

# FCC RF Test Report

APPLICANT : ZTE CORPORATION  
EQUIPMENT : CDMA/LTE Ufi  
BRAND NAME : ZTE  
MODEL NAME : MF975U  
FCC ID : SRQ-MF975U  
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E)  
CLASSIFICATION : PCS Licensed Transmitter (PCB)

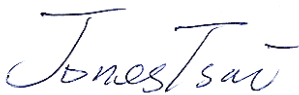
The product was received on Jun. 24, 2015 and testing was completed on Aug. 07, 2015. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA / EIA-603-C-2004 and has been in compliance with the applicable technical standards.

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



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Reviewed by: Joseph Lin / Supervisor



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Approved by: Jones Tsai / Manager



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



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## REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION             | ISSUED DATE   |
|------------|---------|-------------------------|---------------|
| FG562405A  | Rev. 01 | Initial issue of report | Aug. 13, 2015 |
|            |         |                         |               |
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## SUMMARY OF TEST RESULT

| Report Section | FCC Rule                            | Description                                         | Limit                                           | Result | Remark                                        |
|----------------|-------------------------------------|-----------------------------------------------------|-------------------------------------------------|--------|-----------------------------------------------|
| 3.1            | §2.1046                             | Conducted Output Power                              | N/A                                             | PASS   | -                                             |
| 3.2            | §24.232(d)                          | Peak-to-Average Ratio                               | <13 dB                                          | PASS   | -                                             |
| 3.3            | §22.913(a)(2)                       | Effective Radiated Power                            | < 7 Watts                                       | PASS   | -                                             |
| 3.3            | §24.232(c)                          | Equivalent Isotropic Radiated Power                 | < 2 Watts                                       | PASS   | -                                             |
| 3.4            | §2.1049                             | Occupied Bandwidth                                  | N/A                                             | PASS   | -                                             |
| 3.5            | §2.1051<br>§22.917(a)<br>§24.238(a) | Band Edge Measurement                               | $< 43 + 10\log_{10}(P[\text{Watts}])$           | PASS   | -                                             |
| 3.6            | §2.1051<br>§22.917(a)<br>§24.238(a) | Conducted Spurious Emission                         | $< 43 + 10\log_{10}(P[\text{Watts}])$           | PASS   | -                                             |
| 3.7            | §2.1053<br>§22.917(a)<br>§24.238(a) | Field Strength of Spurious Radiation                | $< 43 + 10\log_{10}(P[\text{Watts}])$           | PASS   | Under limit<br>30.77 dB at<br>7521.000<br>MHz |
| 3.8            | §2.1055<br>§22.355                  | Frequency Stability<br>for Temperature &<br>Voltage | < 2.5 ppm for Part 22<br>Within Authorized Band | PASS   | -                                             |
|                | §2.1055<br>§24.235                  |                                                     |                                                 |        |                                               |



# 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 Product Feature of Equipment Under Test

| Product Feature                 |                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Equipment                       | CDMA/LTE Ufi                                                                                                                  |
| Brand Name                      | ZTE                                                                                                                           |
| Model Name                      | MF975U                                                                                                                        |
| FCC ID                          | SRQ-MF975U                                                                                                                    |
| EUT supports Radios application | CDMA/EV-DO/LTE/<br>WLAN 2.4GHz 802.11b/g/n HT20/HT40<br>WLAN 5GHz 802.11a/n HT20/HT40<br>WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 |
| MEID Code                       | Conducted: 004401783463595<br>Radiation: 990005139001045<br>ERP&EIRP: 004401783464262                                         |
| HW Version                      | xz3A                                                                                                                          |
| SW Version                      | USCC_MF975U_V1.0.0B04                                                                                                         |
| EUT Stage                       | Identical Prototype                                                                                                           |

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 1.4 Product Specification subjective to this standard

| Product Specification subjective to this standard |                                                                                  |
|---------------------------------------------------|----------------------------------------------------------------------------------|
| <b>Tx Frequency</b>                               | CDMA2000 BC0: 824.70 MHz ~ 848.31 MHz<br>CDMA2000 BC1: 1851.25 MHz ~ 1908.75 MHz |
| <b>Rx Frequency</b>                               | CDMA2000 BC0: 869.70 MHz ~ 893.31 MHz<br>CDMA2000 BC1: 1931.25 MHz ~ 1988.75 MHz |
| <b>Maximum Output Power to Antenna</b>            | CDMA2000 BC0 : 24.19 dBm<br>CDMA2000 BC1 : 23.89 dBm                             |
| <b>Antenna Type</b>                               | Detachable Internal Antenna                                                      |
| <b>Type of Modulation</b>                         | CDMA2000 : QPSK<br>CDMA2000 1xEV-DO : QPSK/8PSK                                  |

## 1.5 Modification of EUT

No modifications are made to the EUT during all test items.

## 1.6 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

| FCC Rule | System             | Type of Modulation | Maximum ERP/EIRP (W) | Frequency Tolerance (ppm) | Emission Designator |
|----------|--------------------|--------------------|----------------------|---------------------------|---------------------|
| Part 22  | CDMA2000 BC0 1xRTT | QPSK               | 0.1612               | 0.0454 ppm                | 1M28F9W             |
| Part 24  | CDMA2000 BC1 1xRTT | QPSK               | 0.3414               | 0.0239 ppm                | 1M28F9W             |

## 1.7 Testing Location

|                    |                                                                                                                       |           |                      |
|--------------------|-----------------------------------------------------------------------------------------------------------------------|-----------|----------------------|
| Test Site          | SPORTON INTERNATIONAL (KUNSHAN) INC.                                                                                  |           |                      |
| Test Site Location | No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China<br>TEL: +86-0512-5790-0158<br>FAX: +86-0512-5790-0958 |           |                      |
| Test Site No.      | Sporton Site No.                                                                                                      |           | FCC Registration No. |
|                    | TH01-KS                                                                                                               | 03CH02-KS | 418269               |

**Note:** The test site complies with ANSI C63.4 2009 requirement.

## 1.8 Applicable Standards

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

- ♦ FCC 47 CFR Part 2, 22(H), 24(E)
- ♦ ANSI / TIA / EIA-603-C-2004
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

### Remark:

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



## 2 Test Configuration of Equipment Under Test

### 2.1 Test Mode

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r02 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

Radiated emissions were investigated as following frequency range:

1. 30 MHz to 10th harmonic for CDMA2000 BC0.
2. 30 MHz to 10th harmonic for CDMA2000 BC1.

All modes and data rates and positions were investigated.

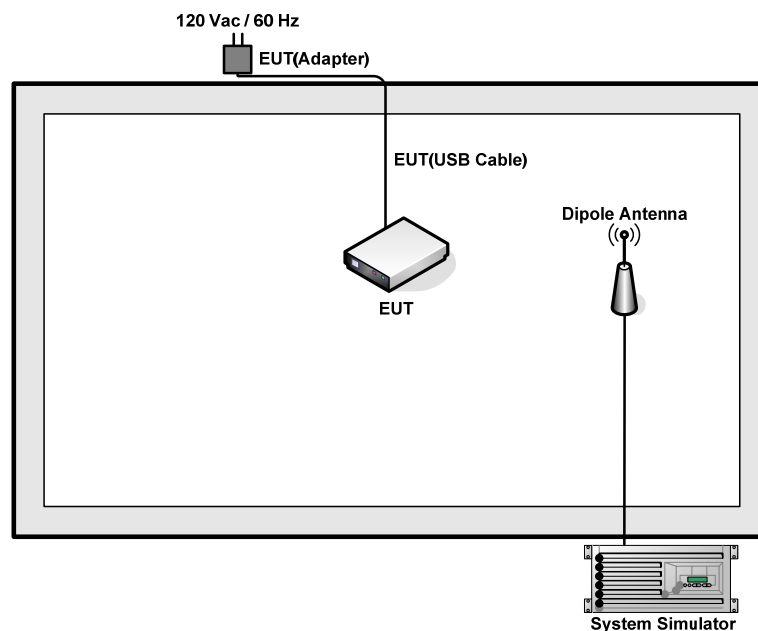
Test modes are chosen to be reported as the worst case configuration below:

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

#### Conducted Power Measurement Results:

| Conducted Power (*Unit: dBm) |              |        |        |              |       |         |
|------------------------------|--------------|--------|--------|--------------|-------|---------|
| Band                         | CDMA2000 BC0 |        |        | CDMA2000 BC1 |       |         |
| Channel                      | 1013         | 384    | 777    | 25           | 600   | 1175    |
| Frequency                    | 824.7        | 836.52 | 848.31 | 1851.25      | 1880  | 1908.75 |
| 1xRTT RC1 SO55               | 24.06        | 24.18  | 24.15  | 23.63        | 23.17 | 23.27   |
| 1xRTT RC3 SO55               | 24.07        | 24.19  | 24.16  | 23.89        | 23.36 | 23.33   |
| 1xRTT RC3 SO32(+ F-SCH)      | 24.06        | 24.16  | 24.15  | 23.77        | 23.25 | 23.27   |
| 1xRTT RC3 SO32(+SCH)         | 24.12        | 24.18  | 24.17  | 23.79        | 23.23 | 23.25   |
| 1xEV-DO RTAP 153.6kbps       | 24.09        | 24.15  | 24.13  | 23.84        | 23.31 | 23.29   |
| 1xEV-DO RETAP 4096Bits       | 24.03        | 24.14  | 24.12  | 23.75        | 23.19 | 23.17   |

## 2.2 Connection Diagram of Test System



## 2.3 Support Unit used in test configuration

| Item | Equipment        | Trade Name | Model No. | FCC ID | Data Cable | Power Cord        |
|------|------------------|------------|-----------|--------|------------|-------------------|
| 1.   | System Simulator | R&S        | CMU 200   | N/A    | N/A        | Unshielded, 1.8 m |
| 2.   | DC Power Supply  | GW INSTEK  | GPD-2303S | N/A    | N/A        | Unshielded, 1.8 m |



## 2.4 Measurement Results Explanation Example

**For all conducted test items:**

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

*Offset = RF cable loss + attenuator factor.*

The following shows an offset computation example with RF cable loss 5.2 dB and a 10dB attenuator.

Example :

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 5.2 + 10 = 15.2 \text{ (dB)}\end{aligned}$$

### 3 Test Result

#### 3.1 Conducted Output Power Measurement

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

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

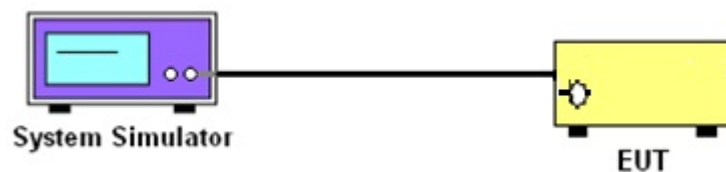
##### 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

##### 3.1.3 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure the maximum burst average power for CDMA.

##### 3.1.4 Test Setup



**3.1.5 Test Result of Conducted Output Power**

| CDMA2000 BC0          |                 |           |            |
|-----------------------|-----------------|-----------|------------|
| Test Mode             | CDMA 2000 1xRTT |           |            |
| Test Status           | RC3+SO55        |           |            |
| Channel               | 1013 (Low)      | 384 (Mid) | 777 (High) |
| Frequency (MHz)       | 824.70          | 836.52    | 848.31     |
| Conducted Power (dBm) | 24.07           | 24.19     | 24.16      |

| CDMA2000 BC1          |                 |           |             |
|-----------------------|-----------------|-----------|-------------|
| Test Mode             | CDMA 2000 1xRTT |           |             |
| Test Status           | RC3+SO55        |           |             |
| Channel               | 25 (Low)        | 600 (Mid) | 1175 (High) |
| Frequency (MHz)       | 1851.25         | 1880.00   | 1908.75     |
| Conducted Power (dBm) | 23.89           | 23.36     | 23.33       |

**Note:** maximum average power for CDMA2000.

## 3.2 Peak-to-Average Ratio

### 3.2.1 Description of the PAR Measurement

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

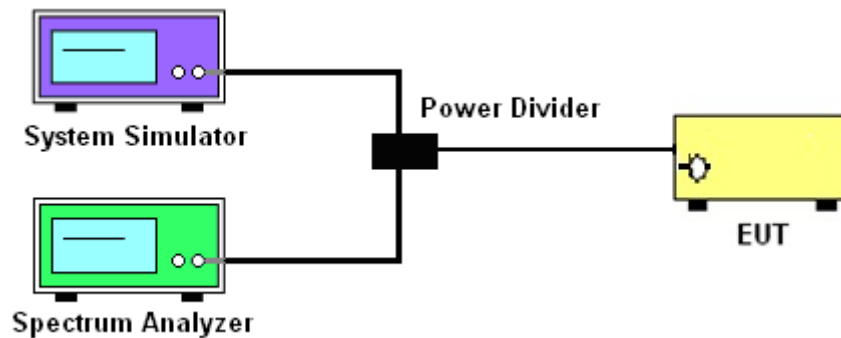
### 3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.2.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 5.7.1.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. Set the CCDF (Complementary Cumulative Distribution Function) option on the spectrum analyzer.
4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.

### 3.2.4 Test Setup



### 3.2.5 Test Result of Peak-to-Average Ratio

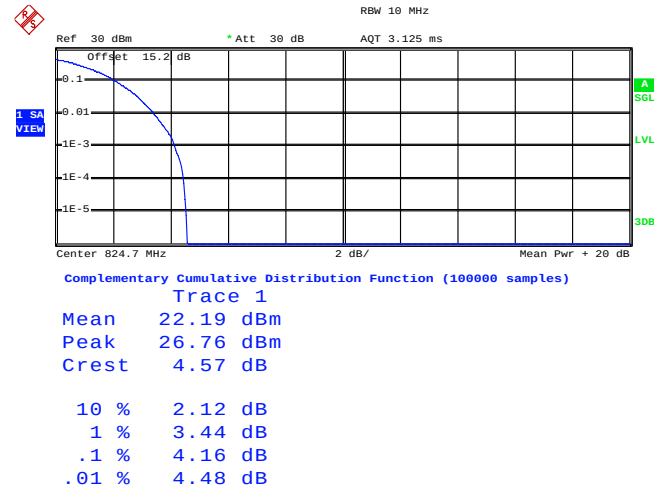
| CDMA2000 BC0               |                 |           |            |
|----------------------------|-----------------|-----------|------------|
| Modes                      | CDMA 2000 1xRTT |           |            |
| Channel                    | 1013 (Low)      | 384 (Mid) | 777 (High) |
| Frequency (MHz)            | 824.70          | 836.52    | 848.31     |
| Peak-to-Average Ratio (dB) | 4.16            | 4.20      | 4.16       |

| CDMA2000 BC1               |                 |           |             |
|----------------------------|-----------------|-----------|-------------|
| Modes                      | CDMA 2000 1xRTT |           |             |
| Test Status                | RC3+SO55        |           |             |
| Channel                    | 25 (Low)        | 600 (Mid) | 1175 (High) |
| Frequency (MHz)            | 1851.25         | 1880.00   | 1908.75     |
| Peak-to-Average Ratio (dB) | 3.32            | 3.36      | 2.84        |

### 3.2.6 Test Result (Plots) of Peak-to-Average Ratio

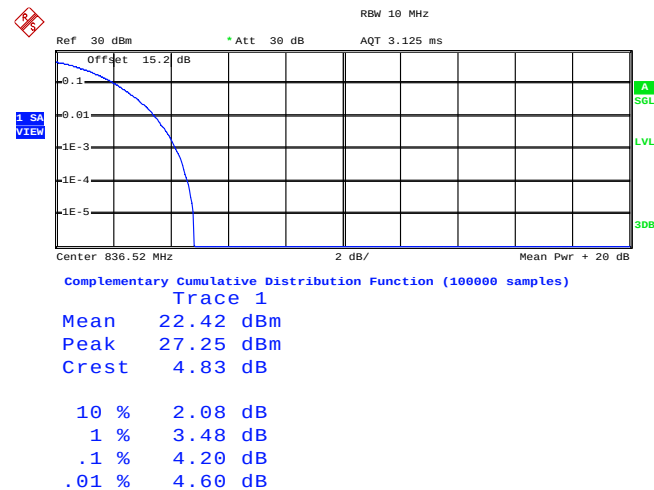
|               |              |                    |                   |
|---------------|--------------|--------------------|-------------------|
| <b>Band :</b> | CDMA2000 BC0 | <b>Test Mode :</b> | 1xRTT Link (QPSK) |
|---------------|--------------|--------------------|-------------------|

#### Peak-to-Average Ratio on Channel 1013 (824.70 MHz)



Date: 7.JUL.2014 21:55:34

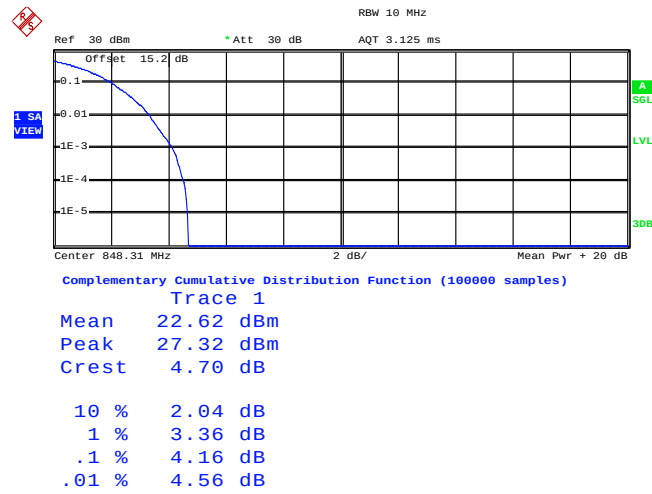
#### Peak-to-Average Ratio on Channel 384 (836.52 MHz)



Date: 7.JUL.2014 21:56:00



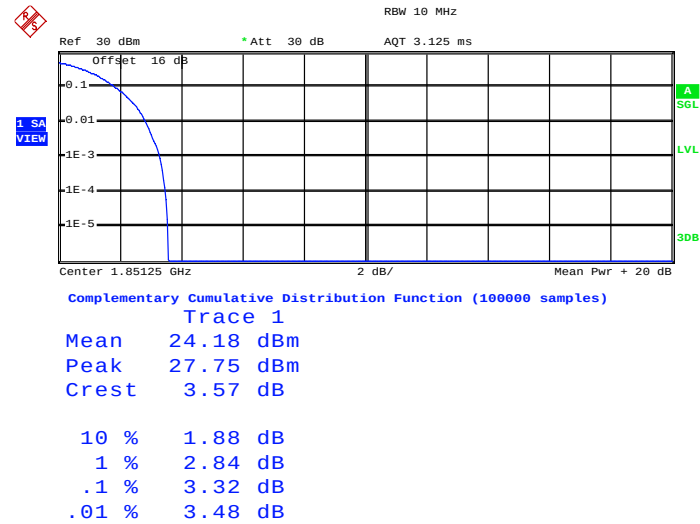
Peak-to-Average Ratio on Channel 777 (848.31 MHz)



Date: 7.JUL.2014 21:56:25

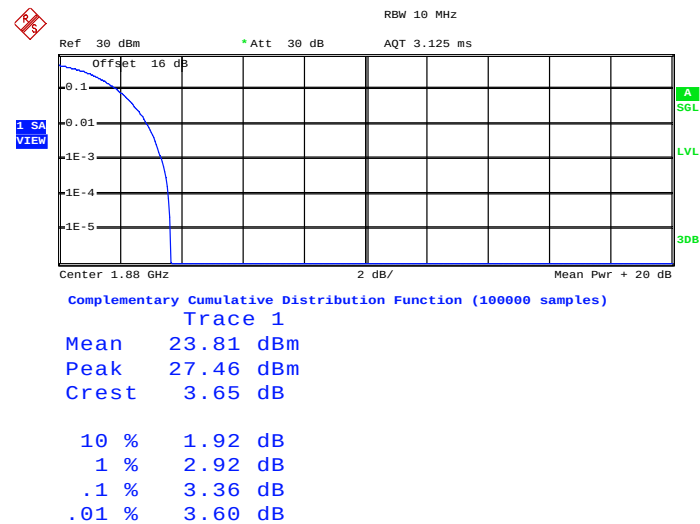
|               |              |                    |                   |
|---------------|--------------|--------------------|-------------------|
| <b>Band :</b> | CDMA2000 BC1 | <b>Test Mode :</b> | 1xRTT Link (QPSK) |
|---------------|--------------|--------------------|-------------------|

### Peak-to-Average Ratio on Channel 25 (1851.25 MHz)



Date: 29.JUN.2014 22:30:53

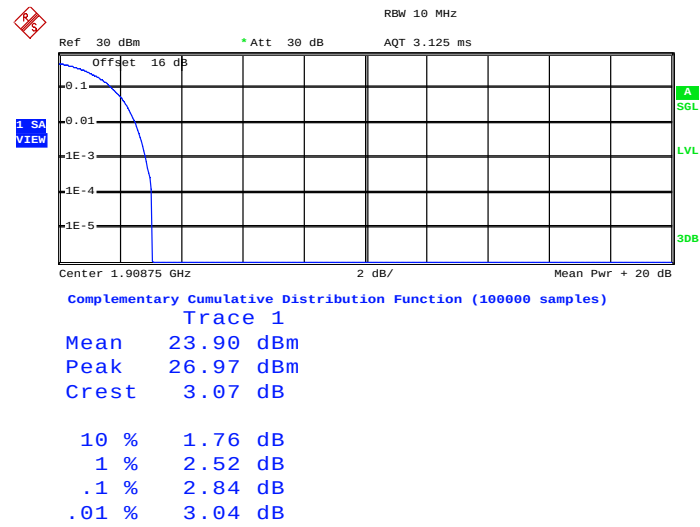
### Peak-to-Average Ratio on Channel 600 (1880 MHz)



Date: 29.JUN.2014 22:30:14



Peak-to-Average Ratio on Channel 1175 (1908.75 MHz)



Date: 29.JUN.2014 22:32:29

### 3.3 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

#### 3.3.1 Description of the ERP/EIRP Measurement

The substitution method, in ANSI / TIA / EIA-603-C-2004, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r02. The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts.

#### 3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.3.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 5.2.1. (for CDMA/WCDMA), Section 5.2.2.2 (for GSM/GPRS/EDGE) and ANSI / TIA-603-C-2004 Section 2.2.17.
2. The EUT was placed on a non-conductive rotating platform 0.8 meters high 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 RMS detector per section 5. of KDB 971168 D01.
3. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power. The maximum 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.
4. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. The EUT was replaced by the 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  $ERP = EIRP - 2.15$ . Take the record of the output power at substitution antenna.



|              |                |
|--------------|----------------|
|              | CDMA2000/EV-DO |
| SPAN         | 3MHz           |
| RBW          | 30kHz          |
| VBW          | 100kHz         |
| Detector     | RMS            |
| Trace        | Average        |
| Average Type | Power          |
| Sweep Count  | 100            |

### 3.3.4 Test Result of ERP

| CDMA2000 BC0 1xRTT_RC3+SO55 Radiated Power ERP |                 |            |        |          |        |
|------------------------------------------------|-----------------|------------|--------|----------|--------|
| Channel                                        | Frequency (MHz) | Horizontal |        | Vertical |        |
|                                                |                 | ERP(dBm)   | ERP(W) | ERP(dBm) | ERP(W) |
| Lowest                                         | 824.70          | 21.02      | 0.1264 | 20.71    | 0.1176 |
| Middle                                         | 836.52          | 22.07      | 0.1612 | 21.55    | 0.1428 |
| Highest                                        | 848.31          | 19.77      | 0.0948 | 19.61    | 0.0914 |
| Limit                                          | ERP < 7W        | Result     |        | PASS     |        |

### 3.3.5 Test Result of EIRP

| CDMA2000 BC1 1xRTT_RC3+SO55 Radiated Power EIRP |                 |            |         |           |         |
|-------------------------------------------------|-----------------|------------|---------|-----------|---------|
| Channel                                         | Frequency (MHz) | Horizontal |         | Vertical  |         |
|                                                 |                 | EIRP(dBm)  | EIRP(W) | EIRP(dBm) | EIRP(W) |
| Lowest                                          | 1851.25         | 25.33      | 0.3414  | 19.52     | 0.0895  |
| Middle                                          | 1880.00         | 23.93      | 0.2470  | 18.18     | 0.0658  |
| Highest                                         | 1908.75         | 23.05      | 0.2017  | 18.41     | 0.0693  |
| Limit                                           | EIRP < 2W       | Result     |         | PASS      |         |

### 3.4 99% Occupied Bandwidth and 26dB Bandwidth Measurement

#### 3.4.1 Description of 99% Occupied Bandwidth and 26dB Bandwidth Measurement

The 99% occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

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.

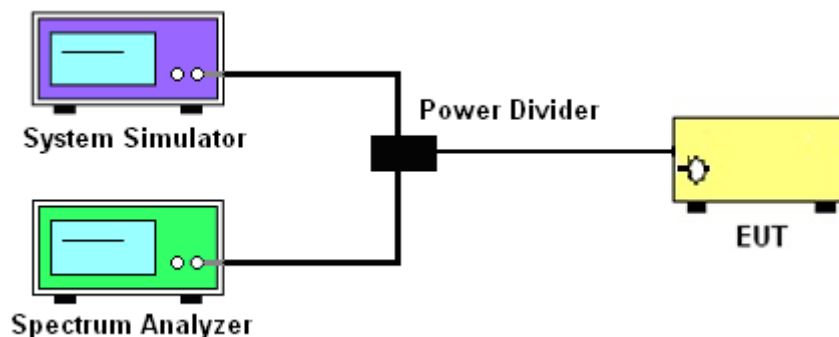
#### 3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.4.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 4.2.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The 99% occupied bandwidth were measured, set RBW= 1% of span, VBW= 3\*RBW, peak detector, trace maximum hold.
5. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3\*RBW, peak detector, trace maximum hold.

#### 3.4.4 Test Setup



**3.4.5 Test Result of Occupied Bandwidth and 26dB Bandwidth**

| CDMA2000 BC0    |                 |           |            |
|-----------------|-----------------|-----------|------------|
| Test Mode       | CDMA 2000 1xRTT |           |            |
| Test Status     | RC3+SO55        |           |            |
| Channel         | 1013 (Low)      | 384 (Mid) | 777 (High) |
| Frequency (MHz) | 824.70          | 836.52    | 848.31     |
| 99% OBW (MHz)   | 1.276           | 1.272     | 1.276      |
| 26dB BW (MHz)   | 1.420           | 1.420     | 1.420      |

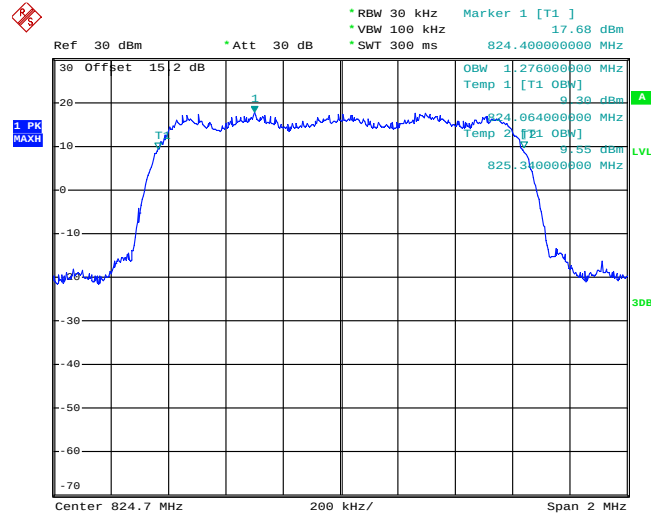
| CDMA2000 BC1    |                 |           |             |
|-----------------|-----------------|-----------|-------------|
| Test Mode       | CDMA 2000 1xRTT |           |             |
| Test Status     | RC3+SO55        |           |             |
| Channel         | 25 (Low)        | 600 (Mid) | 1175 (High) |
| Frequency (MHz) | 1851.25         | 1880.00   | 1908.75     |
| 99% OBW (MHz)   | 1.280           | 1.276     | 1.280       |
| 26dB BW (MHz)   | 1.428           | 1.432     | 1.444       |



## 3.4.6 Test Result (Plots) of Occupied Bandwidth and 26dB Bandwidth

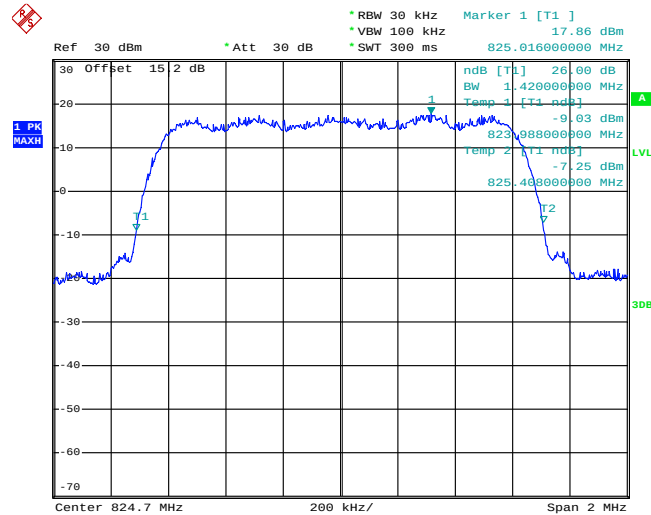
|        |              |             |                       |
|--------|--------------|-------------|-----------------------|
| Band : | CDMA2000 BC0 | Test Mode : | 1xRTT_RC3+SO55 (QPSK) |
|--------|--------------|-------------|-----------------------|

## 99% Occupied Bandwidth Plot on Channel 1013 (824.7 MHz)



Date: 7.JUL.2014 21:49:49

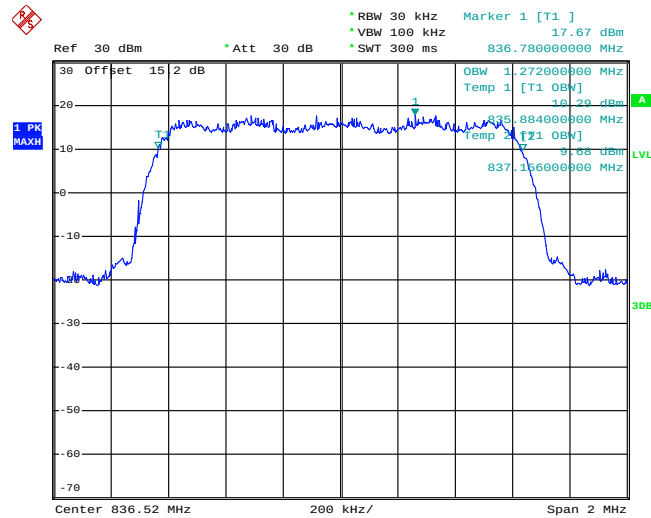
## 26dB Bandwidth Plot on Channel 1013 (824.7 MHz)



Date: 7.JUL.2014 21:45:39

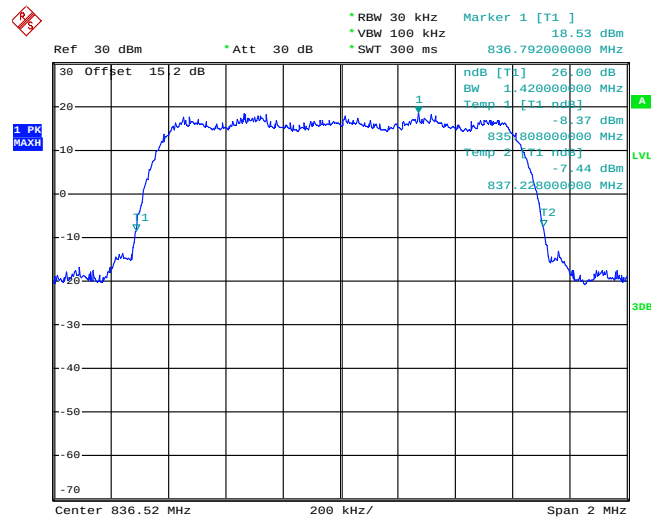


99% Occupied Bandwidth Plot on Channel 384 (836.52 MHz)



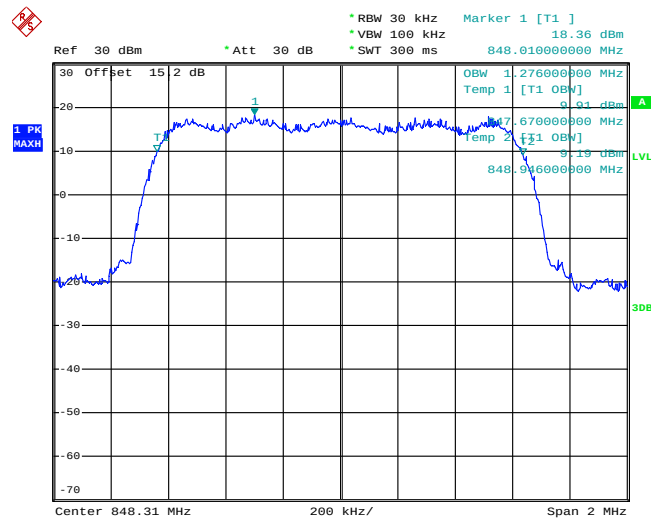
Date: 7.JUL.2014 21:50:11

26dB Bandwidth Plot on Channel 384 (836.52 MHz)



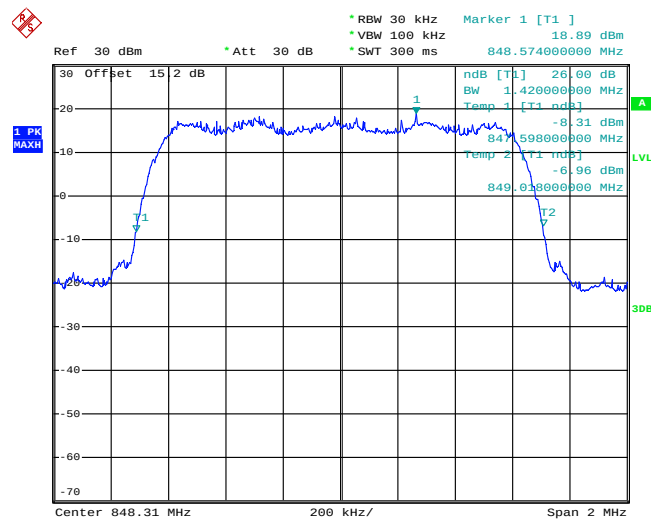
Date: 7.JUL.2014 21:44:07

### 99% Occupied Bandwidth Plot on Channel 777 (848.31 MHz)



Date: 7.JUL.2014 21:50:38

### 26dB Bandwidth Plot on Channel 777 (848.31 MHz)

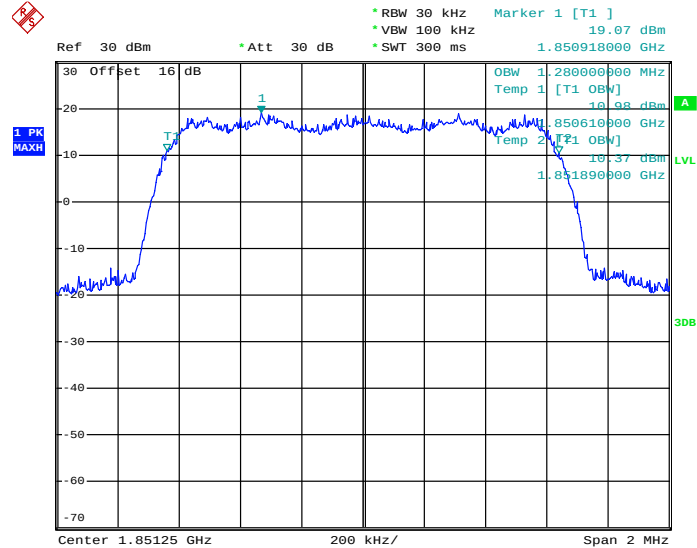


Date: 7.JUL.2014 21:44:57



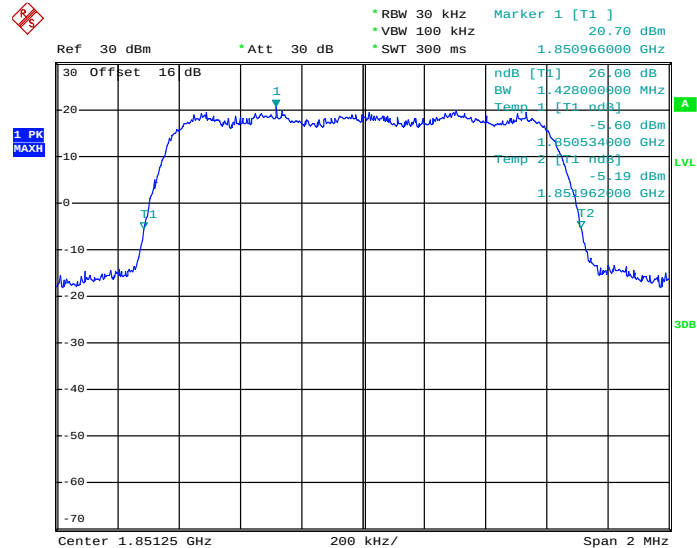
|        |              |             |                       |
|--------|--------------|-------------|-----------------------|
| Band : | CDMA2000 BC1 | Test Mode : | 1xRTT_RC3+SO55 (QPSK) |
|--------|--------------|-------------|-----------------------|

99% Occupied Bandwidth Plot on Channel 25 (1851.25 MHz)



Date: 29.JUN.2014 22:53:15

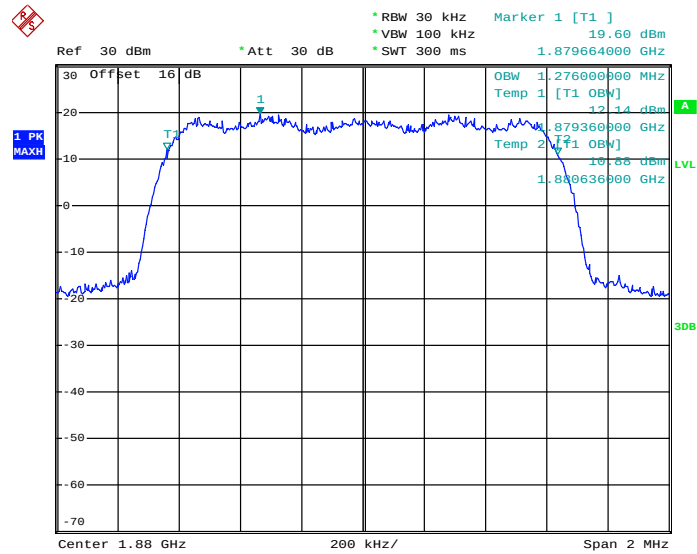
26dB Bandwidth Plot on Channel 25 (1851.25 MHz)



Date: 29.JUN.2014 22:52:47

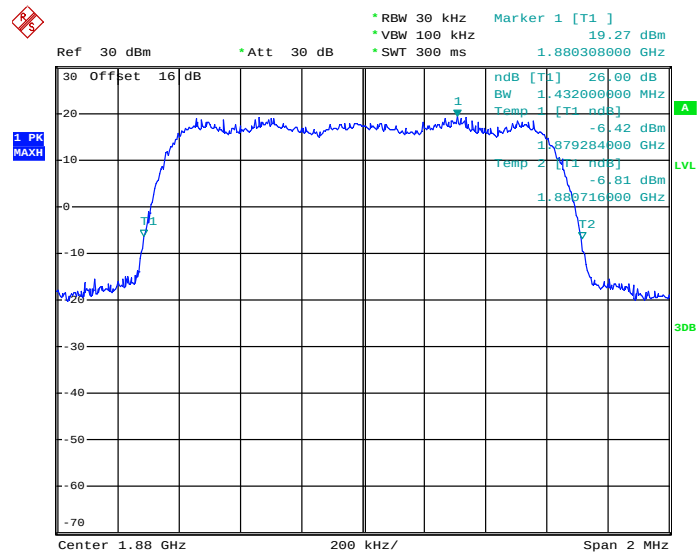


99% Occupied Bandwidth Plot on Channel 600 (1880.0 MHz)



Date: 29.JUN.2014 22:15:58

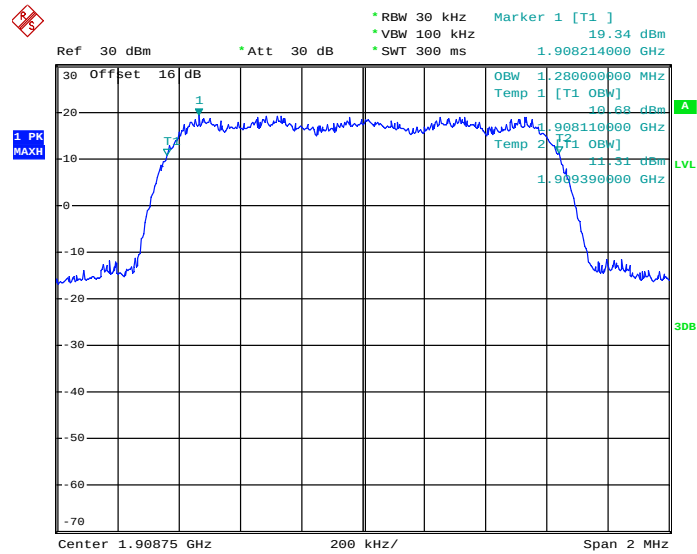
26dB Bandwidth Plot on Channel 600 (1880.0 MHz)



Date: 29.JUN.2014 22:15:04

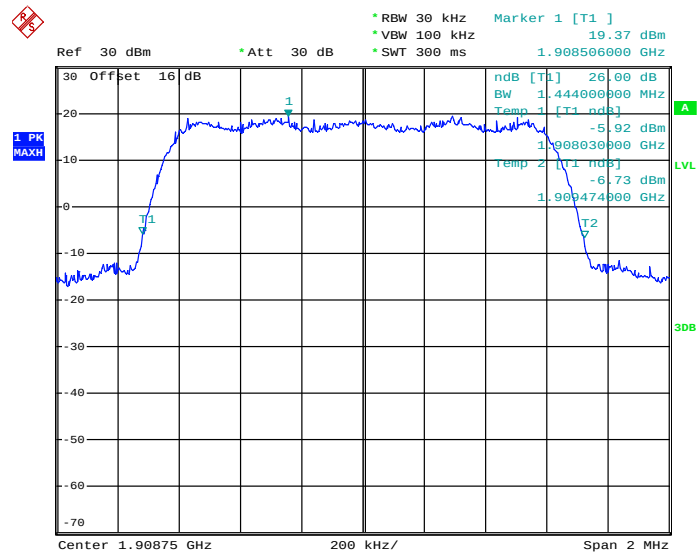


99% Occupied Bandwidth Plot on Channel 1175 (1908.75 MHz)



Date: 29.JUN.2014 22:18:01

26dB Bandwidth Plot on Channel 1175 (1908.75 MHz)



Date: 29.JUN.2014 22:13:55

### 3.5 Band Edge Measurement

#### 3.5.1 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.

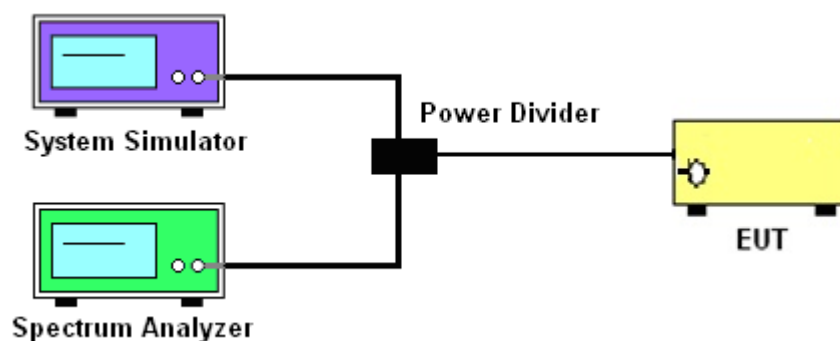
#### 3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.5.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 6.0.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The band edges of low and high channels for the highest RF powers were measured.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)  
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$   
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$   
 $= -13\text{dBm}.$

#### 3.5.4 Test Setup

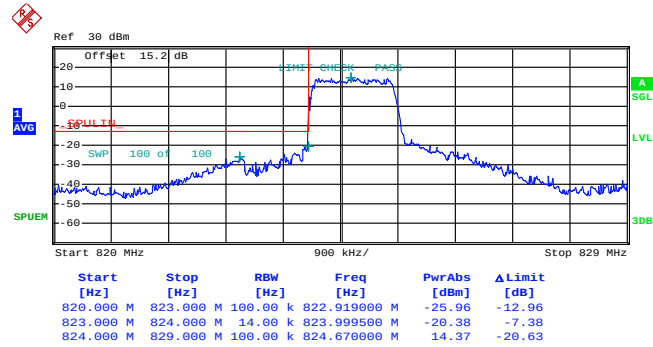




## 3.5.5 Test Result (Plots) of Conducted Band Edge

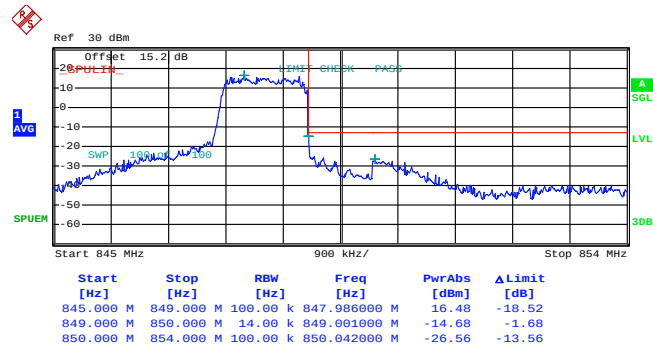
|        |              |             |                       |
|--------|--------------|-------------|-----------------------|
| Band : | CDMA2000 BC0 | Test Mode : | 1xRTT_RC3+SO55 (QPSK) |
|--------|--------------|-------------|-----------------------|

Lower Band Edge Plot on Channel 1013 (824.7 MHz)



Date: 7.JUL.2014 22:19:35

Higher Band Edge Plot on Channel 777 (848.31 MHz)

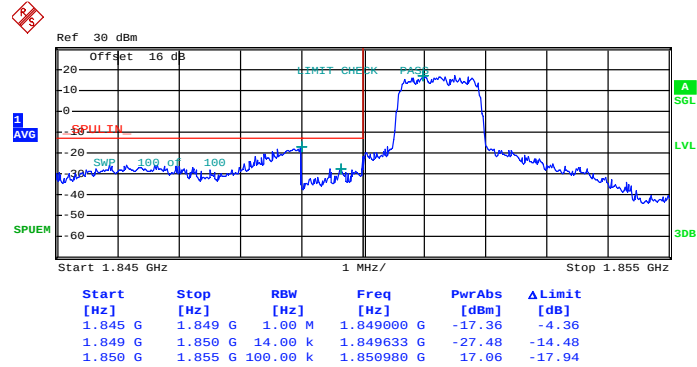


Date: 7.JUL.2014 21:37:39



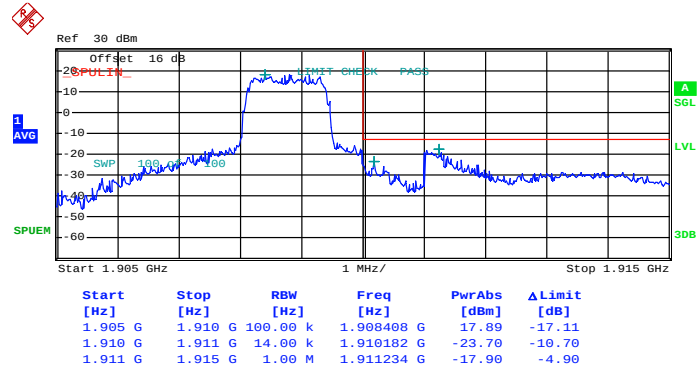
|        |              |             |                       |
|--------|--------------|-------------|-----------------------|
| Band : | CDMA2000 BC1 | Test Mode : | 1xRTT_RC3+SO55 (QPSK) |
|--------|--------------|-------------|-----------------------|

## Lower Band Edge Plot on Channel 25 (1851.25 MHz)



Date: 29.JUN.2014 21:47:38

## Higher Band Edge Plot on Channel 1175 (1908.75 MHz)



Date: 29.JUN.2014 21:55:01

## 3.6 Conducted Spurious Emission Measurement

### 3.6.1 Description of Conducted Spurious 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.

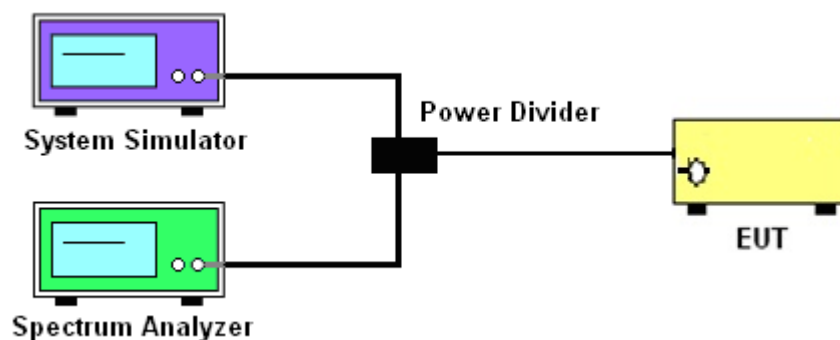
### 3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.6.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 6.0.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)  
 $= P(W) - [43 + 10\log(P)]$  (dB)  
 $= [30 + 10\log(P)]$  (dBm) -  $[43 + 10\log(P)]$  (dB)  
 $= -13\text{dBm}$ .

### 3.6.4 Test Setup

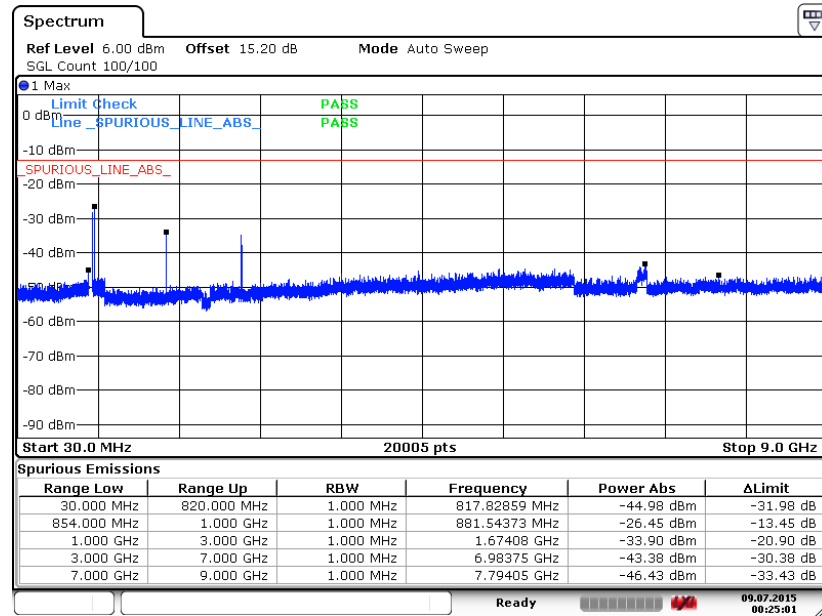




## 3.6.5 Test Result (Plots) of Conducted Spurious Emission

|             |                       |             |            |
|-------------|-----------------------|-------------|------------|
| Band :      | CDMA2000 BC0          | Channel :   | CH384      |
| Test Mode : | 1xRTT_RC3+SO55 (QPSK) | Frequency : | 836.52 MHz |

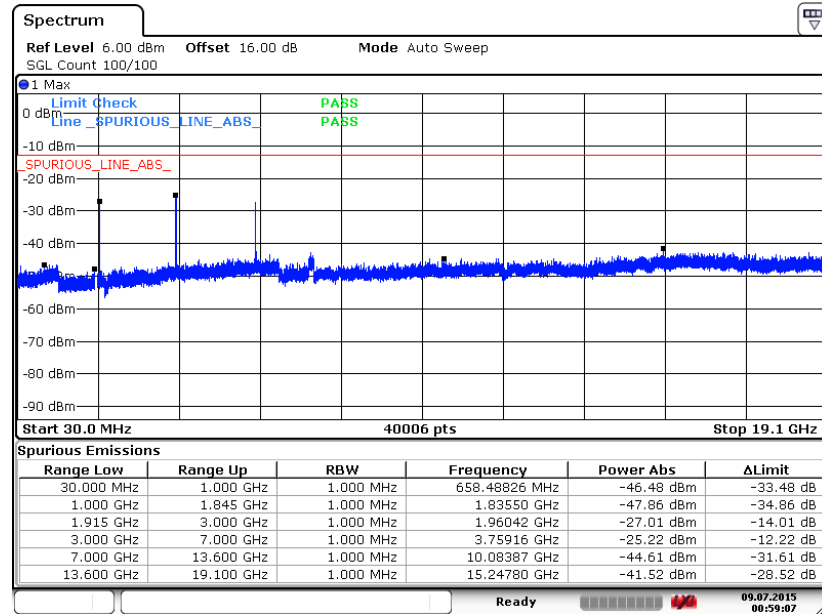
Conducted Spurious Emission Plot between 30MHz ~ 9GHz



Date: 9 JUL 2015 00:25:01



|                    |                       |                    |            |
|--------------------|-----------------------|--------------------|------------|
| <b>Band :</b>      | CDMA2000 BC1          | <b>Channel :</b>   | CH600      |
| <b>Test Mode :</b> | 1xRTT_RC3+SO55 (QPSK) | <b>Frequency :</b> | 1880.0 MHz |

**Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz**

Date: 9 JUL 2015 00:59:07

## 3.7 Field Strength of Spurious Radiation Measurement

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

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

### 3.7.2 Measuring Instruments

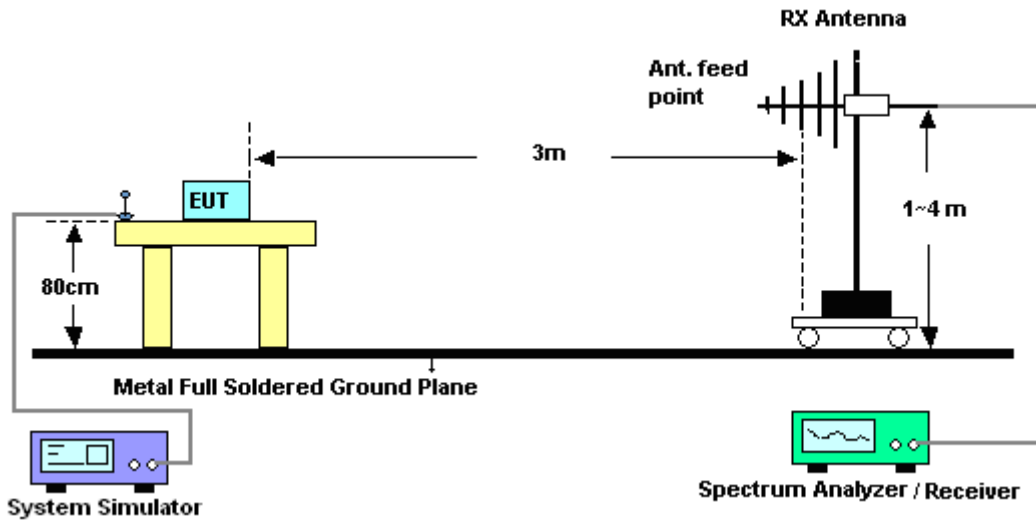
The measuring equipment is listed in the section 4 of this test report.

### 3.7.3 Test Procedures

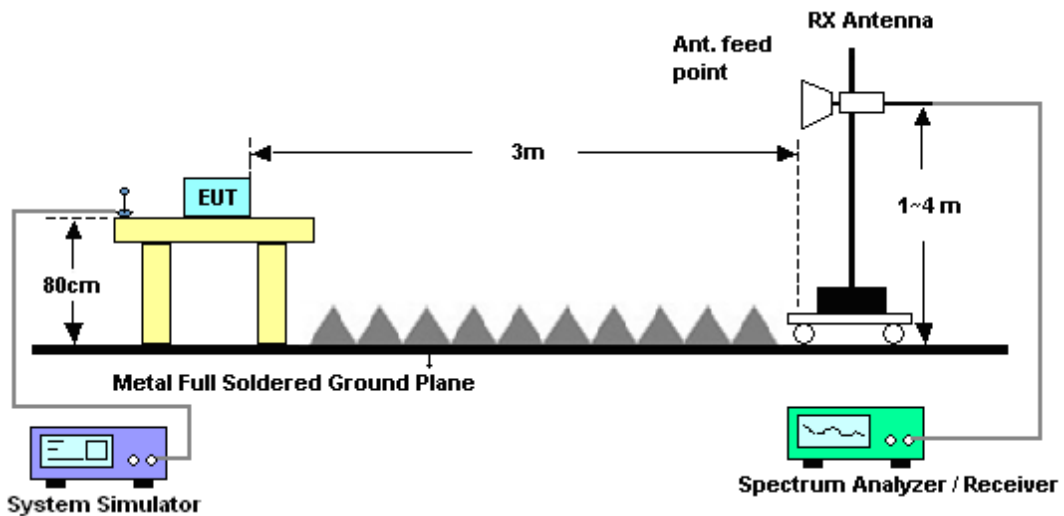
1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-C-2004 Section 2.2.12.
2. The EUT was placed on a rotatable wooden table 0.8 meters above the ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11.  $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
12.  $ERP \text{ (dBm)} = EIRP - 2.15$
13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
14. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)  
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$   
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$   
 $= -13\text{dBm}.$

### 3.7.4 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



**3.7.5 Test Result of Field Strength of Spurious Radiated**

|                 |                                                                                  |         |        |         |         |          |                     |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|--------|---------|---------|----------|---------------------|--------------|--------|
| Band :          | CDMA2000 BC0                                                                     |         |        |         |         |          | Temperature :       | 21~22℃       |        |
| Test Mode :     | 1xRTT_RC3+SO55 (QPSK)                                                            |         |        |         |         |          | Relative Humidity : | 41~42%       |        |
| Test Engineer : | Jack Wang                                                                        |         |        |         |         |          | Polarization :      | Horizontal   |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |        |         |         |          |                     |              |        |
| Frequency       | ERP                                                                              | Limit   | Over   | SPA     | S.G.    | TX Cable | TX Antenna          | Polarization | Result |
|                 |                                                                                  |         | Limit  | Reading | Power   | loss     | Gain                |              |        |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | ( dB ) | (dBm)   | ( dBm ) | ( dB )   | (dBi)               | (H/V)        |        |
| 1672            | -54.22                                                                           | -13     | -41.22 | -56.40  | -56.11  | 1.86     | 5.90                | H            | Pass   |
| 2510            | -49.53                                                                           | -13     | -36.53 | -58.79  | -51.87  | 2.31     | 6.80                | H            | Pass   |
| 3345            | -52.90                                                                           | -13     | -39.90 | -65.53  | -55.30  | 2.85     | 7.40                | H            | Pass   |

|                 |                                                                                  |         |        |         |         |                     |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|--------|---------|---------|---------------------|------------|--------------|--------|
| Band :          | CDMA2000 BC0                                                                     |         |        |         |         | Temperature :       | 21~22°C    |              |        |
| Test Mode :     | 1xRTT_RC3+SO55 (QPSK)                                                            |         |        |         |         | Relative Humidity : | 41~42%     |              |        |
| Test Engineer : | Jack Wang                                                                        |         |        |         |         | Polarization :      | Vertical   |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |        |         |         |                     |            |              |        |
| Frequency       | ERP                                                                              | Limit   | Over   | SPA     | S.G.    | TX Cable            | TX Antenna | Polarization | Result |
|                 |                                                                                  |         | Limit  | Reading | Power   | loss                | Gain       |              |        |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | ( dB ) | (dBm)   | ( dBm ) | ( dB )              | (dBi)      | (H/V)        |        |
| 1672            | -59.06                                                                           | -13     | -46.06 | -57.92  | -60.95  | 1.86                | 5.90       | V            | Pass   |
| 2512            | -48.48                                                                           | -13     | -35.48 | -59.45  | -50.82  | 2.31                | 6.80       | V            | Pass   |
| 3345            | -51.97                                                                           | -13     | -38.97 | -65.95  | -54.37  | 2.85                | 7.40       | V            | Pass   |



|                 |                                                                                  |                     |            |         |         |          |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------------------|------------|---------|---------|----------|------------|--------------|--------|
| Band :          | CDMA2000 BC1                                                                     | Temperature :       | 21~22°C    |         |         |          |            |              |        |
| Test Mode :     | 1xRTT_RC3+SO55 (QPSK)                                                            | Relative Humidity : | 41~42%     |         |         |          |            |              |        |
| Test Engineer : | Jack Wang                                                                        | Polarization :      | Horizontal |         |         |          |            |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |                     |            |         |         |          |            |              |        |
| Frequency       | EIRP                                                                             | Limit               | Over       | SPA     | S.G.    | TX Cable | TX Antenna | Polarization | Result |
| ( MHz )         | ( dBm )                                                                          | ( dBm )             | Limit      | Reading | Power   | loss     | Gain       |              |        |
|                 |                                                                                  |                     | ( dB )     | (dBm)   | ( dBm ) | ( dB )   | (dBi)      | (H/V)        |        |
| 3759            | -50.96                                                                           | -13                 | -37.96     | -65.16  | -55.56  | 3        | 7.60       | H            | Pass   |
| 5640            | -47.15                                                                           | -13                 | -34.15     | -60.94  | -53.41  | 3.84     | 10.10      | H            | Pass   |
| 7521            | -43.77                                                                           | -13                 | -30.77     | -63.55  | -51.27  | 4.43     | 11.93      | H            | Pass   |

|                 |                                                                                  |         |        |         |         |                     |            |              |        |
|-----------------|----------------------------------------------------------------------------------|---------|--------|---------|---------|---------------------|------------|--------------|--------|
| Band :          | CDMA2000 BC1                                                                     |         |        |         |         | Temperature :       | 21~22°C    |              |        |
| Test Mode :     | 1xRTT_RC3+SO55 (QPSK)                                                            |         |        |         |         | Relative Humidity : | 41~42%     |              |        |
| Test Engineer : | Jack Wang                                                                        |         |        |         |         | Polarization :      | Vertical   |              |        |
| Remark :        | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. |         |        |         |         |                     |            |              |        |
| Frequency       | EIRP                                                                             | Limit   | Over   | SPA     | S.G.    | TX Cable            | TX Antenna | Polarization | Result |
|                 |                                                                                  |         | Limit  | Reading | Power   | loss                | Gain       |              |        |
| ( MHz )         | ( dBm )                                                                          | ( dBm ) | ( dB ) | (dBm)   | ( dBm ) | ( dB )              | (dBi)      | (H/V)        |        |
| 3760            | -53.02                                                                           | -13     | -40.02 | -65.51  | -57.62  | 3                   | 7.60       | V            | Pass   |
| 5640            | -47.49                                                                           | -13     | -34.49 | -59.9   | -53.75  | 3.84                | 10.10      | V            | Pass   |
| 7521            | -45.16                                                                           | -13     | -32.16 | -62.95  | -52.66  | 4.43                | 11.93      | V            | Pass   |

## 3.8 Frequency Stability Measurement

### 3.8.1 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.

### 3.8.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

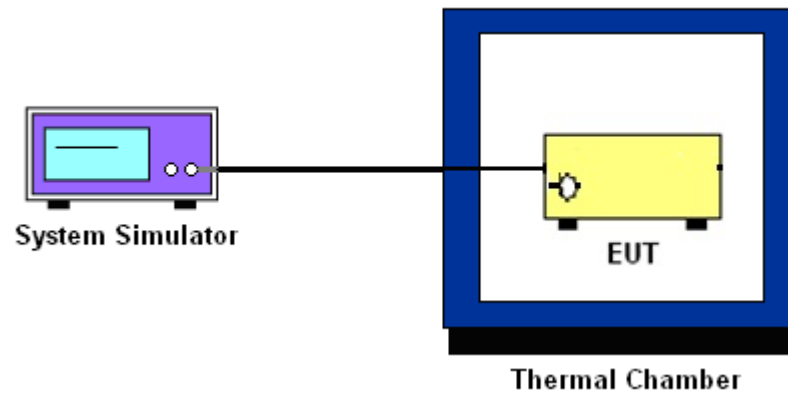
### 3.8.3 Test Procedures for Temperature Variation

1. The testing follows FCC KDB 971168 v02r02 Section 9.0.
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to  $-30^{\circ}\text{C}$  and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in  $10^{\circ}\text{C}$  steps 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.

### 3.8.4 Test Procedures for Voltage Variation

1. The testing follows FCC KDB 971168 v02r02 Section 9.0.
2. The EUT was placed in a temperature chamber at  $25\pm 5^{\circ}\text{C}$  and connected with the system simulator.
3. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
4. The variation in frequency was measured for the worst case.

### 3.8.5 Test Setup



### 3.8.6 Test Result of Temperature Variation

|                      |                             |                    |            |
|----------------------|-----------------------------|--------------------|------------|
| <b>Band :</b>        | CDMA2000 BC0 1xRTT_RC3+SO55 | <b>Channel :</b>   | 384        |
| <b>Limit (ppm) :</b> | 2.5                         | <b>Frequency :</b> | 836.52 MHz |

| Temperature (°C) | Deviation (ppm) | Result |
|------------------|-----------------|--------|
| 50               | 0.0096          | PASS   |
| 40               | 0.0048          |        |
| 30               | 0.0394          |        |
| 20(Ref.)         | 0.0000          |        |
| 10               | 0.0454          |        |
| 0                | 0.0335          |        |
| -10              | 0.0036          |        |
| -20              | 0.0096          |        |
| -30              | 0.0120          |        |

|                      |                             |                    |            |
|----------------------|-----------------------------|--------------------|------------|
| <b>Band :</b>        | CDMA2000 BC1 1xRTT_RC3+SO55 | <b>Channel :</b>   | 600        |
| <b>Limit (ppm) :</b> | within authorized band      | <b>Frequency :</b> | 1880.0 MHz |

| Temperature (°C) | Deviation (ppm) | Result |
|------------------|-----------------|--------|
| 50               | 0.0064          | PASS   |
| 40               | 0.0053          |        |
| 30               | 0.0239          |        |
| 20(Ref.)         | 0.0000          |        |
| 10               | 0.0207          |        |
| 0                | 0.0021          |        |
| -10              | 0.0197          |        |
| -20              | 0.0027          |        |
| -30              | 0.0176          |        |

Note: The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

**3.8.7 Test Result of Voltage Variation**

| Band & Channel        | Mode              | Voltage (Volt) | Deviation (ppm) | Limit (ppm) | Result |
|-----------------------|-------------------|----------------|-----------------|-------------|--------|
| CDMA2000 BC0<br>CH384 | 1xRTT<br>RC3+SO55 | 4.35           | 0.0108          | 2.5         | Pass   |
|                       |                   | 3.8            | 0.0418          |             |        |
|                       |                   | BEP            | 0.0108          |             |        |
| CDMA2000 BC1<br>CH600 | 1xRTT<br>RC3+SO55 | 4.35           | 0.0011          | (Note 3.)   |        |
|                       |                   | 3.8            | 0.0032          |             |        |
|                       |                   | BEP            | 0.0170          |             |        |

**Note:**

1. Normal Voltage = 3.8V.
2. Battery End Point (BEP) = 3.6 V.
3. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.



## 4 List of Measuring Equipment

| Instrument                   | Manufacturer | Model No. | Serial No.   | Characteristics           | Calibration Date | Test Date                       | Due Date      | Remark                   |
|------------------------------|--------------|-----------|--------------|---------------------------|------------------|---------------------------------|---------------|--------------------------|
| Spectrum Analyzer            | R&S          | FSP40     | 100319       | 9kHz~40GHz                | Oct. 28, 2014    | Jun. 29, 2015~<br>Jul. 09, 2015 | Oct. 27, 2015 | Conducted<br>(TH01-KS)   |
| Spectrum Analyzer            | R&S          | FSV30     | 101338       | 9kHz~30GHz                | May 04, 2015     | Jun. 29, 2015~<br>Jul. 09, 2015 | May 03, 2016  | Conducted<br>(TH01-KS)   |
| Thermal Chamber              | Ten Billion  | TTC-B3S   | TBN-960502   | -40~+150°C                | Oct. 25, 2014    | Jun. 29, 2015~<br>Jul. 09, 2015 | Oct. 24, 2015 | Conducted<br>(TH01-KS)   |
| EMI Test Receiver            | R&S          | ESR7      | 101403       | 9kHz~7GHz;<br>Max 30dBm   | Sep. 29, 2014    | Aug. 07, 2015                   | Sep. 28, 2015 | Radiation<br>(03CH02-KS) |
| Spectrum Analyzer            | R&S          | FSV40     | 101040       | 10kHz~40GHz;Ma<br>x 30dBm | Sep. 25, 2014    | Aug. 07, 2015                   | Sep. 24, 2015 | Radiation<br>(03CH02-KS) |
| Bilog Antenna                | TeseQ        | CBL6112D  | 37879        | 30MHz~2GHz                | Sep. 13, 2014    | Aug. 07, 2015                   | Sep. 12, 2015 | Radiation<br>(03CH02-KS) |
| Double Ridge<br>Horn Antenna | ETS-Lindgren | 3117      | 75957        | 1GHz~18GHz                | Nov. 08, 2014    | Aug. 07, 2015                   | Nov. 07, 2015 | Radiation<br>(03CH02-KS) |
| Active Horn<br>Antenna       | com-power    | AHA-118   | 701030       | 1GHz~18GHz                | Nov. 08, 2014    | Aug. 07, 2015                   | Nov. 07, 2015 | Radiation<br>(03CH02-KS) |
| SHF-EHF<br>Horn              | com-power    | AH-840    | 101070       | 18GHz~40GHz               | Sep. 04, 2014    | Aug. 07, 2015                   | Sep. 03, 2015 | Radiation<br>(03CH02-KS) |
| Amplifier                    | com-power    | PA-103A   | 161069       | 1kHz~1000MHz /<br>32 dB   | May 04, 2015     | Aug. 07, 2015                   | May 03, 2016  | Radiation<br>(03CH02-KS) |
| Amplifier                    | Agilent      | 8449B     | 3008A02384   | 1GHz~26.5GHz<br>Gain 30dB | Oct. 28, 2014    | Aug. 07, 2015                   | Oct. 27, 2015 | Radiation<br>(03CH02-KS) |
| AC Power<br>Source           | Chroma       | 61601     | 616010002473 | N/A                       | NCR              | Aug. 07, 2015                   | NCR           | Radiation<br>(03CH02-KS) |
| Turn Table                   | MF           | MF7802    | N/A          | 0~360 degree              | NCR              | Aug. 07, 2015                   | NCR           | Radiation<br>(03CH02-KS) |
| Antenna Mast                 | MF           | MF7802    | N/A          | 1 m~4 m                   | NCR              | Aug. 07, 2015                   | NCR           | Radiation<br>(03CH02-KS) |



## 5 Uncertainty of Evaluation

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

|                                                                          |       |
|--------------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2U_c(y)$ ) | 5.1dB |
|--------------------------------------------------------------------------|-------|