



PCTEST ENGINEERING LABORATORY, INC.

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<http://www.pctestlab.com>



CERTIFICATE OF COMPLIANCE FCC Part 22 & 24 Class II Permissive Change

Applicant Name:
Novatel Wireless Inc.
9645 Scranton Road, Suite 205
San Diego, CA 92121-3030
United States

Date of Testing:
September 20 - 21, 2006
Test Site/Location:
PCTEST Lab., Columbia, MD, USA
Test Report Serial No.:
0609140804

| | |
|-------------------|------------------------------|
| FCC ID: | PKRNVWES720 |
| APPLICANT: | NOVATEL WIRELESS INC. |

Application Type: Class II Permissive Change
FCC Classification: PCS Licensed Transmitter (PCB)
FCC Rule Part(s): §2; §22(H), §24(E)
EUT Type: Dual-Band CDMA/EvDO Module
Model(s): ES720
Tx Frequency Range: 824.70 - 848.31MHz (Cell. CDMA) / 1851.25 - 1908.75MHz (PCS CDMA)
Rx Frequency Range: 869.70 - 893.31MHz (Cell. CDMA) / 1931.25 - 1988.75MHz (PCS CDMA)
Max. RF Output Power: 0.275W Conducted (24.40dBm) Cell. CDMA /
0.263W Conducted (24.20dBm) PCS CDMA
Emission Designator(s): 1M28F9W (CDMA/EvDO)
Test Device Serial No.: *identical prototype* [S/N: N/A]
Class II Permissive Change: Please See Attached Documents
Original Grant Date: 08/07/2006

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947.



I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Grant Conditions: Power output listed is conducted for Part 22 and Part 24.

PCTEST certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.




Randy Ortanez
President

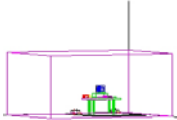


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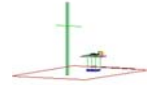
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MEASUREMENT REPORT



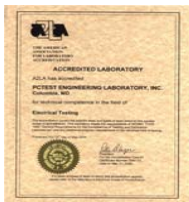
FCC Part 22 & 24

A. §2.1033 General Information

APPLICANT: Novatel Wireless Inc.
APPLICANT ADDRESS: 9645 Scranton Road, Suite 205
 San Diego, CA 92121-3030
TEST SITE: PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS: 6660-B Dobbin Road, Columbia, MD 21045 USA
FCC RULE PART(S): §2; §22(H), §24(E)
MODEL NAME: ES720
FCC ID: PKRNVWES720
FCC CLASSIFICATION: PCS Licensed Transmitter (PCB)
EMISSION DESIGNATOR(S): 1M28F9W (CDMA/EvDO)
MODE: CDMA / EvDO
FREQUENCY TOLERANCE: ±0.00025 % (2.5 ppm)
Test Device Serial No.: N/A Production Pre-Production Engineering
DATE(S) OF TEST: September 20 - 21, 2006
TEST REPORT S/N: 0609140804

A.1 Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21045, U.S.A.



- PCTEST facility is an FCC registered (PCTEST Reg. No. 90864) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (IC-2451).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (IC-2451) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

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1.0 INTRODUCTION

1.1 Measurement Procedure

The radiated spurious measurements were made outdoors at a 3-meter test range (see Figure 1-1). 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 and the level of the signal generator was 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 antenna are taken into consideration.

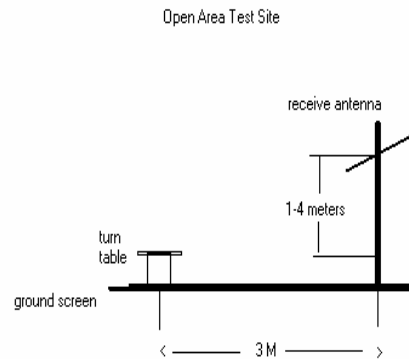


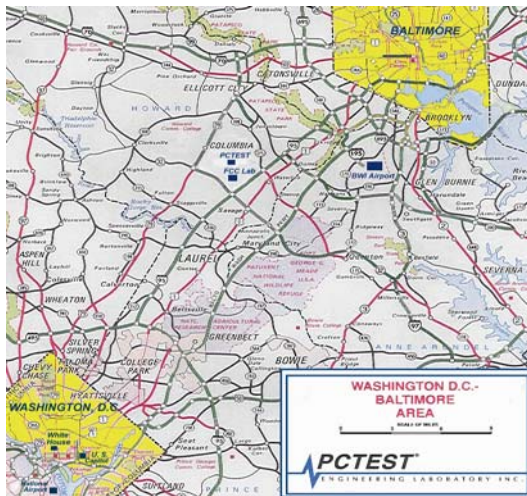
Figure 1-1. Diagram of 3-meter outdoor test range

Deviation from Measurement Procedure.....None

1.2 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.

1.3 Testing Facility



These measurement tests were conducted at PCTEST Engineering Laboratory, Inc. facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2003 on January 27, 2006 and Industry Canada.

Figure 1-3. Map of the Greater Baltimore and Metropolitan Washington, D.C. area.

| | | | | |
|--------------------------------|--|---|------------------|---------------------------------|
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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Novatel Dual-Band CDMA/EvDO Module** **FCC ID: PKRNVWES720**. The EUT consisted of the following component(s):



| Manufacturer / Description | FCC ID | Serial Number |
|------------------------------------|-------------|---------------|
| Novatel Dual-Band CDMA/EvDO Module | PKRNVWES720 | N/A |

Table 2.1. EUT Equipment Description

2.2 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing.

- None

| | | | | |
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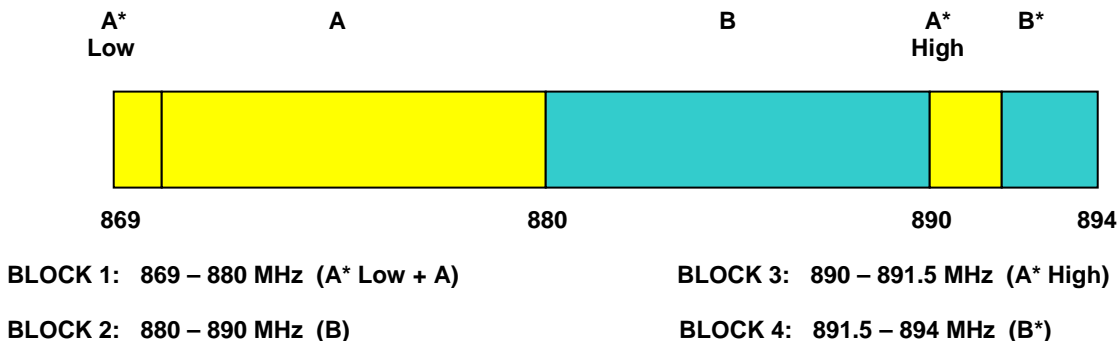
3.0 DESCRIPTION OF TESTS

3.1 Occupied Bandwidth Emission Limits

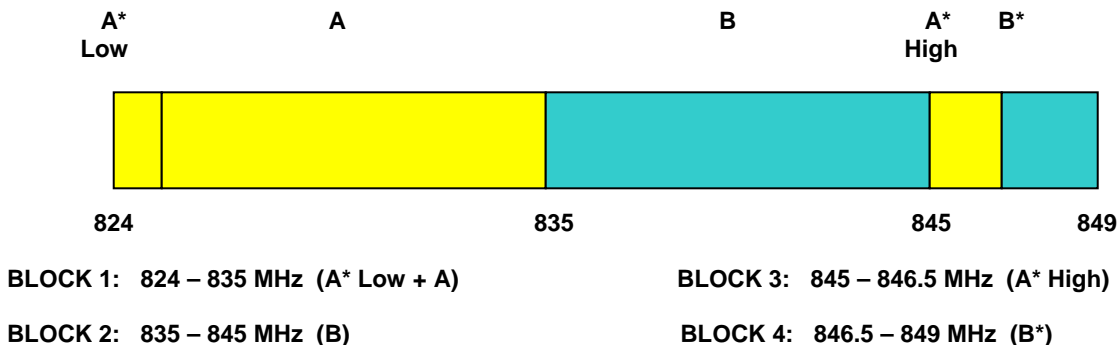
§2.1049, 22.917(a), 24.238(a)



- 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. Compliance with these provisions 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. 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 emission are attenuated at least 26 dB below the transmitter power.
- c. 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.
- d. 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.

3.2 Cellular - Base Frequency Blocks

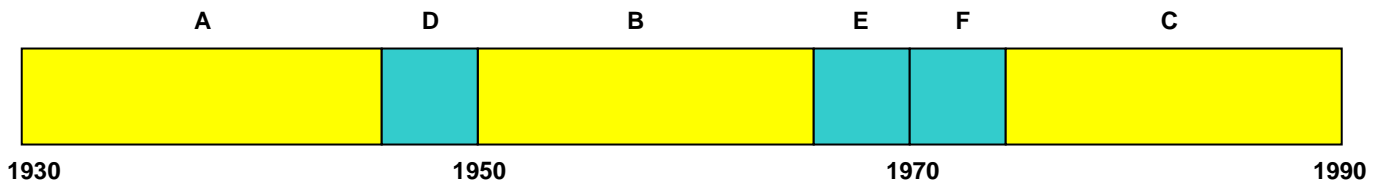


3.3 Cellular - Mobile Frequency Blocks



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3.4 PCS - Base Frequency Blocks



BLOCK 1: 1930 – 1945 MHz (A)

BLOCK 4: 1965 – 1970 MHz (E)

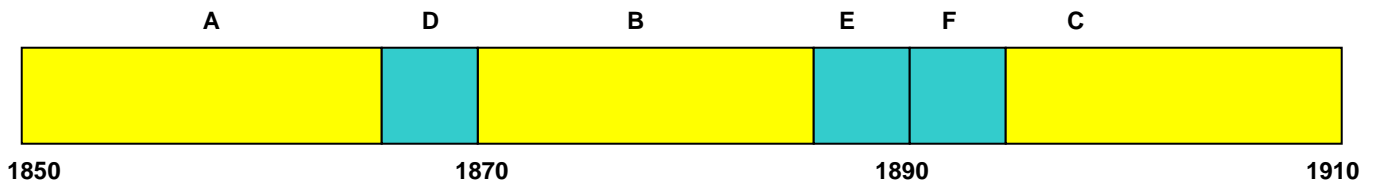
BLOCK 2: 1945 – 1950 MHz (D)

BLOCK 5: 1970 – 1975 MHz (F)

BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 6: 1975 – 1990 MHz (C)

3.5 PCS - Mobile Frequency Blocks



BLOCK 1: 1850 – 1865 MHz (A)

BLOCK 4: 1885 – 1890 MHz (E)

BLOCK 2: 1865 – 1870 MHz (D)

BLOCK 5: 1890 – 1895 MHz (F)

BLOCK 3: 1870 – 1885 MHz (B)

BLOCK 6: 1895 – 1910 MHz (C)



3.6 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 (signals below 1.6 GHz) 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.

3.7 Radiated Spurious and Harmonic Emissions

§2.1051, 22.917(a), 24.238(a); RSS-129 (8.1.1), RSS-133 (6.5.1)

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 1 GHz, 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. This device was tested under all R.C.s and S.O.s and the worst case is reported with EvDO RTAP with "All Up" power control bits.



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4.0 TEST EQUIPMENT CALIBRATION DATA

All Test Equipment Calibrations are traceable to the National Institute of Standards and Technology (NIST).

| TYPE | MODEL | CAL. DUE DATE | CAL. INTERVAL | SERIAL No. |
|-----------------------------------|---------------------------------|---------------|---------------|------------|
| Microwave Spectrum Analyzer | Agilent E4448A (3Hz-50GHz) | 09/19/07 | Annual | US42510244 |
| Spectrum Analyzer | HP 8566B (100Hz-22GHz) | 12/22/06 | Annual | 3638A08713 |
| PSG Signal Generator | Agilent E8257D (250kHz-20GHz) | 02/11/07 | Annual | MY45470194 |
| 5 Watt Amplifier | 5S1G4 (800MHz-4.2GHz) | N/A | N/A | 22332 |
| Wireless Communication Test Set | Agilent 8960 Series 10 E5515C | 06/10/07 | Annual | 6B46110872 |
| Universal Power Meter | Gigatronics 8651A (50MHz-18GHz) | 07/28/07 | Annual | 1834052 |
| Power Sensor | Gigatronics 80701A | 04/11/07 | Annual | 1833460 |
| Quasi-Peak Adapter | HP 85650A | 12/22/06 | Annual | 2043A00301 |
| Preamplifier | HP 8449B (1-26.5GHz) | 12/22/06 | Annual | 3008A00985 |
| Attenuation/Switch Driver | HP 11713A | 12/22/06 | Annual | N/A |
| Preselector | HP 85685A (20Hz-2GHz) | 12/22/06 | Annual | N/A |
| 6dB Res BW Spec. Analyzer Display | OPT 462 | 12/22/06 | Annual | 3701A22204 |
| Horn Antenna | EMCO Model 3115 (1-18GHz) | 08/25/07 | Annual | 9704-5182 |
| Horn Antenna | EMCO Model 3116 (18-40GHz) | 08/25/07 | Annual | 9203-2178 |
| EMCO Dipoles (2) | N/A | 05/08/07 | Annual | 00023951 |
| 10dB Attenuator | HP 8493B | N/A | N/A | N/A |
| Bi-Directional Coax Coupler | PE2208-6 | N/A | Annual | N/A |
| Microwave Cables | MicroCoax (1.0-26.5GHz) | 02/26/07 | Annual | N/A |

Table 4.1. Test Equipment

| | | | | |
|---------------------------------------|---|--|---|--|
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5.0 SAMPLE CALCULATIONS

Emission Designator

Emission Designator = 1M25F9W

CDMA BW = 1.25 MHz

F = Frequency Modulation



9 = Composite Digital Info

W = Combination (Audio/Data) (Measured at the 99.75% power bandwidth)

Spurious Radiated Emission - PCS Band

Example: Channel 25 PCS Mode 2nd Harmonic (3702.50 MHz)

The receive analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the receive analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3702.50 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm $- (-24.80) = 50.3$ dBc.

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6.0 TEST RESULTS



Summary

The intentional radiator has been tested in a simulated typical installation to demonstrate compliance with the relevant FCC performance and procedural standards. The radio was transmitting at full power on the specified channels. The channels tested are high, middle and low of the allocated bands. Final system data was gathered in a mode that tended to maximize emissions by varying the orientation of the EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization. This device was tested under all R.C.s and S.O.s and the worst case is reported with EvDO RTAP with "All Up" power control bits.

Method/System: PCS Licensed Transmitter (PCB)
 Mode(s): CDMA / EVDO

| FCC Part Section(s) | RSS Section | Test Description | Test Limit | Test Condition | Test Result |
|-------------------------------------|--|--|--|----------------------------------|-------------|
| <u>TRANSMITTER MODE (TX)</u> | | | | | |
| 2.1049, 22.917(a), 24.238(a) | N/A | Occupied Bandwidth | N/A | CONDUCTED | PASS |
| 22.917(a), 24.238(a) | RSS-129 (8.1.1) RSS-133 (6.5.1) | Band Edge / Conducted Spurious Emissions | < 43 + log ₁₀ (P[Watts]) at Band Edge and for all out-of-band emissions | | PASS |
| 2.1046 | N/A | Transmitter Conducted Output Power | N/A | | PASS |
| 2.1051, 22.917(a), 24.238(a) | RSS-129 (8.1.1) RSS-133 (6.5.1) | Undesirable Emissions | < 43 + log ₁₀ (P[Watts]) for all out-of-band emissions | RADIATED | PASS |
| <u>RECEIVER MODE (RX)</u> | | | | | |
| 15.107 | RSS-Gen [7.2.2] | AC Conducted Emissions 150kHz – 30MHz | EN55022 | Line Conducted | PASS |
| 15.109 | RSS-129 (10(a,d)), RSS-133 (6.7(a,b)), RSS-210 (7.3) | General Field Strength Limits (Restricted Bands and Radiated Emissions Limits) | < FCC 15.209 limits or < RSS-Gen limits [Section 6; Table1] | RADIATED (30MHz-1GHz) (1-25 GHz) | PASS |
| <u>RF EXPOSURE (SAR)</u> | | | | | |
| 2.1093 | RSS-102 | SAR Test or MPE | 1.6 W/kg (SAR Limit) 1 mW/cm ² (MPE) | 3 Channels | PASS |

Table 6-1. Summary of Test Results

| | | | | |
|--------------------------------|---|---|---|---------------------------------|
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6.1 Conducted Output Power

§2.1046

This device was tested under all R.C.s and S.O.s and the worst case is reported with EvDO RTAP with "All Up" power control bits. The following procedures were followed according to FCC 3G Measurement Procedures, June 2006.

Output Power Verification

1. If the mobile station (MS) supports Reverse TCH RC 1 and Forward TCH RC 1, set up a call using Fundamental Channel Test Mode 1 (RC=1/1) with 9600 bps data rate only.
2. Under RC1, C.S0011 Table 4.4.5.2-1, Table 6-2 parameters were applied.
3. If the MS supports the RC 3 Reverse FCH, RC3 Reverse SCH0 and demodulation of RC 3,4, or 5, set up a call using Supplemental Channel Test Mode 3 (RC 3/3) with 9600 bps Fundamental Channel and 9600 bps SCH0 data rate.
4. Under RC3, C.S0011 Table 4.4.5.2-2, Table 6-3 was applied.

| Parameter | Units | Value |
|------------------------------|--------------|-------|
| \bar{I}_{or} | dBm/1.23 MHz | -104 |
| $\frac{Pilot E_c}{I_{or}}$ | dB | -7 |
| $\frac{Traffic E_c}{I_{or}}$ | dB | -7.4 |



Table 6-2
Parameters for Max. Power for RC1

| Parameter | Units | Value |
|------------------------------|--------------|-------|
| \bar{I}_{or} | dBm/1.23 MHz | -86 |
| $\frac{Pilot E_c}{I_{or}}$ | dB | -7 |
| $\frac{Traffic E_c}{I_{or}}$ | dB | -7.4 |

Table 6-3
Parameters for Max. Power for RC3

| Band | Channel | 1x EvDO Rev. 0 | 1x EvDO Rev. 0 |
|----------|---------|-----------------|-----------------|
| | | [dBm] (FTAP) | [dBm] (RTAP) |
| Cellular | 1013 | 24.20 | 24.40 |
| | 384 | 24.10 | 24.40 |
| | 777 | 24.20 | 24.30 |
| PCS | 25 | 24.00 | 24.10 |
| | 600 | 24.20 | 24.20 |
| | 1175 | 24.00 | 24.10 |

Table 6-4
Maximum Conducted Power Output Table for ES720

| | | | | |
|--------------------------------|---|---|---|---------------------------------|
| FCC ID: PKRNVWES720 |  | FCC Pt. 22/24 CDMA MEASUREMENT REPORT |  | Reviewed by: Quality Manager |
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6.2 Cellular CDMA Radiated Measurements

§2.1051, 22.917(a): RSS-129 (8.1.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 824.70 MHz
 CHANNEL: 1013 (Low)
 MODULATION SIGNAL: CDMA (Internal)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 37.58 dBc

| FREQ. (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBd) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|----------------|--|--|--|--------------|-------|
| 1649.40 | -49.68 | 6.10 | -43.58 | V | 68.2 |
| 2474.10 | -66.58 | 6.70 | -59.88 | V | 84.5 |
| 3298.80 | -74.48 | 6.80 | -67.68 | V | 92.3 |
| 4123.50 | -85.68 | 6.50 | -79.18 | V | 103.8 |
| 4948.20 | -84.38 | 7.00 | -77.38 | V | 102.0 |



Table 6-5. Radiated Spurious Data (Cellular CDMA Mode – Ch. 1013)

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. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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.

This device was tested under all R.C.s and S.O.s and the worst case is reported with EvDO RTAP with "All Up" power control bits.

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Cellular CDMA Radiated Measurements (Cont'd)

§2.1051, 22.917(a); RSS-129 (8.1.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 836.52 MHz
 CHANNEL: 384
 MODULATION SIGNAL: CDMA (Internal)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 37.57 dBc

| FREQ. (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBd) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|----------------|--|--|--|--------------|-------|
| 1673.04 | -48.48 | 6.10 | -42.38 | V | 67.0 |
| 2509.56 | -67.08 | 6.70 | -60.38 | V | 85.0 |
| 3346.08 | -75.78 | 6.80 | -68.98 | V | 93.6 |
| 4182.60 | -85.78 | 6.50 | -79.28 | V | 103.9 |
| 5019.12 | -83.78 | 7.00 | -76.78 | V | 101.4 |



Table 6-6. Radiated Spurious Data (Cellular CDMA Mode – Ch. 384)

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. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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.

This device was tested under all R.C.s and S.O.s and the worst case is reported with EvDO RTAP with "All Up" power control bits.

| | | | | |
|--------------------------------|---|---|---|---------------------------------|
| FCC ID: PKRNVWES720 |  | FCC Pt. 22/24 CDMA MEASUREMENT REPORT |  | Reviewed by: Quality Manager |
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Cellular CDMA Radiated Measurements (Cont'd)

§2.1051, 22.917(a); RSS-129 (8.1.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 848.31 MHz
 CHANNEL: 0777 (High)
 MODULATION SIGNAL: CDMA (Internal)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 37.57 dBc

| FREQ. (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBd) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|----------------|--|--|--|--------------|-------|
| 1696.62 | -50.58 | 6.10 | -44.48 | V | 69.1 |
| 2544.93 | -68.08 | 6.70 | -61.38 | V | 86.0 |
| 3393.24 | -73.08 | 6.80 | -66.28 | V | 90.9 |
| 4241.55 | -85.68 | 6.50 | -79.18 | V | 103.8 |
| 5089.86 | -83.98 | 7.00 | -76.98 | V | 101.6 |



Table 6-7. Radiated Spurious Data (Cellular CDMA Mode – Ch. 777)

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. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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.

This device was tested under all R.C.s and S.O.s and the worst case is reported with EvDO RTAP with "All Up" power control bits.

| | | | | |
|--------------------------------|---|---|---|---------------------------------|
| FCC ID: PKRNVWES720 |  | FCC Pt. 22/24 CDMA MEASUREMENT REPORT |  | Reviewed by: Quality Manager |
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6.3 PCS CDMA Radiated Measurements

§2.1051, 24.238(a); RSS-133 (6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1851.25 MHz
 CHANNEL: 0025 (Low)
 MODULATION SIGNAL: CDMA (Internal)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 37.13 dBc

| FREQ. (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBi) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|----------------|--|--|--|--------------|-------|
| 3702.50 | -50.83 | 8.70 | -42.13 | V | 66.3 |
| 5553.75 | -75.93 | 9.70 | -66.23 | V | 90.4 |
| 7405.00 | -66.43 | 9.90 | -56.53 | V | 80.7 |
| 9256.25 | -77.43 | 11.40 | -66.03 | V | 90.2 |
| 11107.50 | -77.33 | 12.10 | -65.23 | V | 89.4 |



Table 6-8. Radiated Spurious Data (PCS CDMA Mode – Ch. 25)

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. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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.

This device was tested under all R.C.s and S.O.s and the worst case is reported with EvDO RTAP with "All Up" power control bits.

| | | | | |
|--------------------------------|---|---|---|---------------------------------|
| FCC ID: PKRNVWES720 |  | FCC Pt. 22/24 CDMA MEASUREMENT REPORT |  | Reviewed by: Quality Manager |
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PCS CDMA Radiated Measurements (Cont'd)

§2.1051, 24.238(a); RSS-133 (6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 0600 (Mid)
 MODULATION SIGNAL: CDMA (Internal)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 37.13 dBc

| FREQ. (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBi) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|----------------|--|--|--|--------------|-------|
| 3760.00 | -50.33 | 8.70 | -41.63 | V | 65.8 |
| 5640.00 | -83.03 | 9.70 | -73.33 | V | 97.5 |
| 7520.00 | -67.03 | 9.90 | -57.13 | V | 81.3 |
| 9400.00 | -77.23 | 11.40 | -65.83 | V | 90.0 |
| 11280.00 | -77.13 | 12.10 | -65.03 | V | 89.2 |



Table 6-9. Radiated Spurious Data (PCS CDMA Mode – Ch. 600)

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. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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.

This device was tested under all R.C.s and S.O.s and the worst case is reported with EvDO RTAP with "All Up" power control bits.

| | | | | |
|--------------------------------|---|---|---|---------------------------------|
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PCS CDMA Radiated Measurements (Cont'd)

§2.1051, 24.238(a); RSS-133 (6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1908.75 MHz
 CHANNEL: 1175 (High)
 MODULATION SIGNAL: CDMA (Internal)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 37.13 dBc

| FREQ. (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBi) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|----------------|--|--|--|--------------|-------|
| 3817.50 | -50.13 | 8.70 | -41.43 | V | 65.6 |
| 5726.25 | -82.83 | 9.70 | -73.13 | V | 97.3 |
| 7635.00 | -66.73 | 9.90 | -56.83 | V | 81.0 |
| 9543.75 | -76.93 | 11.40 | -65.53 | V | 89.7 |
| 11452.50 | -76.93 | 12.10 | -64.83 | V | 89.0 |

Table 6-10. Radiated Spurious Data (PCS CDMA Mode – Ch. 1175)

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. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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.

This device was tested under all R.C.s and S.O.s and the worst case is reported with EvDO RTAP with "All Up" power control bits.

| | | | | |
|--------------------------------|--|---|--|---------------------------------|
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7.0 CONCLUSION

The data collected shows that the **Novatel Dual-Band CDMA/EvDO Module FCC ID: PKRNVWES720** complies with all the requirements of Parts 2, 22, and 24 of the FCC rules.





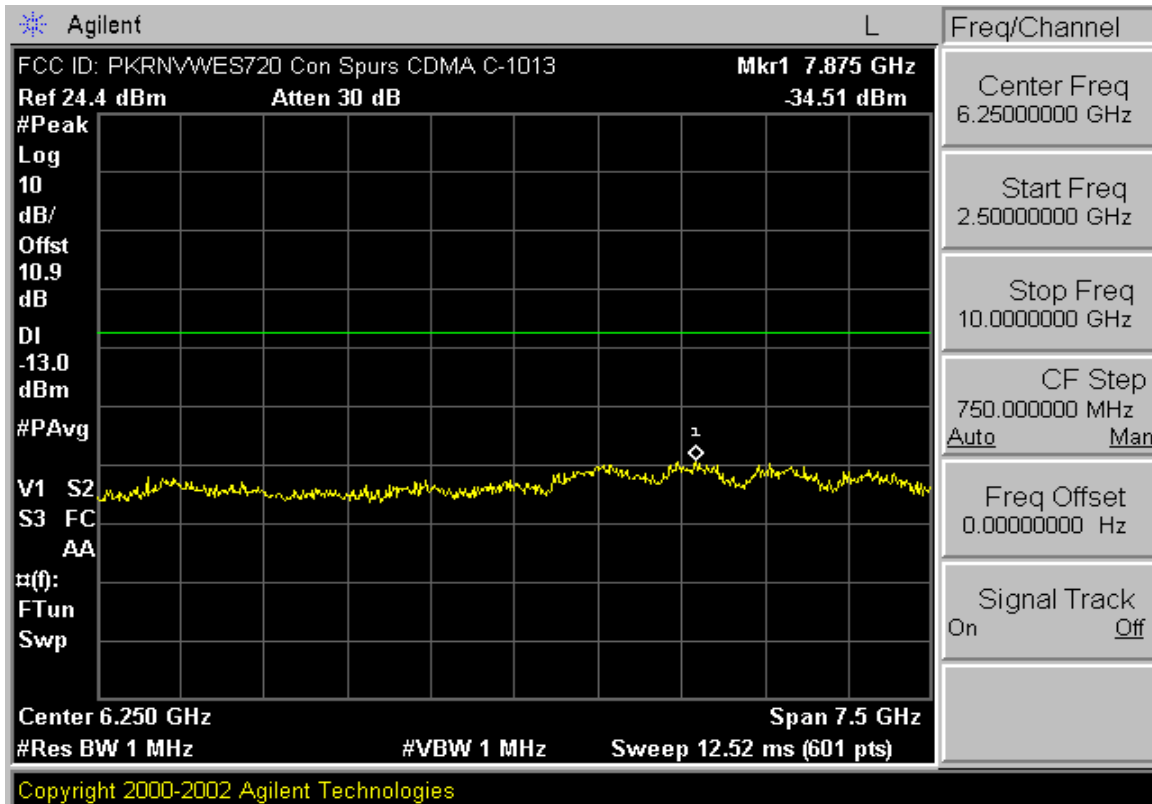
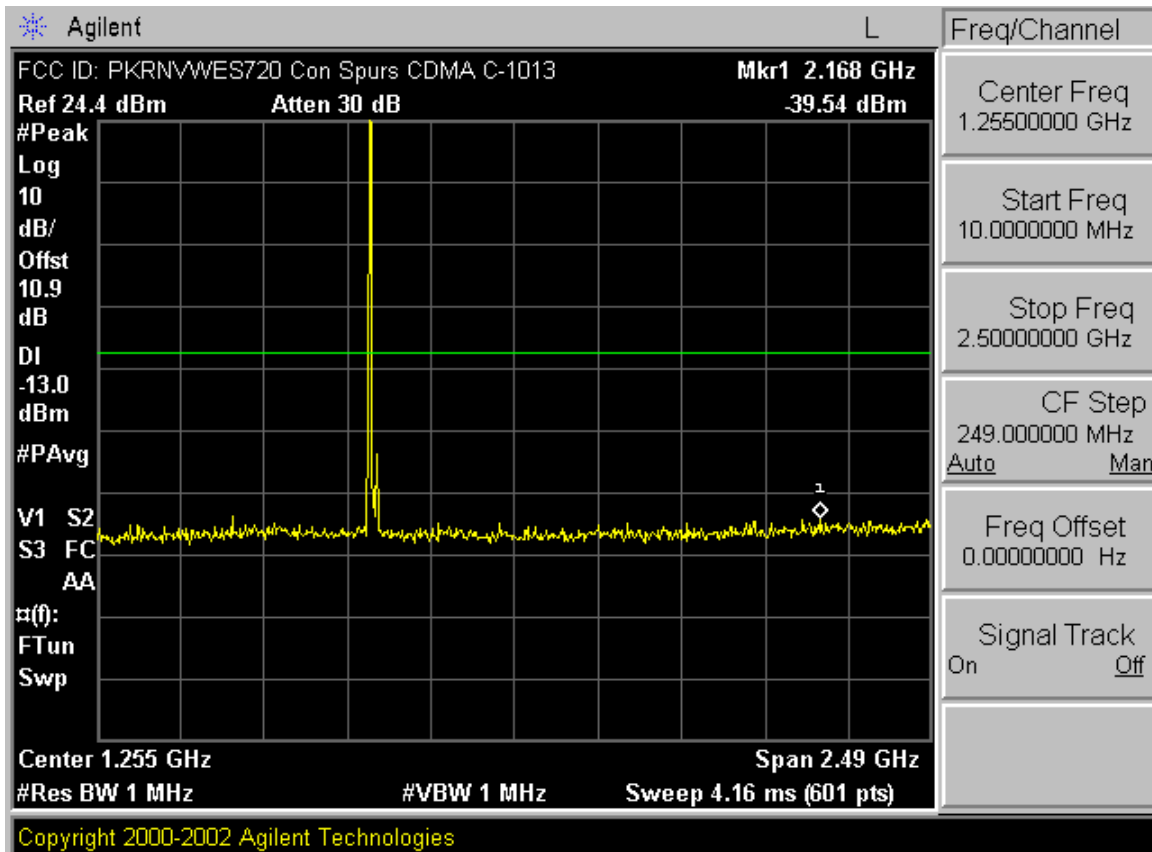
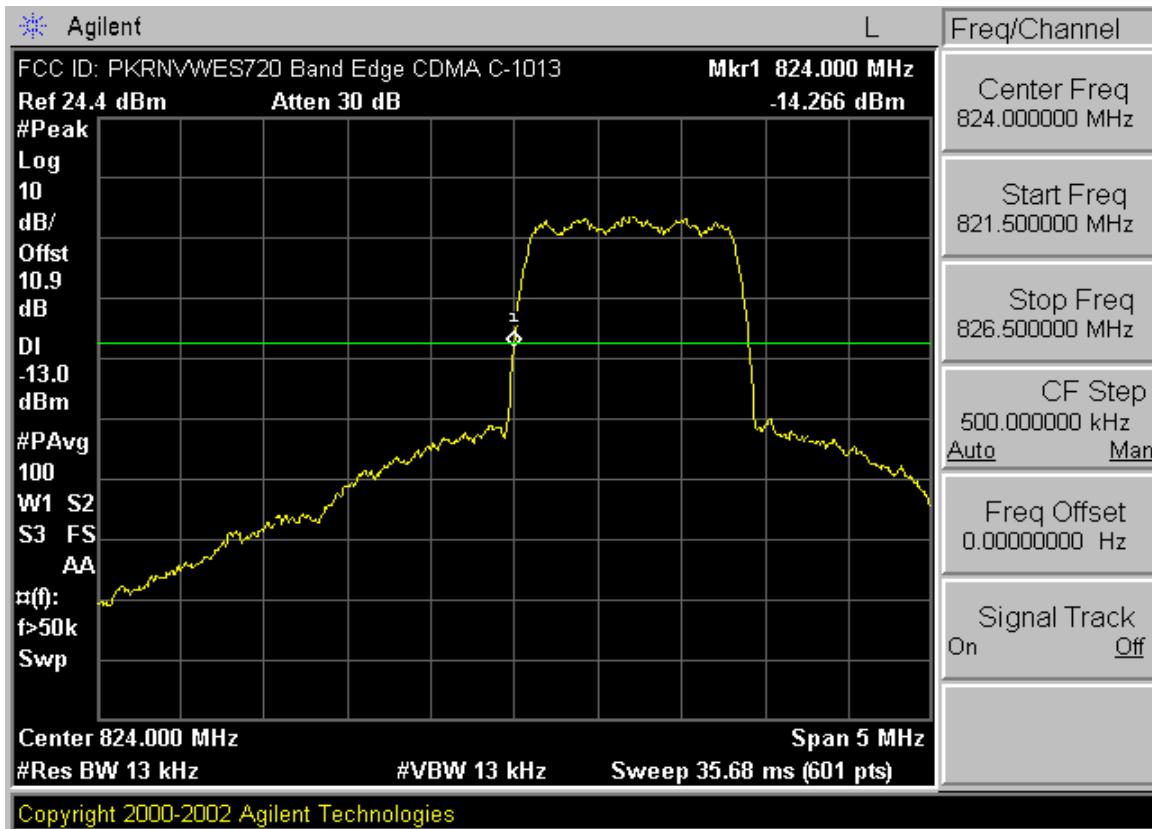
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EXHIBIT A - PLOT(S) OF EMISSIONS

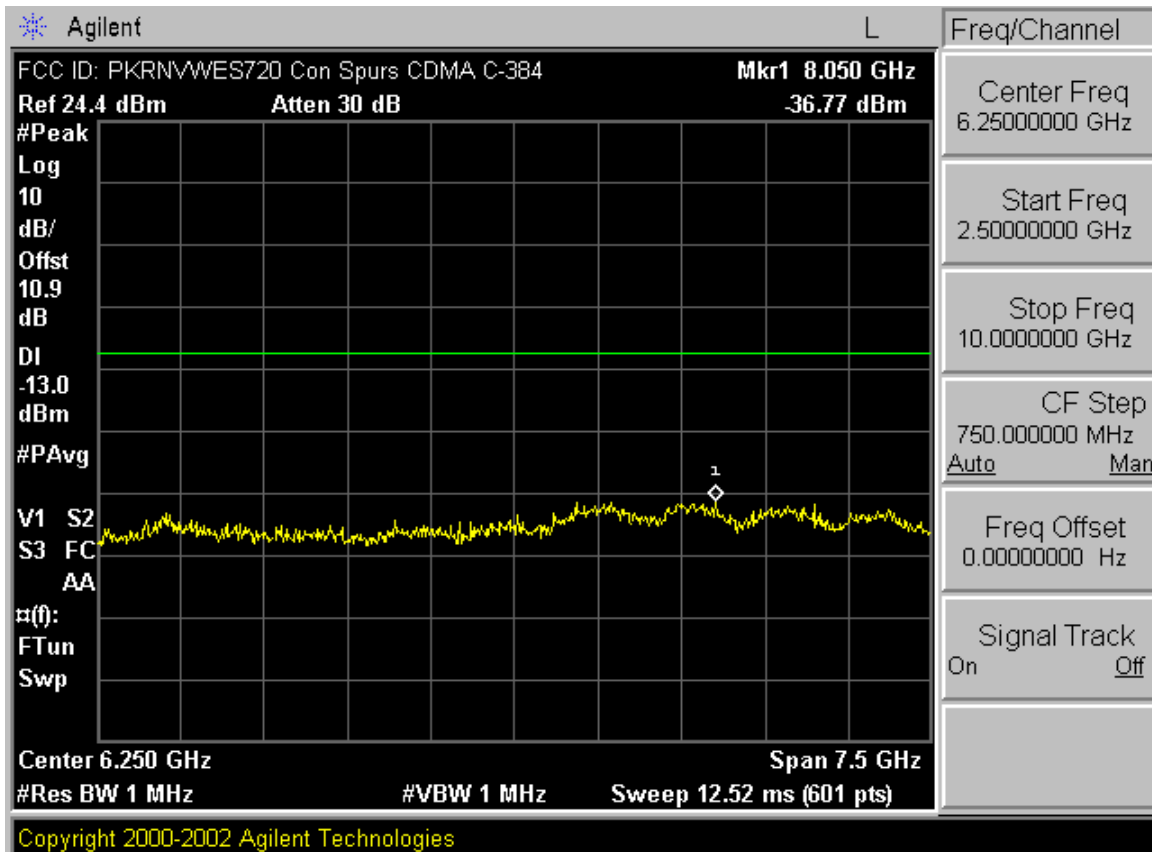
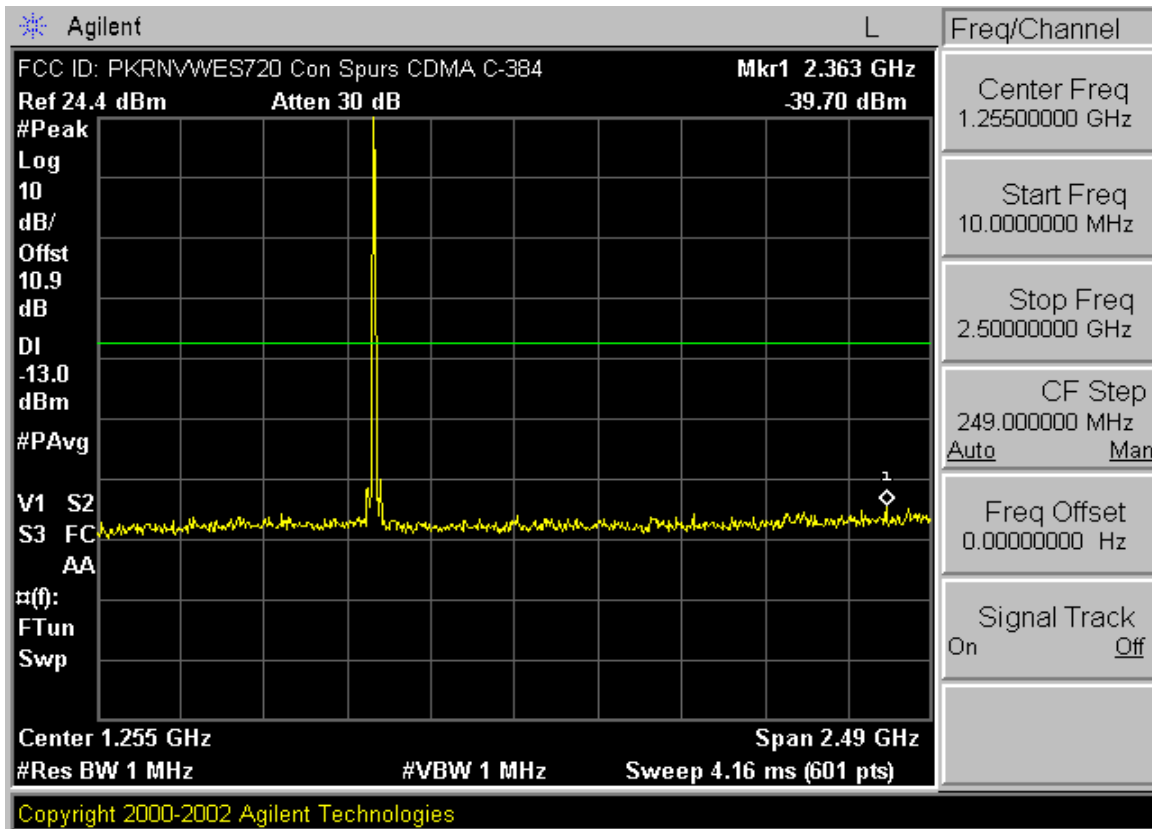
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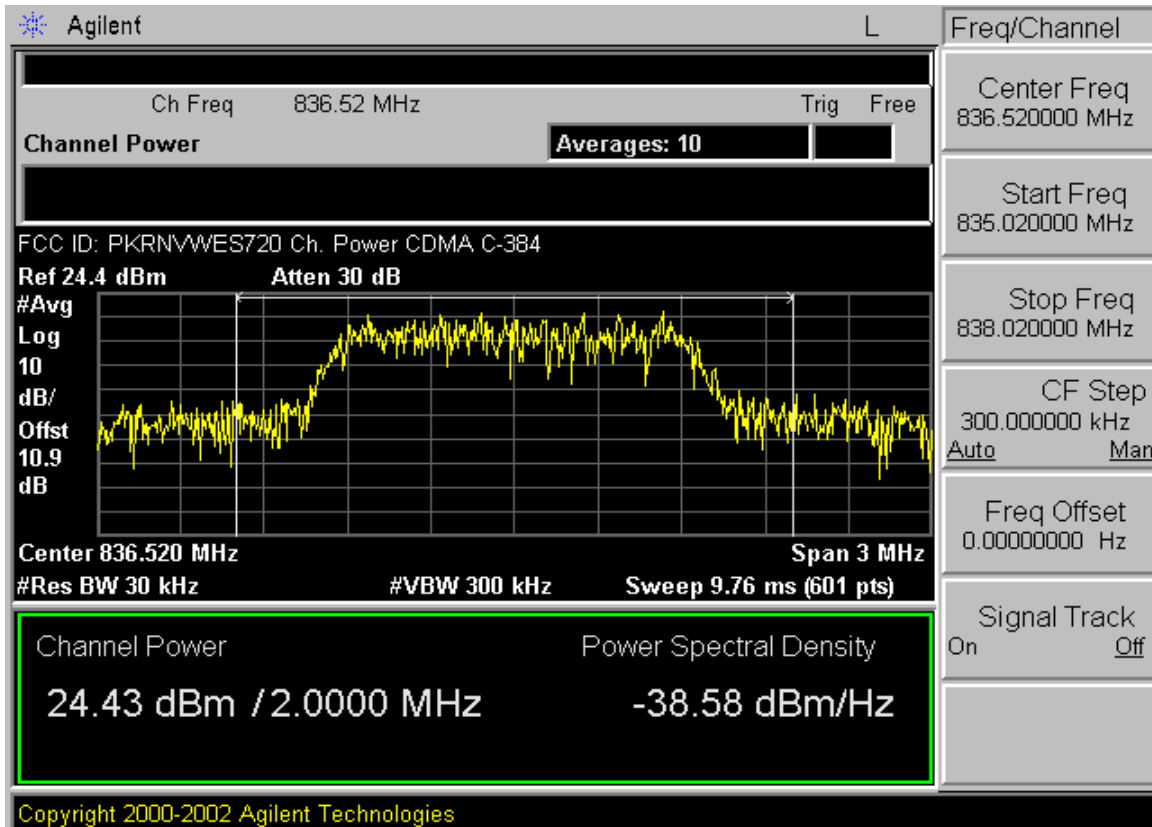
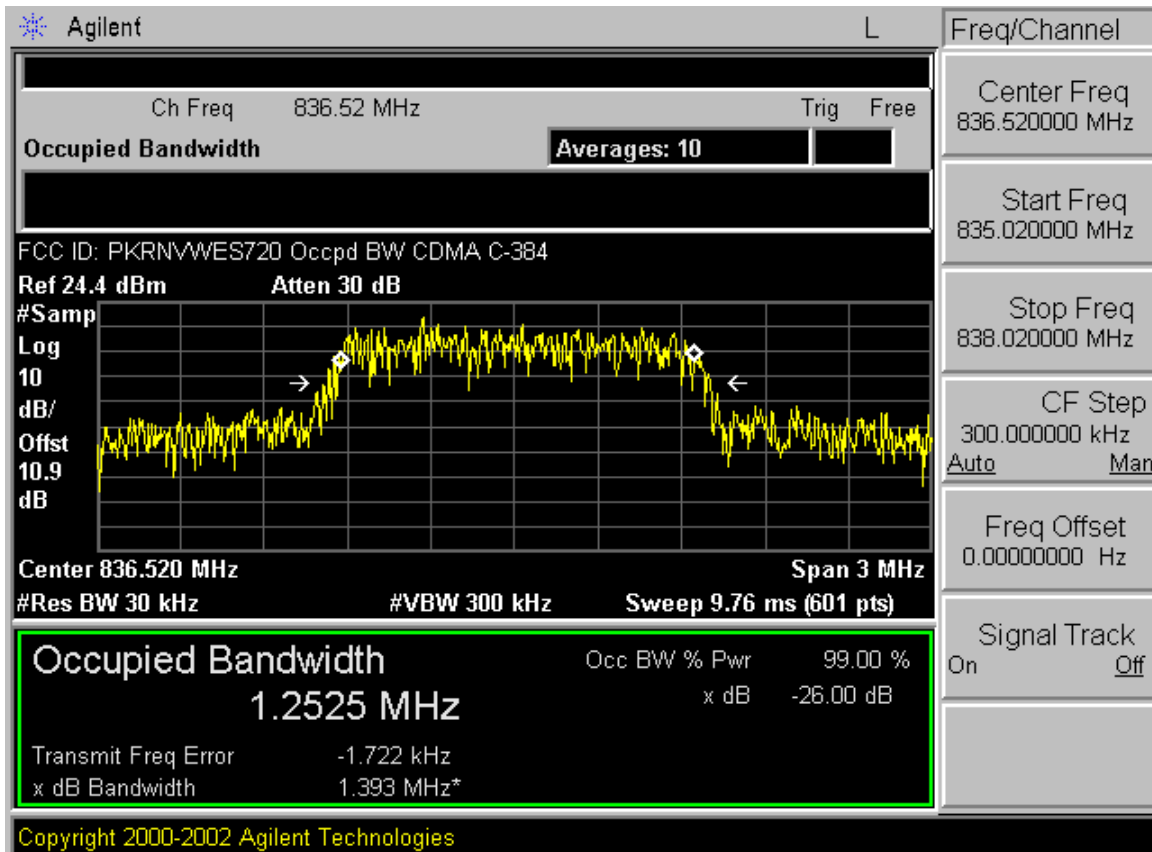
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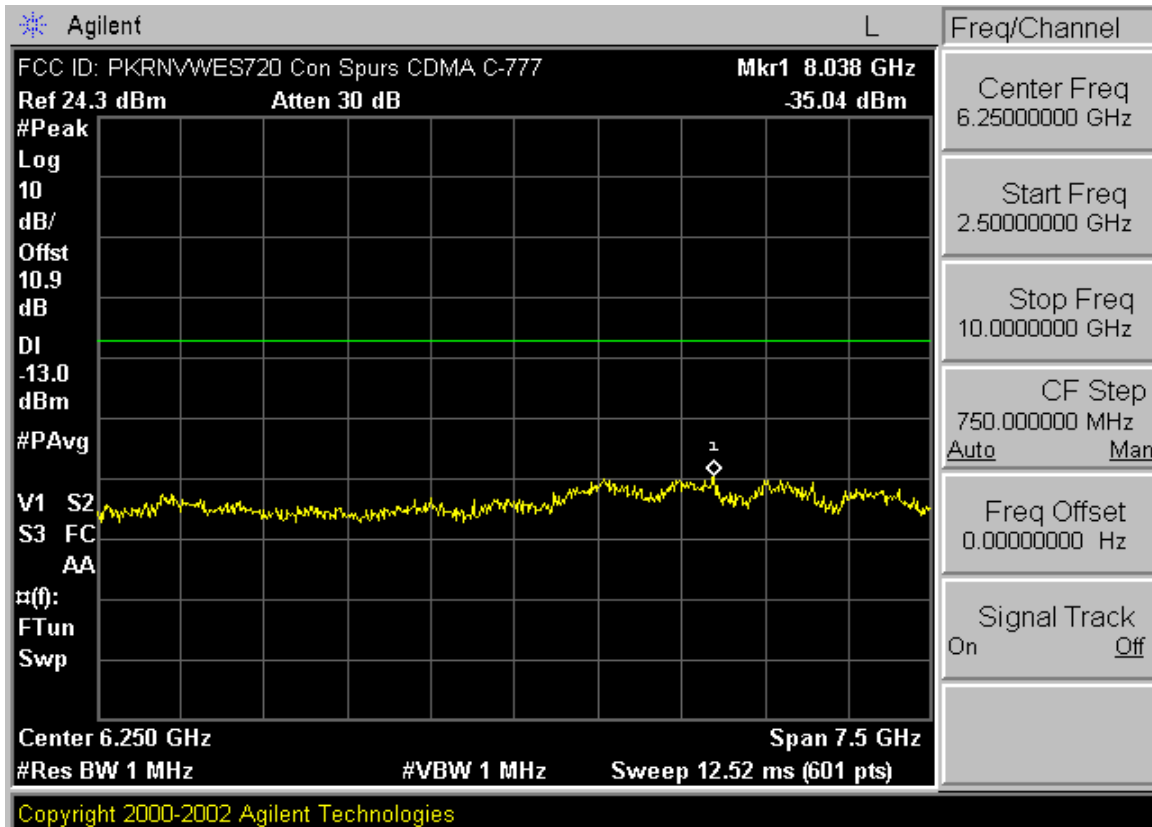
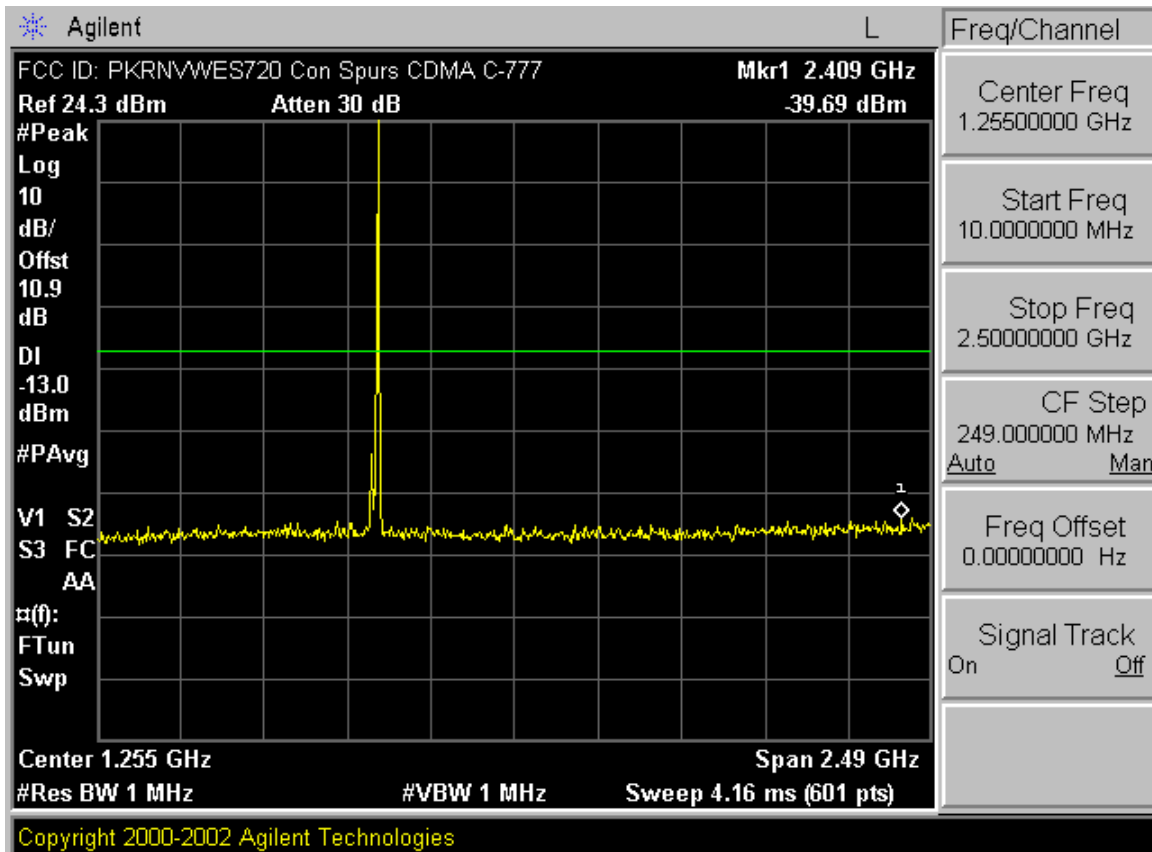
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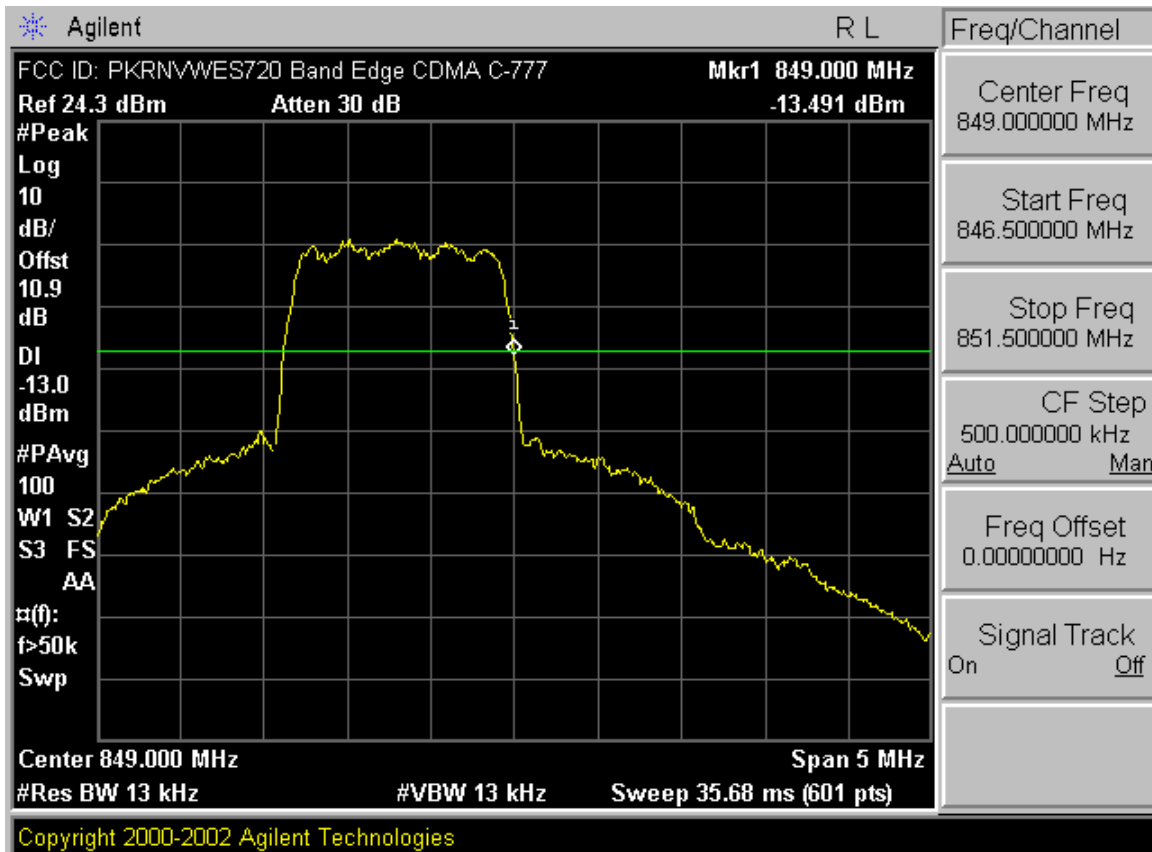
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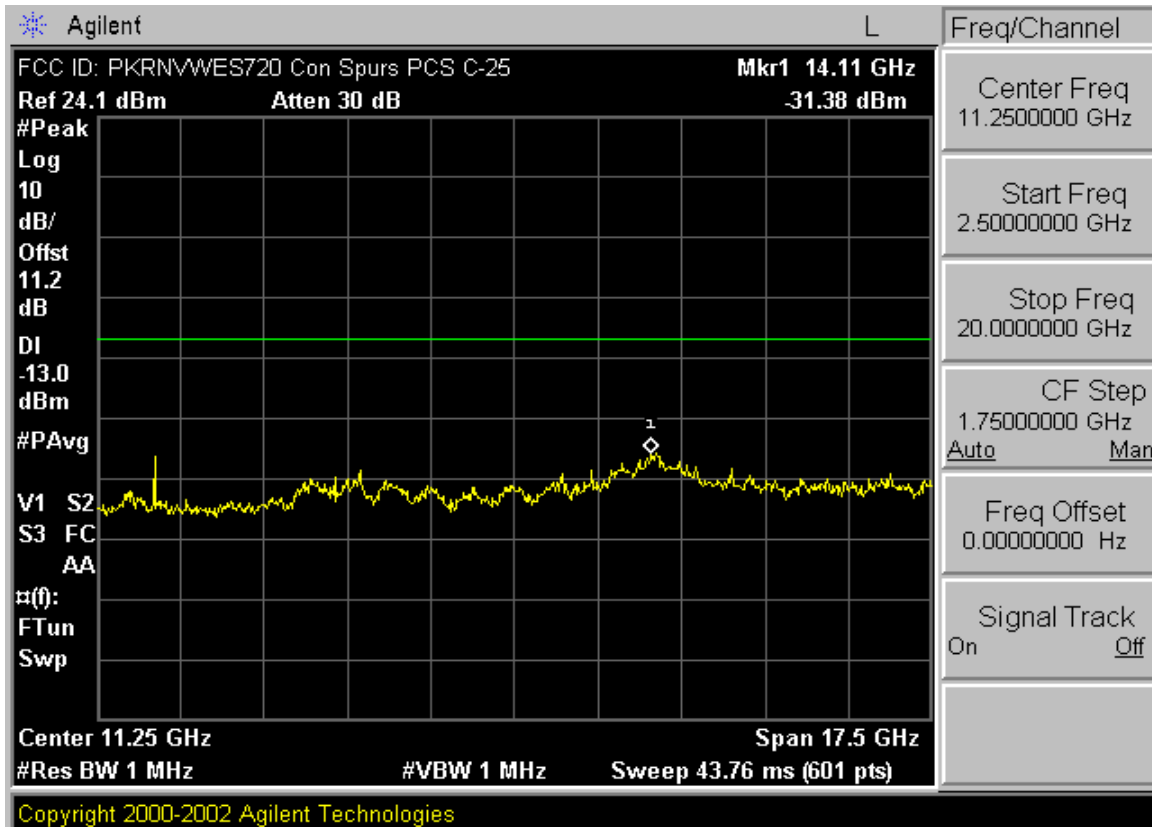
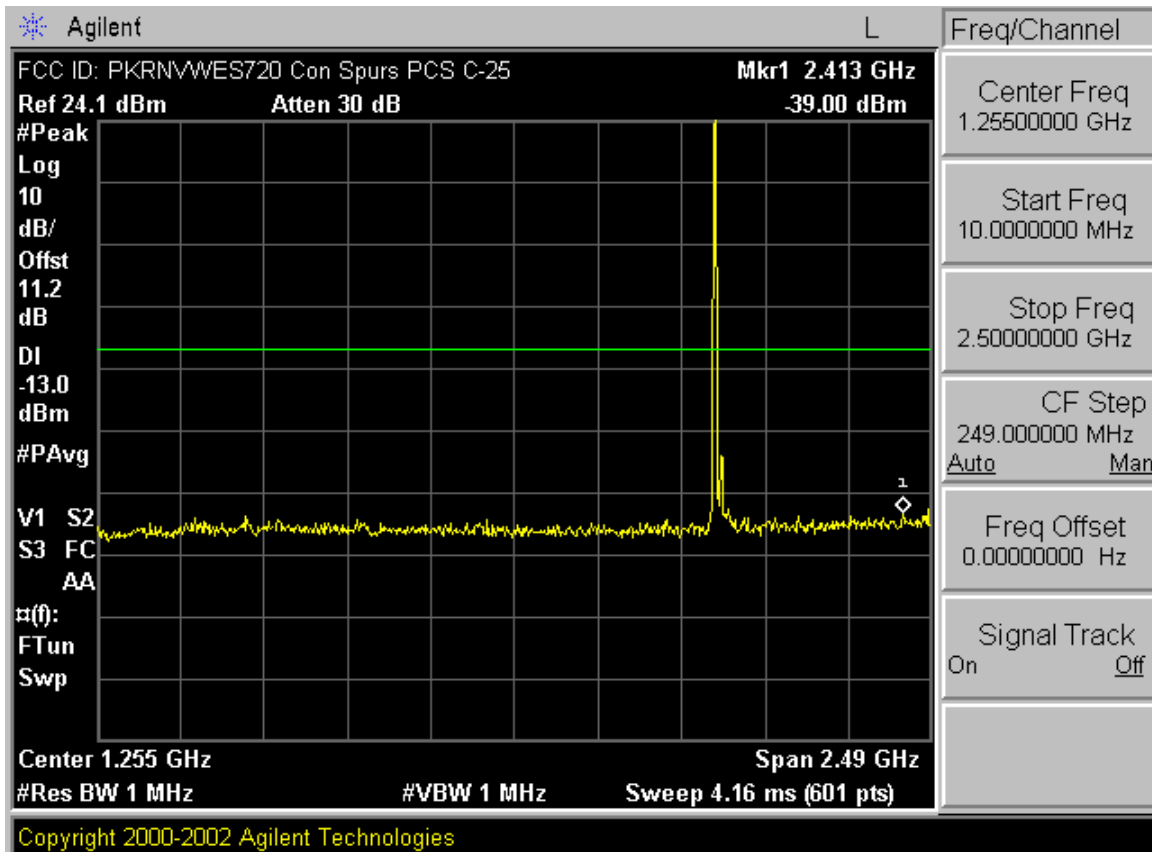
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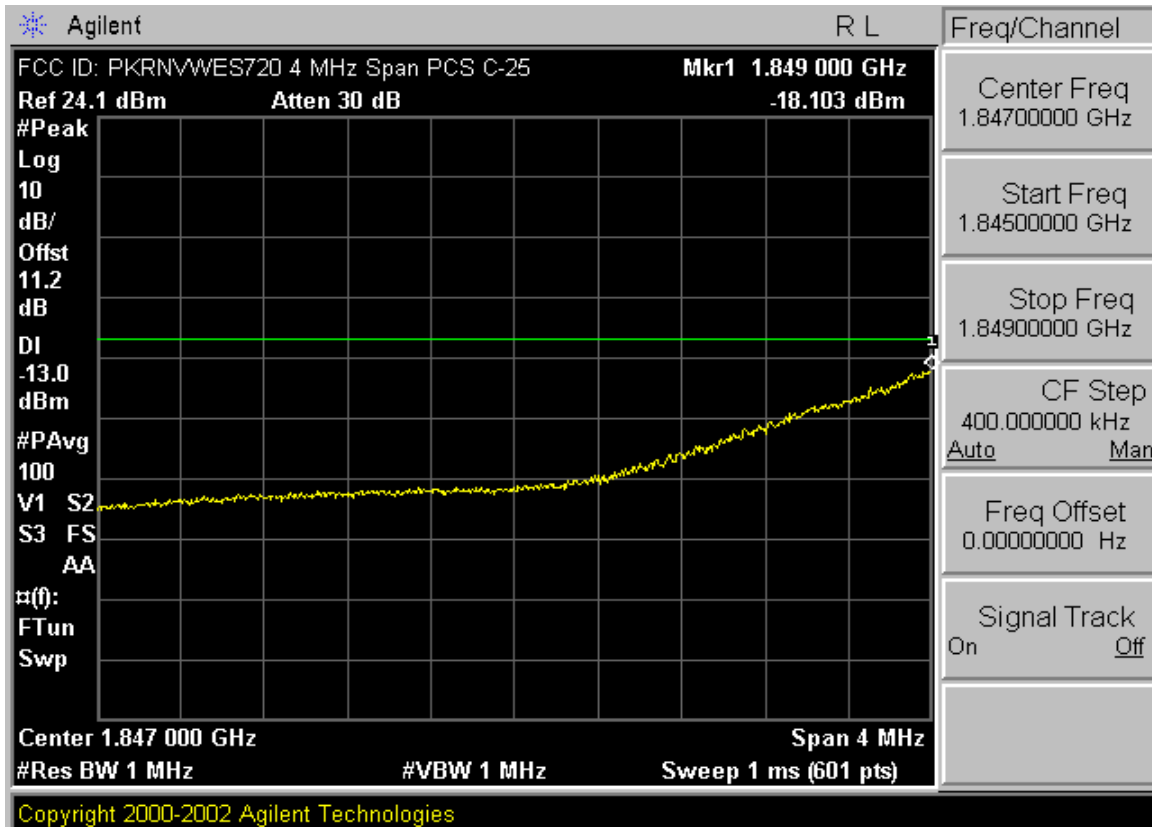
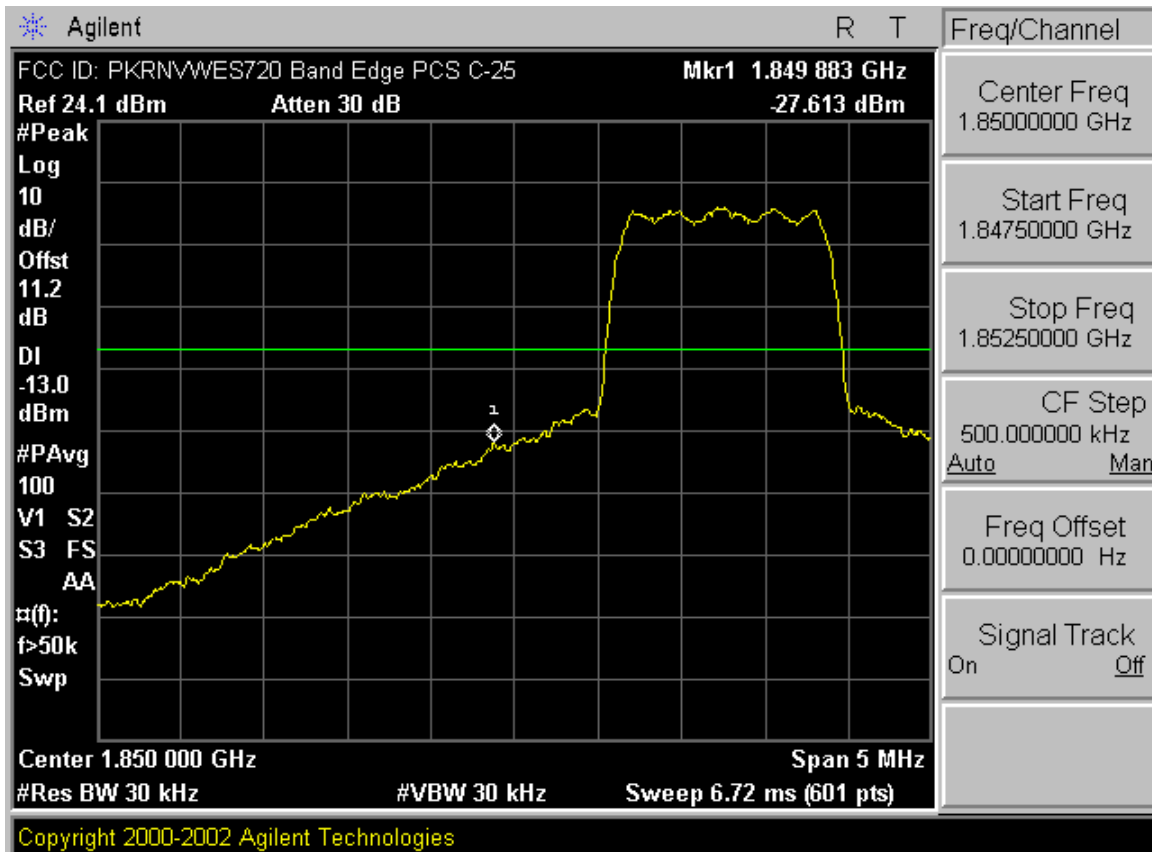
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| Test Report S/N: 0609140804 | Test Dates: September 20 - 21, 2006 | EUT Type: Dual-Band CDMA/EVDO Module | | Page 5 of 12 |



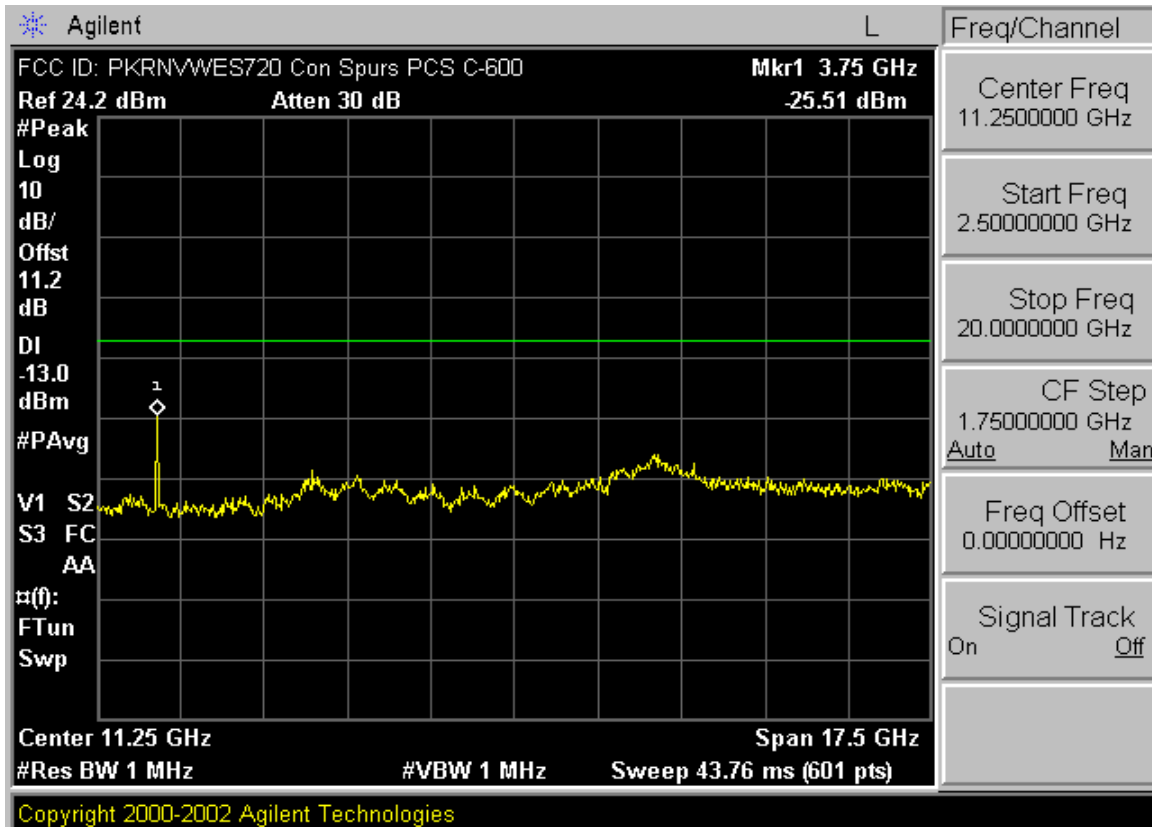
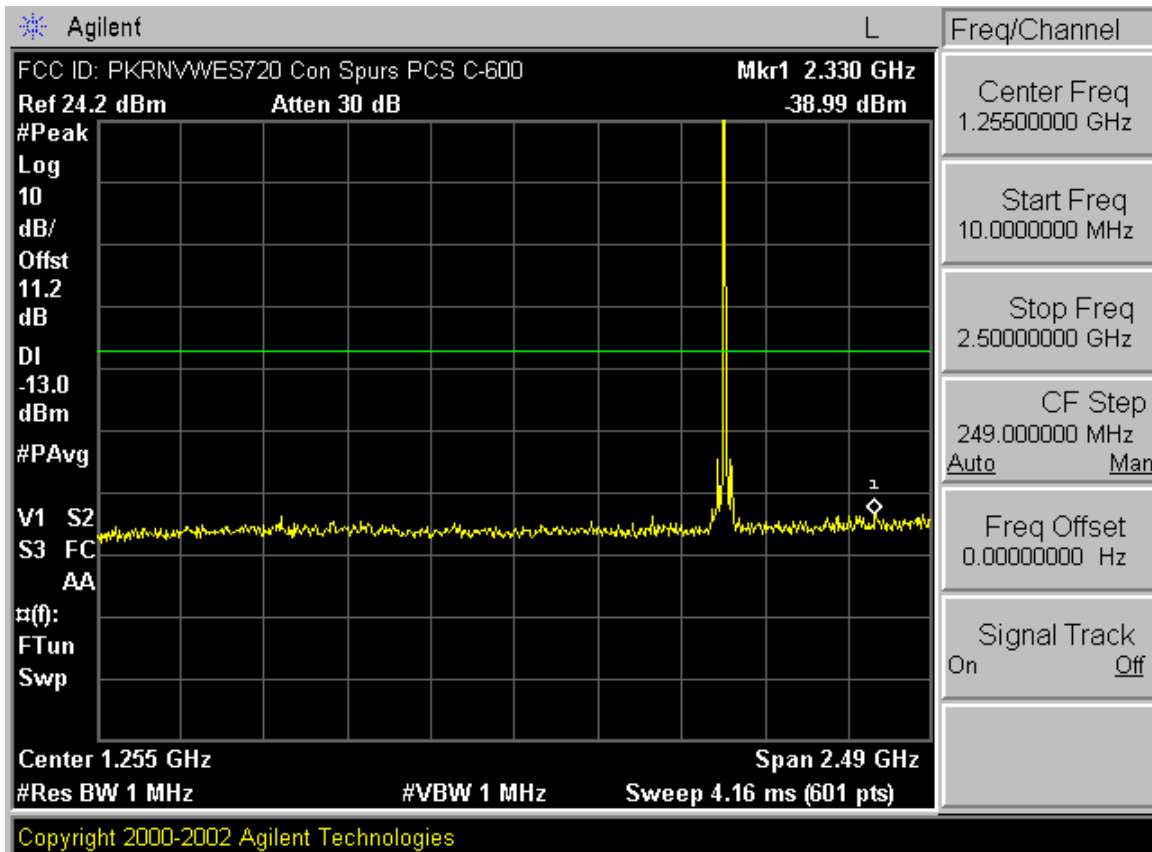
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| Test Report S/N: 0609140804 | Test Dates: September 20 - 21, 2006 | EUT Type: Dual-Band CDMA/EVDO Module | | Page 6 of 12 |



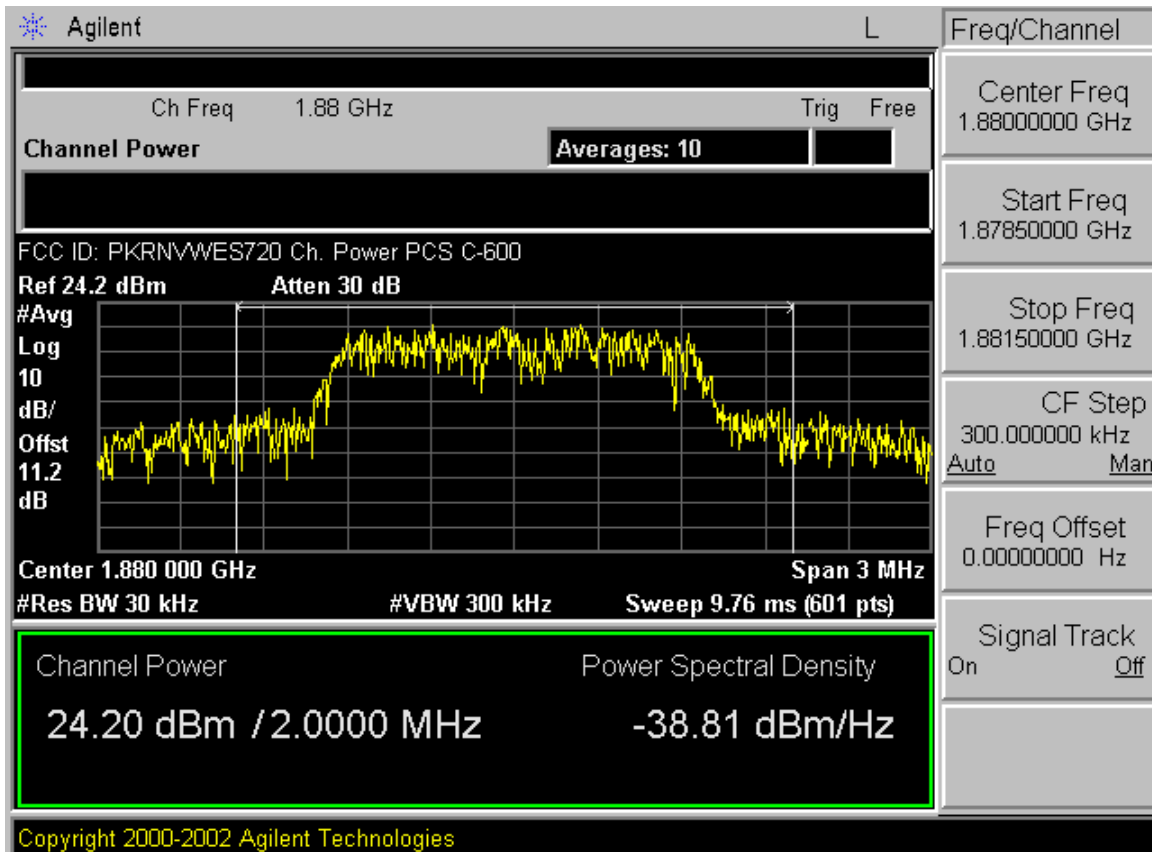
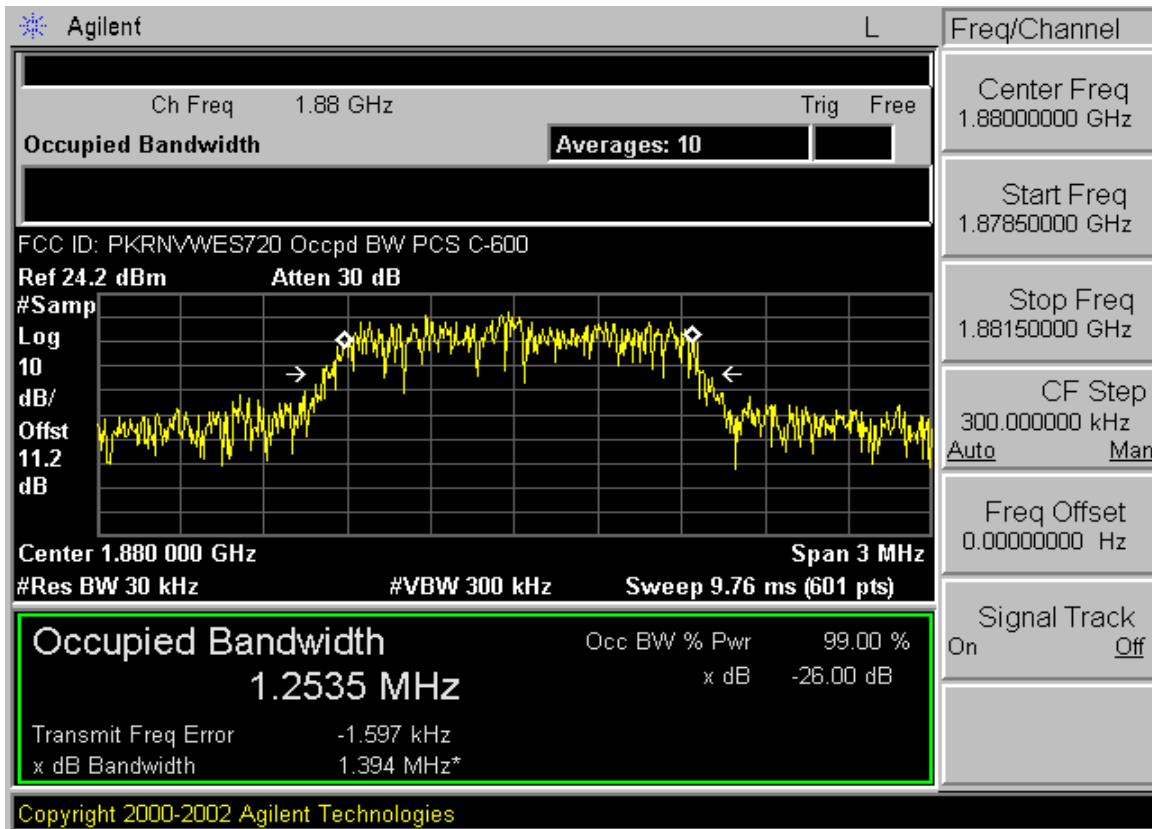
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| Test Report S/N: 0609140804 | Test Dates: September 20 - 21, 2006 | EUT Type: Dual-Band CDMA/EVDO Module | | Page 7 of 12 |



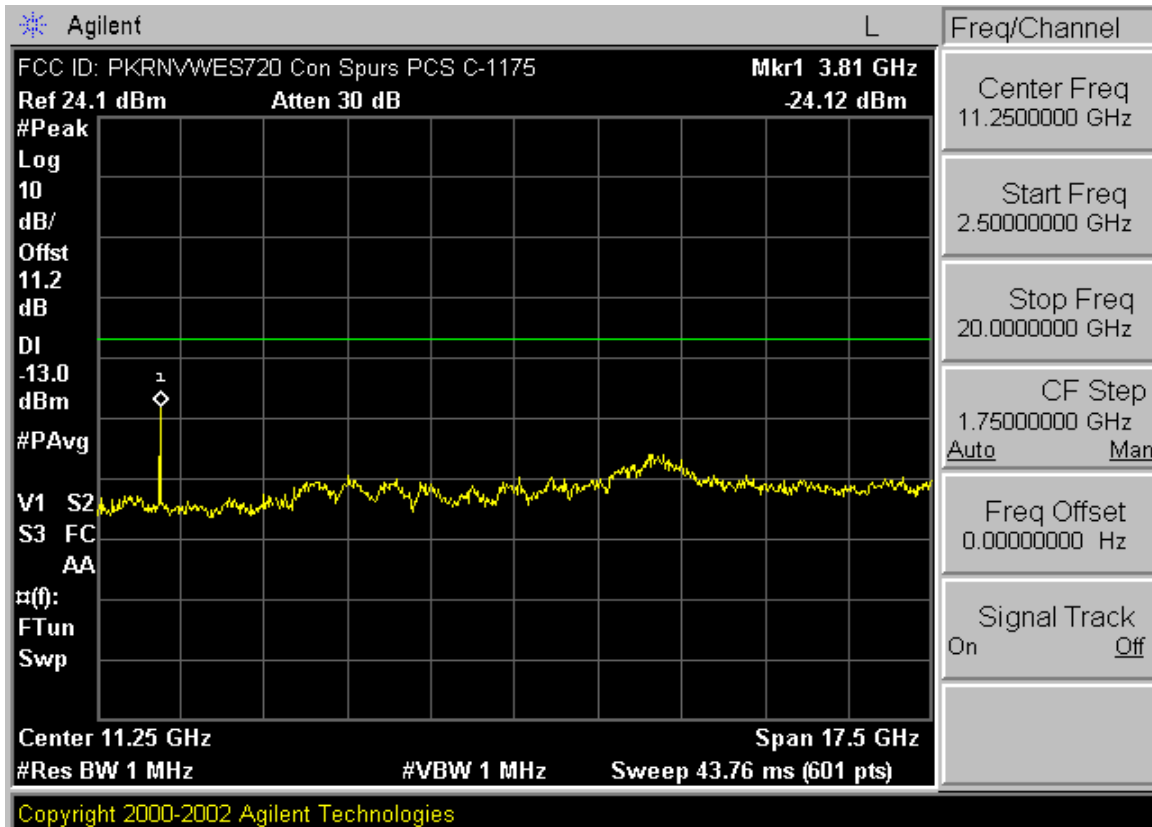
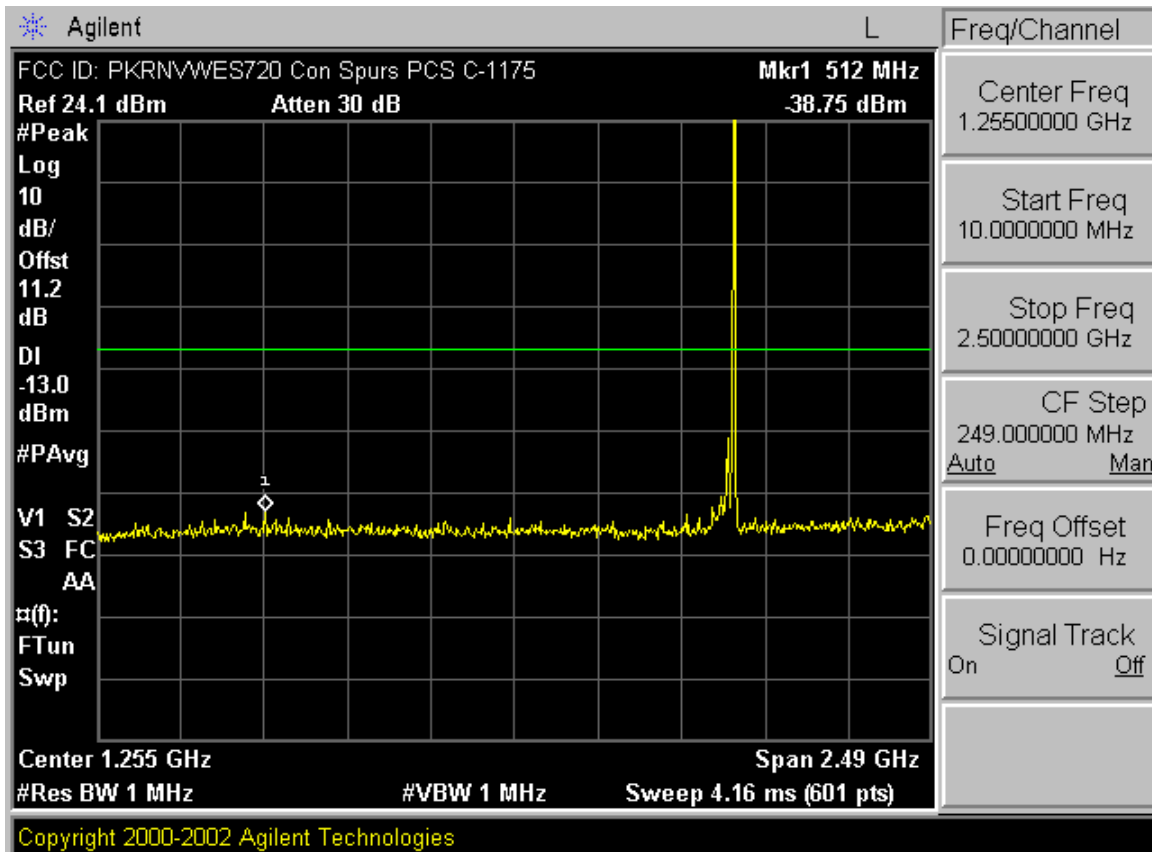
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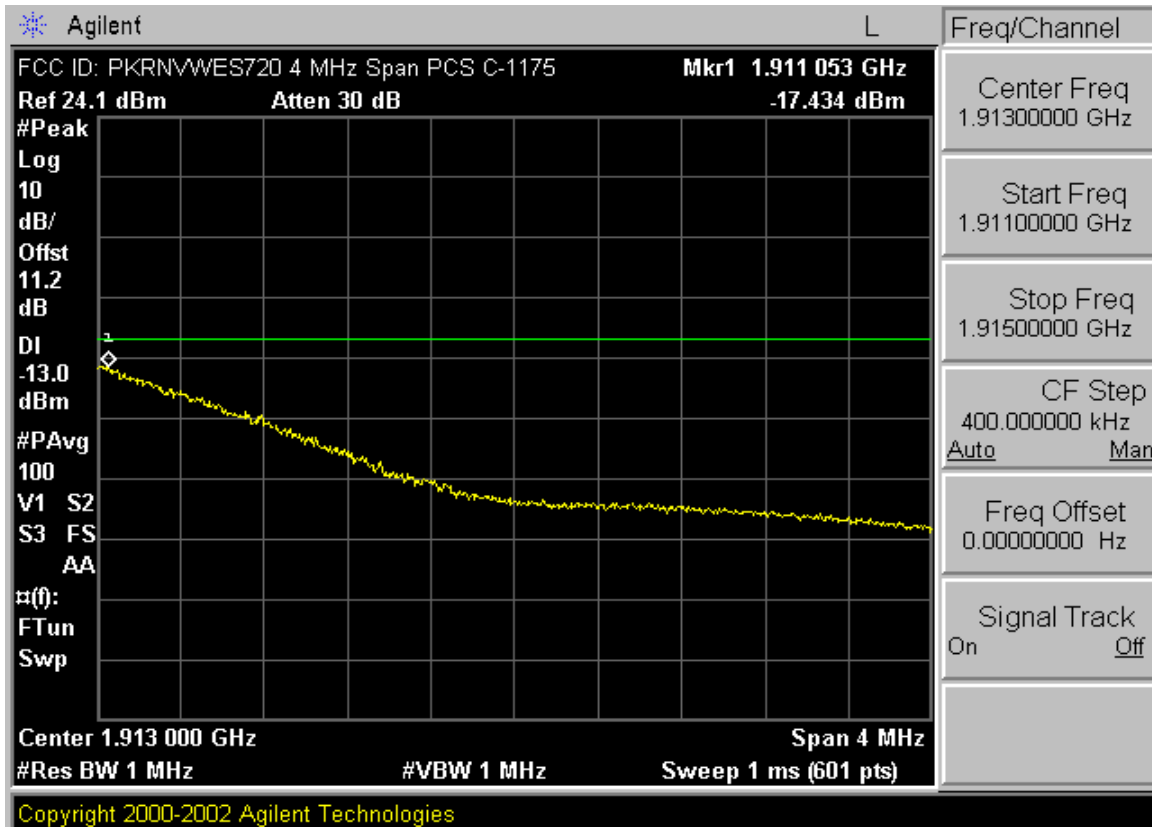
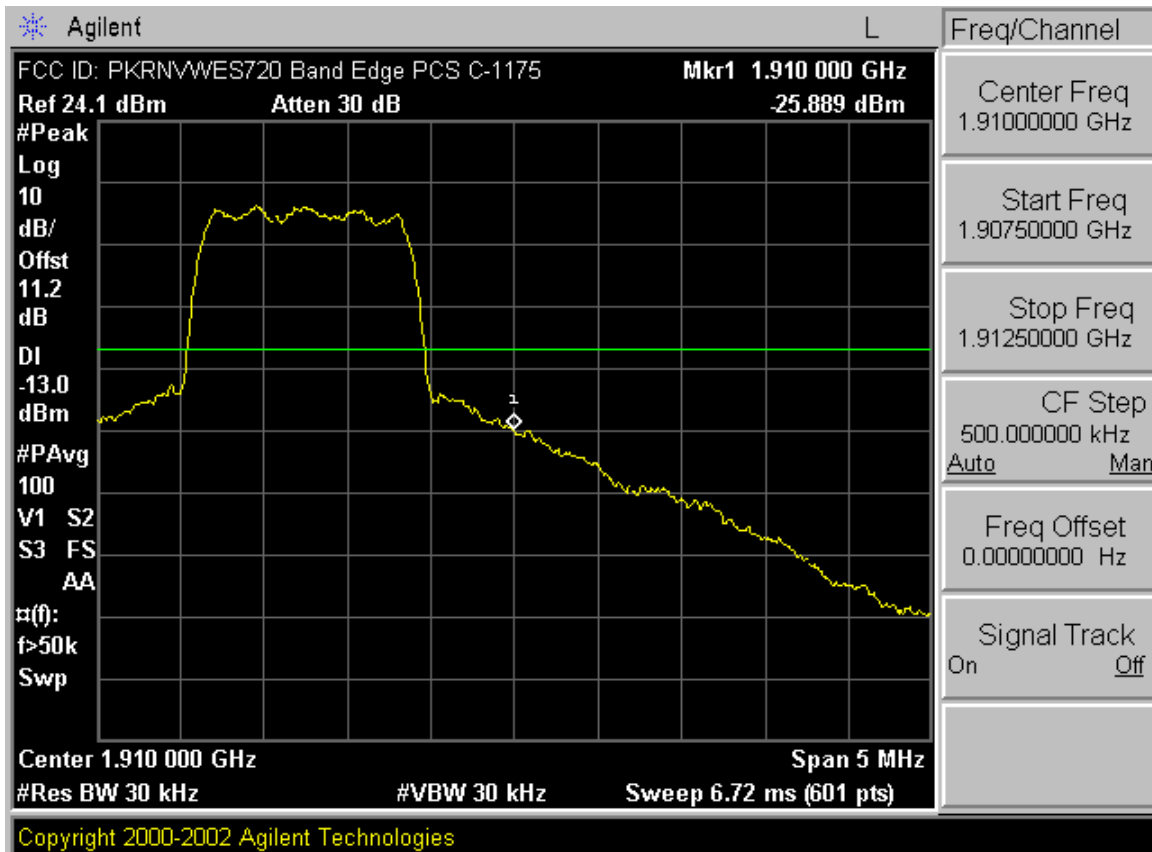
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EXHIBIT B – TEST SETUP PHOTOGRAPHS





| | | | | |
|---------------------------------------|---|--|---|--|
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EXHIBIT C – INTERNAL/EXTERNAL PHOTOGRAPHS

| | | | | |
|---------------------------------------|---|--|---|--|
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