



MEASUREMENT REPORT

FCC Part 22, 24, & 27

Applicant Name:

LG Electronics MobileComm U.S.A
1000 Sylvan Avenue
Englewood Cliffs, NJ 07632
United States

Date of Testing:

7/6-7/20/2016

Test Site/Location:

PCTEST Lab., Columbia, MD, USA

Test Report Serial No.:

0Y1607051203-R1.ZNF

FCC ID:

ZNFLS997

APPLICANT:

LG ELECTRONICS MOBILECOMM U.S.A

Application Type:

Certification

Model(s):

LG-LS997, LGLS997, LS997

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-D-2010, KDB 971168 D01 v02r02

Test Device Serial No.:

identical prototype [S/N: 00305, 00388]

Mode	Tx Frequency (MHz)	Emission Designator	ERP/EIRP	
			Max. Power (W)	Max. Power (dBm)
GPRS850	824.2 - 848.8	243KGXW	1.040	30.17
EDGE850	824.2 - 848.8	248KG7W	0.206	23.14
GPRS1900	1850.2 - 1909.8	244KGXW	0.726	28.61
EDGE1900	1850.2 - 1909.8	243KG7W	0.252	24.01
CDMA850	824.70 - 848.31	1M27F9W	0.091	19.58
CDMA1900	1851.25 - 1908.75	1M27F9W	0.206	23.14
WCDMA850	826.4 - 846.6	4M13F9W	0.139	21.44
WCDMA1700	1712.4 - 1752.6	4M14F9W	0.265	24.23
WCDMA1900	1852.4 - 1907.6	4M15F9W	0.234	23.69

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.

This revised Test Report (S/N: 0Y1607051203-R1.ZNF) supersedes and replaces the previously issued test report (S/N: 0Y1607051203.ZNF) on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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 Orlanez
President

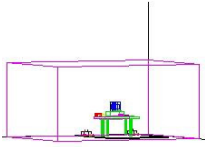


FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 1 of 104

TABLE OF CONTENTS

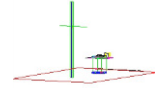
FCC PART 22, 24, & 27 MEASUREMENT REPORT	3
1.0 INTRODUCTION	4
1.1 Scope.....	4
1.2 Testing Facility	4
2.0 PRODUCT INFORMATION.....	5
2.1 Equipment Description	5
2.2 Device Capabilities	5
2.3 Test Configuration.....	5
2.4 EMI Suppression Device(s)/Modifications.....	5
3.0 DESCRIPTION OF TESTS	6
3.1 Evaluation Procedure.....	6
3.2 Cellular - Base Frequency Blocks	6
3.3 Cellular - Mobile Frequency Blocks.....	6
3.4 PCS - Base Frequency Blocks.....	6
3.5 PCS - Mobile Frequency Blocks	7
3.6 AWS - Base Frequency Blocks	7
3.7 AWS - Mobile Frequency Blocks.....	7
3.8 Radiated Measurements	8
4.0 MEASUREMENT UNCERTAINTY	9
5.0 TEST EQUIPMENT CALIBRATION DATA	10
6.0 SAMPLE CALCULATIONS	11
7.0 TEST RESULTS.....	12
7.1 Summary.....	12
7.2 Occupied Bandwidth	13
7.3 Spurious and Harmonic Emissions at Antenna Terminal	19
7.4 Band Edge Emissions at Antenna Terminal.....	52
7.5 Peak-Average Ratio.....	65
7.6 Radiated Power (ERP/EIRP)	68
7.6.1 Antenna-1 Radiated Power (ERP/EIRP).....	71
7.6.1 Antenna-2 Radiated Power (ERP)	73
7.7 Radiated Spurious Emissions Measurements.....	74
7.8 Antenna-1 Radiated Spurious Emissions Measurements	76
7.8.1 Antenna-2 Radiated Spurious Emissions Measurements	87
7.9 Frequency Stability / Temperature Variation	89
8.0 CONCLUSION.....	104

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 2 of 104



MEASUREMENT REPORT

FCC Part 22, 24, & 27

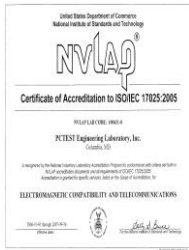
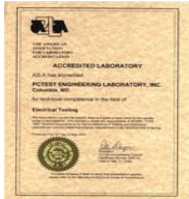


§2.1033 General Information

APPLICANT: LG Electronics MobileComm U.S.A
APPLICANT ADDRESS: 1000 Sylvan Avenue
 Englewood Cliffs, NJ 07632, United States
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: LG-LS997
FCC ID: ZNFLS997
FCC CLASSIFICATION: PCS Licensed Transmitter Held to Ear (PCE)
MODE: GSM / GPRS / EDGE / CDMA / WCDMA
FREQUENCY TOLERANCE: $\pm 0.00025\%$ (2.5 ppm)
Test Device Serial No.: 00305, 00388 ☐ Production ☒ Pre-Production ☐ Engineering
DATE(S) OF TEST: 7/6-7/20/2016
TEST REPORT S/N: 0Y1607051203-R1.ZNF

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, GPRS, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 3 of 104

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 Intern't'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.

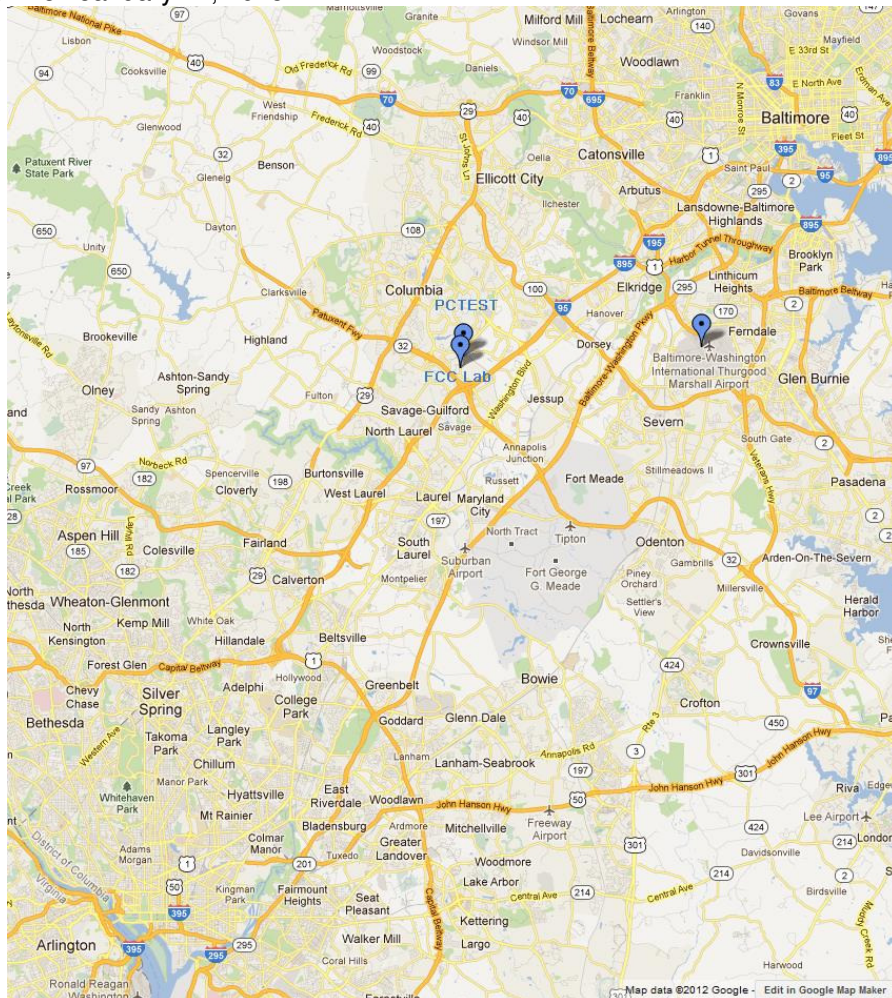


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

FCC ID: ZNFS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 4 of 104

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFLS997**. 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, 1x Advanced (BC0, BC1, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n/ac WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE), NFC

This device also employs an antenna switching diversity (ASDiv) mechanism that allows for radiated transmission from one of two antennas at a time for CDMA/ EVDO BC0. Both antennas cannot transmit simultaneously so dual transmission conditions were not investigated. The two antennas share the same conducted circuitry so only one set of conducted measurements is included. The main transmit antenna data is labeled as "Antenna 1" and the secondary transmit antenna data is labeled as "Antenna 2" in the radiated section of this report.

In addition, in order to optimize antenna performance, the tuner for this device was set to simulate a "free space" condition in which the transmit antenna is matched to the medium into which it is transmitting and, thus, all power is at its maximum level.

2.3 Test Configuration

The LG Portable Handset FCC ID: ZNFLS997 was tested per the guidance of ANSI/TIA-603-D-2010 and KDB 971168 D01 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.

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 5 of 104

3.0 DESCRIPTION OF TESTS

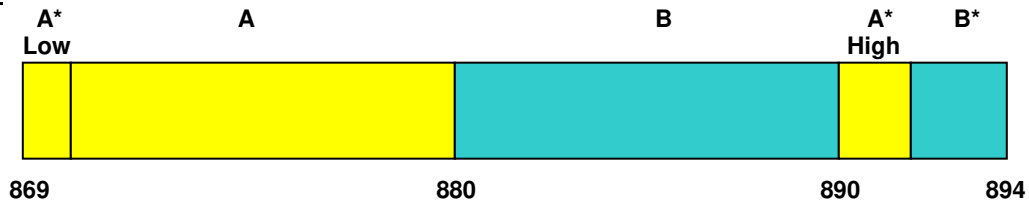
3.1 Evaluation Procedure

The measurement procedures described in the “Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards” (ANSI/TIA-603-D-2010) and “Measurement Guidance for Certification of Licensed Digital Transmitters” (KDB 971168 D01 v02r02) were used in the measurement of the **LG Portable Handset FCC ID: ZNFLS997**.

Deviation from Measurement Procedure.....None

3.2 Cellular - Base Frequency Blocks

§22.905



BLOCK 1: 869 – 880 MHz (A* Low + A)

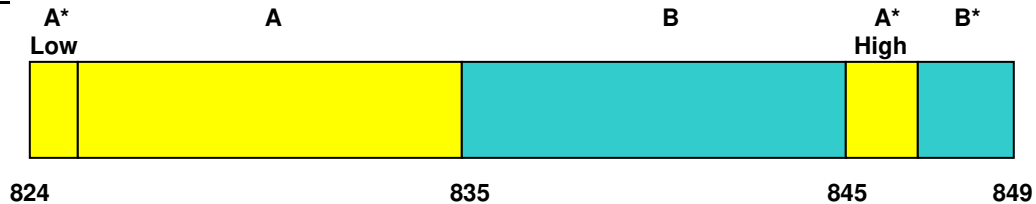
BLOCK 3: 890 – 891.5 MHz (A* High)

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)

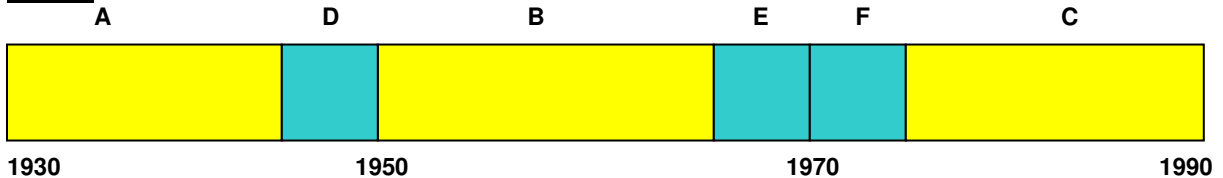
BLOCK 3: 845 – 846.5 MHz (A* High)

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)

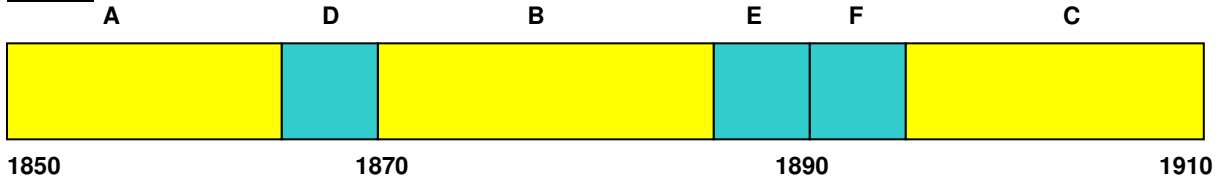
BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 6: 1975 – 1990 MHz (C)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 6 of 104

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)

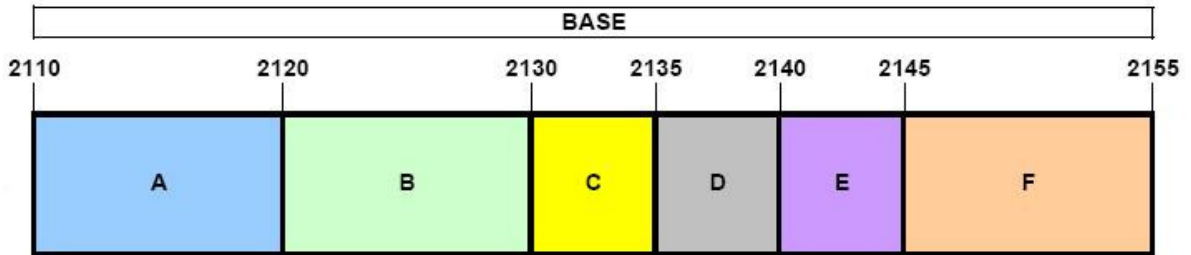
BLOCK 5: 1890 – 1895 MHz (F)

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)

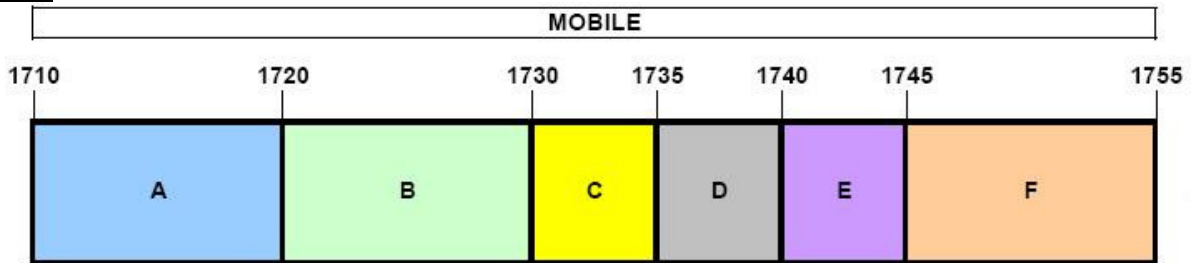
BLOCK 5: 2140 – 2145 MHz (E)

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)

3.8 Radiated Measurements

§2.1053 §22.913(a.2) §22.917(a) §24.232(c) §24.238(a) §27.50(d)(10) §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 Figure 5.7 of Clause 5 in ANSI C63.4-2014. 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 above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table 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 72.4cm high PVC support structure is placed on top of the turntable. A 3" (~7.6cm) sheet of high density polystyrene 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-D-2010, 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-D-2010.

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 8 of 104

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

5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). The receive antennas were calibrated according to C63.5.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTx3	Licensed Transmitter Cable Set	7/12/2016	Annual	7/12/2017	LTx3
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	7/11/2016	Annual	7/11/2017	RE1
Agilent	N9020A	MXA Signal Analyzer	11/5/2015	Annual	11/5/2016	US46470561
Agilent	N9038A	MXE EMI Receiver	4/21/2016	Annual	4/21/2017	MY51210133
Agilent	E5515C	Wireless Communications Test Set	3/4/2016	Biennial	3/4/2018	GB45360985
Espec	ESX-2CA	Environmental Chamber	3/4/2016	Annual	3/4/2017	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/26/2016	Biennial	4/26/2018	125518
PCTEST	-	EMC Switch System	7/6/2016	Annual	7/6/2017	NM2
Rhode & Schwarz	CMU200	Base Station Simulator	N/A			107826
Rohde & Schwarz	CMW500	Radio Communication Tester	10/13/2015	Annual	10/13/2016	100976
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/15/2016	Annual	7/15/2017	100348
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	3/30/2016	Biennial	3/30/2018	9105-2404
Schwarzbeck	NC-100	Torque Wrench 5/16", 8" lbs	3/2/2016	Biennial	3/2/2018	N/A

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.

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset	Page 10 of 104	

6.0 SAMPLE CALCULATIONS

GPRS Emission Designator

Emission Designator = 250KGXW

GPRS 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.

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 11 of 104

7.0 TEST RESULTS

7.1 Summary

Company Name: LG Electronics MobileComm U.S.A
 FCC ID: ZNFLS997
 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	$> 43 + \log_{10}(P[\text{Watts}])$ at Band Edge and for all out-of-band emissions		PASS	Sections 7.3, 7.4
24.232(d)	Peak-Average Ratio	$< 13 \text{ dB}$		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	$< 2.5 \text{ ppm}$ (Part 22) Emission must remain in band (Part 24, 27)		PASS	Section 7.9
22.913(a.2)	Effective Radiated Power	$< 7 \text{ Watts max. ERP}$	RADIATED	PASS	Section 7.6
24.232(c)	Equivalent Isotropic Radiated Power	$< 2 \text{ Watts max. EIRP}$		PASS	Section 7.6
27.50(d.4)	Equivalent Isotropic Radiated Power	$< 1 \text{ Watts max. EIRP}$		PASS	Section 7.6
2.1053 22.917(a) 24.238(a) 27.53(h)	Radiated Spurious Emissions	$> 43 + \log_{10}(P[\text{Watts}])$ 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 3.4.

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset	Page 12 of 104	

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 D01 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.

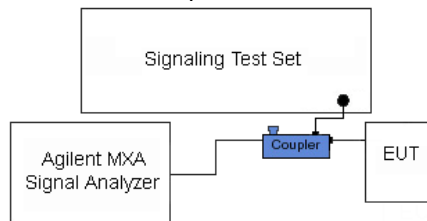


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset	Page 13 of 104	

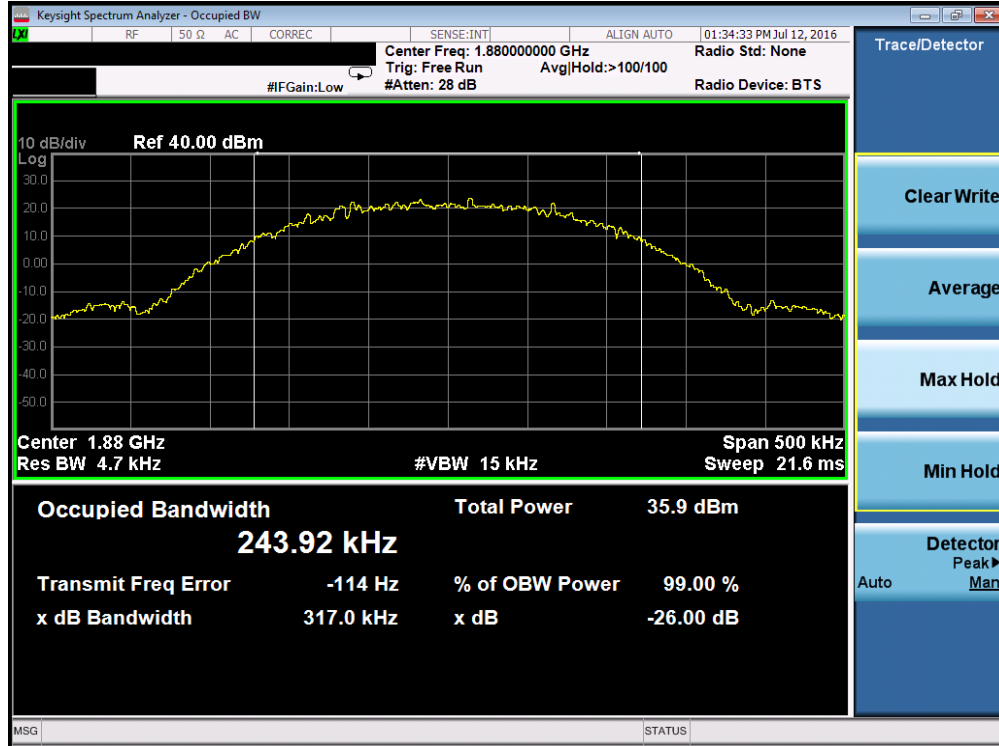


Plot 7-1. Occupied Bandwidth Plot (Cellular GPRS Mode – Ch. 190)

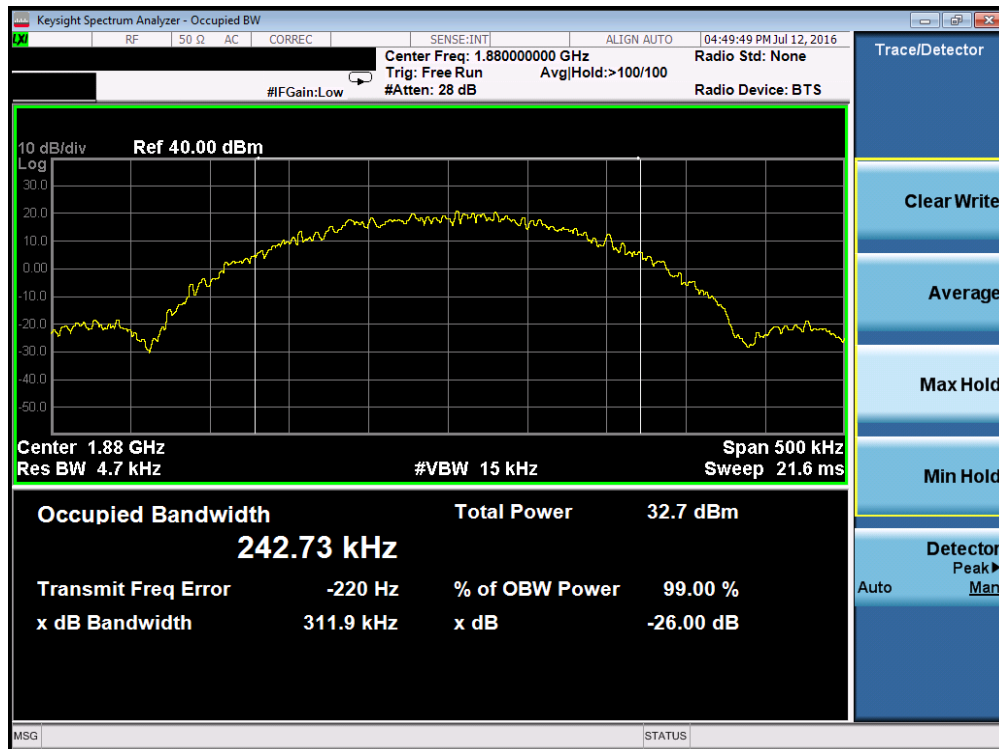


Plot 7-2. Occupied Bandwidth Plot (EDGE850 Mode – Ch. 190)

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 14 of 104

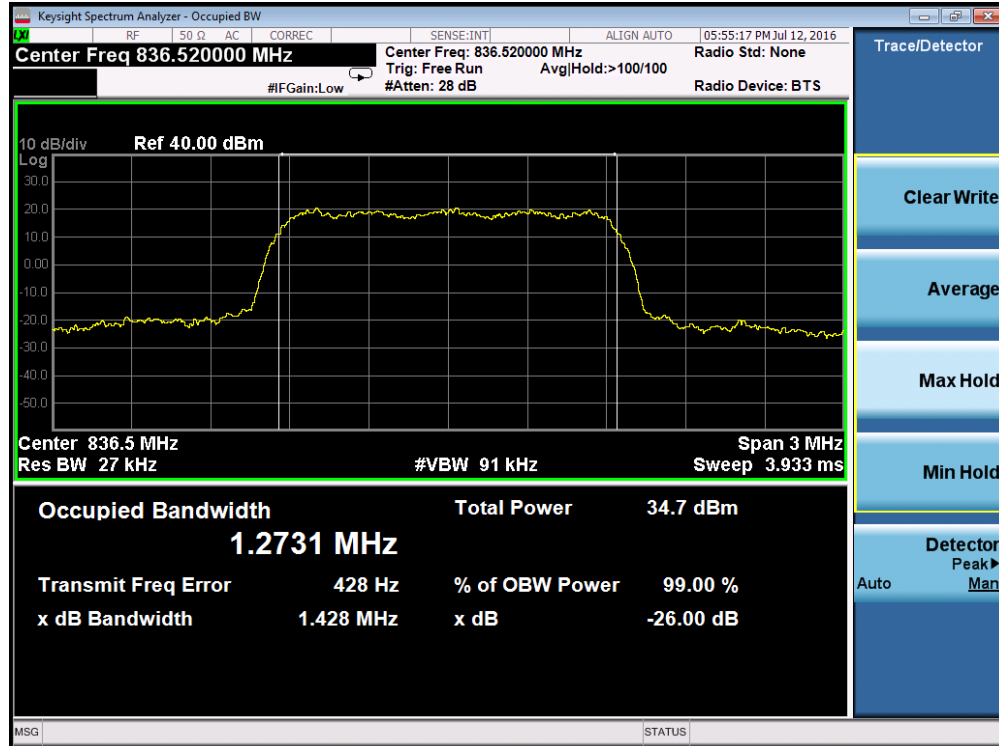


Plot 7-3. Occupied Bandwidth Plot (PCS GPRS Mode – Ch. 661)

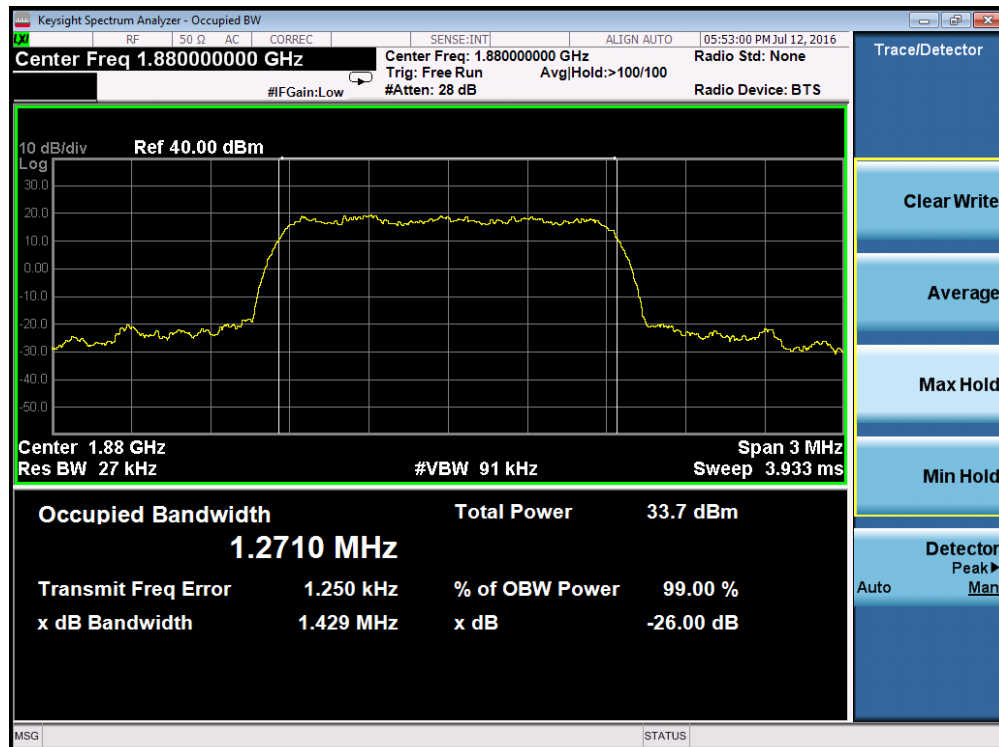


Plot 7-4. Occupied Bandwidth Plot (EDGE1900 Mode – Ch. 661)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 15 of 104

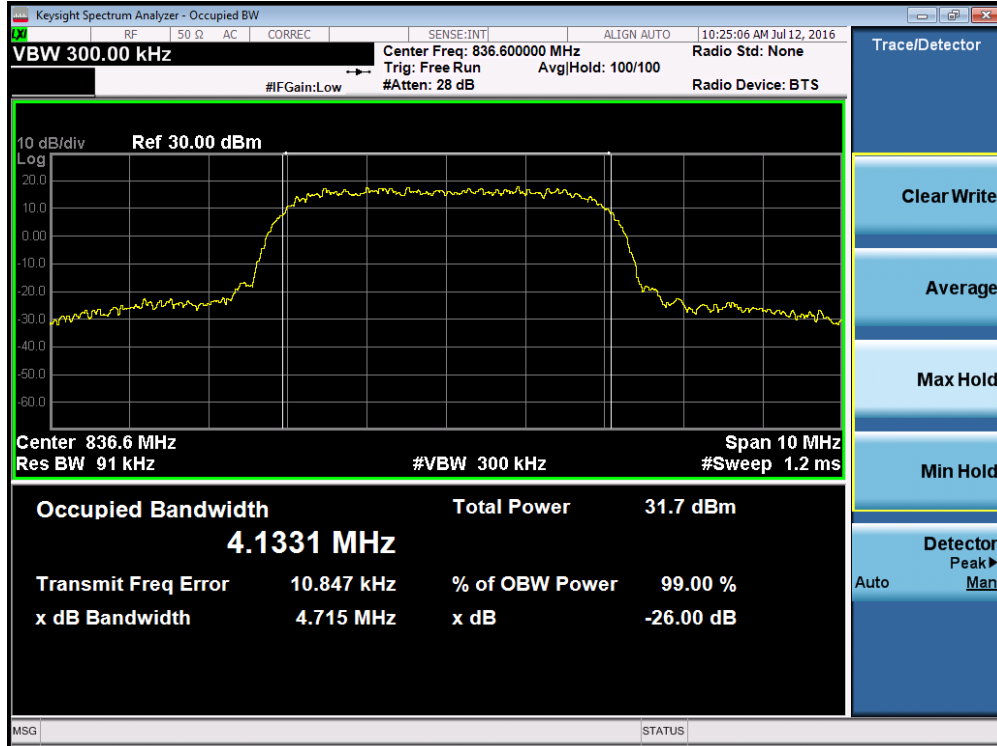


Plot 7-5. Occupied Bandwidth Plot (Cellular CDMA Mode – Ch. 384)

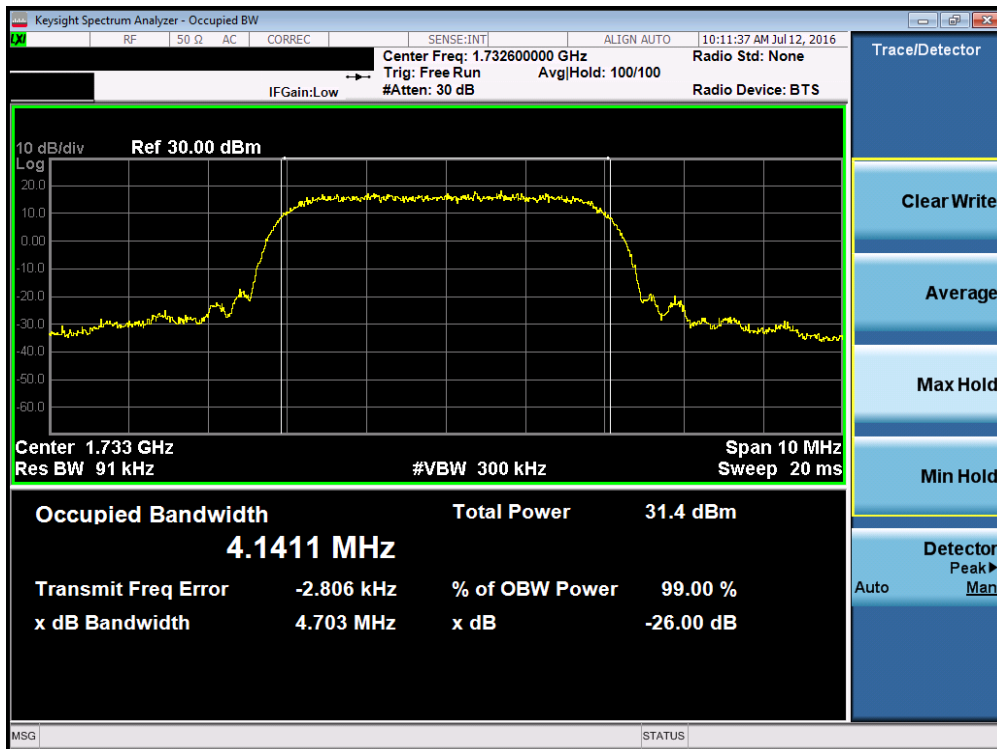


Plot 7-6. Occupied Bandwidth Plot (PCS CDMA Mode – Ch. 600)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 16 of 104

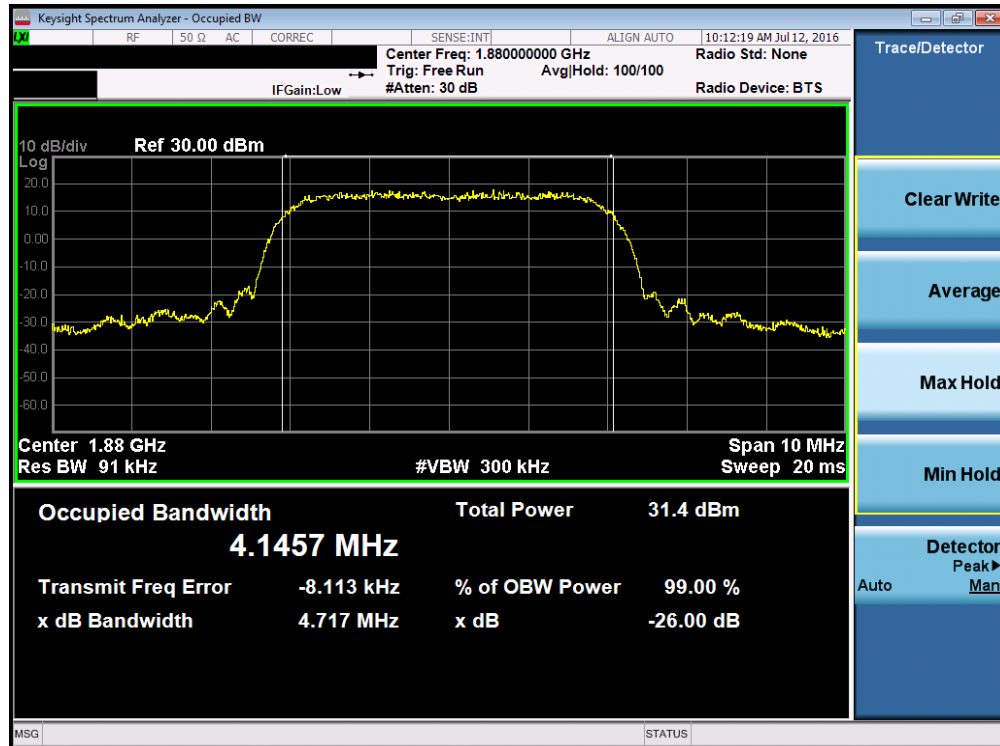


Plot 7-7. Occupied Bandwidth Plot (Cellular WCDMA Mode – Ch. 4183)



Plot 7-8. Occupied Bandwidth Plot (AWS WCDMA Mode – Ch. 1413)

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 17 of 104



Plot 7-9. Occupied Bandwidth Plot (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 18 of 104

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 D01 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.

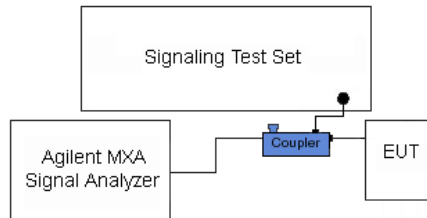
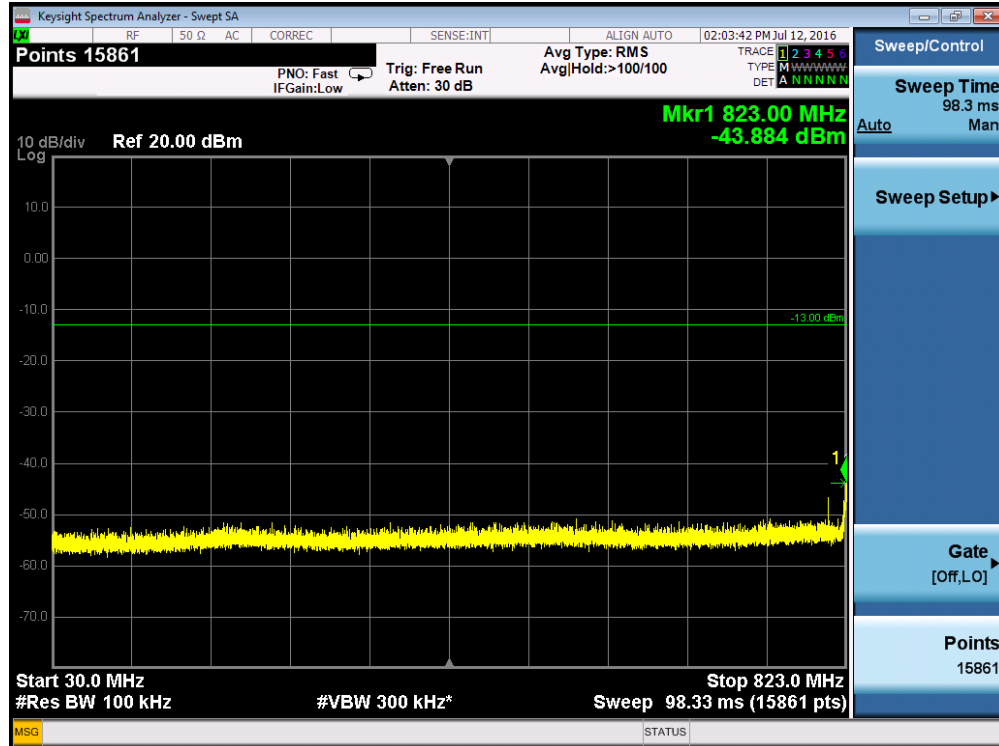


Figure 7-2. Test Instrument & Measurement Setup

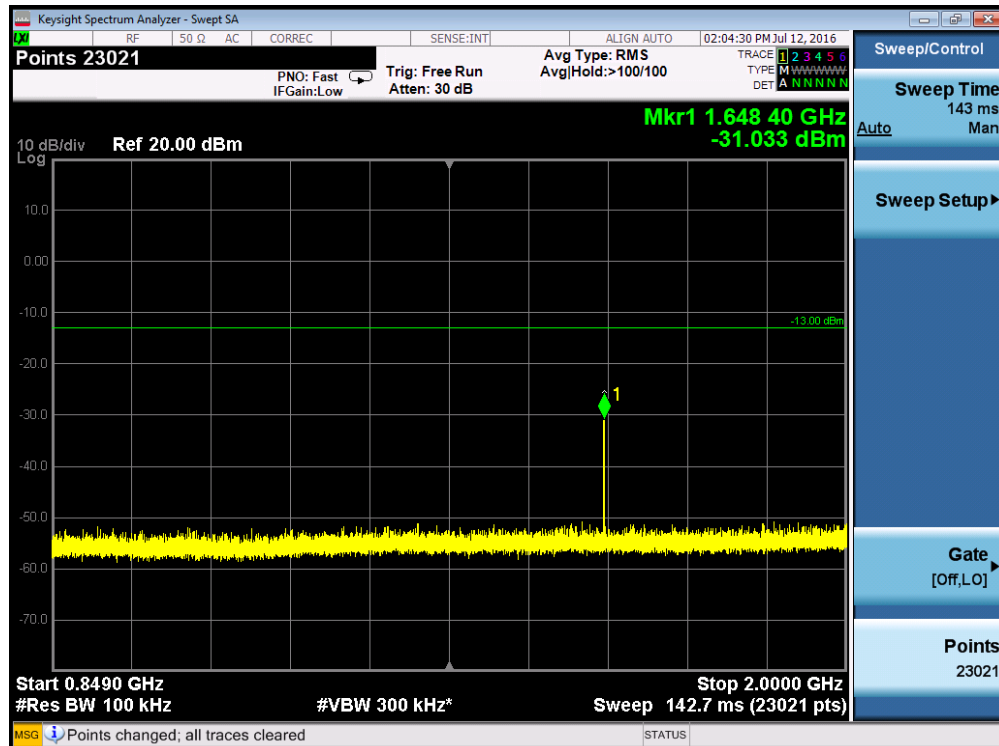
Test Notes

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.

FCC ID: ZNFLS997	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	 LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 19 of 104

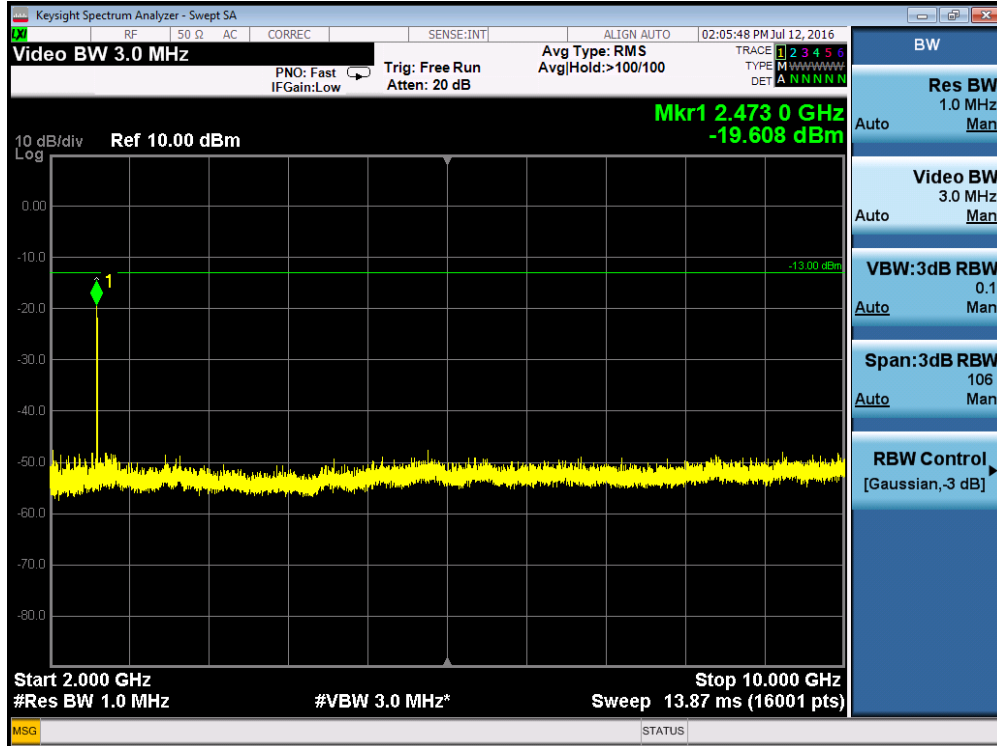


Plot 7-10. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 128)

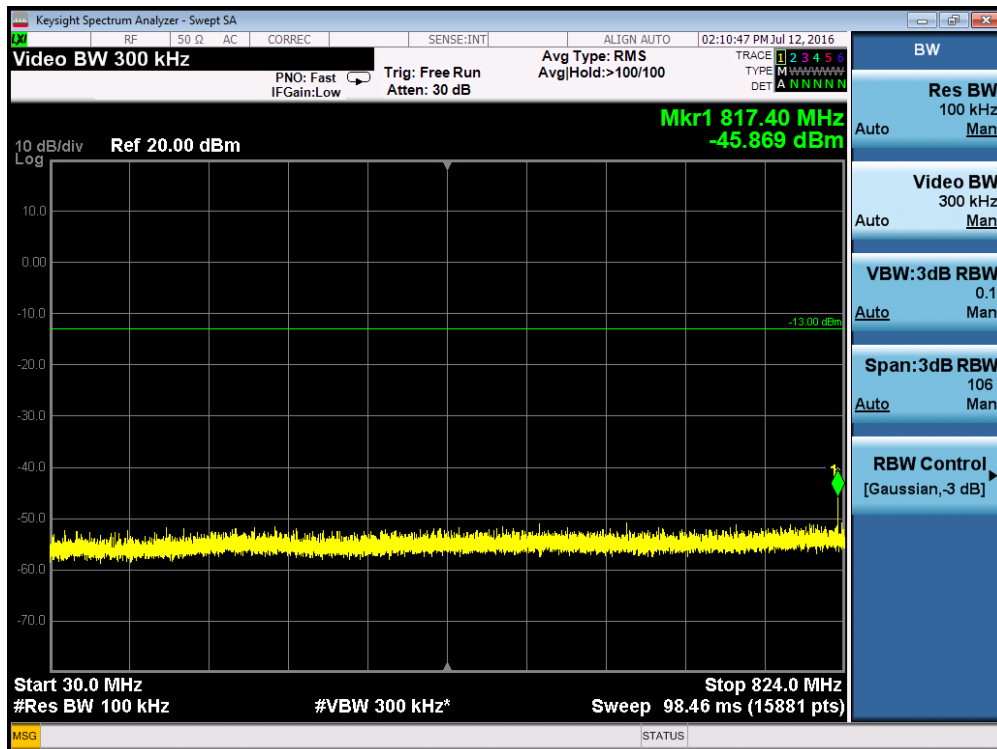


Plot 7-11. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 128)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 20 of 104

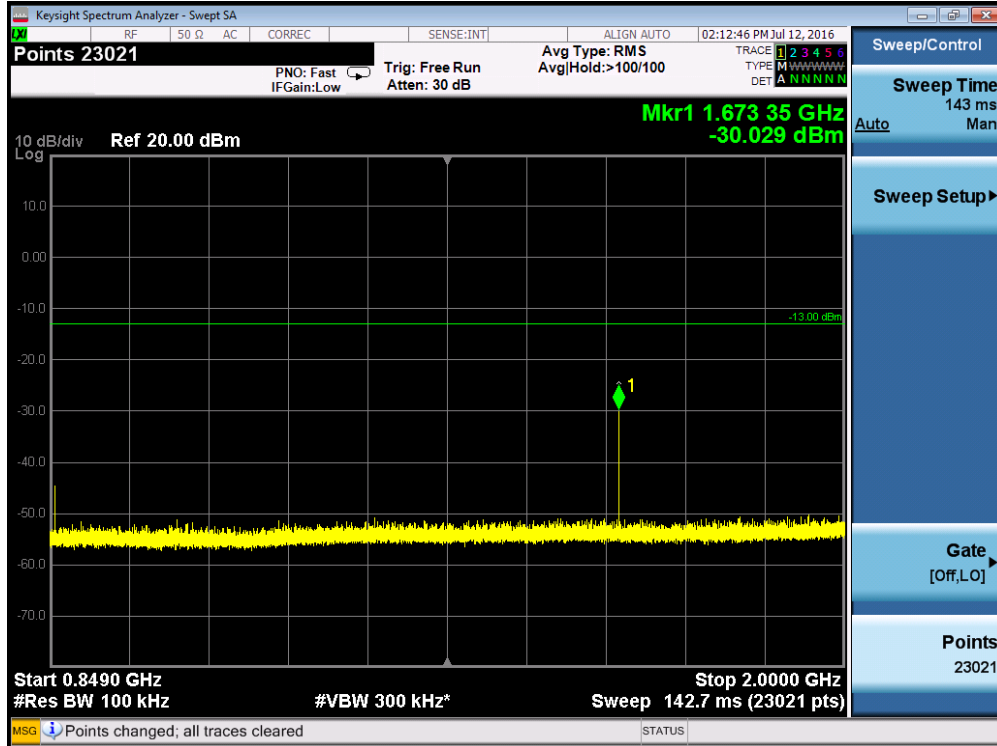


Plot 7-12. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 128)

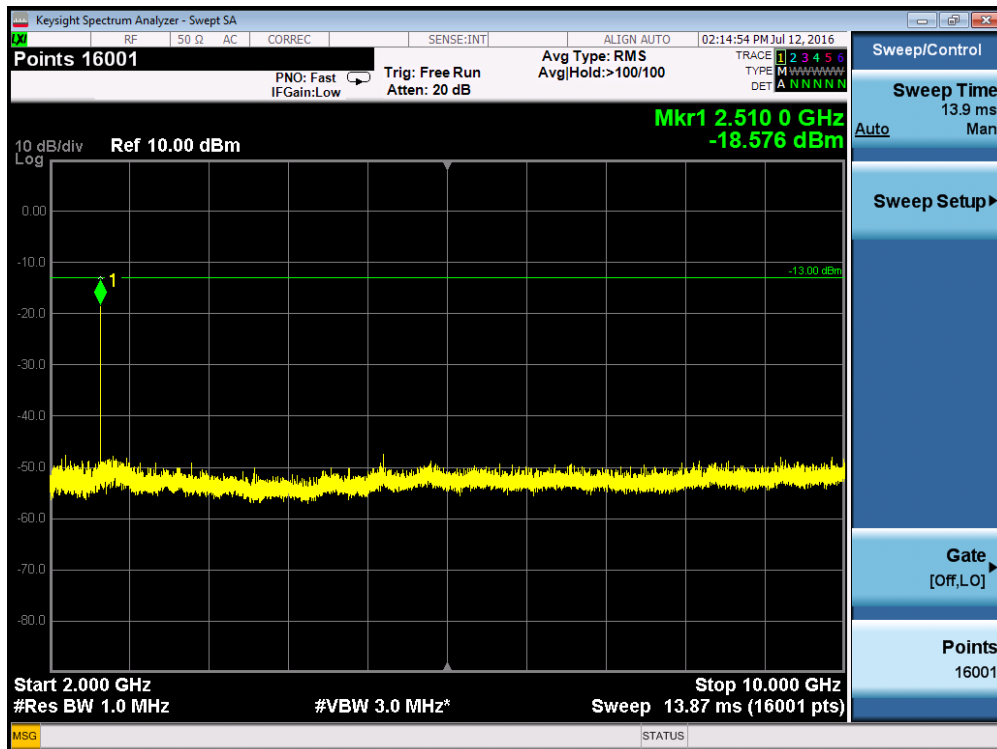


Plot 7-13. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 21 of 104

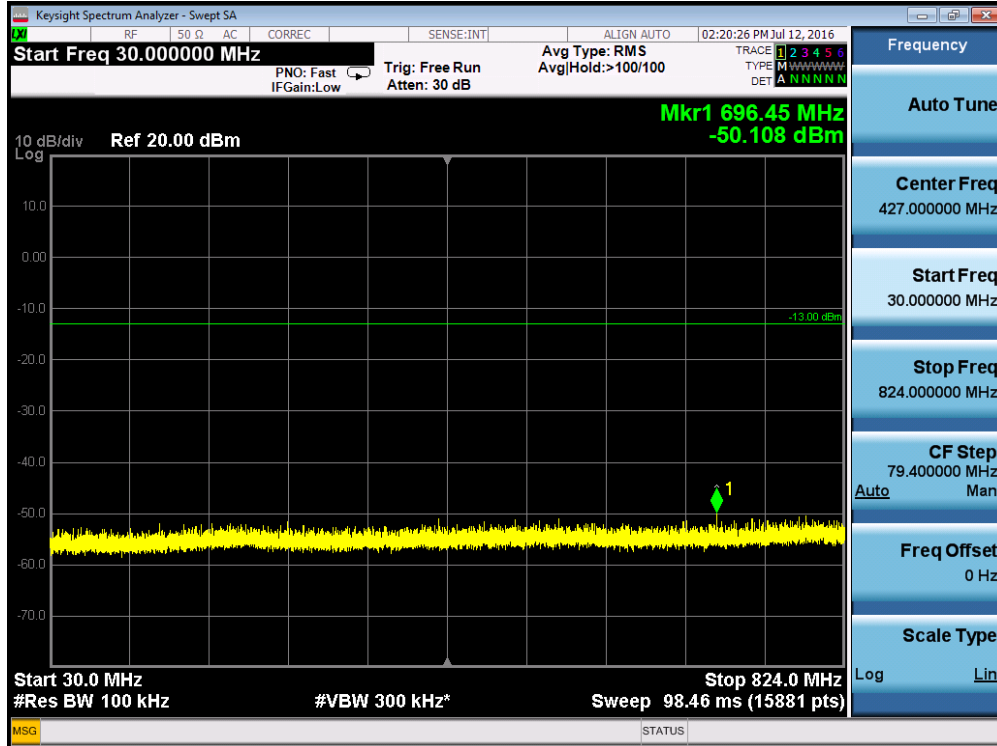


Plot 7-14. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 190)

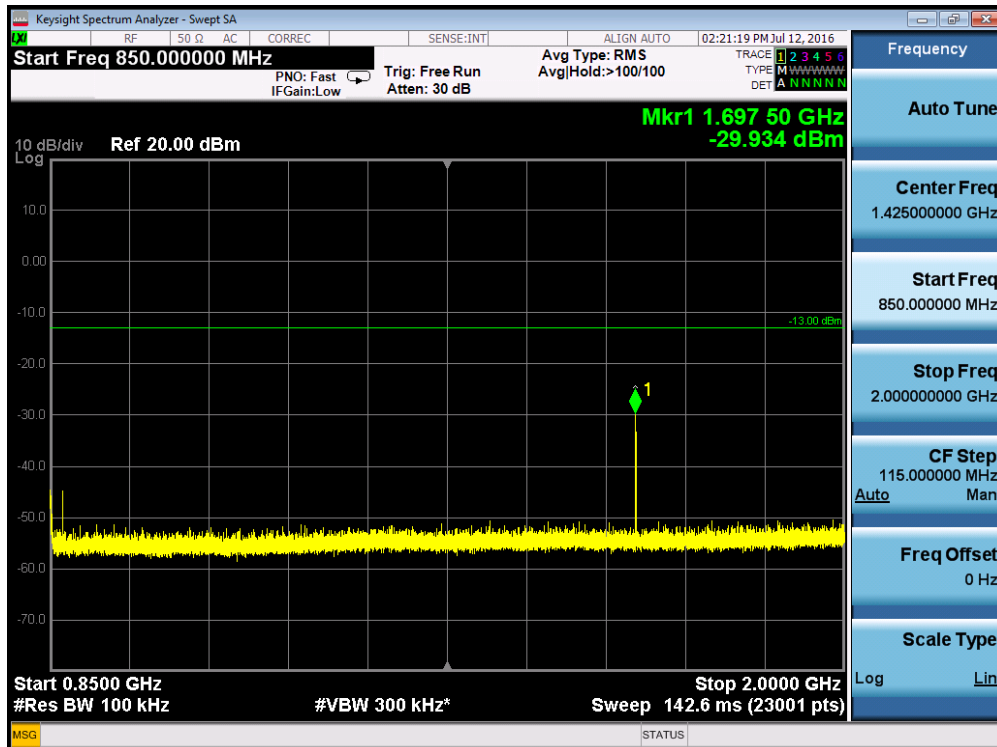


Plot 7-15. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 22 of 104

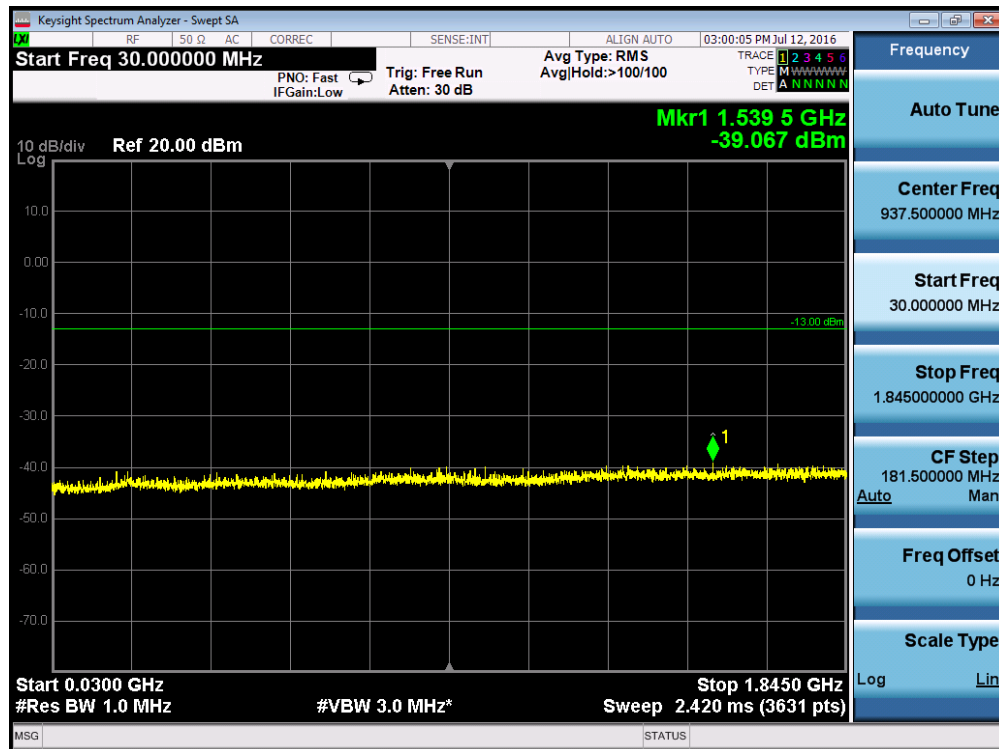
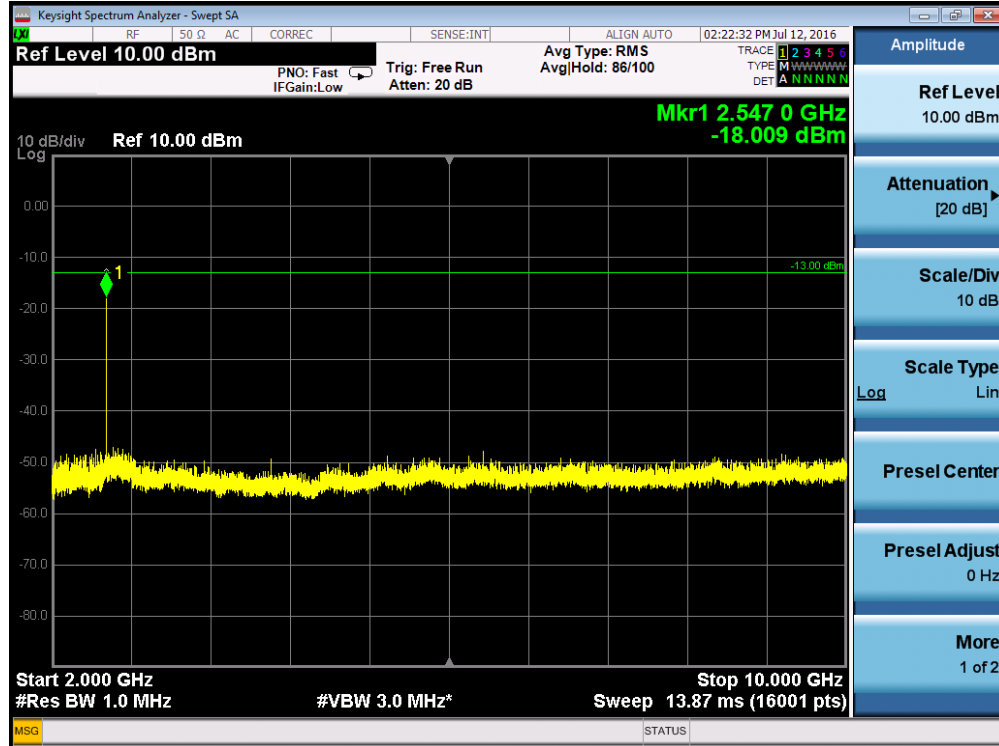


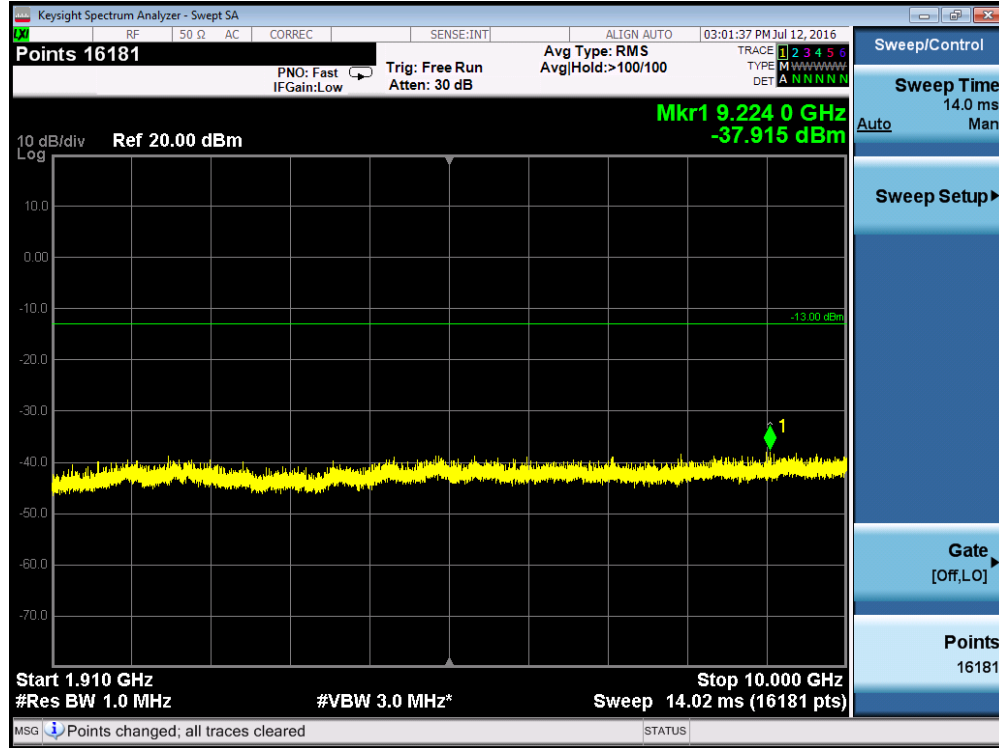
Plot 7-16. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 251)



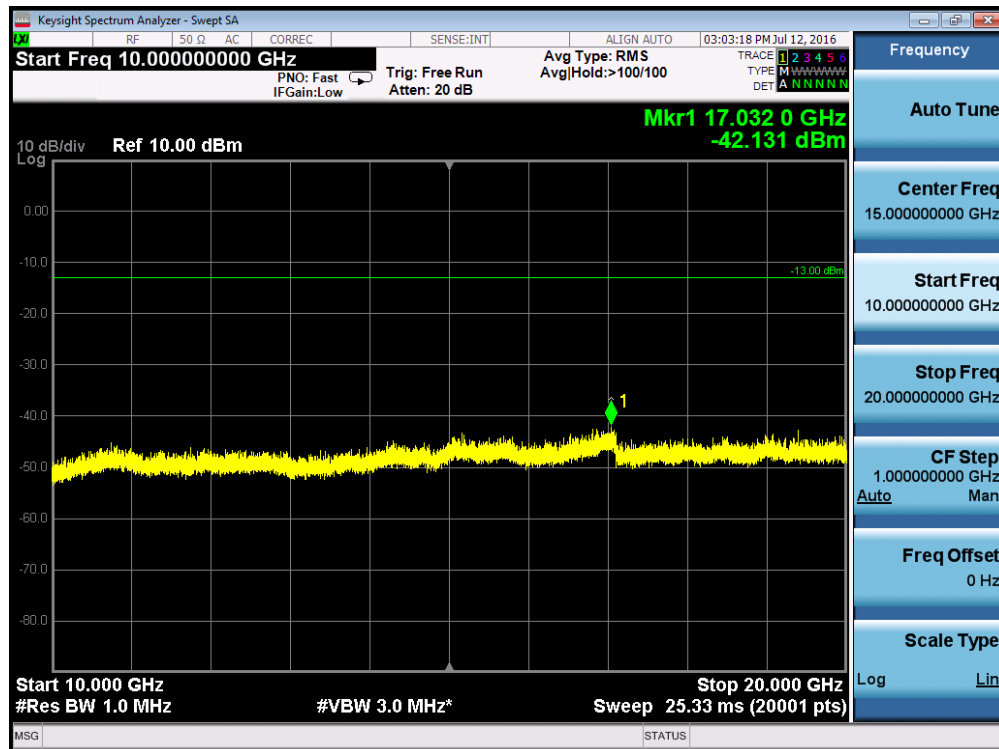
Plot 7-17. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 251)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 23 of 104



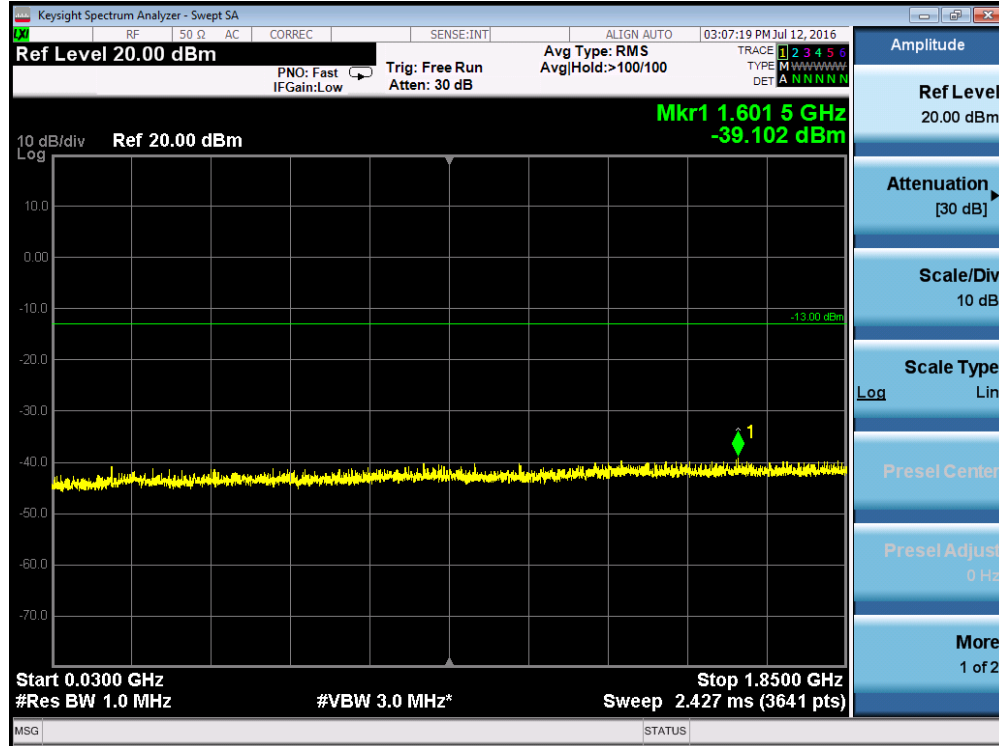


Plot 7-20. Conducted Spurious Plot (PCS GPRS Mode - Ch. 512)

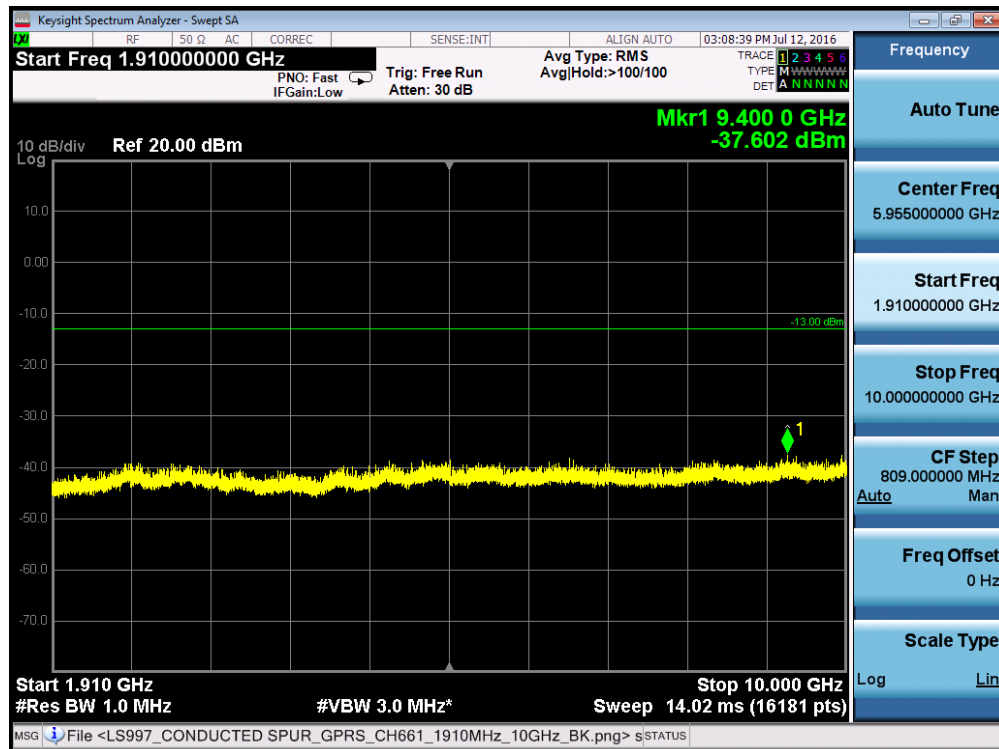


Plot 7-21. Conducted Spurious Plot (PCS GPRS Mode - Ch. 512)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 25 of 104

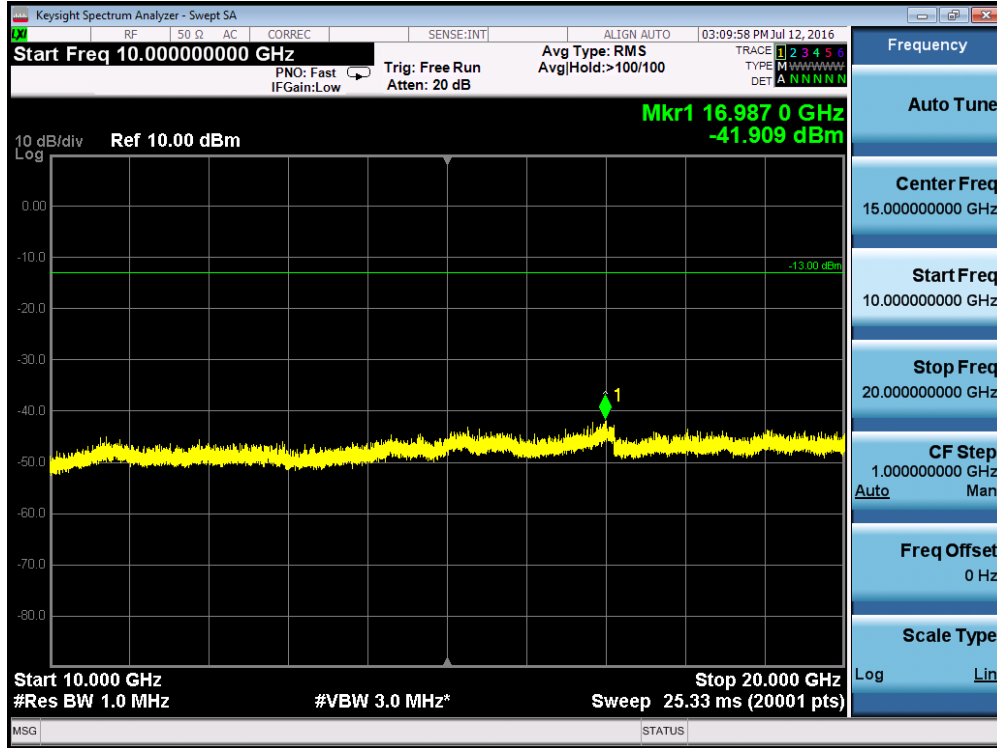


Plot 7-22. Conducted Spurious Plot (PCS GPRS Mode – Ch. 661)

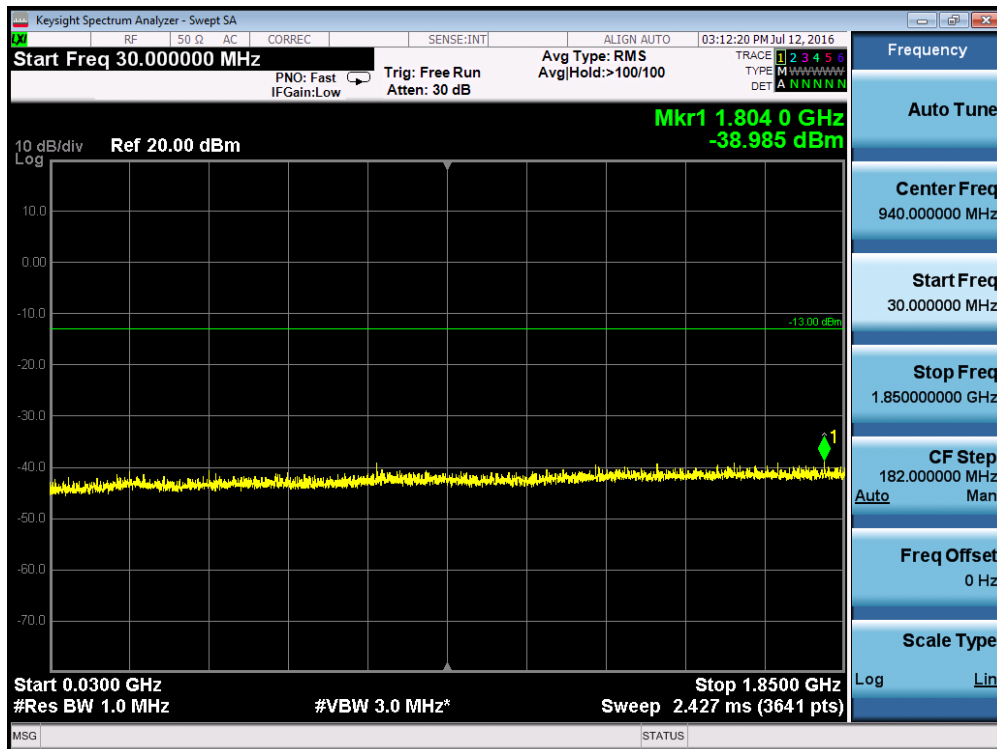


Plot 7-23. Conducted Spurious Plot (PCS GPRS Mode – Ch. 661)

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 26 of 104

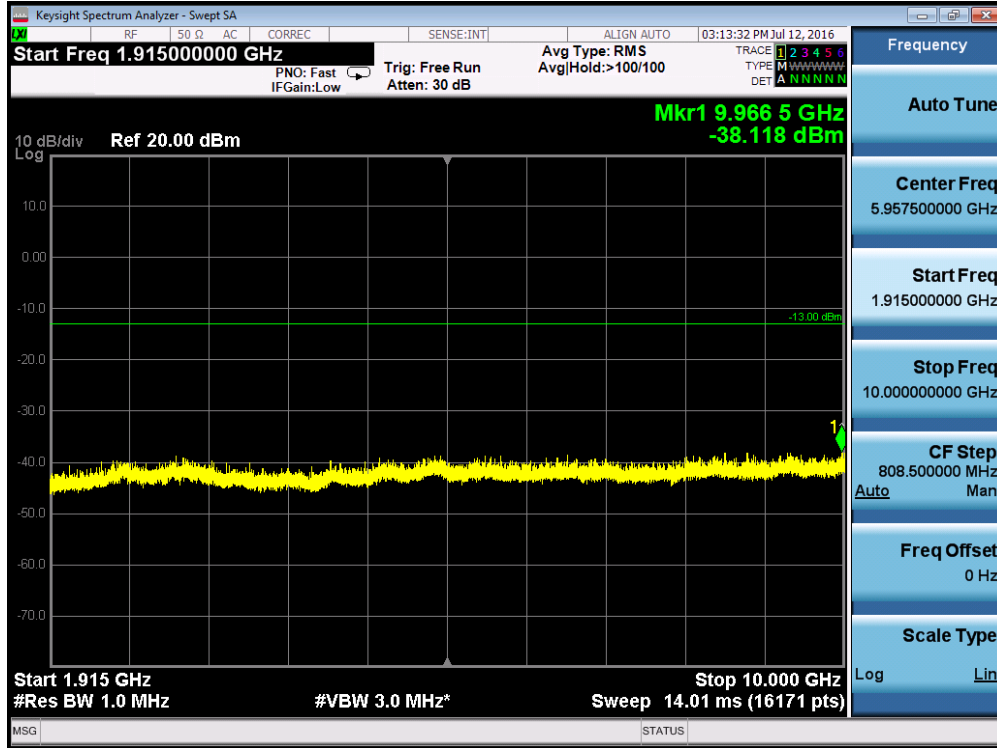


Plot 7-24. Conducted Spurious Plot (PCS GPRS Mode – Ch. 661)

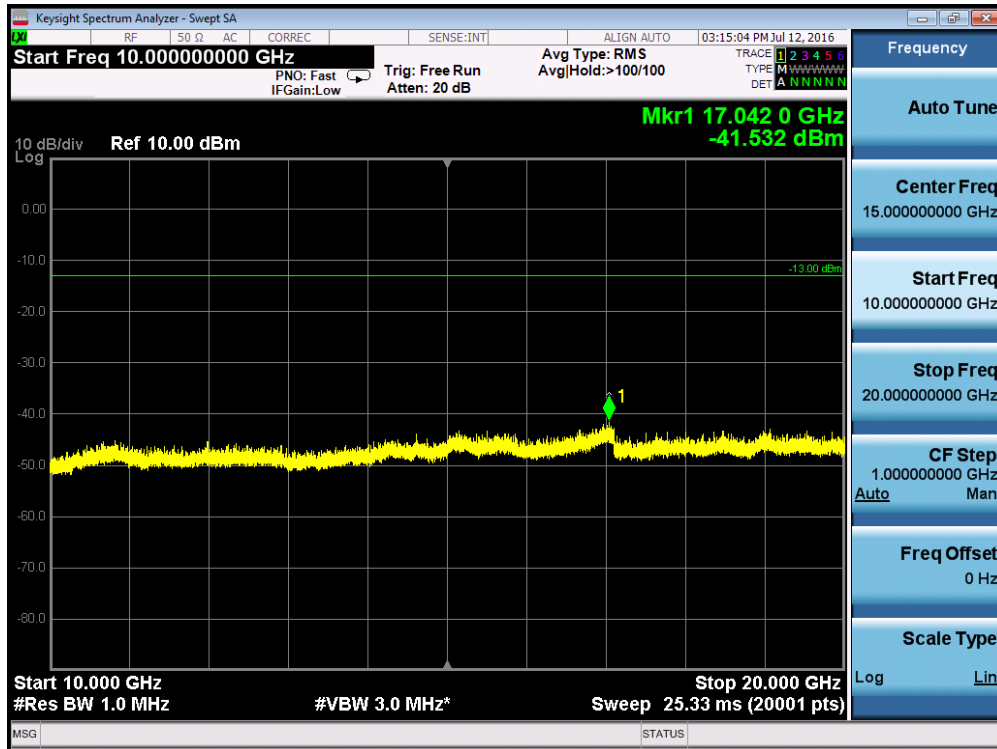


Plot 7-25. Conducted Spurious Plot (PCS GPRS Mode – Ch. 810)

FCC ID: ZNFS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 27 of 104

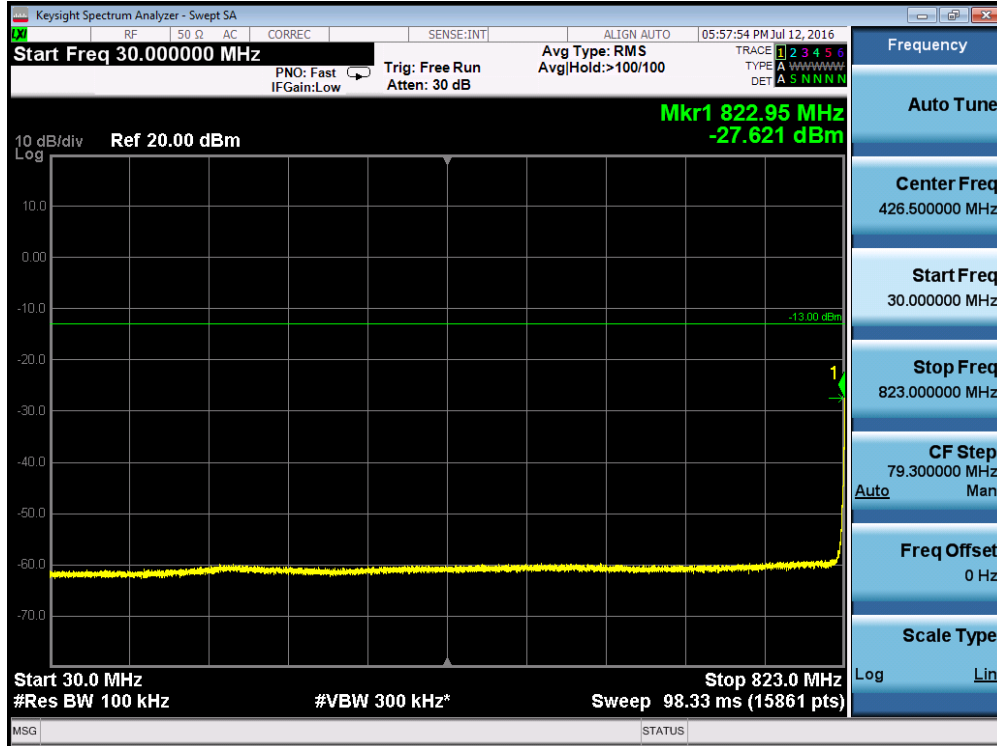


Plot 7-26. Conducted Spurious Plot (PCS GPRS Mode – Ch. 810)

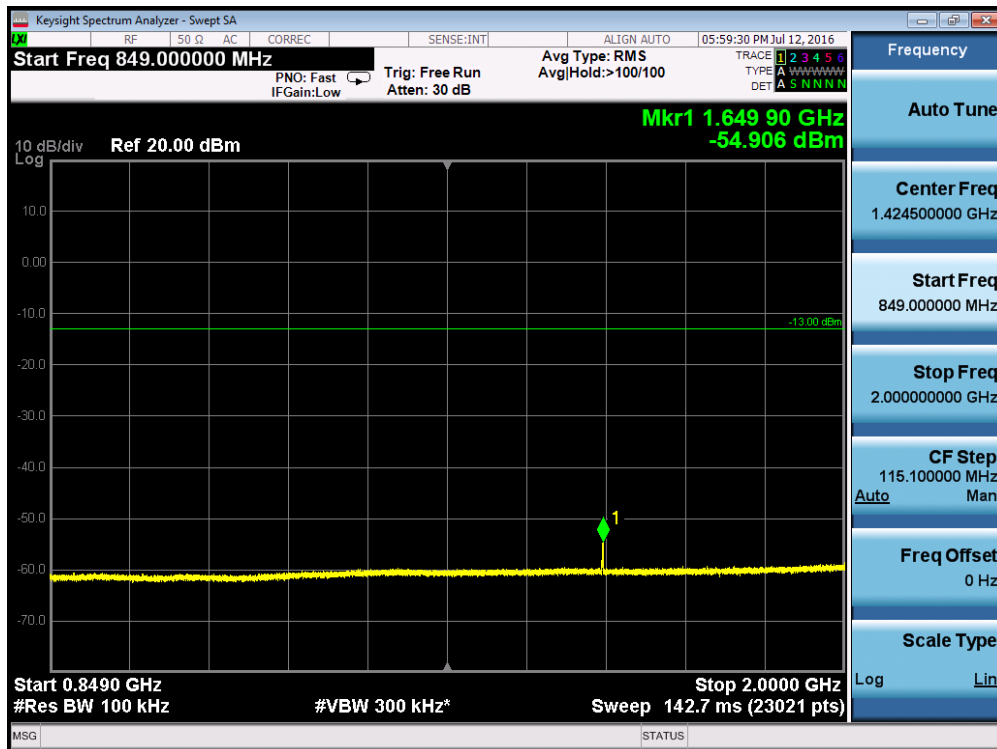


Plot 7-27. Conducted Spurious Plot (PCS GPRS Mode – Ch. 810)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 28 of 104

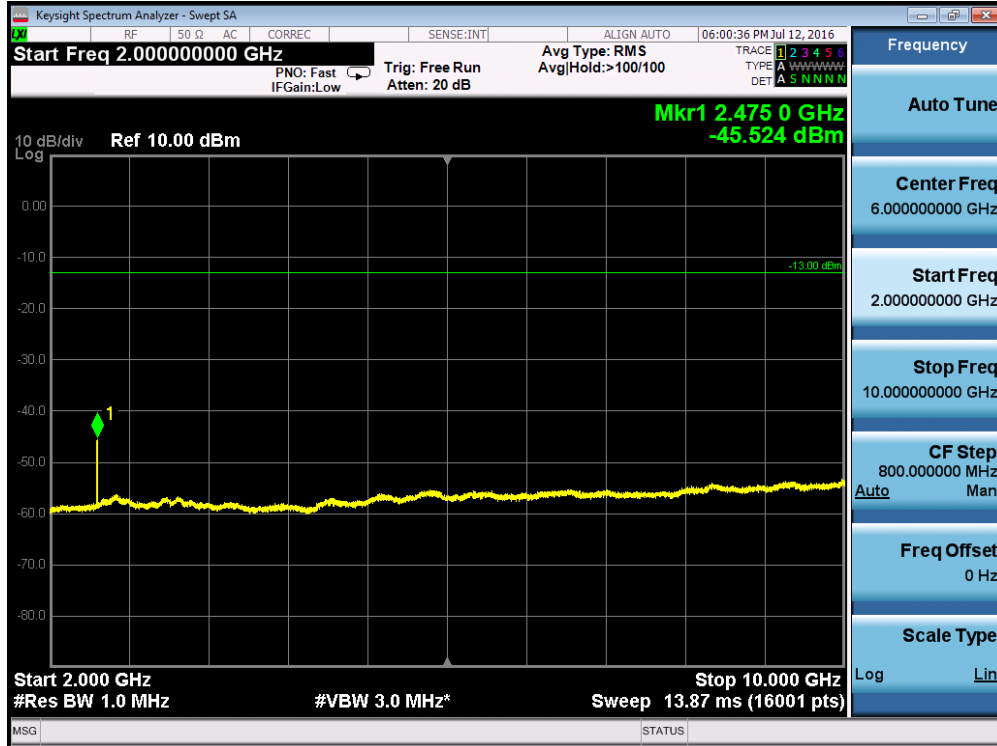


Plot 7-28. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 1013)

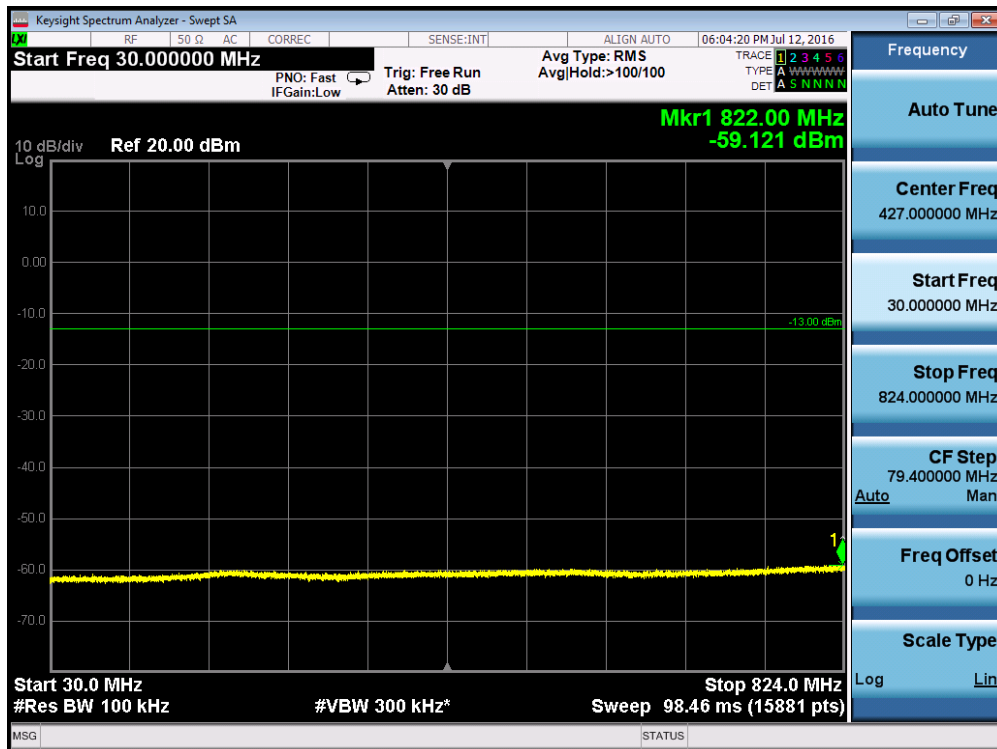


Plot 7-29. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 1013)

FCC ID: ZNFLS997	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: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 29 of 104

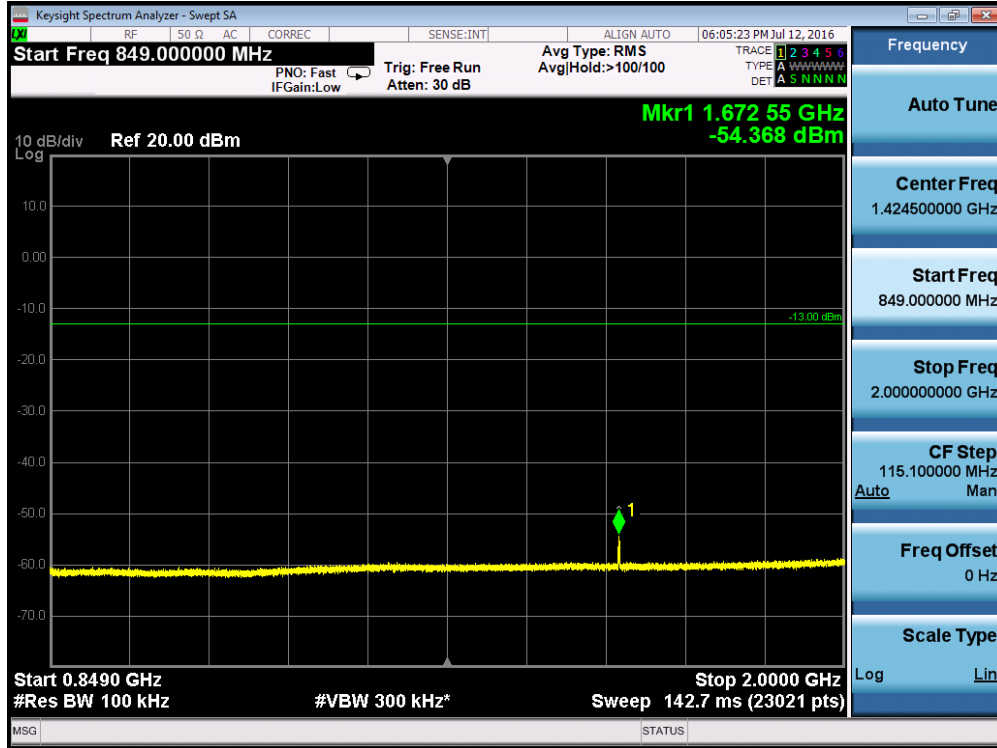


Plot 7-30. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 1013)

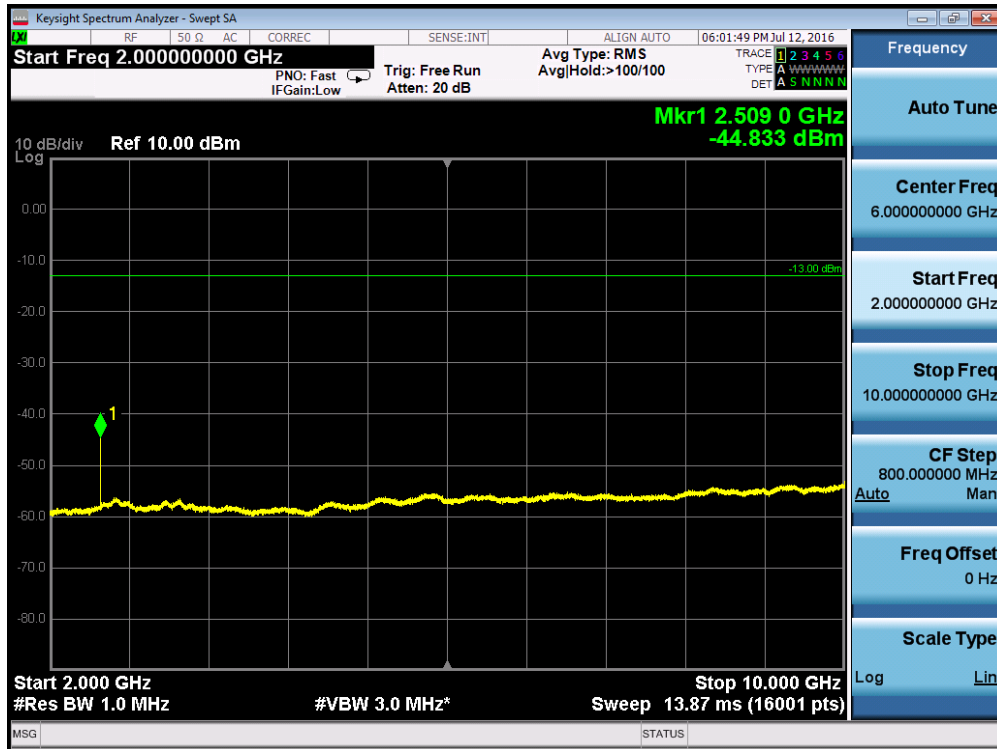


Plot 7-31. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 384)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 30 of 104

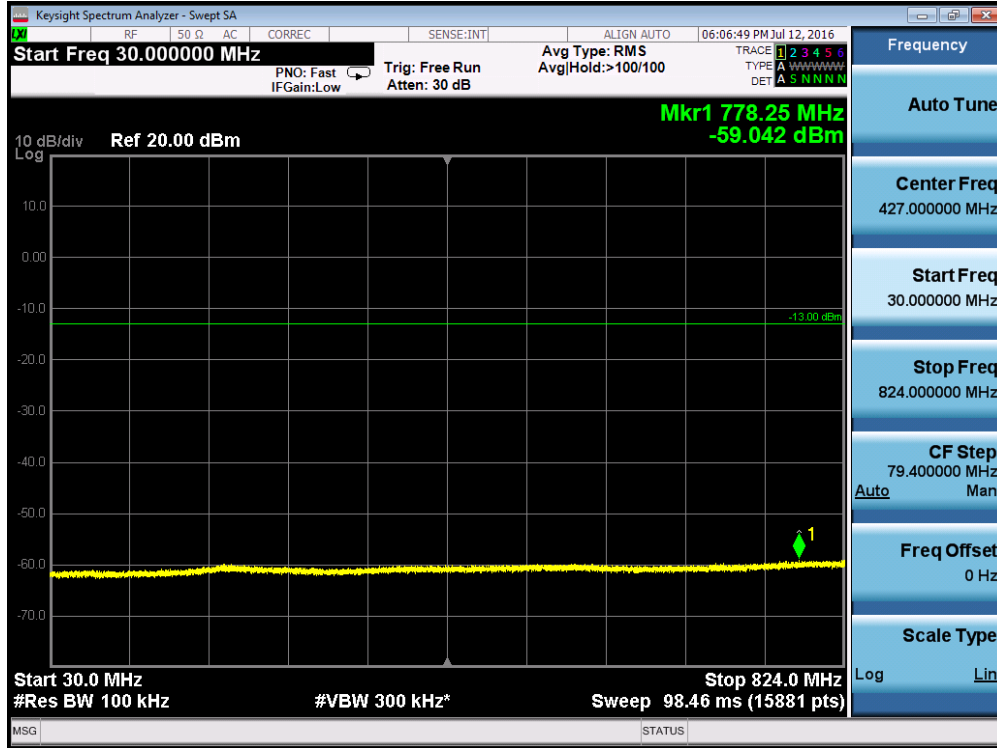


Plot 7-32. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 384)

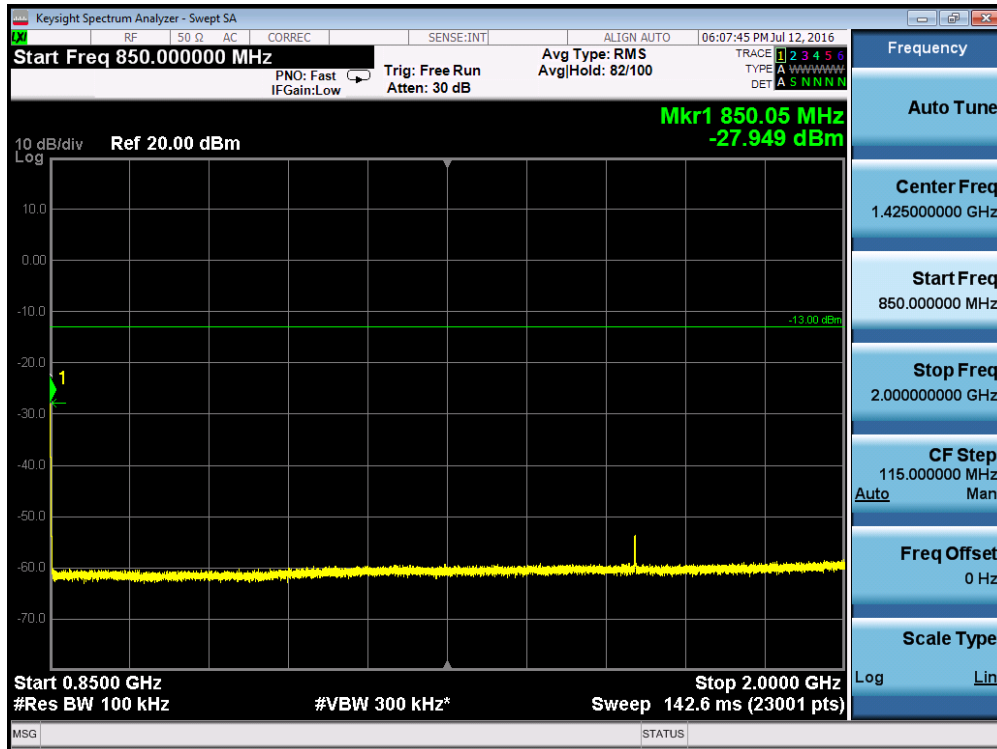


Plot 7-33. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 384)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 31 of 104

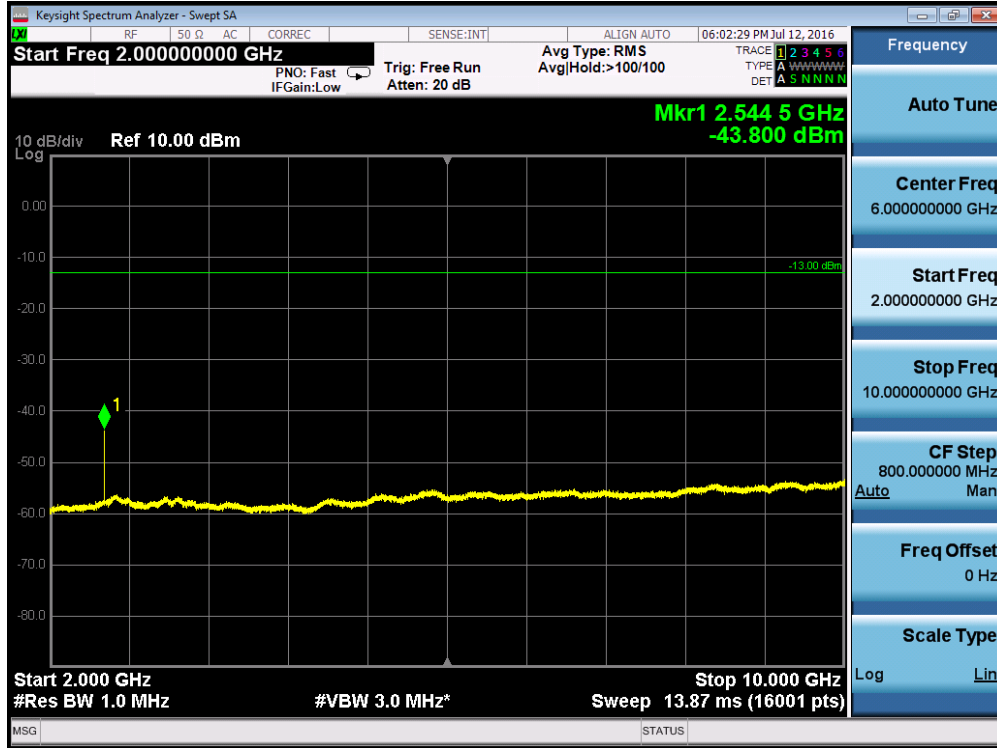


Plot 7-34. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 777)

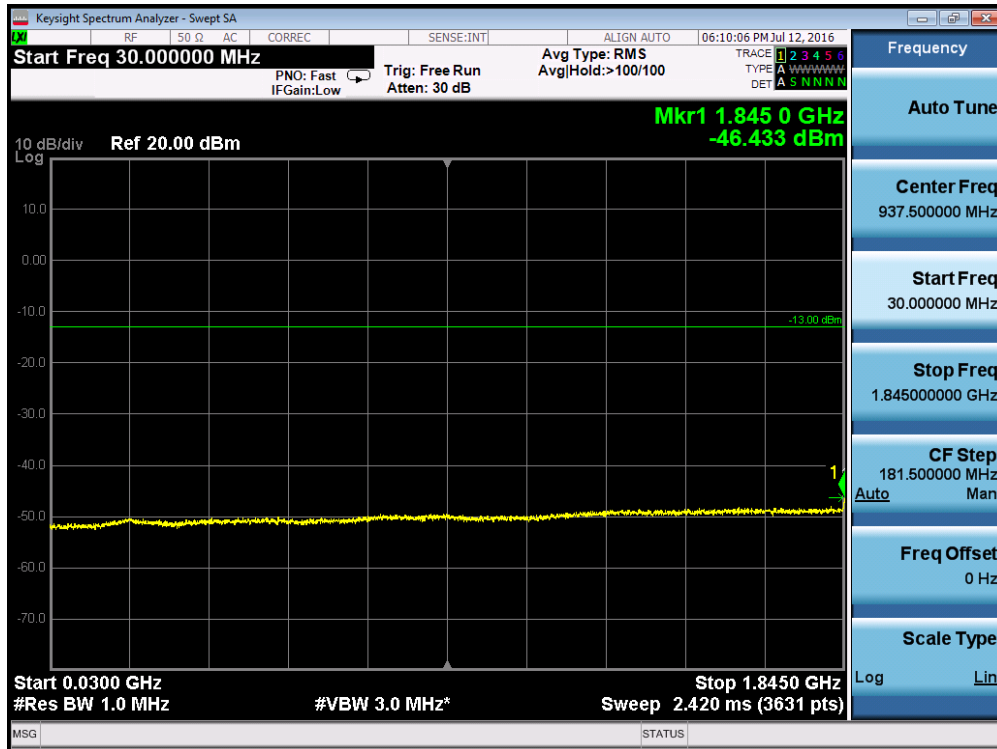


Plot 7-35. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 777)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 32 of 104

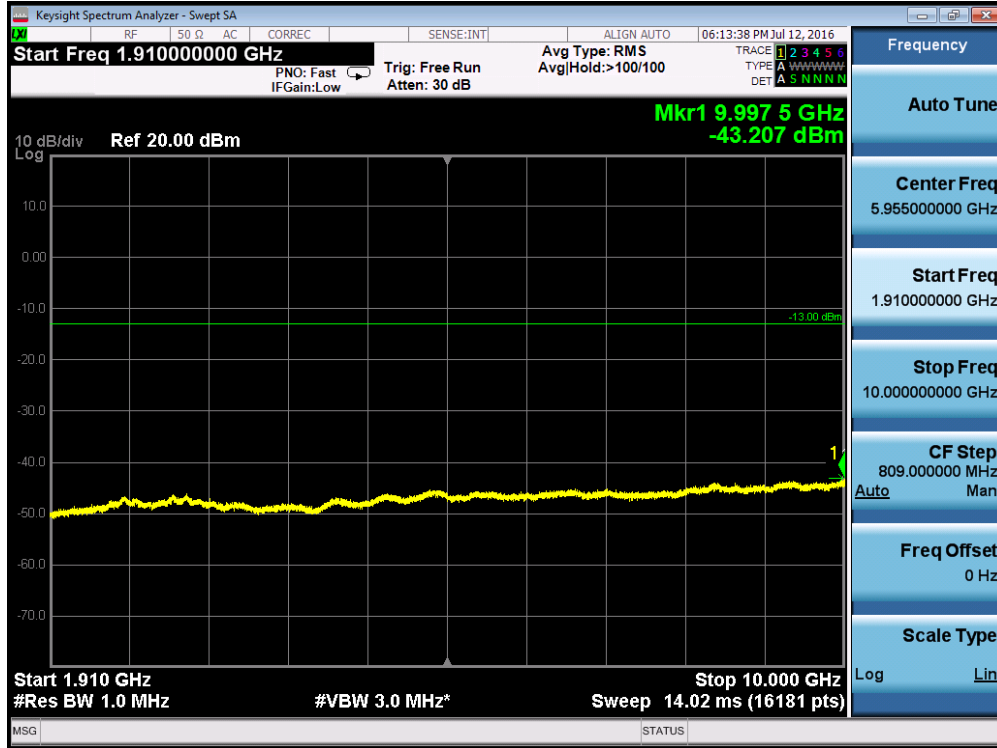


Plot 7-36. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 777)

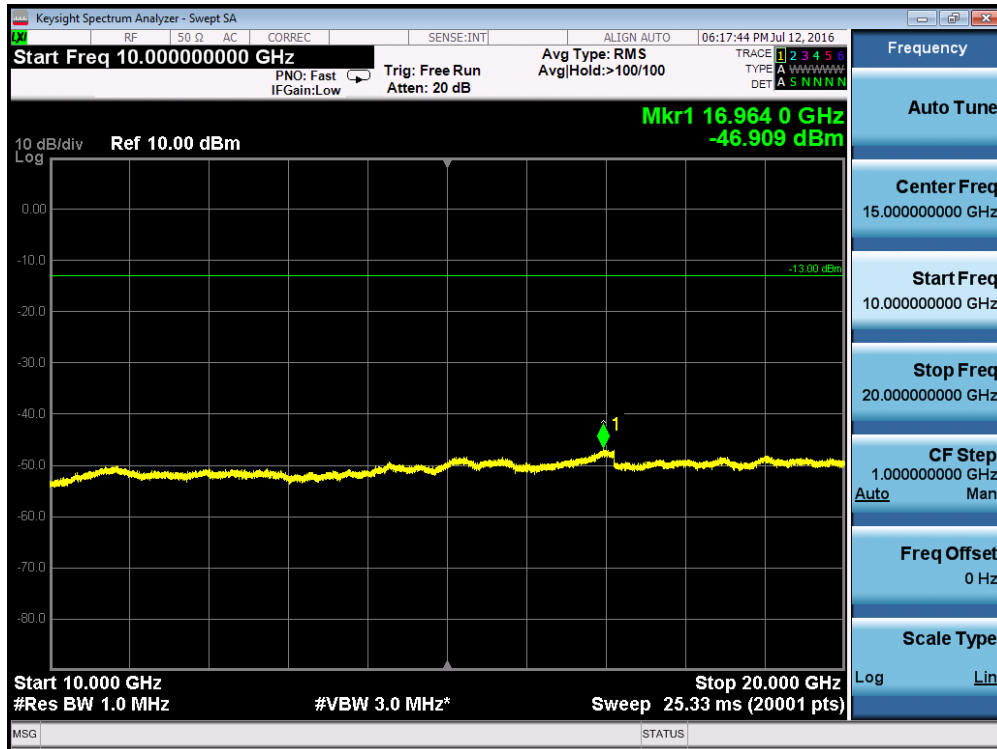


Plot 7-37. Conducted Spurious Plot (PCS CDMA Mode – Ch. 25)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 33 of 104

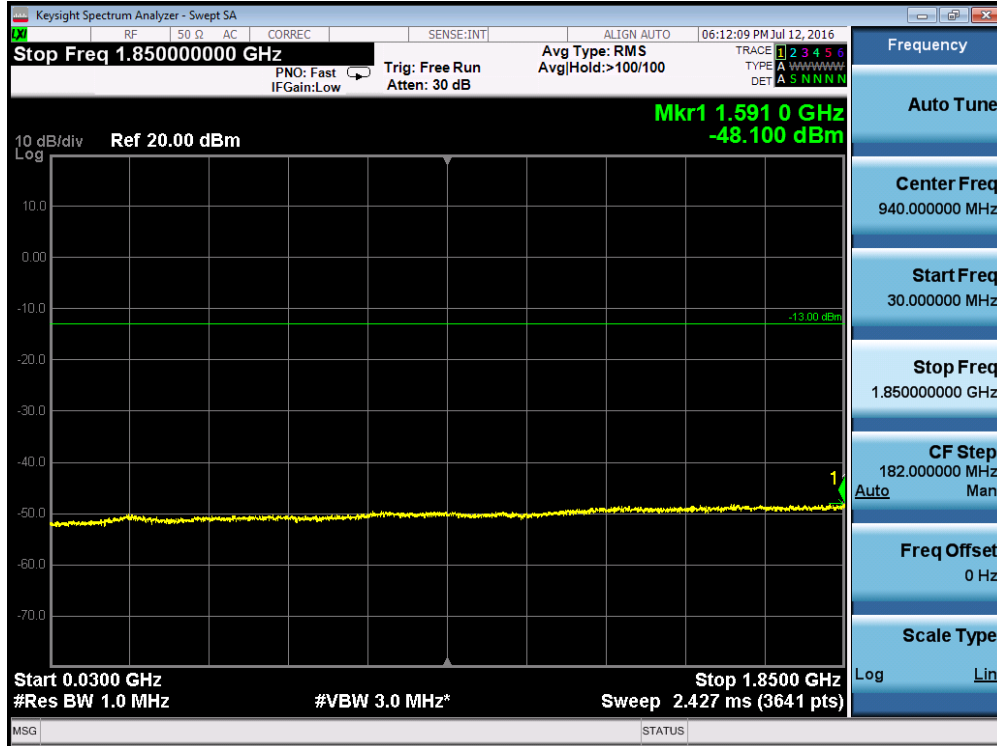


Plot 7-38. Conducted Spurious Plot (PCS CDMA Mode – Ch. 25)

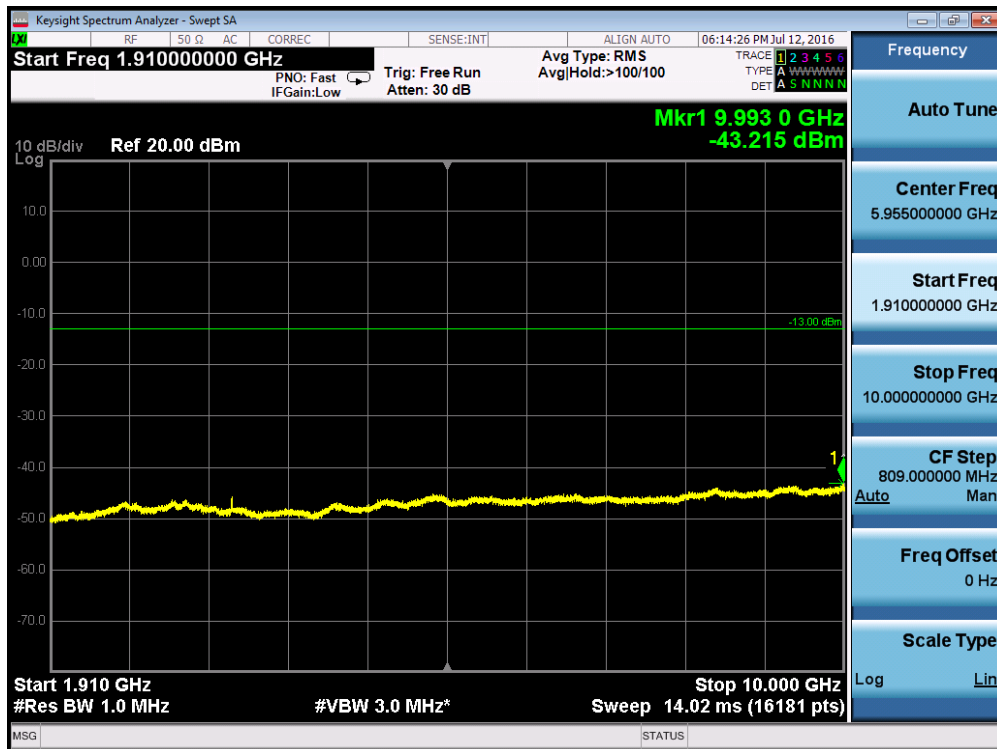


Plot 7-39. Conducted Spurious Plot (PCS CDMA Mode – Ch. 25)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 34 of 104

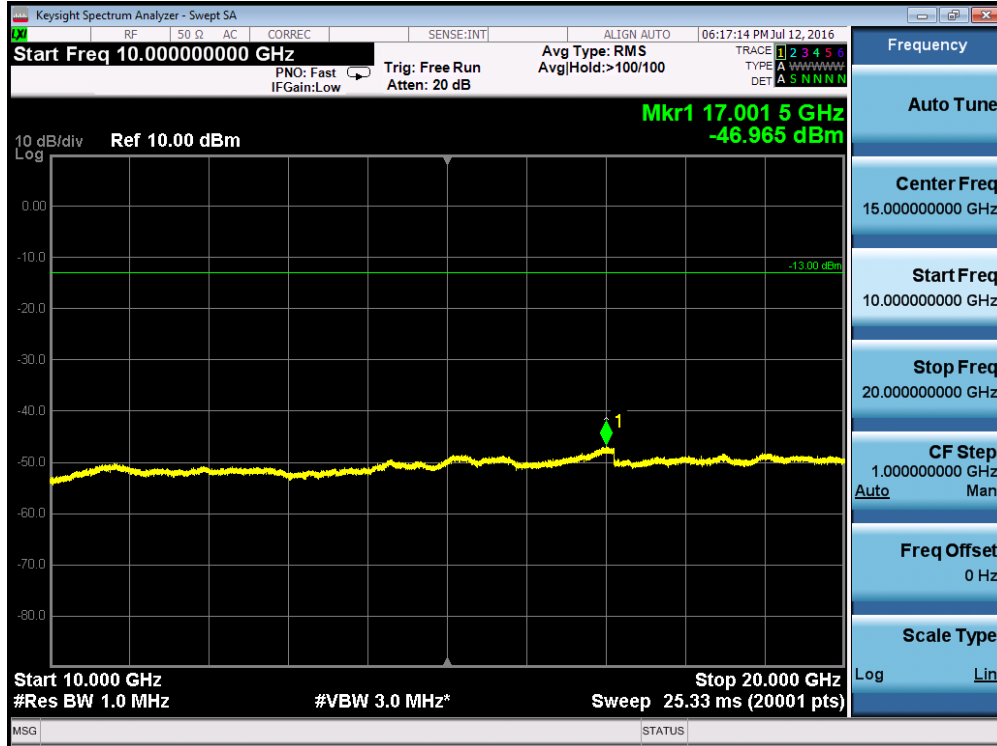


Plot 7-40. Conducted Spurious Plot (PCS CDMA Mode – Ch. 600)

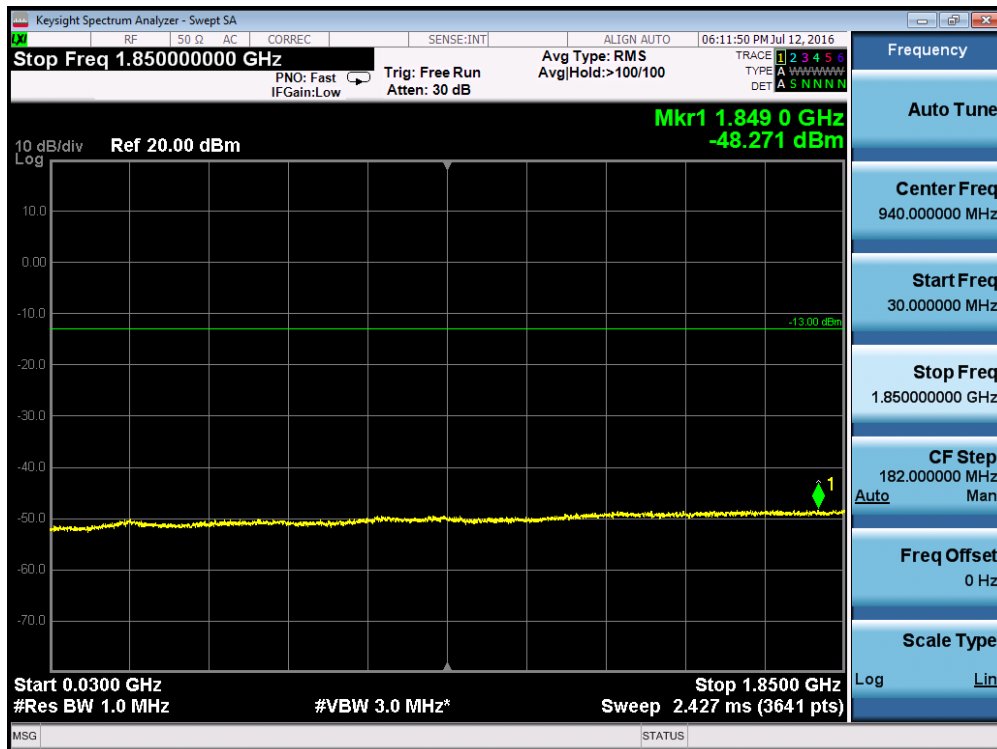


Plot 7-41. Conducted Spurious Plot (PCS CDMA Mode – Ch. 600)

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 35 of 104

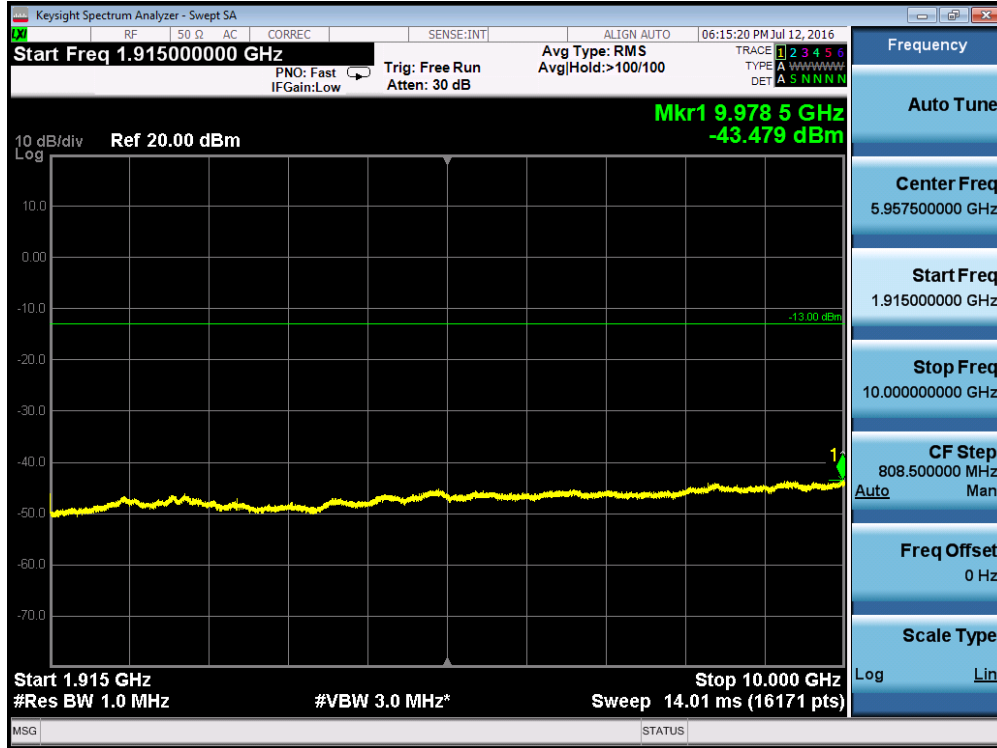


Plot 7-42. Conducted Spurious Plot (PCS CDMA Mode – Ch. 600)

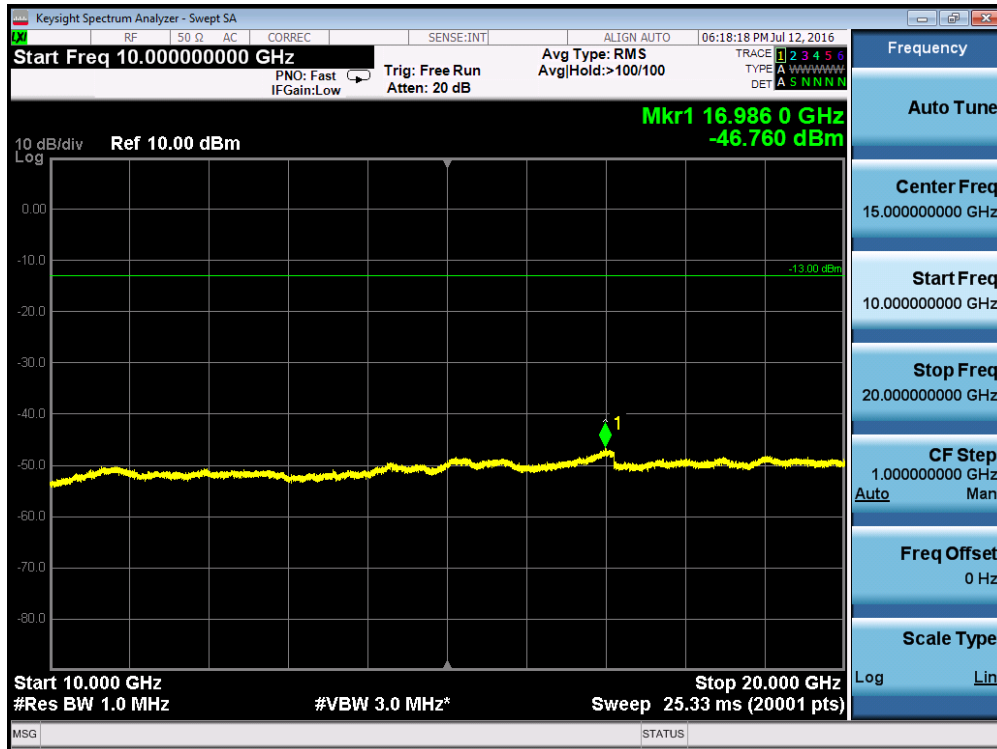


Plot 7-43. Conducted Spurious Plot (PCS CDMA Mode – Ch. 1175)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 36 of 104

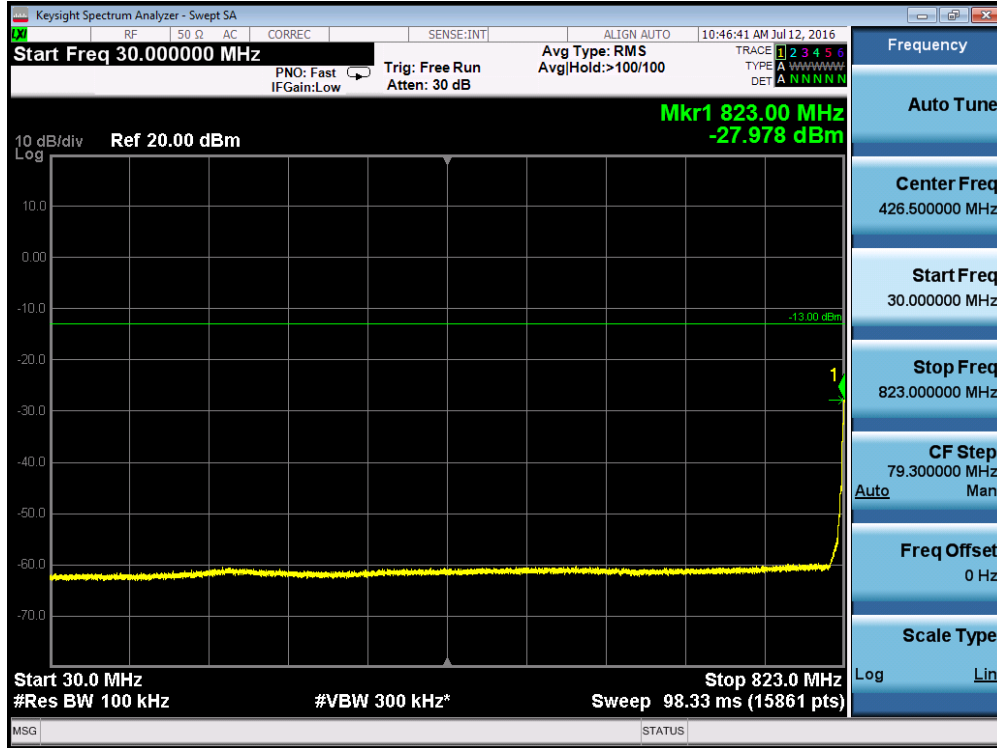


Plot 7-44. Conducted Spurious Plot (PCS CDMA Mode – Ch. 1175)

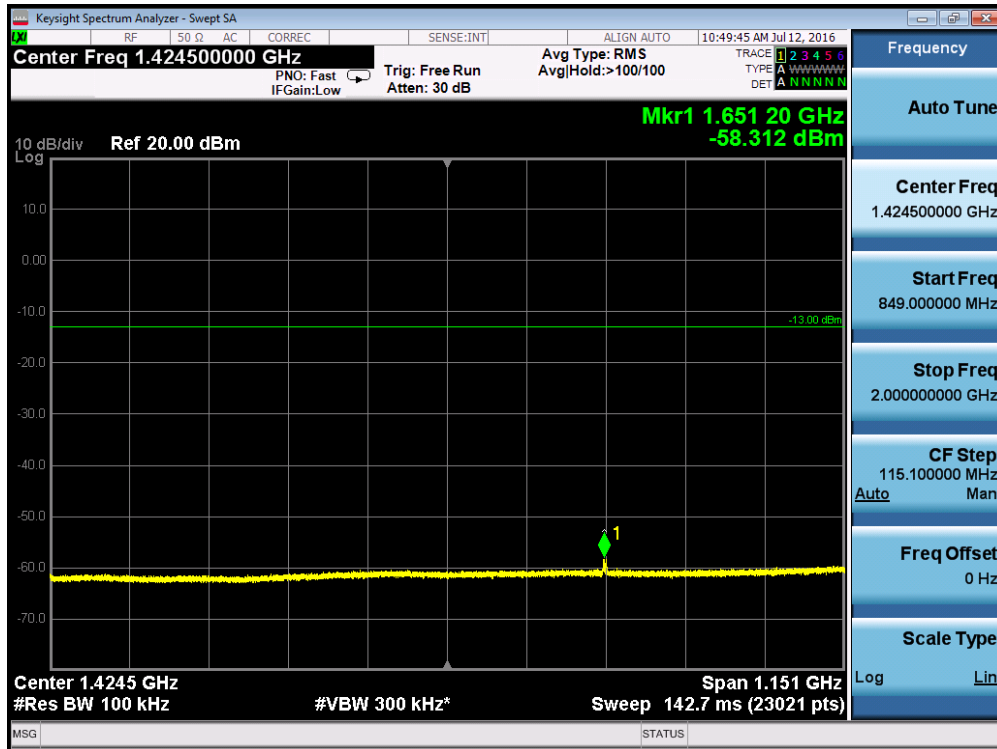


Plot 7-45. Conducted Spurious Plot (PCS CDMA Mode – Ch. 1175)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 37 of 104

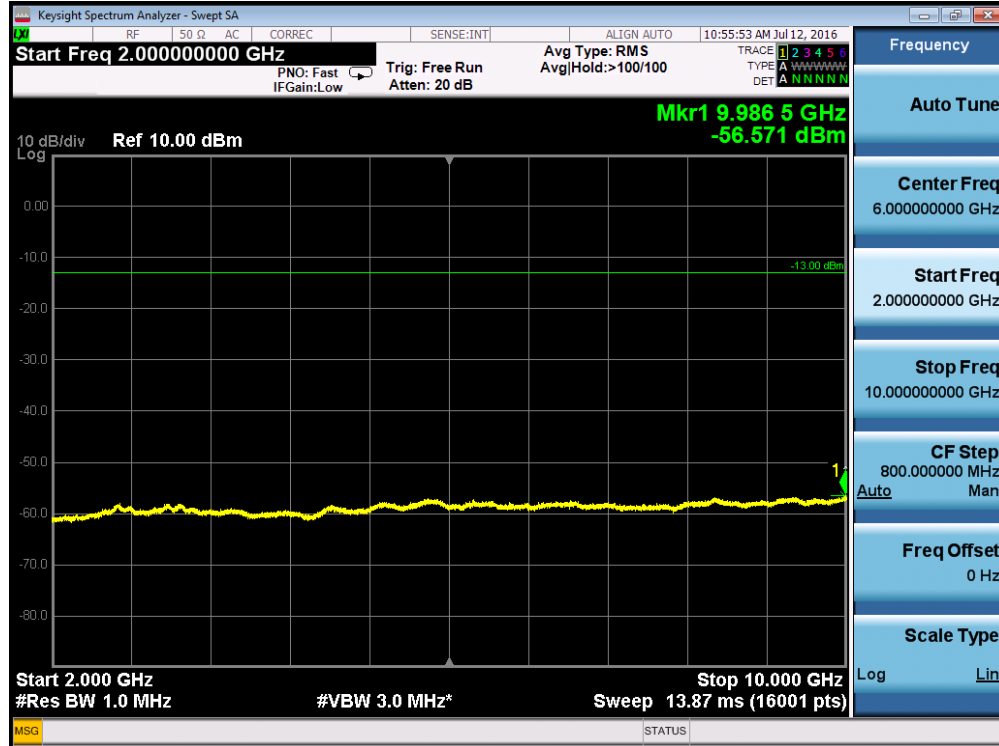


Plot 7-46. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)

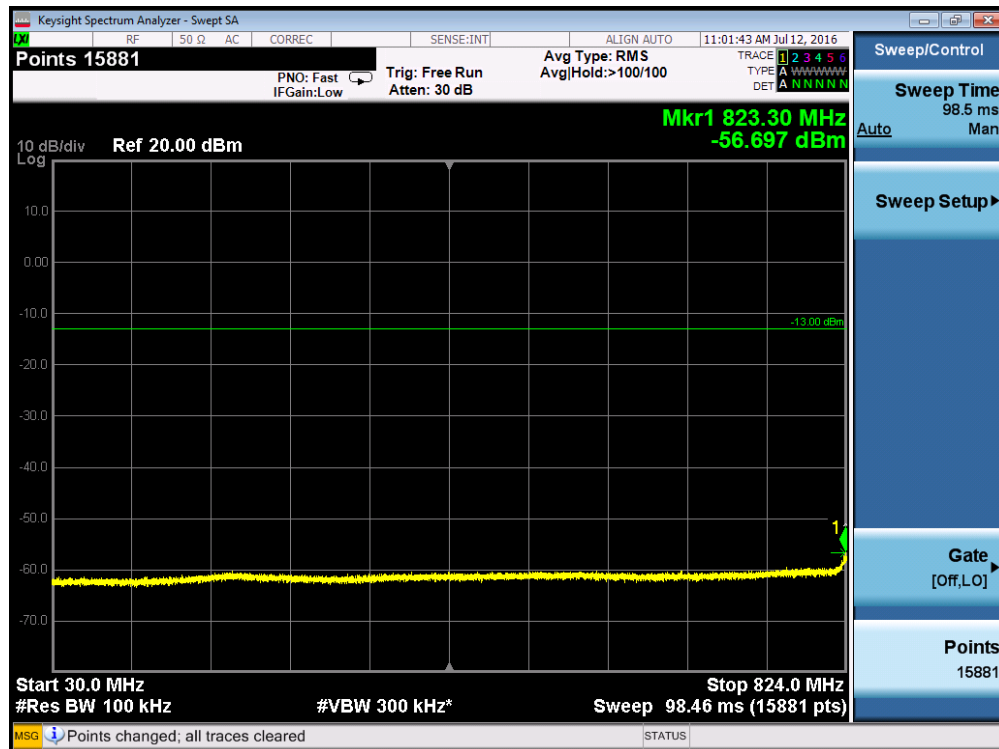


Plot 7-47. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 38 of 104

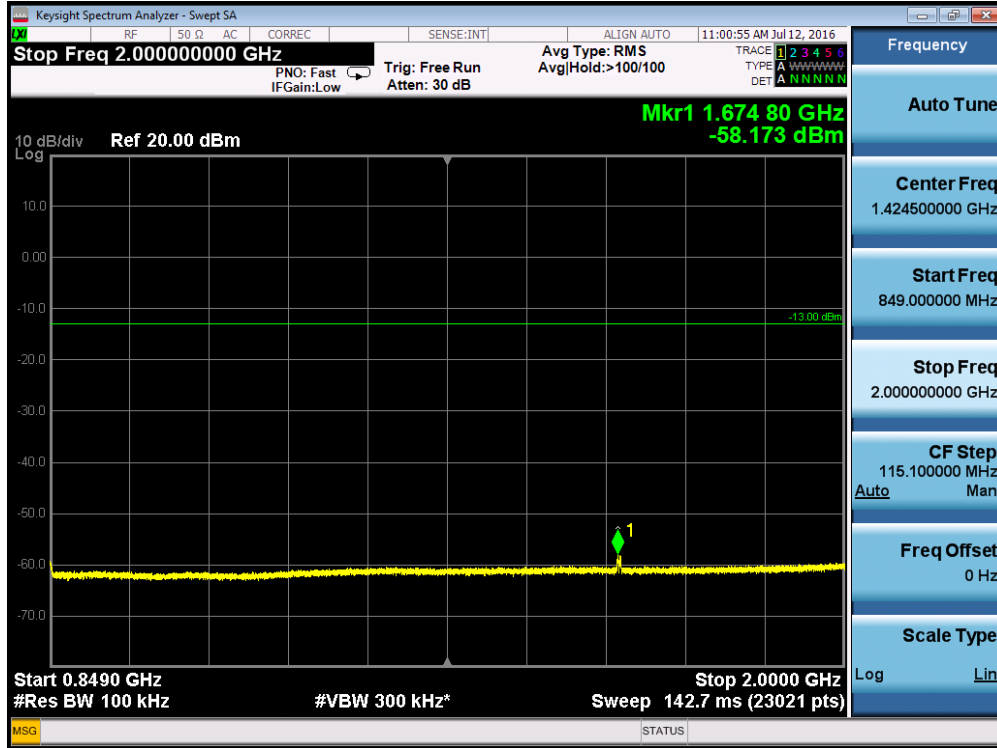


Plot 7-48. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)

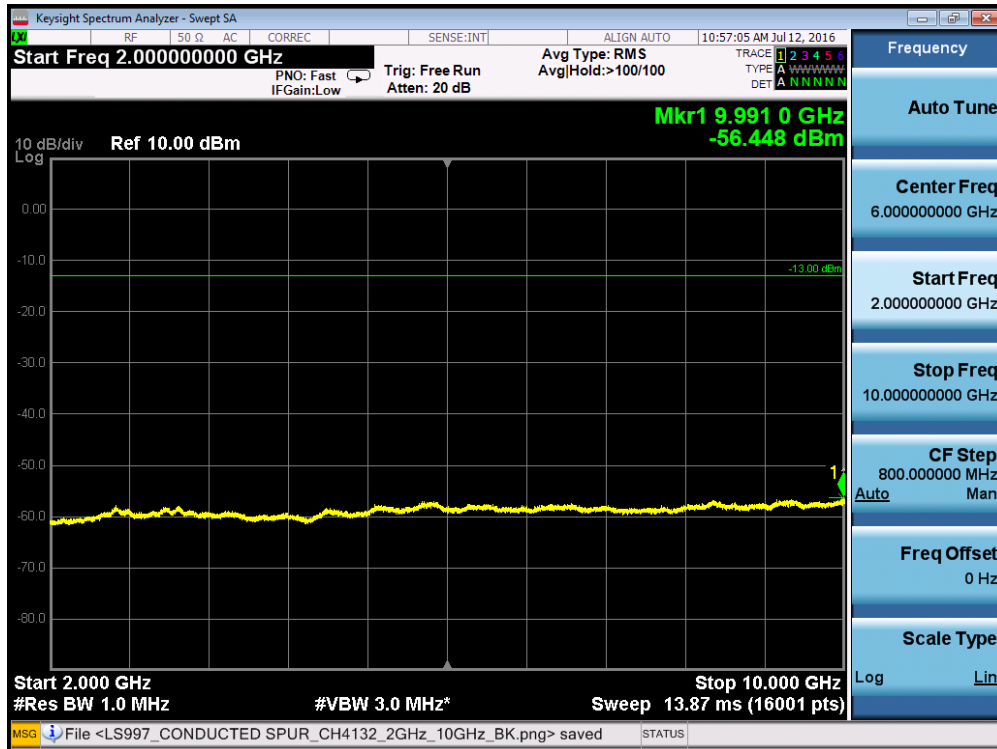


Plot 7-49. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 39 of 104

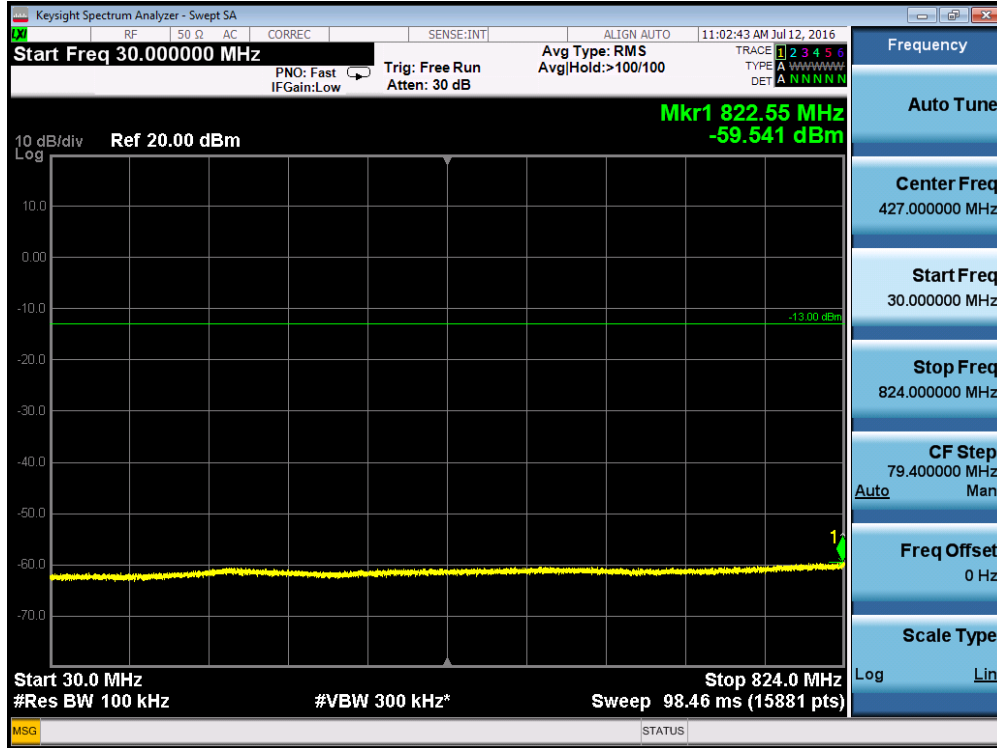


Plot 7-50. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)

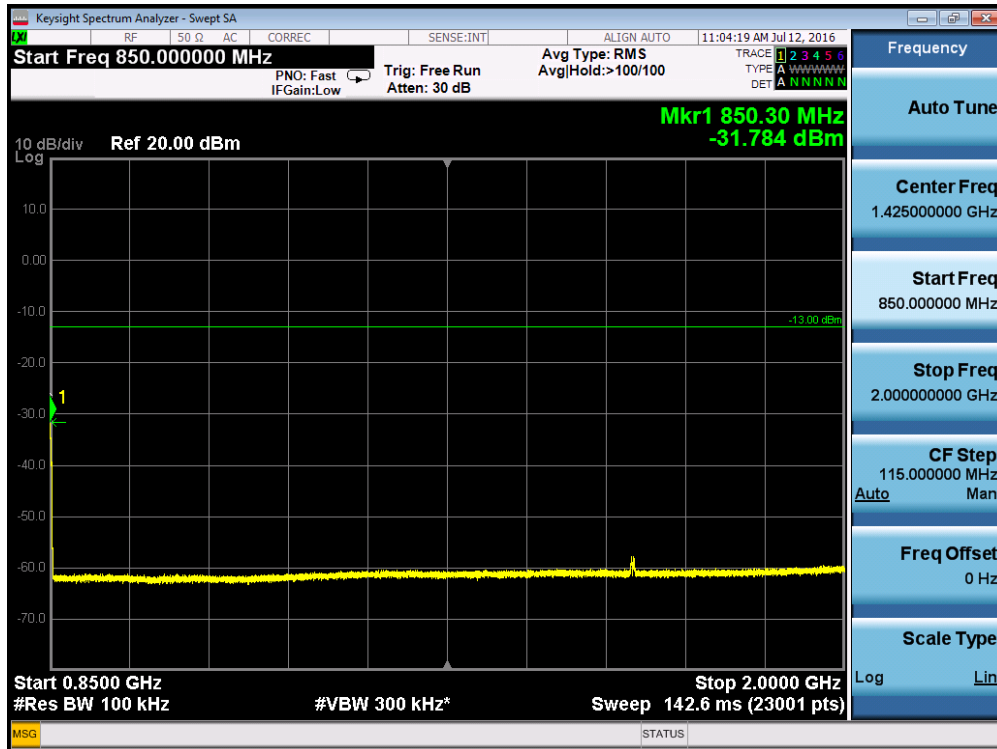


Plot 7-51. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 40 of 104

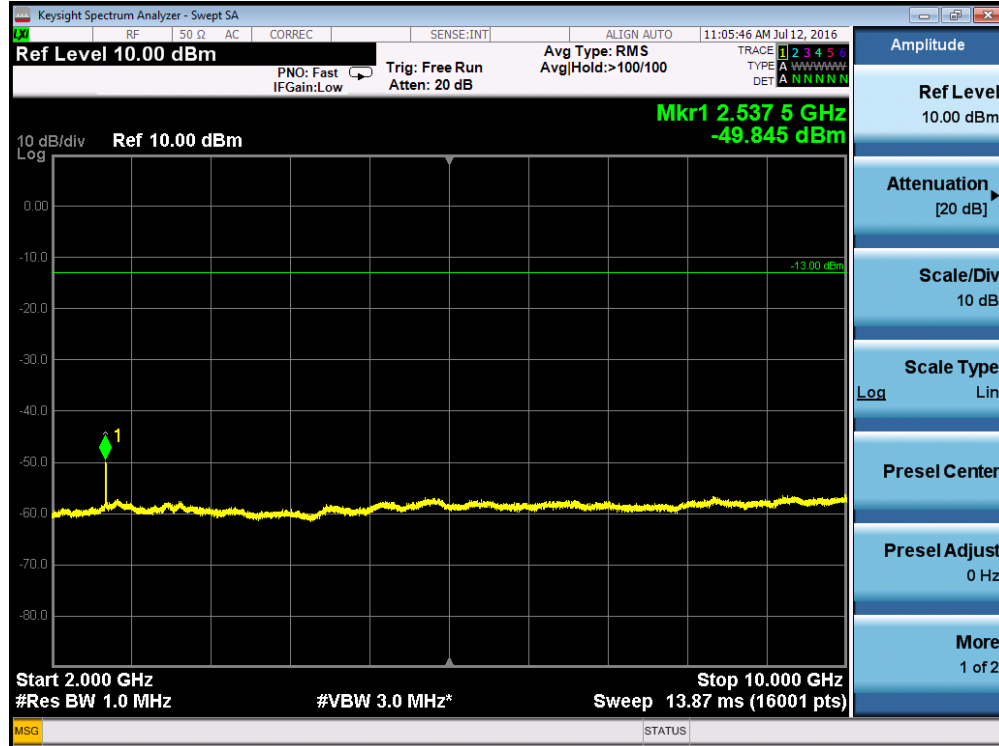


Plot 7-52. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)

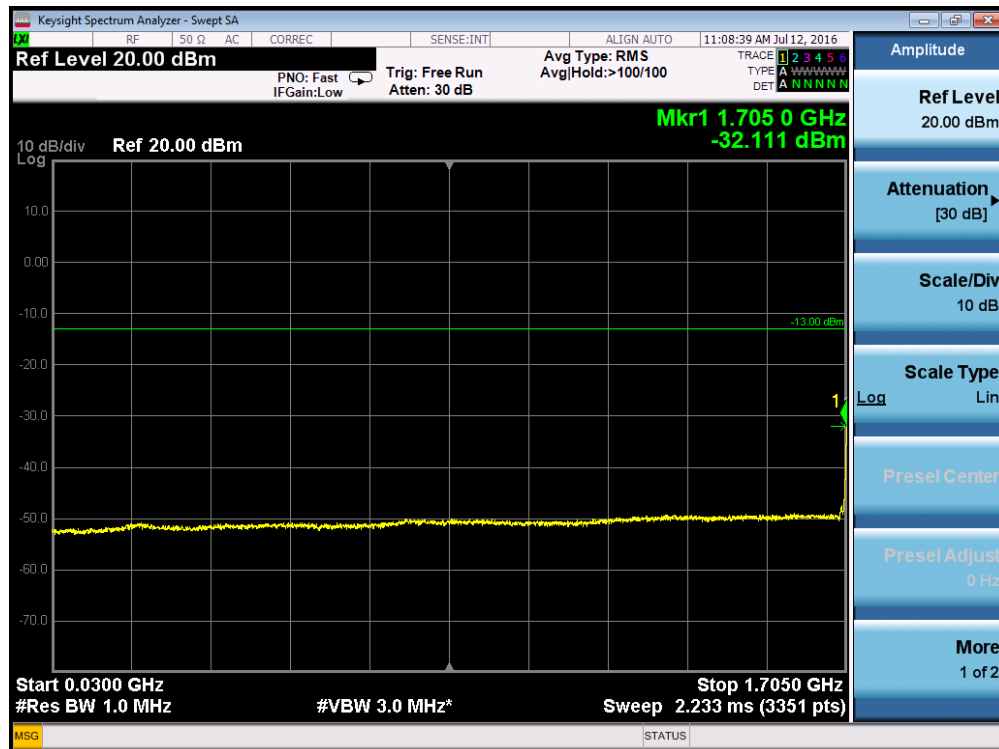


Plot 7-53. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 41 of 104

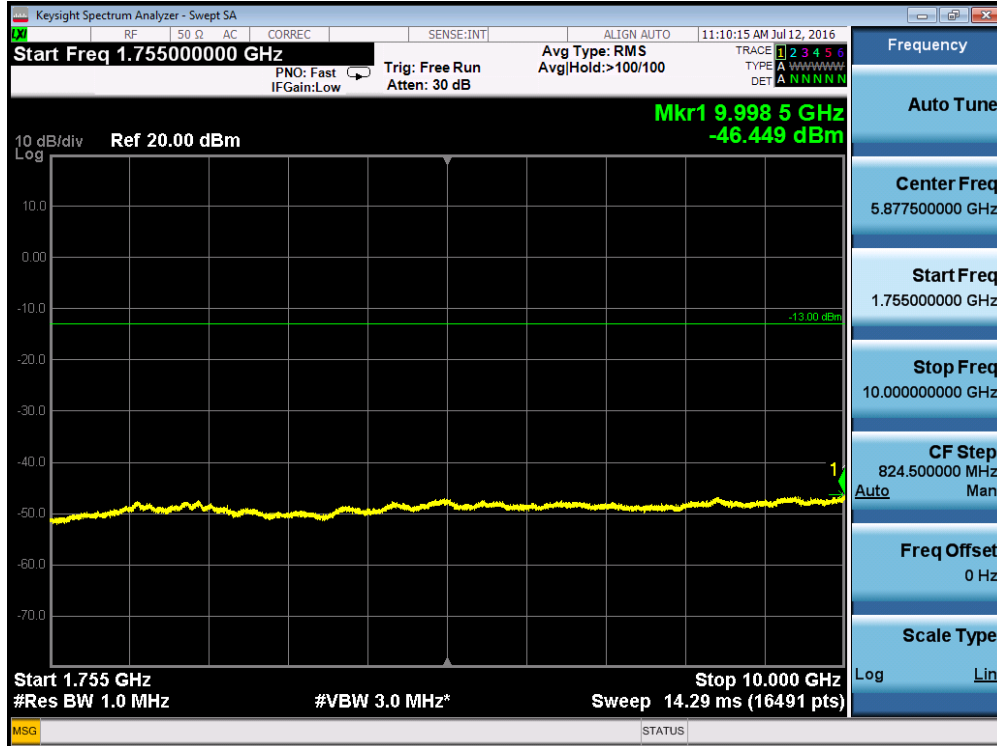


Plot 7-54. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)

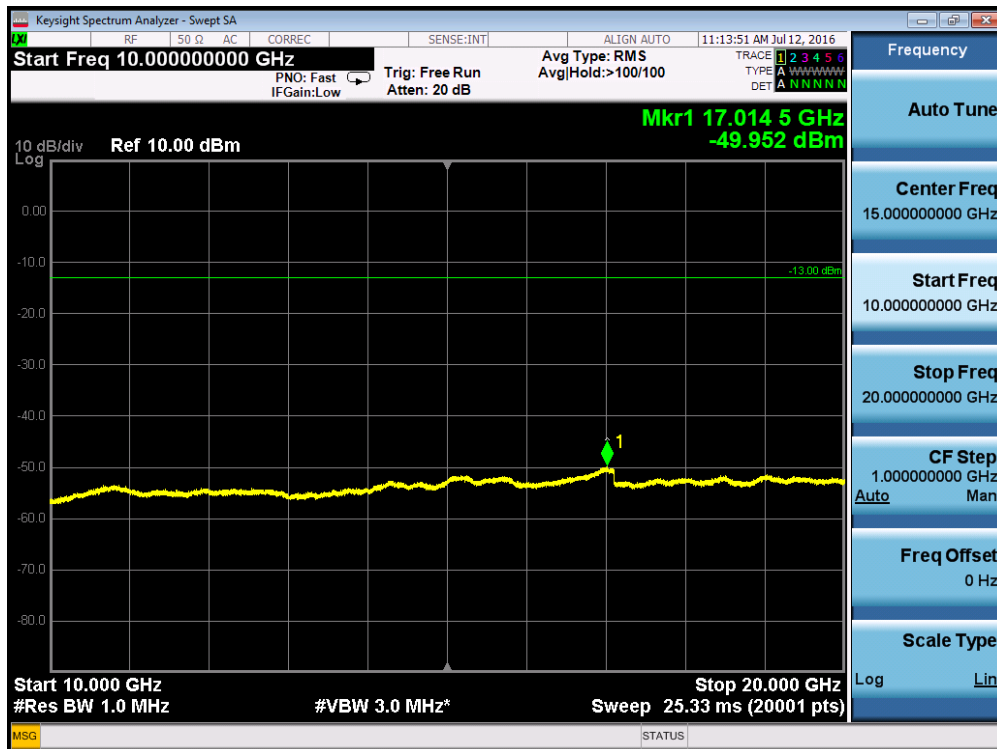


Plot 7-55. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1312)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 42 of 104

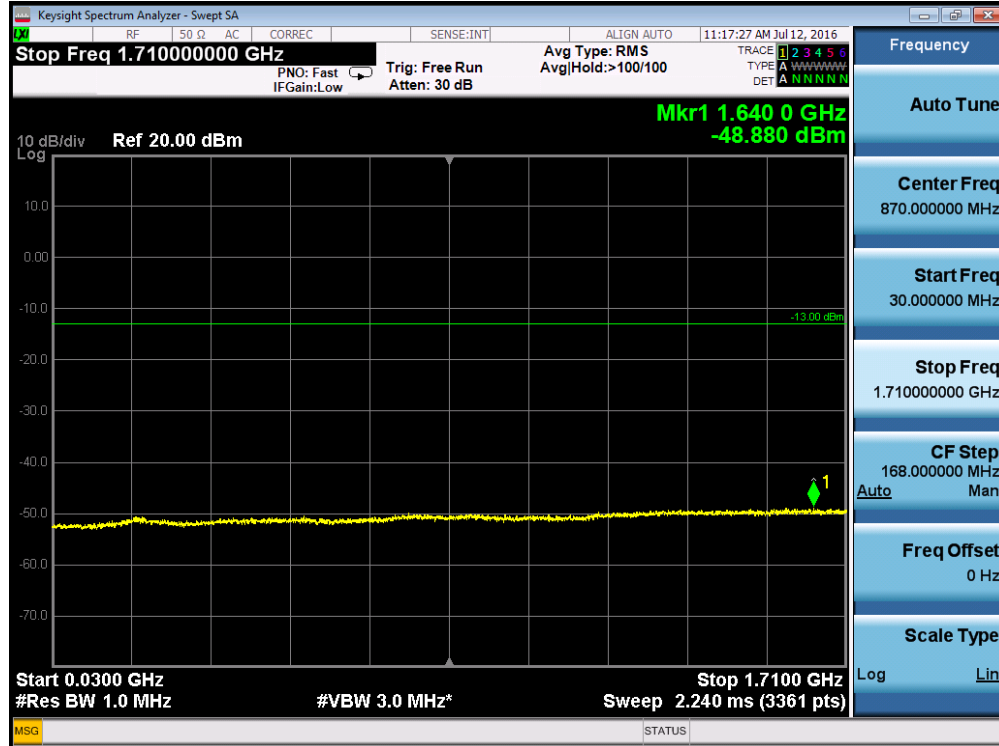


Plot 7-56. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1312)

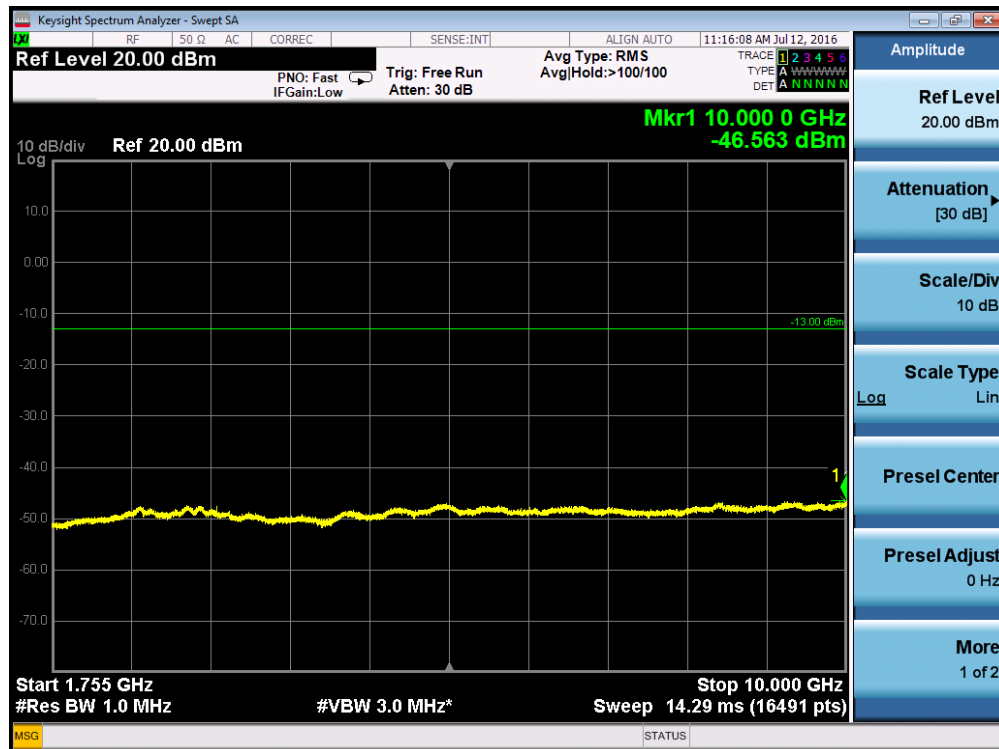


Plot 7-57. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1312)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 43 of 104

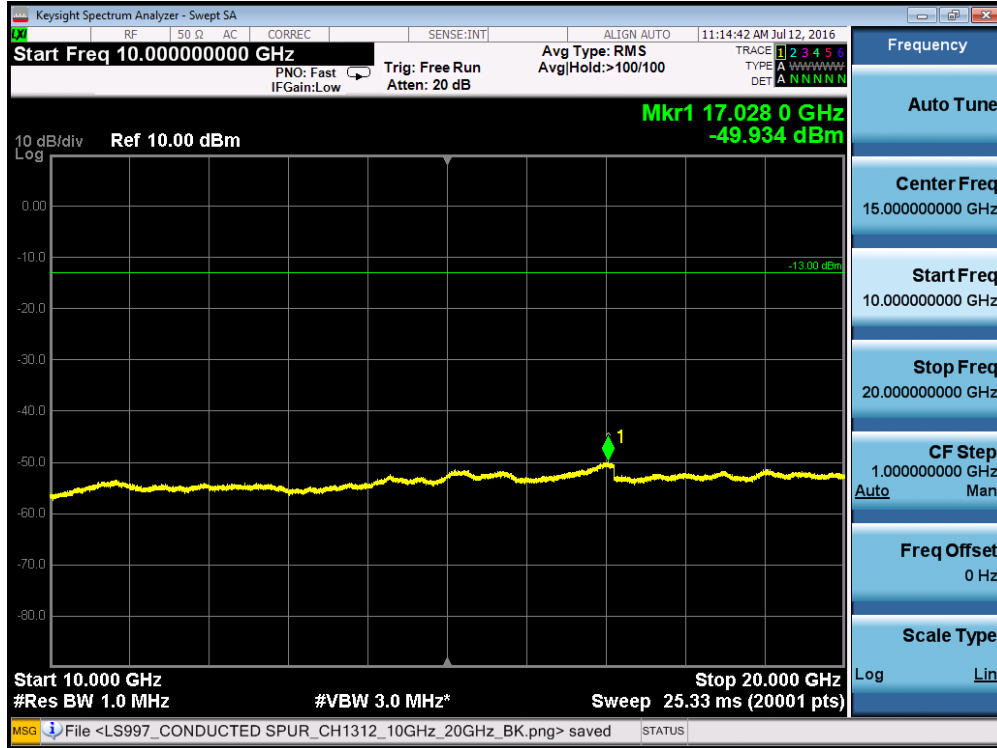


Plot 7-58. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1413)

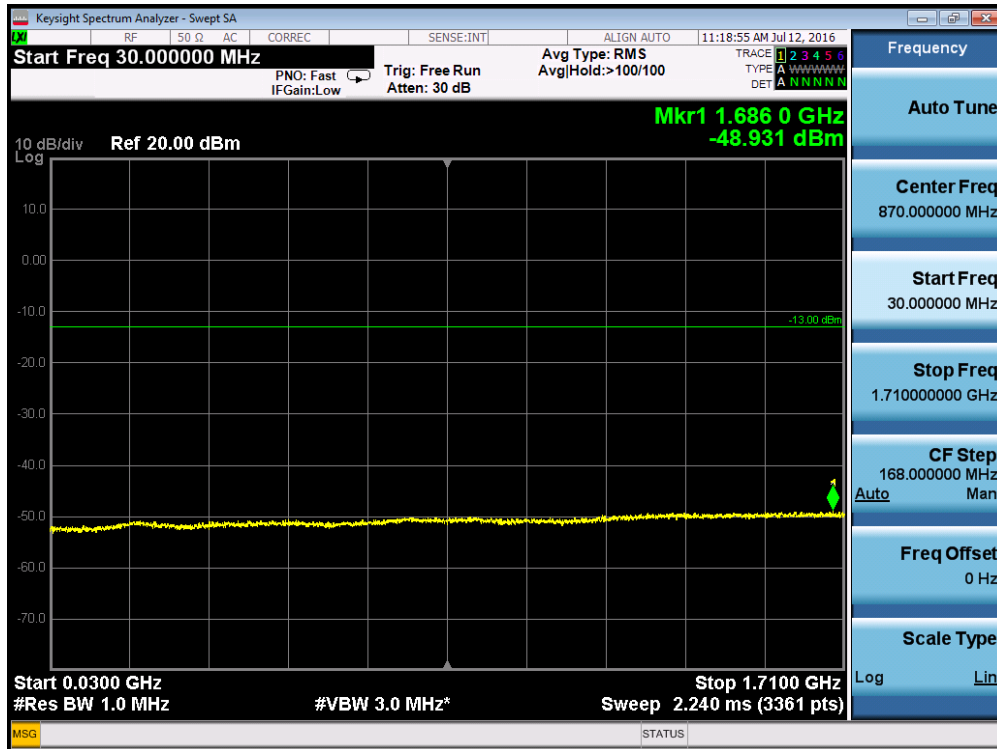


Plot 7-59. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1413)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 44 of 104

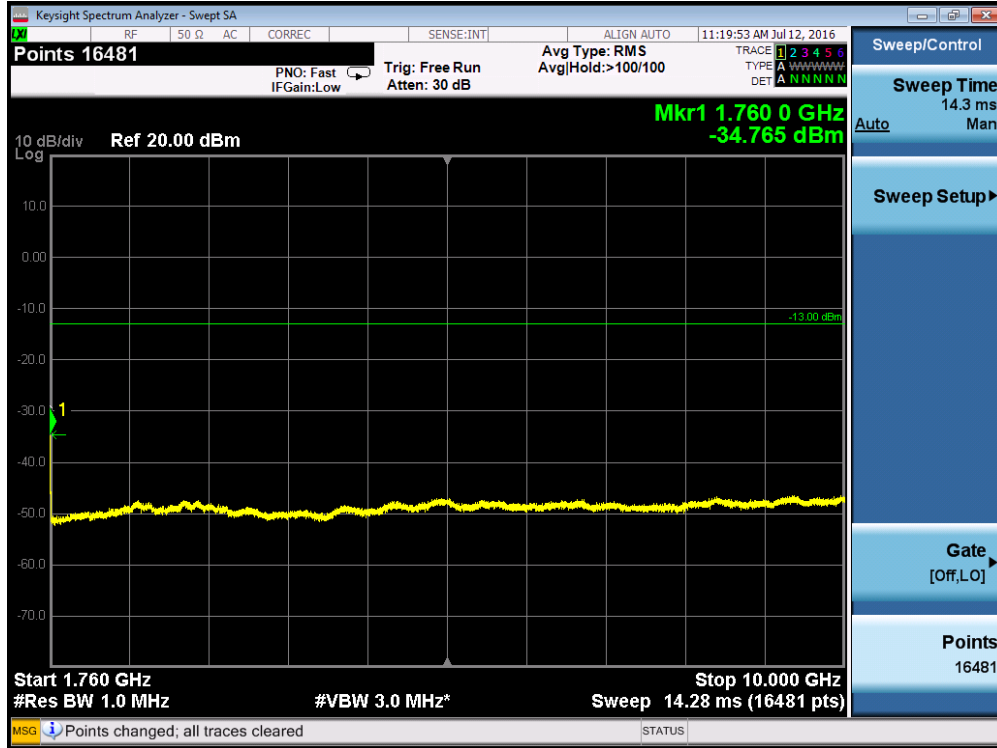


Plot 7-60. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1413)

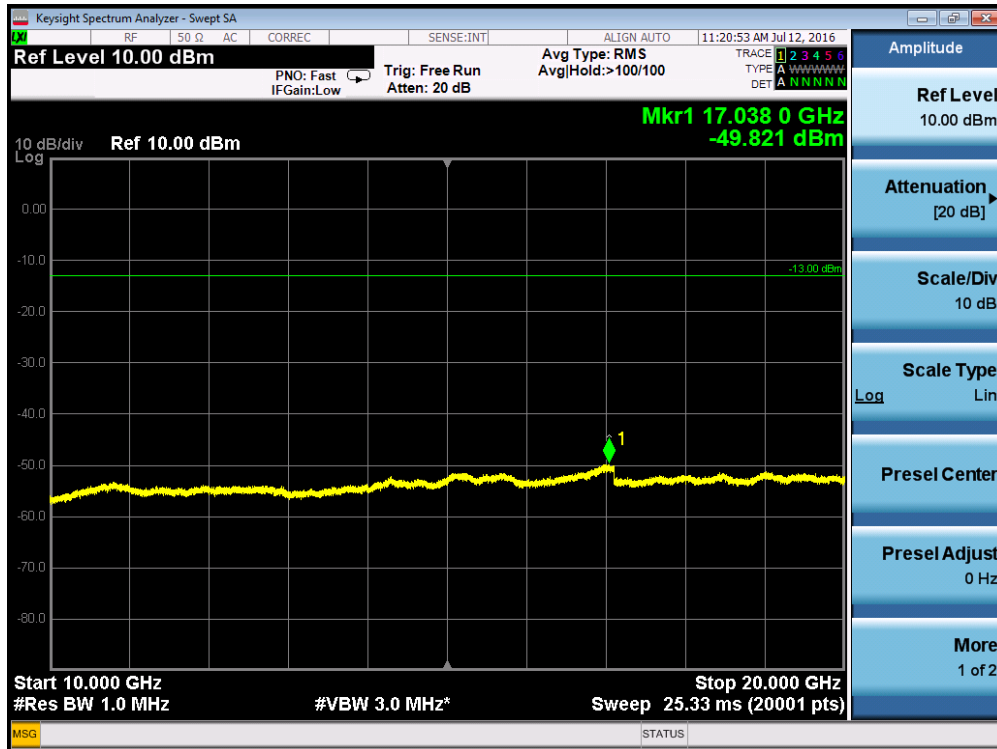


Plot 7-61. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1513)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 45 of 104

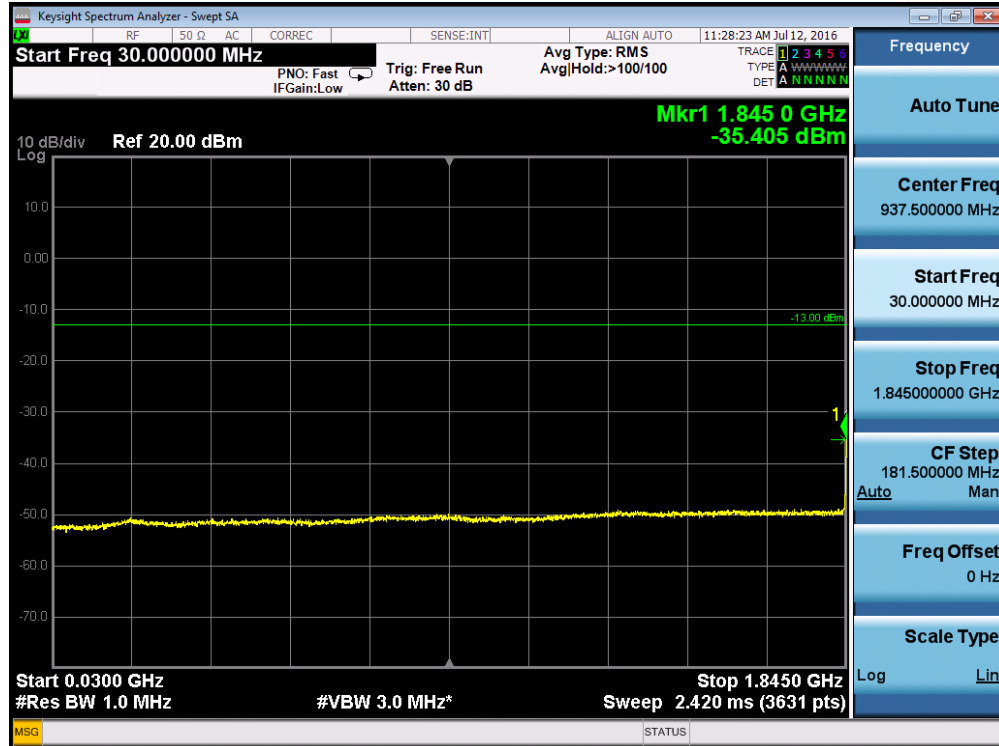


Plot 7-62. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1513)

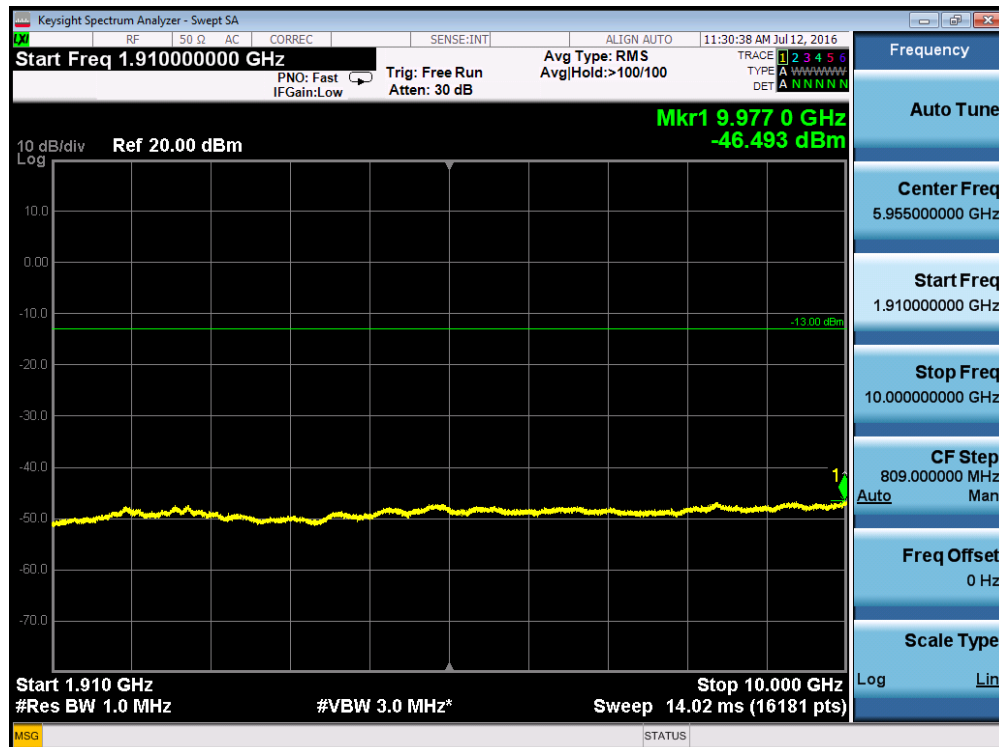


Plot 7-63. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1513)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 46 of 104

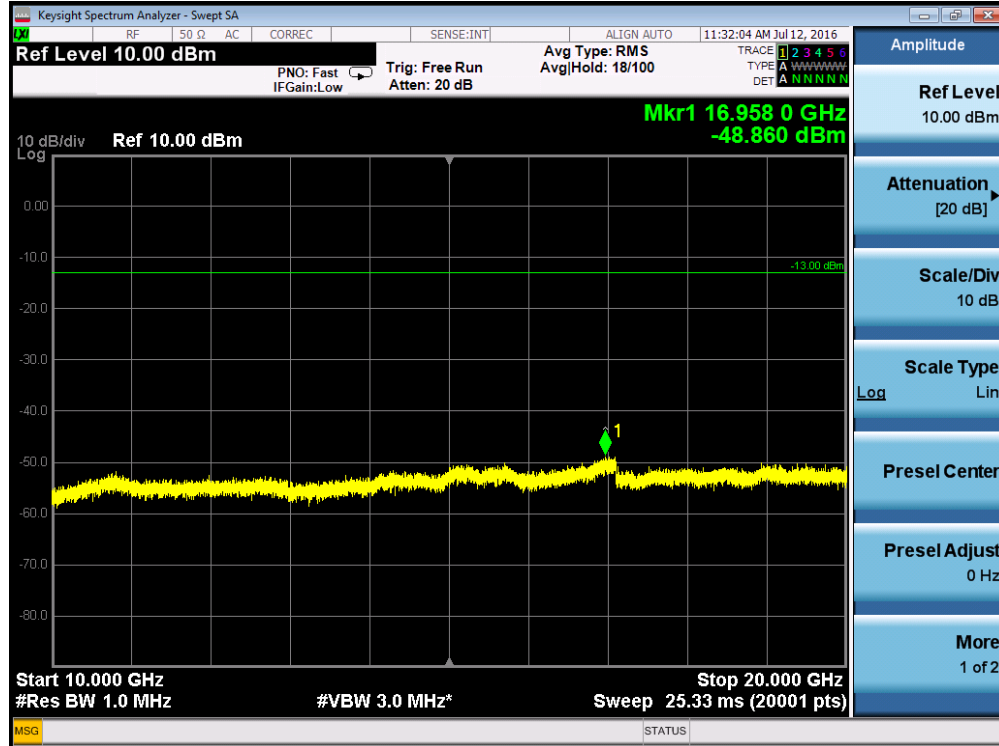


Plot 7-64. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9262)

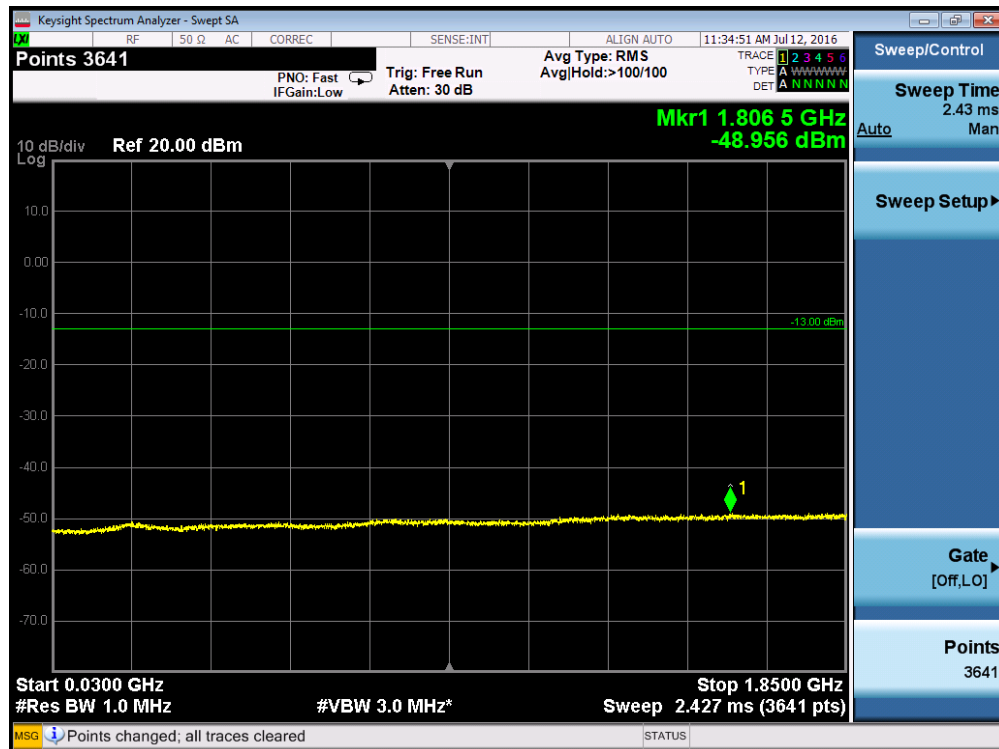


Plot 7-65. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9262)

FCC ID: ZNFLS997	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: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 47 of 104

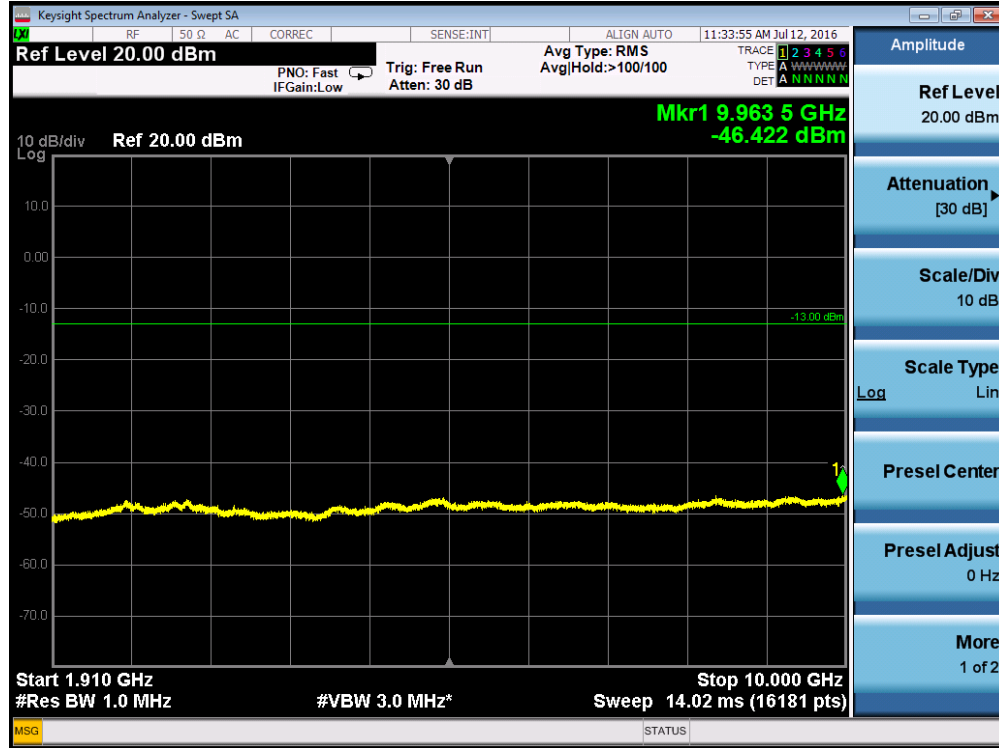


Plot 7-66. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9262)

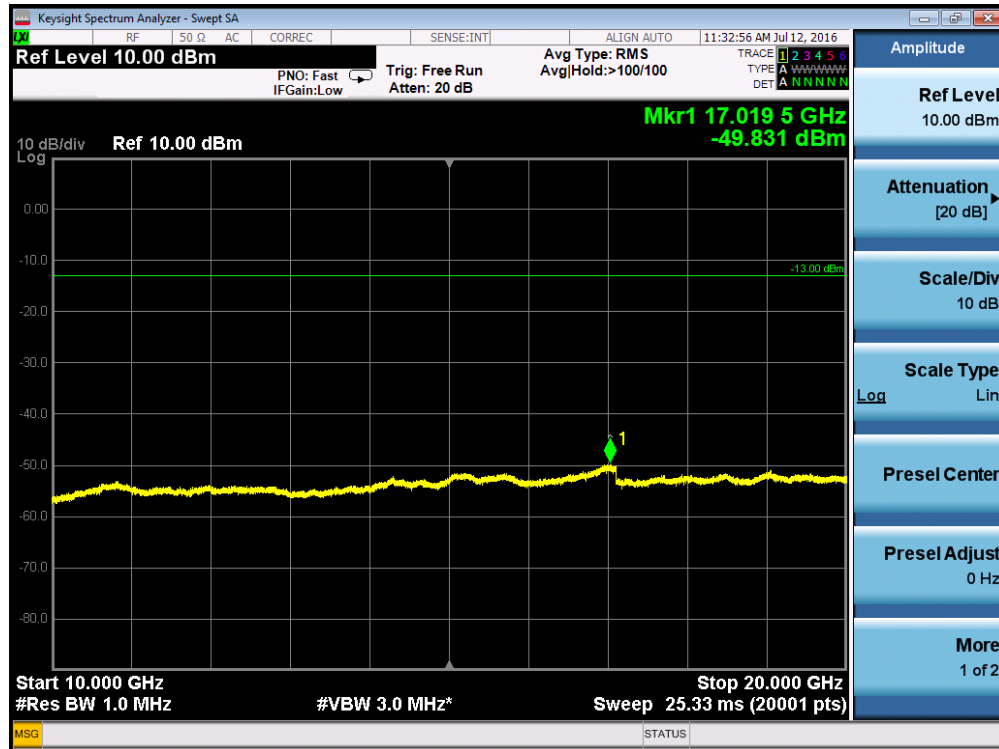


Plot 7-67. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 48 of 104

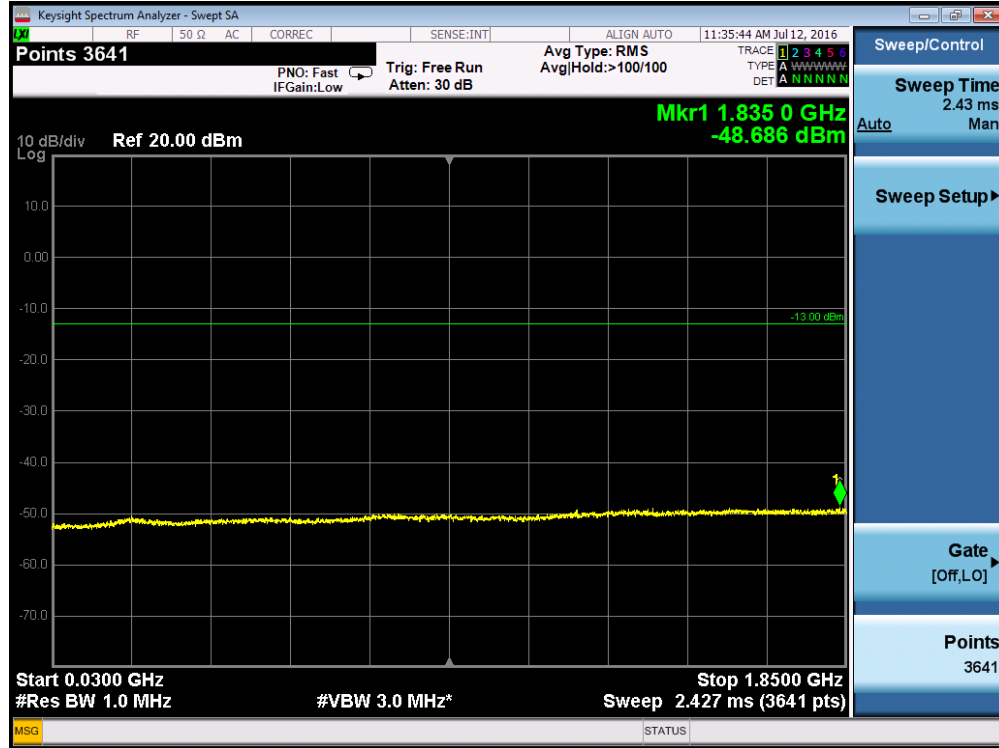


Plot 7-68. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9400)

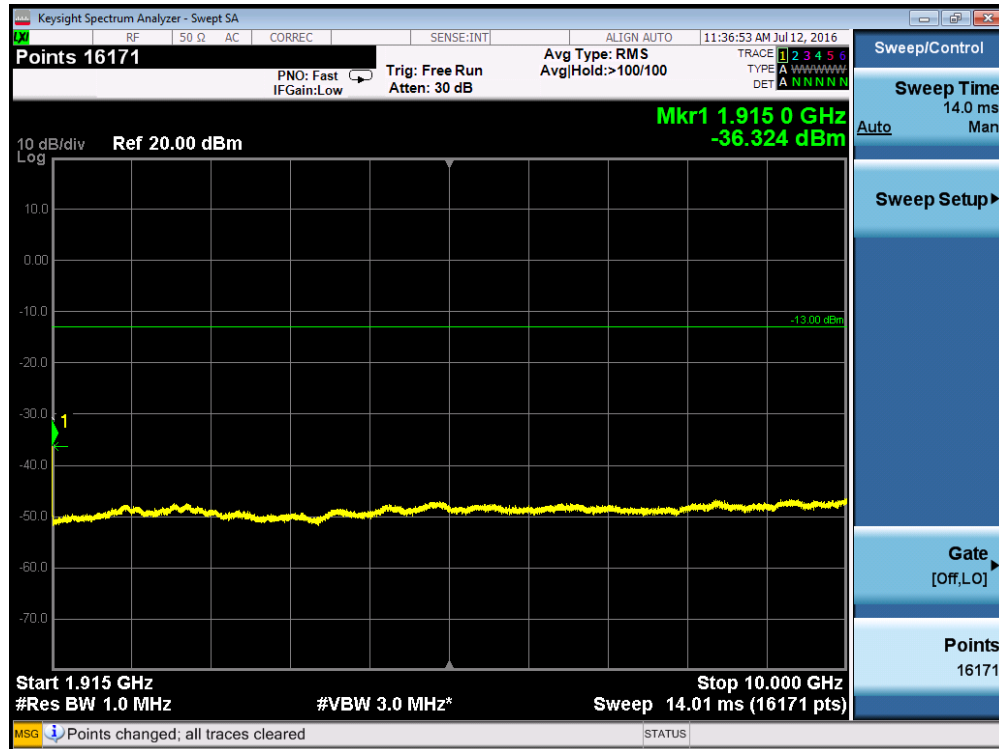


Plot 7-69. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFLS997	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: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 49 of 104

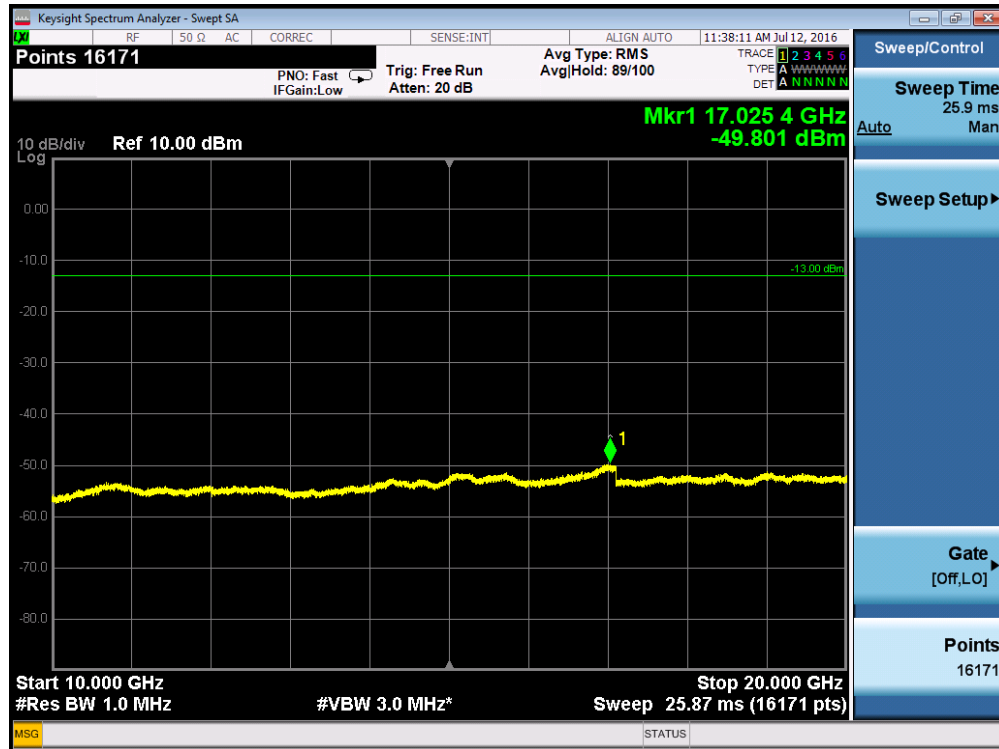


Plot 7-70. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9538)



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

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 50 of 104



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

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 51 of 104

7.4 Band Edge Emissions at Antenna Terminal

\$2.1051 \$22.917(a) \$24.238(a) \$27.53(h)

Test Overview

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 $43 + \log_{10}(P_{\text{Watts}})$, where P is the transmitter power in Watts.

Test Procedure Used

KDB 971168 D01 v02r02 – Section 6.0

Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW $\geq 1\%$ of the emission bandwidth
4. VBW $\geq 3 \times$ RBW
5. Detector = RMS
6. Number of sweep points $\geq 2 \times$ Span/RBW
7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Setup

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

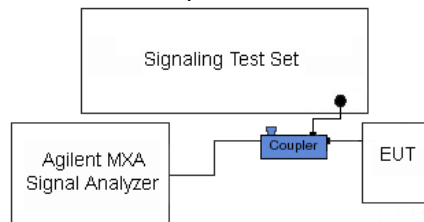
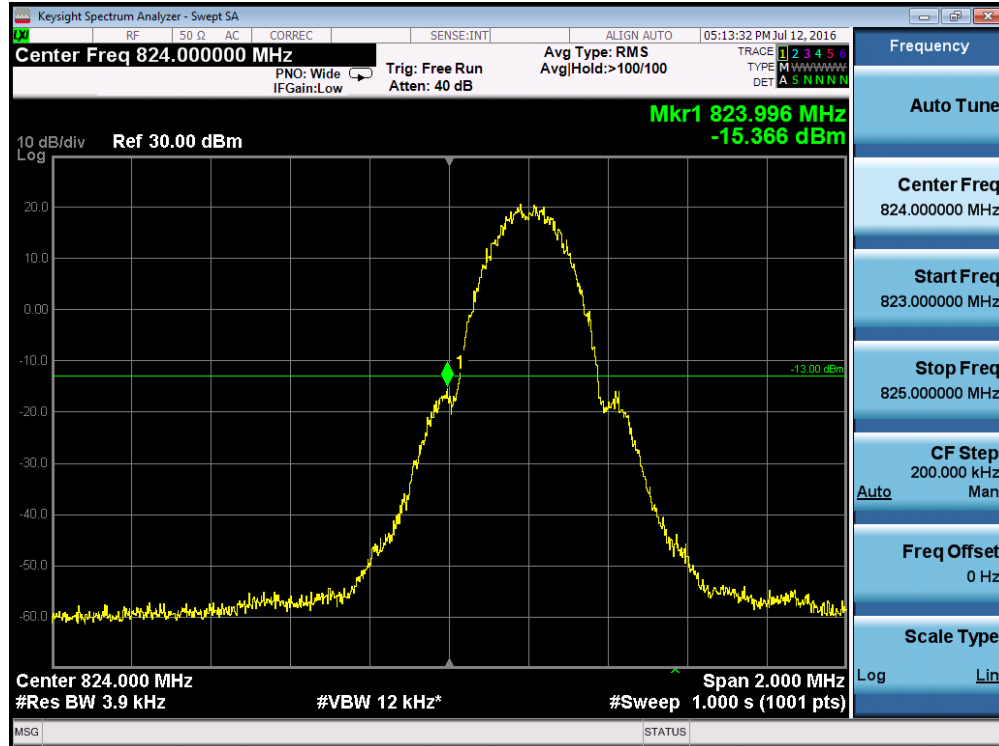


Figure 7-3. Test Instrument & Measurement Setup

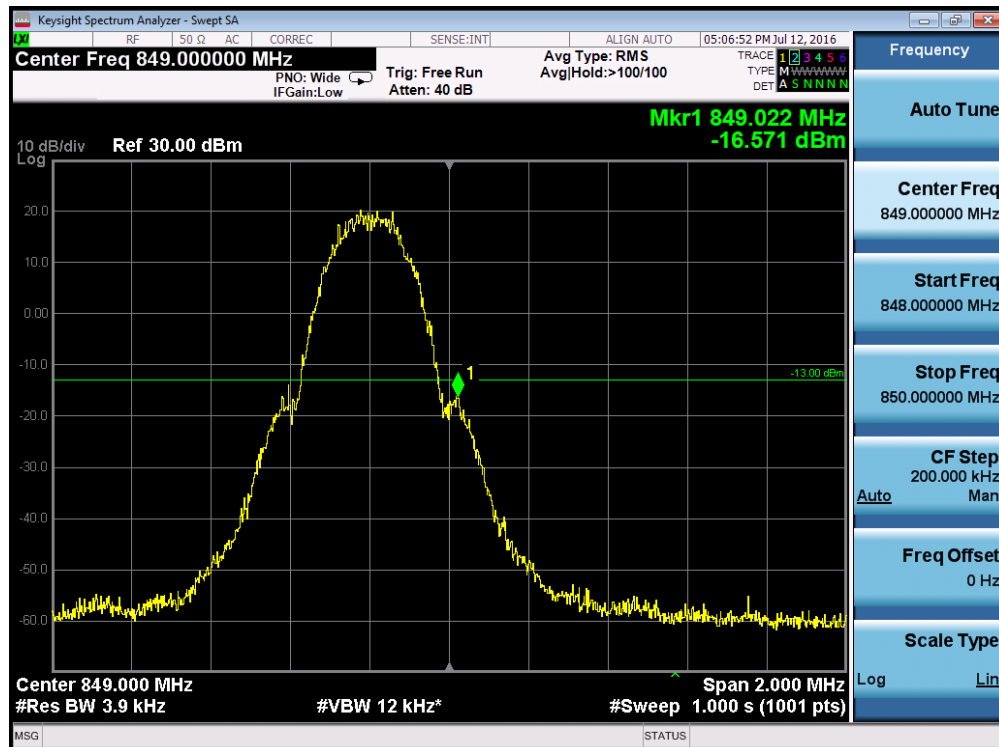
Test Notes

Per 22.917(b), 24.238(b), 27.53(h)(3), 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 to demonstrate compliance with the out-of-band emissions limit. 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.

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 52 of 104

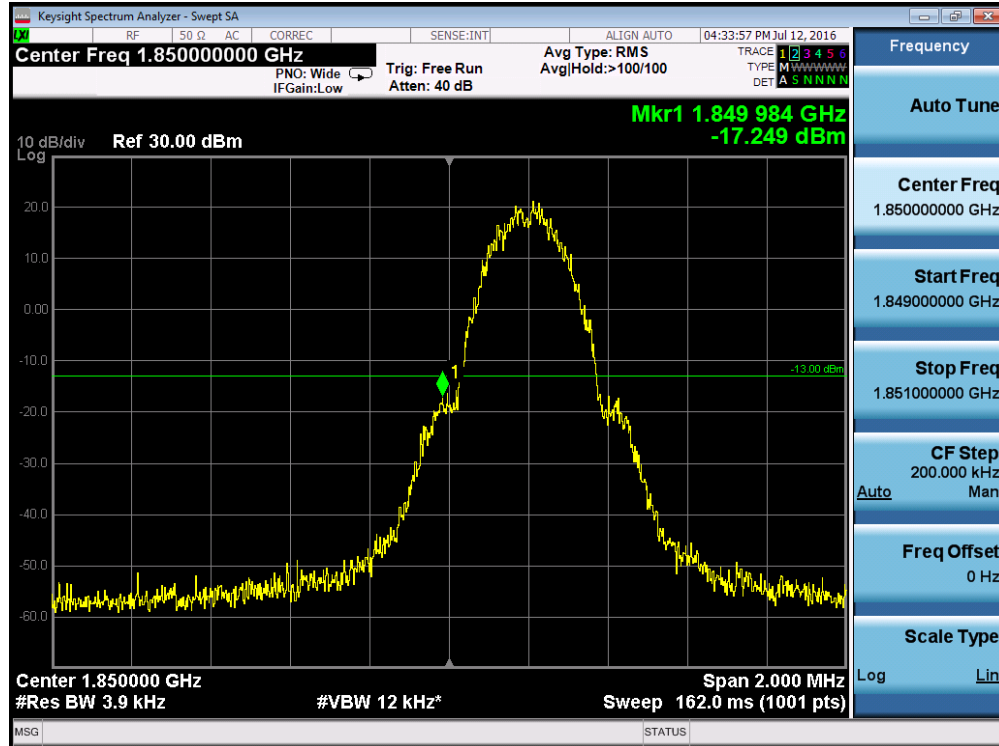


Plot 7-73. Band Edge Plot (Cellular GPRS Mode – Ch. 128)

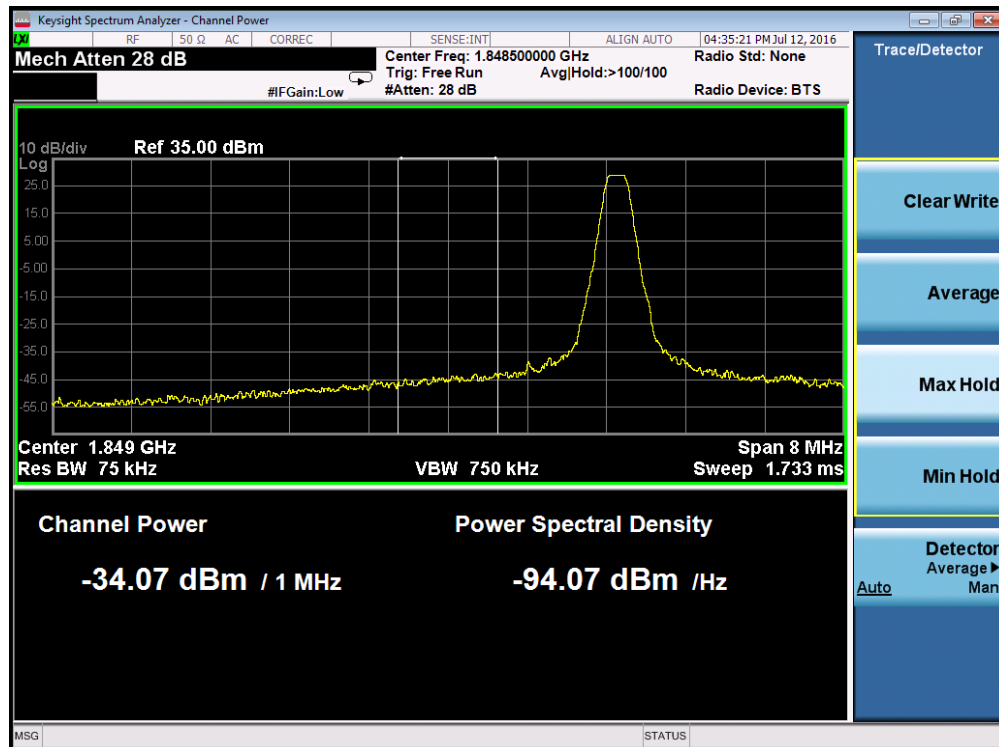


Plot 7-74. Band Edge Plot (Cellular GPRS Mode – Ch. 251)

FCC ID: ZNFS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 53 of 104

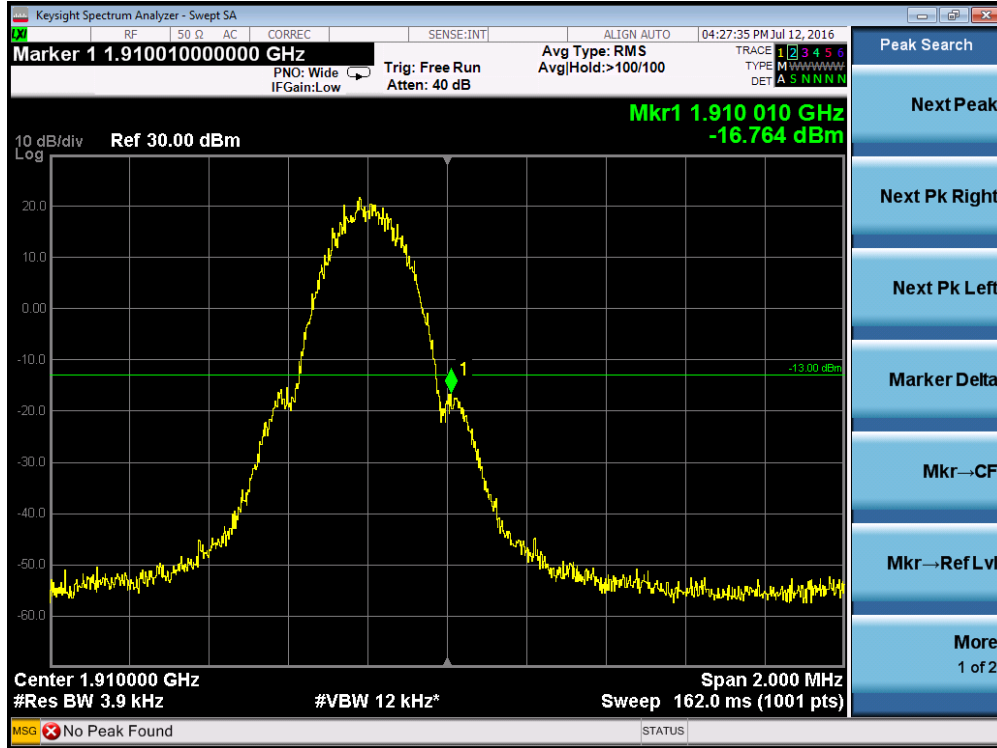


Plot 7-75. Band Edge Plot (PCS GPRS Mode – Ch. 512)

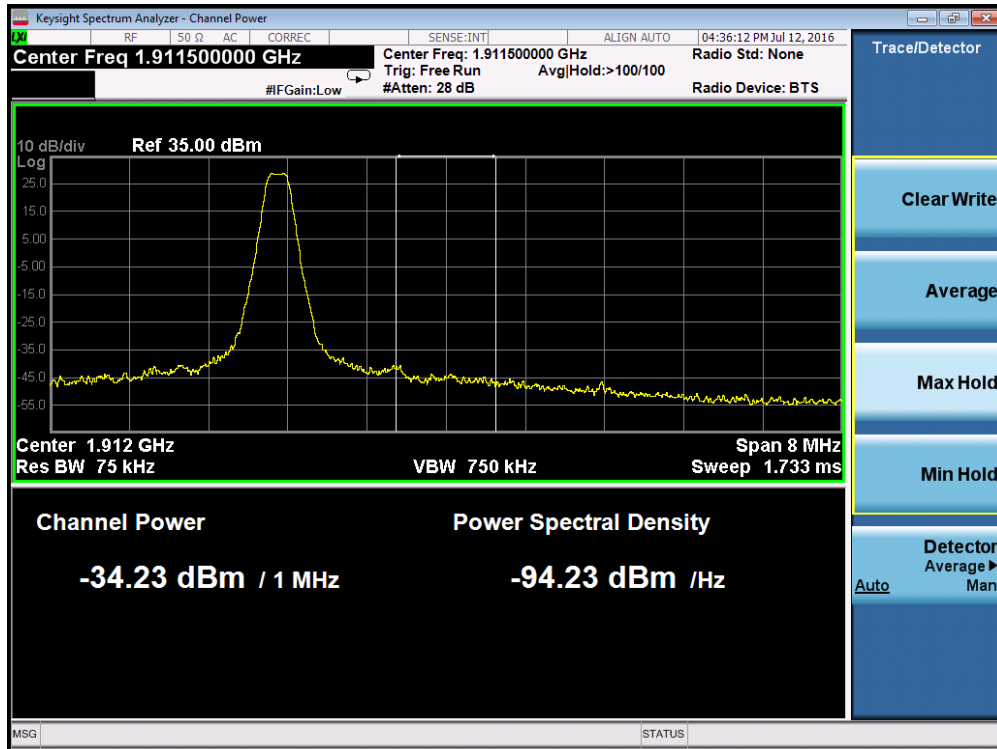


Plot 7-76. 4MHz Span Plot (PCS GPRS Mode – Ch. 512)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 54 of 104

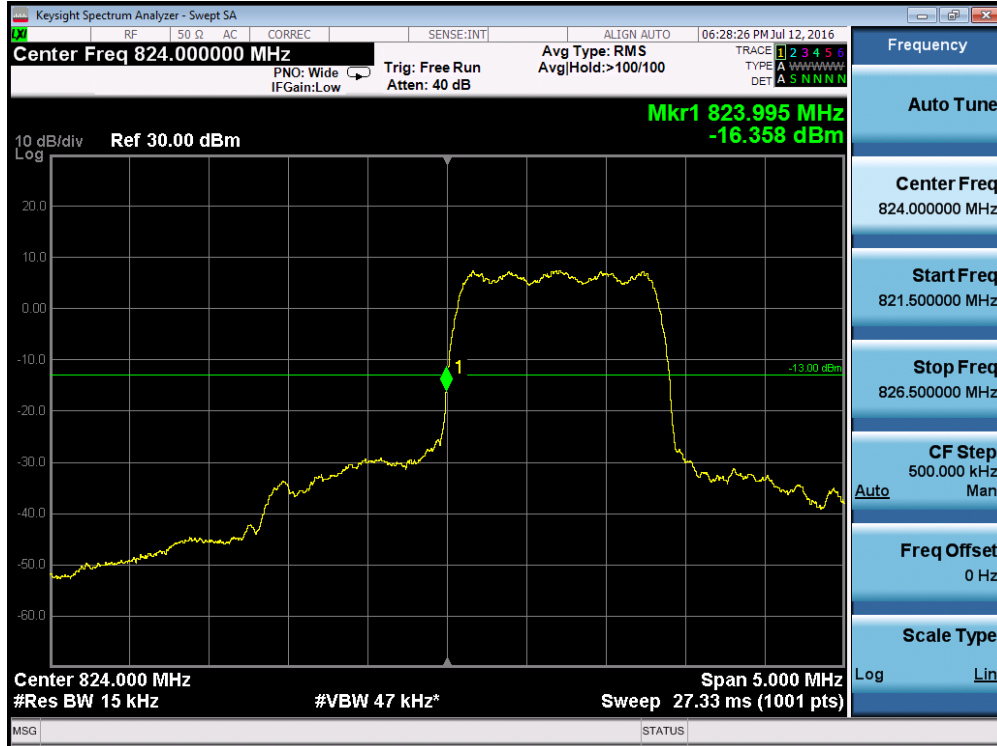


Plot 7-77. Band Edge Plot (PCS GPRS Mode – Ch. 810)

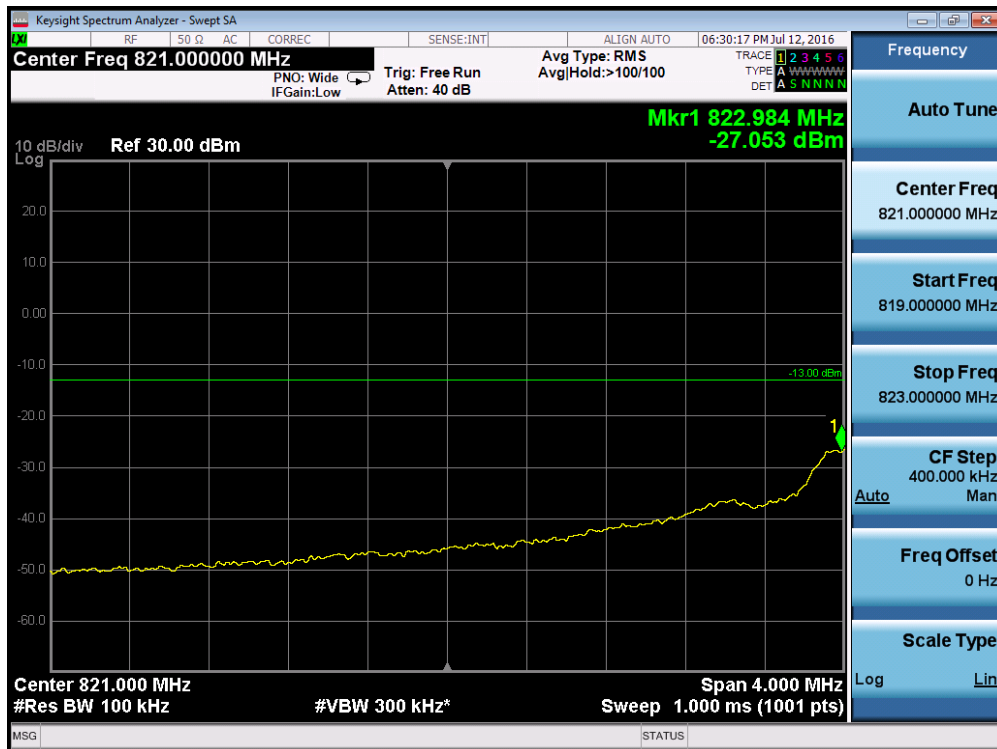


Plot 7-78. 4MHz Span Plot (PCS GPRS Mode – Ch. 810)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 55 of 104

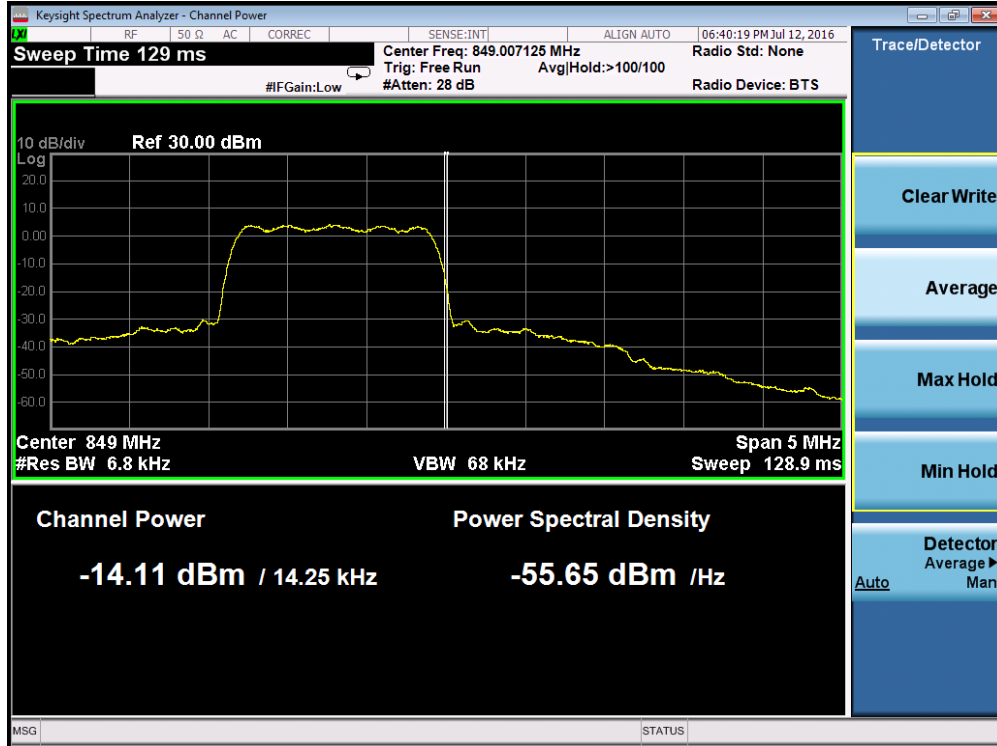


Plot 7-79. Band Edge Plot (Cellular CDMA Mode – Ch. 1013)



Plot 7-80. 4MHz Span Plot (Cellular CDMA Mode – Ch. 1013)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 56 of 104

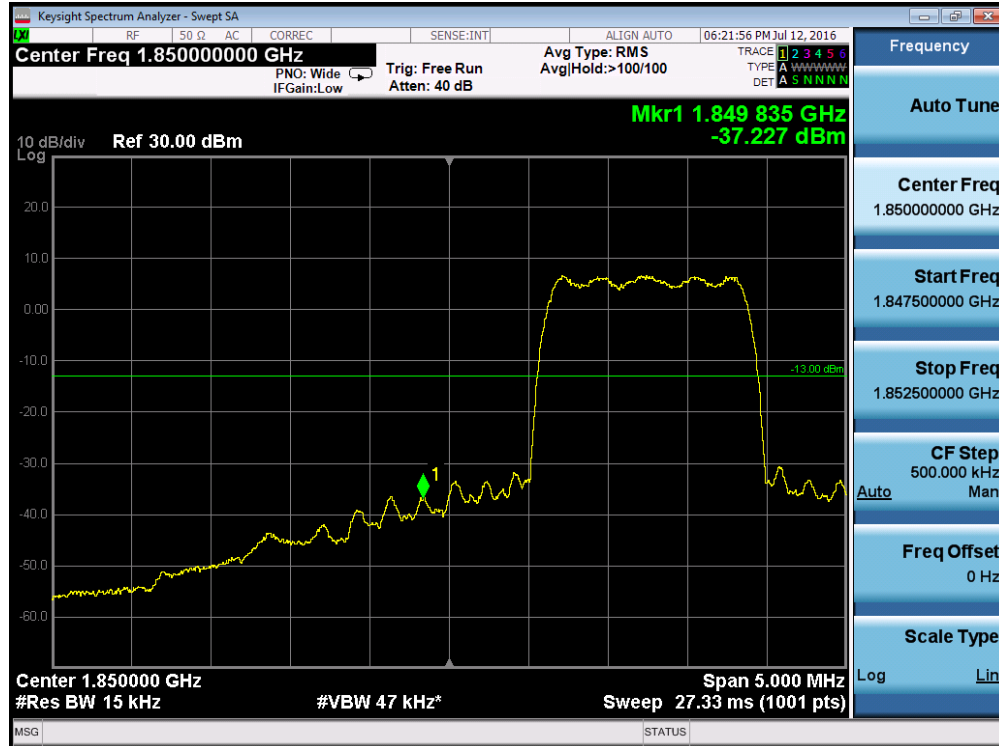


Plot 7-81. Band Edge Plot (Cellular CDMA Mode – Ch. 777)

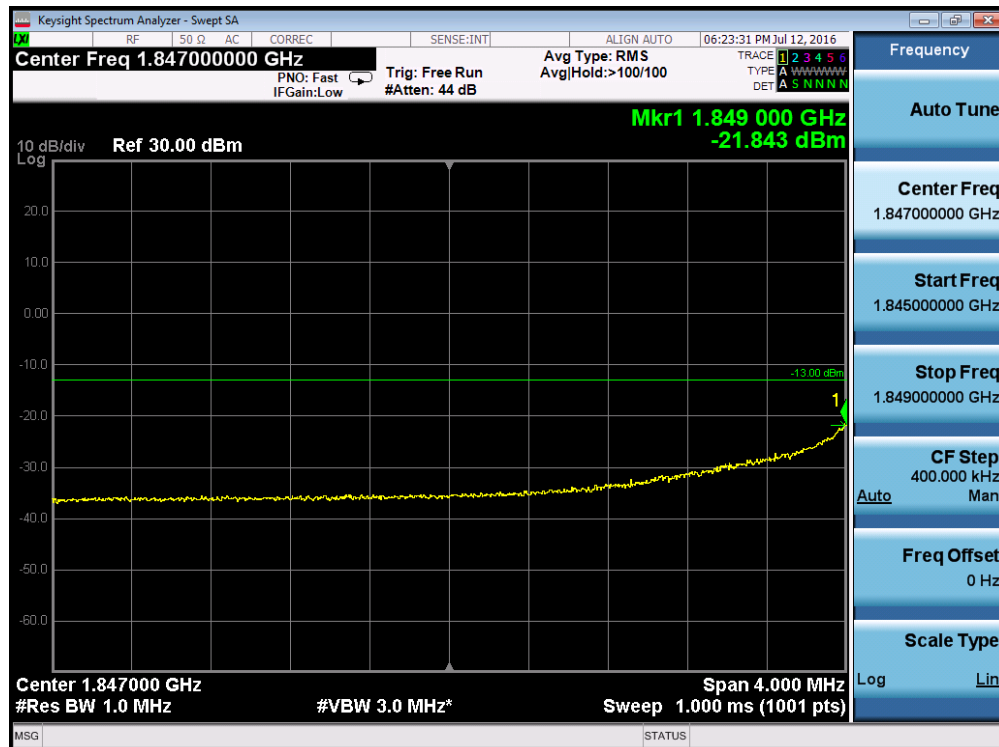


Plot 7-82. 4MHz Span Plot (Cellular CDMA Mode – Ch. 777)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 57 of 104



Plot 7-83. Band Edge Plot (PCS CDMA Mode – Ch. 25)

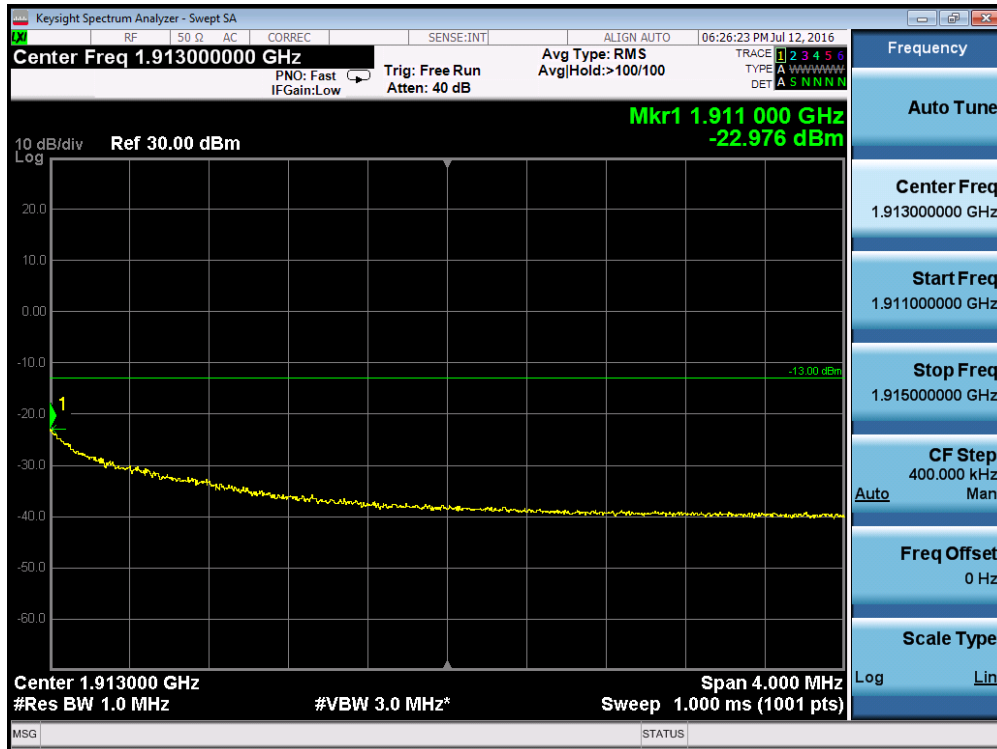


Plot 7-84. 4MHz Span Plot (PCS CDMA Mode – Ch. 25)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 58 of 104

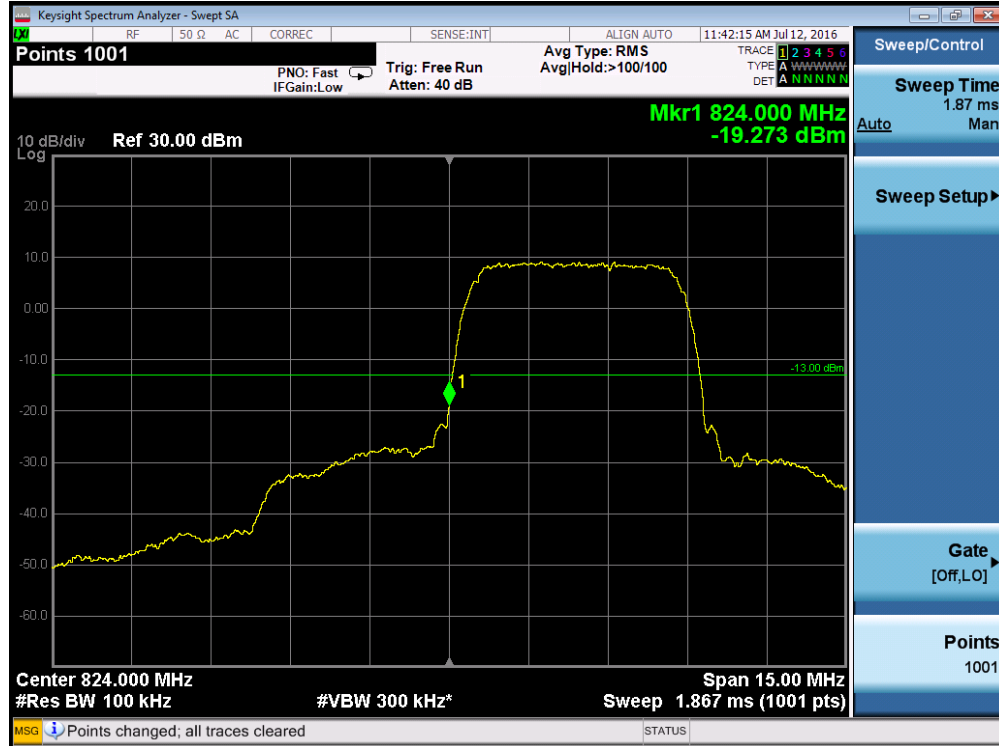


Plot 7-85. Band Edge Plot (PCS CDMA Mode – Ch. 1175)

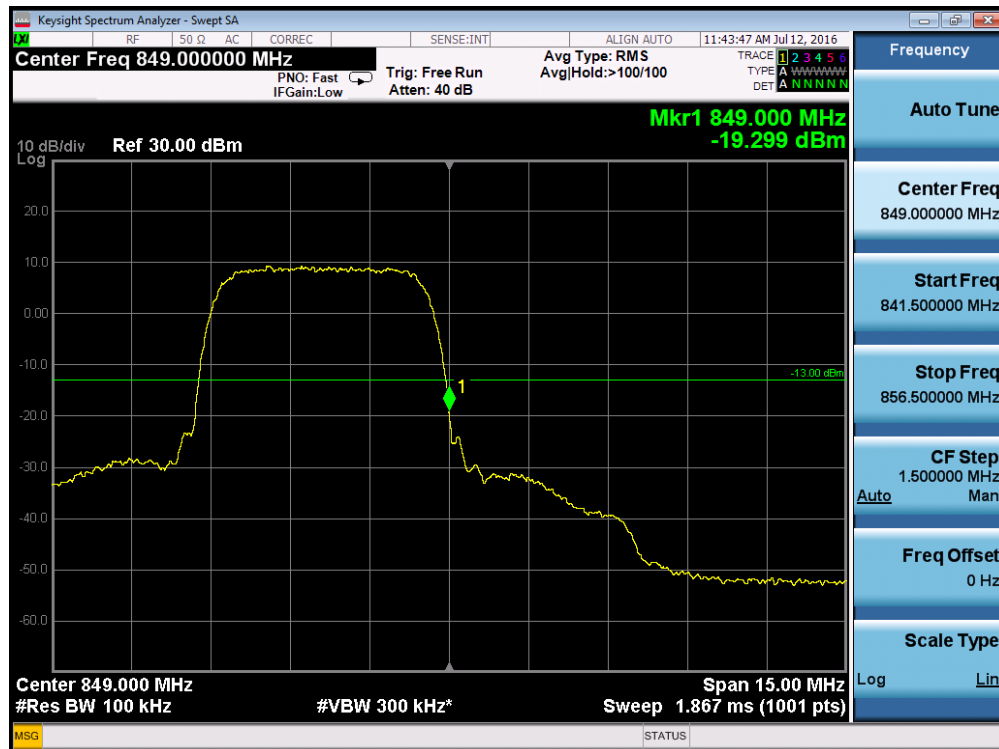


Plot 7-86. 4MHz Span Plot (PCS CDMA Mode – Ch. 1175)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 59 of 104

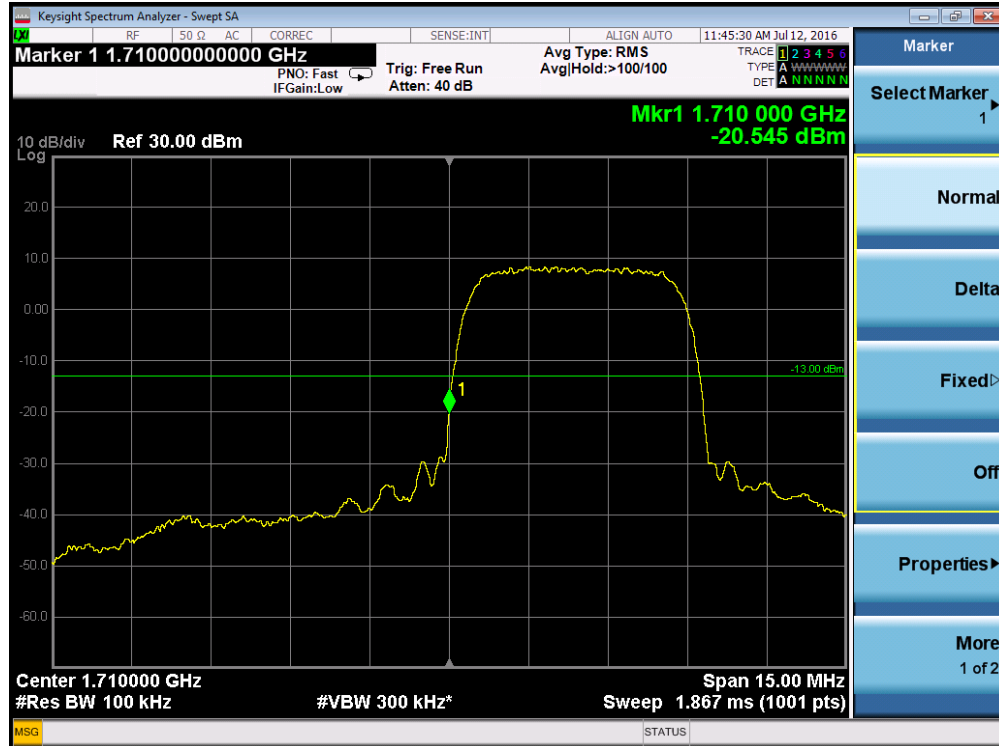


Plot 7-87. Band Edge Plot (Cellular WCDMA Mode – Ch. 4132)

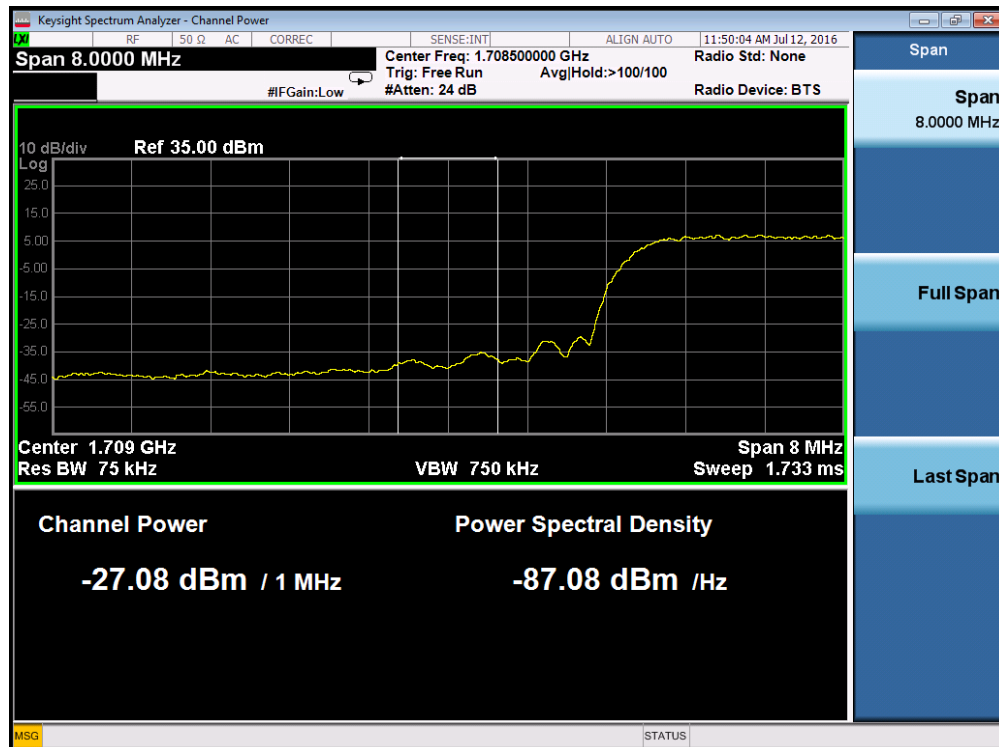


Plot 7-88. Band Edge Plot (Cellular WCDMA Mode – Ch. 4233)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 60 of 104

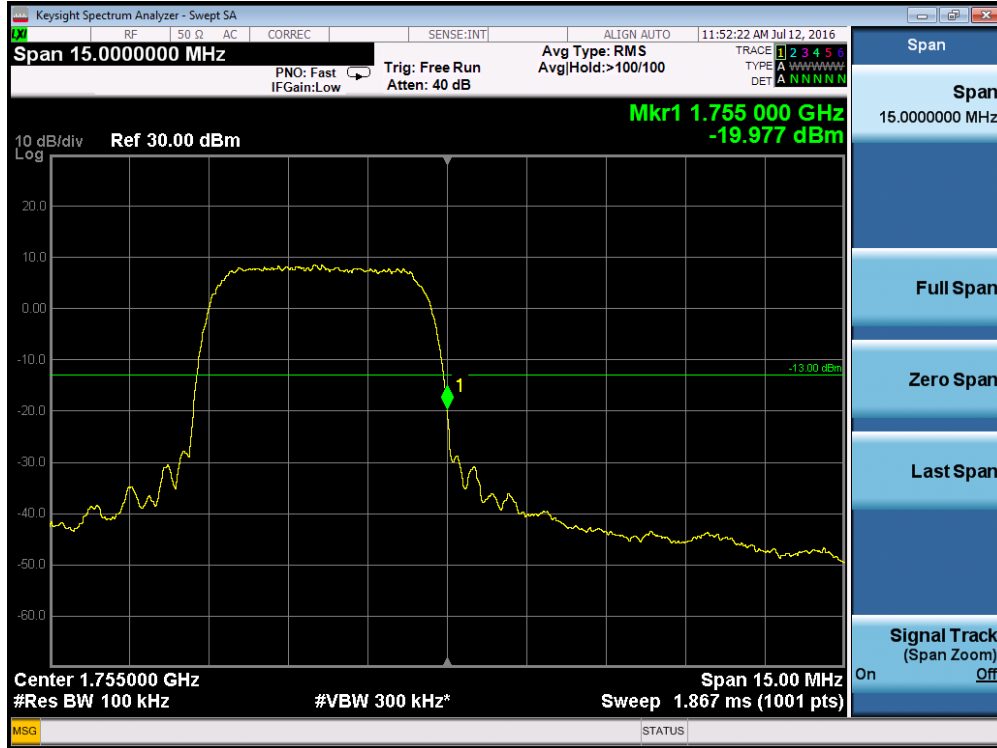


Plot 7-89. Band Edge Plot (AWS WCDMA Mode – Ch. 1312)

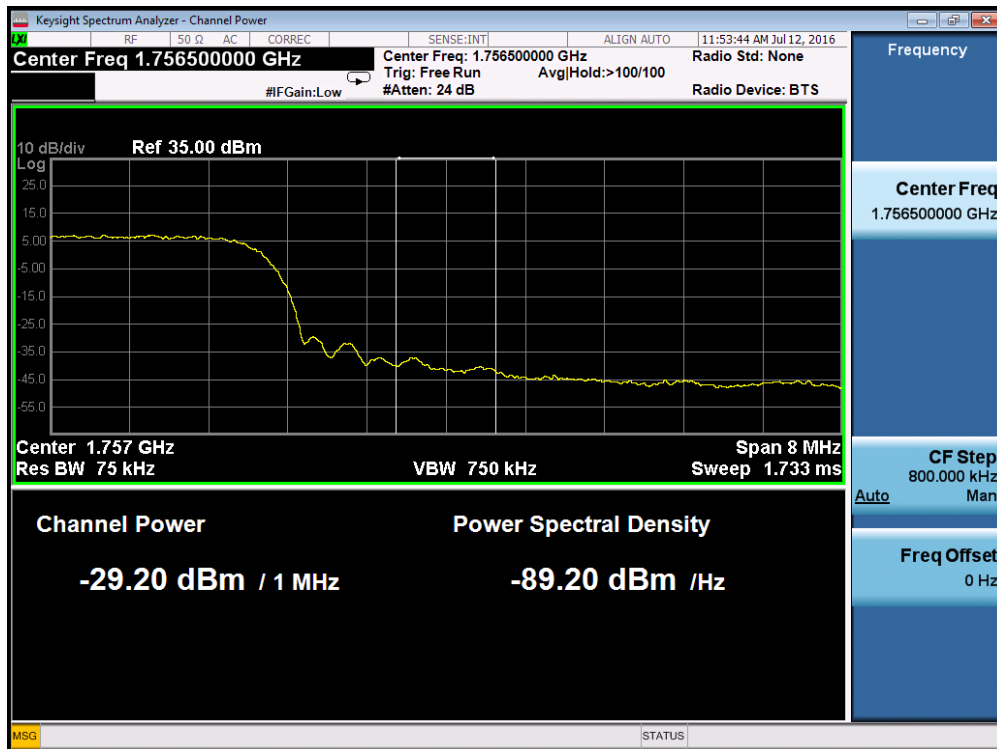


Plot 7-90. 4MHz Span Plot (AWS WCDMA Mode – Ch. 1312)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 61 of 104

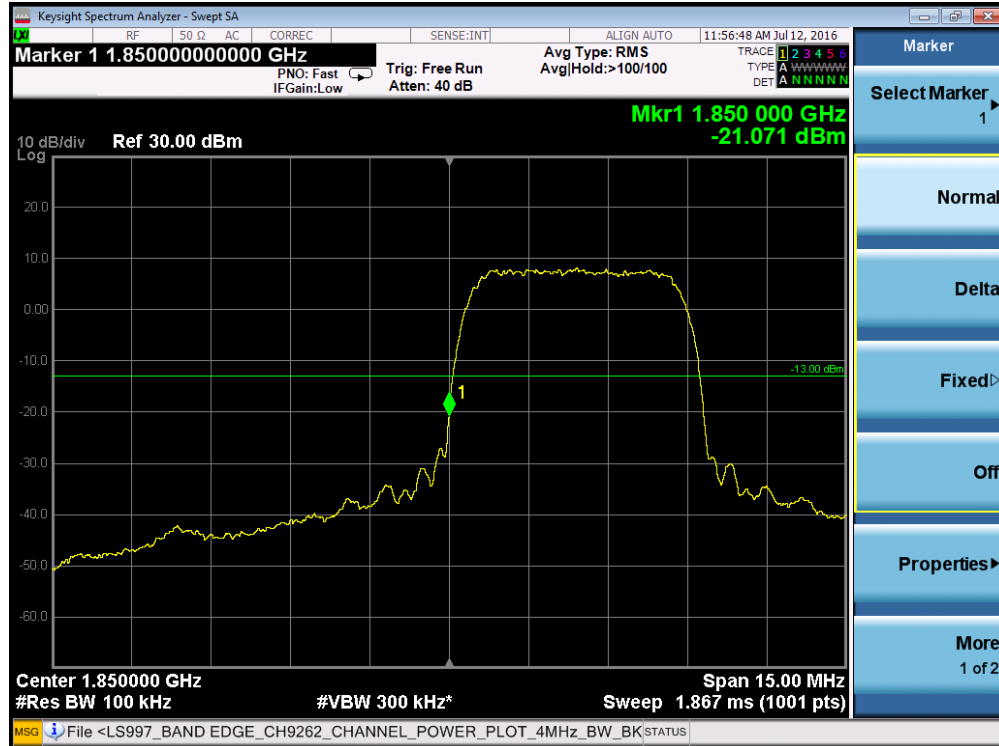


Plot 7-91. Band Edge Plot (AWS WCDMA Mode – Ch. 1513)

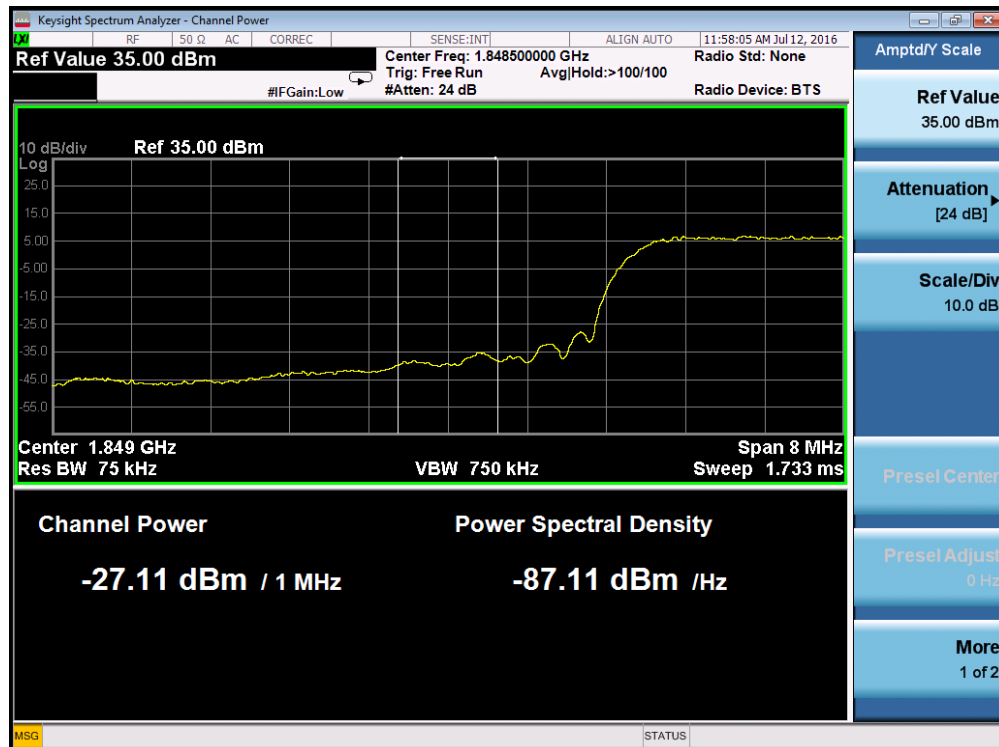


Plot 7-92. 4MHz Span Plot (AWS WCDMA Mode – Ch. 1513)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 62 of 104



Plot 7-93. Band Edge Plot (PCS WCDMA Mode – Ch. 9262)



Plot 7-94. 4MHz Span Plot (PCS WCDMA Mode – Ch. 9262)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 63 of 104



Plot 7-95. Band Edge Plot (PCS WCDMA Mode – Ch. 9538)



Plot 7-96. 4MHz Span Plot (PCS WCDMA Mode – Ch. 9538)

FCC ID: ZNFS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 64 of 104

7.5 Peak-Average Ratio

§24.232(d)

Test Overview

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.

Test Procedure Used

KDB 971168 D01 v02r02 – Section 5.7.1

Test Settings

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, 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

Test Setup

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

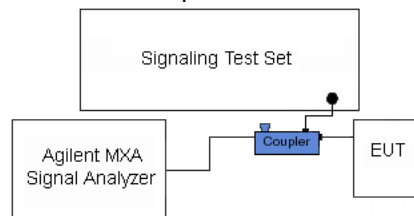
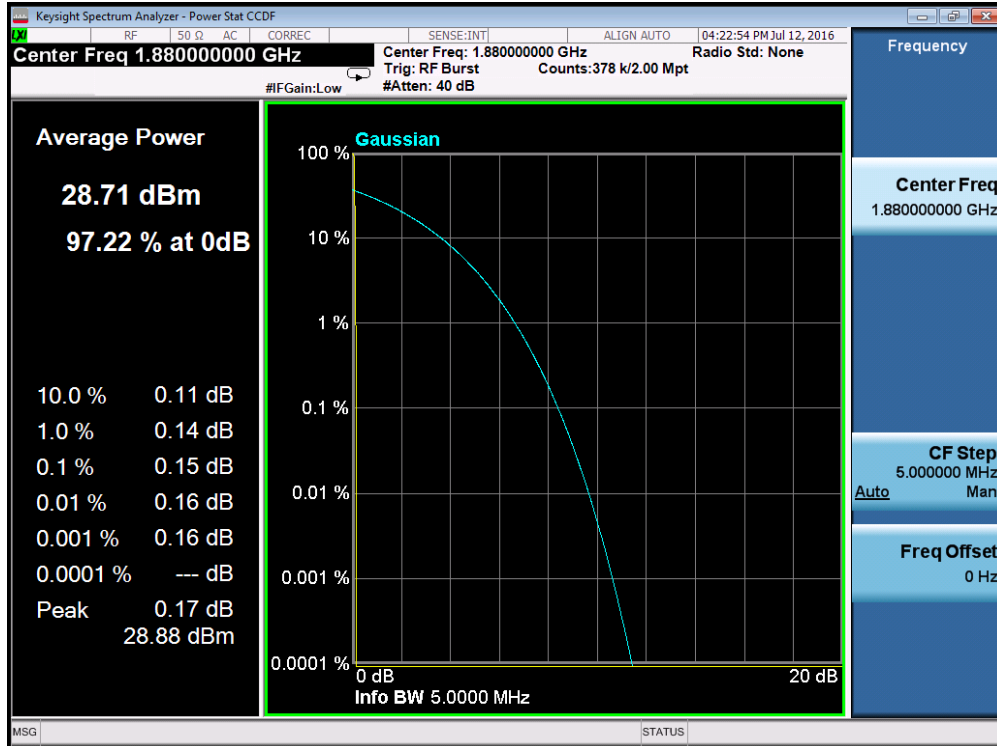


Figure 7-4. Test Instrument & Measurement Setup

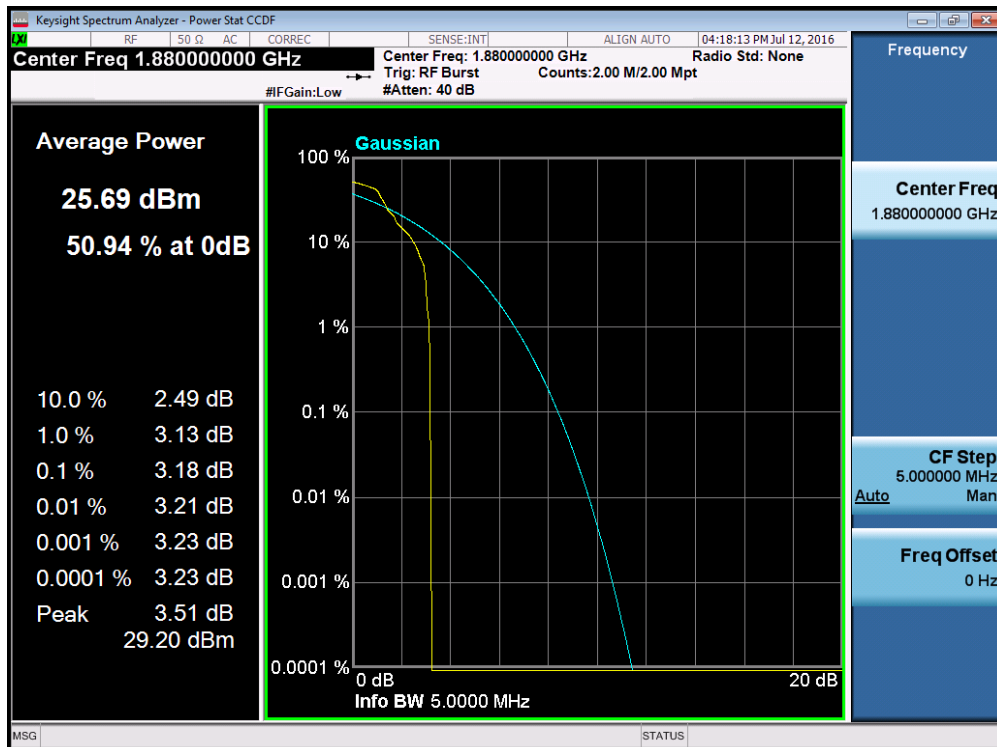
Test Notes

None

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 65 of 104

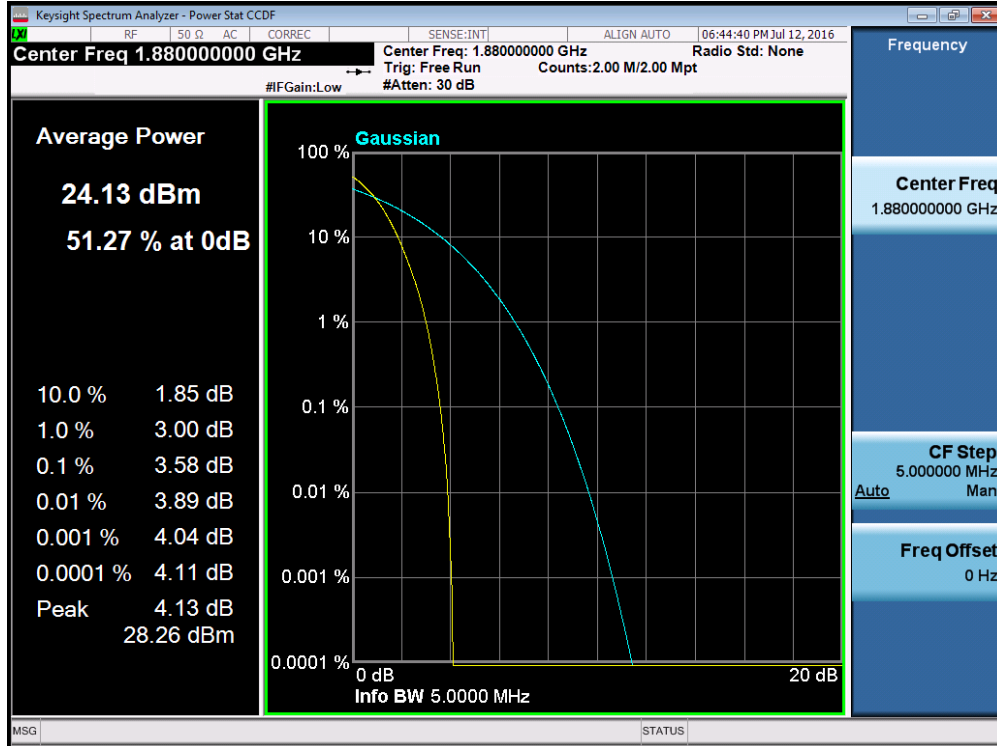


Plot 7-97. Peak-Average Ratio Plot (PCS GPRS Mode – Ch. 661)

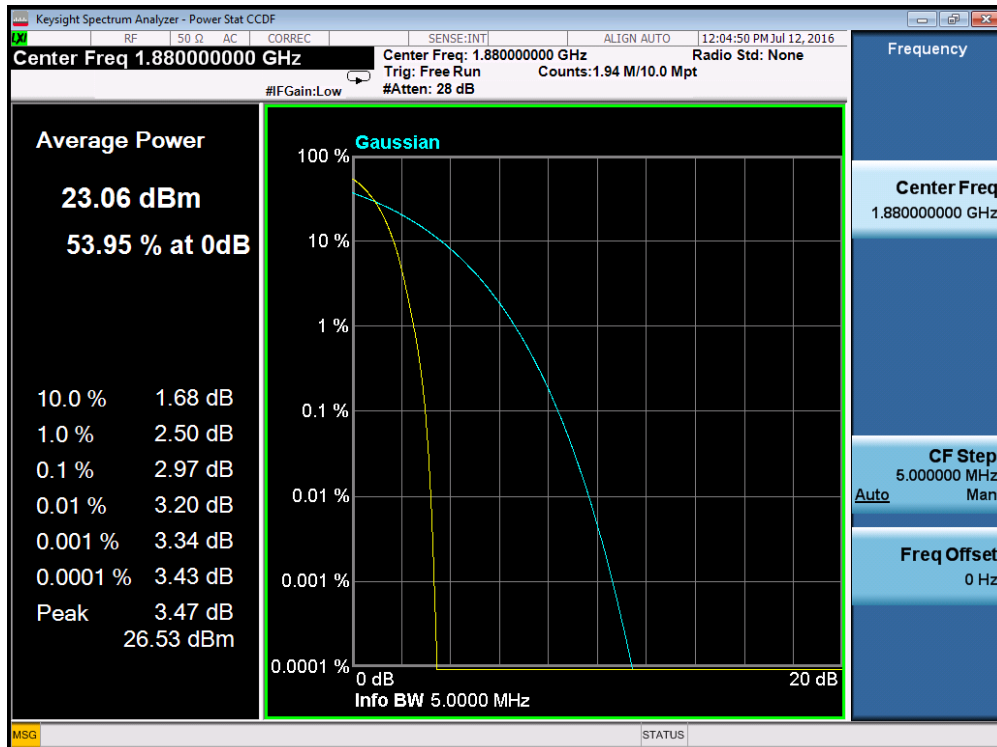


Plot 7-98. Peak-Average Ratio Plot (EDGE1900 Mode – Ch. 661)

FCC ID: ZNFS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 66 of 104



Plot 7-99. Peak-Average Ratio Plot (PCS CDMA Mode – Ch. 600)



Plot 7-100. Peak-Average Ratio Plot (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 67 of 104

7.6 Radiated Power (ERP/EIRP)

§22.913(a)(2) 24.232(c) 27.50(d.4)

Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.2.1

ANSI/TIA-603-D-2010 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW $\geq 3 \times$ RBW
4. Span = 1.5 times the OBW
5. No. of sweep points $\geq 2 \times$ span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 68 of 104

Test Setup

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

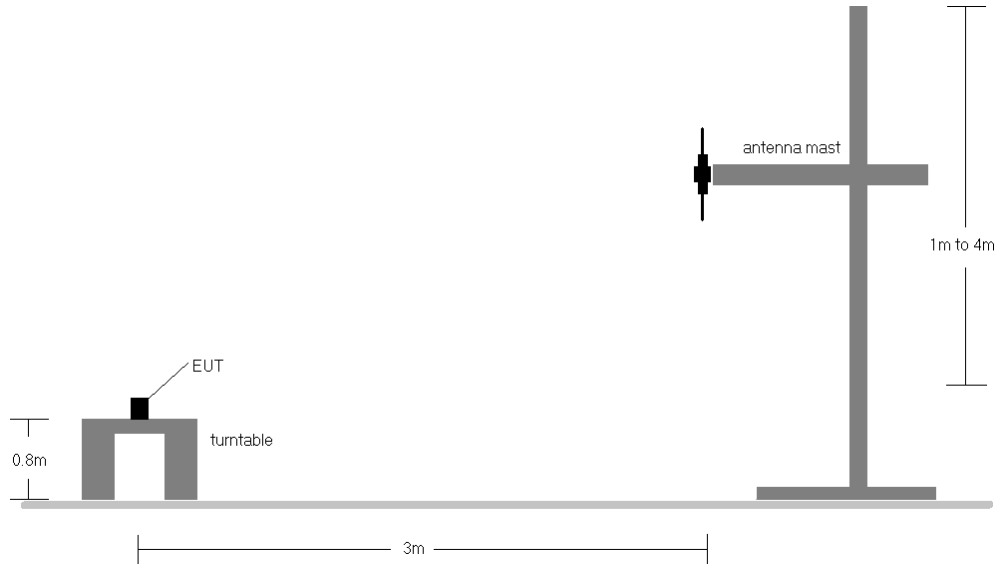


Figure 7-5. Radiated Test Setup <1GHz

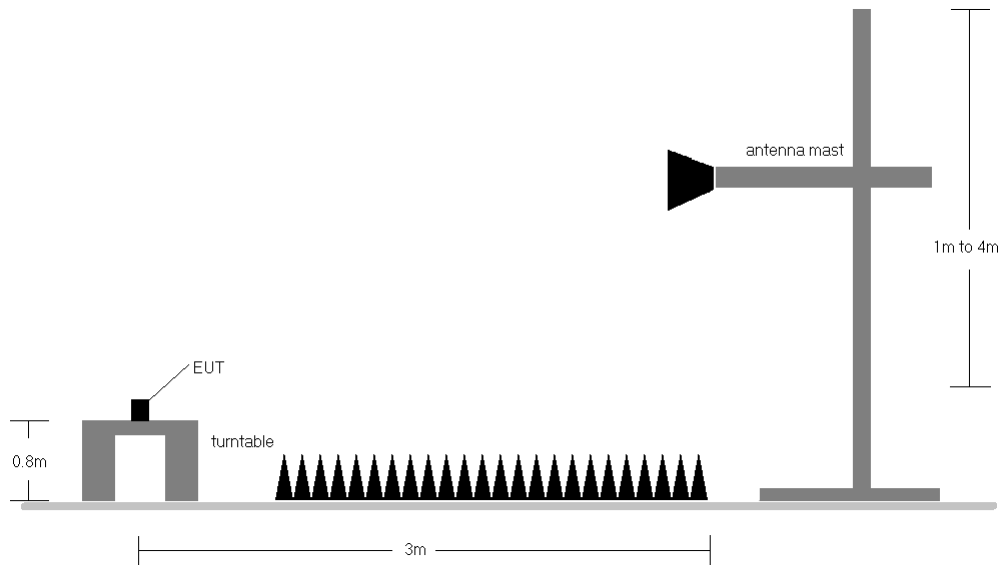


Figure 7-6. Radiated Test Setup >1GHz

FCC ID: ZNFLS997	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	 LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 69 of 104

Test Notes

- 1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, and HSUPA 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."
- 3) This device was tested under all RC and SO combinations and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 4) This unit was tested with its standard battery.
- 5) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 70 of 104

7.6.1 Antenna-1 Radiated Power (ERP/EIRP)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.20	GPRS850	H	203	14	23.91	5.00	28.91	0.778	38.45	-9.54
836.60	GPRS850	H	198	201	25.01	5.16	30.17	1.040	38.45	-8.28
848.80	GPRS850	H	191	357	23.95	5.31	29.26	0.843	38.45	-9.19
836.60	GPRS850	V	144	19	24.23	5.00	29.23	0.837	38.45	-9.22
836.60	EDGE850	H	198	201	17.98	5.16	23.14	0.206	38.45	-15.31

Table 7-2. ERP (Cellular GPRS/EDGE)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.70	CDMA850	H	225	27	13.99	5.01	19.00	0.079	38.45	-19.45
836.52	CDMA850	H	190	80	13.61	5.16	18.77	0.075	38.45	-19.68
848.31	CDMA850	H	208	31	14.28	5.30	19.58	0.091	38.45	-18.87
848.31	CDMA850	V	156	210	12.73	5.05	17.78	0.060	38.45	-20.67

Table 7-3. ERP (Cellular CDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
826.40	WCDMA850	H	206	194	15.20	5.03	20.23	0.105	38.45	-18.22
836.60	WCDMA850	H	206	209	16.28	5.16	21.44	0.139	38.45	-17.01
846.60	WCDMA850	H	206	194	15.11	5.28	20.39	0.109	38.45	-18.06
836.60	WCDMA850	V	139	229	14.93	5.00	19.93	0.098	38.45	-18.52

Table 7-4. ERP (Cellular WCDMA)

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)							Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset						Page 71 of 104	

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1712.40	WCDMA1700	H	117	110	13.36	9.65	23.01	0.200	30.00	-6.99
1732.60	WCDMA1700	H	171	289	13.75	9.61	23.36	0.217	30.00	-6.64
1752.60	WCDMA1700	H	215	113	14.66	9.57	24.23	0.265	30.00	-5.77
1752.60	WCDMA1700	V	206	51	9.15	9.40	18.55	0.072	30.00	-11.45

Table 7-5. EIRP (AWS WCDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.20	GPRS1900	V	119	156	17.72	9.21	26.93	0.493	33.01	-6.08
1880.00	GPRS1900	V	103	266	19.34	9.27	28.61	0.726	33.01	-4.40
1909.80	GPRS1900	V	117	219	18.50	9.37	27.87	0.612	33.01	-5.14
1880.00	GPRS1900	H	103	153	18.06	9.27	27.33	0.541	33.01	-5.68
1880.00	EDGE1900	V	103	266	14.74	9.27	24.01	0.252	33.01	-9.00

Table 7-6. EIRP (PCS GPRS/EDGE)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1851.25	CDMA1900	H	272	91	13.43	9.35	22.78	0.190	33.01	-10.23
1880.00	CDMA1900	H	257	276	13.87	9.27	23.14	0.206	33.01	-9.87
1908.75	CDMA1900	H	264	90	11.99	9.25	21.24	0.133	33.01	-11.77
1880.00	CDMA1900	V	101	253	11.72	9.27	20.99	0.126	33.01	-12.02

Table 7-7. EIRP (PCS CDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1852.40	WCDMA1900	H	107	281	14.35	9.34	23.69	0.234	33.01	-9.32
1880.00	WCDMA1900	H	107	77	14.36	9.27	23.63	0.231	33.01	-9.38
1907.60	WCDMA1900	H	245	294	13.86	9.24	23.10	0.204	33.01	-9.91
1852.40	WCDMA1900	V	246	170	11.54	9.22	20.76	0.119	33.01	-12.25

Table 7-8. EIRP (PCS WCDMA)

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)							Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset						Page 72 of 104	

7.6.1 Antenna-2 Radiated Power (ERP)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.70	CDMA850	H	223	27	4.41	5.01	9.42	0.009	38.45	-29.03
836.52	CDMA850	H	230	334	4.04	5.16	9.20	0.008	38.45	-29.25
848.31	CDMA850	H	337	153	3.73	5.30	9.03	0.008	38.45	-29.42
824.70	CDMA850	V	134	174	3.13	4.95	8.08	0.006	38.45	-30.38

Table 7-9. ERP (Cellular CDMA)

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)					Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset				Page 73 of 104	

7.7 Radiated Spurious Emissions Measurements

§2.1053 §22.917(a) 24.238(a) 27.53(h)

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.8

ANSI/TIA-603-D-2010 – Section 2.2.12

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW $\geq 3 \times$ RBW
3. Span = 1.5 times the OBW
4. No. of sweep points $\geq 2 \times$ span / RBW
5. Detector = Peak
6. Trace mode = max hold
7. The trace was allowed to stabilize

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset	Page 74 of 104	

Test Setup

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

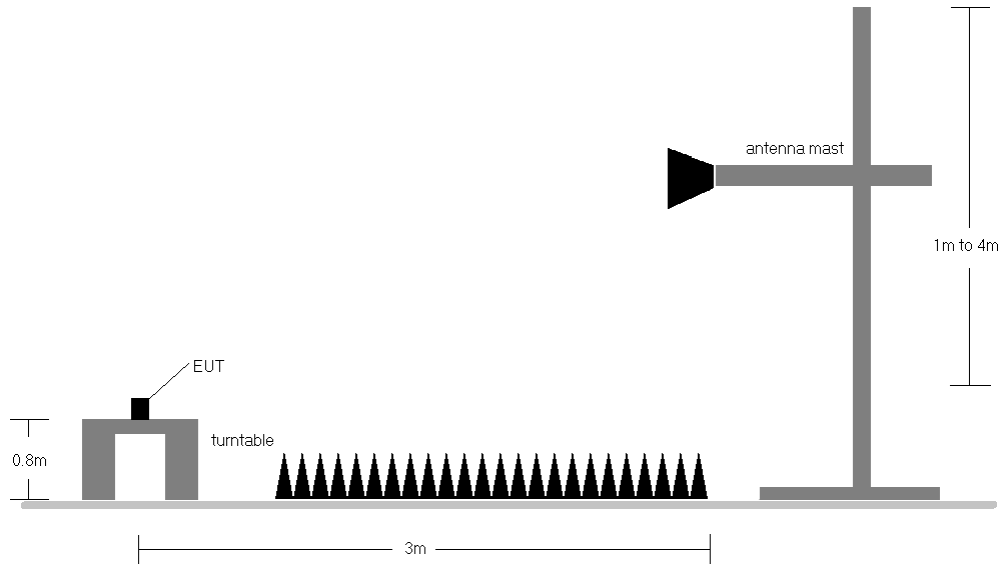


Figure 7-7. Test Instrument & Measurement Setup

Test Notes

- 1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, and HSUPA 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."
- 3) This device was tested under all RC and SO combinations and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 4) This unit was tested with its standard battery.
- 5) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.
- 6) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 7) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 75 of 104

7.8 Antenna-1 Radiated Spurious Emissions Measurements

OPERATING FREQUENCY: 824.20 MHz
 CHANNEL: 128
 MEASURED OUTPUT POWER: 28.85 dBm = 0.768 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 41.85 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1648.40	H	240	19	-53.71	3.65	-50.06	78.9
2472.60	H	260	254	-47.62	3.57	-44.06	72.9
3296.80	H	217	335	-55.16	5.79	-49.37	78.2
4121.00	H	-	-	-55.35	6.96	-48.39	77.2

Table 7-10. Radiated Spurious Data (Cellular GPRS Mode – Ch. 128)

OPERATING FREQUENCY: 836.60 MHz
 CHANNEL: 190
 MEASURED OUTPUT POWER: 30.01 dBm = 1.002 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 43.01 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.20	H	100	0	-52.69	3.52	-49.17	79.2
2509.80	H	245	257	-45.58	3.59	-41.98	72.0
3346.40	H	240	336	-55.34	5.87	-49.47	79.5
4183.00	H	-	-	-54.44	7.16	-47.28	77.3

Table 7-11. Radiated Spurious Data (Cellular GPRS Mode – Ch. 190)

OPERATING FREQUENCY: 848.80 MHz
 CHANNEL: 251
 MEASURED OUTPUT POWER: 29.00 dBm = 0.795 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 42.00 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1697.60	H	112	4	-52.14	3.39	-48.75	77.8
2546.40	H	100	265	-48.36	3.75	-44.62	73.6
3395.20	H	100	75	-54.89	5.92	-48.96	78.0
4244.00	H	-	-	-54.73	7.30	-47.44	76.4

Table 7-12. Radiated Spurious Data (Cellular GPRS Mode – Ch. 251)

OPERATING FREQUENCY: 824.70 MHz
 CHANNEL: 1013
 MEASURED OUTPUT POWER: 18.94 dBm = 0.078 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 31.94 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1649.40	H	-	-	-58.58	3.64	-54.94	73.9

Table 7-13. Radiated Spurious Data (Cellular CDMA Mode – Ch. 1013)

OPERATING FREQUENCY: 836.52 MHz
 CHANNEL: 384
 MEASURED OUTPUT POWER: 18.61 dBm = 0.073 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 31.61 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.04	H	198	202	-57.44	3.52	-53.92	72.5
2509.56	H	119	93	-53.16	3.59	-49.57	68.2
3346.08	H	-	-	-56.35	5.87	-50.48	69.1

Table 7-14. Radiated Spurious Data (Cellular CDMA Mode – Ch. 384)

OPERATING FREQUENCY: 848.31 MHz
 CHANNEL: 777
 MEASURED OUTPUT POWER: 19.33 dBm = 0.086 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.33 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1696.62	H	208	199	-57.31	3.40	-53.91	73.2
2544.93	H	100	235	-52.65	3.74	-48.91	68.2
3393.24	H	-	-	-54.84	5.92	-48.92	68.2

Table 7-15. Radiated Spurious Data (Cellular CDMA Mode – Ch. 777)

OPERATING FREQUENCY: 826.40 MHz
 CHANNEL: 4132
 MEASURED OUTPUT POWER: 20.15 dBm = 0.104 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.15 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1652.80	H	213	214	-57.21	3.62	-53.59	73.7
2479.20	H	201	280	-51.77	3.56	-48.21	68.4
3305.60	H	-	-	-55.38	5.83	-49.56	69.7

Table 7-16. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4132)

OPERATING FREQUENCY: 836.60 MHz
 CHANNEL: 4183
 MEASURED OUTPUT POWER: 21.28 dBm = 0.134 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 34.28 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.20	H	-	-	-58.40	3.52	-54.88	76.2
2509.80	H	105	263	-52.01	3.59	-48.41	69.7
3346.40	H	-	-	-55.56	5.87	-49.69	71.0

Table 7-17. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4183)

OPERATING FREQUENCY: 846.60 MHz
 CHANNEL: 4233
 MEASURED OUTPUT POWER: 20.15 dBm = 0.104 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.15 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1693.20	H	210	213	-55.43	3.42	-52.02	72.2
2539.80	H	210	263	-51.91	3.72	-48.19	68.3
3386.40	H	-	-	-55.11	5.91	-49.20	69.4

Table 7-18. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4233)

OPERATING FREQUENCY: 1712.40 MHz
 CHANNEL: 1312
 MEASURED OUTPUT POWER: 23.02 dBm = 0.200 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.02 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3424.80	H	-	-	-54.90	8.15	-46.75	69.8
5137.20	H	-	-	-54.94	10.37	-44.57	67.6

Table 7-19. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1312)

OPERATING FREQUENCY: 1732.60 MHz
 CHANNEL: 1413
 MEASURED OUTPUT POWER: 23.28 dBm = 0.213 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.28 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3465.20	H	101	105	-53.79	8.26	-45.53	68.8
5197.80	H	-	-	-54.86	10.41	-44.45	67.7

Table 7-20. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1413)

OPERATING FREQUENCY: 1752.60 MHz
 CHANNEL: 1513
 MEASURED OUTPUT POWER: 24.06 dBm = 0.255 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 37.06 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3505.20	H	174	94	-54.62	8.36	-46.26	70.3
5257.80	H	174	329	-42.58	10.35	-32.23	56.3
7010.40	H	-	-	-52.19	11.59	-40.61	64.7

Table 7-21. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1513)

OPERATING FREQUENCY: 1850.20 MHz
 CHANNEL: 512
 MEASURED OUTPUT POWER: 26.93 dBm = 0.493 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 39.93 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3700.40	V	242	194	-55.51	8.79	-46.72	73.6
5550.60	V	-	-	-54.69	10.44	-44.24	71.2
7400.80	V	164	358	-51.45	11.96	-39.50	66.4
9251.00	V	-	-	-51.60	13.18	-38.42	65.4

Table 7-22. Radiated Spurious Data (PCS GPRS Mode – Ch. 512)

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 661
 MEASURED OUTPUT POWER: 28.61 dBm = 0.726 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 41.61 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3760.00	V	119	10	-54.61	8.72	-45.89	74.5
5640.00	V	-	-	-54.53	10.61	-43.92	72.5

Table 7-23. Radiated Spurious Data (PCS GPRS Mode – Ch. 661)

OPERATING FREQUENCY: 1909.80 MHz
 CHANNEL: 810
 MEASURED OUTPUT POWER: 27.87 dBm = 0.612 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 40.87 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3819.60	V	-	-	-55.25	8.64	-46.62	74.5
5729.40	V	-	-	-54.64	10.66	-43.98	71.8

Table 7-24. Radiated Spurious Data (PCS GPRS Mode – Ch. 810)

OPERATING FREQUENCY: 1851.25 MHz
 CHANNEL: 25
 MEASURED OUTPUT POWER: 22.64 dBm = 0.184 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 35.64 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3702.50	H	100	41	-54.07	8.41	-45.66	68.3
5553.75	H	-	-	-53.61	10.52	-43.10	65.7

Table 7-25. Radiated Spurious Data (PCS CDMA Mode – Ch. 25)

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 600
 MEASURED OUTPUT POWER: 23.14 dBm = 0.206 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.14 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3760.00	H	100	249	-53.53	8.64	-44.89	68.0
5640.00	H	-	-	-54.35	10.62	-43.74	66.9

Table 7-26. Radiated Spurious Data (PCS CDMA Mode – Ch. 600)

OPERATING FREQUENCY: 1908.75 MHz
 CHANNEL: 1175
 MEASURED OUTPUT POWER: 21.35 dBm = 0.136 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 34.35 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3817.50	H	100	145	-54.01	8.77	-45.24	66.6
5726.25	H	-	-	-54.98	10.71	-44.27	65.6

Table 7-27. Radiated Spurious Data (PCS CDMA Mode – Ch. 1175)

OPERATING FREQUENCY: 1852.40 MHz
 CHANNEL: 9262
 MEASURED OUTPUT POWER: 23.57 dBm = 0.227 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.57 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3704.80	H	100	84	-54.47	8.42	-46.06	69.6
5557.20	H	154	160	-54.21	10.52	-43.69	67.3
7409.60	H	-	-	-51.81	12.01	-39.80	63.4

Table 7-28. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9262)

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 9400
 MEASURED OUTPUT POWER: 23.63 dBm = 0.231 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.63 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3760.00	H	171	137	-54.28	8.64	-45.64	69.3
5640.00	H	119	95	-54.23	10.62	-43.62	67.2
7520.00	H	-	-	-52.05	12.04	-40.00	63.6

Table 7-29. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9400)

OPERATING FREQUENCY: 1907.60 MHz
 CHANNEL: 9538
 MEASURED OUTPUT POWER: 23.21 dBm = 0.210 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.21 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3815.20	H	-	-	-54.74	8.77	-45.97	69.2
5722.80	H	-	-	-55.05	10.71	-44.35	67.6
7630.40	H	-	-	-52.37	12.17	-40.20	63.4

Table 7-30. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9538)

7.8.1 Antenna-2 Radiated Spurious Emissions Measurements

OPERATING FREQUENCY: 824.70 MHz
 CHANNEL: 1013
 MEASURED OUTPUT POWER: 9.36 dBm = 0.009 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 22.36 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1649.40	H	105	262	-56.95	3.64	-53.31	62.7
2474.10	H	-	-	-54.33	3.57	-50.77	60.1

Table 7-31. Radiated Spurious Data (Cellular CDMA Mode – Ch. 1013)

OPERATING FREQUENCY: 836.52 MHz
 CHANNEL: 384
 MEASURED OUTPUT POWER: 9.04 dBm = 0.008 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 22.04 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.04	H	112	353	-57.98	3.52	-54.46	63.5
2509.56	H	-	-	-54.59	3.59	-51.00	60.0

Table 7-32. Radiated Spurious Data (Cellular CDMA Mode – Ch. 384)

OPERATING FREQUENCY: 848.31 MHz
 CHANNEL: 777
 MEASURED OUTPUT POWER: 8.78 dBm = 0.008 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 21.78 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1696.62	H	169	268	-55.90	3.40	-52.50	61.3
2544.93	H	-	-	-54.49	3.74	-50.75	59.5

Table 7-33. Radiated Spurious Data (Cellular CDMA Mode – Ch. 777)

7.9 Frequency Stability / Temperature Variation

\$2.1055 \$22.355 \$24.235 \$27.54

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-D-2010. 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.

For Part 22, the frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency. For Part 24 and Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure Used

ANSI/TIA-603-D-2010

Test Settings

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.

Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

Test Notes

None

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset	Page 89 of 104	

Frequency Stability / Temperature Variation

§2.1055 §22.355

OPERATING FREQUENCY: 836,600,000 Hz

CHANNEL: 190

REFERENCE VOLTAGE: 3.85 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	836,600,084	84	0.0000100
100 %		- 30	836,599,623	-377	-0.0000451
100 %		- 20	836,600,231	231	0.0000276
100 %		- 10	836,599,660	-340	-0.0000406
100 %		0	836,600,296	296	0.0000354
100 %		+ 10	836,599,943	-57	-0.0000068
100 %		+ 20	836,600,223	223	0.0000267
100 %		+ 30	836,599,981	-19	-0.0000023
100 %		+ 40	836,599,689	-311	-0.0000372
100 %		+ 50	836,599,880	-120	-0.0000143
BATT. ENDPOINT	3.45	+ 20	836,599,772	-228	-0.0000273

Table 7-34. Frequency Stability Data (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)				Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset				Page 90 of 104

Frequency Stability / Temperature Variation

§2.1055 §22.355

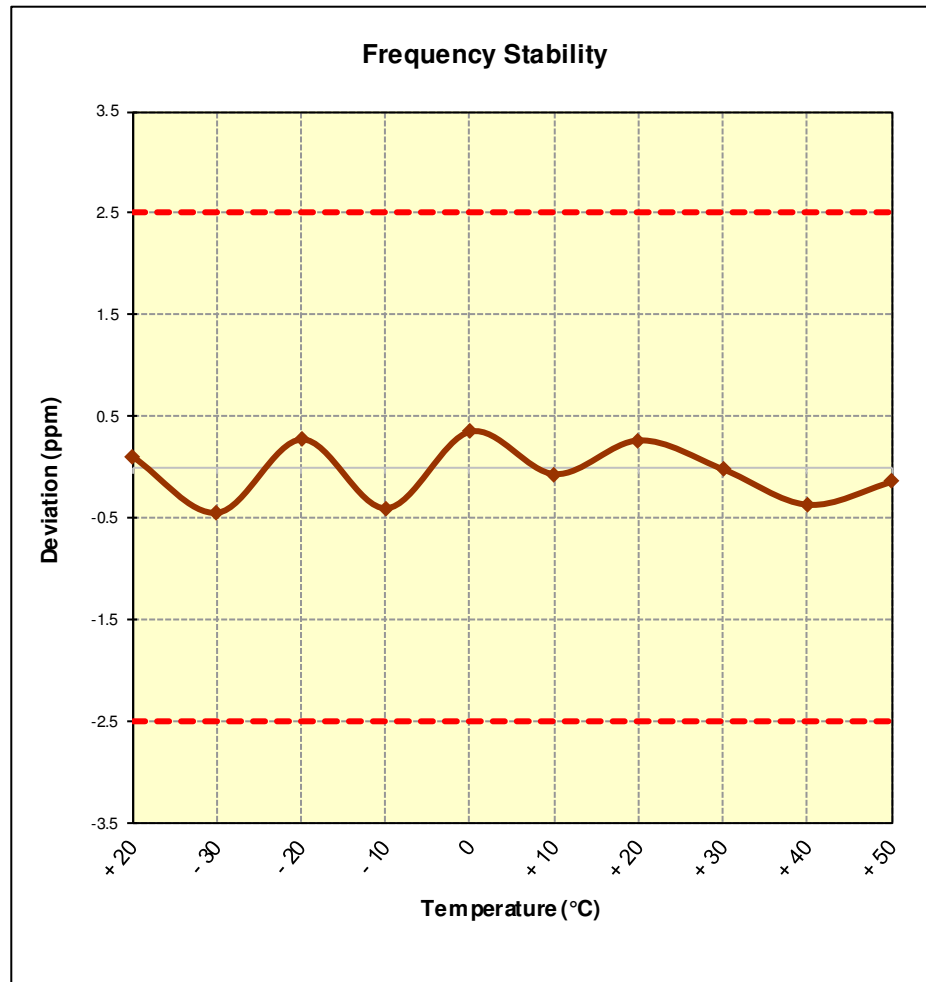


Figure 7-8. Frequency Stability Graph (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 91 of 104

Frequency Stability / Temperature Variation

§2.1055 §22.355

OPERATING FREQUENCY: 836,520,000 Hz

CHANNEL: 384

REFERENCE VOLTAGE: 3.85 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	836,520,243	243	0.0000290
100 %		- 30	836,520,291	291	0.0000348
100 %		- 20	836,519,939	-61	-0.0000073
100 %		- 10	836,519,980	-20	-0.0000024
100 %		0	836,520,161	161	0.0000192
100 %		+ 10	836,519,770	-230	-0.0000275
100 %		+ 20	836,520,364	364	0.0000435
100 %		+ 30	836,519,918	-82	-0.0000098
100 %		+ 40	836,519,741	-259	-0.0000310
100 %		+ 50	836,519,989	-11	-0.0000013
BATT. ENDPOINT	3.45	+ 20	836,519,867	-133	-0.0000159

Table 7-35. Frequency Stability Data (Cellular CDMA Mode – Ch. 384)

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)				Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset				Page 92 of 104

Frequency Stability / Temperature Variation

§2.1055 §22.355

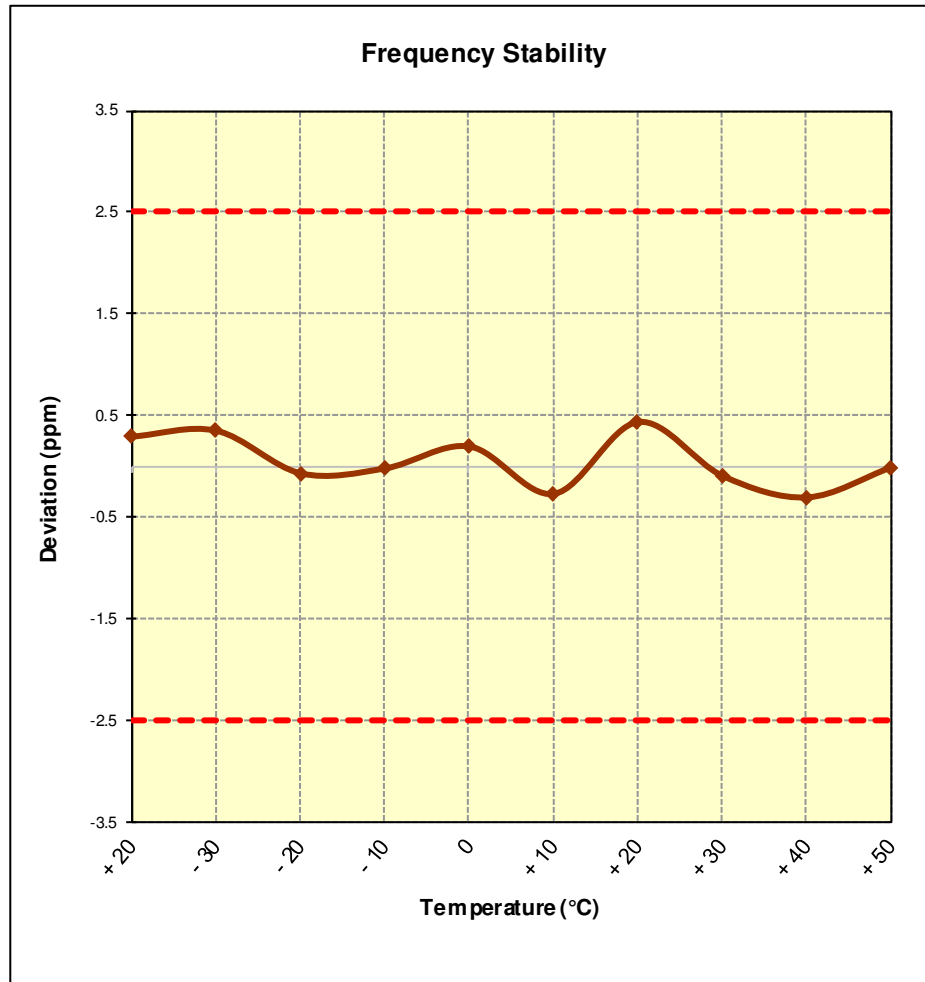


Figure 7-9. Frequency Stability Graph (Cellular CDMA Mode – Ch. 384)

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 93 of 104

Frequency Stability / Temperature Variation

§2.1055 §22.355

OPERATING FREQUENCY: 836,600,000 Hz

CHANNEL: 4183

REFERENCE VOLTAGE: 3.85 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	836,600,196	196	0.0000234
100 %		- 30	836,599,810	-190	-0.0000227
100 %		- 20	836,599,624	-376	-0.0000449
100 %		- 10	836,599,909	-91	-0.0000109
100 %		0	836,600,369	369	0.0000441
100 %		+ 10	836,599,937	-63	-0.0000075
100 %		+ 20	836,600,005	5	0.0000006
100 %		+ 30	836,599,944	-56	-0.0000067
100 %		+ 40	836,599,751	-249	-0.0000298
100 %		+ 50	836,600,231	231	0.0000276
BATT. ENDPOINT	3.45	+ 20	836,599,606	-394	-0.0000471

Table 7-36. Frequency Stability Data (Cellular WCDMA Mode – Ch. 4183)

Frequency Stability / Temperature Variation

§2.1055 §22.355

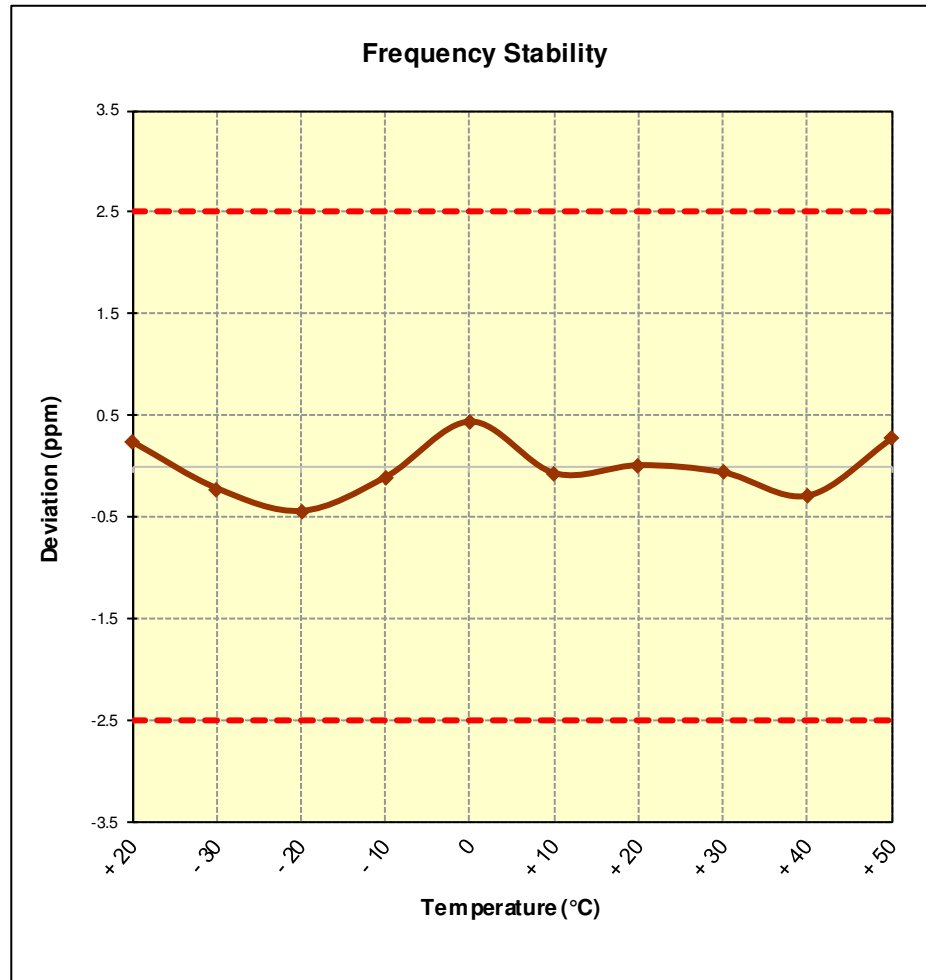


Figure 7-10. Frequency Stability Graph (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 95 of 104

Frequency Stability / Temperature Variation

§2.1055 §27.54

OPERATING FREQUENCY: 1,732,600,000 Hz
CHANNEL: 1413
REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,732,599,909	-91	-0.0000053
100 %		- 30	1,732,599,801	-199	-0.0000115
100 %		- 20	1,732,599,831	-169	-0.0000098
100 %		- 10	1,732,600,042	42	0.0000024
100 %		0	1,732,599,974	-26	-0.0000015
100 %		+ 10	1,732,599,816	-184	-0.0000106
100 %		+ 20	1,732,600,026	26	0.0000015
100 %		+ 30	1,732,599,905	-95	-0.0000055
100 %		+ 40	1,732,599,996	-4	-0.0000002
100 %		+ 50	1,732,599,956	-44	-0.0000025
BATT. ENDPOINT	3.45	+ 20	1,732,600,125	125	0.0000072

Table 7-37. Frequency Stability Data (AWS WCDMA Mode – Ch. 1413)

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: ZNFS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset	Page 96 of 104	

Frequency Stability / Temperature Variation

§2.1055 §27.54

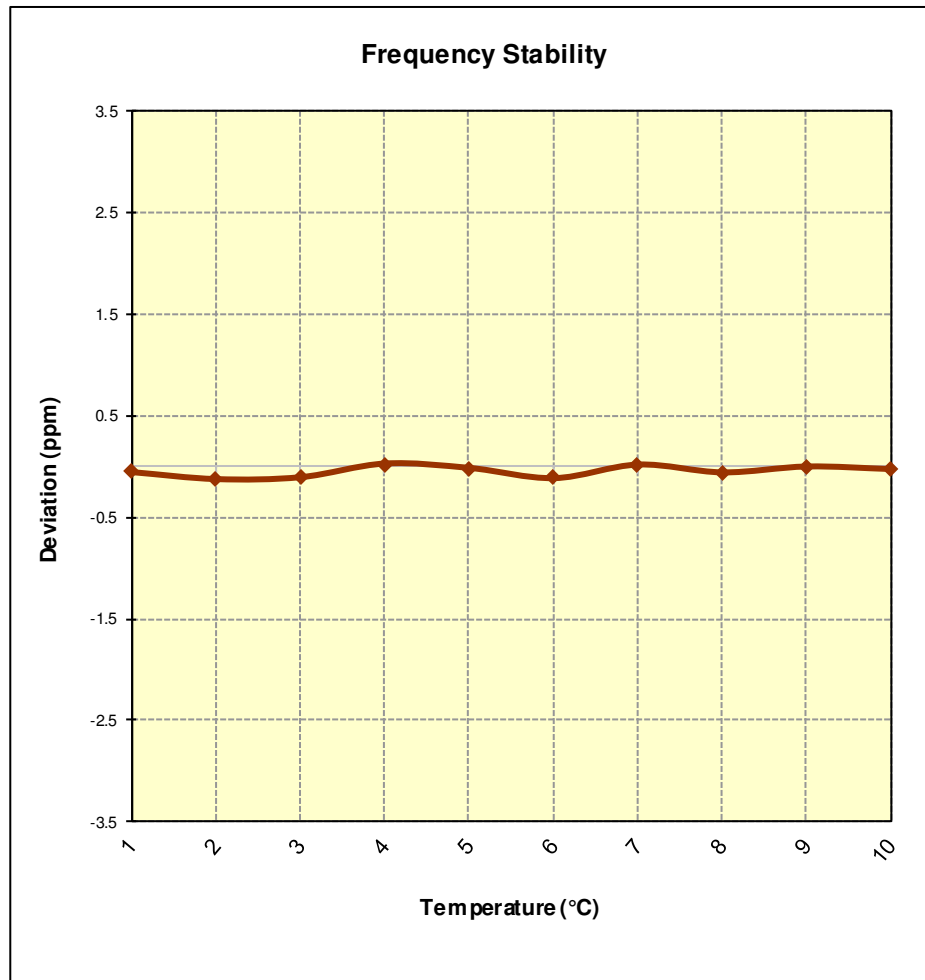


Figure 7-11. Frequency Stability Graph (AWS WCDMA Mode – Ch. 1413)

FCC ID: ZNFS997	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)	 LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 97 of 104

Frequency Stability / Temperature Variation

§2.1055 §24.235

OPERATING FREQUENCY: 1,880,000,000 Hz
 CHANNEL: 661
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,879,999,764	-236	-0.0000126
100 %		- 30	1,880,000,266	266	0.0000141
100 %		- 20	1,880,000,036	36	0.0000019
100 %		- 10	1,880,000,292	292	0.0000155
100 %		0	1,879,999,768	-232	-0.0000123
100 %		+ 10	1,880,000,120	120	0.0000064
100 %		+ 20	1,879,999,602	-398	-0.0000212
100 %		+ 30	1,879,999,867	-133	-0.0000071
100 %		+ 40	1,879,999,801	-199	-0.0000106
100 %		+ 50	1,879,999,954	-46	-0.0000024
BATT. ENDPOINT	3.45	+ 20	1,880,000,035	35	0.0000019

Table 7-38. Frequency Stability Data (PCS GPRS 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: ZNFS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 98 of 104

Frequency Stability / Temperature Variation

§2.1055 §24.235

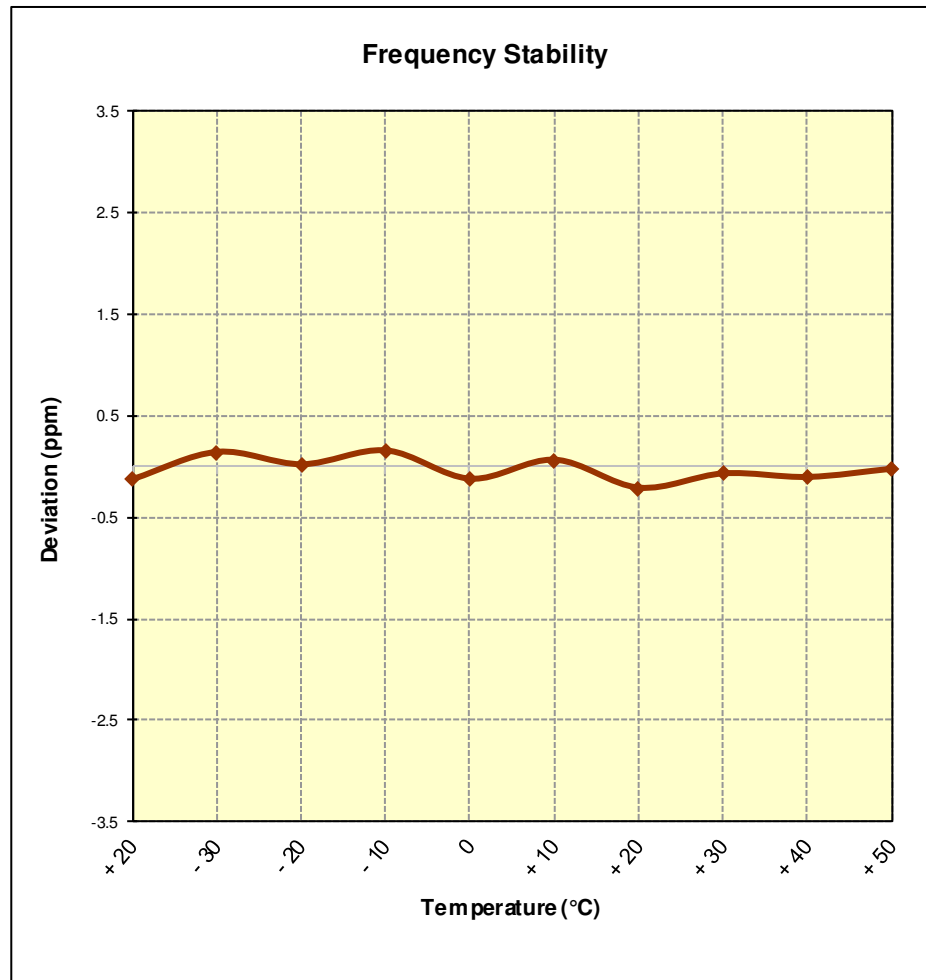


Figure 7-12. Frequency Stability Graph (PCS GPRS Mode – Ch. 661)

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 99 of 104

Frequency Stability / Temperature Variation

§2.1055 §24.235

OPERATING FREQUENCY: 1,880,000,000 Hz
CHANNEL: 600
REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,880,000,196	196	0.0000104
100 %		- 30	1,879,999,933	-67	-0.0000036
100 %		- 20	1,879,999,947	-53	-0.0000028
100 %		- 10	1,880,000,080	80	0.0000043
100 %		0	1,879,999,991	-9	-0.0000005
100 %		+ 10	1,879,999,754	-246	-0.0000131
100 %		+ 20	1,880,000,229	229	0.0000122
100 %		+ 30	1,880,000,036	36	0.0000019
100 %		+ 40	1,880,000,149	149	0.0000079
100 %		+ 50	1,879,999,553	-447	-0.0000238
BATT. ENDPOINT	3.45	+ 20	1,880,000,068	68	0.0000036

Table 7-39. Frequency Stability Data (PCS CDMA Mode – Ch. 600)

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: ZNFS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)				Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset				Page 100 of 104

Frequency Stability / Temperature Variation

§2.1055 §24.235

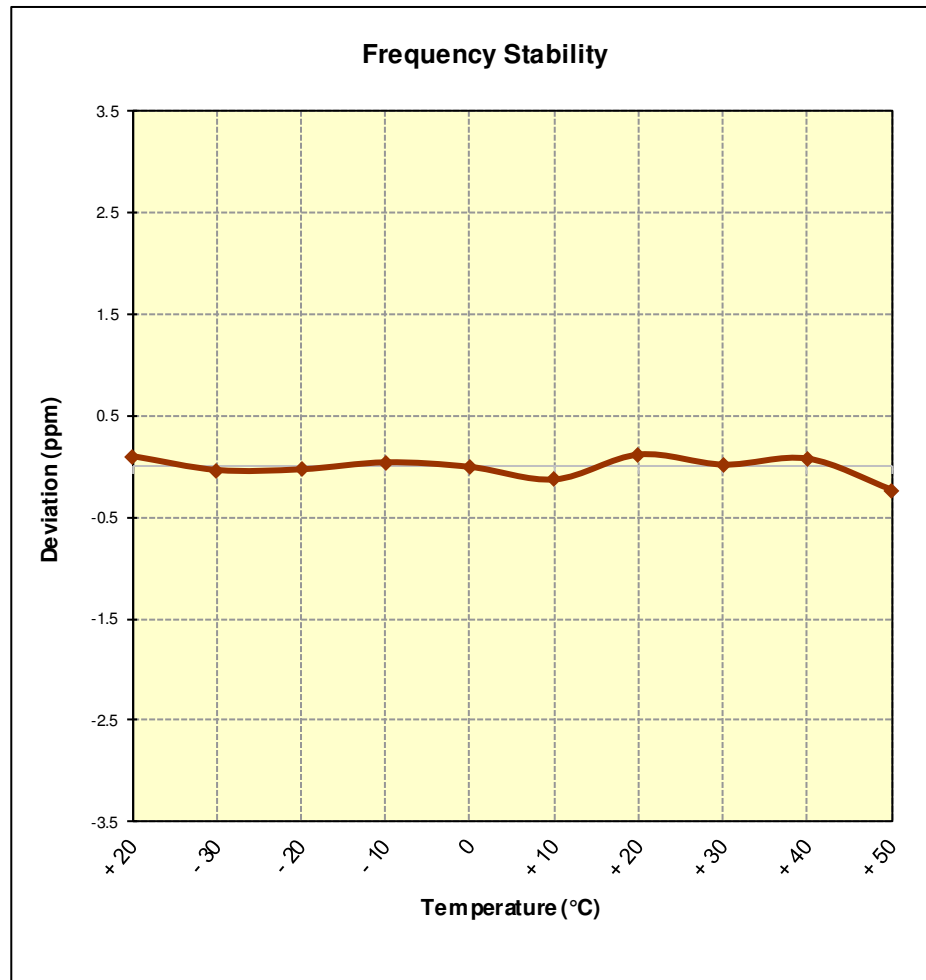


Figure 7-13. Frequency Stability Graph (PCS CDMA Mode – Ch. 600)

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 101 of 104

Frequency Stability / Temperature Variation

§2.1055 §24.235

OPERATING FREQUENCY: 1,880,000,000 Hz
 CHANNEL: 9400
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,879,999,922	-78	-0.0000041
100 %		- 30	1,879,999,962	-38	-0.0000020
100 %		- 20	1,880,000,311	311	0.0000165
100 %		- 10	1,880,000,049	49	0.0000026
100 %		0	1,880,000,165	165	0.0000088
100 %		+ 10	1,879,999,986	-14	-0.0000007
100 %		+ 20	1,880,000,190	190	0.0000101
100 %		+ 30	1,879,999,925	-75	-0.0000040
100 %		+ 40	1,880,000,119	119	0.0000063
100 %		+ 50	1,880,000,158	158	0.0000084
BATT. ENDPOINT	3.45	+ 20	1,880,000,029	29	0.0000015

Table 7-40. Frequency Stability Data (PCS WCDMA Mode – Ch. 9400)

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: ZNFS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)				Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset				Page 102 of 104

Frequency Stability / Temperature Variation

§2.1055 §24.235

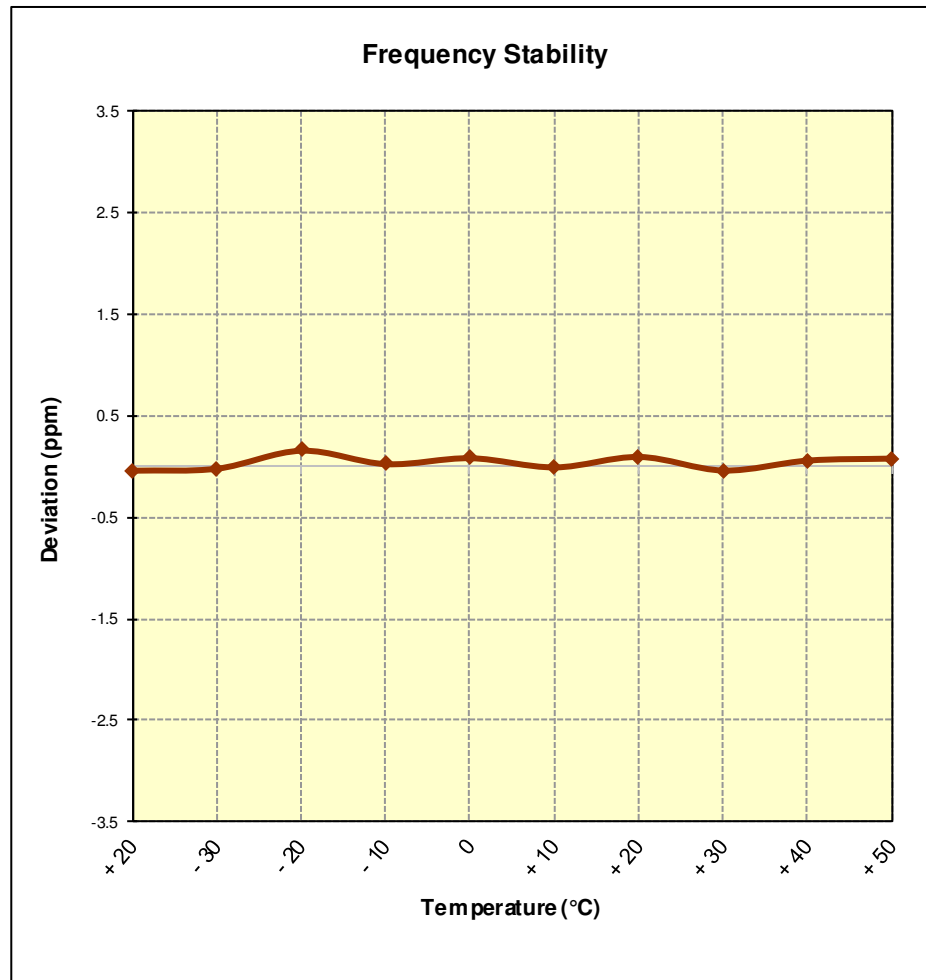


Figure 7-14. Frequency Stability Graph (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 103 of 104

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFLS997** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules.

FCC ID: ZNFLS997		FCC Pt. 22, 24, & 27 GSM/GPRS/EDGE/CDMA/WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1607051203-R1.ZNF	Test Dates: 7/6-7/20/2016	EUT Type: Portable Handset		Page 104 of 104