



PCTEST ENGINEERING LABORATORY, INC.

7185 Oakland Mills Road, Columbia, MD 21046 USA
Tel. 410.290.6652 / Fax 410.290.6654
http://www.pctestlab.com



MEASUREMENT REPORT FCC Part 22, 24, & 27

Applicant Name:
Samsung Electronics Co., Ltd.
129, Samsung-ro,
Yeongtong-gu, Suwon-si
Gyeonggi-do, 16677, Korea

Date of Testing:
9/28 - 11/16/2015
Test Site/Location:
PCTEST Lab., Columbia, MD, USA
Test Report Serial No.:
0Y1511021906.A3L

FCC ID:	A3LSMJ320P
APPLICANT:	SAMSUNG ELECTRONICS CO., LTD.

Application Type: Certification
Model(s): SM-J320P
EUT Type: Portable Handset
FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s): §2 §22(H) §24(E) §27(L)
Test Procedure(s): ANSI/TIA-603-C-2004, KDB 971168 v02r02
Test Device Serial No.: *identical prototype* [S/N: 35525807404600]

Mode	Tx Frequency (MHz)	Emission Designator	ERP/EIRP	
			Max. Power (W)	Max. Power (dBm)
GPRS850	824.2 - 848.8	245KGXW	0.555	27.44
EDGE850	824.2 - 848.8	246KG7W	0.182	22.59
GPRS1900	1850.2 - 1909.8	241KGXW	1.186	30.74
EDGE1900	1850.2 - 1909.8	245KG7W	0.449	26.52
CDMA850	824.70 - 848.31	1M28F9W	0.100	20.00
CDMA1900	1851.25 - 1908.75	1M27F9W	0.236	23.72
WCDMA850	826.4 - 846.6	4M16F9W	0.070	18.44
WCDMA1700	1712.4 - 1752.5	4M17F9W	0.154	21.88
WCDMA1900	1852.4 - 1907.6	4M17F9W	0.205	23.11

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 Ortañez
 President

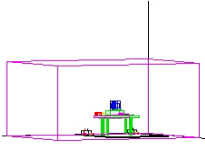


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MEASUREMENT REPORT

FCC Part 22, 24, & 27



§2.1033 General Information



APPLICANT: Samsung Electronics Co., Ltd.
APPLICANT ADDRESS: 129, Samsung-ro,
 Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
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) §27(L)
BASE MODEL: SM-J320P
FCC ID: A3LSMJ320P
FCC CLASSIFICATION: PCS Licensed Transmitter Held to Ear (PCE)
MODE: GSM/GPRS/EDGE/CDMA/WCDMA
FREQUENCY TOLERANCE: ±0.00025 % (2.5 ppm)
Test Device Serial No.: 35525807404600 Production Pre-Production Engineering
DATE(S) OF TEST: 9/28 - 11/16/2015
TEST REPORT S/N: 0Y1511021906.A3L

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.



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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 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 C63.4-2014 on January 22, 2015.

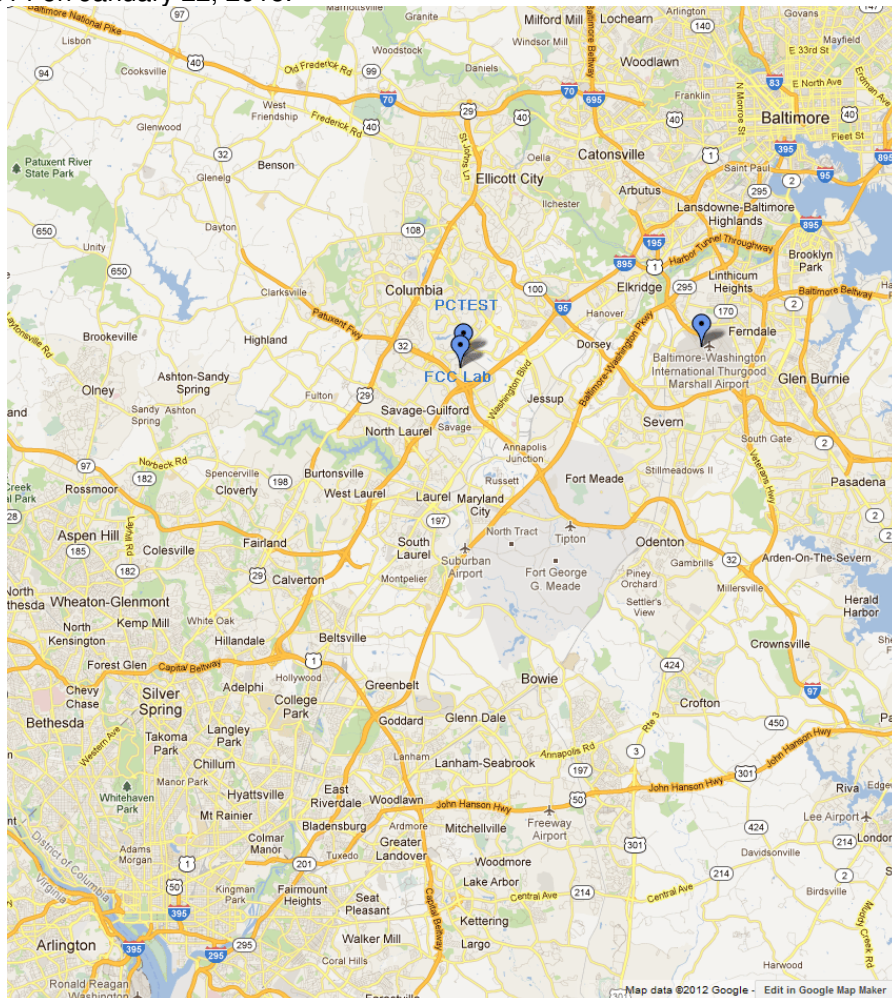




Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMJ320P**. 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 CDMA/EvDO Rev0/A (BC0, BC1, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, Bluetooth (1x, EDR, LE)

2.3 Test Configuration

The Samsung Portable Handset FCC ID: A3LSMJ320P was tested per the guidance of ANSI/TIA-603-C-2004 and KDB 971168 v02r02. See Section 7.0 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

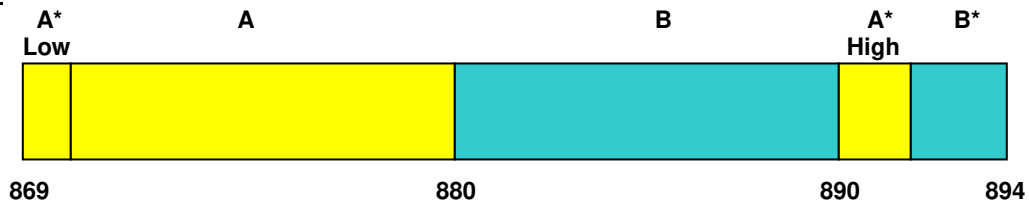
3.1 Evaluation Procedure

The measurement procedures described in the “Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards” (ANSI/TIA-603-C-2004) and “Measurement Guidance for Certification of Licensed Digital Transmitters” (KDB 971168 v02r02) were used in the measurement of the **Samsung Portable Handset FCC ID: A3LSMJ320P**.

Deviation from Measurement Procedure.....None

3.2 Cellular - Base Frequency Blocks

§22.905



BLOCK 1: 869 – 880 MHz (A* Low + A)

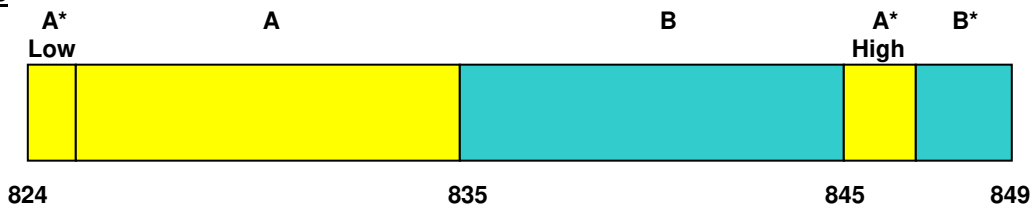
BLOCK 3: 890 – 891.5 MHz (A* High)

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)

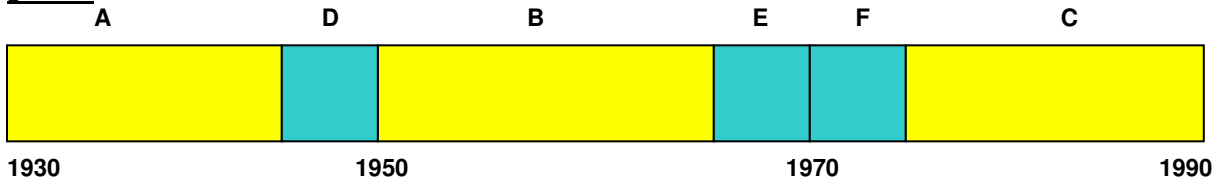
BLOCK 3: 845 – 846.5 MHz (A* High)

BLOCK 2: 835 – 845 MHz (B)

BLOCK 4: 846.5 – 849 MHz (B*)

3.4 PCS - Base Frequency Blocks

§24.229



BLOCK 1: 1930 – 1945 MHz (A)



BLOCK 4: 1965 – 1970 MHz (E)

BLOCK 2: 1945 – 1950 MHz (D)

BLOCK 5: 1970 – 1975 MHz (F)

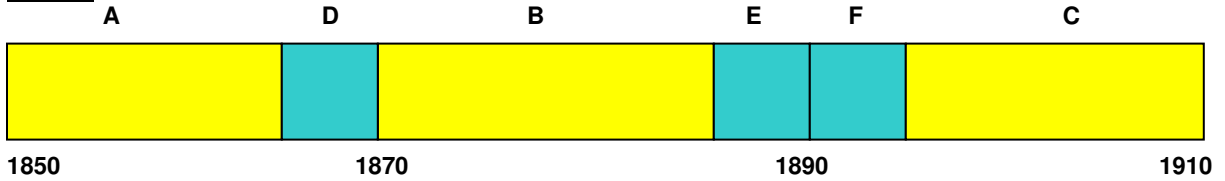
BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 6: 1975 – 1990 MHz (C)

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3.5 PCS - Mobile Frequency Blocks

§24.229



BLOCK 1: 1850 – 1865 MHz (A)

BLOCK 4: 1885 – 1890 MHz (E)

BLOCK 2: 1865 – 1870 MHz (D)

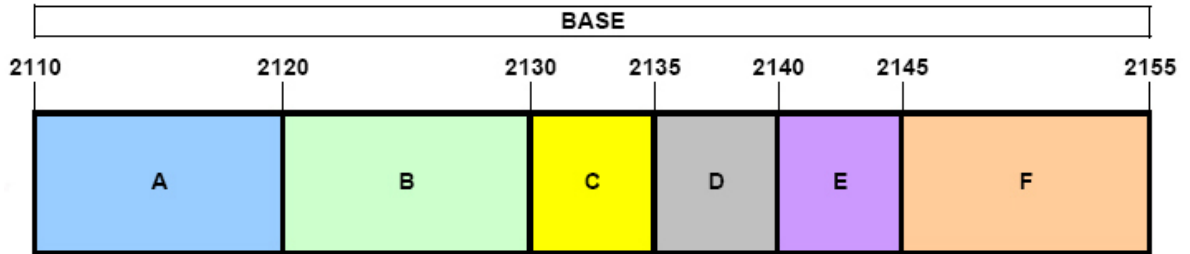
BLOCK 5: 1890 – 1895 MHz (F)

BLOCK 3: 1870 – 1885 MHz (B)

BLOCK 6: 1895 – 1910 MHz (C)

3.6 AWS - Base Frequency Blocks

§27.5(h)



BLOCK 1: 2110 – 2120 MHz (A)

BLOCK 4: 2135 – 2140 MHz (D)

BLOCK 2: 2120 – 2130 MHz (B)

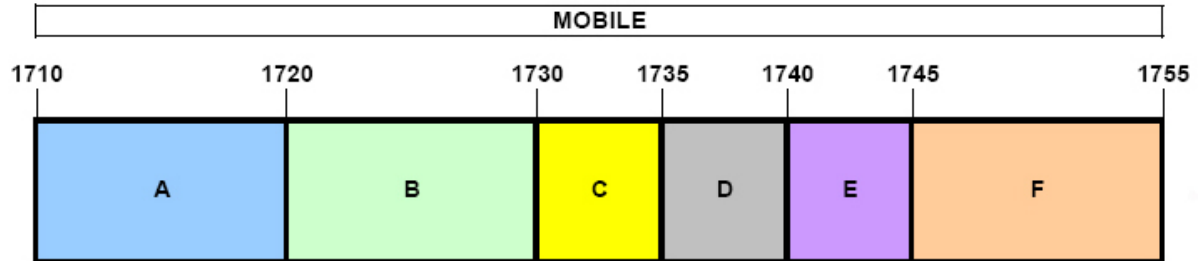
BLOCK 5: 2140 – 2145 MHz (E)

BLOCK 3: 2130 – 2135 MHz (C)

BLOCK 6: 2145 – 2155 MHz (F)

3.7 AWS - Mobile Frequency Blocks

§27.5(h)



BLOCK 1: 1710 – 1720 MHz (A)



BLOCK 4: 1735 – 1740 MHz (D)

BLOCK 2: 1720 – 1730 MHz (B)

BLOCK 5: 1740 – 1745 MHz (E)

BLOCK 3: 1730 – 1735 MHz (C)

BLOCK 6: 1745 – 1755 MHz (F)

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3.8 Radiated Measurements

§2.1053 §22.913(a.2) §22.917(a) §24.232(c) §24.238(a) §27.50(d)(4) §27.53(h)

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. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Clause 5, Figure 5.7 of ANSI C63.4-2009. 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 turntable 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.

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



Radiated power levels are investigated with the receive antenna vertically polarized while radiated spurious emissions levels are investigated with the receive antenna horizontally and vertically polarized per ANSI/TIA-603-C-2004.

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4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95% level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty (\pm dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

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5.0 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
-	LTX3	Licensed Transmitter Cable Set	6/12/2015	Annual	6/12/2016	LTX3
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	4/28/2015	Annual	4/28/2016	RE1
Agilent	8447D	Broadband Amplifier	6/12/2015	Annual	6/12/2016	2443A01900
Agilent	E5515C	Wireless Communications Test Set	N/A			GB46110872
Agilent	N9020A	MXA Signal Analyzer	11/2/2015	Annual	11/2/2016	US46470561
Emco	3115	Horn Antenna (1-18GHz)	1/30/2014	Biennial	1/30/2016	9704-5182
Emco	6502	Active Loop Antenna (10k - 30 MHz)	6/24/2014	Biennial	6/24/2016	267
Espec	ESX-2CA	Environmental Chamber	3/17/2015	Annual	3/17/2016	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/8/2014	Biennial	4/8/2016	125518
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	6/17/2014	Biennial	6/17/2016	135427
K & L	11SH10-3075/U18000	High Pass Filter	12/1/2014	Annual	12/1/2015	11SH10-3075/U18000-2
K & L	11SH10-3075/U18000	High Pass Filter	12/1/2014	Annual	12/1/2015	11SH10-3075/U18000-4
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	3/11/2015	Annual	3/11/2016	11401010036
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini-Circuits	PWR-SENS-4RMS	USB Power Sensor	3/11/2015	Annual	3/11/2016	11210140001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Mini-Circuits	TVA-11-422	RF Power Amp	N/A			QA1303002
Rhode & Schwarz	TS-PR18	Pre-Amplifier	3/5/2015	Annual	3/5/2016	101622
Rohde & Schwarz	CMU200	Base Station Simulator	N/A			107826
Rohde & Schwarz	CMW500	Radio Communication Tester	10/13/2015	Annual	10/13/2016	100976
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	3/12/2015	Annual	3/12/2016	100342
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	3/5/2015	Annual	3/5/2016	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	3/3/2015	Annual	3/3/2016	100040
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	11/1/2013	Biennial	11/1/2015	91052523RX
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/18/2014	Biennial	3/18/2016	N/A
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	1/28/2014	Biennial	1/28/2016	A051107
VWR	62344-734	Thermometer with Clock	2/20/2014	Biennial	2/20/2016	140140336

Table 5-1. Test Equipment

Notes:

1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.
2. Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

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6.0 SAMPLE CALCULATIONS

GSM Emission Designator

Emission Designator = 250KGXW

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

EDGE Emission Designator

Emission Designator = 250KG7W

EDGE BW = 250 kHz
 G = Phase Modulation
 7 = Quantized/Digital Info
 W = Combination (Audio/Data)

CDMA Emission Designator

Emission Designator = 1M25F9W

CDMA BW = 1.25 MHz
 F = Frequency Modulation
 9 = Composite Digital Info
 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)

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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7.0 TEST RESULTS

7.1 Summary



Company Name: Samsung Electronics Co., Ltd.
 FCC ID: A3LSMJ320P
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): GSM / GPRS / EDGE / CDMA / 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 7.2
2.1051 22.917(a) 24.238(a) 27.53(h)	Conducted Band Edge / Spurious Emissions	> 43 + log ₁₀ (P[Watts]) at Band Edge and for all out-of-band emissions		PASS	Sections 7.3, 7.4
24.232(d)	Peak-Average Ratio	< 13 dB		PASS	Section 7.5
2.1046	Transmitter Conducted Output Power	N/A		PASS	RF Exposure Report
2.1055 22.355 24.235 27.54	Frequency Stability	< 2.5 ppm (Part 22) Emission must remain in band (Part 24, 27)		PASS	Section 7.8
22.913(a.2)	Effective Radiated Power	< 7 Watts max. ERP	RADIATED	PASS	Section 7.6
24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS	Section 7.6
27.50(d.4)	Equivalent Isotropic Radiated Power	< 1 Watts max. EIRP		PASS	Section 7.6
2.1053 22.917(a) 24.238(a) 27.53(h)	Radiated Spurious Emissions	> 43 + log ₁₀ (P[Watts]) for all out-of-band emissions		PASS	Section 7.7

Table 7-1. 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 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.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "2G/3G Automation," Version 3.2.

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7.2 Occupied Bandwidth

§2.1049

Test Overview

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. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Procedure Used

KDB 971168 v02r02 – Section 4.2

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW $\geq 3 \times$ RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

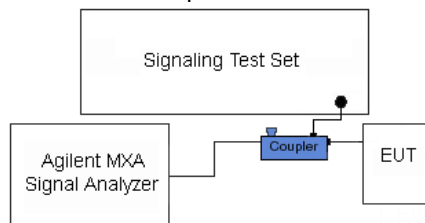


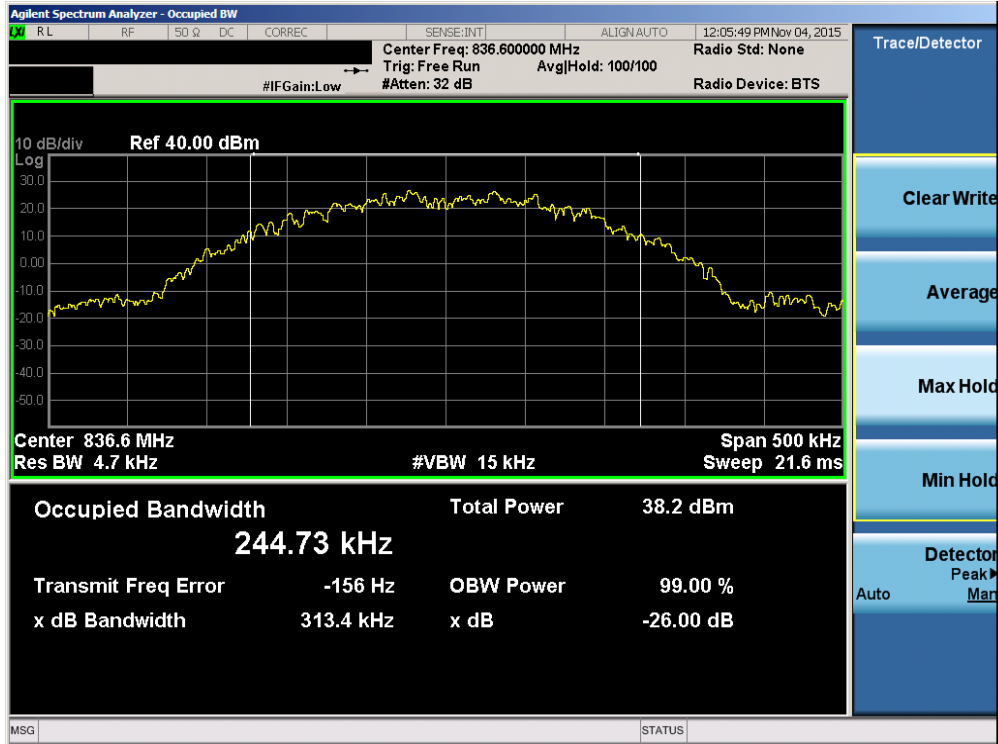


Figure 7-1. Test Instrument & Measurement Setup

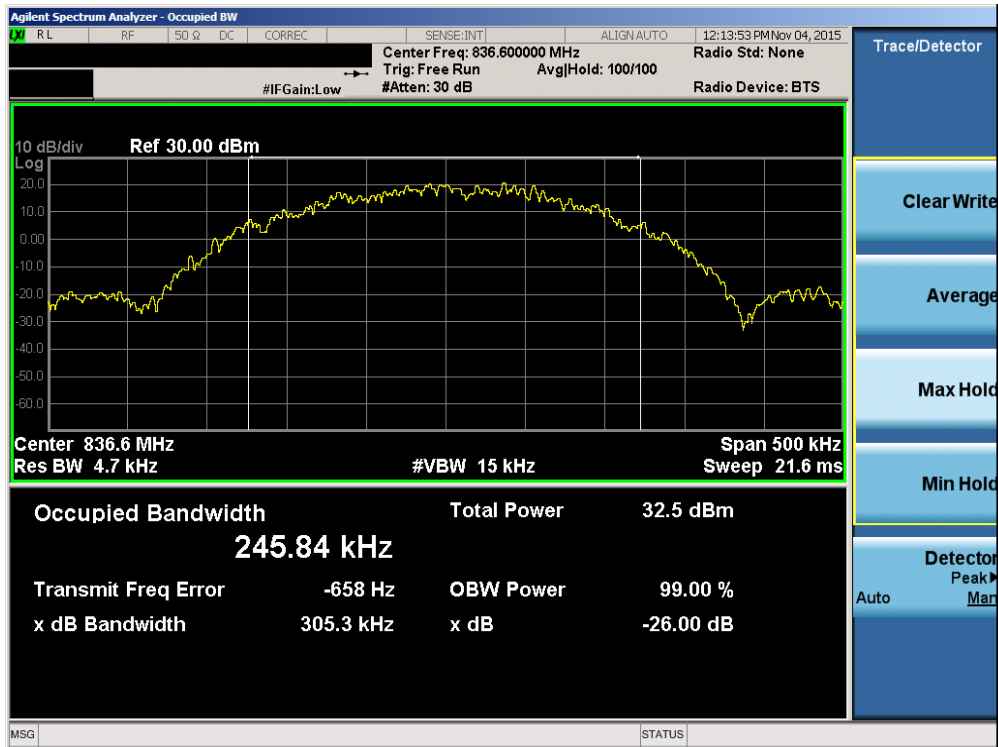
Test Notes

None.

FCC ID: A3LSMJ320P	 FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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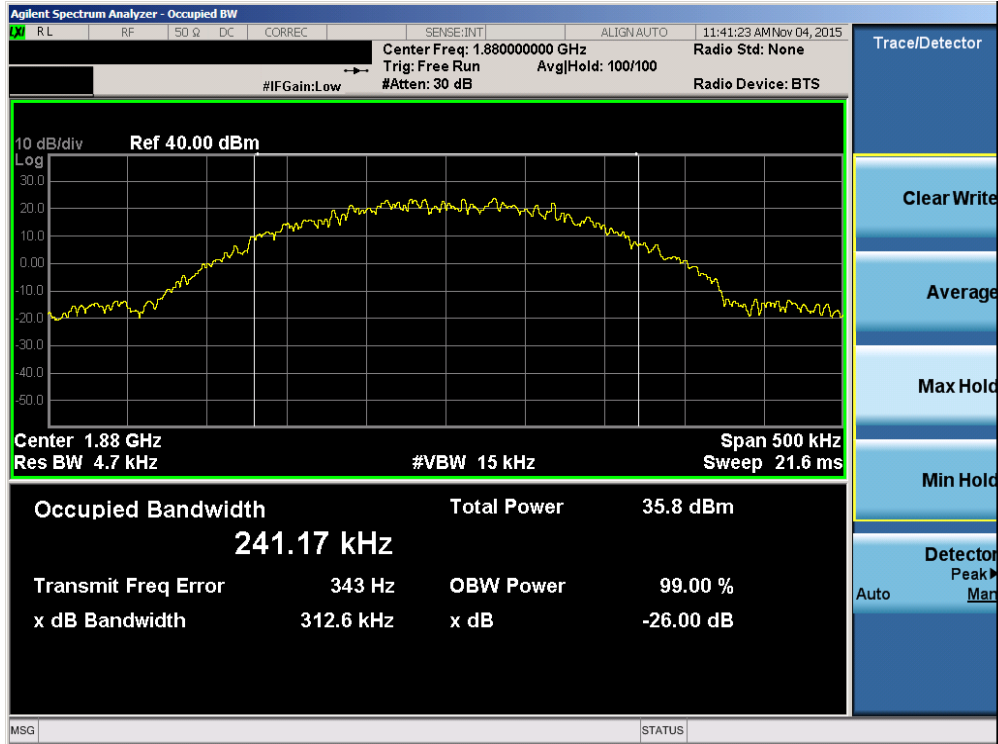


Plot 7-1. Occupied Bandwidth Plot (Cellular GSM Mode – Ch. 190)

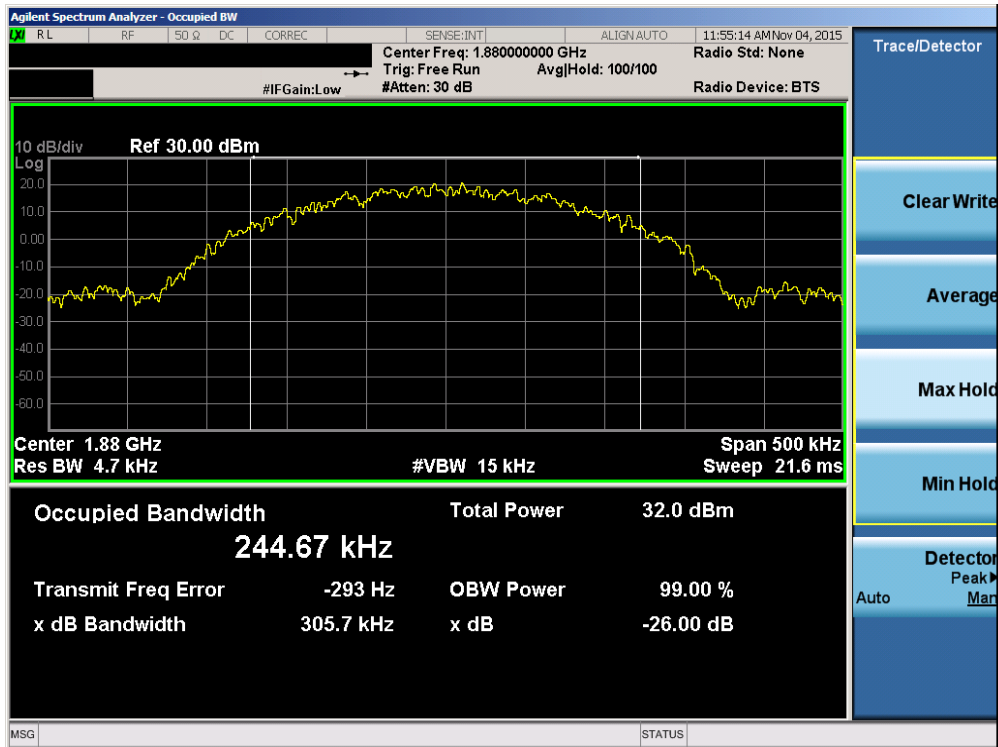


Plot 7-2. Occupied Bandwidth Plot (EDGE850 Mode – Ch. 190)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 14 of 101

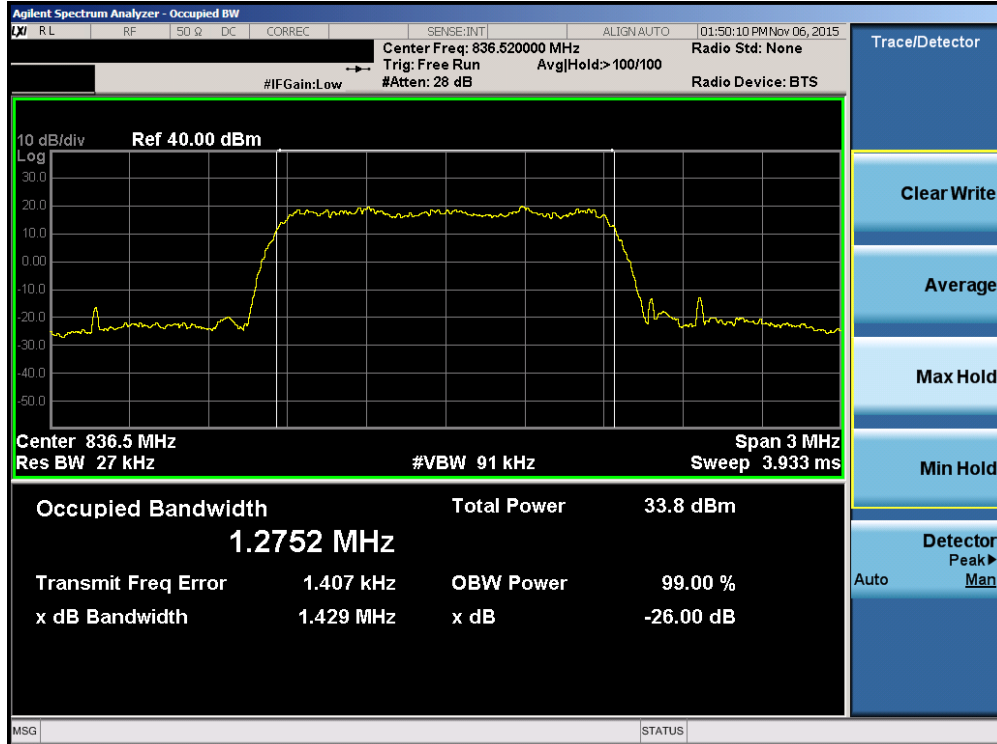


Plot 7-3. Occupied Bandwidth Plot (PCS GSM Mode – Ch. 661)

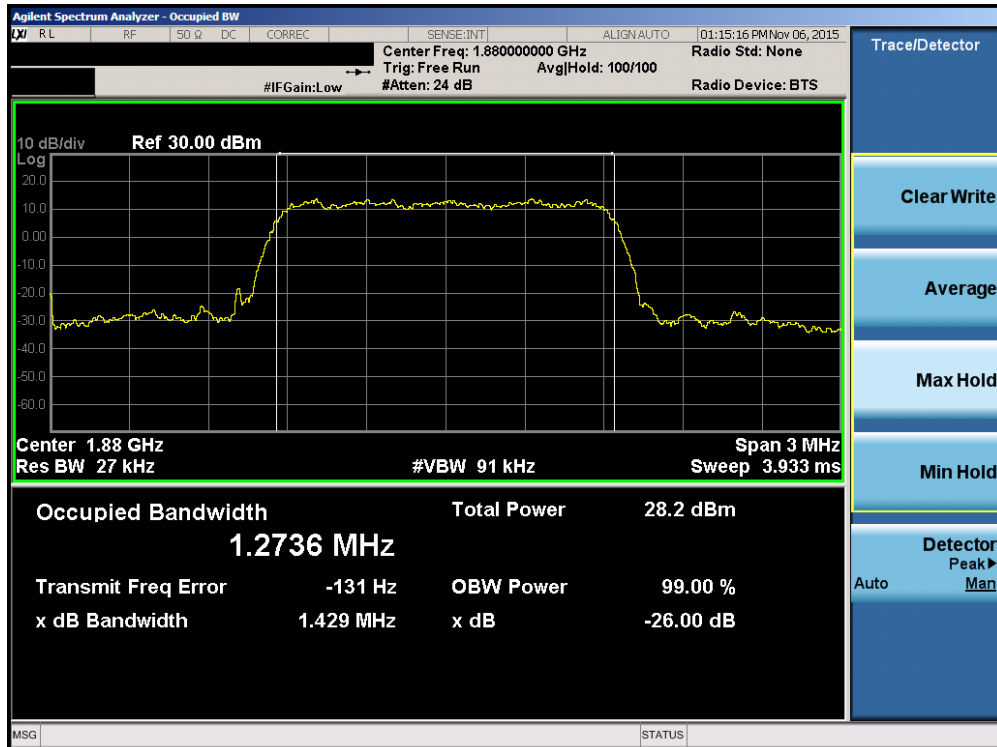


Plot 7-4. Occupied Bandwidth Plot (EDGE1900 Mode – Ch. 661)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 15 of 101

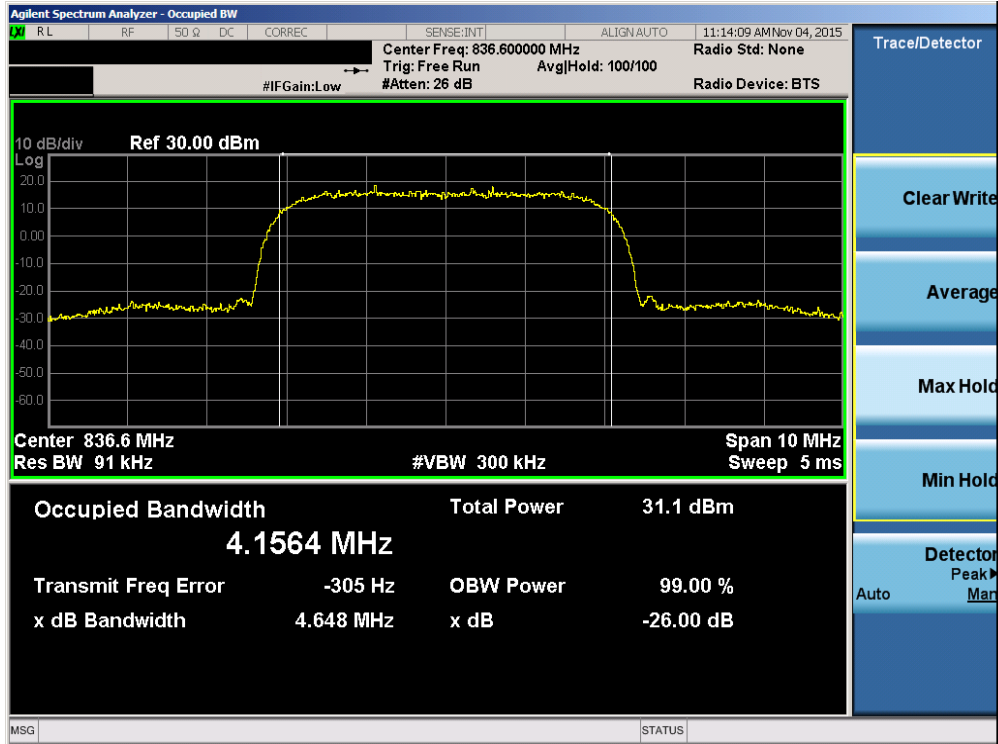


Plot 7-5. Occupied Bandwidth Plot (Cellular CDMA Mode – Ch. 384)

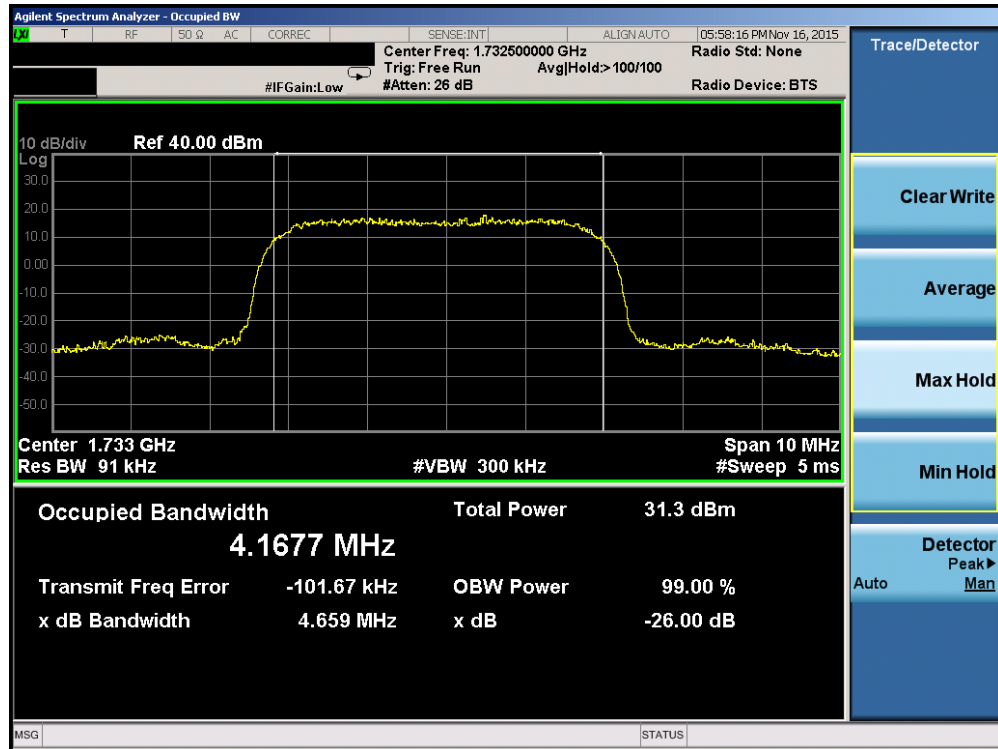


Plot 7-6. Occupied Bandwidth Plot (PCS CDMA Mode – Ch. 600)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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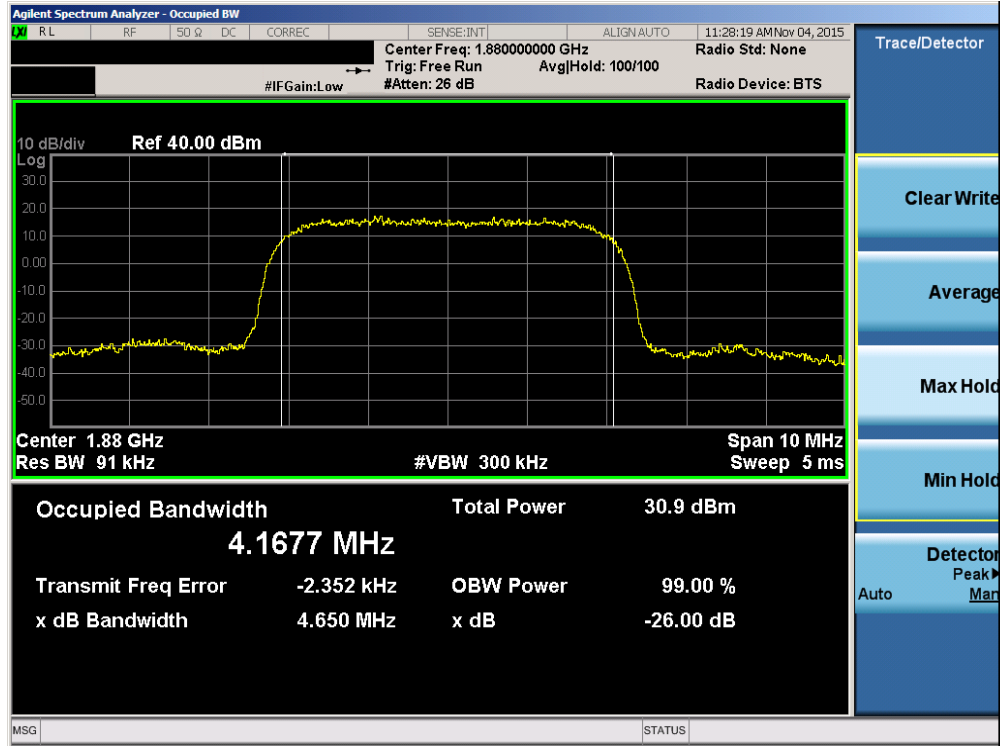


Plot 7-7. Occupied Bandwidth Plot (Cellular WCDMA Mode – Ch. 4183)





Plot 7-8. Occupied Bandwidth Plot (AWS WCDMA Mode – Ch. 1412)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Plot 7-9. Occupied Bandwidth Plot (PCS WCDMA Mode – Ch. 9400)

FCC ID: A3LSMJ320P		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 18 of 101

7.3 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051 §22.917(a) §24.238(a) §27.53(h)

Test Overview

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. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is $43 + \log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

KDB 971168 v02r02 – Section 6.0

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 10GHz for Cell, 20GHz for AWS, 20GHz for PCS (separated into at least two plots per channel)
2. Detector = RMS
3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

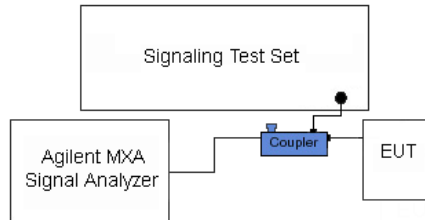


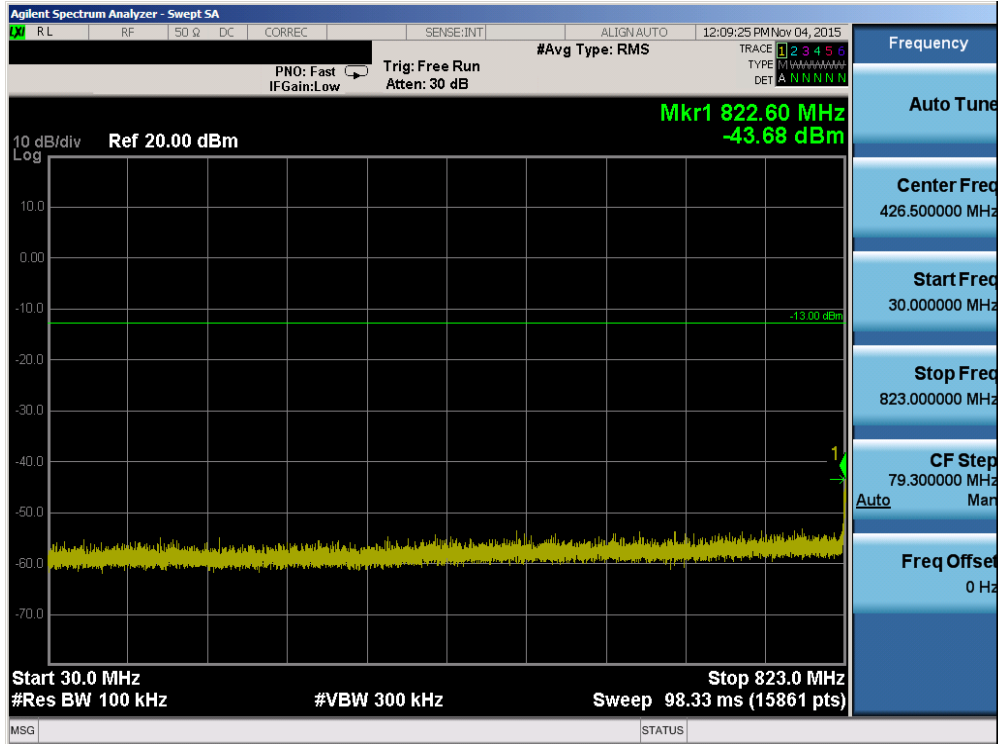


Figure 7-2. Test Instrument & Measurement Setup

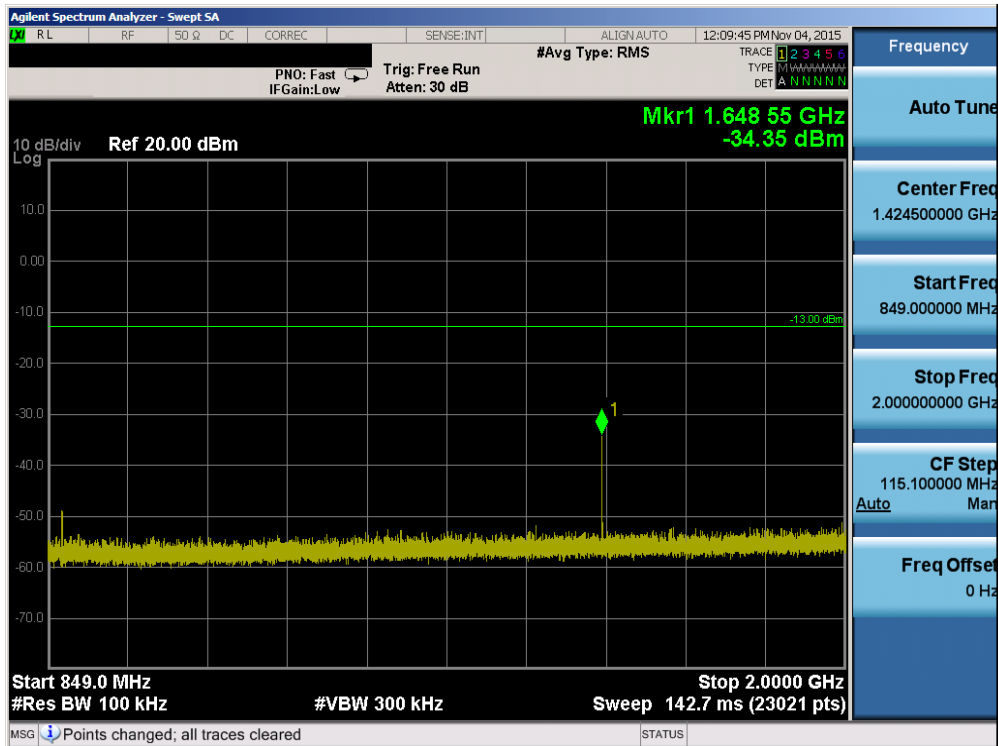
Test Notes

Compliance with the applicable limits 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, Part 27. 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.

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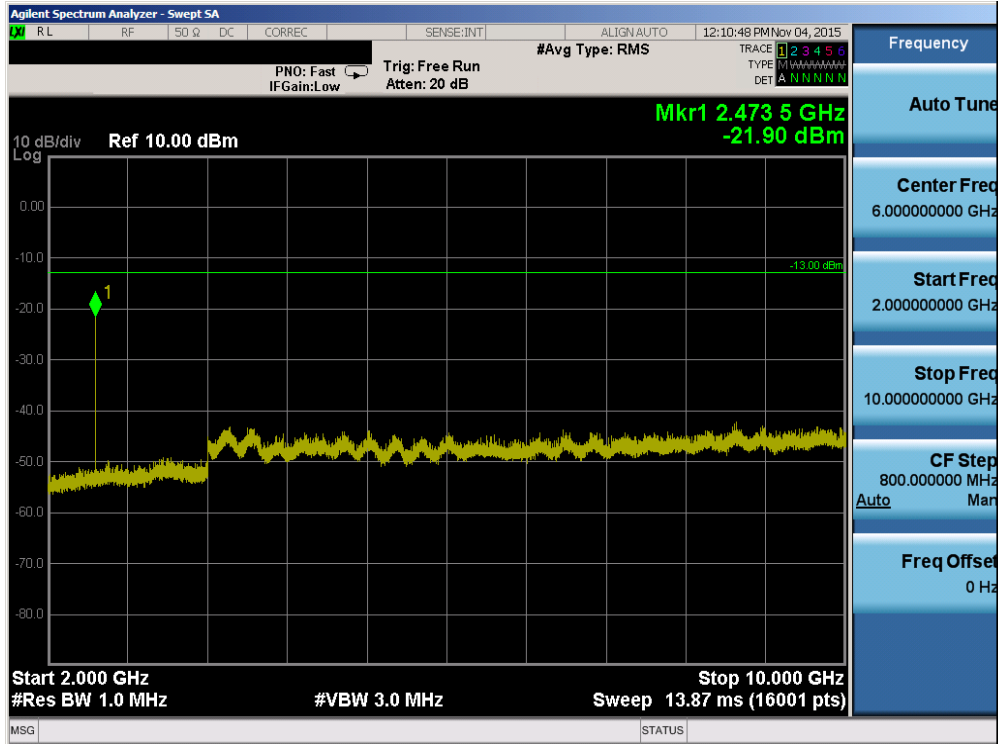


Plot 7-10. Conducted Spurious Plot (Cellular GSM Mode – Ch. 128)

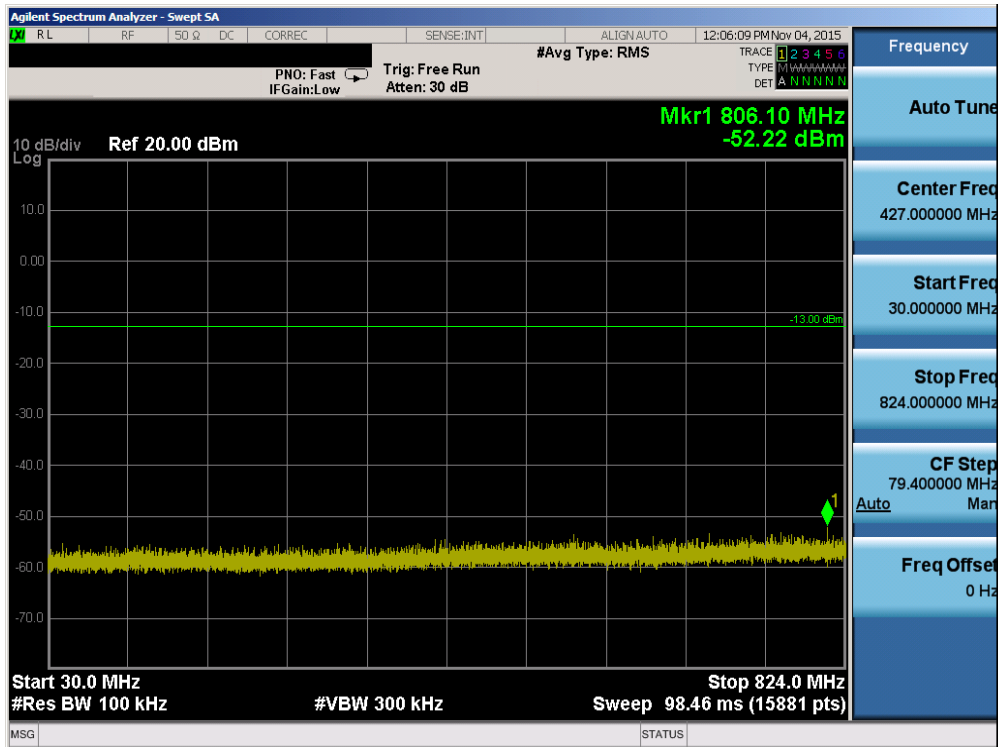


Plot 7-11. Conducted Spurious Plot (Cellular GSM Mode – Ch. 128)



FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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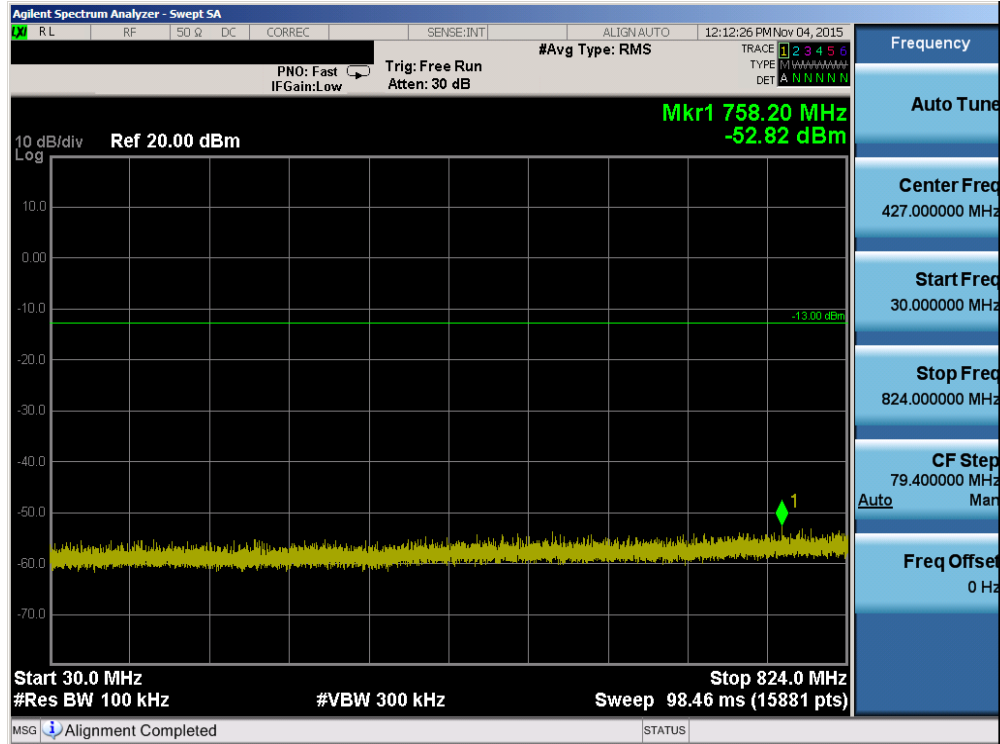


Plot 7-12. Conducted Spurious Plot (Cellular GSM Mode – Ch. 128)

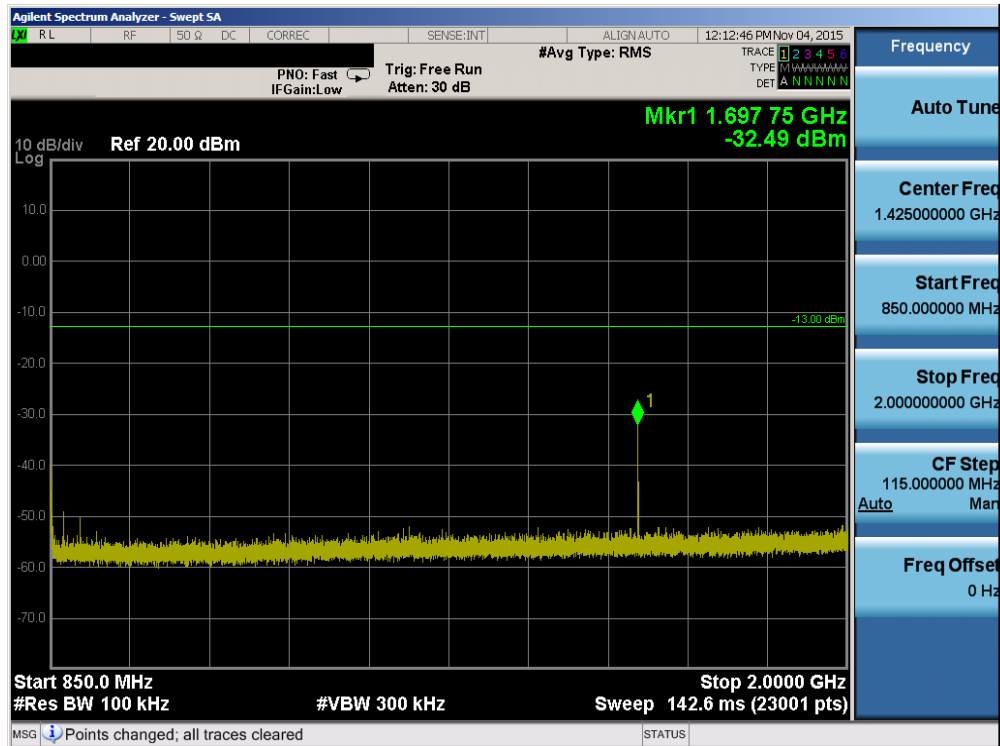


Plot 7-13. Conducted Spurious Plot (Cellular GSM Mode – Ch. 190)

FCC ID: A3LSMJ320P	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 21 of 101

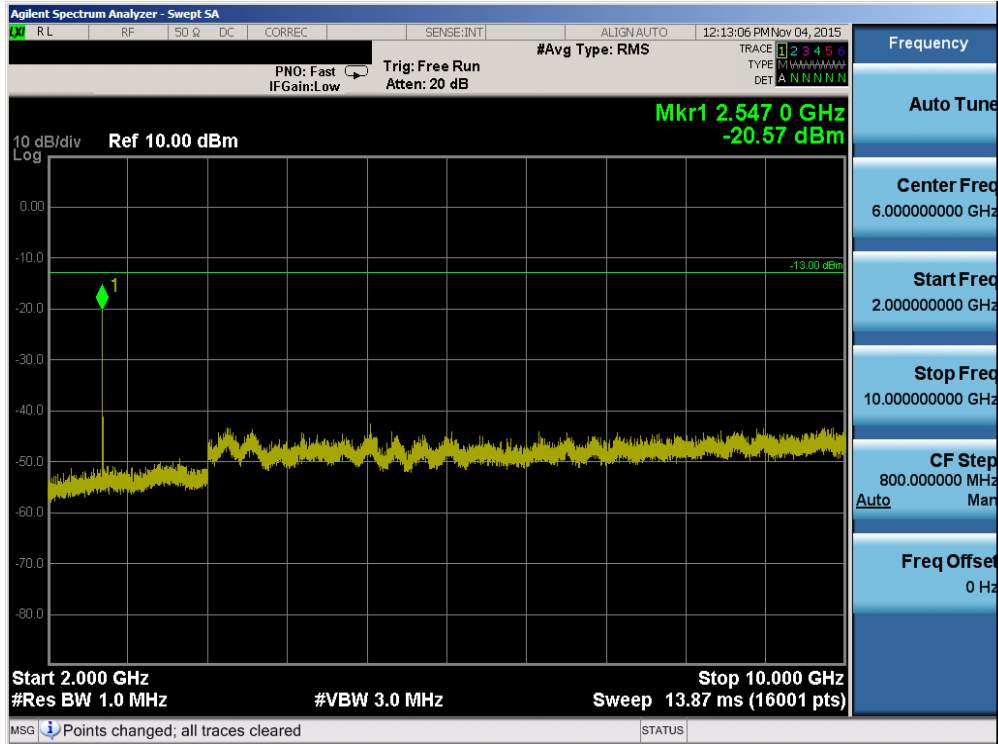


Plot 7-16. Conducted Spurious Plot (Cellular GSM Mode – Ch. 251)

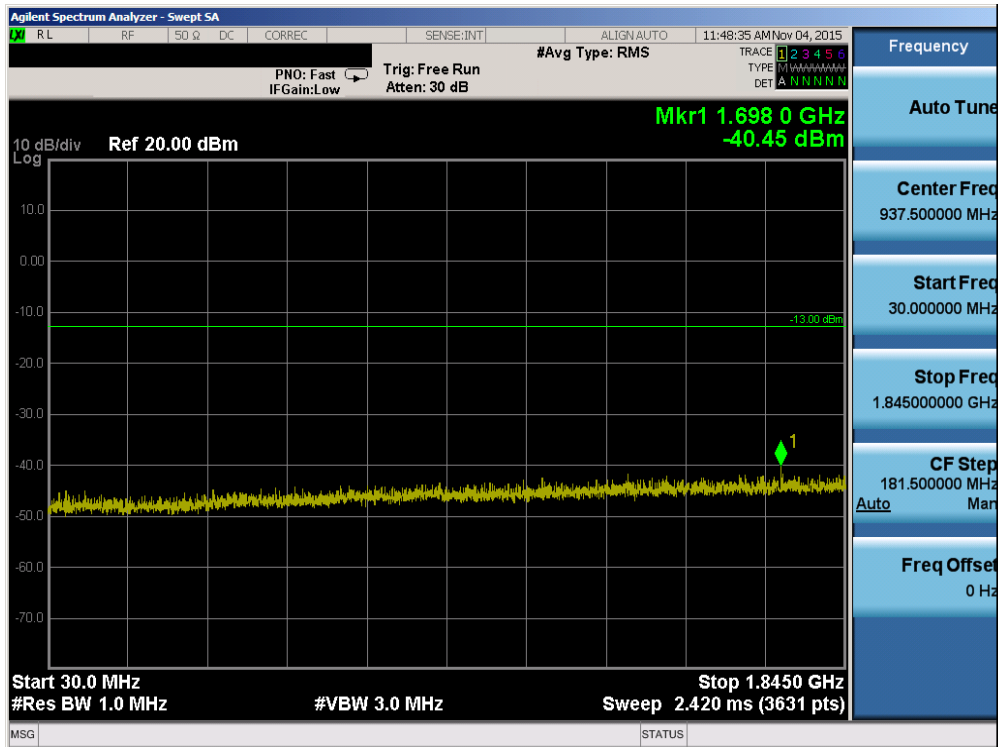


Plot 7-17. Conducted Spurious Plot (Cellular GSM Mode – Ch. 251)



FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 23 of 101

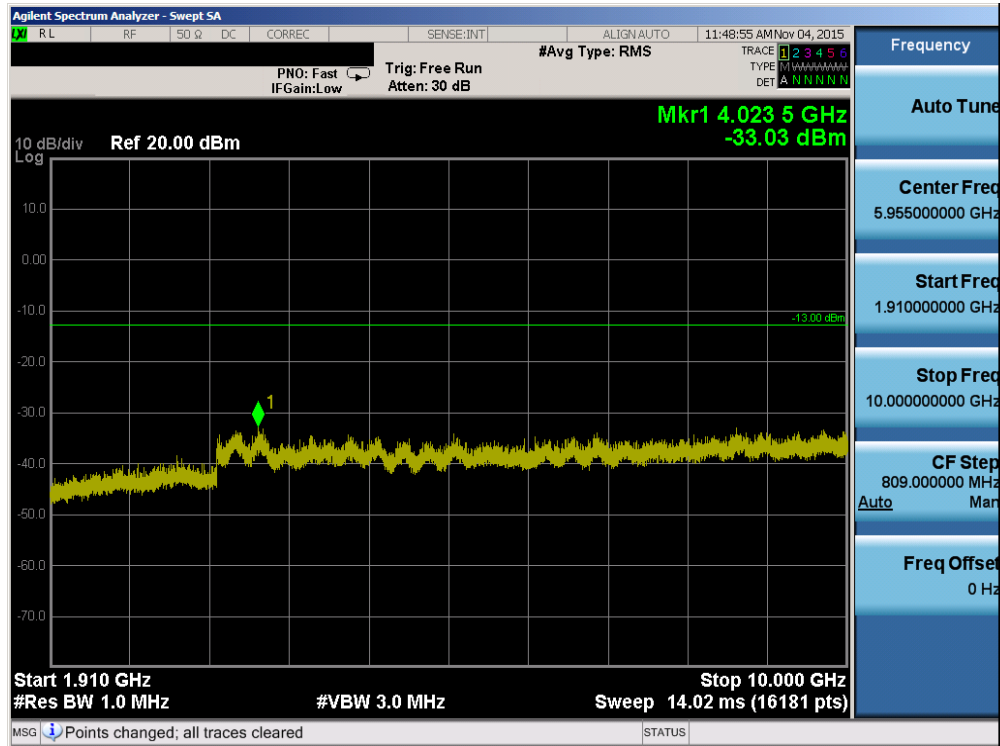


Plot 7-18. Conducted Spurious Plot (Cellular GSM Mode – Ch. 251)

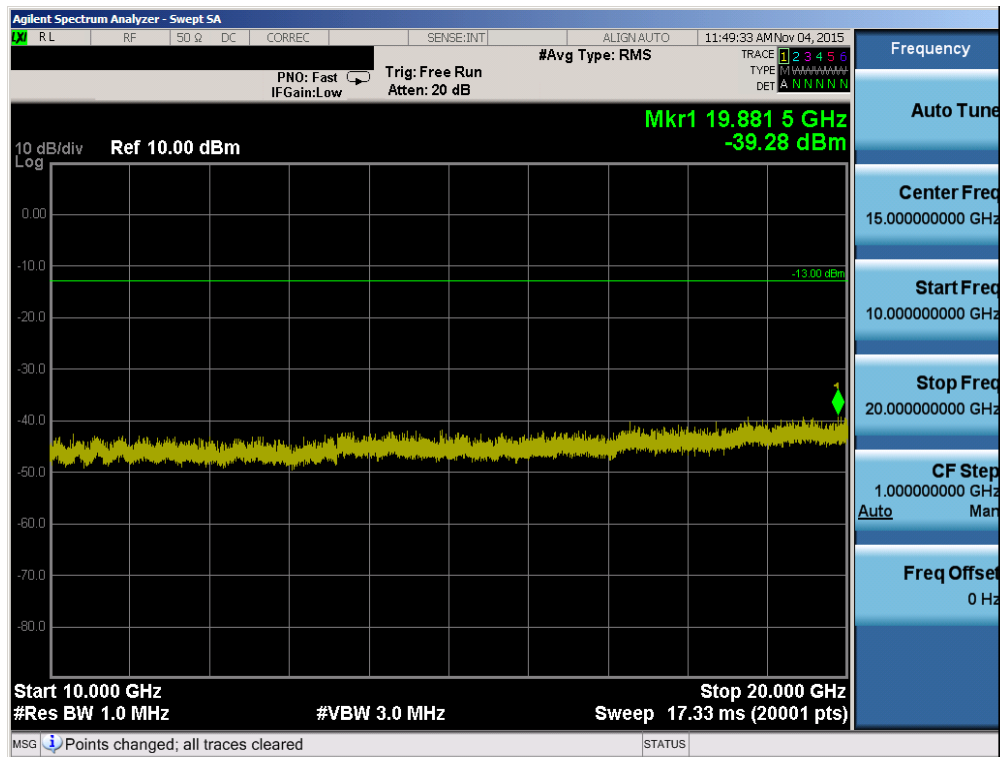


Plot 7-19. Conducted Spurious Plot (PCS GSM Mode – Ch. 512)

FCC ID: A3LSMJ320P	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 24 of 101

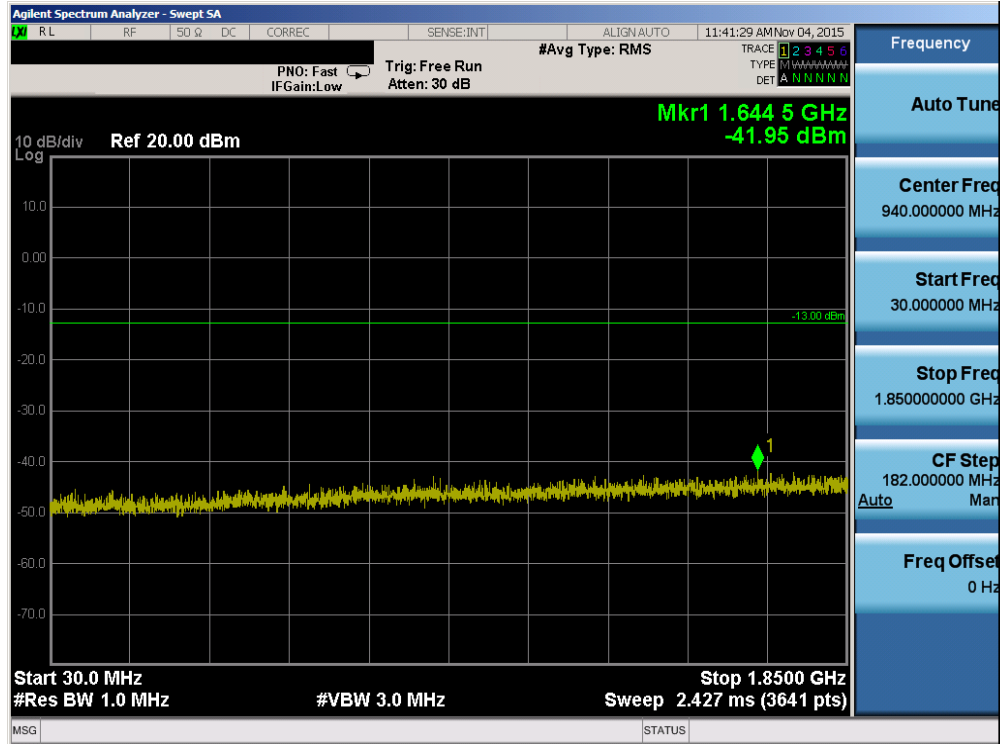


Plot 7-20. Conducted Spurious Plot (PCS GSM Mode – Ch. 512)

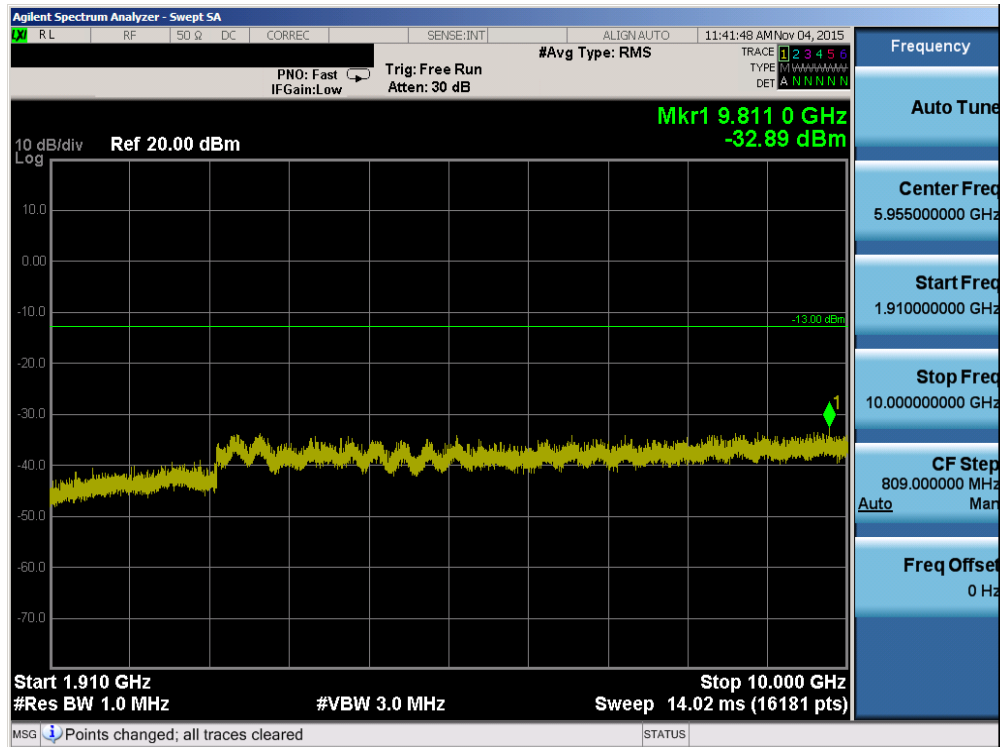


Plot 7-21. Conducted Spurious Plot (PCS GSM Mode – Ch. 512)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 25 of 101

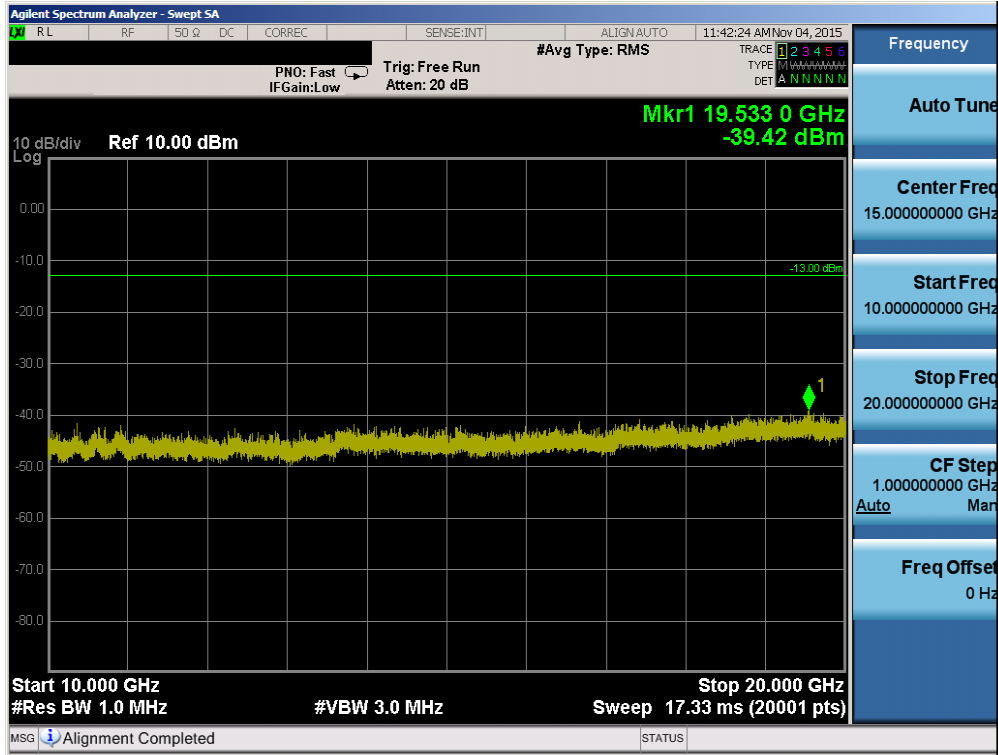


Plot 7-22. Conducted Spurious Plot (PCS GSM Mode – Ch. 661)

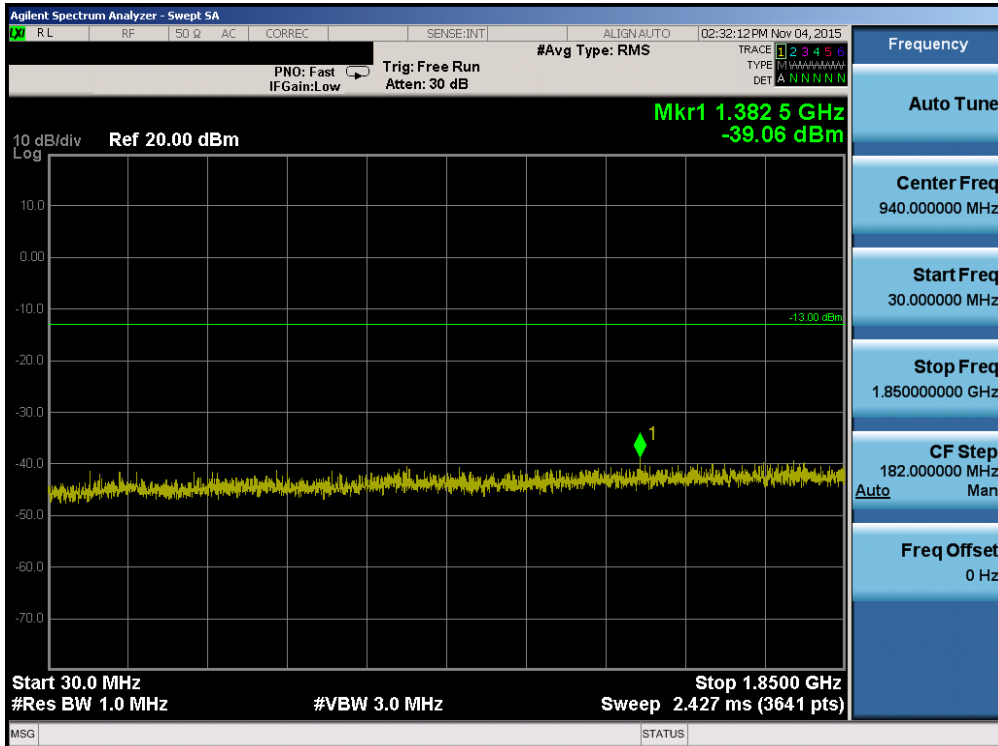


Plot 7-23. Conducted Spurious Plot (PCS GSM Mode – Ch. 661)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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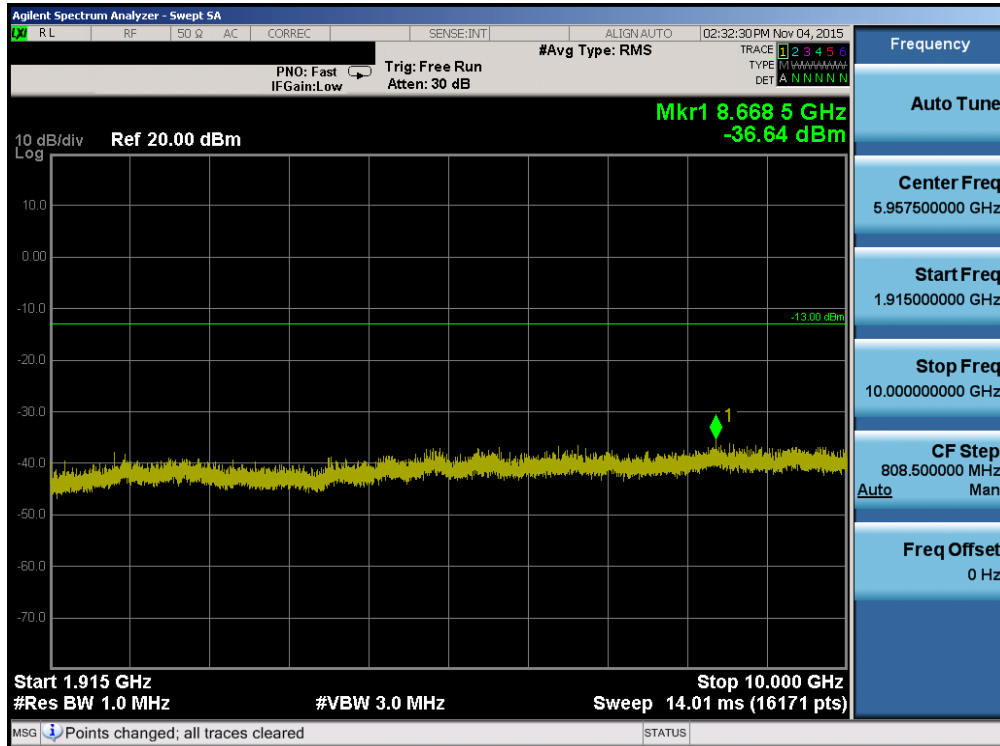


Plot 7-24. Conducted Spurious Plot (PCS GSM Mode – Ch. 661)

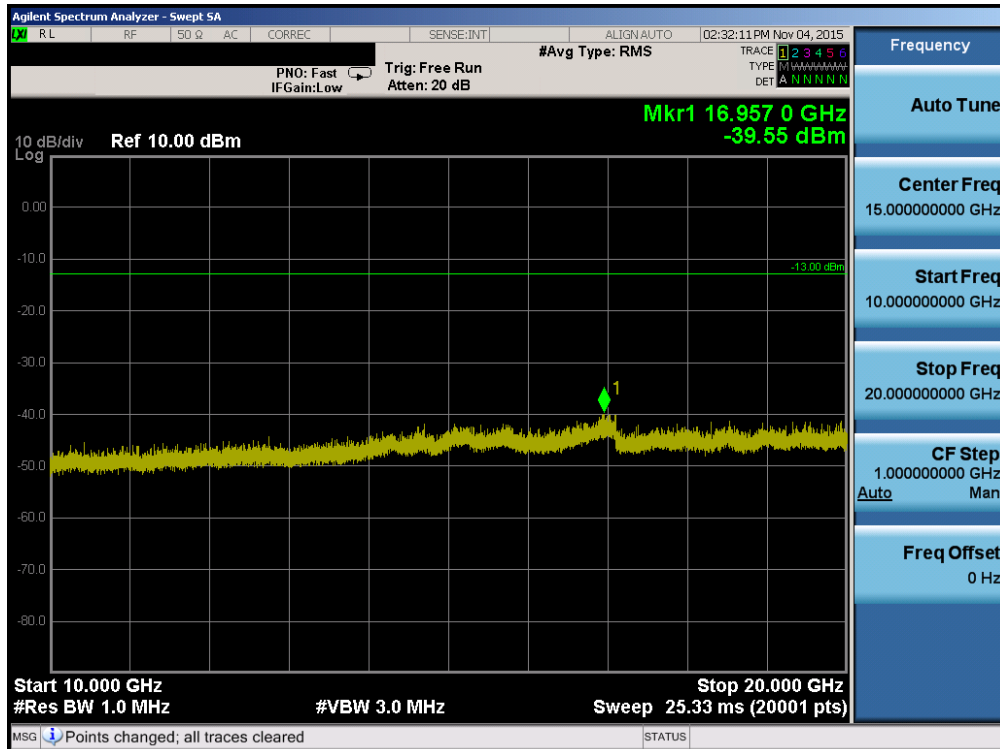


Plot 7-25. Conducted Spurious Plot (PCS GSM Mode – Ch. 810)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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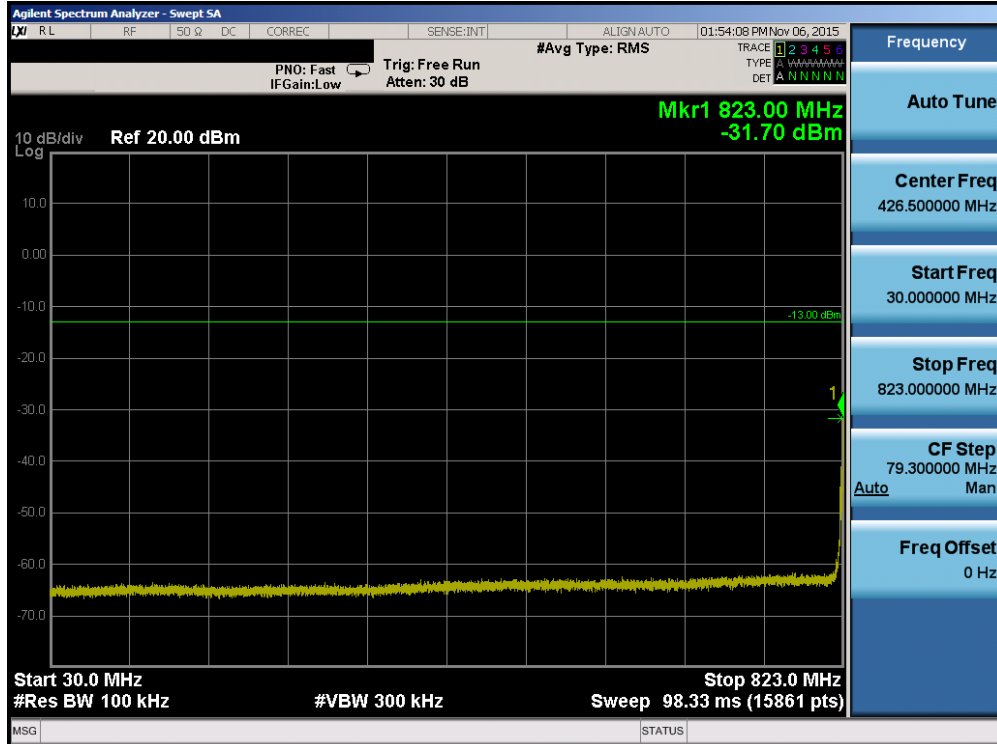


Plot 7-26. Conducted Spurious Plot (PCS GSM Mode – Ch. 810)

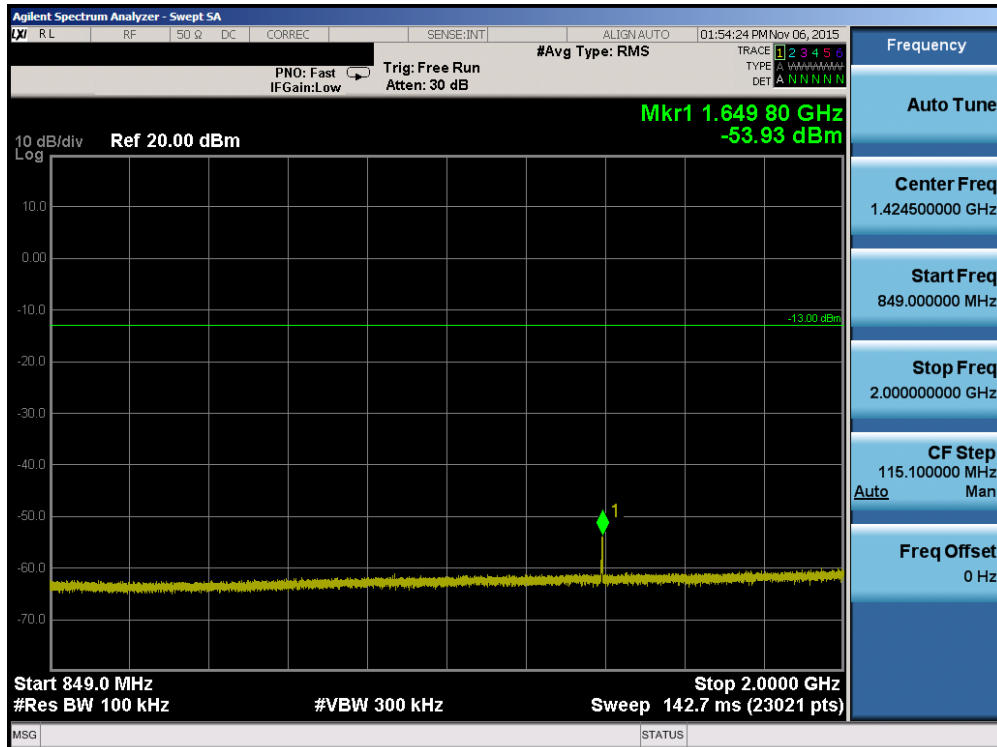


Plot 7-27. Conducted Spurious Plot (PCS GSM Mode – Ch. 810)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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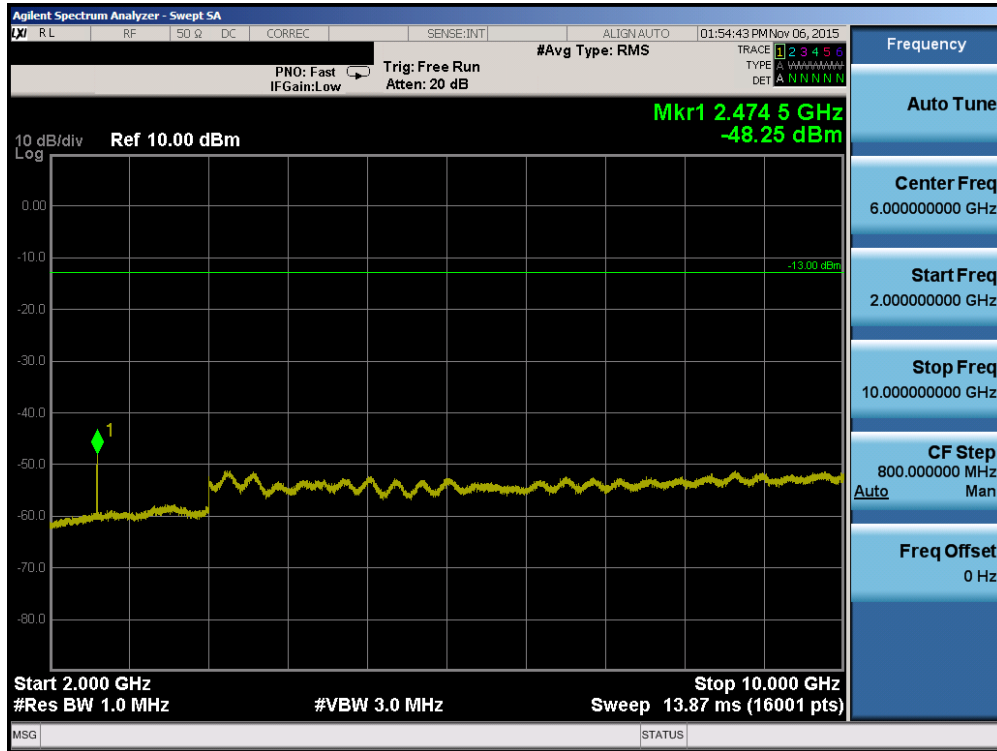


Plot 7-28. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 1013)

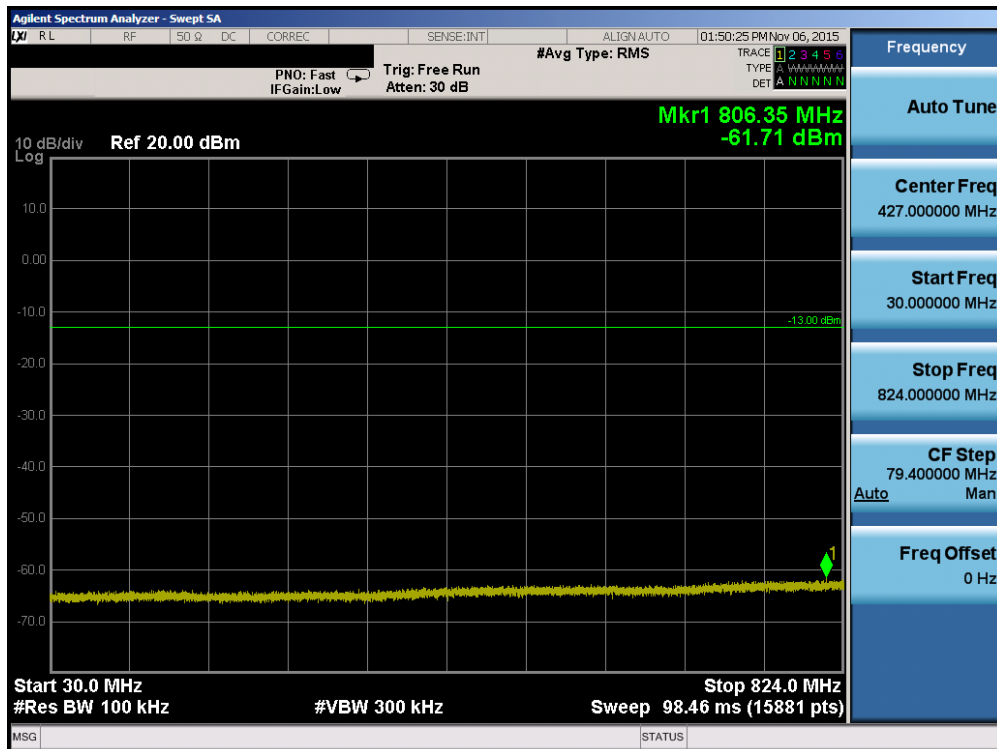


Plot 7-29. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 1013)



FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 29 of 101

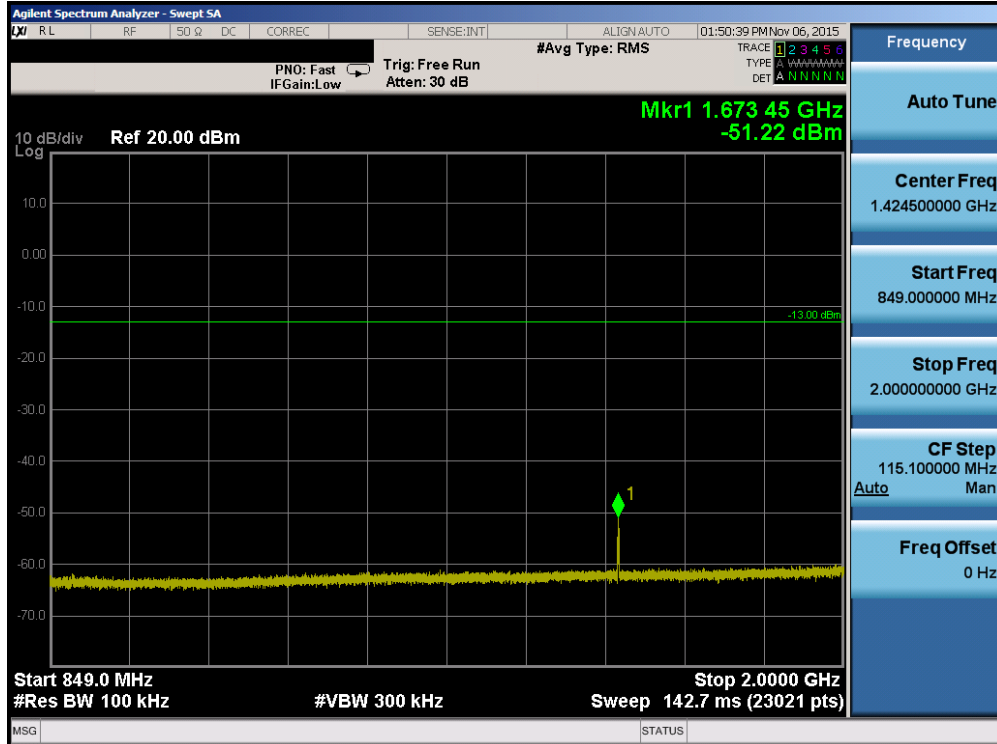


Plot 7-30. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 1013)

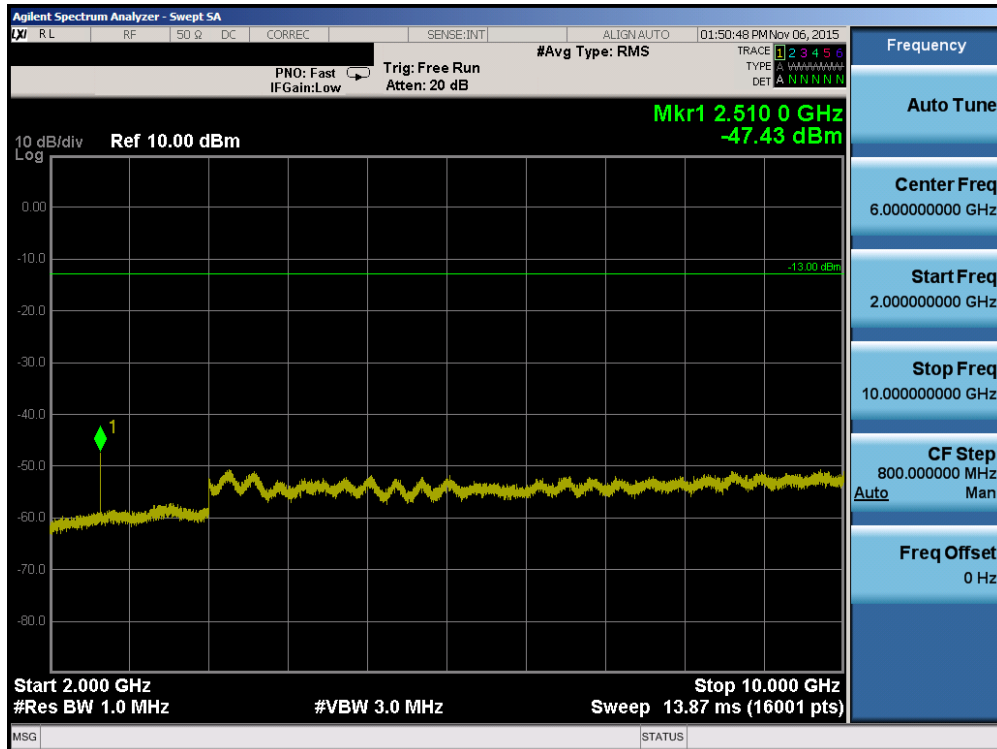


Plot 7-31. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 384)

FCC ID: A3LSMJ320P	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 30 of 101

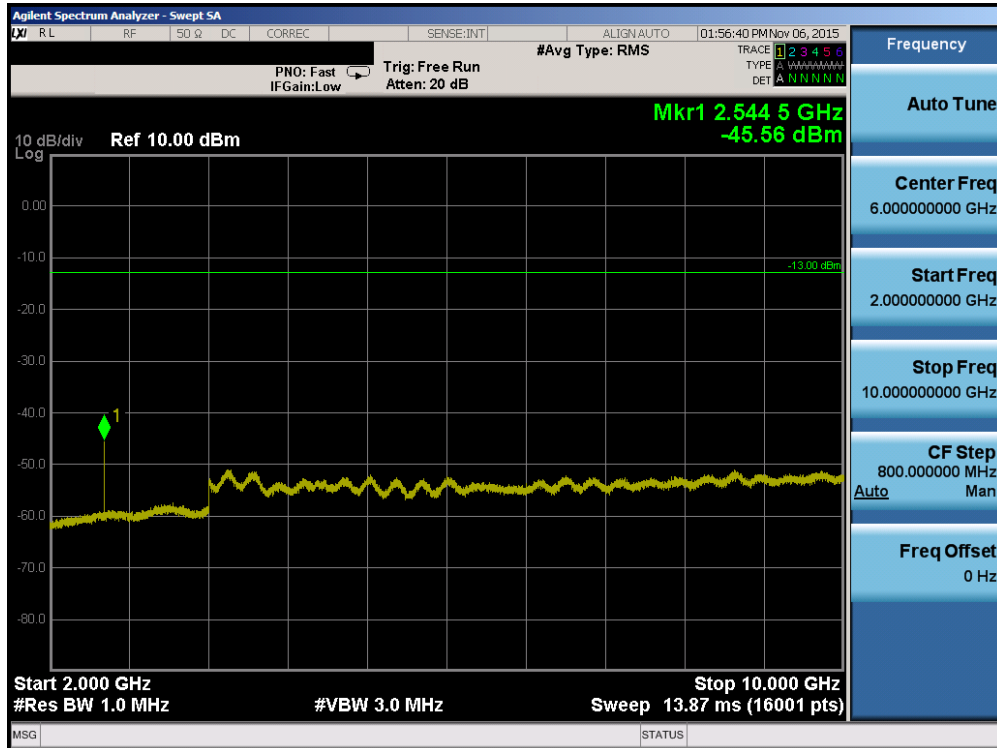


Plot 7-32. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 384)

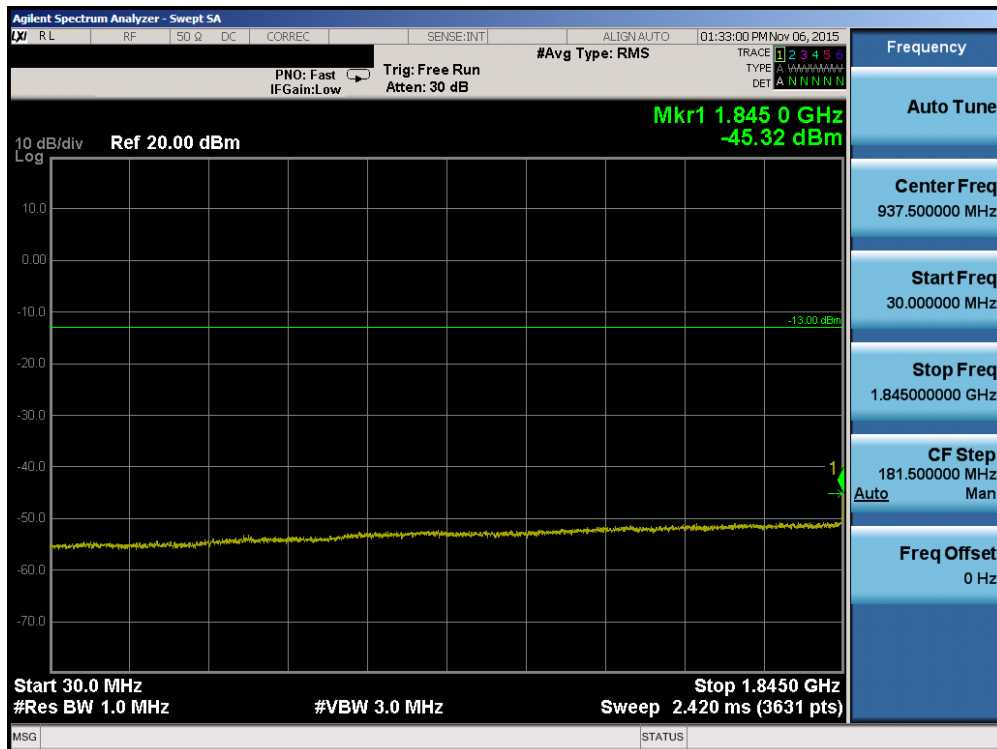


Plot 7-33. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 384)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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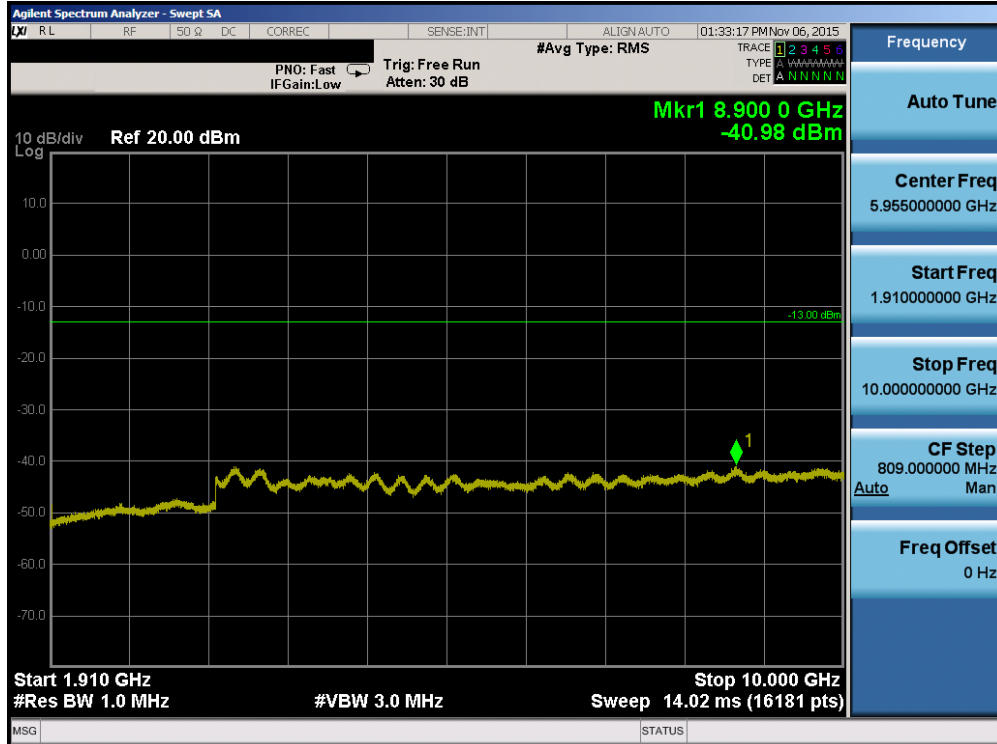


Plot 7-36. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 777)

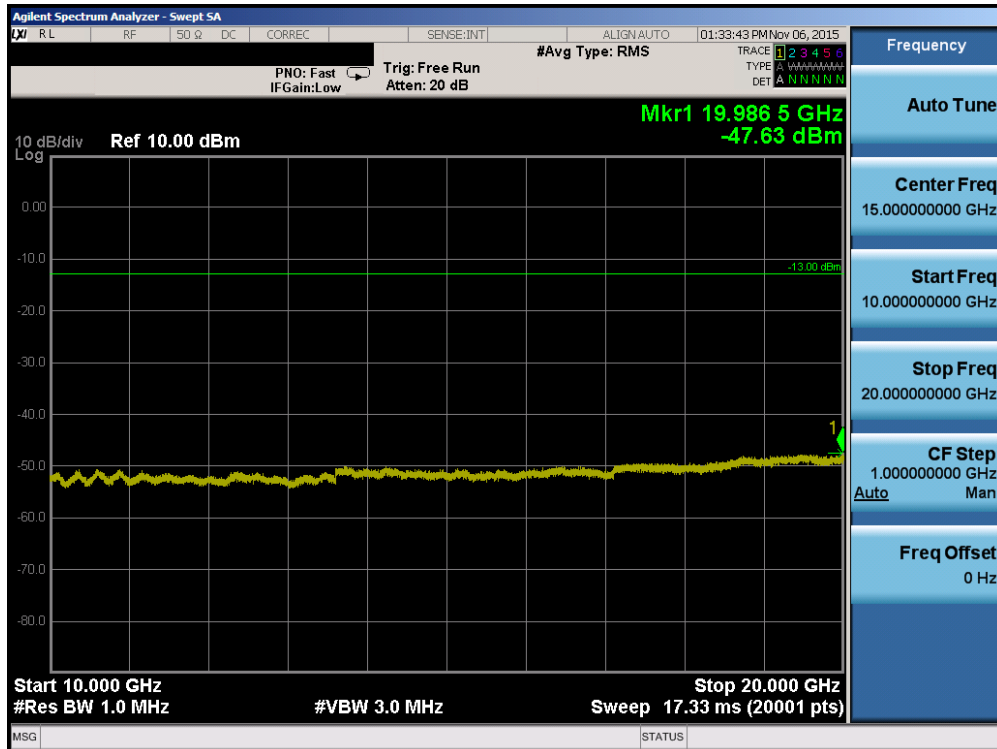


Plot 7-37. Conducted Spurious Plot (PCS CDMA Mode – Ch. 25)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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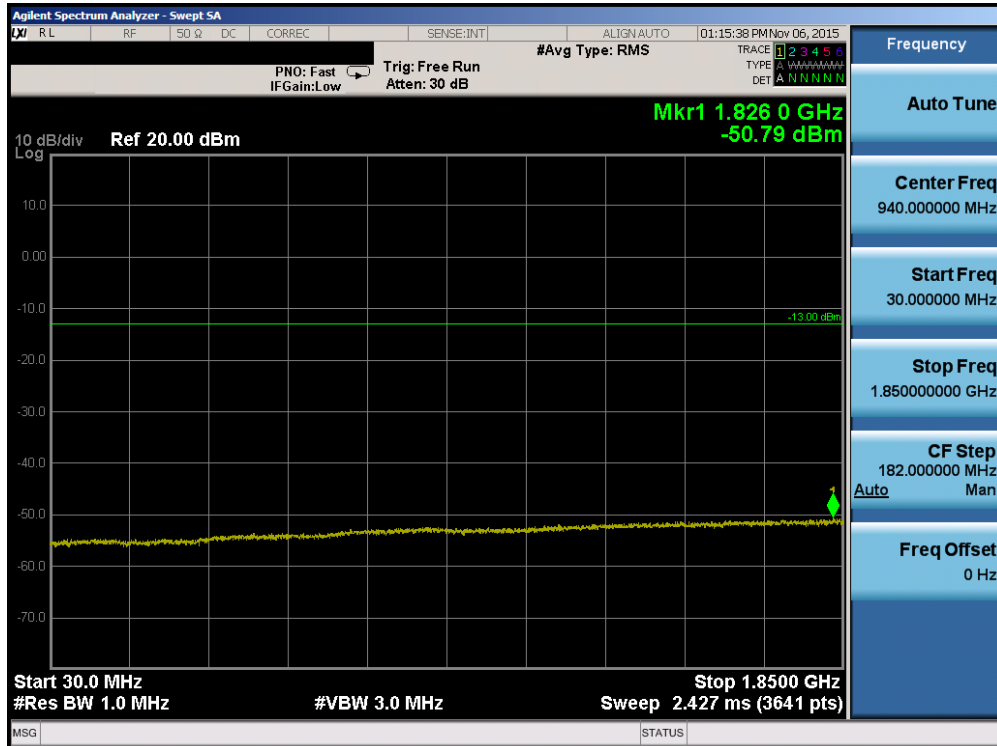


Plot 7-38. Conducted Spurious Plot (PCS CDMA Mode – Ch. 25)

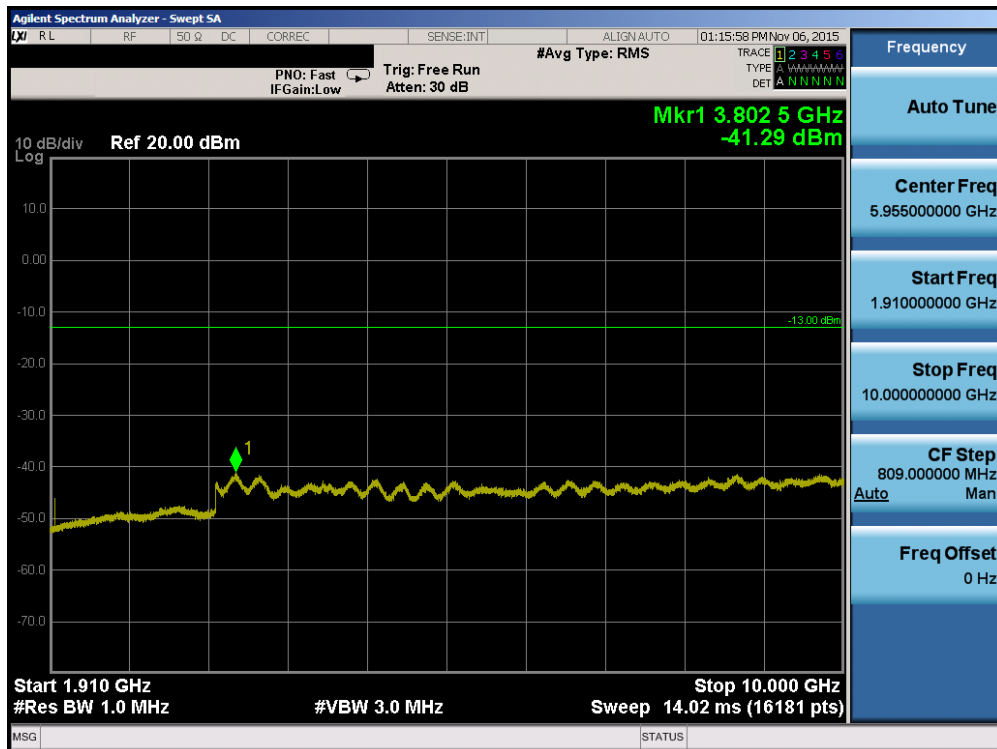


Plot 7-39. Conducted Spurious Plot (PCS CDMA Mode – Ch. 25)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 34 of 101

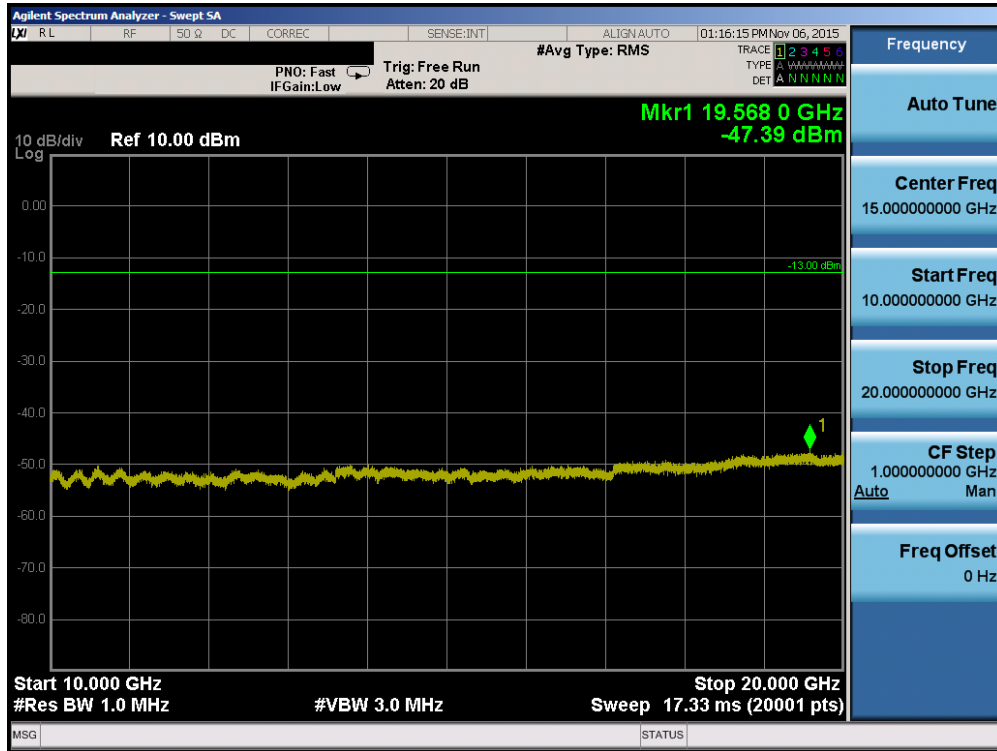


Plot 7-40. Conducted Spurious Plot (PCS CDMA Mode – Ch. 600)

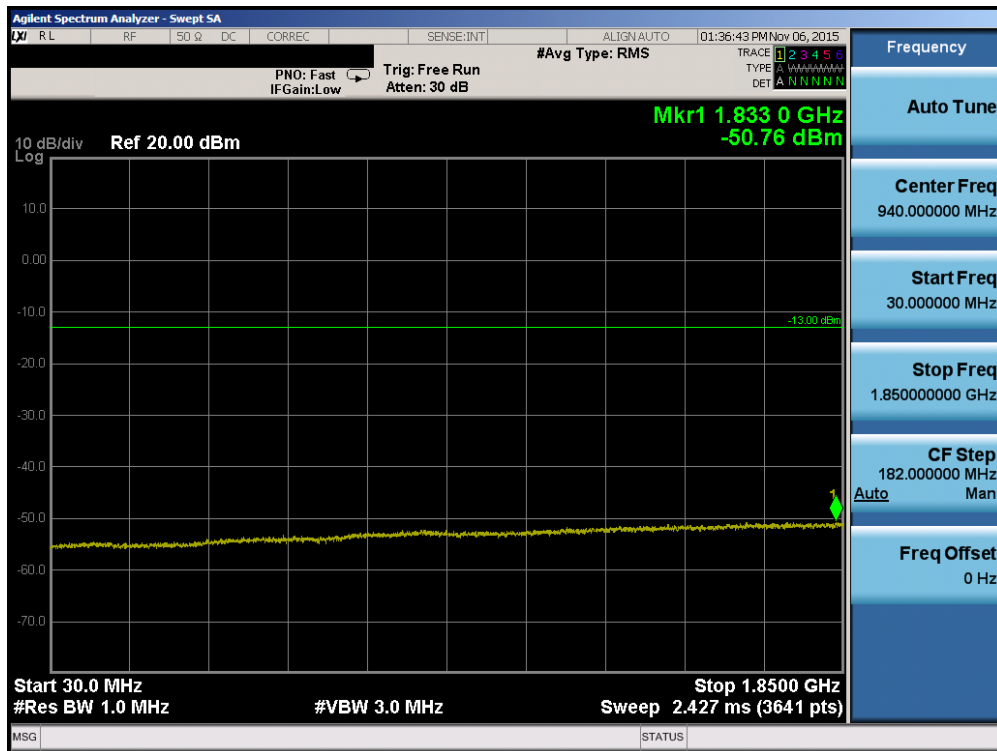


Plot 7-41. Conducted Spurious Plot (PCS CDMA Mode – Ch. 600)



FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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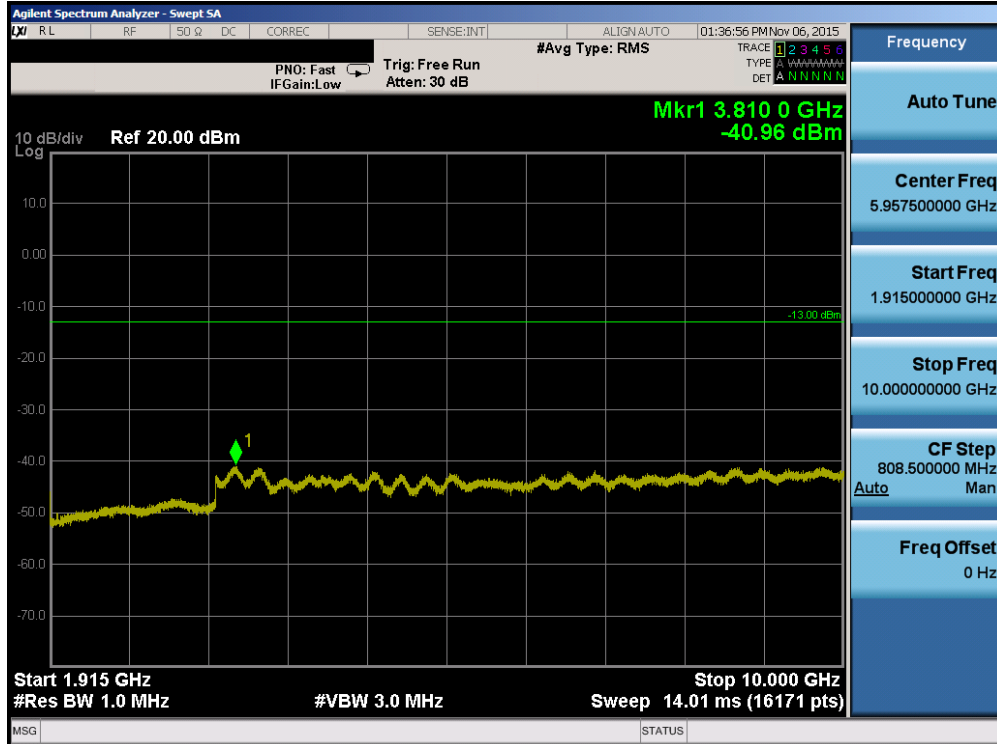


Plot 7-42. Conducted Spurious Plot (PCS CDMA Mode – Ch. 600)

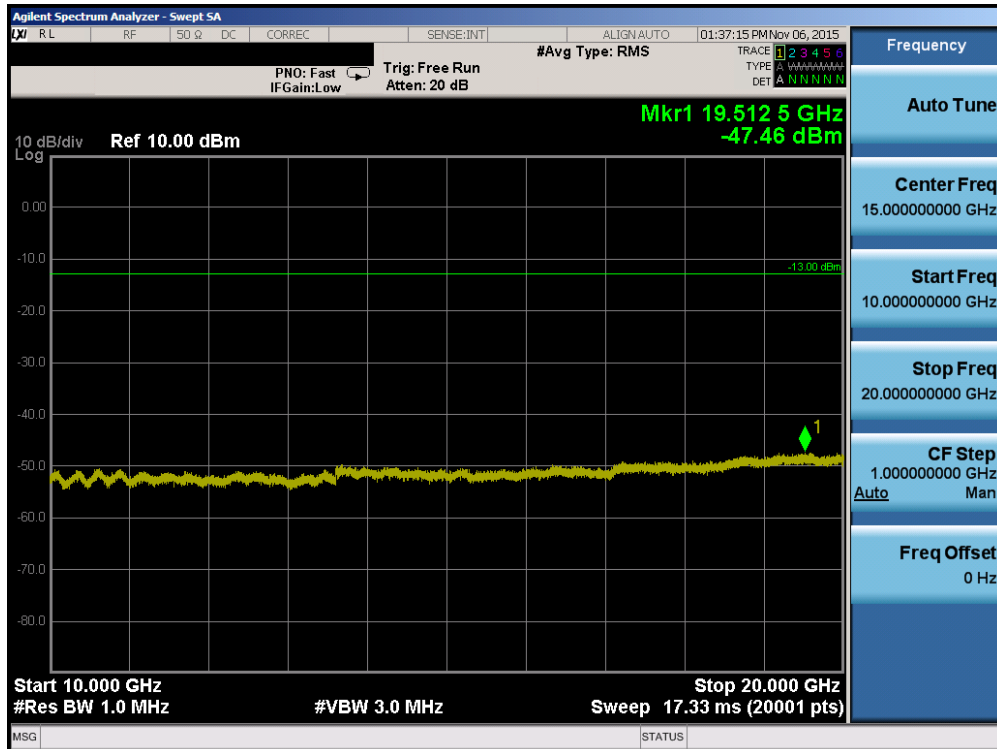


Plot 7-43. Conducted Spurious Plot (PCS CDMA Mode – Ch. 1175)



FCC ID: A3LSMJ320P		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 36 of 101

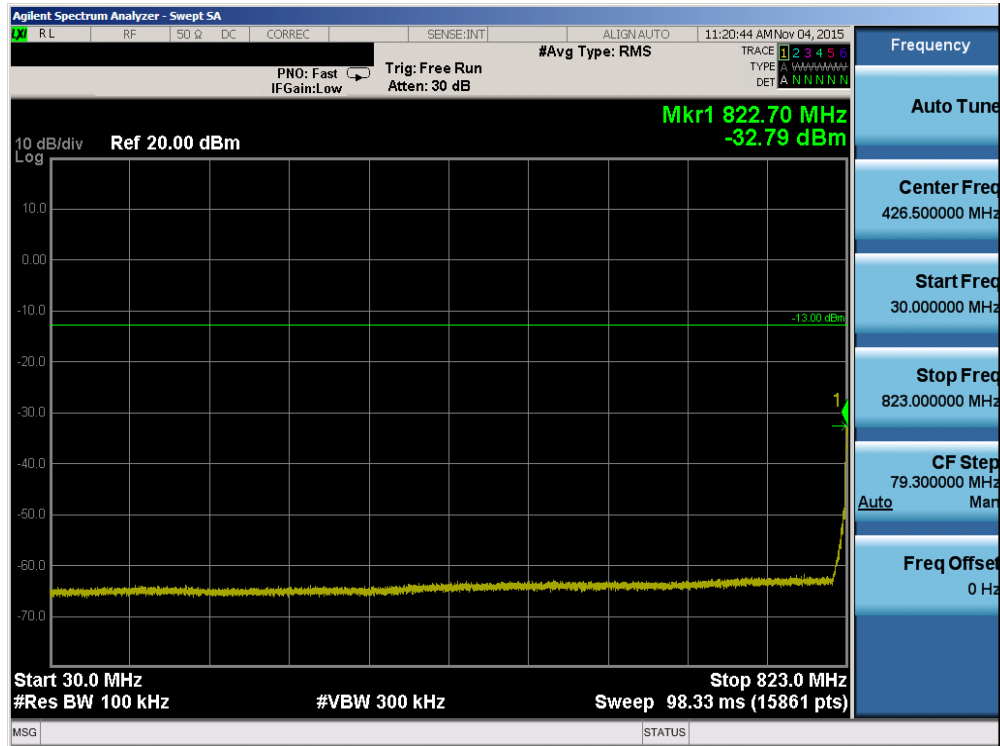


Plot 7-44. Conducted Spurious Plot (PCS CDMA Mode – Ch. 1175)

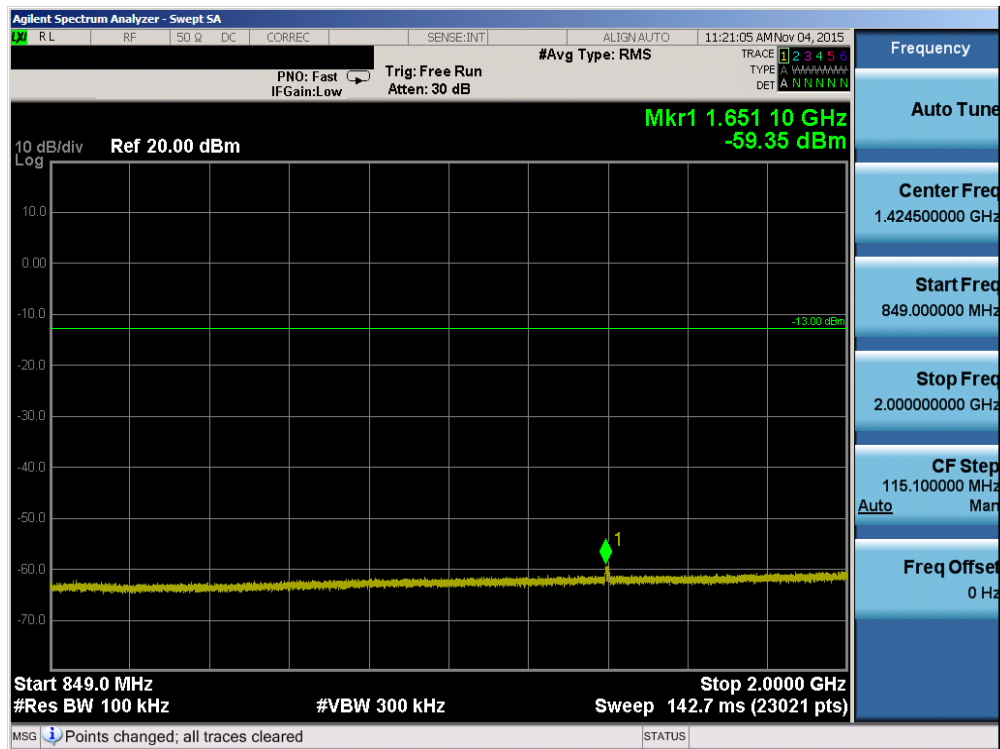


Plot 7-45. Conducted Spurious Plot (PCS CDMA Mode – Ch. 1175)

FCC ID: A3LSMJ320P	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 37 of 101

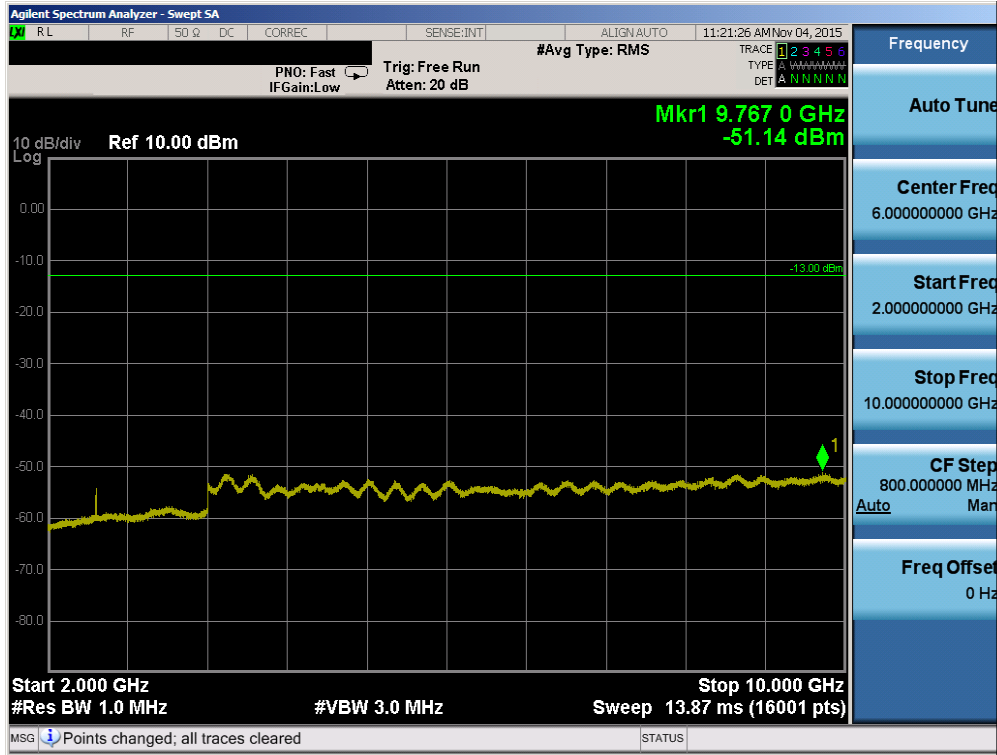


Plot 7-46. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)

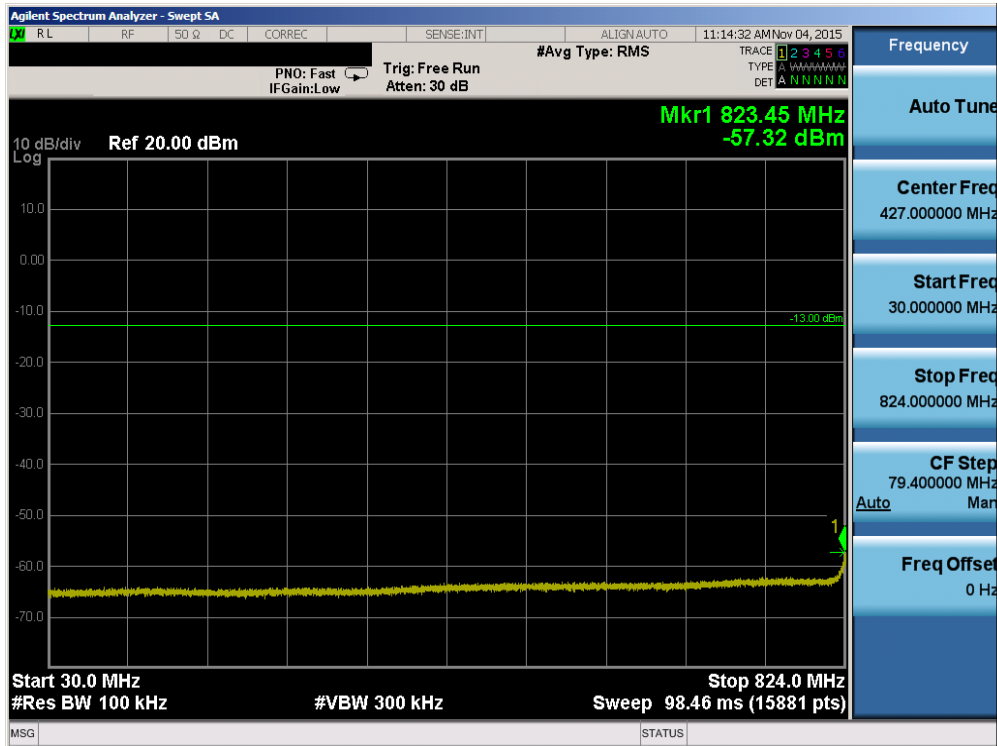


Plot 7-47. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 38 of 101

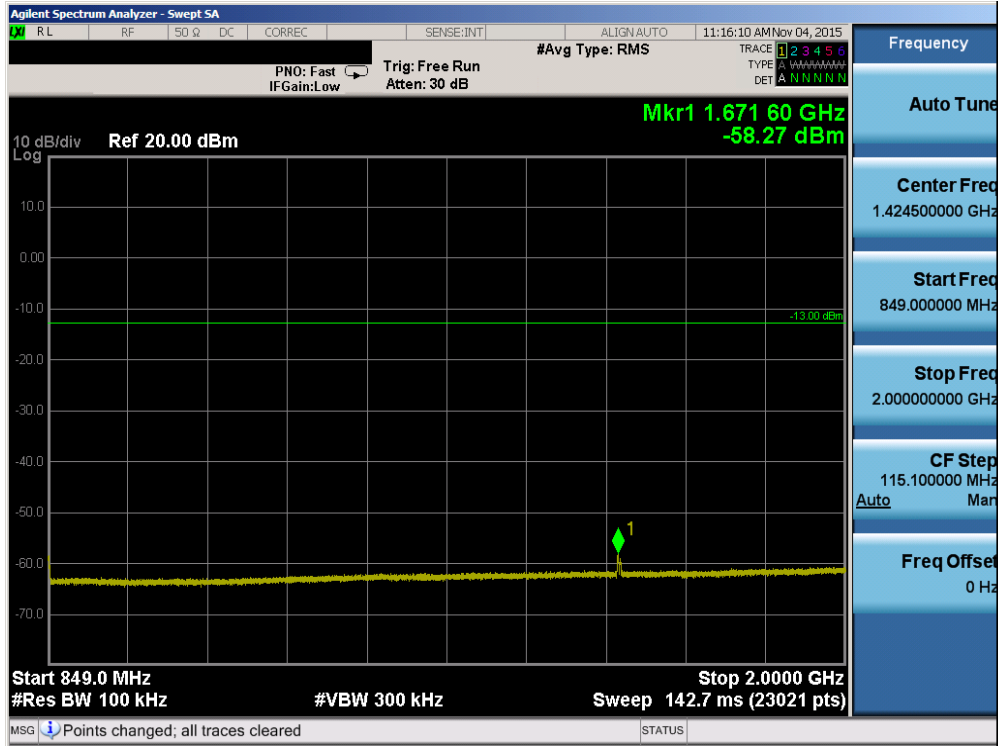


Plot 7-48. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)

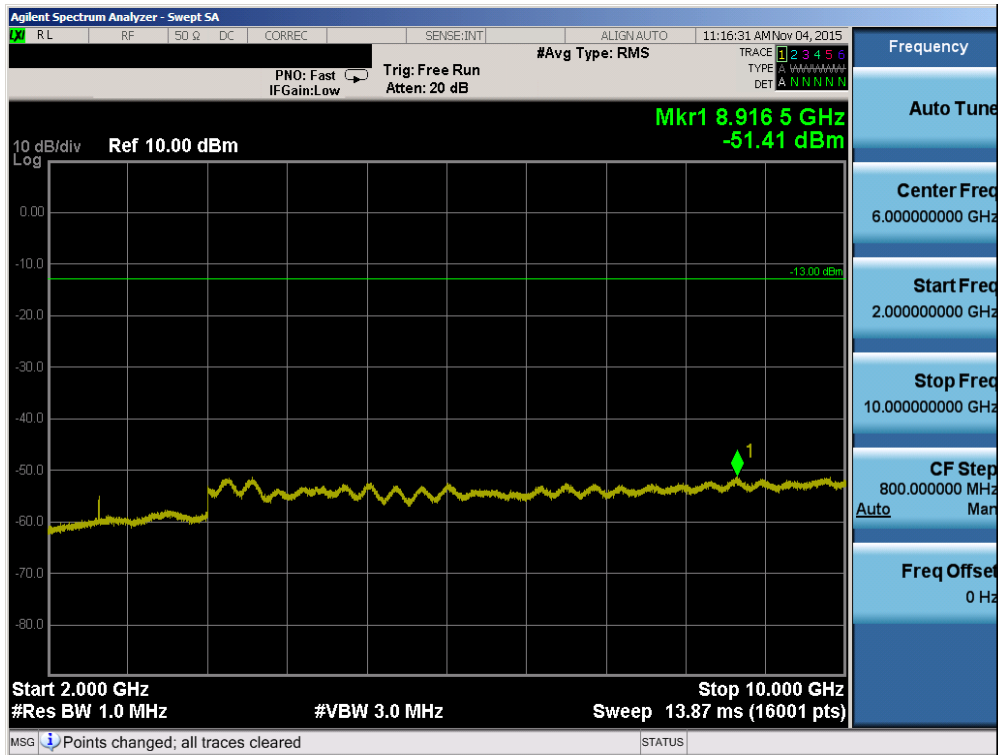


Plot 7-49. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 39 of 101

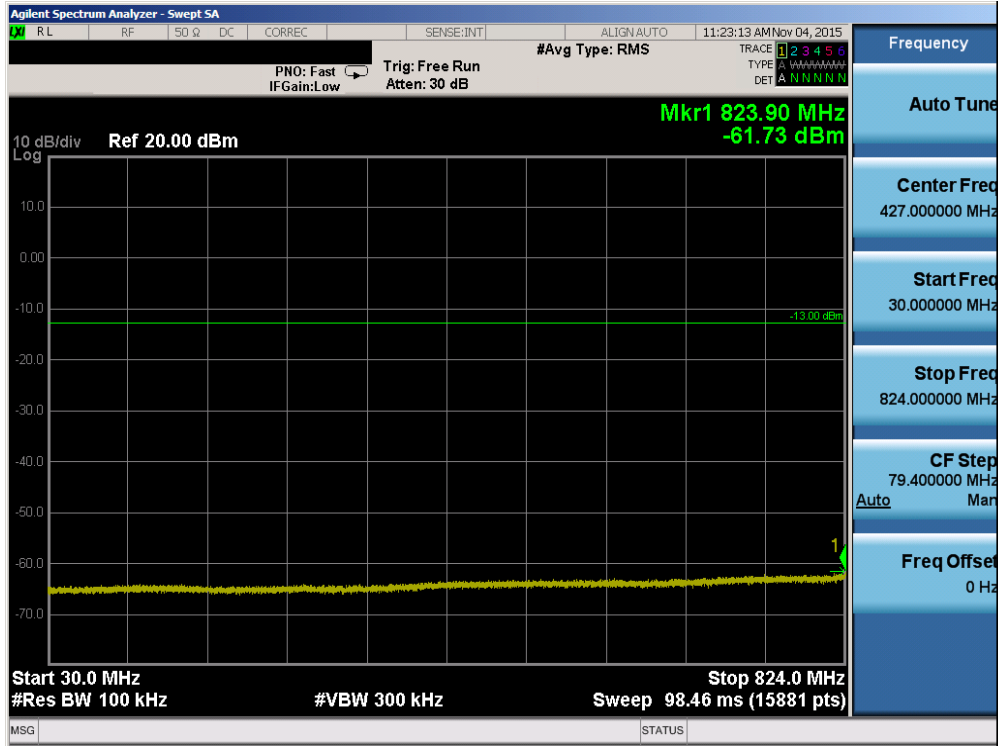


Plot 7-50. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)

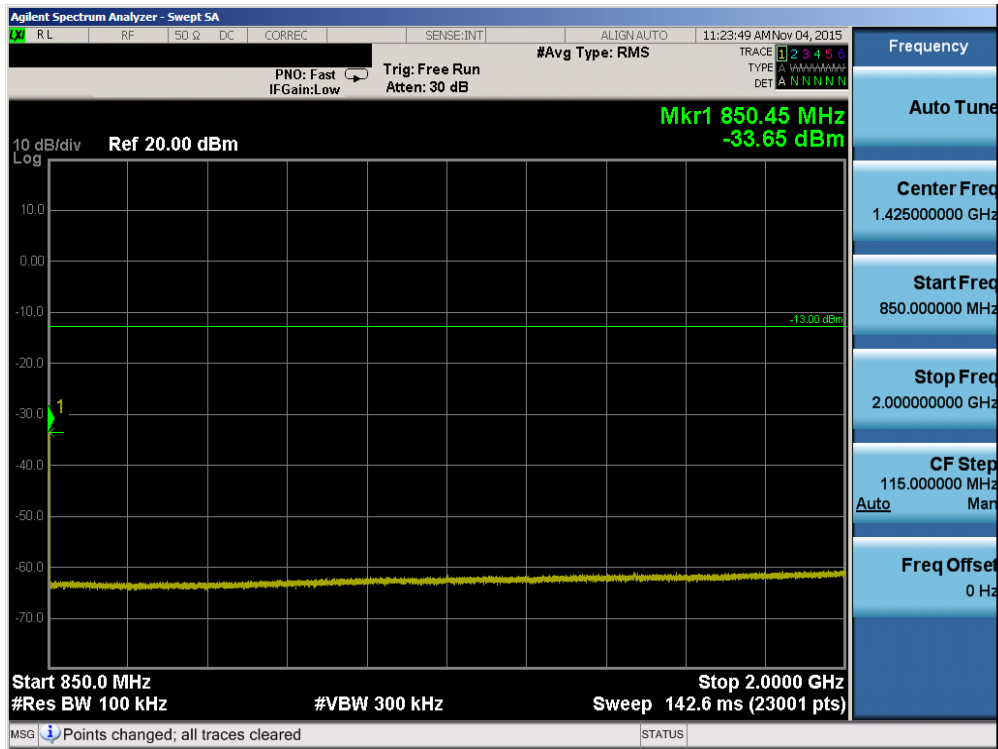


Plot 7-51. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 40 of 101

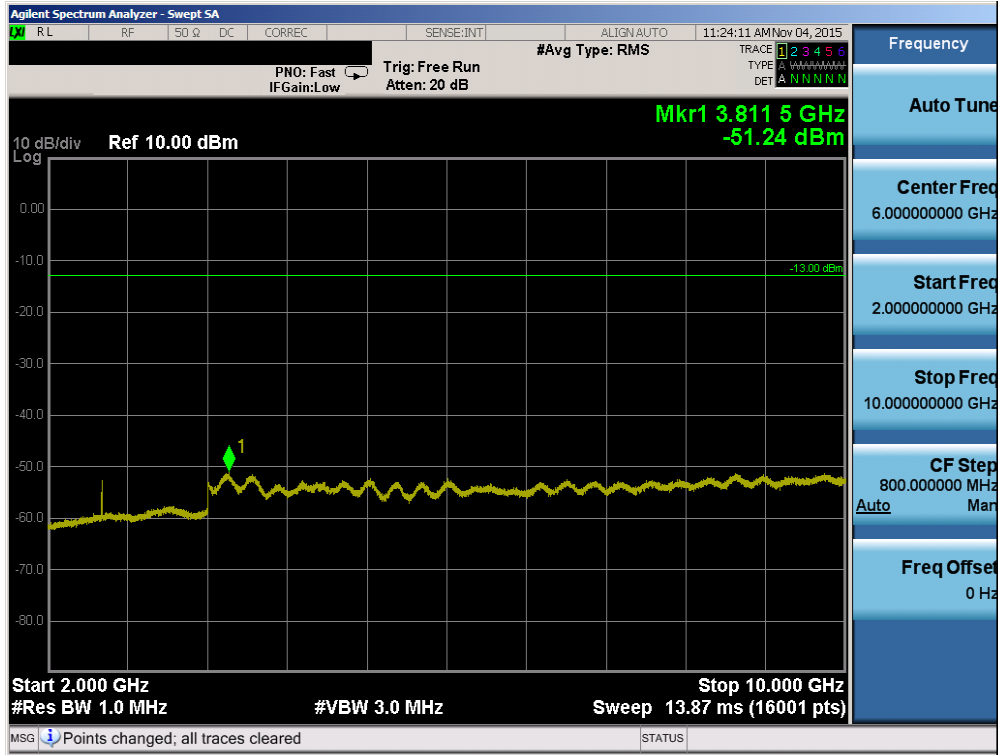


Plot 7-52. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)



Plot 7-53. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 41 of 101

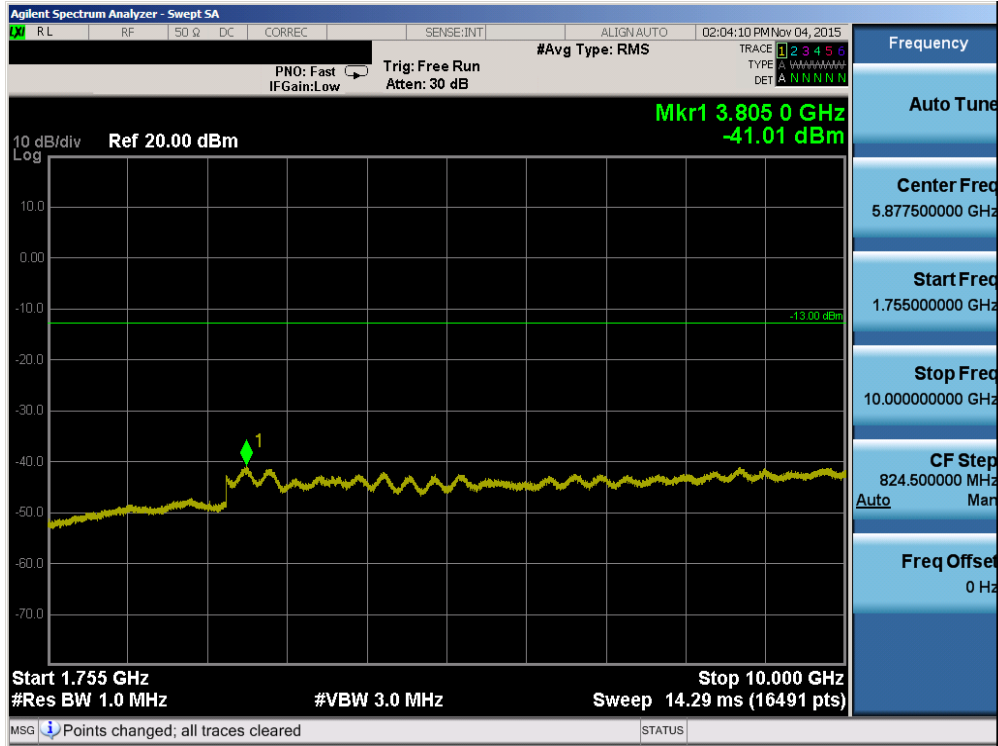


Plot 7-54. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)

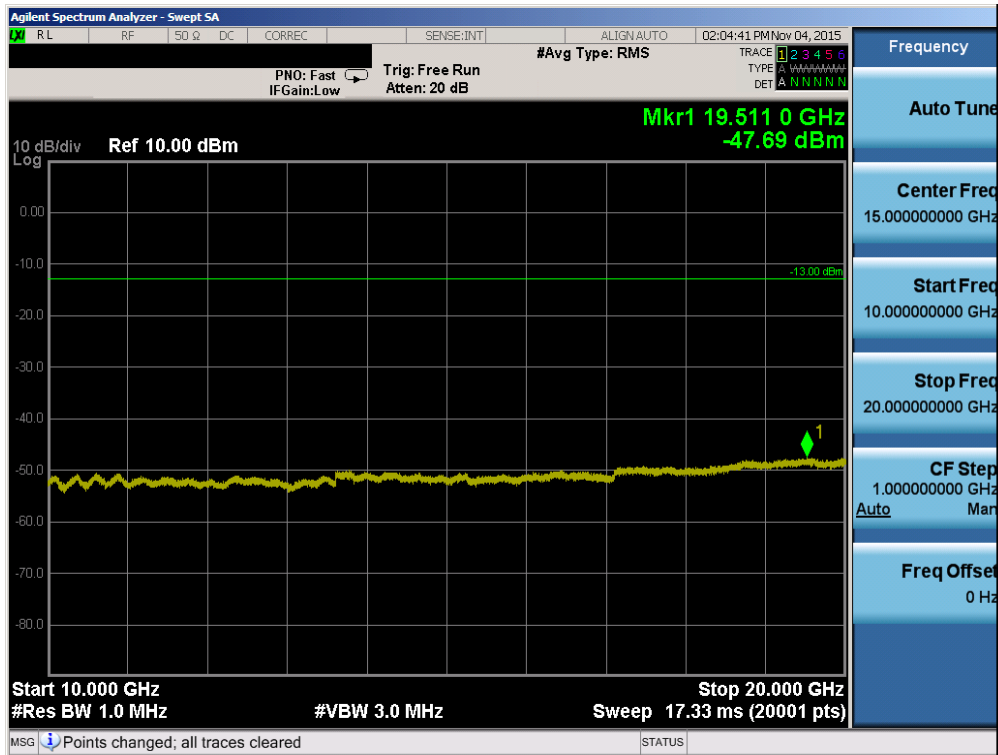


Plot 7-55. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1312)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 42 of 101



Plot 7-56. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1312)

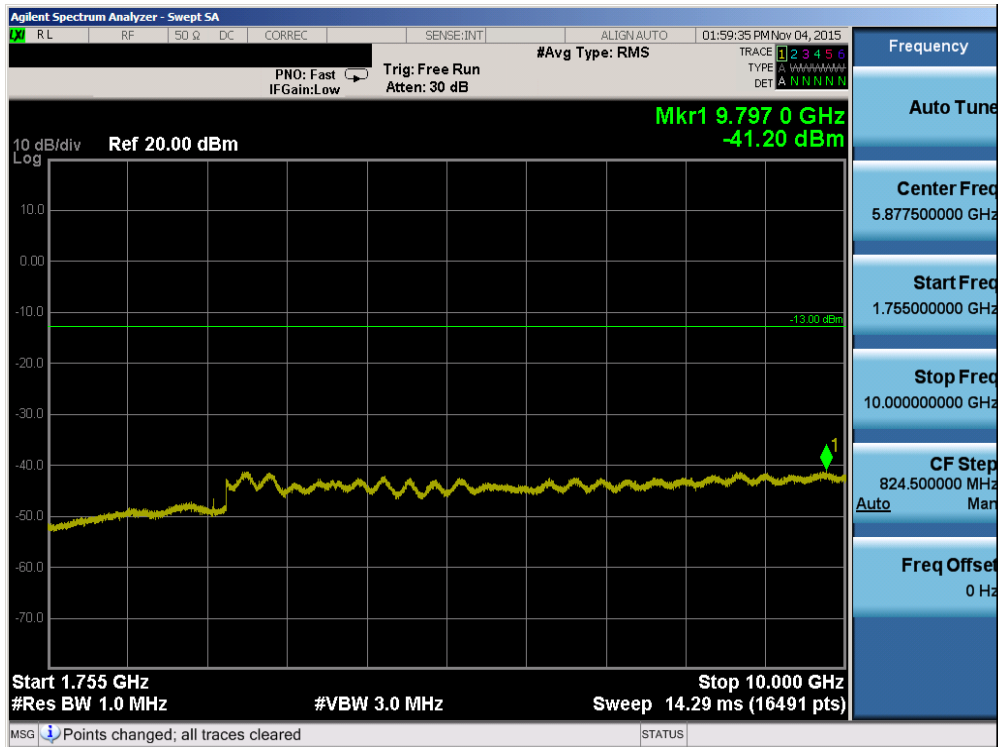


Plot 7-57. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1312)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 43 of 101

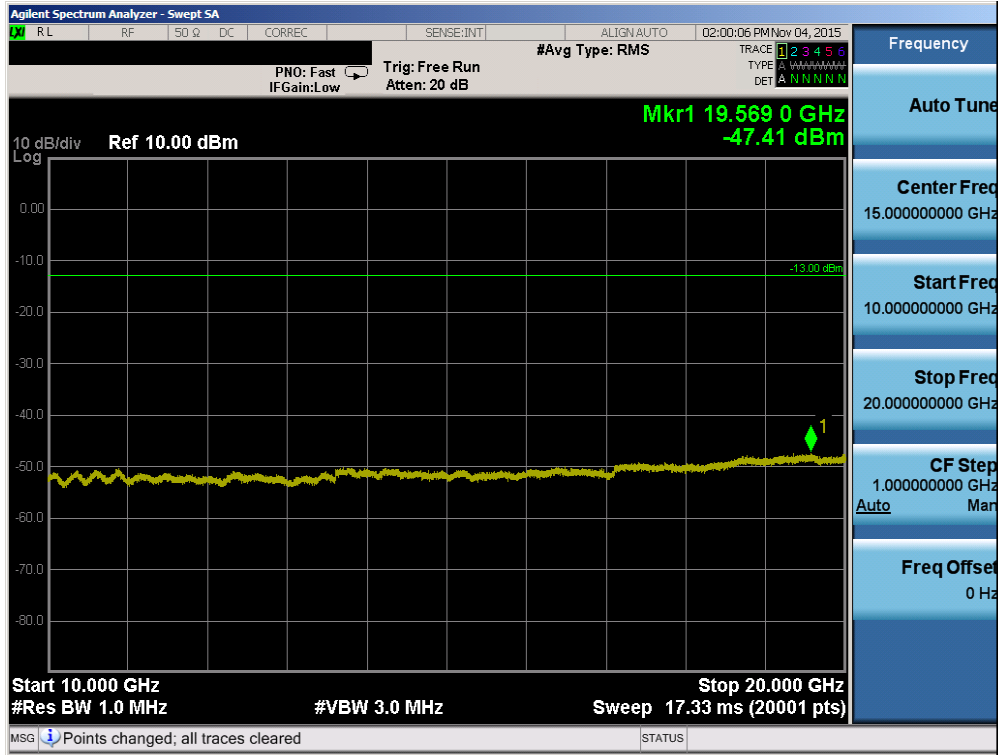


Plot 7-58. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1412)

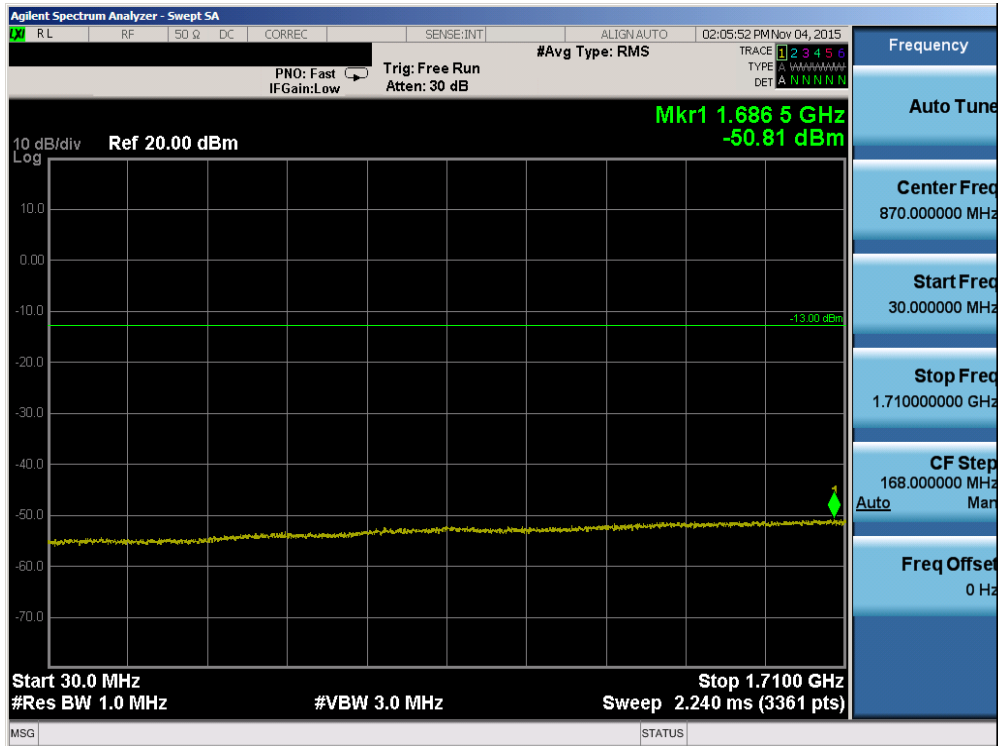


Plot 7-59. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1412)



FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 44 of 101

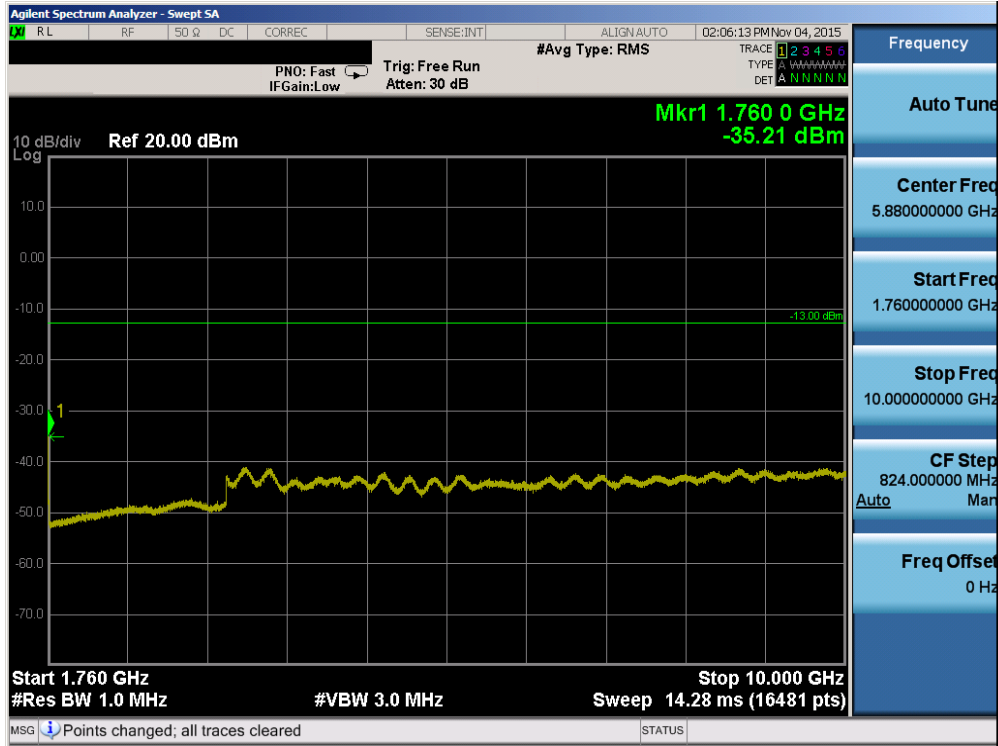


Plot 7-60. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1412)

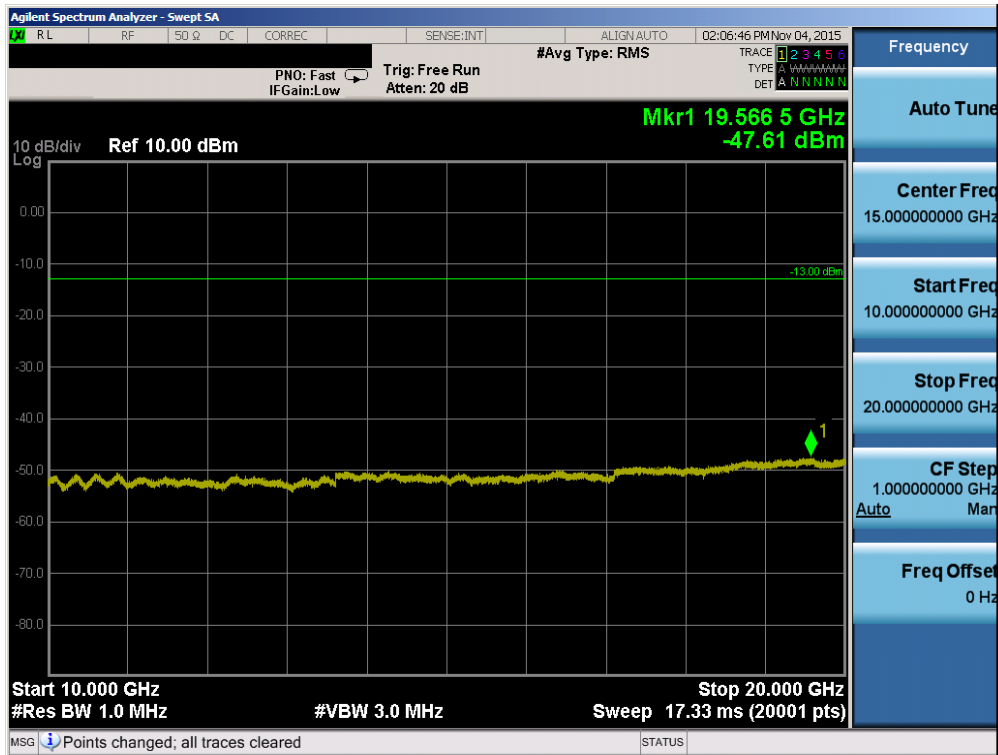


Plot 7-61. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1862)

FCC ID: A3LSMJ320P	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 45 of 101

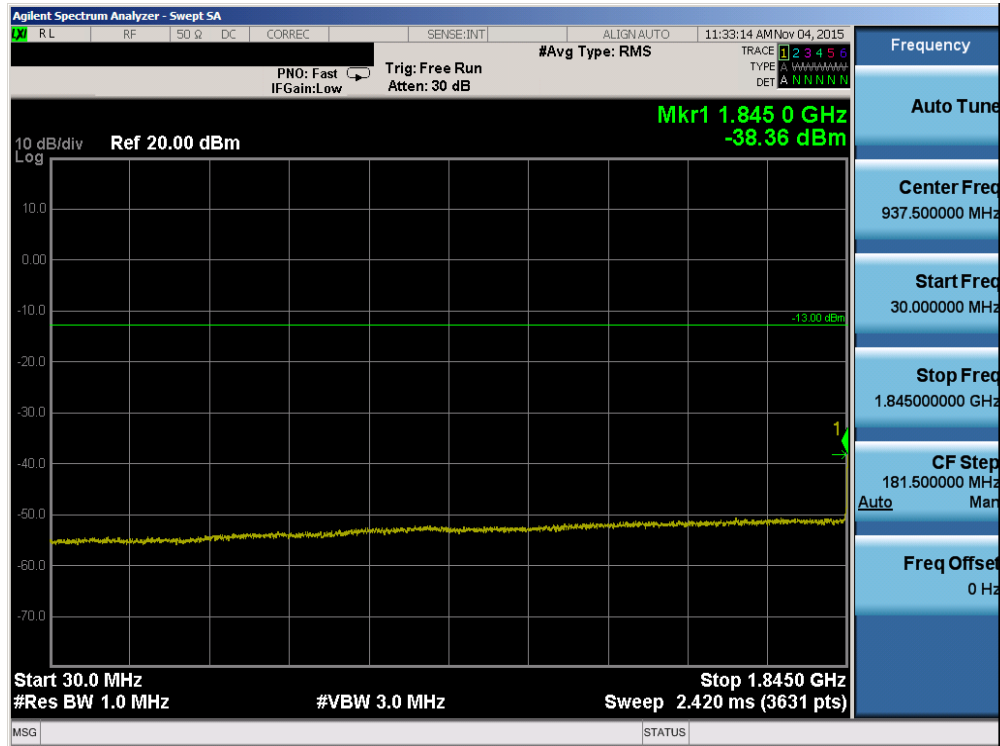


Plot 7-62. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1862)

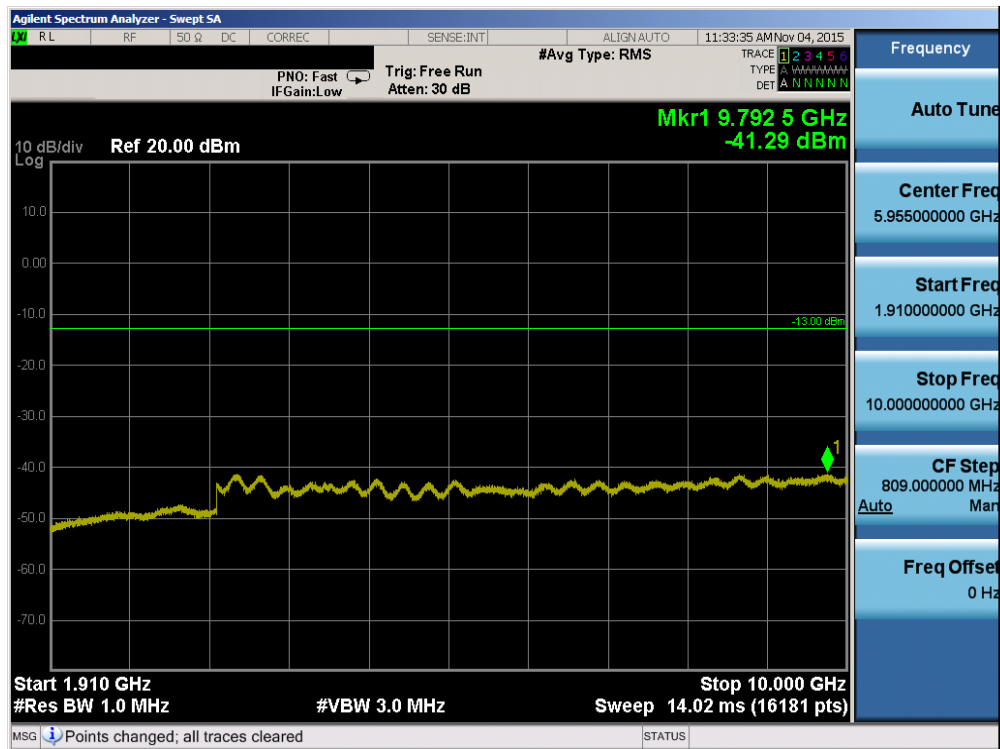


Plot 7-63. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1862)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 46 of 101

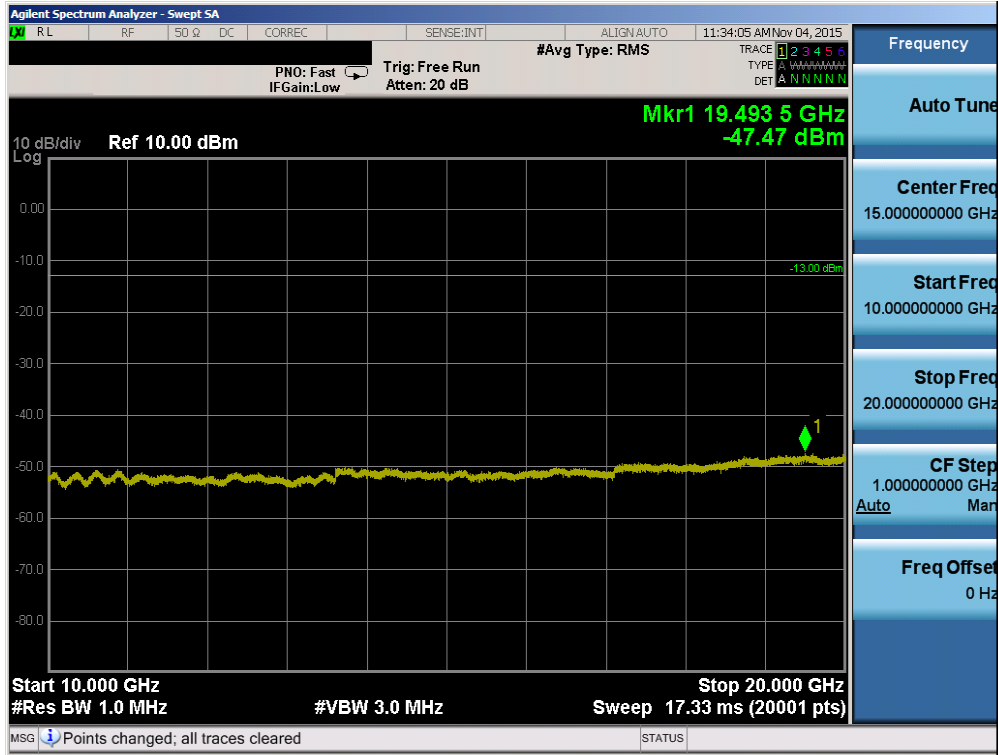


Plot 7-64. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9262)

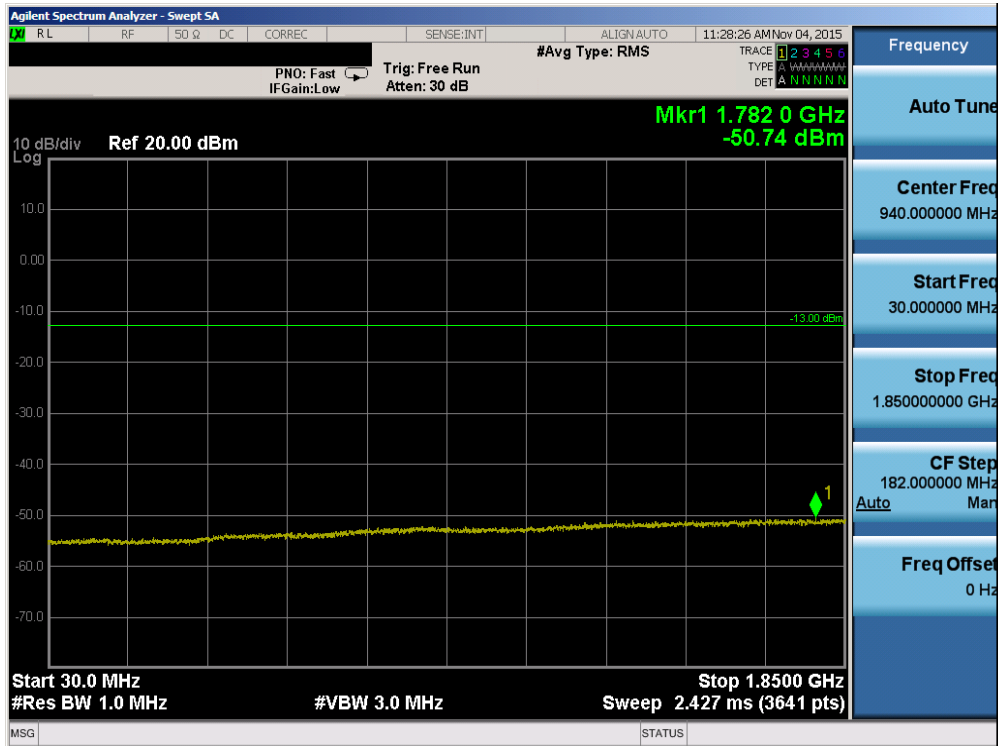


Plot 7-65. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9262)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 47 of 101

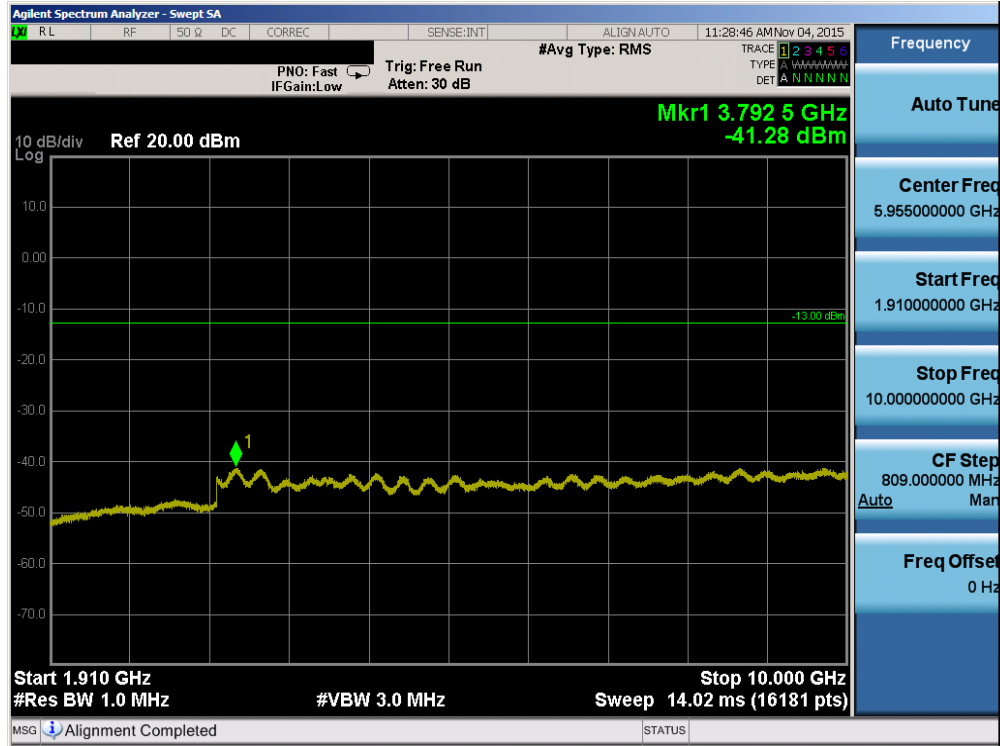


Plot 7-66. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9262)

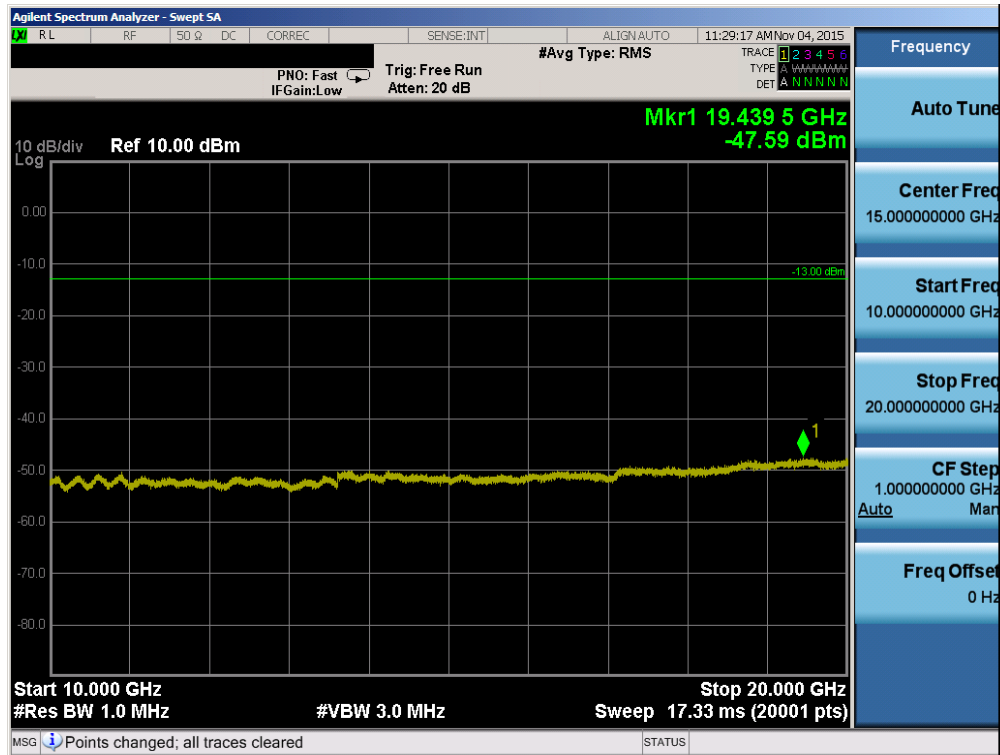


Plot 7-67. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9400)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 48 of 101

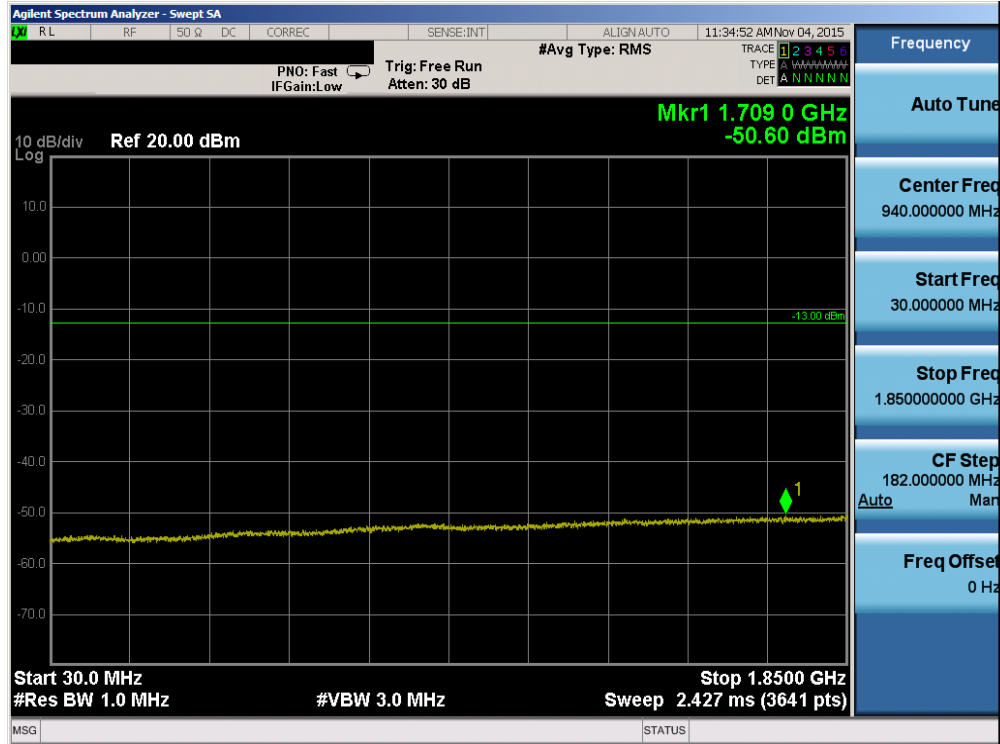


Plot 7-68. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9400)

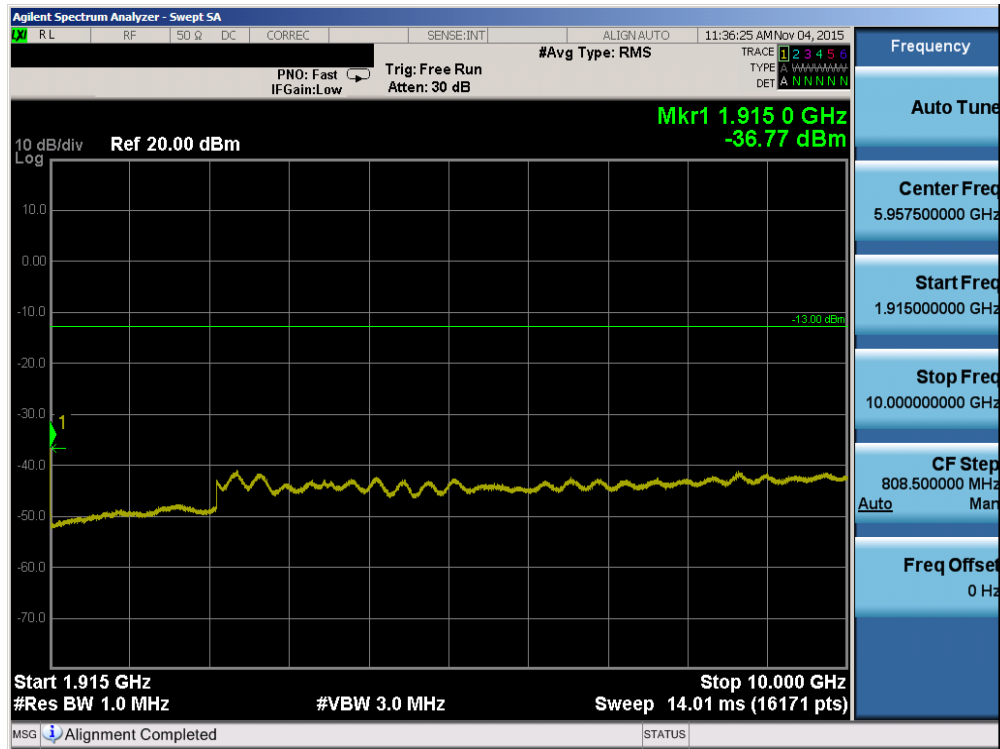


Plot 7-69. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9400)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 49 of 101

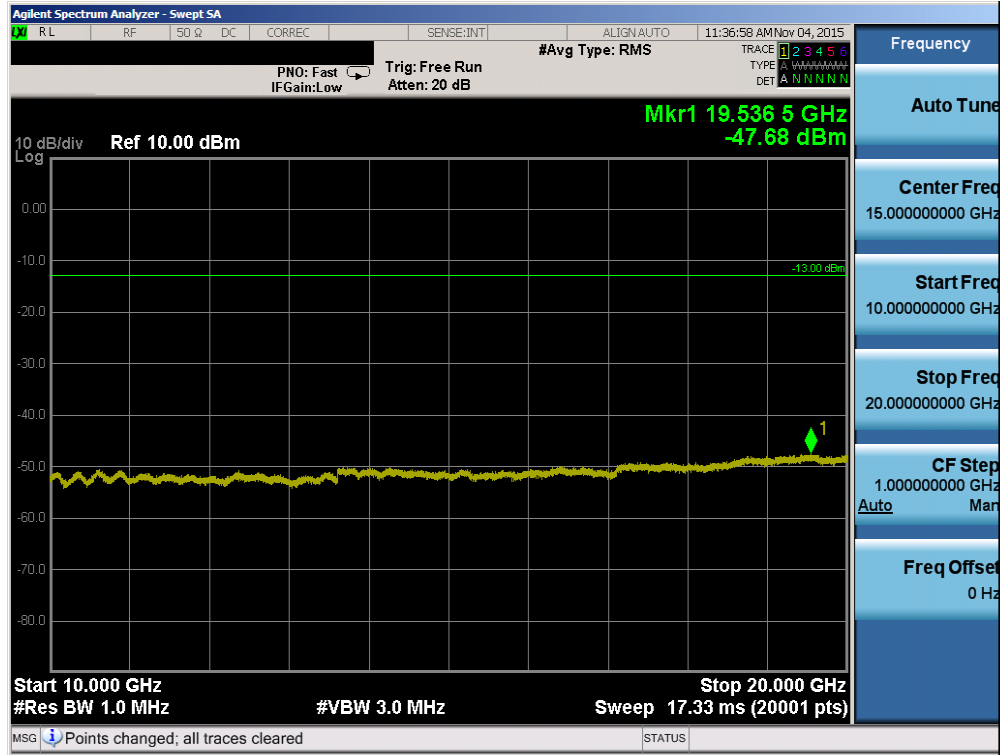


Plot 7-70. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9538)





Plot 7-71. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9538)

FCC ID: A3LSMJ320P	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset		Page 50 of 101



Plot 7-72. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9538)

FCC ID: A3LSMJ320P	 FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1511021906.A3L	Test Dates: 9/28 - 11/16/2015	EUT Type: Portable Handset	Page 51 of 101