



# FCC RF Test Report

**APPLICANT** : ZTE CORPORATION  
**EQUIPMENT** : ZTE C78 CDMA1X Digital Mobile Phone  
**BRAND NAME** : ZTE  
**MODEL NAME** : ZTE C78  
**FCC ID** : Q78-C78  
**STANDARD** : FCC 47 CFR Part 2, 22(H), 24(E), 27(L)  
**CLASSIFICATION** : PCS Licensed Transmitter Held to Ear (PCE)  
**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 BC14 : 1851.25 ~ 1913.75 MHz /  
1931.25 ~ 1993.75 MHz  
CDMA2000 BC15 : 1711.25 ~ 1753.75 MHz /  
2111.25 ~ 2153.75 MHz  
**MAX. ERP/EIRP POWER** : CDMA2000 BC0 : 0.28 W  
CDMA2000 BC1 : 0.24 W  
CDMA2000 BC14 (G Block) : 0.15 W  
CDMA2000 BC15 : 0.30 W  
**EMISSION DESIGNATOR** : 1M28F9W



The product was received on Oct. 21, 2009 and completely tested on Dec. 01, 2009. We, SPORTON INTERNATIONAL 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 INC., the test report shall not be reproduced except in full.

Reviewed by:

Roy Wu / Manager



**SPORTON INTERNATIONAL INC.**

**No. 52, Hwa Ya 1<sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.**



TABLE OF CONTENTS

REVISION HISTORY..... 4
SUMMARY OF TEST RESULT ..... 5
1 GENERAL DESCRIPTION ..... 6
1.1 Applicant..... 6
1.2 Manufacturer ..... 6
1.3 Feature of Equipment Under Test..... 7
1.4 Testing Site..... 9
1.5 Applied Standards ..... 9
1.6 Ancillary Equipment List ..... 9
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST ..... 10
2.1 Test Mode..... 10
2.2 Connection Diagram of Test System ..... 11
3 TEST RESULT ..... 12
3.1 Conducted Output Power Measurement..... 12
3.2 Effective Radiated Power and Effective Isotropic Radiated Power Measurement ..... 14
3.3 Occupied Bandwidth Measurement ..... 19
3.4 Band Edge Measurement..... 28
3.5 Conducted Emission Measurement ..... 37
3.6 Field Strength of Spurious Radiation Measurement ..... 46
3.7 Frequency Stability Measurement..... 54
4 LIST OF MEASURING EQUIPMENT ..... 58
5 UNCERTAINTY OF EVALUATION ..... 59
6 CERTIFICATION OF TAF ACCREDITATION ..... 60
APPENDIX A. PHOTOGRAPHS OF EUT
APPENDIX B. SETUP PHOTOGRAPHS





### 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+10log10(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+10log10(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+10log10(P[Watts])	PASS	Under limit 13.27 dB at 3760 MHz
3.7	§2.1055 §22.355 §24.235 §27.53(g)	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, 518057,  
P.R.China

## **1.2 Manufacturer**

**ZTE CORPORATION**

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057,  
P.R.China

### 1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	ZTE C78 CDMA1X Digital Mobile Phone
Brand Name	ZTE
Model Name	ZTE C78
FCC ID	Q78-C78
Tx Frequency	CDMA2000 BC0 : 824 MHz ~ 849 MHz CDMA2000 BC1 : 1850 MHz ~1910 MHz CDMA2000 BC14 : 1850 MHz ~ 1915 MHz CDMA2000 BC15 : 1710 MHz ~ 1755 MHz
Rx Frequency	CDMA2000 BC0 : 869 MHz ~ 894 MHz CDMA2000 BC1 : 1930 MHz ~ 1990 MHz CDMA2000 BC14 : 1930 MHz ~ 1995 MHz CDMA2000 BC15 : 2110 MHz ~ 2155 MHz
Maximum Output Power to Antenna	CDMA2000 BC0 : 24.09 dBm CDMA2000 BC1 : 23.61 dBm CDMA2000 BC14 (G Block) : 23.24 dBm CDMA2000 BC15 : 23.56 dBm
Maximum ERP/EIRP	CDMA2000 BC0 : 0.28 W (24.54 dBm) CDMA2000 BC1 : 0.24 W (23.83 dBm) CDMA2000 BC14 (G Block) : 0.15 W (21.79 dBm) CDMA2000 BC15 : 0.30 W (24.78 dBm)
Antenna Type	Fixed Internal Antenna
HW Version	C73c
SW Version	CAPMIC78V1.0.0B01
Type of Modulation	QPSK
Type of Emission	1M28F9W
EUT Stage	Identical Prototype

**Remark:**

1. For other wireless features of this EUT, the test report will be issued separately.
2. This test report recorded only product characteristics and test results of PCS Licensed Transmitter Held to Ear (PCE).

**List of Accessory:**

Specification of Accessory		
<b>AC Adapter</b>	<b>Brand Name</b>	ZTE
	<b>Model Name</b>	STC-A22O50U5-C
	<b>Power Rating</b>	I/P:100-240Vac, 50-60Hz, 200mA; O/P: 5Vdc, 700mA
	<b>AC Power Cord Type</b>	1.15 meter non-shielded cable without ferrite core
<b>Battery</b>	<b>Brand Name</b>	ZTE
	<b>Model Name</b>	Li3709T42P3h553447
	<b>Power Rating</b>	3.7Vdc, 900mAh
	<b>Type</b>	Li-ion

**Remark:**

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. For accessories equipped with this EUT, please refer to the appendix of the external photo.

## 1.4 Testing Site

<b>Test Site</b>	SPORTON INTERNATIONAL INC.		
<b>Test Site Location</b>	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		<b>FCC / IC Registration No.</b>
	TH02-HY	03CH07-HY	TW1022 / 4086B-1

## 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.
- ♦ FCC 47 CFR Part 2, 22(H), 24(E)
- ♦ 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 (DoC), 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	Agilent	8960	N/A	N/A	Unshielded, 1.8 m

## 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, and EUT is rotated on three test planes to find out the worst emission.

Frequency range investigated for radiated emission is as follows:

1. 30 MHz to 9000 MHz for CDMA2000 BC0
2. 30MHz to 19000 MHz for CDMA2000 BC14
3. 30MHz to 18000 MHz for CDMA2000 BC15

Test Modes		
Band	Radiated TCs	Conducted TCs
CDMA2000 BC0	■ 1xRTT Link Mode	■ 1xRTT Link Mode
CDMA2000 BC14	■ 1xRTT Link Mode	■ 1xRTT Link Mode
CDMA2000 BC15	■ 1xRTT Link Mode	■ 1xRTT Link Mode

**Note:**

1. For CDMA2000 BC0, the maximum RF output power is RC3+SO55 mode for QPSK Link; only this mode was used for all tests.
2. For CDMA2000 BC14, the maximum RF output power is RC1+SO55 mode for QPSK Link; only this mode was used for all tests.
3. For CDMA2000 BC15, the maximum RF output power is RC1+SO55 mode for QPSK Link; only this mode was used for all tests.

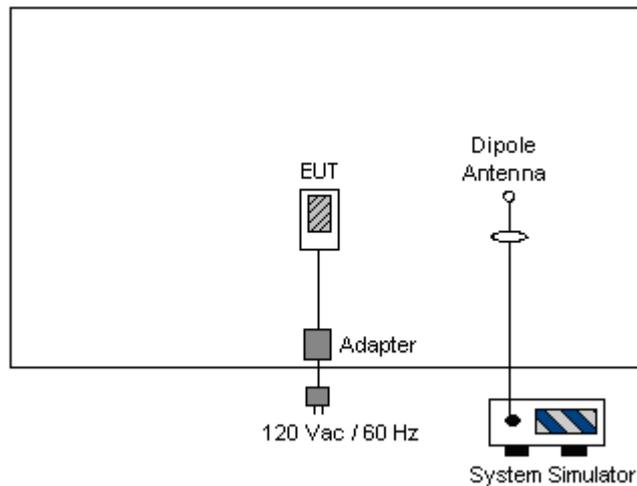
The conducted power table is as follows:

Conducted Power									
Band	CDMA2000 BC0			CDMA2000 BC1			CDMA2000 BC14 (G Block)		
Channel	1013	384	777	25	600	1175	1215	1225	1275
Frequency	824.70	836.52	848.31	1851.25	1880.00	1908.75	1910.75	1911.25	1913.75
RC1+SO55	23.78	24.05	23.75	23.46	23.47	<b>23.61</b>	<b>23.24</b>	23.17	22.89
RC3+SO55	23.83	<b>24.09</b>	23.78	23.53	23.50	23.54	23.07	23.03	22.81
RC3+SO32	23.68	24.02	23.65	23.42	23.55	23.60	22.96	22.95	22.74

Conducted Power			
Band	CDMA2000 BC15		
Channel	25	425	875
Frequency	1711.25	1731.25	1753.75
RC1+SO55	23.38	<b>23.56</b>	23.46
RC3+SO55	23.29	23.48	23.41
RC3+SO32	23.28	23.39	23.27

(\*Unit: dBm)

## 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.

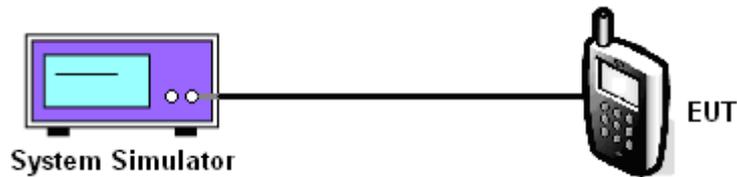
##### 3.1.2 Measuring Instruments

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)
CDMA2000 1xRTT	RC3+SO55	1013 (Low)	824.70	23.83	0.24
		384 (Mid)	836.52	24.09	0.26
		777 (High)	848.31	23.78	0.24

CDMA2000 BC1					
Test Mode	Test Status	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watts)
CDMA 2000 1xRTT	RC1+SO55	25 (Low)	1851.25	23.46	0.22
		600 (Mid)	1880.00	23.47	0.22
		1175 (High)	1908.75	23.61	0.23

CDMA2000 BC14 (G Block)					
Test Mode	Test Status	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watts)
CDMA 2000 1xRTT	RC1+SO55	1215 (Low)	1910.75	23.24	0.21
		1225 (Mid)	1911.25	23.17	0.21
		1275 (High)	1913.75	22.89	0.19

CDMA2000 BC15					
Test Mode	Test Status	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watts)
CDMA 2000 1xRTT	RC1+SO55	25 (Low)	1711.25	23.38	0.22
		425 (Mid)	1731.25	23.56	0.23
		875 (High)	1753.75	23.46	0.22



## 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.

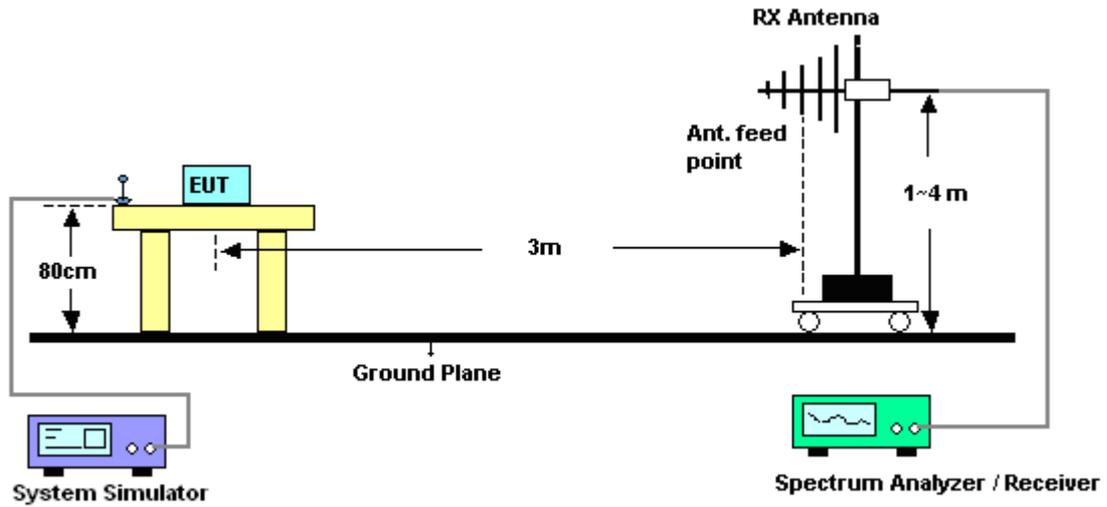
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

1. The EUT was placed on a 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	-13.77	32.04	16.12	0.04
836.52	-14.54	32.91	16.22	0.04
848.31	-14.80	32.84	15.89	0.04
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
824.70	-9.41	36.10	24.54	0.28
836.52	-9.81	34.41	22.45	0.18
848.31	-10.60	34.65	21.90	0.15

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



3.2.6 Test Result of EIRP

CDMA2000 BC1 1xRTT_RC1+SO55 Radiated Power EIRP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1851.25	-17.63	40.91	23.28	0.21
1880.00	-19.82	42.38	22.56	0.18
1908.75	-19.27	42.30	23.03	0.20
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1851.25	-19.80	43.63	23.83	0.24
1880.00	-22.49	43.55	21.06	0.13
1908.75	-21.83	44.84	23.01	0.20

CDMA2000 BC14 (G Block) 1xRTT_RC1+SO55 Radiated Power EIRP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1911.75	-19.55	41.34	21.79	0.15
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1911.75	-22.89	44.64	21.75	0.15



CDMA2000 BC15 1xRTT_RC1+SO55 Radiated Power EIRP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1711.25	-20.99	39.72	18.73	0.07
1731.25	-21.50	39.62	18.12	0.06
1753.75	-21.05	40.06	19.01	0.08
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1711.25	-18.20	42.98	24.78	0.30
1731.25	-20.24	43.15	22.91	0.20
1753.75	-19.34	41.98	22.64	0.18

\* 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.

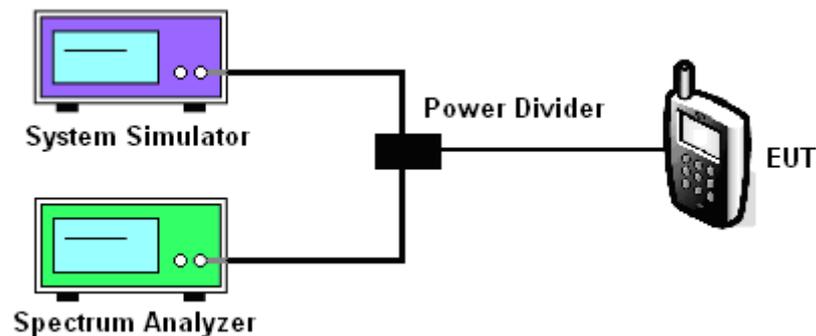
#### 3.3.2 Measuring Instruments

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. 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  $10 \log (1\% \text{ BW}/\text{measurement RBW})$  was implemented.

#### 3.3.4 Test Setup

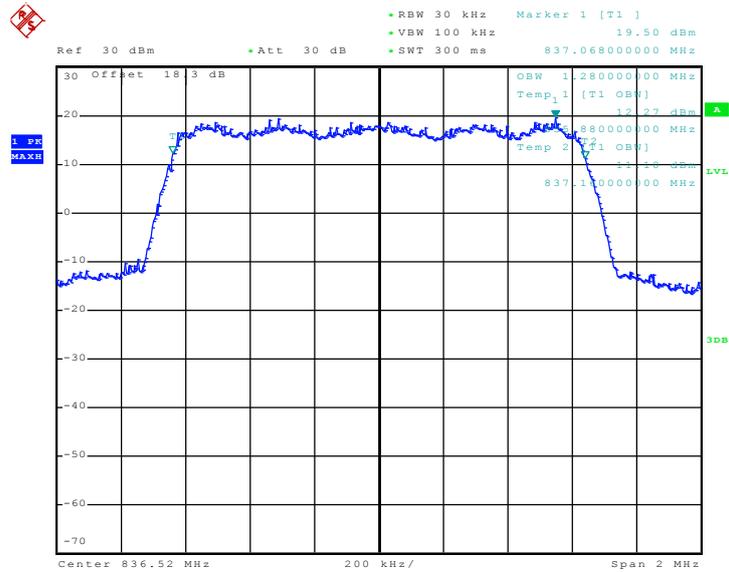




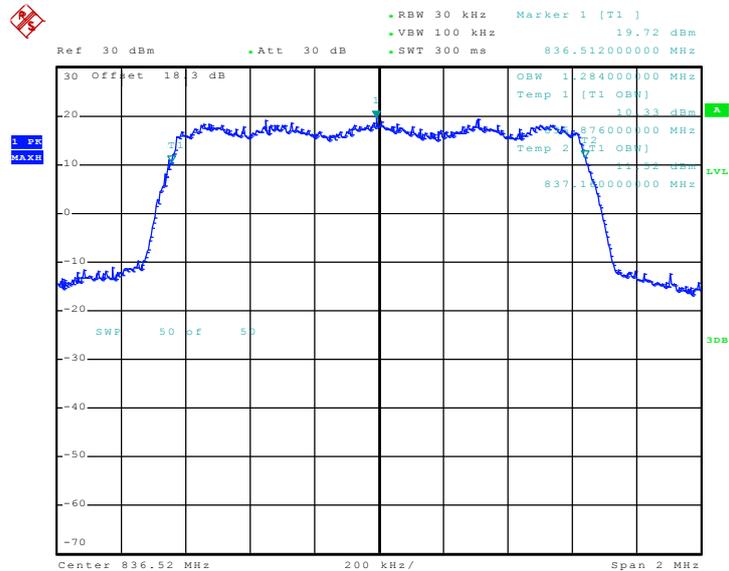
### 3.3.5 Test Result (Plots) of Occupied Bandwidth

<b>Band :</b>	CDMA2000 BC0	<b>Power Stage :</b>	High
<b>Test Mode :</b>	1xRTT_RC3+SO55		

99% Occupied Bandwidth Plot on Channel 384



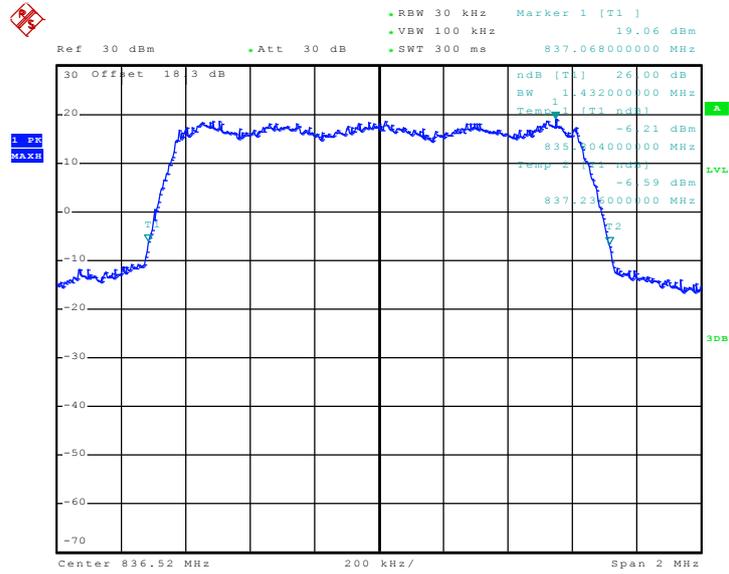
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26dB Bandwidth Plot on Channel 384

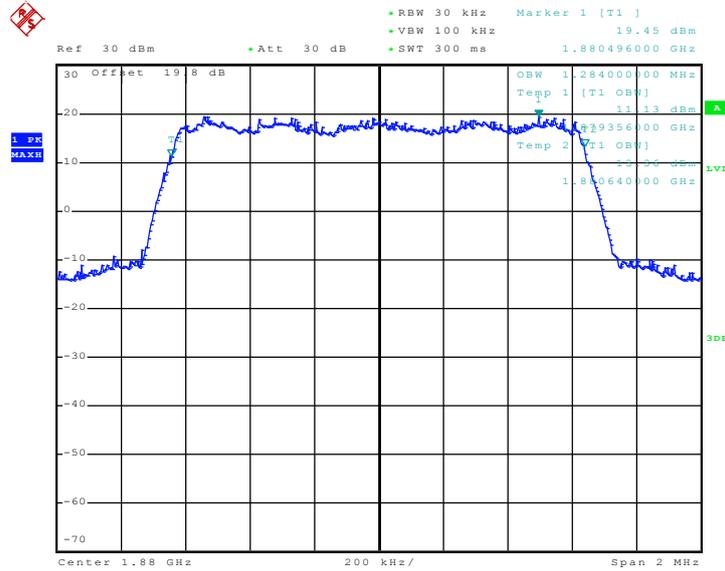


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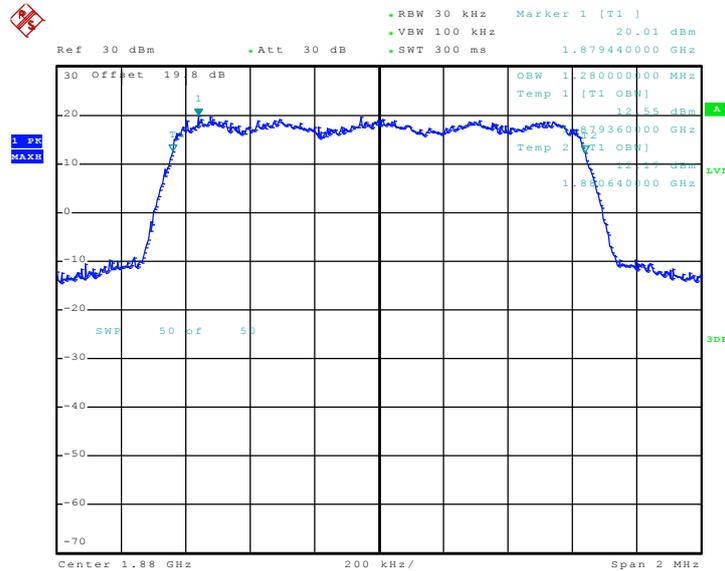


Band :	CDMA2000 BC1	Power Stage :	High
Test Mode :	1xRTT_RC1+SO55		

99% Occupied Bandwidth Plot on Channel 600



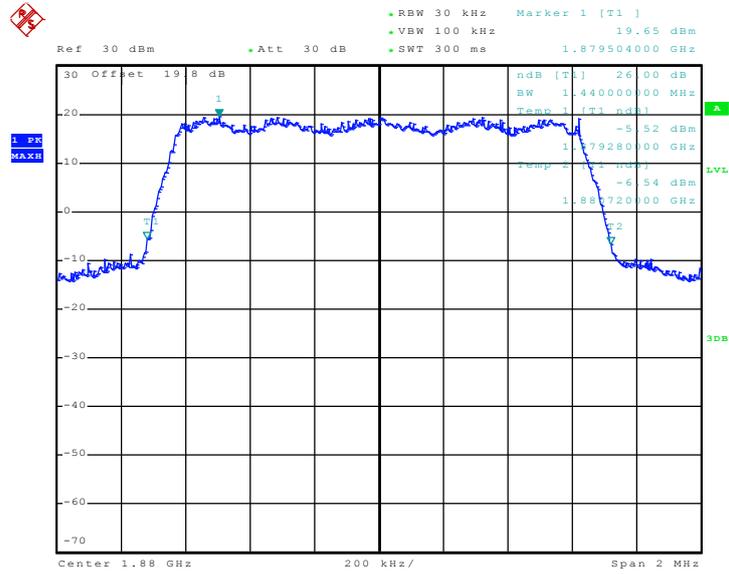
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26dB Bandwidth Plot on Channel 600

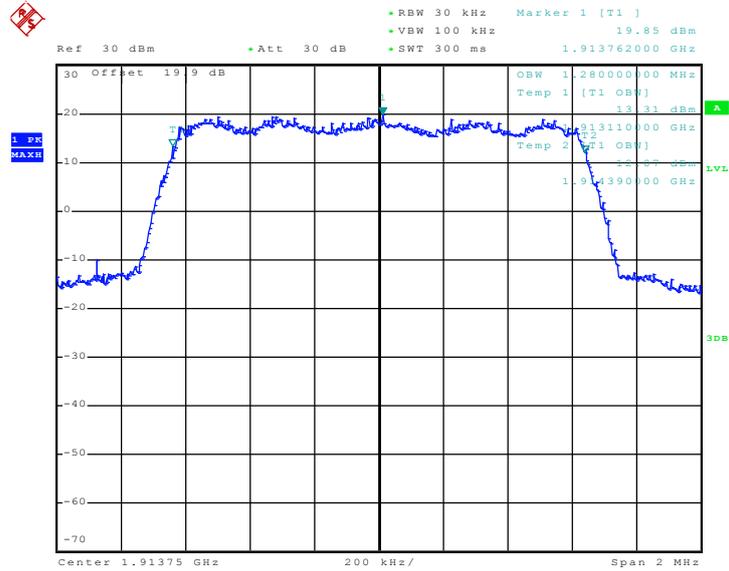


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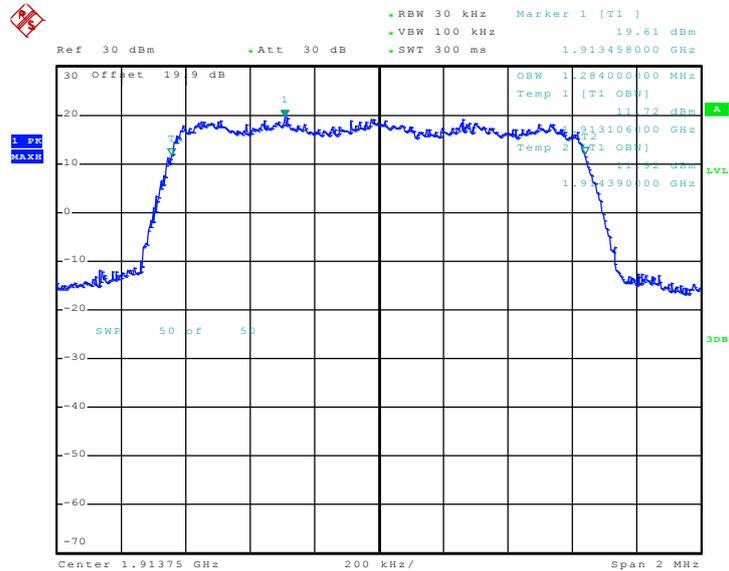


Band :	CDMA2000 BC14 (G Block)	Power Stage :	High
Test Mode :	1xRTT_RC1+SO55		

99% Occupied Bandwidth Plot on Channel 1275



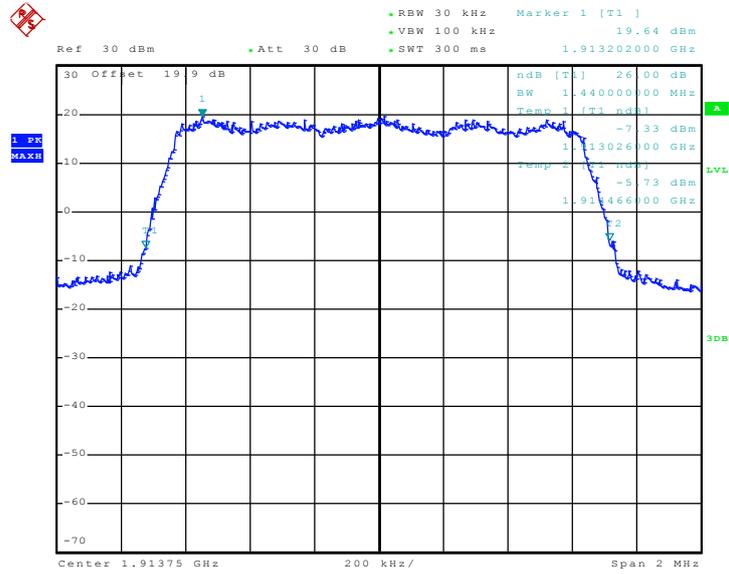
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26dB Bandwidth Plot on Channel 1275

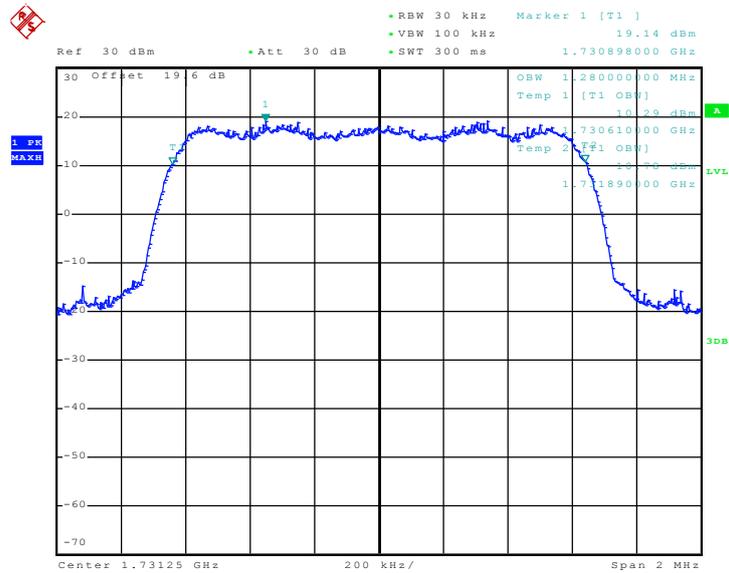


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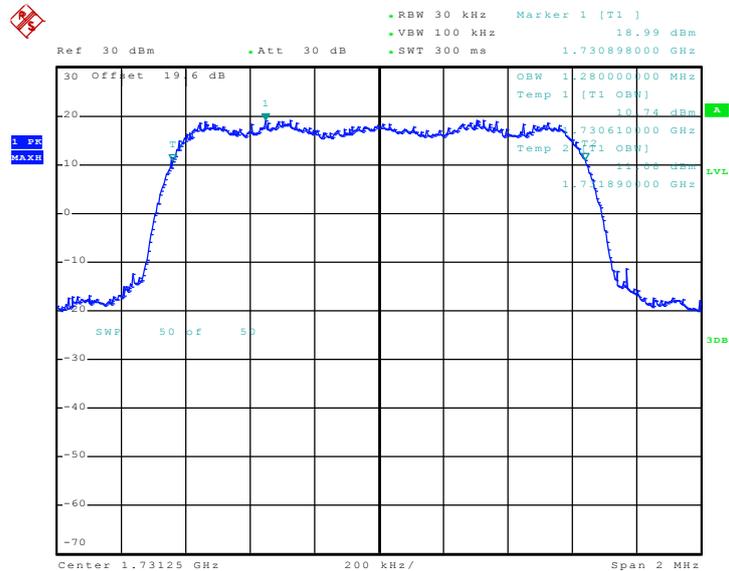


<b>Band :</b>	CDMA2000 BC15	<b>Power Stage :</b>	High
<b>Test Mode :</b>	1xRTT_RC1+SO55		

99% Occupied Bandwidth Plot on Channel 425



Date: 18.NOV.2009 01:36:50



Date: 18.NOV.2009 01:38:07



## 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

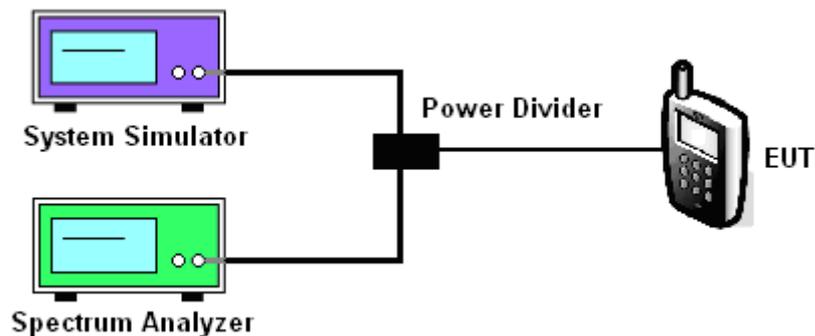
See list of measuring instruments of this test report.

### 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  $10 \log (1\% \text{ BW}/\text{measurement RBW})$  was implemented.

### 3.4.4 Test Setup

<Conducted Band Edge >

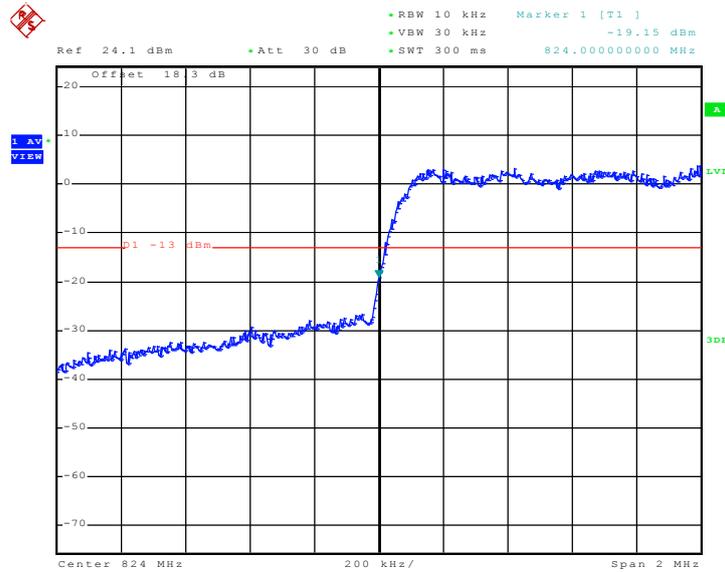




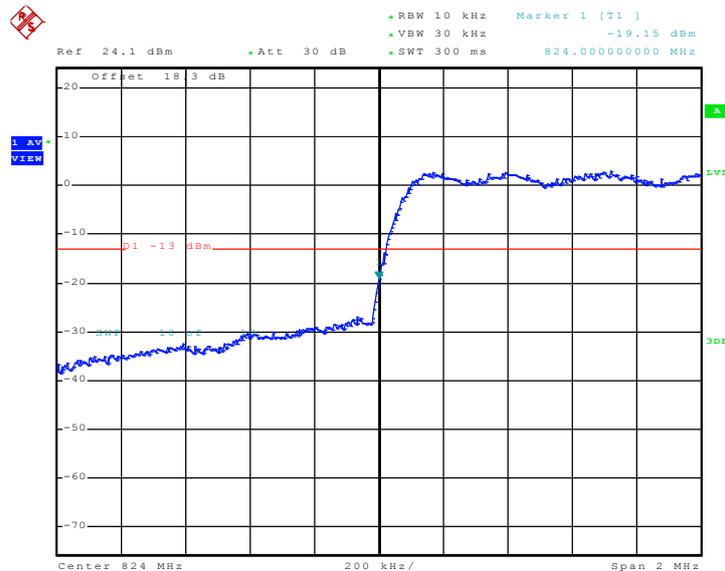
### 3.4.5 Test Result (Plots) of Conducted Band Edge

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

Lower Band Edge Plot on Channel 1013



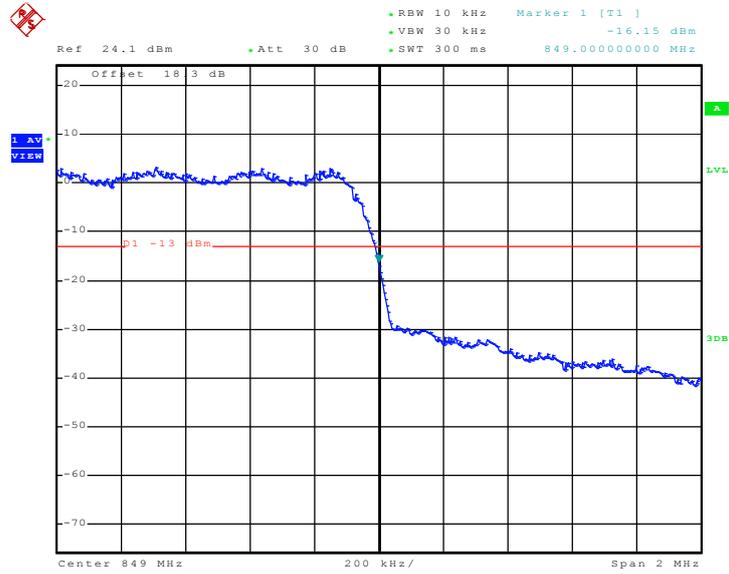
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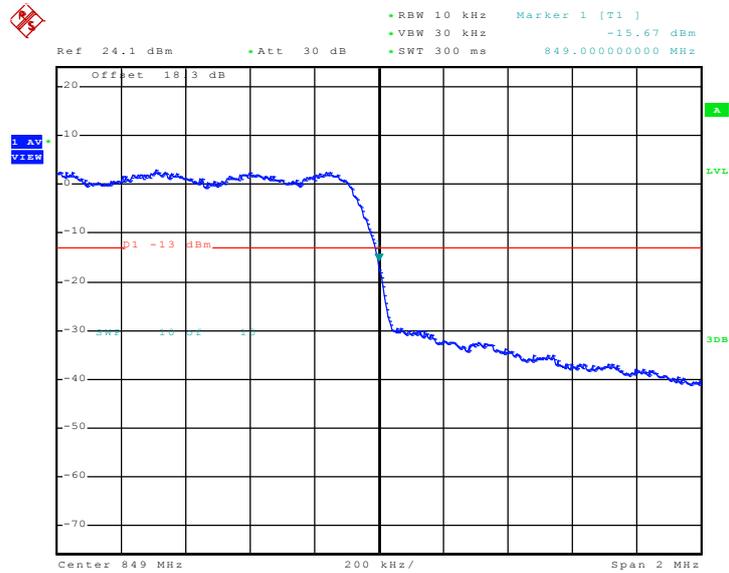
Date: 18.NOV.2009 03:07:39



Higher Band Edge Plot on Channel 777



Date: 18.NOV.2009 03:09:15

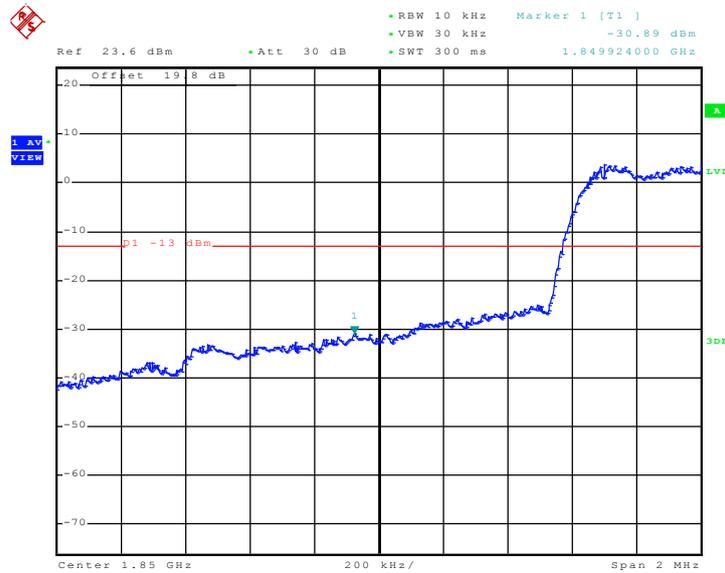


Date: 18.NOV.2009 03:08:48

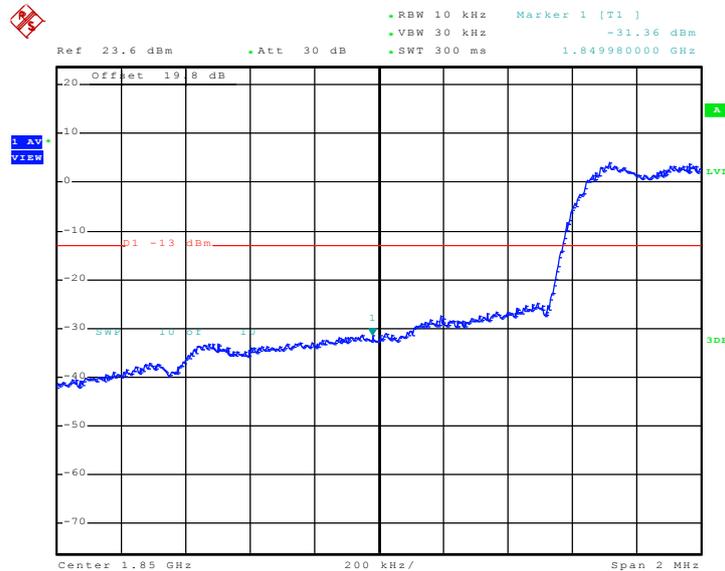


Band :	CDMA2000 BC1	Power Stage :	High
Test Mode :	1xRTT_RC1+SO55		

Lower Band Edge Plot on Channel 25



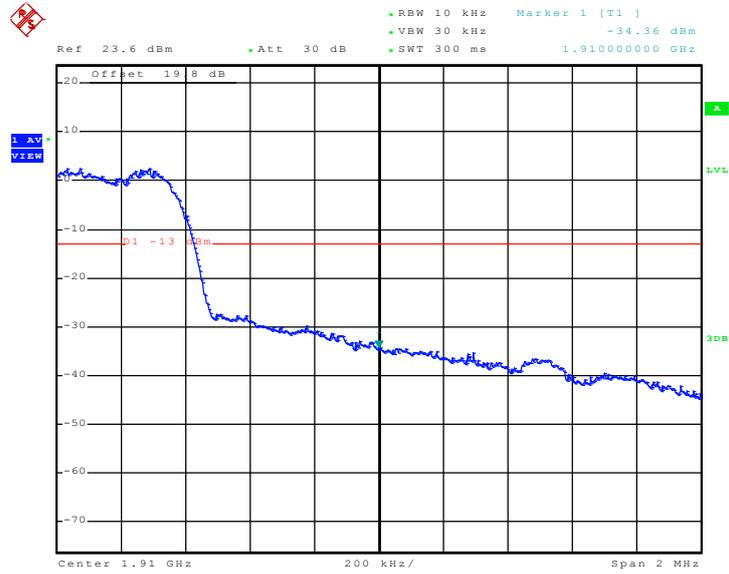
Date: 1.NOV.2009 17:02:22



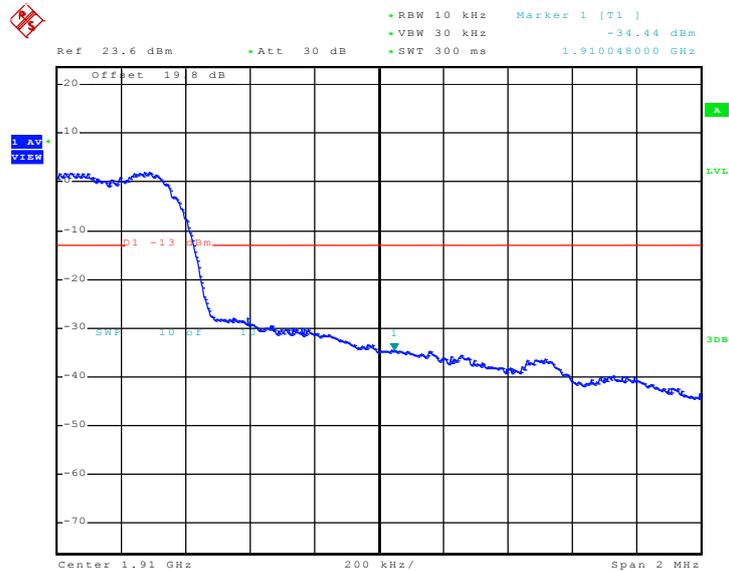
Date: 1.NOV.2009 17:01:55



Higher Band Edge Plot on Channel 1175



Date: 1.NOV.2009 17:02:48

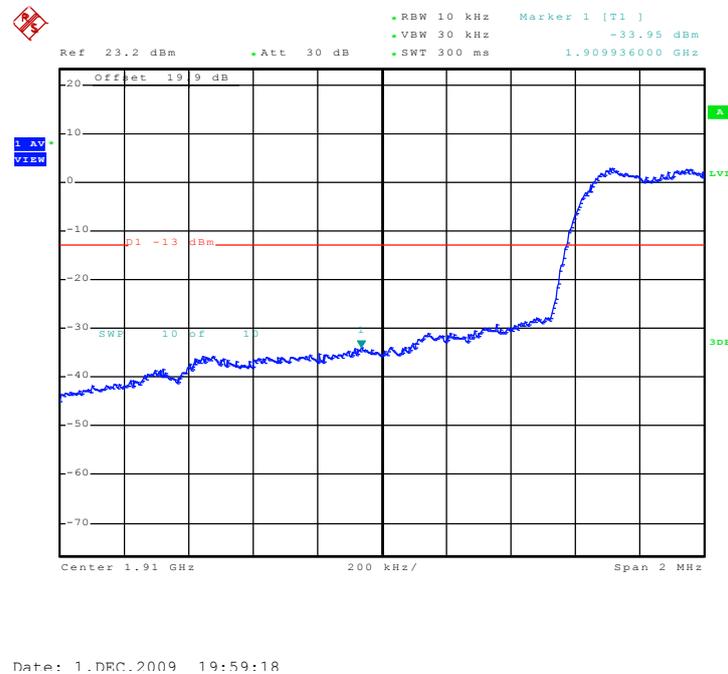
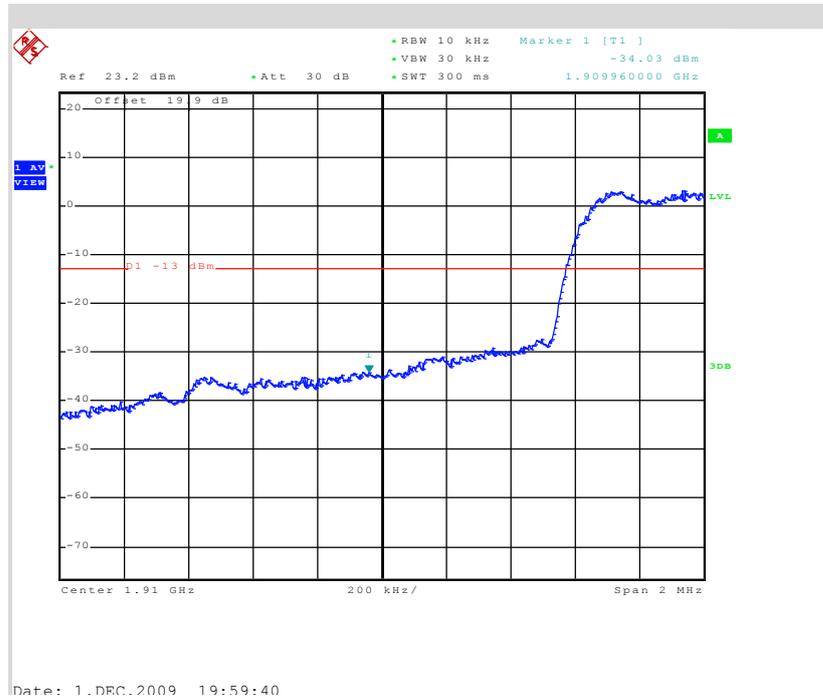


Date: 1.NOV.2009 17:03:37



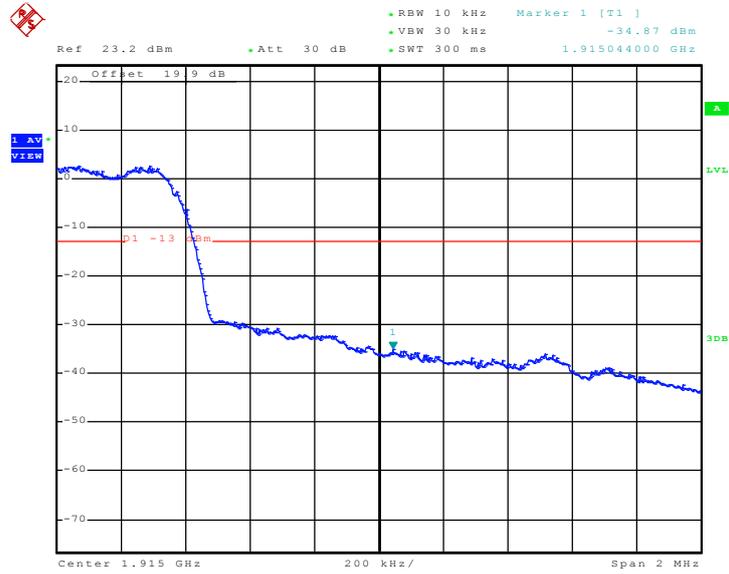
Band :	CDMA2000 BC14 (G Block)	Power Stage :	High
Test Mode :	1xRTT_RC1+SO55		

Lower Band Edge Plot on Channel 1225

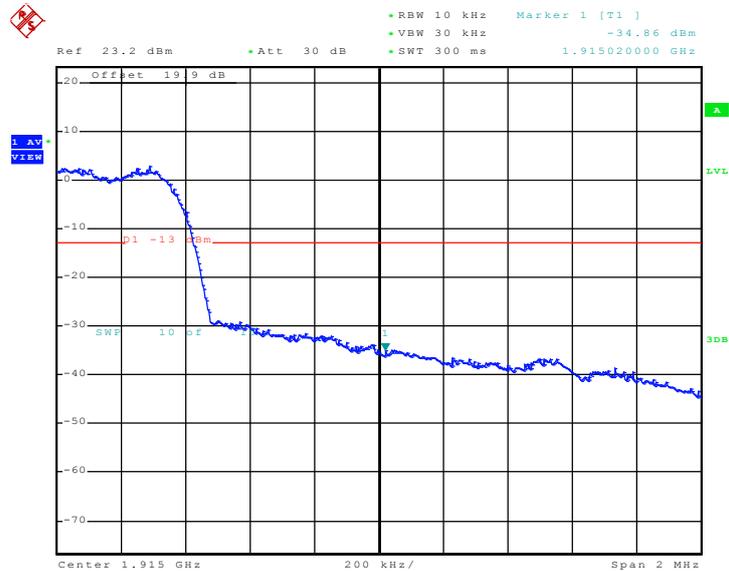




Higher Band Edge Plot on Channel 1275



Date: 1.DEC.2009 19:57:11

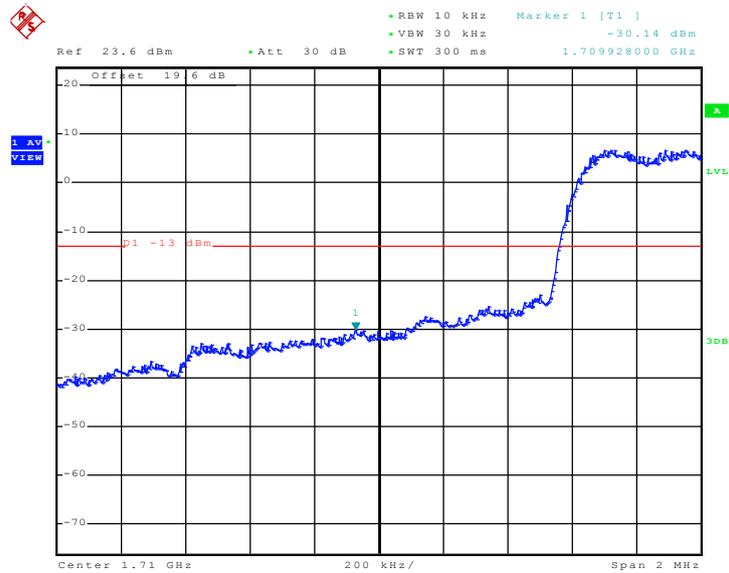


Date: 1.DEC.2009 19:57:53

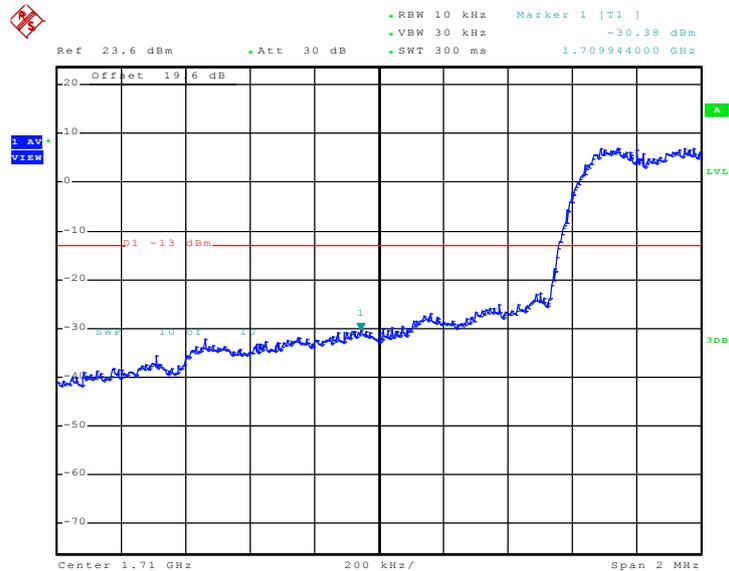


Band :	CDMA2000 BC15	Power Stage :	High
Test Mode :	1xRTT_RC1+SO55		

Lower Band Edge Plot on Channel 25



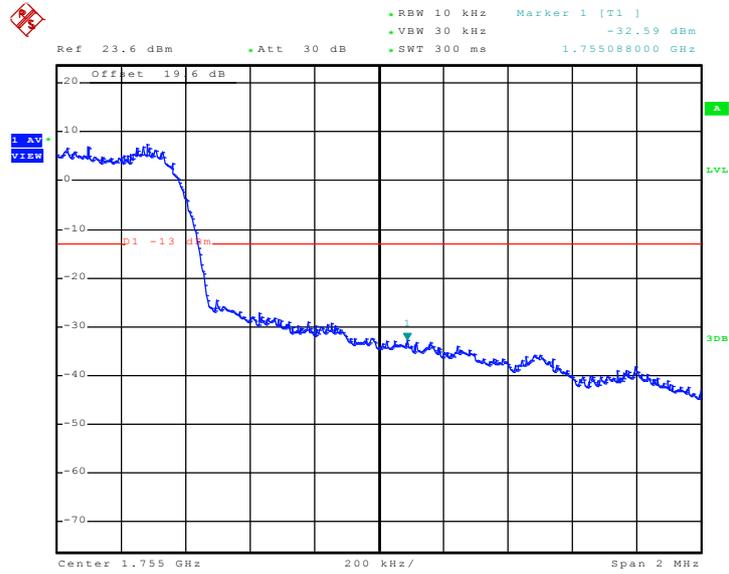
Date: 18.NOV.2009 01:48:33



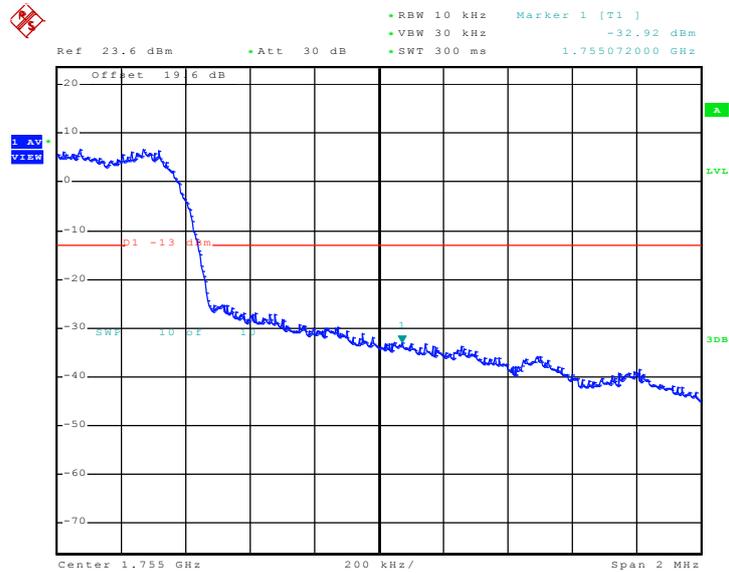
Date: 18.NOV.2009 01:49:15



Higher Band Edge Plot on Channel 875



Date: 18.NOV.2009 01:50:36



Date: 18.NOV.2009 01:50:03

## 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.

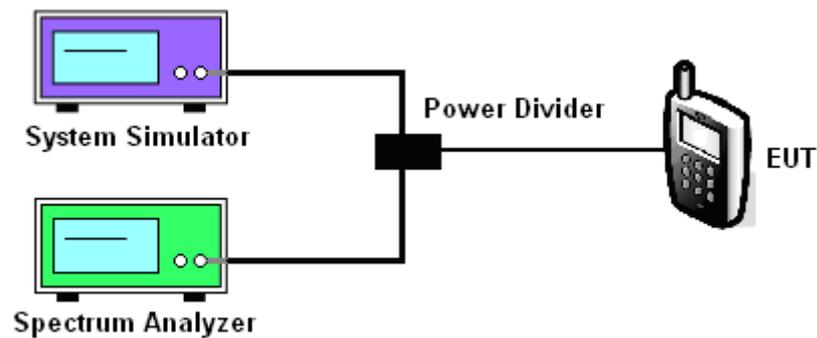
### 3.5.2 Measuring Instruments

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

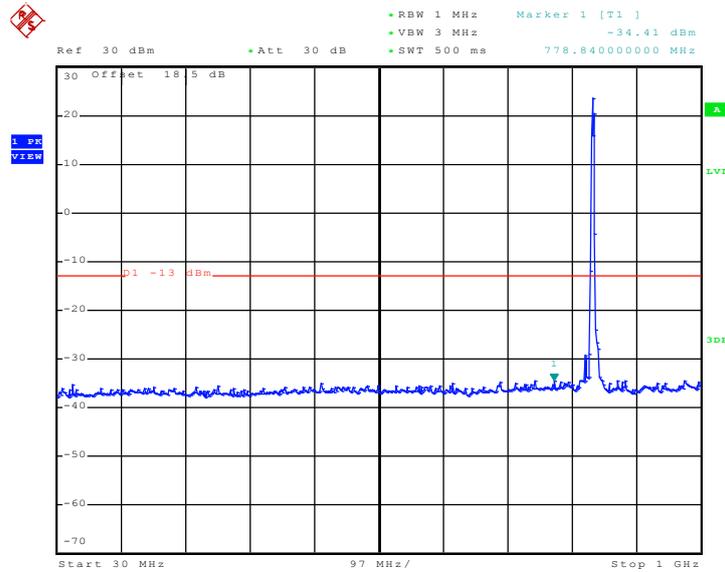




### 3.5.5 Test Result (Plots) of Conducted Emission

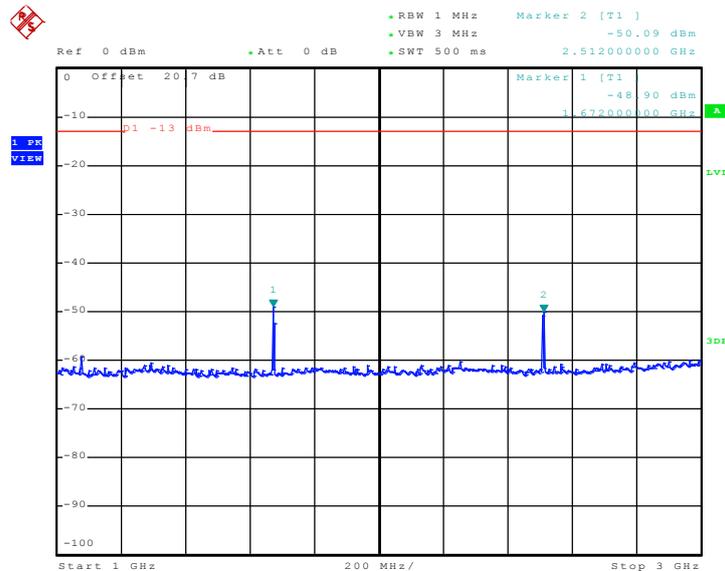
Band :	CDMA2000 BC0	Power Stage :	High
Test Mode :	1xRTT_RC3+SO55		

Conducted Emission Plot between 30MHz ~ 1GHz



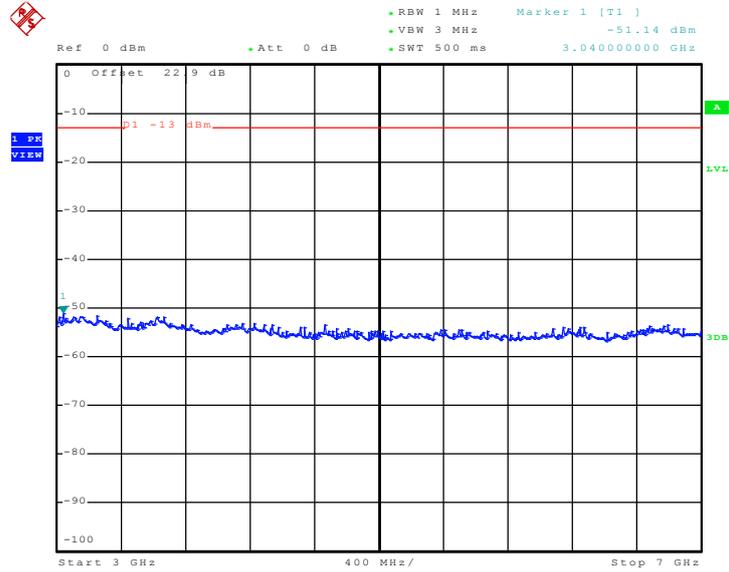
Date: 1.NOV.2009 16:15:21

Conducted Emission Plot between 1GHz ~ 3GHz



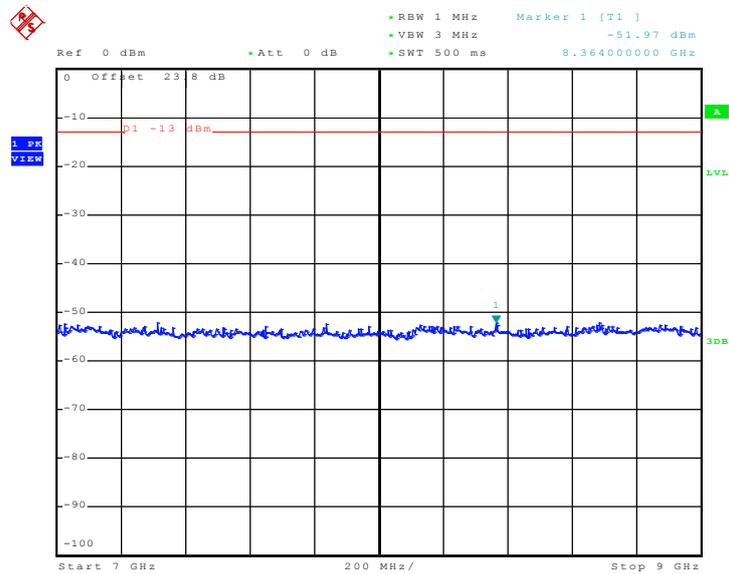


Conducted Emission Plot between 3GHz ~ 7GHz



Date: 1.NOV.2009 16:19:10

Conducted Emission Plot between 7GHz ~ 9GHz

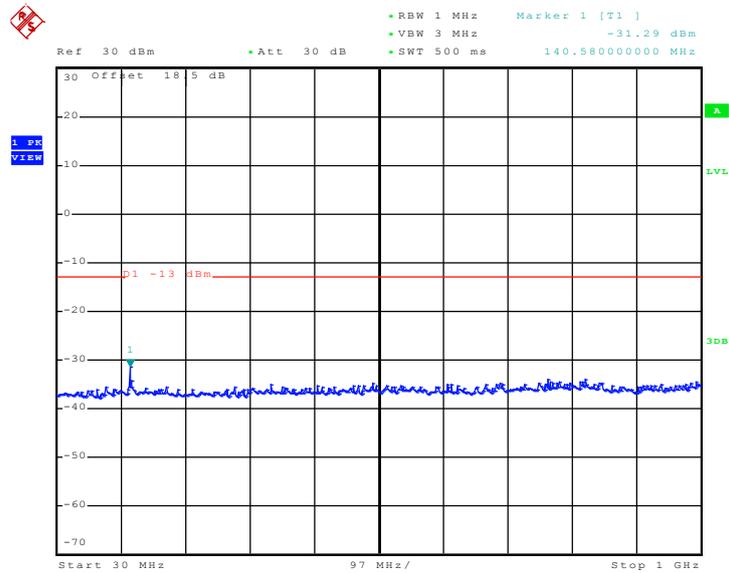


Date: 1.NOV.2009 16:20:00



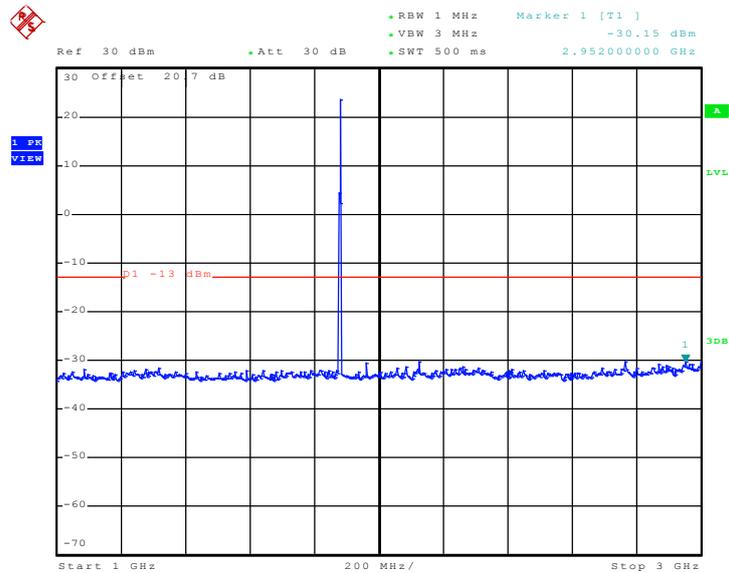
Band :	CDMA2000 BC1	Power Stage :	High
Test Mode :	1xRTT_RC1+SO55		

Conducted Emission Plot between 30MHz ~ 1GHz



Date: 1.NOV.2009 17:12:28

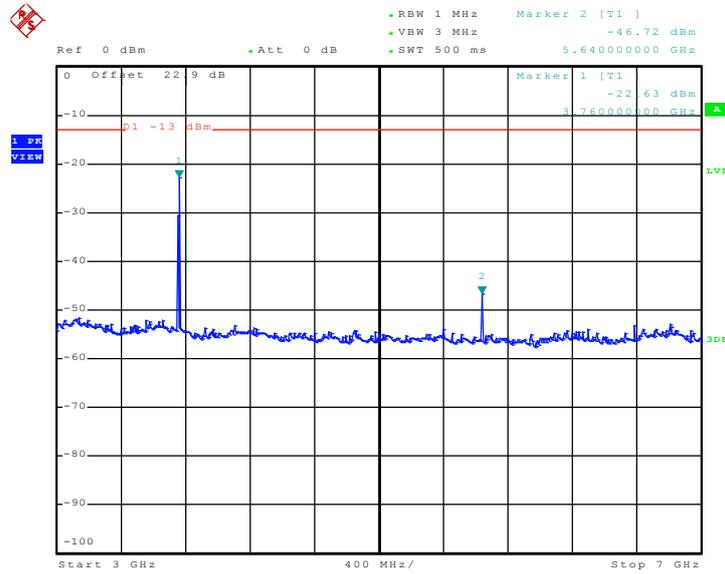
Conducted Emission Plot between 1GHz ~ 3GHz



Date: 1.NOV.2009 17:15:50

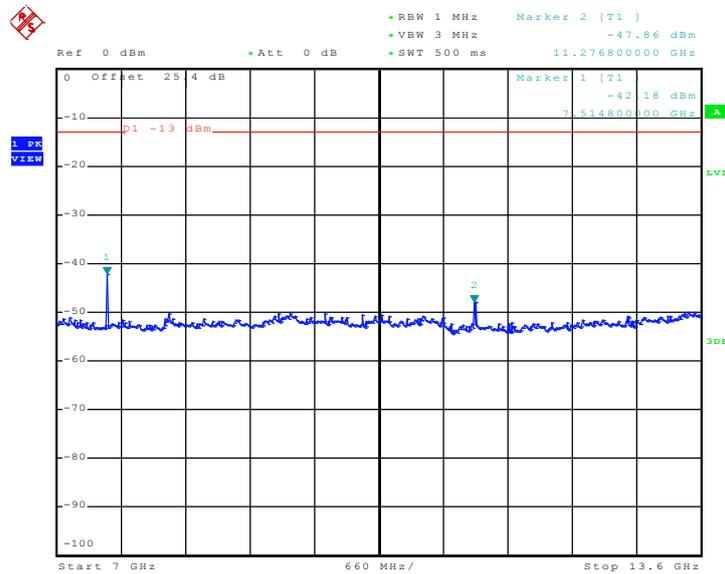


Conducted Emission Plot between 3GHz ~ 7GHz



Date: 1.NOV.2009 17:16:50

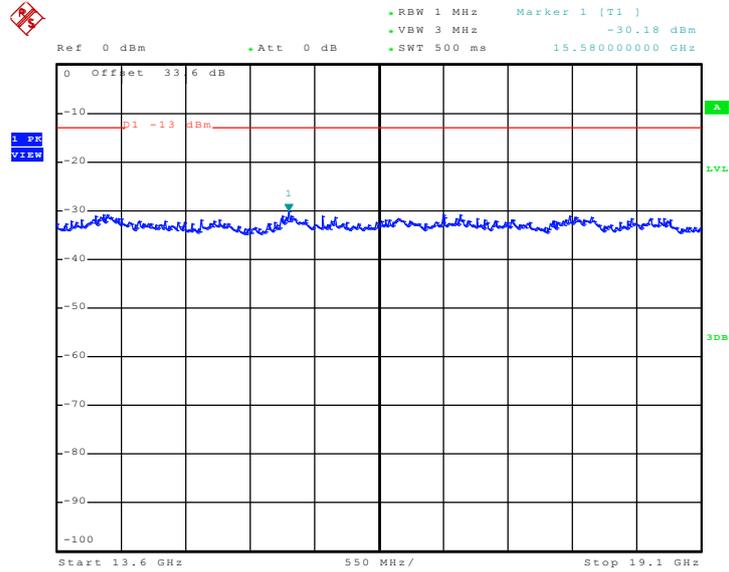
Conducted Emission Plot between 7GHz ~ 13.6GHz



Date: 1.NOV.2009 17:20:37



Conducted Emission Plot between 13.6GHz ~ 19.1GHz

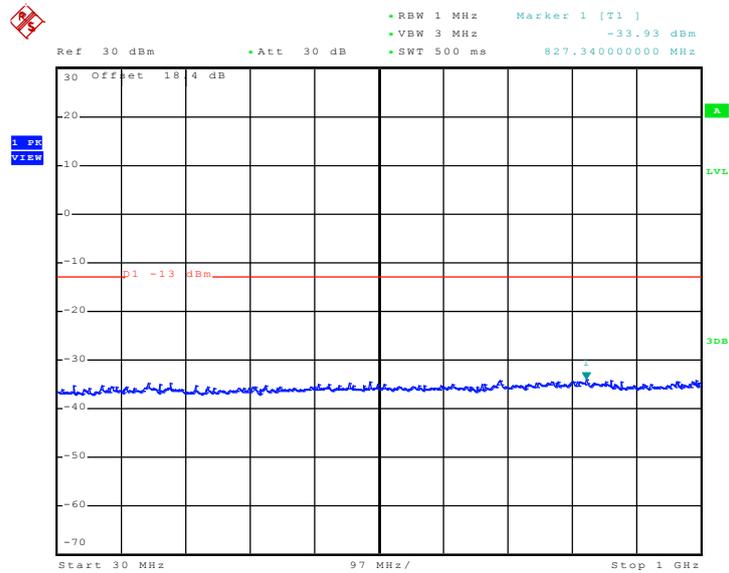


Date: 1.NOV.2009 17:18:12



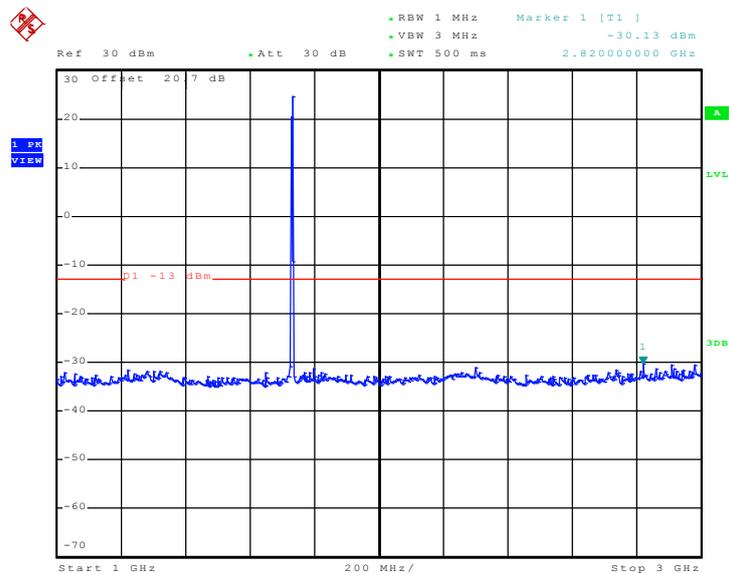
Band :	CDMA2000 BC15	Power Stage :	High
Test Mode :	1xRTT_RC1+SO55		

Conducted Emission Plot between 30MHz ~ 1GHz



Date: 18.NOV.2009 01:59:00

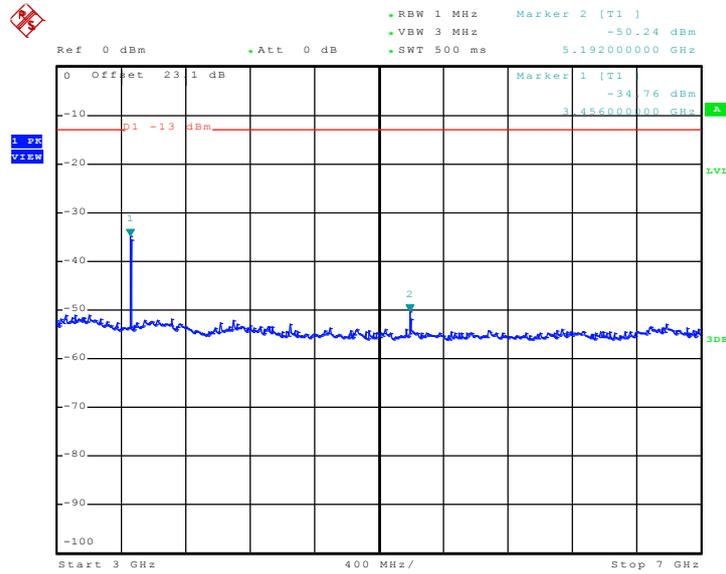
Conducted Emission Plot between 1GHz ~ 3GHz



Date: 18.NOV.2009 02:06:56

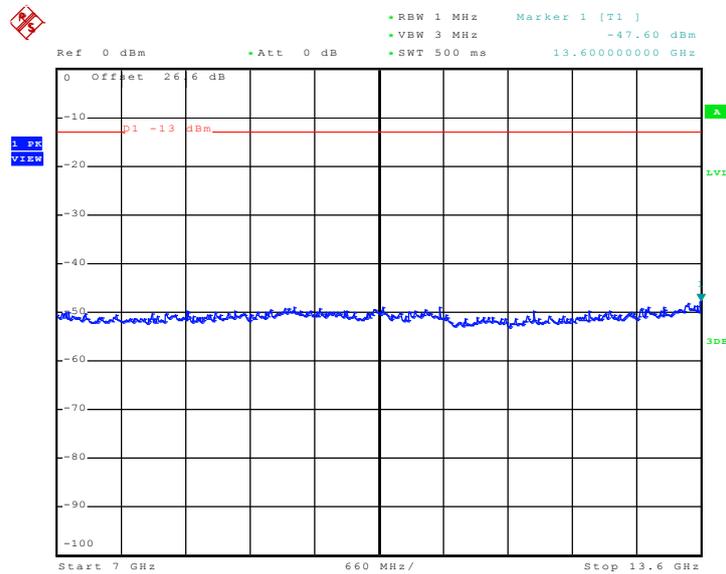


Conducted Emission Plot between 3GHz ~ 7GHz



Date: 18.NOV.2009 02:07:46

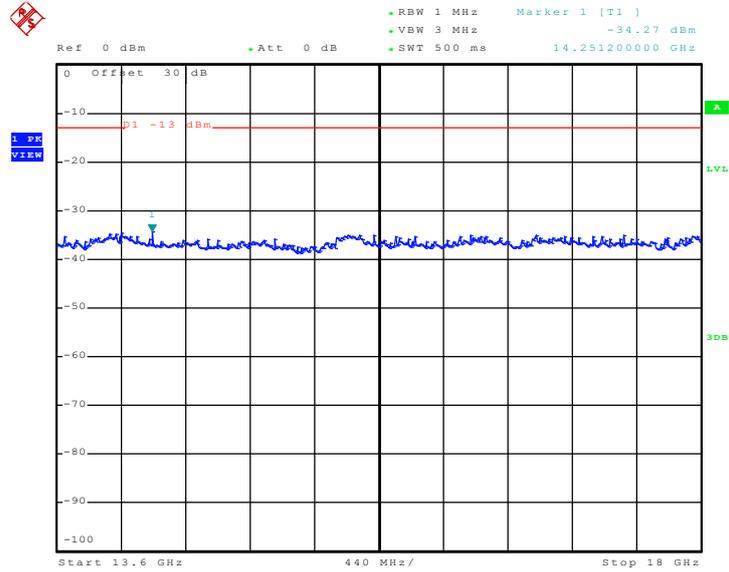
Conducted Emission Plot between 7GHz ~ 13.6GHz



Date: 18.NOV.2009 02:08:30



Conducted Emission Plot between 13.6GHz ~ 18GHz



Date: 18.NOV.2009 02:09:01



## **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  $43+10\log_{10}(P[\text{Watts}])$  dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

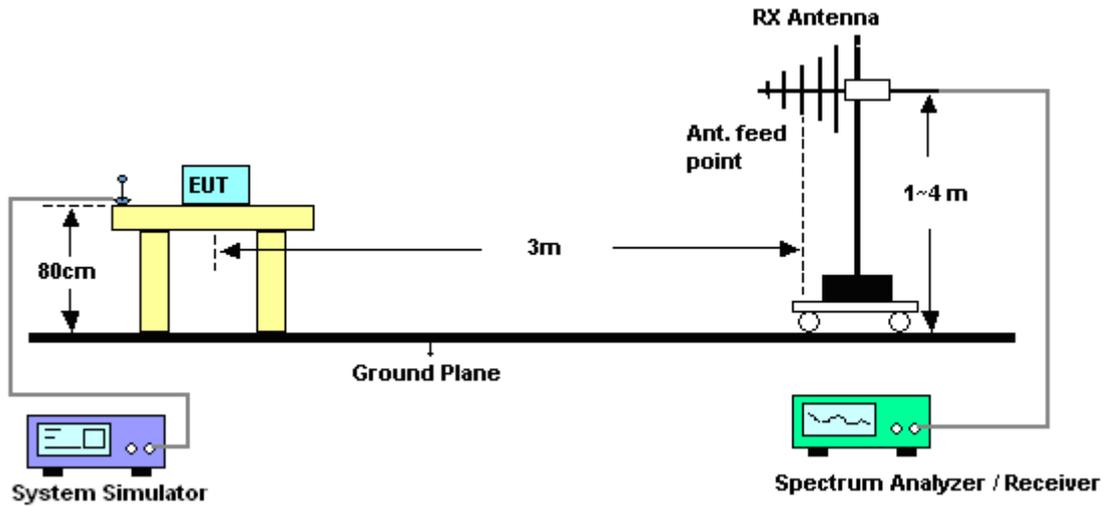
### **3.6.2 Measuring Instruments**

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. Emission level (dBm) = output power + substitution Gain.

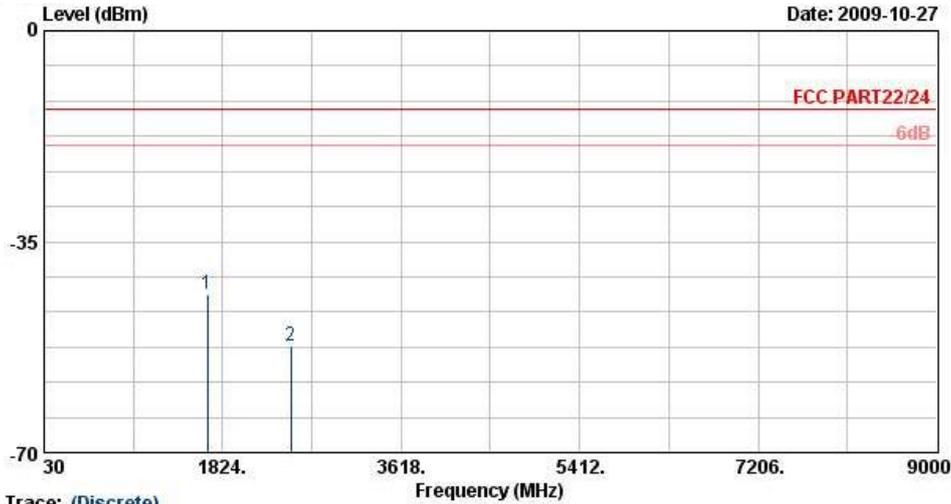
### 3.6.4 Test Setup





3.6.5 Test Result of Field Strength of Spurious Radiated

Band :	CDMA2000 BC0	Temperature :	25~26°C
Test Mode :	1xRTT_RC3+SO55	Relative Humidity :	47~48%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

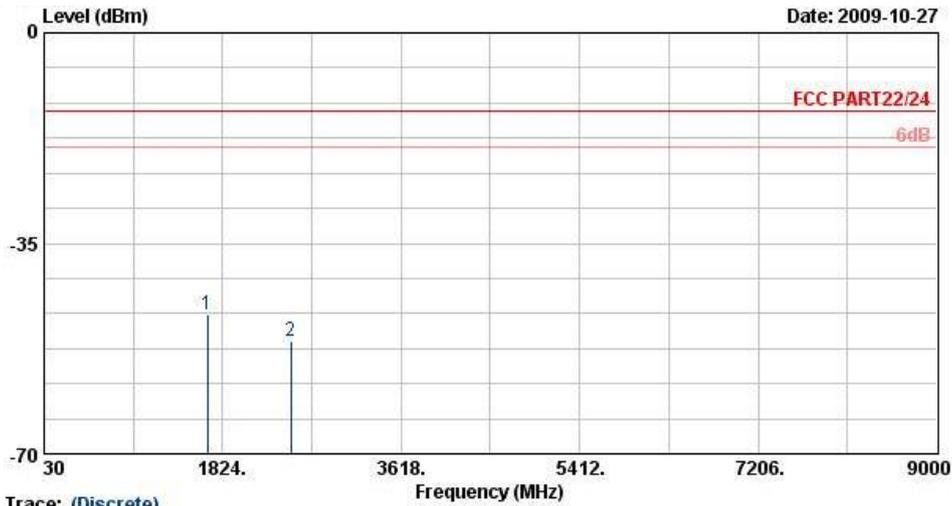


Site : 03CH07-HY  
 Condition : FCC PART22/24 HF-ETRP(080306) HORIZONTAL  
 Project : CG 902129  
 Memo : Mode 1

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
1669	-43.60	-13	-30.60	-51.93	-43.45	3.39	5.39	H	Pass
2509	-52.22	-13	-39.22	-62.36	-52.48	3.71	6.12	H	Pass



Band :	CDMA2000 BC0	Temperature :	25~26°C
Test Mode :	1xRTT_RC3+SO55	Relative Humidity :	47~48%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

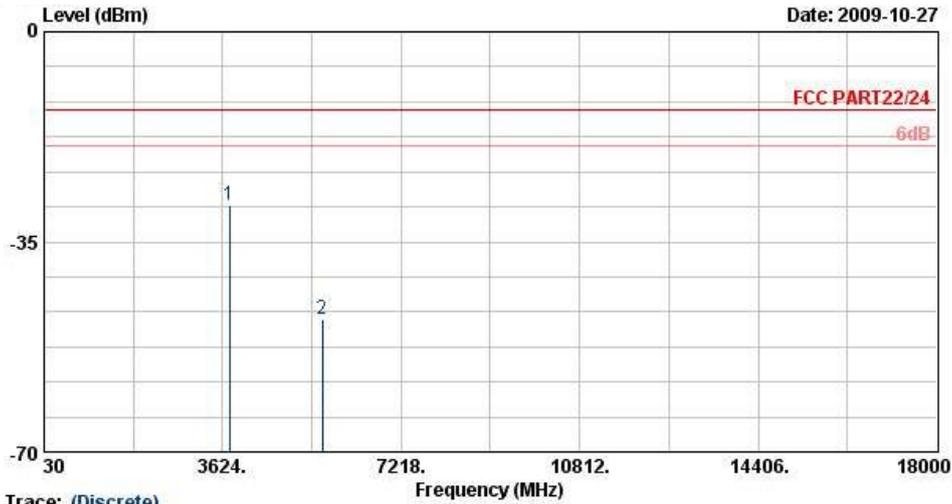


Trace: (Discrete)  
 Site : 03CH07-HY  
 Condition : FCC PART22/24 HF-ETRP(080306) VERTICAL  
 Project : CG 902129  
 Memo : Mode 1

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
1669	-46.83	-13	-33.83	-54.43	-46.68	3.39	5.39	V	Pass
2509	-51.23	-13	-38.23	-61.82	-51.49	3.71	6.12	V	Pass



Band :	CDMA2000 BC1	Temperature :	25~26°C
Test Mode :	1xRTT_RC1+SO55	Relative Humidity :	47~48%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

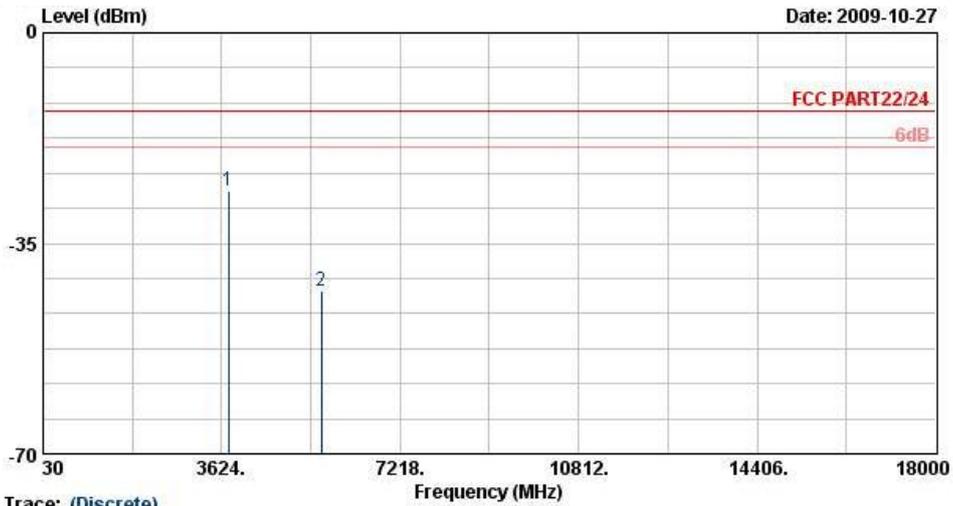


Trace: (Discrete)  
 Site : D3CH07-HY  
 Condition : FCC PART22/24 HF-ETRP(080306) HORIZONTAL  
 Project : CG 902129  
 Memo : Mode 1

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
3760	-28.76	-13	-15.76	-43.81	-31.28	4.88	7.40	H	Pass
5636	-47.79	-13	-34.79	-65.24	-51.05	5.55	8.81	H	Pass



<b>Band :</b>	CDMA2000 BC1	<b>Temperature :</b>	25~26°C
<b>Test Mode :</b>	1xRTT_RC1+SO55	<b>Relative Humidity :</b>	47~48%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

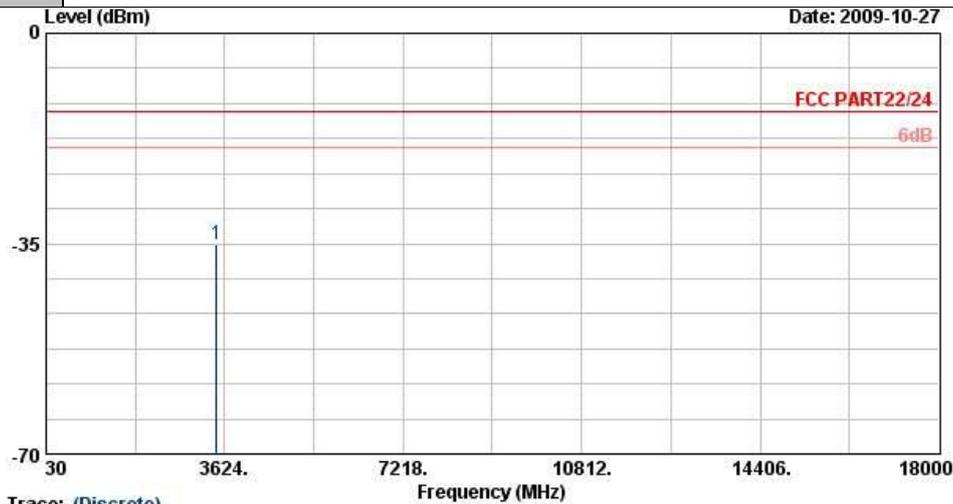


Trace: (Discrete)  
 Site : 03CH07-HY  
 Condition : FCC PART22/24 HF-EIRP(080306) VERTICAL  
 Project : CG 902129  
 Memo : Mode 1

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
3760	-26.27	-13	-13.27	-44.53	-29.3	4.88	7.91	V	Pass
5636	-43.01	-13	-30.01	-62.5	-47.23	5.55	9.77	V	Pass



Band :	CDMA2000 BC15	Temperature :	25~26°C
Test Mode :	1xRTT_RC1	Relative Humidity :	47~48%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

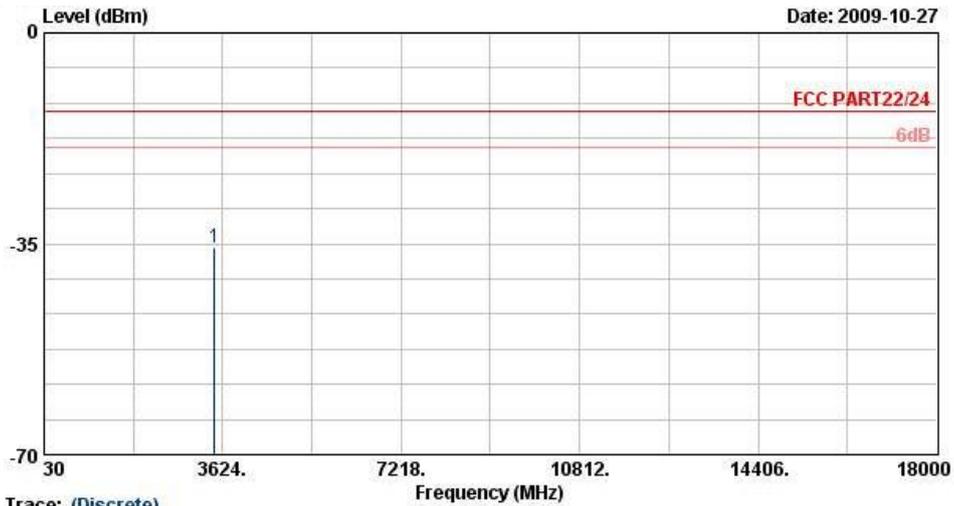


Trace: (Discrete)  
 Site : 03CH07-HY  
 Condition : FCC PART22/24 HF-ETRP(080306) HORIZONTAL  
 Project : CG 902129  
 Memo : Mode 1

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
3460	-35.19	-13	-22.19	-48.46	-39.02	4.48	8.31	H	Pass



<b>Band :</b>	CDMA2000 BC15	<b>Temperature :</b>	25~26°C
<b>Test Mode :</b>	1xRTT_RC1	<b>Relative Humidity :</b>	47~48%
<b>Test Engineer :</b>	Kay Wu	<b>Polarization :</b>	Vertical
<b>Remark :</b>	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Trace: (Discrete)  
 Site : 03CH07-HY  
 Condition : FCC PART22/24 HF-ETRP(080306) VERTICAL  
 Project : CG 902129  
 Memo : Mode 1

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
3460	-35.76	-13	-22.76	-50.3	-39.59	4.48	8.31	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.

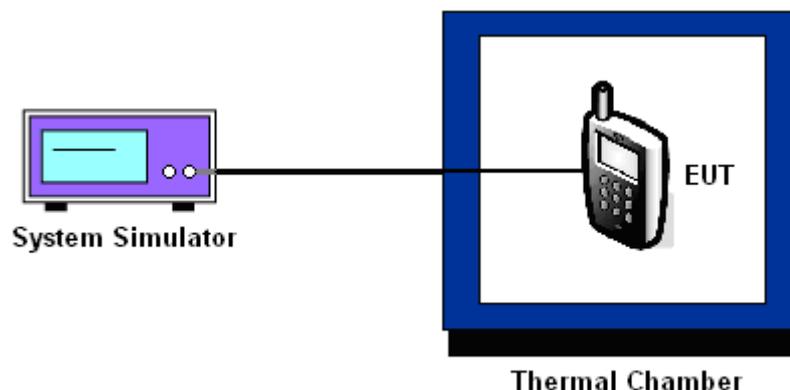
### 3.7.3 Test Procedures for Temperature Variation

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	4	0.00	PASS
-20	7	0.01	
-10	10	0.01	
0	7	0.01	
10	6	0.01	
20	5	0.01	
30	-17	-0.02	
40	37	0.04	
50	-26	-0.03	

<b>Band :</b>	CDMA2000 BC1	<b>Channel :</b>	600
<b>Test Mode :</b>	1xRTT_RC1+SO55	<b>Limit (ppm) :</b>	2.5

Temperature (°C)	Freq. Dev. (Hz)	Deviation (ppm)	Result
-30	-26	-0.01	PASS
-20	46	0.02	
-10	30	0.02	
0	27	0.01	
10	-32	-0.02	
20	54	0.03	
30	-29	-0.02	
40	-49	-0.03	
50	-55	-0.03	



Band :	CDMA2000 BC15	Channel :	425
Test Mode :	1xRTT_RC1+SO55	Limit (ppm) :	2.5

Temperature (°C)	Freq. Dev. (Hz)	Deviation (ppm)	Result
-30	-24	-0.01	PASS
-20	33	0.02	
-10	28	0.01	
0	-37	-0.02	
10	-48	-0.03	
20	-62	-0.03	
30	-54	-0.03	
40	-37	-0.02	
50	-42	-0.02	



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	3.7	34	0.04	2.5	PASS
		BEP	4	0.00		
		4.2	-6	-0.01		
CDMA2000 BC1 CH600	1xRTT RC1+SO55	3.7	-54	-0.03	2.5	PASS
		BEP	-57	-0.03		
		4.2	-57	-0.03		
CDMA2000 BC15 CH425	1xRTT RC1+SO55	3.7	-52	-0.03	2.5	PASS
		BEP	-38	-0.02		
		4.2	-44	-0.02		

Note :

- 1. Normal Voltage = 3.7V.
- 2. Battery End Point (BEP) = 3.6 V.



## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
System Simulator	R&S	CMU200	116456	N/A	Jun. 05, 2008	Jun. 04, 2010	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 23, 2009	Jun. 22, 2010	Conducted (TH02-HY)
Thermal Chamber	TEN BILLION	TTH-D35P	TBN-930701	N/A	Jul. 29, 2009	Jul. 28, 2010	Conducted (TH02-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2009	Oct. 30, 2010	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP	101067	9KHz ~ 30GHz	Dec. 02, 2008	Dec. 01, 2009	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 20, 2009	Aug. 19, 2010	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA917025 1	15GHz- 40GHz	Oct. 14, 2009	Oct. 13, 2010	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec. 17, 2008	Dec. 16, 2009	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32dB. GAIN	Mar. 27, 2009	Mar. 26, 2010	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 KHz~30 MHz	May 22, 2008	May 21, 2010	Radiation (03CH07-HY)
System Simulator	Agilent	E5515C (8960)	MY48360820	N/A	Dec. 15 , 2008	Dec. 14 , 2010	-

## 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>				

## 6 Certification of TAF Accreditation



Certificate No. : L1190-090417

財團法人全國認證基金會  
Taiwan Accreditation Foundation

### Certificate of Accreditation

This is to certify that

**Sporton International Inc.**  
**EMC & Wireless Communications Laboratory**  
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien,  
Taiwan, R.O.C.

**is accredited in respect of laboratory**

<b>Accreditation Criteria</b>	: ISO/IEC 17025:2005
<b>Accreditation Number</b>	: 1190
<b>Originally Accredited</b>	: December 15, 2003
<b>Effective Period</b>	: January 10, 2007 to January 09, 2010
<b>Accredited Scope</b>	: Testing Field, see described in the Appendix
<b>Specific Accreditation Program</b>	: Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory Accreditation Program for BSMI Mutual Recognition Arrangement with Foreign Authorities

  
Jay-San Chen  
President, Taiwan Accreditation Foundation  
Date : April 17, 2009

P1, total 20 pages

The Appendix forms an integral part of this Certificate, which shall be invalid when use without the Appendix



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

Please refer to Sporton report number EP902129 as below.