

# FCC RF Test Report

APPLICANT : ZTE CORPORATION  
EQUIPMENT : USB Dongle  
BRAND NAME : ZTE  
MODEL NAME : AC3781  
FCC ID : Q78-AC3781  
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E), 27(L)  
CLASSIFICATION : PCS Licensed Transmitter (PCB)  
Tx/Rx FREQUENCY RANGE : CDMA2000 BC0 : 824.70 ~ 848.31 MHz /  
869.70 ~ 893.31 MHz  
CDMA2000 BC1 : 1851.25 ~ 1908.75 MHz /  
1931.25 ~ 1988.75 MHz  
CDMA2000 BC15 : 1711.25 ~ 1753.75 MHz /  
2111.25 ~ 2135.75 MHz  
MAX. ERP/EIRP POWER : CDMA2000 BC0 : 0.20 W  
CDMA2000 BC1 : 0.32 W  
CDMA2000 BC15 : 0.33 W  
EMISSION DESIGNATOR : 1M28F9W

The product was received on Apr. 27, 2010 and completely tested on May 10, 2010. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI / TIA / EIA-603-C-2004 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by:



Roy Wu / Manager



**SPORTON INTERNATIONAL (KUNSHAN) INC.**  
**No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.**



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### SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	§2.1046	N/A	Conducted Output Power	N/A	PASS	-
3.2	§22.913(a)(2)	RSS-132(4.4) SRSP-503(5.1.3)	Effective Radiated Power	< 7 Watts	PASS	-
3.2	§24.232(c)	RSS-133 (6.4) SRSP-510(5.1.2)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
3.2	§27.50(d)(2)	RSS-139 (6.4) SRSP-513(5.1.2)	Equivalent Isotropic Radiated Power	< 1 Watts	PASS	-
3.3	§2.1049 §22.917(a) §24.238(a) §27.53(g)	N/A	Occupied Bandwidth	N/A	PASS	-
3.4	§2.1051 §22.917(a) §24.238(a) §27.53(g)	RSS-132 (4.5.1) RSS-133 (6.5.1) RSS-139 (6.5)	Band Edge Measurement	< 43+10log <sub>10</sub> (P[Watts])	PASS	-
3.5	§2.1051 §22.917(a) §24.238(a) §27.53(g)	RSS-132 (4.5.1) RSS-133 (6.5.1) RSS-139 (6.5)	Conducted Emission	< 43+10log <sub>10</sub> (P[Watts])	PASS	-
3.6	§2.1053 §22.917(a) §24.238(a) §27.53(g)	RSS-132 (4.5.1) RSS-133 (6.5.1) RSS-139 (6.5)	Field Strength of Spurious Radiation	< 43+10log <sub>10</sub> (P[Watts])	PASS	Under limit 15.39 dB at 3758.0 MHz
3.7	§2.1055 §22.355 §24.235 §27.54	RSS-132 (4.3) RSS-133 (6.3) RSS-139 (6.3)	Frequency Stability for Temperature & Voltage	< 2.5 ppm	PASS	-

# 1 General Description

## 1.1 Applicant

**ZTE CORPORATION**

ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P. R. China

## 1.2 Manufacturer

**ZTE CORPORATION**

ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P. R. China

## 1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	USB Dongle
Brand Name	ZTE
Model Name	AC3781
FCC ID	Q78-AC3781
Tx Frequency	CDMA2000 BC0 : 824 MHz ~ 849 MHz CDMA2000 BC1 : 1850 MHz ~ 1910 MHz CDMA2000 BC15 : 1710 ~ 1755 MHz
Rx Frequency	CDMA2000 BC0 : 869 MHz ~ 894 MHz CDMA2000 BC1 : 1930 MHz ~ 1990 MHz CDMA2000 BC15 : 2110 ~ 2155 MHz
Maximum Output Power to Antenna	CDMA2000 BC0 : 24.17 dBm CDMA2000 BC1 : 23.59 dBm CDMA2000 BC15 : 23.58 dBm
Maximum ERP/EIRP	CDMA2000 BC0 : 0.20 W (23.06 dBm) CDMA2000 BC1 : 0.32 W (25.10 dBm) CDMA2000 BC15 : 0.33 W (25.20 dBm)
Antenna Type	Fixed Internal Antenna
HW Version	AC3781_A
SW Version	LU3AD109
Type of Modulation	QPSK
Type of Emission	1M28F9W
EUT Stage	Production Unit

**Remark:**

1. This test report recorded only product characteristics and test results of PCS Licensed Transmitter (PCB).
2. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

### 1.4 Testing Site

<b>Test Site</b>	SPORTON INTERNATIONAL (KUNSHAN) INC.	
<b>Test Site Location</b>	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
<b>Test Site No.</b>	<b>Sporton Site No.</b>	
	TH01-KS	03CH01-KS

### 1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- Preliminary Guidance for Receiving Applications for Certification of 3G Device. May 9, 2006.
- 47 CFR Part 2, 22(H), 24(E), 27(L)
- ANSI / TIA / EIA-603-C-2004
- IC RSS-132 Issue 2
- IC RSS-133 Issue 5
- IC RSS-139 Issue 2

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

### 1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU200	N/A	N/A	Unshielded, 1.8 m
2.	Notebook	Dell	P08S	QDS-BRCM1030	N/A	AC I/P: Unshielded, 1.84m DC O/P: Shielded, 0.9m

## 2 Test Configuration of Equipment Under Test

### 2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range.

Frequency range investigated for radiated emission is as follows:

1. 30 MHz to 9000 MHz for CDMA2000 BC0.
2. 30 MHz to 19000 MHz for CDMA2000 BC1.
3. 30 MHz to 18000 MHz for CDMA2000 BC15.

Test Modes		
Band	Radiated TCs	Conducted TCs
CDMA2000 BC0	■ 1xRTT Link Mode	■ 1xRTT Link Mode
CDMA2000 BC1	■ 1xRTT Link Mode	■ 1xRTT Link Mode
CDMA2000 BC15	■ 1xRTT Link Mode	■ 1xRTT Link Mode

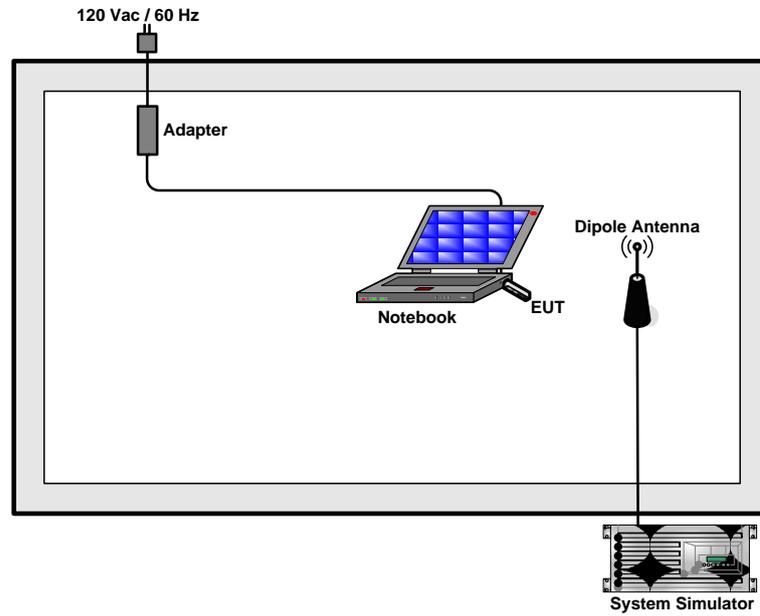
**Note:**

1. For CDMA2000 BC0, BC1 and BC15, The maximum RF output power levels are 1xRTT RC3+SO55 mode for QPSK Link; only these modes were used for all tests.

The conducted power table is as follows:

Band	Conducted Power (*Unit: dBm)								
	CDMA2000 BC0			CDMA2000 BC1			CDMA2000 BC15		
Channel	1013	384	777	25	600	1175	25	450	875
Frequency	824.7	836.52	848.31	1851.25	1880	1908.75	1711.25	1732.50	1753.75
1xRTT RC1+SO55	24.00	24.00	23.90	23.55	23.47	23.55	23.48	23.30	23.55
1xRTT RC3+SO55	24.17	24.09	23.95	23.54	23.54	23.59	23.50	23.27	23.58
1xRTT RC3+SO32	24.17	24.13	23.97	23.55	23.50	23.53	23.50	23.35	23.57
EVDO RTAP 153.6K	23.83	23.80	23.67	23.58	23.31	23.32	23.38	23.37	23.39
EVDO RETAP 4096K	23.87	23.89	23.77	23.59	23.47	23.42	23.43	23.39	23.47

## 2.2 Connection Diagram of Test System



### 3 Test Result

#### 3.1 Conducted Output Power Measurement

##### 3.1.1 Description of the Conducted Output Power Measurement

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.

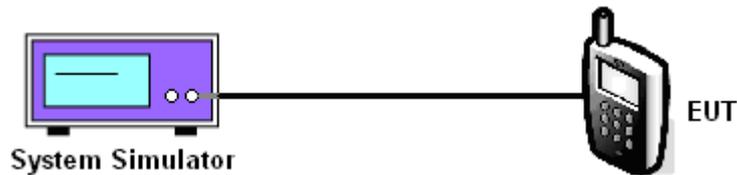
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedures

1. The transmitter output port was connected to base station.
2. Set EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.

##### 3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

CDMA2000 BC0					
Test Mode	Test Status	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watts)
CDMA 2000 1xRTT	RC3+SO55	1013 (Low)	824.70	24.17	0.26
		384 (Mid)	836.52	24.09	0.26
		777 (High)	848.31	23.95	0.25

CDMA2000 BC1					
Test Mode	Test Status	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watts)
CDMA 2000 1xRTT	RC3+SO55	25 (Low)	1851.25	23.54	0.23
		600 (Mid)	1880.00	23.54	0.23
		1175 (High)	1908.75	23.59	0.23

CDMA2000 BC15					
Test Mode	Test Status	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watts)
CDMA 2000 1xRTT	RC3+SO55	25 (Low)	1711.25	23.50	0.22
		450 (Mid)	1732.50	23.27	0.21
		875 (High)	1753.75	23.58	0.23

## 3.2 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

### 3.2.1 Description of the ERP/EIRP Measurement

ERP/EIRP is measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The ERP of mobile transmitters must not exceed 7 Watts. The EIRP of mobile transmitters are limited to 2 Watts for 1850~1910 MHz and 1 watt for 1710~1755 MHz.

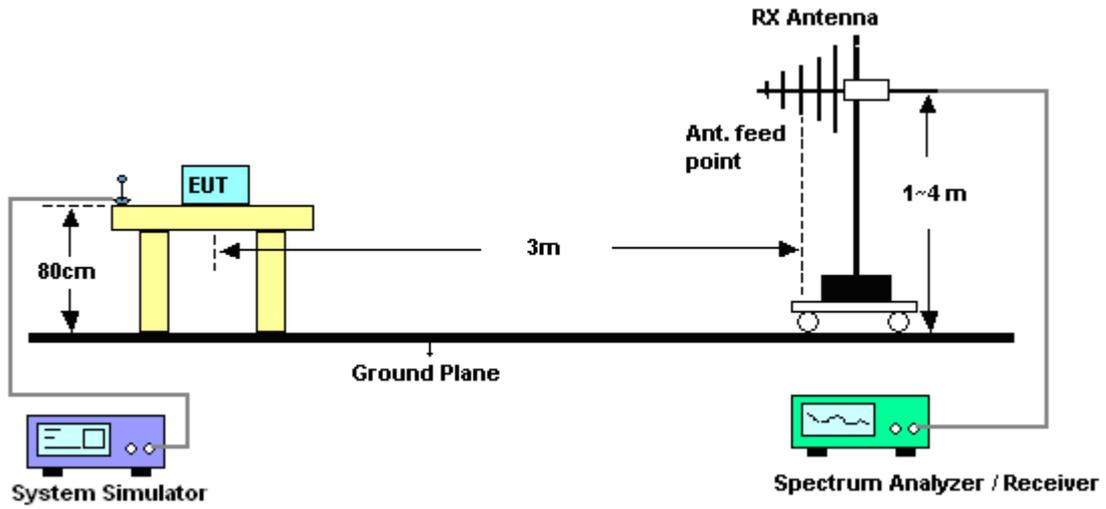
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

1. The EUT was placed on an non-conductive rotating platform with 0.8 meter height in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RBW= 3MHz,VBW= 3MHz, and peak detector settings.
2. During the measurement, the EUT was enforced in maximum power and linked with a base station. The highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
3. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. The EUT was replaced by dipole antenna (substitution antenna) at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor,  $EIRP = LVL + \text{Correction factor}$  and  $ERP = EIRP - 2.15$ .

### 3.2.4 Test Setup





3.2.5 Test Result of ERP

CDMA2000 BC0 1xRTT_RC3+SO55 Radiated Power ERP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
824.70	-3.31	28.11	22.65	0.18
836.52	-2.81	27.85	22.89	0.19
848.31	-4.21	27.90	21.54	0.14
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
824.70	-7.66	32.22	22.41	0.17
836.52	-6.57	31.78	23.06	0.20
848.31	-7.78	32.24	22.31	0.17

\* ERP = LVL (dBm) + Correction Factor (dB) – 2.15

3.2.6 Test Result of EIRP

CDMA2000 BC1 1xRTT_RC3+SO55 Radiated Power EIRP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1851.25	-15.76	39.03	23.27	0.21
1880.00	-15.10	40.19	25.09	0.32
1908.75	-14.40	39.07	24.67	0.29
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1851.25	-18.76	42.21	23.45	0.22
1880.00	-18.80	43.90	25.10	0.32
1908.75	-19.12	43.38	24.26	0.27

\* EIRP = LVL (dBm) + Correction Factor (dB)

CDMA2000 BC15 1xRTT_RC3+SO55 Radiated Power EIRP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1711.25	-12.93	38.03	25.10	0.32
1732.50	-12.62	37.82	25.20	0.33
1753.75	-14.53	37.65	23.12	0.21
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1711.25	-18.71	43.03	24.32	0.27
1732.50	-18.72	42.48	23.76	0.24
1753.75	-19.16	42.69	23.53	0.23

\* EIRP = LVL (dBm) + Correction Factor (dB)

### 3.3 Occupied Bandwidth Measurement

#### 3.3.1 Description of Occupied Bandwidth Measurement

The emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

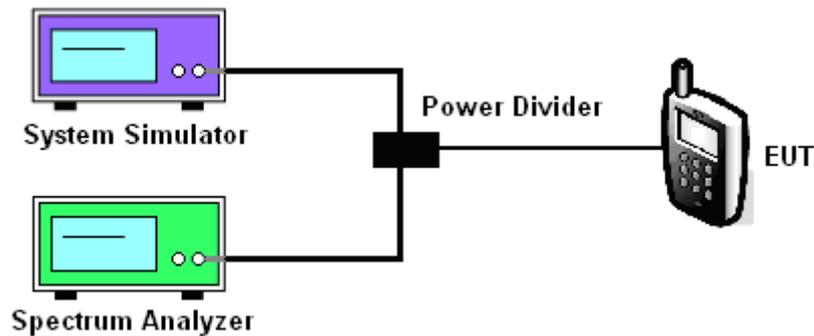
#### 3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The 99% and 26 dB occupied bandwidth (BW) of the middle channel for the highest RF powers were measured.

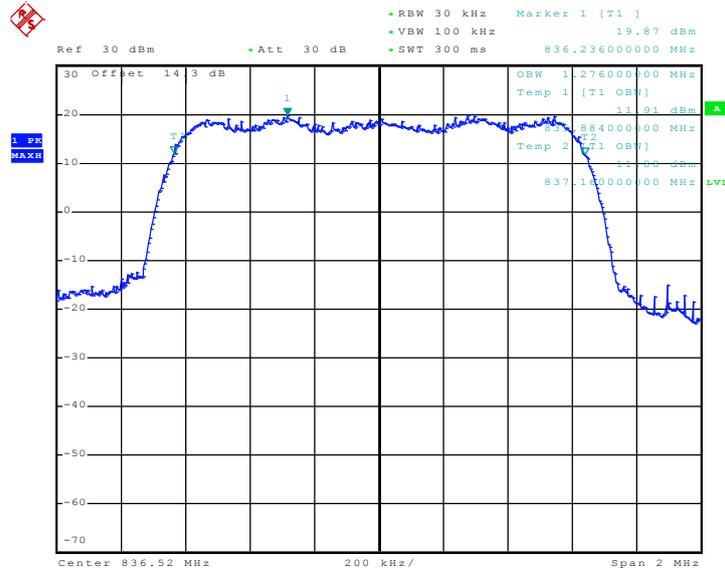
#### 3.3.4 Test Setup



### 3.3.5 Test Result (Plots) of Occupied Bandwidth

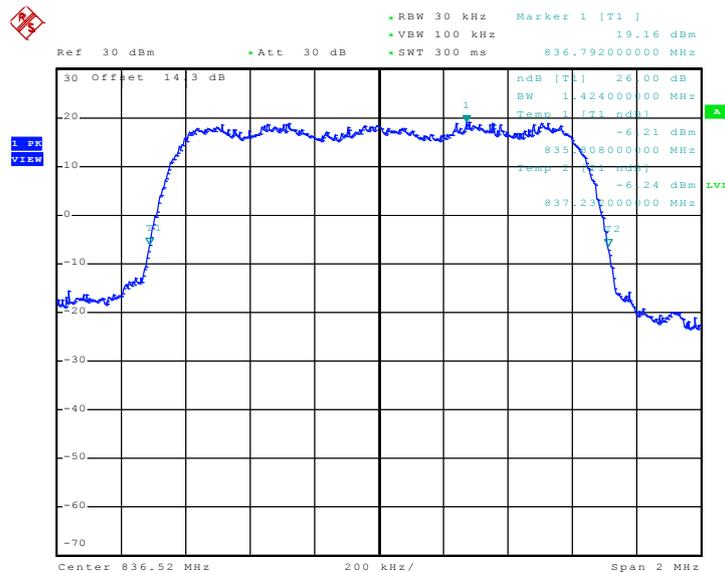
Band :	CDMA2000 BC0	Power Stage :	High
Test Mode :	1xRTT_RC3+SO55		

99% Occupied Bandwidth Plot on Channel 384



Date: 28.APR.2010 10:18:42

26dB Bandwidth Plot on Channel 384

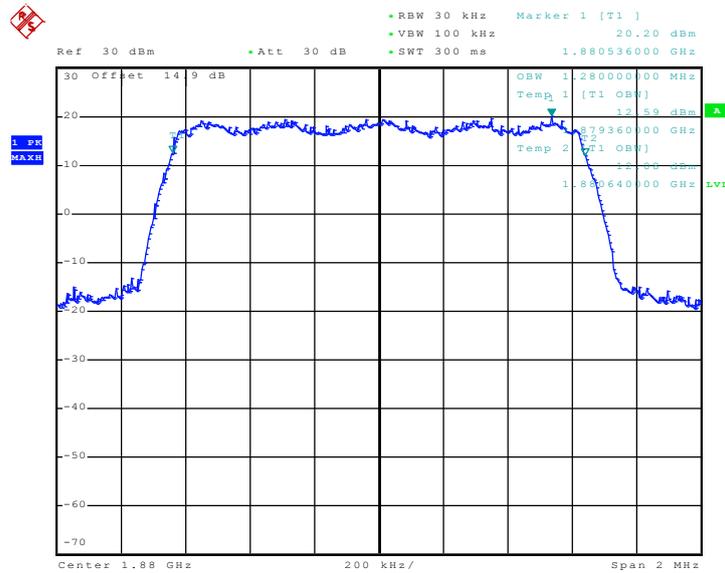


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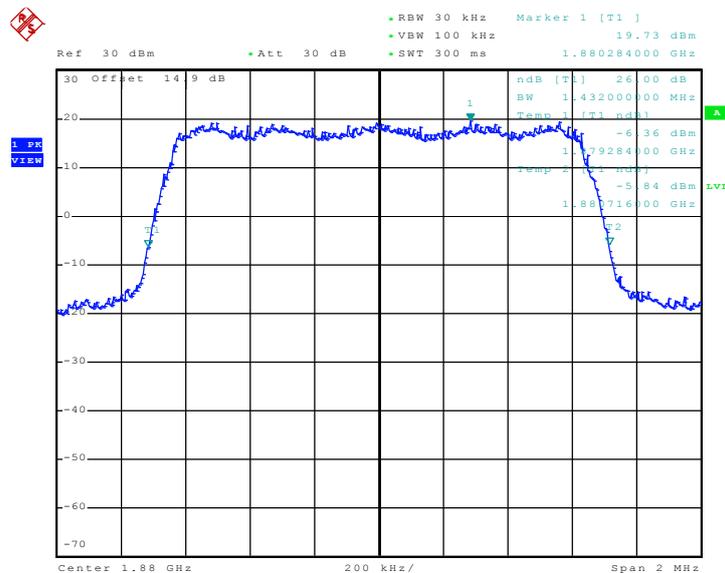
<b>Band :</b>	CDMA2000 BC1	<b>Power Stage :</b>	High
<b>Test Mode :</b>	1xRTT_RC3+SO55		

99% Occupied Bandwidth Plot on Channel 600



Date: 28.APR.2010 11:33:31

26dB Bandwidth Plot on Channel 600

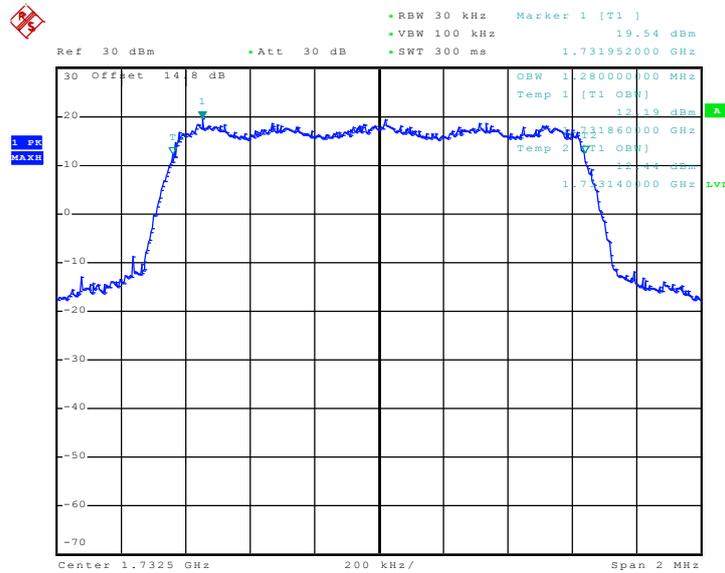


Date: 28.APR.2010 11:38:59



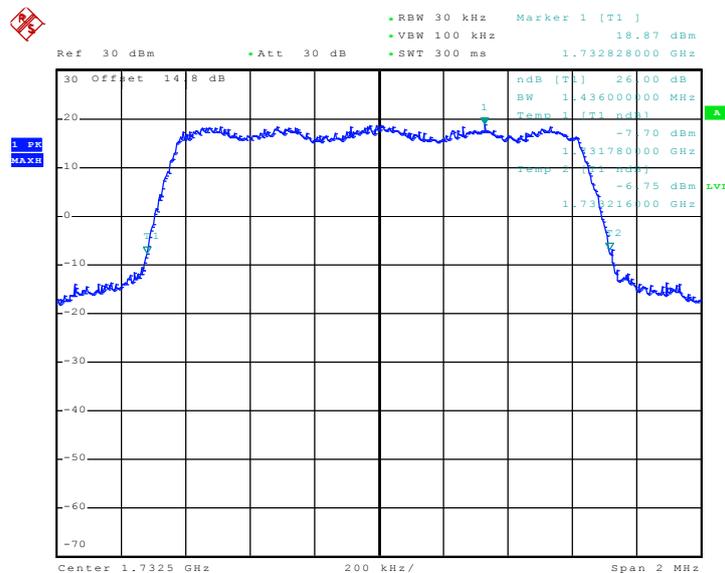
<b>Band :</b>	CDMA2000 BC15	<b>Power Stage :</b>	High
<b>Test Mode :</b>	1xRTT_RC3+SO55		

**99% Occupied Bandwidth Plot on Channel 450**



Date: 8.MAY.2010 03:52:00

**26dB Bandwidth Plot on Channel 450**



Date: 8.MAY.2010 03:55:08

## 3.4 Band Edge Measurement

### 3.4.1 Description of Band Edge Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

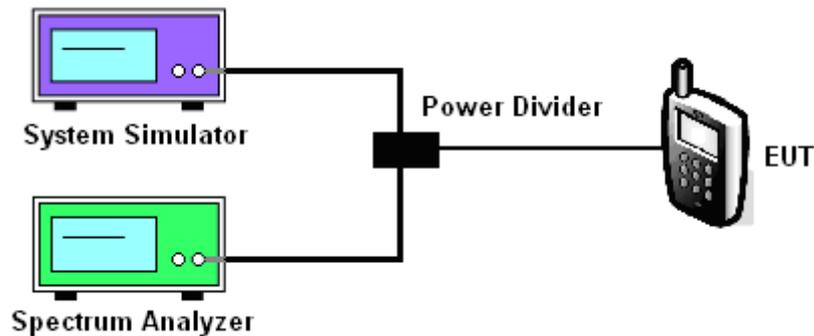
### 3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.4.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Setting RBW as roughly  $BW/100$ .
3. The RBW was replaced by 10 kHz, due to the spectrum analyzer IF-Filter including an excess of the limit. A worst case correction factor of  $10 \log (1\% BW/\text{measurement RBW})$  was implemented.

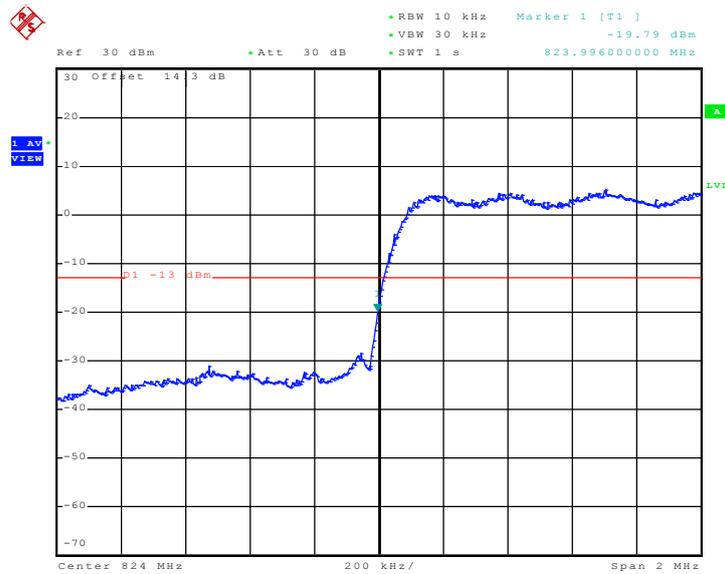
### 3.4.4 Test Setup



### 3.4.5 Test Result (Plots) of Conducted Band Edge

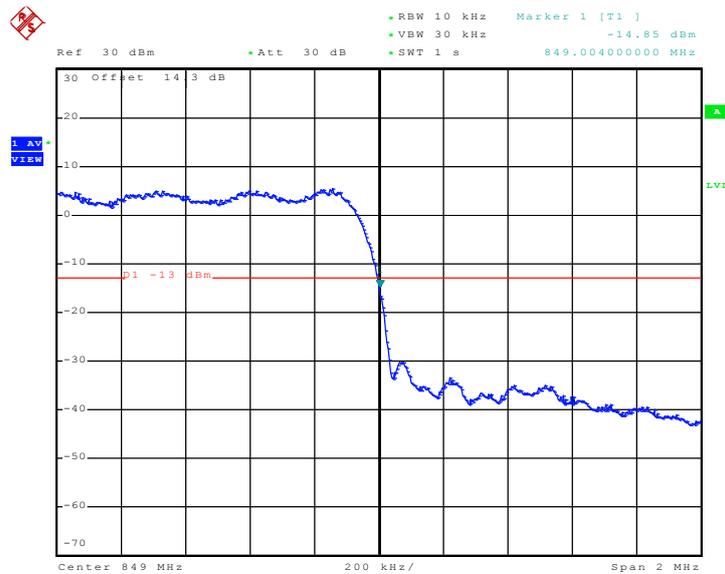
Band :	CDMA2000 BC0	Power Stage :	High
Test Mode :	1xRTT_RC3+SO55		

Lower Band Edge Plot on Channel 1013



Date: 4.MAY.2010 14:17:52

Higher Band Edge Plot on Channel 777

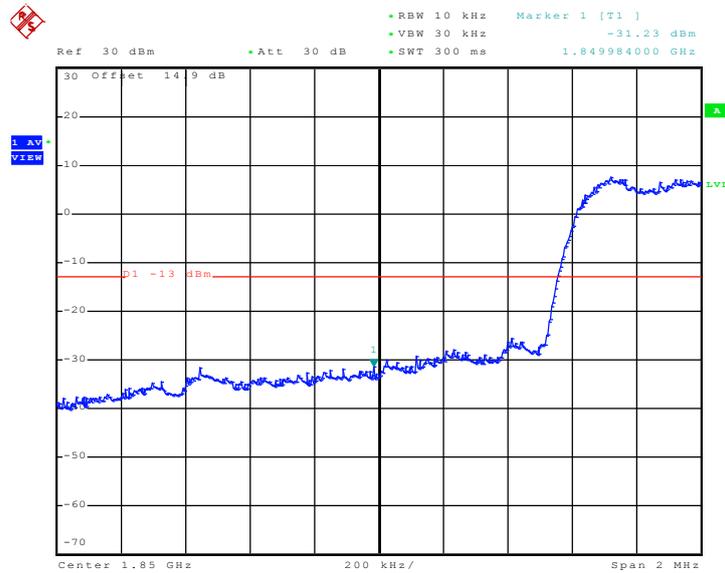


Date: 4.MAY.2010 14:18:52



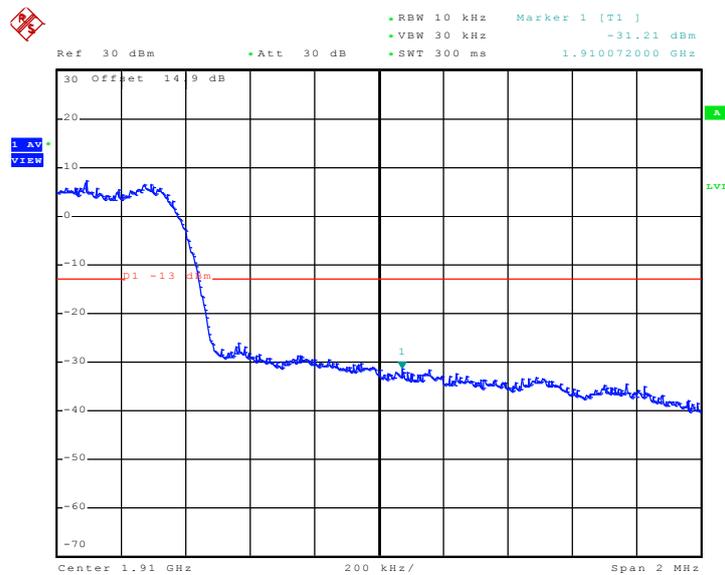
Band :	CDMA2000 BC1	Power Stage :	High
Test Mode :	1xRTT_RC3+SO55		

Lower Band Edge Plot on Channel 25



Date: 28.APR.2010 11:04:11

Higher Band Edge Plot on Channel 1175

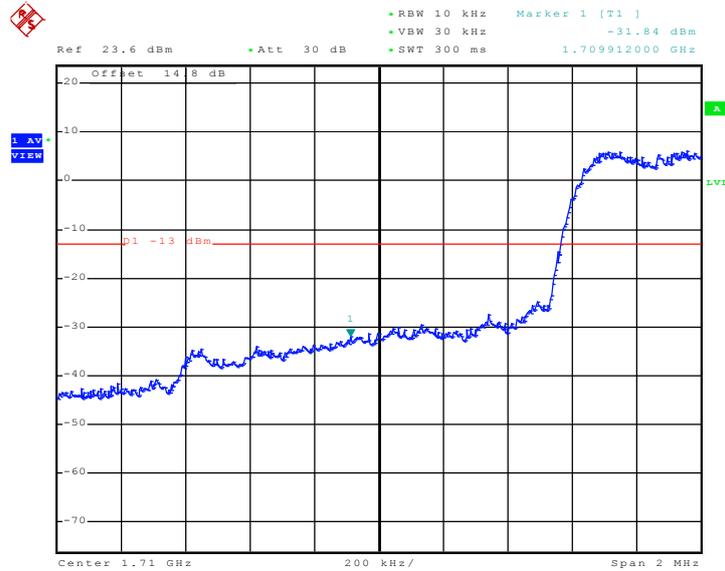


Date: 28.APR.2010 11:02:50



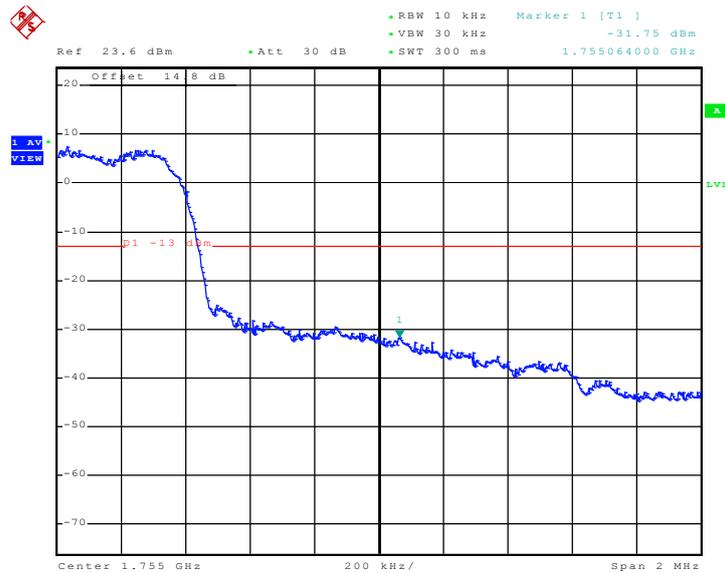
<b>Band :</b>	CDMA2000 BC15	<b>Power Stage :</b>	High
<b>Test Mode :</b>	1xRTT_RC3+SO55		

Lower Band Edge Plot on Channel 25



Date: 29.APR.2010 05:15:14

Higher Band Edge Plot on Channel 875



Date: 29.APR.2010 05:14:12

## 3.5 Conducted Emission Measurement

### 3.5.1 Description of Conducted Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10<sup>th</sup> harmonic.

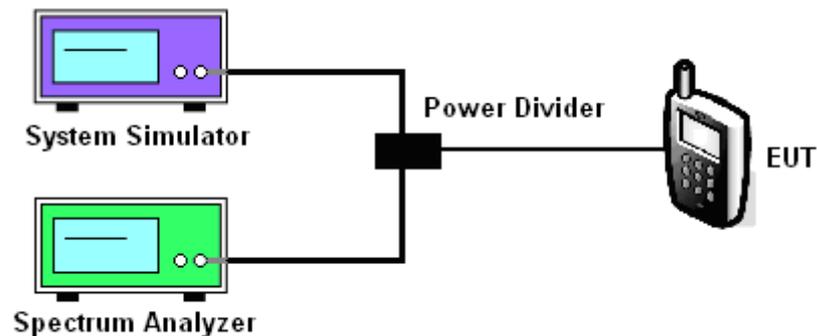
### 3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.5.3 Test Procedures

1. The EUT was connected to spectrum analyzer and base station via power divider.
2. The middle channel for the highest RF power within the transmitting frequency was measured.
3. The conducted spurious emission for the whole frequency range was taken.

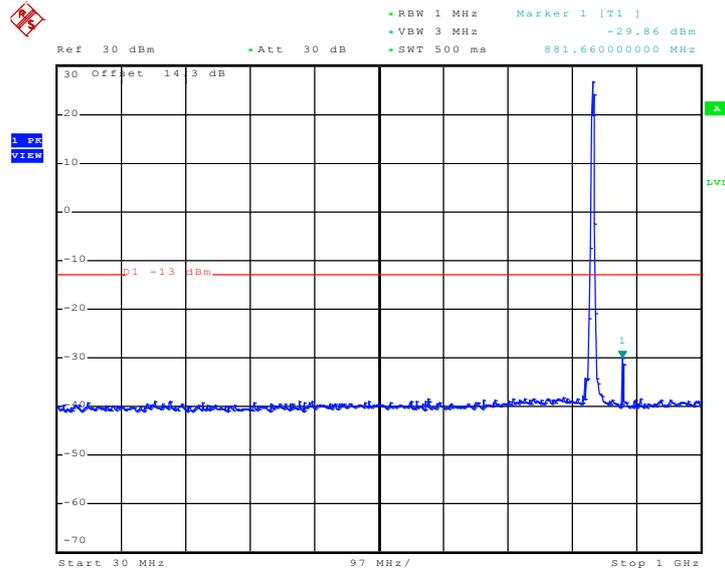
### 3.5.4 Test Setup



### 3.5.5 Test Result (Plots) of Conducted Emission

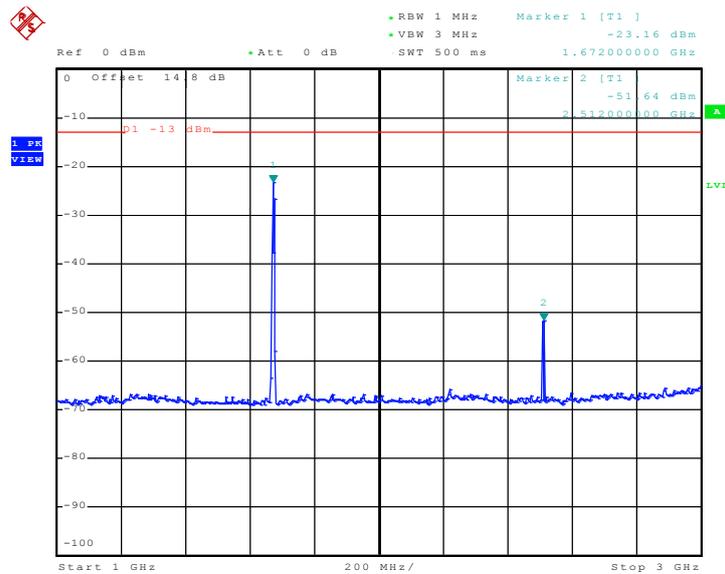
Band :	CDMA2000 BC0	Power Stage :	High
Test Mode :	1xRTT_RC3+SO55		

Conducted Emission Plot between 30MHz ~ 1GHz



Date: 28.APR.2010 10:29:42

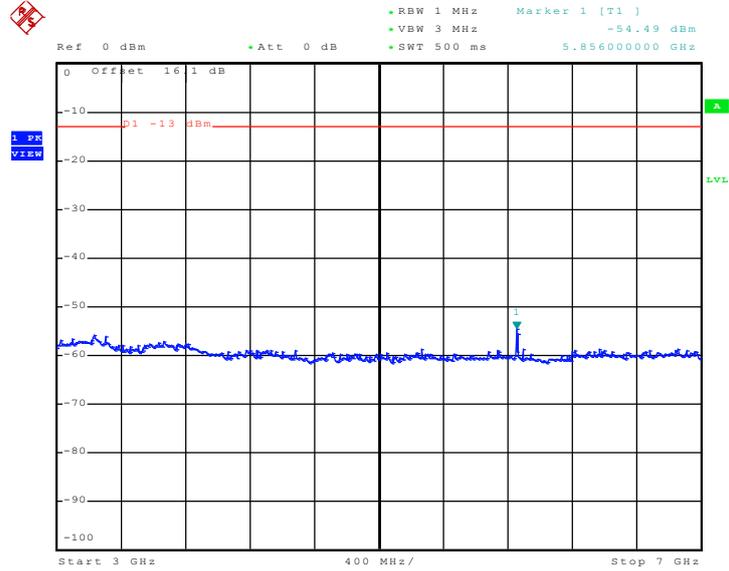
Conducted Emission Plot between 1GHz ~ 3GHz



Date: 28.APR.2010 10:32:53

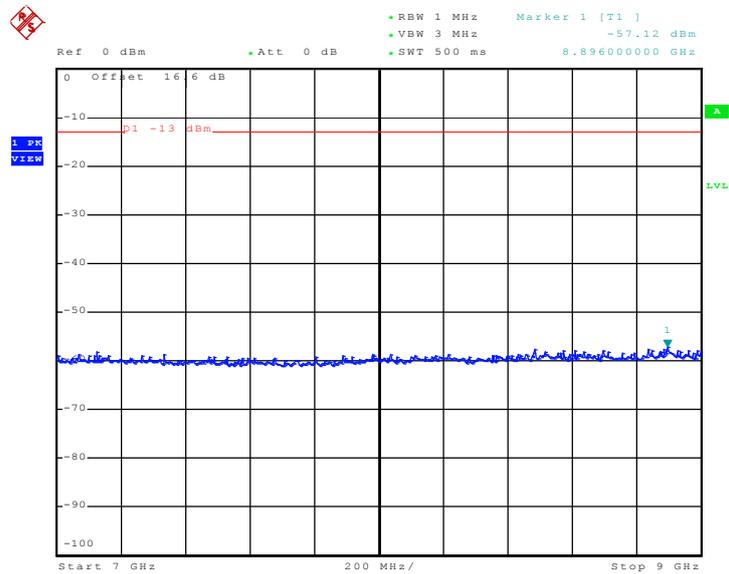


Conducted Emission Plot between 3GHz ~ 7GHz



Date: 28.APR.2010 10:34:55

Conducted Emission Plot between 7GHz ~ 9GHz

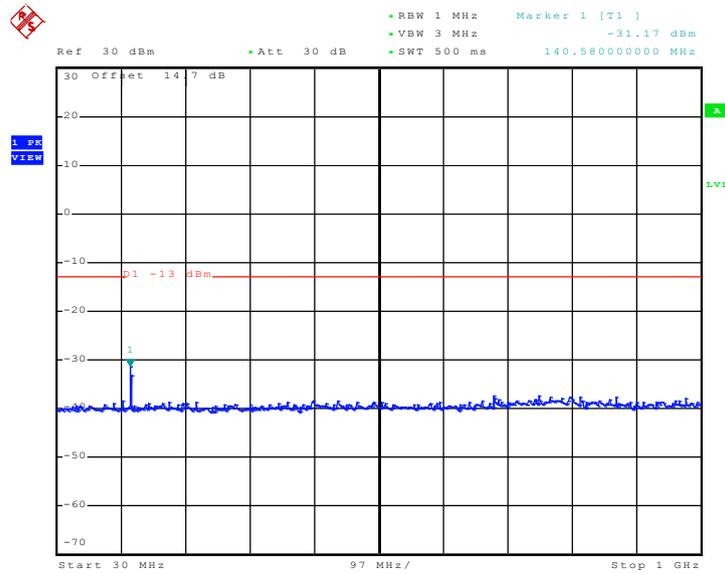


Date: 28.APR.2010 10:36:24



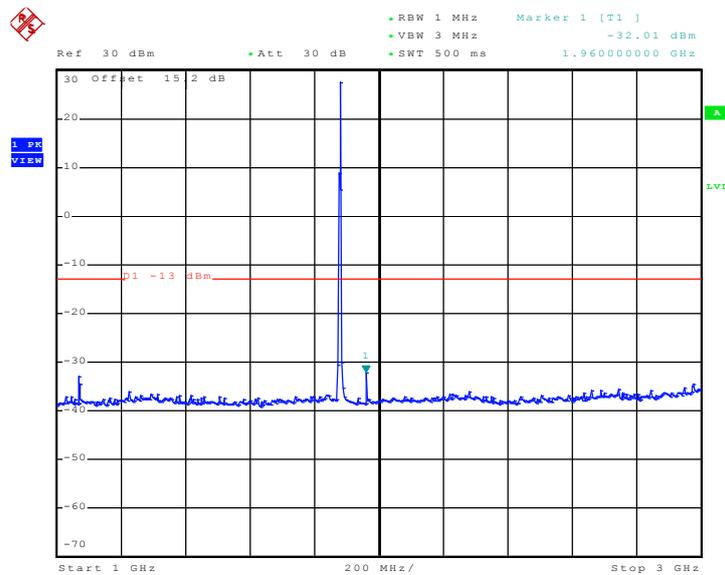
Band :	CDMA2000 BC1	Power Stage :	High
Test Mode :	1xRTT_RC3+SO55		

Conducted Emission Plot between 30MHz ~ 1GHz



Date: 28.APR.2010 11:43:21

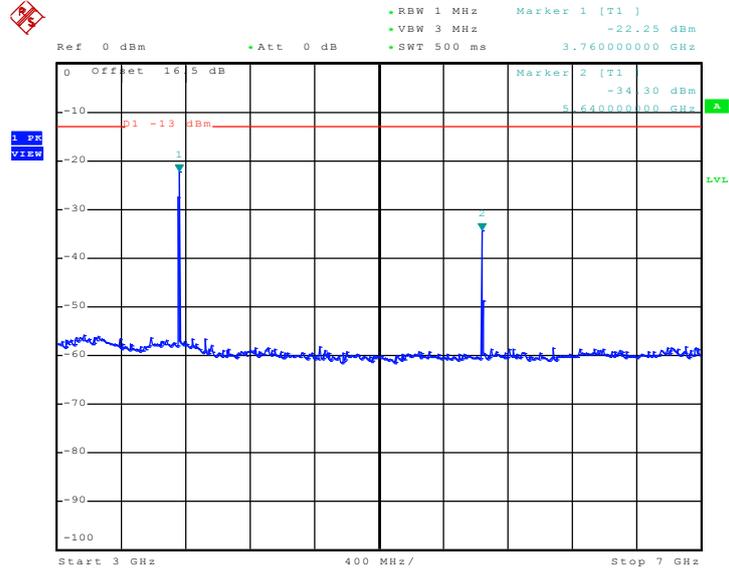
Conducted Emission Plot between 1GHz ~ 3GHz



Date: 28.APR.2010 11:45:40

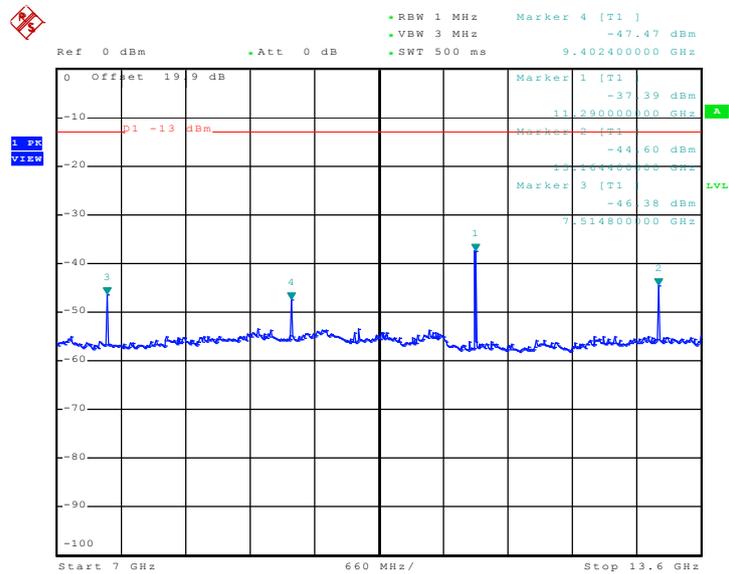


Conducted Emission Plot between 3GHz ~ 7GHz



Date: 28.APR.2010 11:53:37

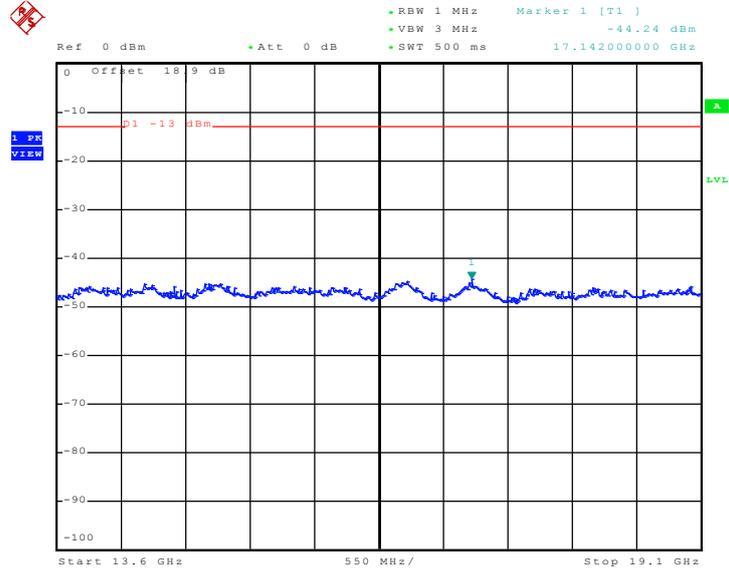
Conducted Emission Plot between 7GHz ~ 13.6GHz



Date: 28.APR.2010 11:55:57



Conducted Emission Plot between 13.6GHz ~ 19.1GHz

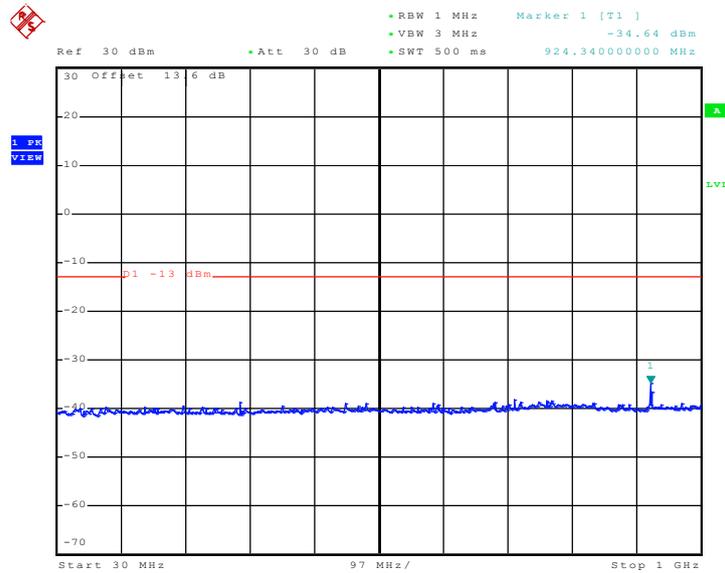


Date: 28.APR.2010 11:58:07



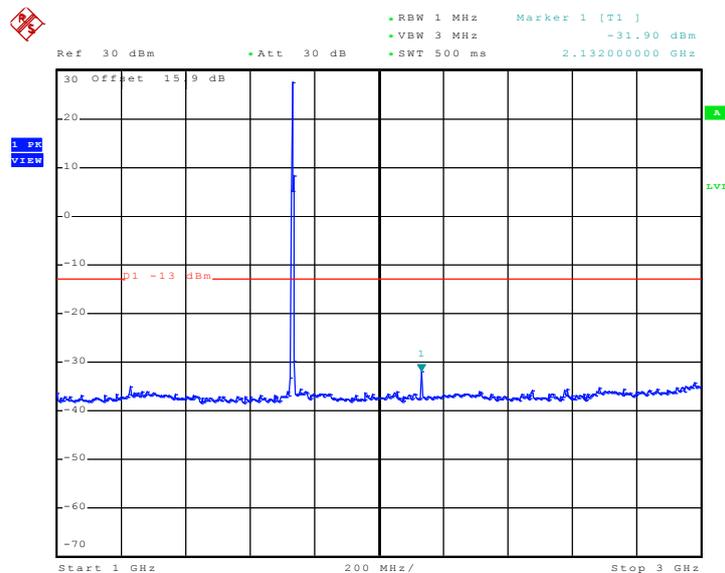
Band :	CDMA2000 BC15	Power Stage :	High
Test Mode :	1xRTT_RC3+SO55		

Conducted Emission Plot between 30MHz ~ 1GHz



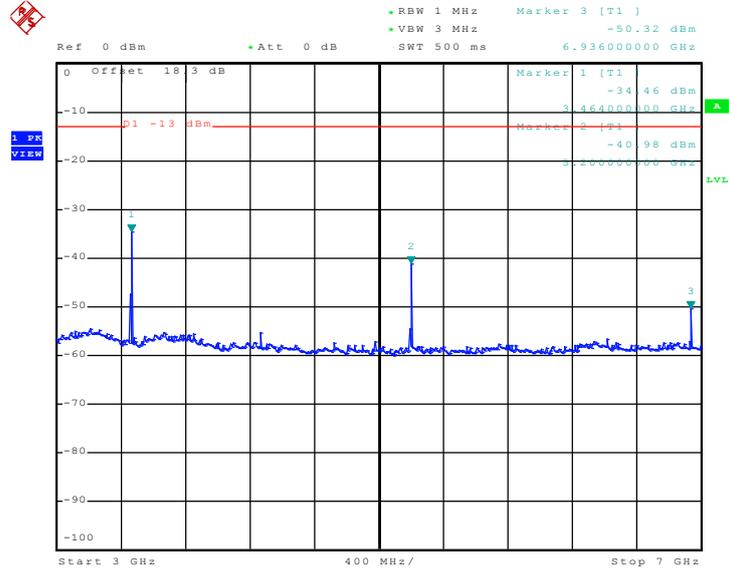
Date: 8.MAY.2010 04:00:54

Conducted Emission Plot between 1GHz ~ 3GHz



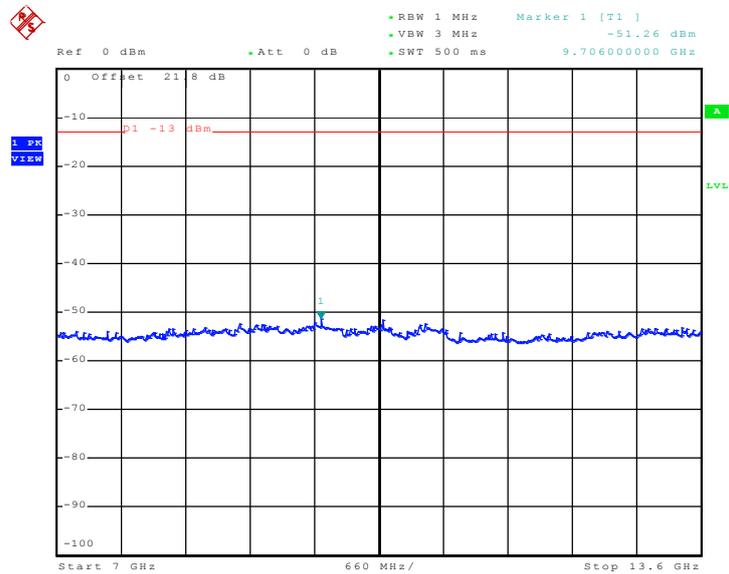
Date: 8.MAY.2010 04:02:44

Conducted Emission Plot between 3GHz ~ 7GHz



Date: 8.MAY.2010 04:05:59

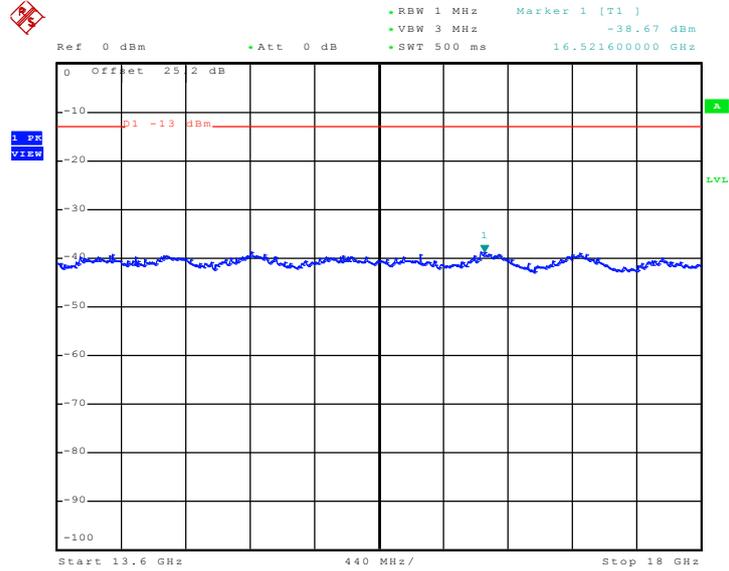
Conducted Emission Plot between 7GHz ~ 13.6GHz



Date: 8.MAY.2010 04:07:32



Conducted Emission Plot between 13.6GHz ~ 18GHz



Date: 8.MAY.2010 04:09:54

## 3.6 Field Strength of Spurious Radiation Measurement

### 3.6.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

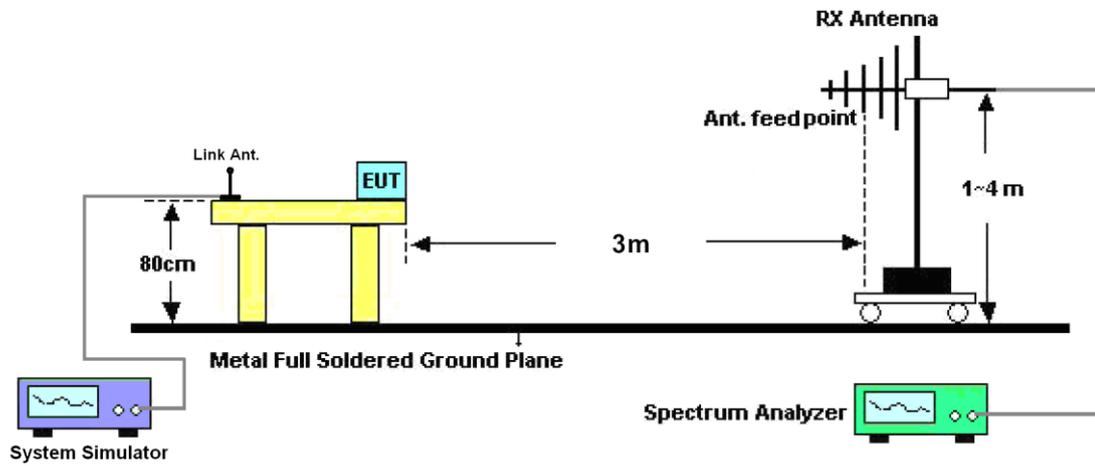
### 3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.6.3 Test Procedures

1. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10.  $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
11.  $ERP \text{ (dBm)} = EIRP - 2.15$

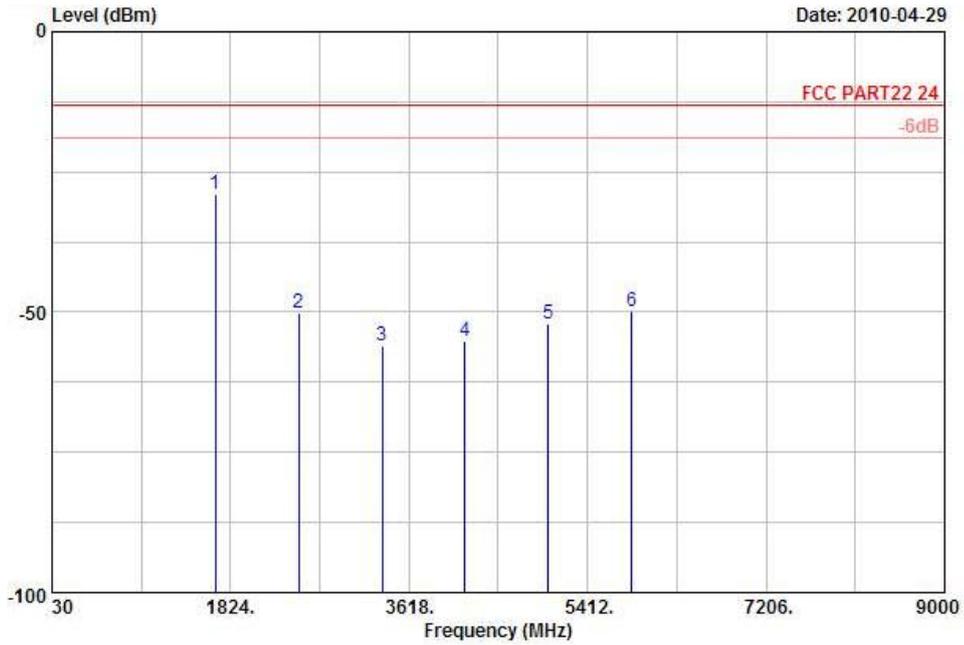
### 3.6.4 Test Setup





3.6.5 Test Result of Field Strength of Spurious Radiated

<b>Band :</b>	CDMA2000 BC0	<b>Temperature :</b>	21~22°C
<b>Test Mode :</b>	1xRTT_RC3+SO55	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Haitao Yin	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

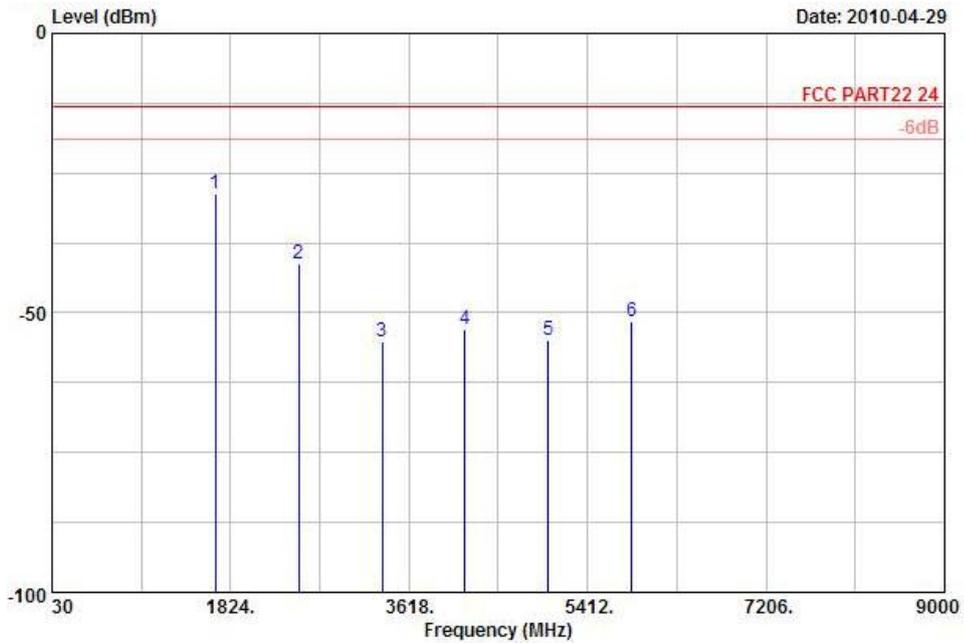


Site : 03CH01-KS  
 Condition: FCC PART22 24 HF EIRP FACTOR-09020 HORIZONTAL  
 Power : From System  
 Plane : E2 Plane

Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
1674	-28.88	-13	-15.88	-29.52	-29.53	0.57	3.37	H	Pass
2508	-50.13	-13	-37.13	-52.27	-52.36	0.78	5.16	H	Pass
3345	-56.00	-13	-43.00	-57.94	-59.64	0.87	6.66	H	Pass
4182	-55.10	-13	-42.10	-58.85	-59.69	0.97	7.71	H	Pass
5018	-52.14	-13	-39.14	-58.52	-57.81	1.09	8.91	H	Pass
5854	-49.75	-13	-36.75	-58.54	-56.19	1.22	9.81	H	Pass



<b>Band :</b>	CDMA2000 BC0	<b>Temperature :</b>	21~22°C
<b>Test Mode :</b>	1xRTT_RC3+SO55	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Haitao Yin	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

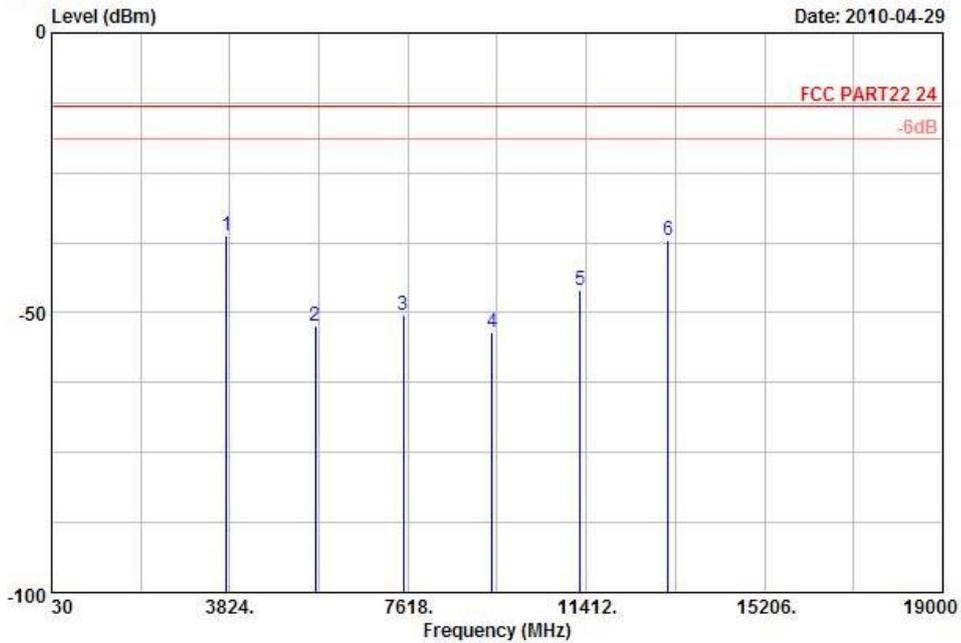


Site : 03CH01-KS  
 Condition: FCC PART22 24 HF EIRP FACTOR-09020 VERTICAL  
 Power : From System  
 Plane : E2 Plane

Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
1674	-28.74	-13	-15.74	-35.07	-29.39	0.57	3.37	V	Pass
2508	-41.33	-13	-28.33	-47.05	-43.56	0.78	5.16	V	Pass
3345	-55.23	-13	-42.23	-58.05	-58.87	0.87	6.66	V	Pass
4178	-53.02	-13	-40.02	-57.36	-57.61	0.97	7.71	V	Pass
5018	-54.75	-13	-41.75	-59.79	-60.42	1.09	8.91	V	Pass
5854	-51.44	-13	-38.44	-59.55	-57.88	1.22	9.81	V	Pass



<b>Band :</b>	CDMA2000 BC1	<b>Temperature :</b>	21~22°C
<b>Test Mode :</b>	1xRTT_RC3+SO55	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Haitao Yin	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

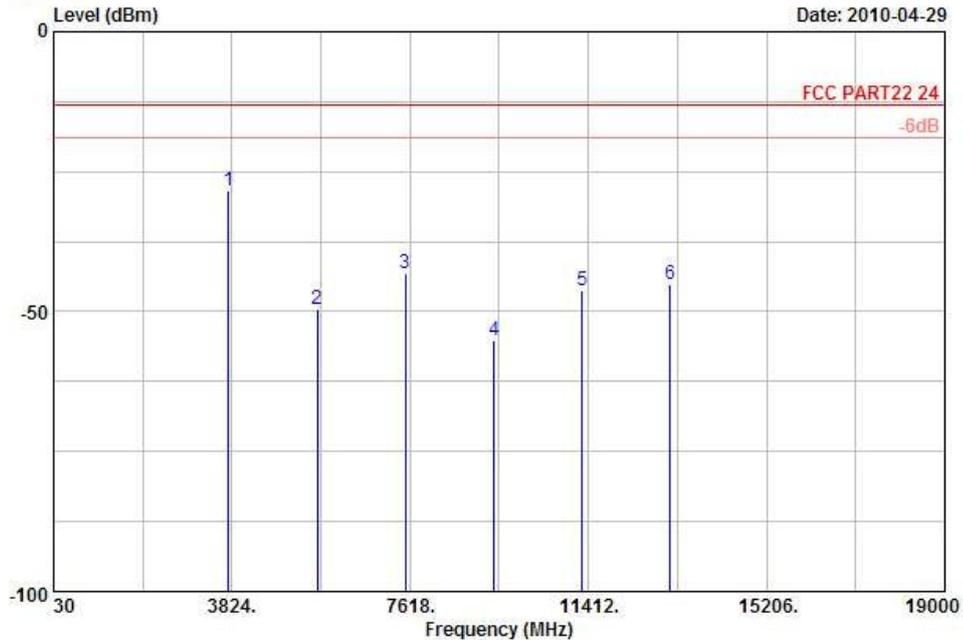


Site : 03CH01-KS  
 Condition: FCC PART22 24 HF EIRP FACTOR-09020 HORIZONTAL  
 Power : From System  
 Plane : H Plane

Frequency ( MHz )	EIRP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
3758	-36.34	-13	-23.34	-43.53	-42.72	0.78	7.16	H	Pass
5638	-52.50	-13	-39.50	-57.70	-61.04	1.04	9.58	H	Pass
7518	-50.35	-13	-37.35	-57.91	-60.46	1.35	11.46	H	Pass
9400	-53.36	-13	-40.36	-58.90	-64.42	1.75	12.81	H	Pass
11280	-46.00	-13	-33.00	-59.16	-57.09	2.00	13.09	H	Pass
13157	-37.03	-13	-24.03	-57.41	-48.74	2.04	13.75	H	Pass



<b>Band :</b>	CDMA2000 BC1	<b>Temperature :</b>	21~22°C
<b>Test Mode :</b>	1xRTT_RC3+SO55	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Haitao Yin	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

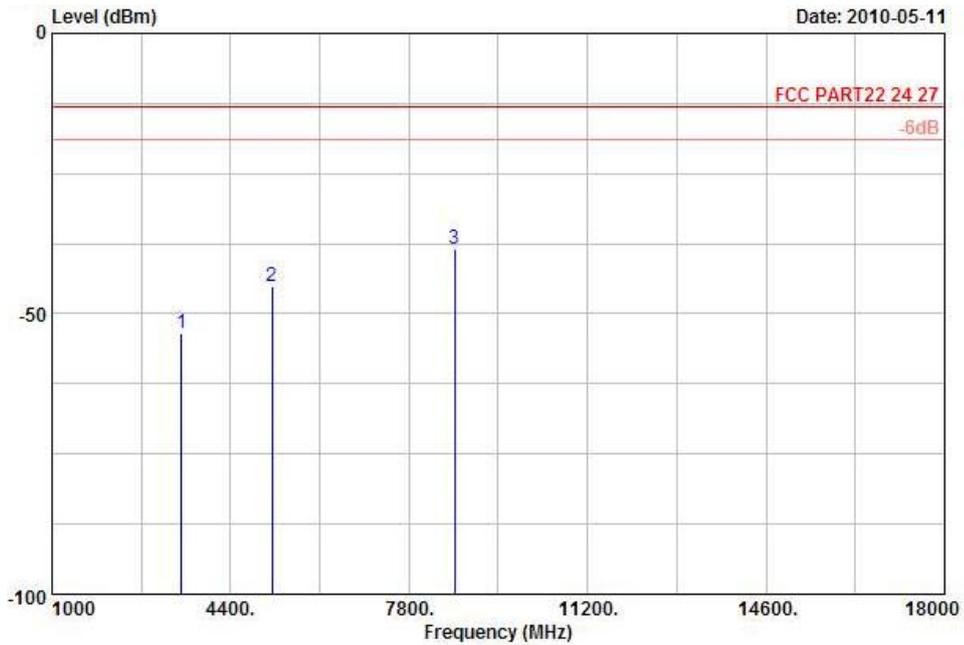


Site : 03CH01-KS  
 Condition: FCC PART22 24 HF EIRP FACTOR-09020 VERTICAL  
 Power : From System  
 Plane : H Plane

Frequency ( MHz )	EIRP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
3758	-28.39	-13	-15.39	-39.70	-34.77	0.78	7.16	V	Pass
5638	-49.47	-13	-36.47	-55.82	-58.01	1.04	9.58	V	Pass
7518	-43.31	-13	-30.31	-55.84	-53.42	1.35	11.46	V	Pass
9400	-55.08	-13	-42.08	-59.43	-66.14	1.75	12.81	V	Pass
11280	-46.31	-13	-33.31	-59.79	-57.40	2.00	13.09	V	Pass
13160	-45.09	-13	-32.09	-58.16	-56.80	2.04	13.75	V	Pass



<b>Band :</b>	CDMA2000 BC15	<b>Temperature :</b>	21~22°C
<b>Test Mode :</b>	1xRTT_RC3+SO55	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Haitao Yin	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

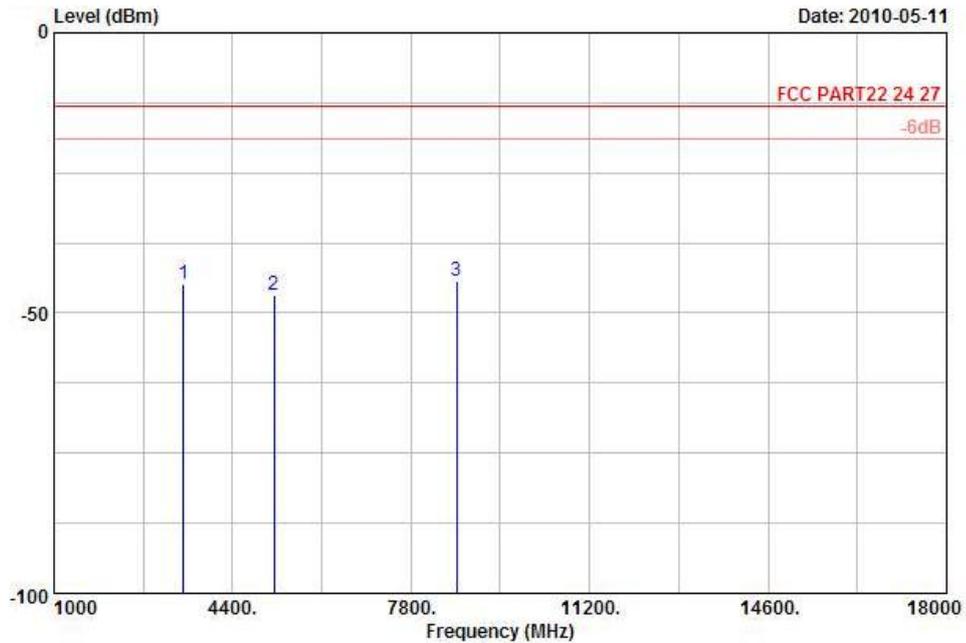


Site : 03CH01-KS  
 Condition: FCC PART22 24 27 HF EIRP FACTOR-09020 HORIZONTAL  
 Power : From System  
 Plane : E1 Plane

Frequency ( MHz )	EIRP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
3465.0	-53.38	-13	-40.38	-56.05	-59.51	0.71	6.84	H	Pass
5197.5	-45.12	-13	-32.12	-55.21	-53.20	0.98	9.06	H	Pass
8862.5	-38.44	-13	-25.44	-53.21	-49.28	1.62	12.46	H	Pass



<b>Band :</b>	CDMA2000 BC15	<b>Temperature :</b>	21~22°C
<b>Test Mode :</b>	1xRTT_RC3+SO55	<b>Relative Humidity :</b>	41~42%
<b>Test Engineer :</b>	Haitao Yin	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH01-KS  
 Condition: FCC PART22 24 27 HF EIRP FACTOR-09020 VERTICAL  
 Power : From System  
 Plane : E1 Plane

Frequency ( MHz )	EIRP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading ( dBm )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain ( dBi )	Polarization ( H/V )	Result
3465.0	-44.98	-13	-31.98	-52.38	-51.11	0.71	6.84	V	Pass
5197.5	-46.93	-13	-33.93	-55.21	-55.01	0.98	9.06	V	Pass
8862.5	-44.33	-13	-31.33	-57.40	-55.17	1.62	12.46	V	Pass

## 3.7 Frequency Stability Measurement

### 3.7.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5\text{ppm}$ ) of the center frequency.

### 3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

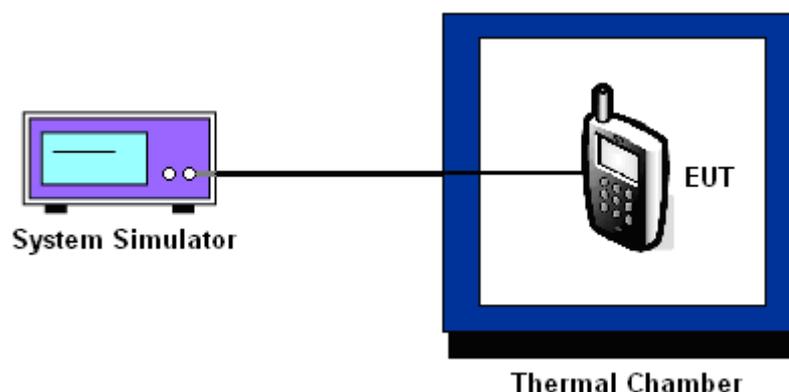
### 3.7.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the base station.
2. With power OFF, the temperature was decreased to  $-30^{\circ}\text{C}$  and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in  $10^{\circ}\text{C}$  step up to  $50^{\circ}\text{C}$ . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.
4. If the EUT can not be turned on at  $-30^{\circ}\text{C}$ , the testing lowest temperature will be raised in  $10^{\circ}\text{C}$  step until the EUT can be turned on.

### 3.7.4 Test Procedures for Voltage Variation

1. The EUT was placed in a temperature chamber at  $25\pm 5^{\circ}\text{C}$  and connected with the base station.
2. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

### 3.7.5 Test Setup





3.7.6 Test Result of Temperature Variation

<b>Band :</b>	CDMA2000 BC0	<b>Channel :</b>	384
<b>Test Mode :</b>	1xRTT_RC3+SO55	<b>Limit (ppm) :</b>	2.5

Temperature (°C)	Freq. Dev. (Hz)	Deviation (ppm)	Result
-30	N/A	N/A	PASS
-20	17	0.02	
-10	-18	-0.02	
0	-23	-0.03	
10	-19	-0.02	
20	-6	-0.01	
30	-9	-0.01	
40	-16	-0.02	
50	-37	-0.04	

Note:

1. The EUT stops transmitting at temperature -30°C.
2. The manufacturer declared that the EUT could work properly between temperatures -20°C~60°C.

<b>Band :</b>	CDMA2000 BC1	<b>Channel :</b>	600
<b>Test Mode :</b>	1xRTT_RC3+SO55	<b>Limit (ppm) :</b>	2.5

Temperature (°C)	Freq. Dev. (Hz)	Deviation (ppm)	Result
-30	N/A	N/A	PASS
-20	-37	-0.02	
-10	-39	-0.02	
0	-46	-0.02	
10	-41	-0.02	
20	-18	-0.01	
30	18	0.01	
40	-19	-0.01	
50	-20	-0.01	

Note:

1. The EUT stops transmitting at temperature -30°C.
2. The manufacturer declared that the EUT could work properly between temperatures -20°C~60°C.



<b>Band :</b>	CDMA2000 BC15	<b>Channel :</b>	450
<b>Test Mode :</b>	1xRTT_RC3+SO55	<b>Limit (ppm) :</b>	2.5

Temperature (°C)	Freq. Dev. (Hz)	Deviation (ppm)	Result
-30	N/A	N/A	PASS
-20	53	0.03	
-10	50	0.03	
0	-6	0.00	
10	-11	-0.01	
20	27	0.01	
30	38	0.02	
40	6	0.00	
50	-9	0.00	

**Note:**

1. The EUT stops transmitting at temperature -30°C.
2. The manufacturer declared that the EUT could work properly between temperatures -20°C~60°C.



3.7.7 Test Result of Voltage Variation

Band & Channel	Mode	Voltage (Volt)	Freq. Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
CDMA2000 BC0 CH384	1xRTT RC3+SO55	5.00	-20	-0.02	2.5	PASS
		4.75	-19	-0.02		
		5.25	-21	-0.02		
CDMA2000 BC1 CH600	1xRTT RC3+SO55	5.00	-44	-0.02	2.5	PASS
		4.75	-51	-0.03		
		5.25	-39	-0.02		
CDMA2000 BC15 CH450	1xRTT RC3+SO55	5.00	41	0.02	2.5	PASS
		4.75	-36	-0.02		
		5.25	-41	-0.02		

## 4 List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 18, 2010	Jan. 17, 2011	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	N/A	Dec. 28, 2009	Dec. 27, 2010	Conducted (TH01-KS)
EMI Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 17, 2009	Nov. 16, 2010	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 18, 2010	Jan. 17, 2011	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Jan. 18, 2010	Jan. 17, 2011	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	75959	1GHz~18GHz	Jan. 18, 2010	Jan. 17, 2011	Radiation (03CH01-KS)
Amplifier	Wireless	FPA6592G	60004	30MHz~2GHz	Feb. 02, 2010	Feb. 01, 2011	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Jan. 18, 2010	Jan. 17, 2011	Radiation (03CH01-KS)
actice hore antenna	com-power	AHA-118	701023	1G-18GHz	Nov. 18, 2009	Nov. 17, 2010	Radiation (03CH01-KS)
Signal Generator	R&S	SMR40	100455	10MHz~40GHz	Jan. 18, 2010	Jan. 17, 2011	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15-40GHz	Oct. 22, 2009	Oct. 21, 2010	Radiation (03CH01-KS)
System Simulator	R&S	CMU200	837587/066	Full-Band	Jan. 08, 2009	Jan. 07, 2011	Radiation (03CH01-KS)

## 5 Uncertainty of Evaluation

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Contribution	Uncertainty of $X_i$		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>1.27</b>		
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>2.54</b>		

### Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Contribution	Uncertainty of $X_i$		$u(X_i)$	$C_i$	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	$\pm 0.10$	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	$\pm 1.70$	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	$\pm 0.50$	Normal (k=2)	0.25	1	0.25
Receiver Correction	$\pm 2.00$	Rectangular	1.15	1	1.15
Antenna Factor Directional	$\pm 1.50$	Rectangular	0.87	1	0.87
Site Imperfection	$\pm 2.80$	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\text{Log}(1-\Gamma_1*\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>2.36</b>				
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>4.72</b>				



## **Appendix A. Photographs of EUT**

Please refer to Sporton report number EP042702 as below.