



# PCTEST ENGINEERING LABORATORY, INC.

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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:**

May 14-15, 2013

**Test Site/Location:**

PCTEST Lab., Columbia, MD, USA

**Test Report Serial No.:**

0Y1305140854.A98

**FCC ID:****A98-MER7671****APPLICANT:****NEC CORPORATION OF AMERICA****Application Type:** Certification**Model(s):** KMP7N4AF1-1A**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: 004401201160039]*

Mode	Tx Frequency (MHz)	Emission Designator	ERP/EIRP	
			Max. Power (W)	Max. Power (dBm)
GSM1900	1850.2 - 1909.8	240KGXW	1.600	32.04
WCDMA850	826.4 - 846.6	4M29F9W	0.265	24.24

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

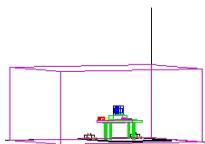
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Test Report S/N: 0Y1305140854.A98	Test Dates: May 14-15, 2013	EUT Type: Portable Handset		Page 1 of 35

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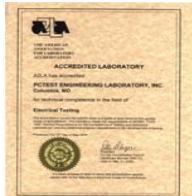
## MEASUREMENT REPORT FCC Part 22, 24

### §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:** 6660-B Dobbin Road, Columbia, MD 21045 USA  
**FCC RULE PART(S):** §2 §22(H) §24(E)  
**BASE MODEL:** KMP7N4AF1-1A  
**FCC ID:** A98-MER7671  
**FCC CLASSIFICATION:** PCS Licensed Transmitter Held to Ear (PCE)  
**MODE:** GSM / WCDMA  
**FREQUENCY TOLERANCE:** ±0.00025 % (2.5 ppm)  
**IMEI:** 004401201160039  Production  Pre-Production  Engineering  
**DATE(S) OF TEST:** May 14-15, 2013  
**TEST REPORT S/N:** 0Y1305140854.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. 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 (2451A-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 (2451A-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.

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## 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 Intert'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 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 C63.4-2009 on January 10, 2012.

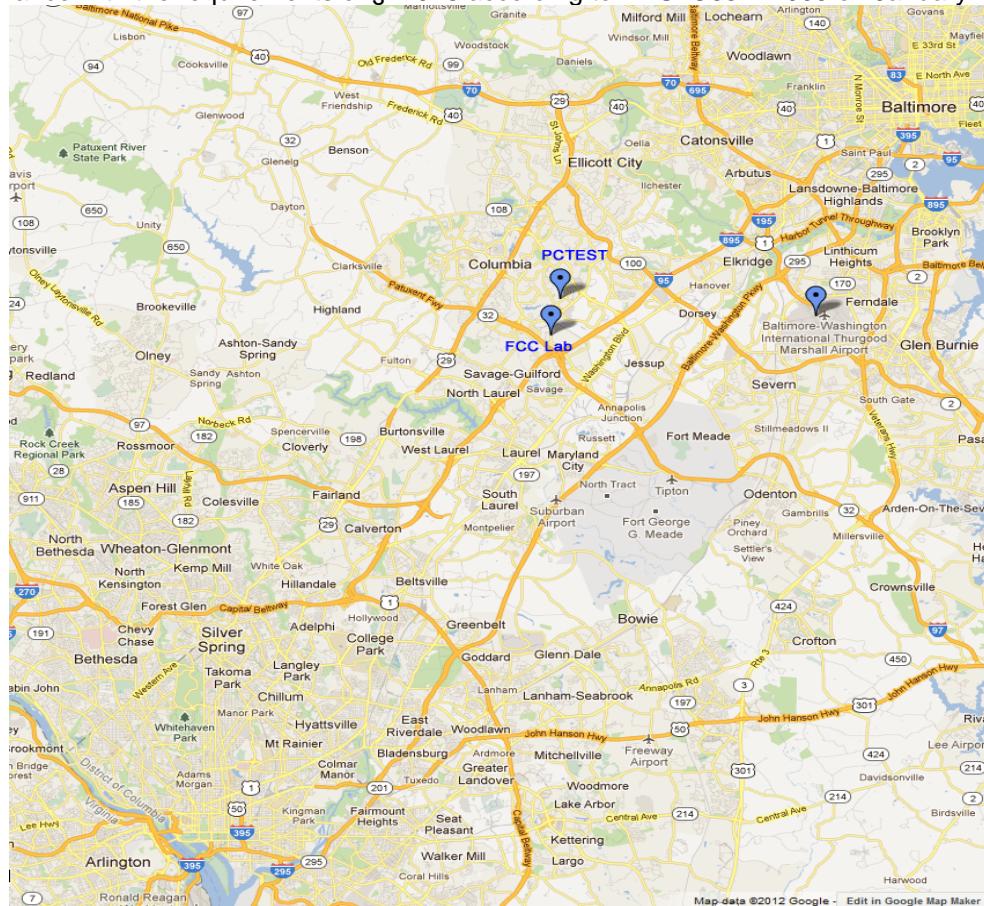


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **NEC Portable Handset FCC ID: A98-MER7671**. 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:

1900 GSM/GPRS, 850 WCDMA/HSPA, 802.11b/g/n WLAN, NFC

### 2.3 Test Configuration

The NEC Portable Handset FCC ID: A98-MER7671 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.

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## 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" (KDB 971168) were used in the measurement of the **NEC Portable Handset** FCC ID: **A98-MER7671**.

Deviation from Measurement Procedure.....**None**

### 3.2 Cellular - Base Frequency Blocks

§22.905



BLOCK 1: 869 – 880 MHz (A\* Low + A)

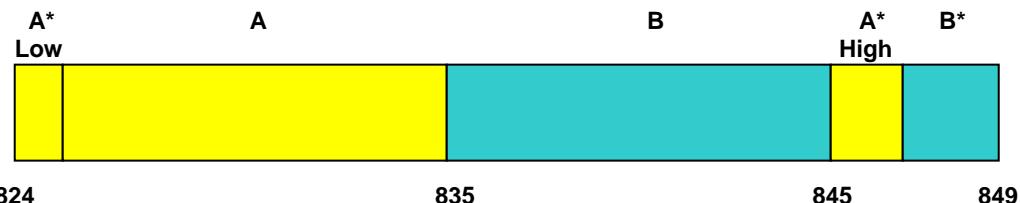
BLOCK 3: 890 – 891.5 MHz (A\* High)

BLOCK 2: 880 – 890 MHz (B)

BLOCK 4: 891.5 – 894 MHz (B\*)

### 3.3 Cellular - Mobile Frequency Blocks

§22.905



BLOCK 1: 824 – 835 MHz (A\* Low + A)

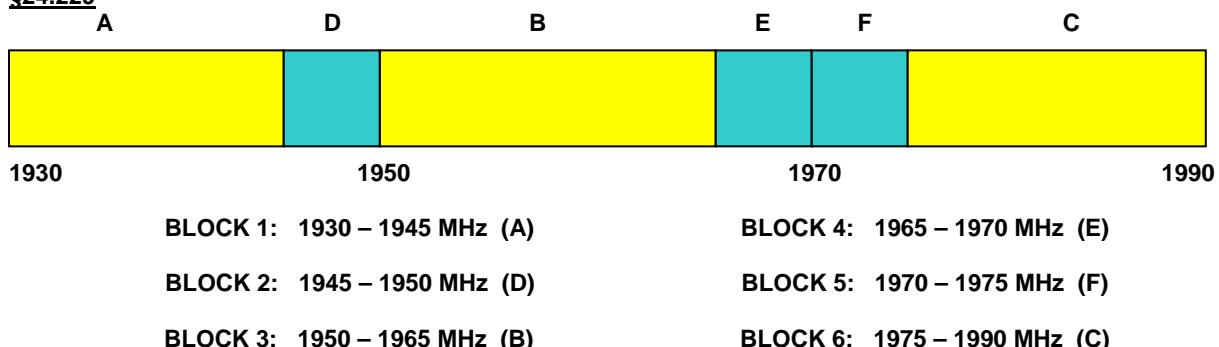
BLOCK 3: 845 – 846.5 MHz (A\* High)

BLOCK 2: 835 – 845 MHz (B)

BLOCK 4: 846.5 – 849 MHz (B\*)

### 3.4 PCS - Base Frequency Blocks

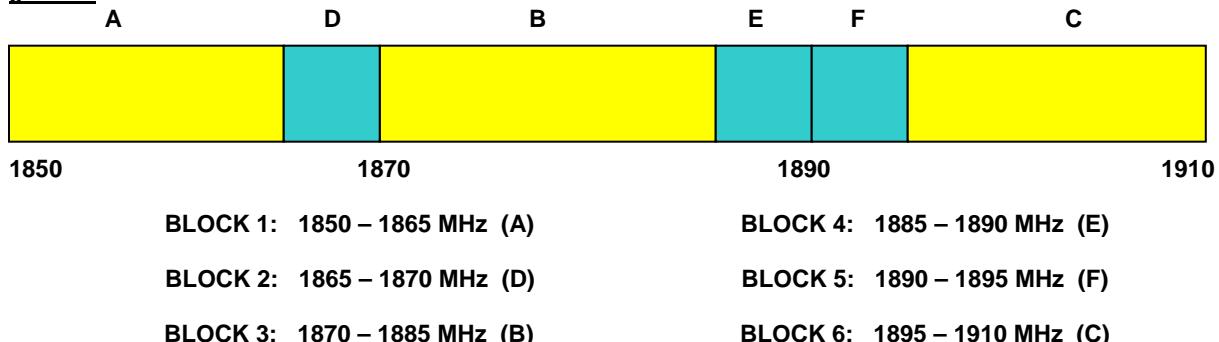
§24.229



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### 3.5 PCS - Mobile Frequency Blocks

§24.229



### 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 10<sup>th</sup> 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)

Radiated power measurements are performed on the 3 meter OATS per the guidelines of ANSI/TIA-603-C-2004. The measurement area is situated on an 18 meter x 20 meter galvanized 1/2" hardware cloth as the conducting ground plane. This material is sewn together in sections 4 feet wide and 60 feet long. A total of eighteen sections are required to cover the entire measurement area. Sections are laid across the width of the pad, overlapped 1" and sewn and soldered together at intervals of 3" (7.6 cm.) The terrain of the test site is reasonably flat and level. Power and cable to the test site are buried 18" deep into the ground outside the perimeter of the site. An all-weather non-metallic housing is situated on a 2 x 3 meter area adjacent to the measurement area to house the test equipment. 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

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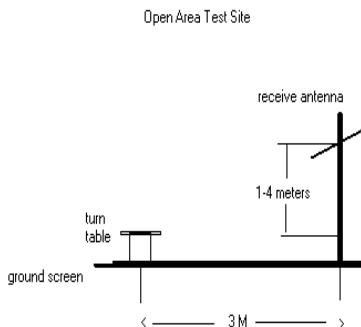
polarized. The maximized power level is recorded using the spectrum analyzer “Channel Power” function with the integration band set to the emissions’ occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168.

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:

$$P_d \text{ [dBm]} = P_g \text{ [dBm]} - \text{cable loss [dB]} + \text{antenna gain [dBd/dBi]}$$

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  $P_g \text{ [dBm]} - \text{cable loss [dB]}$ .

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  $43 + 10\log_{10}(\text{Power [Watts]})$  specified in 22.917(a) and 24.238(a).



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

### 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.

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### 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.

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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	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	3/29/2013	Annual	3/29/2014	N/A
-	RE2	Radiated Emissions Cable Set (VHF/UHF)	3/29/2013	Annual	3/29/2014	N/A
-	LTX2	Licensed Transmitter Cable Set	1/17/2013	Annual	1/17/2014	N/A
Agilent	8449B	(1-26.5GHz) Pre-Amplifier	4/17/2013	Annual	4/17/2014	3008A00985
Agilent	8648D	(9kHz-4GHz) Signal Generator	10/10/2012	Annual	10/10/2013	3613A00315
Agilent	N9020A	MXA Signal Analyzer	10/9/2012	Annual	10/9/2013	US46470561
Agilent	N9038A	MXE EMI Receiver	12/8/2012	Annual	12/8/2013	MY51210133
Anritsu	MA2411B	Pulse Sensor	9/19/2012	Annual	9/19/2013	1027293
Anritsu	ML2495A	Power Meter	10/11/2012	Annual	10/11/2013	1039008
Mini-Circuits	VHF-1300+	High Pass Filter	1/21/2013	Annual	1/21/2014	30716
Mini-Circuits	VHF-3100+	High Pass Filter	1/21/2013	Annual	1/21/2014	31144
Rohde & Schwarz	CMU200	Base Station Simulator		N/A		836536/0005
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
Seekonk	NC-100	Torque Wrench (8" lb)	3/5/2012	Triennial	3/5/2015	N/A
Sunol	DRH-118	Horn Antenna (1 - 18GHz)	7/5/2011	Biennial	7/5/2013	A050307
Sunol	DRH-118	Horn Antenna (1-18 GHz)	6/17/2011	Biennial	6/17/2013	A042511

Table 4-1. Test Equipment

**Notes:**

1. 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.

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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

**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.

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## 6.0 TEST RESULTS

### 6.1 Summary

Company Name: NEC Corporation of America  
 FCC ID: A98-MER7671  
 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
<b>TRANSMITTER MODE (TX)</b>					
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 + $\log_{10}(P[\text{Watts}])$ 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 + $\log_{10}(P[\text{Watts}])$ for all out-of-band emissions		PASS	Sections 6.4, 6.5
2.1055 22.355 24.235	Frequency Stability	< 2.5 ppm (Part 22) Emission must remain in band (Part 24)		PASS	Sections 6.6, 6.7

**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.

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## 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 [dBi]	Pol [H/V]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
826.40	WCDMA850	Standard	24.15	-0.84	V	23.30	0.214	38.45	-15.15
836.60	WCDMA850	Standard	25.05	-0.81	V	24.24	0.265	38.45	-14.21
846.60	WCDMA850	Standard	23.75	-0.76	V	22.98	0.199	38.45	-15.47

Table 6-2. 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 employs UMTS technology with WCDMA (AMR/RMC), HSDPA, HSUPA, and GSM/GPRS capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive 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 "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found in the EUT in the V positioning (Cell Band) and H positioning (PCS Band). The data reported in the table above was measured in this test setup.

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### 6.3 PCS Equivalent Isotropic 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	23.62	7.75	H	31.37	1.370	33.01	-1.64
1880.00	GSM1900	Standard	23.97	7.83	H	31.80	1.513	33.01	-1.21
1909.80	GSM1900	Standard	24.11	7.93	H	32.04	1.600	33.01	-0.97

Table 6-2. 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 employs UMTS technology with WCDMA (AMR/RMC), HSDPA, HSUPA, and GSM/GPRS capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive 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 "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found in the EUT in the V positioning (Cell Band) and H positioning (PCS Band) The data reported in the table above was measured in this test setup.

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## 6.4 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: 23.30 dBm = 0.214 W  
 MODULATION SIGNAL: WCDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  36.30 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1652.80	-58.12	6.15	-51.97	V	75.3
2479.20	-56.79	6.34	-50.45	V	73.8
3305.60	-82.57	6.73	-75.84	V	99.1
4132.00	-80.88	7.45	-73.43	V	96.7
4958.40	-80.81	8.89	-71.92	V	95.2

Table 6-3. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4132)

### NOTES:

- 1) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, HSUPA, and GSM/GPRS capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive 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 "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found in the EUT in the V positioning (Cell Band) and H positioning (PCS Band) The data reported in the table above was measured in this test setup.

FCC ID: A98-MER7671		FCC Pt. 22, 24 GSM / WCDMA MEASUREMENT REPORT (CERTIFICATION)	<b>NEC</b>	Reviewed by: Quality Manager
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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: 24.24 dBm = 0.265 W  
 MODULATION SIGNAL: WCDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  37.24 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1673.20	-57.15	6.10	-51.05	V	75.3
2509.80	-56.23	6.37	-49.86	V	74.1
3346.40	-82.71	6.88	-75.84	V	100.1
4183.00	-81.18	7.74	-73.43	V	97.7
5019.60	-80.74	8.82	-71.92	V	96.2

Table 6-4. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4183)

### NOTES:

- 1) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, HSUPA, and GSM/GPRS capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive 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 "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found in the EUT in the V positioning (Cell Band) and H positioning (PCS Band) The data reported in the table above was measured in this test setup.

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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: 22.98 dBm = 0.199 W  
 MODULATION SIGNAL: WCDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  35.98 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1693.20	-54.22	6.02	-48.20	V	71.2
2539.80	-57.01	6.46	-50.55	V	73.5
3386.40	-82.90	7.07	-75.84	V	98.8
4233.00	-81.49	8.05	-73.43	V	96.4
5079.60	-80.77	8.85	-71.92	V	94.9

Table 6-5. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4233)

### NOTES:

- 1) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, HSUPA, and GSM/GPRS capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive 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 "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found in the EUT in the V positioning (Cell Band) and H positioning (PCS Band) The data reported in the table above was measured in this test setup.

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## 6.5 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: 31.37 dBm = 1.370 W  
 MODULATION SIGNAL: GSM (GMSK)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  44.37 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3700.40	-41.79	9.63	-32.16	H	63.5
5550.60	-44.56	10.60	-33.96	H	65.3
7400.80	-77.30	10.85	-66.45	H	97.8
9251.00	-76.01	12.20	-63.81	H	95.2
11101.20	-73.16	12.85	-60.31	H	91.7

Table 6-6. 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 "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found in the EUT in the V positioning (Cell Band) and H positioning (PCS Band) The data reported in the table above was measured in this test setup.

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## 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: 31.80 dBm = 1.513 W  
 MODULATION SIGNAL: GSM (GMSK)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  44.80 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3760.00	-44.34	9.30	-35.04	H	66.8
5640.00	-45.77	10.89	-34.88	H	66.7
7520.00	-77.03	10.85	-66.18	H	98.0
9400.00	-75.81	12.17	-63.64	H	95.4
11280.00	-73.04	13.05	-60.00	H	91.8

Table 6-7. 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 "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found in the EUT in the V positioning (Cell Band) and H positioning (PCS Band) The data reported in the table above was measured in this test setup.

FCC ID: A98-MER7671		FCC Pt. 22, 24 GSM / WCDMA MEASUREMENT REPORT (CERTIFICATION)	<b>NEC</b>	Reviewed by: Quality Manager
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## 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: 32.04 dBm = 1.600 W  
 MODULATION SIGNAL: GSM (GMSK)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  45.04 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3819.60	-45.39	9.05	-36.34	H	68.4
5729.40	-48.03	11.08	-36.95	H	69.0
7639.20	-77.36	11.11	-66.24	H	98.3
9549.00	-76.00	12.37	-63.63	H	95.7
11458.80	-72.27	13.23	-59.04	H	91.1

Table 6-8. 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.
- 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 "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found in the EUT in the V positioning (Cell Band) and H positioning (PCS Band) The data reported in the table above was measured in this test setup.

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## 6.6 Cellular WCDMA Frequency Stability Measurements

§2.1055 §22.355 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)	836,599,985	-15	-0.0000018
100 %		- 30	836,599,981	-19	-0.0000022
100 %		- 20	836,599,985	-15	-0.0000018
100 %		- 10	836,599,991	-9	-0.0000011
100 %		0	836,599,997	-3	-0.0000003
100 %		+ 10	836,599,984	-16	-0.0000019
100 %		+ 20	836,599,980	-20	-0.0000024
100 %		+ 30	836,599,994	-6	-0.0000007
100 %		+ 40	836,599,991	-9	-0.0000011
100 %		+ 50	836,599,983	-17	-0.0000021
115 %		+ 20	836,600,000	0	0.0000000
BATT. ENDPOINT	3.40	+ 20	836,599,985	-15	-0.0000018

Table 6-9. Frequency Stability Data (Cellular WCDMA Mode – Ch. 4183)

FCC ID: A98-MER7671		FCC Pt. 22, 24 GSM / WCDMA MEASUREMENT REPORT (CERTIFICATION)	<b>NEC</b>	Reviewed by: Quality Manager
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## Cellular WCDMA Frequency Stability Measurements (Cont'd)

§2.1055 §22.355 RSS-132(4.3)

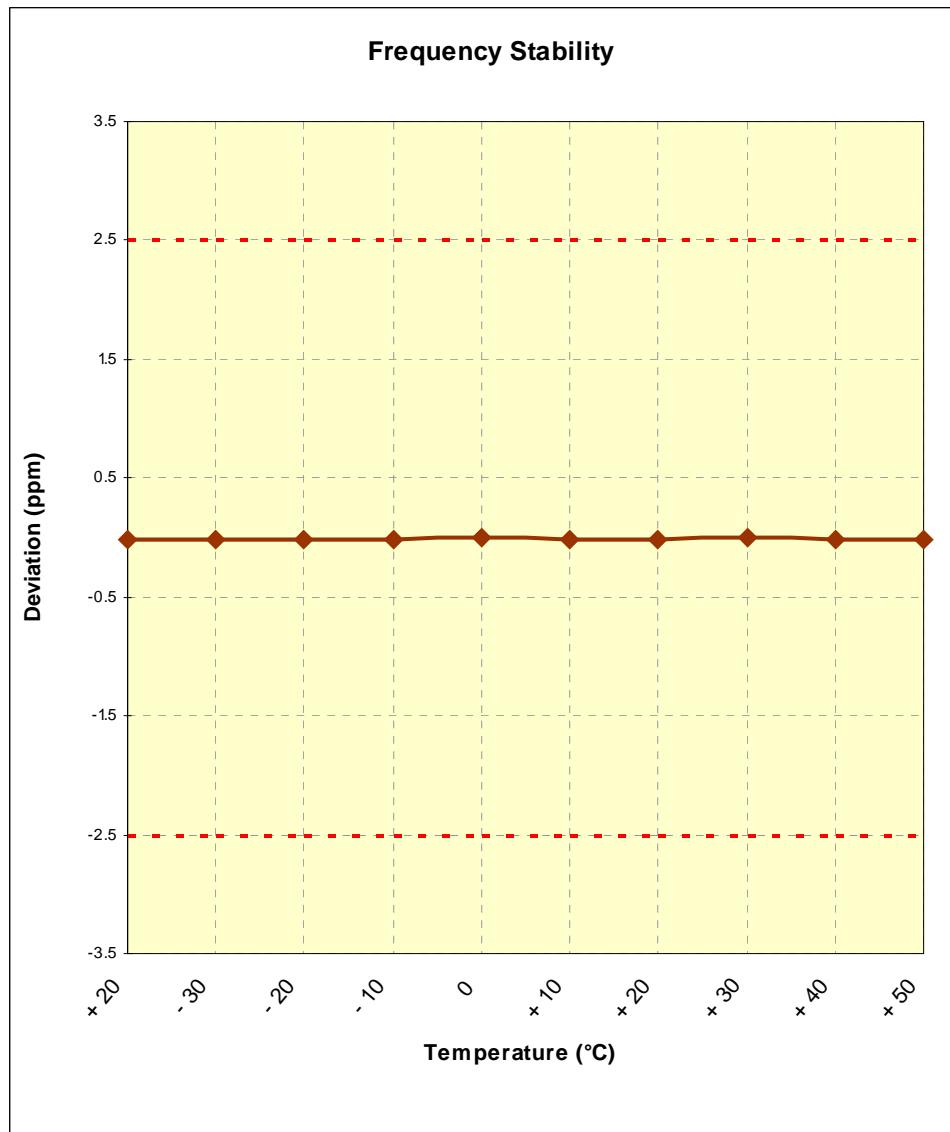


Figure 6-1. Frequency Stability Graph (Cellular WCDMA Mode – Ch. 4183)

FCC ID: A98-MER7671		FCC Pt. 22, 24 GSM / WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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## 6.7 PCS GSM Frequency Stability Measurements

§2.1055 §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)	1,879,999,982	-18	-0.0000010
100 %		- 30	1,879,999,982	-18	-0.0000010
100 %		- 20	1,879,999,992	-8	-0.0000004
100 %		- 10	1,879,999,989	-11	-0.0000006
100 %		0	1,879,999,998	-2	-0.0000001
100 %		+ 10	1,879,999,983	-17	-0.0000009
100 %		+ 20	1,879,999,999	-1	-0.0000001
100 %		+ 30	1,879,999,991	-9	-0.0000005
100 %		+ 40	1,879,999,994	-6	-0.0000003
100 %		+ 50	1,879,999,986	-14	-0.0000008
115 %		+ 20	1,879,999,993	-7	-0.0000004
BATT. ENDPOINT	3.40	+ 20	1,879,999,980	-20	-0.0000011

Table 6-10. 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.

FCC ID: A98-MER7671		FCC Pt. 22, 24 GSM / WCDMA MEASUREMENT REPORT (CERTIFICATION)	<b>NEC</b>	Reviewed by: Quality Manager
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## PCS GSM Frequency Stability Measurements (Cont'd)

§2.1055 §24.235 RSS-139(6.3)

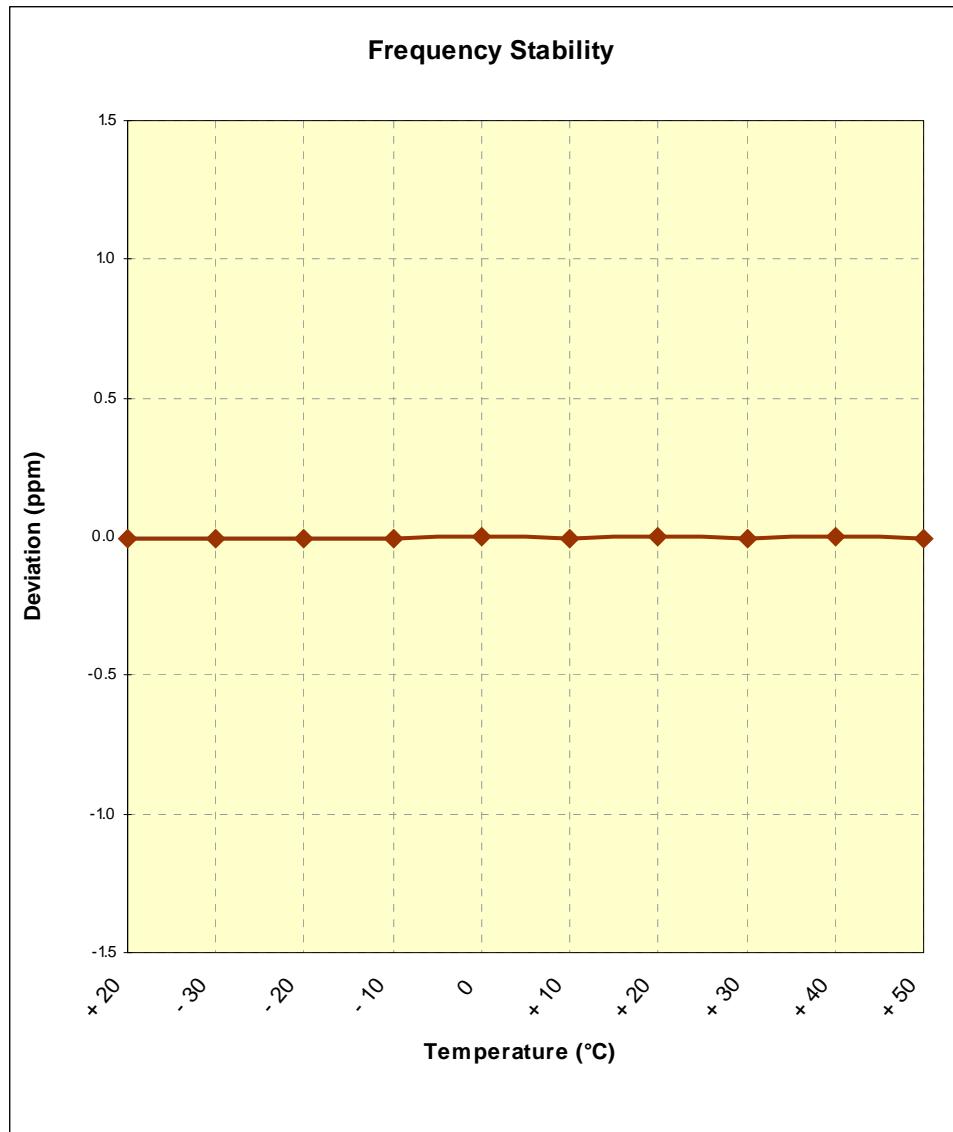
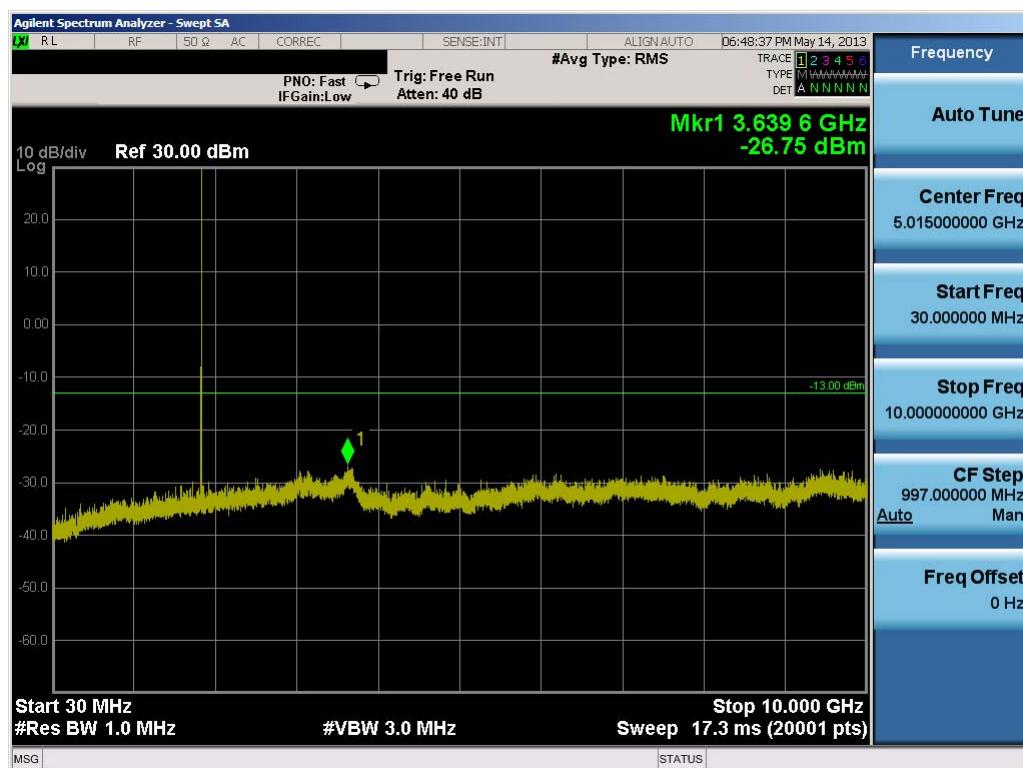


Figure 6-2. Frequency Stability Graph (PCS GSM Mode – Ch. 661)

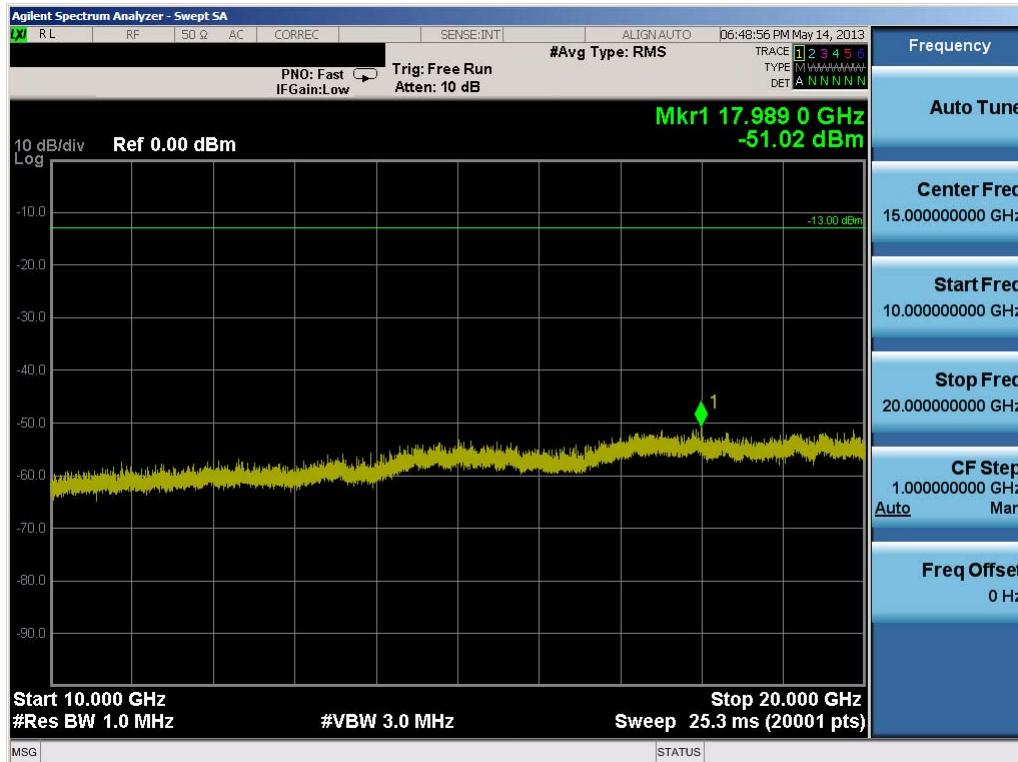
FCC ID: A98-MER7671		FCC Pt. 22, 24 GSM / WCDMA MEASUREMENT REPORT (CERTIFICATION)	<b>NEC</b>	Reviewed by: Quality Manager
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## 7.0 PLOTS OF EMISSIONS

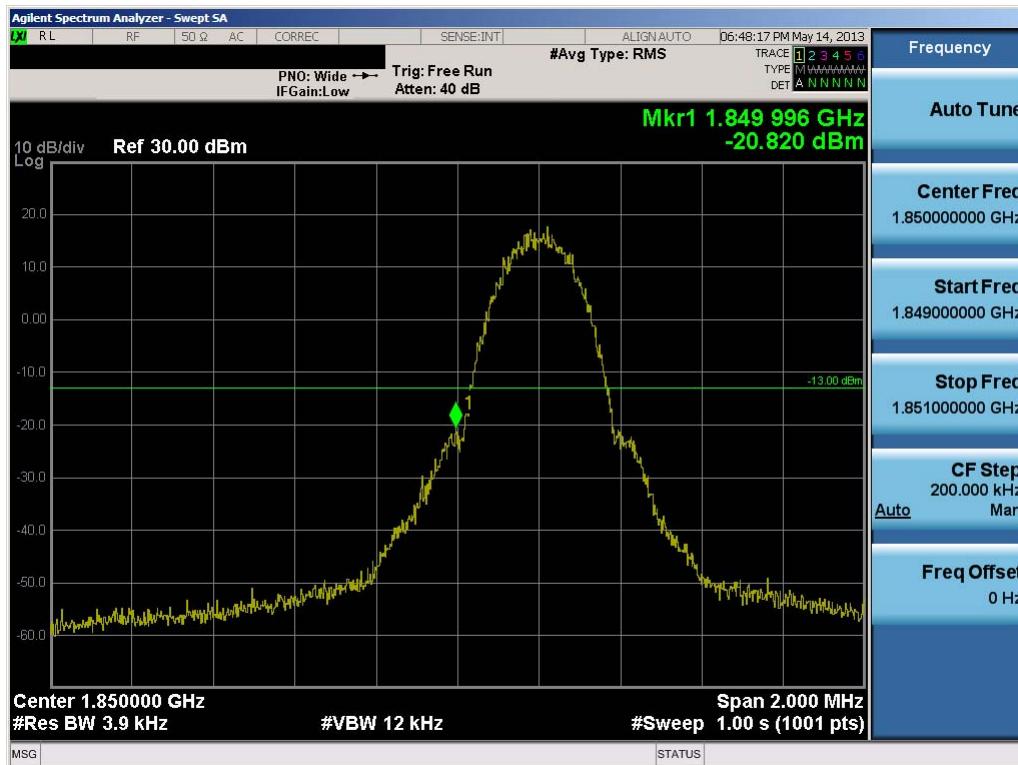


Plot 7-1. Conducted Spurious Plot (PCS GSM Mode – Ch. 512)

FCC ID: A98-MER7671		FCC Pt. 22, 24 GSM / WCDMA MEASUREMENT REPORT (CERTIFICATION)	<b>NEC</b>	Reviewed by: Quality Manager
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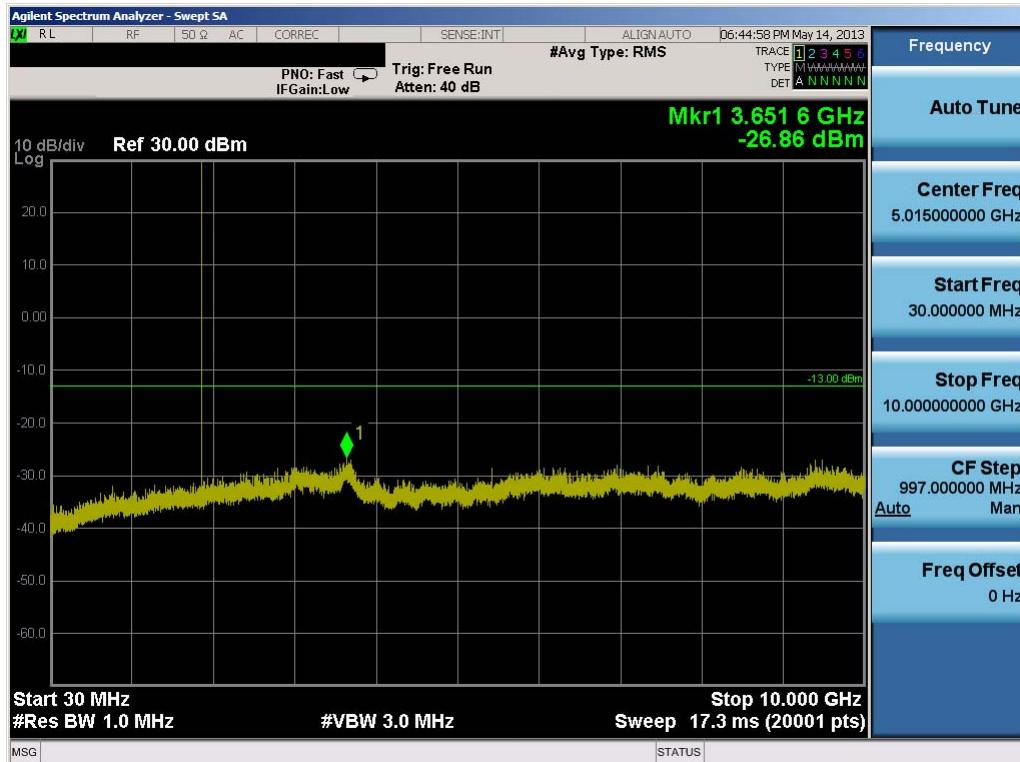


Plot 7-2. Conducted Spurious Plot (PCS GSM Mode – Ch. 512)

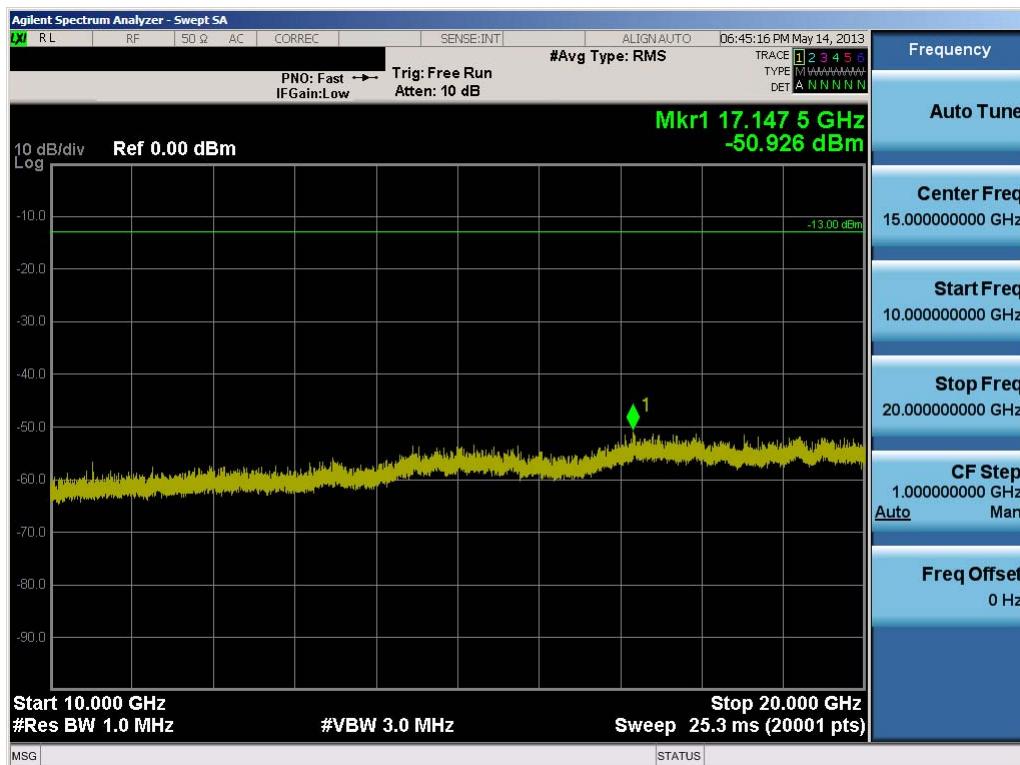


Plot 7-3. Band Edge Plot (PCS GSM Mode – Ch. 512)

FCC ID: A98-MER7671		FCC Pt. 22, 24 GSM / WCDMA MEASUREMENT REPORT (CERTIFICATION)	NEC	Reviewed by: Quality Manager
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Plot 7-4. Conducted Spurious Plot (PCS GSM Mode – Ch. 661)

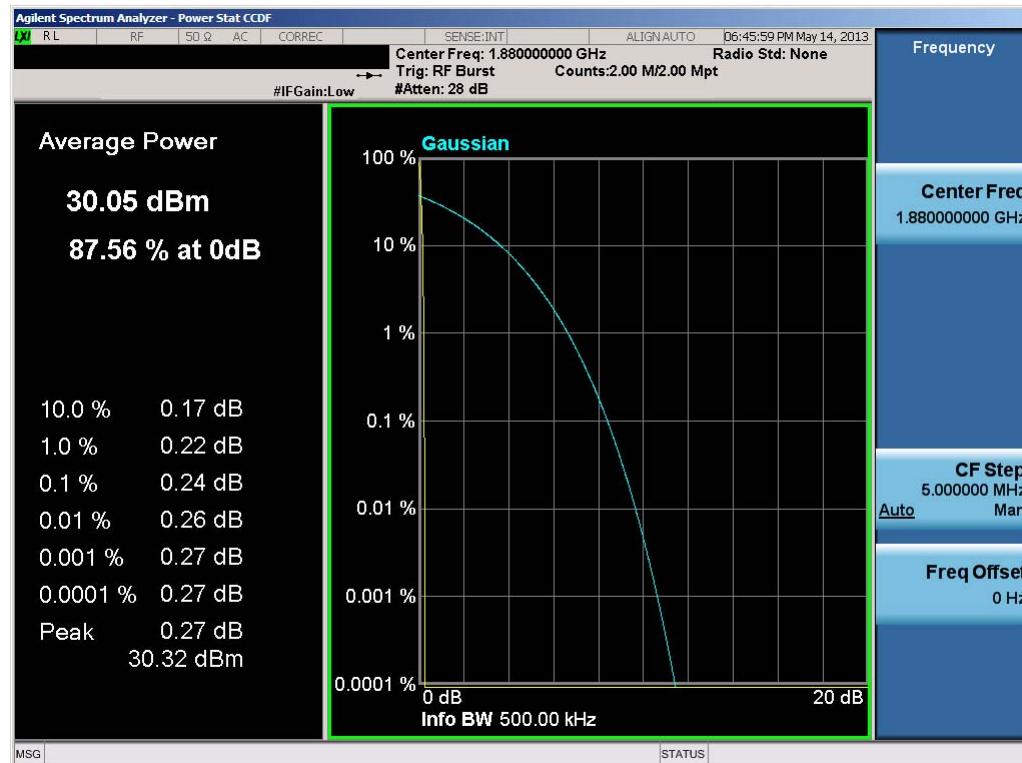


Plot 7-5. Conducted Spurious Plot (PCS GSM Mode – Ch. 661)

FCC ID: A98-MER7671	 <b>FCC Pt. 22, 24 GSM / WCDMA MEASUREMENT REPORT (CERTIFICATION)</b>			Reviewed by: Quality Manager
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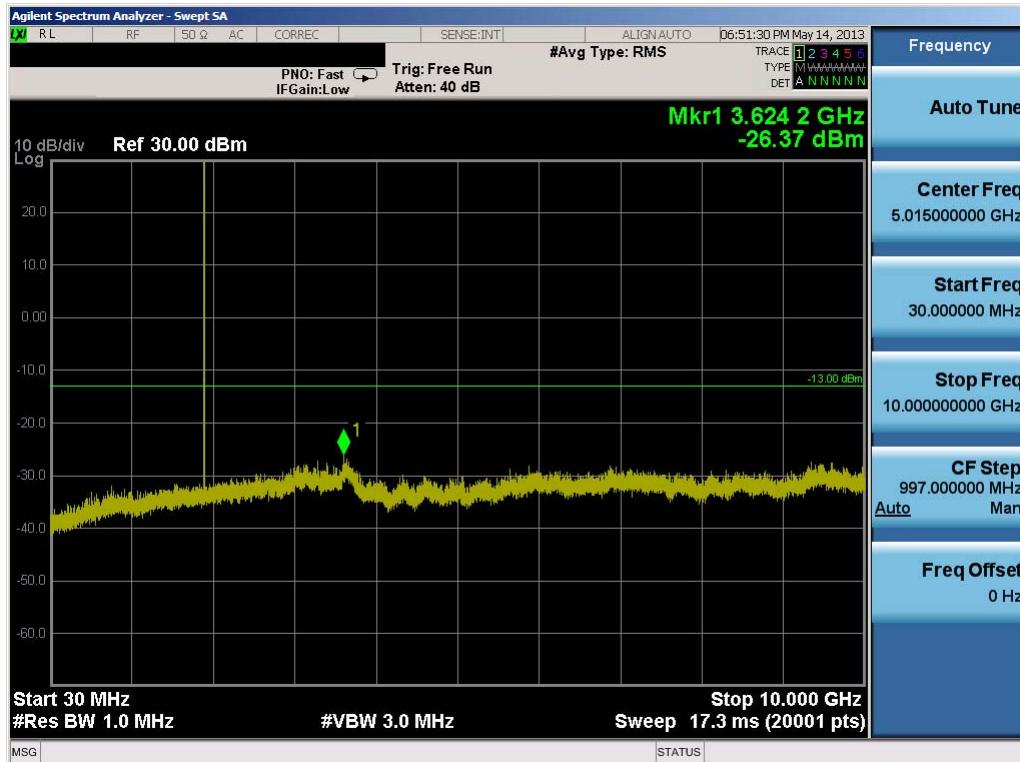


Plot 7-6. Occupied Bandwidth Plot (PCS GSM Mode – Ch. 661)

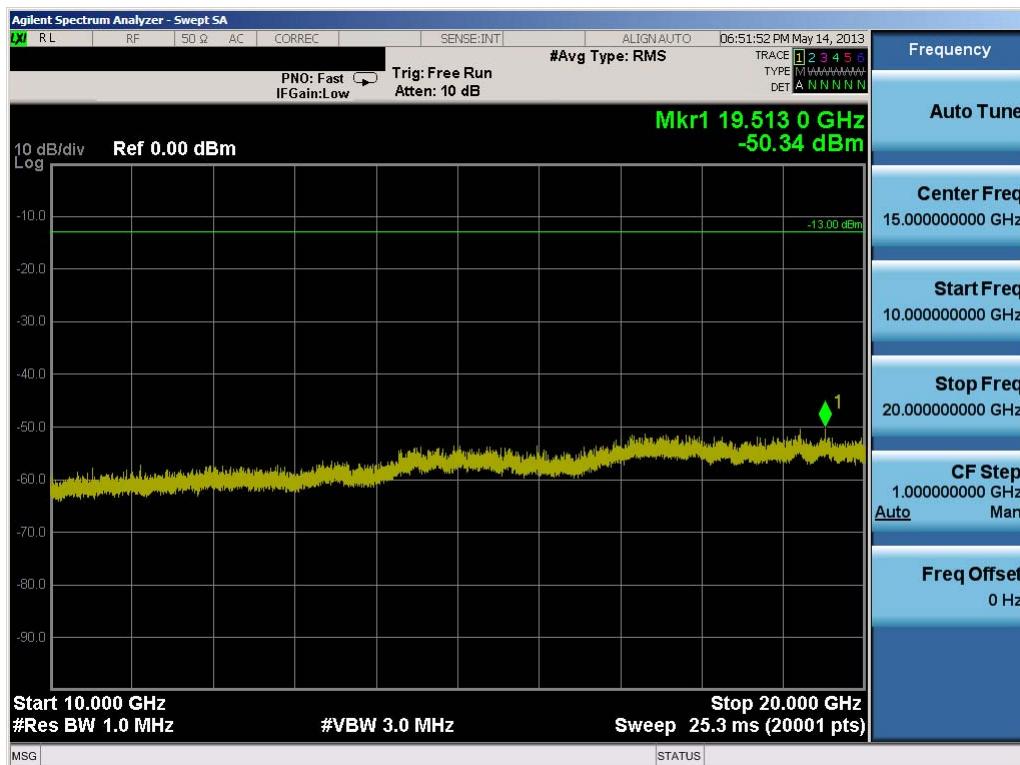


Plot 7-7. Peak-Average Ratio Plot (PCS GSM Mode – Ch. 661)

FCC ID: A98-MER7671		FCC Pt. 22, 24 GSM / WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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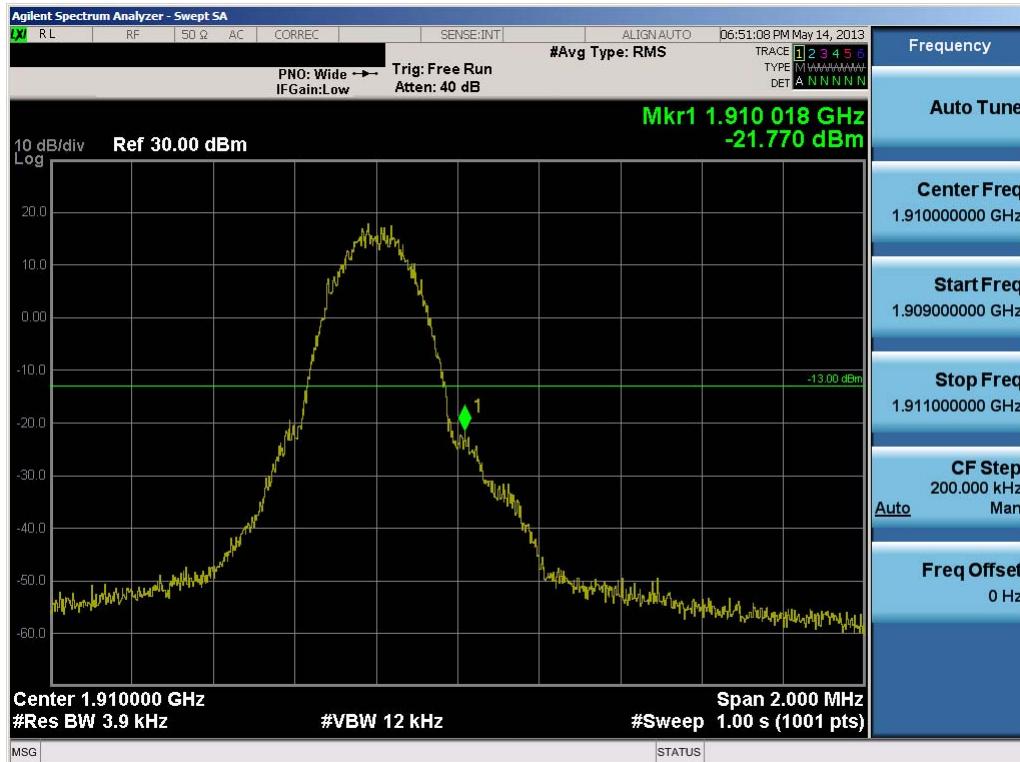


Plot 7-8. Conducted Spurious Plot (PCS GSM Mode – Ch. 810)

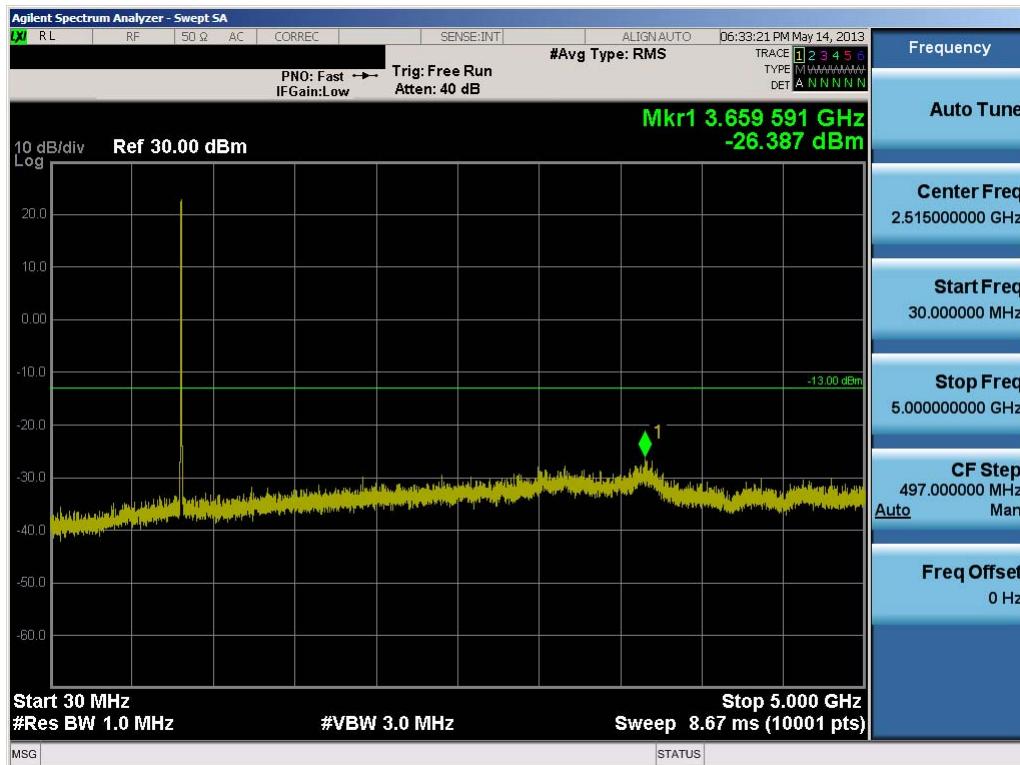


Plot 7-9. Conducted Spurious Plot (PCS GSM Mode – Ch. 810)

FCC ID: A98-MER7671	 <b>FCC Pt. 22, 24 GSM / WCDMA MEASUREMENT REPORT (CERTIFICATION)</b>			Reviewed by: Quality Manager
Test Report S/N: 0Y1305140854.A98	Test Dates: May 14-15, 2013	EUT Type: Portable Handset		Page 29 of 35

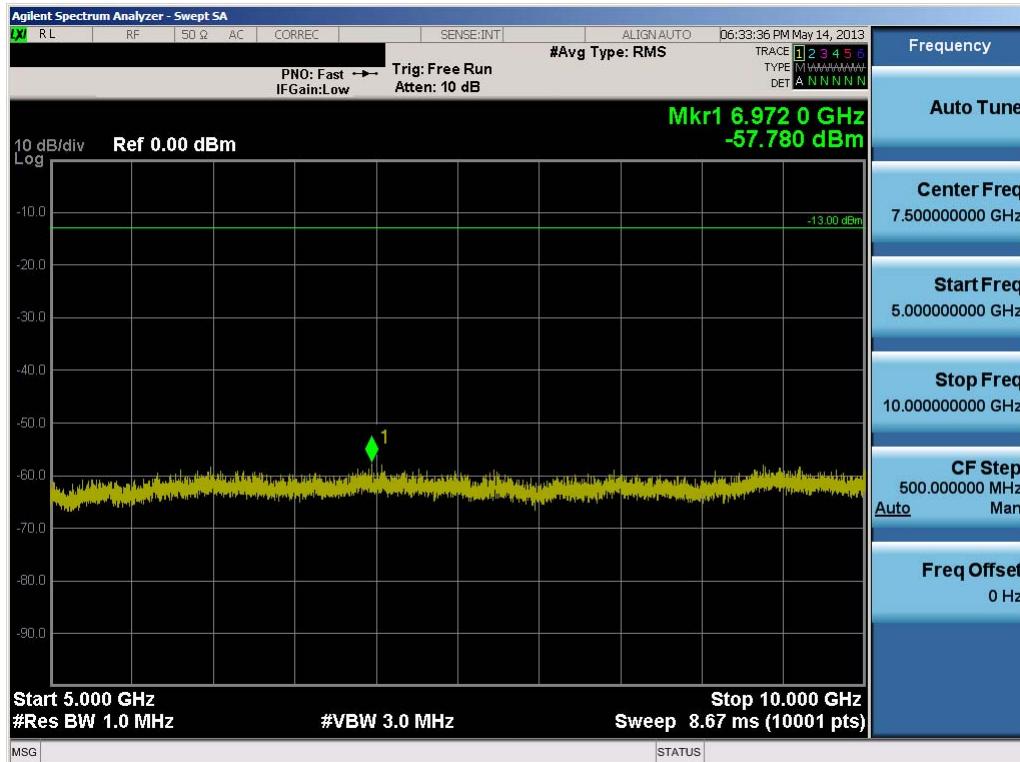


Plot 7-10. Band Edge Plot (PCS GSM Mode – Ch. 810)

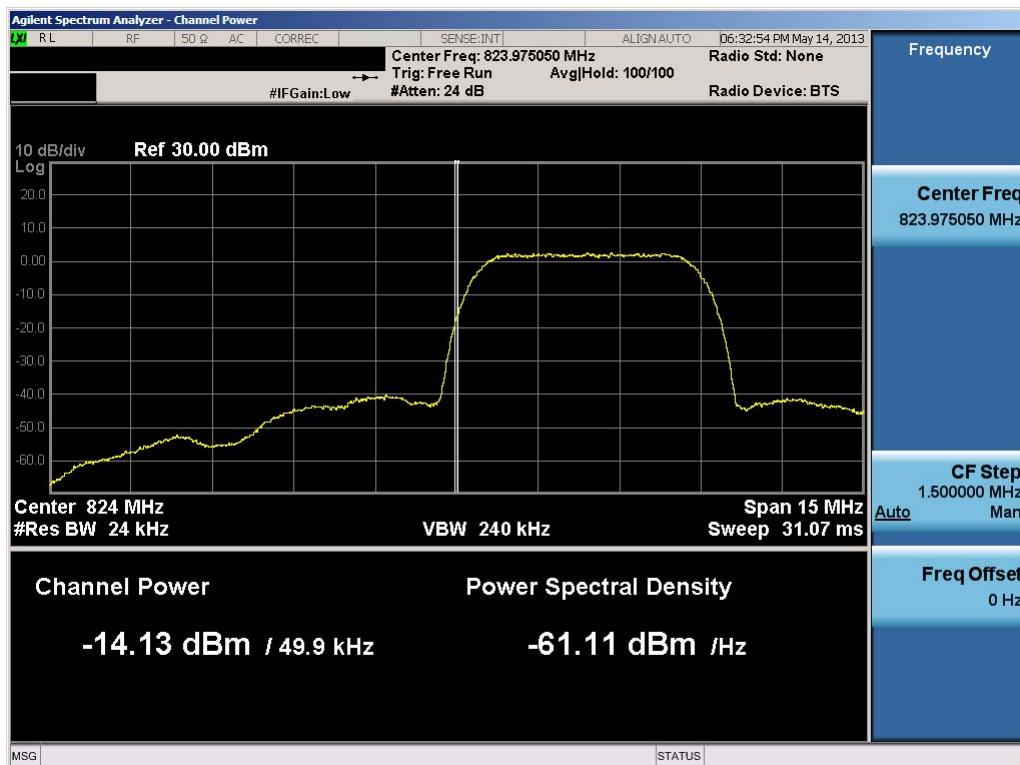


Plot 7-11. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)

FCC ID: A98-MER7671	FCC Pt. 22, 24 GSM / WCDMA MEASUREMENT REPORT (CERTIFICATION)			Reviewed by: <b>NEC</b> Quality Manager
Test Report S/N: 0Y1305140854.A98	Test Dates: May 14-15, 2013	EUT Type: Portable Handset		Page 30 of 35

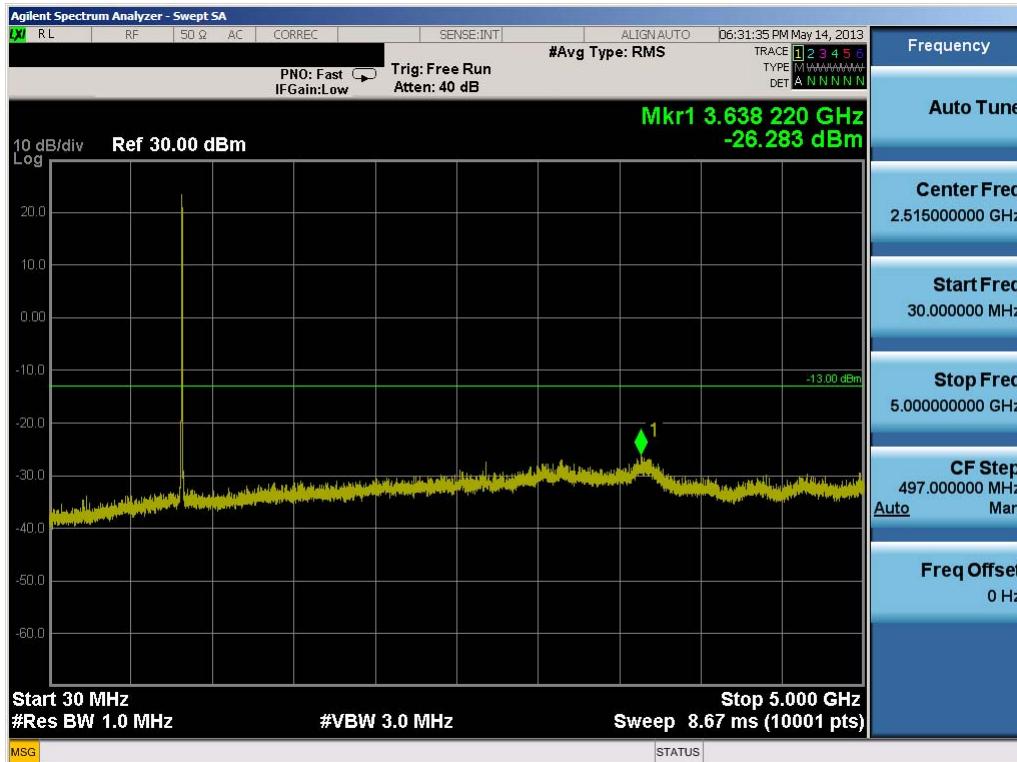


Plot 7-12. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)

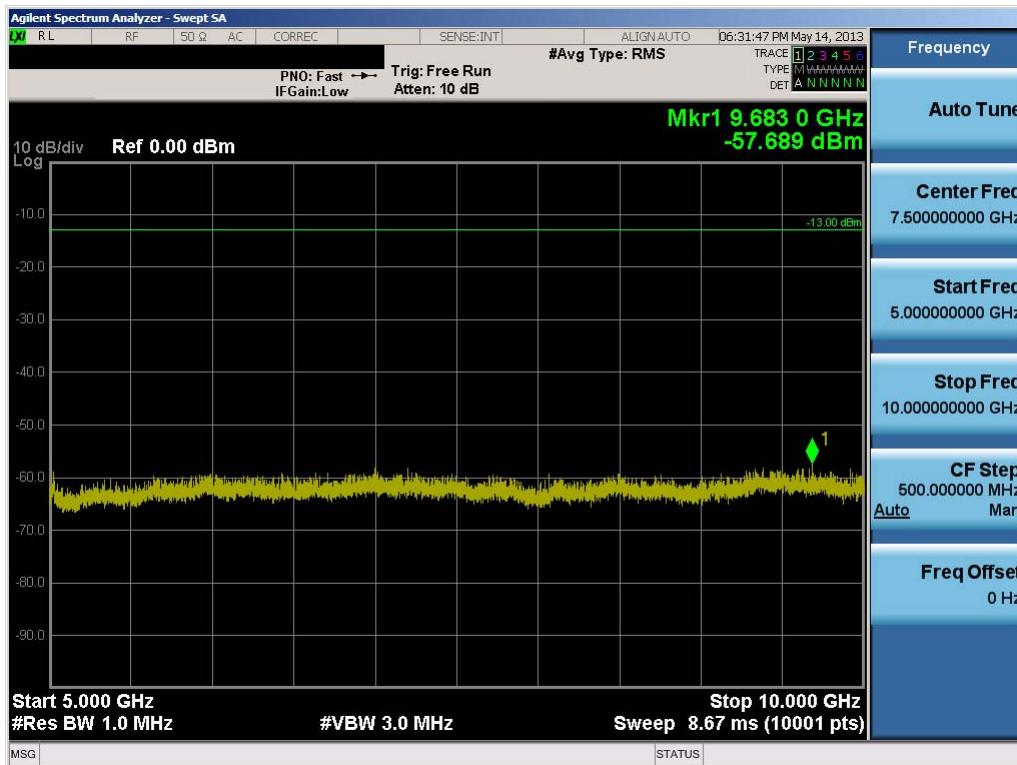


Plot 7-13. Band Edge Plot (Cellular WCDMA Mode – Ch. 4132)

FCC ID: A98-MER7671	 <b>FCC Pt. 22, 24 GSM / WCDMA MEASUREMENT REPORT (CERTIFICATION)</b>			Reviewed by: Quality Manager
Test Report S/N: 0Y1305140854.A98	Test Dates: May 14-15, 2013	EUT Type: Portable Handset		Page 31 of 35

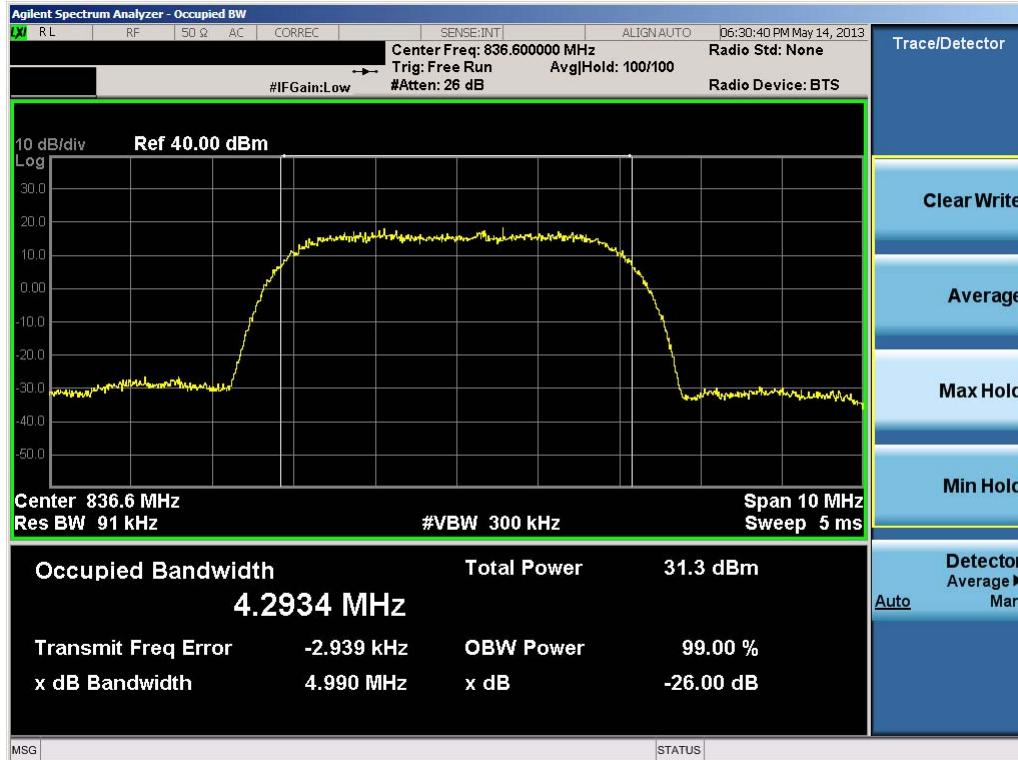


Plot 7-14. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)

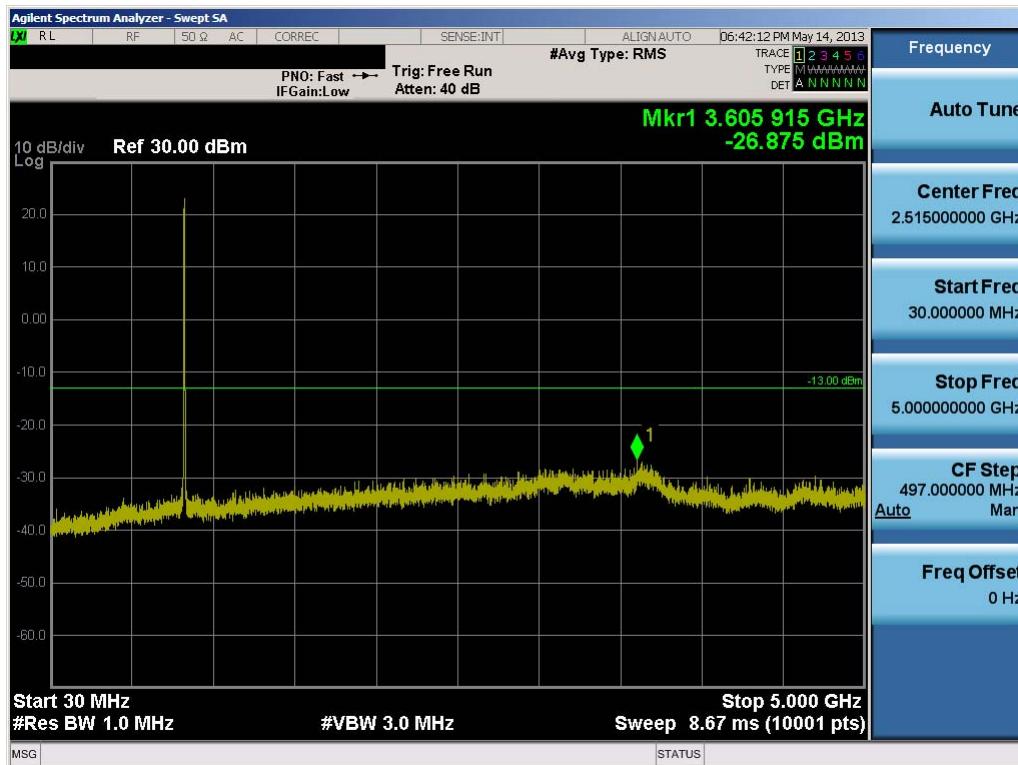


Plot 7-15. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)

FCC ID: A98-MER7671	FCC Pt. 22, 24 GSM / WCDMA MEASUREMENT REPORT (CERTIFICATION)			Reviewed by: <b>NEC</b> Quality Manager
Test Report S/N: 0Y1305140854.A98	Test Dates: May 14-15, 2013	EUT Type: Portable Handset		Page 32 of 35

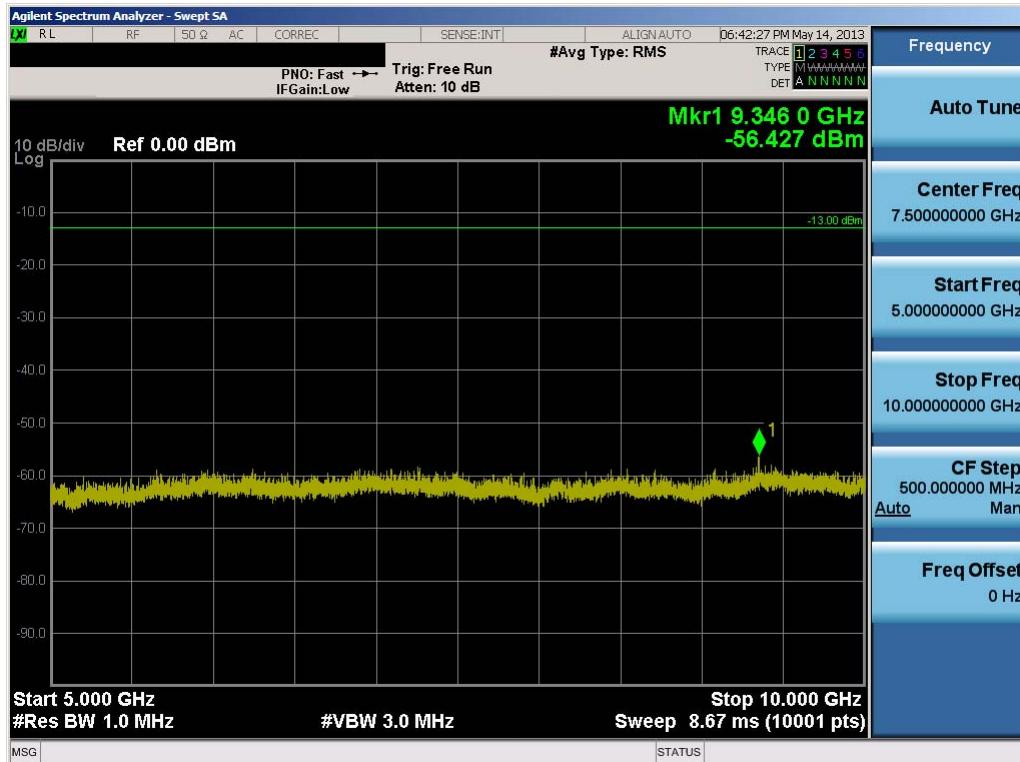


Plot 7-16. Occupied Bandwidth Plot (Cellular WCDMA Mode – Ch. 4183)



Plot 7-17. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)

FCC ID: A98-MER7671	FCC Pt. 22, 24 GSM / WCDMA MEASUREMENT REPORT (CERTIFICATION)			Reviewed by: <b>NEC</b> Quality Manager
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Plot 7-18. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)



Plot 7-19. Band Edge Plot (Cellular WCDMA Mode – Ch. 4233)

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## 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **NEC Portable Handset** **FCC ID: A98-MER7671** complies with all the requirements of Parts 2, 22, 24 of the FCC rules.

<b>FCC ID:</b> A98-MER7671	 <b>PCTEST</b> <sup>®</sup> ENGINEERING LABORATORY, INC.	<b>FCC Pt. 22, 24 GSM / WCDMA MEASUREMENT REPORT (CERTIFICATION)</b>	<b>NEC</b>	<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1305140854.A98	<b>Test Dates:</b> May 14-15, 2013	<b>EUT Type:</b> Portable Handset		Page 35 of 35