# FCC 47 CFR PART 22H, 24E AND 90S
# CERTIFICATION TEST REPORT

**FOR**

**CDMA 1XRTT BC0/BC1/BC10 SLIDER MOBILE PHONE WITH BT 2.1**

**Model: S3150**

**FCC ID: V65S3150**

**REPORT NUMBER: 13U16201-2**

**ISSUE DATE: OCTOBER 10, 2013**

*Prepared for*
**KYOCERA CORP**
**9520 TOWNE CENTRE DR**
**SAN DIEGO, CA 92121, U.S.A**

*Prepared by*
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NVLAP LAB CODE 200065-0

## Revision History

| Rev. | Issue Date | Revisions | Revised By |
|---|---|---|---|
| -- | 10/10/13 | Initial Issue | T. Chan |

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** KYOCERA CORP
9520 TOWNE CENTRE DR
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**EUT DESCRIPTION:** CDMA 1xRTT BC10/BC0/BC1 Slider Mobile Phone with BT 2.1

**MODEL:** S3150

**SERIAL NUMBER:** 9211100168

**DATE TESTED:** OCTOBER 04 -10, 2013

| APPLICABLE STANDARDS | |
|---|---|
| **STANDARD** | **TEST RESULTS** |
| FCC PART 22H, 24E and 90S | Pass |

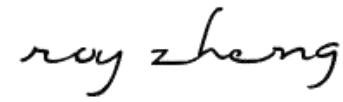
UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Verification Services Inc. By:

THU CHAN
WiSE Operations Manager
UL Verification Services Inc.

Tested By:



ROY ZHENG
WiSE Lab Technician
UL Verification Services Inc.

# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA-603-C, FCC CFR 47 Part 2, Part 22, Part 24 and Part 90.

# 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

| 47173 Benicia Street | 47266 Benicia Street |
|---|---|
| ☐ Chamber A | ☒ Chamber D |
| ☐ Chamber B | ☒ Chamber E |
| ☐ Chamber C | ☐ Chamber F |

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ul.com.

# 4. CALIBRATION AND UNCERTAINTY

## 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

## 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

## 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER | UNCERTAINTY |
|---|---|
| Conducted Disturbance, 0.15 to 30 MHz | 3.52 dB |
| Radiated Disturbance, 30 to 1000 MHz | 4.94 dB |

Uncertainty figures are valid to a confidence level of 95%.

# 5. EQUIPMENT UNDER TEST

## 5.1. DESCRIPTION OF EUT

The EUT is a Tri-bands CDMA 1xRTT slider mobile phone with Bluetooth 2.1 feature.

## 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted and ERP / EIRP output powers as follows:

**CDMA2000**

| Part 90/22/24 Bands | | | | | | |
|---|---|---|---|---|---|---|
| Frequency range (MHz) | Band | Modulation | Conducted (Peak) | | ERP/EIRP (Peak) | |
| | | | dBm | mW | dBm | mW |
| 817.9-823.1 | BC10 | CDMA 2000 1xRTT | 29.09 | 811.0 | 27.66 | 583.4 |
| 824.7-848.31 | BC0 | | 29.21 | 833.7 | 27.56 | 570.2 |
| 1851.25 - 1908.75 | BC1 | | 29.25 | 841.4 | 28.37 | 687.1 |

## 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a band gap type integral antenna with a maximum peak gain as followed:

| Frequency (MHz) | Gain (dBi) |
|---|---|
| Cell band | -1.5 |
| PCS Band | -1.0 |

## 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Version 0.500DSP

The EUT is linked with Agilent 8960 Communication Test Set.

## 5.5. WORST-CASE CONFIGURATION AND MODE

The EUT is a portable device that has three orientations, Closed and Slide open; therefore, X (Lay down), Y (Landscape) and Z orientations (Standup) have been investigated with headset and AC/DC Charger, with EUT closed and slide open and the worst case was found to be at X position for Cell band and Z position for PCS band, closed position with EUT only.

## 5.6. DESCRIPTION OF TEST SETUP

**I/O CABLES (RF CONDUCTED TEST)**

| I/O Cable List | | | | | | |
|---|---|---|---|---|---|---|
| Cable No | Port | # of identical ports | Connector Type | Cable Type | Cable Length (m) | Remarks |
| 1 | DC | 1 | DC | Un-Shielded | 0.5m | NA |
| 2 | RF In/Out | 1 | Directional Coupler | Un-Shielded | 0.2m | NA |
| 3 | RF In/Out | 1 | Spectrum Analyzer | Un-Shielded | 1m | NA |

**I/O CABLES (RF RADIATED TEST)**

| I/O Cable List | | | | | | |
|---|---|---|---|---|---|---|
| Cable No | Port | # of identical ports | Connector Type | Cable Type | Cable Length (m) | Remarks |
| 1 | DC | 1 | DC | Un-Shielded | 1.2m | NA |
| 2 | Jack | 1 | Headset | Un-Shielded | 1m | NA |

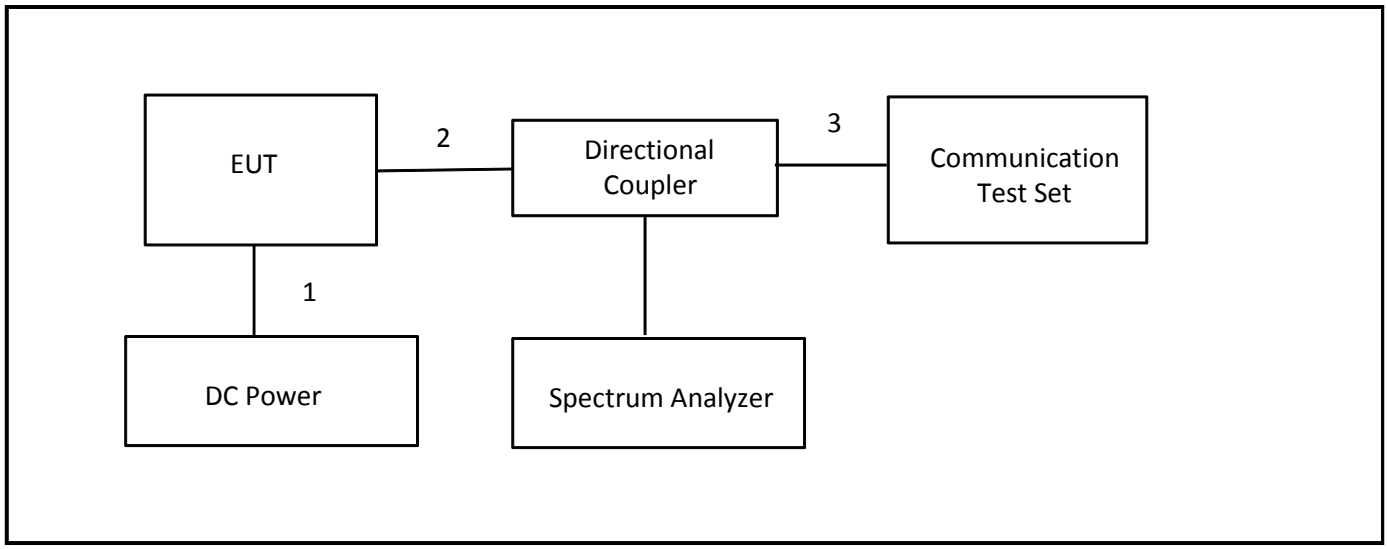
**SUPPORT EQUIPMENT**

| Support Equipment List | | | | |
|---|---|---|---|---|
| Description | Manufacturer | Model | Serial Number | FCC ID |
| AC/DC adapter | Kyocera | SCP-38ADT | 5AAXAD040ULA | NA |
| DC Power Supply | Sorensen | XT 15-4 | 1319A02780 | NA |
| Headset | NA | NA | NA | NA |

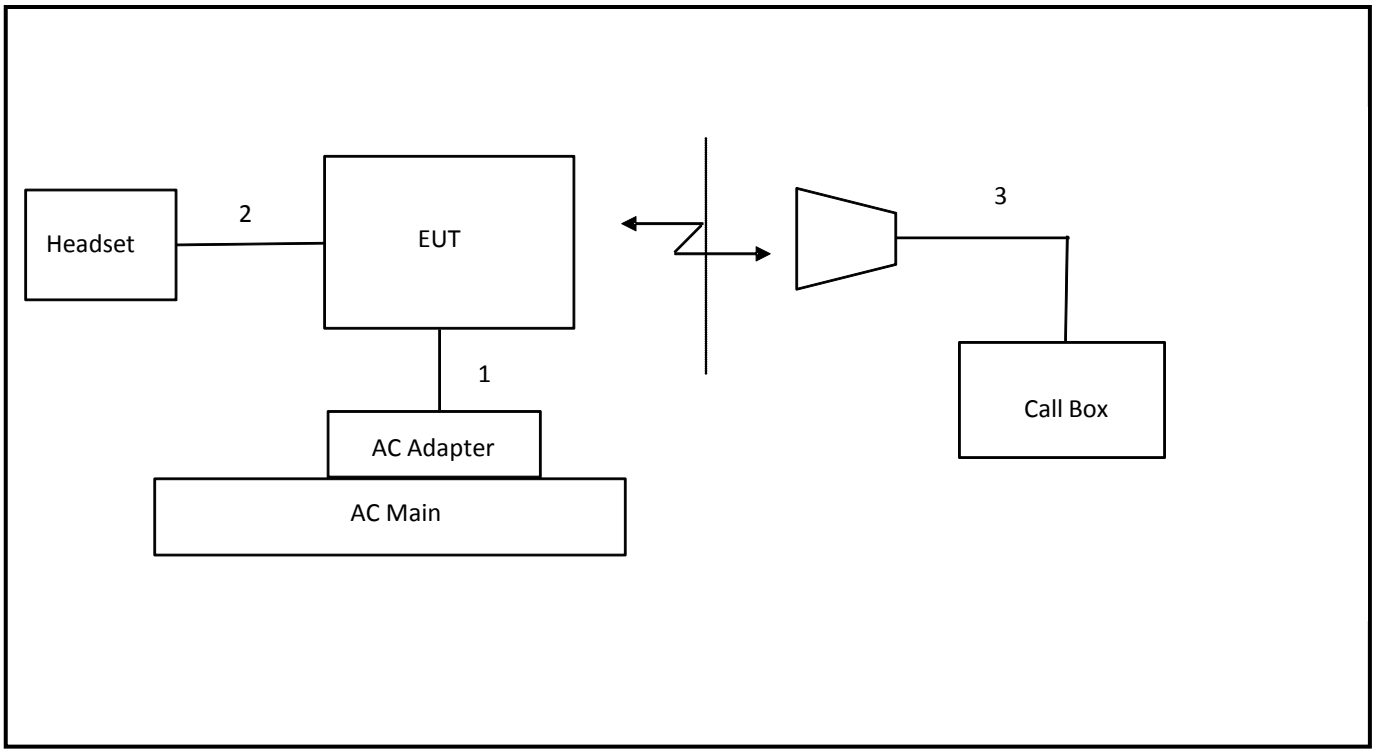
**TEST SETUP**

The EUT is a stand-alone device. The Communication test set linked with the EUT.

**SETUP DIAGRAM FOR RF CONDUCTED TESTS**




**RADIATED SETUP DIAGRAM FOR TESTS**



# 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| TEST EQUIPMENT LIST | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Asset** | **Cal Due** |
| Spectrum Analyzer | Agilent | N9030A | F00127 | 02/21/14 |
| N9030A PXA Signal Analyzer | Agilent | N9030A | F00112 | 01/22/14 |
| Spectrum Analyzer | Agilent | N9030A | F00128 | 02/22/14 |
| Communication Test Set | Agilent / HP | E5515C | C01164 | 11/10/14 |
| Communication Test Set | R & S | CMW500 | F00014 | 02/21/14 |
| Temperature / Humidity Chamber | Thermotron | SE 600-10-10 | C00930 | 01/09/14 |
| Vector signal generator, 6 GHz | Agilent / HP | E4438C | F00037 | 07/06/14 |
| Highpass Filter, 2.7 GHz | Micro-Tronics | HPM13194 | N02686 | CNR |
| Highpass Filter, 1.5 GHz | Micro-Tronics | HPM13193 | N02688 | CNR |
| Bilog, 30-1GHz | Sunol Science | A0222813-1 | F00168 | 03/07/14 |
| Horn Antenna | ETS Lindgren | 3117 | C00872 | 02/19/14 |
| Antenna, Tuned Dipole 400~1000 MHz | ETS Lindgren | 3121C DB4 | C00994 | 07/12/14 |
| PreAmp 1-18GHz | Agilent/HP | 8449B | F0018 | 03/18/14 |
| PreAmp 30-1000MHz | Sonama | 310 | F0009 | 11/06/13 |
| Directional Coupler | Krytar | 1851 | N02656 | CNR |

# 7. RF POWER OUTPUT VERIFICATION

## 7.1. CDMA2000 1xRTT

**TEST PROCEDURE**

This procedure assumes the Agilest 8960 Test Set has the following applications installed and with valid license.

| Application | Rev, License |
|---|---|
| CDMA2000 Mobile Test | B.13.08, L |

- Call Setup > Shift & Preset
- Cell Info > Cell Parameters > System ID (SID) > 4139
  > Network ID (NID) > 1
- Protocol Rev > 6 (IS-2000-0)
- Radio Config (RC) > Please see following table or details
- FCH Service Option (SO) Setup > Please see following table or details
- Traffic Data Rate > Full
- TDSO SCH Info > F-SCH Parameters > F-SCH Data Rate > 153.6 kbps
  > R-SCH Parameters > R-SCH Data Rate > 153.6 kbps
- Rvs Power Ctrl > Active bits
  - Rvs Power Ctrl > All Up bits (Maximum TxPout)

**RESULT**

**BC10 CELL BAND**

| Radio Configuration (RC) | Service Option (SO) | Conducted Output Power (dBm) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Ch.476 / 817.9 MHz | | Ch.580 / 820.5 MHz | | Ch. 684 /823.1 MHz | |
| | | Peak | Average | Peak | Average | Peak | Average |
| RC1 | 2 (Loopback) | 29.00 | 24.47 | 28.96 | 24.33 | 28.95 | 24.57 |
| | 55 (Loopback) | 29.01 | 24.35 | 29.03 | 24.35 | 29.03 | 24.58 |
| RC2 | 9 (Loopback) | 29.04 | 24.44 | 29.02 | 24.32 | 29.09 | 24.57 |
| | 55 (Loopback) | 29.02 | 24.40 | 29.03 | 24.35 | 29.00 | 24.67 |
| RC3 | 2 (Loopback) | 28.67 | 24.34 | 28.72 | 24.32 | 28.90 | 24.37 |
| | 55 (Loopback) | 28.76 | 24.24 | 28.68 | 24.32 | 29.06 | 24.38 |
| | 32 (+ F-SCH) | 28.72 | 24.35 | 28.78 | 24.33 | 29.03 | 24.34 |
| | 32 (+ SCH) | 28.62 | 24.32 | 28.70 | 24.32 | 28.97 | 24.33 |
| RC4 | 2 (Loopback) | 28.63 | 24.31 | 28.74 | 24.32 | 28.96 | 24.38 |
| | 55 (Loopback) | 28.75 | 24.31 | 28.70 | 24.33 | 28.91 | 24.37 |
| | 32 (+ F-SCH) | 28.59 | 24.34 | 28.72 | 24.35 | 28.90 | 24.30 |
| | 32 (+ SCH) | 28.61 | 24.34 | 28.67 | 24.28 | 29.04 | 24.32 |
| RC5 | 9 (Loopback) | 28.66 | 24.30 | 28.71 | 24.34 | 29.00 | 24.40 |
| | 55 (Loopback) | 28.68 | 24.29 | 28.67 | 24.33 | 28.89 | 24.40 |
| RC11 | 2 (Loopback) | 28.72 | 24.31 | 28.67 | 24.33 | 28.88 | 24.36 |
| | 75 (Loopback) | 28.58 | 24.32 | 28.65 | 24.31 | 28.99 | 24.37 |
| | 32 (+ F-SCH) | 28.61 | 24.36 | 28.67 | 24.33 | 29.01 | 24.41 |
| | 32 (+ SCH) | 28.66 | 24.36 | 28.73 | 24.38 | 29.00 | 24.39 |

**BC0 CELL BAND**

| Radio Configuration (RC) | Service Option (SO) | Conducted Output Power (dBm) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Ch.1013/824.7 MHz | | Ch384/836.52 MHz | | Ch.777/848.31 MHz | |
| | | Peak | Average | Peak | Average | Peak | Average |
| RC1 | 2 (Loopback) | 29.15 | 24.71 | 29.02 | 24.59 | 28.93 | 24.72 |
| | 55 (Loopback) | 29.10 | 24.75 | 29.14 | 24.68 | 28.94 | 24.75 |
| RC2 | 9 (Loopback) | 29.21 | 24.65 | 29.11 | 24.62 | 28.94 | 24.85 |
| | 55 (Loopback) | 29.15 | 24.71 | 29.10 | 24.70 | 28.94 | 24.84 |
| RC3 | 2 (Loopback) | 29.14 | 24.51 | 28.88 | 24.52 | 28.78 | 24.51 |
| | 55 (Loopback) | 29.05 | 24.54 | 28.98 | 24.47 | 28.76 | 24.50 |
| | 32 (+ F-SCH) | 29.09 | 24.54 | 28.96 | 24.61 | 28.69 | 24.53 |
| | 32 (+ SCH) | 29.05 | 24.51 | 28.96 | 24.57 | 28.68 | 24.53 |
| RC4 | 2 (Loopback) | 29.08 | 24.48 | 28.92 | 24.59 | 28.68 | 24.50 |
| | 55 (Loopback) | 29.10 | 24.48 | 28.92 | 24.60 | 28.57 | 24.46 |
| | 32 (+ F-SCH) | 29.17 | 24.50 | 28.93 | 24.61 | 28.69 | 24.53 |
| | 32 (+ SCH) | 29.05 | 24.54 | 28.82 | 24.60 | 28.66 | 24.51 |
| RC5 | 9 (Loopback) | 29.10 | 24.47 | 28.95 | 24.56 | 28.70 | 24.47 |
| | 55 (Loopback) | 29.10 | 24.48 | 28.98 | 24.57 | 28.62 | 24.56 |
| RC11 | 2 (Loopback) | 29.12 | 24.55 | 28.91 | 24.63 | 28.79 | 24.56 |
| | 75 (Loopback) | 29.10 | 24.55 | 28.99 | 24.64 | 28.62 | 24.54 |
| | 32 (+ F-SCH) | 29.06 | 24.48 | 28.90 | 24.59 | 28.68 | 24.52 |
| | 32 (+ SCH) | 29.11 | 24.57 | 28.93 | 24.59 | 28.73 | 24.56 |

**BC1 PCS BAND**

| Radio Configuration (RC) | Service Option (SO) | Conducted Output Power (dBm) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Ch. 25 / 1851.25 MHz | | Ch. 600 / 1880 MHz | | Ch. 1175/ 1908.75MHz | |
| | | Peak | Average | Peak | Average | Peak | Average |
| RC1 | 2 (Loopback) | 29.14 | 24.74 | 29.16 | 24.70 | 29.20 | 24.70 |
| | 55 (Loopback) | 29.22 | 24.70 | 29.20 | 24.73 | 29.20 | 24.66 |
| RC2 | 9 (Loopback) | 29.21 | 24.70 | 29.25 | 24.70 | 29.22 | 24.67 |
| | 55 (Loopback) | 29.14 | 24.76 | 29.22 | 24.67 | 29.20 | 24.70 |
| RC3 | 2 (Loopback) | 28.90 | 24.61 | 29.16 | 24.63 | 29.10 | 24.66 |
| | 55 (Loopback) | 28.80 | 24.63 | 29.19 | 24.66 | 29.06 | 24.69 |
| | 32 (+ F-SCH) | 28.87 | 24.52 | 29.14 | 24.52 | 29.04 | 24.57 |
| | 32 (+ SCH) | 28.75 | 24.58 | 29.15 | 24.53 | 29.02 | 24.54 |
| RC4 | 2 (Loopback) | 28.87 | 24.64 | 29.20 | 24.63 | 29.07 | 24.58 |
| | 55 (Loopback) | 28.82 | 24.60 | 29.15 | 24.63 | 29.03 | 24.61 |
| | 32 (+ F-SCH) | 28.85 | 24.59 | 29.15 | 24.56 | 29.04 | 24.54 |
| | 32 (+ SCH) | 28.80 | 24.55 | 29.12 | 24.59 | 29.00 | 24.56 |
| RC5 | 9 (Loopback) | 28.89 | 24.63 | 29.14 | 24.61 | 28.92 | 24.68 |
| | 55 (Loopback) | 28.79 | 24.64 | 29.13 | 24.60 | 29.02 | 24.62 |
| RC11 | 2 (Loopback) | 28.80 | 24.65 | 29.15 | 24.62 | 29.10 | 24.66 |
| | 75 (Loopback) | 28.70 | 24.65 | 29.10 | 24.66 | 29.16 | 24.63 |
| | 32 (+ F-SCH) | 28.78 | 24.57 | 29.15 | 24.60 | 29.05 | 24.50 |
| | 32 (+ SCH) | 28.71 | 24.56 | 29.18 | 24.52 | 29.00 | 24.53 |

# 8. CONDUCTED TEST RESULTS

## 8.1. OCCUPIED BANDWIDTH

**RULE PART(S)**

FCC: §2.1049

**LIMITS**

For reporting purposes only

**TEST PROCEDURE**

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

**MODES TESTED**

CDMA2000 1xRTT (RC2-SO9)

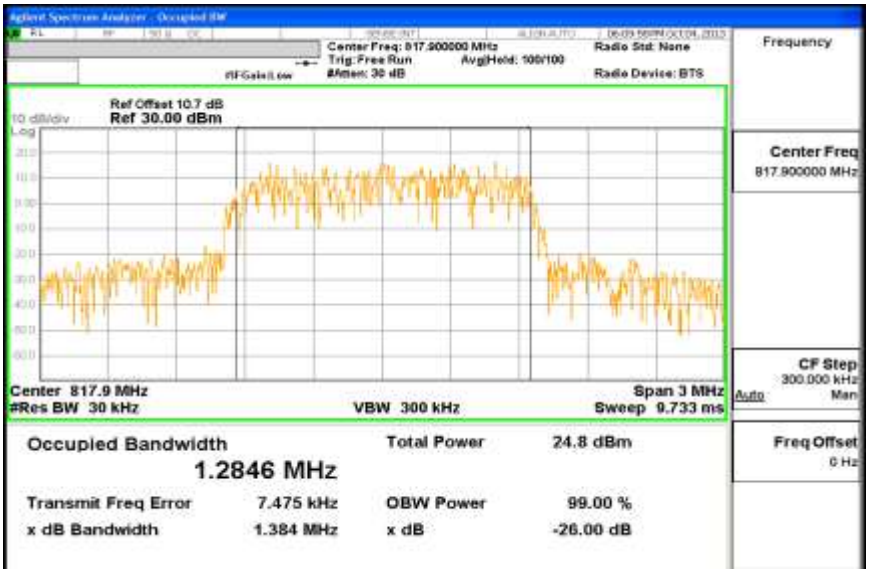
BC10, BC0 and BC1

**RESULTS**

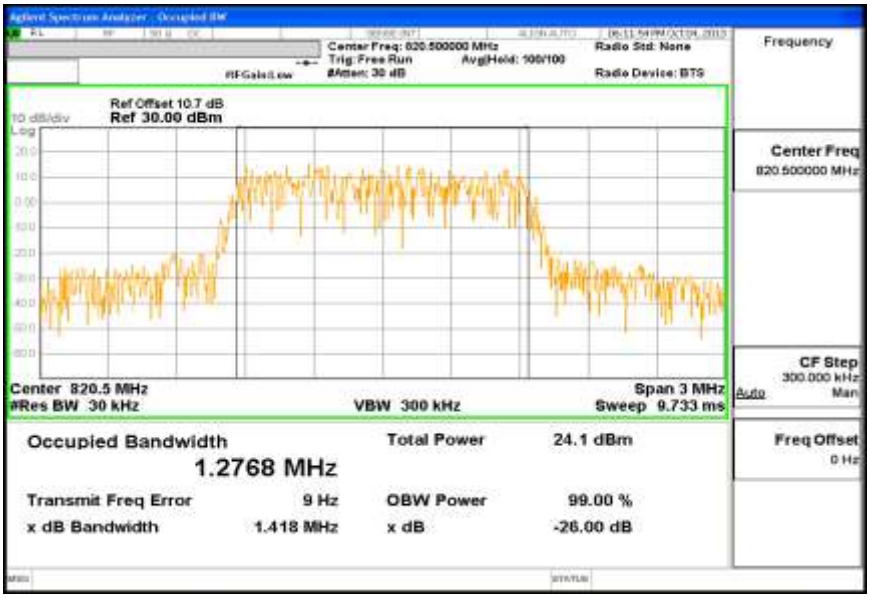
| Band | Mode | Channel | f (MHz) | 99% BW (MHz) | -26dB BW ( MHz) |
|---|---|---|---|---|---|
| BC10 | 1xRTT | 476 | 817.90 | 1.2846 | 1.384 |
| | | 526 | 820.50 | 1.2768 | 1.418 |
| | | 684 | 823.10 | 1.2737 | 1.404 |
| BC0 | | 1013 | 824.70 | 1.2793 | 1.400 |
| | | 384 | 836.52 | 1.2681 | 1.415 |
| | | 777 | 848.31 | 1.2745 | 1.360 |
| BC1 | | 25 | 1851.25 | 1.2813 | 1.395 |
| | | 600 | 1880.00 | 1.2839 | 1.390 |
| | | 1175 | 1908.75 | 1.2876 | 1.382 |

## 8.1.1. CDMA2000 1xRTT, BC10

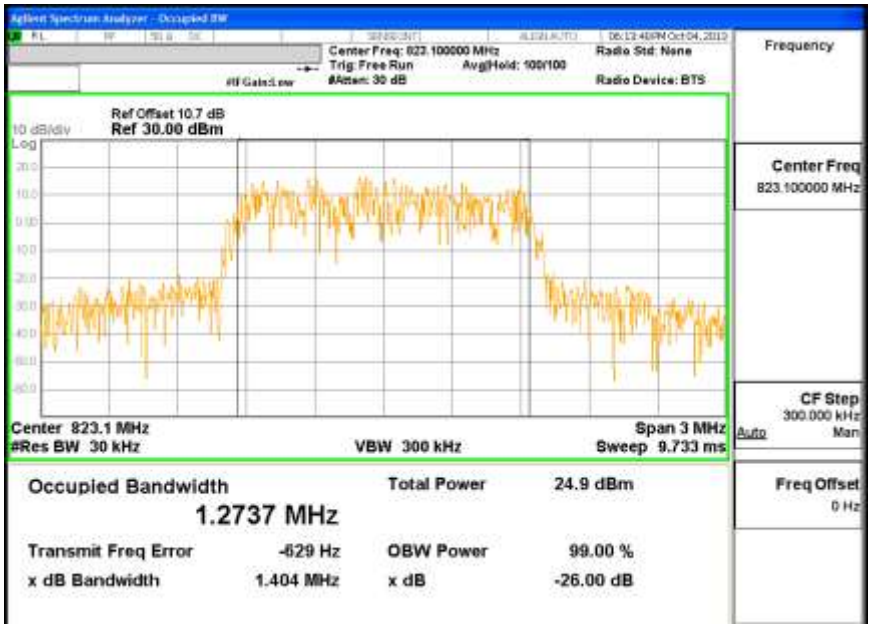
LOW CH




MID CH

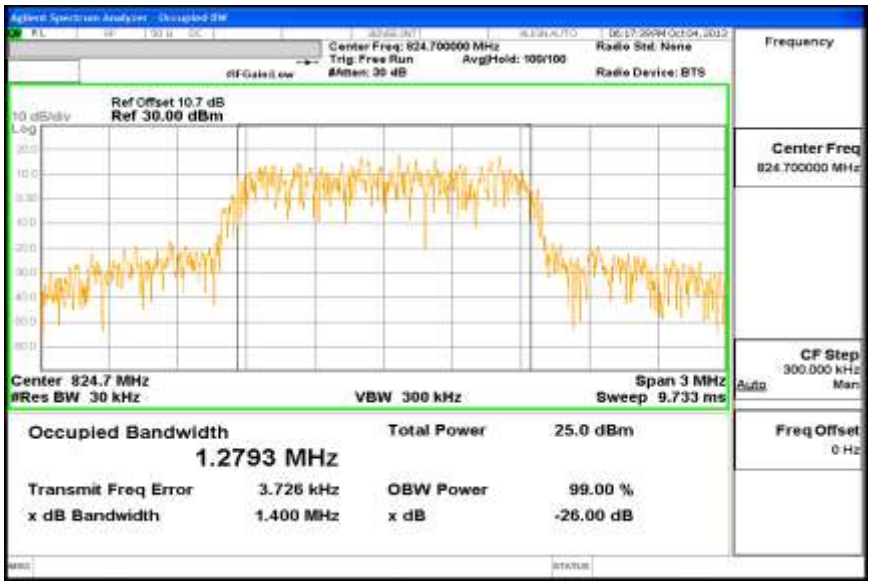


HIGH CH

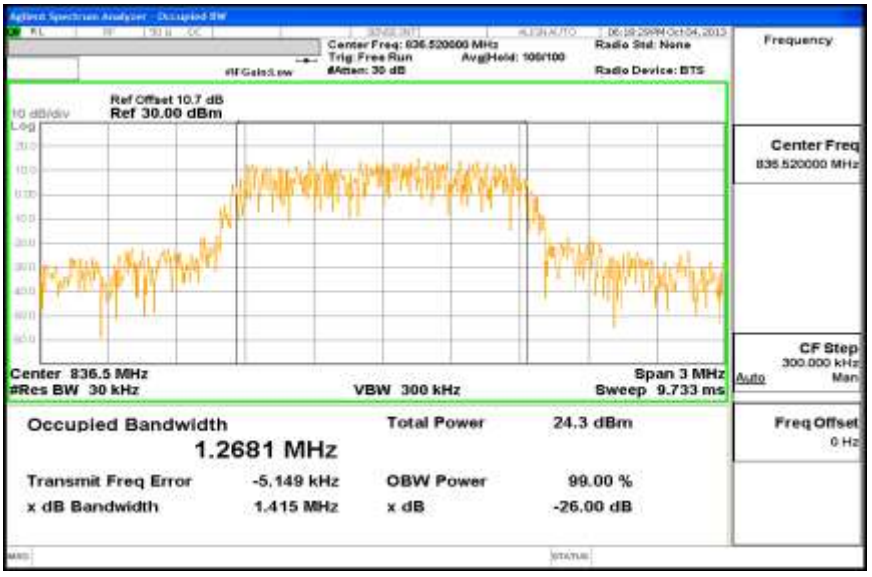


## 8.1.2. CDMA2000 1xRTT, BC0

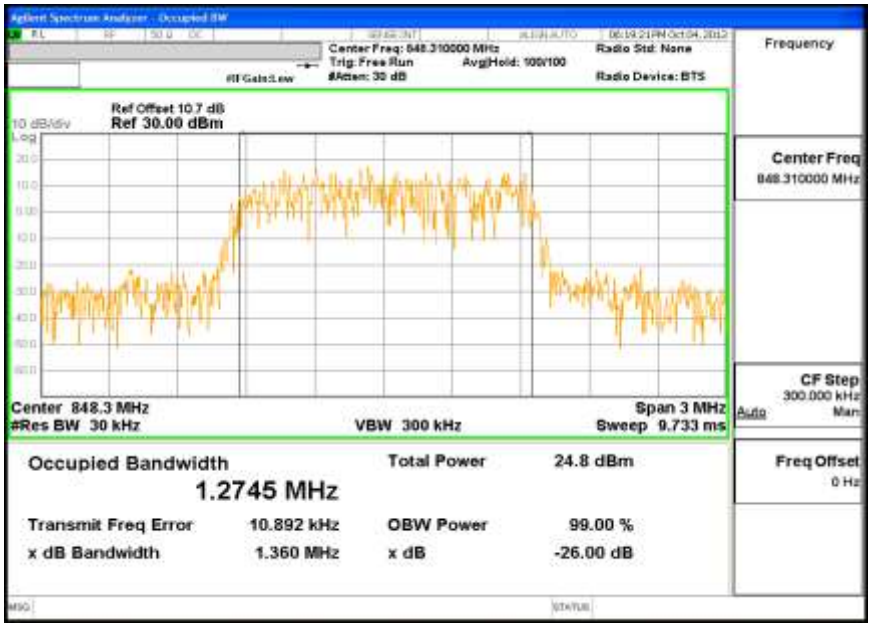
LOW CH




MID CH

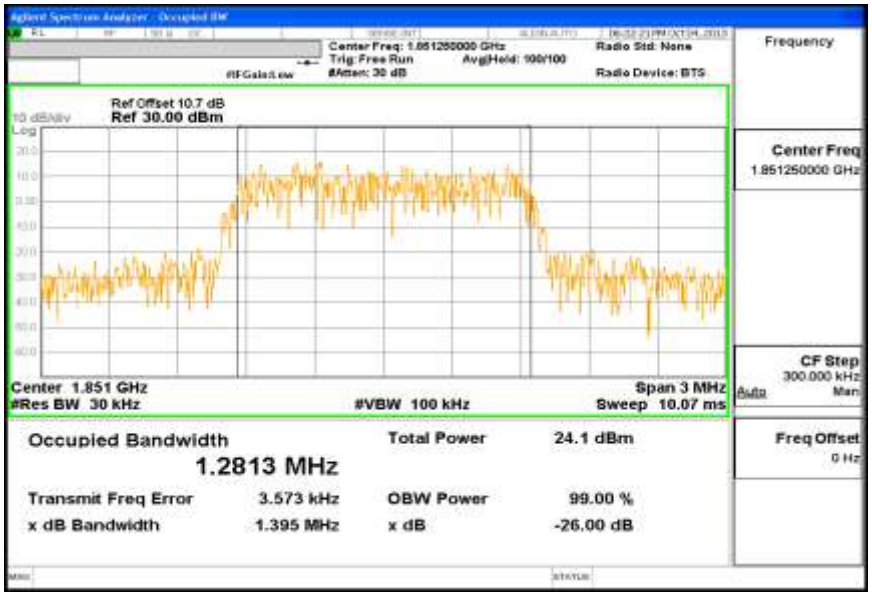


HIGH CH

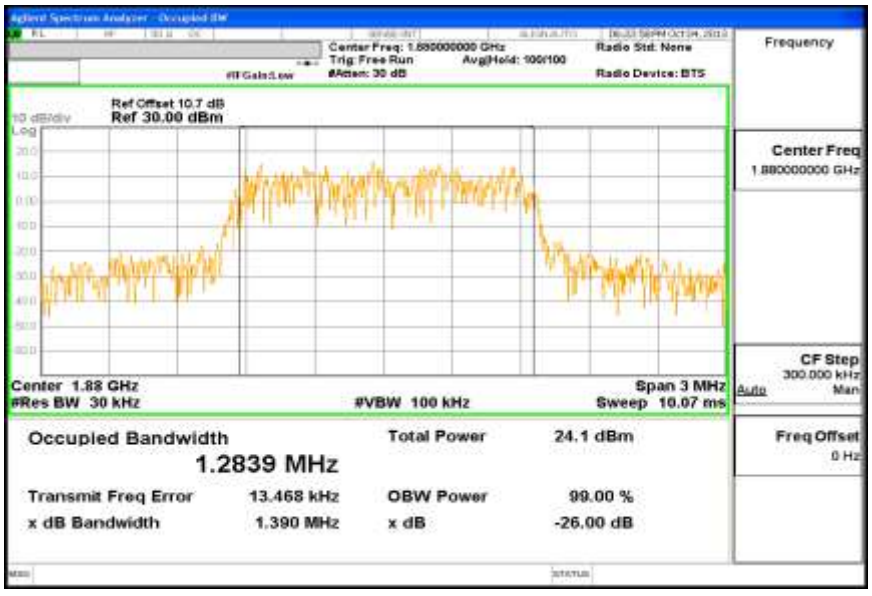


## 8.1.3. CDMA2000 1xRTT, BC1

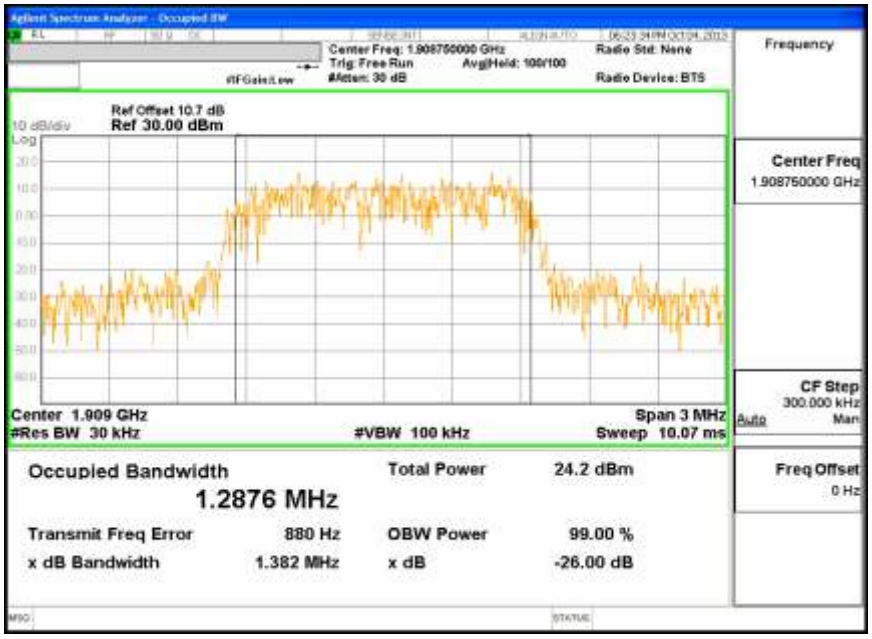
LOW CH




MID CH



HIGH CH



## 8.2. BAND EDGE

**RULE PART(S)**

FCC: §22.359, 24.238, and 90.691

**LIMITS**

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

**TEST PROCEDURE**

The transmitter output was connected to a Agilent 8960 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.
For each band edge measurement:

- Set the spectrum analyzer span to include the block edge frequency ( 817, 824, 849, 1850 and 1910MHz)
- Set a marker to point the corresponding band edge frequency in each test case.
- Set display line at -13 dBm
- Set resolution bandwidth to at least 1% of emission bandwidth.

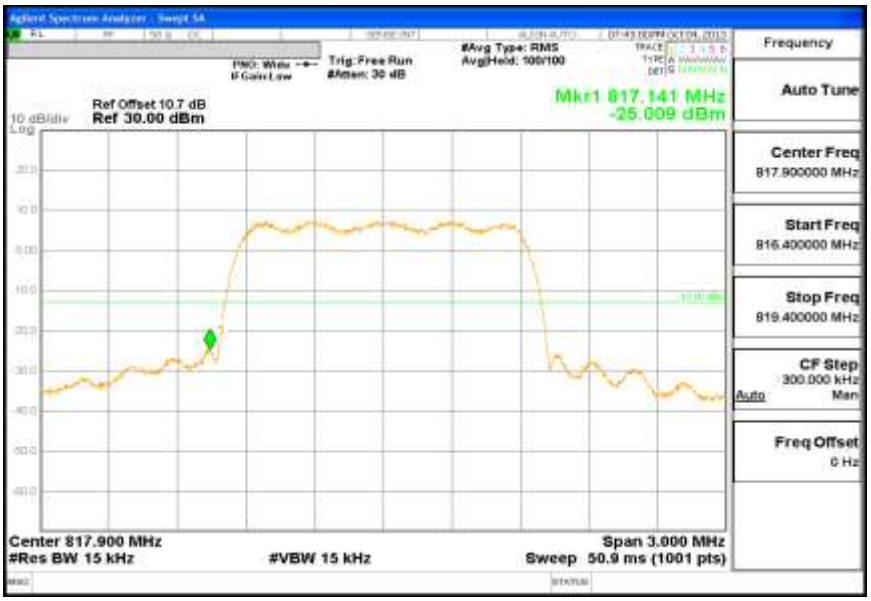
**MODES TESTED**

CDMA2000 1xRTT (RC2-SO9)
BC10, BC0 and BC1

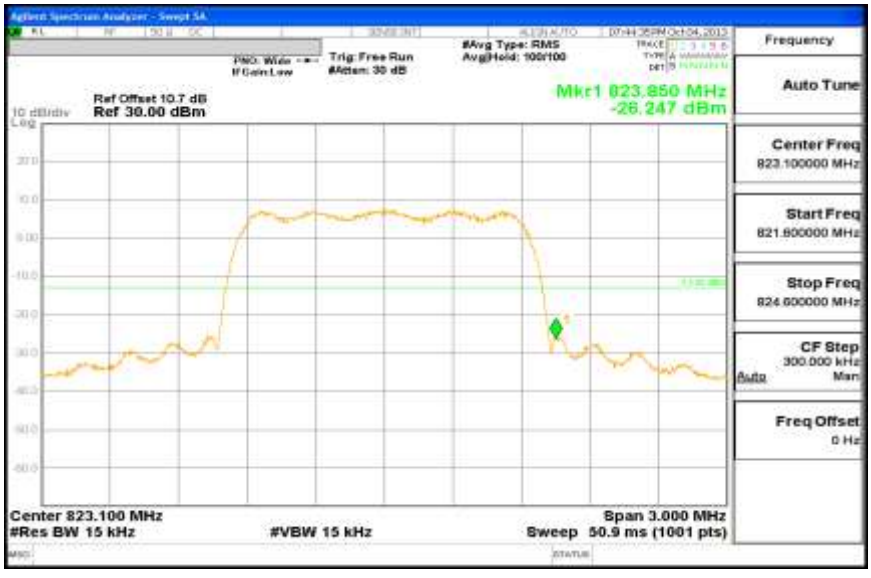
**RESULTS**

## 8.2.1. CDMA2000 1xRTT, BC10

LOW CH




HIGH CH



## 8.2.2. CDMA2000 1xRTT, BC0

LOW CH


HIGH CH

## 8.2.3. CDMA2000 1xRTT, BC1

LOW CH


HIGH CH

## 8.3. OUT OF BAND EMISSIONS

**RULE PART(S)**

FCC: §2.1051, §22.901, §22.917, §24.238, §90.691

**LIMITS**

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

**TEST PROCEDURE**

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

- Set display line at -13 dBm
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

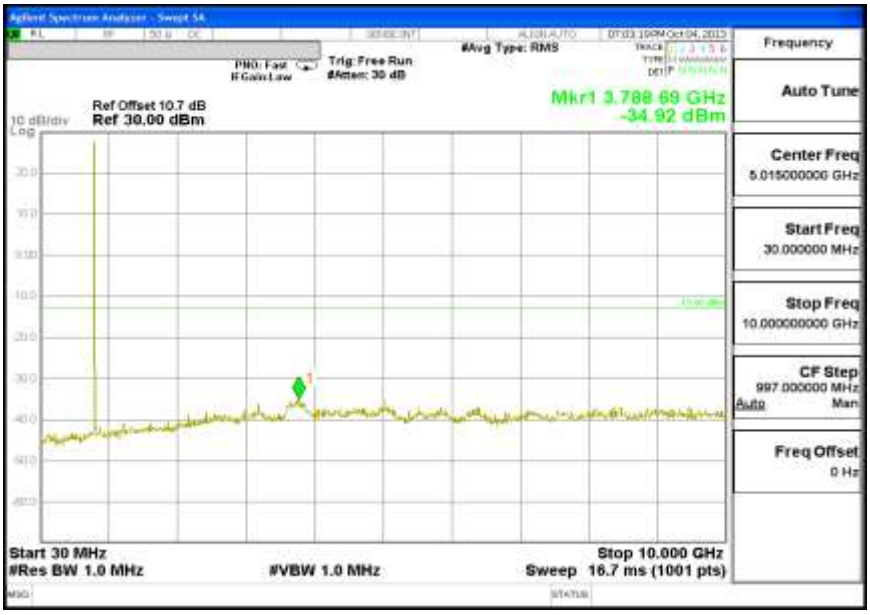
**MODES TESTED**

CDMA2000 1xRTT (RC2-SO9)
BC10, BC0 and BC1

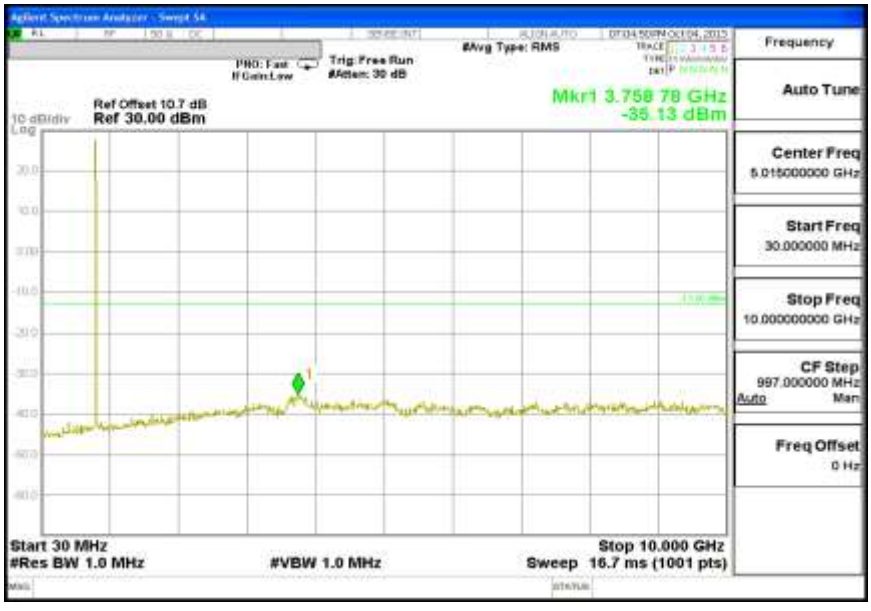
**RESULTS**

## 8.3.1. CDMA2000 1xRTT, BC10

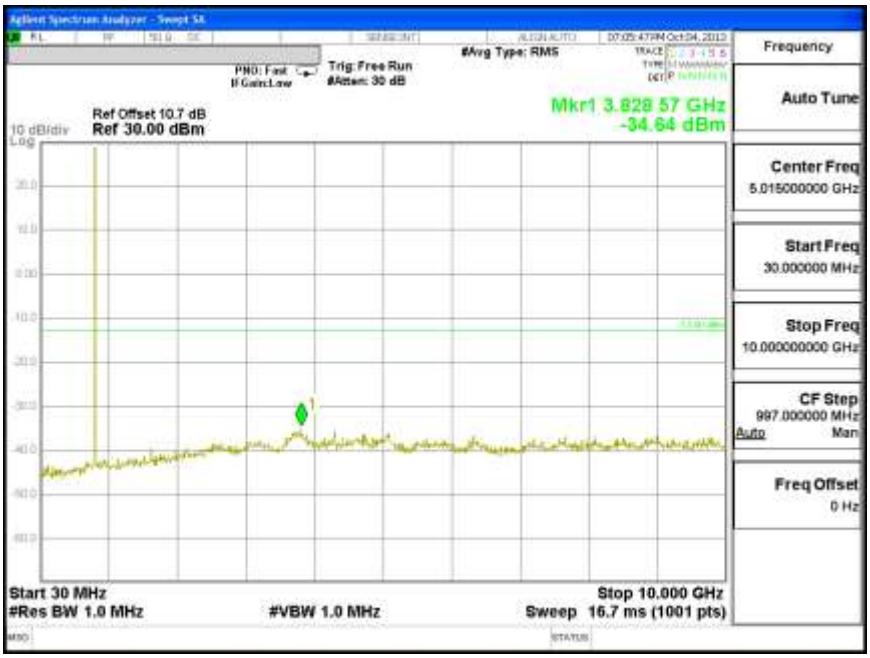
LOW CH




MID CH

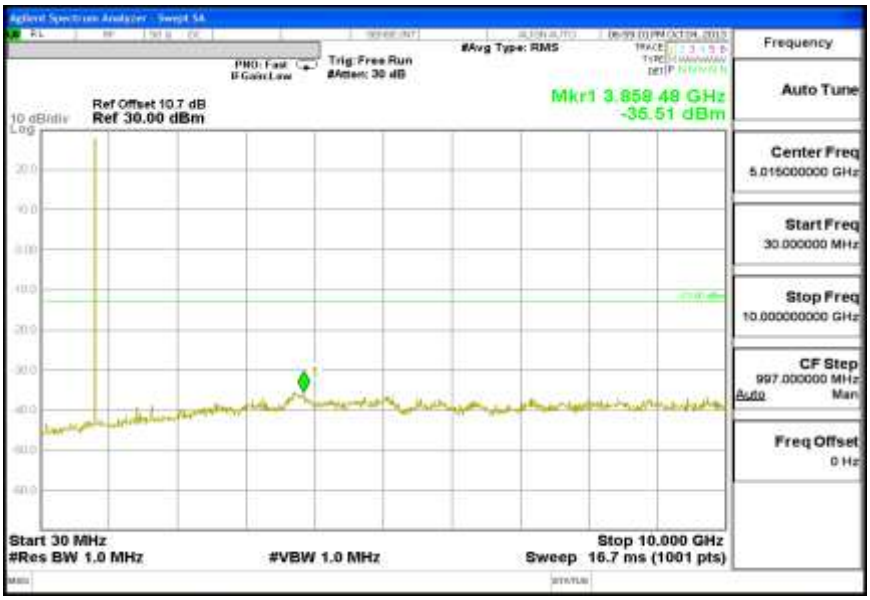


HIGH CH

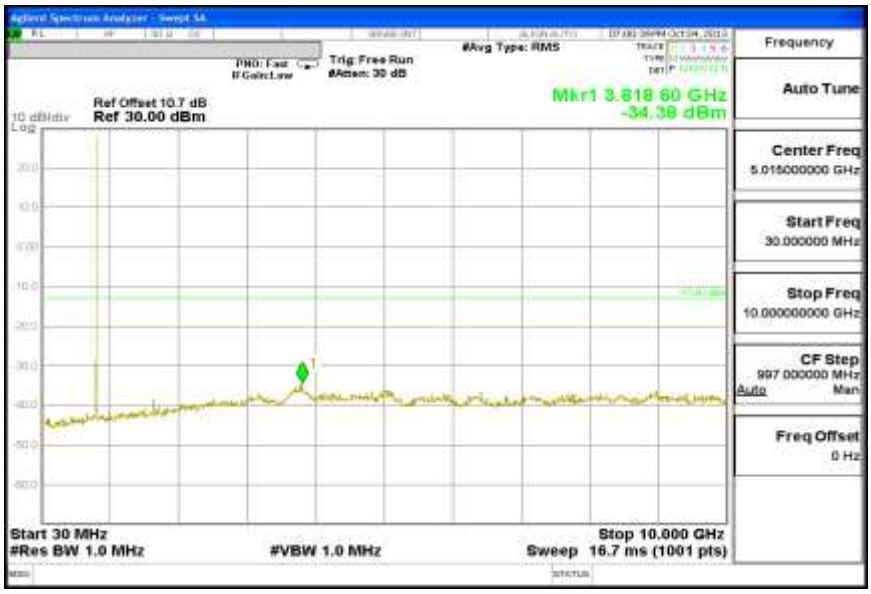


## 8.3.2. CDMA2000 1xRTT, BC0

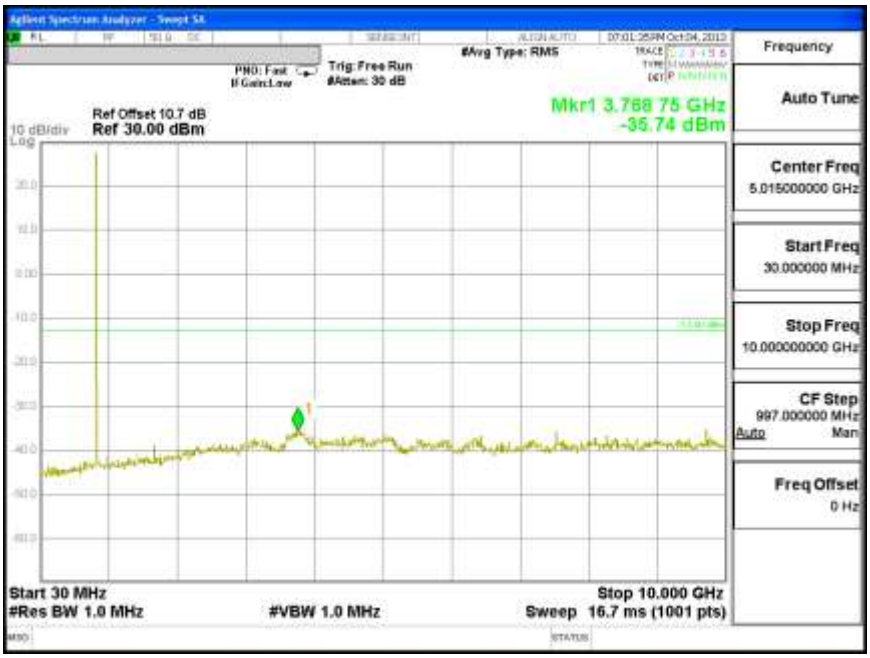
LOW CH




MID CH

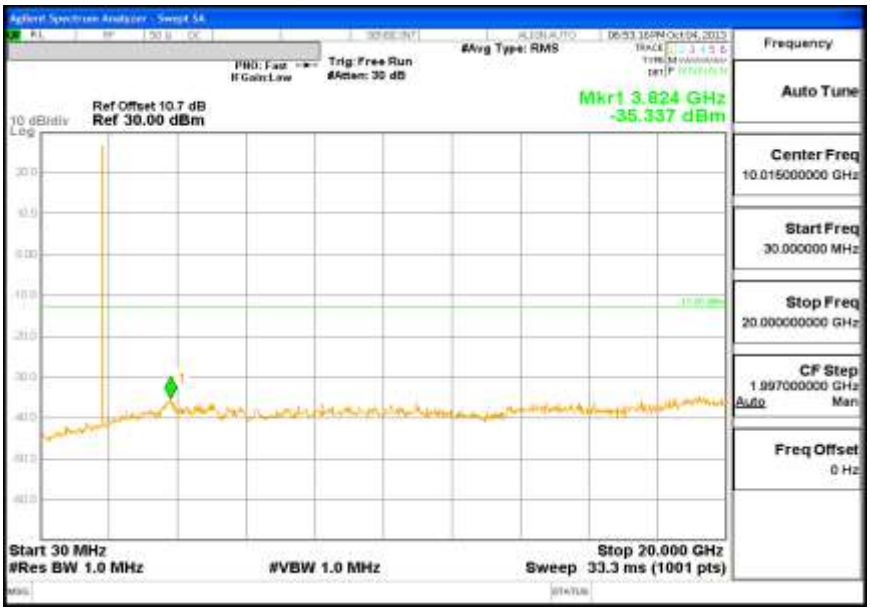


HIGH CH

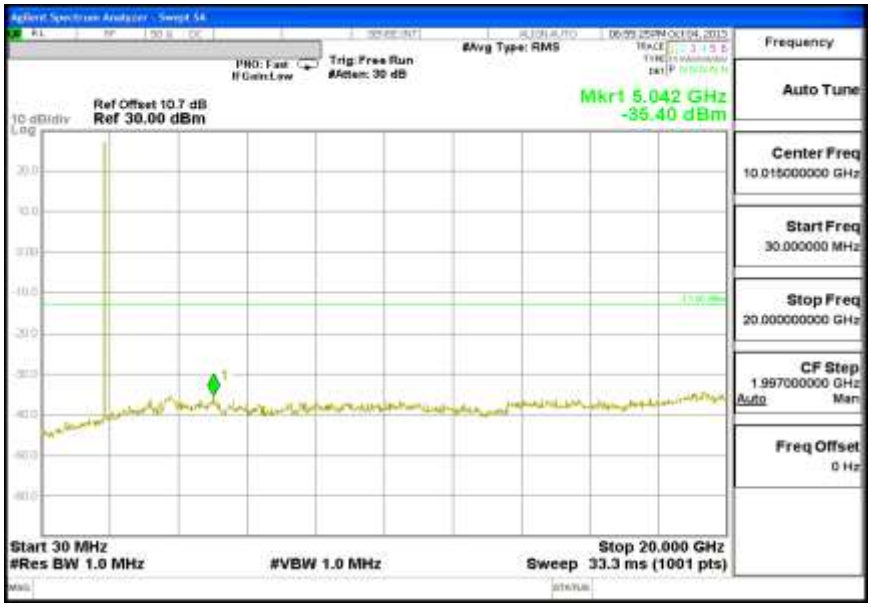


## 8.3.3. CDMA2000 1xRTT, BC1

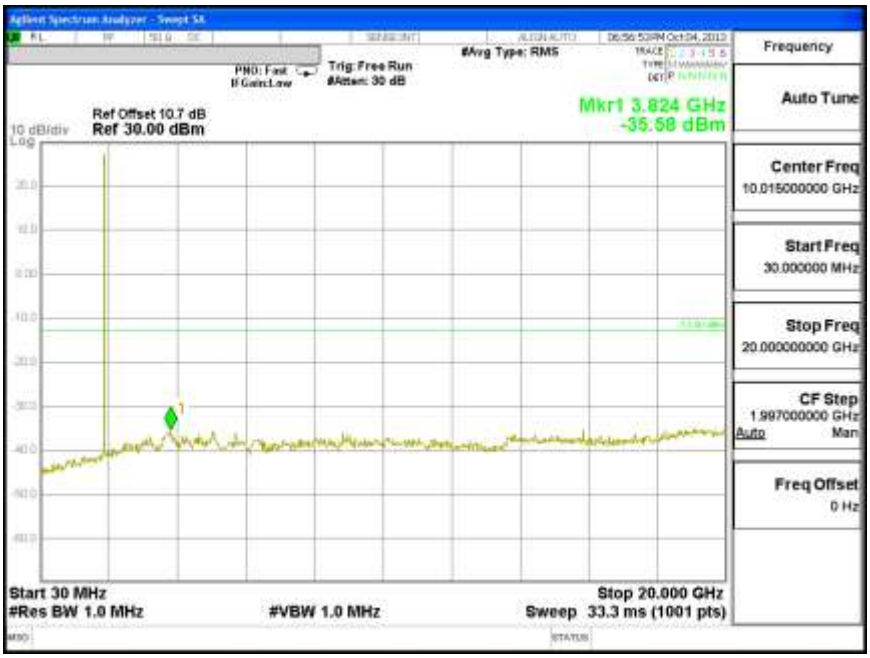
LOW CH




MID CH



HIGH CH



## 8.4. FREQUENCY STABILITY

**RULE PART(S)**

FCC: §2.1055, §22.355, §24.235

**LIMITS**

- §22.355 - The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

- §24.235 - The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

- §90.213(a) - The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

**TEST PROCEDURE**

Use Agilent 8960 and CMW 500 with Frequency Error measurement capability.

- Temp. = −30° to +50°C
- Voltage = (85% - 115%)

**Frequency Stability vs Temperature:**
The EUT is place inside a temperature chamber. The temperature is set to 20ºC and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50ºC is reached.

**Frequency Stability vs Voltage:**
The peak frequency error is recorded (worst-case).

**MODES TESTED**

CDMA2000 1xRTT (RC2-SO9)
BC10, BC0 and BC1

**RESULTS**

See the following pages.

**CDMA2000 1xRTT, BC10**

| Reference Frequency: Cellular Mid Channel 820.499999 MHz @ 20°C<br>Limit: to stay +- 2.5 ppm = 2051.250 Hz | | | | |
|---|---|---|---|---|
| Power Supply (Vdc) | Environment Temperature (°C) | Frequency Deviation Measureed with Time Elapse (MHz) | Delta (ppm) | Limit (ppm) |
| 3.70 | 50 | 820.500002 | -0.005 | 2.5 |
| 3.70 | 40 | 820.500002 | -0.005 | 2.5 |
| 3.70 | 30 | 820.499998 | 0.000 | 2.5 |
| ***3.70*** | ***20*** | ***820.499999*** | ***0*** | 2.5 |
| 3.70 | 10 | 820.499997 | 0.002 | 2.5 |
| 3.70 | 0 | 820.499997 | 0.002 | 2.5 |
| 3.70 | -10 | 820.499996 | 0.003 | 2.5 |
| 3.70 | -20 | 820.499996 | 0.003 | 2.5 |
| 3.70 | -30 | 820.499997 | 0.001 | 2.5 |
| **Reference Frequency: Cellular Mid Channel 820.499999 MHz @ 20°C<br>Limit: to stay +- 2.5 ppm = 2051.250 Hz** | | | | |
| **Power Supply (Vdc)** | **Environment Temperature (°C)** | **Frequency Deviation Measureed with Time Elapse (MHz)** | **Delta (ppm)** | **Limit (ppm)** |
| ***3.70*** | ***20*** | ***820.499999*** | ***0*** | ***2.5*** |
| 4.26 | 20 | 820.500002 | *-0.004* | 2.5 |
| 3.14 | 20 | 820.500000 | *-0.002* | 2.5 |
| End Voltage(3.0V) | 20 | 820.499982 | *0.020* | 2.5 |

**CDMA2000 1xRTT, BC0**

| Reference Frequency: Cellular Mid Channel 836.519998 MHz @ 20°C<br>Limit: to stay +- 2.5 ppm = 2091.300 Hz | | | | |
|---|---|---|---|---|
| Power Supply (Vdc) | Environment Temperature (°C) | Frequency Deviation Measureed with Time Elapse (MHz) | Delta (ppm) | Limit (ppm) |
| 3.70 | 50 | 836.520003 | -0.006 | 2.5 |
| 3.70 | 40 | 836.520003 | -0.005 | 2.5 |
| 3.70 | 30 | 836.520002 | -0.005 | 2.5 |
| ***3.70*** | ***20*** | ***836.519998*** | ***0*** | 2.5 |
| 3.70 | 10 | 836.519997 | 0.001 | 2.5 |
| 3.70 | 0 | 836.519997 | 0.001 | 2.5 |
| 3.70 | -10 | 836.519996 | 0.002 | 2.5 |
| 3.70 | -20 | 836.519997 | 0.001 | 2.5 |
| 3.70 | -30 | 836.519998 | 0.000 | 2.5 |
| **Reference Frequency: Cellular Mid Channel 836.519998MHz @ 20°C<br>Limit: to stay +- 2.5 ppm = 2091.300 Hz** | | | | |
| **Power Supply (Vdc)** | **Environment Temperature (°C)** | **Frequency Deviation Measureed with Time Elapse (MHz)** | **Delta (ppm)** | **Limit (ppm)** |
| ***3.70*** | ***20*** | ***836.519998*** | ***0*** | ***2.5*** |
| 4.26 | 20 | 836.520003 | *-0.005* | 2.5 |
| 3.14 | 20 | 836.520000 | *-0.002* | 2.5 |
| End Voltage(3.0V) | 20 | 836.519997 | *0.001* | 2.5 |

**CDMA2000 1xRTT, BC1**

| Reference Frequency: PCS Mid Channel 1879.999997 MHz @ 20°C<br>Limit: to stay +- 2.5 ppm = 4700.000 Hz | | | | |
|---|---|---|---|---|
| Power Supply (Vdc) | Environment Temperature (°C) | Frequency Deviation Measureed with Time Elapse | | |
| | | (MHz) | Delta (ppm) | Limit (ppm) |
| 3.70 | 50 | 1879.999996 | 0.001 | 2.5 |
| 3.70 | 40 | 1879.999996 | 0.000 | 2.5 |
| 3.70 | 30 | 1879.999997 | 0.000 | 2.5 |
| ***3.70*** | ***20*** | ***1879.999997*** | ***0*** | 2.5 |
| 3.70 | 10 | 1880.000004 | -0.004 | 2.5 |
| 3.70 | 0 | 1880.000005 | -0.004 | 2.5 |
| 3.70 | -10 | 1880.000004 | -0.004 | 2.5 |
| 3.70 | -20 | 1880.000005 | -0.004 | 2.5 |
| 3.70 | -30 | 1880.000004 | -0.004 | 2.5 |
| **Reference Frequency: PCS Mid Channel 1879.999997 MHz @ 20°C<br>Limit: to stay +- 2.5 ppm = 4700.000 Hz** | | | | |
| **Power Supply (Vdc)** | **Environment Temperature (°C)** | **Frequency Deviation Measureed with Time Elapse** | | |
| | | **(MHz)** | **Delta (ppm)** | **Limit (ppm)** |
| ***3.70*** | ***20*** | ***1879.999997*** | ***0*** | ***2.5*** |
| 4.26 | 20 | 1879.999996 | *0.001* | 2.5 |
| 3.14 | 20 | 1880.000000 | *-0.001* | 2.5 |
| End Voltage(3.0V) | 20 | 1879.999986 | *0.006* | 2.5 |

# 9. RADIATED TEST RESULTS

## 9.1. RADIATED POWER (ERP & EIRP)

**RULE PART(S)**

FCC: §2.1046, §22.913, §24.232, § 90.635.

**LIMITS**

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

24.232(c) - Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

§ 90.635 Limitations on power and antenna height.

(a) The effective radiated power and antenna height for base stations may not exceed 1 kilowatt (30 dBw) and 304 m. (1,000 ft.) above average terrain (AAT), respectively, or the equivalent thereof as determined from the Table. These are maximum values, and applicants will be required to justify power levels and antenna heights requested.

(b) The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

Table—Equivalent Power and Antenna Heights for Base Stations in the 851–869 MHz and 935–940 MHz Bands Which Have a Requirement for a 32 km (20 mi) Service Area Radius

| Antenna height (ATT) meters (feet) | Effective radiated power (watts)[1,2,4] |
|---|---|
| Above 1,372 (4,500) | 65 |
| Above 1,220 (4,000) to 1,372 (4,500) | 70 |
| Above 1,067 (3,500) to 1,220 (4,000) | 75 |
| Above 915 (3,000) to 1,067 (3,500) | 100 |
| Above 763 (2,500) to 915 (3,000) | 140 |
| Above 610 (2,000) to 763 (2,500) | 200 |
| Above 458 (1,500) to 610 (2,000) | 350 |
| Above 305 (1,000) to 458 (1,500) | 600 |
| Up to 305 (1,000) | 31,000 |

1Power is given in terms of effective radiated power (ERP).

2Applicants in the Los Angeles, CA, area who demonstrate a need to serve both the downtown and fringe areas will be permitted to utilize an ERP of 1 kw at the following mountaintop sites: Santiago Park, Sierra Peak, Mount Lukens, and Mount Wilson.

3Stations with antennas below 305 m (1,000 ft) (AAT) will be restricted to a maximum power of 1 kw (ERP).

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

**TEST PROCEDURE**

ANSI / TIA / EIA 603C Clause 2.2.17

KDB 971168 v02r01 RF Power output using broadband peak and average power meter method

**MODES TESTED**

CDMA2000 1xRTT (RC2-SO9)
BC10, BC0 and BC1

| Mode | Channel | f (MHz) | ERP | |
|---|---|---|---|---|
| | | | dBm | mW |
| BC10, 1xRTT | 476 | 817.9 | 27.66 | 583.45 |
| | 526 | 820.5 | 27.36 | 544.50 |
| | 684 | 823.1 | 27.20 | 524.81 |

| Mode | Channel | f (MHz) | ERP | |
|---|---|---|---|---|
| | | | dBm | mW |
| BC 0, 1xRTT | 1013 | 824.70 | 27.56 | 570.16 |
| | 384 | 836.52 | 27.06 | 508.16 |
| | 777 | 848.31 | 26.60 | 457.09 |

| Mode | Channel | f (MHz) | EIRP | |
|---|---|---|---|---|
| | | | dBm | mW |
| BC1, 1xRTT | 25 | 1851.25 | 28.00 | 630.96 |
| | 600 | 1880.00 | 28.21 | 662.22 |
| | 1175 | 1908.75 | 28.37 | 687.07 |

**CDMA2000 1xRTT, BC10**

**High Frequency Substitution Measurement**
**Compliance Certification Services Chamber E**

**Company:** Kyocera
**Project #:** 13U16201
**Date:** 10/07/13
**Test Engineer:** R.Zheng
**Configuration:** EUT ONLY
**Mode:** Cell Band BC 10 Peak

**Test Equipment:**
**Receiving: Sunol T407, and Chamber E Cable**
**Substitution: Dipole S/N: 00022117, 8ft SMA Cable (SN # 245185004) Warehouse.**

| f MHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 817.90 | 18.50 | V | 0.5 | 0.0 | 18.00 | 38.5 | -20.4 | |
| 817.90 | 28.16 | H | 0.5 | 0.0 | 27.66 | 38.5 | -10.8 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 819.15 | 18.70 | V | 0.5 | 0.0 | 18.20 | 38.5 | -20.2 | |
| 819.15 | 27.86 | H | 0.5 | 0.0 | 27.36 | 38.5 | -11.1 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 823.10 | 18.85 | V | 0.5 | 0.0 | 18.35 | 38.5 | -20.1 | |
| 823.10 | 27.70 | H | 0.5 | 0.0 | 27.20 | 38.5 | -11.2 | |
| | | | | | | | | |

Rev. 3.17.11

**CDMA2000 1xRTT, BC0**

**High Frequency Substitution Measurement**
**Compliance Certification Services Chamber E**

**Company:** Kyocera
**Project #:** 13U16201
**Date:** 10/07/13
**Test Engineer:** R.Zheng
**Configuration:** EUT ONLY
**Mode:** Cell Band BC 0 Peak

**Test Equipment:**
**Receiving: Sunol T407, and Chamber E Cable**
**Substitution: Dipole S/N: 00022117, 8ft SMA Cable (SN # 245185004) Warehouse.**

| f MHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 824.70 | 19.60 | V | 0.5 | 0.0 | 19.10 | 38.5 | -19.3 | |
| 824.70 | 28.06 | H | 0.5 | 0.0 | 27.56 | 38.5 | -10.9 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 836.52 | 19.40 | V | 0.5 | 0.0 | 18.90 | 38.5 | -19.5 | |
| 836.52 | 27.56 | H | 0.5 | 0.0 | 27.06 | 38.5 | -11.4 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 848.31 | 19.15 | V | 0.5 | 0.0 | 18.65 | 38.5 | -19.8 | |
| 848.31 | 27.10 | H | 0.5 | 0.0 | 26.60 | 38.5 | -11.8 | |
| | | | | | | | | |

Rev. 3.17.11

**CDMA2000 1xRTT, BC1**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

**Company:** Kyocera
**Project #:** 13U16201
**Date:** 10/10/13
**Test Engineer:** R.Zheng
**Configuration:** EUT only
**Mode:** CDMA BC 1 PCS

**Test Equipment:**
**Receiving: Horn T334, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, 8ft SMA Cable (244639001) Warehouse**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.852 | 19.5 | V | 0.70 | 7.94 | 26.77 | 33.0 | -6.2 | |
| 1.852 | 19.9 | H | 0.70 | 8.80 | 28.00 | 33.0 | -5.0 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.880 | 19.6 | V | 0.70 | 7.95 | 26.85 | 33.0 | -6.2 | |
| 1.880 | 20.2 | H | 0.70 | 8.68 | 28.21 | 33.0 | -4.8 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.909 | 19.9 | V | 0.70 | 7.97 | 27.17 | 33.0 | -5.8 | |
| 1.909 | 20.5 | H | 0.70 | 8.57 | 28.37 | 33.0 | -4.6 | |
| | | | | | | | | |

Rev. 3.17.11

## 9.2. FIELD STRENGTH OF SPURIOUS RADIATION

**RULE PART(S)**

FCC: §2.1053, §22.917, §24.238 & § 90.691

**LIMIT**

§22.917 (e) and §24.238 (a): Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

§ 90.691 Emission mask requirements for EA-based systems.

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10 (f/6.1) decibels or 50 + 10 Log10 (P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10Log10 (P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

**TEST PROCEDURE**

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

**MODES TESTED:**

CDMA2000 1xRTT (RC2-SO9)

BC10, BC0 and BC1

**RESULTS**

**CDMA2000 1xRTT, BC10**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Kyocera
**Project #:** 13U16201
**Date:** 10/09/13
**Test Engineer:** R.Zheng
**Configuration:** EUT only
**Mode:** CDMA 2000, 1xRTT, BC10

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T145 8449B | Filter 1 | Part 90 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | ERP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (817.9MHz) | | | | | | | | | |
| 1.636 | -21.1 | V | 3.0 | 32.7 | 1.0 | -52.8 | -13.0 | -39.8 | |
| 2.454 | -21.2 | V | 3.0 | 31.3 | 1.0 | -51.5 | -13.0 | -38.5 | |
| 1.636 | -22.9 | H | 3.0 | 32.7 | 1.0 | -54.6 | -13.0 | -41.6 | |
| 2.454 | -22.8 | H | 3.0 | 31.3 | 1.0 | -53.0 | -13.0 | -40.0 | |
| | | | | | | | | | |
| Mid Ch, (819.15MHz) | | | | | | | | | |
| 1.638 | -20.7 | V | 3.0 | 32.7 | 1.0 | -52.4 | -13.0 | -39.4 | |
| 2.457 | -19.7 | V | 3.0 | 31.3 | 1.0 | -50.0 | -13.0 | -37.0 | |
| 1.638 | -24.1 | H | 3.0 | 32.7 | 1.0 | -55.8 | -13.0 | -42.8 | |
| 2.457 | -22.2 | H | 3.0 | 31.3 | 1.0 | -52.5 | -13.0 | -39.5 | |
| | | | | | | | | | |
| High Ch, (823.1MHz) | | | | | | | | | |
| 1.646 | -22.4 | V | 3.0 | 32.7 | 1.0 | -54.1 | -13.0 | -41.1 | |
| 2.469 | -20.5 | V | 3.0 | 31.3 | 1.0 | -50.8 | -13.0 | -37.8 | |
| 1.646 | -25.5 | H | 3.0 | 32.7 | 1.0 | -57.2 | -13.0 | -44.2 | |
| 2.469 | -22.4 | H | 3.0 | 31.3 | 1.0 | -52.7 | -13.0 | -39.7 | |

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Note: No other emissions were detected above the system noise floor.

**CDMA2000 1xRTT, BC0**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Kyocera
**Project #:** 13U16201
**Date:** 10/09/13
**Test Engineer:** R.Zheng
**Configuration:** EUT only
**Mode:** CDMA 2000, 1xRTT, BC0

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T145 8449B | Filter 1 | Part 22 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | ERP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (824.7MHz) | | | | | | | | | |
| 1.649 | -23.4 | V | 3.0 | 32.7 | 1.0 | -55.1 | -13.0 | -42.1 | |
| 2.474 | -20.5 | V | 3.0 | 31.4 | 1.0 | -50.9 | -13.0 | -37.9 | |
| 1.649 | -24.3 | H | 3.0 | 32.7 | 1.0 | -56.0 | -13.0 | -43.0 | |
| 2.474 | -22.3 | H | 3.0 | 31.4 | 1.0 | -52.7 | -13.0 | -39.7 | |
| | | | | | | | | | |
| Mid Ch, (836.52MHz) | | | | | | | | | |
| 1.673 | -22.5 | V | 3.0 | 32.6 | 1.0 | -54.1 | -13.0 | -41.1 | |
| 2.510 | -20.2 | V | 3.0 | 31.5 | 1.0 | -50.7 | -13.0 | -37.7 | |
| 1.673 | -24.9 | H | 3.0 | 32.6 | 1.0 | -56.5 | -13.0 | -43.5 | |
| 2.510 | -22.5 | H | 3.0 | 31.5 | 1.0 | -53.0 | -13.0 | -40.0 | |
| | | | | | | | | | |
| High Ch, (848.31MHz) | | | | | | | | | |
| 1.697 | -23.0 | V | 3.0 | 32.6 | 1.0 | -54.5 | -13.0 | -41.5 | |
| 2.545 | -20.8 | V | 3.0 | 31.4 | 1.0 | -51.3 | -13.0 | -38.3 | |
| 1.697 | -24.8 | H | 3.0 | 32.6 | 1.0 | -56.3 | -13.0 | -43.3 | |
| 2.545 | -22.4 | H | 3.0 | 31.4 | 1.0 | -52.8 | -13.0 | -39.8 | |
| | | | | | | | | | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**CDMA2000 1xRTT, BC1**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

| | |
|---|---|
| **Company:** | Kyocera |
| **Project #:** | 13U16201 |
| **Date:** | 10/09/13 |
| **Test Engineer:** | R.Zheng |
| **Configuration:** | EUT only |
| **Mode:** | CDMA 2000, 1xRTT, BC1 |

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T145 8449B | Filter 1 | Part 24 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | ERP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1851.25MHz) | | | | | | | | | |
| 3.703 | -21.5 | V | 3.0 | 30.2 | 1.0 | -50.7 | -13.0 | -37.7 | |
| 5.554 | -24.9 | V | 3.0 | 28.4 | 1.0 | -52.3 | -13.0 | -39.3 | |
| 3.703 | -21.5 | H | 3.0 | 30.2 | 1.0 | -50.6 | -13.0 | -37.6 | |
| 5.554 | -23.7 | H | 3.0 | 28.4 | 1.0 | -51.1 | -13.0 | -38.1 | |
| | | | | | | | | | |
| Mid Ch, (1880MHz) | | | | | | | | | |
| 3.760 | -21.4 | V | 3.0 | 30.1 | 1.0 | -50.5 | -13.0 | -37.5 | |
| 5.640 | -24.7 | V | 3.0 | 28.3 | 1.0 | -52.0 | -13.0 | -39.0 | |
| 3.760 | -20.5 | H | 3.0 | 30.1 | 1.0 | -49.6 | -13.0 | -36.6 | |
| 5.640 | -24.0 | H | 3.0 | 28.3 | 1.0 | -51.3 | -13.0 | -38.3 | |
| | | | | | | | | | |
| High Ch, (1908.75MHz) | | | | | | | | | |
| 3.818 | -21.0 | V | 3.0 | 30.1 | 1.0 | -50.1 | -13.0 | -37.1 | |
| 5.726 | -24.8 | V | 3.0 | 28.2 | 1.0 | -52.0 | -13.0 | -39.0 | |
| 3.818 | -20.5 | H | 3.0 | 30.1 | 1.0 | -49.6 | -13.0 | -36.6 | |
| 5.726 | -23.8 | H | 3.0 | 28.2 | 1.0 | -51.0 | -13.0 | -38.0 | |
| | | | | | | | | | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.