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# TEST REPORT For FCC

| | | |
|---|---|---|
| Test Report No. | : | 2007120009 |
| Date of Issue | : | December 4, 2007 |
| FCC ID | : | SG7U802T |
| Model/Type No. | : | U802T |
| Classification | : | Licensed Non-Broadcast Station Transmitter (TNB) |
| Applicant | : | Haier Telecom (Qingdao) Co., Ltd. |
| Applicant Address | : | No1. Haier Road , Hi-tech Zone, Qingdao, China |
| Manufacturer | : | Haier Telecom (I) Pvt.Ltd. |
| Manufacturer Address | : | 862 Udyog Vihar,Phase-V,Gurgaon, Haryana , India |
| Contact Person | : | Mr.Anil kaushik |
| Telephone | : | +91-124-4648019 |
| Received Date | : | November 6, 2007 |
| Test period | : | Start : November 7, 2007 End : December 4, 2007 |
| Test Results | : | ☒ In Compliance ☐ Not in Compliance |

The test results presented in this report relate only to the object tested.

*Tested by*

Eun-Won, Lee
Test Engineer
Date: December 4, 2007

*Reviewed by*

Young-Joon, Park
Technical Manager
Date: December 4, 2007

# REPORT REVISION HISTORY

| Date | Revision | Page No |
|---|---|---|
| December 4, 2007 | Issued (2007120009) | All |
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# TABLE OF CONTENTS

# TEST REPORT

## 1. 1 Scope

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

## 2.1 General Information

| | | |
|---|---|---|
| Classification | : | Licensed Non-Broadcast Station Transmitter (TNB) |
| EUT Type | : | CDMA 1X RTT (800MHz Single Band USB Modem) |
| FCC Rule Part(s) | : | §22(H), §2 |
| CDMA MS Protocol Rev. Number | : | 6 |
| Model name | : | U802T |
| Serial number | : | Identical prototype |
| Emission Designators: | : | 1M28F9W |
| Tx Freq. Range | : | 824.70 ~ 848.31 MHz (Cellular Band) |
| Rx Freq. Range | | 869.70 ~ 893.31 MHz (Cellular Band) |
| Modulation(s): | : | CDMA |
| Frequency Tolerance: | : | ± 0.00025 % (2.5ppm) |
| Max. Power Rating | : | 0.180W ERP CDMA Cellular Band(22.56dBm) |
| Max. SAR Measurement | : | 0.376W/kg CDMA Cellular Band Body SAR |
| Power Source | : | USB 5 Vdc |

# 3.1 DESCRIPTION OF TESTS

## 3.1.1 Occupied Bandwidth Emission Limits

(a) On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P) dB.

(b) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

(c) The measurement of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

## 3.1.2 Occupied Bandwidth

The 99% power bandwidth was measured with a calibrated spectrum analyzer.

## 3.1.3 Spurious and Harmonic Emissions at Antenna Terminal

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer.
The spectrum is scanned from the lowest frequency generated in the equipment up to 10 GHz.

At the input terminals of the spectrum analyzer, an isolator(RF circulator with on port terminated with 50ohms) and an 870 MHz to 890 MHz band pass filter is connected between the test transceiver(for conducted tests)or the receive antenna(for radiated tests) and the analyzer . The rejection of the band pass filter to signals in the 825-845 MHz range is adequate to limit the transmit energy from the test transceiver which appears to a level which will allow the analyzer to measure signals less than-90dBm. Calibration of the test receiver is performed in the 870-890 MHz range to insure accuracy to allow variation in the band pass filter insertion loss to be calibrated.

## 3.1.4 Frequencies

At the input terminals of the spectrum analyzer, an isolator (RF pad) and a high-pass filter are connected between the test transceiver (for conducted tests) or the receive antenna (for radiated tests) and the analyzer. The high-pass filter is to limit the fundamental frequency from interfering with the measurement of low-level spurious and harmonic emissions and to ensure that the preamplifier is not saturated.

## 3.1.5 Radiation Spurious and Harmonic Emissions

Radiation and harmonic emissions are measured outdoors at our 3-meter test range. The equipment under test is placed on a wooden turntable 3-meters from the receive antenna.
The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

## 3.1.6 Frequency Stability / Temperature Variation.

The frequency stability of the transmitter is measured by:

a) **Temperature** :The temperature is varied from -30°C to + 60°C using an environmental chamber.
b) **Primary Supply Voltage** :The primary supply voltage is varied from 85% to 115% of the voltage Normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification –The minimum frequency stability shall be +/- 0.00025% at any time during normal operation.

Specification — The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025(±2.5ppm) of the center frequency.

**Time Period and Procedure:**

1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature (25°C to 27 °C to provide a reference)
2. The equipment is subjected to an overnight "soak" at -30°C without any power applied.
3. After the overnight "soak" at -30°C(usually 14-16 hours),the equipment is turned on in a "standby" condition for one minute before applying power to the transmitter. Measurement of the carrier frequency to the transmitter and the individual oscillators is made within a three minute interval after applying power to the transmitter.
4. Frequency measurements is made at 10°C interval up to room temperature. At least a period of one and one half hour is provided to allow stabilization of the equipment at each temperature level.
5. Again the transmitter carrier frequency and the individual oscillators is measured at room temperature to begin measurement of the upper temperature levels.
6. Frequency were made at 10 intervals starting at -30°C up to +50°C allowing at least two hours at each temperature for stabilization. In all measurements the frequency is measured within three minutes after applying power to the transmitter.
7. The artificial load is mounted external to the temperature chamber.

## 3.1.7 Radiated Emission

Final test was performed according to ANSI C63.4-2003 at the open field test site. There are no deviations from the standard.
The EUT was placed in a 0.8m high table along with the peripherals. The turn table was separated from the antenna distance 3meters. Cables were placed in a position to produce maximum emissions as determined by experimentation, and operation mode was selected for maximum.
The frequencies and amplitudes of maximum emission were measured at varying azimuths, antenna heights and antenna polarities. Reported are maximized emission levels.
These tests were performed at 120kHz of 6dB bandwidth.

## 3.1.8 Conducted Emission

The power line conducted interference measurements were performed according to ANSI C63.4-2003 in a shielded enclosure with peripherals placed on a table, 0.8m high over a metal floor. It was located more than required distance away from the shielded enclosure wall. There are no deviations from the standard.
The EUT was plugged into the LISN and the frequency range of interest scanned.
Reported are maximized emission levels.
These tests were performed at 9kHz of 6dB bandwidth.

# 4.1 TEST DATA

## 4.1.1 Conducted Output Power

The output power was measured under all R.C.s and S.O.s which are listed below measurement data.
The worst case output power is reported with SO55 of RC3 for CELLULAR band.
Therefore this device was tested under SO55 of RC3 for CELLULAR band.

**SAR Measurement Procedures for 3G Devices(Released June 2006)**

- verify maximum output power
  - on high, middle and low channels
  - according to 3GPP2 C.S0011 / TIA-98-E, Sec. 4.4.5
- Power measurement configurations

1. 1X RRT
   - Test Mode 1(C.S0011 Table 4.4.5.2-1), SO55, RC1, Traffic Channel @9600bps
   - Test Mode 3(C.S0011 Table 4.4.5.2-2), SO55 or SO32, RC3, FCH @9600bps
   - Test Mode 3(C.S0011 Table 4.4.5.2-2), SO32, RC3, FCH+SCH @9600bps
   - other configurations supported by the DUT
   - power control
     · Bits Hold for FCH+SCH
     · otherwise ALL Bits Up

2. Ev-DO Rev.0
   - FTAP: 2 slot version of 307.2Kbps (ACK in all slots)
   - RTAP: 153.6Kbps in sub type 0/1 PHY Configuration

- Measurement data

| Band | Channel | 1X RRT | | | | | |
|---|---|---|---|---|---|---|---|
| | | RC1 | RC1 | RC3 | RC3 | RC3 | RC3 |
| | | SO2 | SO55 | SO2 | SO55 | SO32 (Only FCH) | SO32 (TDSO) |
| Cellular | 1013 | 24.42 | 24.54 | 24.57 | **24.58** | 24.53 | 24.54 |
| | 384 | 24.86 | 24.88 | 24.84 | **24.90** | 24.80 | 24.81 |
| | 777 | 24.71 | 24.79 | 24.74 | **24.84** | 24.77 | 24.72 |

## 4.1.2 Effective Radiated Power Output

A. POWER: **High (CDMA Mode)**

| **Freq. Tuned** (MHz) | **REF. LEVEL** (dBm) | **POL** (H/V) | **ERP** (dBm) | **ERP** (W) | **Supplied Power** | **Note** |
|---|---|---|---|---|---|---|
| 824.70 | -16.78 | H | 20.54 | 0.113 | DC 5V | RC3 SO55 |
| **836.52** | **-14.86** | **H** | **22.56** | **0.180** | **DC 5V** | **RC3 SO55** |
| 848.31 | -16.20 | H | 21.16 | 0.131 | DC 5V | RC3 SO55 |

.

**NOTES:**

Effective Radiated Power Output Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

## 4.1.3 CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY : 824.7 MHz
CHANNEL : 1013(Low)
MEASURED OUTPUT POWER : 20.54 dBm = 0.113 W
MODULATION SIGNAL : CDMA (Internal)
DISTANCE : 3 meters
LIMIT : 43 + 10 $\log_{10}$ (W) = 33.54 dBc

| **Freq.** (MHz) | **LEVEL@ ANTENNA TERMINALS** (dBm) | **SUBSTITUTE ANTENNA GAIN** (dBd) | **CORRECT GENERATOR LEVEL** (dBm) | **POL** (H/V) | (dBc) |
|---|---|---|---|---|---|
| 1649.40 | -41.30 | 5.7 | -35.60 | H | -56.14 |
| - | - | - | - | - | - |

- No other emissions were detected at a level greater than 20dB below limit.

**NOTES:**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

## 4.1.3 CDMA Radiated Measurements (Continued…)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY : 836.52 MHz
CHANNEL : 384(Mid)
MEASURED OUTPUT POWER : 22.56 dBm = 0.180 W
MODULATION SIGNAL : CDMA (Internal)
DISTANCE : 3 meters
LIMIT : 43 + 10 $\log_{10}$ (W) = 35.56 dBc

| **Freq.** (MHz) | **LEVEL@ ANTENNA TERMINALS** (dBm) | **SUBSTITUTE ANTENNA GAIN** (dBd) | **CORRECT GENERATOR LEVEL** (dBm) | **POL** (H/V) | (dBc) |
|---|---|---|---|---|---|
| 1673.04 | -38.86 | 5.8 | -33.06 | H | -55.62 |
| - | - | - | - | - | - |

- No other emissions were detected at a level greater than 20dB below limit.

**NOTES:**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

## 4.1.3 CDMA Radiated Measurements (Continued…)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY : 848.31 MHz
CHANNEL : 777(High)
MEASURED OUTPUT POWER : 21.16 dBm = 0.182 W
MODULATION SIGNAL : CDMA (Internal)
DISTANCE : 3 meters
LIMIT : 43 + 10 $\log_{10}$ (W) = 34.16 dBc

| Freq. (MHz) | LEVEL@ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBd) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|---|---|---|---|---|---|
| 1696.62 | -40.60 | 5.9 | -34.70 | H | -55.86 |
| - | - | - | - | - | - |

- No other emissions were detected at a level greater than 20dB below limit.

**NOTES:**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

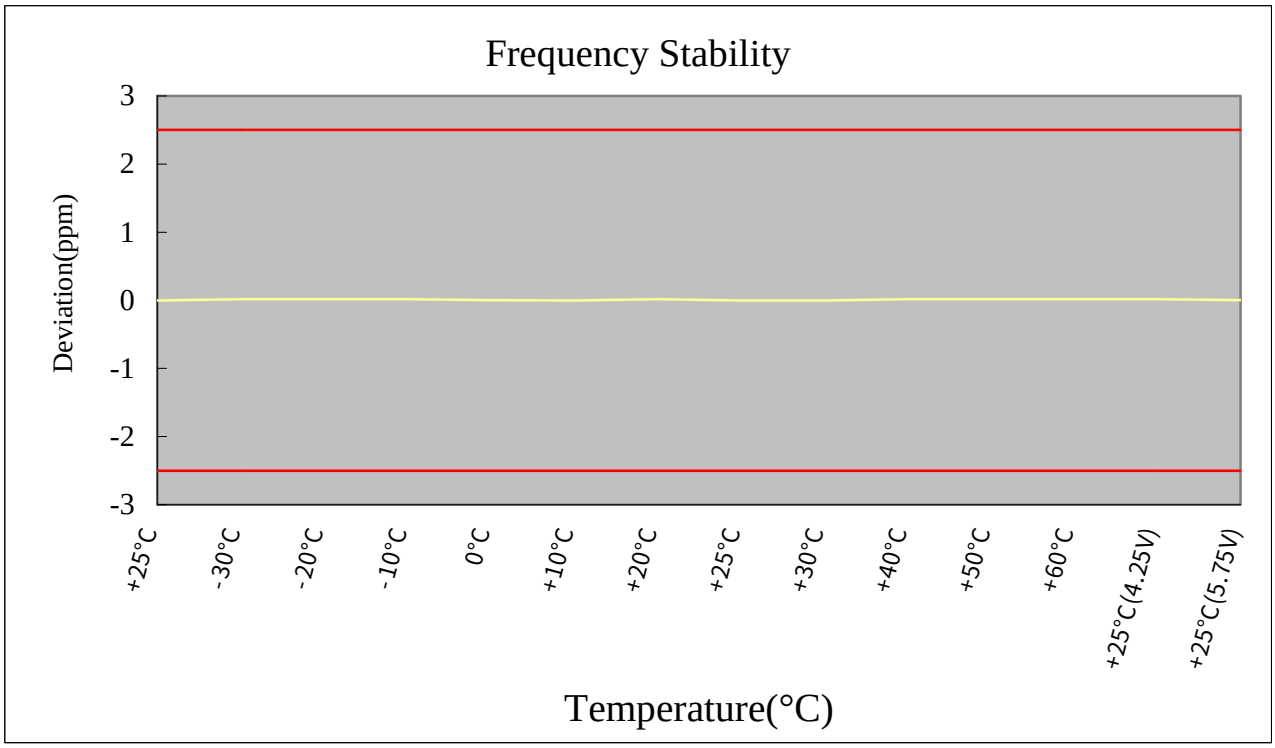
The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

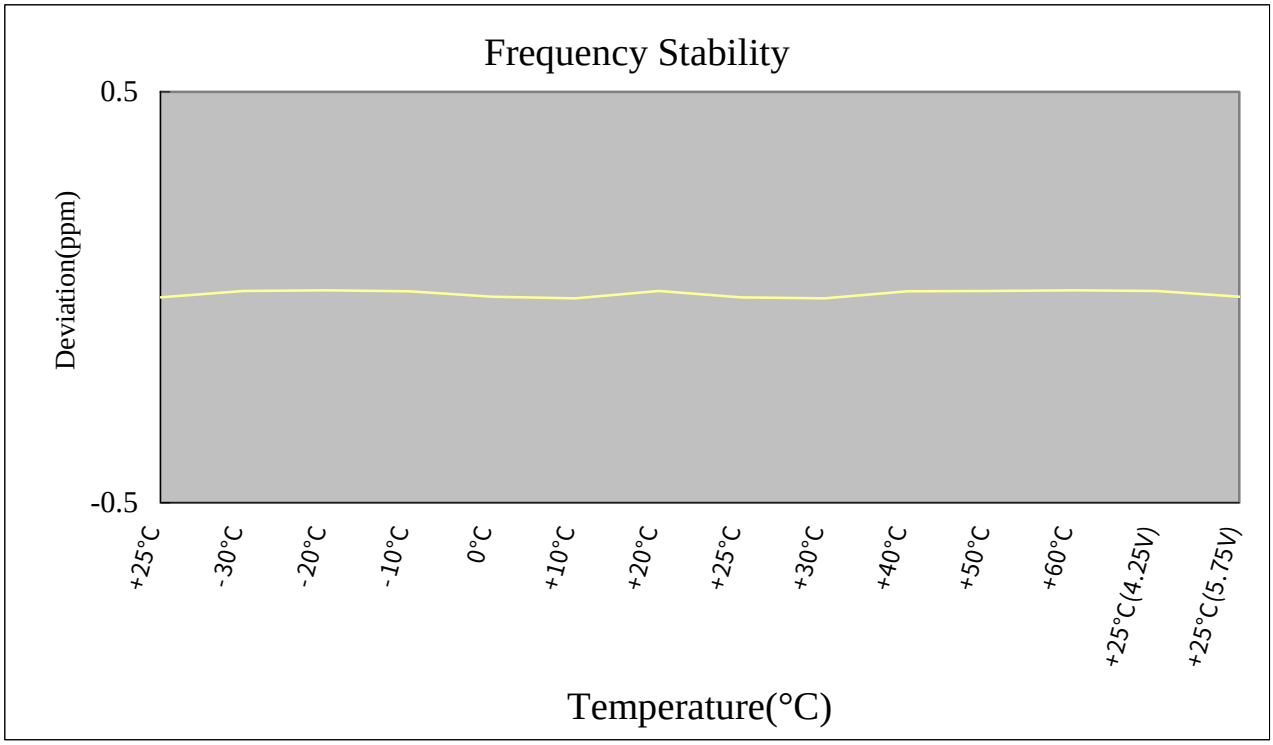
## 4.1.4 Frequency Stability (CDMA)

OPERATING FREQUENCY : 836,519,994 Hz
CHANNEL : 0384(Mid)
REFERENCE VOLTAGE : 5 VDC
DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQ (Hz) | Deviation (%) |
|---|---|---|---|---|
| 100% | 5 | +25(Ref) | 836,519,994 | 0.000000 |
| 100% | | -30 | 836,520,007 | 0.000002 |
| 100% | | -20 | 836,520,008 | 0.000002 |
| 100% | | -10 | 836,520,006 | 0.000001 |
| 100% | | 0 | 836,519,995 | 0.000000 |
| 100% | | +10 | 836,519,992 | 0.000000 |
| 100% | | +20 | 836,520,007 | 0.000002 |
| 100% | | +25 | 836,519,994 | 0.000000 |
| 100% | | +30 | 836,519,992 | 0.000000 |
| 100% | | +40 | 836,520,006 | 0.000001 |
| 100% | | +50 | 836,520,007 | 0.000002 |
| 100% | | +60 | 836,520,008 | 0.000002 |
| 85% | 4.25 | +25 | 836,520,007 | 0.000002 |
| 115% | 5.75 | +25 | 836,519,995 | 0.000000 |
| BATT.ENDPOINT | - | +25 | - | - |

## 4.1.4 Frequency Stability (CDMA) (Continued…)



## 5.1 PLOTS OF EMISSIONS

(SEE ATTACHMENT "Test Plots")

## 6.1 LIST OF TEST EQUIPMENT

| | Name of Equipment | Manufacturer | Model No. | Serial No. | Due Date |
|---|---|---|---|---|---|
| 1 | Spectrum Analyzer | Agilent | 8564E | 3551A0041 | 2008-11-01 |
| 2 | Spectrum Analyzer | HP | E4403B | US39440619 | 2008-09-03 |
| 3 | Spectrum Analyzer | Rohde & Schwarz | FSP-30 | 100994 | 2008-11-19 |
| 4 | EMI Test Receiver | Rohde & Schwarz | ESVS30 | 826638/008 | 2008-03-07 |
| 5 | ULTRA Broadband Antenna | Rohde & Schwarz | HL562 | 361324/014 | 2008-06-12 |
| 6 | LOOP ANTENNA | EMCO | 6502 | 9107-2652 | 2008-10-17 |
| 7 | LOOP ANTENNA | EMCO | 6502 | 9607-3020 | 2008-03-06 |
| 8 | System Power Supply | HP | 6032A | 3440A-10521 | 2008-07-16 |
| 9 | EPM Series Power Meter | HP | E4418A | GB38272734 | 2008-11-03 |
| 10 | Power Sensor | HP | 8481A | 331BA92056 | 2008-11-03 |
| 11 | Power Sensor | HP | 8482B | 331BA05406 | 2008-11-03 |
| 12 | Audio Analyzer | HP | 8903B | 2747A03432 | 2008-11-01 |
| 13 | ESG-D Series Signal Generator | Agilent | E4432B | US40054094 | 2008-11-01 |
| 14 | SYNTHESIZED SWEEPER | HP | 8341B | 2819A01563 | 2008-11-22 |
| 15 | Modulation Analyzer | HP | 8901B | 3438A05228 | 2008-11-08 |
| 16 | Attenuator | HP | 8494A | 3308A33351 | 2008-11-06 |
| 17 | Attenuator | HP | 8496A | 3308A15142 | 2008-11-06 |
| 18 | Temp&Humi Chamber | Kunpoong | KP-1000 | 2002KP050041 | 2008-01-15 |
| 19 | Temp&Humi Chamber | Kunpoong | KP-RC2000 | 2002KP650042 | 2008-01-15 |
| 20 | EMC Analyzer | Agilent | E7405A | MY45110859 | 2008-01-09 |
| 21 | Horn Antenna | ETS-Lindgren | 3115 | 00078894 | 2008-11-29 |
| 22 | Horn Antenna | ETS-Lindgren | 3115 | 00078895 | 2008-11-29 |
| 23 | Horn Antenna | ETS-Lindgren | 3116 | 00062504 | 2008-11-27 |
| 24 | Horn Antenna | ETS-Lindgren | 3116 | 00062916 | 2008-11-27 |
| 25 | Dipole Antenna | SCHWARZBECK | VHA 9103 | VHA91032557 | 2009-11-27 |
| 26 | Dipole Antenna | SCHWARZBECK | UHA 9105 | UHA91052417 | 2009-11-27 |
| 27 | OPT H64 AMPLIFIER | HP | 8447F | 3113A06814 | 2008-02-28 |
| 28 | PREAMPLIFIER | Agilent | 8449B | 3008A02307 | 2007-11-20 |
| 29 | Radio Communication Tester | Rohde & Schwarz | CMU200 | 106765 | 2008-02-09 |
| 30 | Band Reject Filter | Wainwright Instruments | WRCG824 | - | 2008-04-16 |
| 31 | Band Reject Filter | Wainwright Instruments | WRCG1750 | - | 2008-04-13 |

# 7.1 SAMPLE CALCULATIONS

## A. Emission Designator

**- Cellular Band**

Emission Designator = 1M28F9W

CDMA BW = 1.2770 MHz
F = Frequency Modulation
9 = Composite Digital Info
W = Combination (Audio/Data)
(Measured at the 99% power bandwidth)

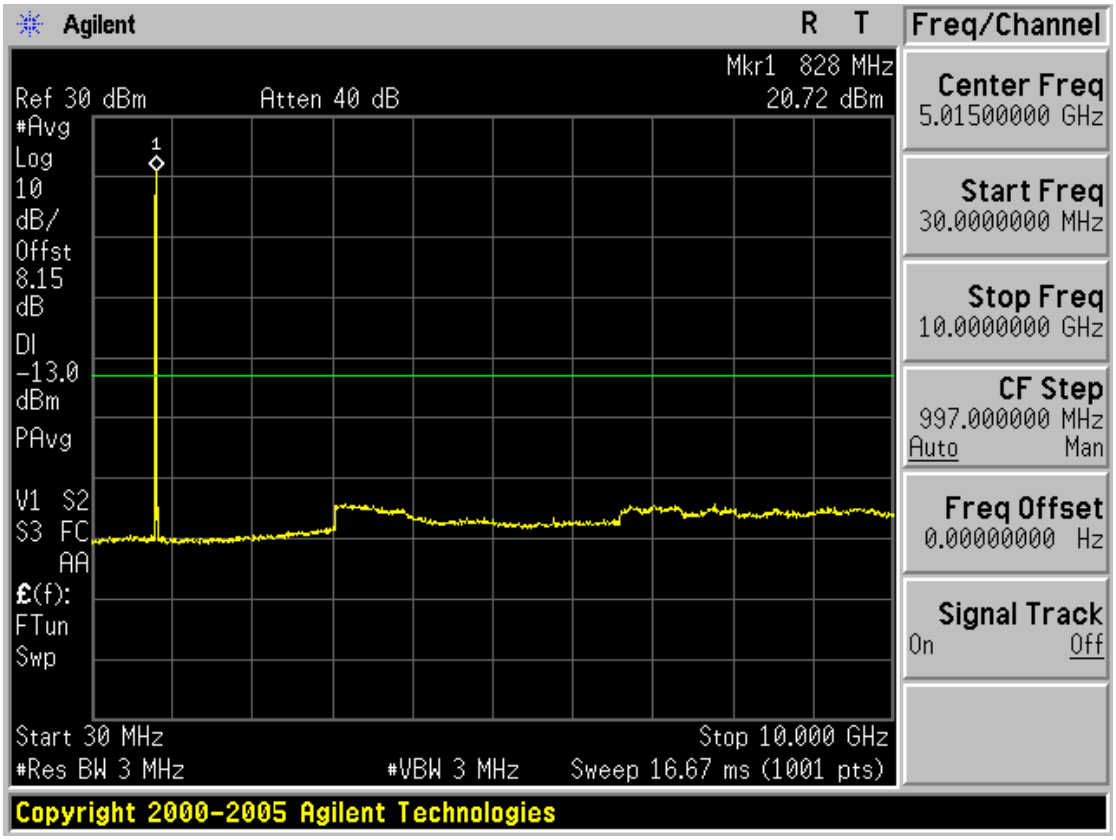
## 8.1 CONCLUSION

The data collected shows that the **Haier Telecom (I) Pvt.Ltd** CDMA 1X RTT (800MHz Single Band USB Modem) (**FCC ID: SG7U802T)** complies with all the requirements of Parts 2 and 22 of the FCC rules.

# ATTACHMENT
# Test Plots

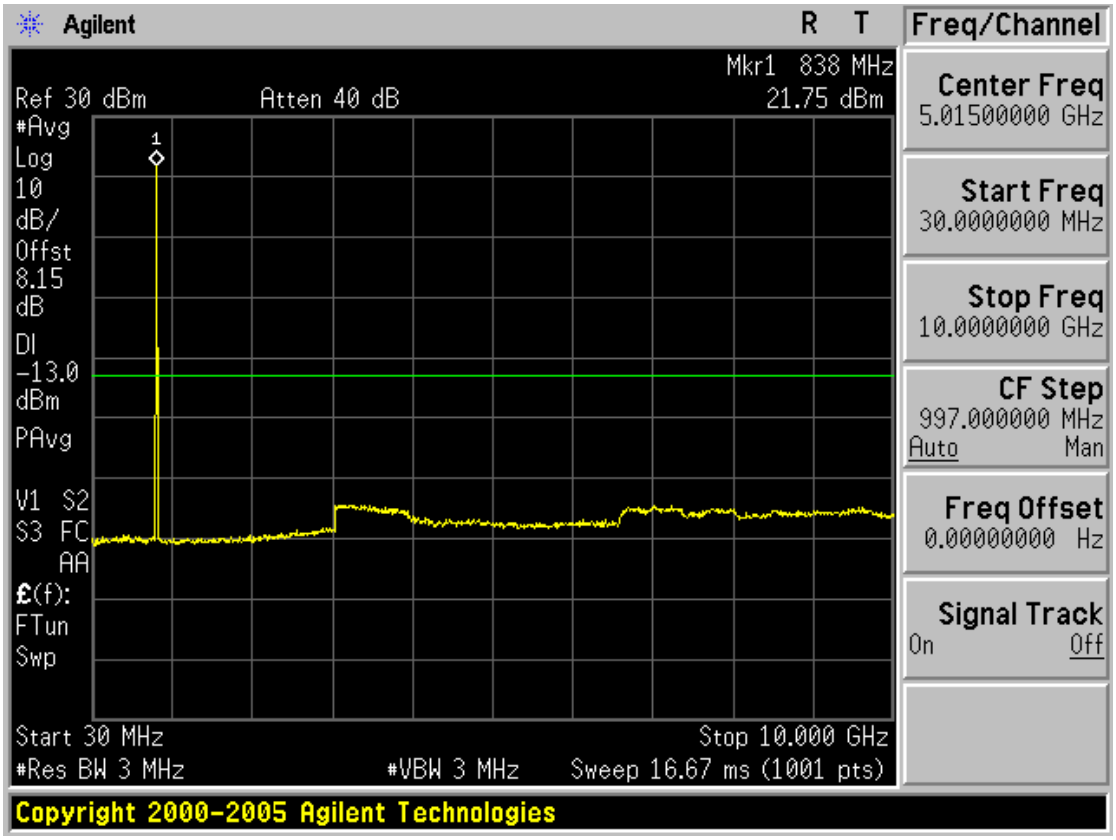
# Test Plots

**- Conducted Spurious CDMA Cellular Band Ch. 1013**



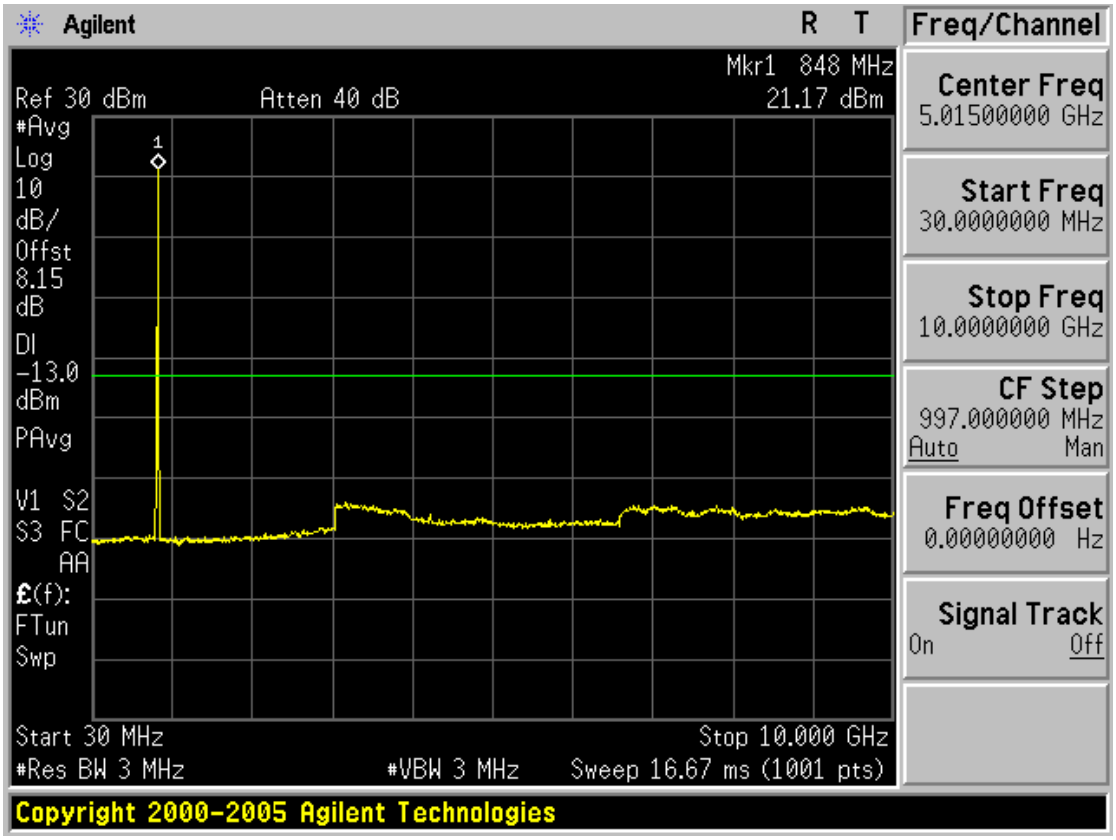
# Test Plots

**- Conducted Spurious CDMA Cellular Band Ch. 0384**



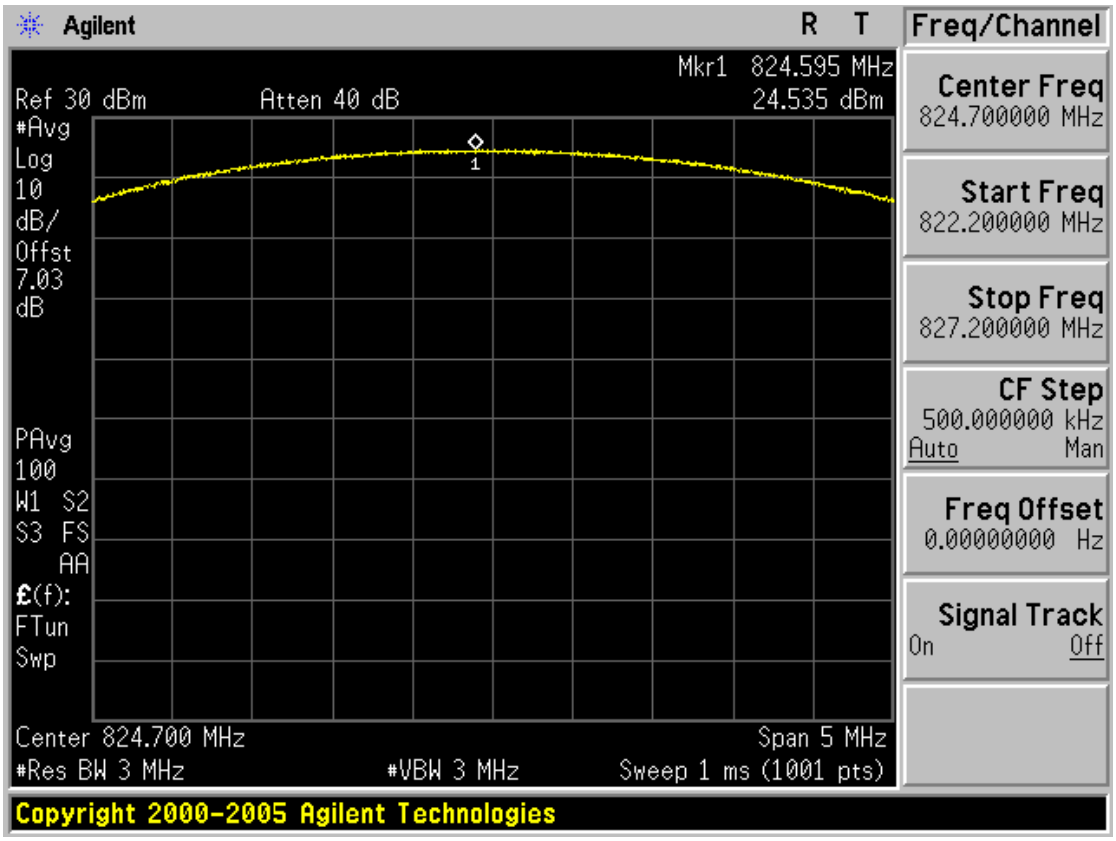
# Test Plots

**- Conducted Spurious CDMA Cellular Band Ch. 0777**



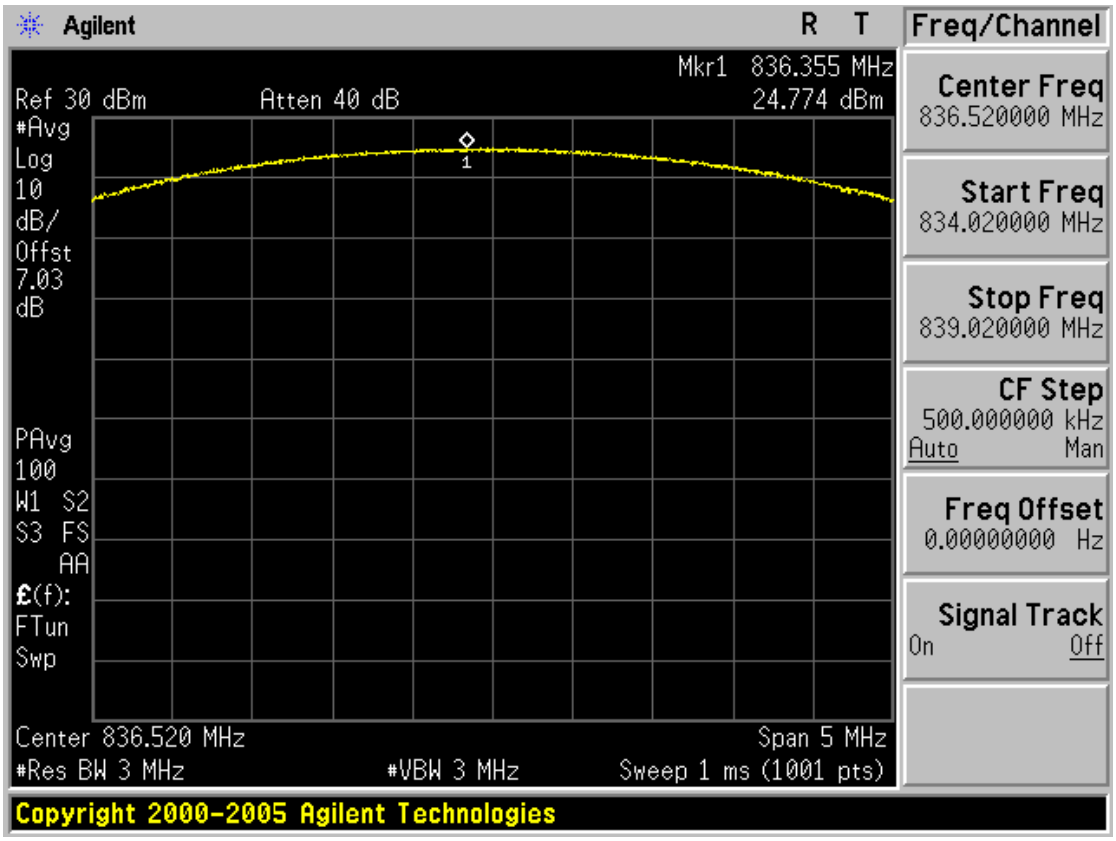
# Test Plots

**- Power Out. CDMA Cellular Band Ch. 1013**



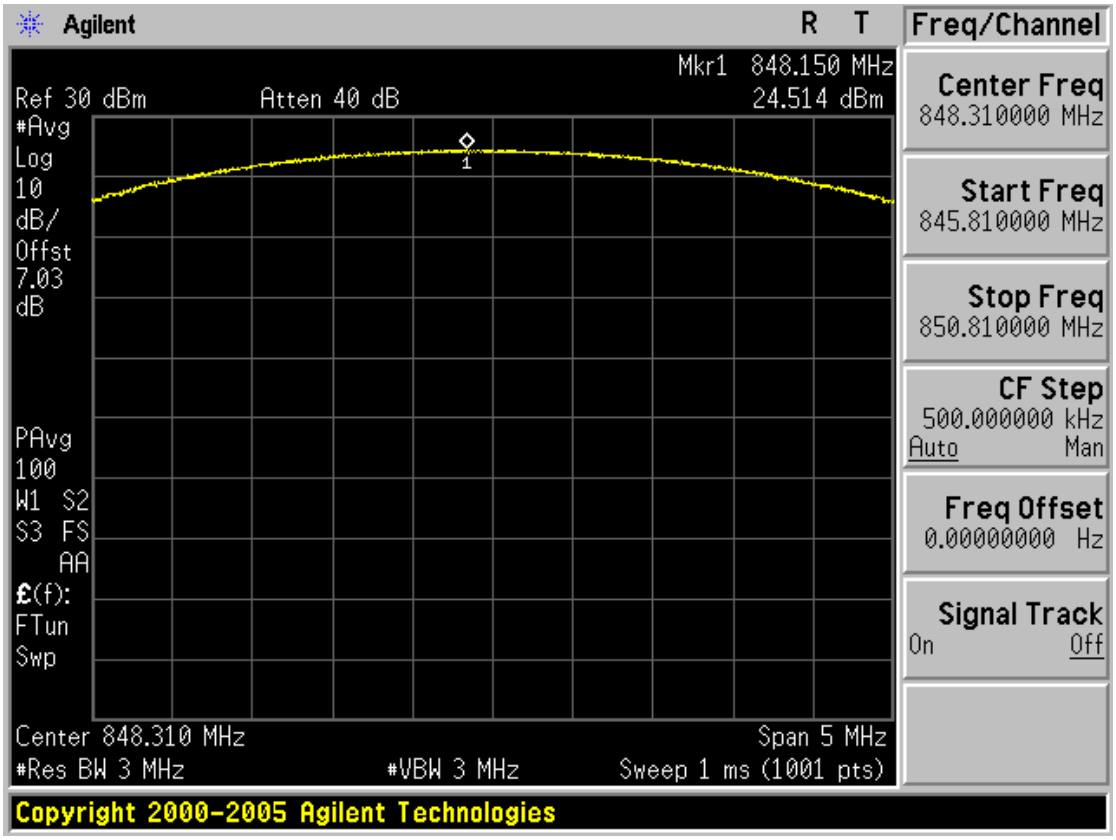
# Test Plots

**- Power Out. CDMA Cellular Band Ch. 0384**



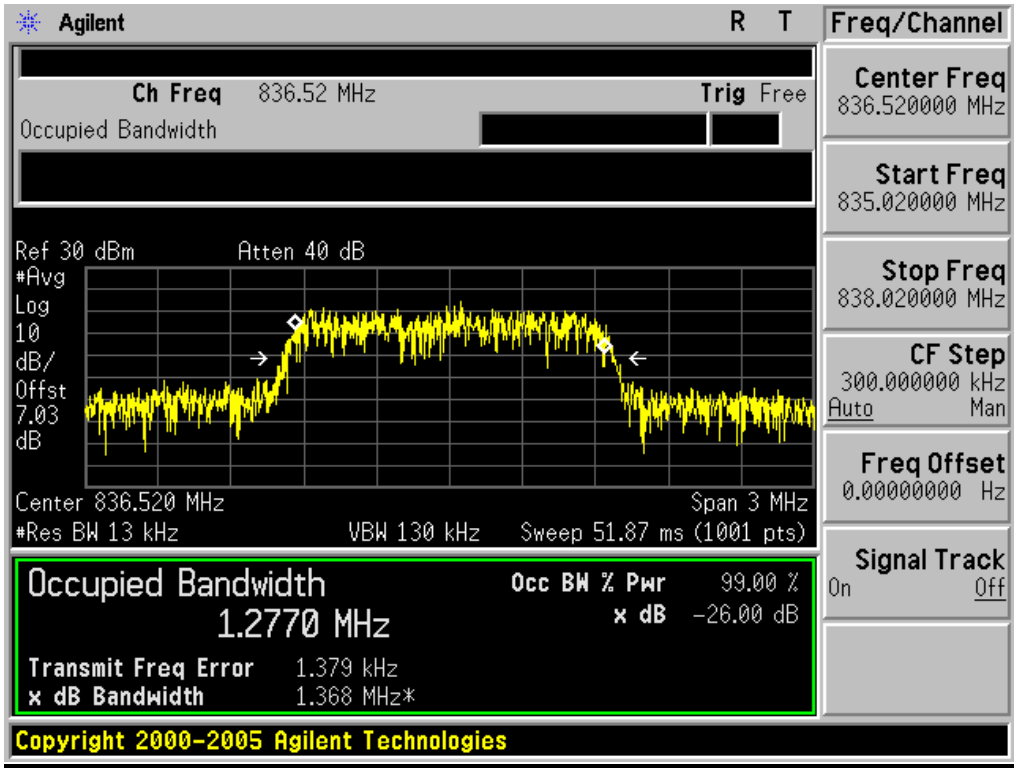
# Test Plots

**- Power Out. CDMA Cellular Band Ch. 0777**

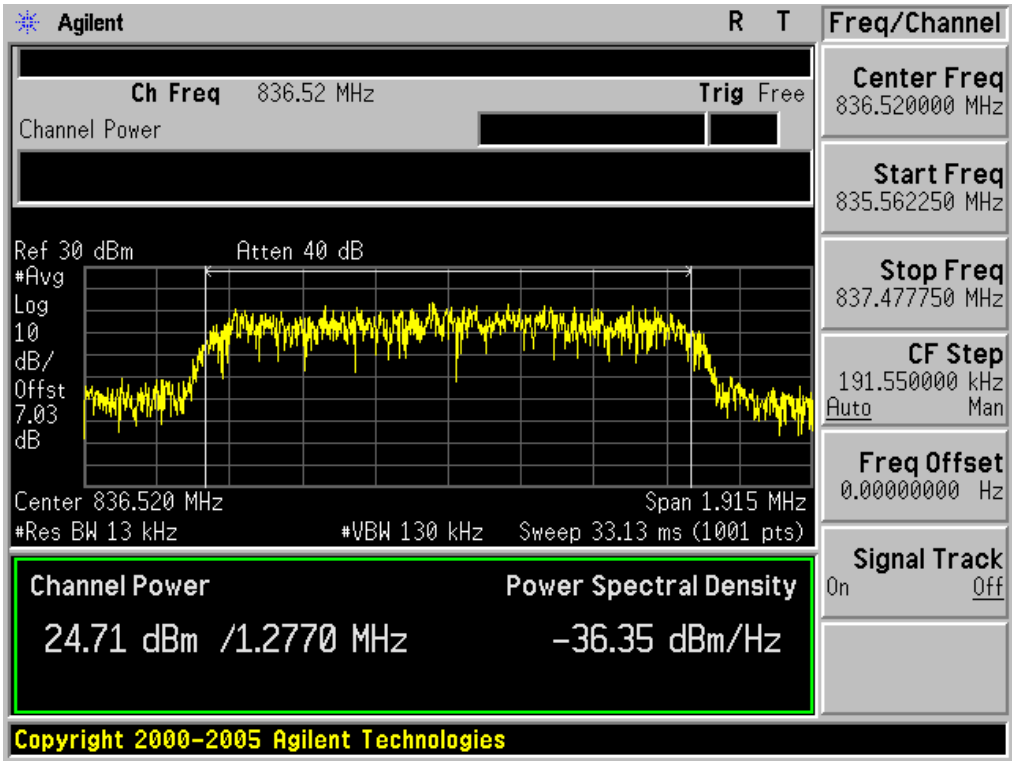


# Test Plots

**- Occupied Bandwidth. CDMA** Cellular Band **Ch. 0384**

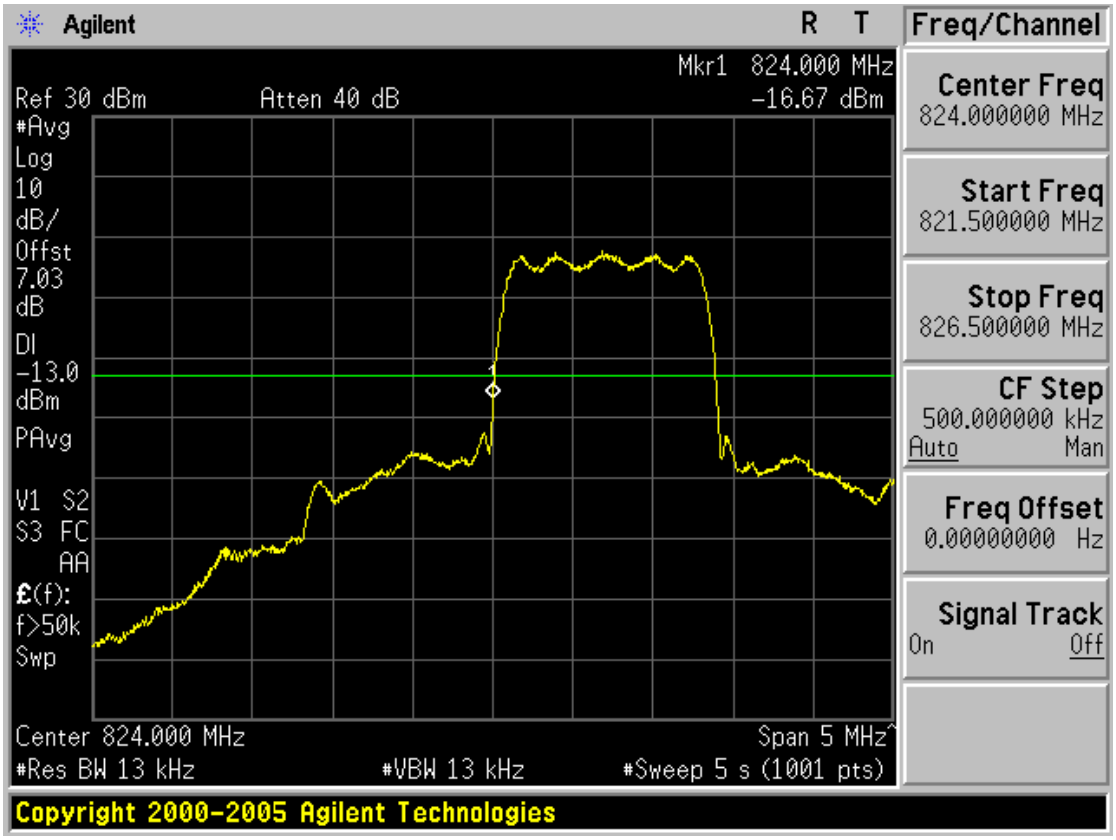



**- Channel Power. CDMA Cellular Band Ch. 0384**



# Test Plots

**- Band Edge. CDMA Cellular Band Ch. 1013**



# Test Plots

**- Band Edge. CDMA Cellular Band Ch. 0777**