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MEASUREMENT REPORT
FCC Part 22, 24

Applicant Name:
NEC Corporation of America
Radio Communications Systems Division
6535 N. State Highway 161
Irving, TX 75039-2402 USA

Date of Testing:
3/29 - 4/4/2013
Test Site/Location:
PCTEST Lab., Columbia, MD, USA
Test Report Serial No.:
0Y1303220528.A98

FCC ID:	**A98-HDN2538**
APPLICANT:	**NEC CORPORATION OF AMERICA**

Application Type:	Certification
Model(s):	KMP7R4K1-2A
EUT Type:	Portable Handset
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§2 §22(H) §24(E)
Test Procedure(s):	ANSI/TIA-603-C-2004, KDB 971168
Test Device Serial No.:	*identical prototype* [S/N: 22MAR-1, 22MAR-3]

Mode	Tx Frequency (MHz)	Emission Designator	ERP/EIRP	
			Max. Power (W)	Max. Power (dBm)
GSM850	824.2 - 848.8	245KGXW	1.027	30.11
GSM1900	1850.2 - 1909.8	245KGXW	1.188	30.75
WCDMA850	826.4 - 846.6	4M16F9W	0.174	22.40

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. Test results reported herein relate only to the item(s) tested.

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.

Randy Ortanez
President

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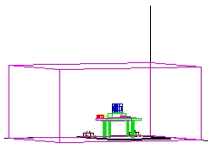


MEASUREMENT REPORT
FCC Part 22, 24

§2.1033 General Information

APPLICANT:	NEC Corporation of America
APPLICANT ADDRESS:	Radio Communications Systems Division 6535 N. State Highway 161, Irving, TX 75039-2402 USA
TEST SITE:	PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS:	7185 Oakland Mills Road, Columbia, MD 21046 USA
FCC RULE PART(S):	§2 §22(H) §24(E)
BASE MODEL:	KMP7R4K1-2A
FCC ID:	A98-HDN2538
FCC CLASSIFICATION:	PCS Licensed Transmitter Held to Ear (PCE)
MODE:	(GSM / WCDMA)
FREQUENCY TOLERANCE:	±0.00025 % (2.5 ppm)
Test Device Serial No.:	004401201150212, 004401201150253 ☐ Production ☒ Pre-Production ☐ Engineering
DATE(S) OF TEST:	3/29 - 4/4/2013
TEST REPORT S/N:	0Y1303220528.A98

Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) 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 (2451B-1).
- 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 (2451B-1) 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 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 and the Industry Canada Certification and Engineering Bureau.

1.2 Testing Facility

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity, the Baltimore-Washington Internt'l (BWI) airport, the city of Baltimore and the Washington, DC area. (*See Figure 1-1*).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39° 10'23" N latitude and 76° 49'50" W longitude. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on February 15, 2012.

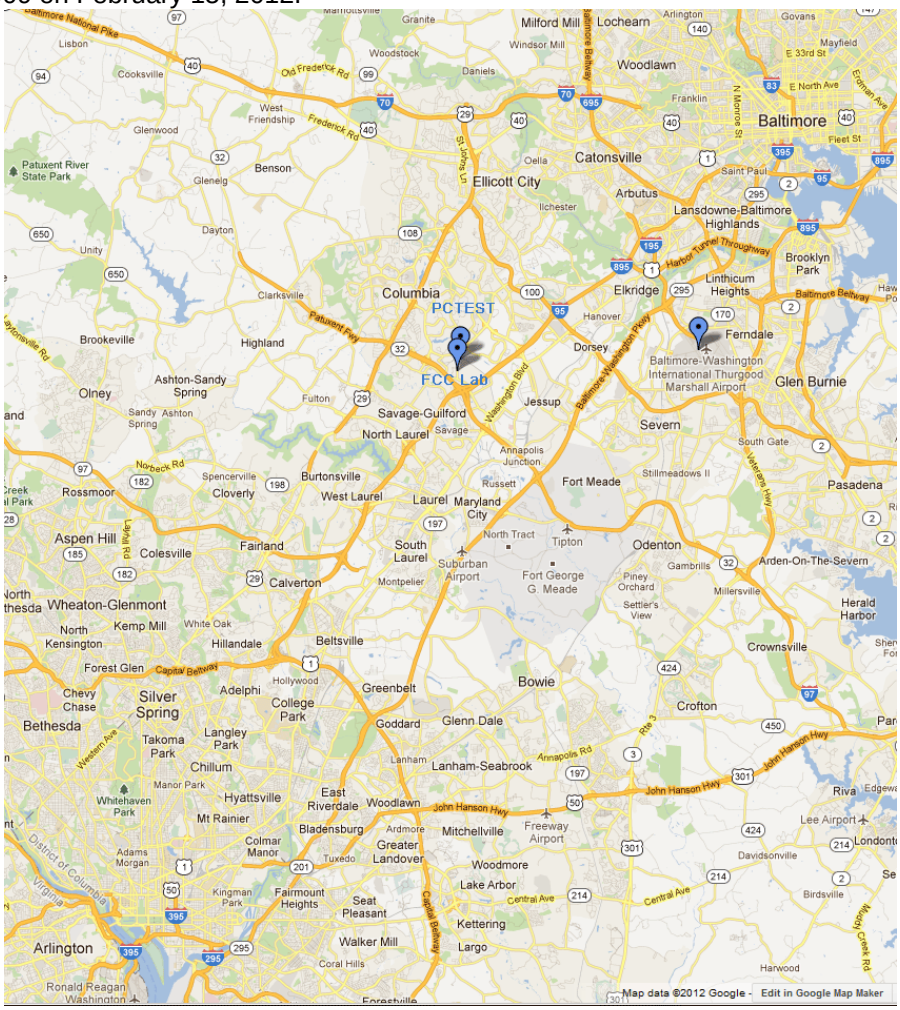


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **NEC Portable Handset FCC ID: A98-HDN2538**. The test data contained in this report pertains only to the emissions due to the EUT's 2G/3G licensed transmitters.

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS, 850 WCDMA/HSPA, 802.11b/g/n WLAN, Bluetooth (1x, EDR, LE), NFC

2.3 Test Configuration

The NEC Portable Handset FCC ID: A98-HDN2538 was tested per the guidance of ANSI/TIA-603-C-2004 and KDB 971168. See Section 3.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

2.4 EMI Suppression Device(s)/Modifications

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

3.0 DESCRIPTION OF TESTS

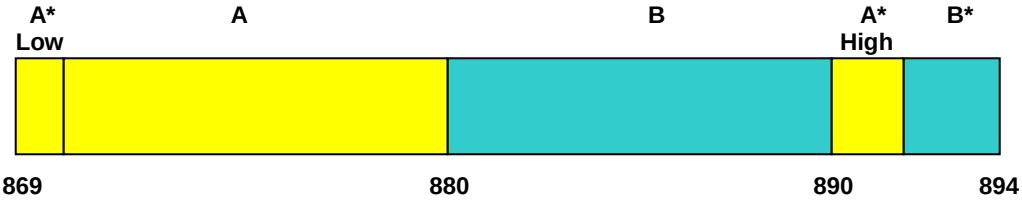
3.1 Evaluation Procedure

The measurement procedures described in the "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-C-2004) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems" were used in the measurement of the measurement of the **NEC Portable Handset FCC ID: A98-HDN2538.**

Deviation from Measurement Procedure……..None

3.2 Cellular - Base Frequency Blocks

§22.905



BLOCK 1: 869 – 880 MHz (A* Low + A)

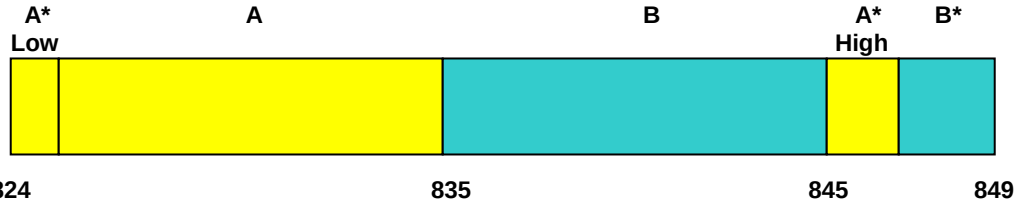
BLOCK 2: 880 – 890 MHz (B)

BLOCK 3: 890 – 891.5 MHz (A* High)

BLOCK 4: 891.5 – 894 MHz (B*)

3.3 Cellular - Mobile Frequency Blocks

§22.905



BLOCK 1: 824 – 835 MHz (A* Low + A)

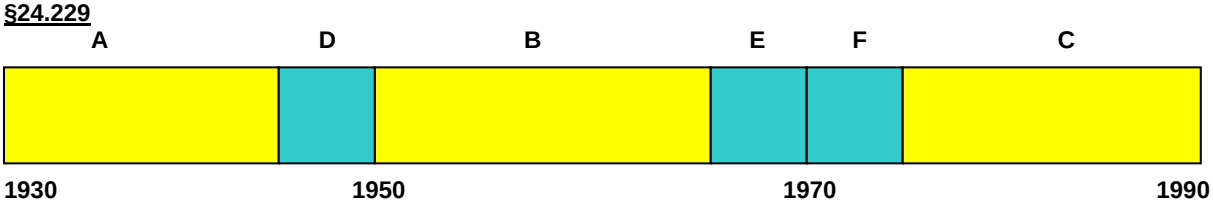
BLOCK 2: 835 – 845 MHz (B)

BLOCK 3: 845 – 846.5 MHz (A* High)

BLOCK 4: 846.5 – 849 MHz (B*)

3.4 PCS - Base Frequency Blocks

§24.229



BLOCK 1: 1930 – 1945 MHz (A)

BLOCK 2: 1945 – 1950 MHz (D)

BLOCK 3: 1950 – 1965 MHz (B)

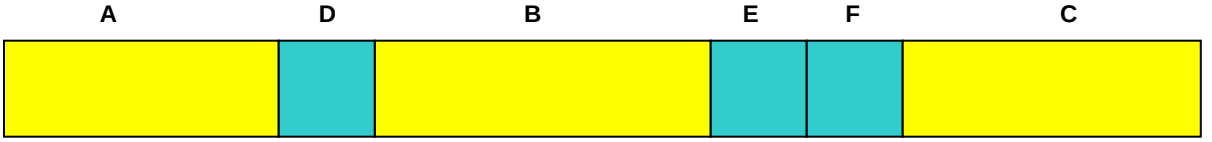
BLOCK 4: 1965 – 1970 MHz (E)

BLOCK 5: 1970 – 1975 MHz (F)

BLOCK 6: 1975 – 1990 MHz (C)

3.5 PCS - Mobile Frequency Blocks

§24.229



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 Occupied Bandwidth

§2.1049 RSS-Gen(4.6.1) RSS-133(2.3)

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. The spectrum analyzers' "occupied bandwidth" measurement function was used to record the occupied bandwidth in accordance with KDB 971168.

3.7 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051 §22.917(a) §24.238(a) RSS-132(4.5.1) 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. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P) dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for Part 22 and 1 MHz or greater for Part 24. 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.

3.8 Radiated Power and Radiated Spurious Emissions

§2.1053 §22.913(a.2) §22.917(a) §24.232(c) §24.238(a) RSS-132(4.4) RSS-132(4.5.1) RSS-133(6.4) RSS-133(6.5.1)

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. An ETS Lindgren Model 2188 raised turntable is used for radiated measurement. It is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. A 78cm high PVC support structure is placed on top of the turntable. A ¾" (~1.9cm) sheet of high density polyethylene is used as the table top and is placed on top of the PVC supports to bring the total height of the table to 80cm.

The equipment under test was transmitting while connected to its integral antenna and is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions' occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168.

Per the guidance of ANSI/TIA-603-C-2004, a half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

$$P_{d\ [dBm]} = P_{g\ [dBm]} - \text{cable loss}_{\ [dB]} + \text{antenna gain}_{\ [dBd/dBi]}$$

Where, P_d is the dipole equivalent power, P_g is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to $P_{g\ [dBm]}$ – cable loss $_{[dB]}$.

The calculated P_d levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of 43 + $10\log_{10}$(Power $_{[Watts]}$) specified in 22.917(a) and 24.238(a).

3.9 Peak-Average Ratio

§24.232(d) RSS-132(5.4) RSS-133(6.4)

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

For pulsed signals, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power. For continuous signals, the trigger is set to "free run" in the CCDF measurement mode.

3.10 Frequency Stability / Temperature Variation

§2.1055 §22.355 §22.863 §22.905 §24.229 §24.235 RSS-132(4.3) RSS-133(6.3)

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-C-2004. 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 and AC powered 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 – For Part 22, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency. For Part 24, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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 fifteen minutes 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.

4.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8447D	Broadband Amplifier	5/8/2012	Annual	5/8/2013	2443A01900
Agilent	E8267C	Vector Signal Generator	10/10/2011	Biennial	10/10/2013	US42340152
Agilent	N9020A	MXA Signal Analyzer	10/9/2012	Annual	10/9/2013	US46470561
Espec	ESX-2CA	Environmental Chamber	4/4/2012	Annual	4/4/2013	17620
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	11/14/2011	Biennial	11/14/2013	9105-2404
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Tx	11/14/2011	Biennial	11/14/2013	9105-2403
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	1/26/2012	Biennial	1/26/2014	A051107
Rohde & Schwarz	CMU200	Base Station Simulator	N/A		N/A	836536/0005
Anritsu	MA2411B	Pulse Sensor	9/19/2012	Annual	9/19/2013	1027293
Anritsu	ML2495A	Power Meter	10/11/2012	Annual	10/11/2013	1039008
Sunol	DRH-118	Horn Antenna (1-18 GHz)	6/17/2011	Biennial	6/17/2013	A042511
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Tx	10/3/2011	Biennial	10/3/2013	91052522TX
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	10/3/2011	Biennial	10/3/2013	91052523RX
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	7/22/2011	Biennial	7/22/2013	125518
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	5/30/2012	Biennial	5/30/2014	135427
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	6/26/2012	Annual	6/26/2013	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/30/2012	Annual	5/30/2013	100040
-	LTx1	Licensed Transmitter Cable Set	1/17/2013	Annual	1/17/2014	N/A
Rohde & Schwarz	ESU26	EMI Test Receiver	2/25/2013	Annual	2/25/2014	100342
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	3/29/2013	Annual	3/29/2014	N/A
Mini-Circuits	VHF-1200+	High Pass Filter	1/17/2013	Annual	1/17/2014	30923
Mini-Circuits	VHF-3100+	High Pass Filter	1/21/2013	Annual	1/21/2014	31144
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	11/7/2012	Biennial	11/7/2014	128338

Table 4-1. Test Equipment

Note:

Equipment used for signaling with a calibration date of “N/A” shown in this list was only used for maintaining a link between the piece of equipment and the EUT. This equipment was not used to make direct calibrated measurements.

If the “Cal Date” or “Cal Due” date falls within the testing period, care was taken to ensure that the piece of equipment is used for testing before calibration was due, or the equipment was used after its calibration.

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

Example: Spurious emission at 3700.40 MHz

The receive spectrum 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 spectrum 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 25.50 dBm so this harmonic was 25.50 dBm – (-24.80) = 50.3 dBc.

6.0 TEST RESULTS

6.1 Summary

Company Name: NEC Corporation of America

FCC ID: A98-HDN2538

FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)

Mode(s): (GSM / WCDMA)

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (TX)					
2.1049	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 7.0
2.1051 22.917(a) 24.238(a)	Band Edge / Conducted Spurious Emissions	> 43 + $\log_{10}$ (P[Watts]) at Band Edge and for all out-of-band emissions		PASS	Section 7.0
24.232(d)	Peak-Average Ratio	< 13 dB		PASS	Section 7.0
2.1046	Transmitter Conducted Output Power	N/A		PASS	RF Exposure Report
22.913(a.2)	Effective Radiated Power	< 7 Watts max. ERP	RADIATED	PASS	Section 6.2
24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS	Section 6.3
2.1053 22.917(a) 24.238(a)	Undesirable Emissions	> 43 + $\log_{10}$ (P[Watts]) for all out-of-band emissions		PASS	Sections 6.4, 6.5, 6.6
2.1055 22.355 22.863 22.905 24.229 24.235	Frequency Stability	< 2.5 ppm (Part 22) Emission must remain in band (Part 24)		PASS	Sections 6.7, 6.8, 6.9

Table 6-1. Summary of Test Results

Notes:

1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
2) The analyzer plots shown in Section 7.0 were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.

6.2 Cellular Effective Radiated Power (ERP)

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

Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Antenna Gain [dBd]	Pol [H/V]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.20	GSM850	Standard	25.31	4.59	H	29.90	0.978	38.45	-8.55
836.60	GSM850	Standard	25.29	4.82	H	30.11	1.027	38.45	-8.34
848.80	GSM850	Standard	24.82	5.05	H	29.87	0.970	38.45	-8.58

Table 6-2. ERP (Cellular GSM)

Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Antenna Gain [dBd]	Pol [H/V]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
826.40	WCDMA850	Standard	16.70	4.63	H	21.33	0.136	38.45	-17.12
836.60	WCDMA850	Standard	17.60	4.80	H	22.40	0.174	38.45	-16.06
846.60	WCDMA850	Standard	16.08	5.01	H	21.09	0.128	38.45	-17.36

Table 6-4. ERP (Cellular WCDMA)

NOTES:

1) This device was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active. This device was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to "1."

2) This unit was tested with its standard battery.

3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

6.3 PCS Effective Radiated Power (EIRP)

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

Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.20	GSM1900	Standard	21.15	9.60	H	30.75	1.188	33.01	-2.26
1880.00	GSM1900	Standard	19.90	9.53	H	29.43	0.877	33.01	-3.58
1909.80	GSM1900	Standard	19.71	9.47	H	29.18	0.829	33.01	-3.83

Table 6-3. EIRP (PCS GSM)

NOTES:

1) This device was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active. This device was tested under all R.C.s and S.O.s and the worst case is reported with RC3/SO55 with "All Up" power control bits. This device was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to "1."

2) This unit was tested with its standard battery.

3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

6.4 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:	29.90	dBm	=	0.978 W
MODULATION SIGNAL:	GSM (GMSK)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	42.90	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1648.40	-37.18	2.60	-34.58	H	64.5
2472.60	-44.29	2.90	-41.40	H	71.3
3296.80	-54.16	5.44	-48.72	H	78.6
4121.00	-52.38	7.05	-45.33	H	75.2
4945.20	-80.98	7.86	-73.12	H	103.0

Table 6-4. Radiated Spurious Data (Cellular GSM Mode – Ch. 128)

NOTES:

1) This device was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.

2) This unit was tested with its standard battery.

3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

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:	30.11	dBm	=	1.027 W
MODULATION SIGNAL:	GSM (GMSK)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	43.11	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1673.20	-35.40	2.34	-33.06	H	63.2
2509.80	-42.24	2.84	-39.40	H	69.5
3346.40	-53.18	5.64	-47.54	H	77.7
4183.00	-51.07	7.15	-43.93	H	74.0
5019.60	-81.01	7.97	-73.04	H	103.2

Table 6-5. Radiated Spurious Data (Cellular GSM Mode – Ch. 190)

NOTES:

1) This device was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.

2) This unit was tested with its standard battery.

3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

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:	29.87	dBm	=	0.970 W
MODULATION SIGNAL:	GSM (GMSK)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	42.87	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1697.60	-36.74	2.08	-34.66	H	64.5
2546.40	-45.86	3.17	-42.69	H	72.6
3395.20	-55.47	5.84	-49.63	H	79.5
4244.00	-53.79	7.24	-46.55	H	76.4
5092.80	-80.78	8.03	-72.76	H	102.6

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

NOTES:

1) This device was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.

2) This unit was tested with its standard battery.

3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

6.5 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:	21.33	dBm	=	0.136 W
MODULATION SIGNAL:	WCDMA			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	34.33	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1652.80	-54.79	2.55	-52.24	H	73.6
2479.20	-52.33	2.86	-49.47	H	70.8
3305.60	-81.82	5.48	-76.35	H	97.7
4132.00	-81.53	7.06	-74.46	H	95.8
4958.40	-81.00	7.88	-73.12	H	94.5

Table 6-7. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4132)

NOTES:

1) This device was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to "1."

2) This unit was tested with its standard battery.

3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

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:	22.40	dBm	=	0.174 W
MODULATION SIGNAL:	WCDMA			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	35.40	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1673.20	-53.61	2.37	-51.24	H	73.6
2509.80	-50.95	2.80	-48.15	H	70.5
3346.40	-81.96	5.62	-76.35	H	98.7
4183.00	-81.60	7.13	-74.46	H	96.9
5019.60	-81.07	7.96	-73.12	H	95.5

Table 6-8. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4183)

NOTES:

1) This device was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to "1."

2) This unit was tested with its standard battery.

3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

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:	21.09	dBm	=	0.128 W
MODULATION SIGNAL:	WCDMA			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	34.09	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1693.20	-56.04	2.13	-53.91	H	75.0
2539.80	-52.55	3.11	-49.43	H	70.5
3386.40	-82.15	5.80	-76.35	H	97.4
4233.00	-81.69	7.22	-74.46	H	95.6
5079.60	-81.13	8.01	-73.12	H	94.2

Table 6-9. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4233)

NOTES:

1) This device was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to "1."

2) This unit was tested with its standard battery.

3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

6.6 PCS GSM Radiated Measurements

§2.1053 §24.238(a) RSS-133(6.5.2)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1850.20	MHz		
CHANNEL:	512			
MEASURED OUTPUT POWER:	30.75	dBm	=	1.188 W
MODULATION SIGNAL:	GSM (GMSK)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	43.75	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3700.40	-53.32	8.40	-44.92	H	75.7
5550.60	-56.40	10.62	-45.78	H	76.5
7400.80	-51.46	11.82	-39.64	H	70.4
9251.00	-53.31	13.30	-40.01	H	70.8
11101.20	-78.19	13.50	-64.69	H	95.4

Table 6-10. Radiated Spurious Data (PCS GSM Mode – Ch. 512)

NOTES:

1) This device was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.

2) This unit was tested with its standard battery.

3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

PCS GSM Radiated Measurements (Cont'd)

§2.1053 §24.238(a) RSS-133(6.5.2)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1880.00	MHz		
CHANNEL:	661			
MEASURED OUTPUT POWER:	29.43	dBm	=	0.877 W
MODULATION SIGNAL:	GSM (GMSK)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	42.43	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3760.00	-56.01	8.42	-47.58	H	77.0
5640.00	-57.33	10.66	-46.67	H	76.1
7520.00	-53.82	11.92	-41.89	H	71.3
9400.00	-53.80	13.24	-40.56	H	70.0
11280.00	-77.91	13.49	-64.42	H	93.9

Table 6-11. Radiated Spurious Data (PCS GSM Mode – Ch. 661)

NOTES:

1) This device was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.

2) This unit was tested with its standard battery.

3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

PCS GSM Radiated Measurements (Cont'd)

§2.1053 §24.238(a) RSS-133(6.5.2)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1909.80	MHz		
CHANNEL:	810			
MEASURED OUTPUT POWER:	29.18	dBm	=	0.829 W
MODULATION SIGNAL:	GSM (GMSK)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	42.18	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3819.60	-53.83	8.57	-45.26	H	74.4
5729.40	-58.69	10.69	-48.00	H	77.2
7639.20	-51.24	12.07	-39.17	H	68.4
9549.00	-54.99	13.20	-41.79	H	71.0
11458.80	-77.84	13.42	-64.43	H	93.6

Table 6-12. Radiated Spurious Data (PCS GSM Mode – Ch. 810)

NOTES:

1) This device was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.

1) This unit was tested with its standard battery.

2) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

6.7 Cellular GSM Frequency Stability Measurements

§2.1055 §22.355 §22.863 §22.905 RSS-132(4.3)

OPERATING FREQUENCY: 836,600,000 Hz

CHANNEL: 190

REFERENCE VOLTAGE: 3.8 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,599,988	-12	-0.0000014
100 %		- 30	836,600,007	7	0.0000008
100 %		- 20	836,600,022	22	0.0000026
100 %		- 10	836,599,997	-3	-0.0000004
100 %		0	836,599,976	-24	-0.0000029
100 %		+ 10	836,599,971	-29	-0.0000035
100 %		+ 20	836,599,984	-16	-0.0000019
100 %		+ 30	836,599,973	-27	-0.0000032
100 %		+ 40	836,600,026	26	0.0000031
100 %		+ 50	836,599,998	-2	-0.0000002
115 %	4.37	+ 20	836,599,979	-21	-0.0000025
BATT. ENDPOINT	3.4	+ 20	836,599,987	-13	-0.0000016

Table 6-13. Frequency Stability Data (Cellular GSM Mode – Ch. 190)

Cellular GSM Frequency Stability Measurements (Cont'd)

§2.1055 §22.355 §22.863 §22.905 RSS-132(4.3)

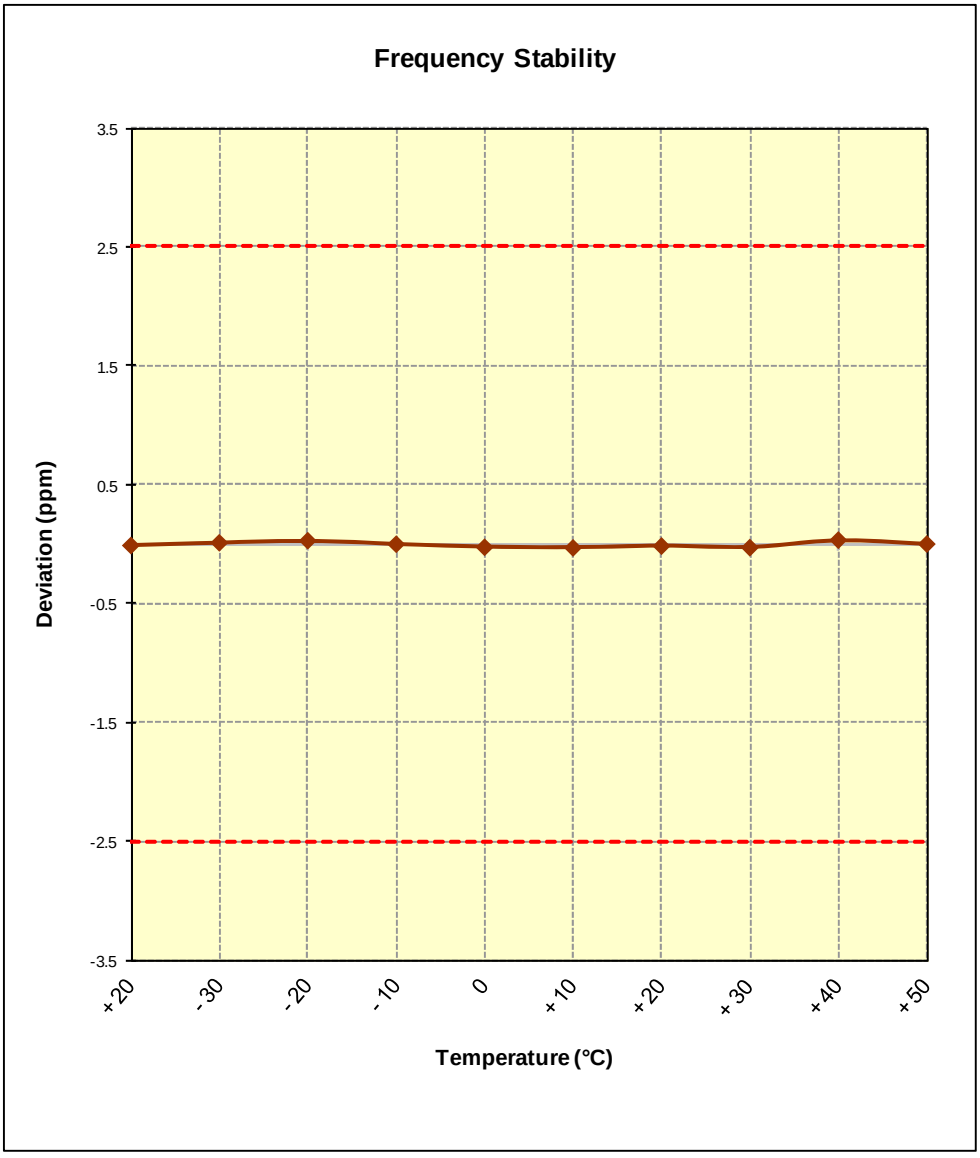


Figure 6-1. Frequency Stability Graph (Cellular GSM Mode – Ch. 190)

6.8 Cellular WCDMA Frequency Stability Measurements

§2.1055 §22.355 §22.863 §22.905 RSS-132(4.3)

OPERATING FREQUENCY: 836,600,000 Hz

CHANNEL: 4183

REFERENCE VOLTAGE: 3.8 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,600,016	16	0.0000019
100 %		- 30	836,599,973	-27	-0.0000032
100 %		- 20	836,599,972	-28	-0.0000033
100 %		- 10	836,600,030	30	0.0000036
100 %		0	836,600,017	17	0.0000020
100 %		+ 10	836,599,988	-12	-0.0000014
100 %		+ 20	836,599,990	-10	-0.0000012
100 %		+ 30	836,599,998	-2	-0.0000002
100 %		+ 40	836,600,005	5	0.0000006
100 %		+ 50	836,599,986	-14	-0.0000017
115 %	4.37	+ 20	836,599,984	-16	-0.0000019
BATT. ENDPOINT	3.40	+ 20	836,600,017	17	0.0000020

Table 6-14. Frequency Stability Data (Cellular WCDMA Mode – Ch. 4183)

Cellular WCDMA Frequency Stability Measurements (Cont'd)

§2.1055 §22.355 §22.863 §22.905 RSS-132(4.3)

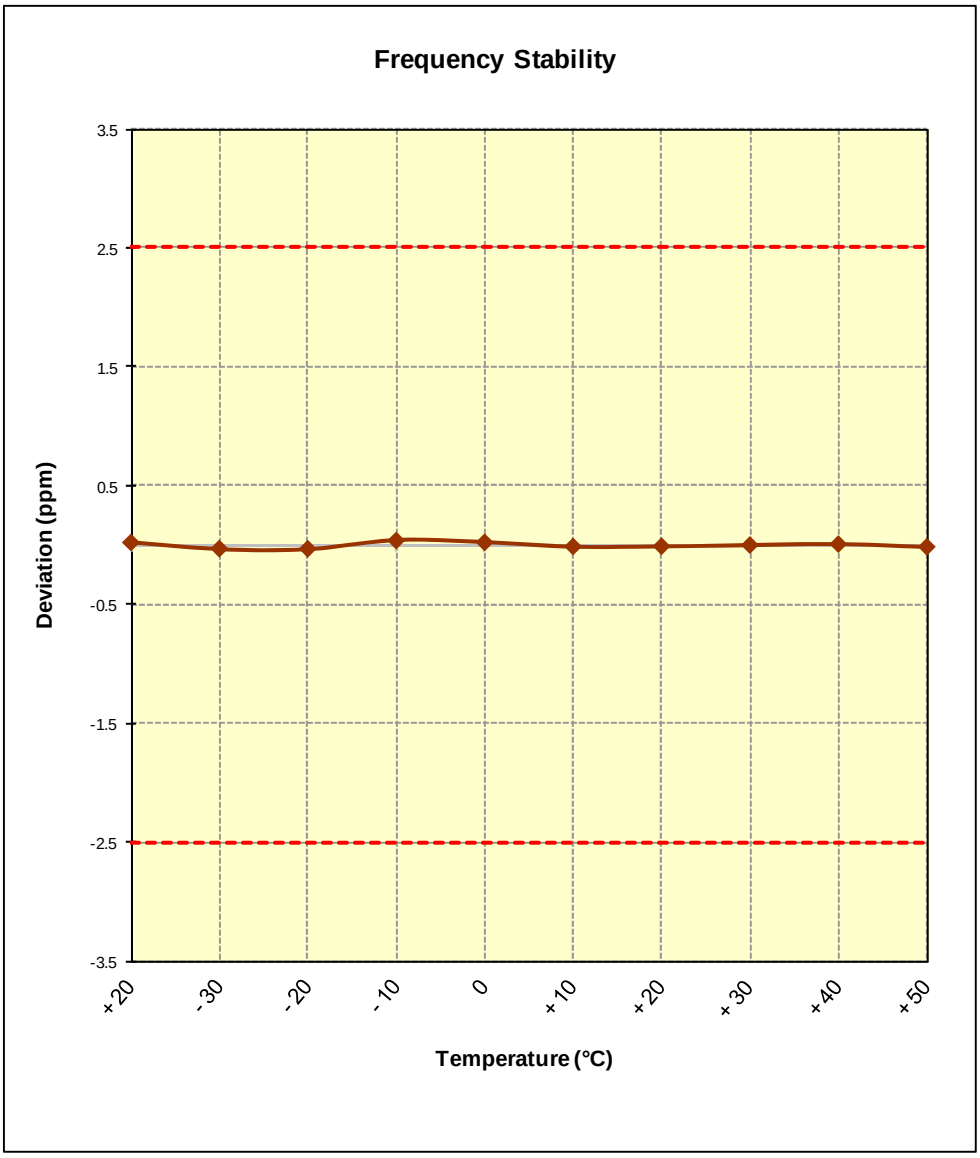


Figure 6-2. Frequency Stability Graph (Cellular WCDMA Mode – Ch. 4183)

6.9 PCS GSM Frequency Stability Measurements

§2.1055 §22.355 §24.229 §24.235 RSS-139(6.3)

OPERATING FREQUENCY: 1,880,000,000 Hz

CHANNEL: 661

REFERENCE VOLTAGE: 3.8 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,879,999,952	-48	-0.0000026
100 %		- 30	1,879,999,988	-12	-0.0000006
100 %		- 20	1,879,999,950	-50	-0.0000027
100 %		- 10	1,880,000,007	7	0.0000004
100 %		0	1,880,000,000	0	0.0000000
100 %		+ 10	1,879,999,945	-55	-0.0000029
100 %		+ 20	1,879,999,953	-47	-0.0000025
100 %		+ 30	1,880,000,032	32	0.0000017
100 %		+ 40	1,880,000,024	24	0.0000013
100 %		+ 50	1,880,000,043	43	0.0000023
115 %	4.37	+ 20	1,880,000,000	0	0.0000000
BATT. ENDPOINT	3.40	+ 20	1,879,999,943	-57	-0.0000030

Table 6-15. Frequency Stability Data (PCS GSM Mode – Ch. 661)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

PCS GSM Frequency Stability Measurements (Cont'd)

§2.1055 §22.355 §24.229 §24.235 RSS-139(6.3)

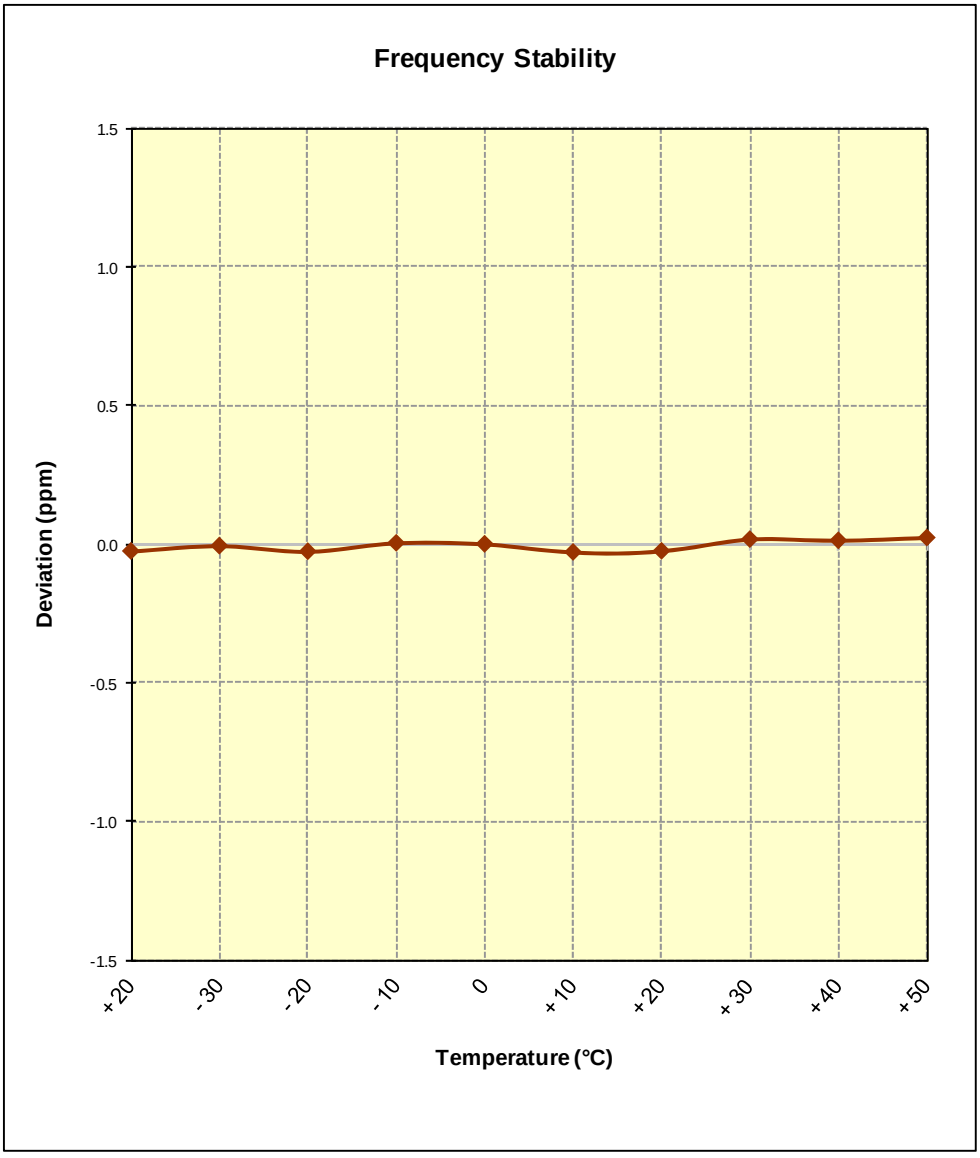
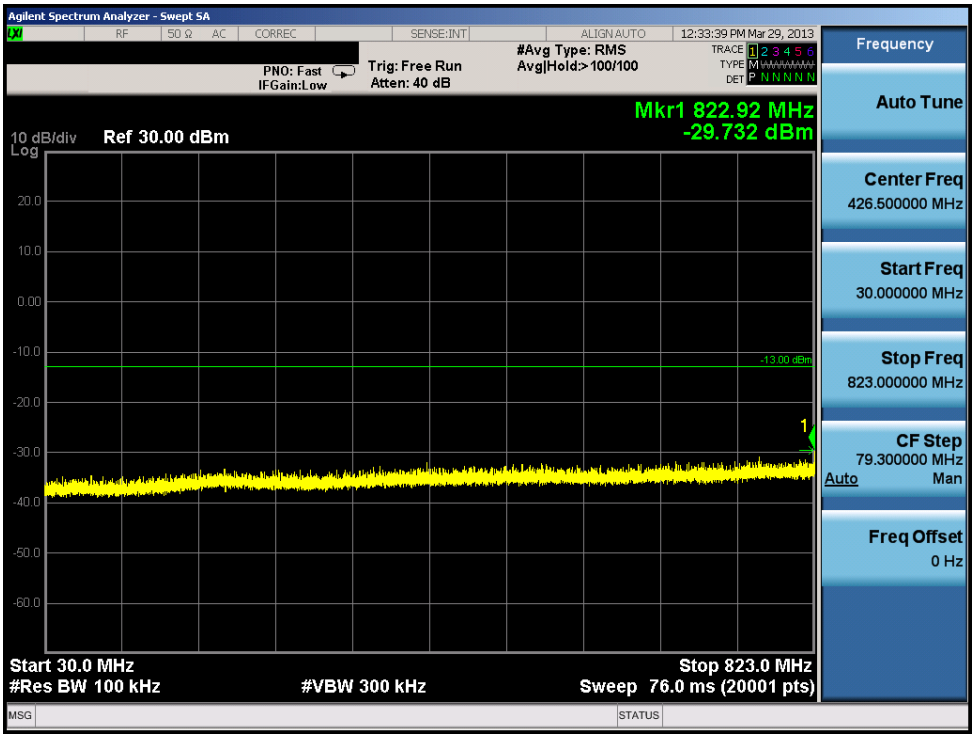
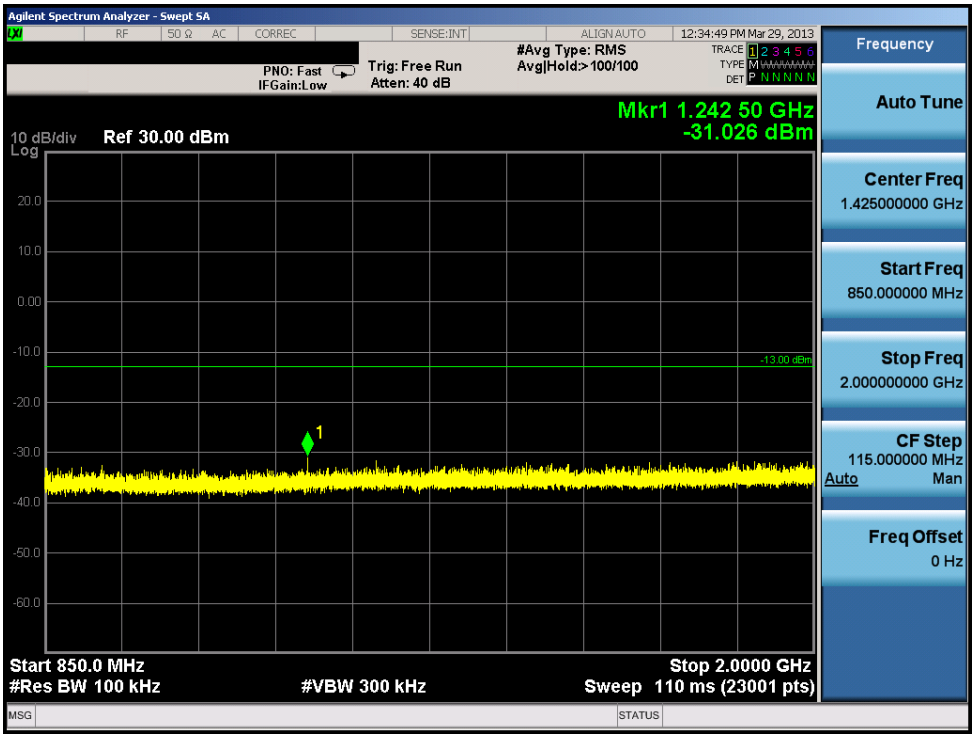


Figure 6-3. Frequency Stability Graph (PCS GSM Mode – Ch. 661)

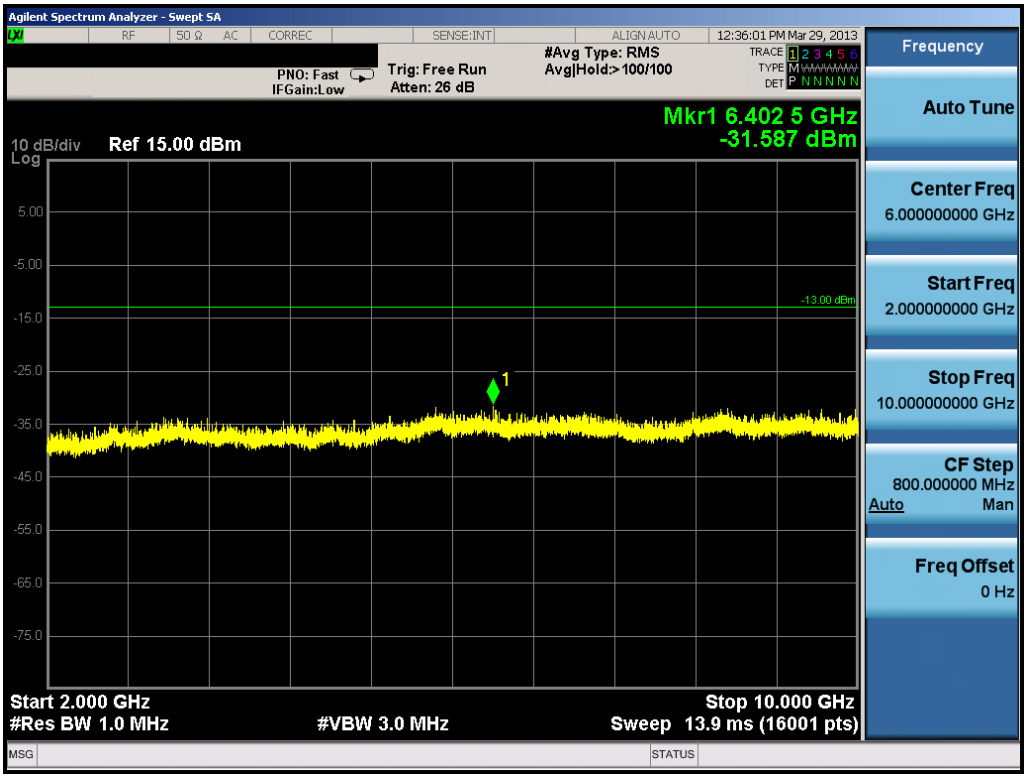
7.0 PLOTS OF EMISSIONS



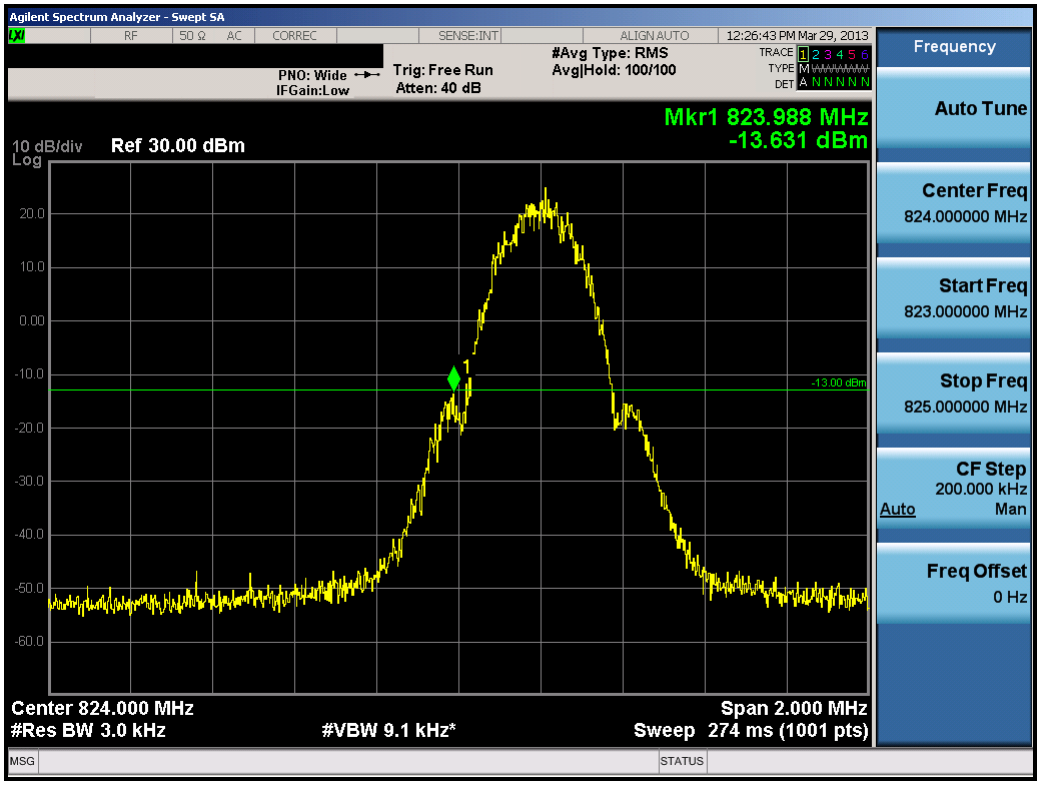
Plot 7-1. Conducted Spurious Plot (Cellular GSM Mode – Ch. 128)



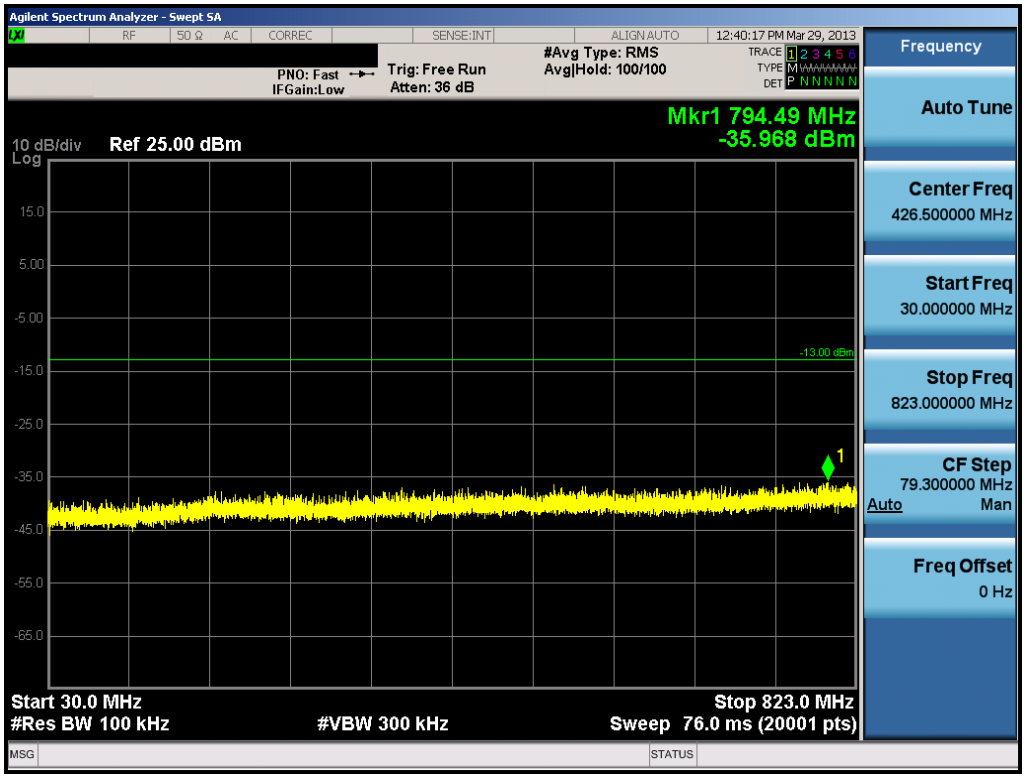
Plot 7-2. Conducted Spurious Plot (Cellular GSM Mode – Ch. 128)



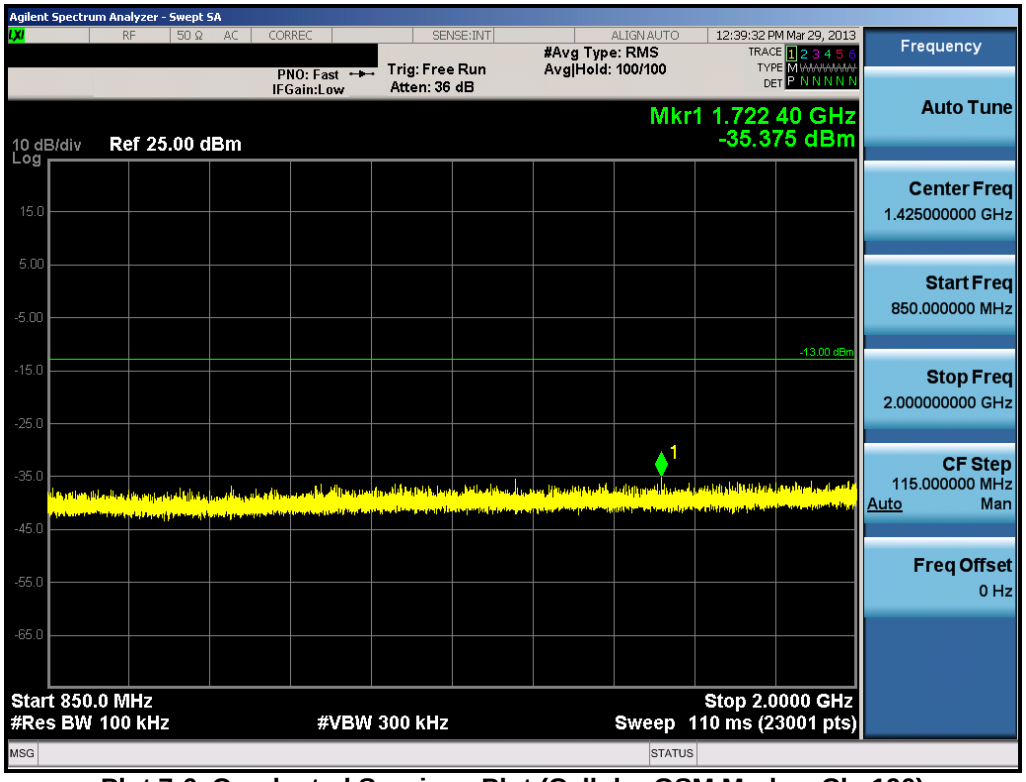
Plot 7-3. Conducted Spurious Plot (Cellular GSM Mode – Ch. 128)



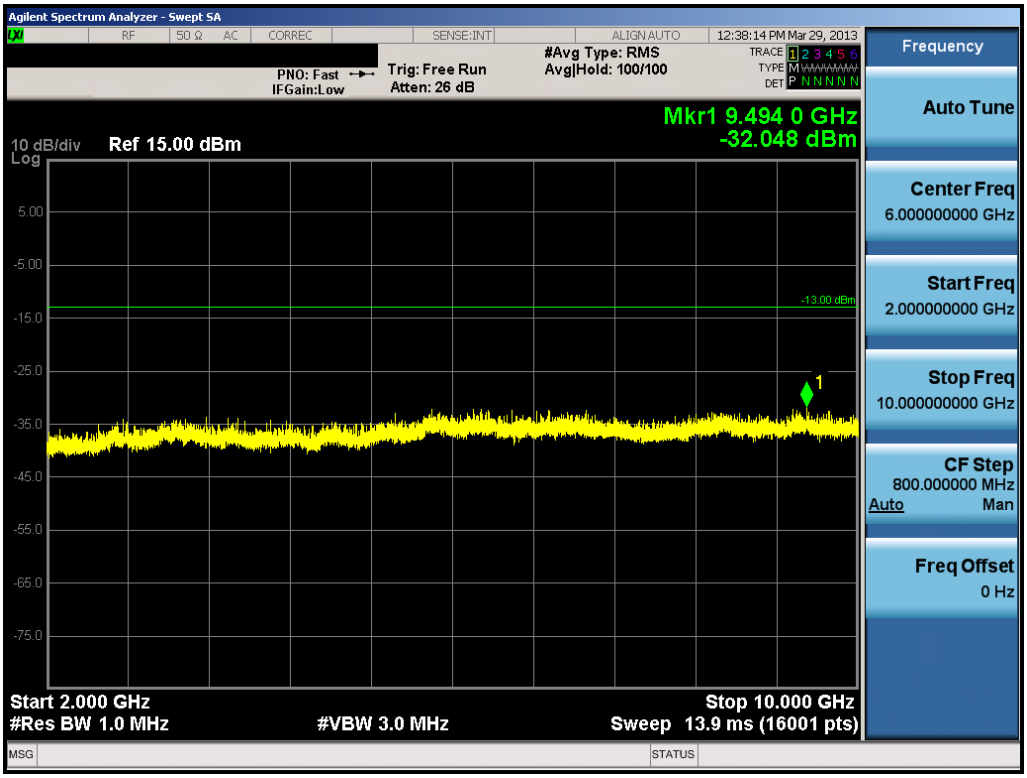
Plot 7-4. Band Edge Plot (Cellular GSM Mode – Ch. 128)



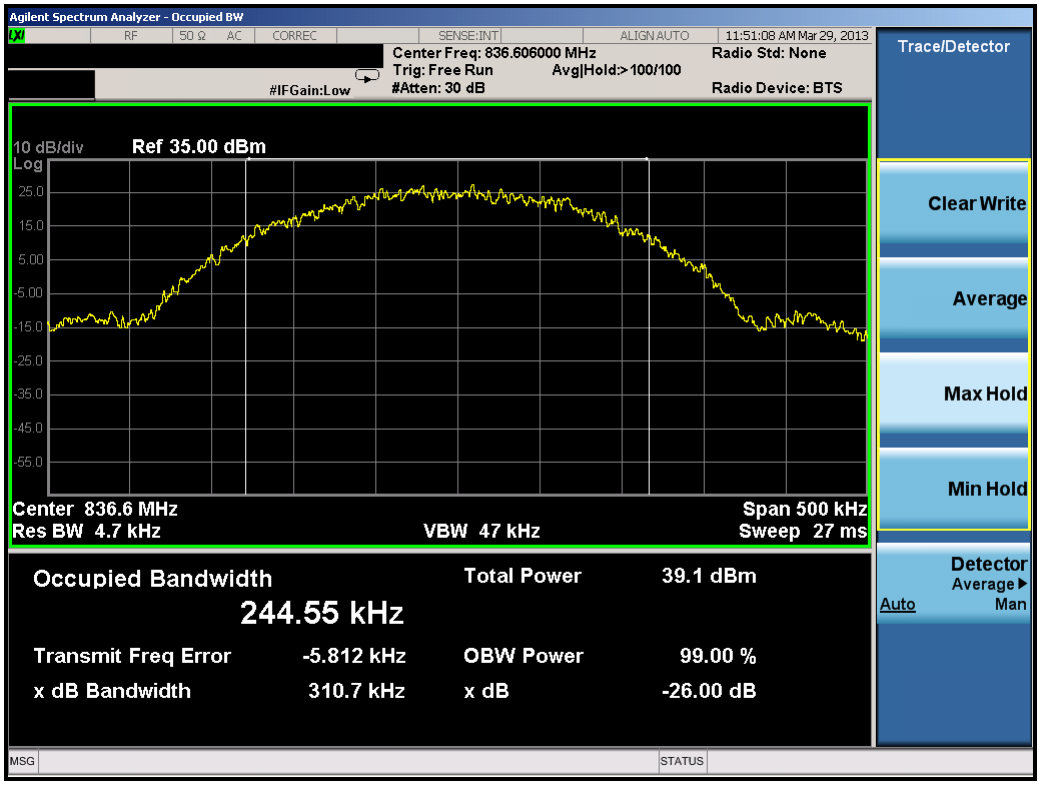
Plot 7-5. Conducted Spurious Plot (Cellular GSM Mode – Ch. 190)



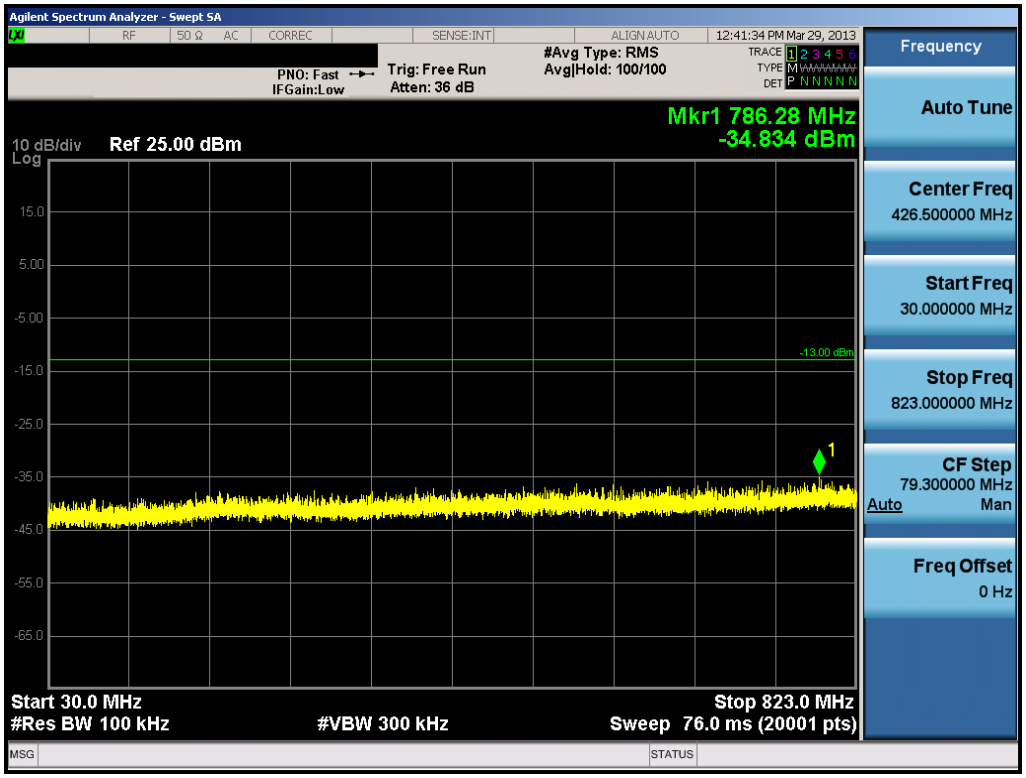
Plot 7-6. Conducted Spurious Plot (Cellular GSM Mode – Ch. 190)



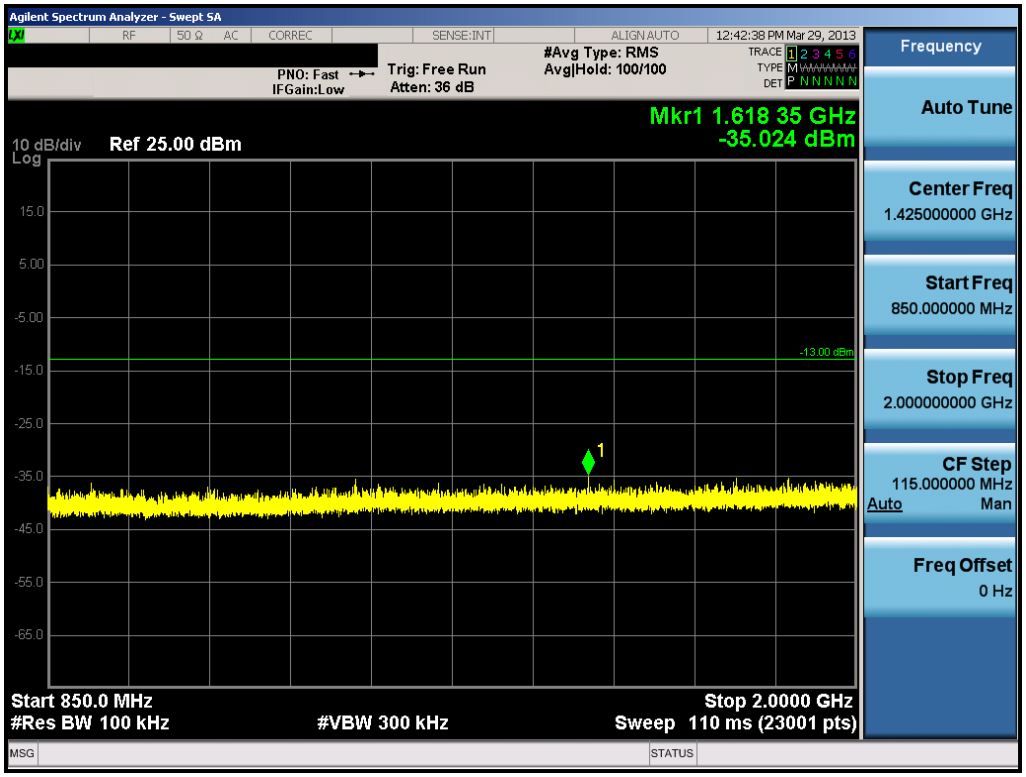
Plot 7-7. Conducted Spurious Plot (Cellular GSM Mode – Ch. 190)



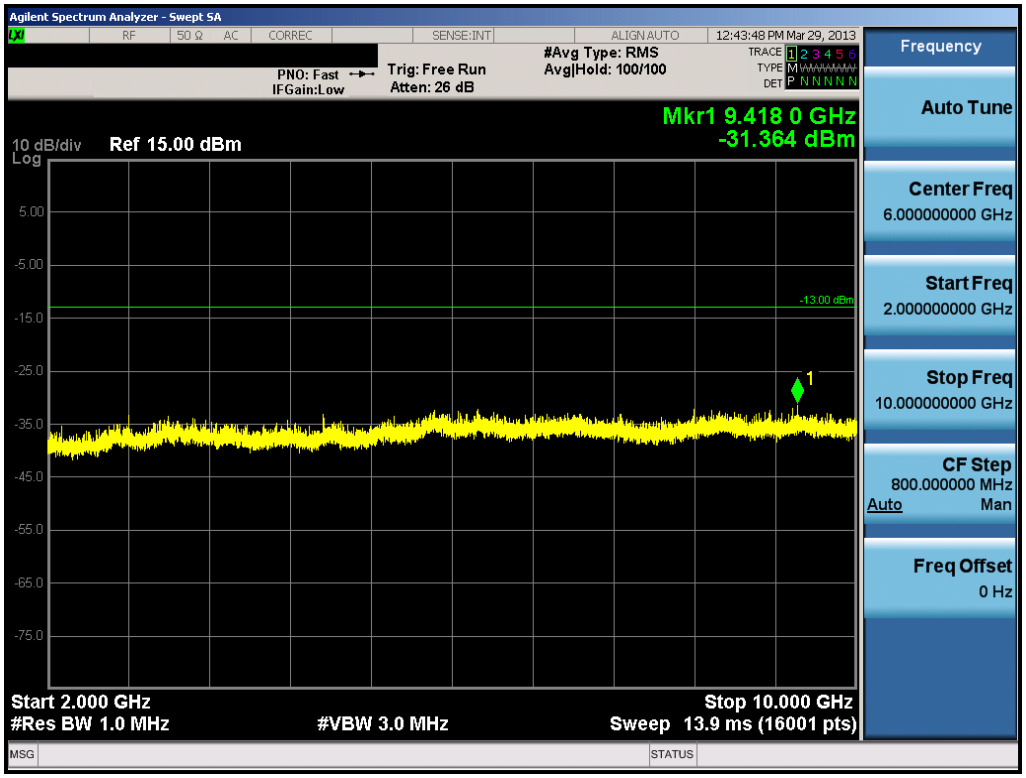
Plot 7-8. Occupied Bandwidth Plot (Cellular GSM Mode – Ch. 190)



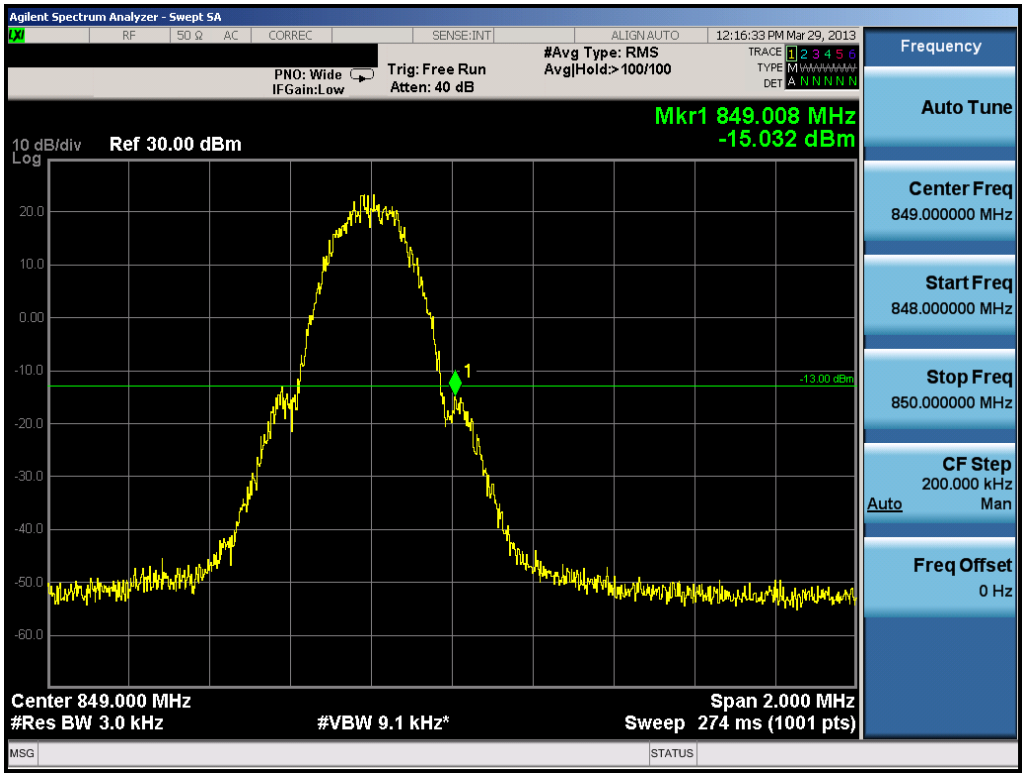
Plot 7-9. Conducted Spurious Plot (Cellular GSM Mode – Ch. 251)



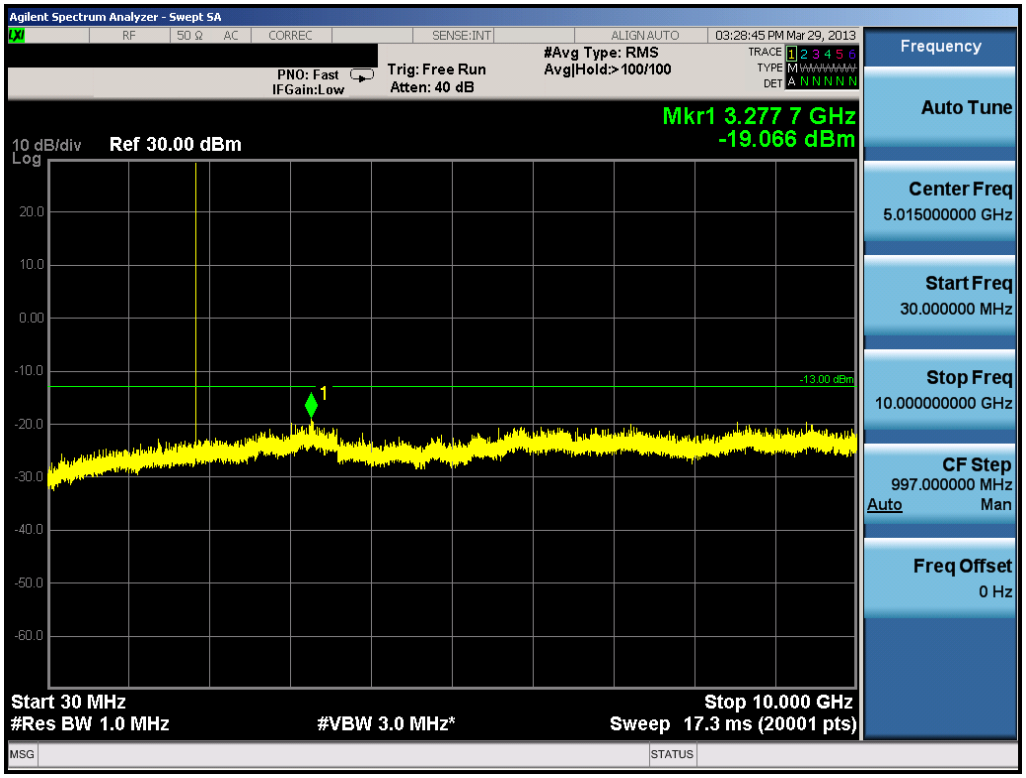
Plot 7-10. Conducted Spurious Plot (Cellular GSM Mode – Ch. 251)



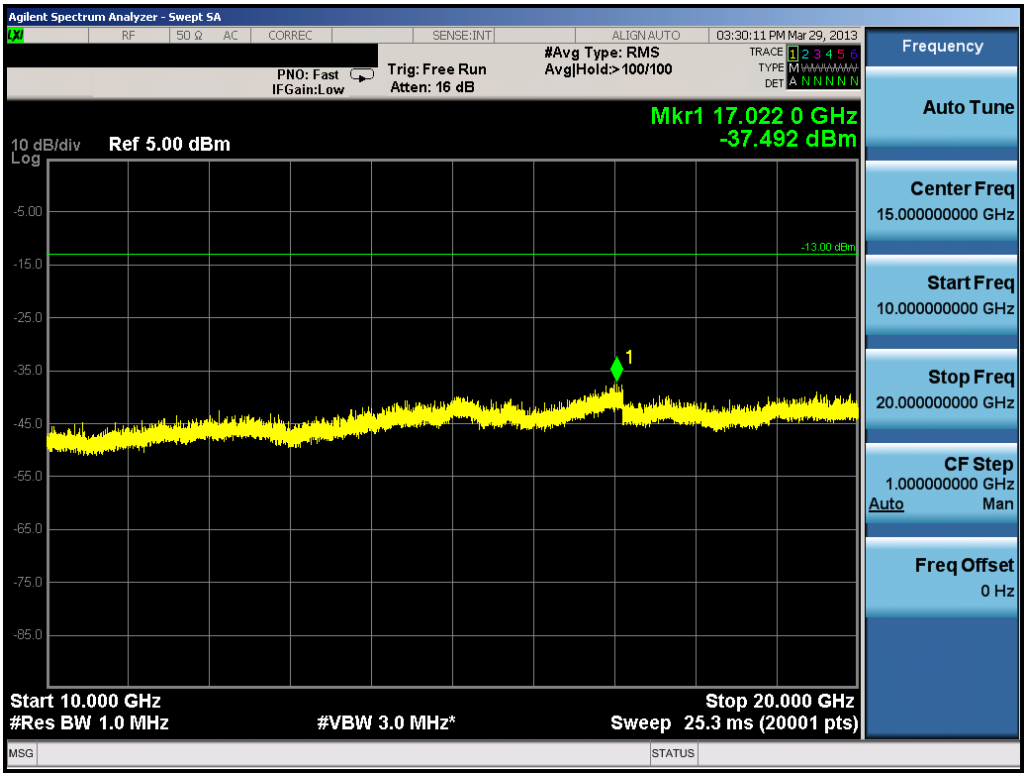
Plot 7-11. Conducted Spurious Plot (Cellular GSM Mode – Ch. 251)



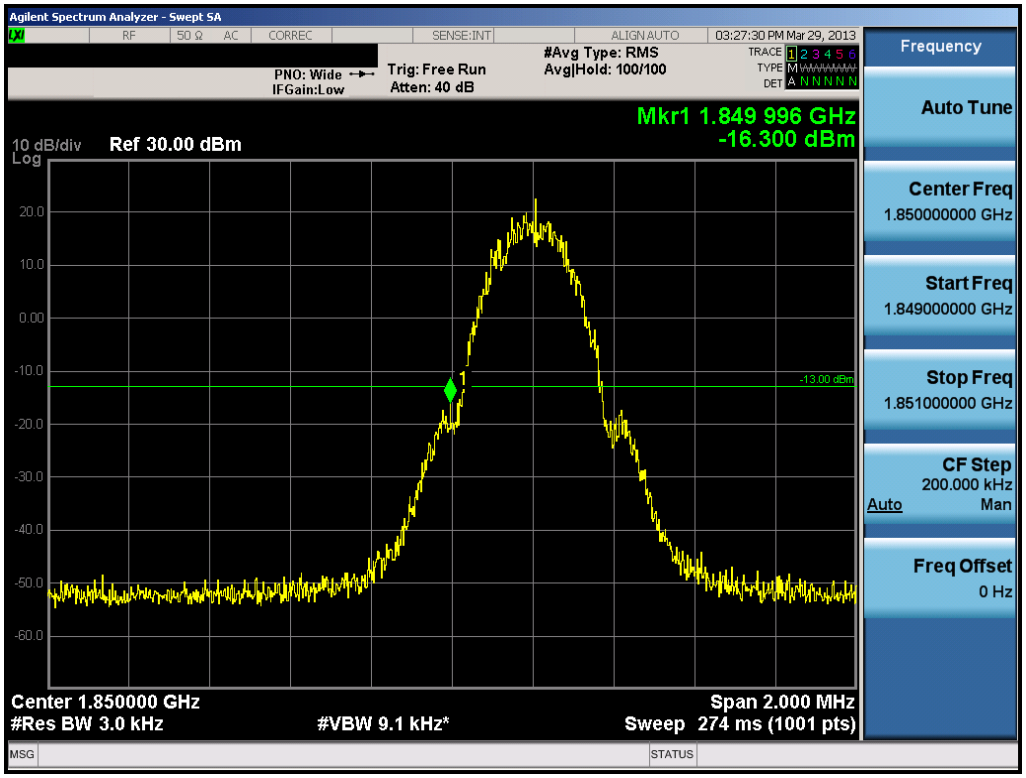
Plot 7-12. Band Edge Plot (Cellular GSM Mode – Ch. 251)



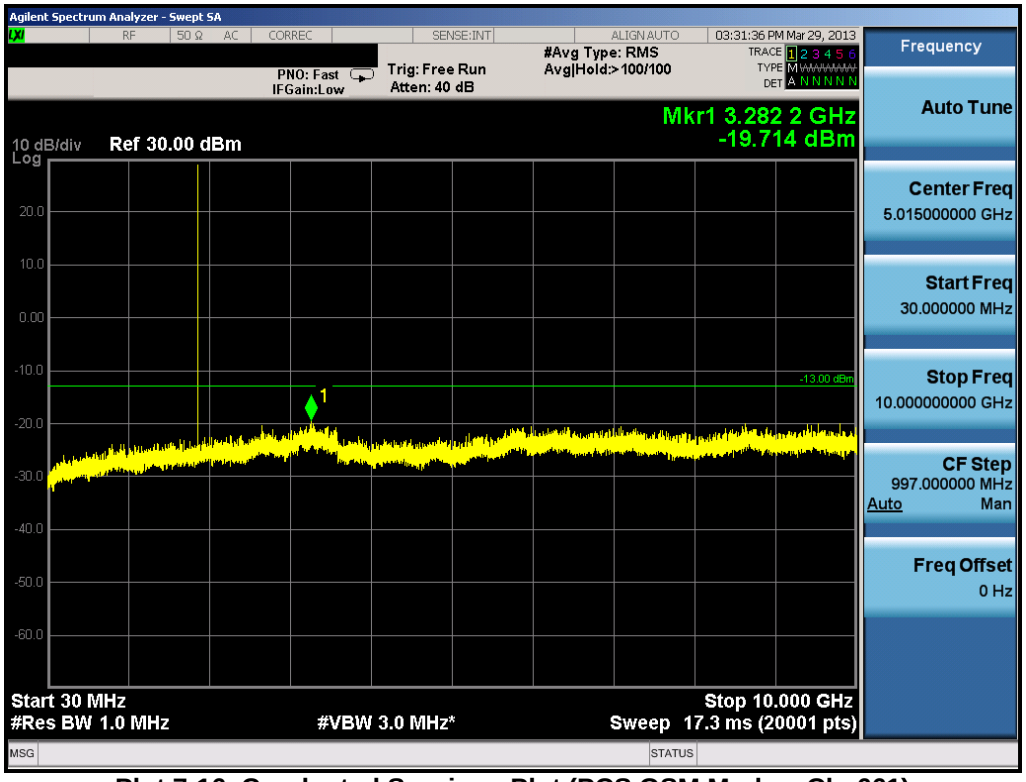
Plot 7-13. Conducted Spurious Plot (PCS GSM Mode – Ch. 512)



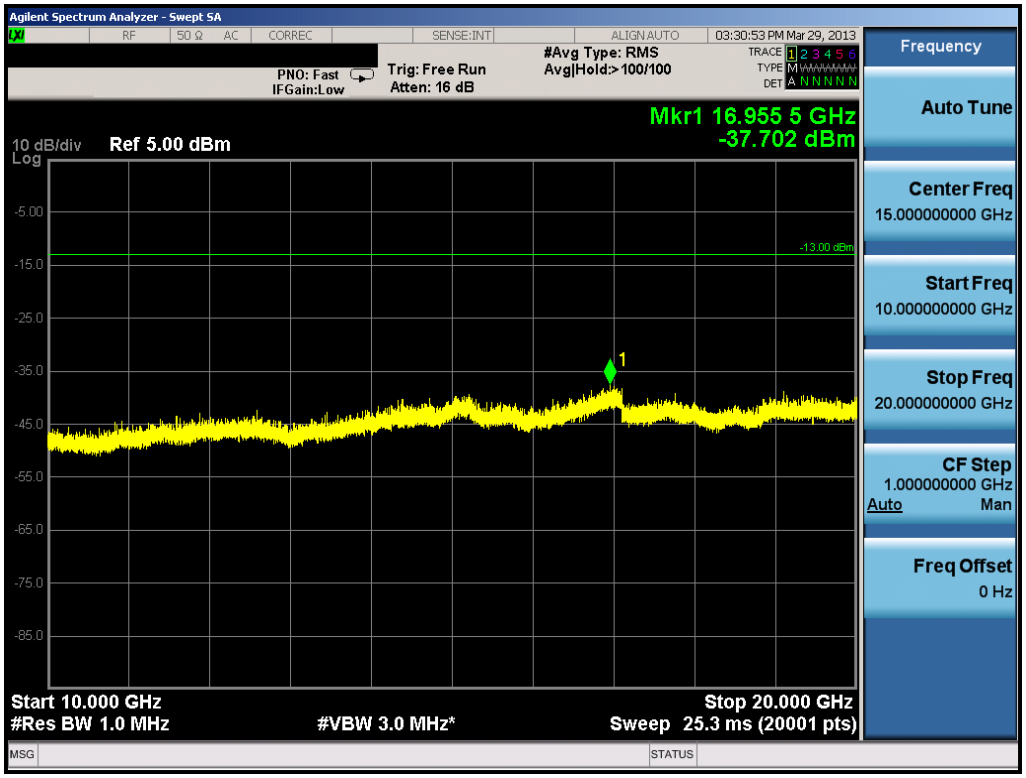
Plot 7-14. Conducted Spurious Plot (PCS GSM Mode – Ch. 512)



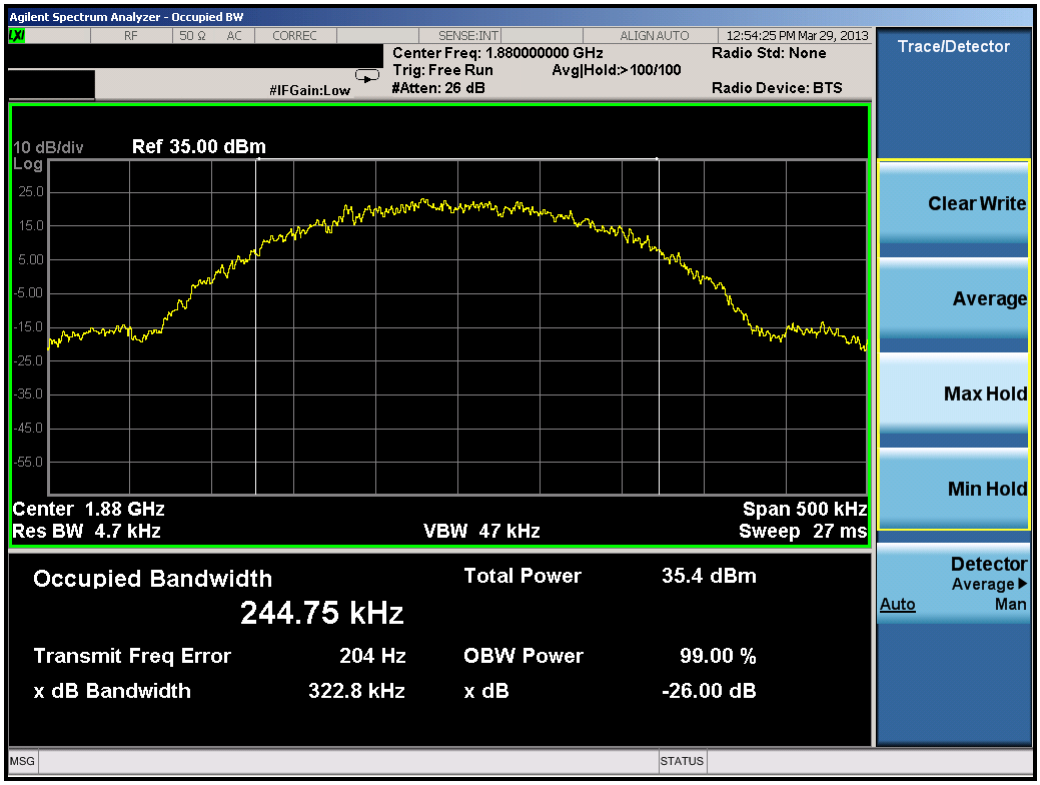
Plot 7-15. Band Edge Plot (PCS GSM Mode – Ch. 512)



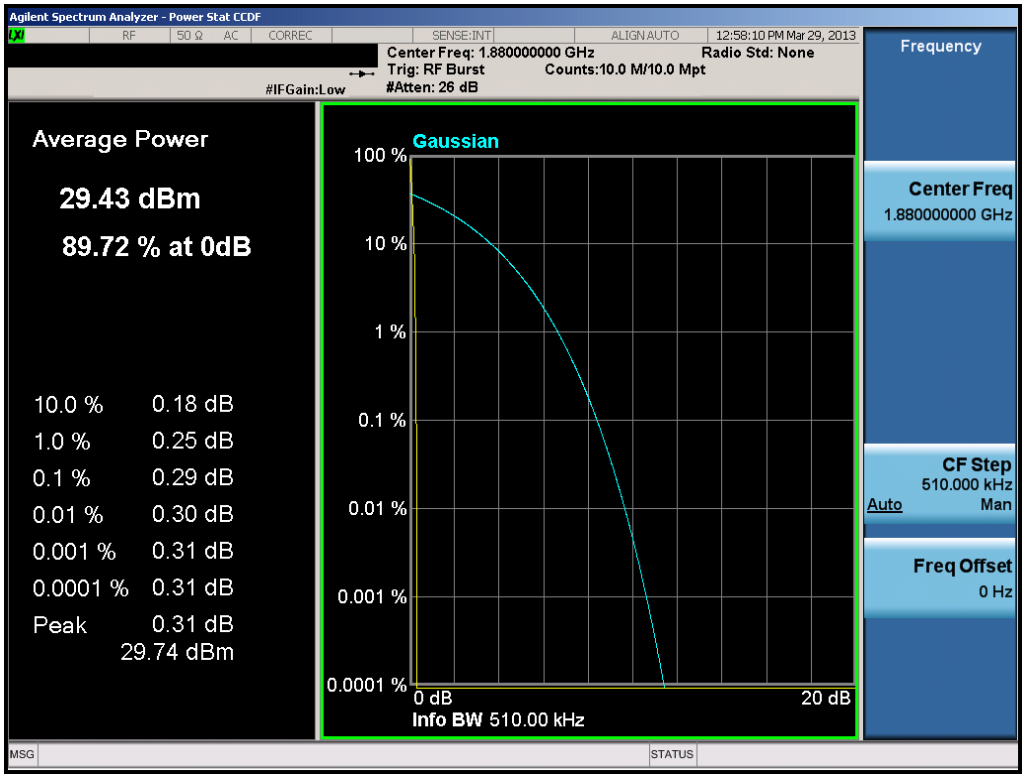
Plot 7-16. Conducted Spurious Plot (PCS GSM Mode – Ch. 661)



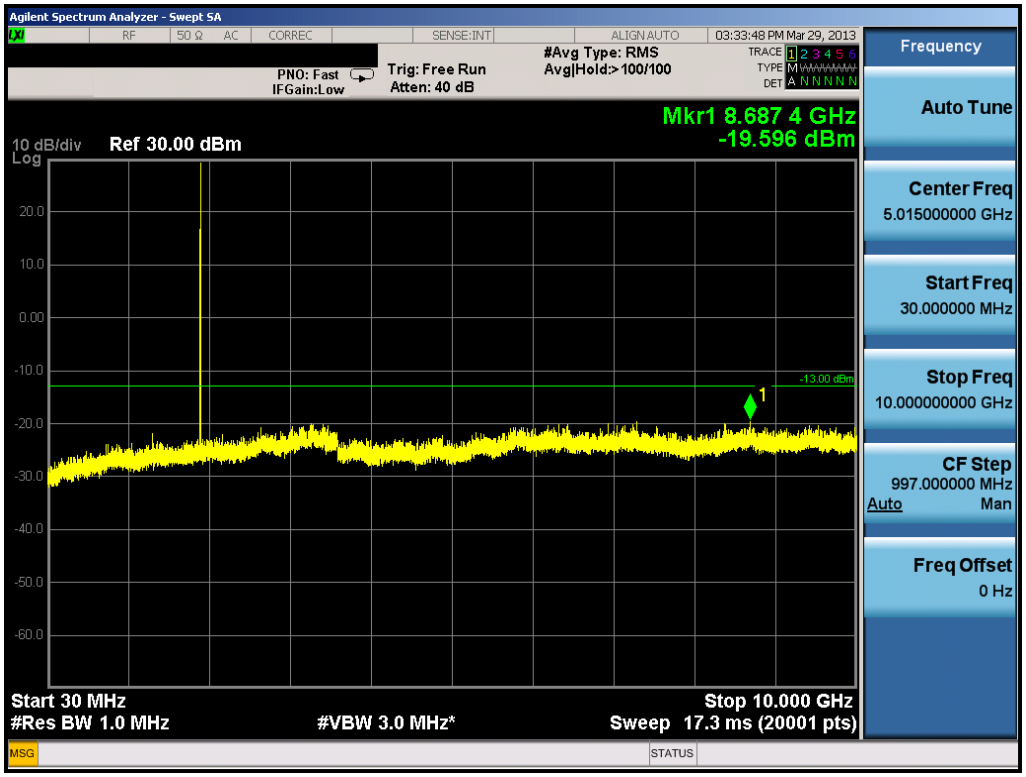
Plot 7-17. Conducted Spurious Plot (PCS GSM Mode – Ch. 661)



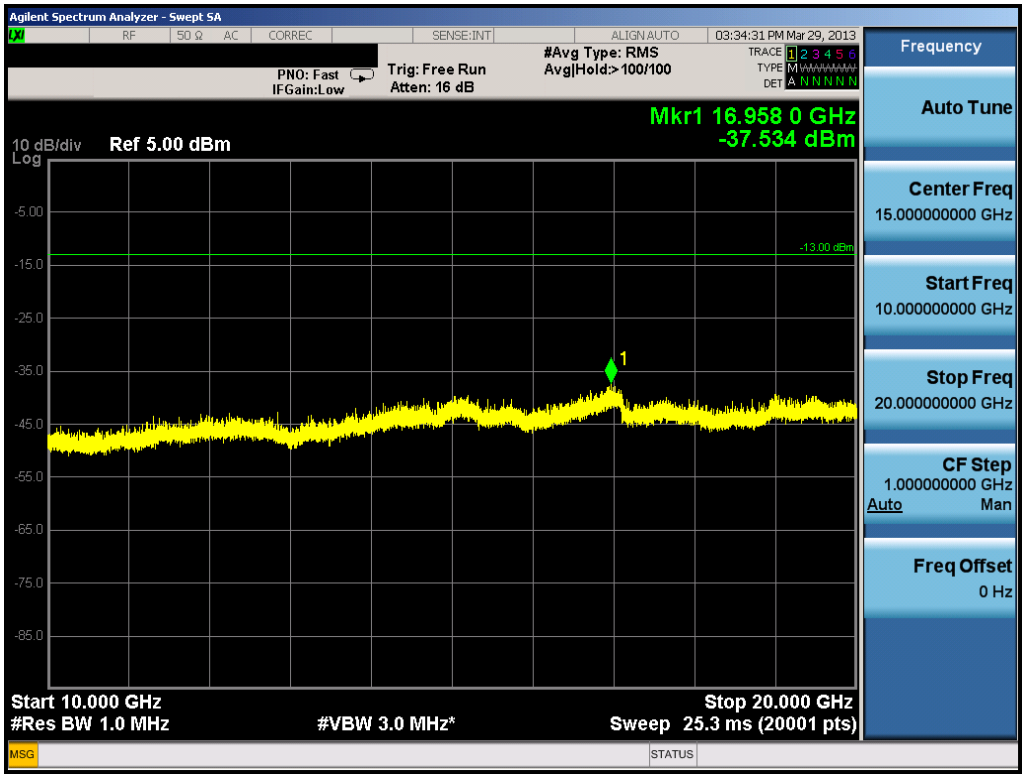
Plot 7-18. Occupied Bandwidth Plot (PCS GSM Mode – Ch. 661)



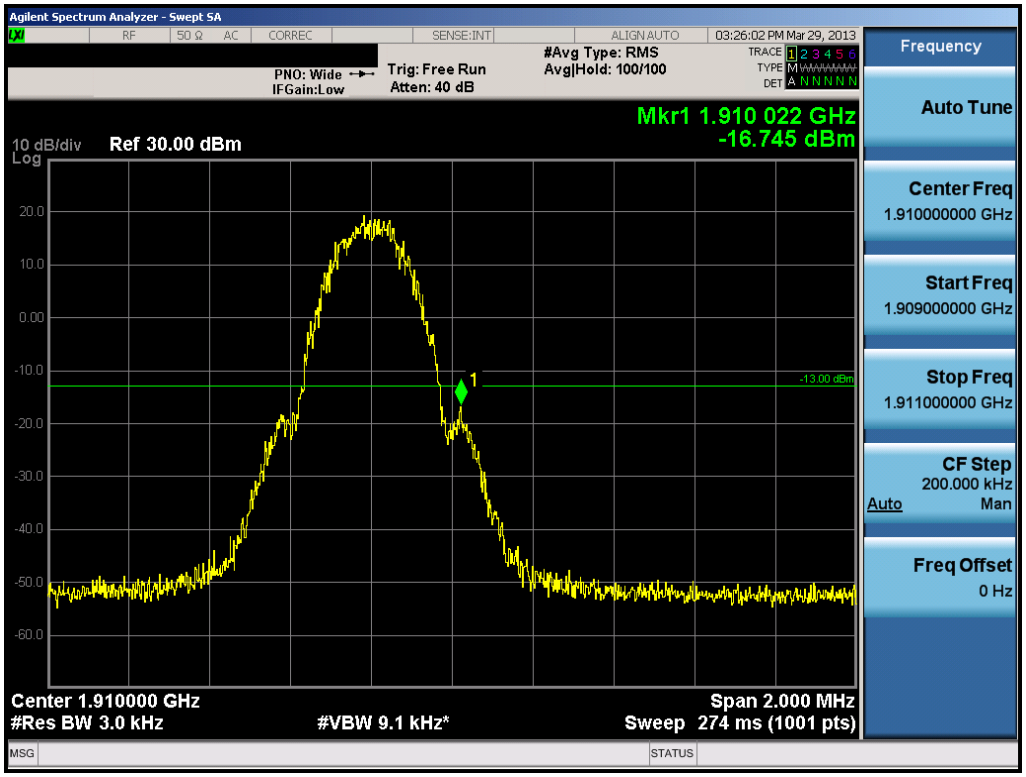
Plot 7-19. Peak-Average Ratio Plot (PCS GSM Mode – Ch. 661)



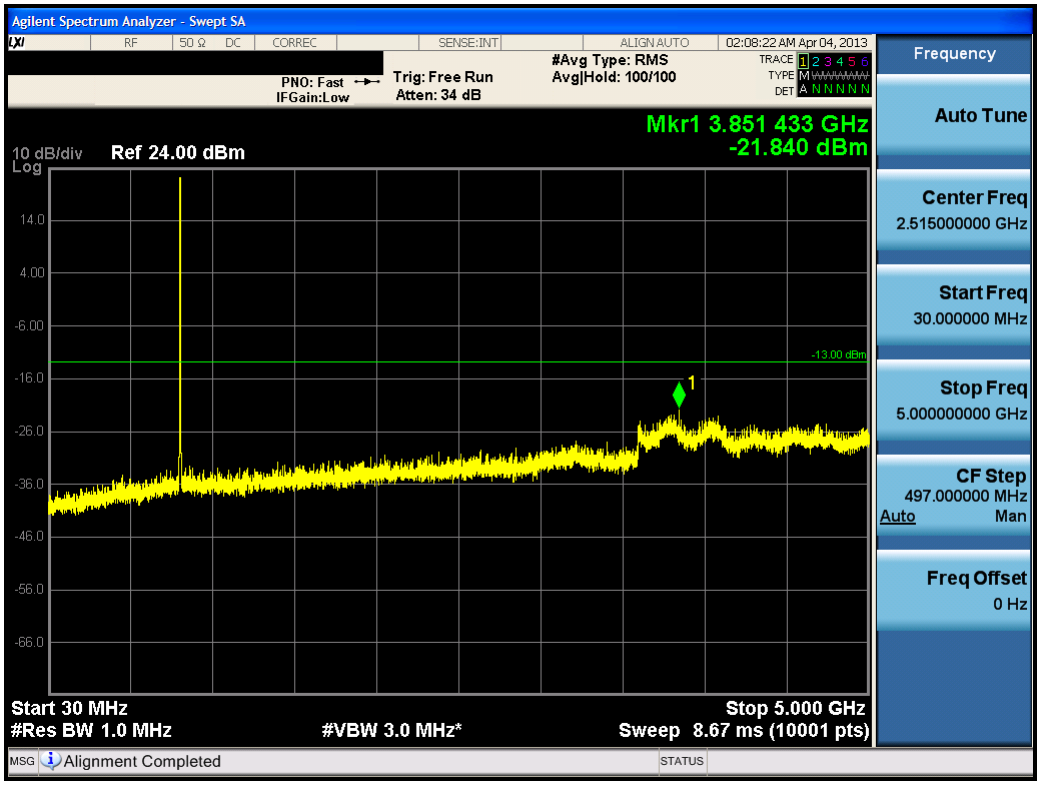
Plot 7-20. Conducted Spurious Plot (PCS GSM Mode – Ch. 810)



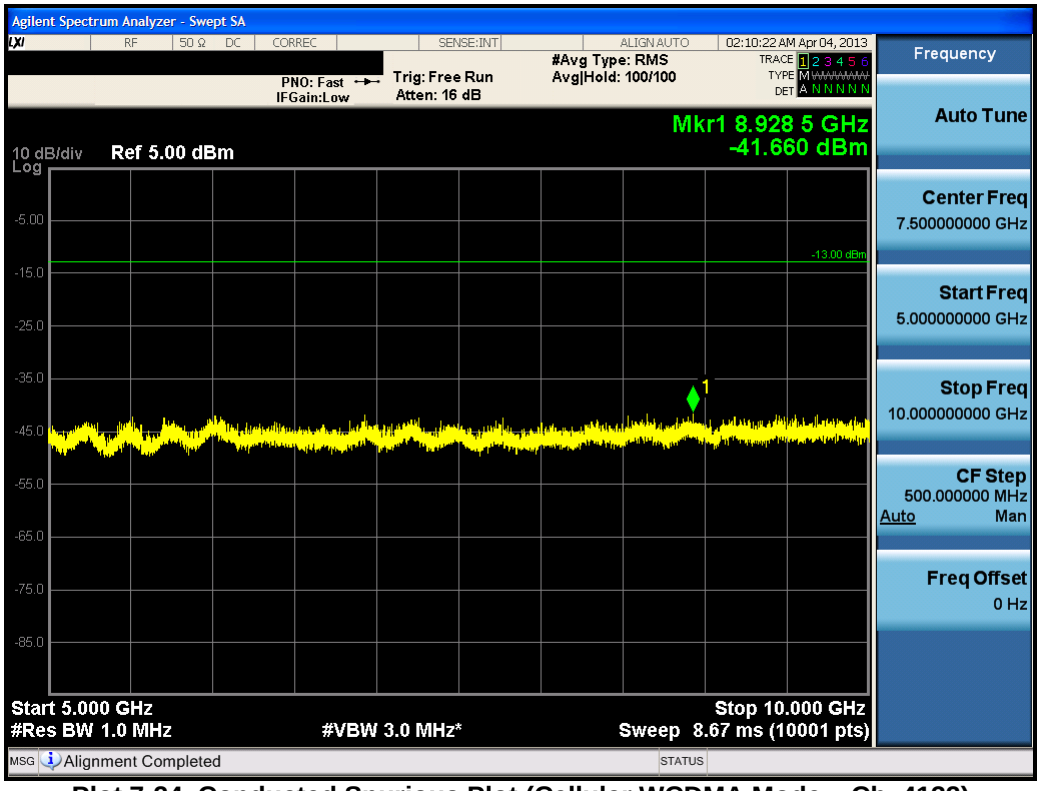
Plot 7-21. Conducted Spurious Plot (PCS GSM Mode – Ch. 810)



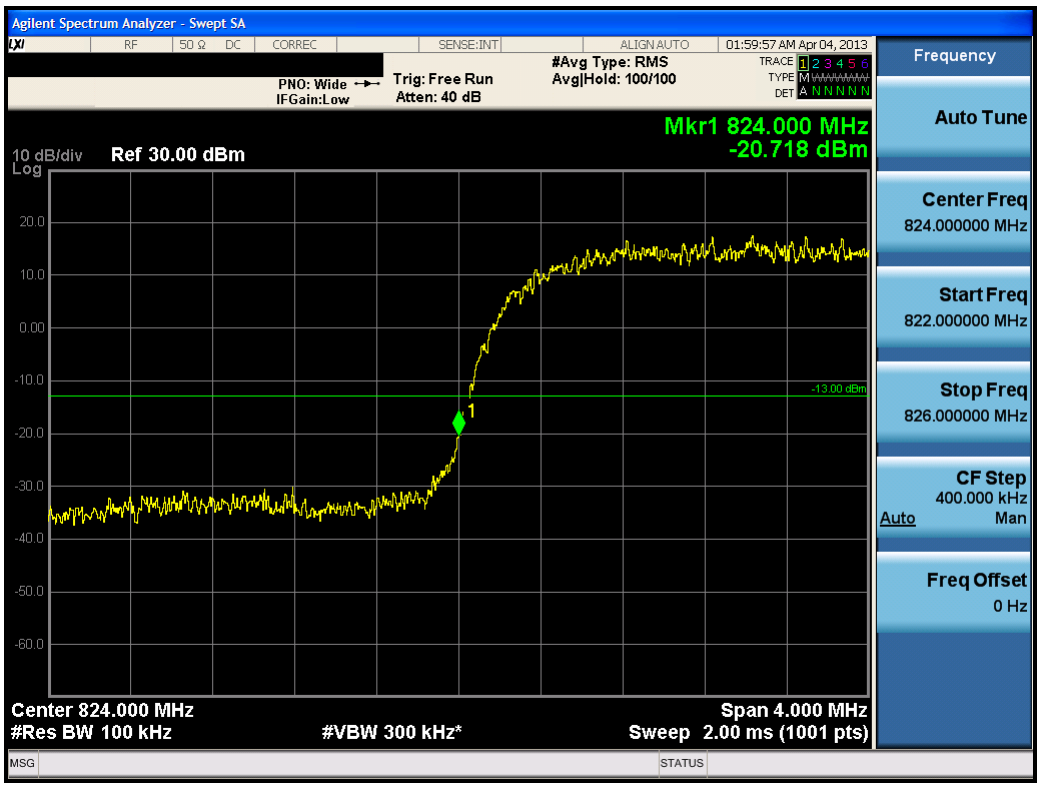
Plot 7-22. Band Edge Plot (PCS GSM Mode – Ch. 810)



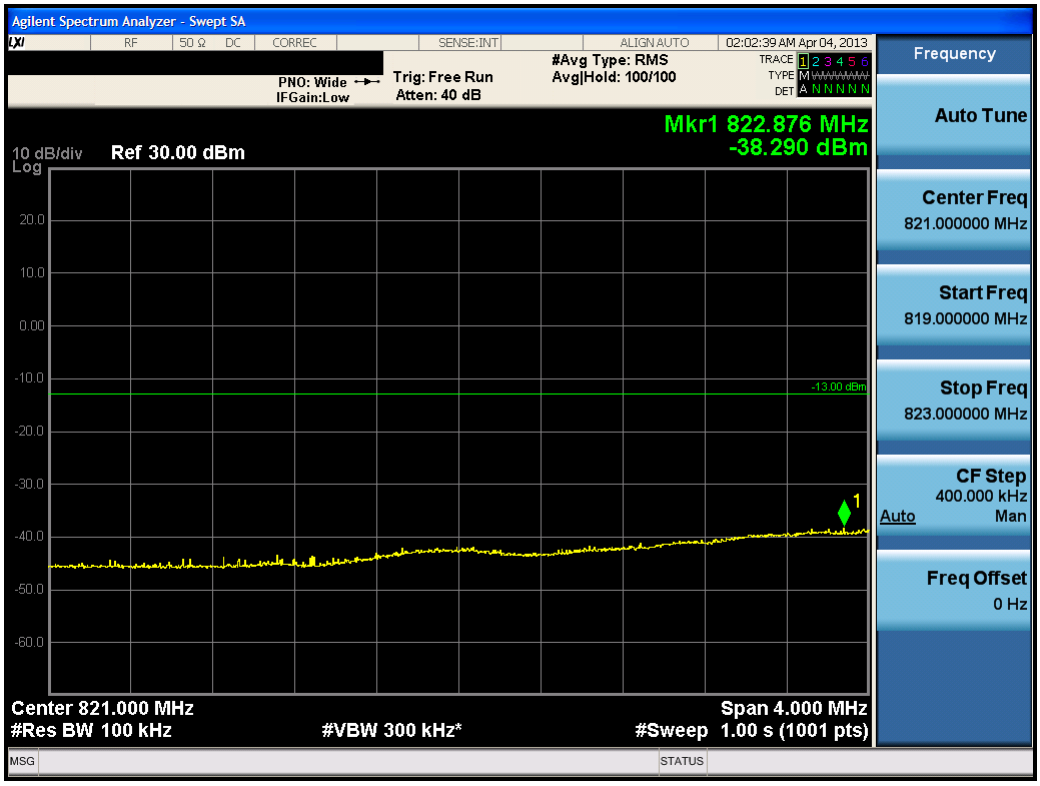
Plot 7-23. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)



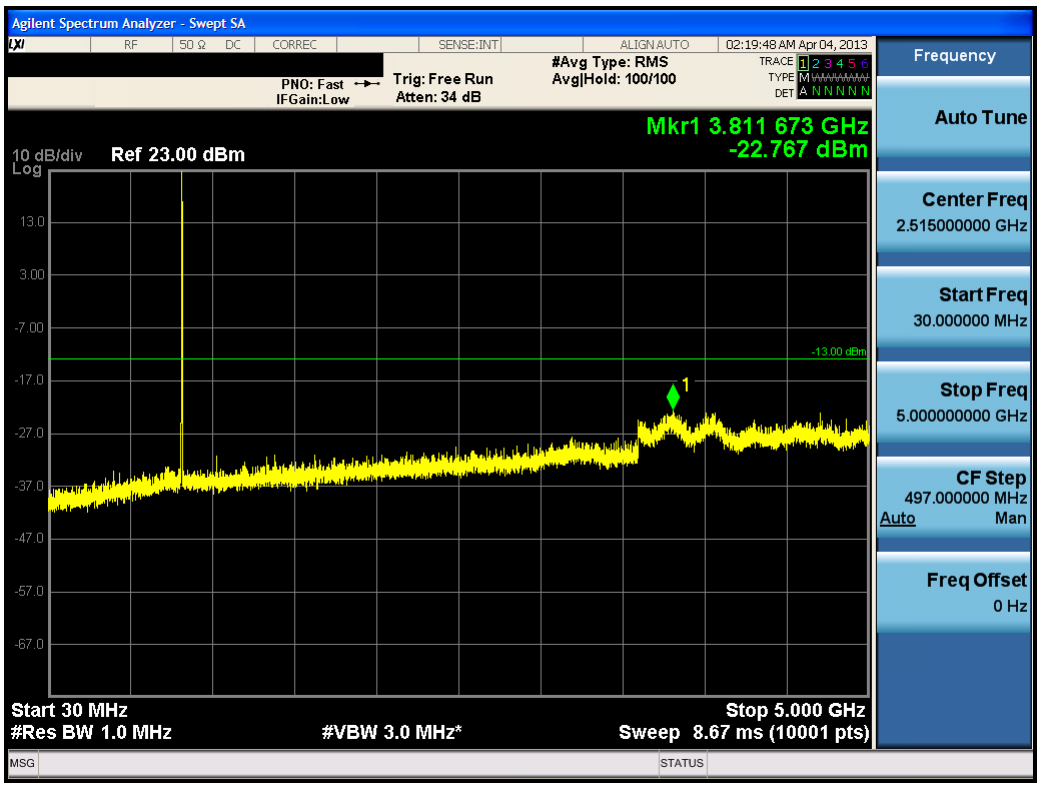
Plot 7-24. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)



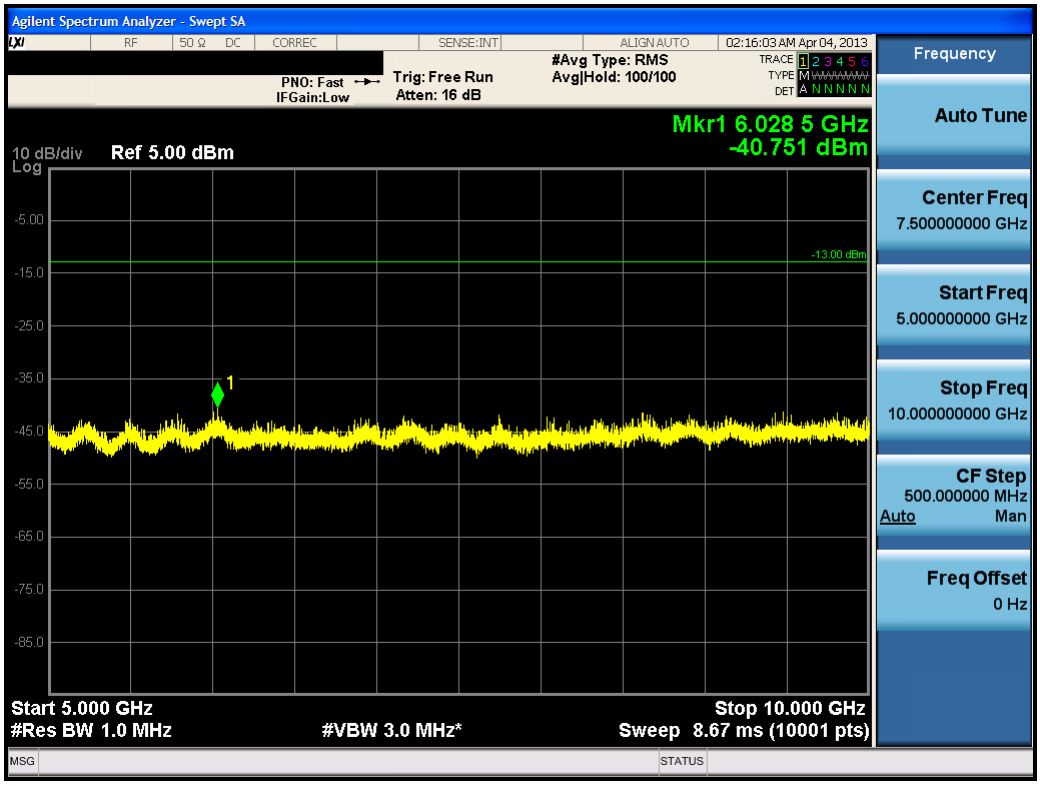
Plot 7-25. Band Edge Plot (Cellular WCDMA Mode – Ch. 4132)



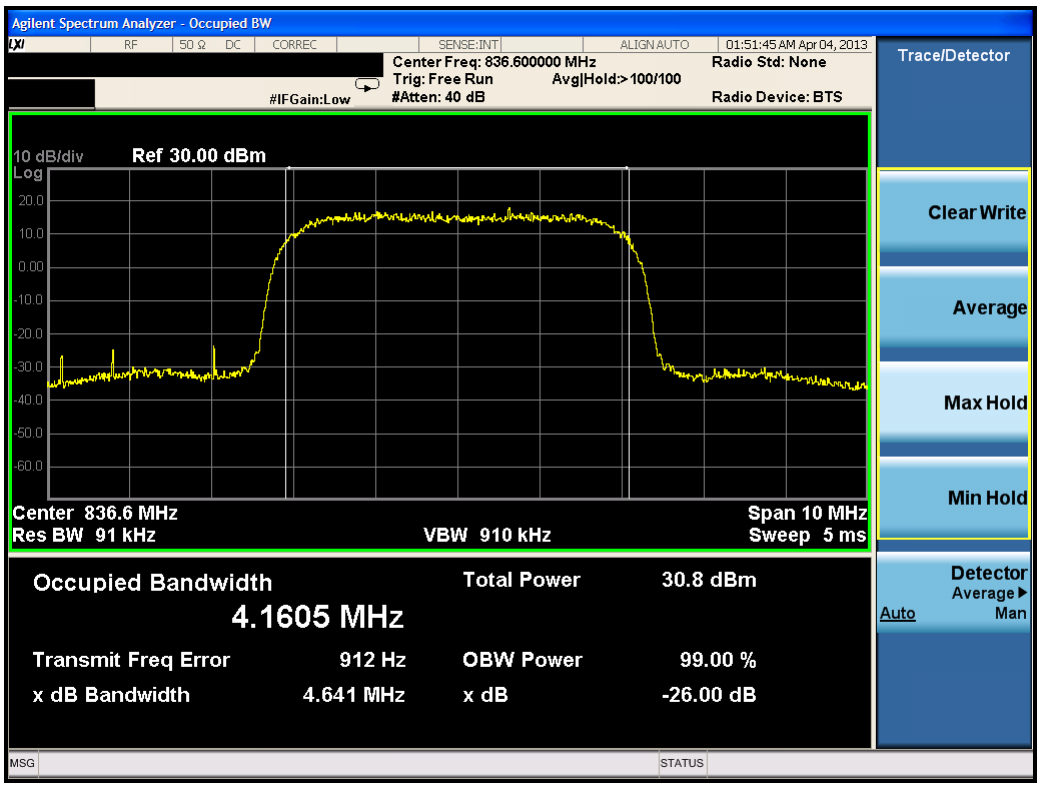
Plot 7-26. 4MHz Span Plot (Cellular WCDMA Mode – Ch. 4132)



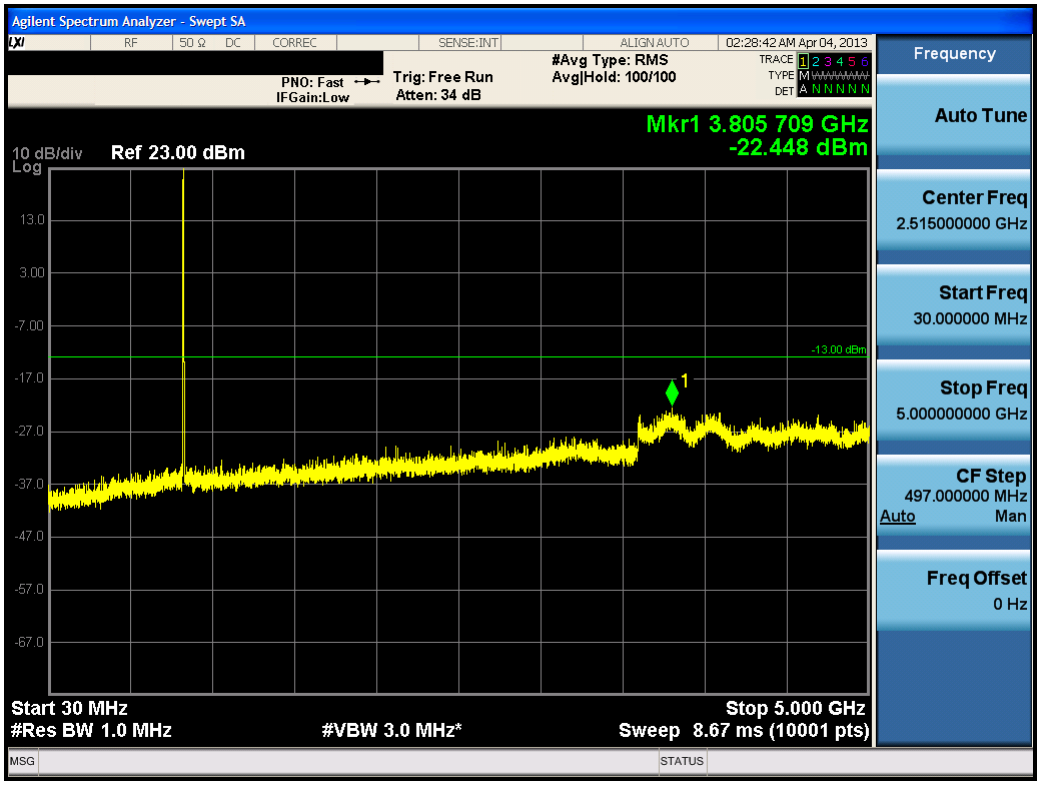
Plot 7-27. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)



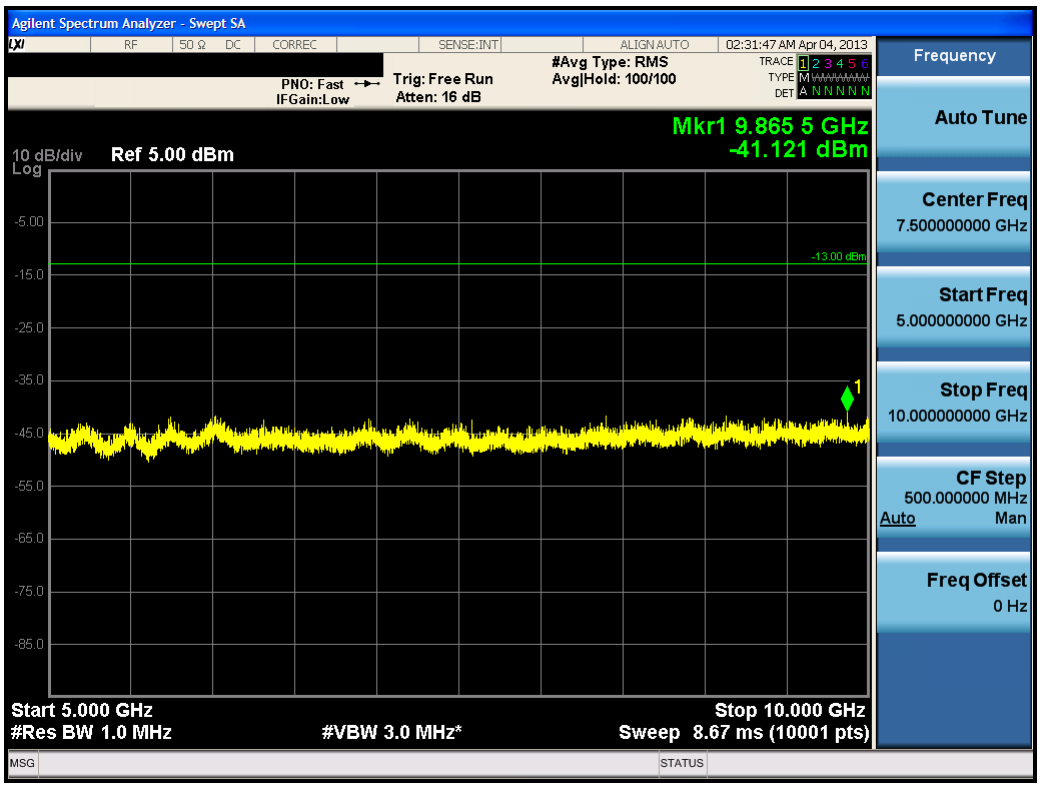
Plot 7-28. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)



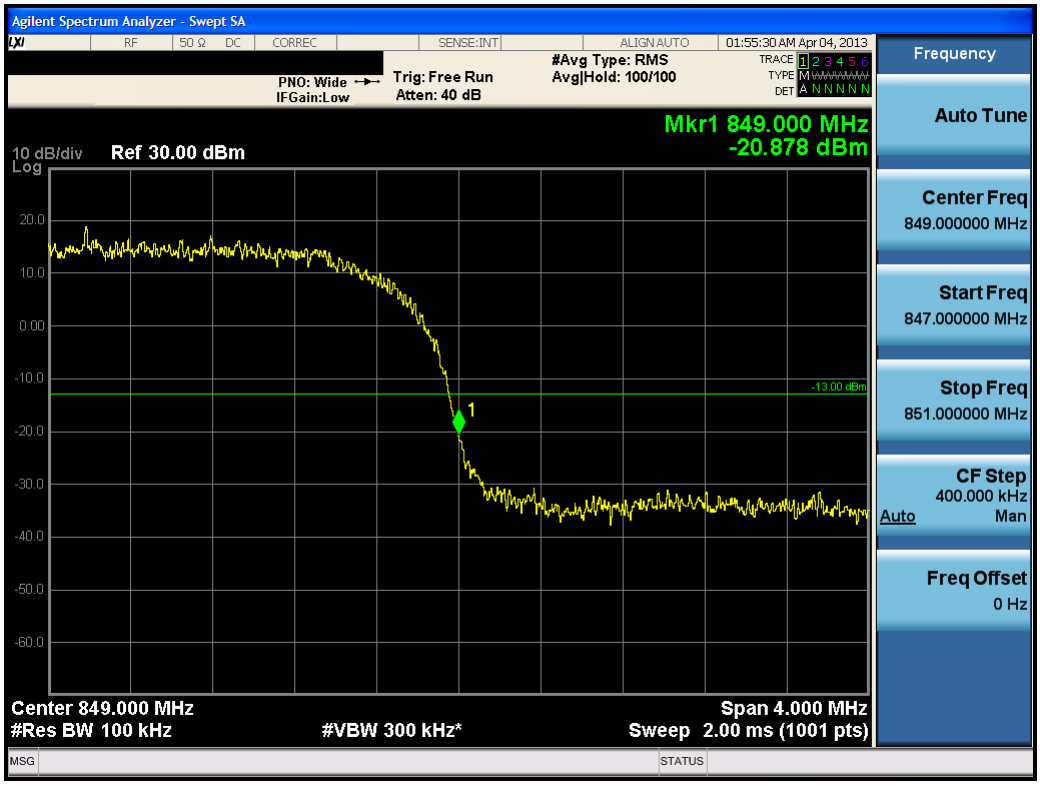
Plot 7-29. Occupied Bandwidth Plot (Cellular WCDMA Mode – Ch. 4183)



Plot 7-30. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)



Plot 7-31. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)



Plot 7-32. Band Edge Plot (Cellular WCDMA Mode – Ch. 4233)

Plot 7-33. 4MHz Span Plot (Cellular WCDMA Mode – Ch. 4233)

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **NEC Portable Handset FCC ID: A98-HDN2538** complies with all the requirements of Parts 2, 22, 24 of the FCC rules.