PCTEST ENGINEERING LABORATORY, INC.
6660-B Dobbin Road, Columbia, MD 21045 USA
Tel. 410.290.6652 / Fax 410.290.6554
http://www.pctestlab.com

CERTIFICATE OF COMPLIANCE
FCC Part 22 & 24 Certification

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

Date of Testing:
September 29 - October 3, 2006
Test Site/Location:
PCTEST Lab., Columbia, MD, USA
Test Report Serial No.:
0608220697

FCC ID:	**ACJ9TGCF-192**
APPLICANT:	**PANASONIC CORPORATION OF NORTH AMERICA**

Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§2; §22(H), §24(E)
EUT Type:	Toughbook Model: CF-19
Model(s):	CF-19
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:	0.289 W ERP Cell. CDMA (EvDO) (24.609 dBm) / 0.344 W EIRP PCS CDMA (EvDO) (25.366 dBm)
Max. SAR Measurement:	0.417 W/kg Cell. CDMA (EvDO) Body SAR / 0.775 W/kg PCS CDMA (EvDO) Body SAR
Emission Designator(s):	1M26F9W (CDMA EvDO) / 1M27F9W (PCS EvDO)
Test Device Serial No.:	*identical prototype* [S/N: N/A]

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. SAR compliance for body-worn operating configuration is based on a separation distance of 1.5cm between the back of the unit and the body of the user. End-users must be informed of the body-worn operating requirements for satisfying RF exposure compliance. Belt clips or holsters may not contain metallic components.

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

TABLE OF CONTENTS

FCC Part 22 & 24

A. §2.1033 General Information

APPLICANT:	Panasonic Corporation of North America
APPLICANT ADDRESS:	One Panasonic Way, 4B-8 Secaucus, NJ 07094
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:	CF-19
FCC ID:	ACJ9TGCF-192
FCC CLASSIFICATION:	PCS Licensed Transmitter (PCB)
EMISSION DESIGNATOR(S):	1M26F9W (CDMA EvDO) / 1M27F9W (PCS 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 29 - October 3, 2006
TEST REPORT S/N:	0608220697

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.

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.

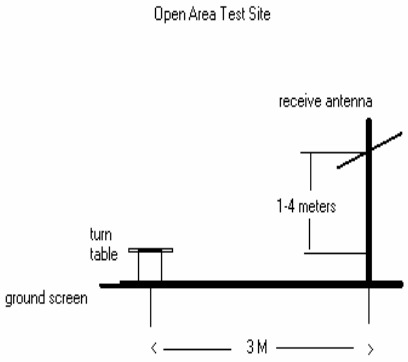


Figure 1-1. Diagram of 3-meter outdoor test range

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

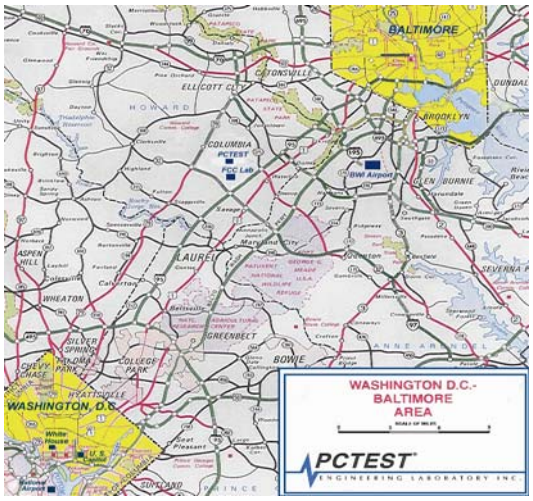


Figure 1-3. Map of the Greater Baltimore and Metropolitan Washington, D.C. area.

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 C63.4-2003 on January 27, 2006 and Industry Canada.

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Panasonic Toughbook Model: CF-19 FCC ID: ACJ9TGCF-192**. The EUT consisted of the following component(s):

Manufacturer / Description	FCC ID	Model
Panasonic Toughbook Model: CF-19	ACJ9TGCF-192	CF-19
Intel PRO/Wireless Network Module	PD9WM3945ABG	WM3945ABG
Taiyo Yuden Bluetooth Module	N/A	EYSF1CSMX
Express Mini-PCI USB Wireless CDMA 1x EV-DO Module	N7N-MC5720	MC5720

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

3.0 DESCRIPTION OF TESTS

3.1 Occupied Bandwidth Emission Limits

§2.1049, 22.917(a), 24.238(a)

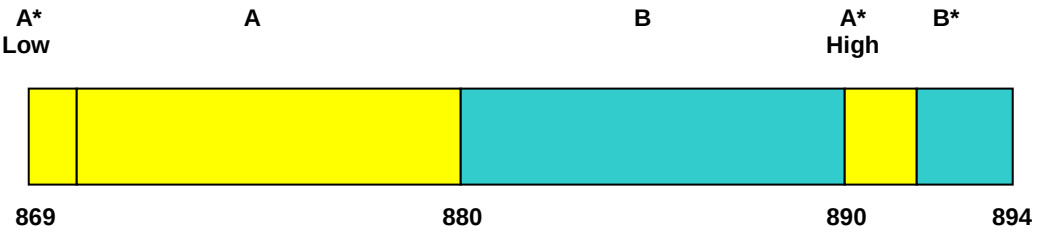
a. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P) dB.

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



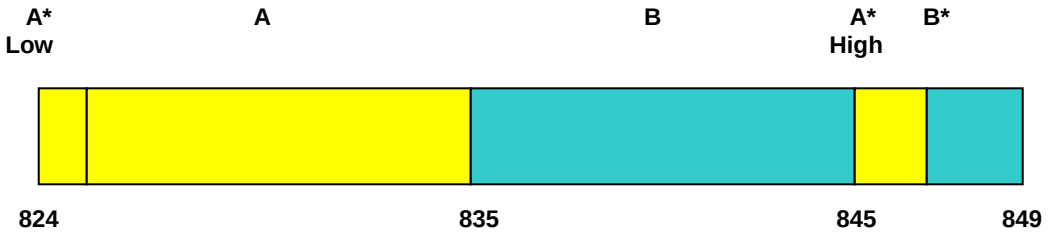
BLOCK 1: 869 – 880 MHz (A* Low + A)

BLOCK 2: 880 – 890 MHz (B)

BLOCK 3: 890 – 891.5 MHz (A* High)

BLOCK 4: 891.5 – 894 MHz (B*)

3.3 Cellular - Mobile Frequency Blocks



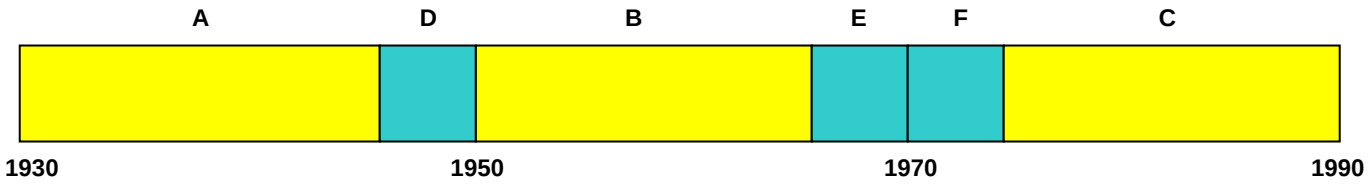
BLOCK 1: 824 – 835 MHz (A* Low + A)

BLOCK 2: 835 – 845 MHz (B)

BLOCK 3: 845 – 846.5 MHz (A* High)

BLOCK 4: 846.5 – 849 MHz (B*)

3.4 PCS - Base Frequency Blocks



BLOCK 1: 1930 – 1945 MHz (A)

BLOCK 2: 1945 – 1950 MHz (D)

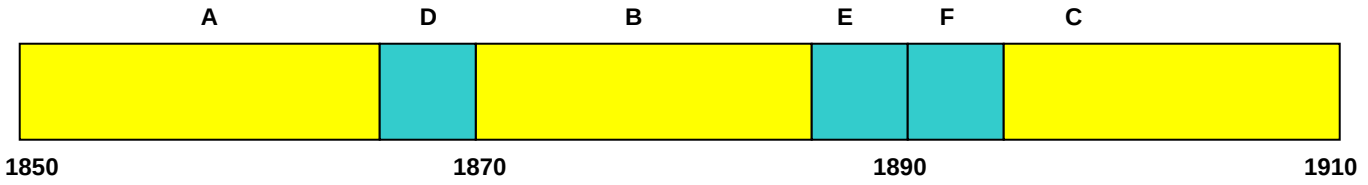
BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 4: 1965 – 1970 MHz (E)

BLOCK 5: 1970 – 1975 MHz (F)

BLOCK 6: 1975 – 1990 MHz (C)

3.5 PCS - Mobile Frequency Blocks



BLOCK 1: 1850 – 1865 MHz (A)

BLOCK 2: 1865 – 1870 MHz (D)

BLOCK 3: 1870 – 1885 MHz (B)

BLOCK 4: 1885 – 1890 MHz (E)

BLOCK 5: 1890 – 1895 MHz (F)

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(i))

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.

3.8 Frequency Stability / Temperature Variation

§2.1055, 22.355, 24.235; RSS-129 (9.2.1), RSS-133 (6.7(a,b))

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 ±0.00025 (±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.

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.

4.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

TYPE	MODEL	CAL. DUE DATE	CAL. INTERVAL	SERIAL No.
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
Attenutation/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	Bi-Annual	9704-5182
Horn Antenna	EMCO Model 3116 (18-40GHz)	08/25/07	Bi-Annual	9203-2178
EMCO Dipoles (2)	N/A	05/08/08	Bi-Annual	00023951
EMCO LISN (3)	3816/2, 3816/2, 3725/2	10/26/06	Annual	1077, 1079, 2099
10dB Attenuator	HP 8493B	N/A	N/A	N/A
Microwave Cables	MicroCoax (1.0-26.5GHz)	02/26/07	Annual	N/A

Table 4.1. Test Equipment

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.

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 FTAP 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
TRANSMITTER MODE (TX)					
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 + 10log$_{10}$ (P[Watts]) at Band Edge and for all out-of-band emissions		PASS
2.1046	N/A	Transmitter Conducted Output Power	N/A		PASS
22.913(a)(2)	RSS-129 (9.1)	Effective Radiated Power	< 7 Watts max. ERP	RADIATED	PASS
24.232(c)	RSS-133 (6.4) [SRSP-510 (5.1.2)]	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS
2.1051, 22.917(a), 24.238(a)	RSS-129 (8.1.1) RSS-133 (6.5.1)	Undesirable Emissions	< 43 + 10log$_{10}$ (P[Watts]) for all out-of-band emissions		PASS
2.1055, 22.355, 24.235	RSS-129 (9.2.1) RSS-133 (6.3)	Frequency Stability	< 2.5 ppm		PASS
RECEIVER MODE (RX)					
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
RF EXPOSURE (SAR)					
2.1093	RSS-102	SAR Test or MPE	1.6 W/kg (SAR Limit) 1 mW/cm² (MPE Limit)	3 Channels	PASS

Table 6-1. Summary of Test Results

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 FTAP with "All Up" power control bits.

SAR Measurement Conditions for CDMA2000

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

Output Power Verification

See 3GPP2 C.S0011/TIA-98-E as recommended by "SAR Measurement Procedures for 3G Devices", June 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 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.
5. FCHs were configured at full rate for maximum SAR with "All Up" power control bits.

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

Table 6-2
Parameters for Max. Power for RC1

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

Table 6-3
Parameters for Max. Power for RC3

Band	Channel	SO55	TDSO SO32	1x EvDO Rev. 0	1x EvDO Rev. 0
		RC3/3	RC3/3	(FTAP)	(RTAP)
Cellular	1013	24.91	24.83	25.03	24.98
	384	24.84	24.91	25.08	25.01
	777	24.53	24.50	25.02	24.96
PCS	25	25.11	25.09	25.12	25.09
	600	24.54	24.31	25.16	25.02
	1175	24.38	24.27	24.98	24.93

Table 6-4
Maximum Power Output Table for CF-19

6.2 Effective Radiated Power Output Data

§22.913(a)(2); RSS-129 (9.1)

POWER: High (CDMA EvDO Mode)

Freq. Tuned (MHz)	REF. LEVEL (dBm)	POL (H/V)	ERP (W)	ERP (dBm)	BATTERY
824.70	-17.015	H	0.267	24.258	Standard
836.52	-16.824	H	0.289	24.609	Standard
848.31	-17.233	H	0.272	24.350	Standard

Table 6-5. Effective Radiated Power Output Data

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 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. 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. This unit was tested with its standard battery. The unit was tested standalone and with the external antenna attached via the docking station. The highest ERP with external antenna was recorded.

6.3 Equivalent Isotropic Radiated Power Output Data

§24.232(c); RSS-133 (6.4) [SRSP-510 (5.1.2)]

Radiated measurements at 3 meters

Supply Voltage: 3.7 VDC

Modulation: PCS CDMA EvDO

FREQ. (MHz)	REF. LEVEL (dBm)	POL (H/V)	Azimuth (o angle)	EIRP (dBm)	EIRP (W)	Battery
1851.25	-17.997	H	95	25.084	0.322	Standard
1880.00	-17.885	H	95	25.366	0.344	Standard
1908.75	-18.214	H	95	25.207	0.332	Standard

Table 6-6. Equivalent Isotropic Radiated Power Output Data

NOTES:

Equivalent Isotropic Radiated Power 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 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. This unit was tested with its standard battery. The unit was tested standalone and with the external antenna attached via the docking station. The highest EIRP with external antenna was recorded.

6.4 Cellular CDMA EvDO 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)			
MEASURED OUTPUT POWER:	24.609	dBm	=	0.289 W
MODULATION SIGNAL:	CDMA EvDO (Internal)			
DISTANCE:	3	meters		
LIMIT:	$43 + 10 \log_{10}$ (W) =	37.61	dBc	

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1649.40	-60.53	6.10	-54.43	H	79.0
2474.10	-62.55	6.70	-55.85	V	80.5
3298.80	-67.69	6.80	-60.89	H	85.5
4123.50	-85.68	6.50	-79.18	H	103.8
4948.20	-84.38	7.00	-77.38	H	102.0

Table 6-7. Radiated Spurious Data (Cellular CDMA EvDO 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 FTAP with "All Up" power control bits. This unit was tested with its standard battery.

Cellular CDMA EvDO 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:	0384 (Mid)			
MEASURED OUTPUT POWER:	24.609	dBm	=	0.289 W
MODULATION SIGNAL:	CDMA EvDO (Internal)			
DISTANCE:	3	meters		
LIMIT:	$43 + 10 \log_{10}$ (W) =	37.61	dBc	

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1673.04	-59.93	6.10	-53.83	H	78.4
2509.56	-62.06	6.70	-55.36	V	80.0
3346.08	-65.60	6.80	-58.80	H	83.4
4182.60	-85.78	6.50	-79.28	H	103.9
5019.12	-83.78	7.00	-76.78	H	101.4

Table 6-8. Radiated Spurious Data (Cellular CDMA EvDO 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 FTAP with "All Up" power control bits. This unit was tested with its standard battery.

Cellular CDMA EvDO 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)			
MEASURED OUTPUT POWER:	24.609	dBm	=	0.289 W
MODULATION SIGNAL:	CDMA EvDO (Internal)			
DISTANCE:	3	meters		
LIMIT:	$43 + 10 \log_{10}$ (W) =	37.61	dBc	

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1696.62	-59.44	6.10	-53.34	V	77.9
2544.93	-61.46	6.70	-54.76	H	79.4
3393.24	-64.11	6.80	-57.31	H	81.9
4241.55	-85.68	6.50	-79.18	H	103.8
5089.86	-83.98	7.00	-76.98	H	101.6

Table 6-9. Radiated Spurious Data (Cellular CDMA EvDO 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 FTAP with "All Up" power control bits. This unit was tested with its standard battery.

6.5 PCS CDMA EvDO 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)			
MEASURED OUTPUT POWER:	25.366	dBm	=	0.344 W
MODULATION SIGNAL:	CDMA EvDO (Internal)			
DISTANCE:	3	meters		
LIMIT:	$43 + 10 \log_{10}$ (W) =	38.37	dBc	

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3702.50	-57.55	8.70	-48.85	V	74.2
5553.75	-54.60	9.70	-44.90	H	70.3
7405.00	-61.12	9.90	-51.22	H	76.6
9256.25	-77.43	11.40	-66.03	H	91.4
11107.50	-77.33	12.10	-65.23	H	90.6

Table 6-10. Radiated Spurious Data (PCS CDMA EvDO 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 FTAP with "All Up" power control bits. This unit was tested with its standard battery.

PCS CDMA EvDO 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)			
MEASURED OUTPUT POWER:	25.366	dBm	=	0.344 W
MODULATION SIGNAL:	CDMA EvDO (Internal)			
DISTANCE:	3	meters		
LIMIT:	$43 + 10 \log_{10}$ (W) =	38.37	dBc	

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3760.00	-58.20	8.70	-49.50	V	74.9
5640.00	-57.53	9.70	-47.83	V	73.2
7520.00	-61.93	9.90	-52.03	H	77.4
9400.00	-77.23	11.40	-65.83	H	91.2
11280.00	-77.13	12.10	-65.03	H	90.4

Table 6-11. Radiated Spurious Data (PCS CDMA EvDO 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 FTAP with "All Up" power control bits. This unit was tested with its standard battery.

PCS CDMA EvDO 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)			
MEASURED OUTPUT POWER:	25.366	dBm	=	0.344 W
MODULATION SIGNAL:	CDMA EvDO (Internal)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	38.37	dBc	

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3817.50	-55.54	8.70	-46.84	H	72.2
5726.25	-46.82	9.70	-37.12	V	62.5
7635.00	-60.60	9.90	-50.70	H	76.1
9543.75	-76.93	11.40	-65.53	H	90.9
11452.50	-76.93	12.10	-64.83	H	90.2

Table 6-12. Radiated Spurious Data (PCS CDMA EvDO 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 FTAP with "All Up" power control bits. This unit was tested with its standard battery.

6.6 Cellular CDMA EvDO Frequency Stability

§2.1055, 22.355; RSS-129 (9.2.1)

OPERATING FREQUENCY: 836,520,008 Hz

CHANNEL: 384

REFERENCE VOLTAGE: 10.65 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (ºC)	FREQ. (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	10.65	+ 20 (Ref)	836,520,008	0.00	0.000000
100 %		-30	836,519,891	117.11	0.000014
100 %		-20	836,519,866	142.21	0.000017
100 %		-10	836,519,816	192.40	0.000023
100 %		0	836,519,841	167.30	0.000020
100 %		10	836,519,933	75.29	0.000009
100 %		20	836,520,133	-125.48	-0.000015
100 %		25	836,520,192	-184.03	-0.000022
100 %		30	836,519,832	175.67	0.000021
100 %		40	836,520,267	-259.32	-0.000031
100 %		50	836,519,941	66.92	0.000008
100 %		60	836,519,908	100.38	0.000012
85 %	9.05	20	836,519,874	133.84	0.000016
115 %	12.25	20	836,519,866	142.21	0.000017
BATT. ENDPOINT	8.53	20	836,520,142	-133.84	-0.000016

Table 6-13. Frequency Stability Data (Cellular CDMA EvDO Mode – Ch. 384)

Note:

Standard batteries were used to perform this test.

Cellular CDMA EvDO Frequency Stability (Cont'd)

§2.1055, 22.355; RSS-129 (9.2.1)

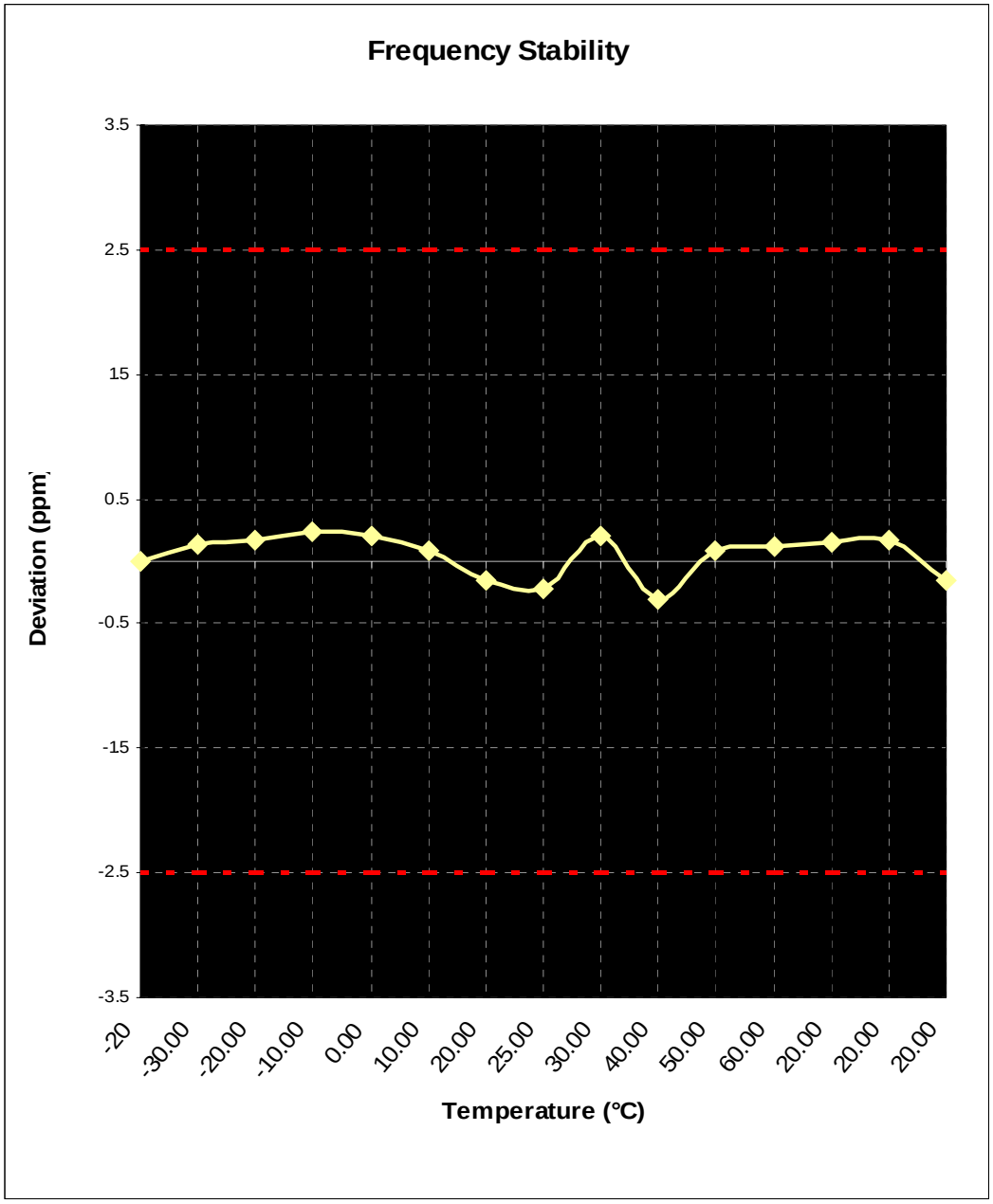


Figure 6-1. Frequency Stability Graph (Cellular CDMA EvDO Mode – Ch. 384)

Note:

Standard batteries were used to perform this test.

6.7 PCS CDMA EvDO Frequency Stability

§2.1055, 24.235; RSS-133 (6.3)

OPERATING FREQUENCY: 1,880,000,003 Hz

CHANNEL: 600

REFERENCE VOLTAGE: 10.65 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (ºC)	FREQ. (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	10.65	+ 20 (Ref)	1,880,000,003	0.00	0.000000
100 %		-30	1,880,000,210	-206.80	-0.000011
100 %		-20	1,880,000,304	-300.80	-0.000016
100 %		-10	1,880,000,435	-432.40	-0.000023
100 %		0	1,879,999,683	319.60	0.000017
100 %		10	1,879,999,589	413.60	0.000022
100 %		20	1,880,000,360	-357.20	-0.000019
100 %		25	1,880,000,266	-263.20	-0.000014
100 %		30	1,880,000,304	-300.80	-0.000016
100 %		40	1,879,999,571	432.40	0.000023
100 %		50	1,879,999,364	639.20	0.000034
100 %		60	1,880,000,623	-620.40	-0.000033
85 %	9.05	20	1,880,000,417	-413.60	-0.000022
115 %	12.25	20	1,879,999,890	112.80	0.000006
BATT. ENDPOINT	8.59	20	1,879,999,683	319.60	0.000017

Table 6-14. Frequency Stability Data (PCS CDMA EvDO Mode – Ch. 600)

Note:

Standard batteries were used to perform this test.

PCS CDMA EvDO Frequency Stability (Cont'd)

§2.1055, 24.235; RSS-133 (6.3)

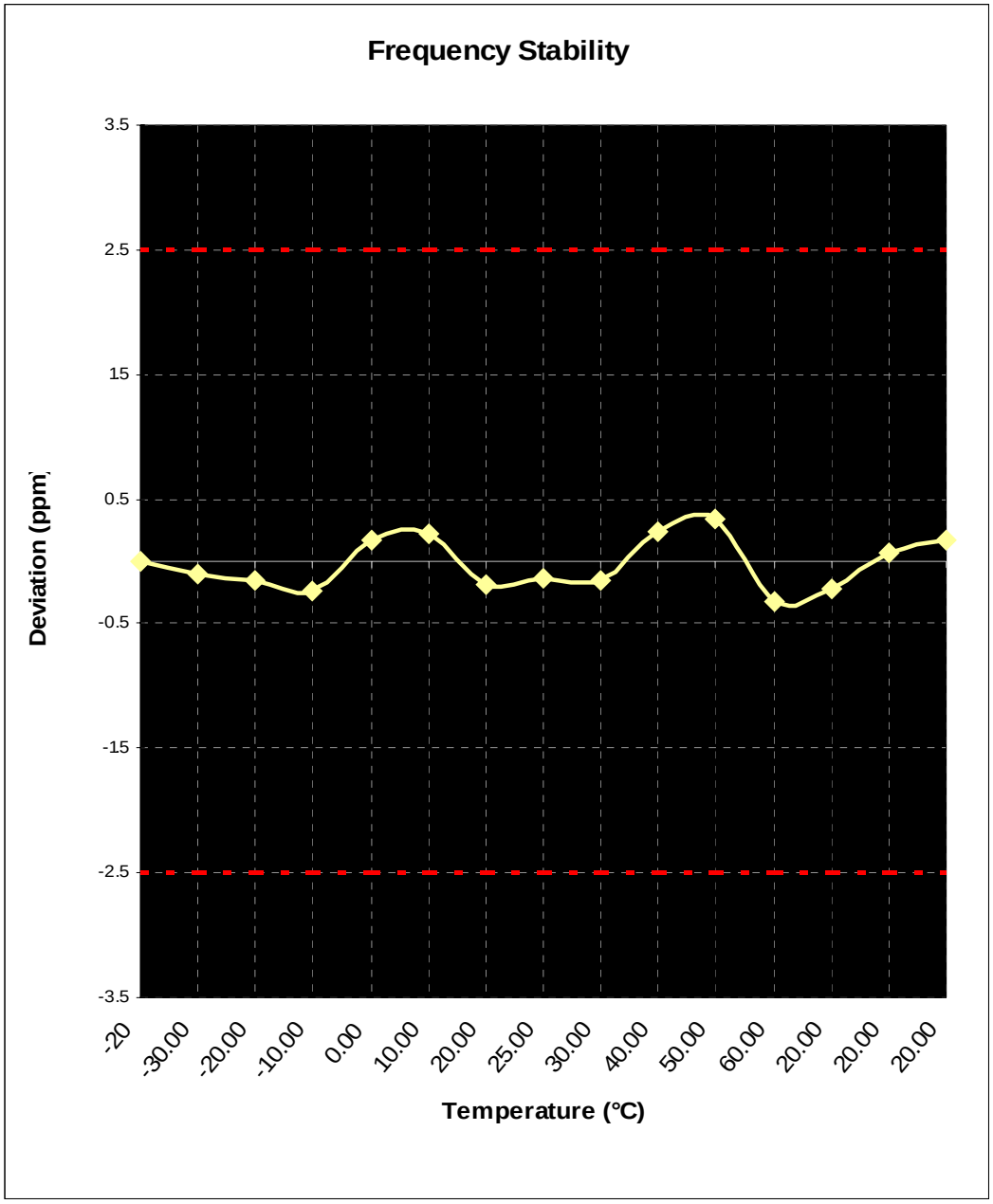


Figure 6-2. Frequency Stability Graph (PCS CDMA EvDO Mode – Ch. 600)

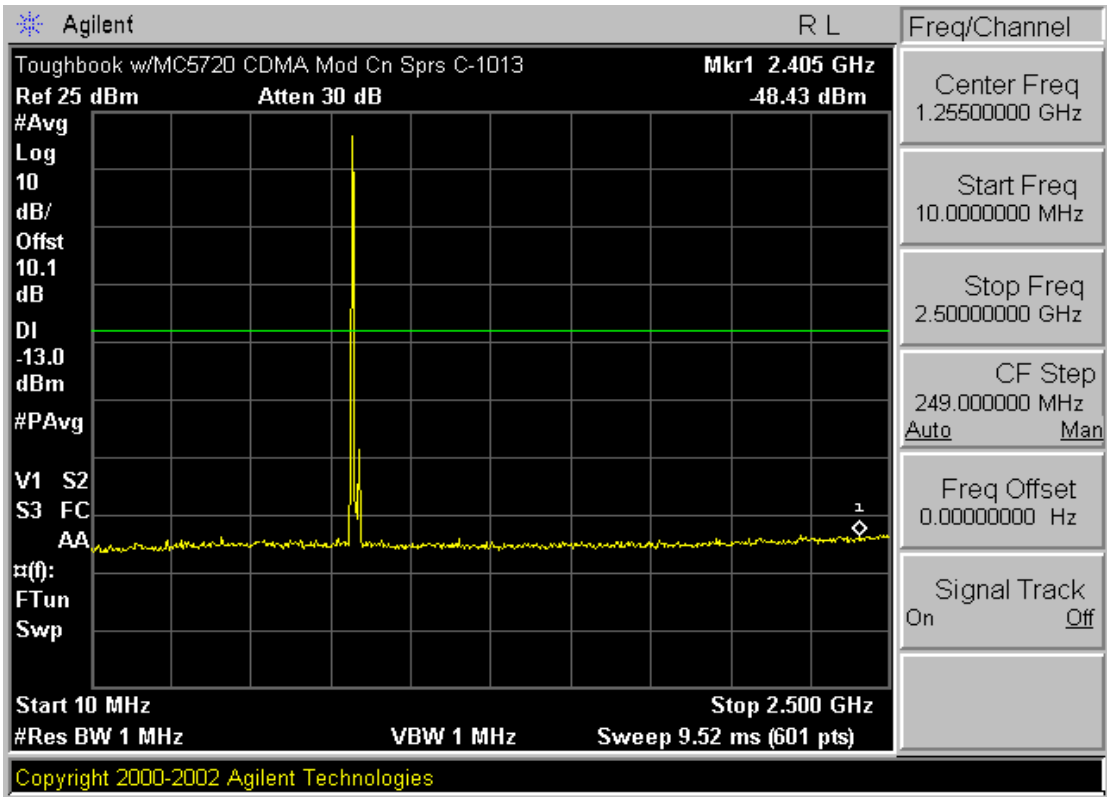
Note:

Standard batteries were used to perform this test.

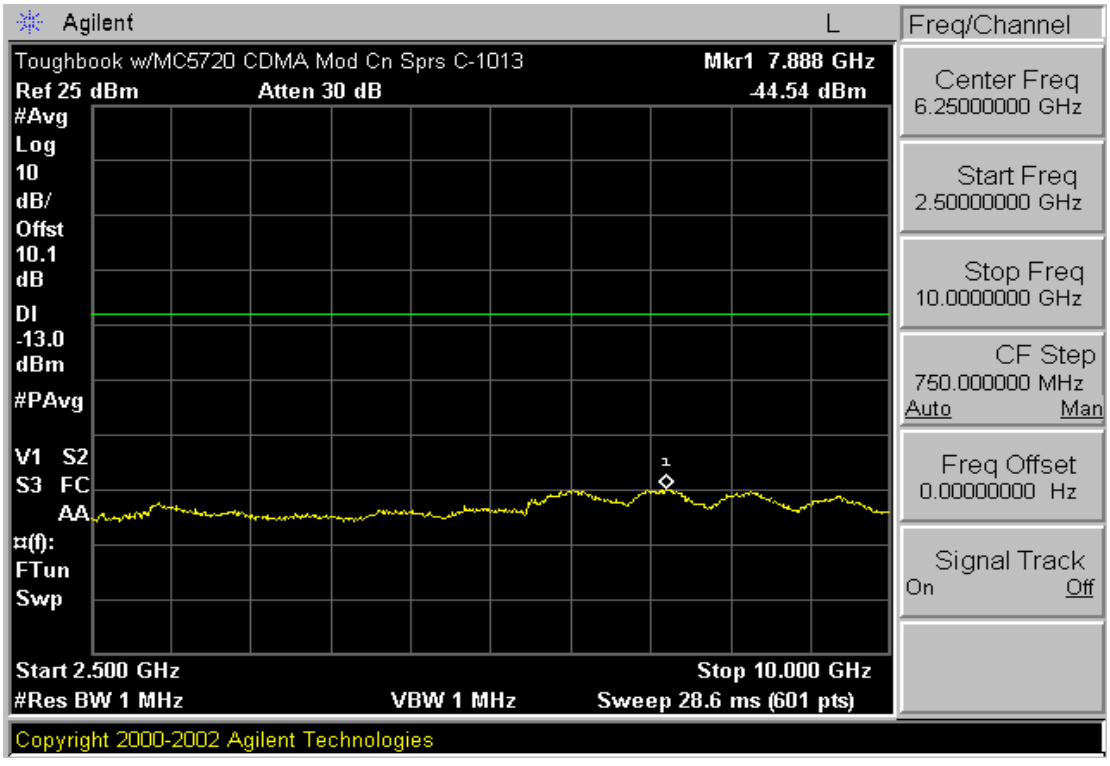
7.0 CONCLUSION

The data collected shows that the **Panasonic Toughbook Model: CF-19 FCC ID: ACJ9TGCF-192** complies with all the requirements of Parts 2, 22, and 24 of the FCC rules.

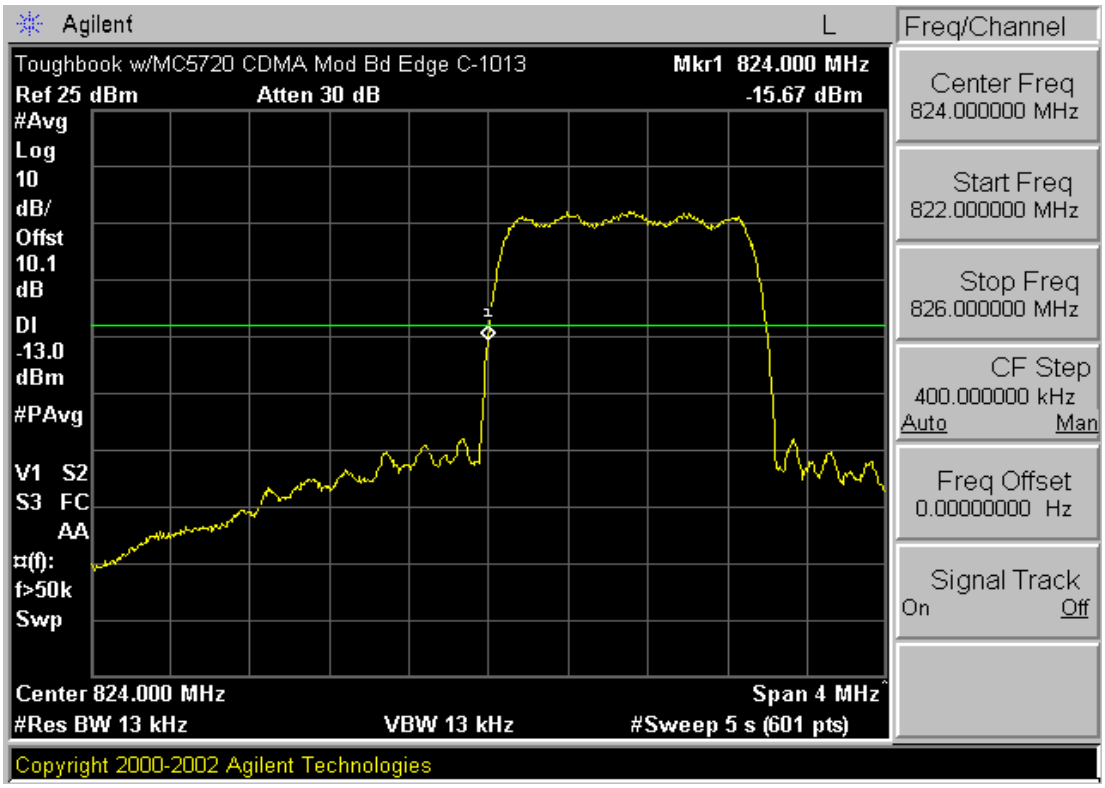
EXHIBIT A - PLOT(S) OF EMISSIONS



Plot A-1. Conducted Spurious Plot (Cellular CDMA EvDO Mode – Ch. 1013)

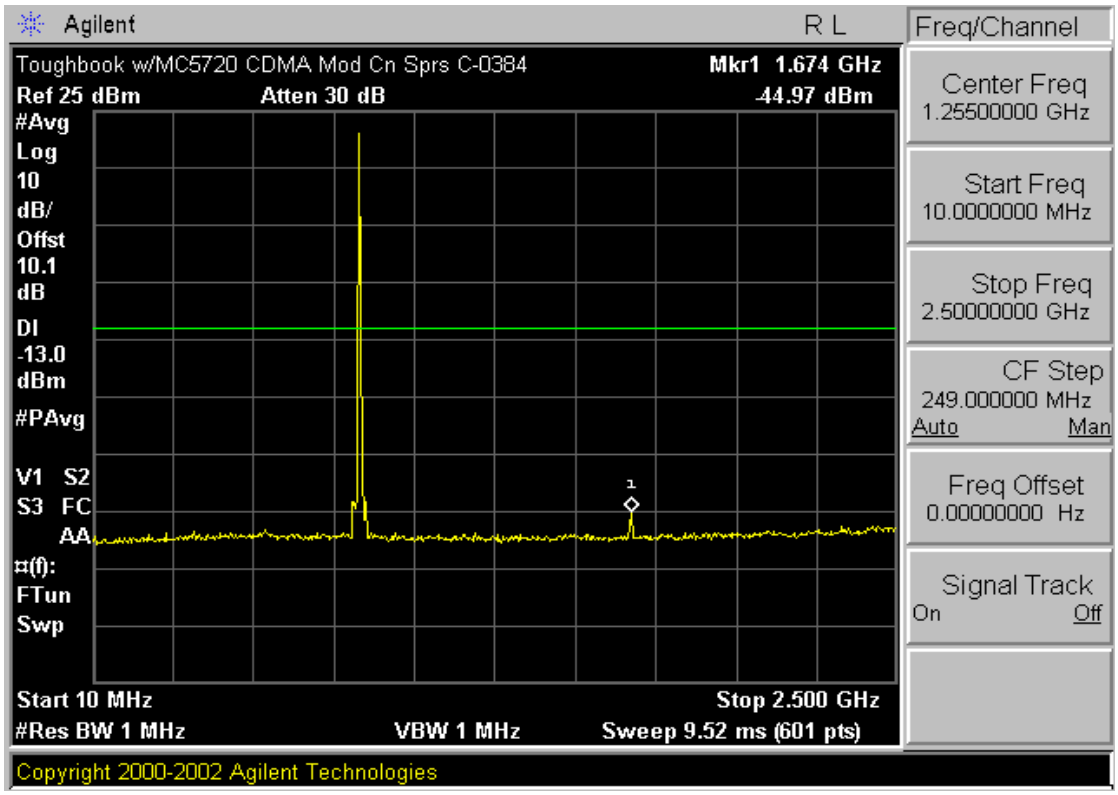


Plot A-2. Conducted Spurious Plot (Cellular CDMA EvDO Mode – Ch. 1013)

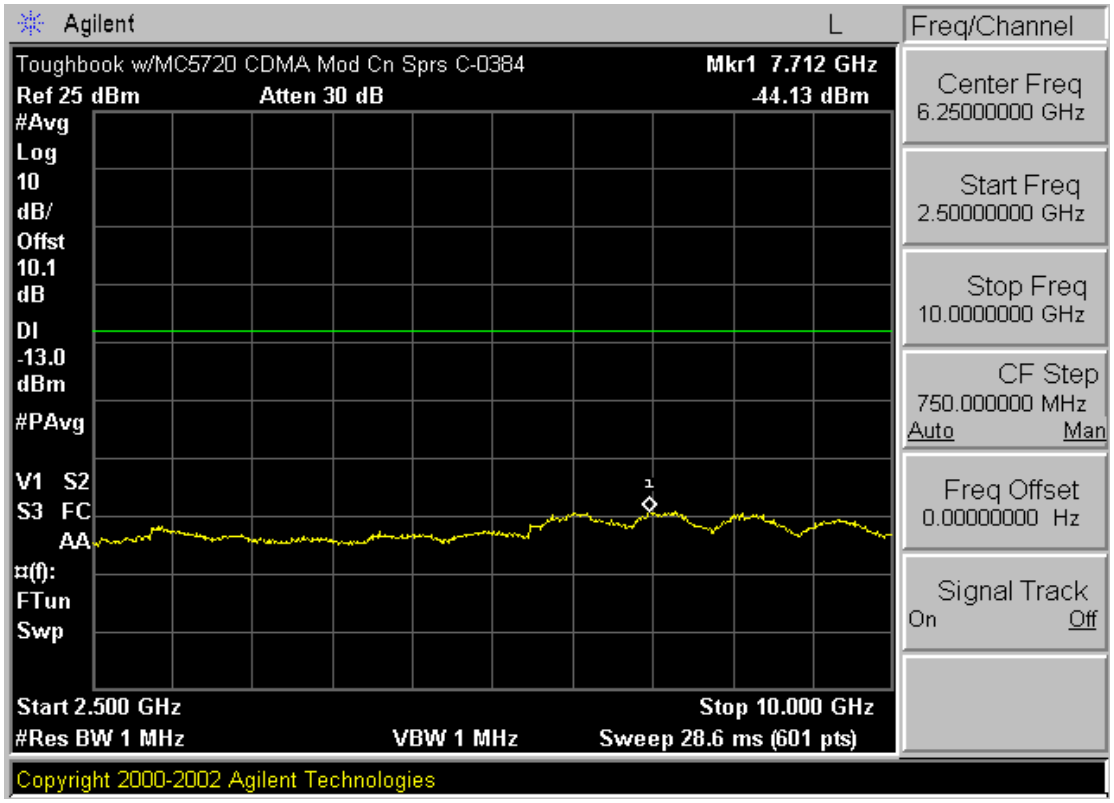


Plot A-3. Band Edge Plot (Cellular CDMA EvDO Mode – Ch. 1013)

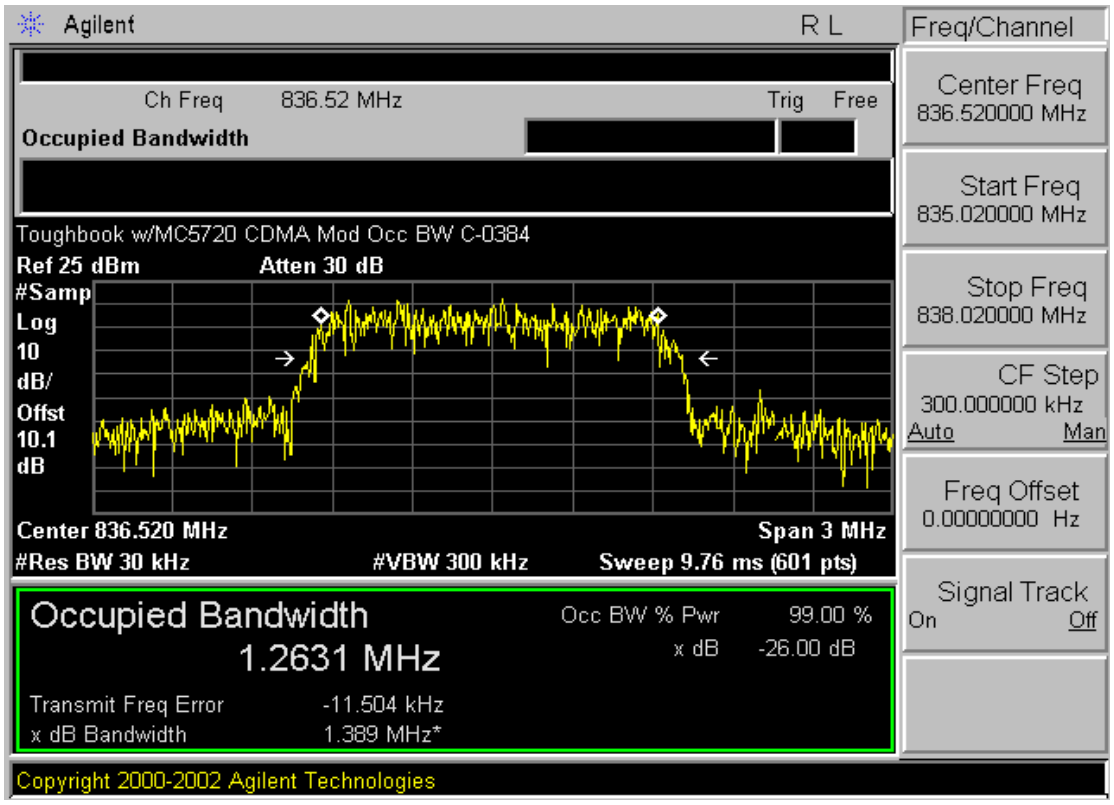
Plot A-4. 4MHz Span Plot (Cellular CDMA EvDO Mode – Ch. 1013)



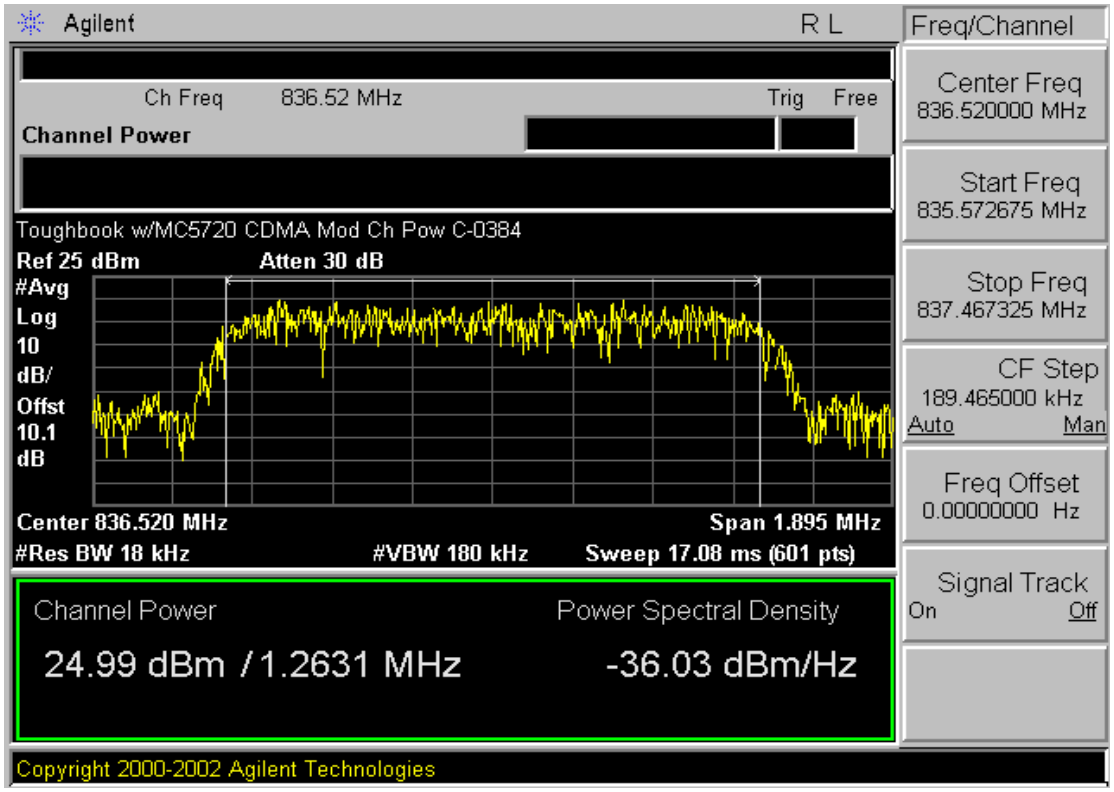
Plot A-5. Conducted Spurious Plot (Cellular CDMA EvDO Mode – Ch. 384)



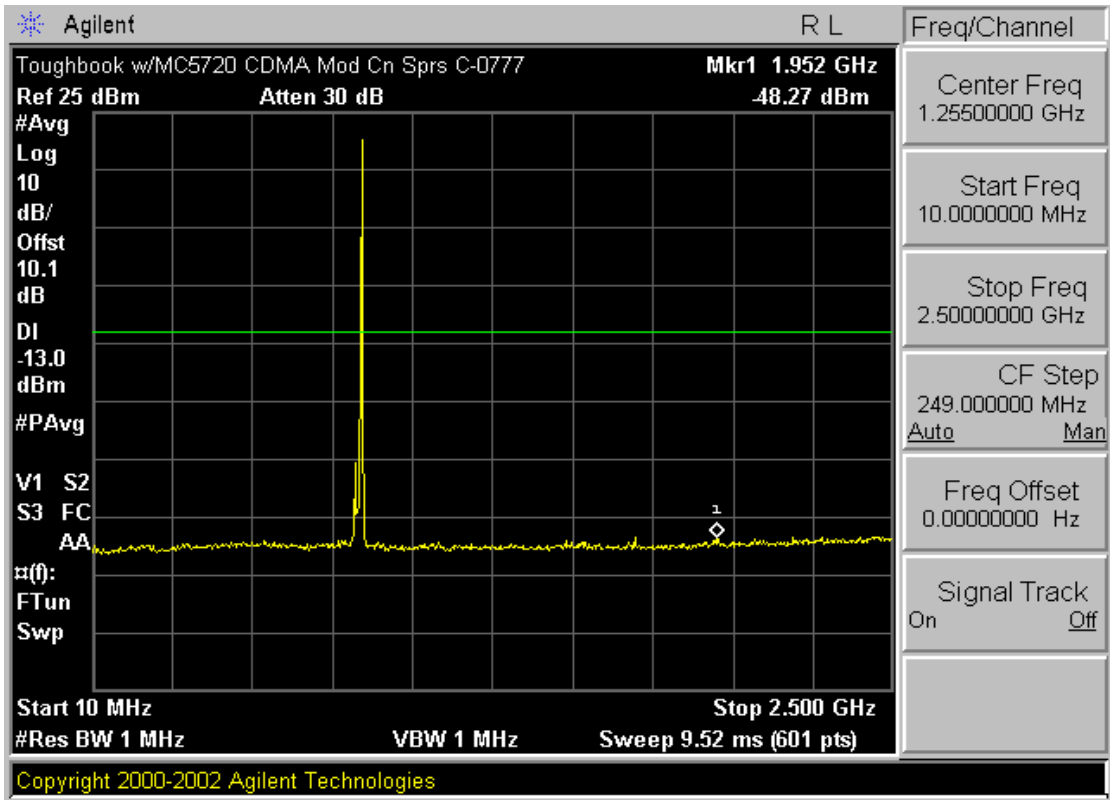
Plot A-6. Conducted Spurious Plot (Cellular CDMA EvDO Mode – Ch. 384)



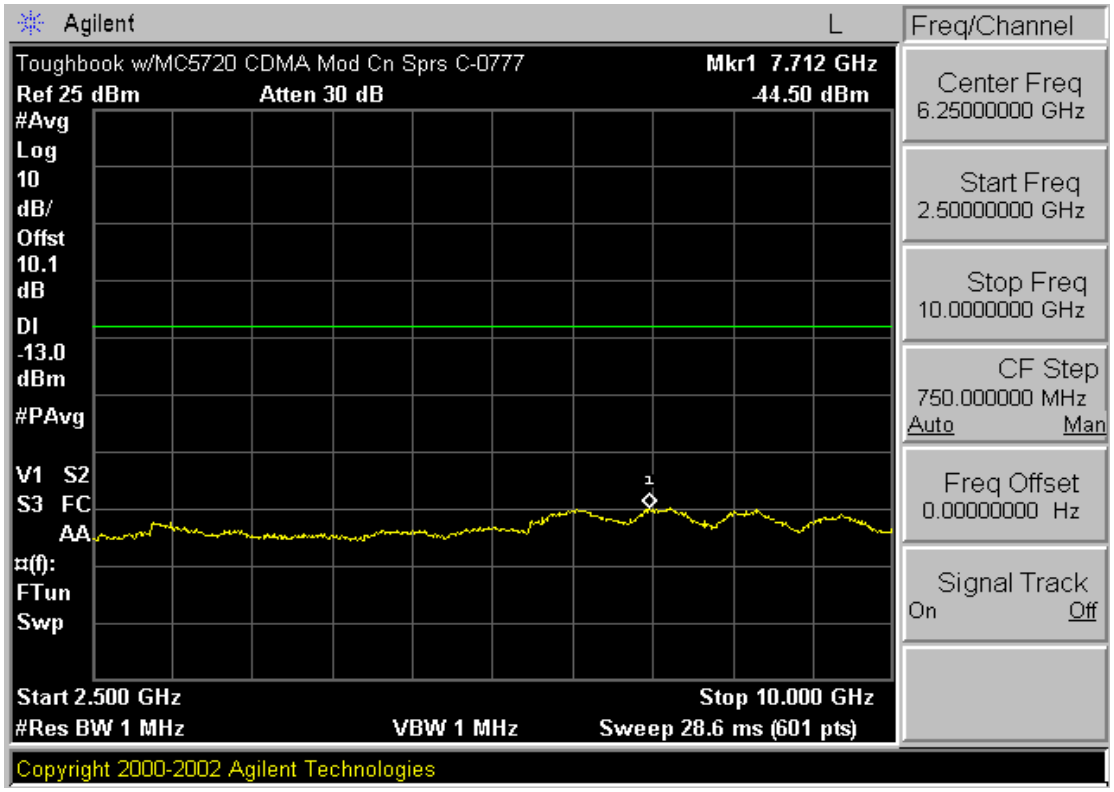
Plot A-7. Occupied Bandwidth Plot (Cellular CDMA EvDO Mode – Ch. 384)



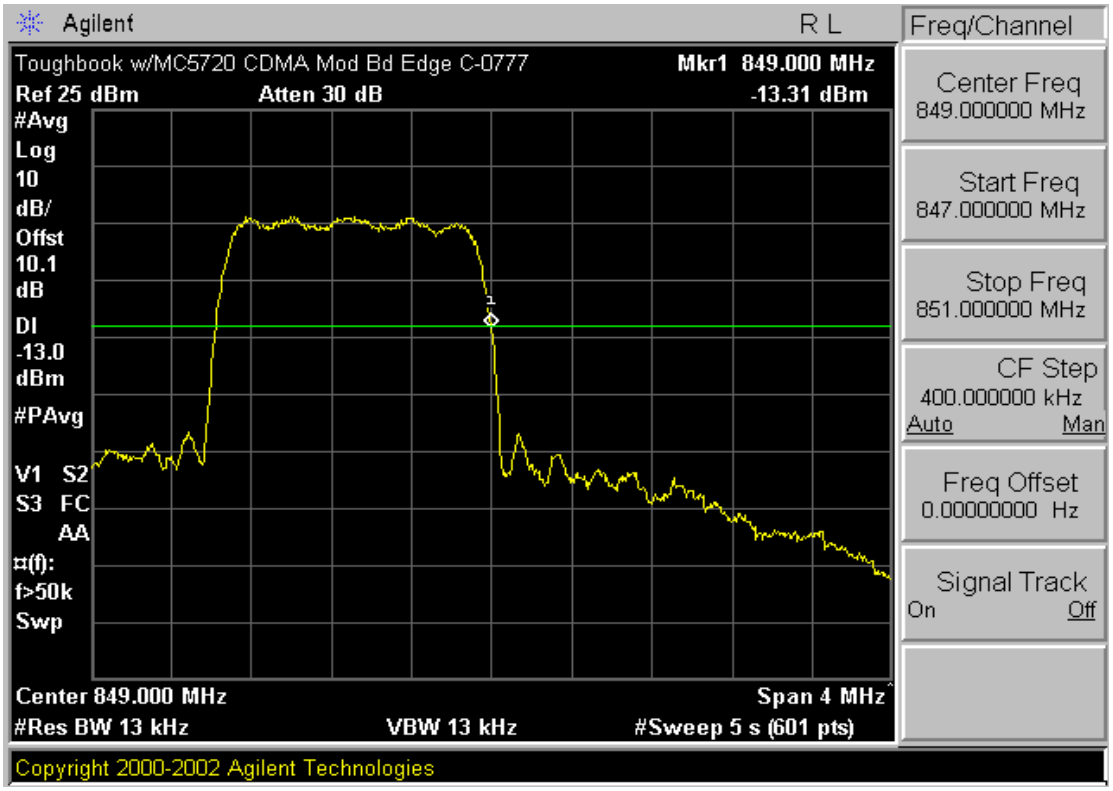
Plot A-8. Channel Power Plot (Cellular CDMA EvDO Mode – Ch. 384)



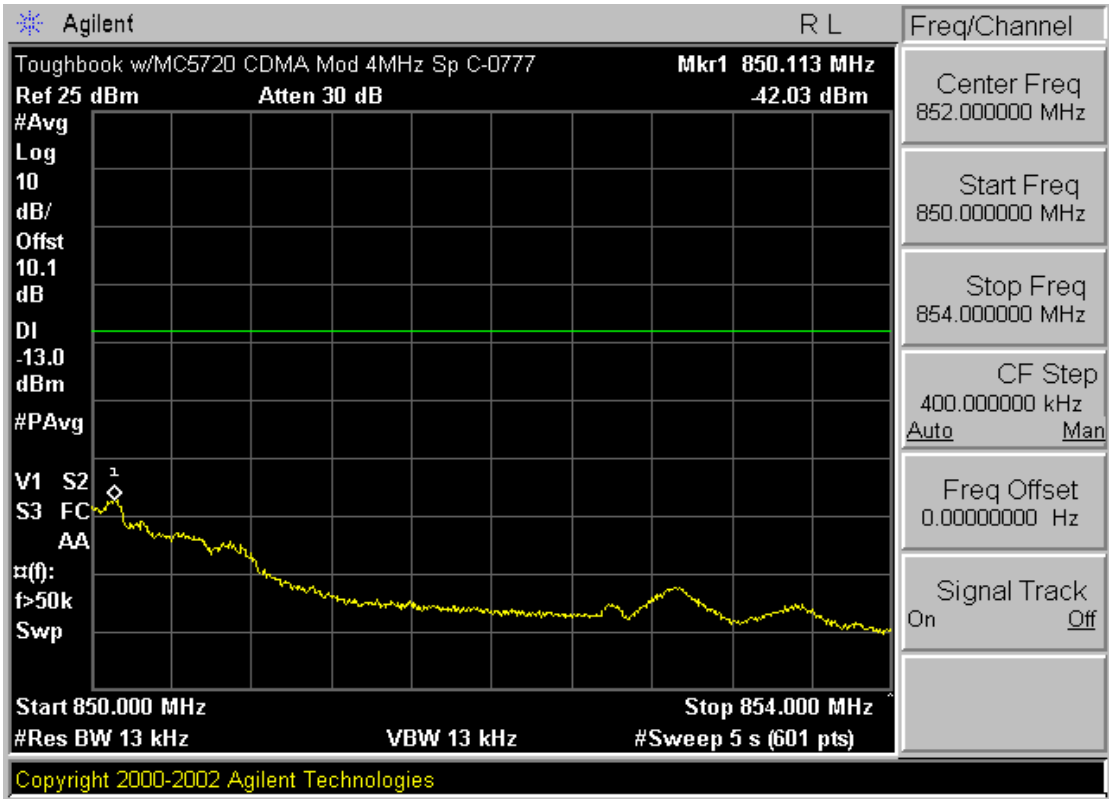
Plot A-9. Conducted Spurious Plot (Cellular CDMA EvDO Mode – Ch. 777)



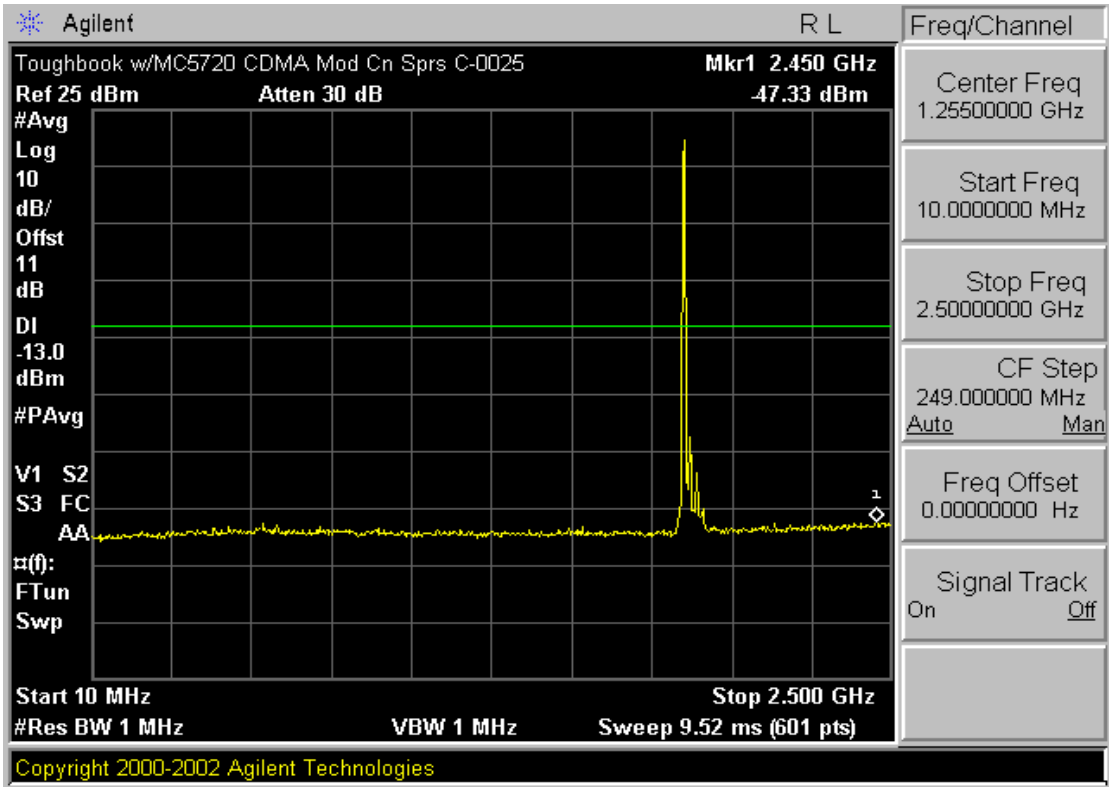
Plot A-10. Conducted Spurious Plot (Cellular CDMA EvDO Mode – Ch. 777)



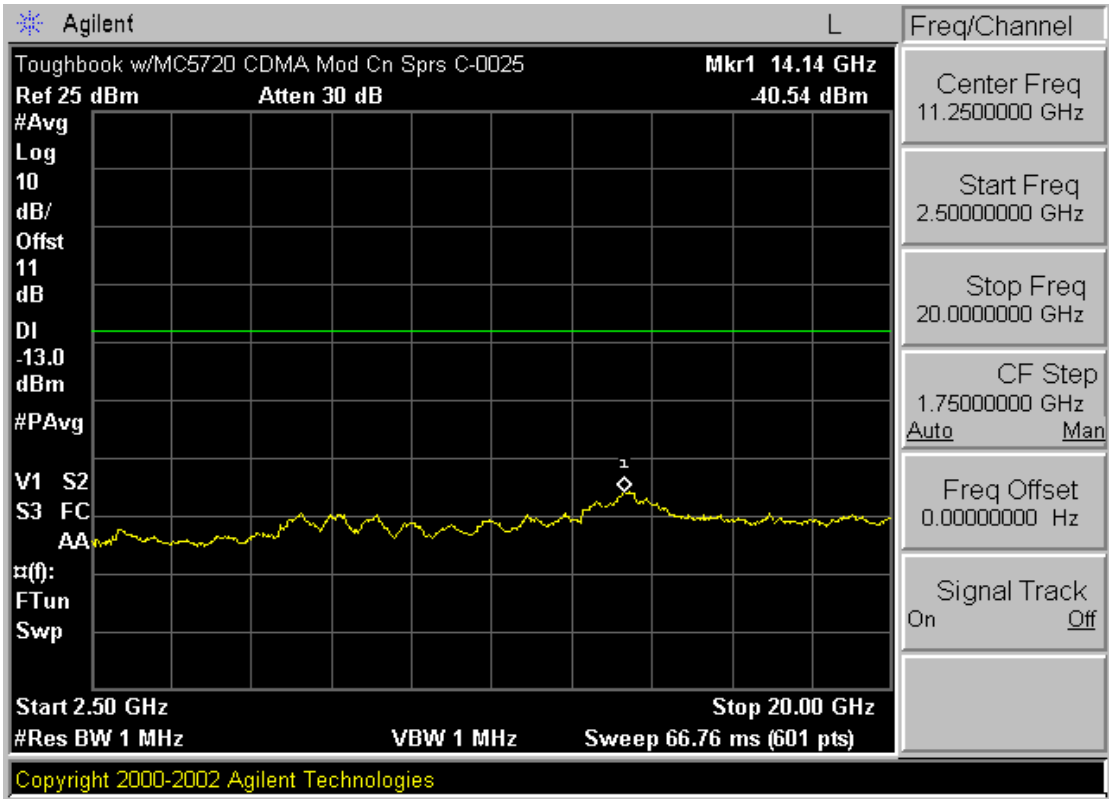
Plot A-11. Band Edge Plot (Cellular CDMA EvDO Mode – Ch. 777)



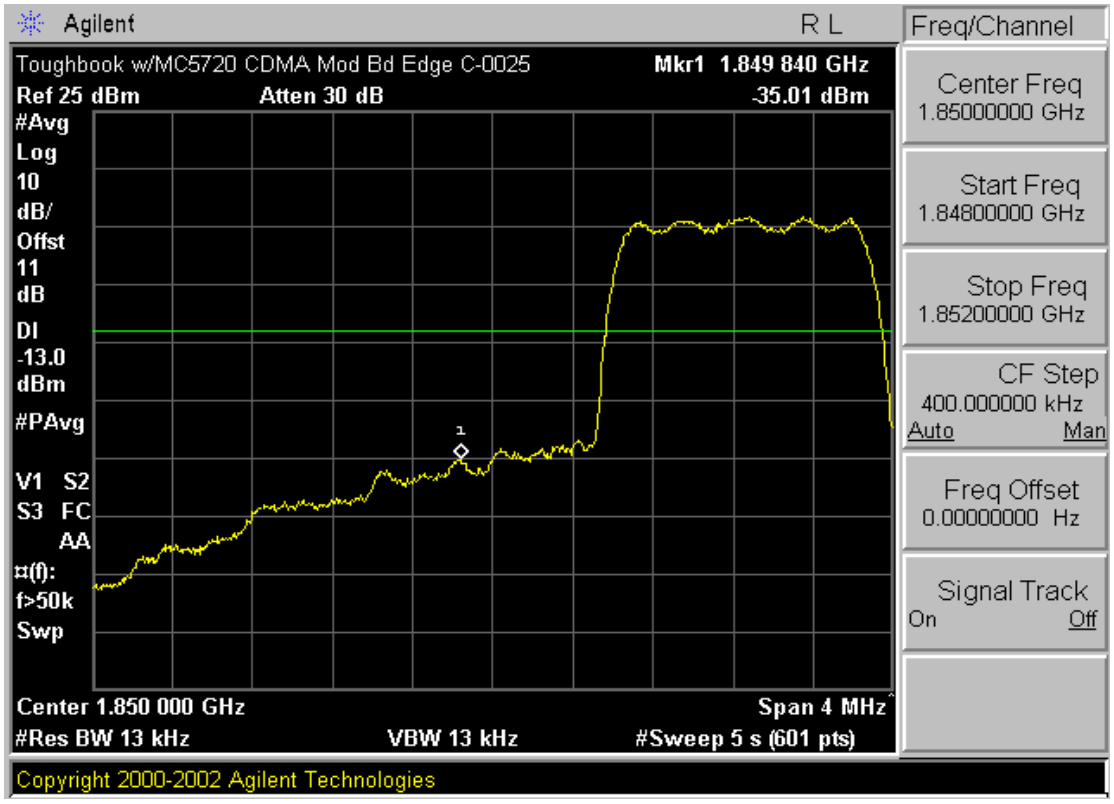
Plot A-12. 4MHz Span Plot (Cellular CDMA EvDO Mode – Ch. 777)



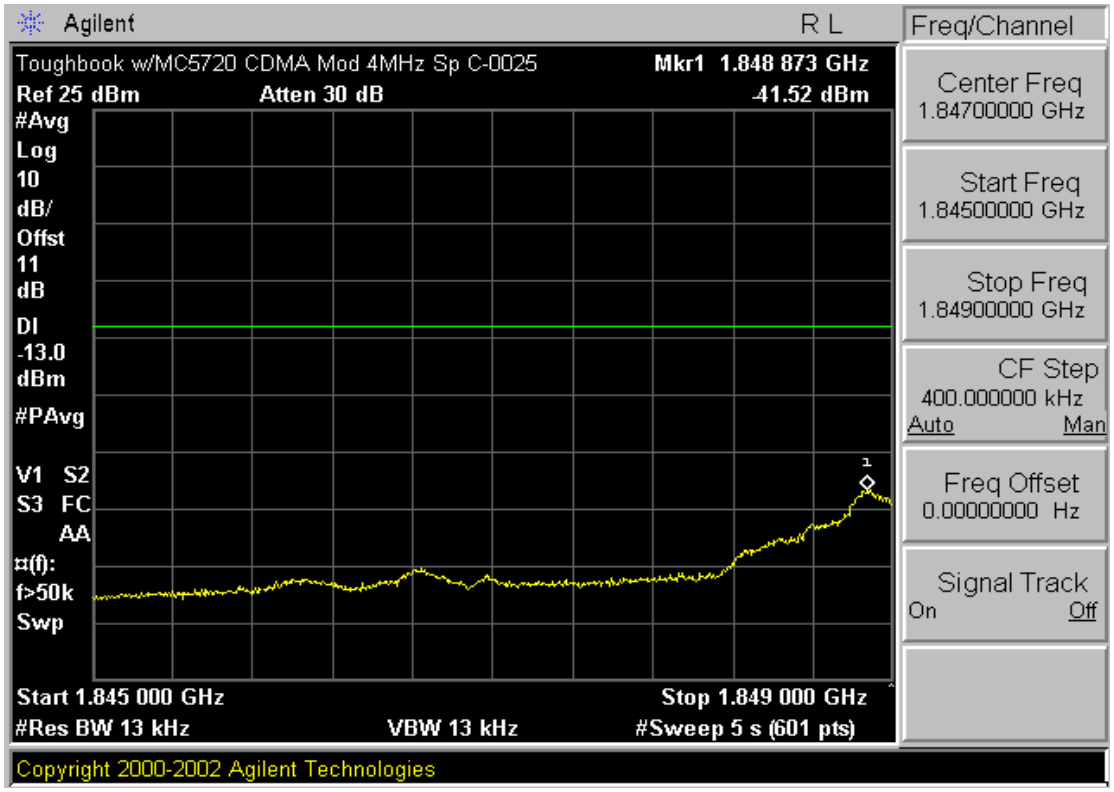
Plot A-13. Conducted Spurious Plot (PCS CDMA EvDO Mode – Ch. 25)



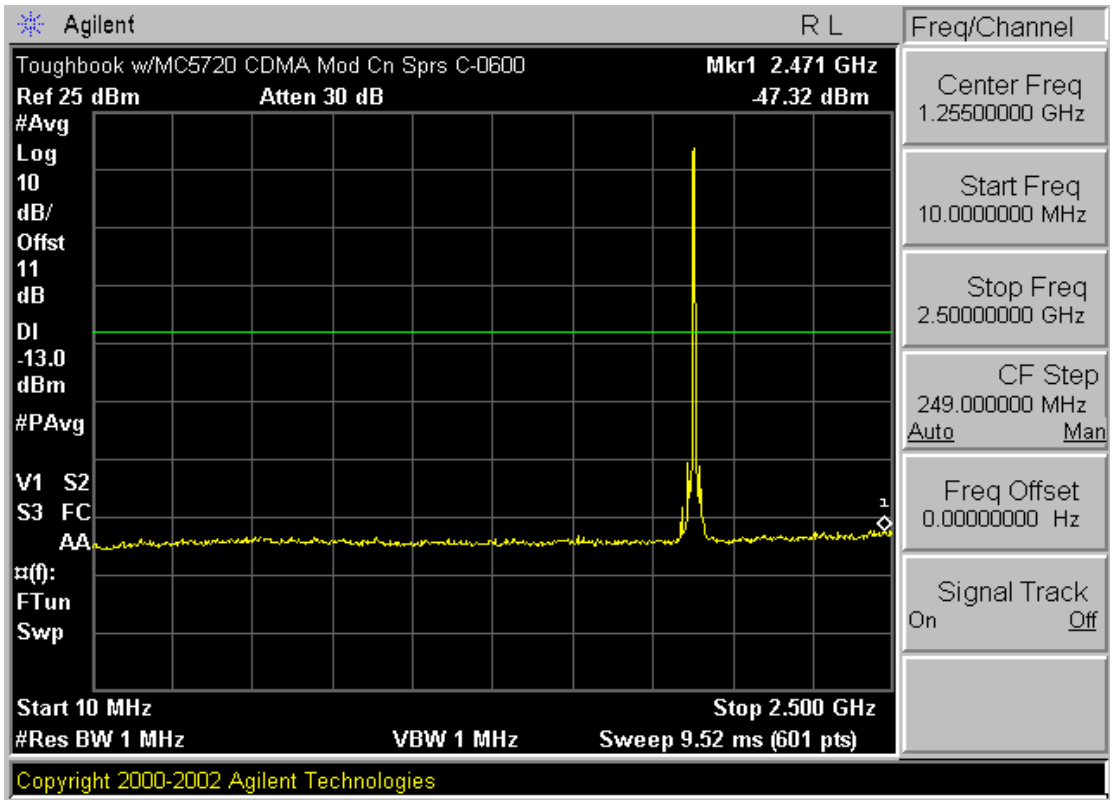
Plot A-14. Conducted Spurious Plot (PCS CDMA EvDO Mode – Ch. 25)



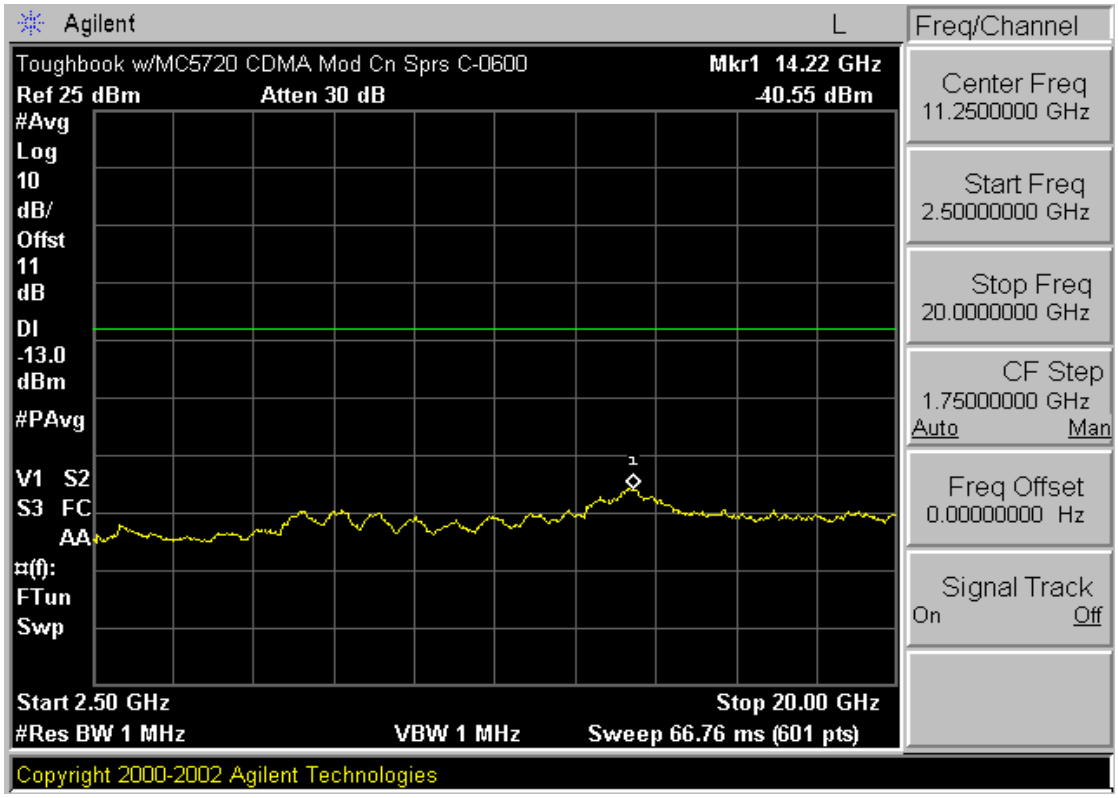
Plot A-15. Band Edge Plot (PCS CDMA EvDO Mode – Ch. 25)



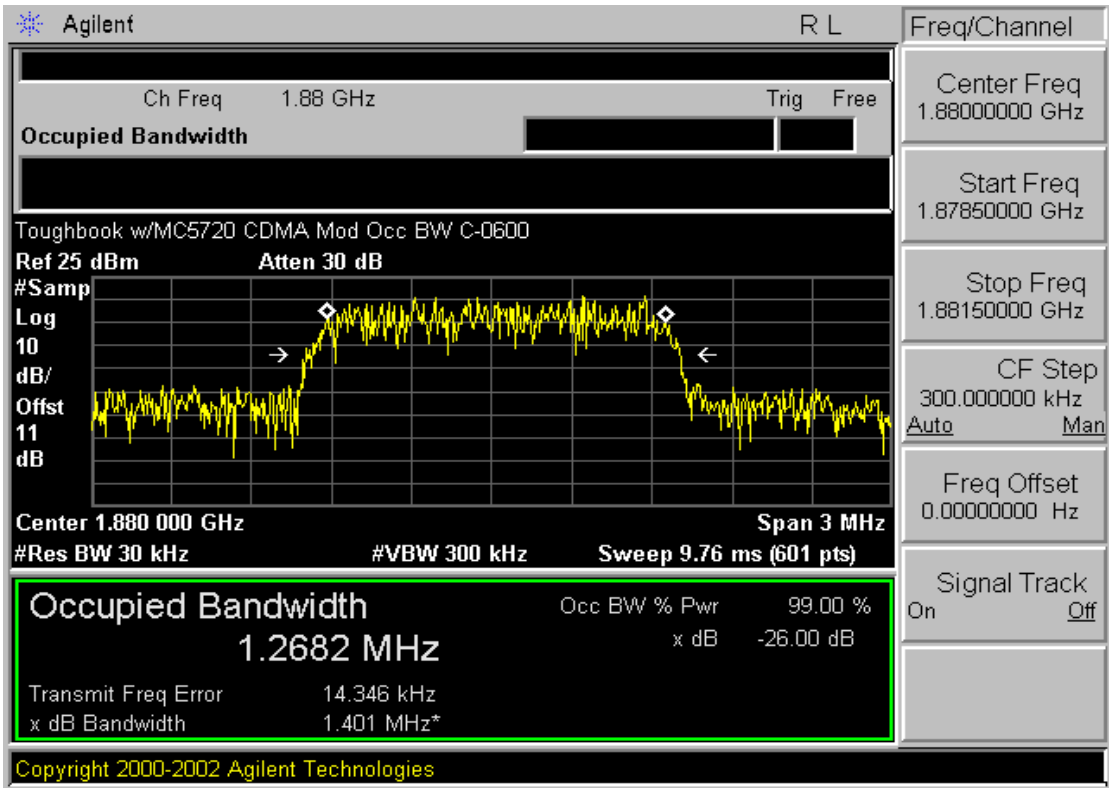
Plot A-16. 4MHz Span Plot (PCS CDMA EvDO Mode – Ch. 25)



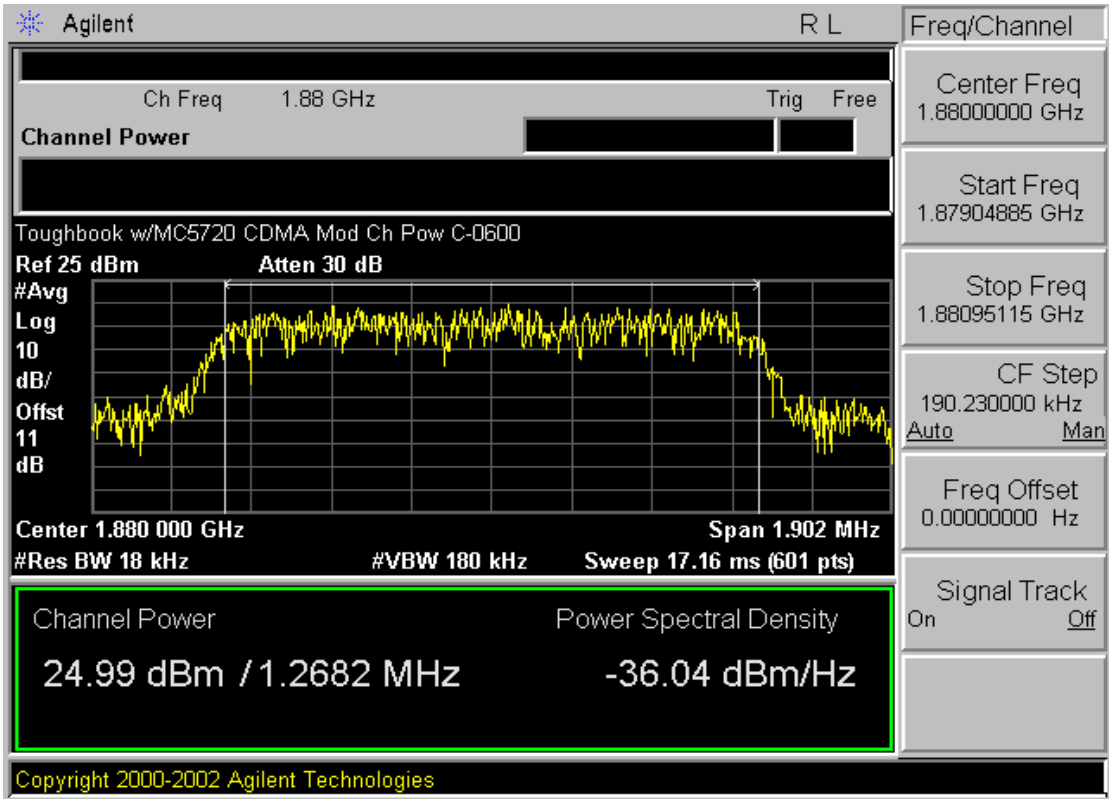
Plot A-17. Conducted Spurious Plot (PCS CDMA EvDO Mode – Ch. 600)



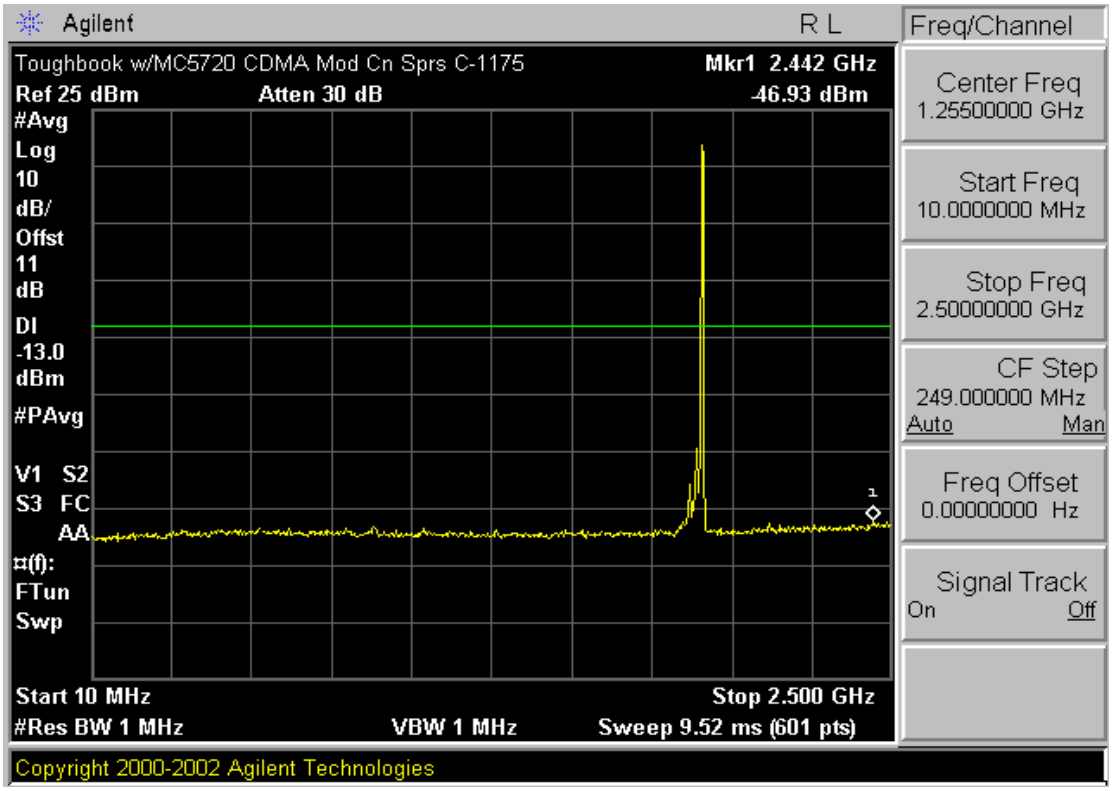
Plot A-18. Conducted Spurious Plot (PCS CDMA EvDO Mode – Ch. 600)



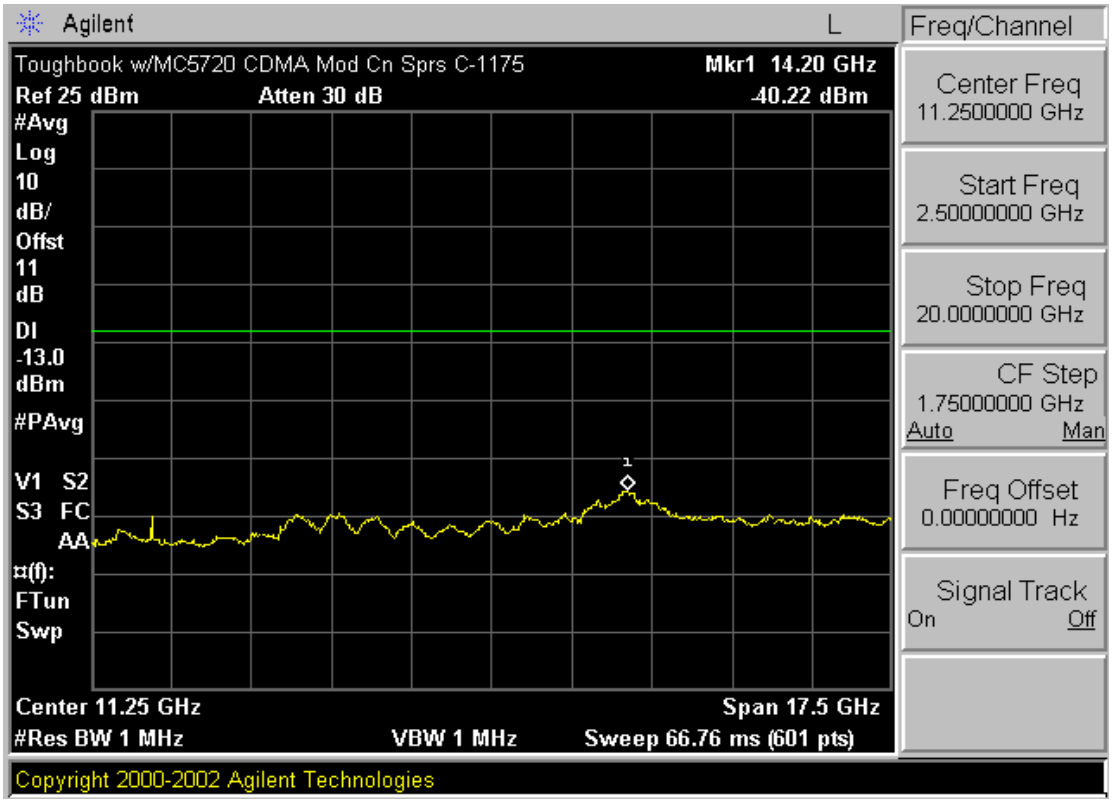
Plot A-19. Occupied Bandwidth Plot (PCS CDMA EvDO Mode – Ch. 600)



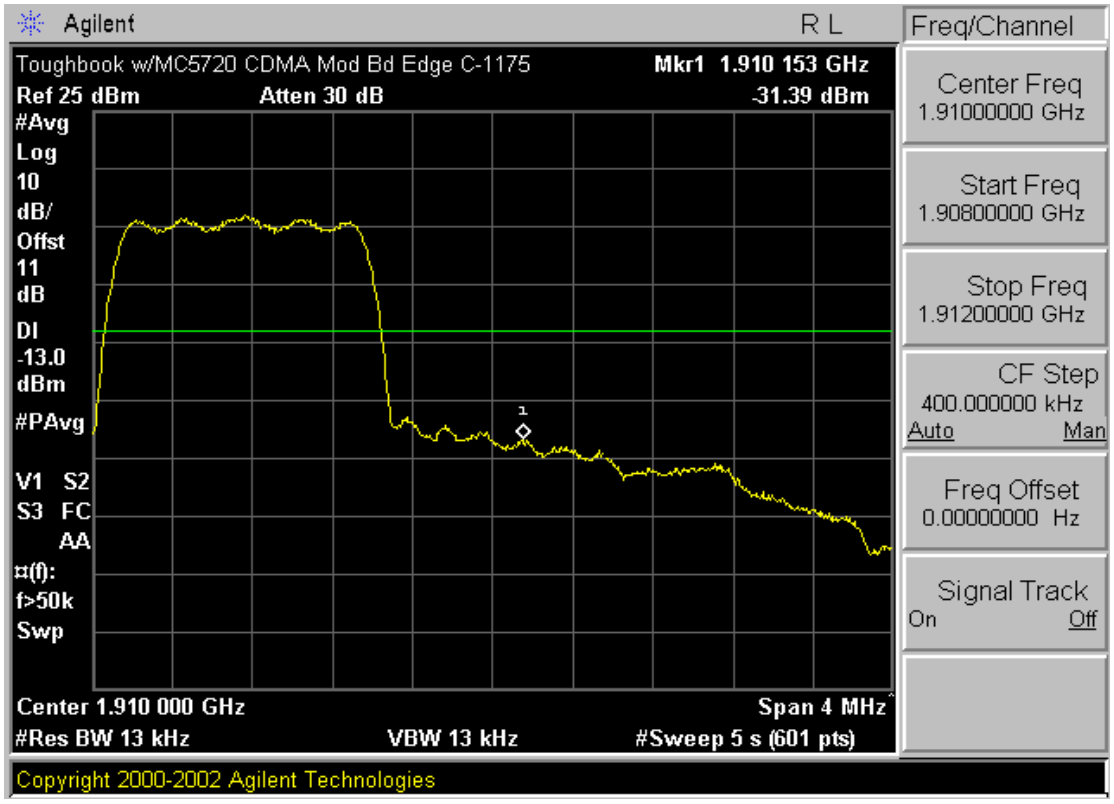
Plot A-20. Channel Power Plot (PCS CDMA EvDO Mode – Ch. 600)



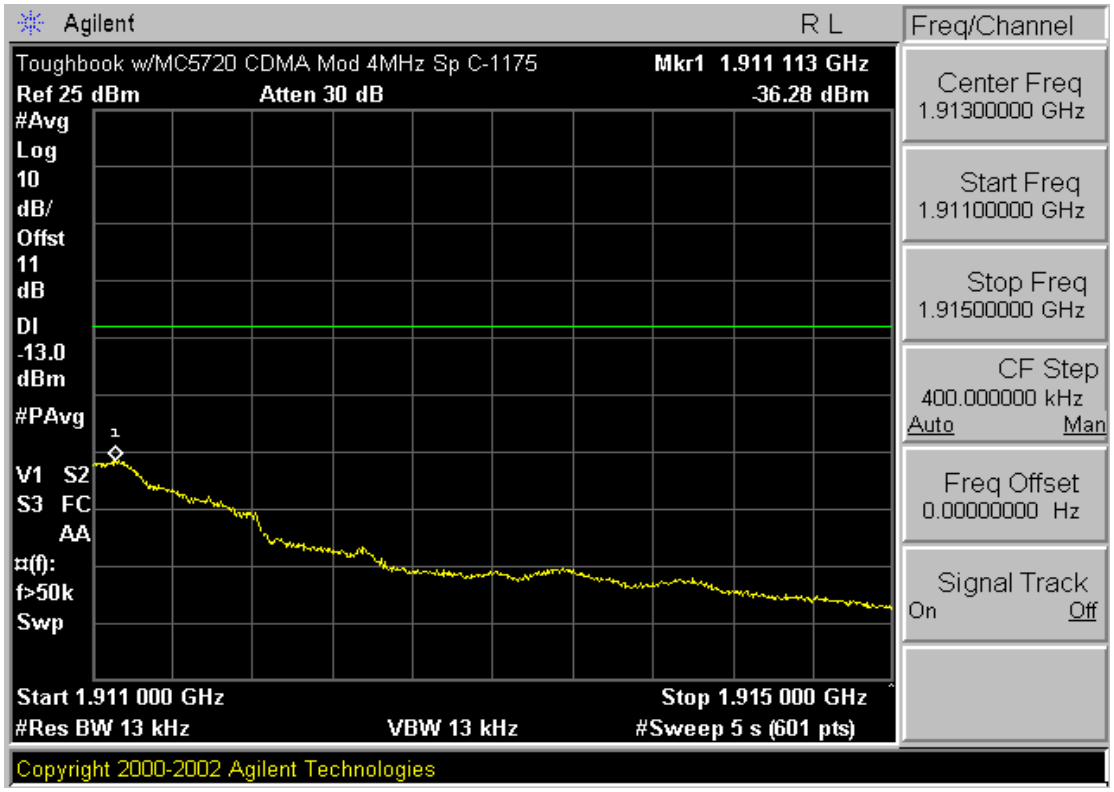
Plot A-21. Conducted Spurious Plot (PCS CDMA EvDO Mode – Ch. 1175)



Plot A-22. Conducted Spurious Plot (PCS CDMA EvDO Mode – Ch. 1175)



Plot A-23. Band Edge Plot (PCS CDMA EvDO Mode – Ch. 1175)



Plot A-24. 4MHz Span Plot (PCS CDMA EvDO Mode – Ch. 1175)

EXHIBIT B – TEST SETUP PHOTOGRAPHS

EXHIBIT C – INTERNAL/EXTERNAL PHOTOGRAPHS