# FCC Test Report

## According to

## 47 CFR Part 22H, 24E

| | | |
|---|---|---|
| **Equipment** | : | **ZTE C78 CDMA1X Digital Mobile Phone** |
| **Trade Name** | : | **ZTE** |
| **Model No.** | : | **ZTE C78** |
| **FCC ID** | : | **Q78-ZTEC78** |
| **Uplink Frequency Range** | : | **CDMA2000 Cellular : 824.70~848.31 MHz**<br>**CDMA2000 PCS : 1851.25~1908.75 MHz** |
| **Max. ERP/EIRP Power** | : | **CDMA2000 Cellular : 0.18 W**<br>**CDMA2000 PCS : 0.27 W** |
| **Emission Designator** | : | **1M25F9W** |
| **Applicant** | : | **ZTE CORPORATION**<br>ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China |

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- The data shown in this test report were carried out on Mar. 25, 2008 at **Sporton International Inc. LAB.**
- Report No.: FG830102-A, Report Version: Rev. 01.

Roy Wu
Manager

***SPORTON International Inc.***
***No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.***

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# History of This Test Report

Report Issue Date: Mar. 31, 2008

| Report No. | Description |
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# 1. General Information

## 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 Basic Description of Equipment under Test

| | | |
|---|---|---|
| **Equipment** | | ZTE C78 CDMA1X Digital Mobile Phone |
| **Trade Name** | | ZTE |
| **Model Name** | | ZTE C78 |
| **FCC ID** | | Q78-ZTEC78 |
| **AC Adapter** | **Brand Name** | ZTE |
| | **Model Name** | STC-A22O50U5-C |
| | **Power Rating** | I/P:100-240Vac, 50-60Hz; O/P:5.0Vdc, 700mA |
| | **AC Power Cord Type** | 1.8 meter non-shielded cable without ferrite core |
| **Battery** | **Brand Name** | ZTE |
| | **Model Name** | Li3709T42P3h553447 |
| | **Rating** | 3.7Vdc, 900mAh |
| | **Type** | Li-ion |
| **Earphone** | **Brand Name** | ZTE |
| | **Model Name** | P500 |
| | **Signal Line Type** | 1.2 meter non-shielded cable without ferrite core |
| **USB Cable** | **Brand Name** | ZTE |
| | **Model Name** | ZX676.12.3012JA.A |
| | **Signal Line Type** | 1.2 meter shielded cable without ferrite core |

Remark: Above EUT's information was declared by manufacturer. Please refer to the specifications of manufacturer or User's Manual for more detailed features description.

## 1.4 Feature of Equipment under Test

| | |
|---|---|
| **DUT Type :** | ZTE C78 CDMA1X Digital Mobile Phone |
| **Model Name :** | ZTE C78 |
| **FCC ID :** | Q78-ZTEC78 |
| **Tx Frequency :** | CDMA2000 Cellular : 824 ~ 849 MHz<br>CDMA2000 AWS : 1710 ~ 1755 MHz<br>CDMA2000 PCS : 1850 ~1910 MHz<br>Bluetooth : 2400 ~ 2483.5 MHz |
| **Rx Frequency :** | CDMA2000 Cellular : 869 ~ 894 MHz<br>CDMA2000 AWS : 2110 ~ 2155 MHz<br>CDMA2000 PCS : 1930 ~ 1990 MHz<br>Bluetooth : 2400 ~ 2483.5 MHz |
| **Maximum Output Power :** | **CDMA2000 Cellular**<br>FCH_RC1 : 23.95 dBm<br>FCH_RC3 : 23.87 dBm<br>FCH+SCH_RC3 : 23.83 dBm<br>**CDMA2000 AWS**<br>FCH_RC1 : 24.40 dBm<br>FCH_RC3 : 24.22 dBm<br>FCH+SCH_RC3 : 24.15 dBm<br>**CDMA2000 PCS**<br>FCH_RC1 : 24.06 dBm<br>FCH_RC3 : 23.80 dBm<br>FCH+SCH_RC3 : 23.78 dBm |
| **Maximum ERP/EIRP :** | CDMA2000 Cellular : 0.18 W ( 22.66 dBm)<br>CDMA2000 PCS : 0.27 W ( 24.31 dBm) |
| **Antenna Type :** | CDMA2000 : Fixed Internal<br>Bluetooth : Fixed Internal |
| **HW Version :** | c73B |
| **SW Version :** | ZTEC78V1.0.0B02 |
| **Modulation Type :** | CDMA2000 : QPSK<br>Bluetooth (1Mbps) : GFSK<br>Bluetooth EDR (2Mbps) : π/4-DQPSK<br>Bluetooth EDR (3Mbps) : 8-DPSK |
| **Emission Designator :** | 1M25F9W |
| **DUT Stage :** | Production Unit |

## 1.5 Report Date

EUT Received : Mar. 01, 2008

Report Date : Mar. 31, 2008

# 2 Test Configuration of Equipment under Test

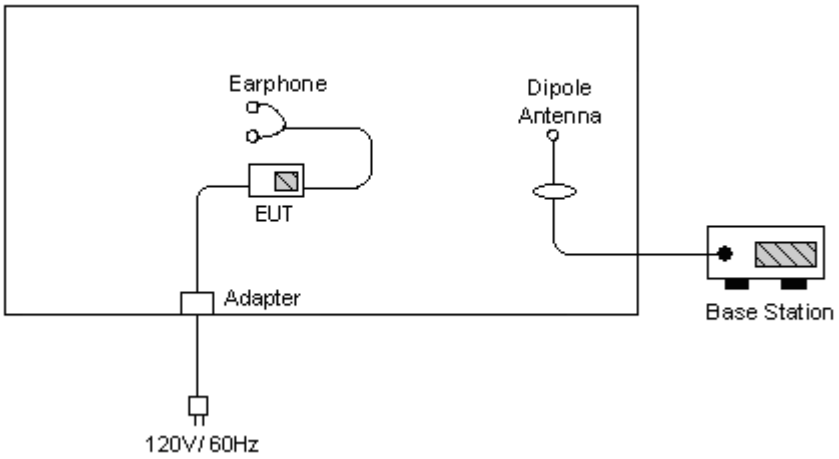
## 2.1 Test Manner

a. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range.
b. During all testings, EUT is in link mode with base station emulator at maximum power level.
c. Frequency range investigated: radiated emission 30 MHz to 9000 MHz for CDMA2000 Cellular; 30MHz to 19000 MHz for CDMA2000 PCS.

## 2.2 Test Mode

| Application | CDMA2000 Cellular | CDMA2000 PCS |
|---|---|---|
| Radiated Emission | ☒ Mode 1: 1xRTT Link Mode_CH384 | ☒ Mode 2: 1xRTT Link Mode_CH600 |
| | ☒ Mode 3: 1xRTT Link Mode+BT Link | |
| Conducted Measurement | ☒ Mode 1: 1xRTT Link Mode | ☒ Mode 2: 1xRTT Link Mode |

## 2.3 Connection Diagram of Test System




## 2.4 Ancillary Equipmnt List

| Item | Equipment | Trade Name | Model No. | FCC ID | Data Cable / Power Code |
|---|---|---|---|---|---|
| 1. | Base Station | R&S | CMU200 | N/A | Unshielded, 1.8m |

# 3. General Information of Test Site

| | | |
|---|---|---|
| Test Site Location | : | No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.<br>TEL : 86-0512- 5790-0158<br>FAX : 86-0512- 5790-0958 |
| Test Site No | : | 03CH01-KS, TH01-KS |

The chamber meets the characteristics of ANSI C63.4-2003. This site is on file with the FCC.

## 3.1 Test Voltage

AC 120V / 60Hz

## 3.2 Test Compliance

47 CFR Part 22H, 24E, Part 2

## 3.3 Frequency Range

a. Radiation: from 30MHz to 9000MHz for CDMA2000 Cellular.
b. Radiation: from 30 MHz to 19000 MHz for CDMA2000 PCS.

## 3.4 Test Distance

The test distance of radiated emission from antenna to EUT is 3 m.

# 4. Test Data and Test Result

## 4.1 List of Measurements and Examinations

| FCC Rule | Description Of Test | Result | Section |
|---|---|---|---|
| §2.1046 | RF Output Power | Passed | 4.2 |
| § 22.913<br>§24.232 | ERP / EIRP | Passed | 4.3 |
| §2.1049,<br>§ 22.917,<br>§ 24.238(b) | Occupied Bandwidth & Band Edge Measurement | Passed | 4.4 |
| §2.1051 | Conducted Emission | Passed | 4.5 |
| §2.1053 | Field Strength of Spurious Radiation | Passed | 4.6 |
| §2.1055,<br>§ 22.355,<br>§24.235 | Frequency Stability vs. Temperature | Passed | 4.7 |
| §2.1055,<br>§22.355,<br>§24.235 | Frequency Stability vs. Voltage | Passed | 4.8 |

## 4.2 RF Output Power

### 4.2.1 Measurement Instruments

As described in chapter 5 of this test report.

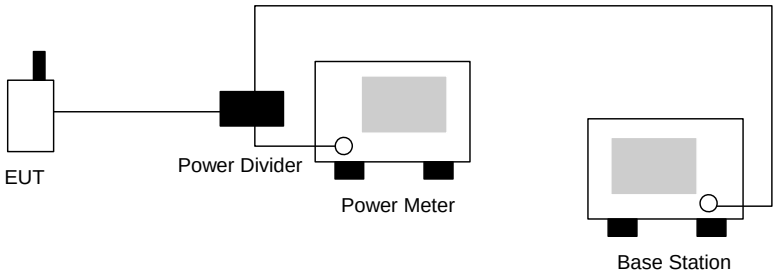
### 4.2.2 Test Procedure

a. The transmitter output was connected to power meter and base station through power divider.

b. Set EUT at maximum power through base station.

c. Select lowest, middle, and highest channels for each band.

### 4.2.3 Test Setup Layout



4.2.4 Test Result

| Bands | Test Mode | Test Status | Channel | Frequency (MHz) | Conducted Power (dBm) | Conducted Power (Watts) |
|---|---|---|---|---|---|---|
| CDMA2000 Cellular | 1xRTT | FCH_RC1 | 1013 | 824.70 (Low) | 23.37 | 0.22 |
| | | | 384 | 836.52 (Mid) | 23.95 | 0.25 |
| | | | 777 | 848.31 (High) | 23.90 | 0.25 |
| | | FCH_RC3 | 1013 | 824.70 (Low) | 23.29 | 0.21 |
| | | | 384 | 836.52 (Mid) | 23.66 | 0.23 |
| | | | 777 | 848.31 (High) | 23.87 | 0.24 |
| | | FCH+SCH_RC3 | 1013 | 824.70 (Low) | 23.28 | 0.21 |
| | | | 384 | 836.52 (Mid) | 23.78 | 0.24 |
| | | | 777 | 848.31 (High) | 23.83 | 0.24 |
| CDMA2000 PCS | 1xRTT | FCH_RC1 | 25 | 1851.25 (Low) | 23.84 | 0.24 |
| | | | 600 | 1880.00 (Mid) | 24.06 | 0.25 |
| | | | 1177 | 1908.75 (High) | 23.84 | 0.24 |
| | | FCH_RC3 | 25 | 1851.25 (Low) | 23.74 | 0.24 |
| | | | 600 | 1880.00 (Mid) | 23.80 | 0.24 |
| | | | 1177 | 1908.75 (High) | 23.72 | 0.24 |
| | | FCH+SCH_RC3 | 25 | 1851.25 (Low) | 23.72 | 0.24 |
| | | | 600 | 1880.00 (Mid) | 23.78 | 0.24 |
| | | | 1177 | 1908.75 (High) | 23.69 | 0.23 |

Note:
1. For cellular band, the worst case adopted as maximum output power 23.95dBm, is at CDMA2000 1xRTT FCH RC1.
2. For PCS band, the worst case adopted as maximum output power 24.06dBm, is at CDMA2000 1xRTT FCH RC1.

## 4.3 ERP / EIRP Measurement

Equivalent isotropic radiated power measurements by substitution method according to ANSI/TIA/EIA-603-C.

### 4.3.1 Measurement Instruments

As described in chapter 5 of this test report.

### 4.3.2 Test Procedure

a. The EUT was placed on a tutntable with 1.0 meter height in an fully anechoic chamber.

b. The EUT was set 1.2 meters from the receiving antenna which was mounted on the antenna tower.

c. The table was rotated 360 degrees to determine the position of the highest radiated power.

d. The height of the receiving antenna is also kept at 1.0M height.

e. Taking the record of maximum ERP/EIRP.

f. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.

g. The conducted power at the terminal of the dipole antenna is measured.

h. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.

i. ERP/EIRP = Ps + Et – Es + Gs = Ps + Rt – Rs + Gs

Ps (dBm)：Input power to substitution antenna.

Gs (dBi or dBd)：Substitution antenna Gain.

Et = Rt + AF

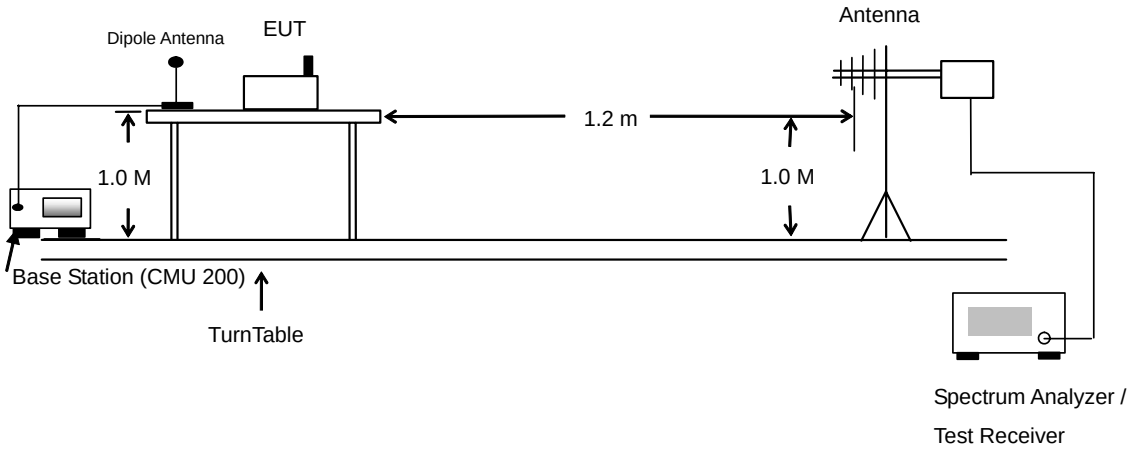
Es = Rs + AF

AF (dB/m)：Receive antenna factor

Rt：The highest received signal in Spectrum Analyzer for EUT.

Rs：The highest received signal in spectrum analyzer for substitution antenna.

4.3.3 Test Setup Layout of ERP/EIRP



4.3.4 Test Result

| CDMA2000 Cellular 850 1xRTT FCH_RC1 Radiated Power ERP | | | | | | |
|---|---|---|---|---|---|---|
| Horizontal Polarization | | | | | | |
| Frequency (MHz) | Rt (dBm) | Rs (dBm) | Ps (dBm) | Gs (dBd) | ERP (dBm) | ERP (W) |
| 824.70 | -24.92 | -48.12 | 0.00 | -1.08 | 22.12 | 0.16 |
| 836.52 | -24.69 | -48.28 | 0.00 | -0.93 | 22.66 | 0.18 |
| 848.31 | -25.17 | -48.35 | 0.00 | -0.76 | 22.42 | 0.17 |
| Vertical Polarization | | | | | | |
| Frequency (MHz) | Rt (dBm) | Rs (dBm) | Ps (dBm) | Gs (dBd) | ERP (dBm) | ERP (W) |
| 824.70 | -40.10 | -47.97 | 0.00 | -1.08 | 6.79 | 0.00 |
| 836.52 | -39.01 | -48.01 | 0.00 | -0.93 | 8.07 | 0.01 |
| 848.31 | -38.97 | -48.05 | 0.00 | -0.76 | 8.32 | 0.01 |

| CDMA2000 PCS1900 1xRTT FCH_RC1 Radiated Power EIRP | | | | | | |
|---|---|---|---|---|---|---|
| Horizontal Polarization | | | | | | |
| Frequency (MHz) | Rt (dBm) | Rs (dBm) | Ps (dBm) | Gs (dBi) | EIRP (dBm) | EIRP (W) |
| 1851.25 | -29.53 | -51.88 | 0.00 | 1.96 | 24.31 | 0.27 |
| 1880.00 | -30.68 | -52.99 | 0.00 | 2.00 | 24.31 | 0.27 |
| 1908.75 | -33.75 | -54.28 | 0.00 | 1.98 | 22.51 | 0.18 |
| Vertical Polarization | | | | | | |
| Frequency (MHz) | Rt (dBm) | Rs (dBm) | Ps (dBm) | Gs (dBi) | EIRP (dBm) | EIRP (W) |
| 1851.25 | -32.26 | -52.13 | 0.00 | 1.96 | 21.83 | 0.15 |
| 1880.00 | -33.45 | -53.17 | 0.00 | 2.00 | 21.72 | 0.15 |
| 1908.75 | -36.37 | -54.13 | 0.00 | 1.98 | 19.74 | 0.09 |

## 4.4 Occupied Bandwidth and Band Edge Measurement

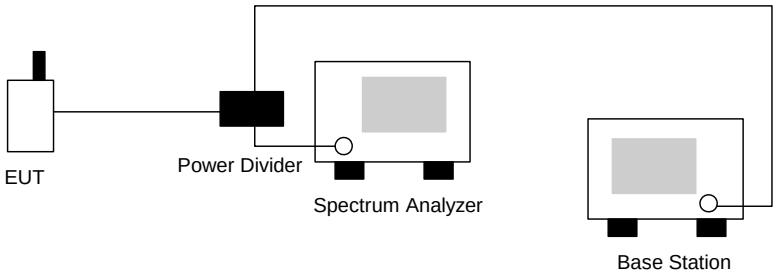
4.4.1 Measurement Instruments

As described in chapter 5 of this test report.

4.4.2 Test Procedure

a. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
b. The 99% occupied bandwidth and 26 dB Bandwidth of middle channel for the highest RF powers were measured.
c. The bandedge of low and high channels for the highest RF powers within the transmitting frequency band were measured. Setting RBW as roughly BW/100.
d. The RBW was replaced 30KHz with 10KHz, due to the spectrum analyzer IF-Filter leading to an exceeding of the limit, a worst case correction factor of 10 log (1% Occupy Bandwidth / Measured RBW) was used.

4.4.3 Test Setup Layout



4.4.4 Test Data

- **Mode 1**

| Bands | Test Mode | Test Status | Channel | Frequency (MHz) | Measurement Value (dBm) | Correction Factor (dB) | Band Edge (dBm) |
|---|---|---|---|---|---|---|---|
| CDMA2000 Cellular | 1xRTT | FCH_RC1 | 1013 | 824.70 (Low) | -17.04 | 1.07 | -15.97 |
| | | | 777 | 848.31 (High) | -15.69 | 1.07 | -14.62 |
| | | FCH_RC3 | 1013 | 824.70 (Low) | -16.66 | 1.07 | -15.59 |
| | | | 777 | 848.31 (High) | -14.80 | 1.07 | -13.73 |
| | | FCH+SCH_RC3 | 1013 | 824.70 (Low) | -15.05 | 1.07 | -13.98 |
| | | | 777 | 848.31 (High) | -15.27 | 1.07 | -14.20 |

Note:

*Occupy Bandwidth = 1280.00KHz

*Correction Factor = 10*log(1% Occupy Bandwidth / Measurement RBW)
= 10*log[(0.01*1280.00KHz) / 10KHz]
= 1.07 dB

*Band Edge = Measurement Value + Correction Factor

- **Mode 2**

| Bands | Test Mode | Test Status | Channel | Frequency (MHz) | Measurement Value (dBm) | Correction Factor (dB) | Band Edge (dBm) |
|---|---|---|---|---|---|---|---|
| CDMA2000 PCS | 1xRTT | FCH_RC1 | 25 | 1851.25 (Low) | -32.64 | 1.07 | -31.57 |
| | | | 1177 | 1908.75 (High) | -30.39 | 1.07 | -29.32 |
| | | FCH_RC3 | 25 | 1851.25 (Low) | -30.30 | 1.07 | -29.23 |
| | | | 1177 | 1908.75 (High) | -30.21 | 1.07 | -29.14 |
| | | FCH+SCH_RC3 | 25 | 1851.25 (Low) | -29.59 | 1.07 | -28.52 |
| | | | 1177 | 1908.75 (High) | -32.26 | 1.07 | -31.19 |

Note:

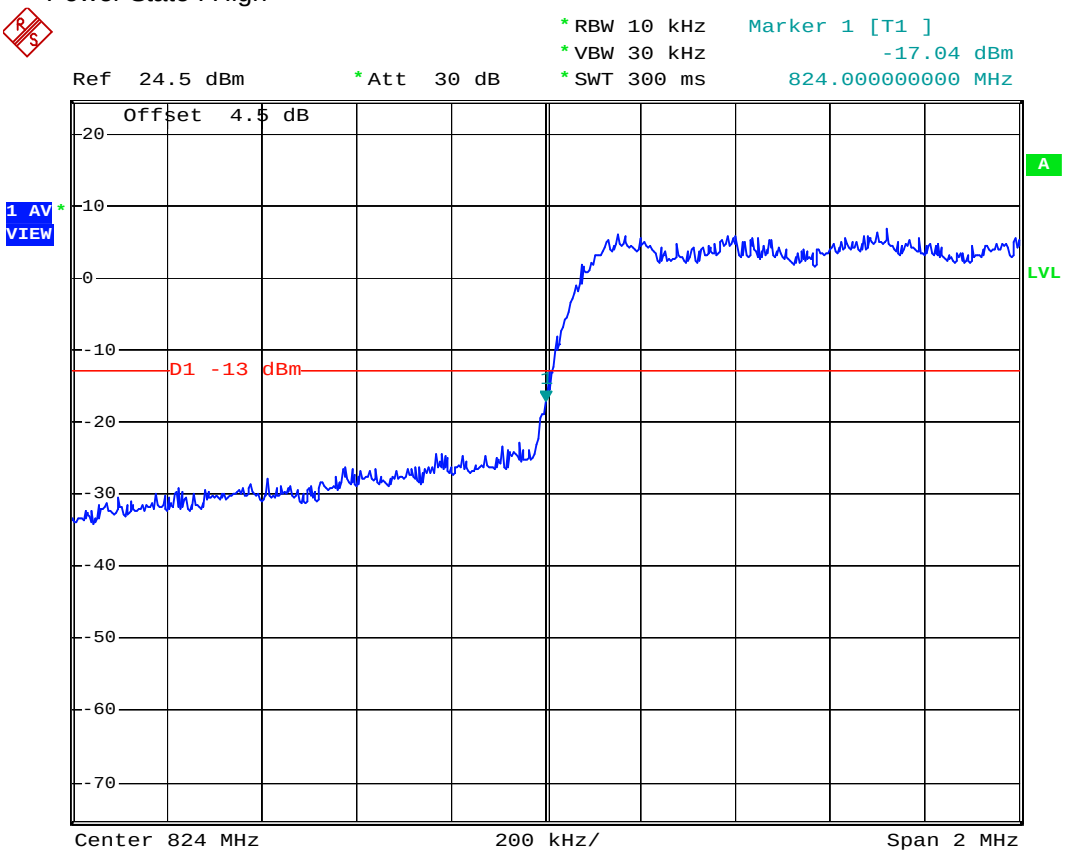
*Occupy Bandwidth = 1280.00KHz

*Correction Factor = 10*log(1% Occupy Bandwidth / Measurement RBW)
= 10*log[(0.01*1280.00KHz) / 10KHz]
= 1.07 dB

*Band Edge = Measurement Value + Correction Factor

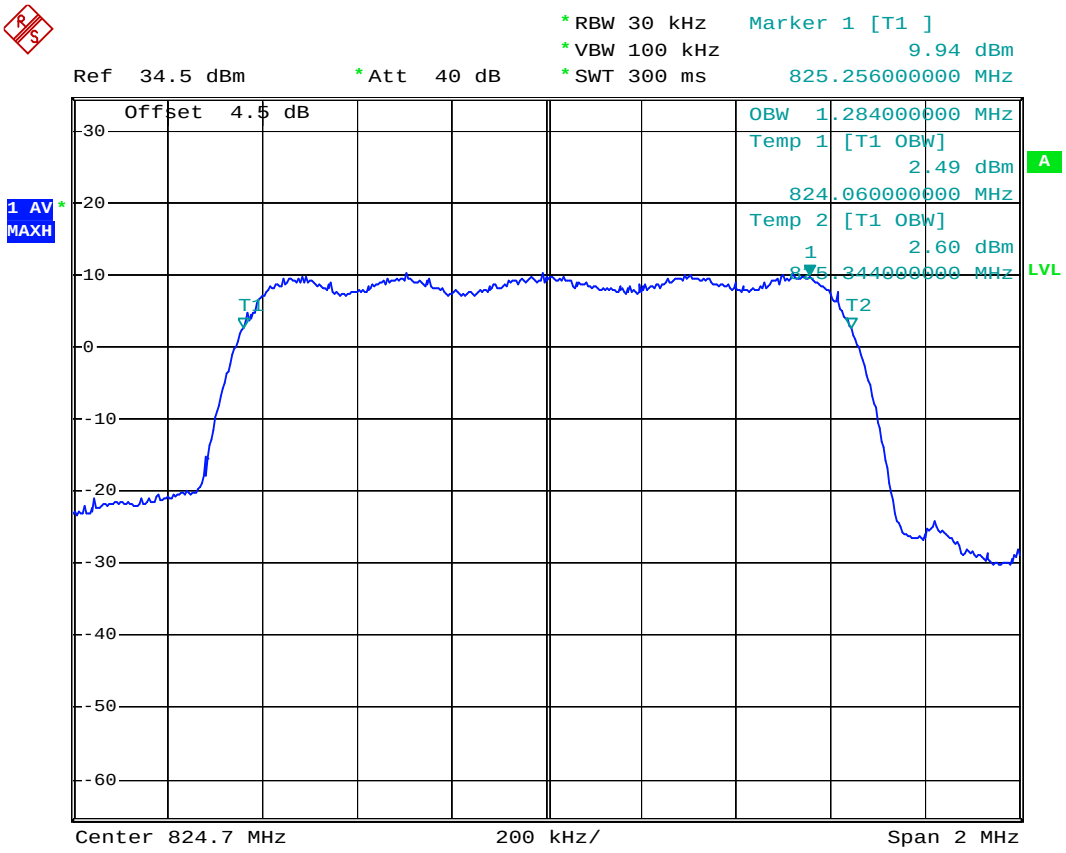
4.4.5 Test Result

- Mode 1
- Test Mode : CDMA2000 Cellular Band CH1013_FCH_RC1 Lower Band Edge for 1xRTT
- Power State : High



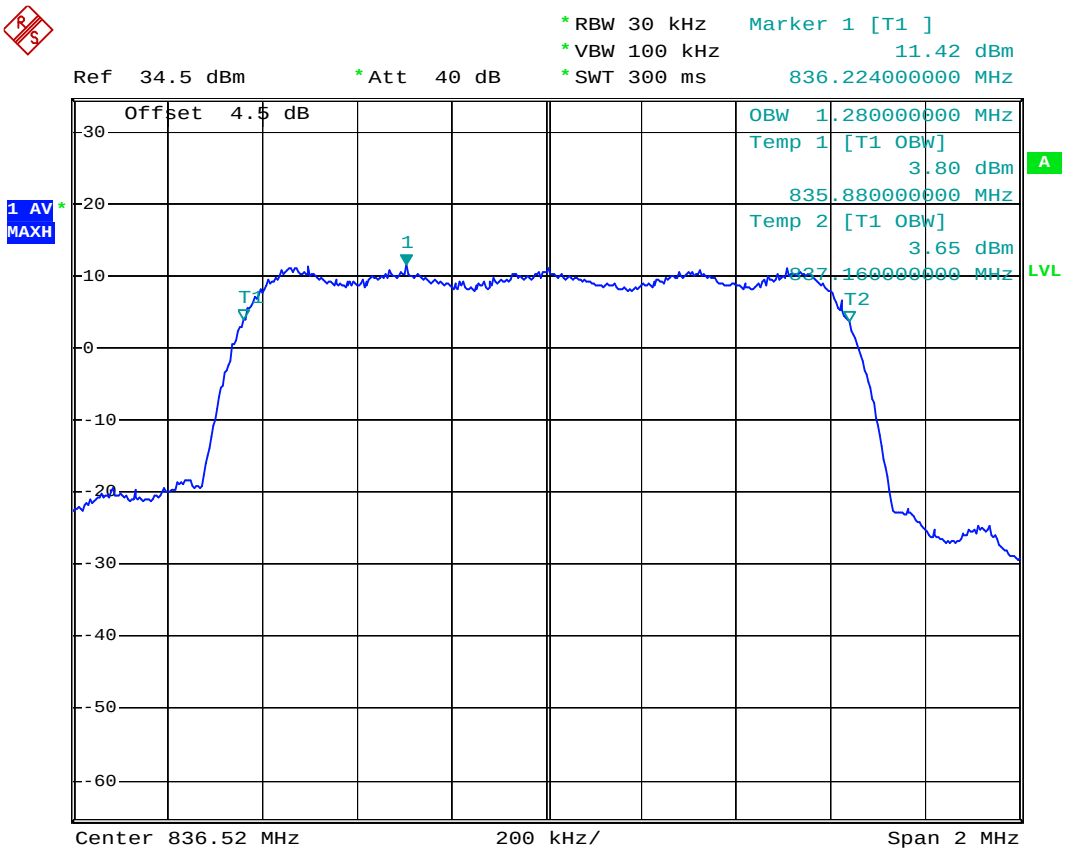

Date: 10.MAR.2008 13:47:48

- Test Mode : CDMA2000 Cellular CH1013_FCH_RC1 99% Occupid Bandwidth for 1xRTT
- Power State : High



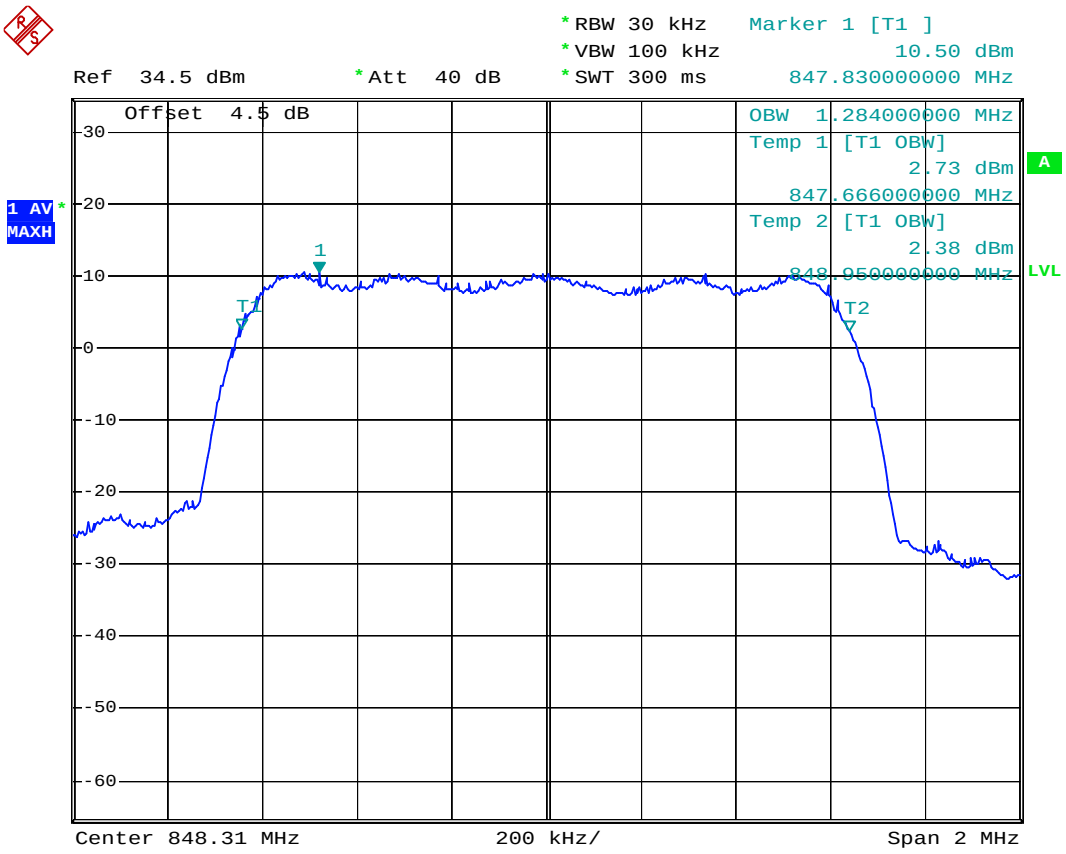

Date: 10.MAR.2008 14:02:42

- Test Mode : CDMA2000 Cellular CH384_FCH_RC1 99% Occupid Bandwidth for 1xRTT
- Power State : High



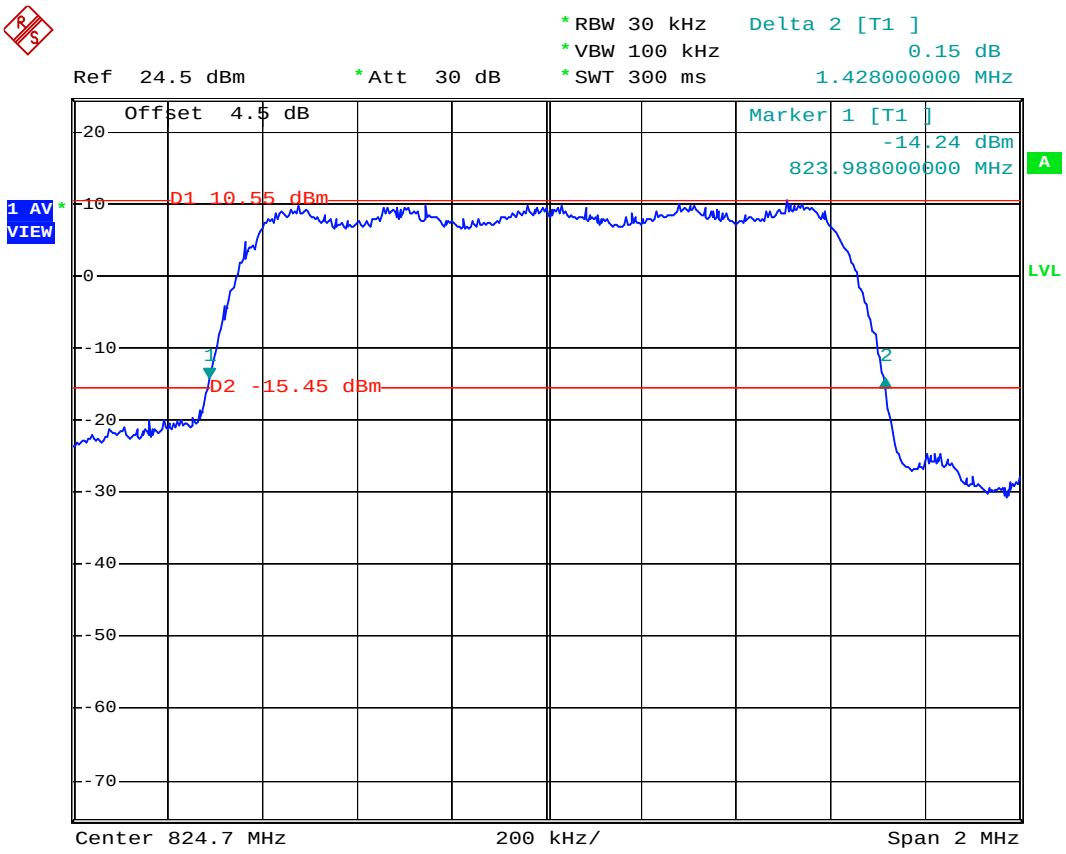

Date: 10.MAR.2008 14:01:25

- Test Mode : CDMA2000 Cellular CH777_FCH_RC1 99% Occupid Bandwidth for 1xRTT
- Power State : High



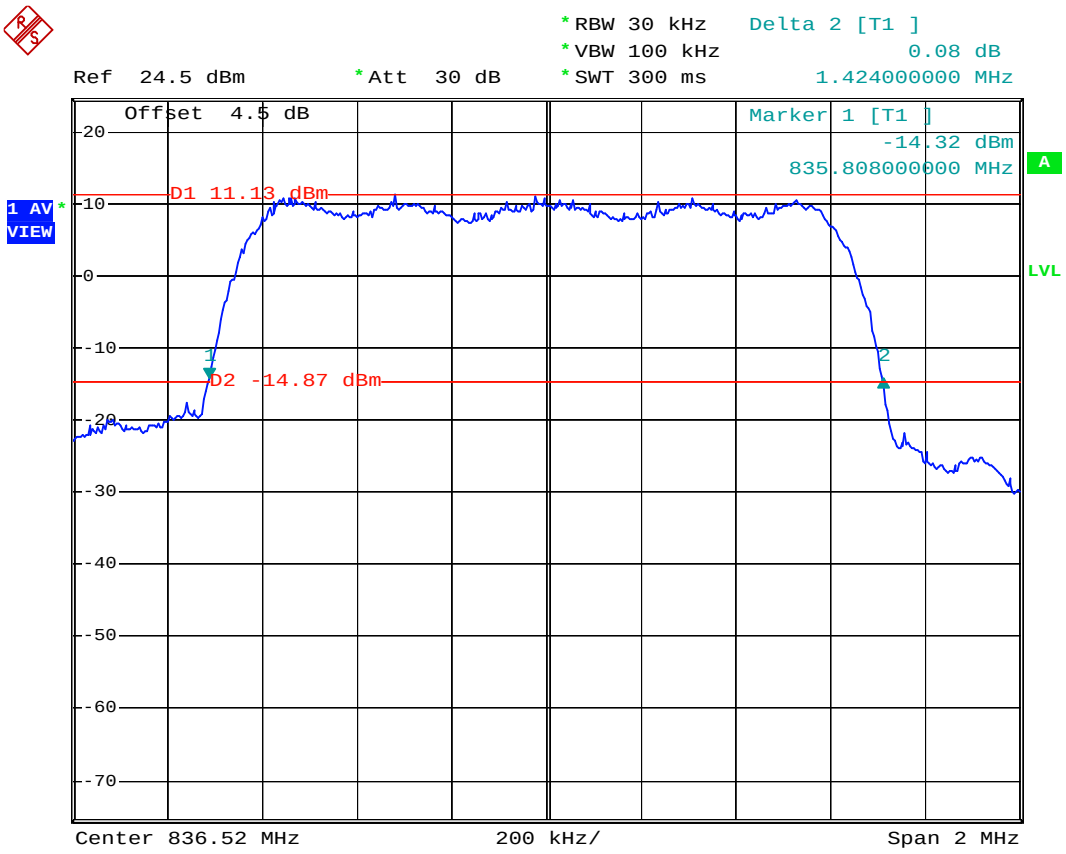

Date: 10.MAR.2008 14:01:58

- Test Mode : CDMA2000 Cellular CH1013_FCH_RC1 26 dB Bandwidth for 1xRTT
- Power State : High



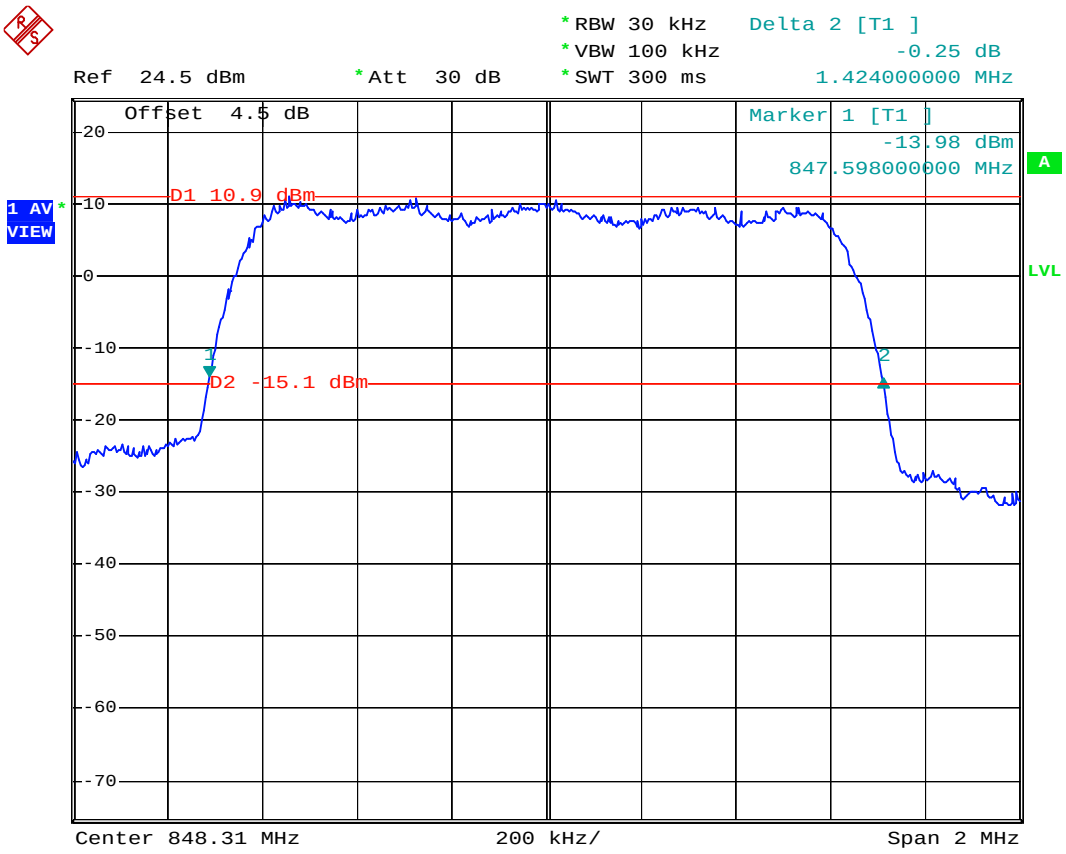

Date: 10.MAR.2008 13:54:27

- Test Mode : CDMA2000 Cellular CH384_FCH_RC1 26 dB Bandwidth for 1xRTT
- Power State : High



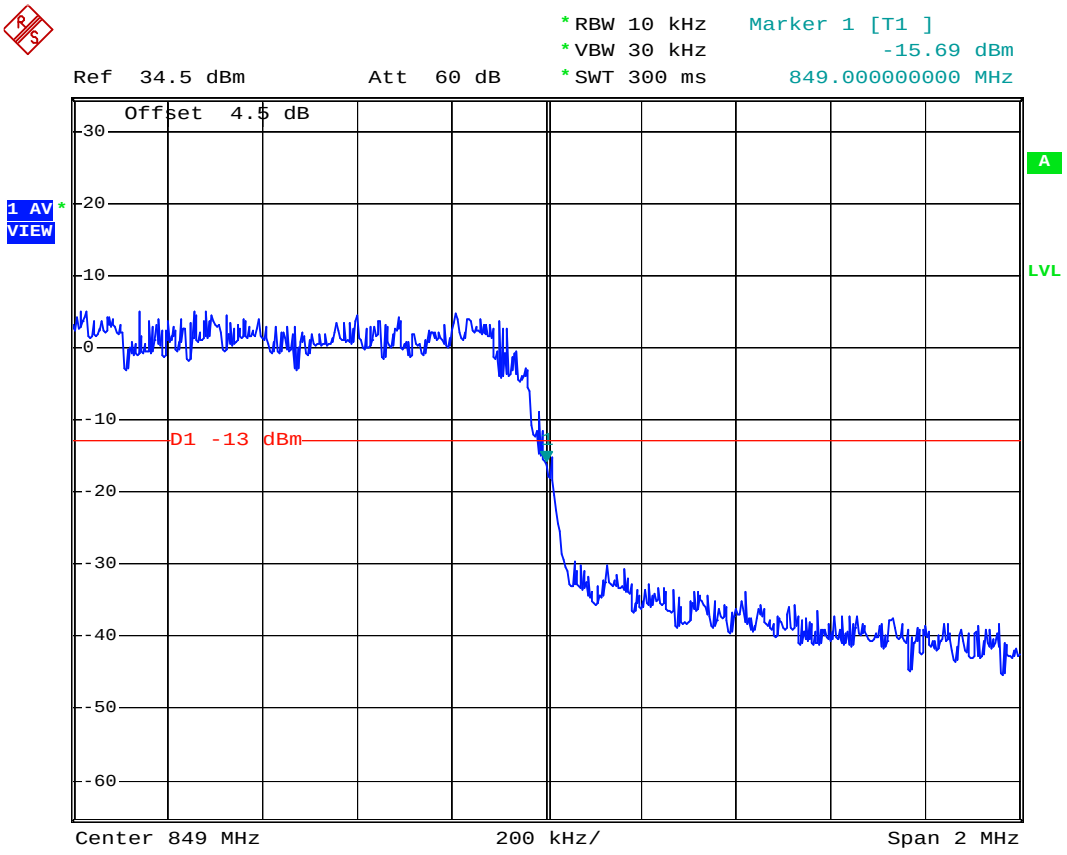

Date: 10.MAR.2008 13:52:01

- Test Mode : CDMA2000 Cellular CH777_FCH_RC1 26 dB Bandwidth for 1xRTT
- Power State : High



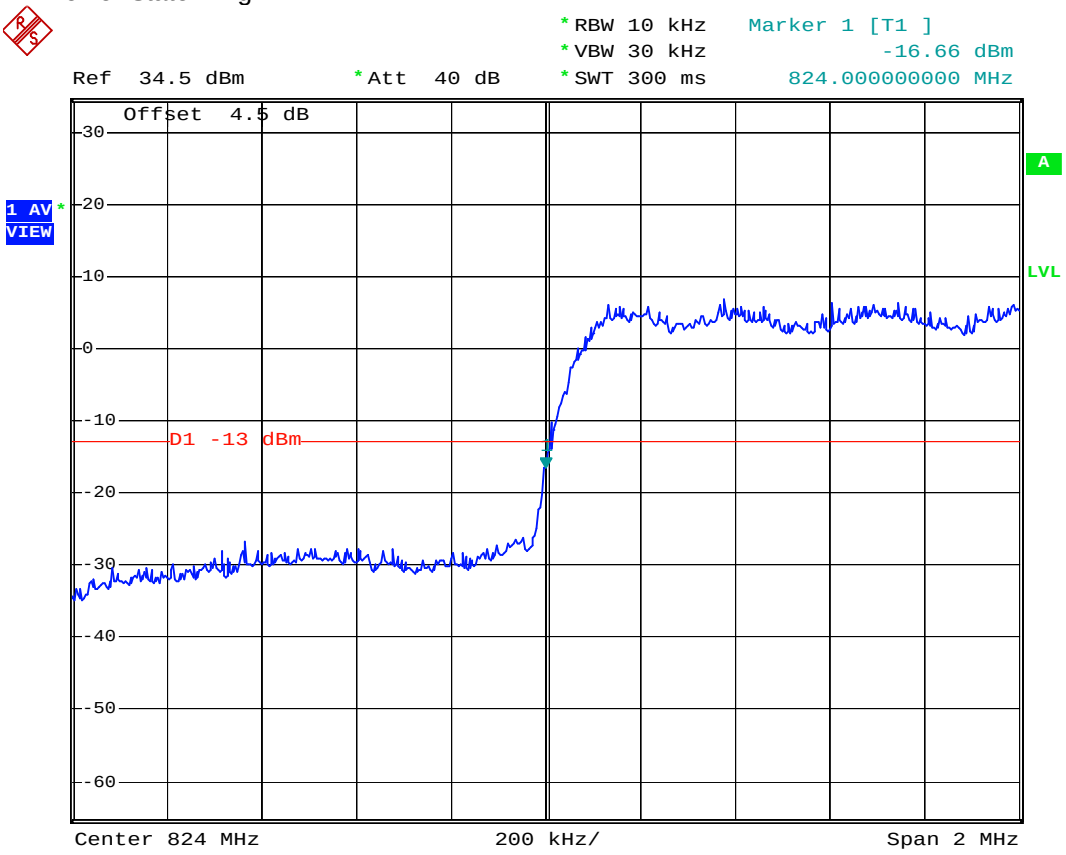

Date: 10.MAR.2008 13:53:12

- Test Mode : CDMA2000 Cellular CH777_FCH_RC1 Higher Band Edge for 1xRTT
- Power State : High



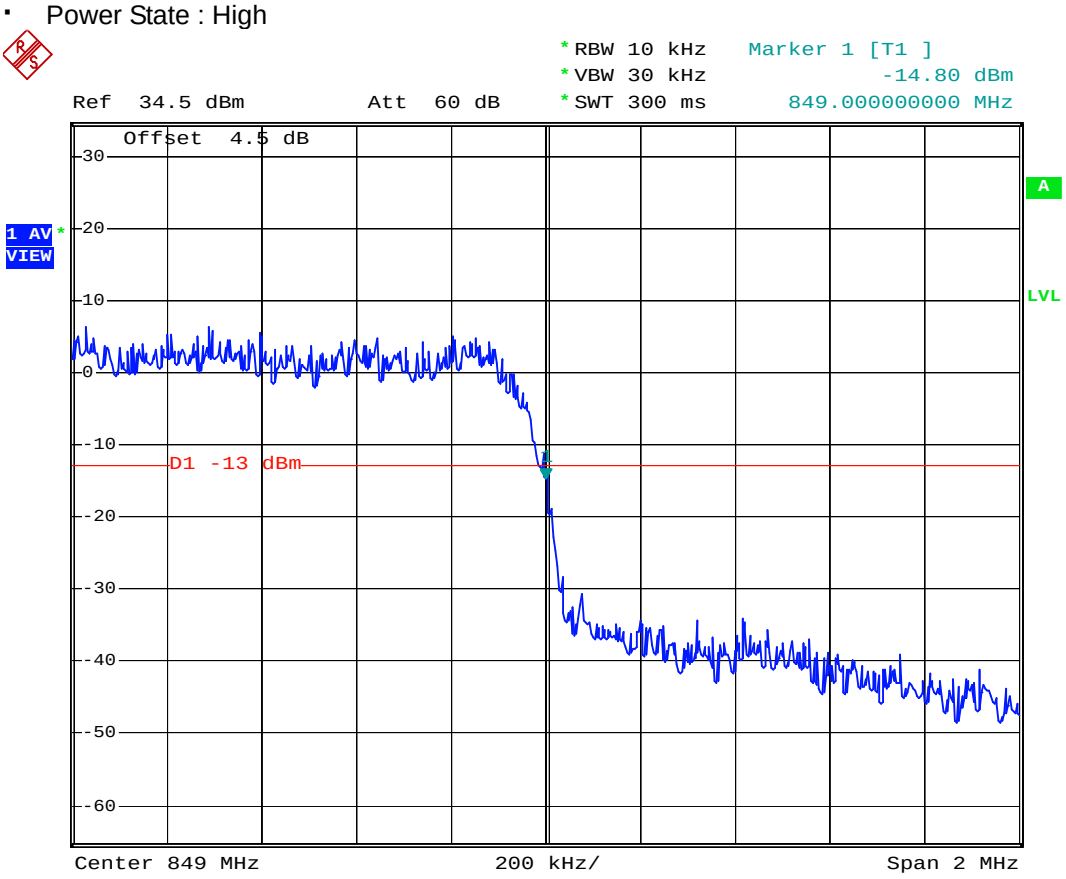

Date: 22.MAR.2008 15:01:52

- Test Mode : CDMA2000 Cellular Band CH1013_FCH_RC3 Lower Band Edge for 1xRTT
- Power State : High



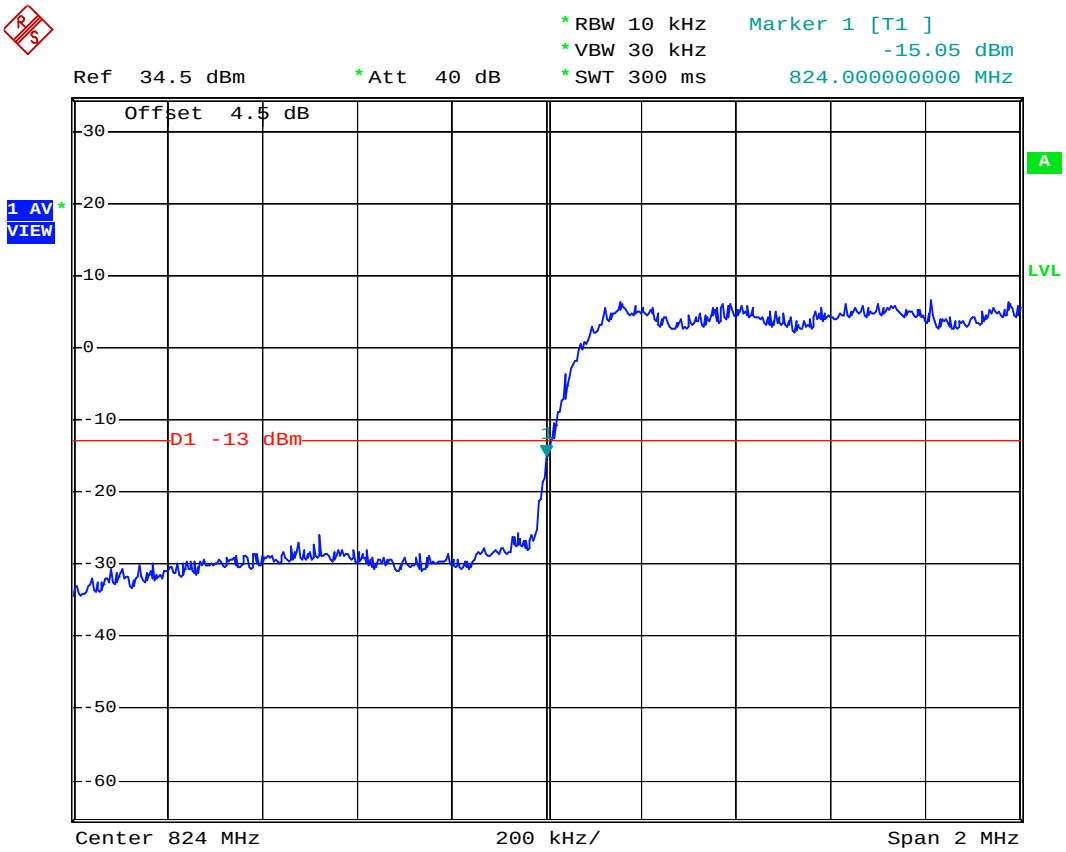

Date: 10.MAR.2008 14:08:28

- Test Mode : CDMA2000 Cellular CH777_FCH_RC3 Higher Band Edge for 1xRTT
- Power State : High



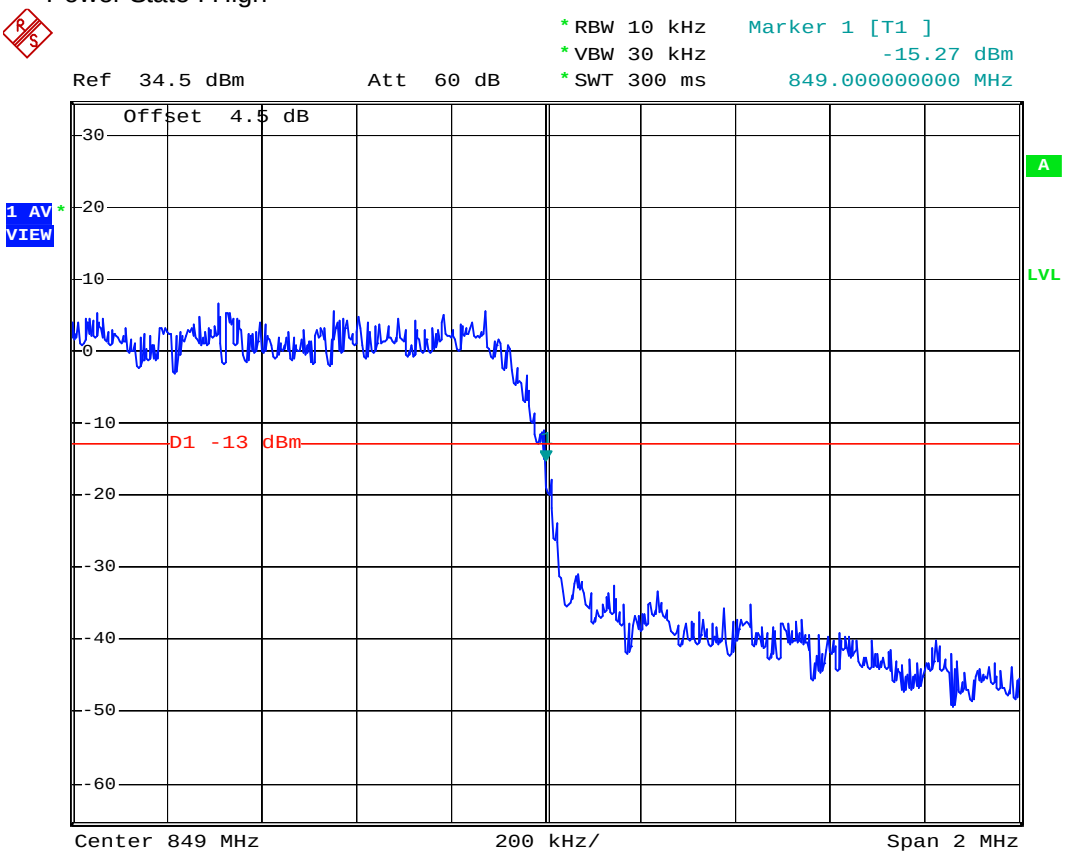

Date: 22.MAR.2008 14:59:01

- Test Mode : CDMA2000 Cellular Band CH1013_FCH+SCH_RC3 Lower Band Edge for 1xRTT
- Power State : High



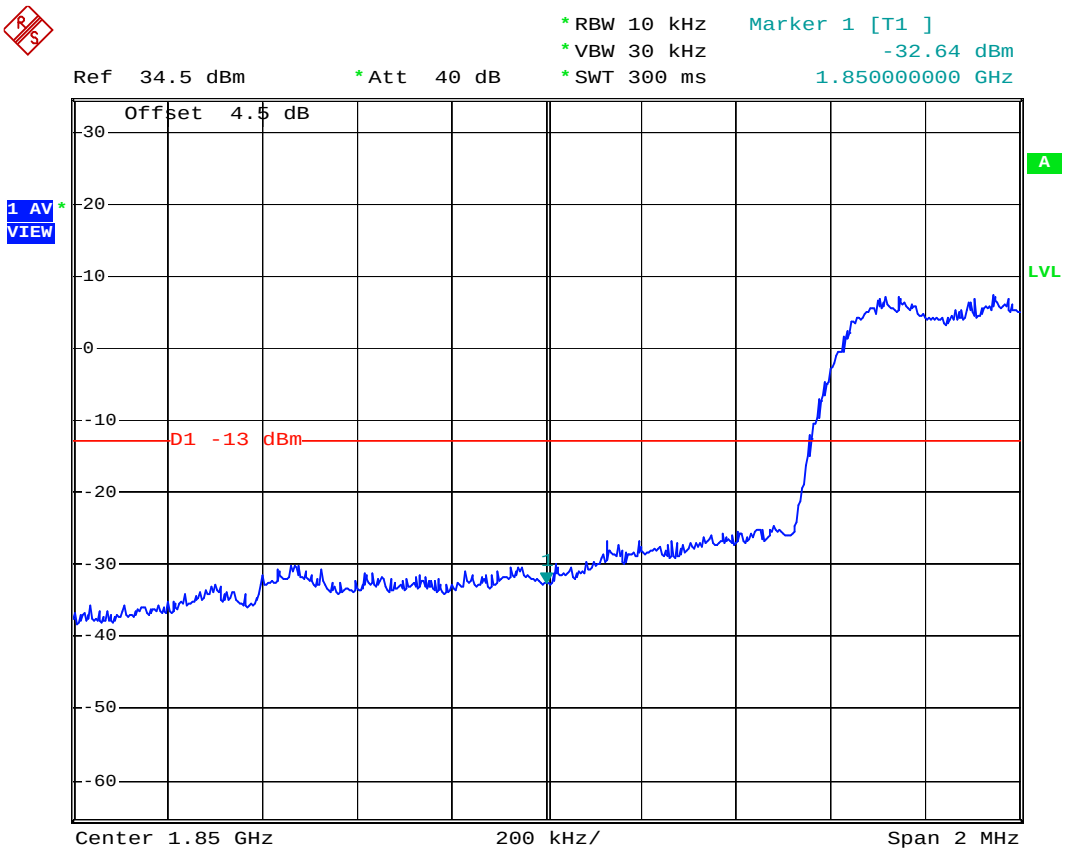

Date: 10.MAR.2008 14:13:12

- Test Mode : CDMA2000 Cellular CH777_FCH+SCH_RC3 Higher Band Edge for 1xRTT
- Power State : High



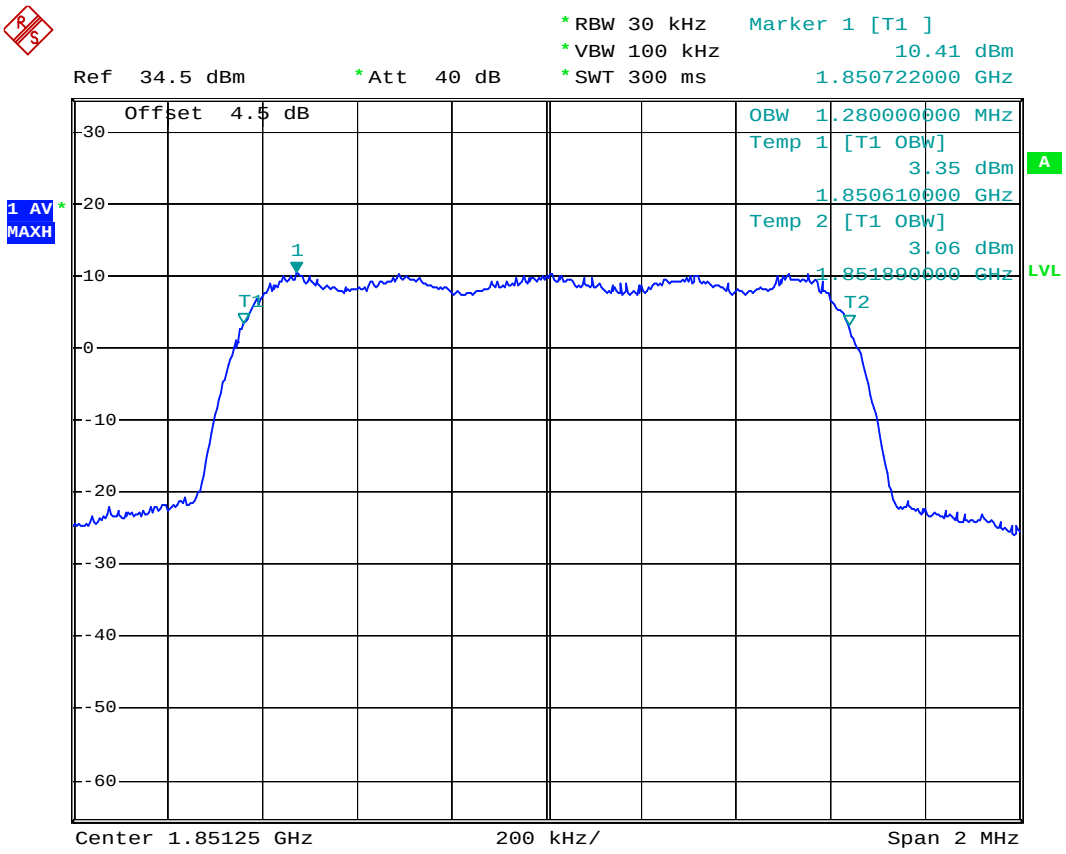

Date: 22.MAR.2008 17:05:29

- Mode 2
- Test Mode : CDMA2000 PCS Band CH25_FCH_RC1 Lower Band Edge for 1xRTT
- Power State : High



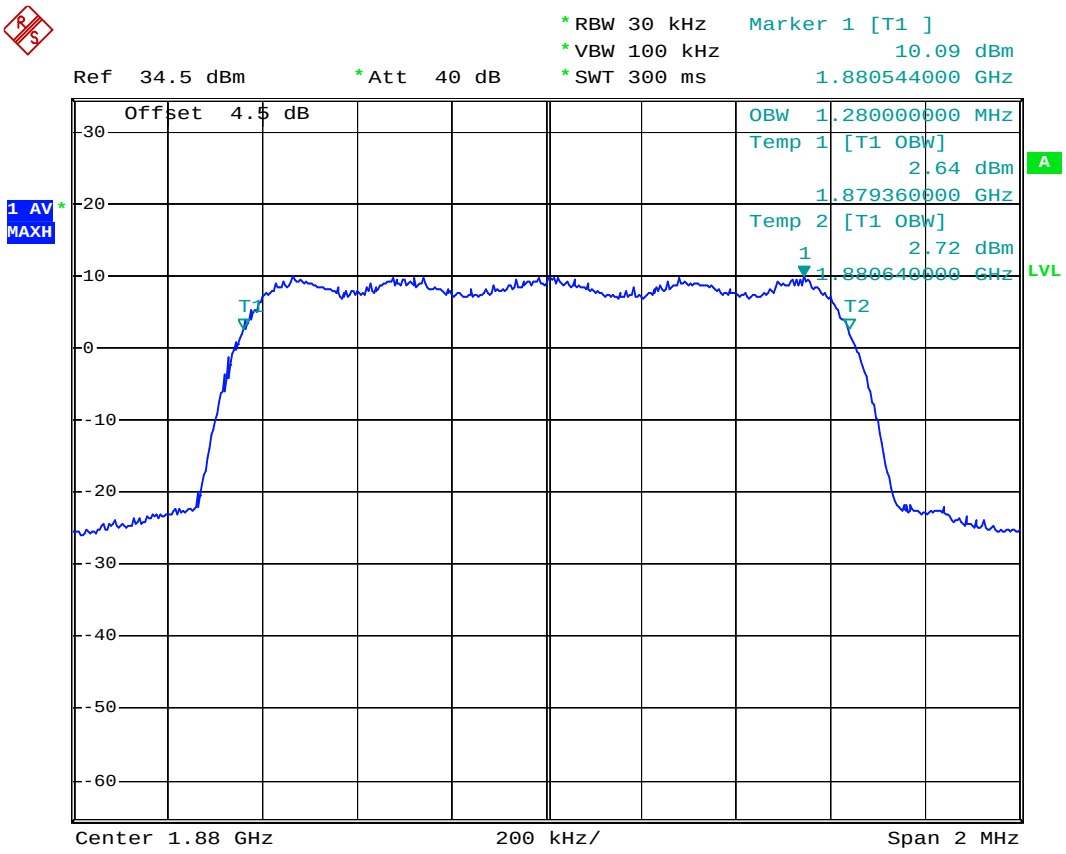

Date: 10.MAR.2008 11:06:18

- Test Mode : CDMA2000 PCS Band CH25_FCH_RC1 99% Occupid Bandwidth for 1xRTT
- Power State : High



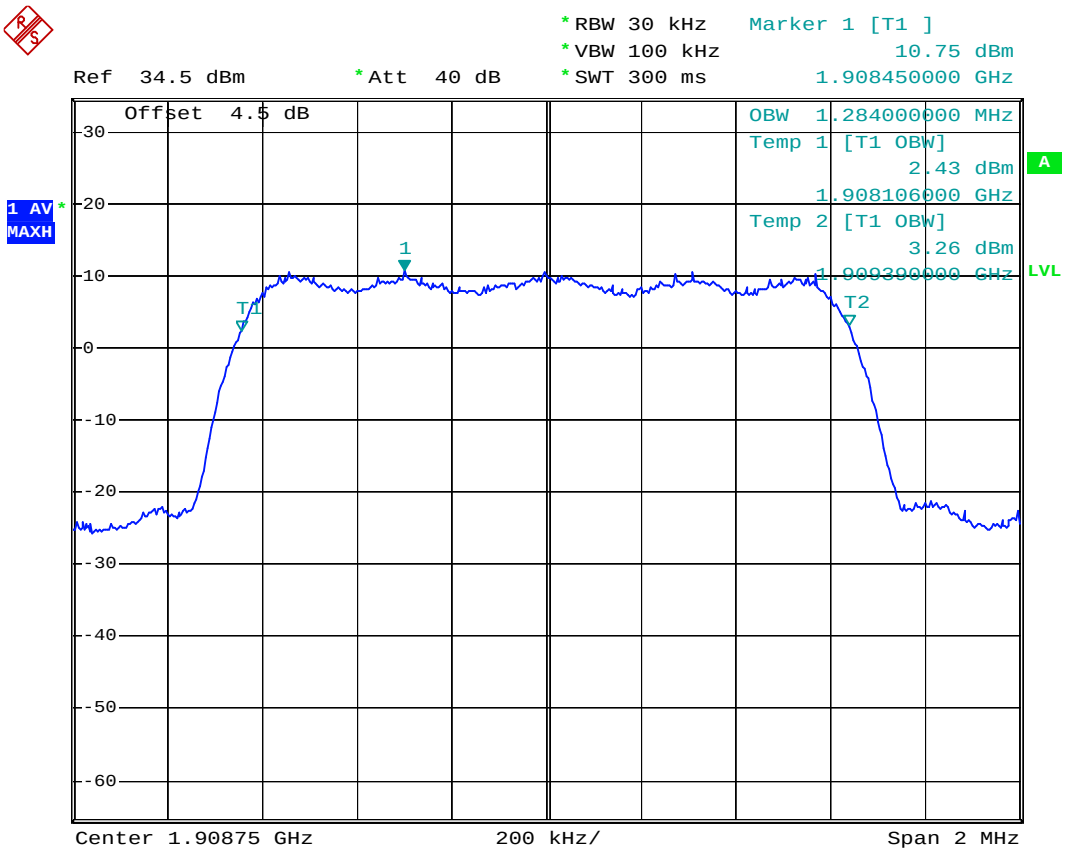

Date: 10.MAR.2008 11:18:53

- Test Mode : CDMA2000 PCS Band CH600_FCH_RC1 99% Occupid Bandwidth for 1xRTT
- Power State : High



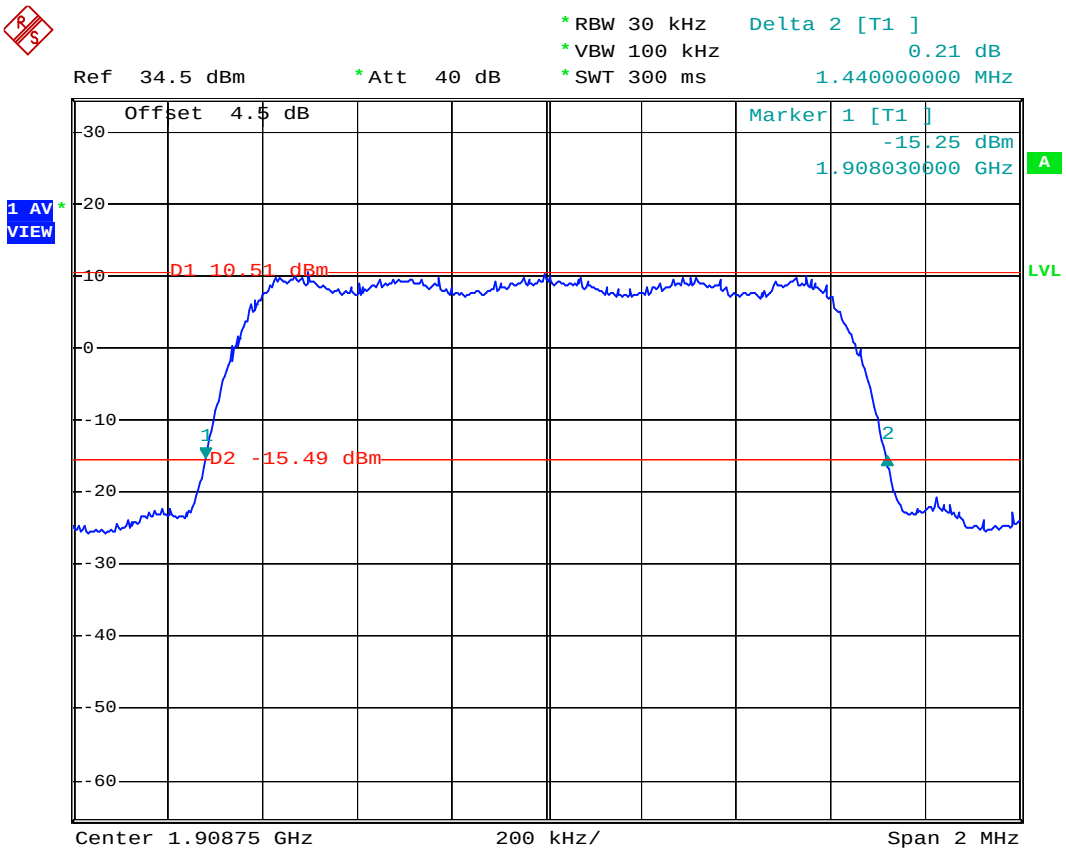

Date: 10.MAR.2008 11:18:08

- Test Mode : CDMA2000 PCS Band CH1175_FCH_RC1 99% Occupid Bandwidth for 1xRTT
- Power State : High



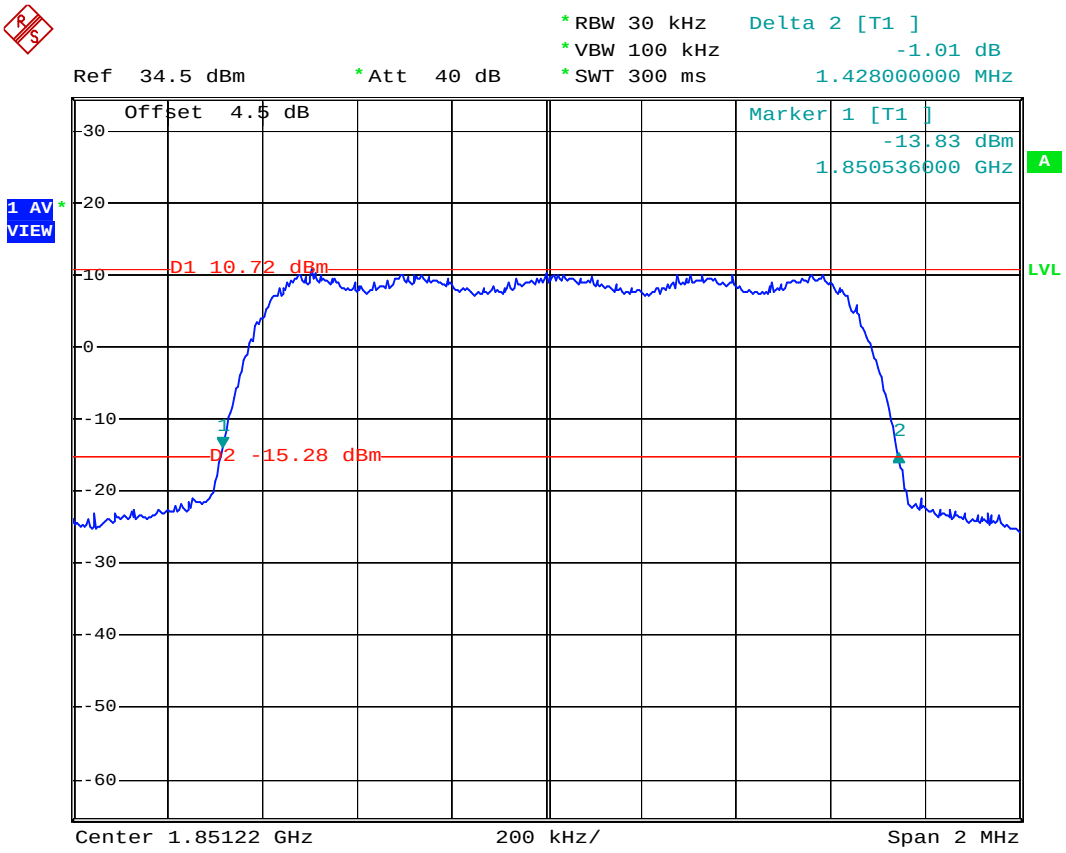

Date: 10.MAR.2008 11:17:22

- Test Mode : CDMA2000 PCS Band CH25_FCH_RC1 26 dB Bandwidth for 1xRTT
- Power State : High



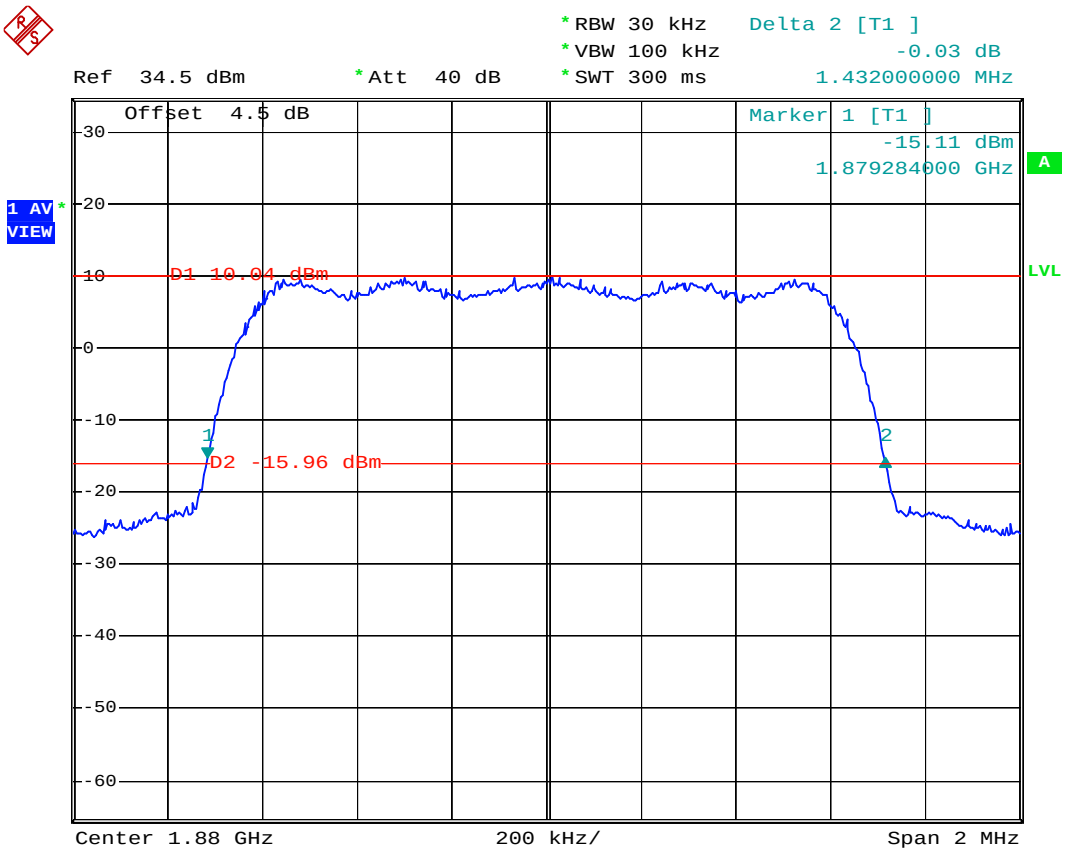

Date: 10.MAR.2008 11:26:03

- Test Mode : CDMA2000 PCS Band CH600_FCH_RC1 26 dB Bandwidth for 1xRTT
- Power State : High




Date: 10.MAR.2008 11:22:54

- Test Mode : CDMA2000 CS 1900 Band CH1175_FCH_RC1 26 dB Bandwidth for 1xRTT
- Power State : High

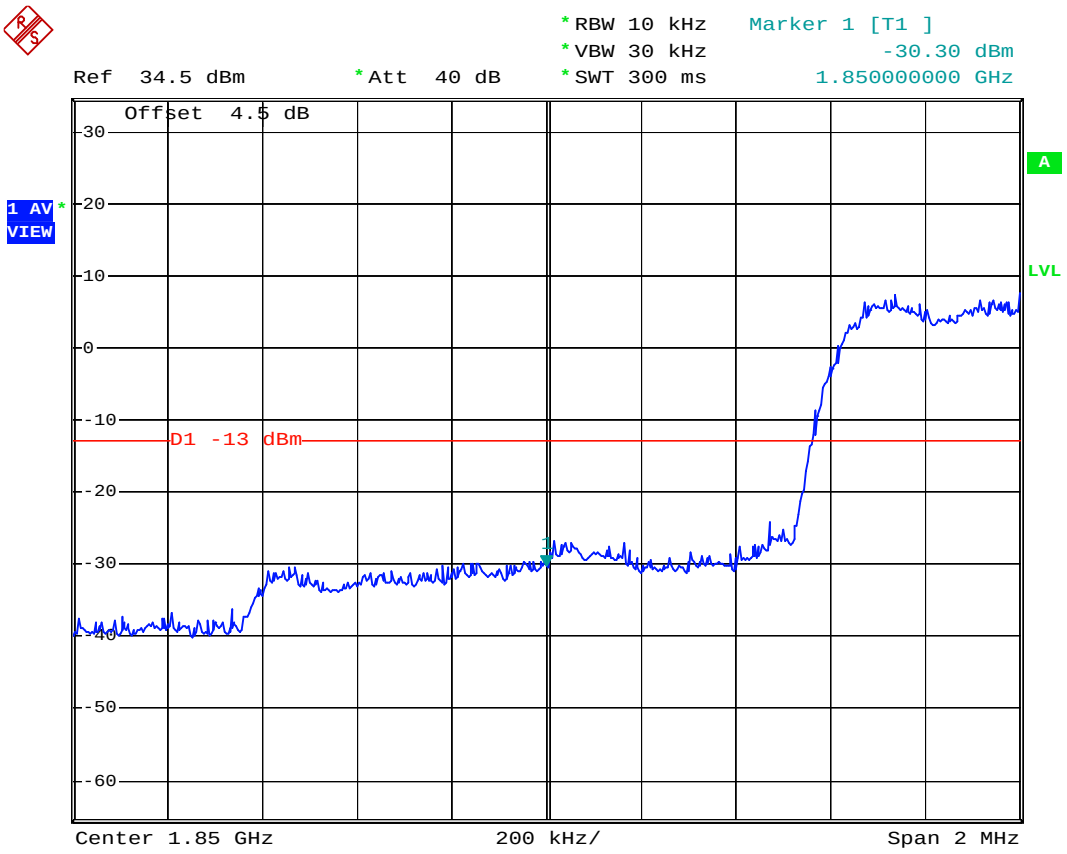



Date: 10.MAR.2008 11:24:25

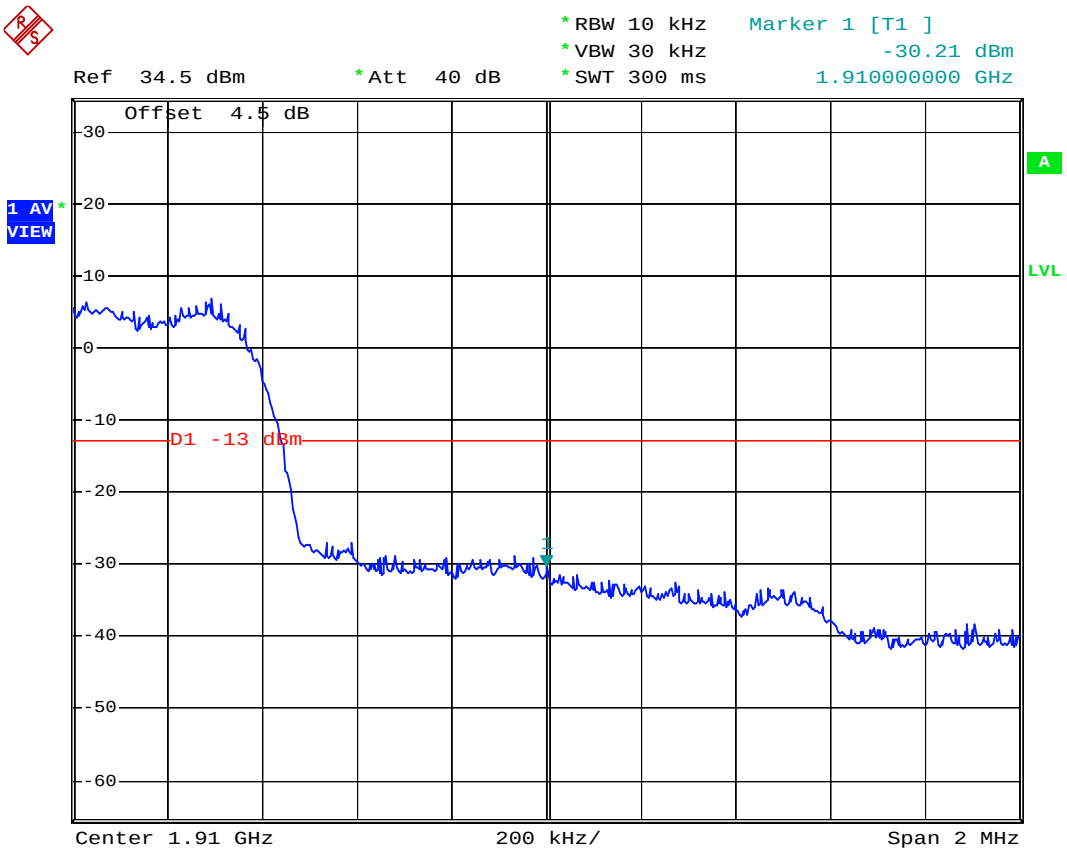
- Test Mode : CDMA2000 PCS Band CH1175_FCH_RC1 Higher Band Edge for 1xRTT
- Power State : High


Date: 10.MAR.2008 11:07:45

- Test Mode : CDMA2000 PCS Band CH25_FCH+SCH_RC3 Lower Band Edge for 1xRTT
- Power State : High

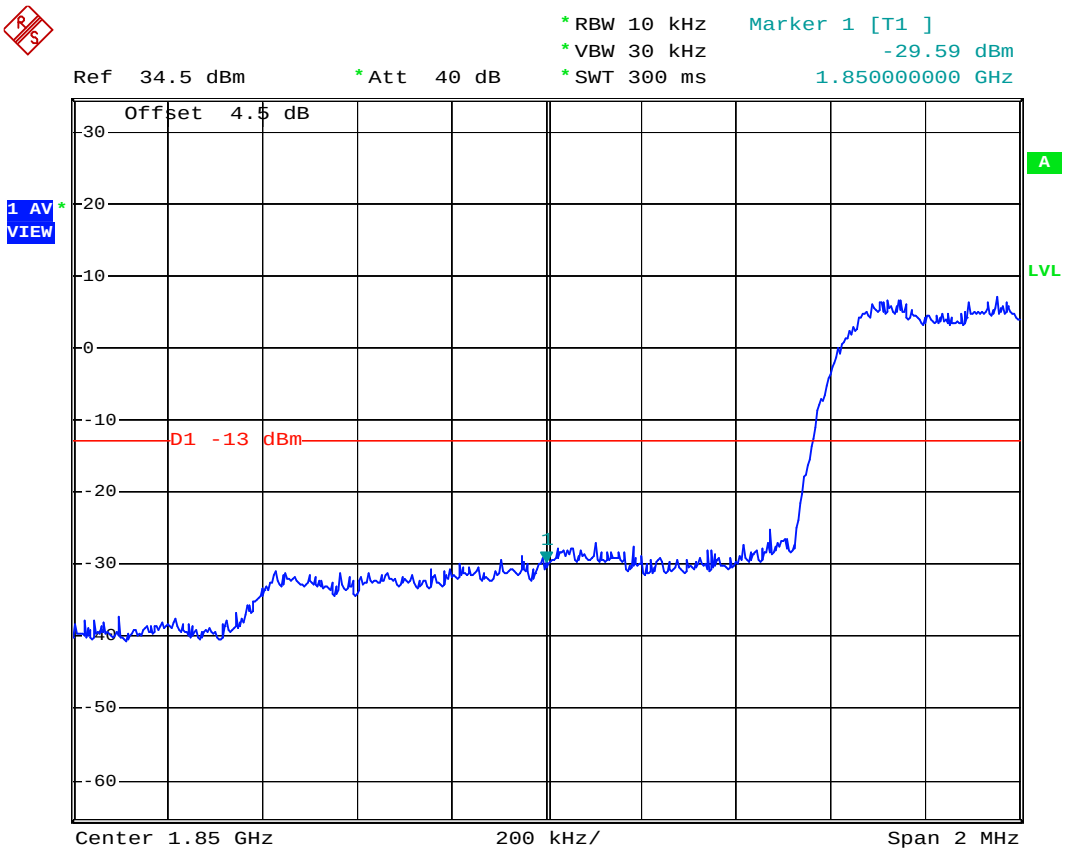


- Test Mode : CDMA2000 PCS Band CH1175_FCH+SCH_RC3 Higher Band Edge for 1xRTT
- Power State : High



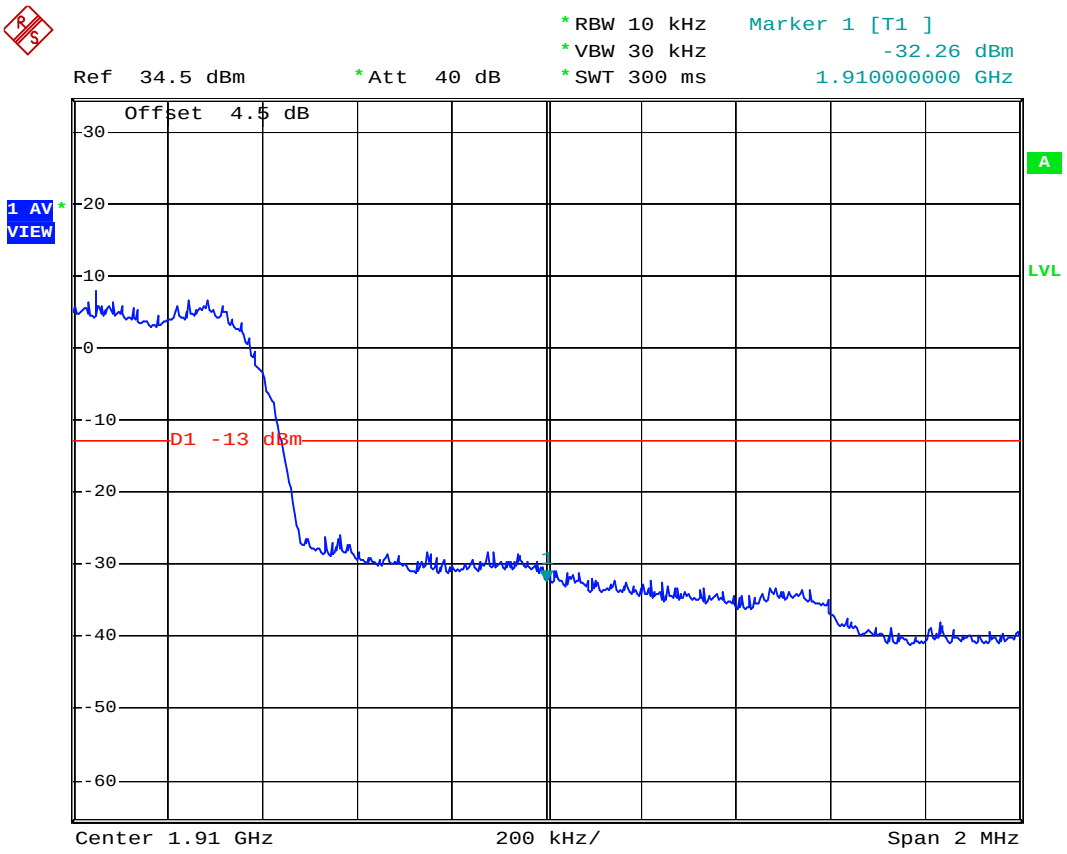

Date: 10.MAR.2008 11:04:06

- Test Mode : CDMA2000 PCS Band CH25_FCH+SCH_RC3 Lower Band Edge for 1xRTT
- Power State : High




Date: 10.MAR.2008 10:48:12

- Test Mode : CDMA2000 PCS Band CH1175_FCH+SCH_RC3 Higher Band Edge for 1xRTT
- Power State : High




Date: 10.MAR.2008 10:42:24

## 4.5 Conducted Emission

### 4.5.1 Measurement Instruments

As described in chapter 5 of this test report.

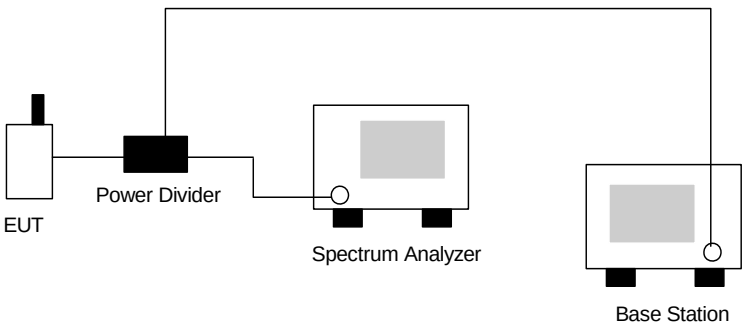
### 4.5.2 Test Procedure

a. The EUT was connected to Spectrum Analyzer and Base Station via power divider.

b. The middle channel for the highest RF power within the transmitting frequency was measured.

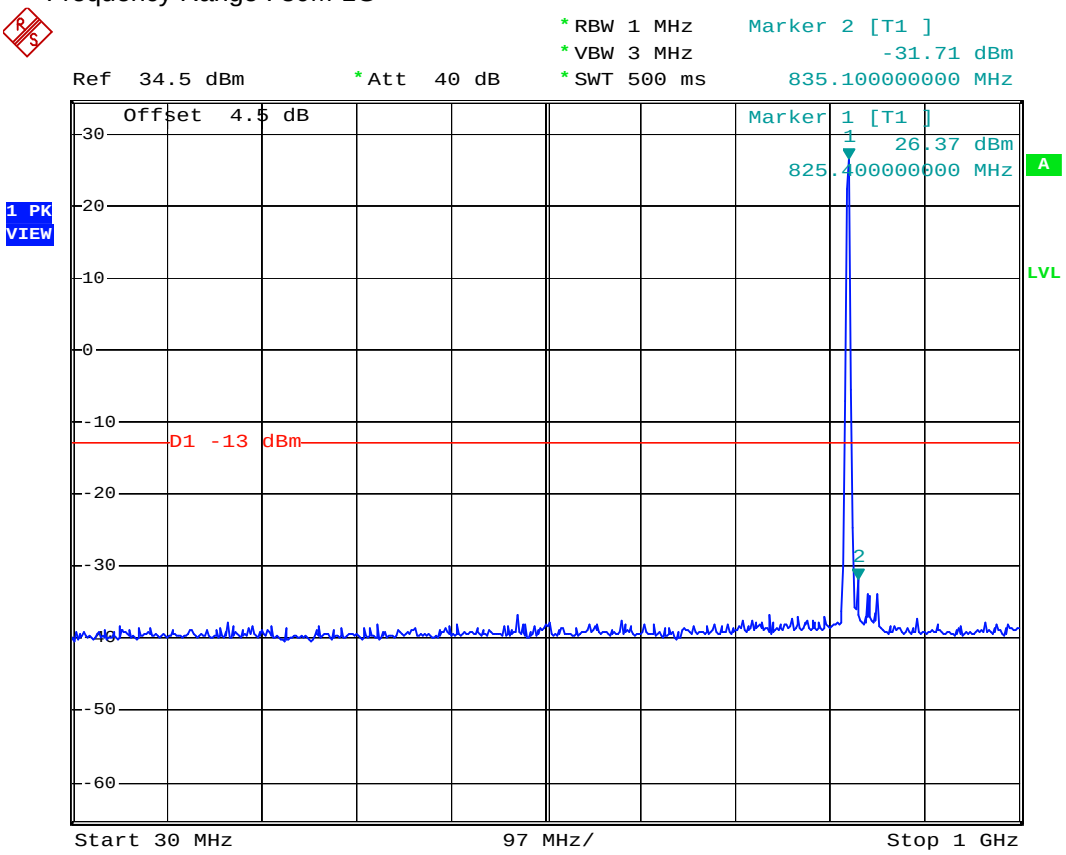
c. The conducted spurious emission for the whole frequency range was taken.

### 4.5.3 Test Setup Layout



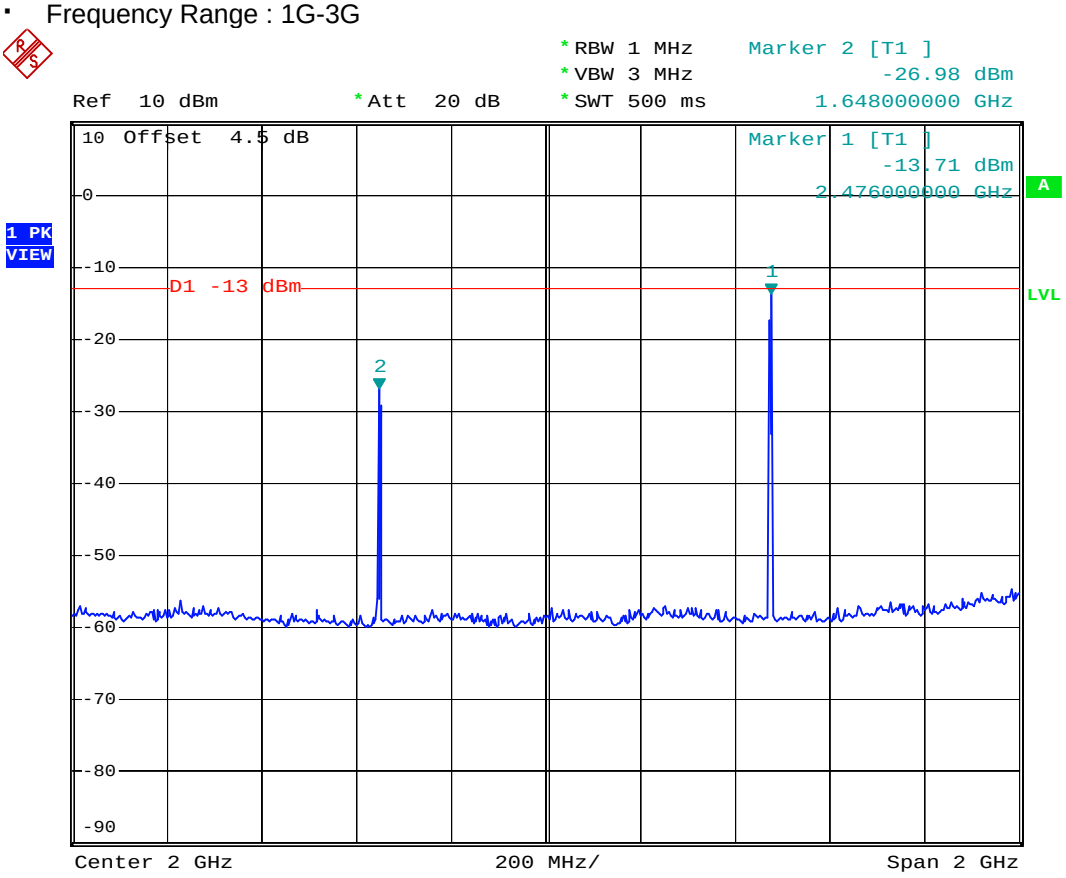
4.5.4 Test Result

- Mode 1
- Test Mode : CDMA2000 Cellular CH1013 for 1xRTT
- Frequency Range : 30M-1G



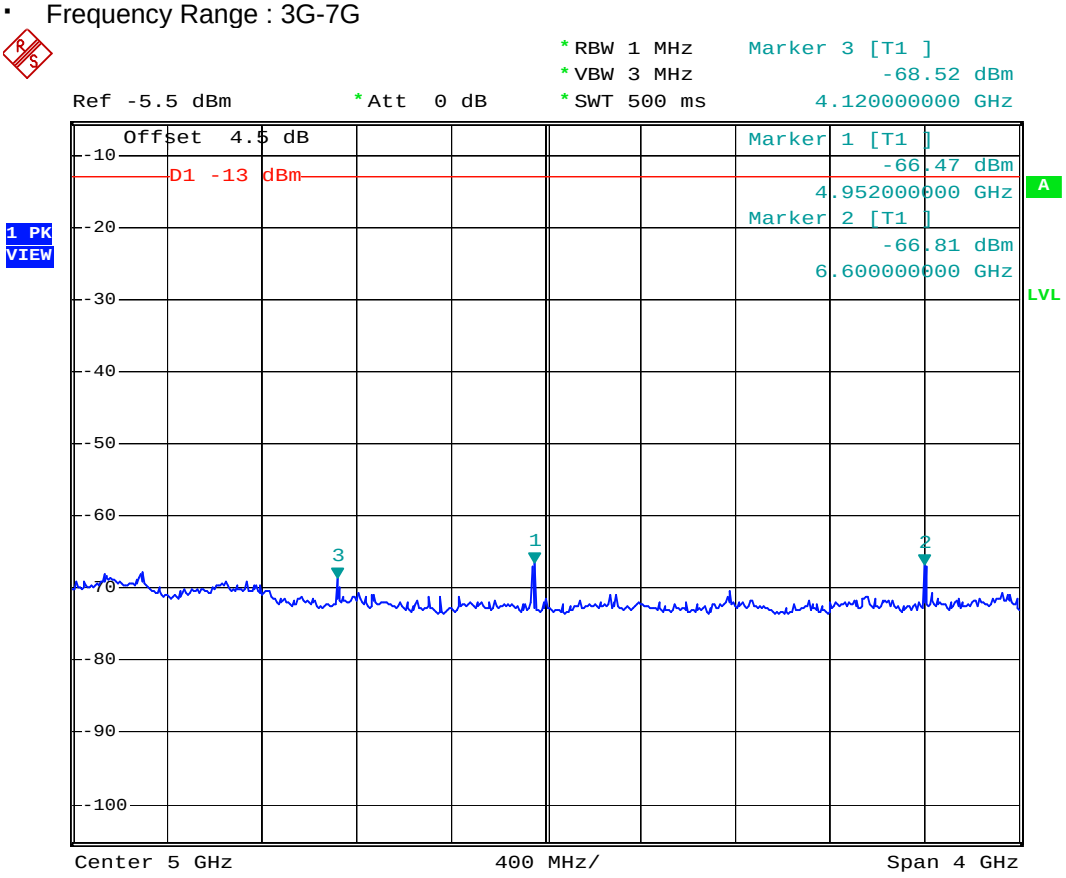

Date: 10.MAR.2008 14:17:28

- Test Mode : CDMA2000 Cellular CH1013 for 1xRTT
- Frequency Range : 1G-3G



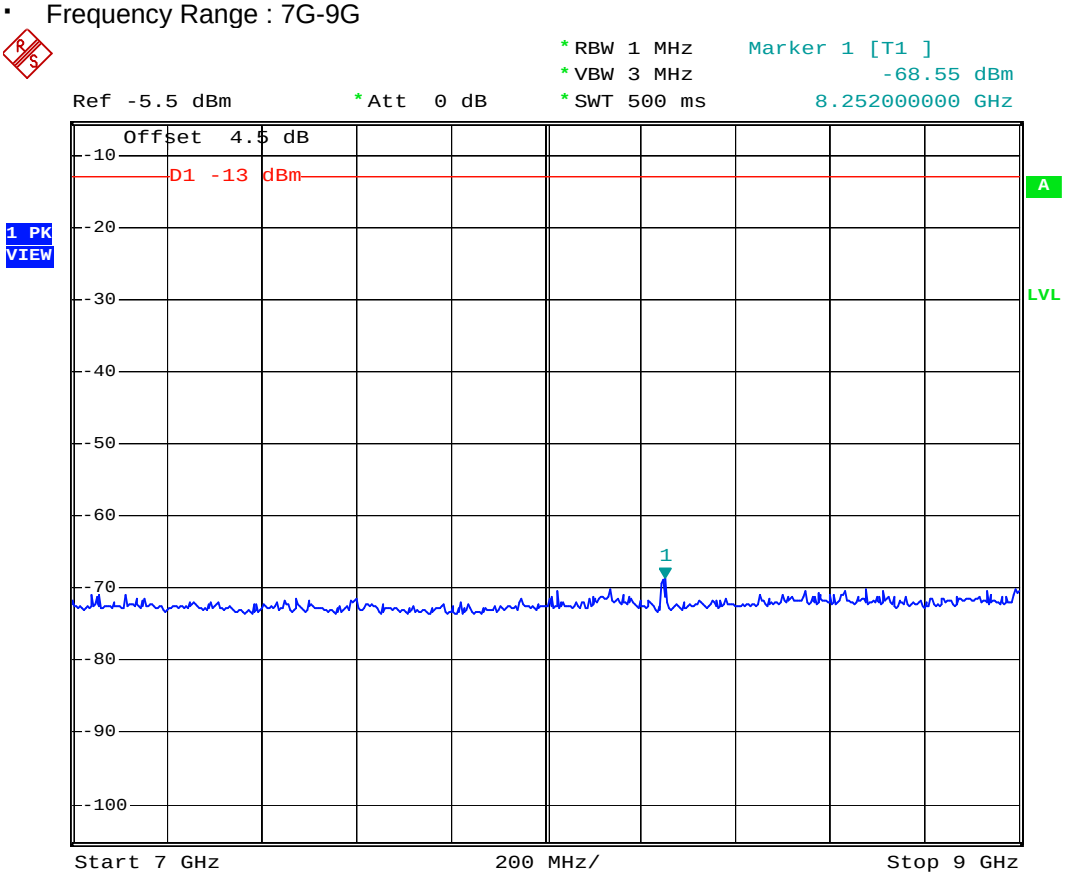

Date: 10.MAR.2008 14:22:09

- Test Mode : CDMA2000 Cellular CH1013 for 1xRTT
- Frequency Range : 3G-7G



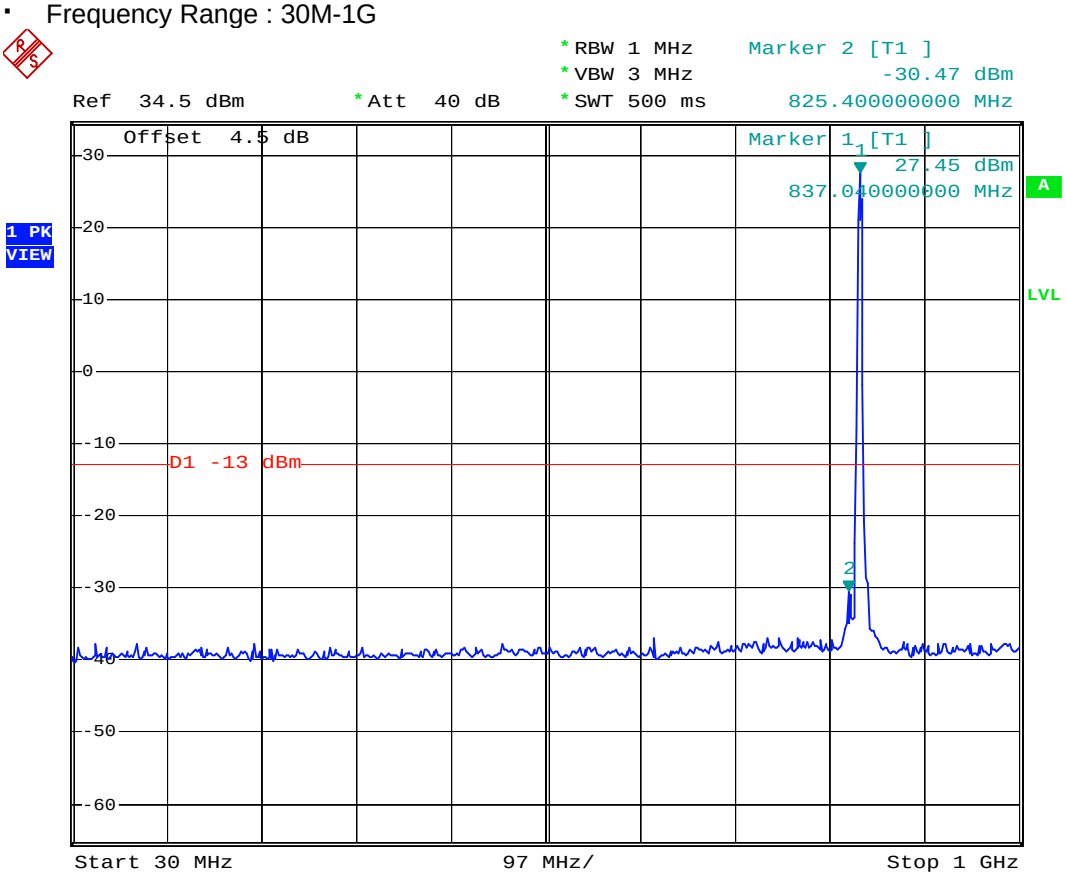

Date: 10.MAR.2008 14:26:22

- Test Mode : CDMA2000 Cellular CH1013 for 1xRTT
- Frequency Range : 7G-9G



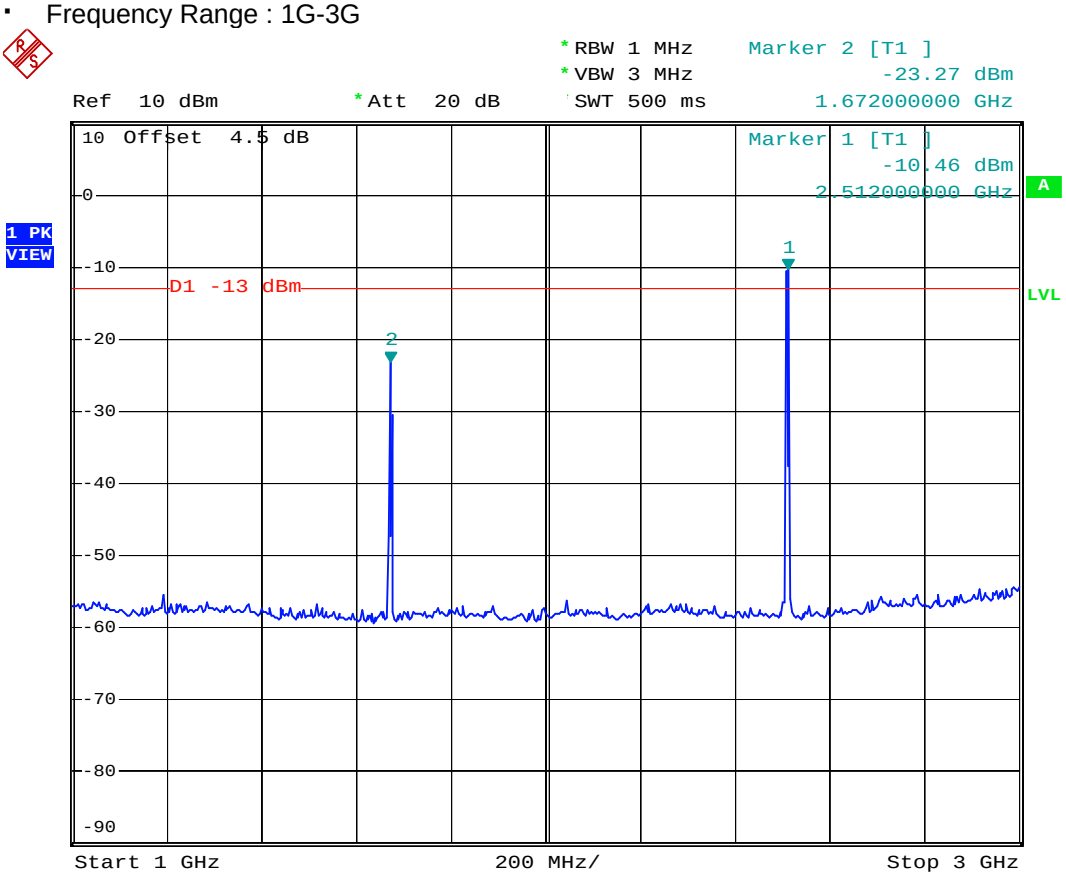

Date: 10.MAR.2008 14:27:08

- Mode 2
- Test Mode : CDMA2000 Cellular CH384 for 1xRTT
- Frequency Range : 30M-1G



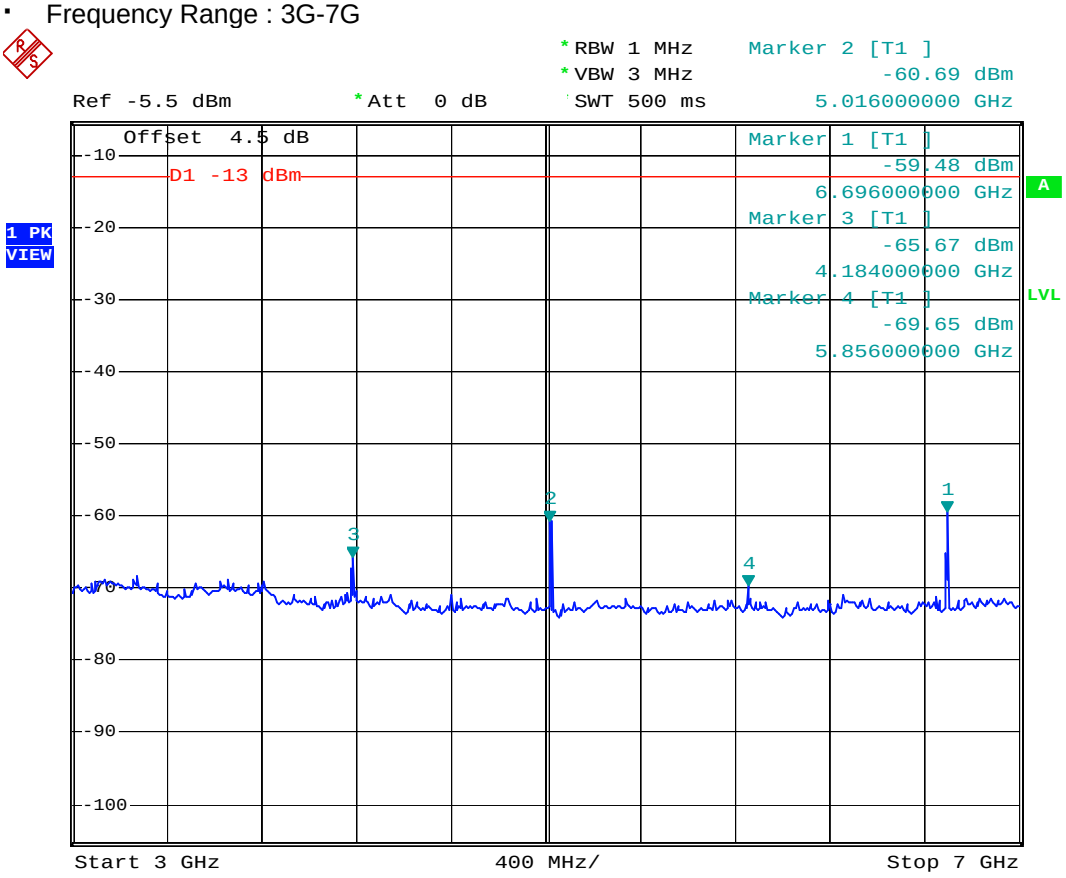

Date: 10.MAR.2008 14:15:58

- Test Mode : CDMA2000 Cellular CH384 for 1xRTT
- Frequency Range : 1G-3G



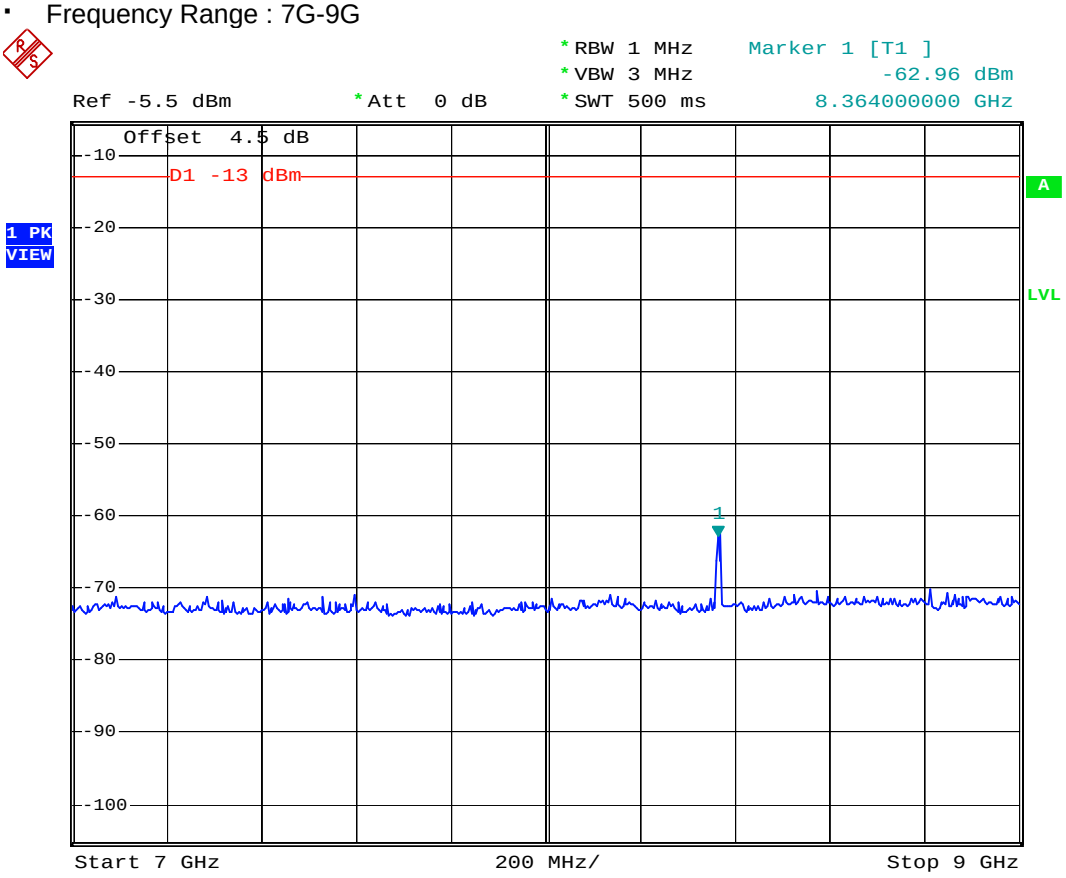

Date: 10.MAR.2008 14:21:00

- Test Mode : CDMA2000 Cellular CH384 for 1xRTT
- Frequency Range : 3G-7G



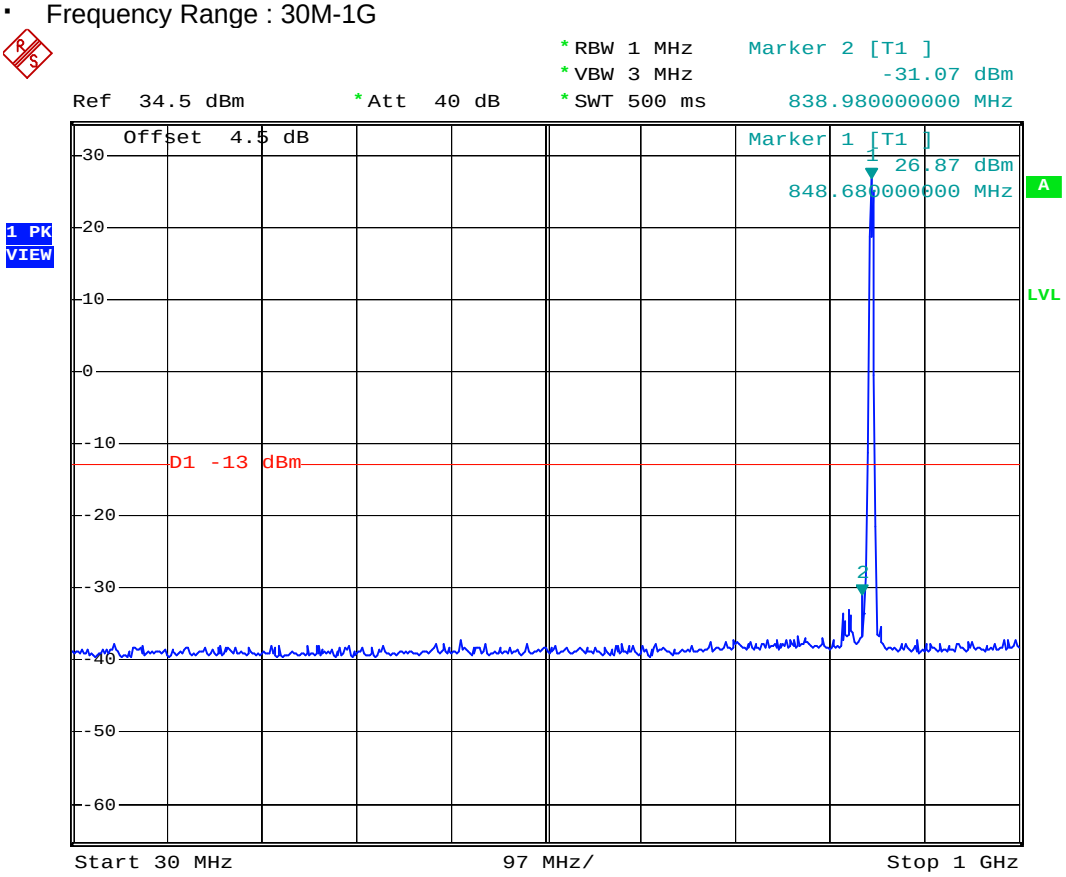

Date: 10.MAR.2008 14:24:45

- Test Mode : CDMA2000 Cellular CH384 for 1xRTT
- Frequency Range : 7G-9G



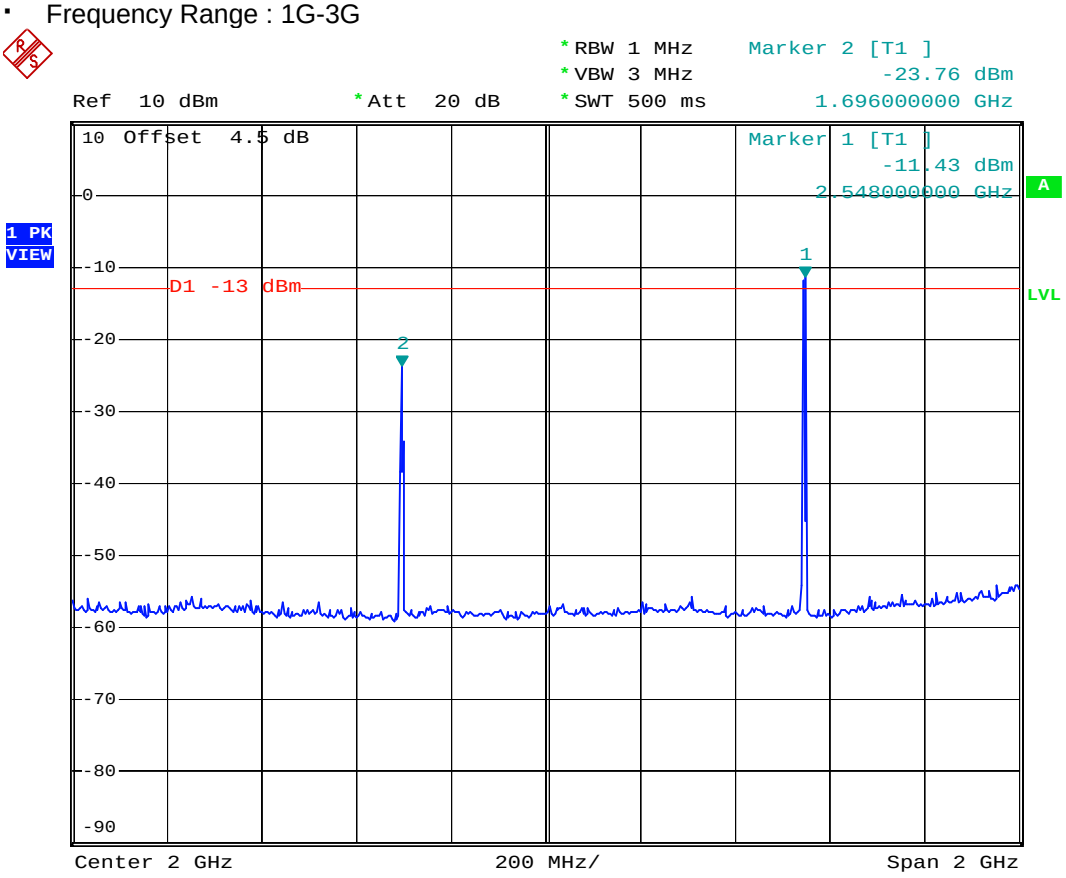

Date: 10.MAR.2008 14:28:14

- Mode 3
- Test Mode : CDMA2000 Cellular CH777 for 1xRTT
- Frequency Range : 30M-1G



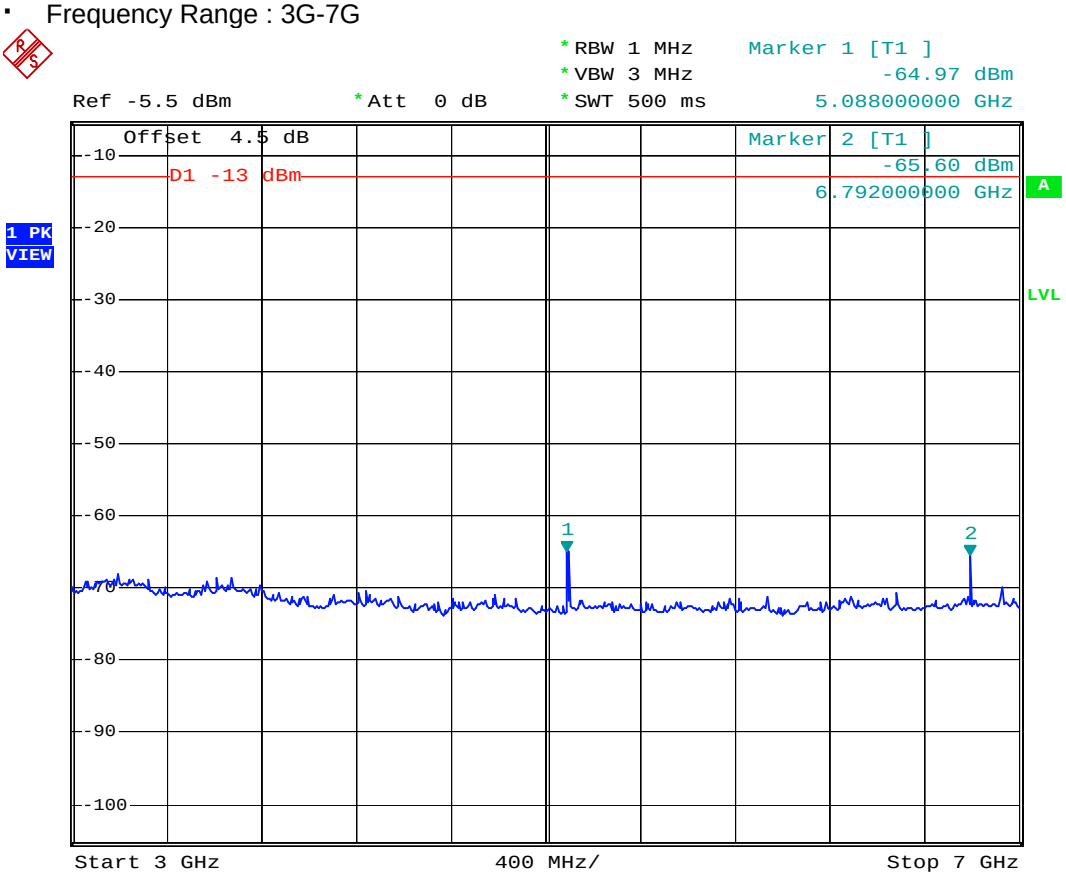

Date: 10.MAR.2008 14:16:41

- Test Mode : CDMA2000 Cellular CH777 for 1xRTT
- Frequency Range : 1G-3G



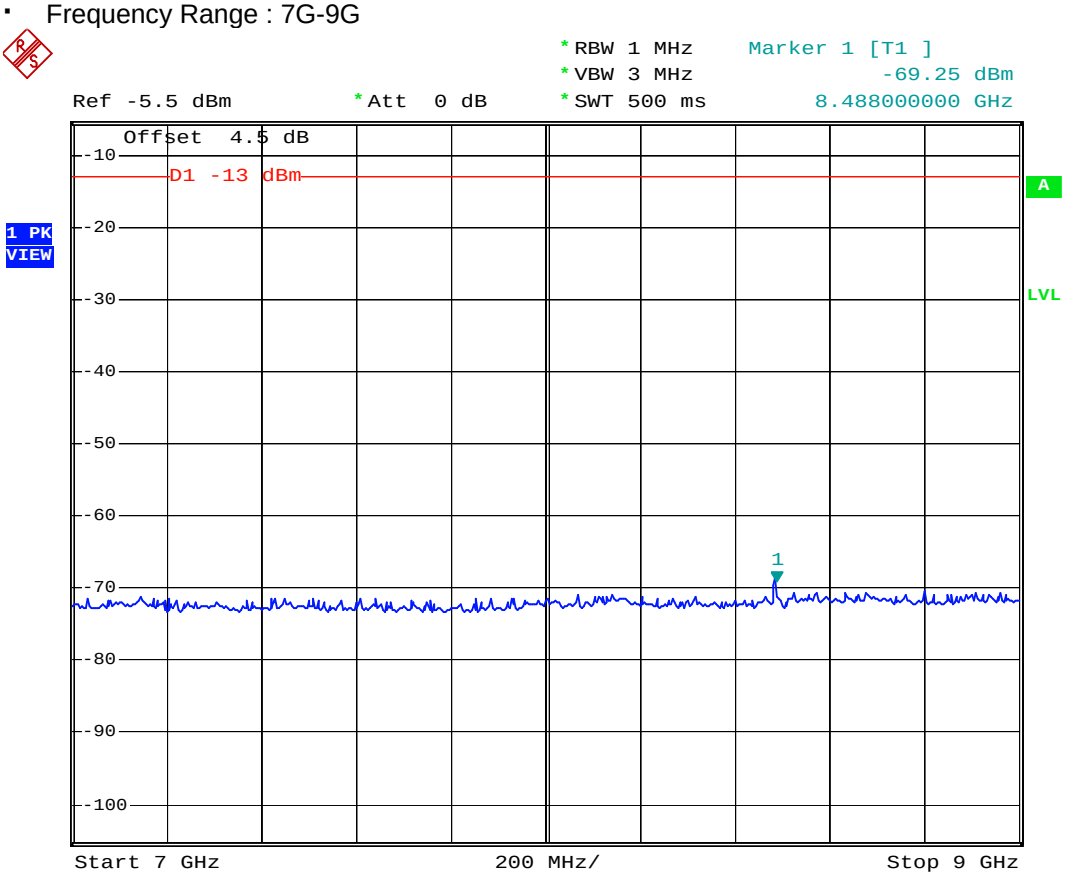

Date: 10.MAR.2008 14:21:42

- Test Mode : CDMA2000 Cellular CH777 for 1xRTT
- Frequency Range : 3G-7G



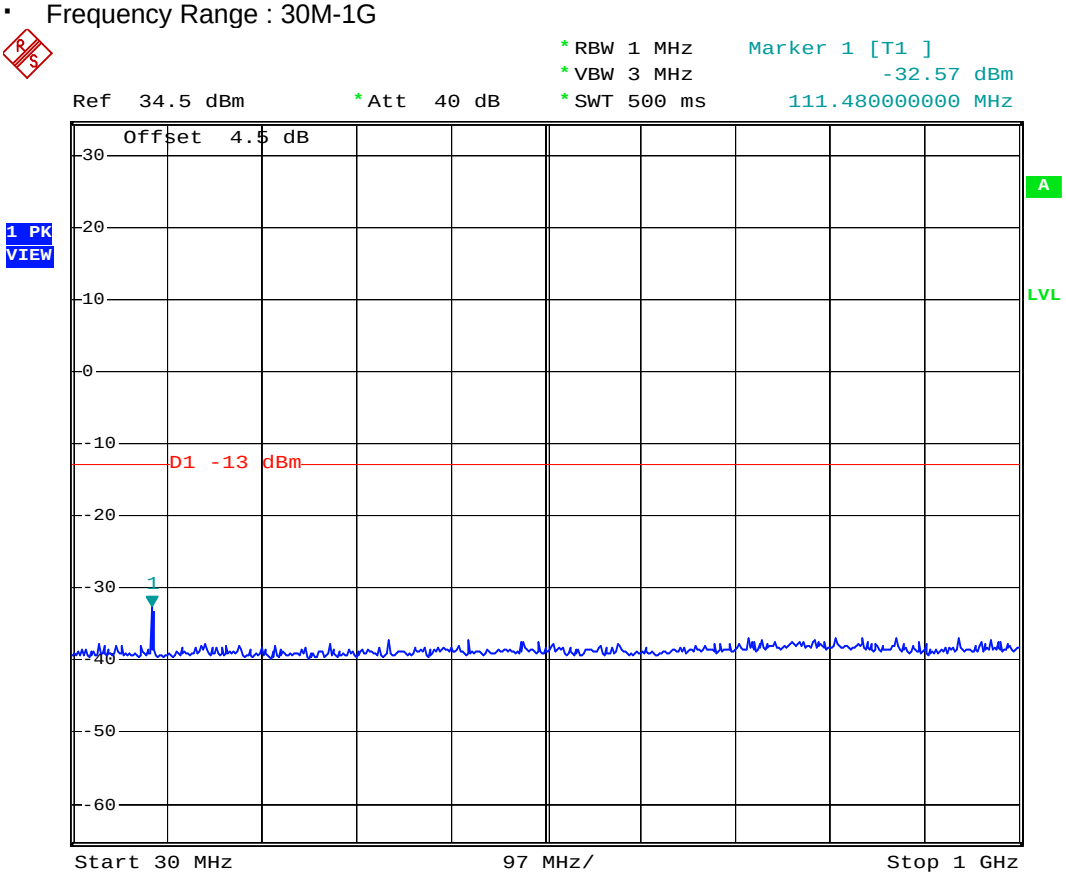

Date: 10.MAR.2008 14:25:42

- Test Mode : CDMA2000 Cellular CH777 for 1xRTT
- Frequency Range : 7G-9G



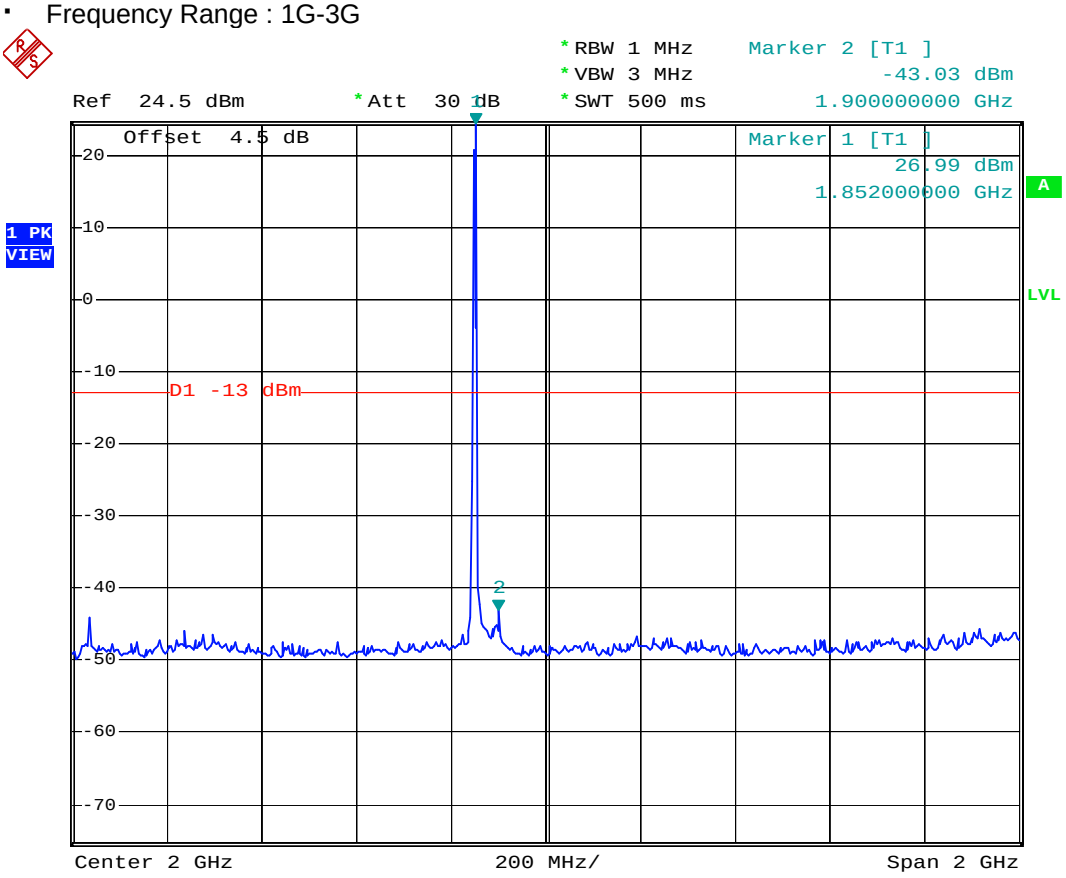

Date: 10.MAR.2008 14:27:47

- Mode 4
- Test Mode : CDMA2000 PCS CH25 for 1xRTT
- Frequency Range : 30M-1G



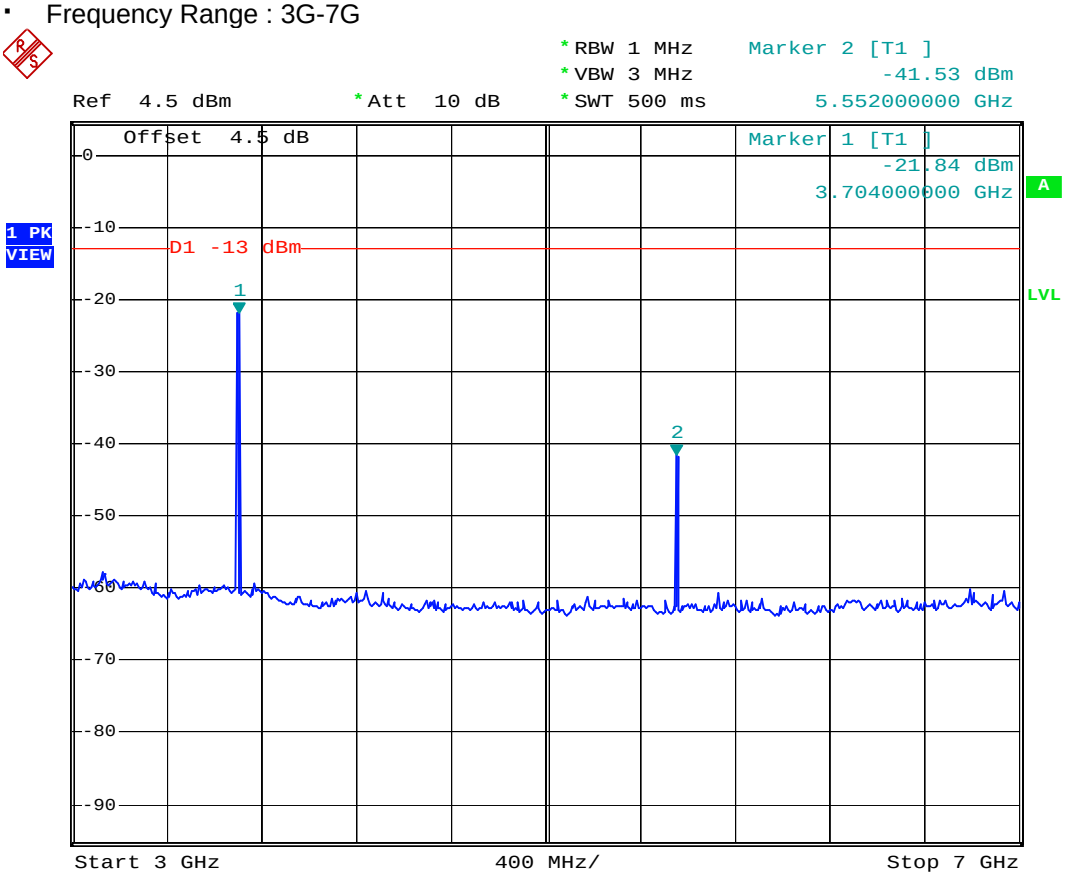

Date: 10.MAR.2008 11:29:42

- Test Mode : CDMA2000 PCS CH25 for 1xRTT
- Frequency Range : 1G-3G



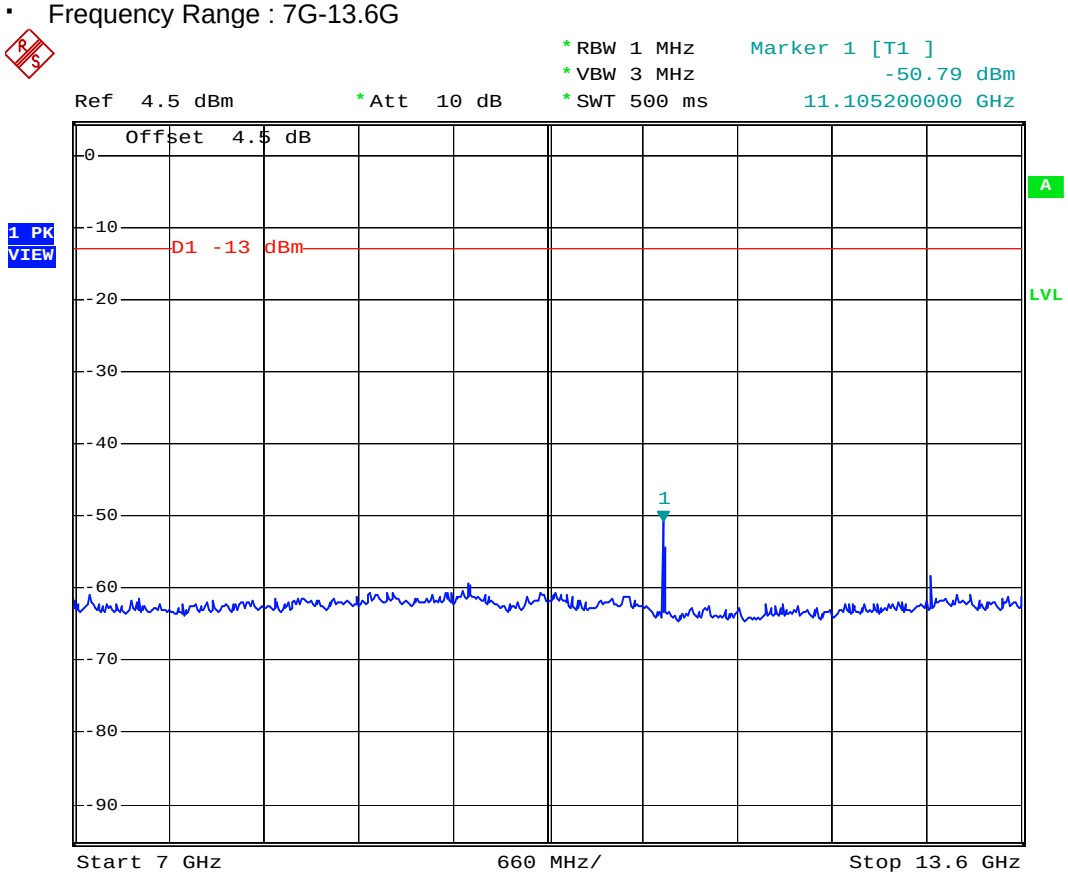

Date: 10.MAR.2008 11:38:50

- Test Mode : CDMA2000 PCS CH25 for 1xRTT
- Frequency Range : 3G-7G



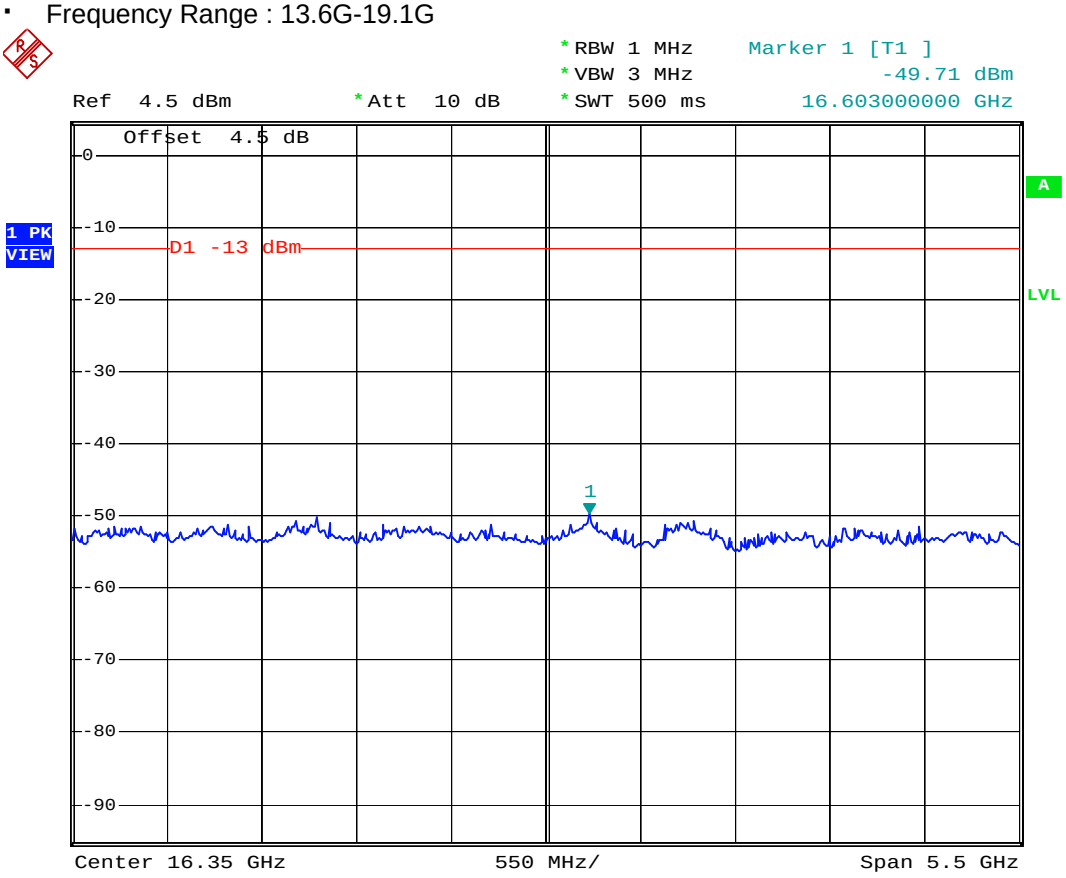

Date: 10.MAR.2008 11:44:33

- Test Mode : CDMA2000 PCS CH25 for 1xRTT
- Frequency Range : 7G-13.6G



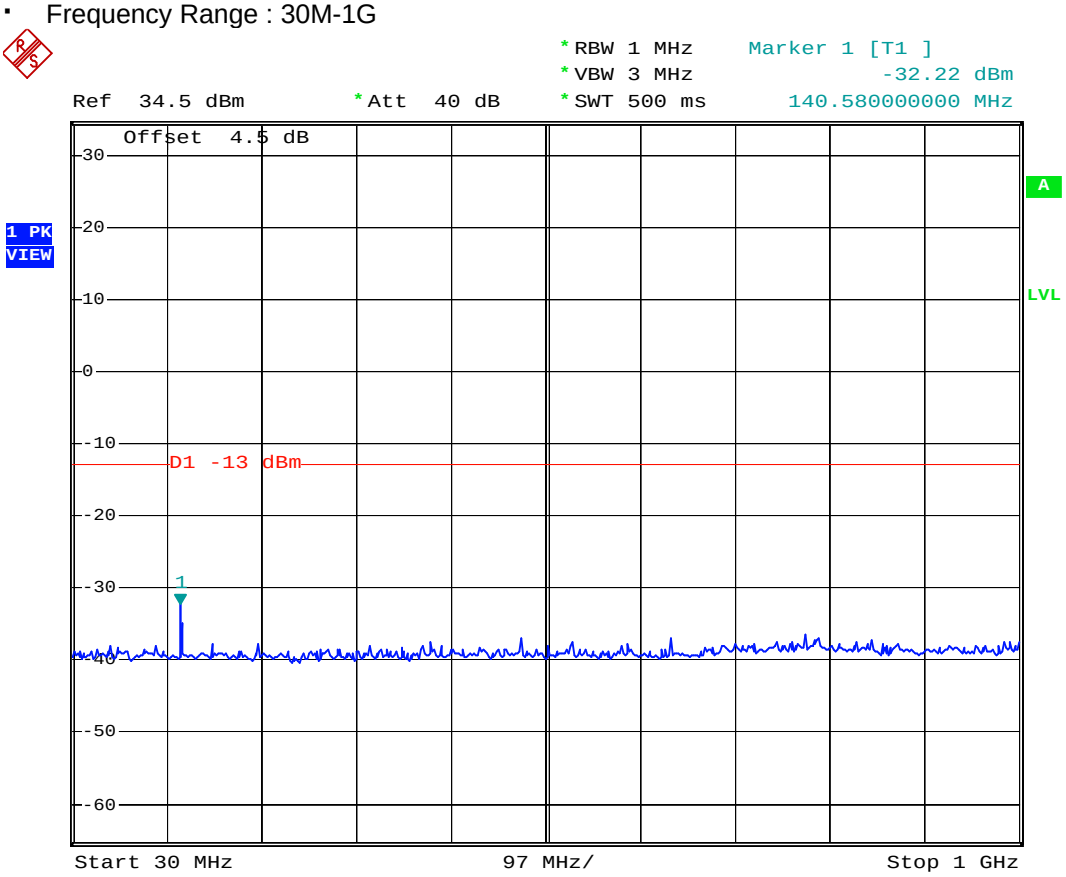

Date: 10.MAR.2008 11:47:13

- Test Mode : CDMA2000 PCS CH25 for 1xRTT
- Frequency Range : 13.6G-19.1G



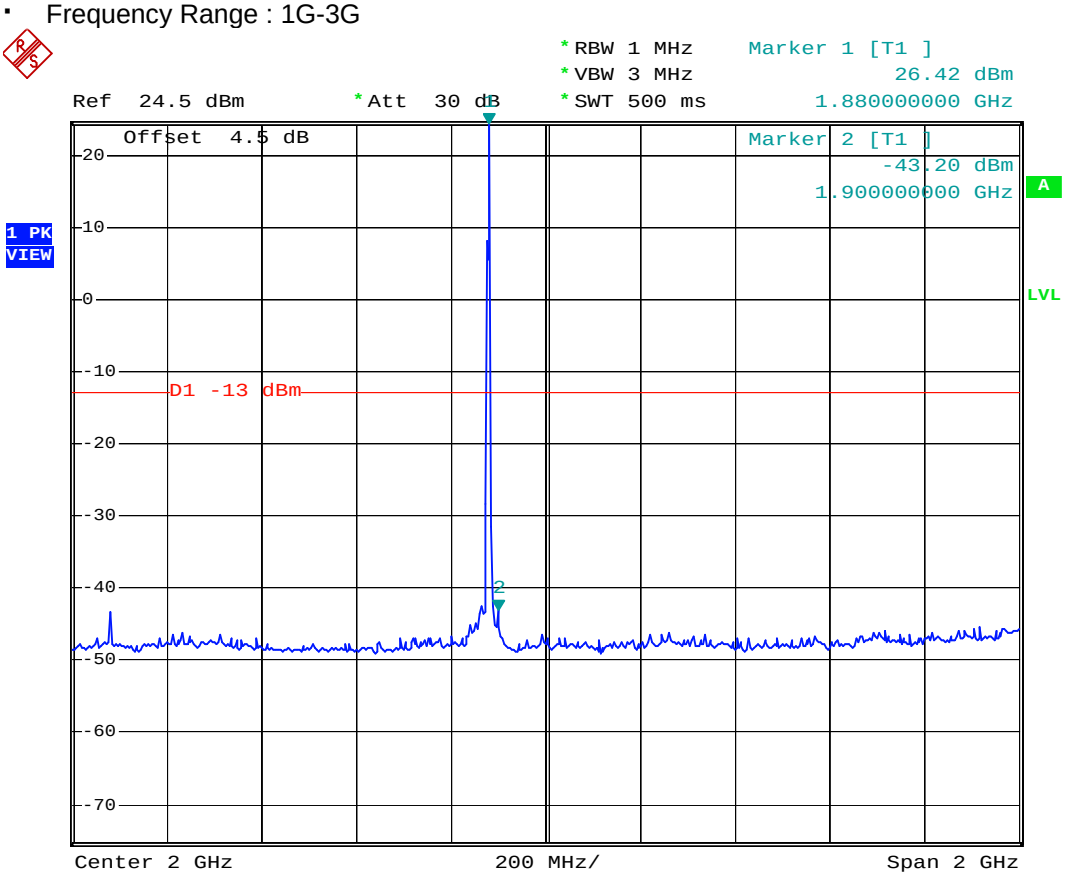

Date: 10.MAR.2008 11:52:15

- Mode 5
- Test Mode : CDMA2000 PCS CH600 for 1xRTT
- Frequency Range : 30M-1G



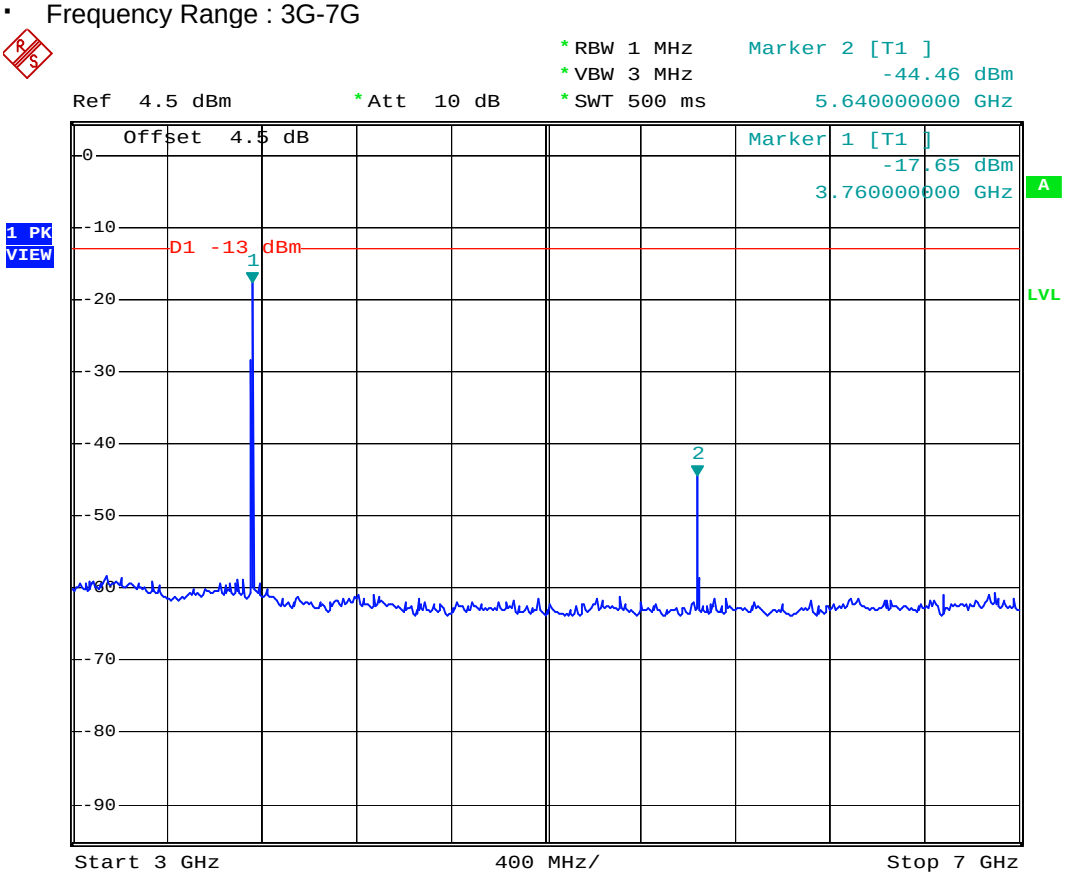

Date: 10.MAR.2008 11:30:32

- Test Mode : CDMA2000 PCS CH600 for 1xRTT
- Frequency Range : 1G-3G



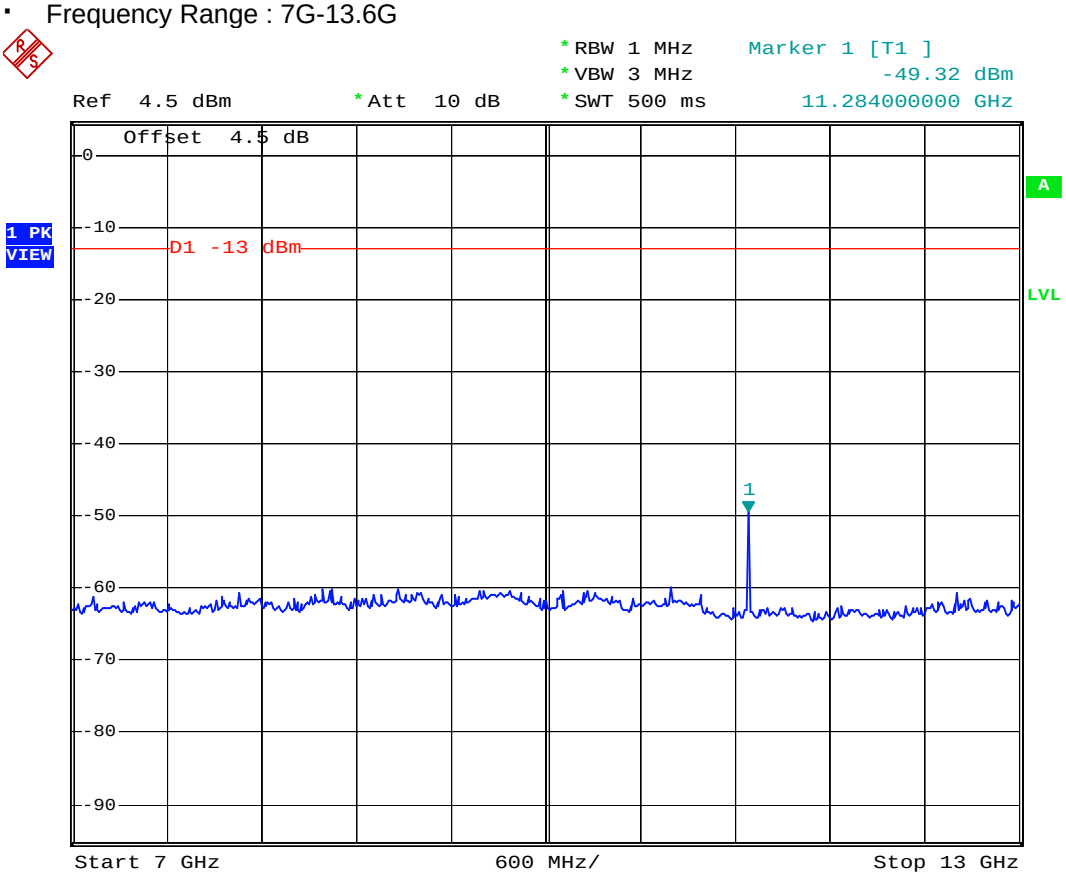

Date: 10.MAR.2008 11:39:22

- Test Mode : CDMA2000 PCS CH600 for 1xRTT
- Frequency Range : 3G-7G



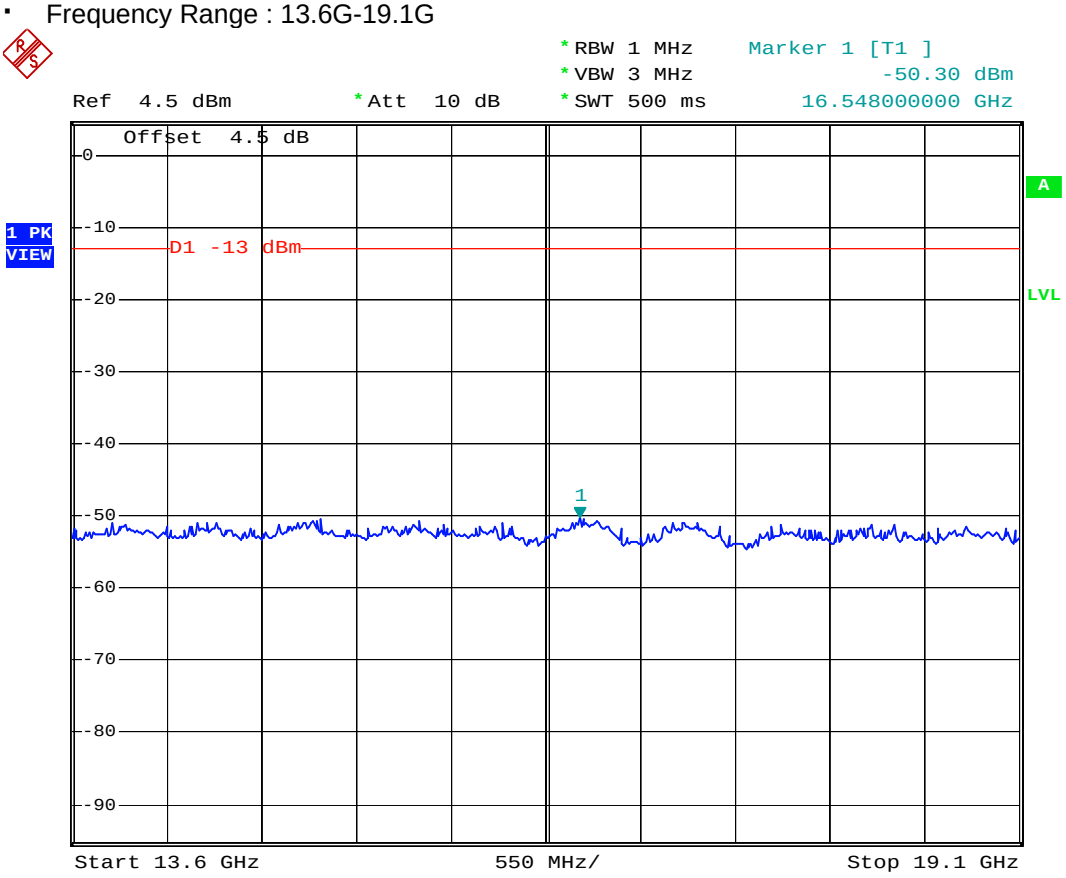

Date: 10.MAR.2008 11:43:48

- Test Mode : CDMA2000 PCS CH600 for 1xRTT
- Frequency Range : 7G-13.6G



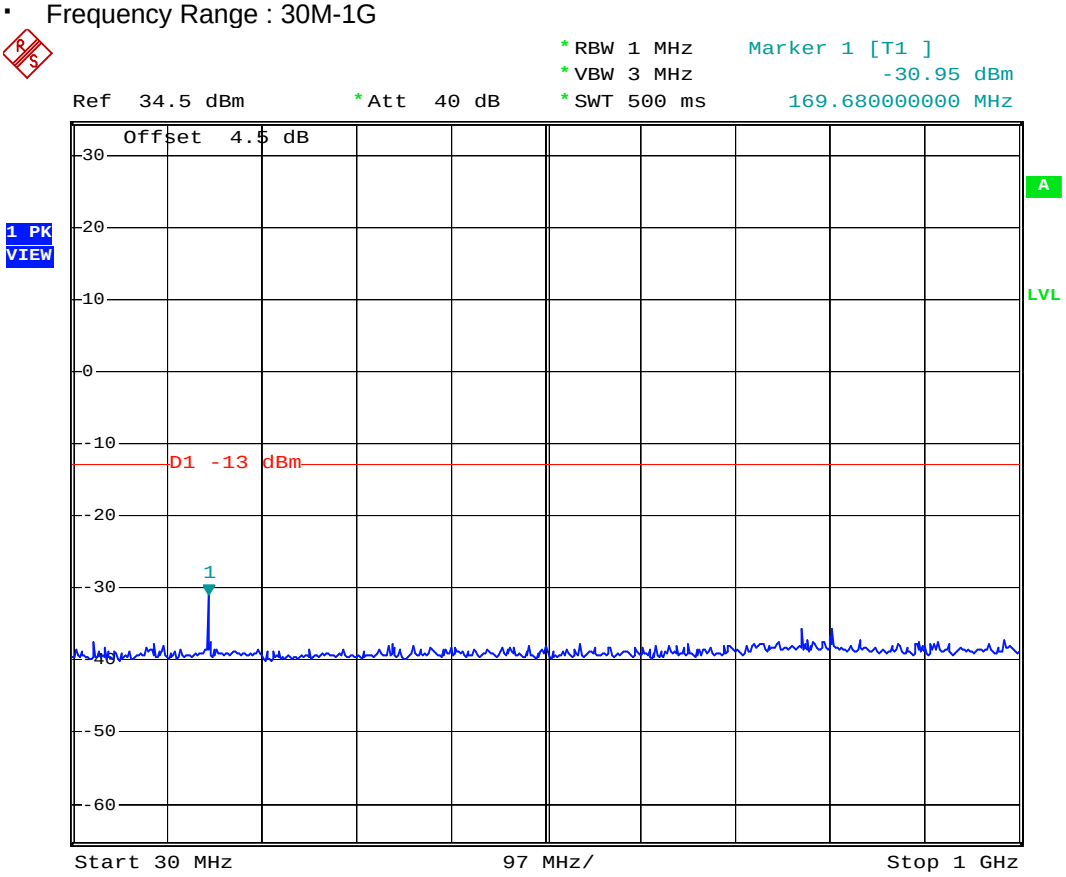

Date: 10.MAR.2008 11:49:54

- Test Mode : CDMA2000 PCS CH600 for 1xRTT
- Frequency Range : 13.6G-19.1G



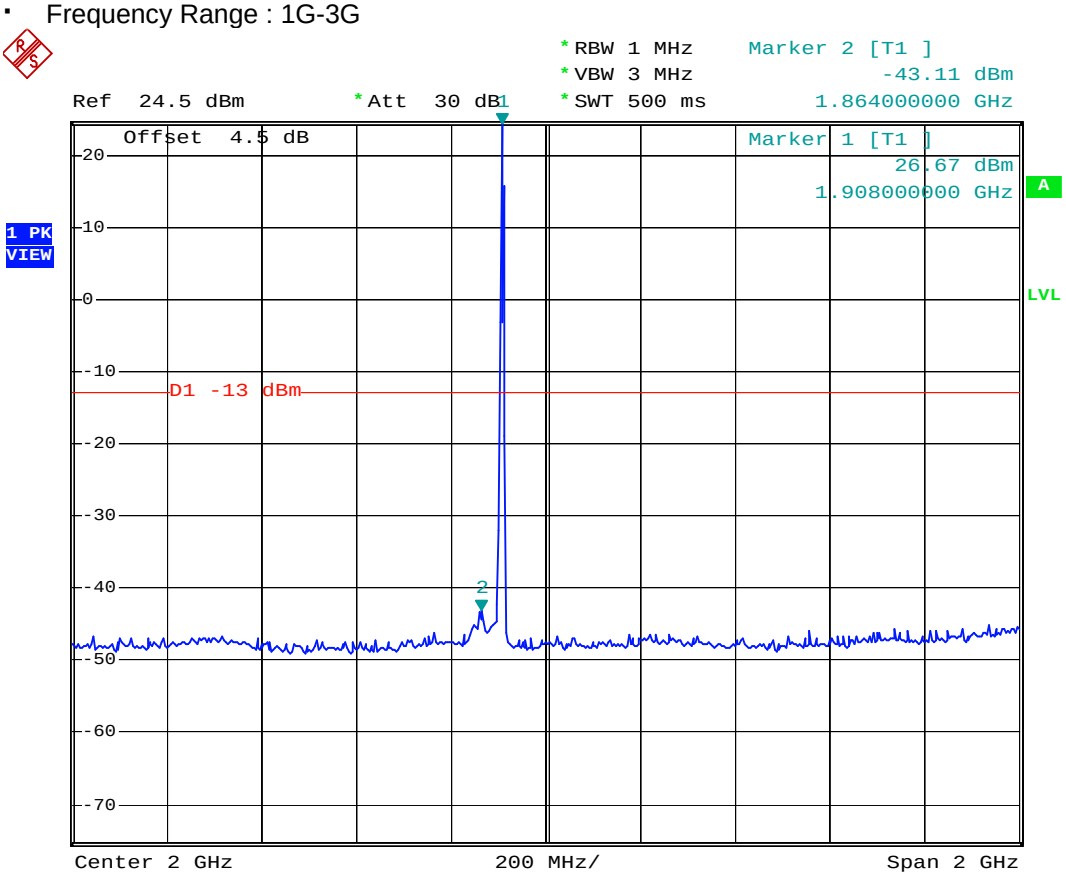

Date: 10.MAR.2008 11:48:34

- Mode 6
- Test Mode : CDMA2000 PCS CH1175 for 1xRTT
- Frequency Range : 30M-1G



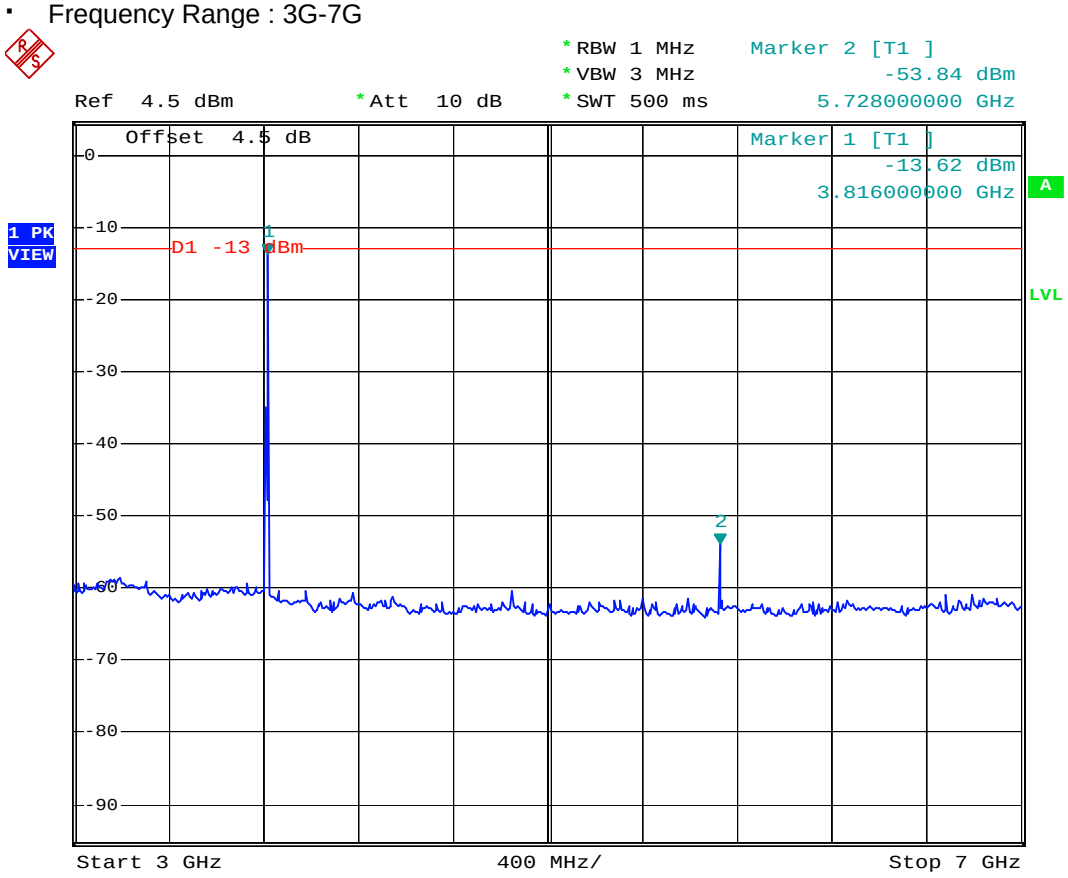

Date: 10.MAR.2008 11:31:12

- Test Mode : CDMA2000 PCS CH1175 for 1xRTT
- Frequency Range : 1G-3G



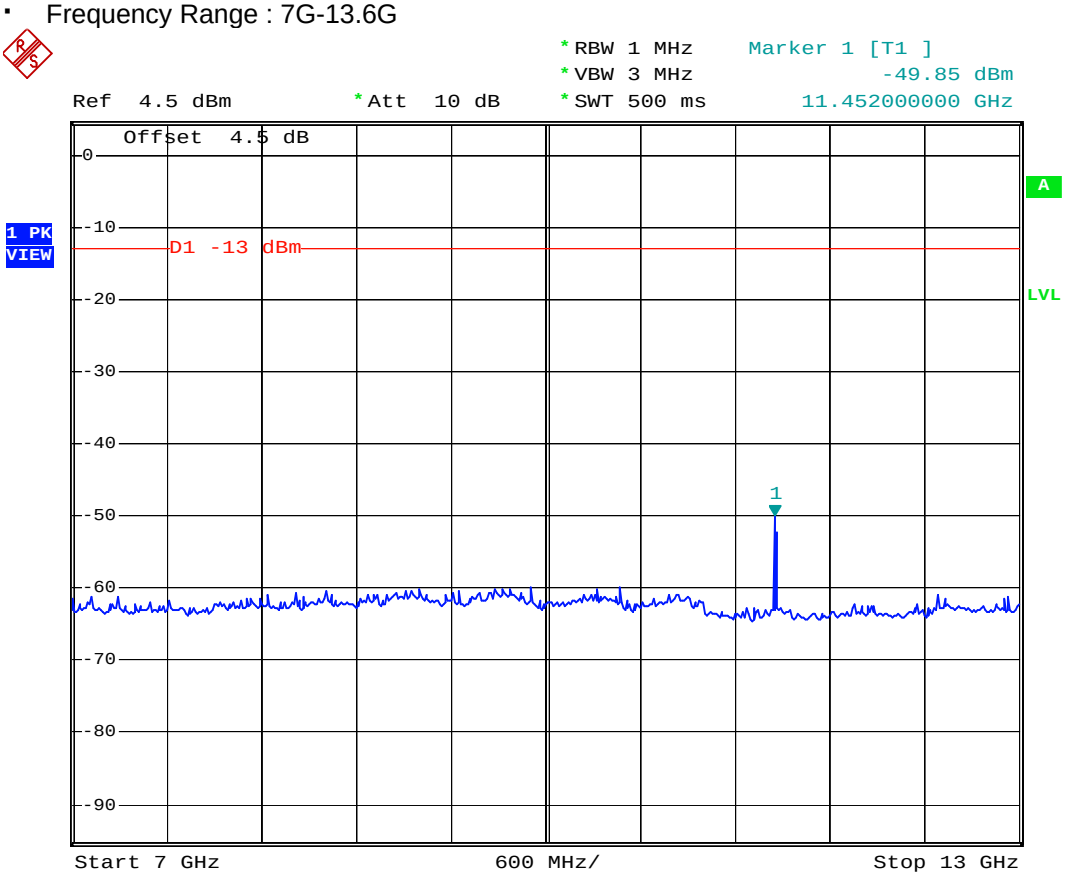

Date: 10.MAR.2008 11:39:59

- Test Mode : CDMA2000 PCS CH1175 for 1xRTT
- Frequency Range : 3G-7G



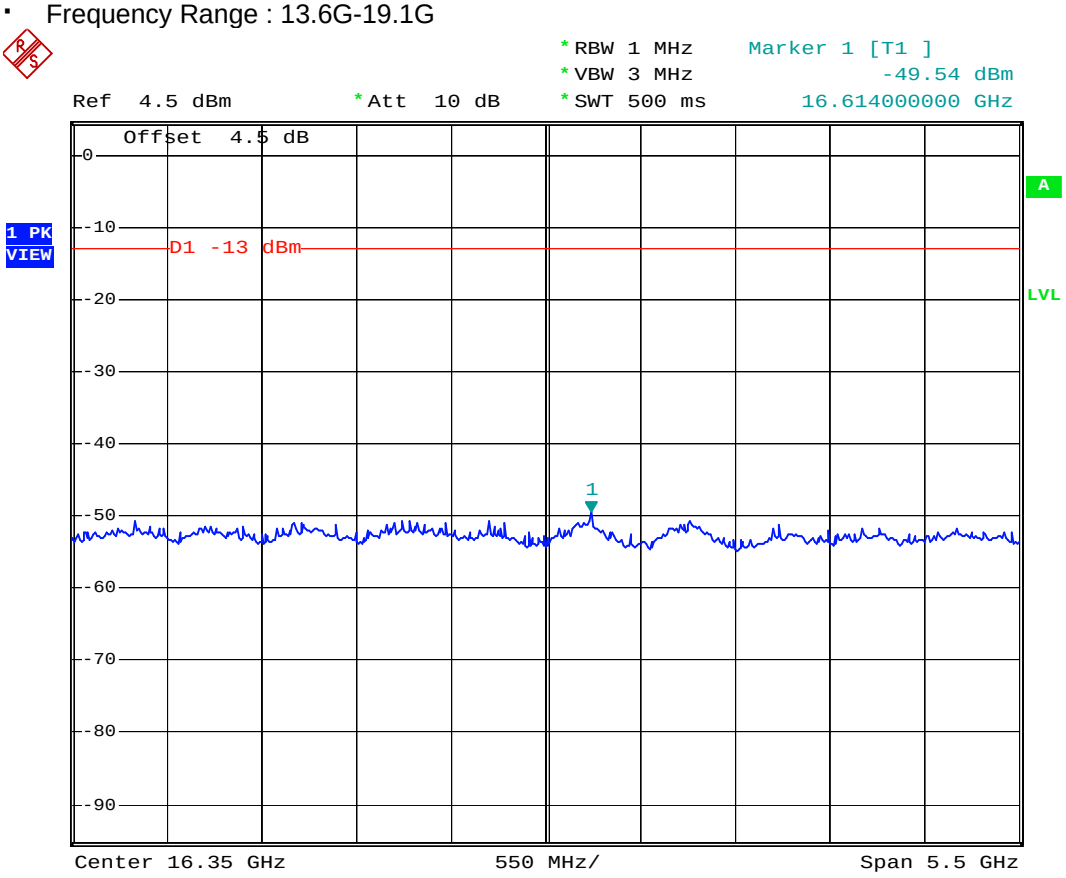

Date: 10.MAR.2008 11:42:47

- Test Mode : CDMA2000 PCS CH1175 for 1xRTT
- Frequency Range : 7G-13.6G




Date: 10.MAR.2008 11:50:45

- Test Mode : CDMA2000 PCS CH1175 for 1xRTT
- Frequency Range : 13.6G-19.1G




Date: 10.MAR.2008 11:51:46

## 4.6 Field Strength of Spurious Radiation

Equivalent isotropic radiated Power Measurements by substitution method according to ANSI/TIA/EIA-603-C.

4.6.1 Measurement Instruments

As described in chapter 5 of this test report.

4.6.2 Test Procedure

a. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.

b. The EUT was set 3 meters from the receiving antenna which was mounted on the antenna tower.

c. The table was rotated 360 degrees to determine the position of the highest spurious emission.

d. The height of the receiving antenna is varied between one meter and four meters to reach the maximum spurious emission for both horizontal and vertical polarizations.

e. Taking the record of maximum spurious emission.

f. A Horn antenna was substituted in place of the EUT and was driven by a signal generator.

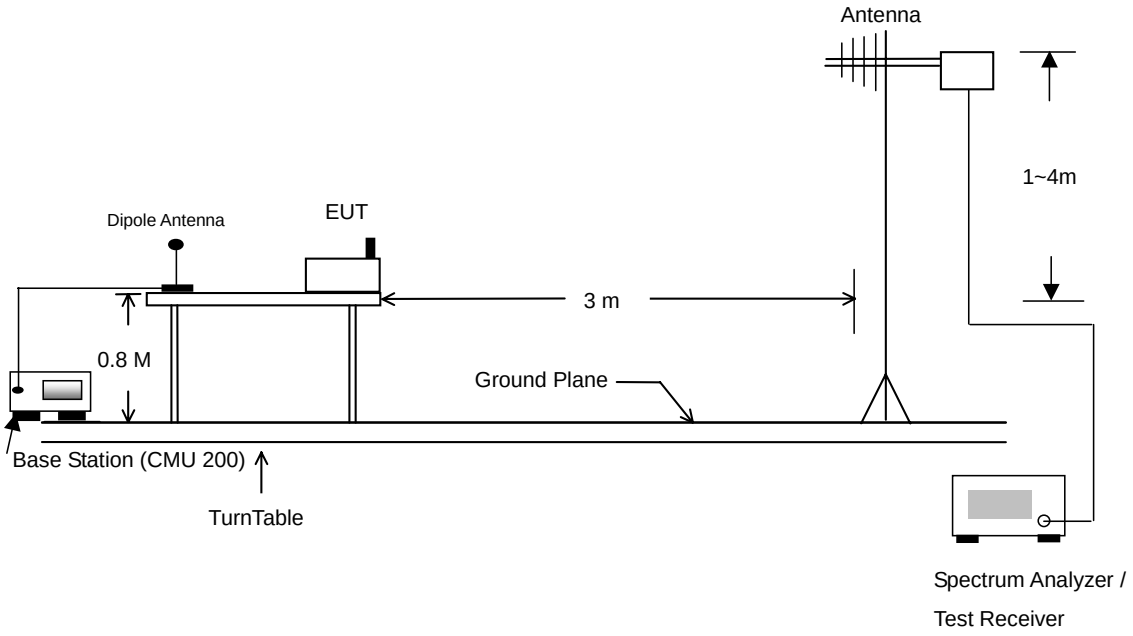
g. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.

h. Taking the recored of output power at antenna port.

i. Repeat step 7 to step 8 for another polarization.

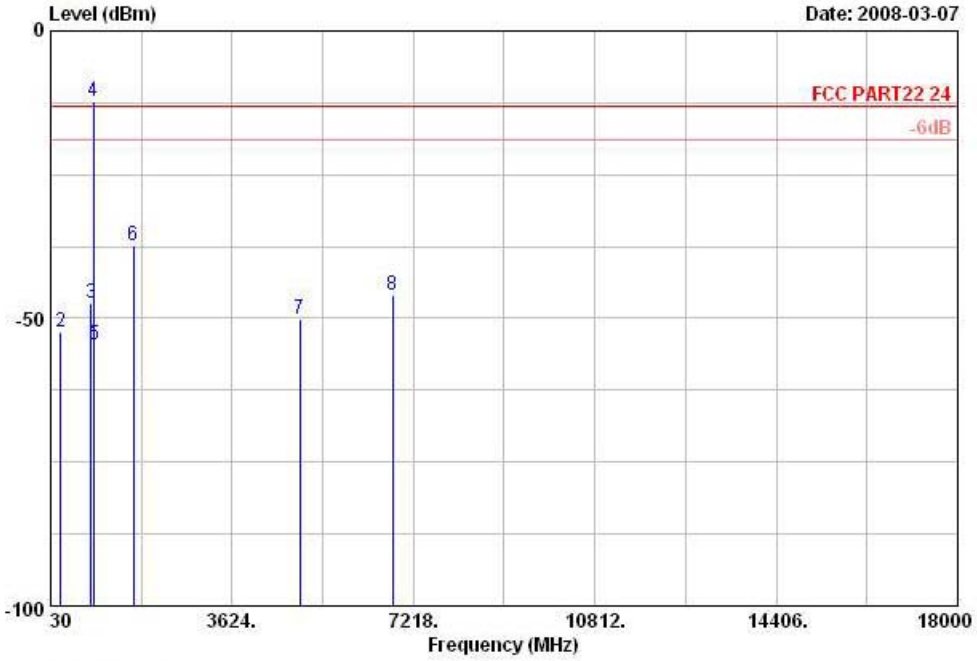
j. Emission level (dBm) = output power + substitution Gain.

4.6.3 Test Setup Layout



4.6.4 Test Data

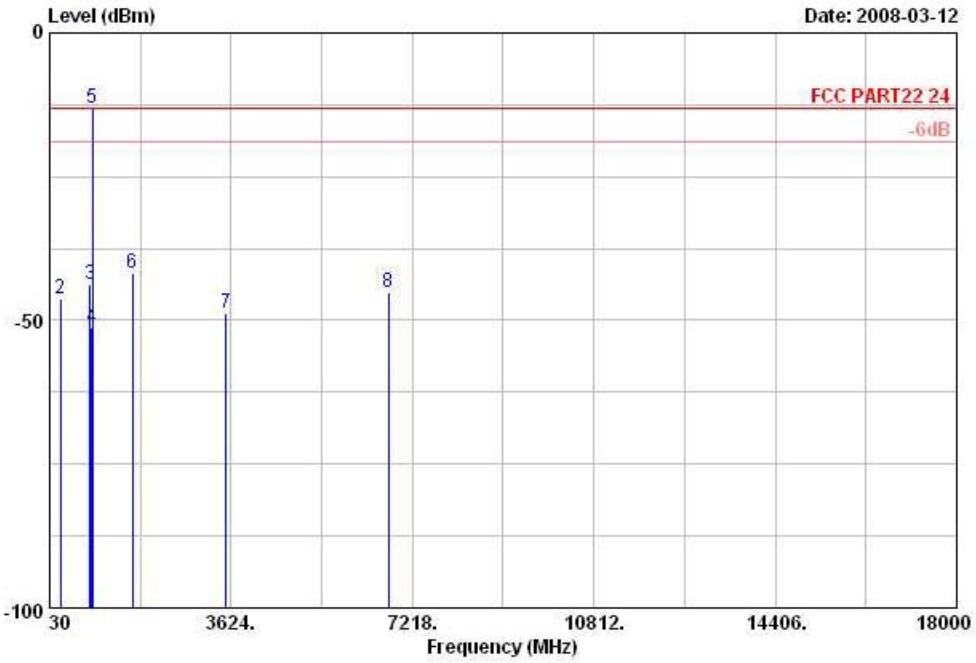
4.6.4.1 Mode 1




Site : 03CH01-KS
Condition: FCC PART22 24 LF EIRP FACTOR-07091
EUT : Mobile Phone
Power : 120Vac/60Hz
Model : C78
Memo : CDMA 850 Link Ch.384

| Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | SPA Reading (dBm) | S.G. Power (dBm) | TX Cable loss (dB) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 31.62 | -47.12 | -13 | -34.12 | -59.29 | -28.47 | -0.29 | -16.79 | H | Pass |
| 232.77 | -54.47 | -13 | -41.47 | -56.41 | -60.84 | -0.74 | 7.78 | H | Pass |
| 836.90 | -49.59 | | | -60.15 | -57.28 | -1.24 | 8.60 | H | |
| 881.70 | -14.27 | | | -23.1 | -22.15 | -1.25 | 8.78 | H | |
| 895.70 | -56.77 | -13 | -43.77 | -64.71 | -64.71 | -1.26 | 8.83 | H | Pass |
| 1674.00 | -39.50 | -13 | -26.50 | -41.82 | -48.08 | -1.79 | 8.94 | H | Pass |
| 4962.00 | -52.43 | -13 | -39.43 | -64.52 | -64.56 | -3.25 | 11.03 | H | Pass |
| 6797.00 | -48.07 | -13 | -35.07 | -64.01 | -61.97 | -3.90 | 12.15 | H | Pass |

Remark :
1. 836.9MHz is mobile phone signal
2. 881.7MHz is base station signal

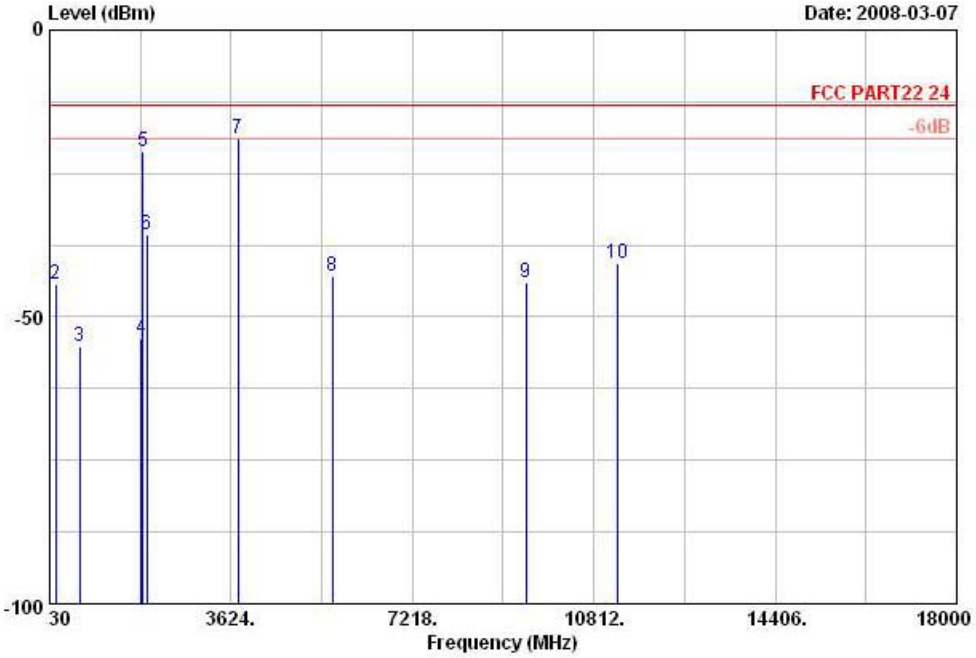



Site : 03CH01-KS
Condition: FCC PART22 24 LF EIRP FACTOR-07091
EUT : Mobile Phone
Power : 120Vac/60Hz
Model : C78
Memo : CDMA 850 Link Ch.384

| Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | SPA Reading (dBm) | S.G. Power (dBm) | TX Cable loss (dB) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 32.16 | -32.35 | -13 | -19.35 | -44.52 | -13.70 | -0.29 | -16.79 | V | Pass |
| 249.24 | -48.28 | -13 | -35.28 | -52.47 | -53.11 | -0.74 | 6.24 | V | Pass |
| 836.90 | -45.88 | | | -56.44 | -53.57 | -1.24 | 8.60 | V | |
| 855.80 | -53.50 | -13 | -40.50 | -64.39 | -61.25 | -1.24 | 8.66 | V | Pass |
| 881.70 | -15.28 | | | -24.11 | -23.16 | -1.25 | 8.78 | V | |
| 1674.00 | -44.06 | -13 | -31.06 | -46.38 | -52.64 | -1.79 | 8.94 | V | Pass |
| 3526.00 | -51.00 | -13 | -38.00 | -59.7 | -61.63 | -2.55 | 10.23 | V | Pass |
| 6746.00 | -47.18 | -13 | -34.18 | -63.12 | -61.04 | -3.86 | 12.15 | V | Pass |

Remark :
1. 836.9MHz is mobile phone signal
2. 881.7MHz is base station signal

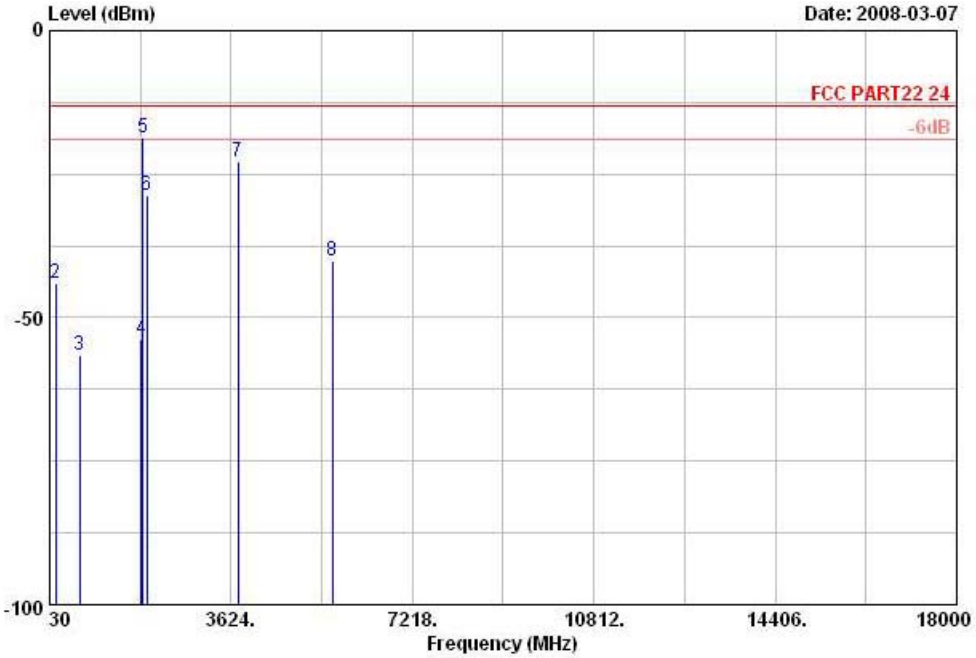
4.6.4.2 Mode 2




Site : 03CH01-KS
Condition: FCC PART22 24 LF EIRP FACTOR-07091
EUT : Mobile Phone
Power : 120Vac/60Hz
Model : C78
Memo : CDMA1900 Link Ch.600

| Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | SPA Reading (dBm) | S.G. Power (dBm) | TX Cable loss (dB) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 32.16 | -43.96 | -13 | -30.96 | -58.28 | -25.31 | -0.29 | -16.79 | H | Pass |
| 142.32 | -44.20 | -13 | -31.20 | -43.4 | -45.14 | -0.55 | 2.54 | H | Pass |
| 621.30 | -55.19 | -13 | -42.19 | -65.27 | -61.45 | -1.07 | 7.34 | H | Pass |
| 1842.00 | -53.88 | -13 | -40.88 | -59.86 | -62.84 | -1.90 | 9.21 | H | Pass |
| 1880.00 | -21.09 | | | -27.32 | -30.12 | -1.92 | 9.26 | H | |
| 1960.00 | -35.52 | | | -42.21 | -44.66 | -1.95 | 9.34 | H | |
| 3760.00 | -18.93 | -13 | -5.93 | -30.52 | -29.97 | -2.72 | 10.47 | H | Pass |
| 5639.00 | -42.79 | -13 | -29.79 | -59.03 | -55.46 | -3.35 | 11.47 | H | Pass |
| 9464.00 | -44.09 | -13 | -31.09 | -64.01 | -58.46 | -4.37 | 12.15 | H | Pass |
| 11279.00 | -40.60 | -13 | -27.60 | -63.01 | -57.02 | -5.42 | 13.15 | H | Pass |

Remark :
1. 1880.0MHz is mobile phone signal
2. 1960.0MHz is base station signal

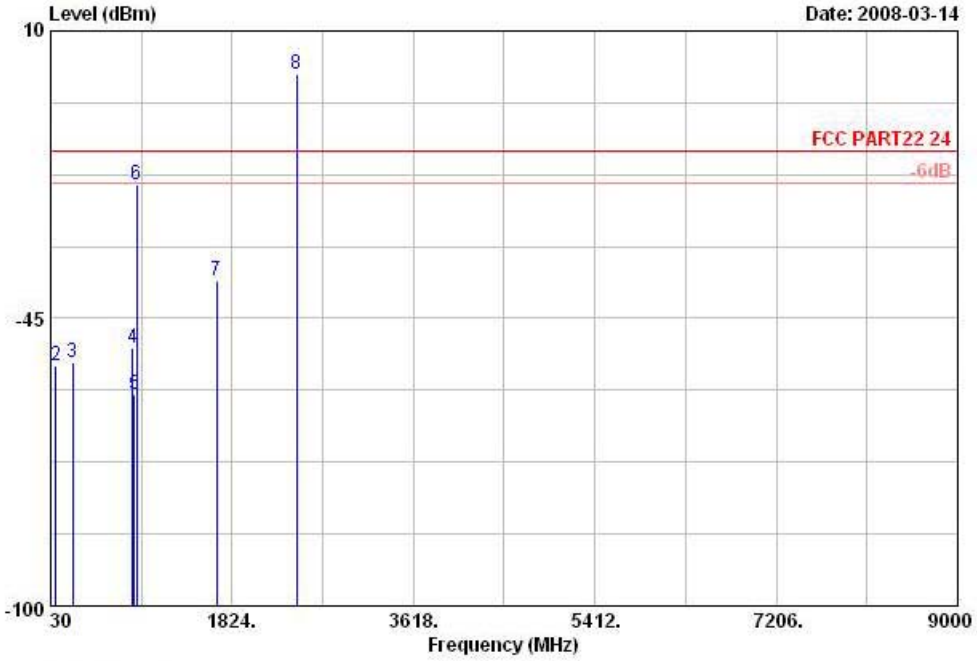



Site : 03CH01-KS
Condition: FCC PART22 24 LF EIRP FACTOR-07091
EUT : Mobile Phone
Power : 120Vac/60Hz
Model : C78
Memo : CDMA1900 Link Ch.600

| Frequency (MHz) | ERP (dBm) | Limit (dBm) | (dB) | SPA Reading (dBm) | S.G. Power (dBm) | TX Cable loss (dB) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 31.89 | -29.57 | -13 | -16.57 | -43.89 | -10.92 | -0.29 | -16.79 | V | Pass |
| 142.32 | -43.97 | -13 | -30.97 | -43.17 | -44.91 | -0.55 | 2.54 | V | Pass |
| 630.40 | -56.45 | -13 | -43.45 | -67.91 | -62.77 | -1.06 | 7.41 | V | Pass |
| 1840.00 | -53.74 | -13 | -40.74 | -59.59 | -62.67 | -1.89 | 9.19 | V | Pass |
| 1880.00 | -18.77 | | | -25 | -27.80 | -1.92 | 9.26 | V | |
| 1960.00 | -28.57 | | | -35.26 | -37.71 | -1.95 | 9.34 | V | |
| 3758.00 | -22.87 | -13 | -9.87 | -34.46 | -33.91 | -2.72 | 10.47 | V | Pass |

Remark :
1. 1880.0MHz is mobile phone signal
2. 1960.0MHz is base station signal

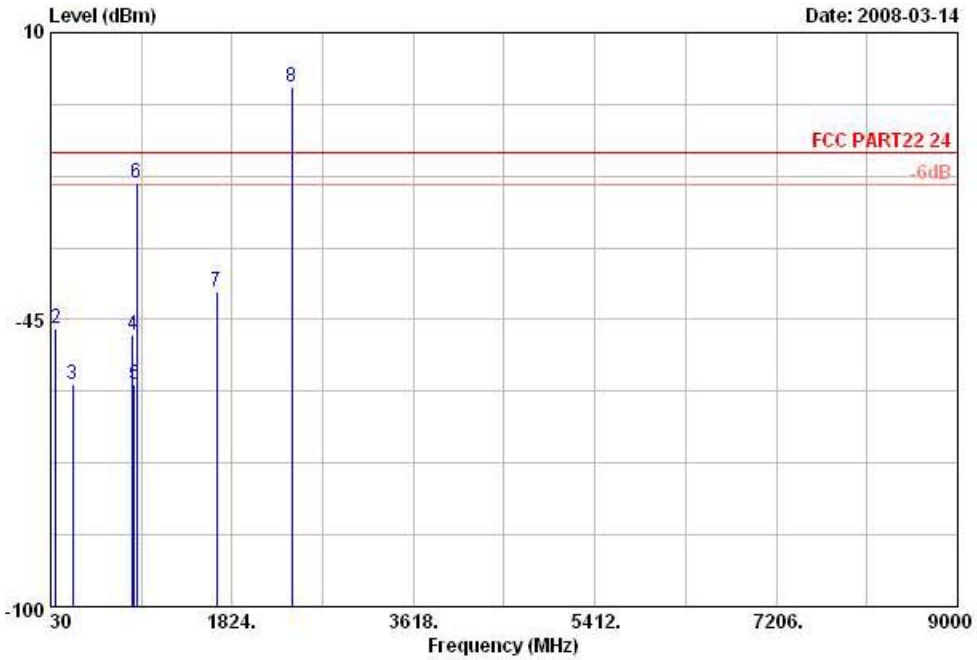
4.6.4.3 Mode 3




Site : 03CH01-KS
Condition: FCC PART22 24 LF EIRP FACTOR-07091
EUT : CDMA 2000 Mobile phone + Bluetooth
Power : 120Vac/60Hz
Model : C78
Memo : CDMA850 Link + BT Link

| Frequency (MHz) | ERP (dBm) | Limit (dBm) | (dB) | SPA Reading (dBm) | S.G. Power (dBm) | TX Cable loss (dB) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 32.43 | -53.94 | -13 | -40.94 | -65.93 | -36.02 | -0.29 | -16.06 | H | Pass |
| 80.49 | -56.26 | -13 | -43.26 | -52.89 | -56.17 | -0.48 | 1.58 | H | Pass |
| 247.08 | -55.66 | -13 | -42.66 | -59.64 | -60.63 | -0.74 | 6.38 | H | Pass |
| 836.90 | | | 0.00 | -63.38 | -7.69 | -1.24 | 8.60 | H | |
| 855.80 | -61.83 | -13 | -48.83 | -72.72 | -69.58 | -1.24 | 8.66 | H | Pass |
| 881.70 | | | 0.00 | -30.3 | -7.88 | -1.25 | 8.78 | H | |
| 1672.00 | -40.04 | -13 | -27.04 | -42.36 | -48.62 | -1.79 | 8.94 | H | Pass |
| 2460.00 | | | 0.00 | -64.01 | -12.18 | -2.18 | 12.15 | H | |

Remark :
1. 836.9MHz is mobile phone signal
2. 881.7MHz is base station signal
3. 2460MHz is bluetooth signal




Site : 03CH01-KS
Condition: FCC PART22 24 LF EIRP FACTOR-07091
EUT : CDMA 2000 Mobile phone + Bluetooth
Power : 120Vac/60Hz
Model : C78
Memo : CDMA850 Link + BT Link

| Frequency (MHz) | ERP (dBm) | Limit (dBm) | (dB) | SPA Reading (dBm) | S.G. Power (dBm) | TX Cable loss (dB) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 32.43 | -37.34 | -13 | -24.34 | -49.33 | -19.42 | -0.29 | -16.06 | V | Pass |
| 79.14 | -48.75 | -13 | -35.75 | -45.45 | -48.75 | -0.48 | 1.67 | V | Pass |
| 250.05 | -59.49 | -13 | -46.49 | -63.78 | -64.25 | -0.74 | 6.17 | V | Pass |
| 837.60 | -49.92 | | | -60.48 | -57.61 | -1.24 | 8.60 | V | |
| 855.80 | -59.46 | -13 | -46.46 | -70.35 | -67.21 | -1.24 | 8.66 | V | Pass |
| 881.70 | -20.82 | | | -29.65 | -28.70 | -1.25 | 8.78 | V | |
| 1674.00 | -41.64 | -13 | -28.64 | -43.96 | -50.22 | -1.79 | 8.94 | V | Pass |
| 2418.00 | -2.53 | | | -10.31 | -12.71 | -2.16 | 10.17 | V | |

Remark :
1. 837.6MHz is mobile phone signal
2. 881.7MHz is base station signal
3. 2418MHz is bluetooth signal

## 4.7 Frequency Stability (Temperature Variation)

4.7.1 Measurement Instrument

As decribed in chapter 5 of this test report.

4.7.2 Test Procedure

a. The EUT and test equipment were set up as shown on the following section.

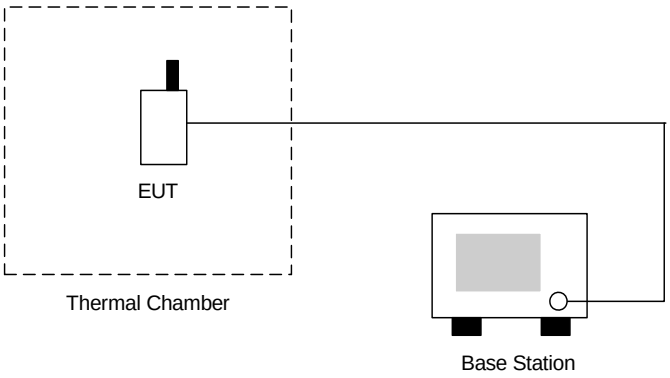
b. With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was note within one minute.

c. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change ws noted within one minute.

d. The temperature tests were performed for the worst case.

e. Test data was recorded.

4.7.3 Test Setup Layout



4.7.4 Test Result

- Test Mode : CDMA2000 Cellular 1xRTT

| Temperature(℃) | Change (Hz) | Change (ppm) | Limit (ppm) | Result |
|---|---|---|---|---|
| -30 | N/A | N/A | 2.5 | Passed |
| -20 | 32 | 0.04 | | |
| -10 | 16 | 0.02 | | |
| 0 | -18 | -0.02 | | |
| 10 | 22 | 0.03 | | |
| 20 | -9 | -0.01 | | |
| 30 | 13 | 0.02 | | |
| 40 | 6 | 0.01 | | |
| 50 | 27 | 0.03 | | |

Remark : The EUT can not be turn on at −30℃.

- Test Mode : CDMA2000 PCS 1xRTT

| Temperature(℃) | Change (Hz) | Change (ppm) | Limit (ppm) | Result |
|---|---|---|---|---|
| -30 | N/A | N/A | 2.5 | Passed |
| -20 | 28 | 0.01 | | |
| -10 | -14 | -0.01 | | |
| 0 | 36 | 0.02 | | |
| 10 | 17 | 0.01 | | |
| 20 | 8 | 0.00 | | |
| 30 | 32 | 0.02 | | |
| 40 | 24 | 0.01 | | |
| 50 | -12 | -0.01 | | |

Remark : The EUT can not be turn on at −30℃.

## 4.8 Frequency Stability (Voltage Variation)

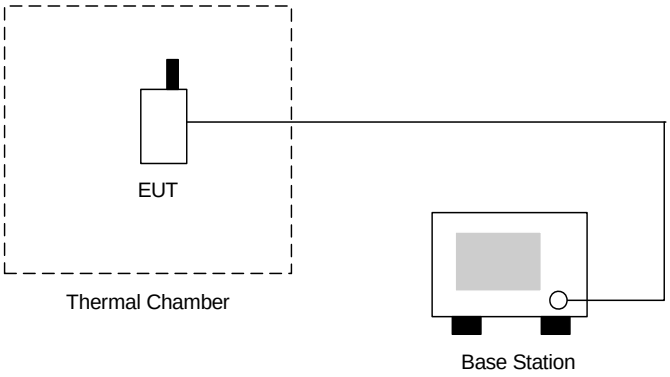
4.8.1 Measurement Instrument

As described in chapter 5 of this test report.

4.8.2 Test Procedure

a. The EUT was placed in a temperature chamber at 25±5°C and connected as the following section.
b. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
c. The variation in frequency was measured for the worst case.

4.8.3 Test Setup Layout



4.8.4 Test Result

- Test Mode : CDMA2000 Cellular 1xRTT

| Voltage(Volt) | Change (Hz) | Change (ppm) | Limit (ppm) | Result |
|---|---|---|---|---|
| 3.7 | -12.0 | -0.01 | 2.5 | Passed |
| BEP | 3.0 | 0.00 | | |
| 4.2 | 23.0 | 0.03 | | |

- Test Mode : CDMA2000 PCS 1xRTT

| Voltage(Volt) | Change (Hz) | Change (ppm) | Limit (ppm) | Result |
|---|---|---|---|---|
| 3.7 | 4.0 | 0.00 | 2.5 | Passed |
| BEP | 12.0 | 0.01 | | |
| 4.2 | 16.0 | 0.01 | | |

Remark:
1. Normal Voltage = 3.7 V.
2. Battery End Point (BEP) = 3.2 V.

# 5 List of Measurement Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Due Date | Remark |
|---|---|---|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSP40 | 100319 | 9K~40GHz | Mar. 13, 2008 | Mar. 12, 2009 | Radiation (03CH01-KS) |
| EMI Test Receiver | R&S | ESCI | 100534 | 9KHz~2.75GHz | Mar. 15, 2008 | Mar. 14, 2009 | Radiation (03CH01-KS) |
| Bilog Antenna | Schaffner | CBL6112D | 23182 | 25MHz~2000MHz | May 22, 2007 | May 21, 2008 | Radiation (03CH01-KS) |
| Preamplifier | Agilent | 8449B | 3008A02370 | 1G~26.5GHz | Jun. 04, 2007 | Jun. 03, 2008 | Radiation (03CH01-KS) |
| Preamplifier | Wireless | FPA6592G | 60006 | 30M~2000MHz | Jul. 24, 2007 | Jul. 23, 2008 | Radiation (03CH01-KS) |
| High Pass filter (3GHz) | Microwave Circuits | H3G018G | N/A | N/A | N/A | N/A | Radiation (03CH01-KS) |
| High Pass filter (7GHz) | Microwave Circuits | H07G18G3 | N/A | N/A | N/A | N/A | Radiation (03CH01-KS) |
| High Pass filter | N/A | WHKX1.5/15 G-10SS | 23 | N/A | N/A | N/A | Radiation (03CH01-KS) |
| High Pass filter | N/A | WHKX2.2-18 G-10SS | 8 | N/A | N/A | N/A | Radiation (03CH01-KS) |
| Band Reject Filter | WI | WRCG2400/ 2483-2390/2 493-35/10SS | 14 | N/A | N/A | N/A | Radiation (03CH01-KS) |
| Band Reject Filter | WI | WRCG 1850/1910-1 835/1925-40/ 8SS | 15 | N/A | N/A | N/A | Radiation (03CH01-KS) |
| Band Reject Filter | WI | WRCG 824/849-814/ 859-40/8SS | 34 | N/A | N/A | N/A | Radiation (03CH01-KS) |
| Low pass filter (1.2GHz) | N/A | WLKS 1200-8SS | 2 | N/A | N/A | N/A | Radiation (03CH01-KS) |
| DRG Horn(Medium) | EMCO | 3117 | 75959 | 1GHz ~ 18GHz | Aug. 17, 2007 | Aug. 16, 2008 | Radiation (03CH01-KS) |
| Power Meter | Agilent | E4416A | MY45101555 | N/A | Jun. 18, 2007 | Jun. 17, 2008 | Conduction (TH01-KS) |
| Power Sensor | Agilent | E9327A | MY44421198 | 50MHz~18GHz | Jun. 12, 2007 | Jun. 11, 2008 | Conduction (TH01-KS) |
| Thermal | Rten Billion | TTC-B3S | TBN-960502 | -40~150C | Jun. 27, 2007 | Jun. 26, 2008 | Conduction (TH01-KS) |
| Power Divider | ARRA | A3200-2 | N/A | DC~18GHz | Sep. 01, 2007 | Aug. 31, 2008 | Conduction (TH01-KS) |
| DC Power Supply | Topward | 3306D | N/A | 30V6A | N/A | N/A | Conduction (TH01-KS) |

# 6 Uncertainty Evaluation

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

| 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-shaped | 0.28 |
| **Combined standard uncertainty Uc(y)** | **1.27** | | |
| **Measuring uncertainty for a level of Confidence of 95% U=2Uc(y)** | **2.54** | | |

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

| Contribution | Uncertainty of $x_i$ | | $u(x_i)$ | $Ci$ | $Ci*u(x_i)$ |
|---|---|---|---|---|---|
| | dB | Probability Distribution | | | |
| Receiver reading | ±0.10 | Normal(k=1) | 0.10 | 1 | 0.10 |
| Antenna factor calibration | ±1.70 | Normal(k=2) | 0.85 | 1 | 0.85 |
| Cable loss calibration | ±0.50 | Normal(k=2) | 0.25 | 1 | 0.25 |
| Receiver Correction | ±2.00 | Rectangular | 1.15 | 1 | 1.15 |
| Antenna Factor Directional | ±1.50 | Rectangular | 0.87 | 1 | 0.87 |
| Site imperfection | ±2.80 | Triangular | 1.14 | 1 | 1.14 |
| Mismatch<br>Receiver VSWR Γ1= 0.197<br>Antenna VSWR Γ2= 0.194<br>Uncertainty=20log(1-Γ1*Γ2*Γ3) | +0.34/-0.35 | U-shaped | 0.244 | 1 | 0.244 |
| **Combined standard uncertainty Uc(y)** | **2.36** | | | | |
| **Measuring uncertainty for a level of Confidence of 95% U=2Uc(y)** | **4.72** | | | | |

END OF TEST REPORT