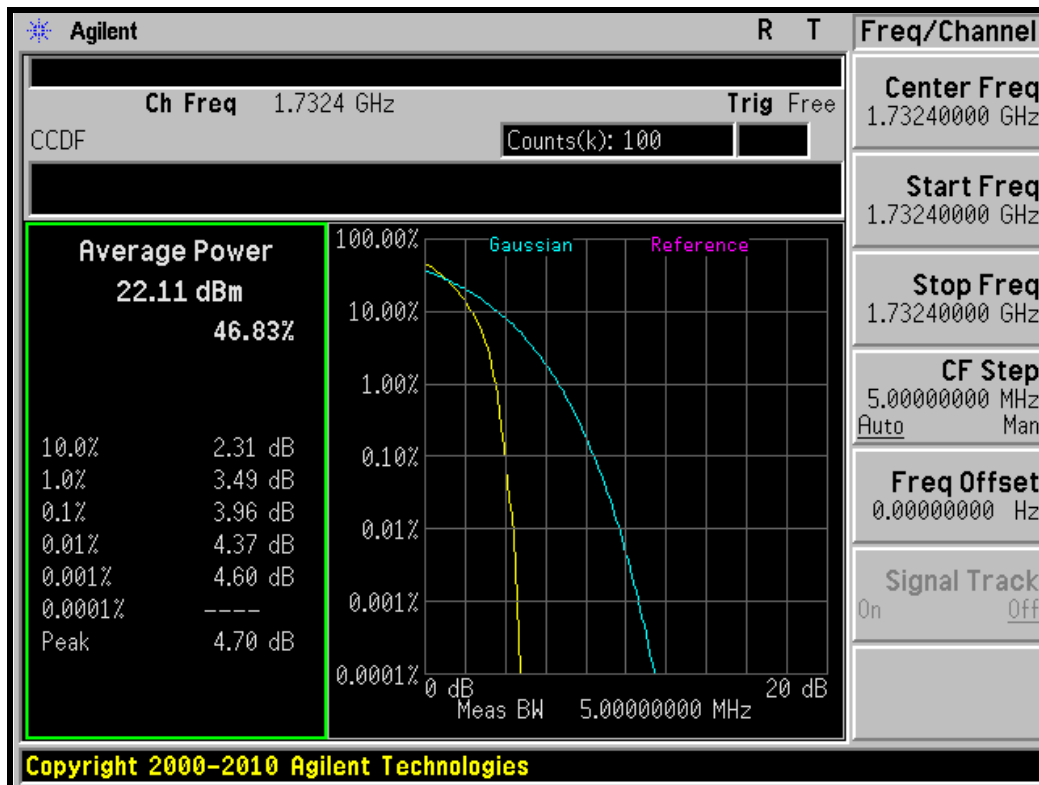


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### HSUPA

FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
1712.4	3.81
1732.4	3.96
1752.6	3.81

### CH 1412



## 4.5 BAND EDGE MEASUREMENT

### 4.5.1 LIMITS OF BAND EDGE MEASUREMENT

For operations in the 1710–1755 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10}(P)$  dB. The limit of emission equal to  $-13$  dBm. 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.

### 4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
* ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100041	Jul. 09, 2010	Jul. 08, 2011
* Mini-Circuits Power Splitter	ZN2PD-9G	NA	Mar. 24, 2011	Mar. 23, 2012
* Hewlett Packard RF cable	8120-6192	274388	Oct. 22, 2010	Oct. 21, 2011
* JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
* Suhner RF cable	Sucoflex104	246272	May 14, 2010	May 13, 2011

**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. "\*" = These equipments are used for the final measurement.

### 4.5.3 TEST SETUP

Same as Item 4.1.4 (Conducted Power Setup)

#### 4.5.4 TEST PROCEDURES

- a. The EUT was set up for the maximum peak power with WCDMA link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels (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. This splitter loss and cable loss are the worst loss 24.9 dB in the transmitted path track.
- c. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz.
- d. Record the max trace plot into the test report.

#### 4.5.5 EUT OPERATING CONDITION

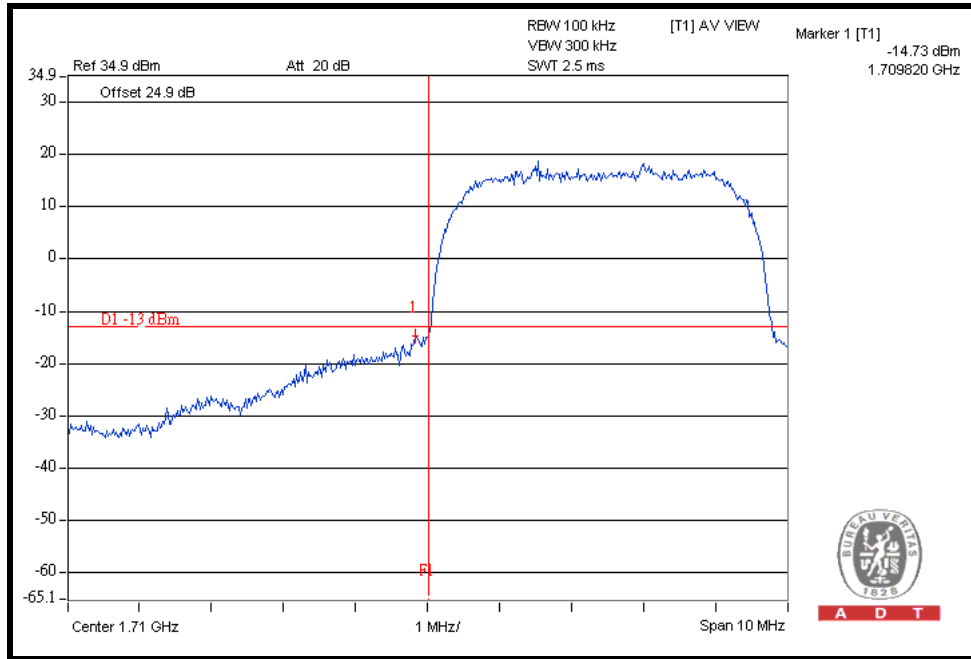
- a. The EUT makes a call to the communication simulator.
- b. The communication simulator station system controlled an EUT to export maximum output power under transmission mode and specific channel frequency.



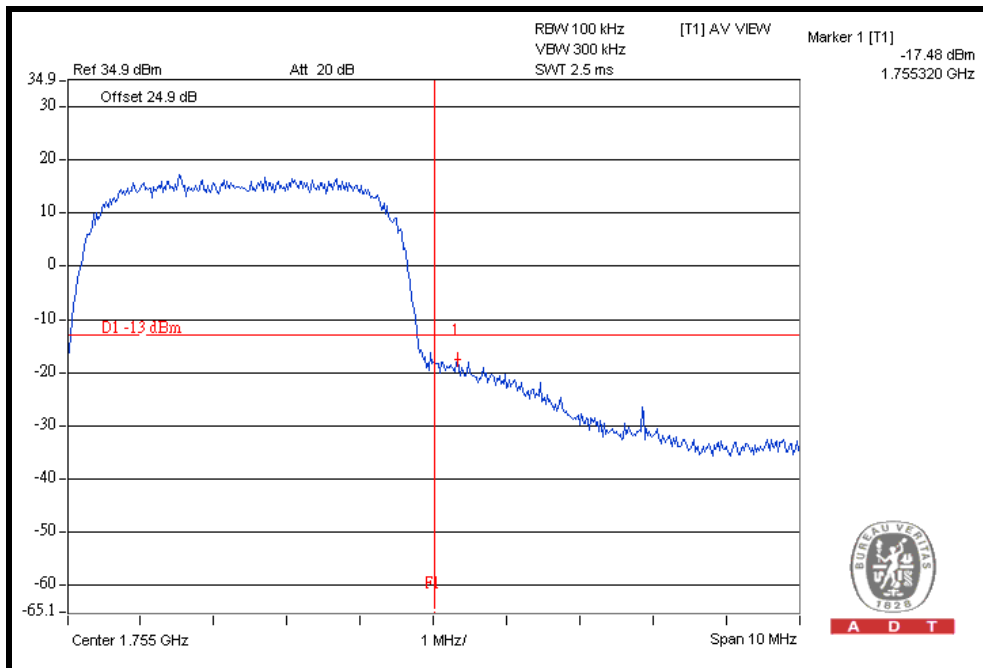
## 4.5.6 TEST RESULTS

### WCDMA

#### LOWER BAND EDGE



#### HIGHER BAND EDGE

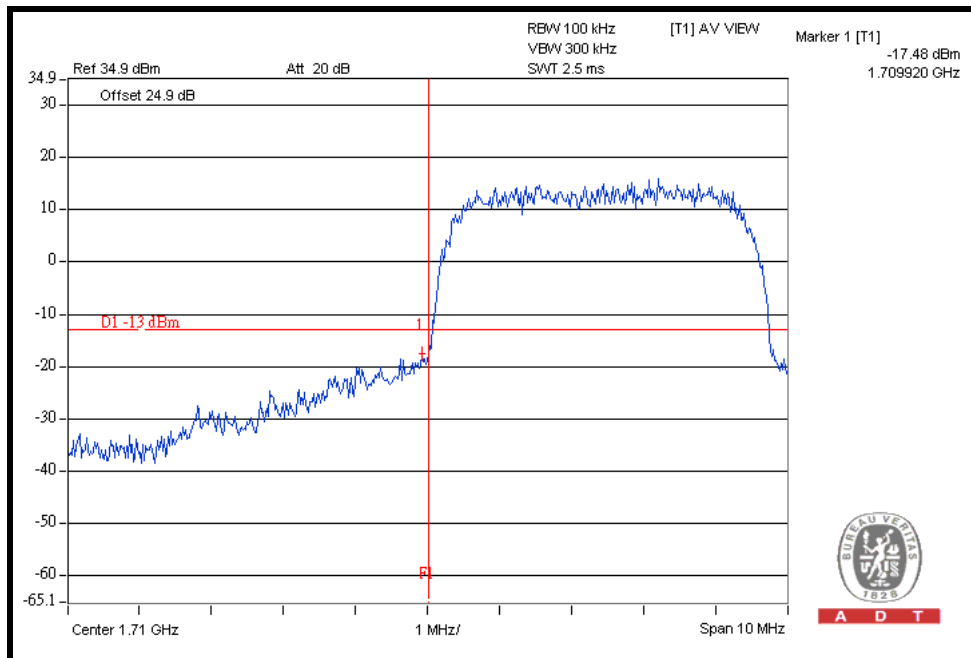




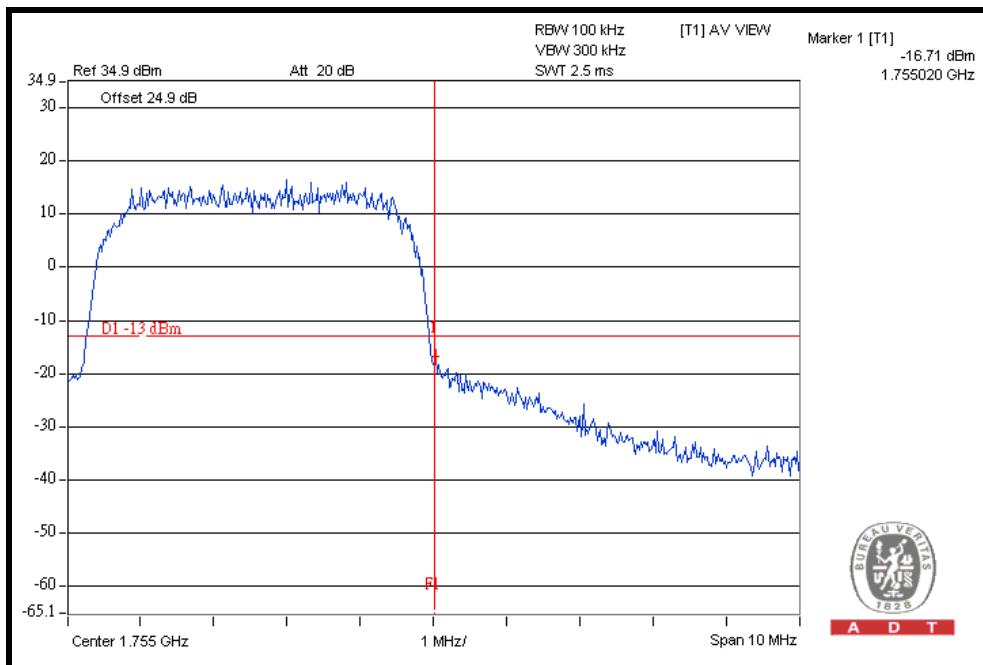
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## HSDPA

### LOWER BAND EDGE



### HIGHER BAND EDGE

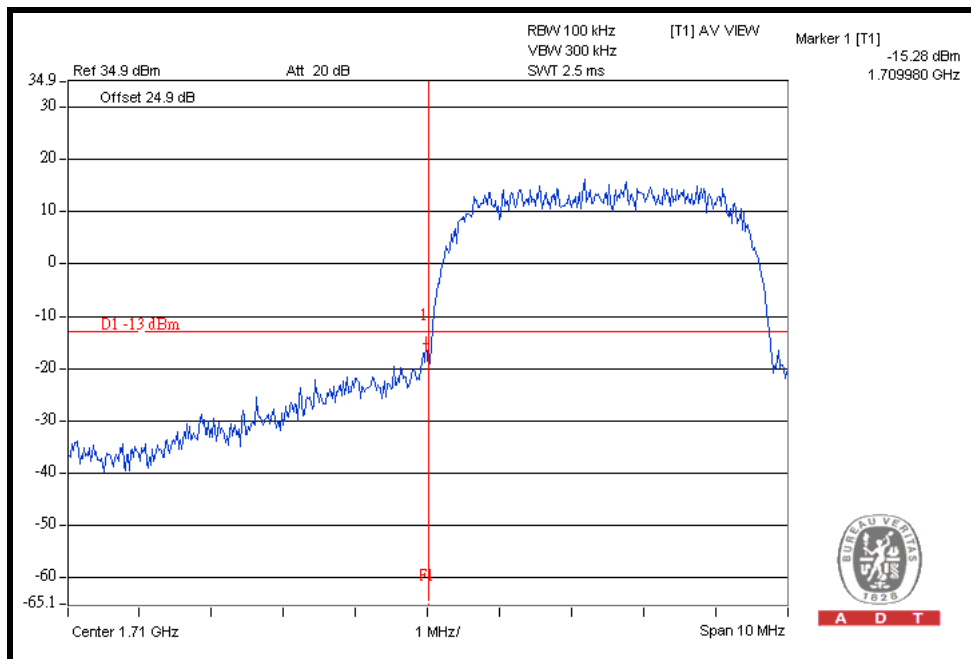




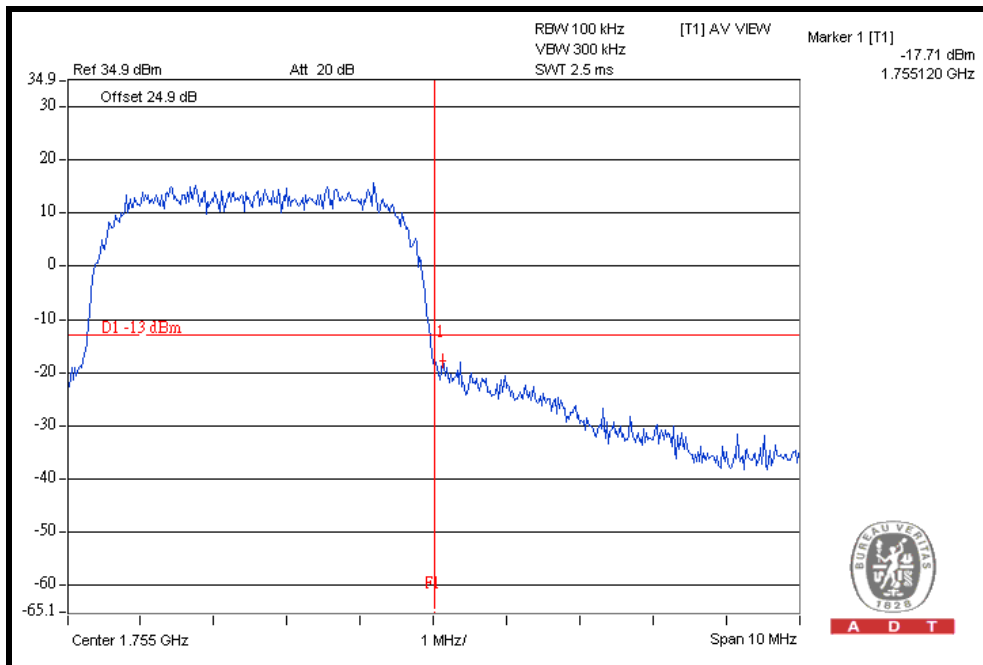
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## HSUPA

### LOWER BAND EDGE



### HIGHER BAND EDGE



## 4.6 CONDUCTED SPURIOUS EMISSIONS

### 4.6.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10}(P)$  dB. The limit of emission equal to  $-13\text{dBm}$

### 4.6.2 TEST INSTRUMENTS

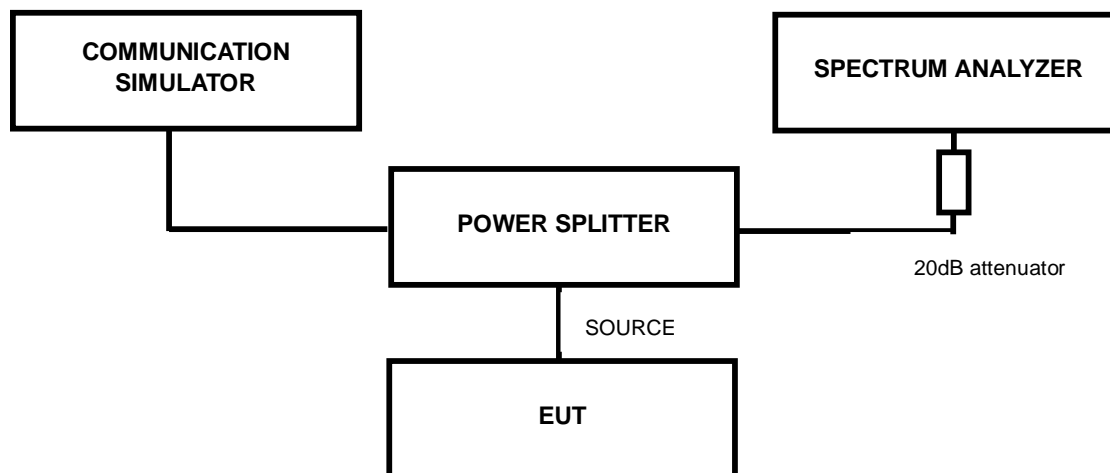
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
* ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100041	Jul. 09, 2010	Jul. 08, 2011
* Wainwright Instruments Band Reject Filter	WRCG1850/1910-1 830/1930-60/10SS	SN1	Mar. 23, 2011	Mar. 22, 2012
* Wainwright Instruments High Pass Filter	WHK3.1/18G-10SS	SN3	Jun. 29, 2010	Jun. 28, 2011
* Mini-Circuits Power Splitter	ZAPD-4	NA	Jun. 29, 2010	Jun. 28, 2011
* Hewlett Packard RF cable	8120-6192	274388	Oct. 22, 2010	Oct. 21, 2011
* JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
* Suhner RF cable	Sucoflex104	246272	May 14, 2010	May 13, 2011

- 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. "\*" = These equipments are used for the final measurement.

#### 4.6.3 TEST PROCEDURE

- a. The EUT was set up for the maximum peak power with WCDMA link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels (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. When the spectrum scanned from 30MHz to 20GHz. The spectrum set RB=1MHz, VB=3MHz.

#### 4.6.4 TEST SETUP



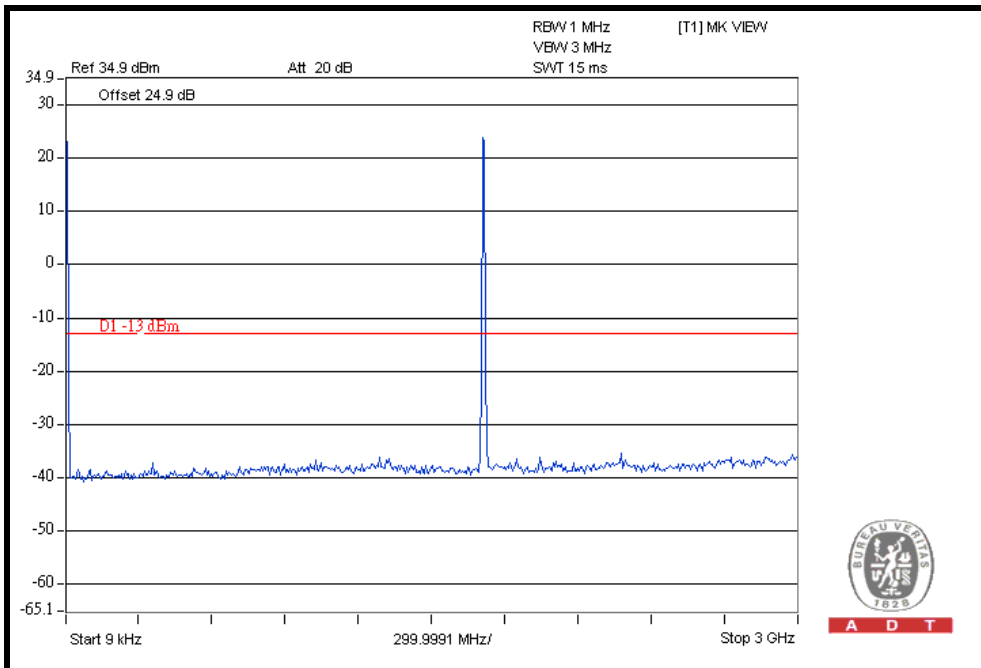
#### 4.6.5 EUT OPERATING CONDITIONS

- 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.

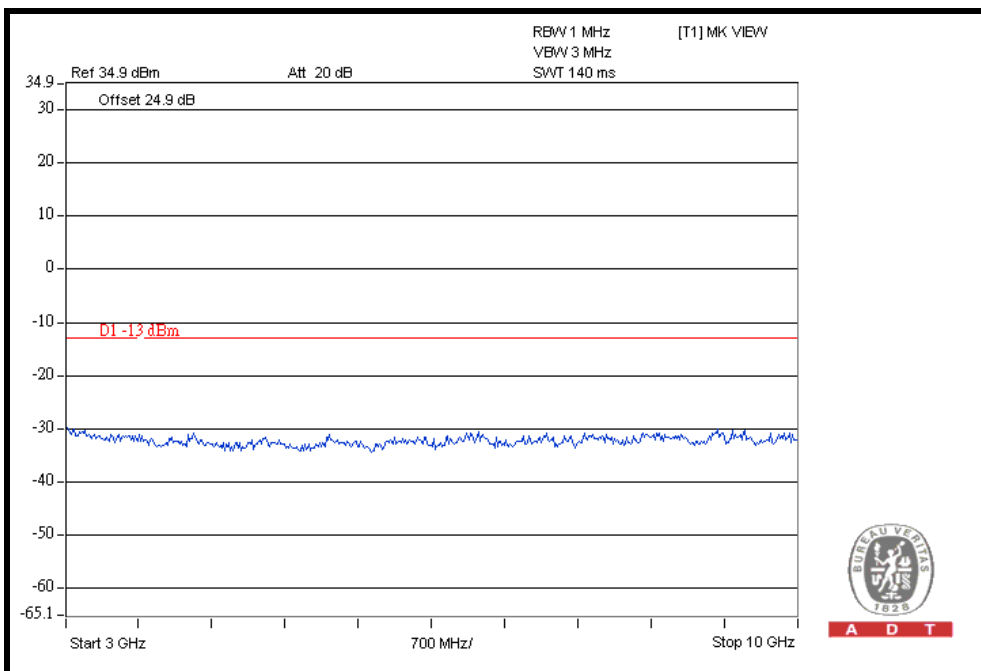
### 4.6.6 TEST RESULTS

#### WCDMA

#### CH 1312: 9kHz ~ 3GHz



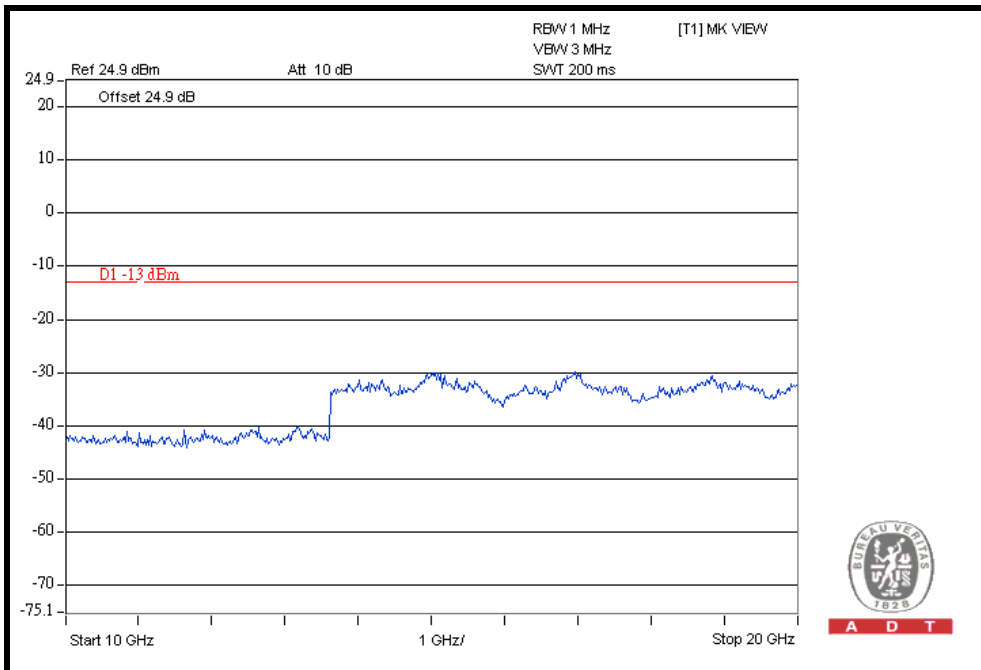
#### CH 1312: 3GHz ~ 10GHz



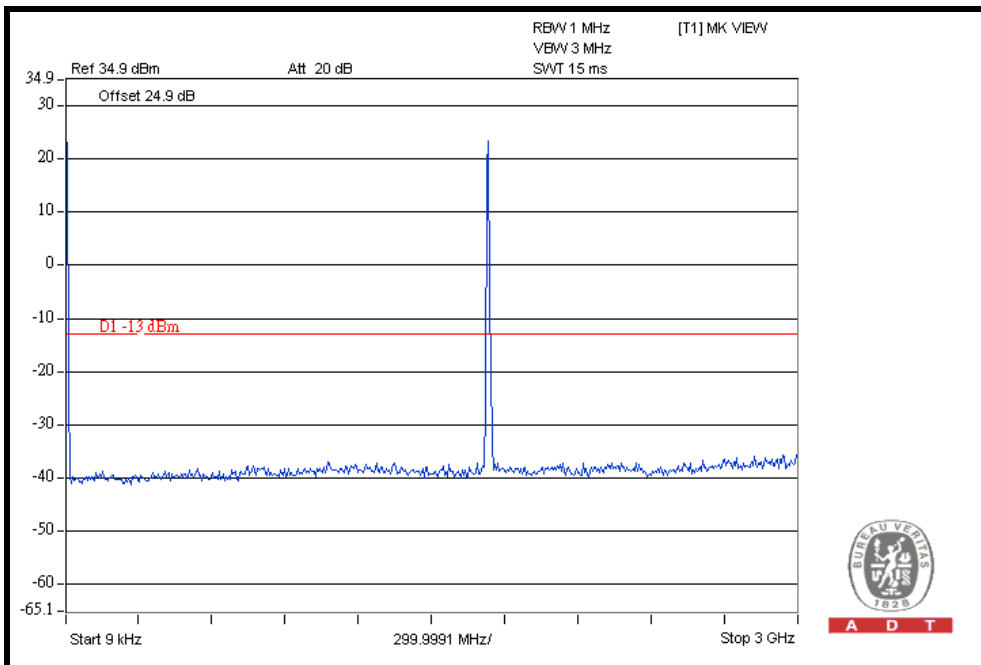


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### CH 1312: 10GHz ~ 20GHz



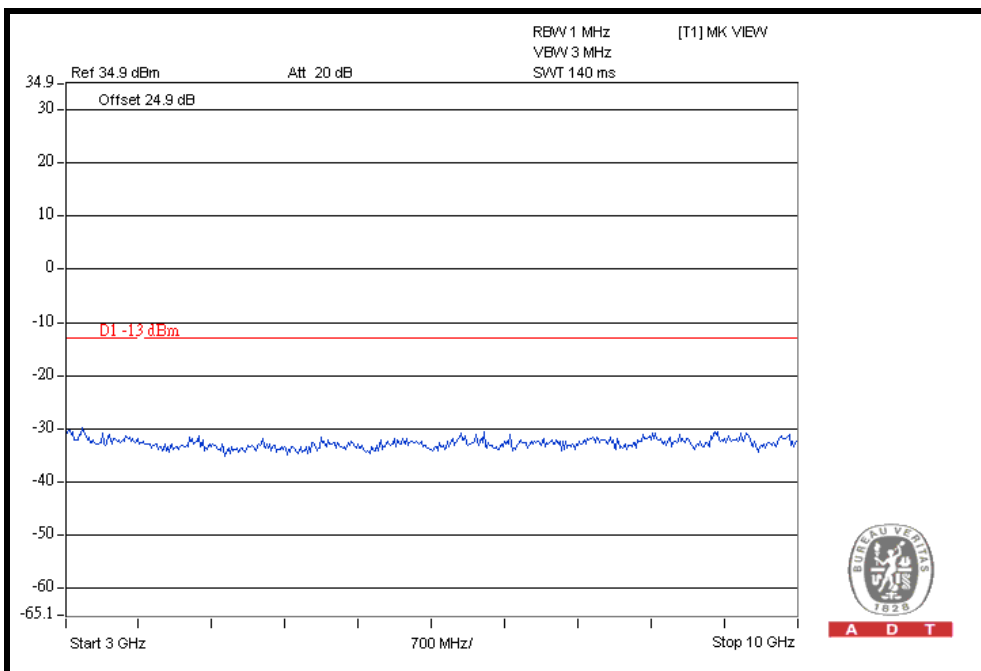
### CH 1412: 9kHz ~ 3GHz



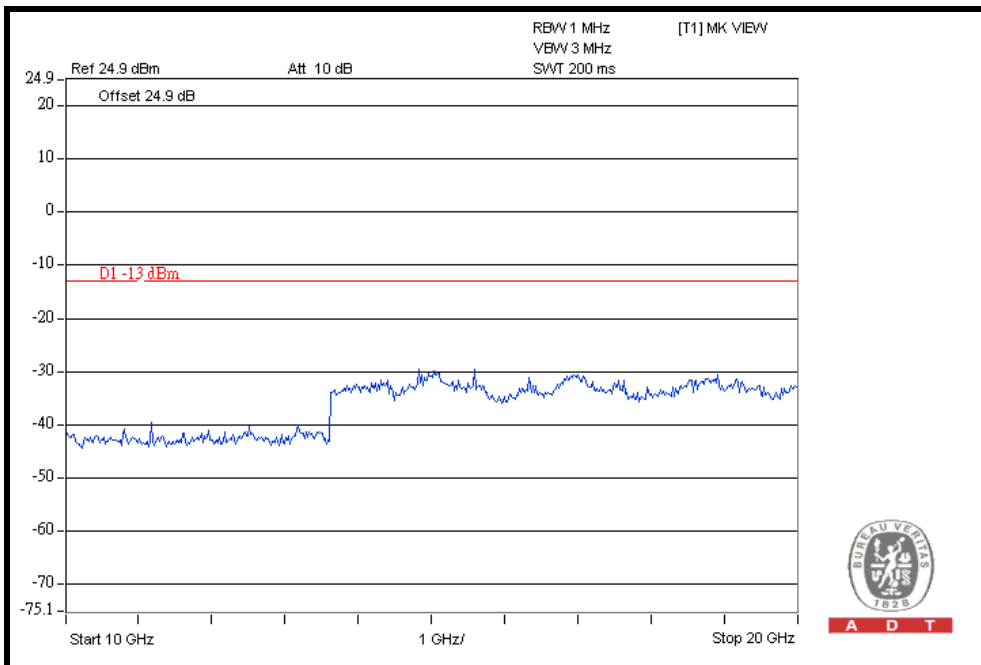


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### CH 1412: 3GHz ~ 10GHz



### CH 1412: 10GHz ~ 20GHz

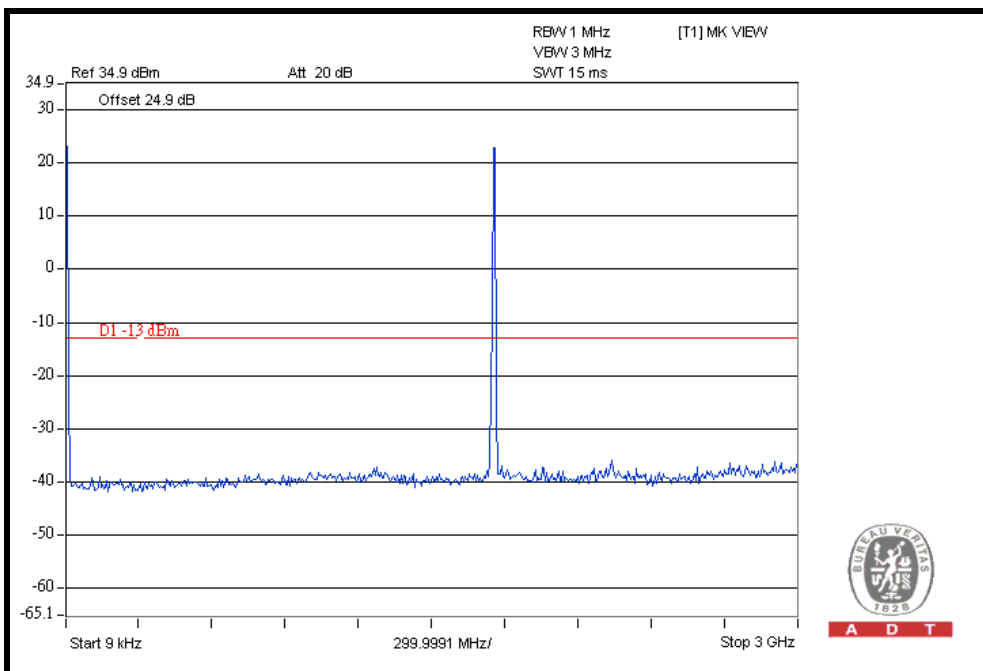




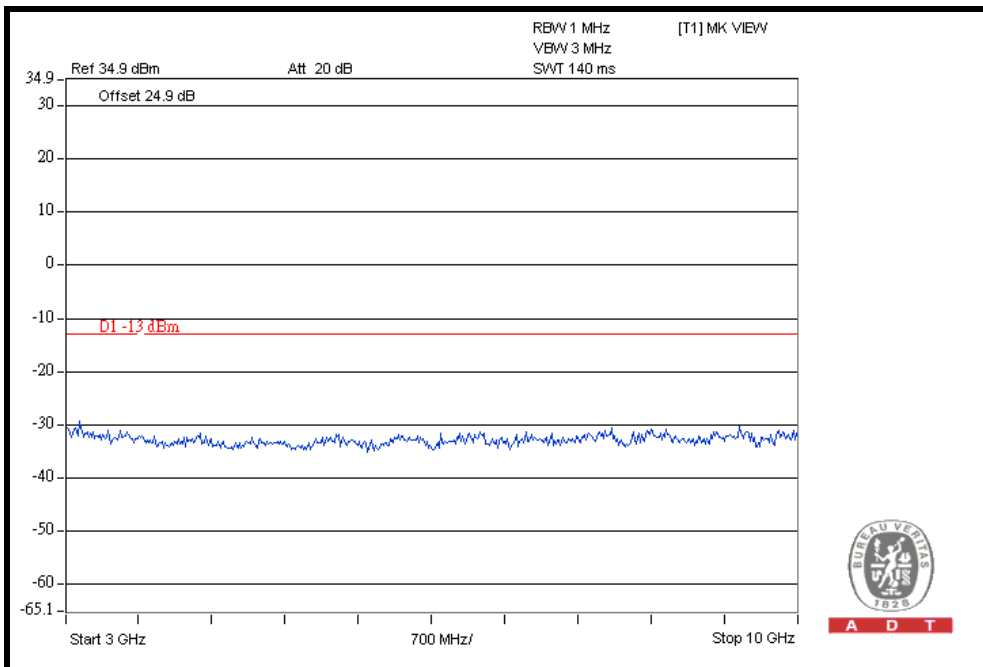


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### CH 1513: 9kHz ~ 3GHz



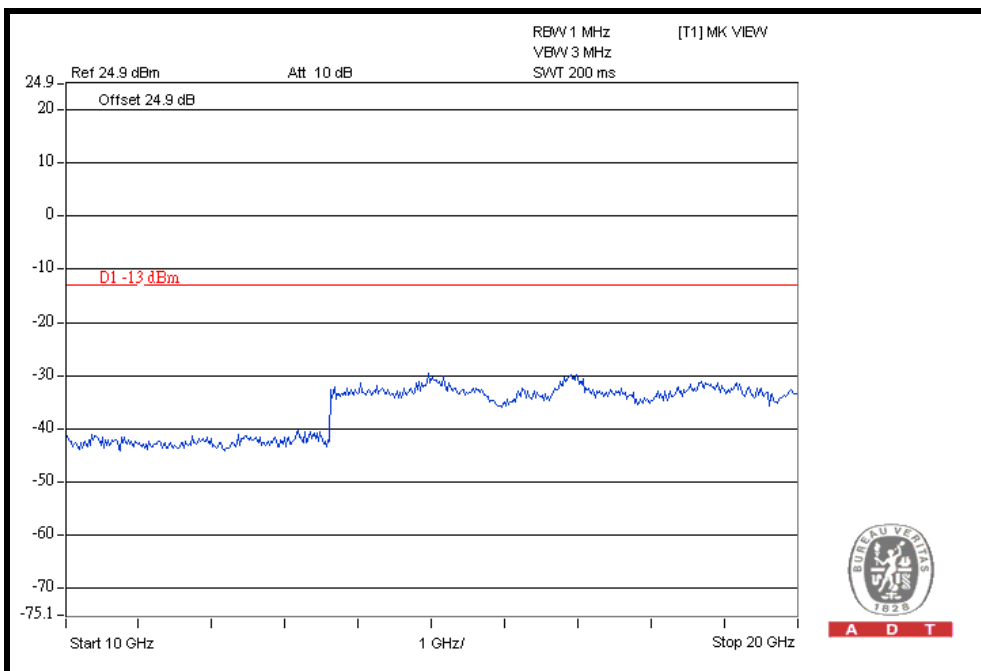
### CH 1513: 3GHz ~ 10GHz





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### CH 1513: 10GHz ~ 20GHz



## 4.7 RADIATED EMISSION MEASUREMENT

### 4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10}(P)$  dB. The limit of emission equal to  $-13$ dBm

So the limit of emission is the same absolute specified line.

LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBuV/m) (NOTE)
-13	82.22

**NOTE:** The following formula is used to convert the equipment radiated power to field strength.

$$E = [1000000 \sqrt{(30P)}] / 3 \text{ uV/m, where P is Watts.}$$

#### 4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Dec. 27, 2010	Dec. 26, 2011
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	100115	Aug. 02, 2010	Aug. 01, 2011
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Apr. 12, 2011	Apr. 11, 2012
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-408	Jan. 06, 2011	Jan. 05, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 27, 2010	Dec. 26, 2011
Preamplifier Agilent	8449B	3008A01961	Nov. 02, 2010	Nov. 01, 2011
Preamplifier Agilent	8447D	2944A10738	Nov. 02, 2010	Nov. 01, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	274041/4	Aug. 21, 2010	Aug. 20, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	283397/4	Aug. 21, 2010	Aug. 20, 2011
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table ADT.	TT100.	TT93021704	NA	NA
Turn Table Controller ADT.	SC100.	SC93021704	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 4.
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 988962.
5. The IC Site Registration No. is IC7450F-4.

### 4.7.3 TEST PROCEDURES

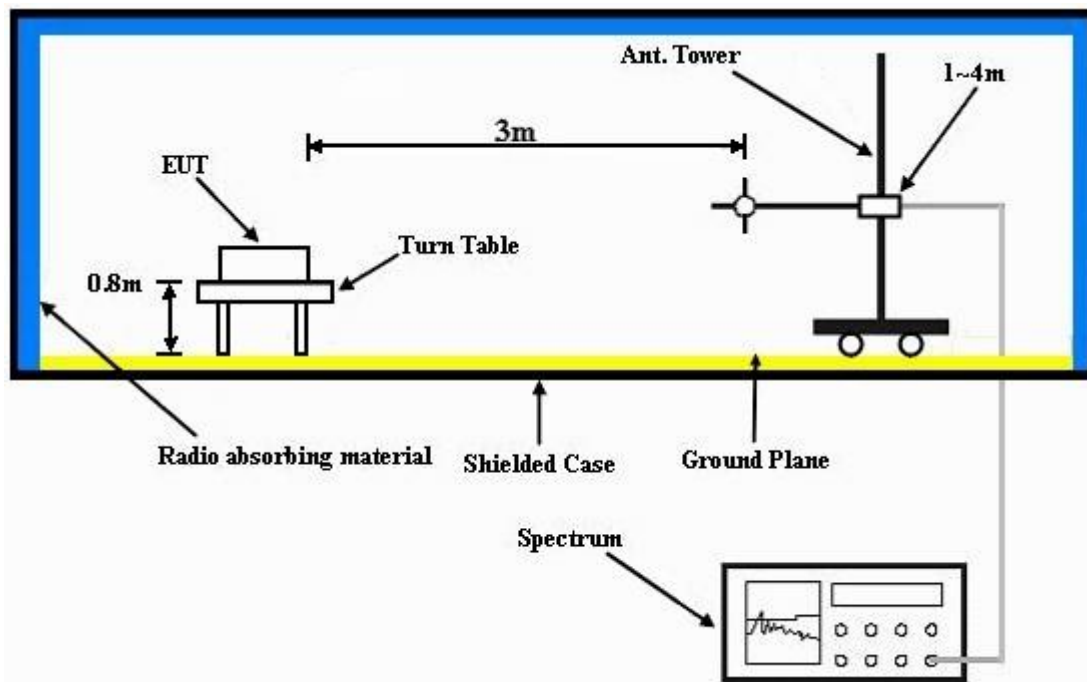
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8 m above the ground.
- c. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.
- d. Repeat step a ~ c for horizontal polarization.

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

### 4.7.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.7.5 TEST SETUP



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

#### 4.7.6 EUT OPERATING CONDITIONS

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



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#### 4.7.7 TEST RESULTS (Below 1GHz)

#### WCDMA AWS Band

<b>MODE</b>	Middle channel	<b>FREQUENCY RANGE</b>	Below 1000MHz
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#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	90.26	46.8	82.2	-35.5	2.00 H	118	38.20	8.60
2	136.91	48.6	82.2	-33.7	2.00 H	100	34.90	13.70
3	228.28	54.9	82.2	-27.4	1.25 H	265	42.20	12.70
4	381.84	42.7	82.2	-39.6	1.00 H	271	24.90	17.80
5	467.37	40.5	82.2	-41.8	2.00 H	241	20.40	20.10
6	605.39	34.8	82.2	-47.5	1.25 H	349	11.60	23.20

#### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	90.26	41.3	82.2	-41.0	1.25 V	124	32.70	8.60
2	158.30	43.0	82.2	-39.3	1.00 V	91	28.50	14.50
3	234.11	49.1	82.2	-33.2	1.00 V	73	36.20	12.90
4	370.18	37.9	82.2	-44.4	1.25 V	94	20.40	17.50
5	475.15	38.6	82.2	-43.7	1.25 V	145	18.30	20.30
6	628.72	36.1	82.2	-46.2	1.00 V	67	12.70	23.40

#### NOTE:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. This is valid for all 3 channels.



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#### 4.7.8 TEST RESULTS (Above 1GHz)

Test channel		Low channel				
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m						
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV)	LIMIT (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	POWER VALUE (dBm)
1	3424.8	61.5	-13.0	-41.4	8.7	-32.7
2	5137.2	47.2	-13.0	-56.6	9.7	-46.9
3	6849.6	51.8	-13.0	-51.0	8.3	-42.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m						
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV)	LIMIT (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	POWER VALUE (dBm)
1	3424.8	66.5	-13.0	-36.4	8.7	-27.7
2	5137.2	52.1	-13.0	-51.7	9.7	-42.0
3	6849.6	50.7	-13.0	-52.1	8.3	-43.8

Test channel		Middle channel				
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m						
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV)	LIMIT (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	POWER VALUE (dBm)
1	3464.8	57.2	-13.0	-47.3	9.9	-37.4
2	5197.2	46.7	-13.0	-57.1	9.7	-47.4
3	6929.6	49.8	-13.0	-52.4	8.0	-44.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m						
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV)	LIMIT (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	POWER VALUE (dBm)
1	3464.8	60.6	-13.0	-43.9	9.9	-34.0
2	5197.2	47.5	-13.0	-56.3	9.7	-46.6
3	6929.6	49.8	-13.0	-52.4	8.0	-44.4

**NOTE:** Power Value (dBm) = S.G Power Value (dBm) + Correction Factor (dB).  
Correction Factor = gain of substitution antenna + cable loss





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Test channel		High channel				
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m						
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV)	LIMIT (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	POWER VALUE (dBm)
1	3505.2	65.3	-13.0	-39.1	10.0	-29.1
2	5257.8	50.1	-13.0	-54.3	9.7	-44.6
3	7010.4	50.3	-13.0	-52.2	7.9	-44.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m						
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV)	LIMIT (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	POWER VALUE (dBm)
1	3505.2	63.8	-13.0	-40.6	10.0	-30.6
2	5257.8	51.4	-13.0	-53.0	9.7	-43.3
3	7010.4	51.6	-13.0	-50.9	7.9	-43.0

**NOTE:** Power Value (dBm) = S.G Power Value (dBm) + Correction Factor (dB).  
Correction Factor = gain of substitution antenna + cable loss



## 5 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 certificates of our laboratories obtained from approval agencies can be downloaded from our web site: [www.adt.com.tw/index.5.phtml](http://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:**

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



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## **6 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.

**---END---**