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

Date of Testing:
May 30, 2007
Test Site/Location:
PCTEST Lab., Columbia, MD, USA
Test Report Serial No.:
0705160472.NBZ

FCC ID:	**NBZNRM-MC950D**
APPLICANT:	**NOVATEL WIRELESS INC.**

Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§2; §22(H), §24(E)
EUT Type:	850/1900 GSM/WCDMA/EDGE USB Modem
Model(s):	MC950D
Tx Frequency Range:	824.20 - 848.80MHz (Cell. GSM) / 1850.20 - 1909.80MHz (PCS GSM)
	826.40 - 846.60MHz (Cell. WCDMA) / 1852.4 - 1907.6MHz (PCS WCDMA)
Max. RF Output Power:	2.786 W ERP Cell. GSM (34.45 dBm) / 1.95 W EIRP PCS GSM (32.9 dBm)
	0.507 W ERP Cell. WCDMA (27.05 dBm)
	0.457 W EIRP PCS WCDMA (26.6 dBm)
	0.881 W ERP EDGE850 (29.45 dBm) / 0.977 W EIRP EDGE1900 (29.9 dBm)
Emission Designator(s):	251KGXW (Cellular GSM), 248KGXW (PCS GSM)
	243KG7W (EDGE850), 245KG7W (EDGE1900)
	4M16F9W (Cellular WCDMA), 4M16F9W (PCS WCDMA)
Test Device Serial No.:	*identical prototype* [S/N: 1]

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. This device also contains functions that are not operational in U.S. territories. This report is applicable only to U.S. operations.

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

ACCREDITED
TESTING LABORATORY
CERTIFICATE #2041.01

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TABLE OF CONTENTS

FCC PART 22 & 24 MEASUREMENT REPORT.....3

1.0 INTRODUCTION.....4

1.1 MEASUREMENT PROCEDURE.....4

1.2 SCOPE.....4

1.3 TESTING FACILITY.....4

2.0 PRODUCT INFORMATION.....5

2.1 EQUIPMENT DESCRIPTION.....5

2.2 EMI SUPPRESSION DEVICE(S)/MODIFICATIONS.....5

2.3 LABELING REQUIREMENTS.....5

3.0 DESCRIPTION OF TESTS.....6

3.1 OCCUPIED BANDWIDTH EMISSION LIMITS.....6

3.2 CELLULAR - BASE FREQUENCY BLOCKS.....6

3.3 CELLULAR - MOBILE FREQUENCY BLOCKS.....6

3.4 PCS - BASE FREQUENCY BLOCKS.....7

3.5 PCS - MOBILE FREQUENCY BLOCKS.....7

3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL.....7

3.7 RADIATED SPURIOUS AND HARMONIC EMISSIONS.....7

3.8 FREQUENCY STABILITY / TEMPERATURE VARIATION.....8

4.0 TEST EQUIPMENT CALIBRATION DATA.....9

5.0 SAMPLE CALCULATIONS.....10

6.0 TEST RESULTS.....11

6.1 SUMMARY.....11

6.2 CONDUCTED OUTPUT POWER.....12

6.3 EFFECTIVE RADIATED POWER OUTPUT DATA.....13

6.4 EQUIVALENT ISOTROPIC RADIATED POWER OUTPUT DATA.....14

6.5 CELLULAR GSM RADIATED MEASUREMENTS.....15

6.6 CELLULAR WCDMA RADIATED MEASUREMENTS.....18

6.7 PCS GSM RADIATED MEASUREMENTS.....21

6.8 PCS WCDMA RADIATED MEASUREMENTS.....24

6.9 CELLULAR GSM FREQUENCY STABILITY MEASUREMENTS.....27

6.10 CELLULAR WCDMA FREQUENCY STABILITY MEASUREMENTS.....29

6.11 PCS GSM FREQUENCY STABILITY MEASUREMENTS.....31

6.12 PCS WCDMA FREQUENCY STABILITY MEASUREMENTS.....33

7.0 PLOTS OF EMISSIONS.....35

8.0 CONCLUSION.....56

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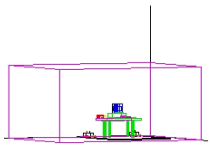
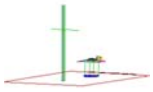


MEASUREMENT REPORT
FCC Part 22 & 24



§2.1033 General Information

APPLICANT:	Novatel Wireless Inc.
APPLICANT ADDRESS:	9645 Scranton Road, Suite 205 San Diego, CA 92121-3030
TEST SITE:	PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS:	6660-B Dobbin Road, Columbia, MD 21045 USA
FCC RULE PART(S):	§2; §22(H), §24(E)
BASE MODEL:	MC950D
FCC ID:	NBZNRM-MC950D
FCC CLASSIFICATION:	PCS Licensed Transmitter (PCB)
EMISSION DESIGNATOR(S):	251KGXW (Cellular GSM), 248KGXW (PCS GSM) 243KG7W (EDGE850), 245KG7W (EDGE1900) 4M16F9W (Cellular WCDMA), 4M16F9W (PCS WCDMA)
MODE:	GSM/EDGE/WCDMA
FREQUENCY TOLERANCE:	±0.00025 % (2.5 ppm)
Test Device Serial No.:	1 ☐ Production ☒ Pre-Production ☐ Engineering
DATE(S) OF TEST:	May 30, 2007
TEST REPORT S/N:	0705160472.NBZ

Test Facility / Accreditations

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

- PCTEST facility is an FCC registered (PCTEST Reg. No. 90864) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (IC-2451).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.

- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (IC-2451) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

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1.0 INTRODUCTION

1.1 Measurement Procedure

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

Deviation from Measurement Procedure……...None

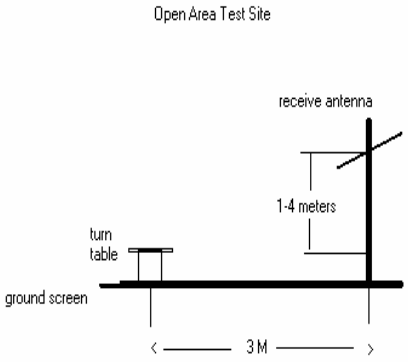

Figure 1-1. Diagram of 3-meter outdoor test range

1.2 Scope

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

1.3 Testing Facility

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

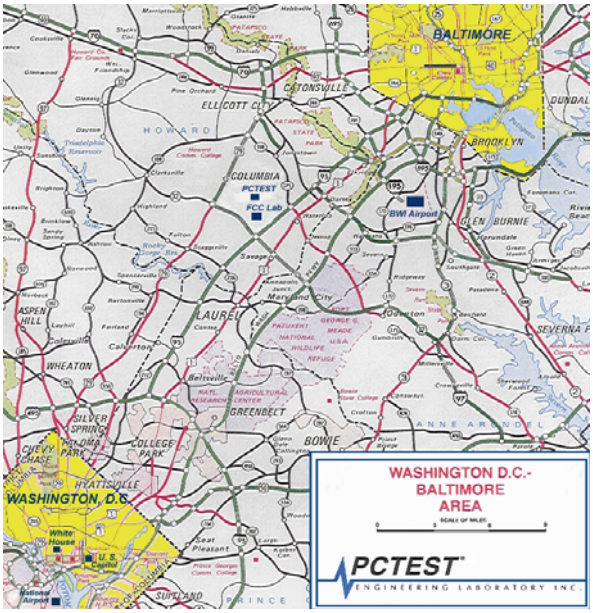

Figure 1-2. Map of the Greater Baltimore and Metropolitan Washington, D.C. area.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Novatel Wireless 850/1900 GSM/WCDMA/EDGE USB Modem FCC ID: NBZNRM-MC950D**. The EUT consisted of the following component(s):

Trade Name / Base Model	FCC ID	Description
Novatel Wireless / Model: MC950D	NBZNRM-MC950D	850/1900 GSM/WCDMA/EDGE USB Modem

Table 2-1. EUT Equipment Description

2.2 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

2.3 Labeling Requirements

Per 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the trade name and FCC ID must be displayed on the device per Section 15.19(b)(2).

Please see attachment for FCC ID label and label location.

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3.0 DESCRIPTION OF TESTS

3.1 Occupied Bandwidth Emission Limits

§2.1049, 22.917(a), 24.238(a)

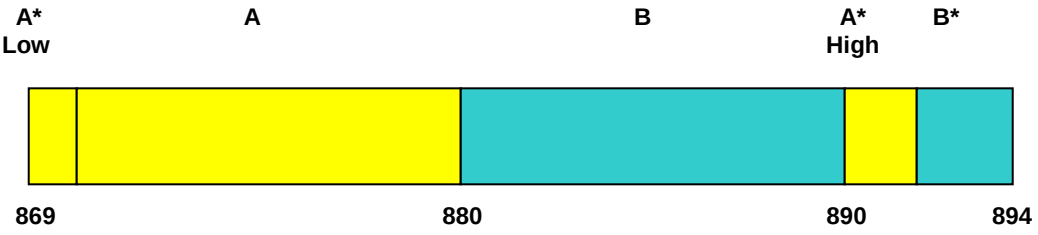
a. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P) dB.

b. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

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

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

3.2 Cellular - Base Frequency Blocks



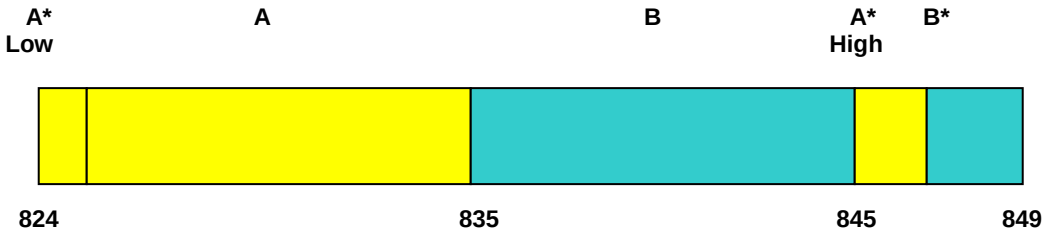
BLOCK 1: 869 – 880 MHz (A* Low + A)

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*)

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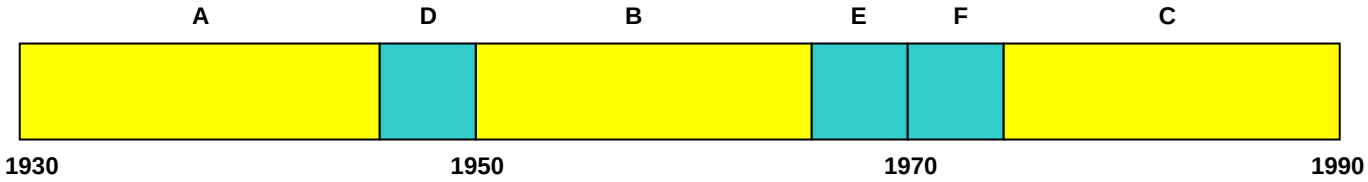
3.4 PCS - Base Frequency Blocks



BLOCK 1: 1930 – 1945 MHz (A)

BLOCK 2: 1945 – 1950 MHz (D)

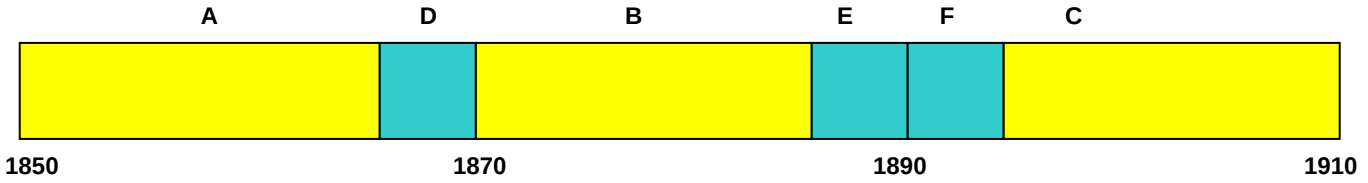
BLOCK 3: 1950 – 1965 MHz (B)

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 Spurious and Harmonic Emissions at Antenna Terminal

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

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

3.7 Radiated Spurious and Harmonic Emissions

§2.1053, 22.917(a), 24.238(a); RSS-129 (8.1.1), RSS-133 (6.5.1(i))

Spurious and harmonic radiated 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. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. 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 configurations and the highest power is reported in WCDMA mode with HSDPA Active at 12.2 kbps RMC and TPC bits all set to "1" and in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band.

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3.8 Frequency Stability / Temperature Variation

§2.1055, 22.355, 24.235; RSS-132 (4.3) / RSS-133 (6.3)

The frequency stability of the transmitter is measured by:

a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

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 is measured at room temperature (20°C to provide a reference).

2. 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 is made within one minute after applying power to the transmitter.

3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

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4.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model / Equipment	Calibration Date	Cal Interval	Calibration Due	Serial No.
Agilent	E4407B ESA Spectrum Analyzer	04/29/07	Annual	04/28/08	US39210313
Agilent	E5515C Wireless Communications Test Set	07/27/06	Biennial	07/26/08	GB41450275
Agilent	E5515C Wireless Communications Test Set	10/06/06	Biennial	10/05/08	GB43193972
Agilent	E4432B ESG-D Series Signal Generator	08/08/06	Annual	08/08/07	US40053896
Agilent	8648D (9kHz-4GHz) Signal Generator	10/01/06	Annual	10/01/07	3613A00315
Agilent	E5515C Wireless Communications Test Set	10/26/06	Biennial	10/25/08	GB46310798
EMCO	Model 3115 (1-18GHz) Horn Antenna	08/24/06	Biennial	08/23/08	9203-2178
EMCO	Model 3115 (1-18GHz) Horn Antenna	08/25/06	Biennial	08/24/08	9704-5182
Rohde & Schwarz	CMU200 Base Station Simulator	11/08/06	Annual	11/08/07	107826
Rohde & Schwarz	CMU200 Base Station Simulator	07/26/06	Annual	07/26/07	833855/010
Rohde & Schwarz	CMU200 Base Station Simulator	05/24/07	Annual	05/23/08	836371/079
Agilent	HP 8566B (100Hz–22GHz) Spectrum Analyzer	12/21/06	Annual	12/21/07	3638A08713
Agilent	E4448A (3Hz-50GHz) Spectrum Analyzer	09/22/06	Annual	09/22/07	US42510244
Agilent	E8257D (250kHz-20GHz) Signal Generator	03/08/07	Annual	03/07/08	MY45470194
Gigatronics	80701A (0.05-18GHz) Power Sensor	08/04/06	Annual	08/04/07	1835299
Agilent	HP 85650A Quasi-Peak Adapter	12/21/06	Annual	12/21/07	2043A00301
Agilent	HP 8449B (1-26.5GHz) Pre-Amplifier	12/12/06	Annual	12/12/07	3008A00985
Agilent	HP 85650A Quasi-Peak Adapter	12/21/06	Annual	12/21/07	2043A00301
Agilent	HP 8449B (1-26.5GHz) Pre-Amplifier	12/12/06	Annual	12/12/07	3008A00985
Agilent	HP 11713A Attenuation/Switch Driver	12/12/06	Annual	12/12/07	N/A
Agilent	HP 85685A (20Hz-2GHz) Preselector	12/12/06	Annual	12/12/07	N/A
Agilent	HP 8566B Opt. 462 Impulse Bandwidth	12/12/06	Annual	12/12/07	3701A22204
EMCO	3115 (1-18GHz) Horn Antenna	08/25/05	Biennial	08/25/07	9205-3874
Compliance Design	A100 Roberts Dipoles	08/31/05	Biennial	08/31/07	5118
EMCO	Dipole Pair	09/21/06	Biennial	09/20/08	23951
SOLAR	8012-50 LISN (2)	11/18/05	Biennial	11/18/07	0313233, 0310234
K & L	11SH10 Band Pass Filter	N/A	Annual	N/A	1300/4000
K & L	11SH10 Band Pass Filter	N/A	Annual	N/A	4000/12000
Agilent	HP 8495A (0-70dB) DC-4GHz Attenuator	N/A		N/A	N/A
-	263-10dB (DC-18GHz) 10 dB Attenuator	N/A		N/A	N/A
Pasternack	PE2208-6 Bidirectional Coupler	N/A		N/A	N/A
-	No.165 (30MHz - 1000MHz) RG58 Coax Cable	N/A		N/A	N/A
-	No.166 (1000-26500MHz) Microwave RF Cable	N/A		N/A	N/A
-	No.167 (100kHz - 100MHz) RG58 Coax Cable	N/A		N/A	N/A
Rohde & Schwarz	NRVD Dual Channel Power Meter	12/11/06	Biennial	12/10/08	101695
Rohde & Schwarz	NRV-Z33 Peak Power Sensor (1mW-20W)	11/28/06	Biennial	11/27/08	100155

Table 4-1. Test Equipment

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5.0 SAMPLE CALCULATIONS

GSM Emission Designator

Emission Designator = 250KGXW

GSM BW = 250 kHz
G = Phase Modulation
X = Cases not otherwise covered
W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M16F9W

WCDMA BW = 4.16 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: GSM Channel 512 PCS Mode 2nd Harmonic (3700.40 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 3700.40 MHz. So 6.1 dB is added to the signal generator reading of –30.9 dBm yielding –24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm – (-24.80) = 50.3 dBc.

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6.0 TEST RESULTS

6.1 Summary

Company Name: Novatel Wireless Inc.

FCC ID: NBZNRM-MC950D

FCC Classification: PCS Licensed Transmitter (PCB)

Mode(s): GSM/EDGE/WCDMA

FCC Part Section(s)	RSS Section	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (TX)						
2.1049, 22.917(a), 24.238(a)	N/A	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 7.0
2.1051, 22.917(a), 24.238(a)	RSS-132 (4.5.1) RSS-133 (6.5.1)	Band Edge / Conducted Spurious Emissions	< 43 + $\log_{10}$ (P[Watts]) at Band Edge and for all out-of-band emissions		PASS	Section 7.0
2.1046	N/A	GSM/WCDMA Conducted Output Power	N/A		PASS	Section 6.2
22.913(a)(2)	RSS-132 (4.4) [SRSP-503(5.1.3)]	Effective Radiated Power	< 7 Watts max. ERP (<6.3 Watts max. ERP (IC))	RADIATED	PASS	Section 6.3
24.232(c)	RSS-133 (6.4) [SRSP-510 (5.1.2)]	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS	Section 6.4
2.1053, 22.917(a), 24.238(a)	RSS-132 (4.5.1) RSS-133 (6.5.1)	Undesirable Emissions	< 43 + $\log_{10}$ (P[Watts]) for all out-of-band emissions		PASS	Sections 6.5, 6.6, 6.7, 6.8
2.1055, 22.355, 24.235	RSS-132 (4.3) RSS-133 (6.3)	Frequency Stability	< 2.5 ppm		PASS	Sections 6.9, 6.10, 6.11, 6.12
RECEIVER MODE (RX) / DIGITAL EMISSIONS						
15.107	RSS-Gen (7.2.2)	AC Conducted Emissions 150kHz – 30MHz	< FCC 15.107 limits or < RSS-Gen table 2 limits	LINE CONDUCTED	PASS	Pt. 15B Test Report
15.109	RSS-132 (4.6) RSS-133(6.7(a) [RSS-Gen (7.2.2)] RSS-210 (7.3)	General Field Strength Limits (Restricted Bands and Radiated Emissions Limits)	< FCC 15.109 limits or < RSS-210 table 3 limits	RADIATED (30MHz-1GHz) (1-25 GHz)	PASS	Pt. 15B Test Report
RF EXPOSURE (SAR)						
2.1091 / 2.1093	RSS-102	SAR Test	1.6 W/kg (SAR Limit)	SAR	PASS	SAR Report

Table 6-1. Summary of Test Results

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6.2 Conducted Output Power

§2.1046

A base station simulator (Rhode and Schwartz Model: CMU200) was used to establish communication with the **Novatel Wireless 850/1900 GSM/WCDMA/EDGE USB Modem FCC ID: NBZNRM-MC950D**. The base station simulator parameters were set to produce the maximum power from the EUT. This device was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Active at 12.2 kbps RMC and TPC bits all set to "1" and in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band.

Band	Channel	GSM / GPRS		EDGE
		Power Control Level	Conducted Power	Conducted Power
			[dBm]	[dBm]
Cellular	128	5	32.40	27.40
	190	5	32.30	27.40
	251	5	32.10	27.10
PCS	512	0	29.75	27.61
	661	0	29.75	27.73
	810	0	29.60	27.50

Table 6-2. GSM Conducted Output Powers

Band	Channel	HSDPA Inactive 12.2 kbps RMC	HSDPA Active 12.2 kbps RMC
		[dBm]	[dBm]
Cellular	4132	24.91	24.93
	4183	24.35	24.36
	4233	24.61	24.66
PCS	9262	23.96	23.97
	9400	23.78	23.82
	9538	23.77	23.78

Table 6-3. WCDMA Conducted Output Powers

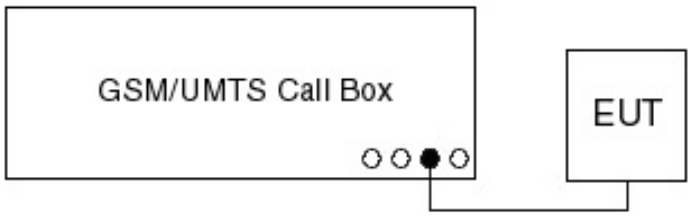

Figure 6-1. GSM/WCDMA Conducted Power Test Setup Diagram

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6.3 Effective Radiated Power Output Data

§22.913(a)(2); RSS-132 (4.4) [SRSP-503(5.1.3)]

POWER: PCL "5" (Cellular GSM Mode)

Frequency [MHz]	Mode	Measured Level [dBm]	Substitute Level [dBm]	Antenna Gain [dBd]	Pol [H/V]	ERP [dBm]	ERP [Watts]	Battery Type
824.20	GSM850	-4.100	36.10	-1.65	H	34.45	2.786	Standard
836.60	GSM850	-4.200	36.00	-1.65	H	34.35	2.723	Standard
848.80	GSM850	-4.700	35.50	-1.65	H	33.85	2.427	Standard
824.20	EDGE850	-9.100	31.10	-1.65	H	29.45	0.881	Standard

Table 6-4. Effective Radiated Power Output Data (GSM)

POWER: All "1" bits (Cellular WCDMA Mode)

Frequency [MHz]	Measured Level [dBm]	Substitute Level [dBm]	Antenna Gain [dBd]	Pol [H/V]	ERP [dBm]	ERP [Watts]	Battery Type
826.40	-11.500	28.70	-1.65	H	27.05	0.507	Standard
836.60	-12.100	28.10	-1.65	H	26.45	0.442	Standard
846.60	-11.800	28.40	-1.65	H	26.75	0.473	Standard

Table 6-5. Effective Radiated Power Output Data (WCDMA)

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 configurations and the highest power is reported in WCDMA mode with HSDPA Active at 12.2 kbps RMC and TPC bits all set to "1" and in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band. This unit was tested with its standard battery.

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6.4 Equivalent Isotropic Radiated Power Output Data

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

POWER: PCL "0" (PCS GSM Mode)

Frequency [MHz]	Mode	Measured Level [dBm]	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Battery Type
1850.20	GSM1900	-9.600	24.70	8.00	V	32.70	1.862	Standard
1880.00	GSM1900	-9.400	24.90	8.00	V	32.90	1.950	Standard
1909.80	GSM1900	-10.100	24.20	8.00	V	32.20	1.660	Standard
1880.00	EDGE1900	-12.400	21.90	8.00	V	29.90	0.977	Standard

Table 6-6. Equivalent Isotropic Radiated Power Output Data (GSM)

POWER: All "1" bits (PCS WCDMA Mode)

Frequency [MHz]	Measured Level [dBm]	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Battery Type
1852.40	-15.700	18.60	8.00	V	26.60	0.457	Standard
1880.00	-15.900	18.40	8.00	V	26.40	0.437	Standard
1907.60	-16.200	18.10	8.00	V	26.10	0.407	Standard

Table 6-7. Equivalent Isotropic Radiated Power Output Data (WCDMA)

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 configurations and the highest power is reported in WCDMA mode with HSDPA Active at 12.2 kbps RMC and TPC bits all set to "1" and in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band. This unit was tested with its standard battery.

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6.5 Cellular GSM Radiated Measurements

§2.1053, 22.917(a); RSS-132 (4.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	824.20	MHz		
CHANNEL:	128			
MEASURED OUTPUT POWER:	34.450	dBm	=	2.786 W
MODULATION SIGNAL:	GSM (Internal)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	47.45	dBc	

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1648.40	-52.03	6.32	-45.72	H	80.2
2472.60	-60.79	7.69	-53.10	H	87.6
3296.80	-57.72	7.83	-49.89	H	84.3
4121.00	-92.00	7.83	-84.17	H	118.6
4945.20	-91.32	8.62	-82.70	H	117.1

Table 6-8. Radiated Spurious Data (Cellular GSM Mode – Ch. 128)

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 configurations and the highest power is reported in WCDMA mode with HSDPA Active at 12.2 kbps RMC and TPC bits all set to "1" and in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band. This unit was tested with its standard battery.

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Cellular GSM Radiated Measurements (Cont'd)

§2.1053, 22.917(a); RSS-132 (4.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	836.60	MHz		
CHANNEL:	190			
MEASURED OUTPUT POWER:	34.450	dBm	=	2.786 W
MODULATION SIGNAL:	GSM (Internal)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	47.45	dBc	

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1673.20	-53.12	6.33	-46.79	H	81.2
2509.80	-97.70	7.75	-89.95	H	124.4
3346.40	-94.56	7.86	-86.70	H	121.1
4183.00	-92.12	8.07	-84.05	H	118.5
5019.60	-91.09	8.55	-82.55	H	117.0

Table 6-9. Radiated Spurious Data (Cellular GSM Mode – Ch. 190)

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 configurations and the highest power is reported in WCDMA mode with HSDPA Active at 12.2 kbps RMC and TPC bits all set to "1" and in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band. This unit was tested with its standard battery.

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Cellular GSM Radiated Measurements (Cont'd)

§2.1053, 22.917(a); RSS-132 (4.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	848.80	MHz		
CHANNEL:	251			
MEASURED OUTPUT POWER:	34.450	dBm	=	2.786 W
MODULATION SIGNAL:	GSM (Internal)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	47.45	dBc	

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1697.60	-49.80	6.34	-43.47	H	77.9
2546.40	-77.54	7.74	-69.80	H	104.3
3395.20	-94.40	7.89	-86.51	H	121.0
4244.00	-92.24	8.31	-83.93	H	118.4
5092.80	-90.84	8.53	-82.31	H	116.8

Table 6-10. Radiated Spurious Data (Cellular GSM Mode – Ch. 251)

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 configurations and the highest power is reported in WCDMA mode with HSDPA Active at 12.2 kbps RMC and TPC bits all set to "1" and in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band. This unit was tested with its standard battery.

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6.6 Cellular WCDMA Radiated Measurements

§2.1053, 22.917(a); RSS-132 (4.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	826.40	MHz		
CHANNEL:	4132			
MEASURED OUTPUT POWER:	27.050	dBm	=	0.507 W
MODULATION SIGNAL:	WCDMA (Internal)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	40.05	dBc	

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1652.80	-79.01	6.32	-72.70	H	99.7
2479.20	-89.78	7.70	-82.07	H	109.1
3305.60	-94.69	7.84	-86.86	H	113.9
4132.00	-92.02	7.87	-84.15	H	111.2
4958.40	-91.28	8.61	-82.68	H	109.7

Table 6-11. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4132)

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 configurations and the highest power is reported in WCDMA mode with HSDPA Active at 12.2 kbps RMC and TPC bits all set to "1" and in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band. This unit was tested with its standard battery.

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Cellular WCDMA Radiated Measurements (Cont'd)

§2.1053, 22.917(a); RSS-132 (4.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	836.60	MHz		
CHANNEL:	4183			
MEASURED OUTPUT POWER:	27.050	dBm	=	0.507 W
MODULATION SIGNAL:	WCDMA (Internal)			
DISTANCE:	3	meters		
LIMIT:	$43 + 10 \log_{10}$ (W) =	40.05	dBc	

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1673.20	-80.93	6.32	-74.61	H	101.7
2509.80	-90.72	7.75	-82.97	H	110.0
3346.40	-94.58	7.86	-86.72	H	113.8
4183.00	-92.11	8.04	-84.06	H	111.1
5019.60	-91.12	8.55	-82.58	H	109.6

Table 6-12. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4183)

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 configurations and the highest power is reported in WCDMA mode with HSDPA Active at 12.2 kbps RMC and TPC bits all set to "1" and in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band. This unit was tested with its standard battery.

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Cellular WCDMA Radiated Measurements (Cont'd)

§2.1053, 22.917(a); RSS-132 (4.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	846.60	MHz		
CHANNEL:	4233			
MEASURED OUTPUT POWER:	27.050	dBm	=	0.507 W
MODULATION SIGNAL:	WCDMA (Internal)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	40.05	dBc	

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1693.20	-79.82	6.33	-73.49	H	100.5
2539.80	-90.57	7.74	-82.83	H	109.9
3386.40	-94.43	7.89	-86.55	H	113.6
4233.00	-92.22	8.26	-83.95	H	111.0
5079.60	-90.88	8.53	-82.35	H	109.4

Table 6-13. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4233)

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 configurations and the highest power is reported in WCDMA mode with HSDPA Active at 12.2 kbps RMC and TPC bits all set to "1" and in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band. This unit was tested with its standard battery.

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6.7 PCS GSM Radiated Measurements

§2.1053, 24.238(a); RSS-133 (6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1850.20	MHz		
CHANNEL:	512			
MEASURED OUTPUT POWER:	32.900	dBm	=	1.950 W
MODULATION SIGNAL:	GSM (Internal)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	45.90	dBc	

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3700.40	-54.91	9.85	-45.06	V	78.0
5550.60	-89.47	10.72	-78.75	V	111.7
7400.80	-85.96	11.60	-74.36	V	107.3
9251.00	-81.72	11.36	-70.37	V	103.3
11101.20	-81.75	12.74	-69.01	V	101.9

Table 6-14. Radiated Spurious Data (PCS GSM Mode – Ch. 512)

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 configurations and the highest power is reported in WCDMA mode with HSDPA Active at 12.2 kbps RMC and TPC bits all set to "1" and in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band.This unit was tested with its standard battery.

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PCS GSM Radiated Measurements (Cont'd)

§2.1053, 24.238(a); RSS-133 (6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1880.00	MHz		
CHANNEL:	661			
MEASURED OUTPUT POWER:	32.900	dBm	=	1.950 W
MODULATION SIGNAL:	GSM (Internal)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	45.90	dBc	

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3760.00	-53.03	9.78	-43.26	V	76.2
5640.00	-89.41	10.92	-78.49	V	111.4
7520.00	-85.66	11.66	-74.00	V	106.9
9400.00	-81.80	11.56	-70.24	V	103.1
11280.00	-81.38	12.63	-68.75	V	101.6

Table 6-15. Radiated Spurious Data (PCS GSM Mode – Ch. 661)

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 configurations and the highest power is reported in WCDMA mode with HSDPA Active at 12.2 kbps RMC and TPC bits all set to "1" and in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band. This unit was tested with its standard battery.

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PCS GSM Radiated Measurements (Cont'd)

§2.1053, 24.238(a); RSS-133 (6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1909.80	MHz		
CHANNEL:	810			
MEASURED OUTPUT POWER:	32.900	dBm	=	1.950 W
MODULATION SIGNAL:	GSM (Internal)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	45.90	dBc	

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3819.60	-48.36	9.71	-38.65	V	71.6
5729.40	-89.35	11.12	-78.23	V	111.1
7639.20	-85.09	11.44	-73.65	V	106.5
9549.00	-81.84	11.73	-70.11	V	103.0
11458.80	-81.00	12.52	-68.48	V	101.4

Table 6-16. Radiated Spurious Data (PCS GSM Mode – Ch. 810)

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 configurations and the highest power is reported in WCDMA mode with HSDPA Active at 12.2 kbps RMC and TPC bits all set to "1" and in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band. This unit was tested with its standard battery.

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6.8 PCS WCDMA Radiated Measurements

§2.1053, 24.238(a); RSS-133 (6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1852.40	MHz		
CHANNEL:	9262			
MEASURED OUTPUT POWER:	26.600	dBm	=	0.457 W
MODULATION SIGNAL:	WCDMA (Internal)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	39.60	dBc	

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3704.80	-76.09	9.84	-66.25	V	92.8
5557.20	-89.46	10.73	-78.73	V	105.3
7409.60	-85.95	11.61	-74.33	V	100.9
9262.00	-81.73	11.37	-70.36	V	97.0
11114.40	-81.72	12.73	-68.99	V	95.6

Table 6-17. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9262)

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 configurations and the highest power is reported in WCDMA mode with HSDPA Active at 12.2 kbps RMC and TPC bits all set to "1" and in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band. This unit was tested with its standard battery.

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PCS WCDMA Radiated Measurements (Cont'd)

§2.1053, 24.238(a); RSS-133 (6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1880.00	MHz		
CHANNEL:	9400			
MEASURED OUTPUT POWER:	26.600	dBm	=	0.457 W
MODULATION SIGNAL:	WCDMA (Internal)			
DISTANCE:	3	meters		
LIMIT:	$43 + 10 \log_{10}$ (W) =	39.60	dBc	

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3760.00	-74.83	9.78	-65.06	V	91.7
5640.00	-89.41	10.92	-78.49	V	105.1
7520.00	-85.66	11.66	-74.00	V	100.6
9400.00	-81.80	11.56	-70.24	V	96.8
11280.00	-81.38	12.63	-68.75	V	95.3

Table 6-18. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9400)

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 configurations and the highest power is reported in WCDMA mode with HSDPA Active at 12.2 kbps RMC and TPC bits all set to "1" and in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band. This unit was tested with its standard battery.

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PCS WCDMA Radiated Measurements (Cont'd)

§2.1053, 24.238(a); RSS-133 (6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1907.60	MHz		
CHANNEL:	9538			
MEASURED OUTPUT POWER:	26.600	dBm	=	0.457 W
MODULATION SIGNAL:	WCDMA (Internal)			
DISTANCE:	3	meters		
LIMIT:	$43 + 10 \log_{10}$ (W) =	39.60	dBc	

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3815.20	-76.58	9.71	-66.87	V	93.5
5722.80	-89.36	11.10	-78.25	V	104.9
7630.40	-85.13	11.46	-73.67	V	100.3
9538.00	-81.84	11.72	-70.12	V	96.7
11445.60	-81.03	12.53	-68.50	V	95.1

Table 6-19. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9538)

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 configurations and the highest power is reported in WCDMA mode with HSDPA Active at 12.2 kbps RMC and TPC bits all set to "1" and in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band. This unit was tested with its standard battery.

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6.9 Cellular GSM Frequency Stability Measurements

§2.1055, 22.355; RSS-132 (4.3)

Operating Frequency:	836600000	Hz
Channel:	PDTCH=190	
Reference Voltage:	5.0	Vdc
Deviation Limit:	+/- 0.00025/2.5	%/ppm

Voltage	Power	Temp	Tx Frequency	Deviation	Offset
(%)	(Vdc)	(C)	(Hz)	(%)	(Hz)
100%	5.0	25 (Ref)	836,599,994.42	0.0000000	-5.58
100%		-20	836,600,006.77	0.0000124	6.77
100%		-10	836,600,010.32	0.0000159	10.32
100%		0	836,600,034.14	0.0000397	34.14
100%		10	836,600,009.05	0.0000146	9.05
100%		25	836,599,992.54	-0.0000019	-7.46
100%		30	836,599,983.44	-0.0000110	-16.56
100%		40	836,599,993.61	-0.0000008	-6.39
100%		50	836,600,006.88	0.0000125	6.88
100%		60	836,600,016.56	0.0000221	16.56
90%	4.5	25	836,600,003.08	0.0000087	3.08
110%	5.5	25	836,599,994.91	0.0000005	-5.09

Table 6-20. Frequency Stability Data (Cellular GSM Mode – Ch. 190)

Note: This unit was tested with its standard battery.

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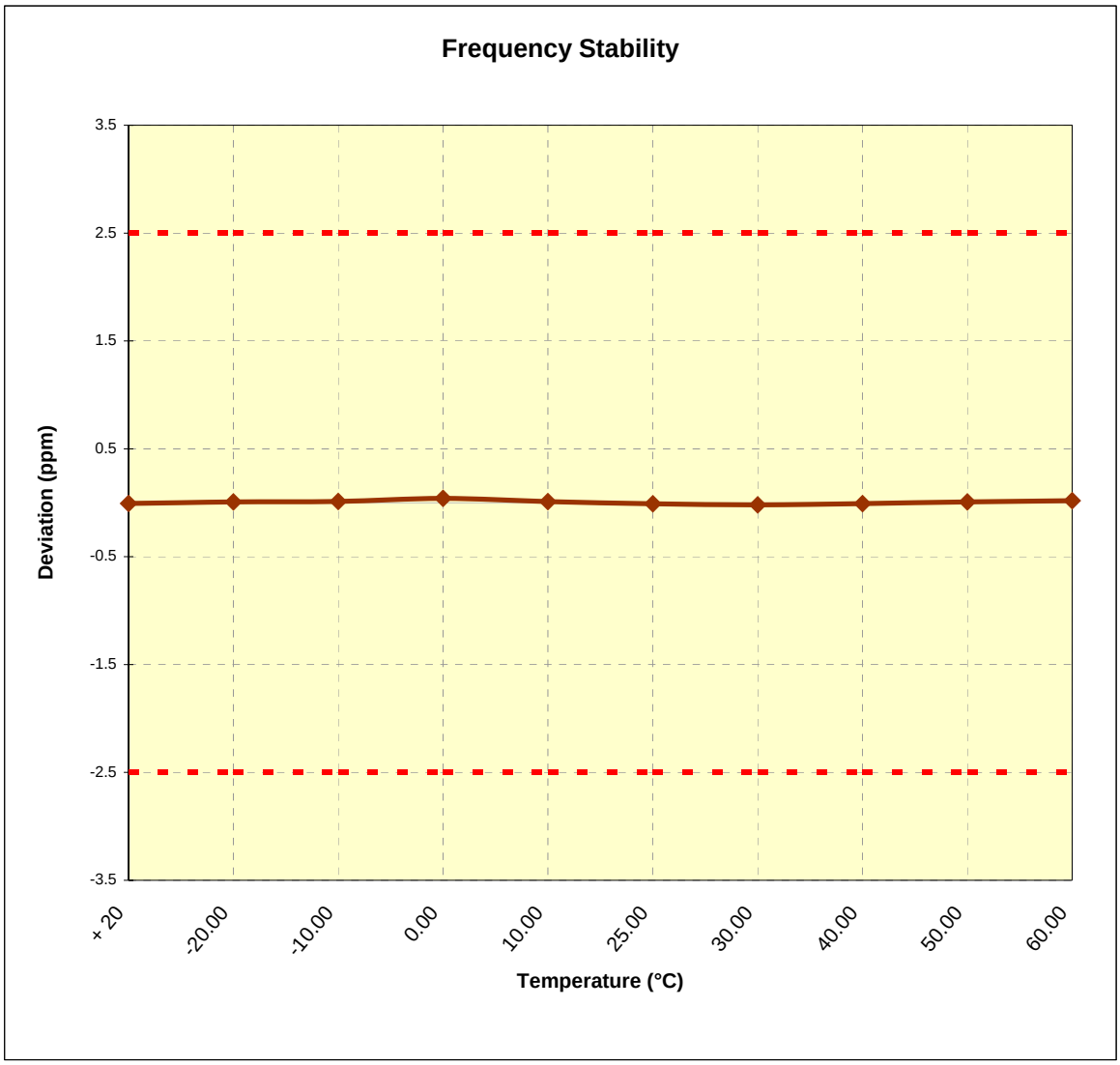
Cellular GSM Frequency Stability Measurements (Cont'd)

§2.1055, 22.355; RSS-132 (4.3)



Plot 6-1. Frequency Stability Graph (Cellular GSM Mode – Ch. 190)

Note: This unit was tested with its standard battery.

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6.10 Cellular WCDMA Frequency Stability Measurements

§2.1055, 22.355; RSS-132 (4.3)

Operating Frequency:	836400000	Hz
Channel:	ULCH=4182, DLCH=4407	
Reference Voltage:	5.0	Vdc
Deviation Limit:	+/- 0.00025/2.5	%/ppm

Voltage (%)	Power (Vdc)	Temp (C)	Tx Frequency (Hz)	Deviation (%)	Offset (Hz)
100%	5.0	25 (Ref)	836,400,013.06	0.0000000	13.06
100%		-20	836,400,010.27	-0.0000028	10.27
100%		-10	836,400,007.88	-0.0000052	7.88
100%		0	836,400,029.84	0.0000168	29.84
100%		10	836,400,014.08	0.0000010	14.08
100%		25	836,400,015.30	0.0000022	15.30
100%		30	836,400,019.70	0.0000066	19.70
100%		40	836,399,985.74	-0.0000273	-14.26
100%		50	836,400,015.61	0.0000026	15.61
100%		60	836,400,013.07	0.0000000	13.07
90%	4.5	25	836,399,986.52	-0.0000265	-13.48
110%	5.5	25	836,400,013.34	0.0000003	13.34

Table 6-21. Frequency Stability Data (Cellular WCDMA Mode – Ch. 4182)

Note: This unit was tested with its standard battery.

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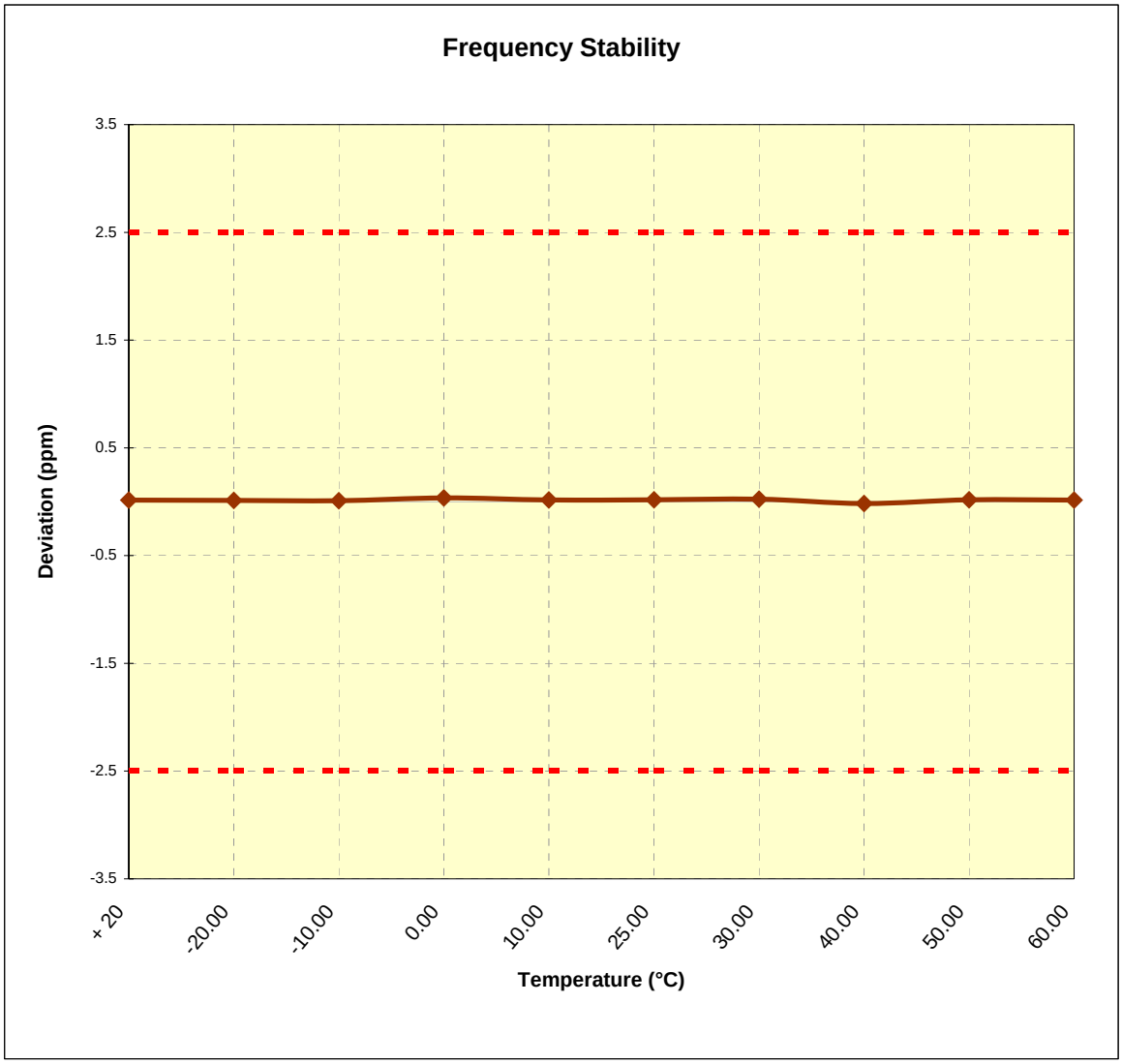
Cellular WCDMA Frequency Stability Measurements (Cont'd)

§2.1055, 22.355; RSS-132 (4.3)



Plot 6-2. Frequency Stability Graph (Cellular WCDMA Mode – Ch. 4182)

Note:

This unit was tested with its standard battery.

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6.11 PCS GSM Frequency Stability Measurements

§2.1055, 24.235; RSS-133 (6.3)

Operating Frequency:	1880000000	Hz
Channel:	PDTCH=661	
Reference Voltage:	5.0	Vdc
Deviation Limit:	+/- 0.00025/2.5	%/ppm

Voltage	Power	Temp	Tx Frequency	Deviation	Offset
(%)	(Vdc)	(C)	(Hz)	(%)	(Hz)
100%	5.0	25 (Ref)	1,879,999,961.99	0.0000000	-38.01
100%		-20	1,879,999,979.15	0.0000172	-20.85
100%		-10	1,880,000,036.43	0.0000744	36.43
100%		0	1,880,000,013.79	0.0000518	13.79
100%		10	1,879,999,964.29	0.0000023	-35.71
100%		25	1,879,999,959.91	-0.0000021	-40.09
100%		30	1,879,999,968.53	0.0000065	-31.47
100%		40	1,879,999,958.42	-0.0000036	-41.58
100%		50	1,880,000,012.67	0.0000507	12.67
100%		60	1,880,000,022.78	0.0000608	22.78
90%	4.5	25	1,879,999,964.00	0.0000020	-36.00
110%	5.5	25	1,879,999,959.58	-0.0000024	-40.42

Table 6-22. Frequency Stability Data (PCS GSM Mode – Ch. 661)

Note: This unit was tested with its standard battery.

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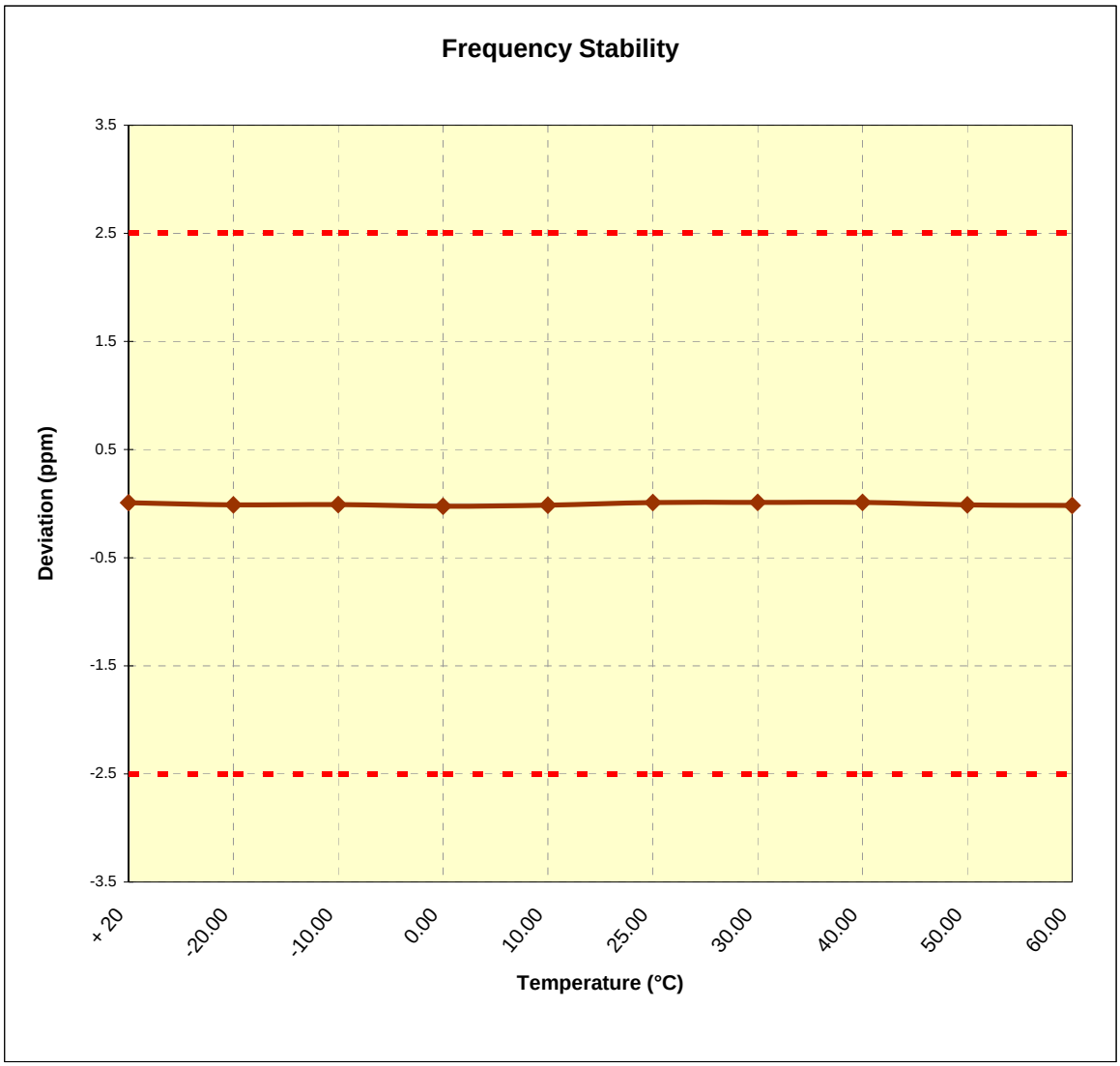
PCS GSM Frequency Stability Measurements (Cont'd)

§2.1055, 24.235; RSS-133 (6.3)



Plot 6-3. Frequency Stability Graph (PCS GSM Mode – Ch. 661)

Note: This unit was tested with its standard battery.

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6.12 PCS WCDMA Frequency Stability Measurements

§2.1055, 24.235; RSS-133 (6.3)

Operating Frequency:	1880000000	Hz
Channel:	ULCH=9400, DLCH=9800	
Reference Voltage:	5.0	Vdc
Deviation Limit:	+/- 0.00025/2.5	%/ppm

Voltage (%)	Power (Vdc)	Temp (C)	Tx Frequency (Hz)	Deviation (%)	Offset (Hz)
100%	5.0	25 (Ref)	1,880,000,017.12	0.0000000	17.12
100%		-20	1,879,999,979.80	-0.0000373	-20.20
100%		-10	1,879,999,984.13	-0.0000330	-15.87
100%		0	1,879,999,953.74	-0.0000634	-46.26
100%		10	1,879,999,972.88	-0.0000442	-27.12
100%		25	1,880,000,018.23	0.0000011	18.23
100%		30	1,880,000,022.79	0.0000057	22.79
100%		40	1,880,000,020.37	0.0000033	20.37
100%		50	1,879,999,978.32	-0.0000388	-21.68
100%		60	1,879,999,967.03	-0.0000501	-32.97
90%	4.5	25	1,879,999,981.24	-0.0000359	-18.76
110%	5.5	25	1,880,000,019.13	0.0000020	19.13

Table 6-23. Frequency Stability Data (PCS WCDMA Mode – Ch. 9400)

Note: This unit was tested with its standard battery.

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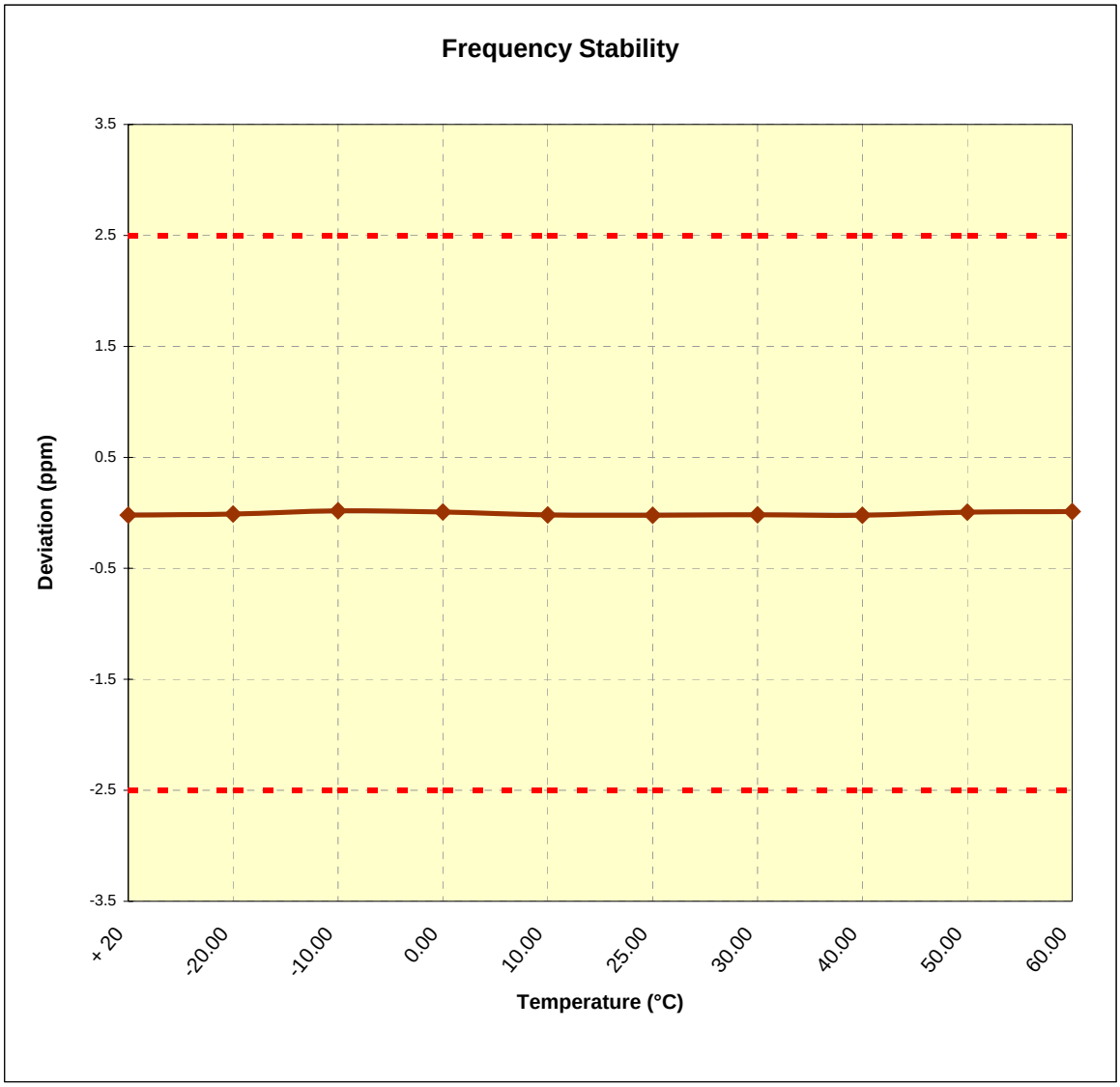
PCS WCDMA Frequency Stability Measurements (Cont'd)

§2.1055, 24.235; RSS-133 (6.3)



Plot 6-4. Frequency Stability Graph (PCS WCDMA Mode – Ch. 9400)

Note:

This unit was tested with its standard battery.

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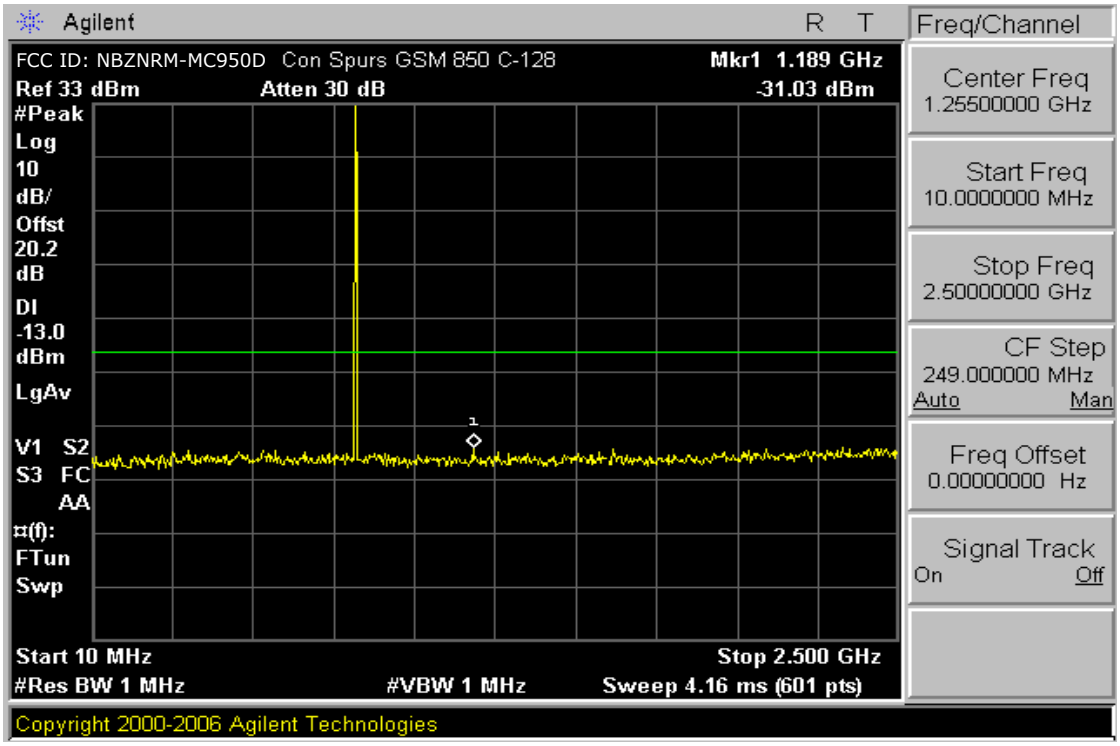
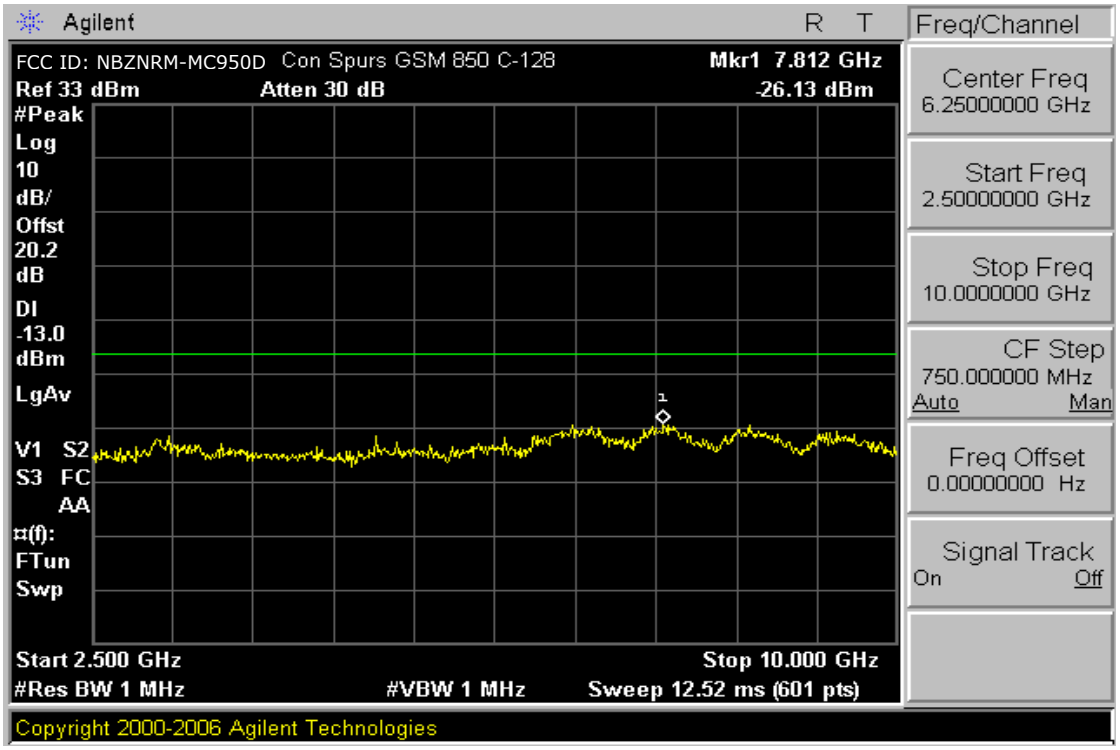
7.0 PLOTS OF EMISSIONS



Plot 7-1. Conducted Spurious Plot (Cellular GSM Mode – Ch. 128)



Plot 7-2. Conducted Spurious Plot (Cellular GSM Mode – Ch. 128)

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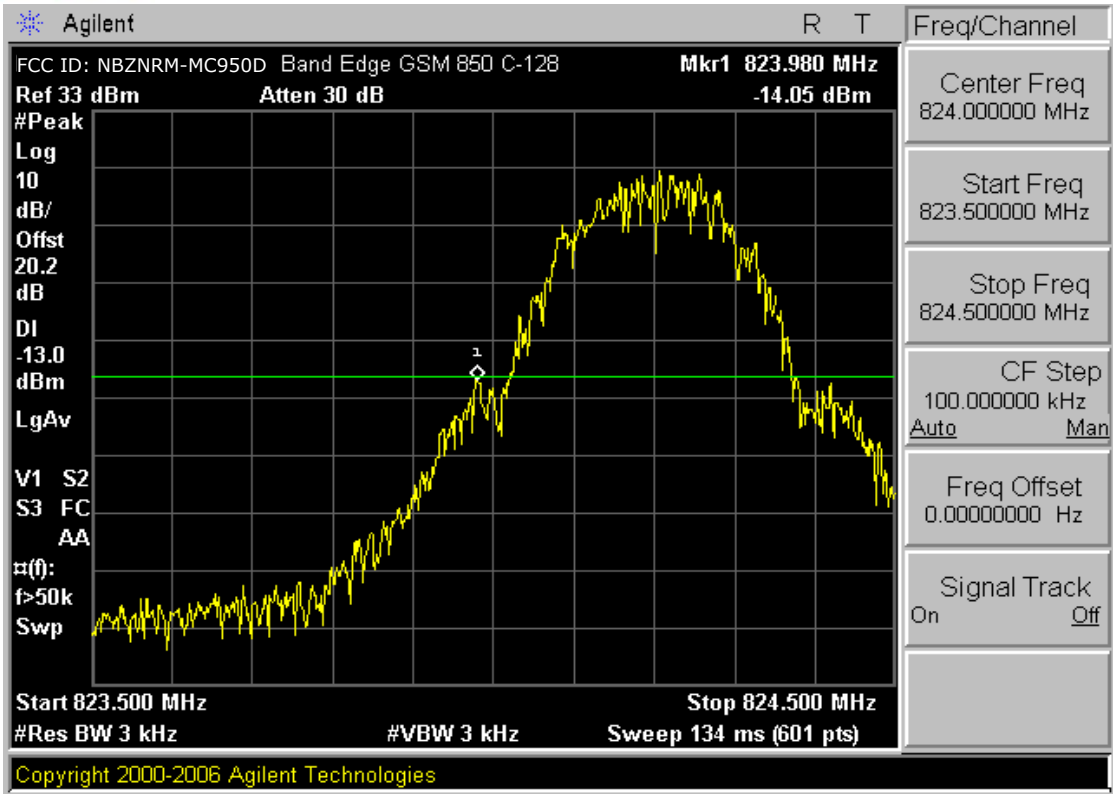
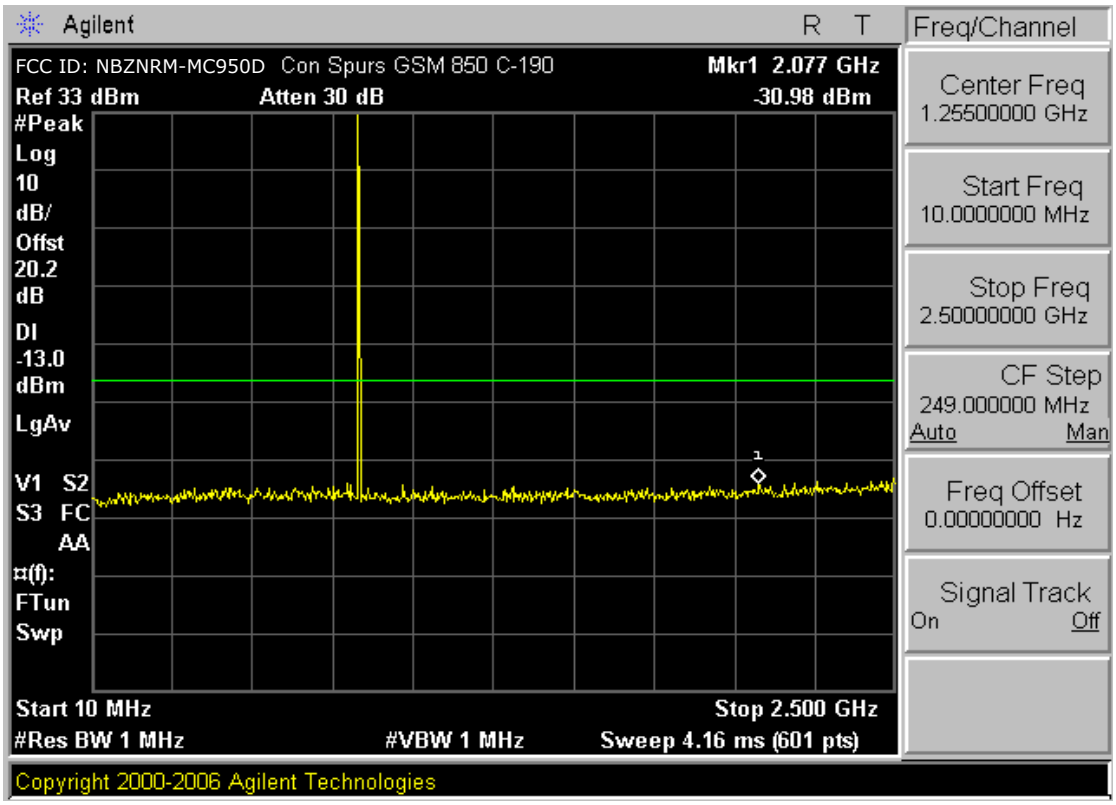


Plot 7-3. Band Edge Plot (Cellular GSM Mode – Ch. 128)



Plot 7-4. Conducted Spurious (Cellular GSM Mode – Ch. 190)

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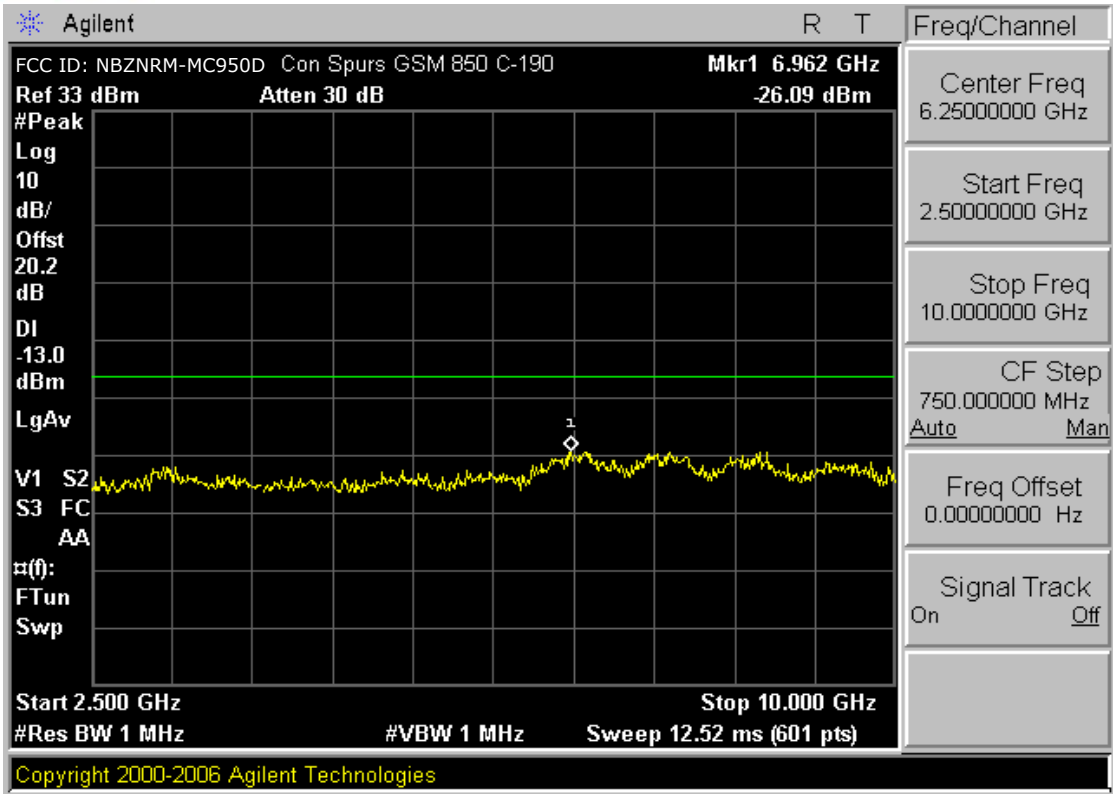
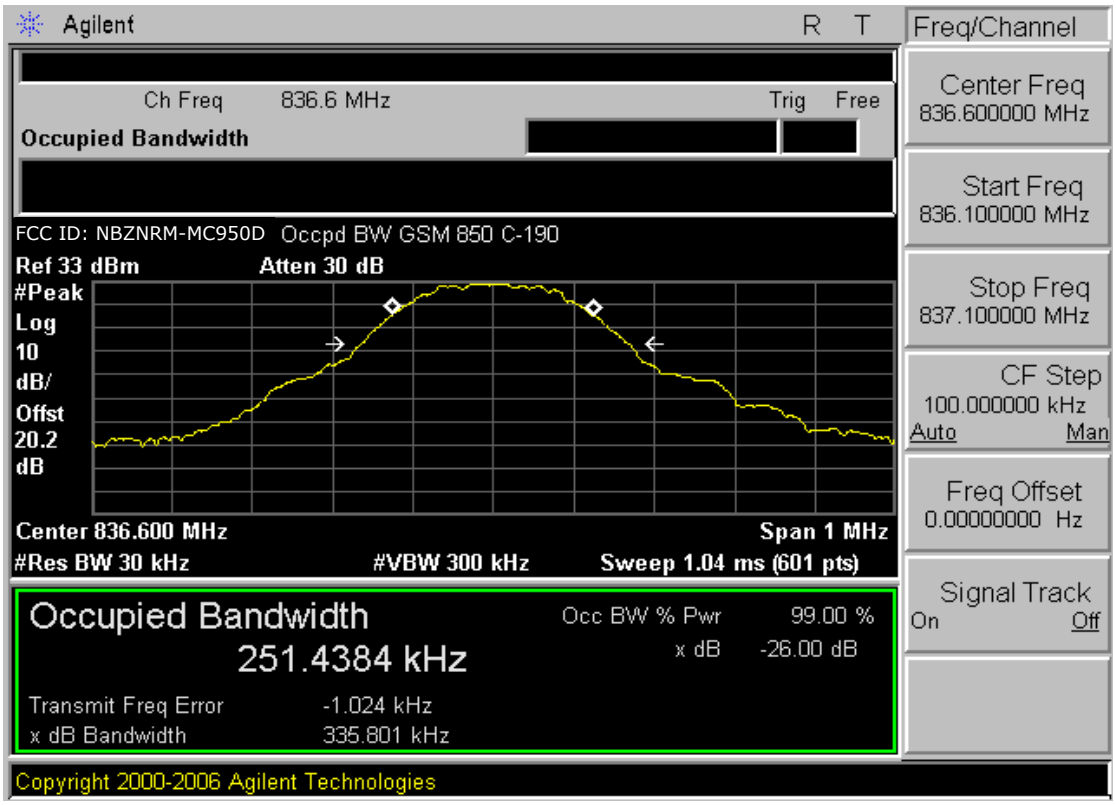


Plot 7-5. Conducted Spurious Plot (Cellular GSM Mode – Ch. 190)



Plot 7-6. Occupied Bandwidth Plot (Cellular GSM Mode – Ch. 190)

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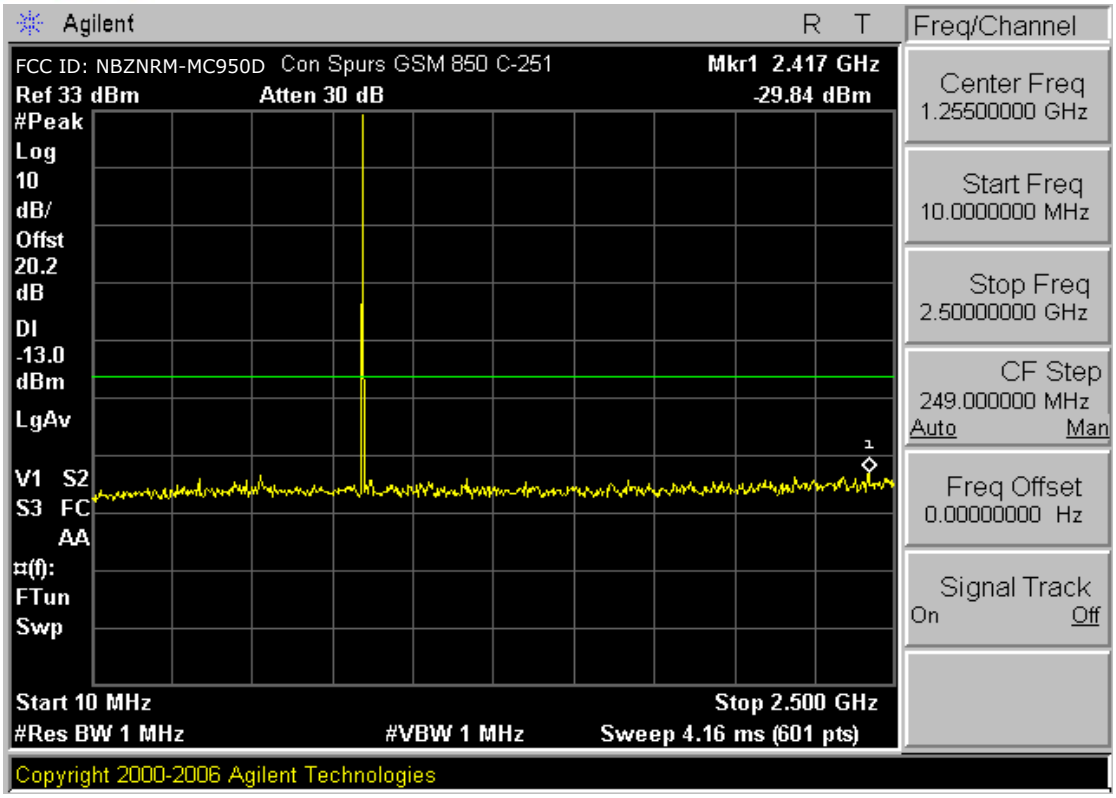
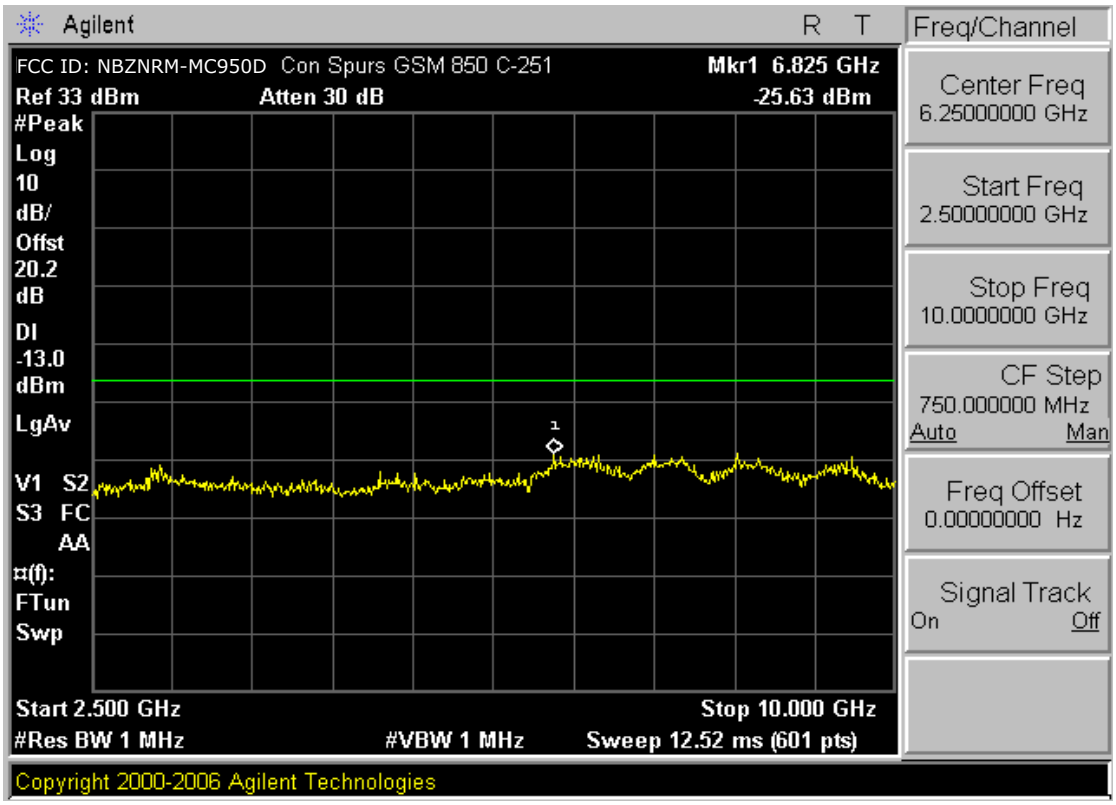


Plot 7-7. Conducted Spurious Plot (Cellular GSM Mode – Ch. 251)



Plot 7-8. Conducted Spurious Plot (Cellular GSM Mode – Ch. 251)

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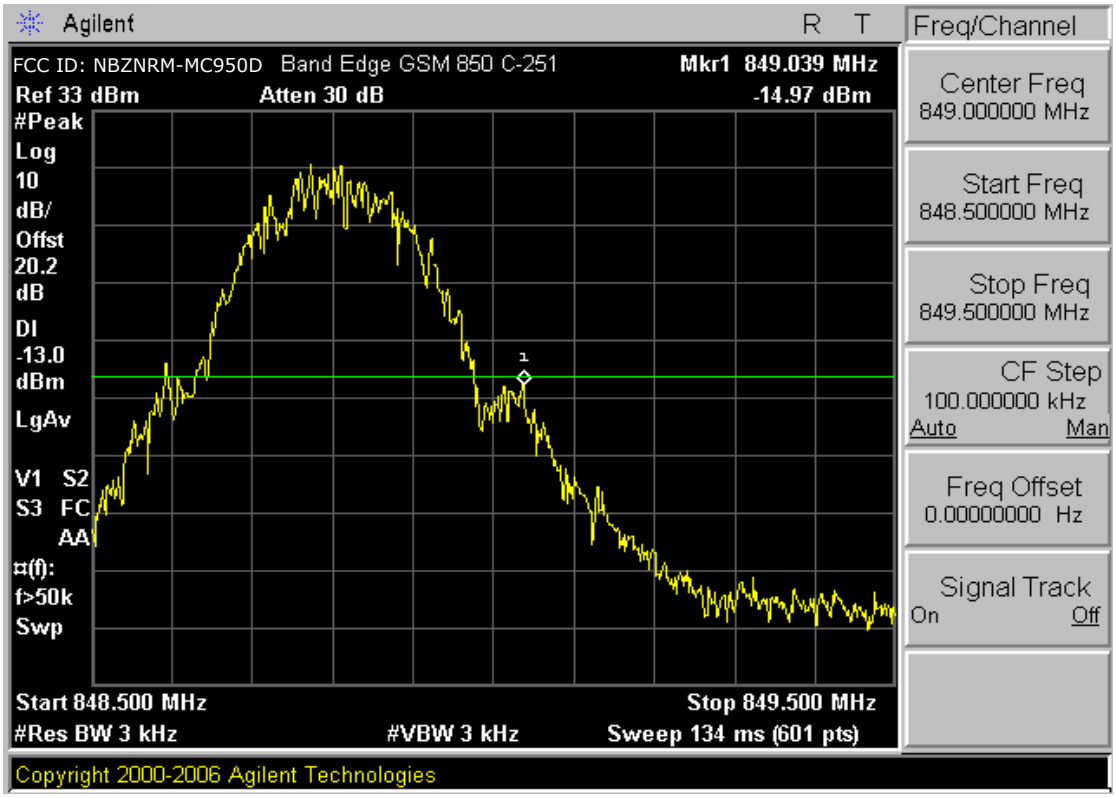
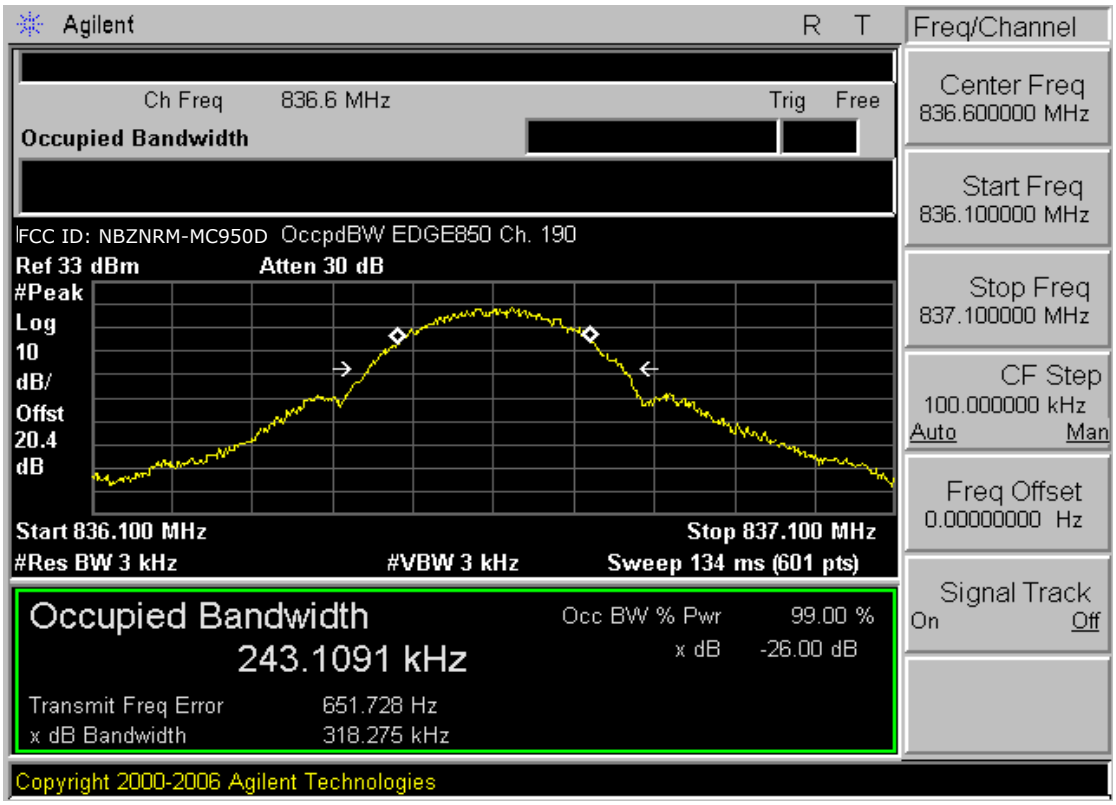


Plot 7-9. Band Edge Plot (Cellular GSM Mode – Ch. 251)



Plot 7-10. Occupied Bandwidth Plot (EDGE850 Mode – Ch. 190)

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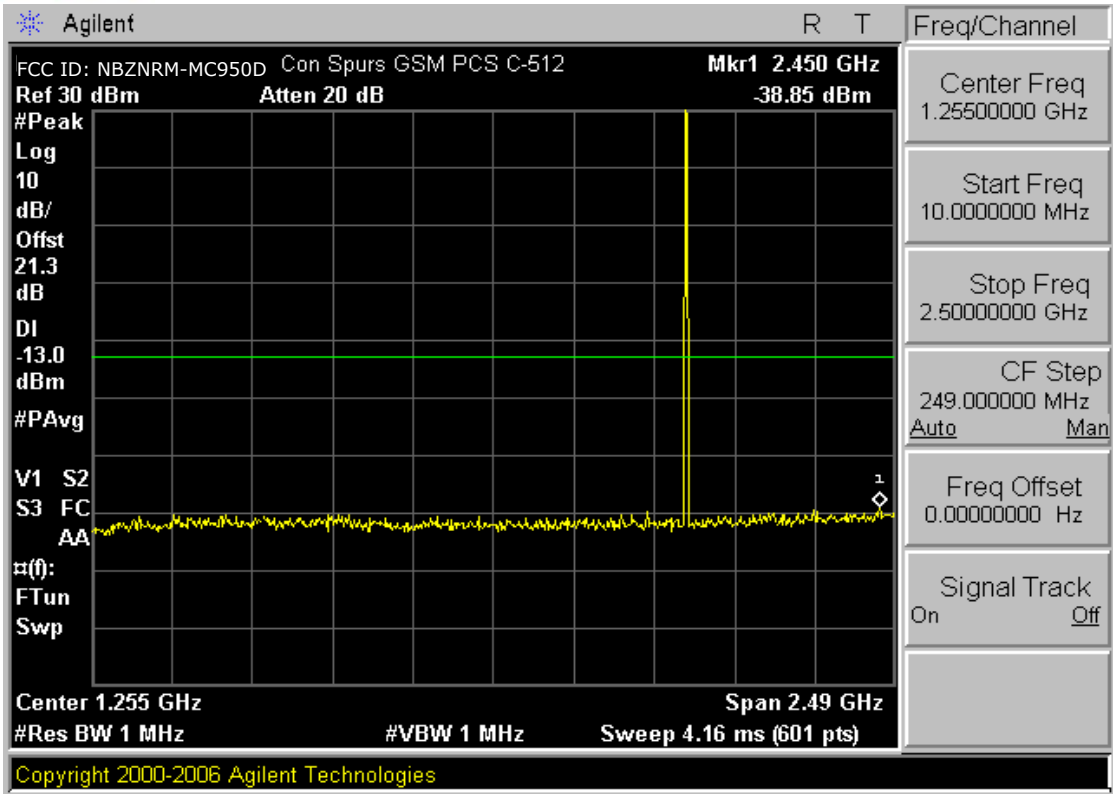
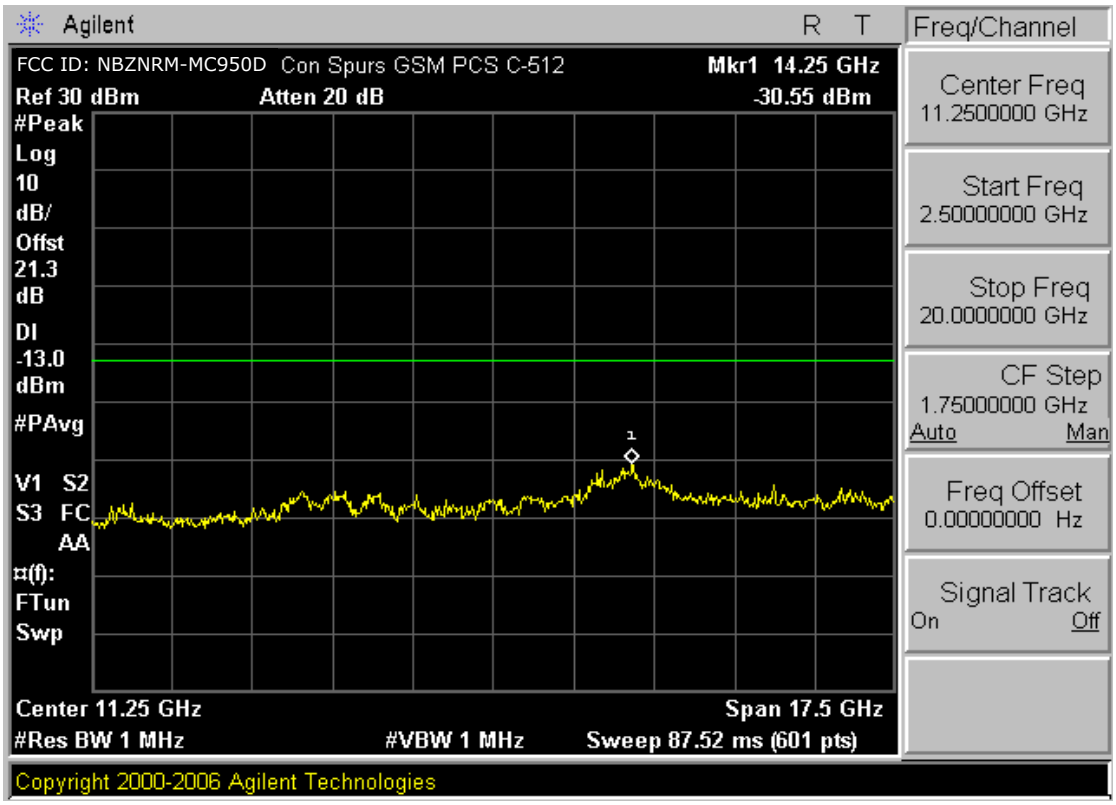


Plot 7-11. Conducted Spurious Plot (PCS GSM Mode – Ch. 512)



Plot 7-12. Conducted Spurious Plot (PCS GSM Mode – Ch. 512)

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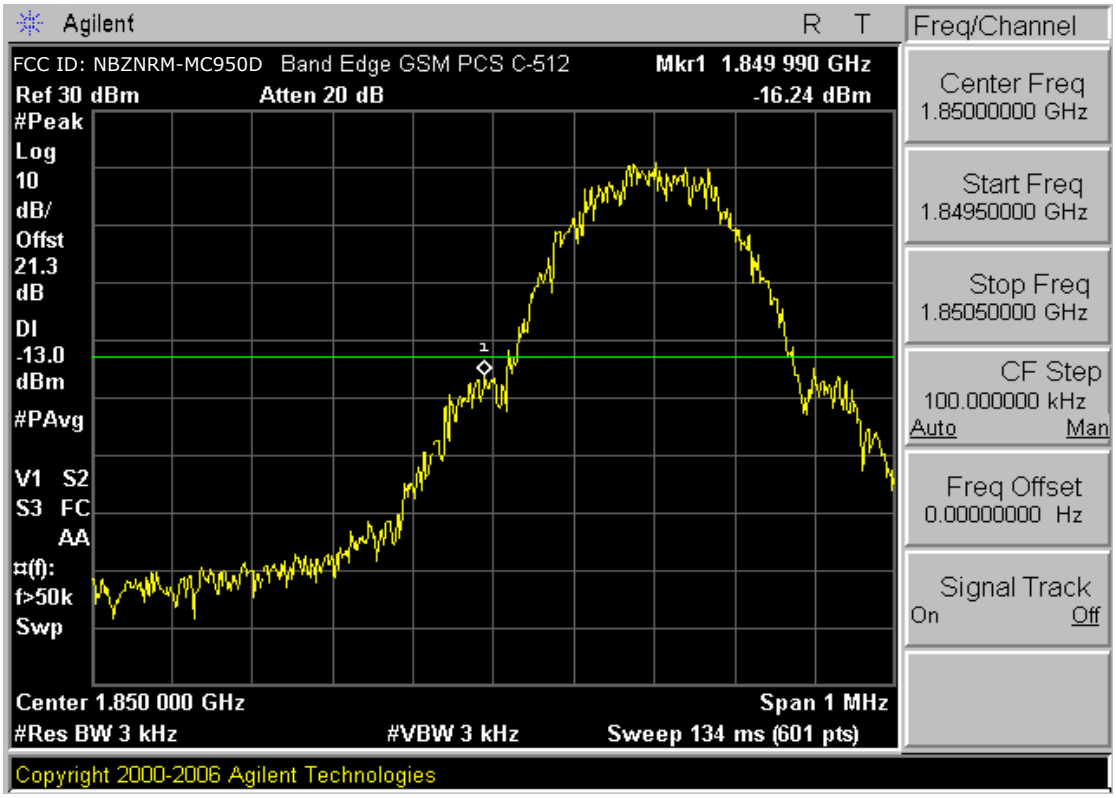
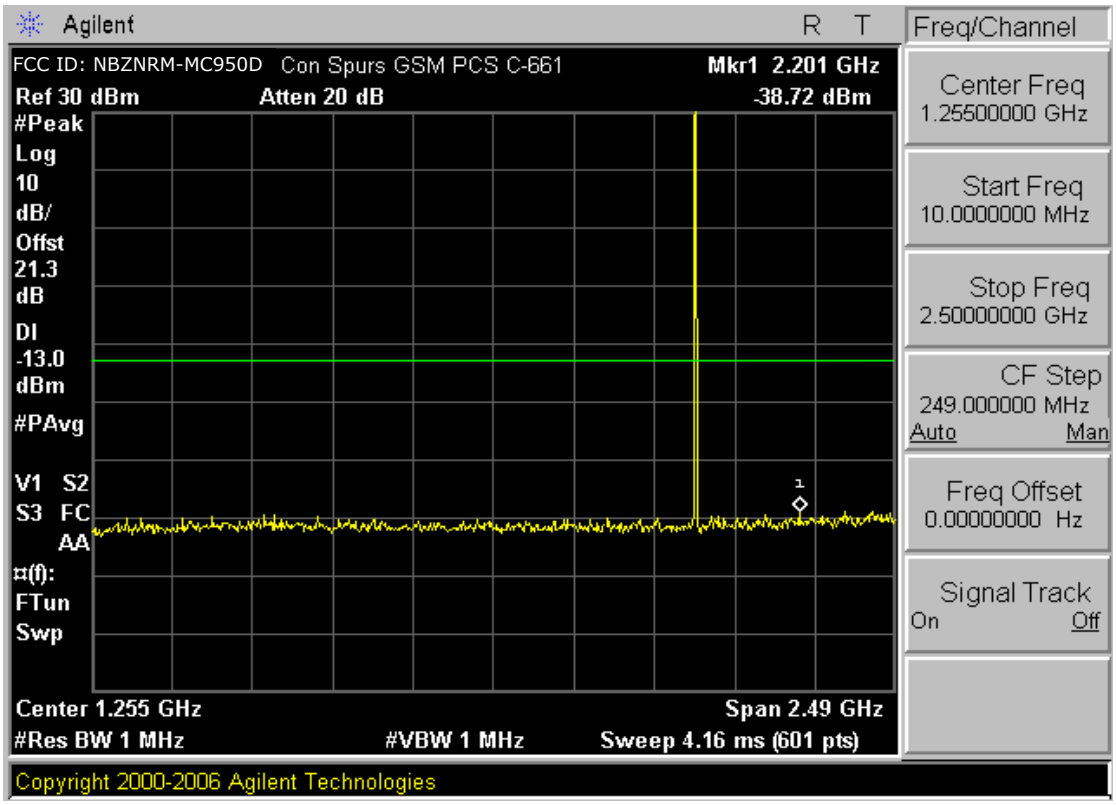


Plot 7-13. Band Edge Plot (PCS GSM Mode – Ch. 512)



Plot 7-14. Conducted Spurious Plot (PCS GSM Mode – Ch. 661)

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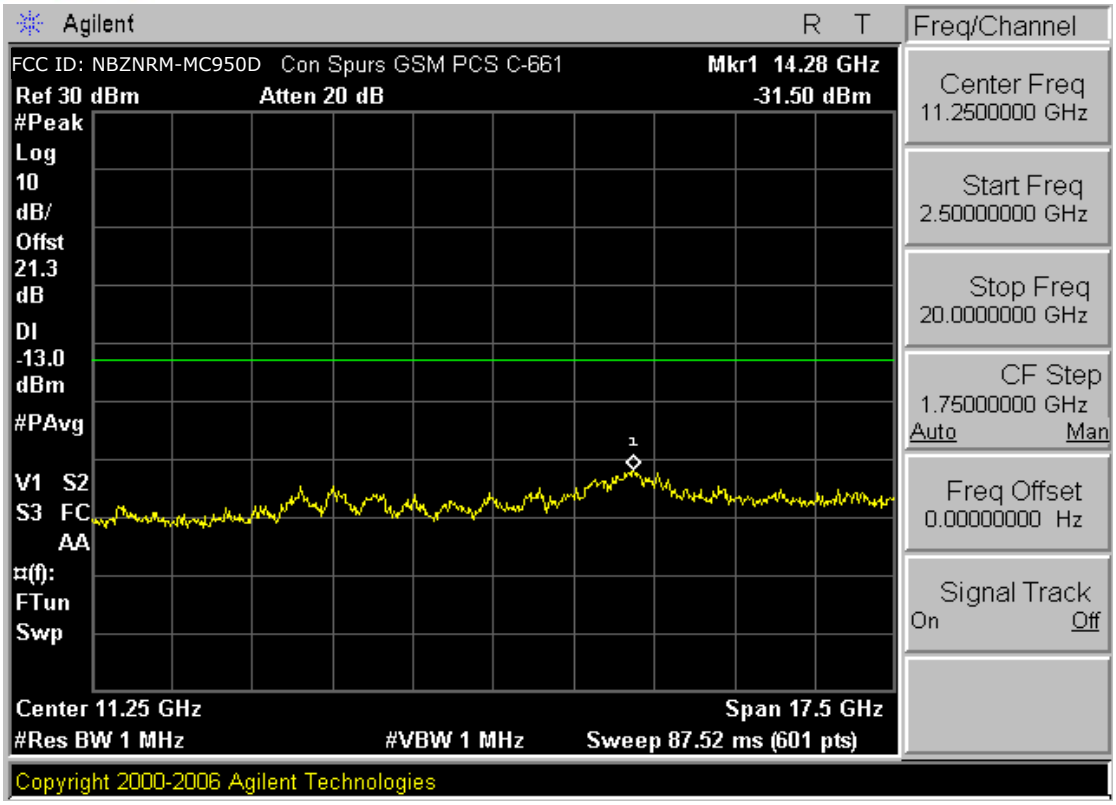
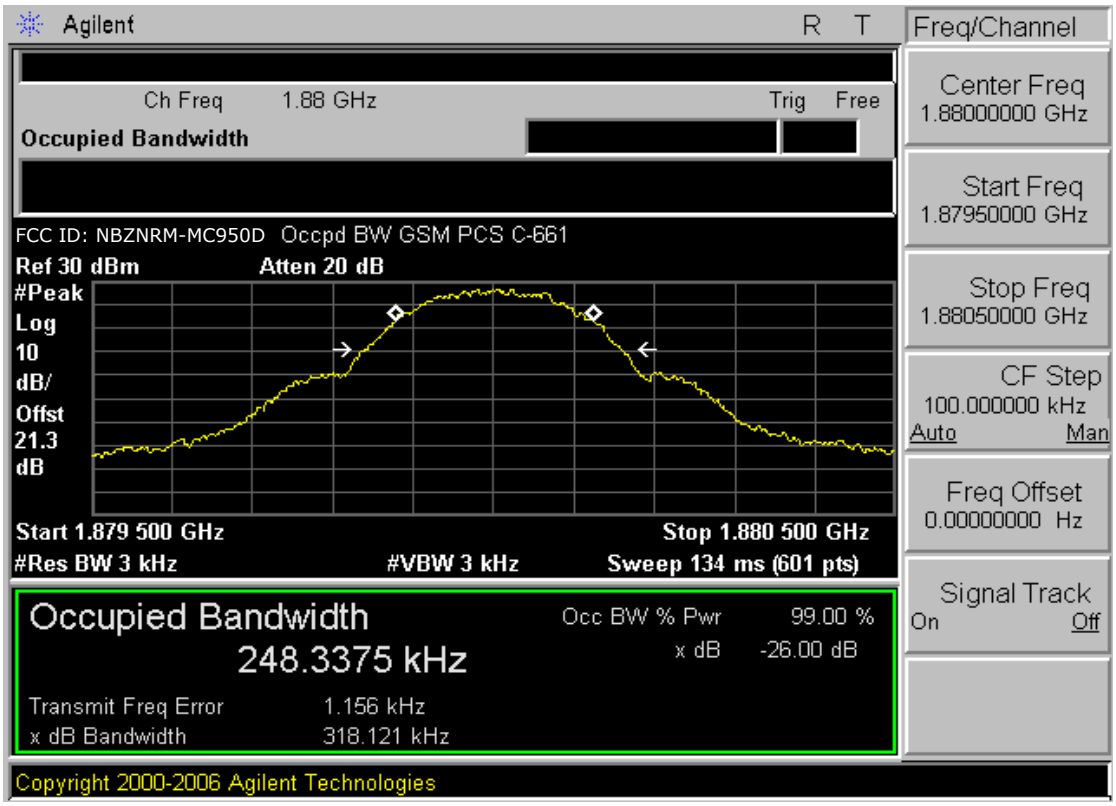


Plot 7-15. Conducted Spurious Plot (PCS GSM Mode – Ch. 661)



Plot 7-16. Occupied Bandwidth Plot (PCS GSM Mode – Ch. 661)

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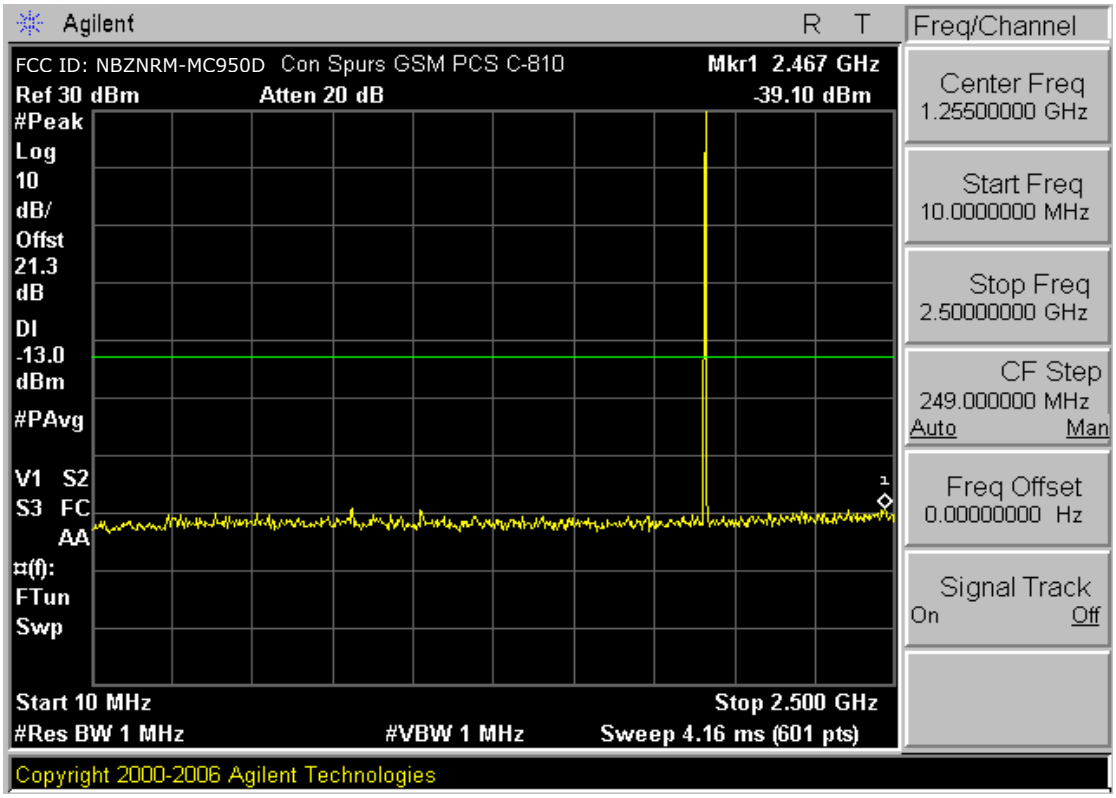
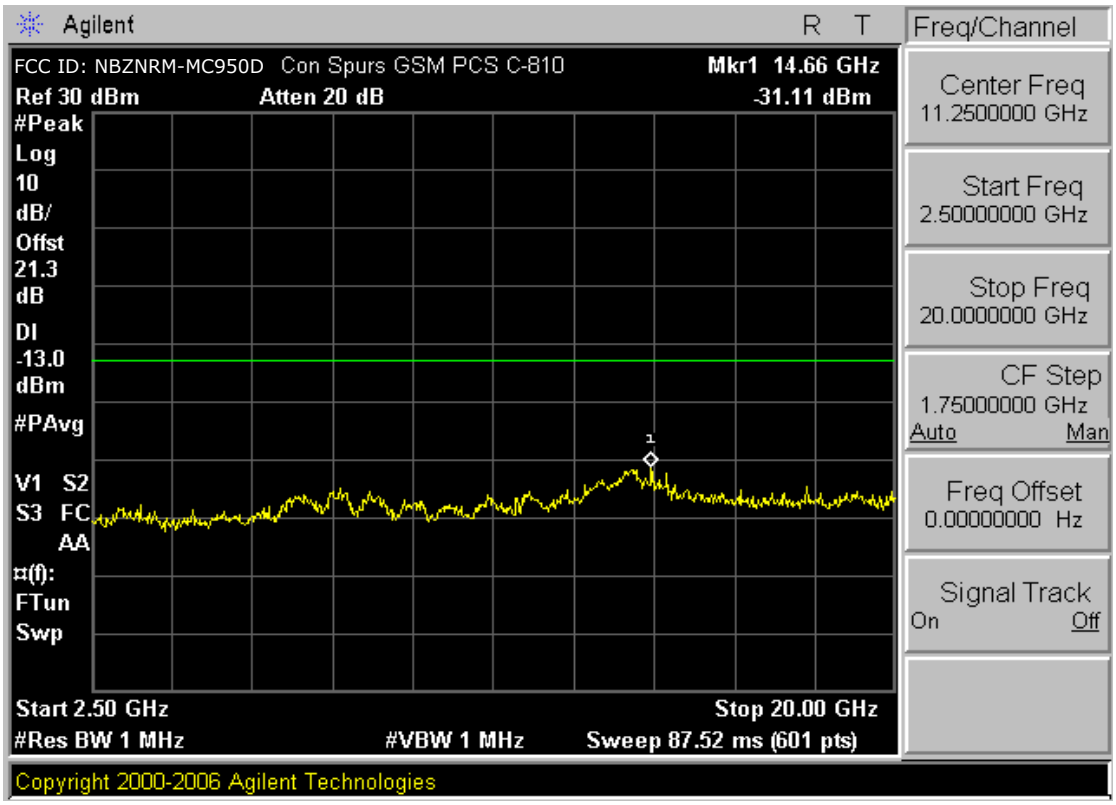


Plot 7-17. Conducted Spurious Plot (PCS GSM Mode – Ch. 810)



Plot 7-18. Conducted Spurious Plot (PCS GSM Mode – Ch. 810)

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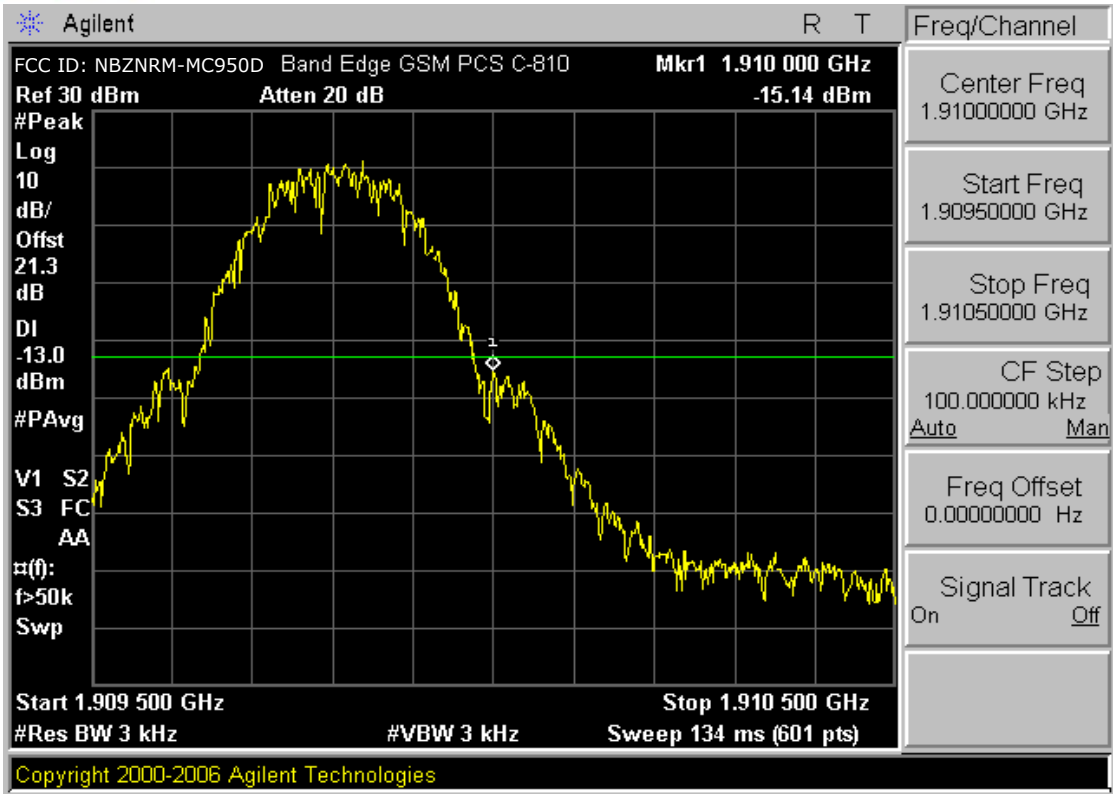
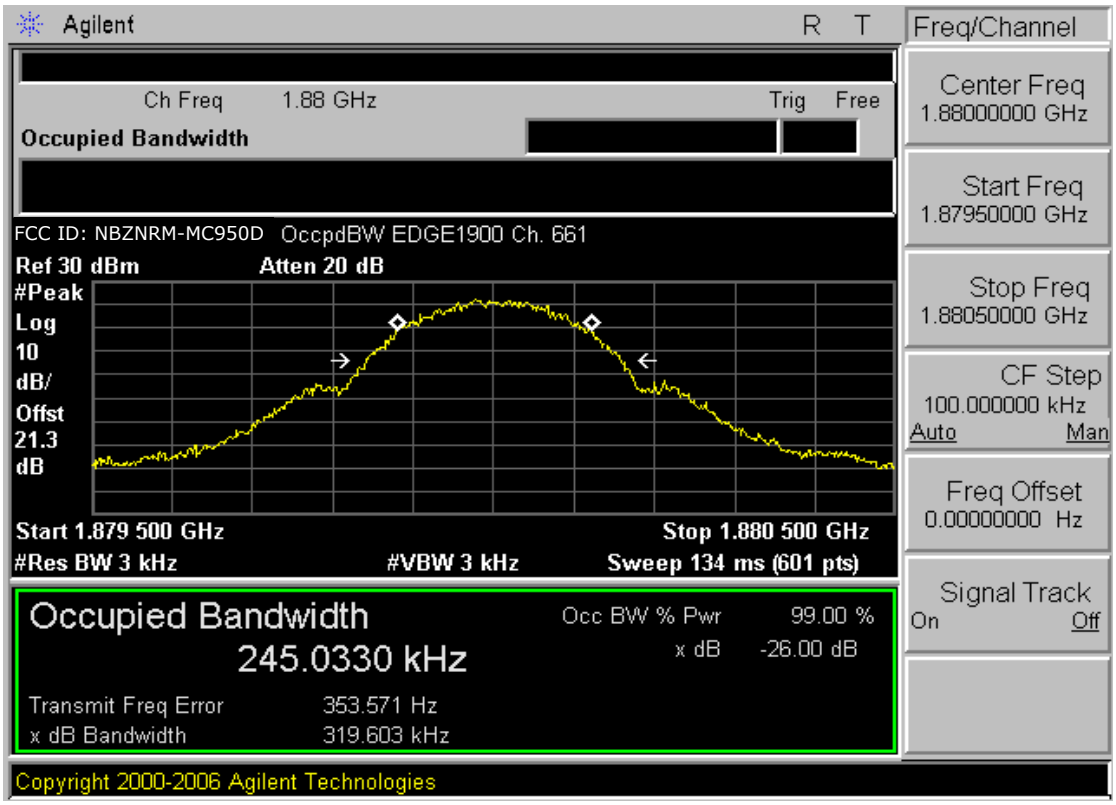


Plot 7-19. Band Edge Plot (PCS GSM Mode – Ch. 810)



Plot 7-20. Occupied Bandwidth Plot (EDGE1900 Mode – Ch. 661)

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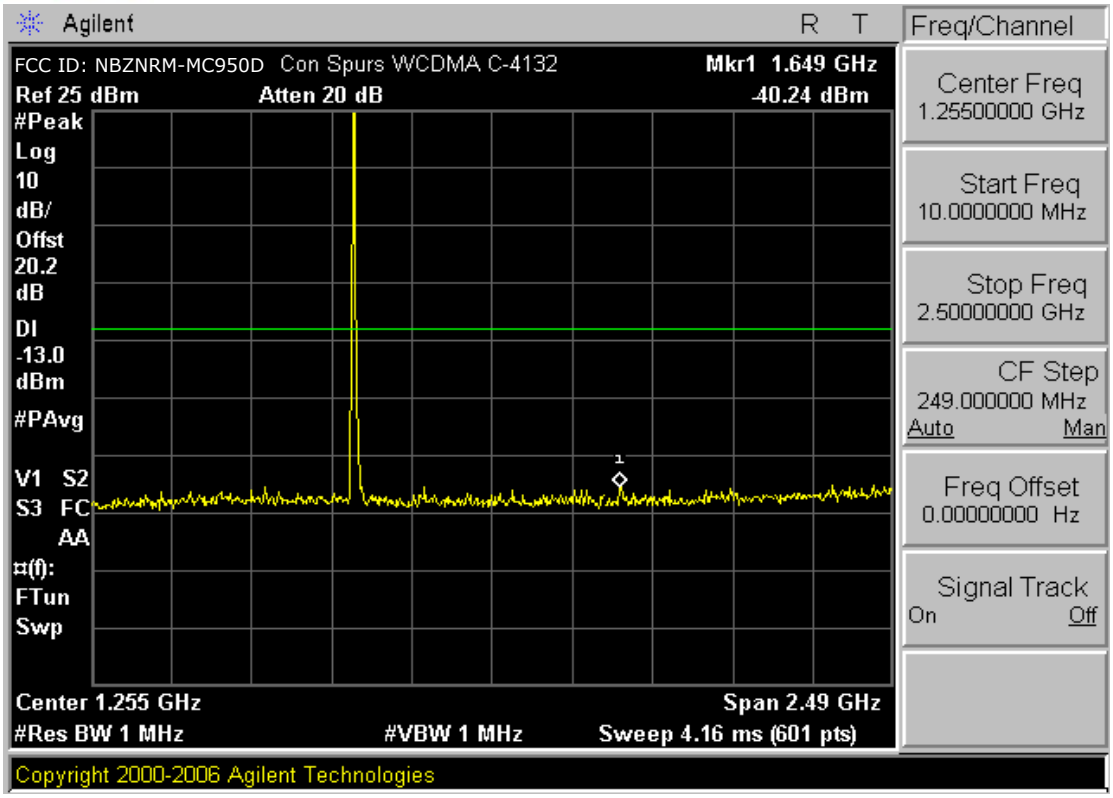
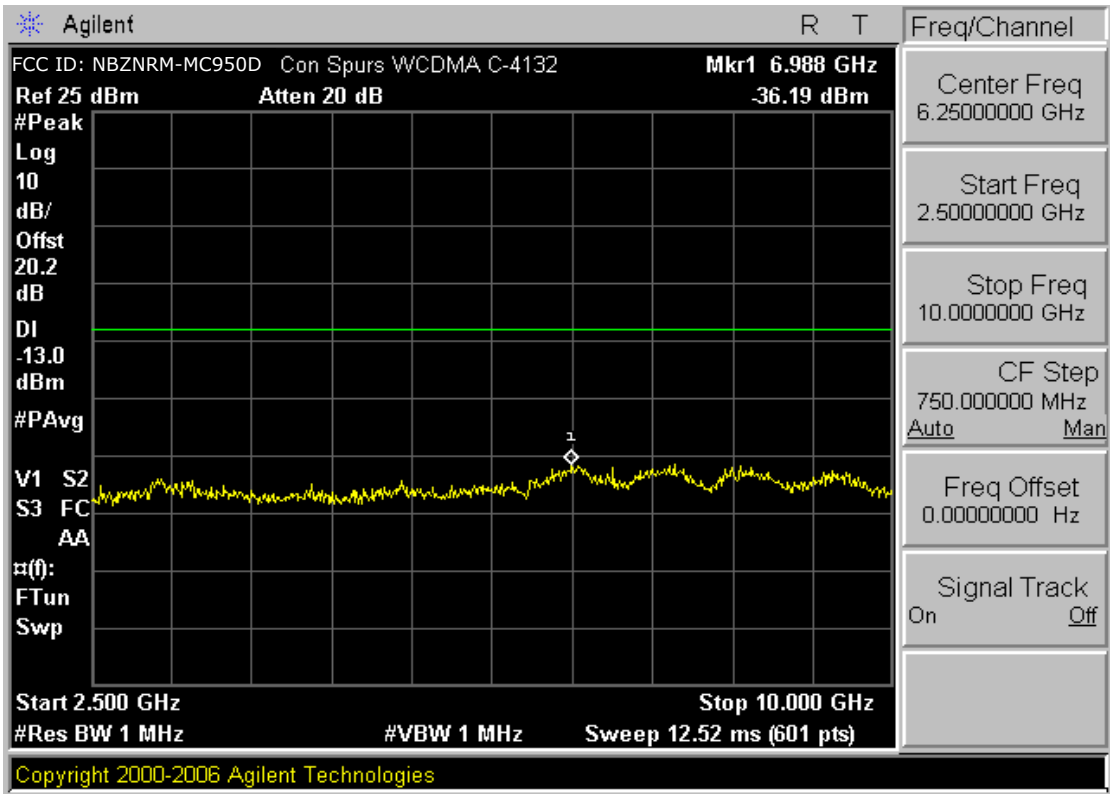


Plot 7-21. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)



Plot 7-22. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)

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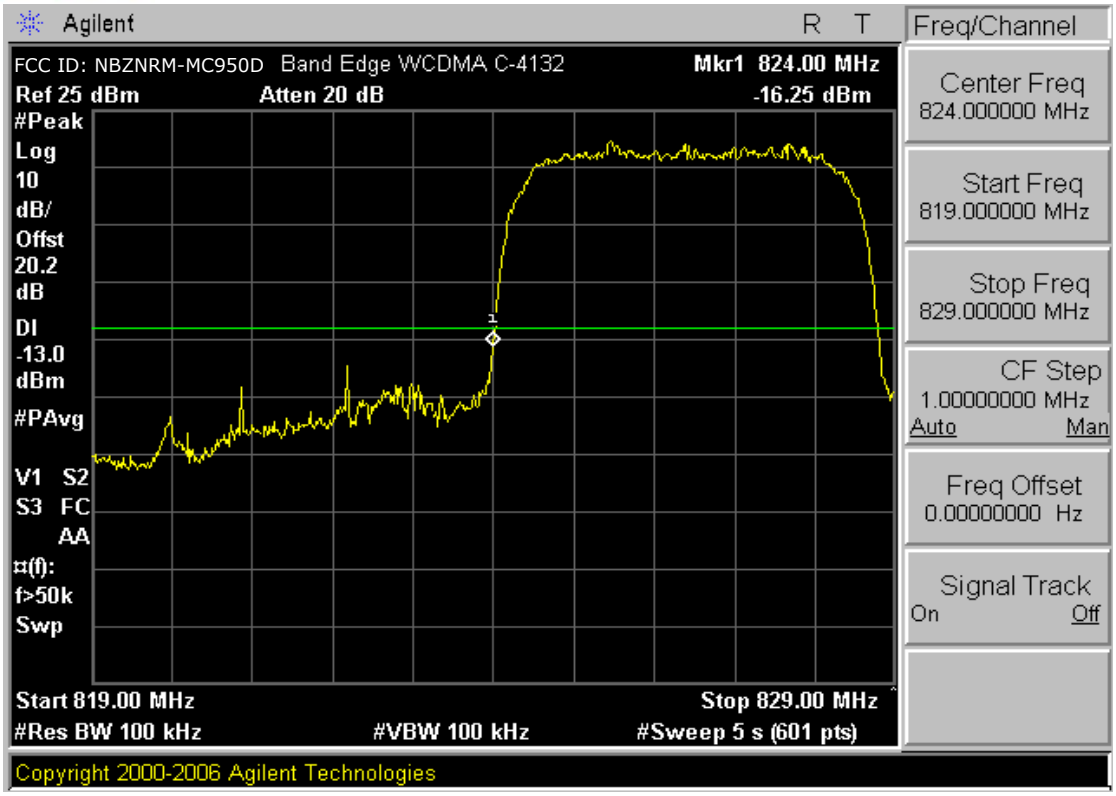
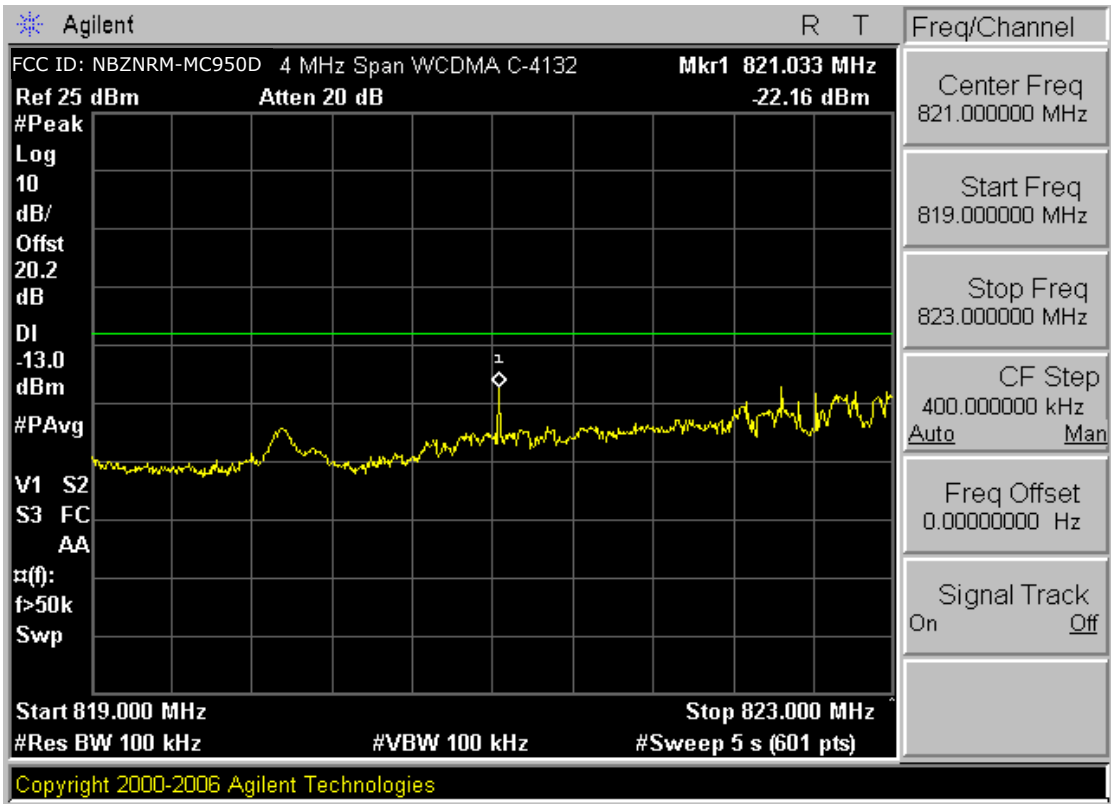


Plot 7-23. Band Edge Plot (Cellular WCDMA Mode – Ch. 4132)



Plot 7-24. 4MHz Span Plot (Cellular WCDMA Mode – Ch. 4132)

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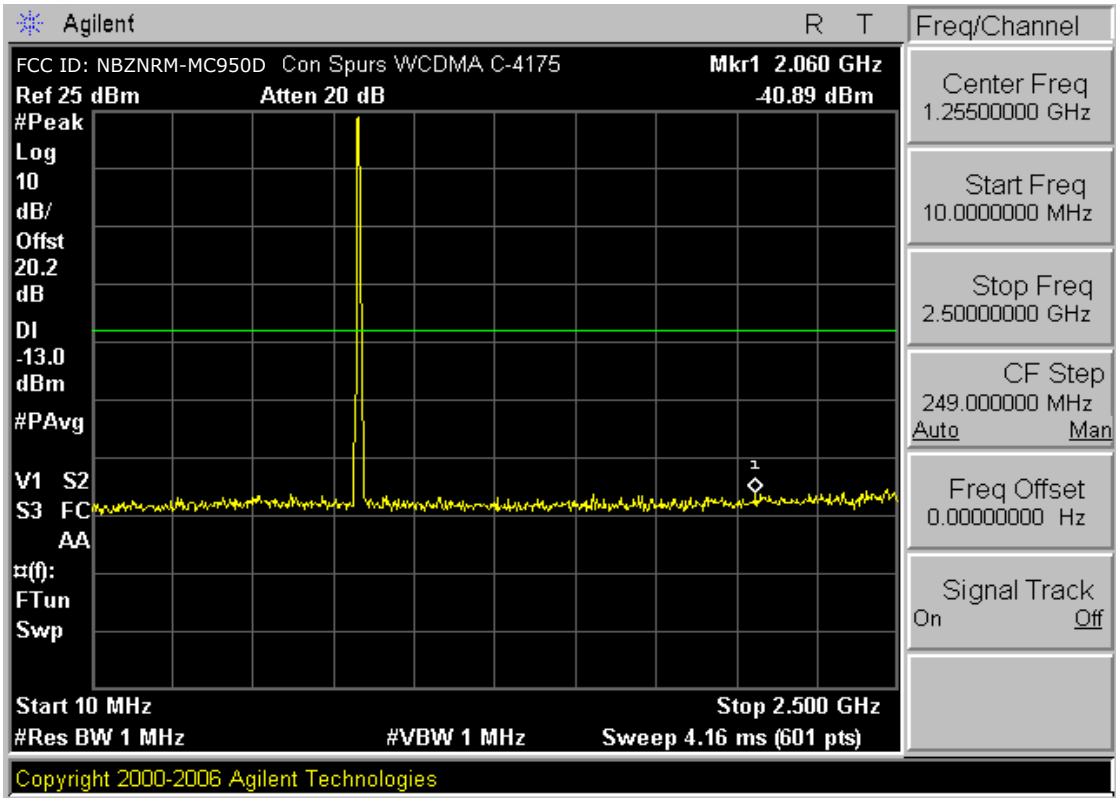
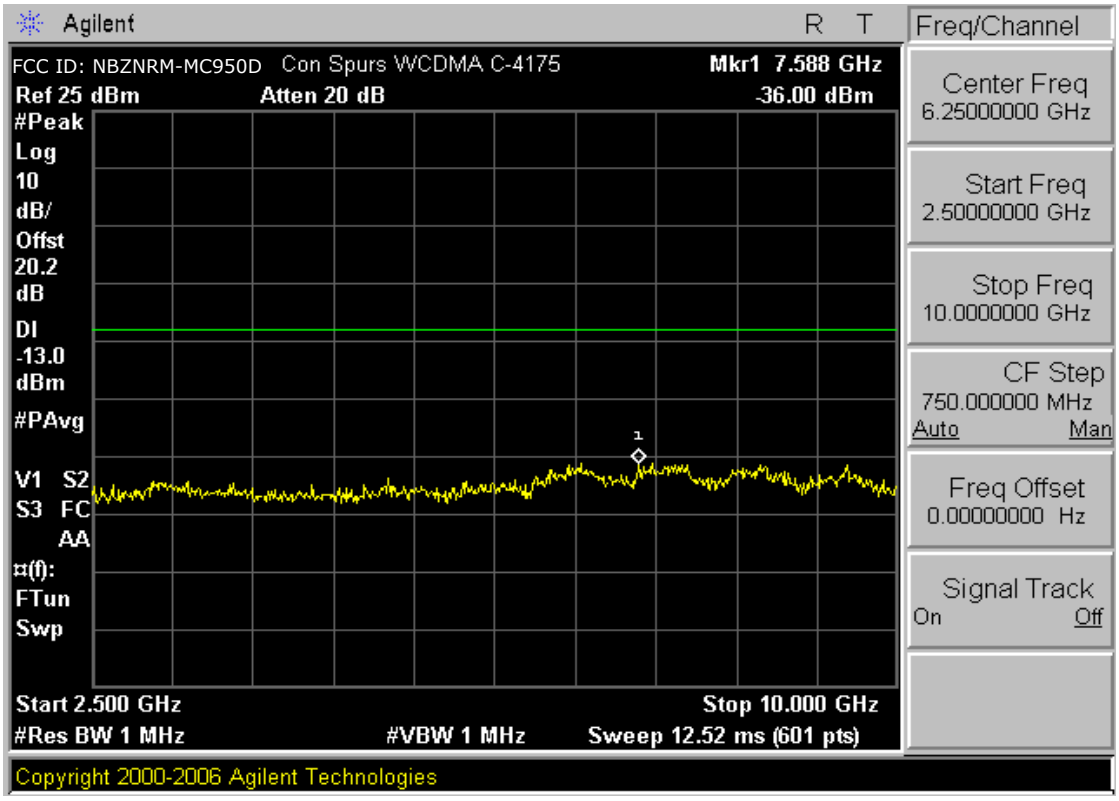


Plot 7-25. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4175)



Plot 7-26. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4175)

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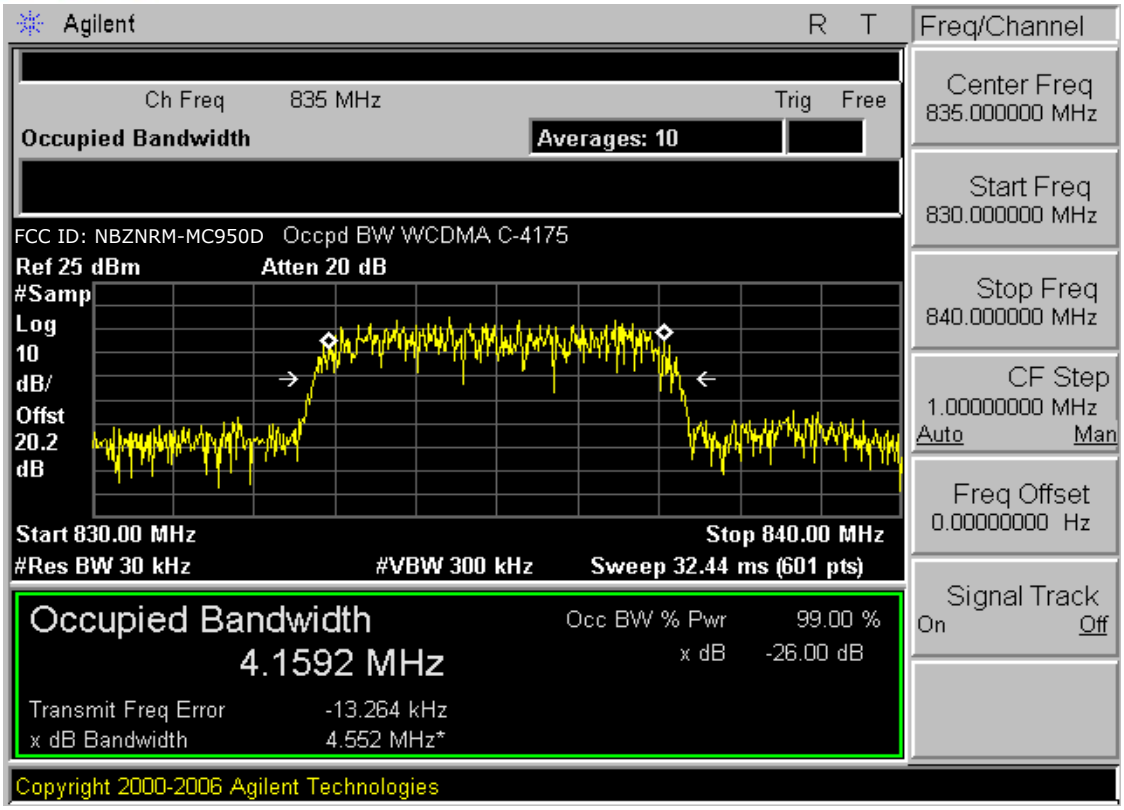
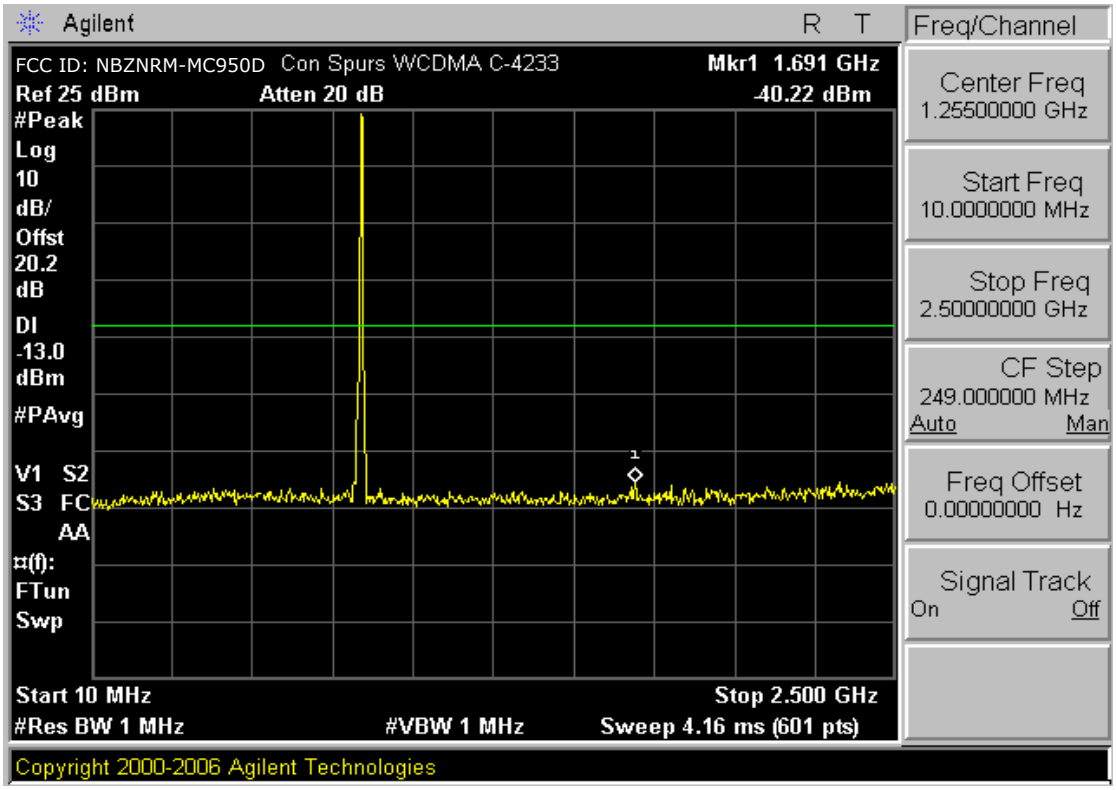


Plot 7-27. Occupied Bandwidth Plot (Cellular WCDMA Mode – Ch. 4175)



Plot 7-28. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)

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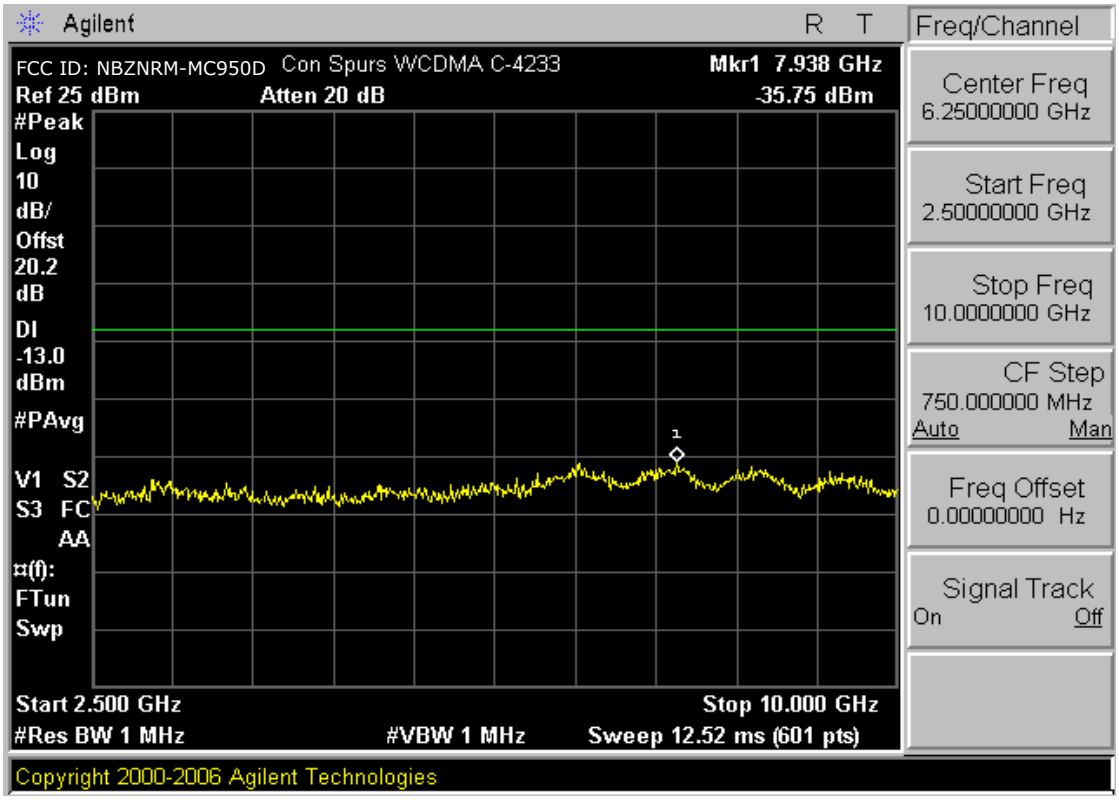
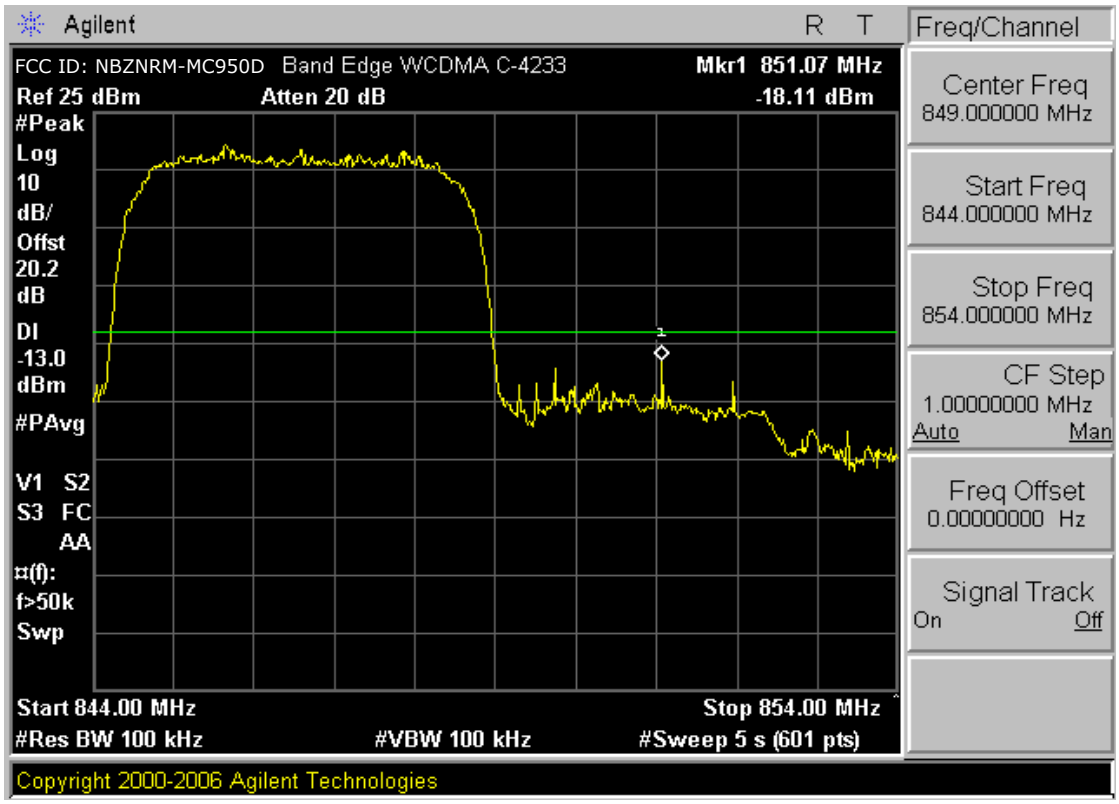


Plot 7-29. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)



Plot 7-30. Band Edge Plot (Cellular WCDMA Mode – Ch. 4233)

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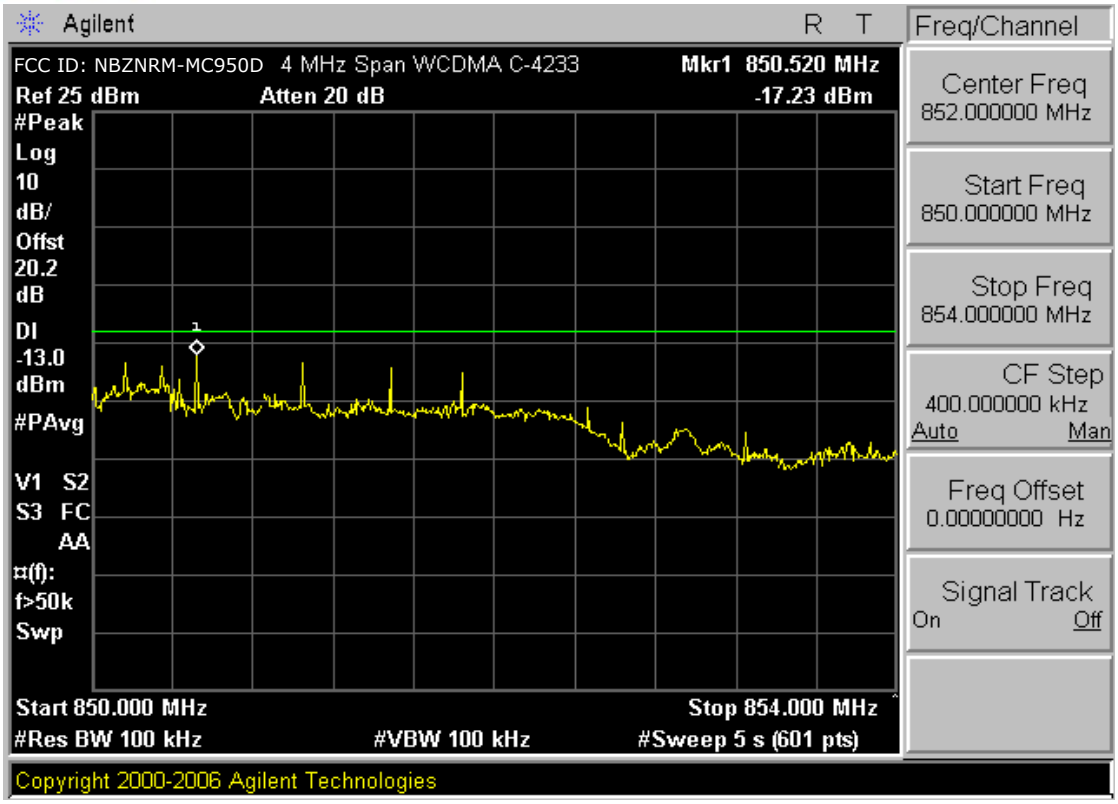
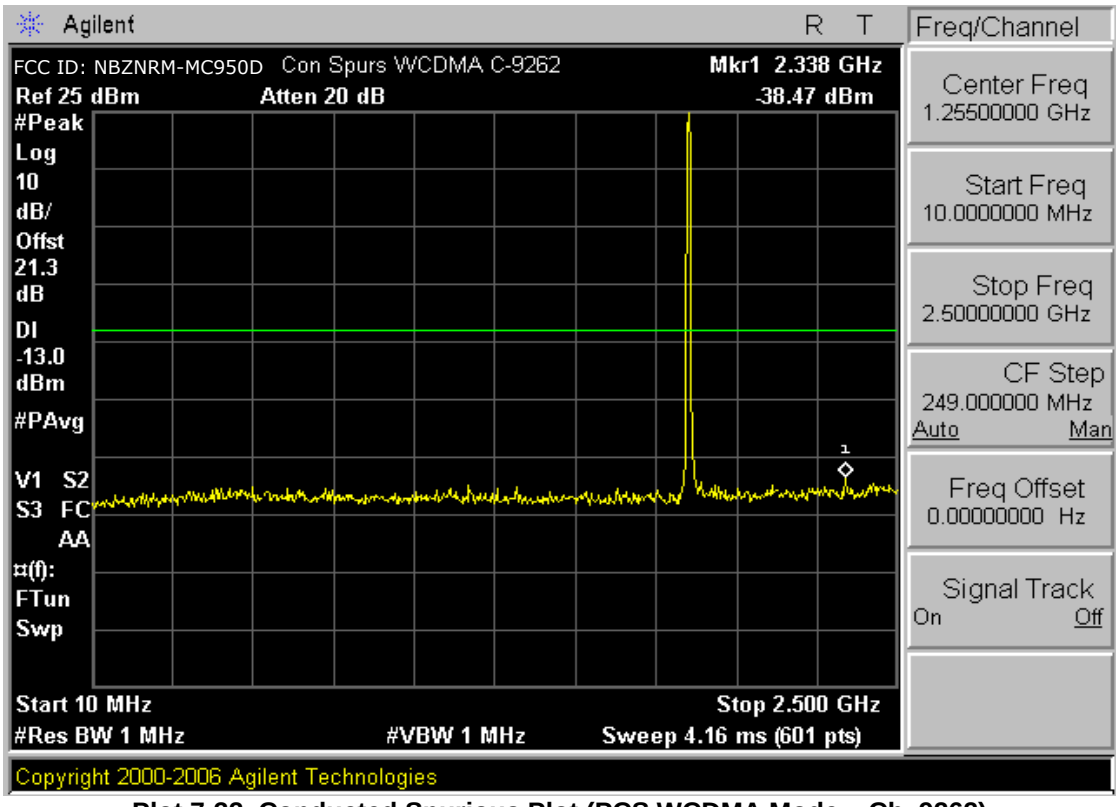


Plot 7-31. 4MHz Span Plot (Cellular WCDMA Mode – Ch. 4233)



Plot 7-32. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9262)

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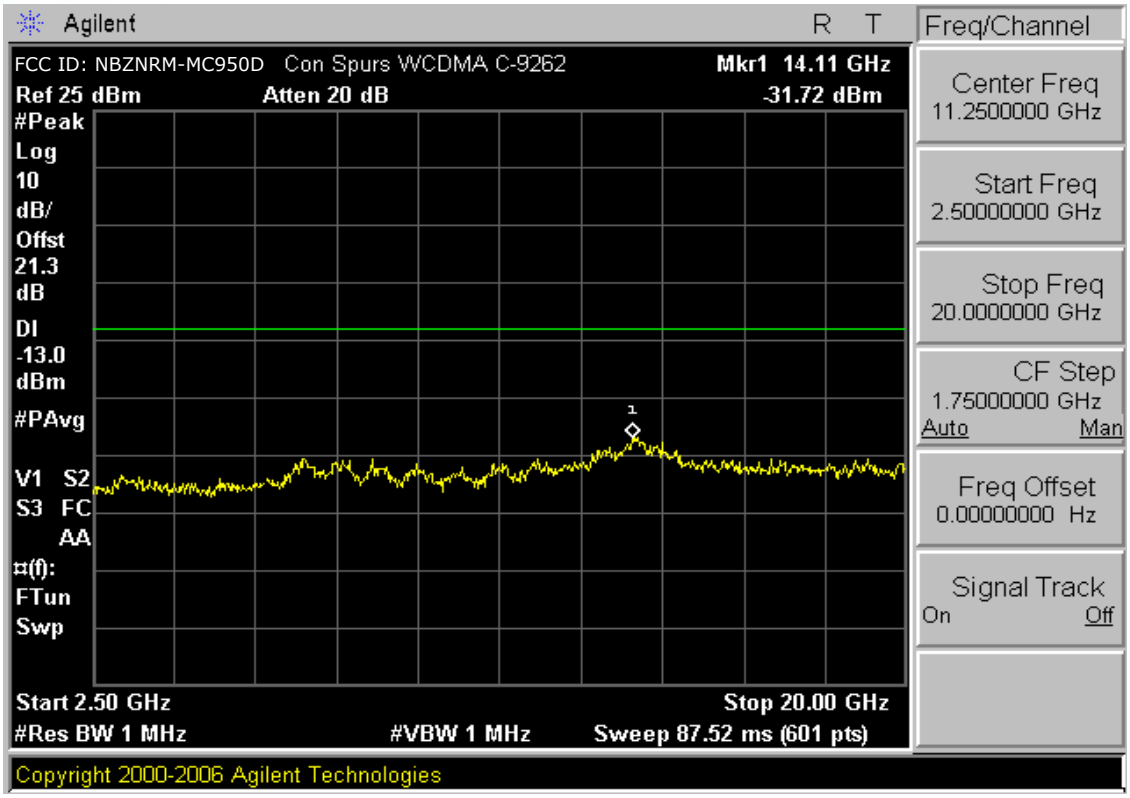
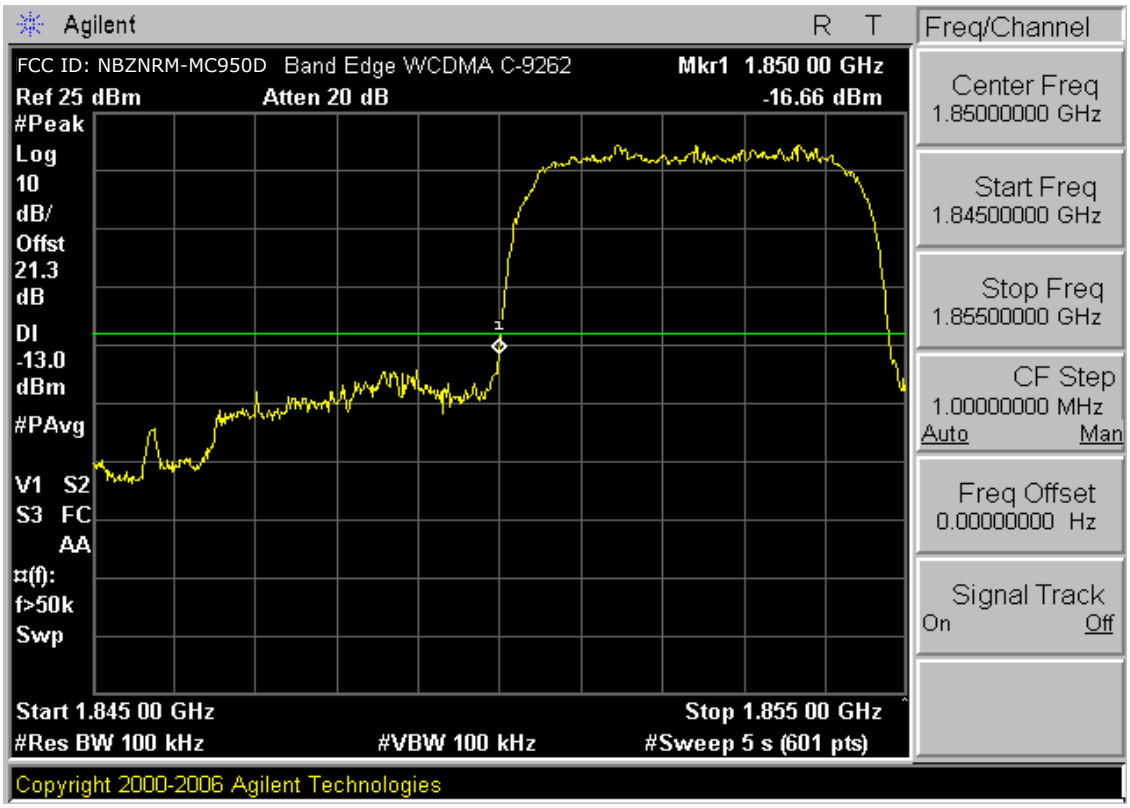


Plot 7-33. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9262)



Plot 7-34. Band Edge Plot (PCS WCDMA Mode – Ch. 9262)

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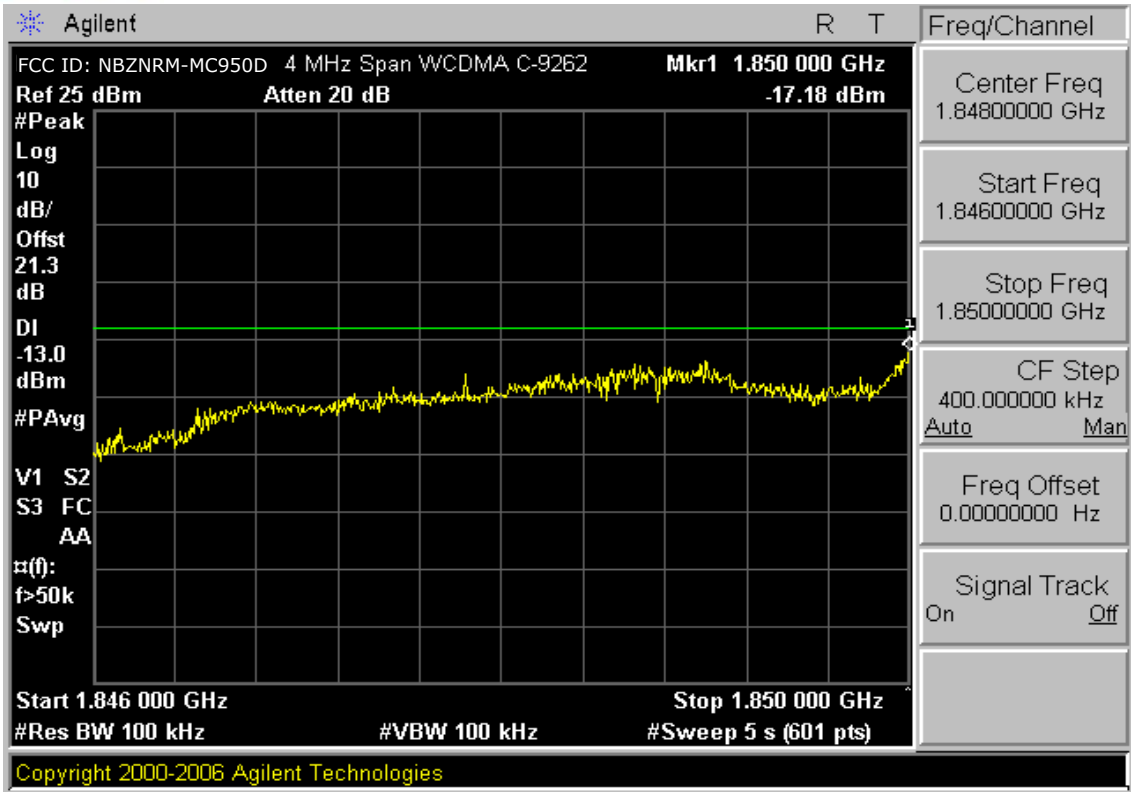
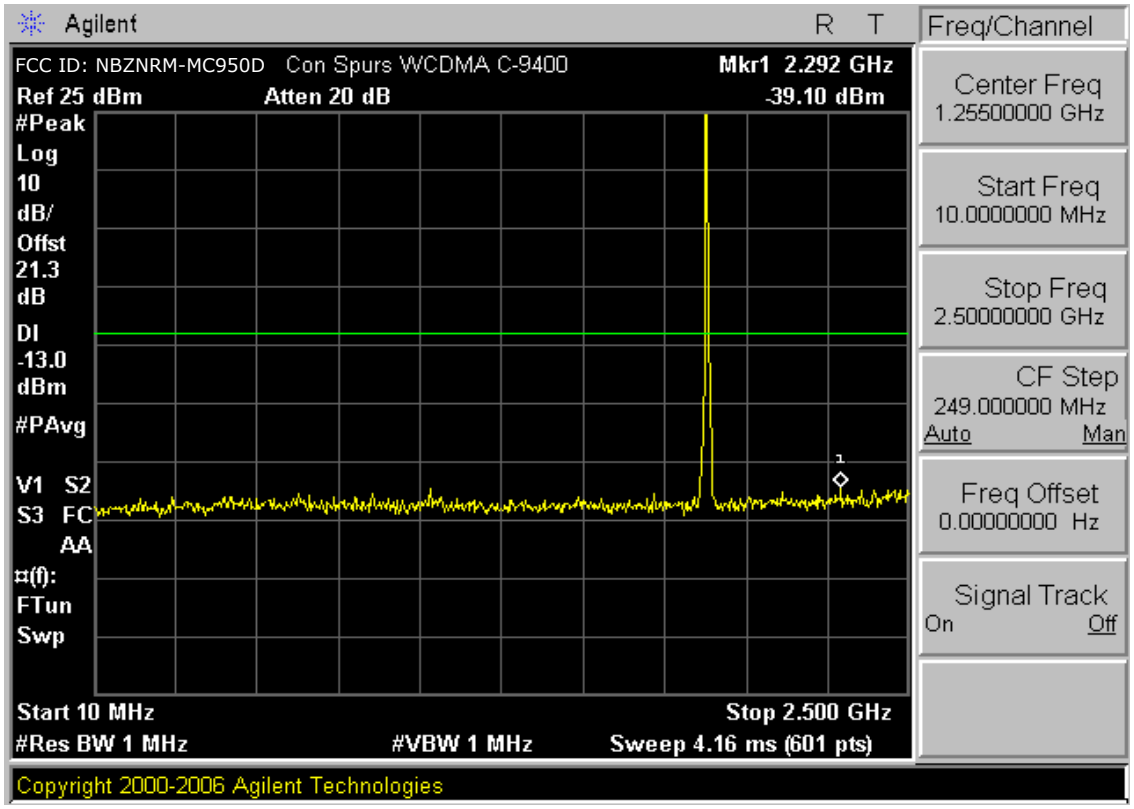


Plot 7-35. 4MHz Span Plot (PCS WCDMA Mode – Ch. 9262)



Plot 7-36. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9400)

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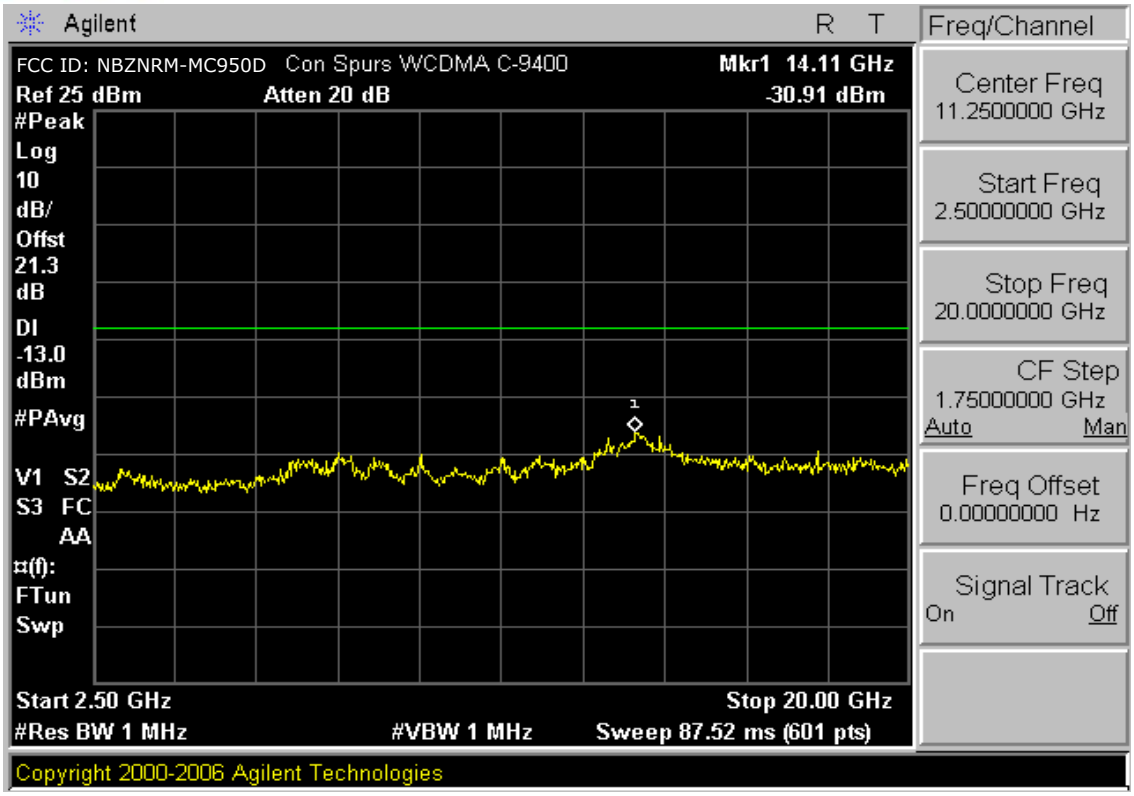
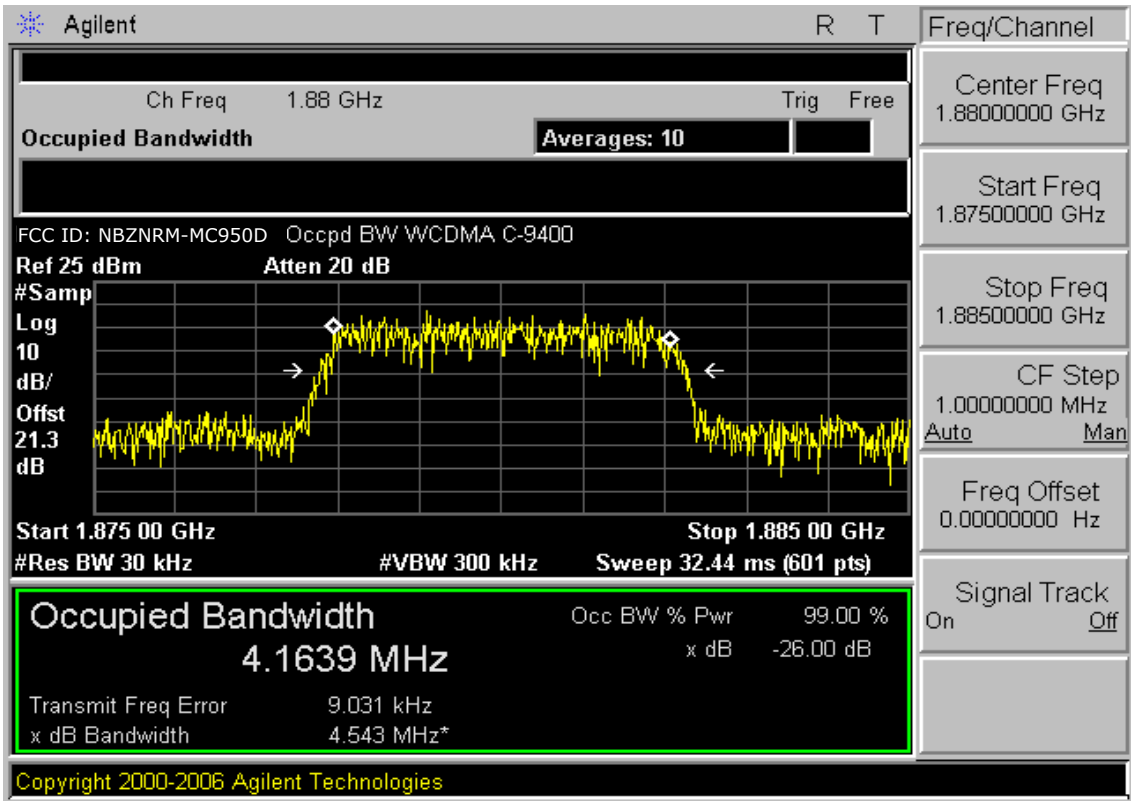


Plot 7-37. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9400)



Plot 7-38. Occupied Bandwidth Plot (PCS WCDMA Mode – Ch. 9400)

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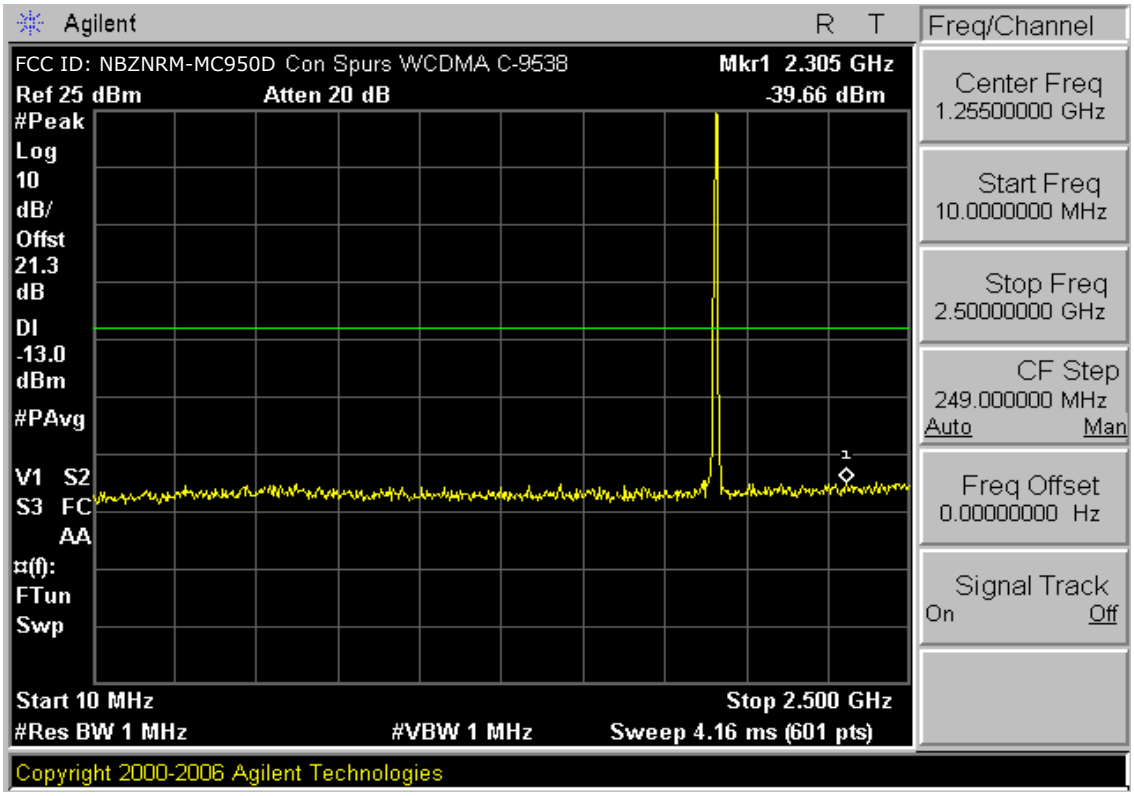
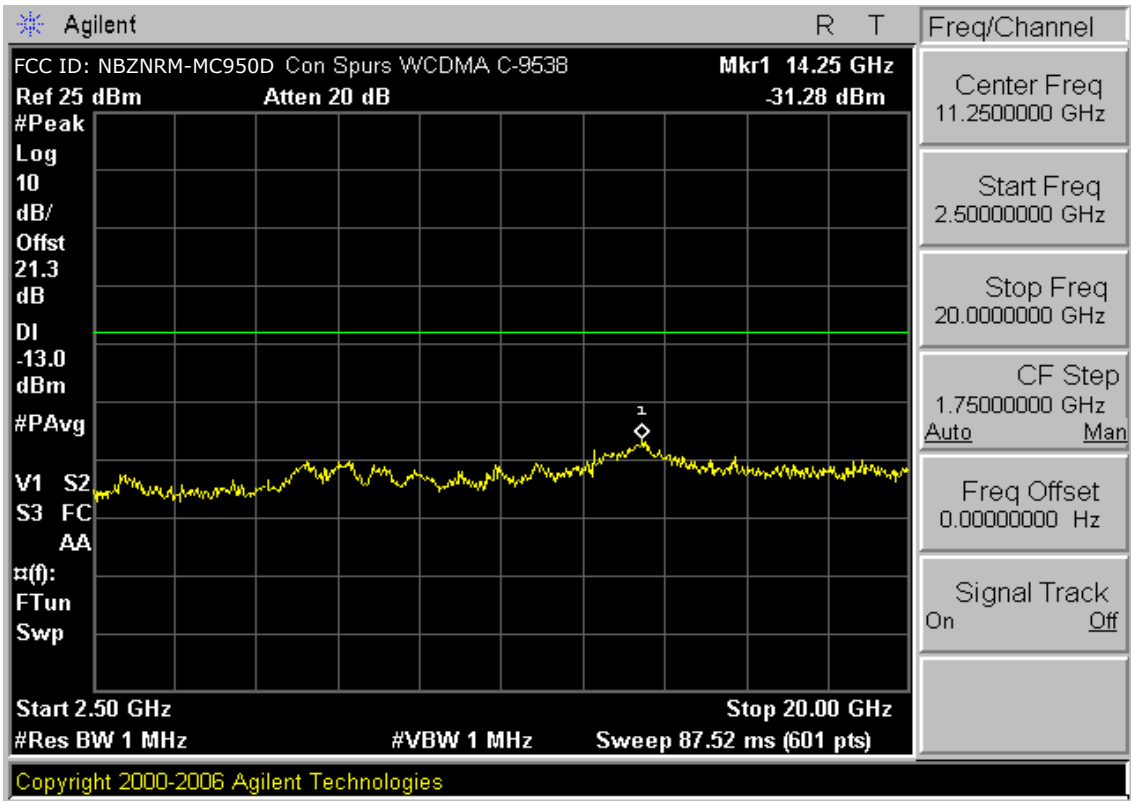


Plot 7-39. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9538)



Plot 7-40. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9538)

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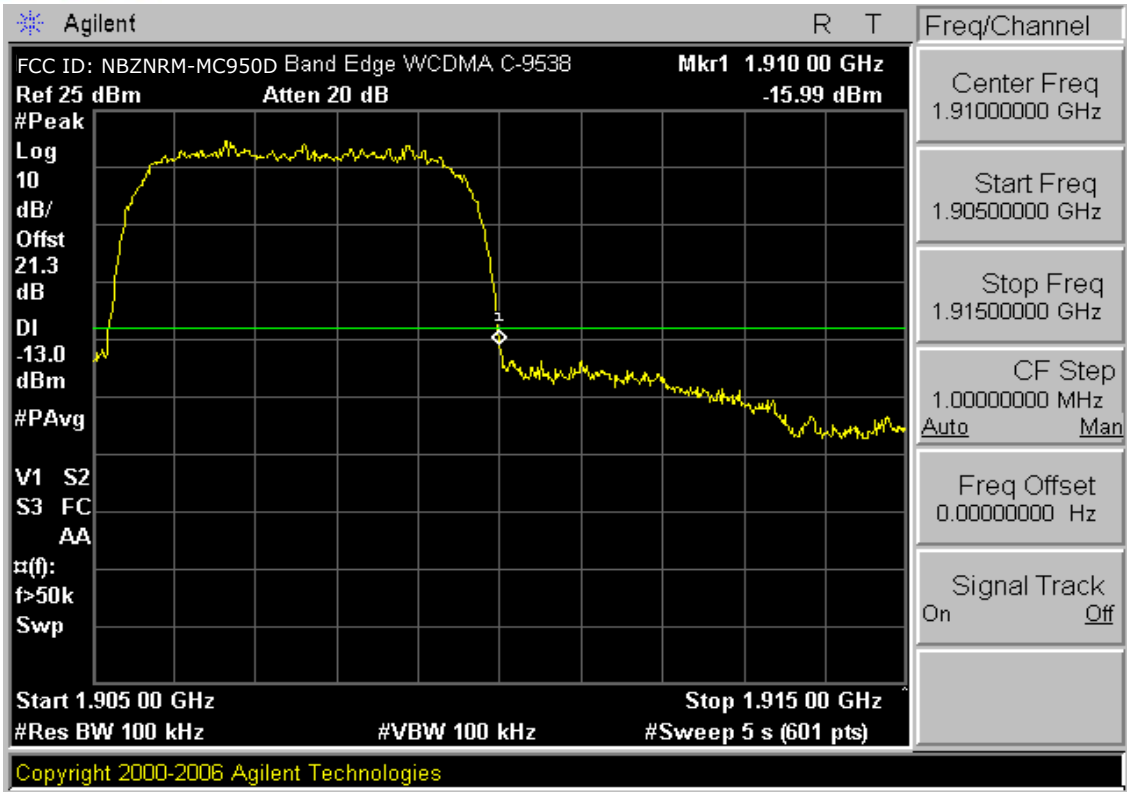
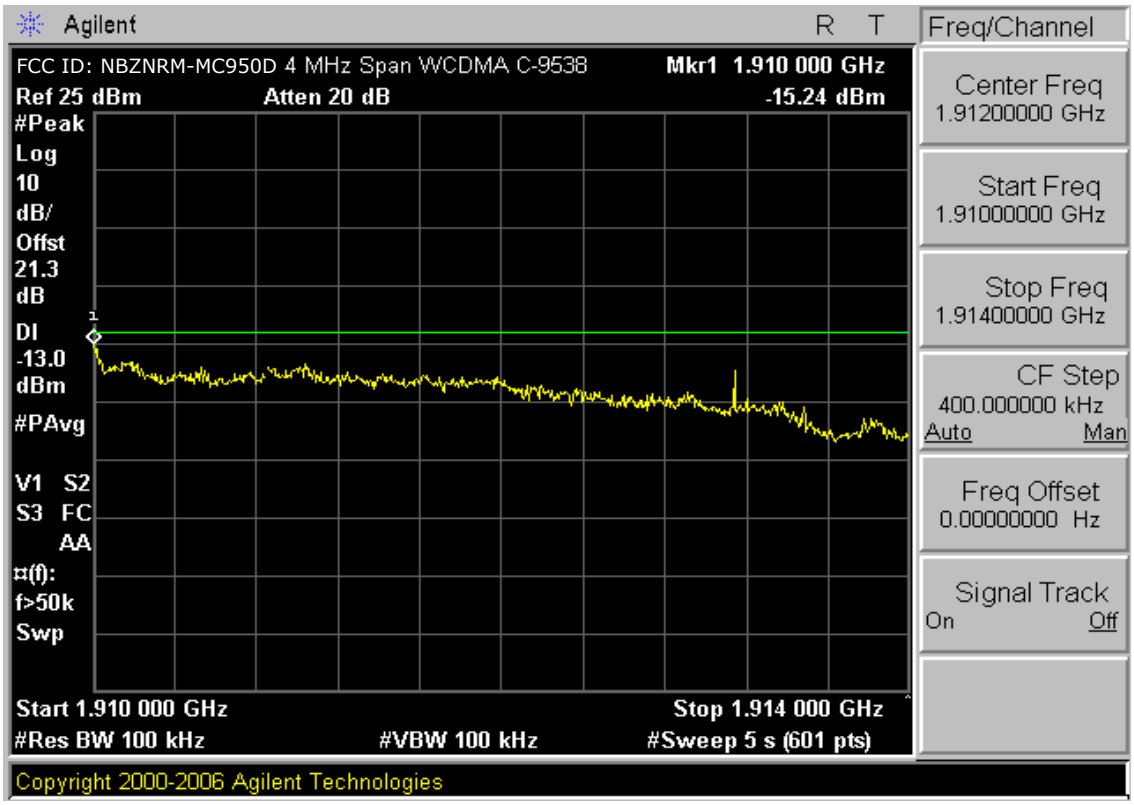


Plot 7-41. Band Edge Plot (PCS WCDMA Mode – Ch. 9538)



Plot 7-42. 4MHz Span Plot (PCS WCDMA Mode – Ch. 9538)

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8.0 CONCLUSION

The data collected show that the **Novatel Wireless 850/1900 GSM/WCDMA/EDGE USB Modem FCC ID: NBZNRM-MC950D** complies with all the requirements of Parts 2, 22, and 24 of the FCC rules.

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