



# PCTEST ENGINEERING LABORATORY, INC.

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## CERTIFICATE OF COMPLIANCE FCC Part 24 & 22 Certification

**Applicant Name:**

Panasonic Corporation of North America  
One Panasonic Way, 4B-8  
Secaucus, NJ 07094  
United States

**Date of Testing:**

June 15 - June 20, 2006

**Test Site/Location:**

PCTEST Lab, Columbia, MD, USA

**Test Report Serial No.:**

0606010437

**FCC ID:**

ACJ9TGCF-W51

**APPLICANT:**

PANASONIC CORPORATION OF NORTH AMERICA

**Application Type:**

Certification

**FCC Classification:**

PCS Licensed Transmitter (PCB)

**FCC Rule Part(s):**

§24(E), §22(H); §2

**EUT Type:**

Notebook PC w/ Intel WLAN and Sierra EvDO Modem

**Model(s):**

CF-W5

**Tx Frequency Range:**

824.70 - 848.31MHz (Cellular CDMA) / 1851.25 - 1908.75MHz (PCS CDMA)

**Rx Frequency Range:**

869.70 - 893.31MHz (Cellular CDMA) / 1931.25 - 1988.75MHz (PCS CDMA)

**Max. RF Output Power:**

0.498 W ERP Cellular CDMA (EvDO) (26.970 dBm) /

0.360 W EIRP PCS CDMA (EvDO) (25.562 dBm)

**Emission Designator(s):**

1M27F9W (Cellular CDMA (EvDO)) / 1M27F9W (PCS CDMA (EvDO))

**Test Device Serial No.:**

[S/N: 6BKSA00029R]

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 ERP for Part 22 and EIRP for 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





2041.01

PCTEST™ PT. 22/24 TEST REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 1 of 26

# TABLE OF CONTENTS

1.0	SCOPE .....	3
2.0	INTRODUCTION .....	4
2.1	TESTING FACILITY .....	4
2.2	MEASUREMENT PROCEDURE .....	4
3.0	INSERTS .....	5
4.0	DESCRIPTION OF TESTS .....	6
4.1	OCCUPIED BANDWIDTH EMISSION LIMITS .....	6
4.2	CELLULAR - BASE FREQUENCY BLOCKS .....	6
4.3	CELLULAR - MOBILE FREQUENCY BLOCKS .....	6
4.4	PCS - BASE FREQUENCY BLOCKS .....	7
4.5	PCS - MOBILE FREQUENCY BLOCKS .....	7
4.6	FREQUENCIES .....	8
4.7	RADIATED SPURIOUS AND HARMONIC EMISSIONS .....	8
4.8	FREQUENCY STABILITY / TEMPERATURE VARIATION .....	8
5.0	CONDUCTED OUTPUT POWER .....	10
5.1	SAR MEASUREMENT CONDITIONS FOR CDMA2000 .....	10
5.2	OUTPUT POWER VERIFICATION .....	10
6.0	EFFECTIVE RADIATED POWER .....	11
6.1	EFFECTIVE RADIATED POWER OUTPUT DATA .....	11
7.0	EQUIVALENT ISOTROPIC RADIATED POWER .....	12
7.1	EQUIVALENT ISOTROPIC RADIATED POWER OUTPUT DATA .....	12
8.0	RADIATED MEASUREMENTS .....	13
8.1	CELLULAR CDMA (EVDO) RADIATED MEASUREMENTS .....	13
8.2	PCS CDMA (EVDO) RADIATED MEASUREMENTS .....	16
9.0	FREQUENCY STABILITY .....	19
9.1	FREQUENCY STABILITY (CELLULAR CDMA (EVDO)) .....	19
9.2	FREQUENCY STABILITY (PCS CDMA (EVDO)) .....	21
10.0	PLOT(S) OF EMISSIONS .....	23
11.0	TEST EQUIPMENT .....	24
12.0	SAMPLE CALCULATIONS .....	25
13.0	CONCLUSION .....	26
ATTACHMENT A:	TEST PLOTS	
ATTACHMENT B:	TEST SETUP PHOTOGRAPHS	
ATTACHMENT C:	EXTERNAL PHOTOGRAPHS	
ATTACHMENT D:	INTERNAL PHOTOGRAPHS	

<b>PCTEST™ PT. 22/24 TEST REPORT</b>		<b>FCC MEASUREMENT REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0606010437	<b>Test Dates:</b> June 15 - June 20, 2006	<b>EUT Type:</b> Notebook PC w/ Intel WLAN and Sierra EvDO Modem	<b>FCC ID:</b> ACJ9TGCF-W51	Page 2 of 26

## 1.0 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.



### §2.1033 General Information

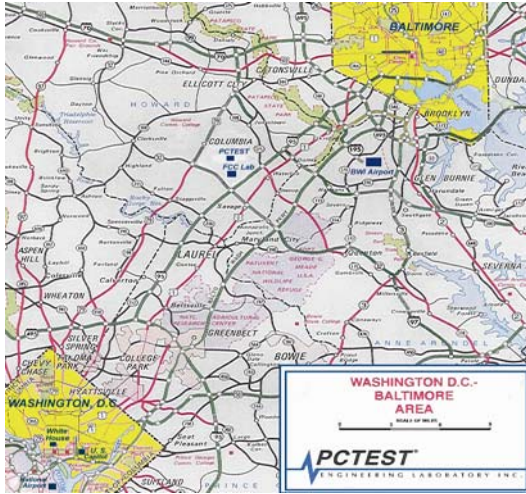
Applicant Name: Panasonic Corporation of North America  
 Address: One Panasonic Way, 4B-8  
 Secaucus, NJ 07094  
 United States

- FCC ID: ACJ9TGCF-W51
- Quantity: Quantity production is planned
- Emission Designators: 1M27F9W (Cellular CDMA (EvDO)) / 1M27F9W (PCS CDMA (EvDO))
- Tx Freq. Range: 824.70 - 848.31MHz (Cellular CDMA)  
 1851.25 - 1908.75MHz (PCS CDMA)
- Rx Freq. Range: 869.70 - 893.31MHz (Cellular CDMA)  
 1931.25 – 1988.75MHz (PCS CDMA)
- Max. Power Rating: 0.498 W ERP Cellular CDMA (EvDO) (26.970 dBm) /  
 0.360 W EIRP PCS CDMA (EvDO) (25.562 dBm)
- FCC Classification(s): PCS Licensed Transmitter (PCB)
- Equipment (EUT) Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem
- Modulation(s): CDMA (EvDO)
- Frequency Tolerance:  $\pm 0.00025\%$  (2.5 ppm)
- FCC Rule Part(s): § 24(E), §22(H)
- Dates of Tests: June 15 - June 20, 2006
- Place of Tests: PCTEST Lab, Columbia, MD U.S.A.
- Test Report S/N: 0606010437
- Deviation from measurement procedure - None

PCTEST™ PT. 22/24 TEST REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 3 of 26

## 2.0 INTRODUCTION

### 2.1 Testing Facility

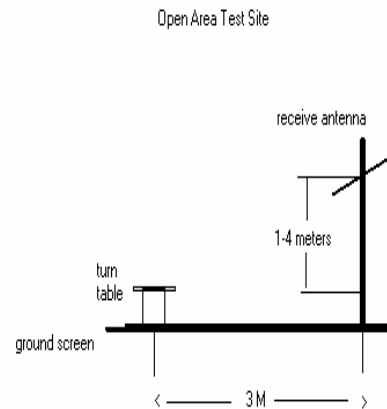


**Figure 1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area.**



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 on October 19, 1992.

### 2.2 Measurement Procedure

The radiated spurious measurements were made outdoors at a 3-meter test range (see Figure2). 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 2. Diagram of 3-meter outdoor test range**

<b>PCTEST™ PT. 22/24 TEST REPORT</b>		<b>FCC MEASUREMENT REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0606010437	<b>Test Dates:</b> June 15 - June 20, 2006	<b>EUT Type:</b> Notebook PC w/ Intel WLAN and Sierra EvDO Modem	<b>FCC ID:</b> ACJ9TGCF-W51	Page 4 of 26

### 3.0 INSERTS

Function of Active Devices (Confidential)

Block & Schematic Diagrams (Confidential)



Operating Instructions

Parts List & Tune-Up Procedure (Confidential)

Description of Freq. Stabilization Circuit (Confidential)

Description for Suppression of Spurious Radiation, for Limiting Modulation, and Harmonic Suppression Circuits (Confidential)

*\* These exhibits are not included.*

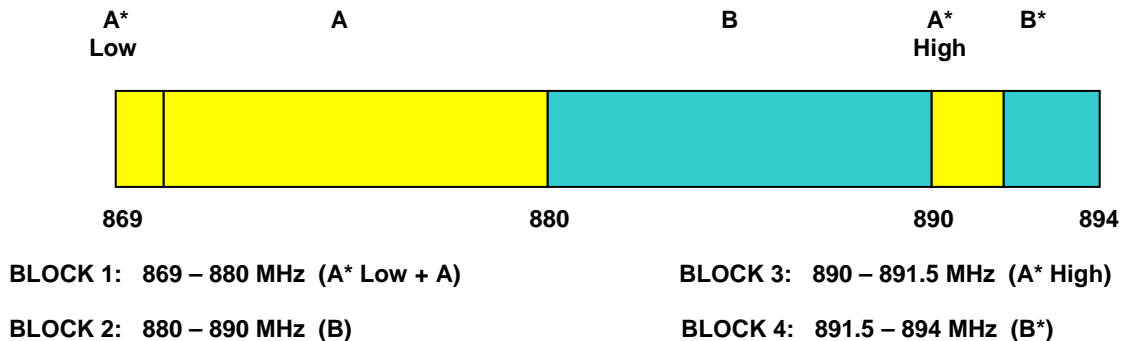
PCTEST™ PT. 22/24 TEST REPORT			FCC MEASUREMENT REPORT	 Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 5 of 26

## 4.0 DESCRIPTION OF TESTS

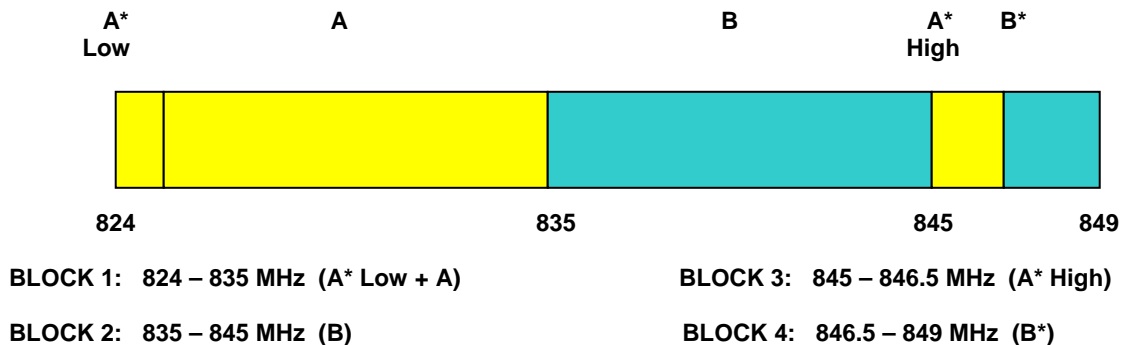
### 4.1 Occupied Bandwidth Emission Limits



- 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.
- 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.
- 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.
- 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.

### 4.2 Cellular - Base Frequency Blocks

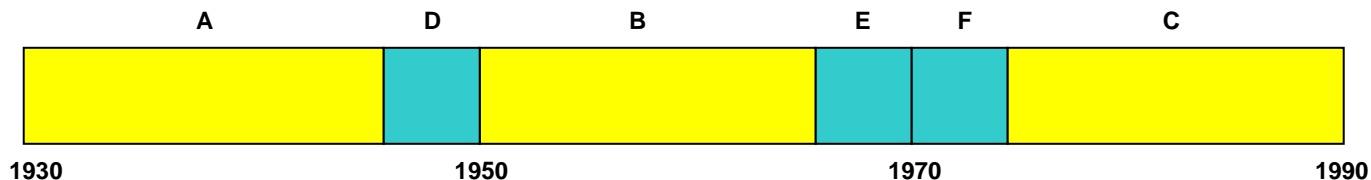


### 4.3 Cellular - Mobile Frequency Blocks



PCTEST™ PT. 22/24 TEST REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 6 of 26

#### 4.4 PCS - Base Frequency Blocks



BLOCK 1: 1930 – 1945 MHz (A)

BLOCK 4: 1965 – 1970 MHz (E)

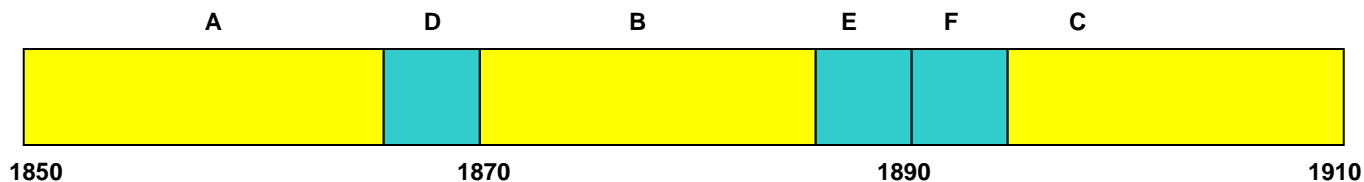
BLOCK 2: 1945 – 1950 MHz (D)

BLOCK 5: 1970 – 1975 MHz (F)

BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 6: 1975 – 1990 MHz (C)

#### 4.5 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)

PCTEST™ PT. 22/24 TEST REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 7 of 26

## 4.6 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.

## 4.7 Radiated 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 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 FTAP with "All Up" power control bits..

## 4.8 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 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  $\pm 0.00025$  ( $\pm 2.5$  ppm) of the center frequency.*

### **Time Period and Procedure:**

1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature (22°C to 25°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 of the transmitter and the individual oscillators is made within a three minute interval after applying power to the transmitter.
4. Frequency measurements are 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.



PCTEST™ PT. 22/24 TEST REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 8 of 26



#### 4.8 Frequency Stability / Temperature Variation (Cont'd)

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 measurements are 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 re-applying power to the transmitter.
7. The artificial load is mounted external to the temperature chamber.

**NOTE: The EUT is tested down to the battery endpoint.**

PCTEST™ PT. 22/24 TEST REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 9 of 26

## 5.0 CONDUCTED OUTPUT POWER

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

### 5.1 SAR Measurement Conditions for CDMA2000

The following procedures were followed according to FCC "SAR Measurement Procedures for 3G Devices", May 2006.

### 5.2 Output Power Verification

See 3GPP2 C.S0011/TIA-98-E as recommended by "SAR Measurement Procedures for 3G Devices", May 2006.

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 5-1 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 5-2 was applied.
5. FCHs were configured at full rate for maximum SAR with "All Up" power control bits.

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



**Table 5-1**  
**Parameters for Max. Power for RC1**

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

**Table 5-2**  
**Parameters for Max. Power for RC3**

Band	Channel	SO2	SO2	SO55	SO55	TDSO SO32	1x EvDO Rev. 0	1x EvDO Rev. 0
		RC1/1	RC3/3	RC1/1	RC3/3	RC3/3	(FTAP)	(RTAP)
Cellular	1013	24.89	24.81	24.98	25.09	25.08	25.13	25.14
	384	24.52	24.62	24.70	24.62	24.86	25.01	24.98
	777	24.81	24.58	24.61	24.67	24.71	24.78	24.87
PCS	25	24.67	24.74	24.87	24.59	25.02	25.22	25.19
	600	24.61	24.74	24.86	24.76	24.95	25.16	25.11
	1175	24.81	24.68	24.84	24.67	25.06	25.11	25.21

**Table 5-3**  
**Maximum Power Output Table for CF-W5**

PCTEST™ PT. 22/24 TEST REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 10 of 26

## 6.0 EFFECTIVE RADIATED POWER

### 6.1 Effective Radiated Power Output Data

POWER: High (CDMA Mode)

Freq. Tuned (MHz)	REF. LEVEL (dBm)	POL (H/V)	ERP (W)	ERP (dBm)	BATTERY
824.70	-14.303	H	0.498	26.970	Standard
836.52	-14.605	H	0.482	26.828	Standard
848.31	-15.436	H	0.412	26.147	Standard



Note: This unit was tested with its standard battery.

#### **NOTES:**

Effective Radiated Power Output Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

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 = 5MHz. 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. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

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

PCTEST™ PT. 22/24 TEST REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 11 of 26

## 7.0 EQUIVALENT ISOTROPIC RADIATED POWER

### 7.1 Equivalent Isotropic Radiated Power Output Data

#### Radiated measurements at 3 meters

**Supply Voltage:** 11.1 VDC

**Modulation:** PCS CDMA (EvDO)

FREQ. (MHz)	REF. LEVEL (dBm)	POL (H/V)	Azimuth (o angle)	EIRP (dBm)	EIRP (W)	Battery
1851.25	-17.519	H	95	25.562	0.360	Standard
1880.00	-18.238	H	95	25.013	0.317	Standard
1908.75	-18.626	H	95	24.795	0.302	Standard



Note: This unit was tested with its standard battery.

#### **NOTES:**

Equivalent Isotropic Radiated Power Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

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 = 5MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A Horn antenna was substituted in place of the EUT. This Horn 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 Horn antenna is measured. The difference between the gain of the horn and an isotropic antenna is taken into consideration and the EIRP is recorded.

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

PCTEST™ PT. 22/24 TEST REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 12 of 26

## 8.0 RADIATED MEASUREMENTS

### 8.1 Cellular CDMA (EvDO) Radiated Measurements

#### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 824.70 MHz  
 CHANNEL: 1013 (Low)  
 MEASURED OUTPUT POWER: 26.970 dBm = 0.498 W  
 MODULATION SIGNAL: CDMA (Internal)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  39.97 dBc



FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1649.40	-60.73	6.10	-54.63	H	81.6
2474.10	-60.45	6.70	-53.75	H	80.7
3298.80	-64.99	6.80	-58.19	V	85.2
4123.50	-64.08	6.50	-57.58	H	84.5
4948.20	-84.38	7.00	-77.38	H	104.3

#### NOTES:

Radiated Spurious Emission Measurements by Substitution Method  
according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

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 = 5MHz. 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 FTAP with "All Up" power control bits..

PCTEST™ PT. 22/24 TEST REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 13 of 26

## 8.1 Cellular CDMA (EvDO) Radiated Measurements (Cont'd)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 836.52 MHz  
 CHANNEL: 0384 (Mid)  
 MEASURED OUTPUT POWER: 26.970 dBm = 0.498 W  
 MODULATION SIGNAL: CDMA (Internal)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  39.97 dBc



FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1673.04	-58.03	6.10	-51.93	V	78.9
2509.56	-63.56	6.70	-56.86	V	83.8
3346.08	-63.50	6.80	-56.70	H	83.7
4182.60	-63.01	6.50	-56.51	V	83.5
5019.12	-83.78	7.00	-76.78	H	103.7

#### NOTES:

Radiated Spurious Emission Measurements by Substitution Method  
according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

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 = 5MHz. 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 FTAP with "All Up" power control bits..

PCTEST™ PT. 22/24 TEST REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 14 of 26

## 8.1 Cellular CDMA (EvDO) Radiated Measurements (Cont'd)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 848.31 MHz  
 CHANNEL: 0777 (High)  
 MEASURED OUTPUT POWER: 26.970 dBm = 0.498 W  
 MODULATION SIGNAL: CDMA (Internal)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  39.97 dBc



FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1696.62	-48.94	6.10	-42.84	V	69.8
2544.93	-62.16	6.70	-55.46	H	82.4
3393.24	-62.71	6.80	-55.91	H	82.9
4241.55	-63.55	6.50	-57.05	V	84.0
5089.86	-83.98	7.00	-76.98	H	103.9

#### NOTES:

Radiated Spurious Emission Measurements by Substitution Method  
according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

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 = 5MHz. 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 FTAP with "All Up" power control bits..

PCTEST™ PT. 22/24 TEST REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 15 of 26

## 8.2 PCS CDMA (EvDO) Radiated Measurements

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1851.25 MHz  
 CHANNEL: 0025 (Low)  
 MEASURED OUTPUT POWER: 25.562 dBm = 0.360 W  
 MODULATION SIGNAL: CDMA (Internal)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  38.56 dBc



FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3702.50	-52.05	8.70	-43.35	H	68.9
5553.75	-47.50	9.70	-37.80	V	63.4
7405.00	-54.12	9.90	-44.22	V	69.8
9256.25	-77.43	11.40	-66.03	V	91.6
11107.50	-77.33	12.10	-65.23	H	90.8

#### NOTES:

Radiated Spurious Emission Measurements by Substitution Method  
according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

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 = 5MHz. 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 FTAP with "All Up" power control bits..

PCTEST™ PT. 22/24 TEST REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 16 of 26

## 8.2 PCS CDMA (EvDO) Radiated Measurements (Cont'd)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1880.00 MHz  
 CHANNEL: 0600 (Mid)  
 MEASURED OUTPUT POWER: 25.562 dBm = 0.360 W  
 MODULATION SIGNAL: CDMA (Internal)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  38.56 dBc



FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3760.00	-48.70	8.70	-40.00	V	65.6
5640.00	-54.83	9.70	-45.13	V	70.7
7520.00	-55.53	9.90	-45.63	H	71.2
9400.00	-77.23	11.40	-65.83	H	91.4
11280.00	-77.13	12.10	-65.03	H	90.6

#### NOTES:

Radiated Spurious Emission Measurements by Substitution Method  
according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

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 = 5MHz. 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 FTAP with "All Up" power control bits..

PCTEST™ PT. 22/24 TEST REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 17 of 26

## 8.2 PCS CDMA (EvDO) Radiated Measurements (Cont'd)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1908.75 MHz  
 CHANNEL: 1175 (High)  
 MEASURED OUTPUT POWER: 25.562 dBm = 0.360 W  
 MODULATION SIGNAL: CDMA (Internal)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  38.56 dBc



FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3817.50	-40.44	8.70	-31.74	H	57.3
5726.25	-40.92	9.70	-31.22	V	56.8
7635.00	-52.70	9.90	-42.80	V	68.4
9543.75	-76.93	11.40	-65.53	H	91.1
11452.50	-76.93	12.10	-64.83	H	90.4

#### NOTES:

Radiated Spurious Emission Measurements by Substitution Method  
according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

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 = 5MHz. 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 FTAP with "All Up" power control bits..

PCTEST™ PT. 22/24 TEST REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 18 of 26

## 9.0 FREQUENCY STABILITY

### 9.1 Frequency Stability (Cellular CDMA (EvDO))

OPERATING FREQUENCY: 836,520,007 Hz

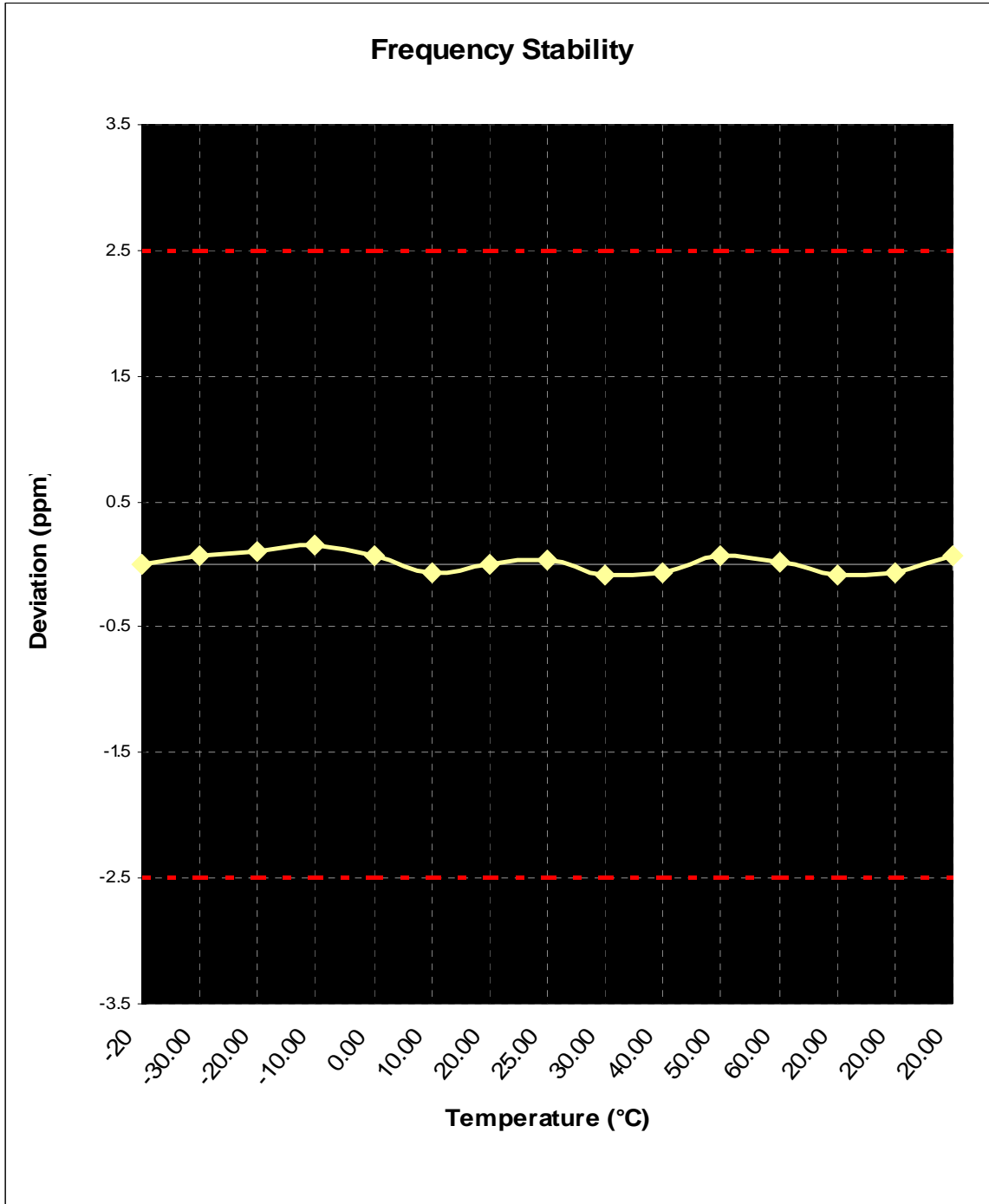
CHANNEL: 384



REFERENCE VOLTAGE: 11.1 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQ. (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	11.10	+ 20 (Ref)	836,520,007	0.00	0.000000
100 %		-30	836,519,957	50.19	0.000006
100 %		-20	836,519,915	92.02	0.000011
100 %		-10	836,519,882	125.48	0.000015
100 %		0	836,519,948	58.56	0.000007
100 %		10	836,520,057	-50.19	-0.000006
100 %		20	836,520,007	0.00	0.000000
100 %		25	836,519,974	33.46	0.000004
100 %		30	836,520,082	-75.29	-0.000009
100 %		40	836,520,066	-58.56	-0.000007
100 %		50	836,519,957	50.19	0.000006
100 %		60	836,519,990	16.73	0.000002
85 %	9.44	20	836,520,082	-75.29	-0.000009
115 %	12.77	20	836,520,066	-58.56	-0.000007
BATT. ENDPOINT	10.86	20	836,519,957	50.19	0.000006

## 9.1 Frequency Stability (Cellular CDMA (EvDO)) (Cont'd)



<b>PCTEST™ PT. 22/24 TEST REPORT</b>			<b>FCC MEASUREMENT REPORT</b>		<b>Reviewed by:</b> Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 20 of 26	

## 9.2 Frequency Stability (PCS CDMA (EvDO))

OPERATING FREQUENCY: 1,880,000,003 Hz

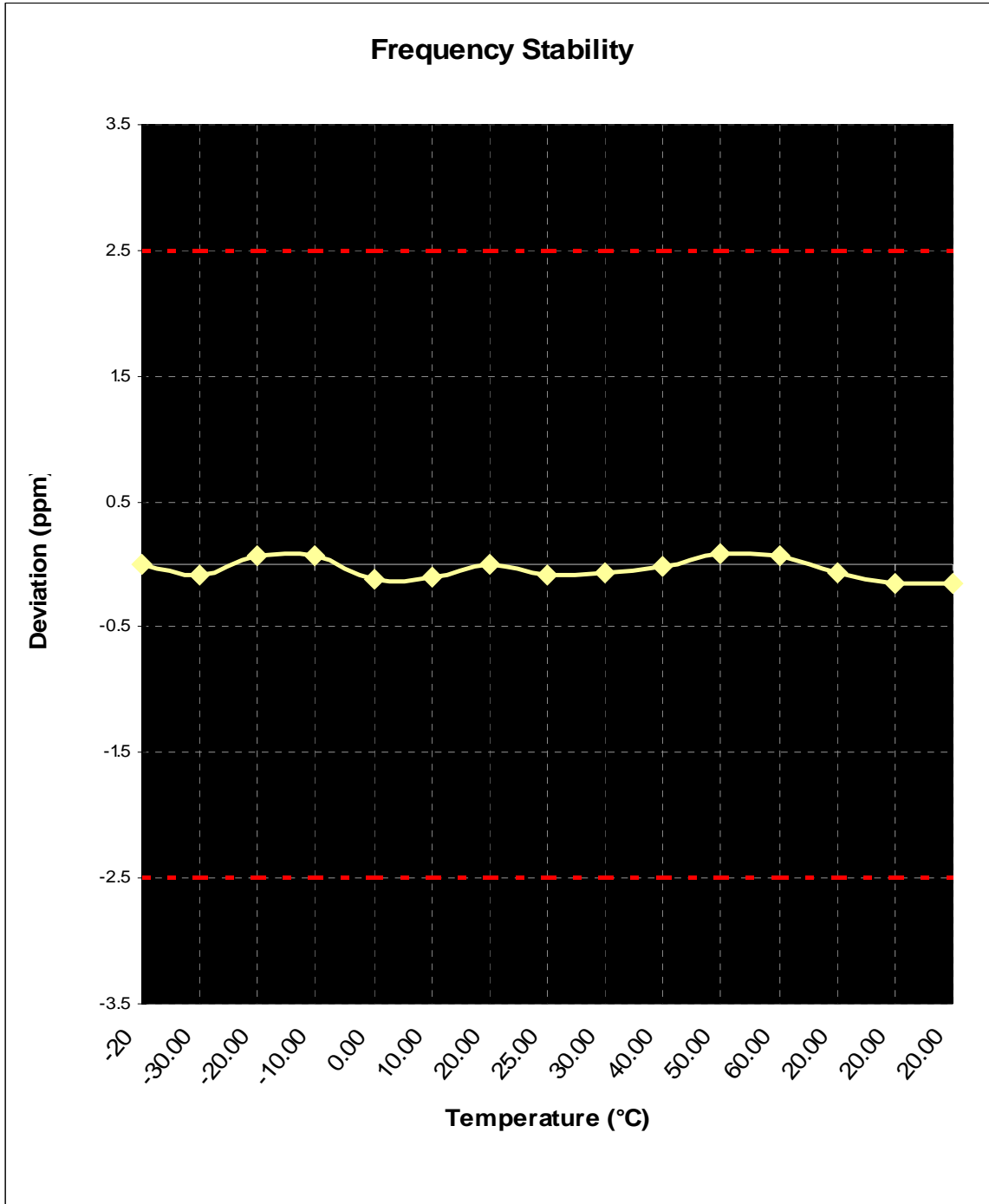
CHANNEL: 600



REFERENCE VOLTAGE: 11.1 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQ. (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	11.10	+ 20 (Ref)	1,880,000,003	0.00	0.000000
100 %		-30	1,880,000,172	-169.20	-0.000009
100 %		-20	1,879,999,871	131.60	0.000007
100 %		-10	1,879,999,890	112.80	0.000006
100 %		0	1,880,000,229	-225.60	-0.000012
100 %		10	1,880,000,210	-206.80	-0.000011
100 %		20	1,880,000,003	0.00	0.000000
100 %		25	1,880,000,153	-150.40	-0.000008
100 %		30	1,880,000,135	-131.60	-0.000007
100 %		40	1,880,000,041	-37.60	-0.000002
100 %		50	1,879,999,853	150.40	0.000008
100 %		60	1,879,999,871	131.60	0.000007
85 %	9.44	20	1,880,000,116	-112.80	-0.000006
115 %	12.77	20	1,880,000,285	-282.00	-0.000015
BATT. ENDPOINT	10.96	20	1,880,000,304	-300.80	-0.000016



## 9.2 Frequency Stability (PCS CDMA (EvDO)) (Cont'd)



<b>PCTEST™ PT. 22/24 TEST REPORT</b>			<b>FCC MEASUREMENT REPORT</b>		<b>Reviewed by:</b> Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 22 of 26	

## 10.0 PLOT(S) OF EMISSIONS



(SEE ATTACHMENT A)

PCTEST™ PT. 22/24 TEST REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 23 of 26

## 11.0 TEST EQUIPMENT

TYPE	MODEL	CAL DUE DATE	S/N
Signal Generator	Rohde & Schwarz (0.1-1000MHz)	9/11/2006	894215/012
Ailtech/Eaton Receiver	NM 37/57A-SL (30-1000MHz)	4/12/2007	0792-03271
Ailtech/Eaton Receiver	NM 37/57A (30-1000MHz)	3/11/2007	0805-03334
Ailtech/Eaton Receiver	NM 17/27A (0.1-32MHz)	9/17/2006	0608-03241
Ailtech/Eaton Adapter	CCA-7 CISPR/ANSI QP Adapter	3/11/2007	0194-04082
Harmonic/Flicker	Test System HP 6841A (IEC 555-2/3)	2/11/2007	3531A00115/ PCT468
Shielded Screen Room	RF Lindgren Model 26-2/2-0	N/A	6710 (PCT270)
Shielded Semi-Anechoic Chamber	Ray Proof Model S81	N/A	R2437 (PCT278)
Quasi-Peak Adapter	HP 85650A	8/9/2006	2043A00301
Microwave Spectrum Analyzer	Agilent E4448A (3Hz-50GHz)	9/19/2006	US42510244
Microwave Spectrum Analyzer	HP 8566B (100Hz-22GHz)	4/17/2007	2542A11898
Spectrum Analyzer/Tracking Gen.	HP 8591A (100Hz-1.8GHz)	9/12/2006	3144A02458
Signal Generator	HP 8640D (500Hz-1GHz)	12/7/2007	3613A00315
Signal Generator	HP 8648D (9kHz-4GHz)	5/1/2007	3613A00315
Spectrum Analyzer	HP 8594A	11/2/2006	3051A00187
Spectrum Analyzer (2)	HP 8591A	10/15/2006	3034A01395, 3108A02053
Audio Analyzer	HP 8903B		3011A09025
Modulation Analyzer	HP 8901A		2432A03467
Power Meter	HP 437B		3125U24437
Power Sensor	HP 8482H (30mW-3W)		2237A02084
Broadband Amplifier (2)	HP 8447D		1145A00470, 1937A03348
Broadband Amplifier	HP 8447F		2443A03784
Network Analyzer	HP 8753E (30kHz-3GHz)		JP38020182
Attenuator	HP 8495A (0-70dB) DC-4GHz		
Horn Antenna	EMCO Model 3115 (1-18GHz)		9704-5182
Horn Antenna	EMCO Model 3115 (1-18GHz)		9205-3874
Horn Antenna	EMCO Model 3116 (18-40GHz)		9203-2178
Biconical Antenna (4)	Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design		1295, 1332, 0355
Log-Spiral Antenna (3)	Ailtech/Eaton 93490-1		0608, 1103, 1104
Roberts Dipoles	Compliance Design (1 set)		
Ailtech Dipoles	DM-105A (1 set)		33448-111
EMCO LISN (6)	3816/2		1079
Microwave Preamplifier 40dB	Gain HP 83017A (0.5-26.5GHz)		3123A00181
Microwave Cables	MicroCoax (1.0-26.5GHz)		
Gigatronics Universal Power Meter	8657A		1835256
Gigatronics Power Sensor	80701A (0.05-18GHz)		1833460
Amplifier Research	5S1G4 (5W, 800MHz-4.2GHz)		22322
Microwave Survey Meter	Holaday Model 1501 (2.450GHz)		80931
Digital Thermometer	Extech Instruments 421305		426966
Bi-Directional Coax Coupler	Narda 3020A (50-1000MHz)		
Environmental Chamber	Associated Systems Model 1025 (Temperature/Humidity)		PCT285

Table 11-1. Test Equipment

PCTEST™ PT. 22/24 TEST REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 24 of 26

## 12.0 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 2<sup>nd</sup> Harmonic (3702.50 MHz)**

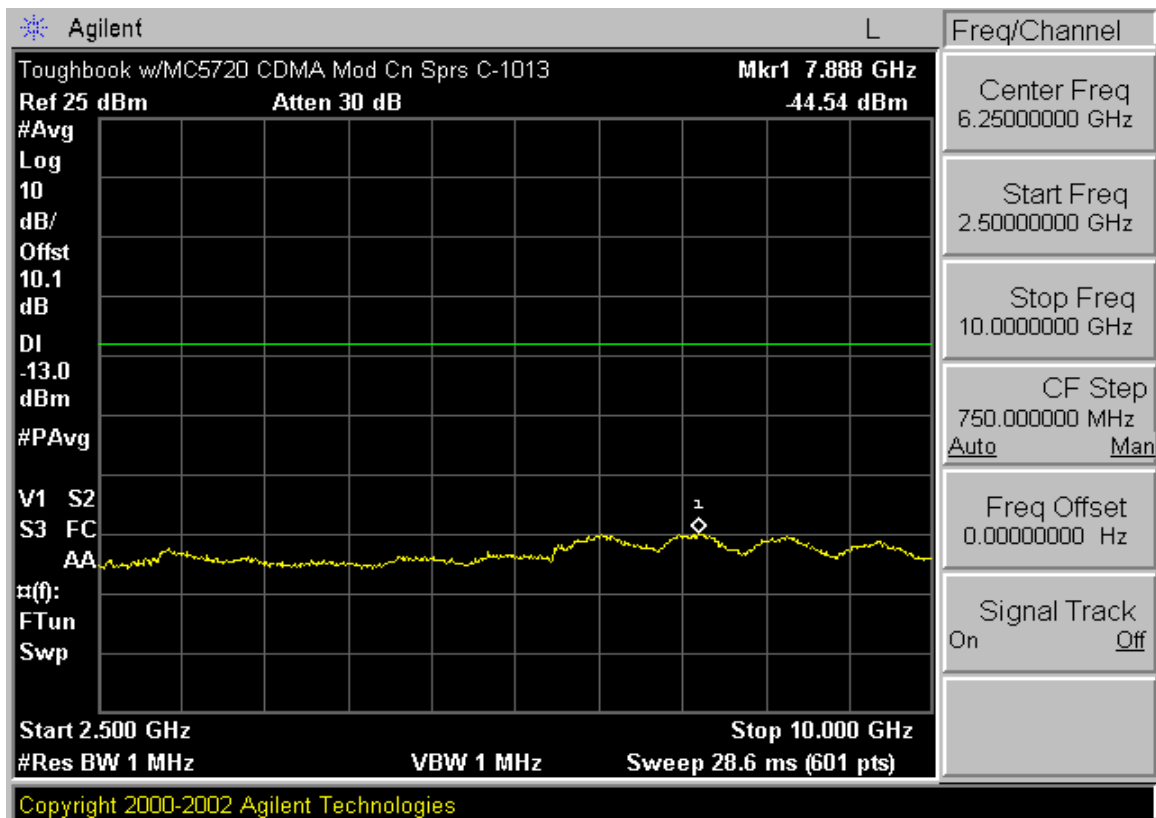
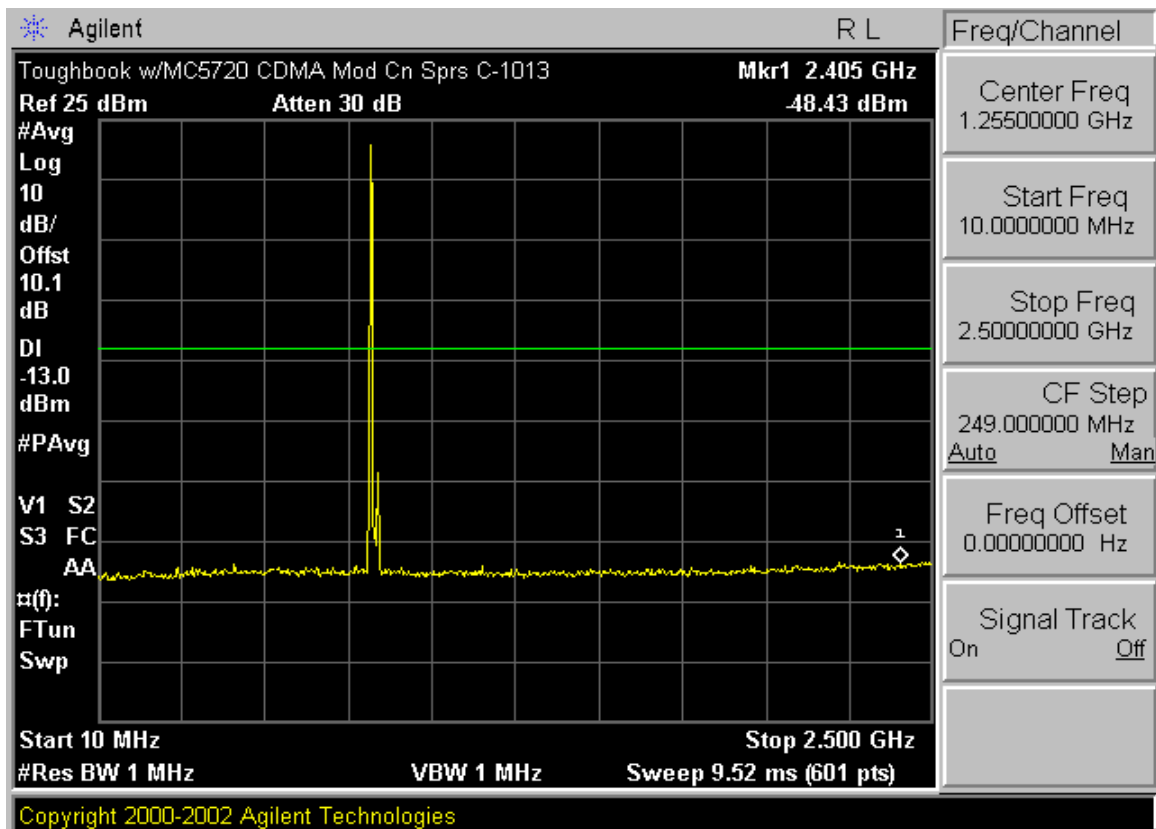
The receive analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the receive analyzer. The loss of the cable between 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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Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 25 of 26	

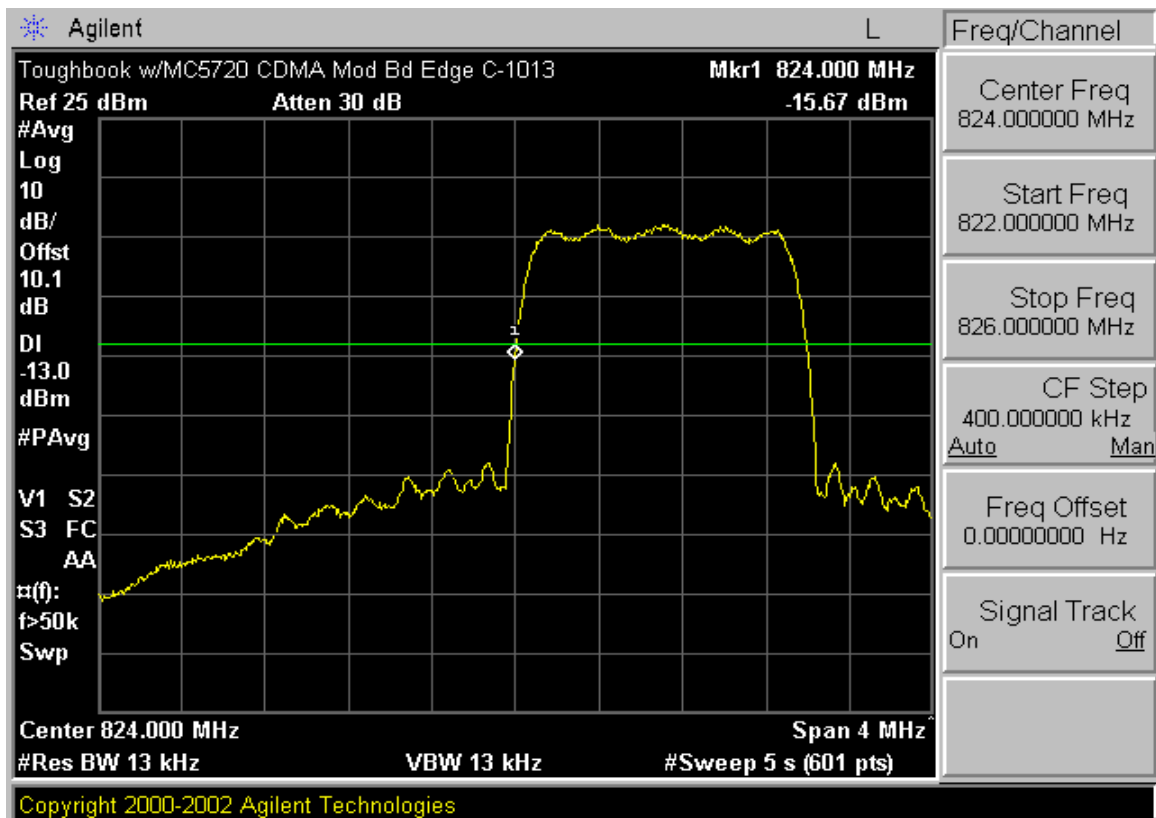
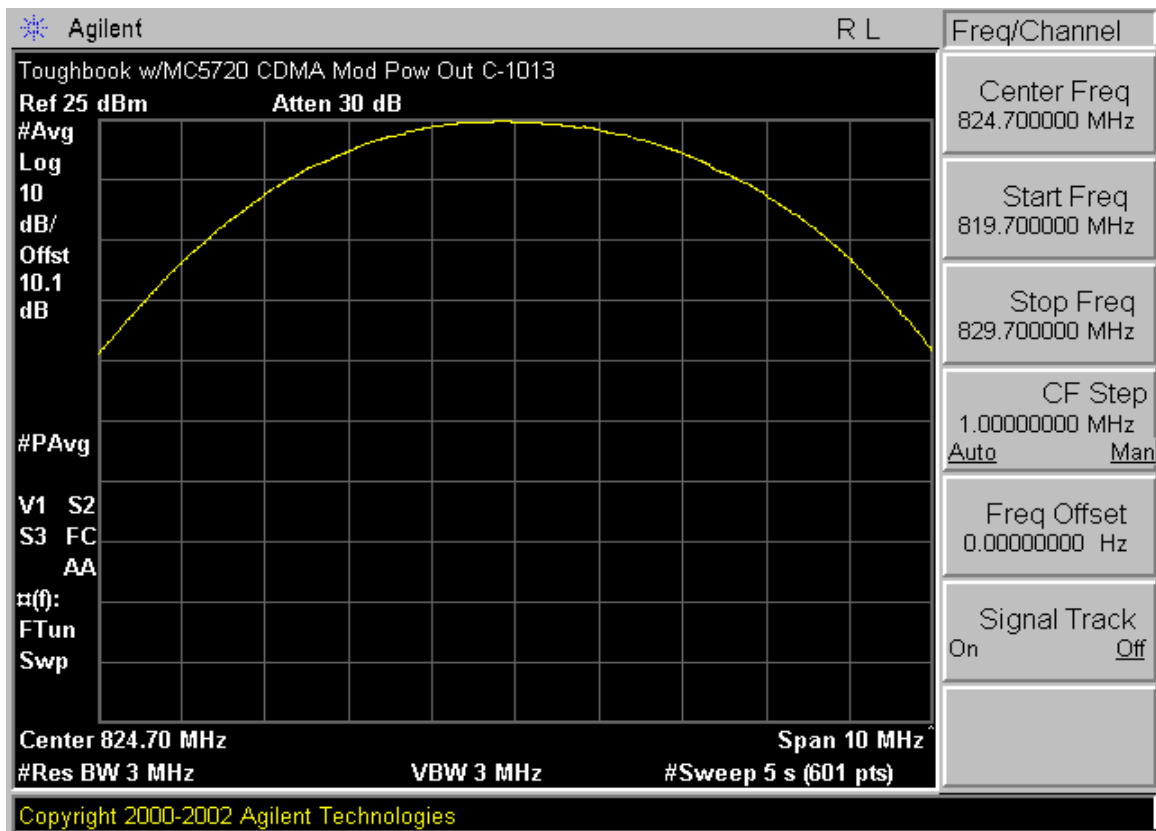
## 13.0 CONCLUSION



The data collected shows that the Panasonic Notebook PC w/ Intel WLAN and Sierra EvDO Modem FCC ID: ACJ9TGCF-W51 complies with all the requirements of Parts 2, 22, and 24 of the FCC rules.

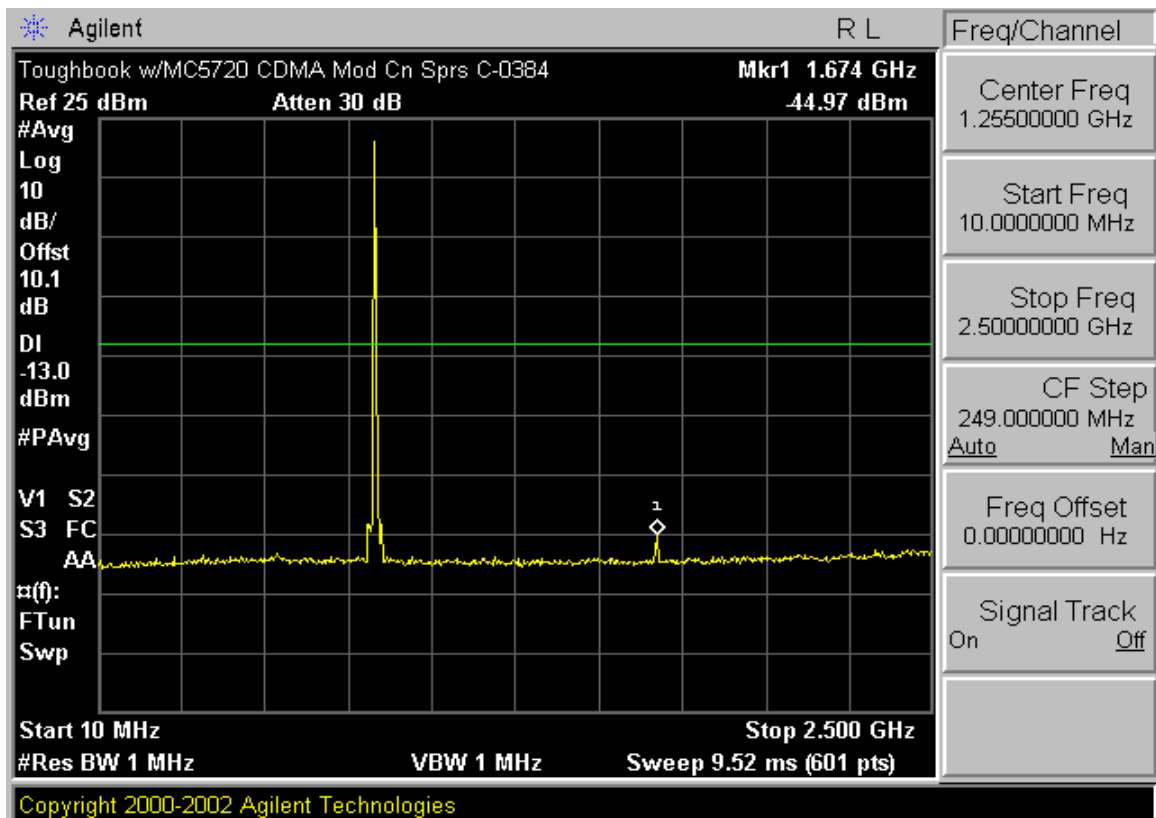
PCTEST™ PT. 22/24 TEST REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 26 of 26





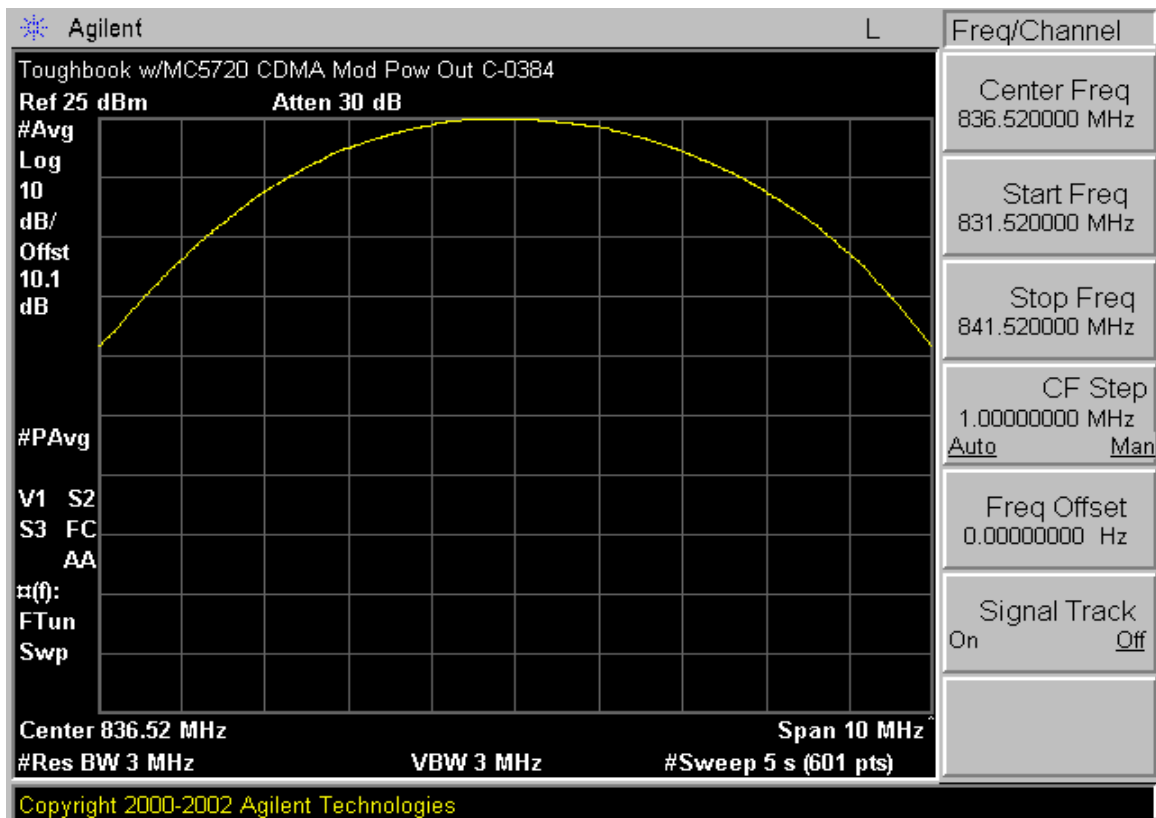
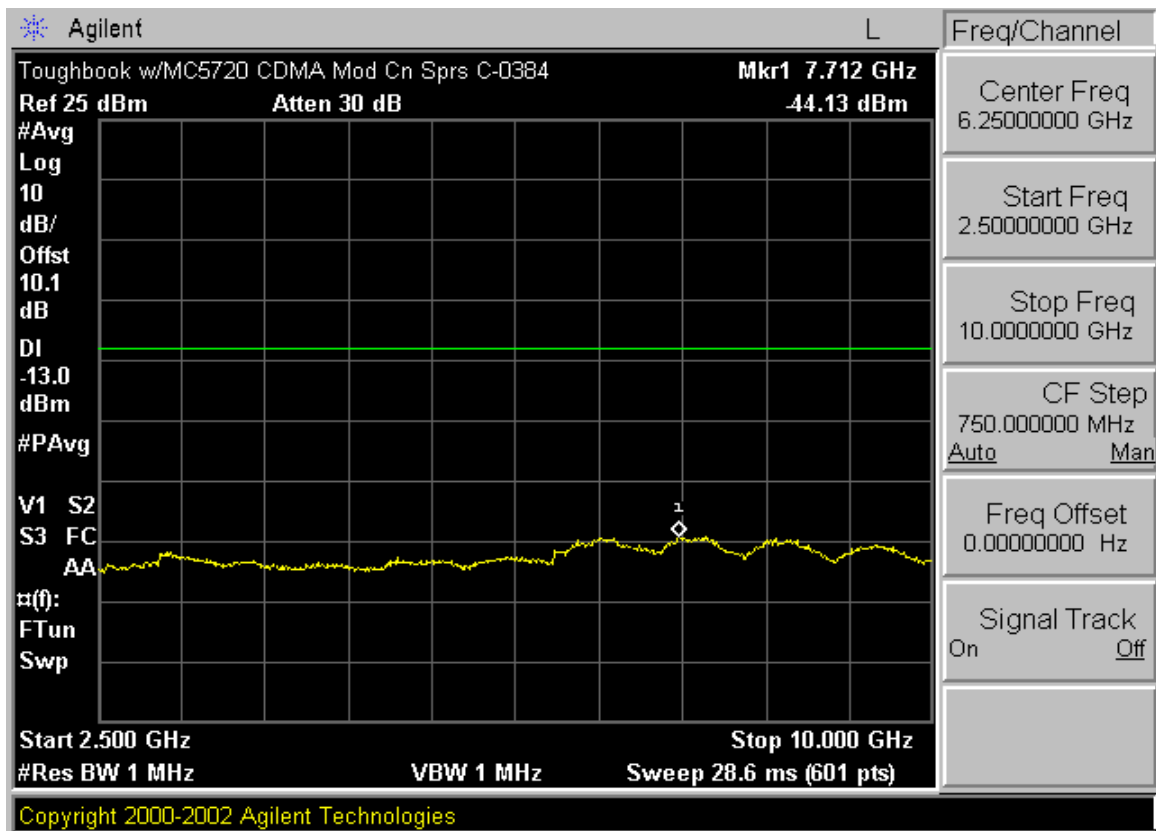
PCTEST™ PT. 22/24 CONDUCTED PLOTS	 <b>CDMA/EVDO MODE</b>			Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 1 of 15





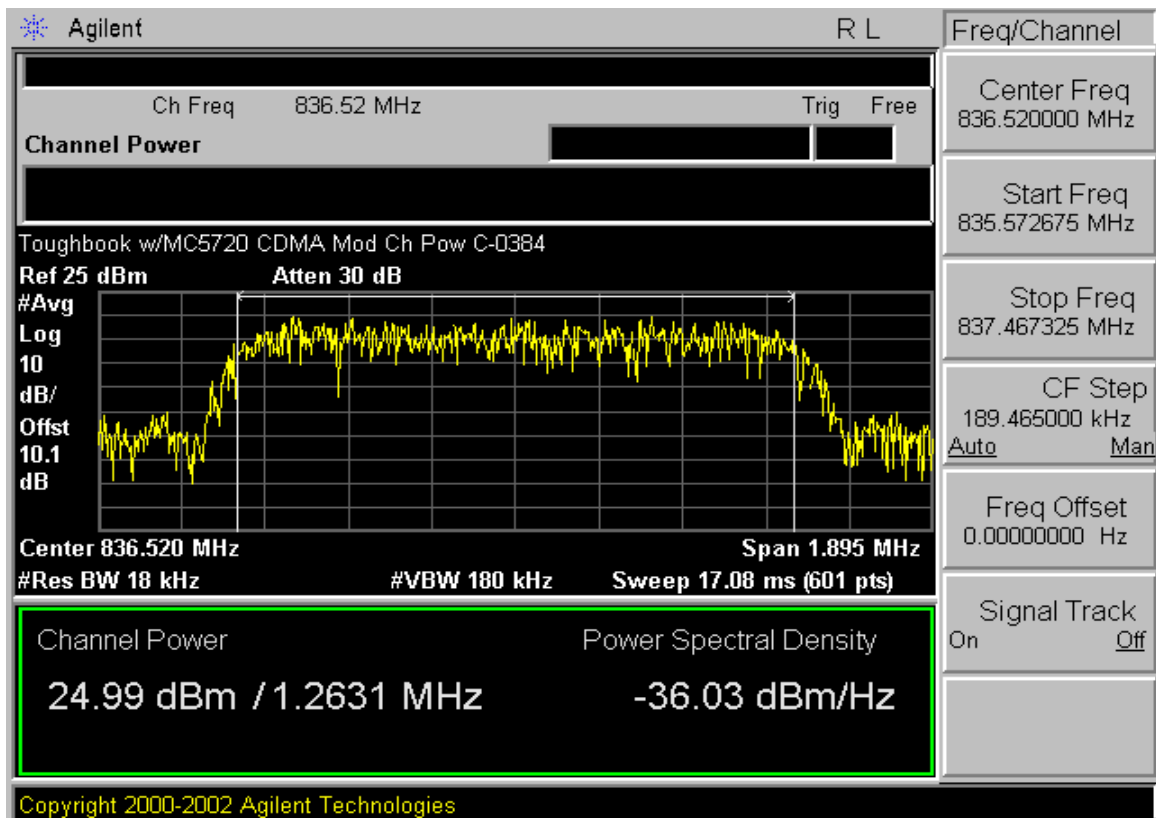
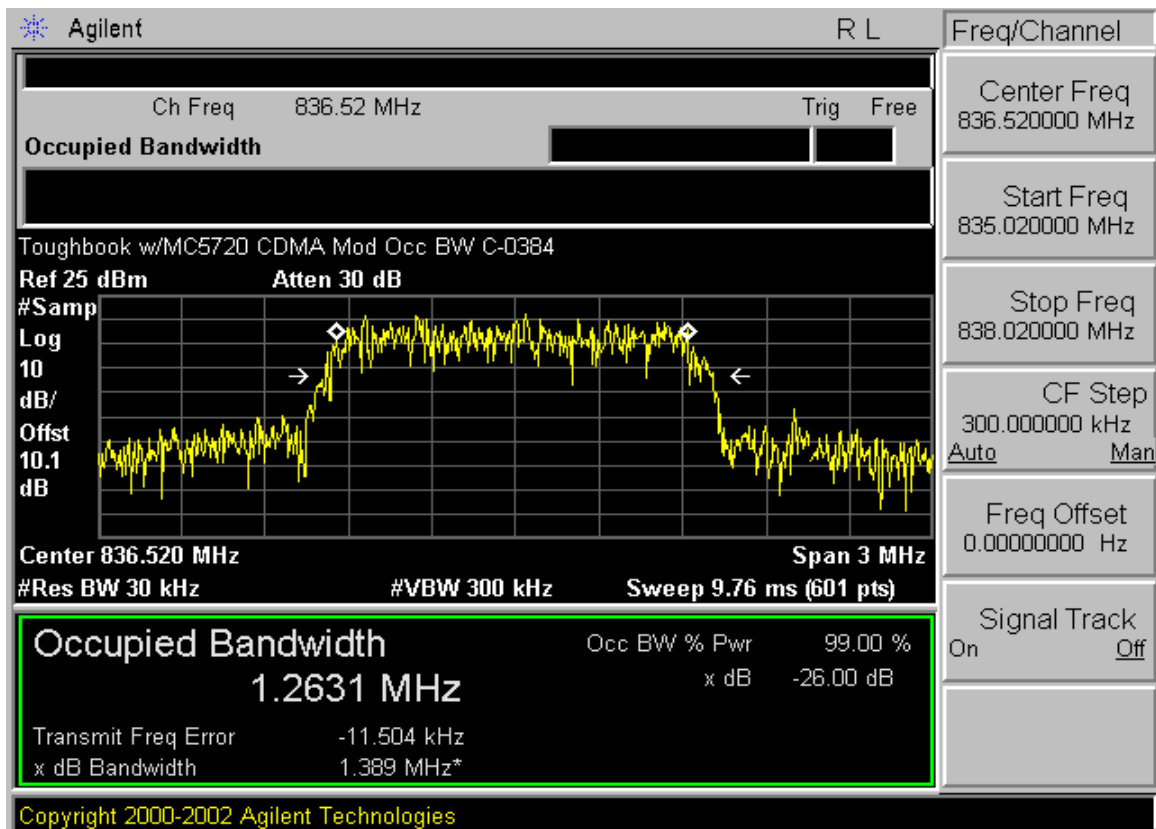
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Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 2 of 15





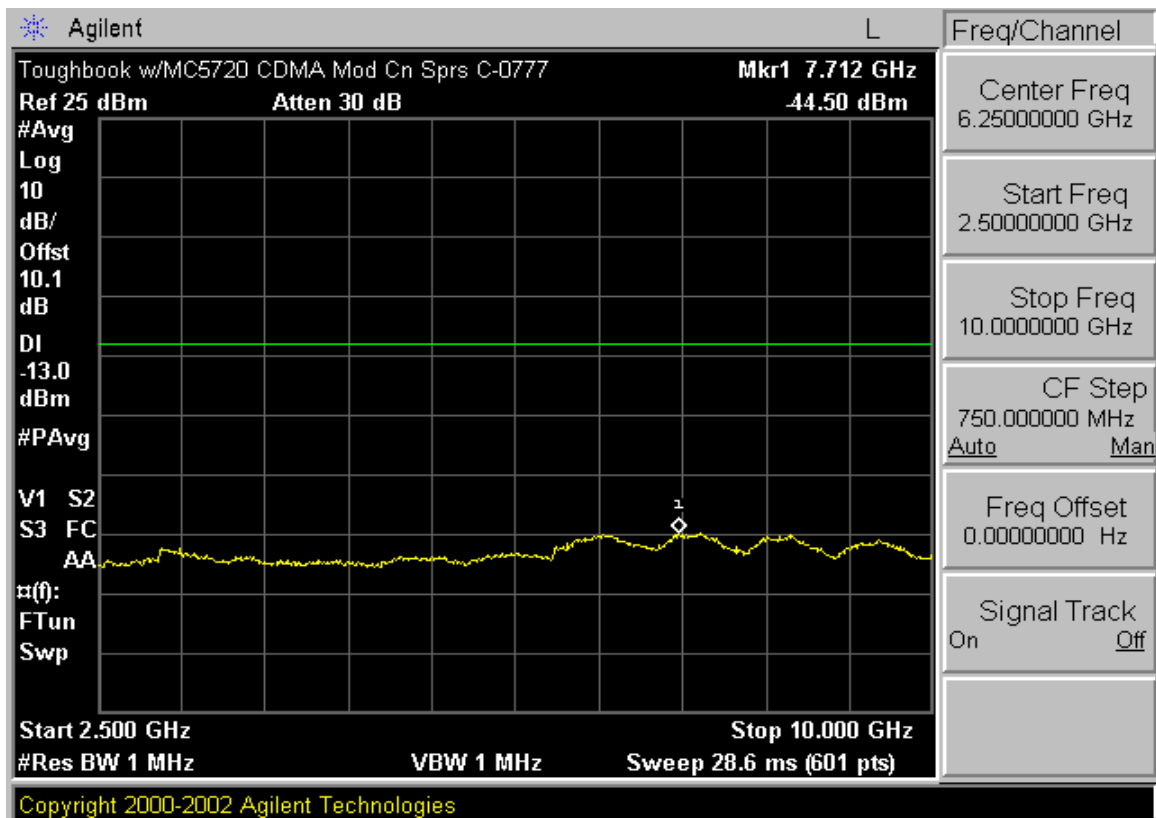
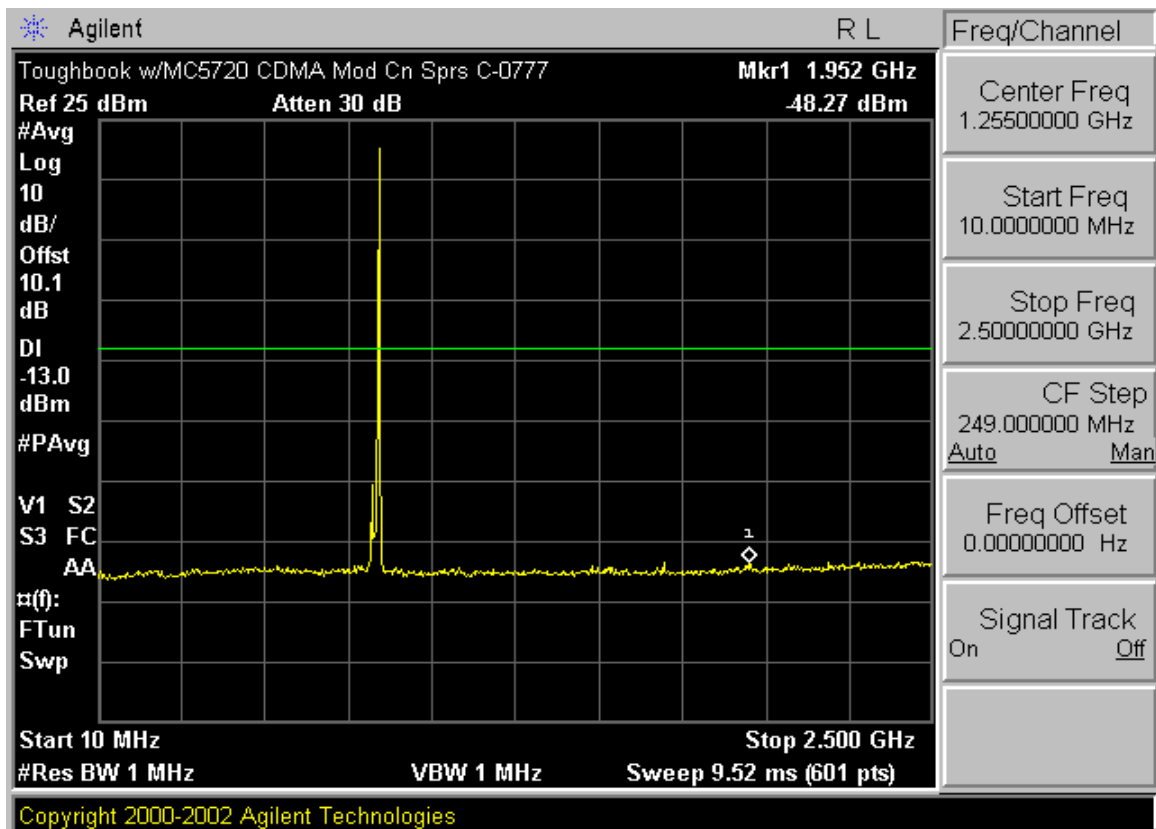
PCTEST™ PT. 22/24 CONDUCTED PLOTS	 <b>CDMA/EVDO MODE</b>			Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 3 of 15





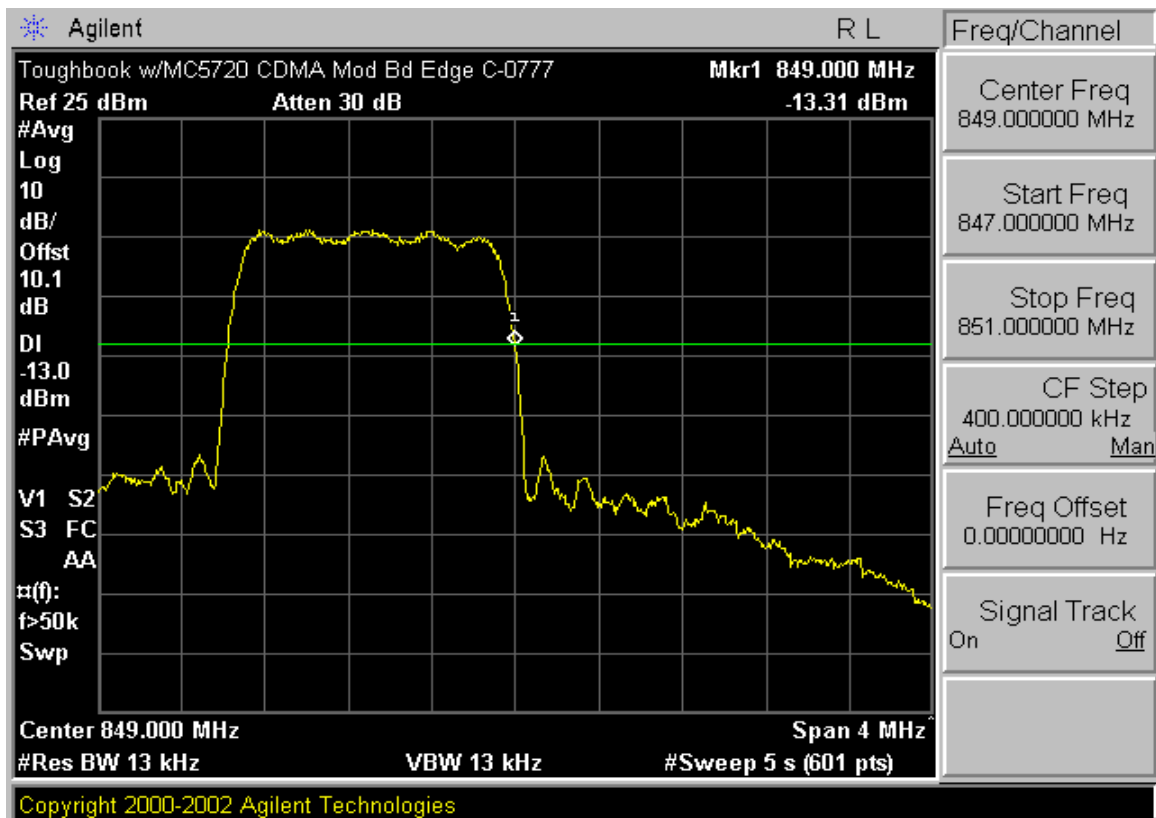
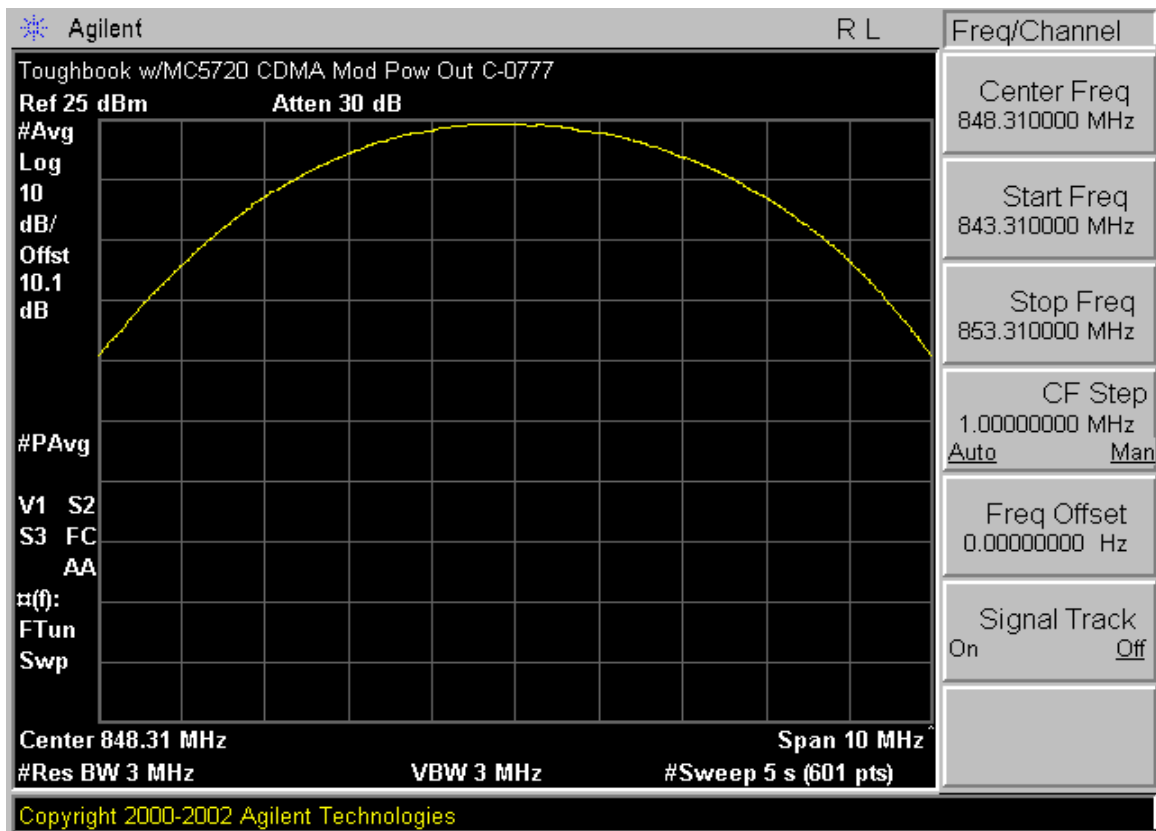
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Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 4 of 15	





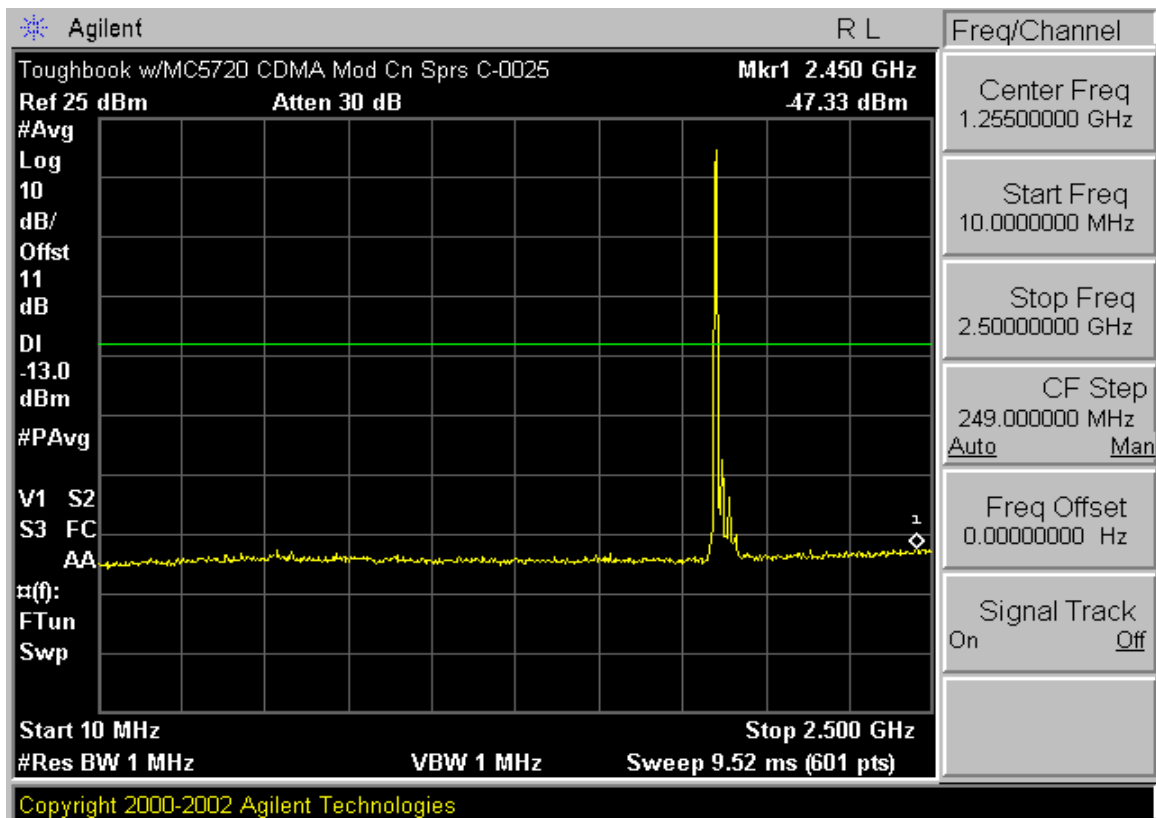
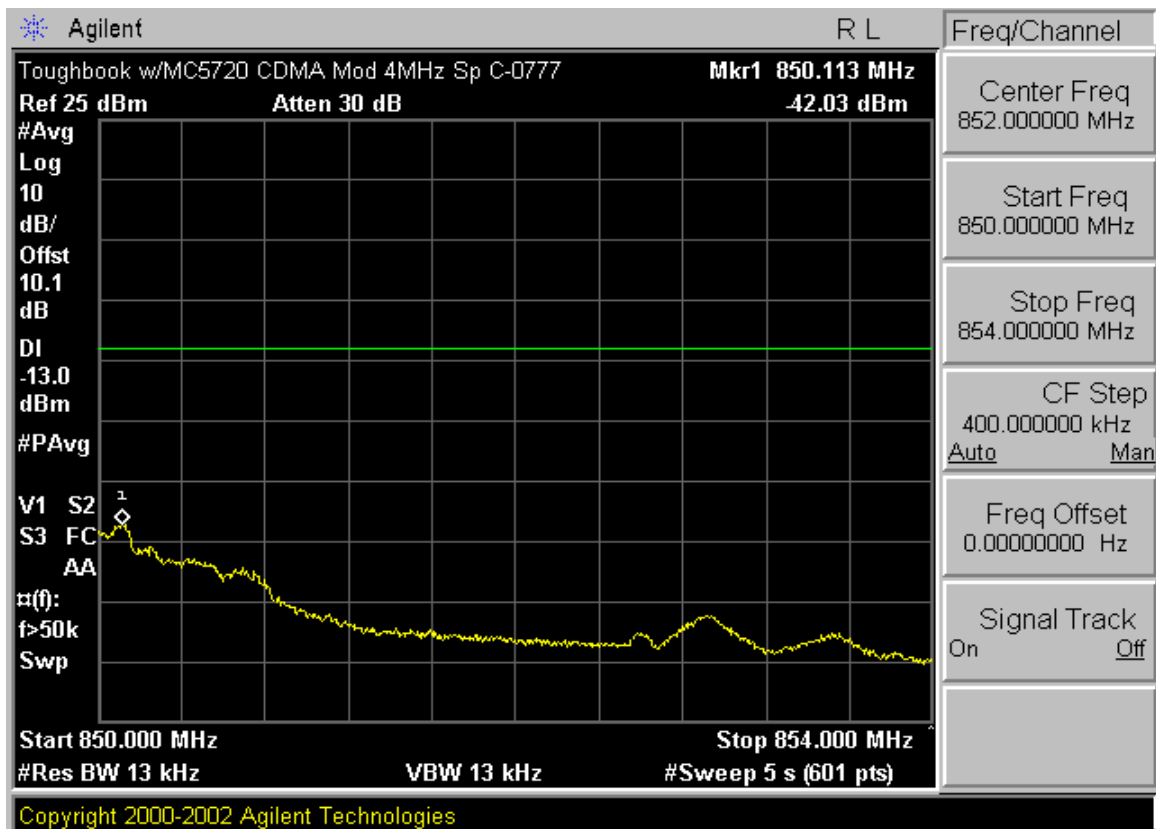
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Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 5 of 15





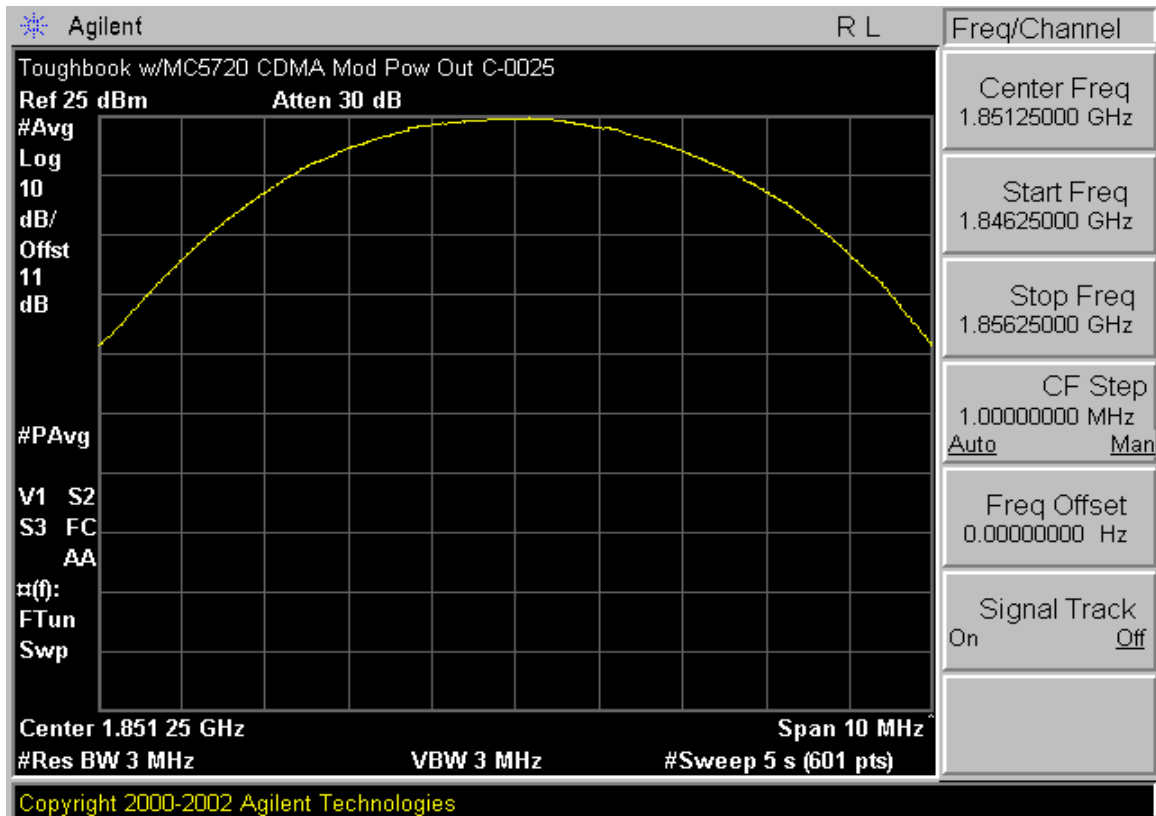
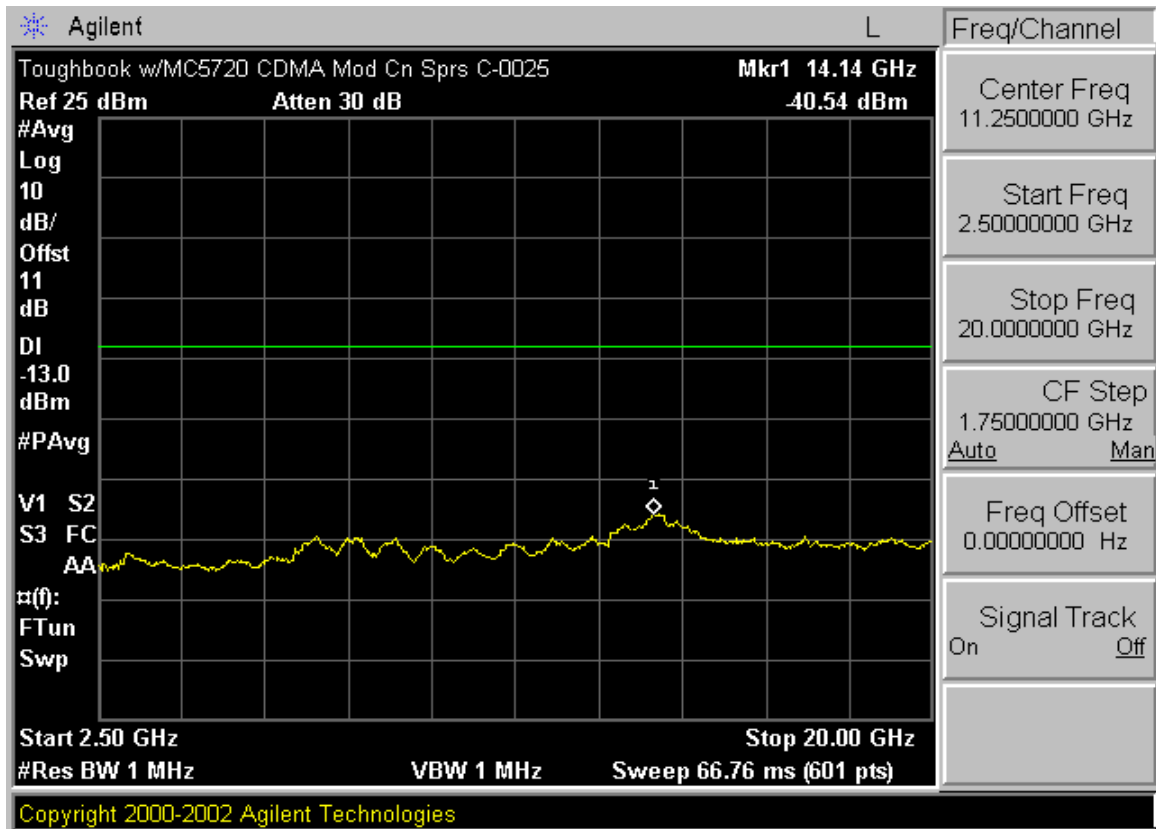
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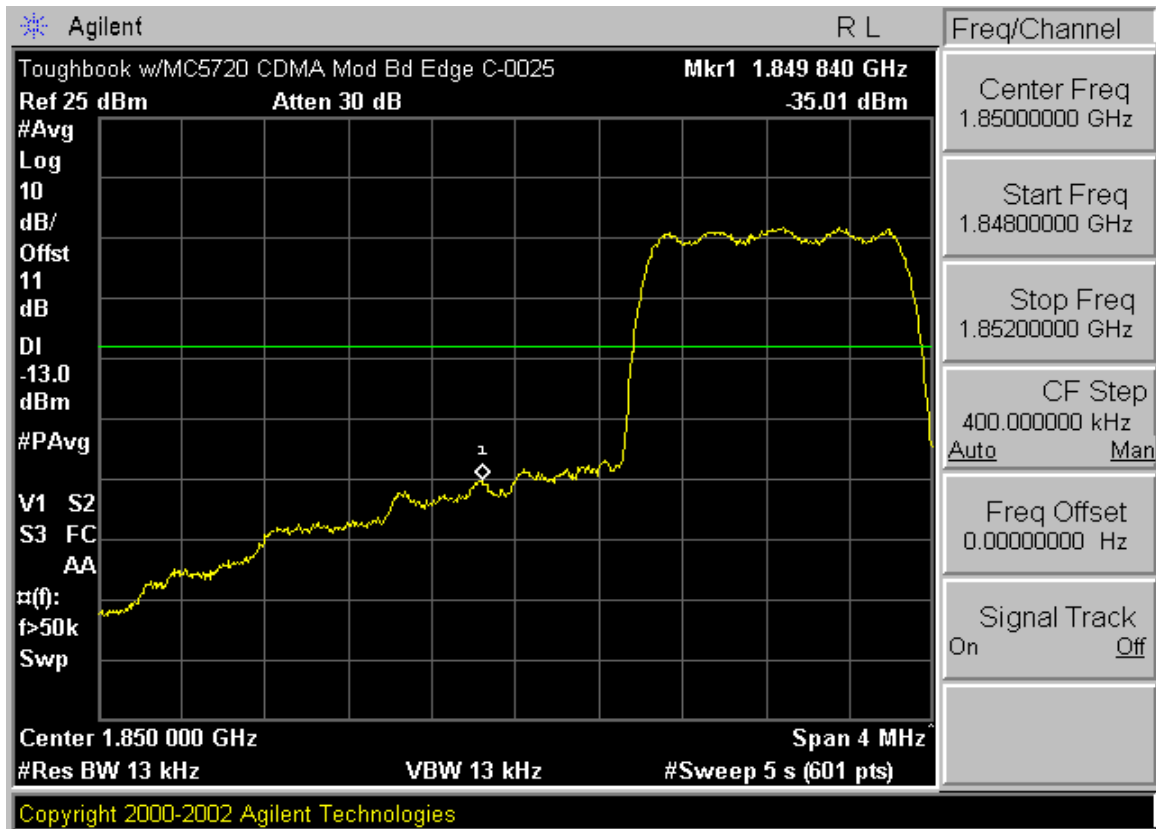
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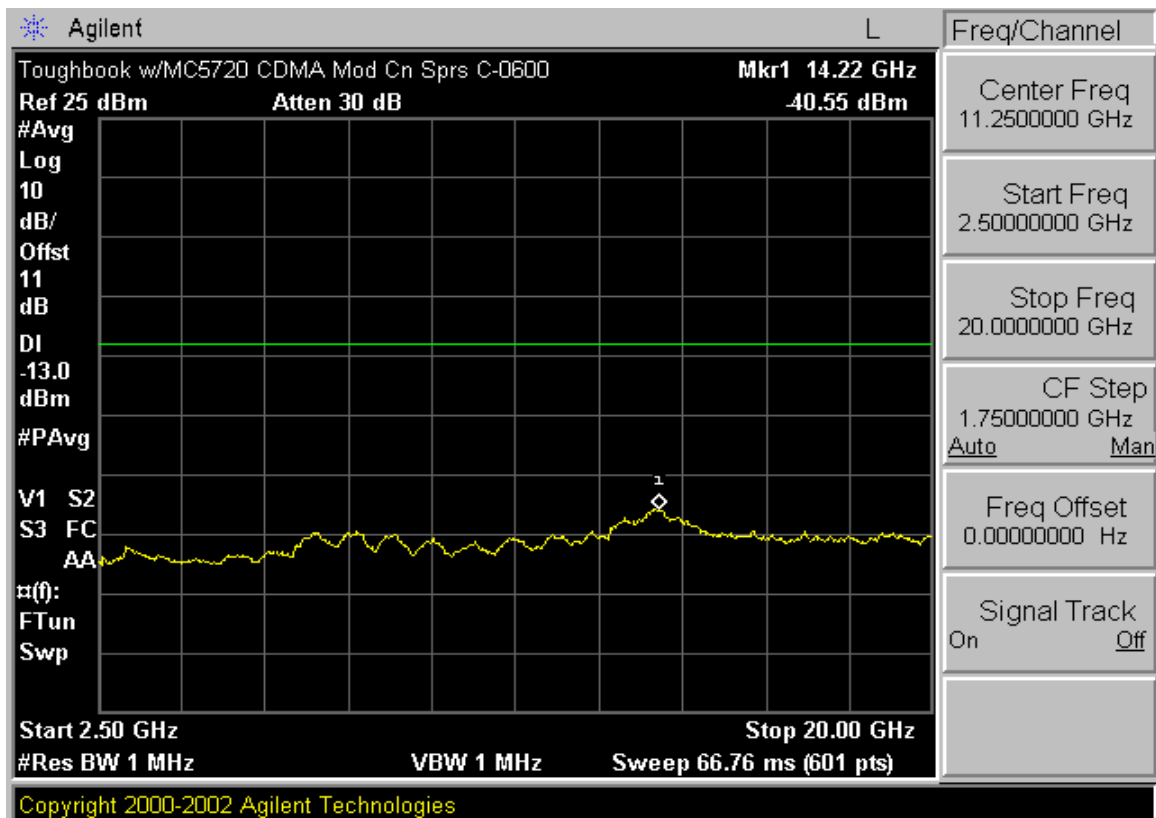
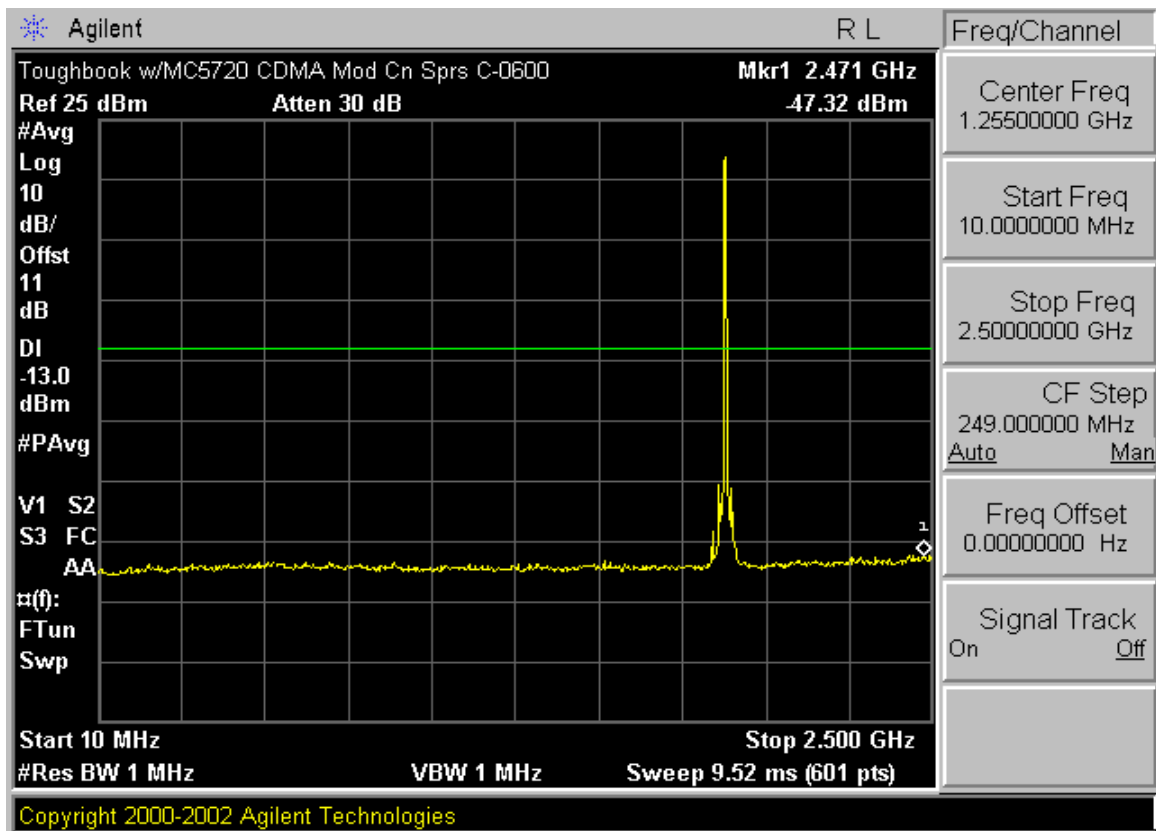
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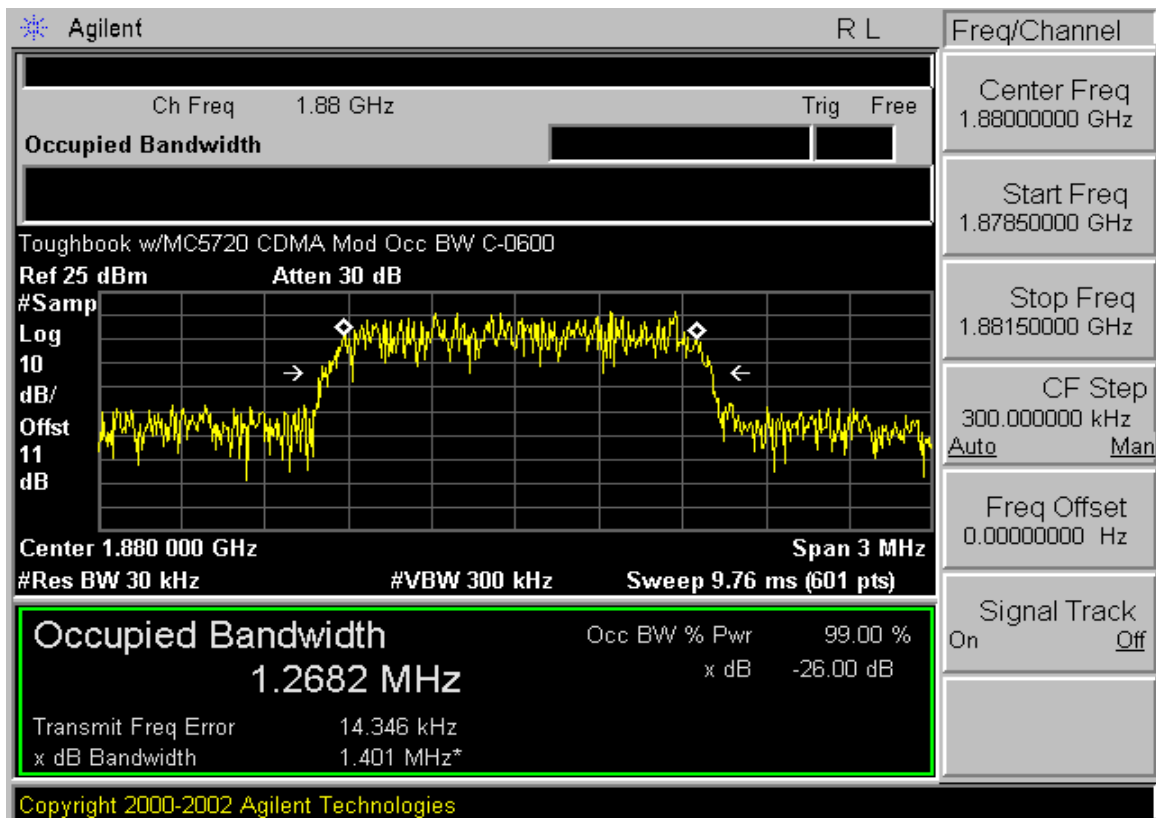
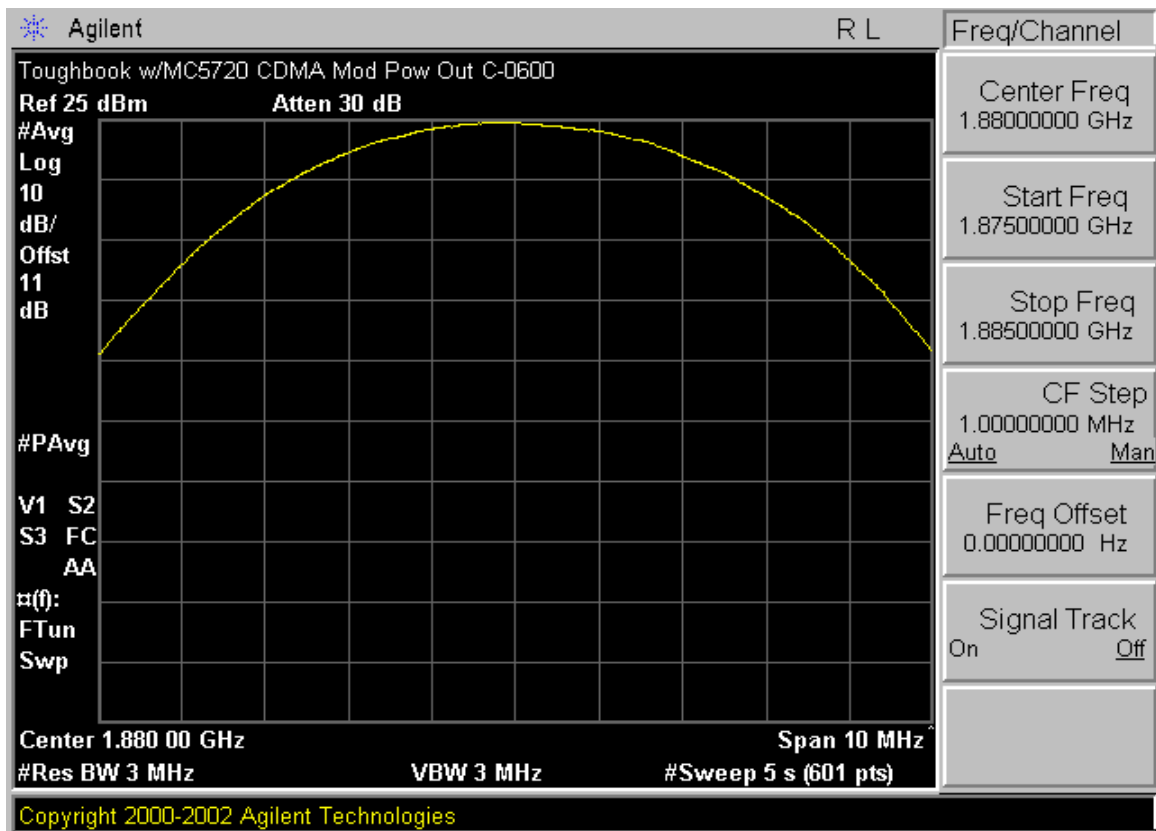
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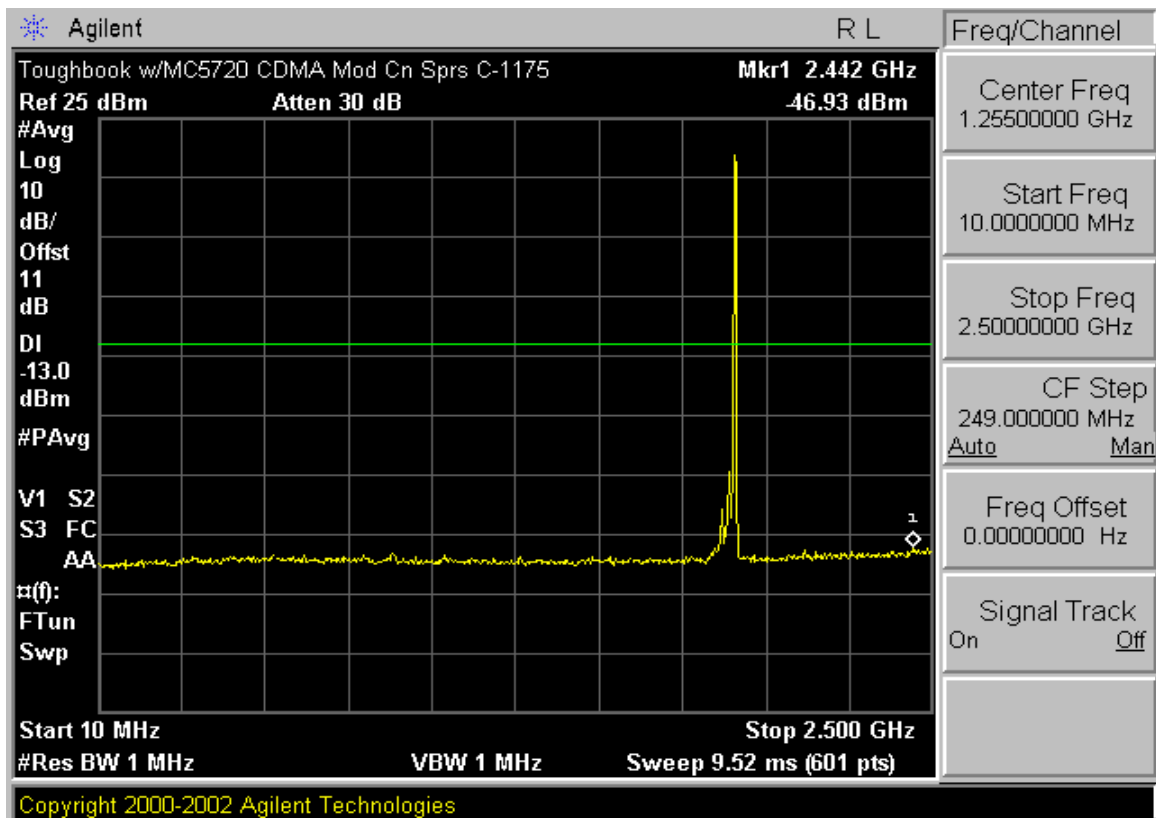
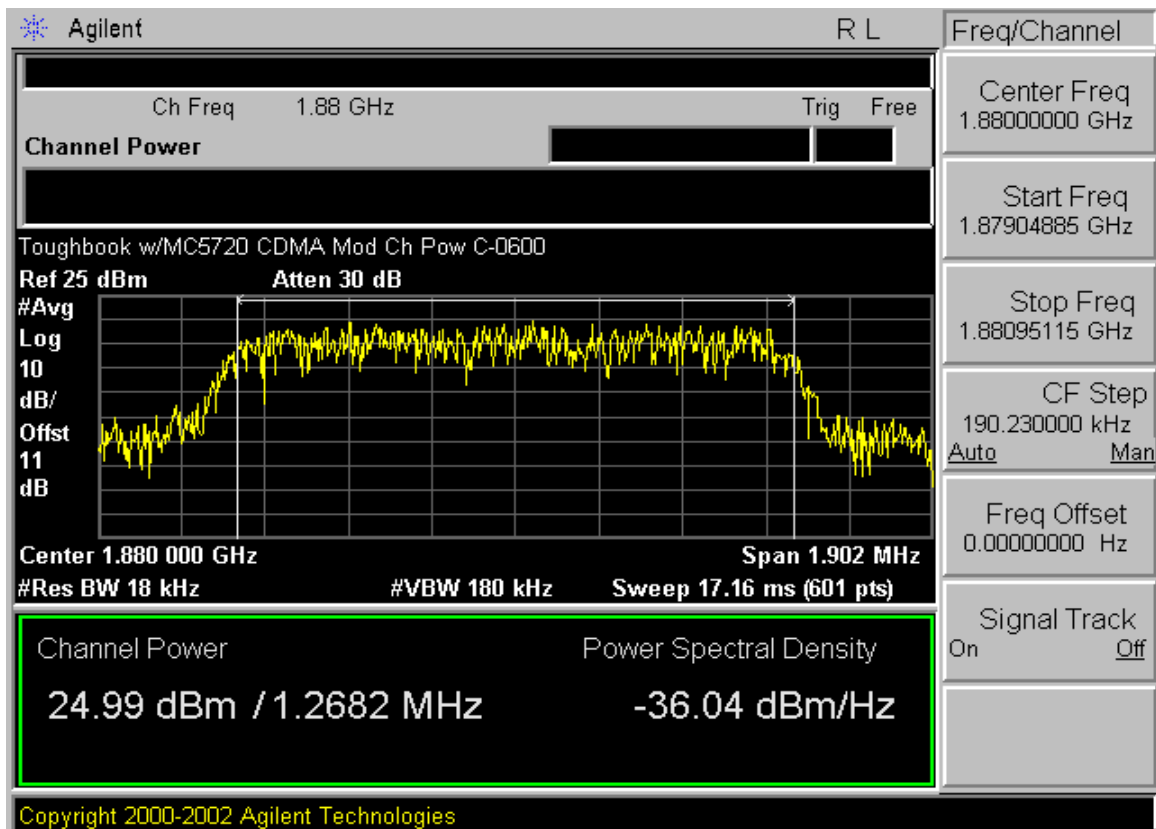
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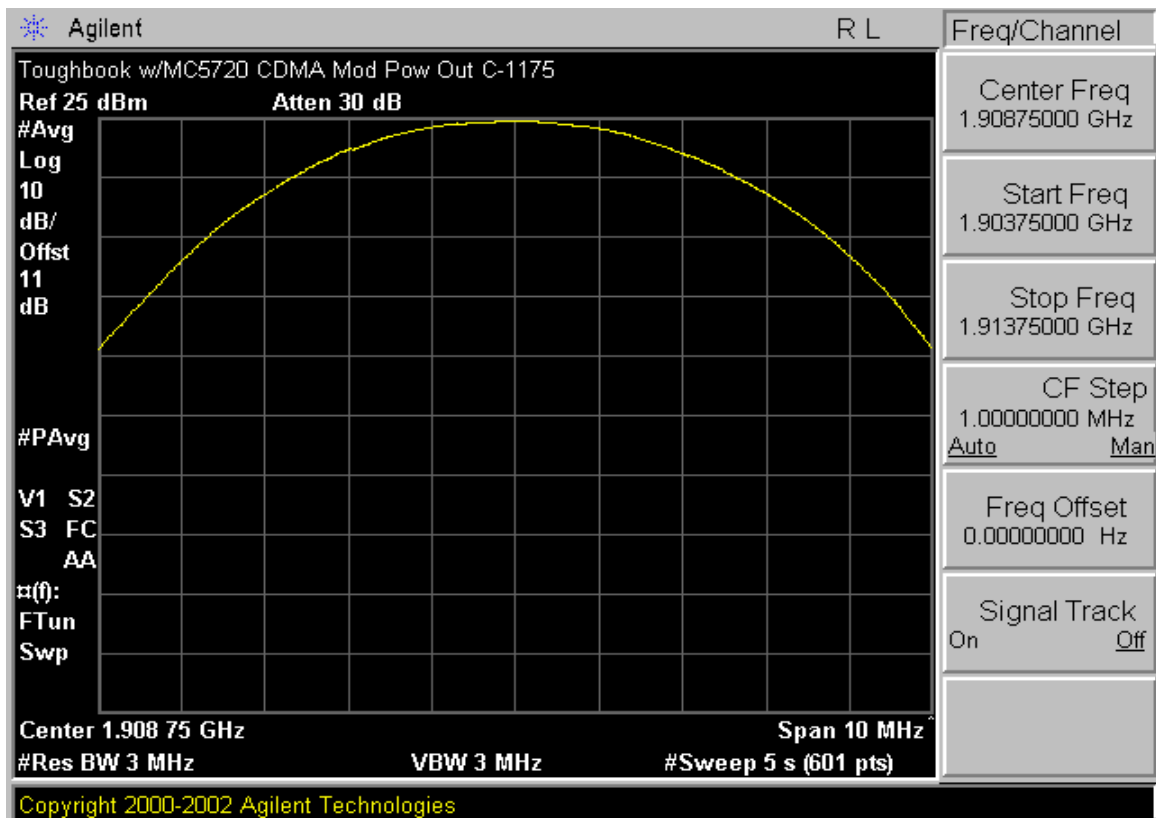
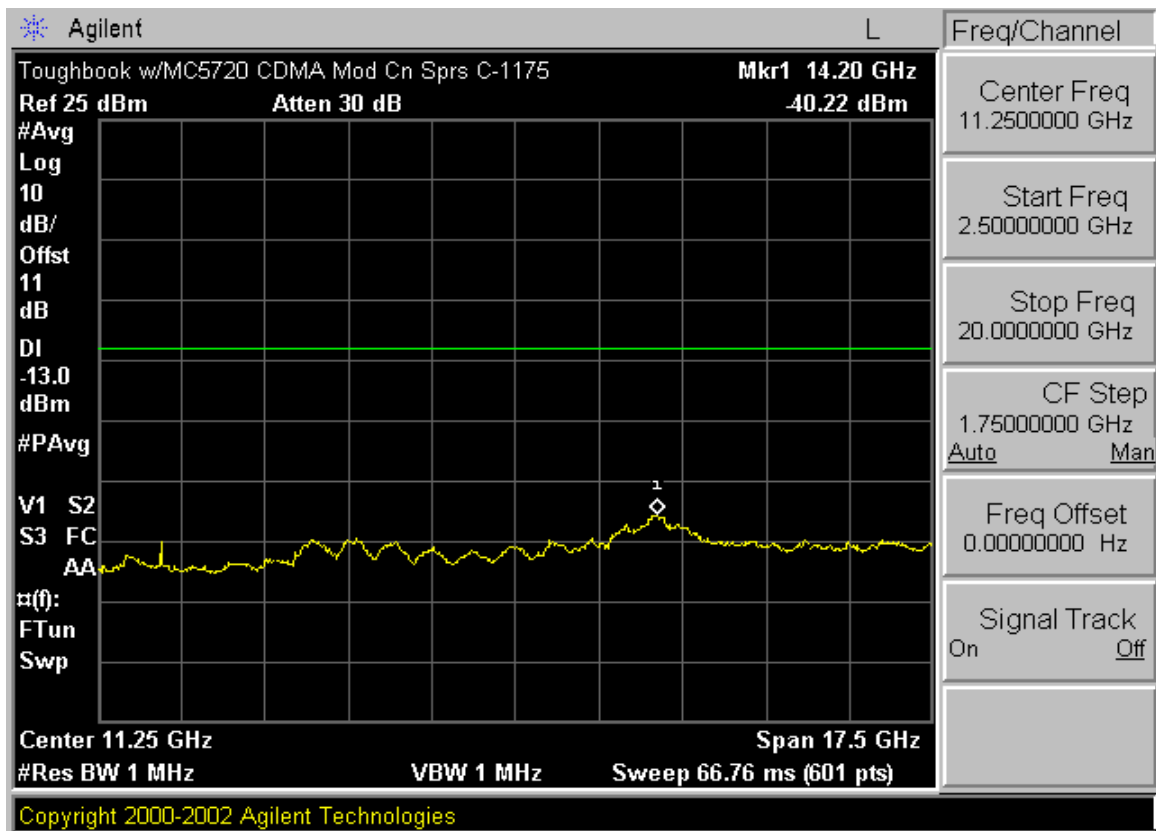
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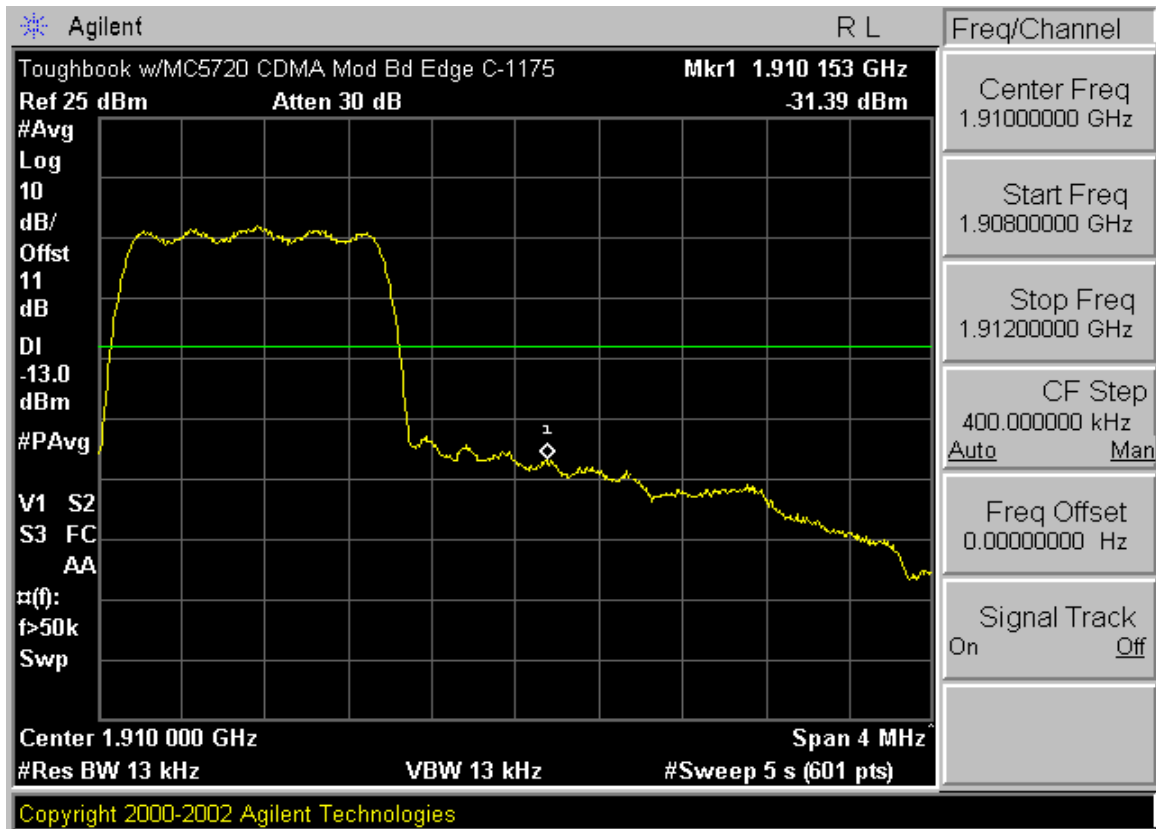
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PCTEST™ PT. 22/24 CONDUCTED PLOTS	 <b>CDMA/EVDO MODE</b>				Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem		FCC ID: ACJ9TGCF-W51	Page 13 of 15



PCTEST™ PT. 22/24 CONDUCTED PLOTS	 CDMA/EvDO MODE				Reviewed by: Quality Manager
Test Report S/N: 0606010437	Test Dates: June 15 - June 20, 2006	EUT Type: Notebook PC w/ Intel WLAN and Sierra EvDO Modem	FCC ID: ACJ9TGCF-W51	Page 14 of 15	



PCTEST™ PT. 22/24 CONDUCTED PLOTS	 <b>CDMA/EVDO MODE</b>			Reviewed by: Quality Manager
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