



## MEASUREMENT REPORT

### GSM / GPRS / EDGE / CDMA / WCDMA

**Applicant Name:**

Apple Inc.  
1 Infinite Loop  
Cupertino, CA  
United States

**Date of Testing:**

10/31/2017-2/15/2018

**Test Site/Location:**

PCTEST Lab. Morgan Hill, CA, USA

**Test Report Serial No.:**

1C1710060006-02-R2.BCG

<b>FCC ID:</b>	<b>BCGA1954</b>
<b>IC:</b>	<b>579C-A1954</b>
<b>APPLICANT:</b>	<b>Apple Inc.</b>

**Application Type:**

Certification

**Model/HVIN:**

A1954

**EUT Type:**

Tablet Device

**FCC Classification:**

PCS Licensed Transmitter (PCB)

**FCC Rule Part(s):**

22, 24, &amp; 27

**ISED Specification:**

RSS-132, RSS-133, RSS-139

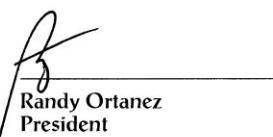
**Test Procedure(s):**

ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03

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: 1C1710060006-02-R2.BCG) supersedes and replaces the previously issued test report (S/N: 1C1710060006-02-R1.BCG) 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.

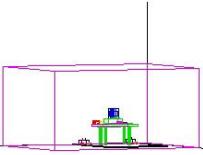
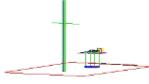

  
Randy Ortanez  
President


FCC ID: BCGA1954	<b>PCTEST</b> ENGINEERING LABORATORY, INC.		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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## MEASUREMENT REPORT

### GSM / GPRS / EDGE / CDMA / WCDMA

Mode	FCC Rule Part	Tx Frequency (MHz)	ERP		EIRP		Emission Designator
			Max. Power (W)	Max. Power (dBm)	Max. Power (W)	Max. Power (dBm)	
GPRS850	22H	824.2 - 848.8	1.390	31.43	2.280	33.58	242KGXW
EDGE850	22H	824.2 - 848.8	0.489	26.89	0.802	29.04	234KG7W
WCDMA850	22H	826.4 - 846.6	0.211	23.24	0.346	25.39	4M16F9W
CDMA850	22H	824.70 - 848.31	0.178	22.51	0.292	24.66	1M28F9W
WCDMA1700	27	1712.4 - 1752.6			0.507	27.05	4M16F9W
GPRS1900	24E	1850.2 - 1909.8			1.542	31.88	246KGXW
EDGE1900	24E	1850.2 - 1909.8			1.148	30.60	246KG7W
WCDMA1900	24E	1852.4 - 1907.6			0.608	27.84	4M16F9W
CDMA1900	24E	1851.25 - 1908.75			0.611	27.86	1M29F9W

#### EUT Overview

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## 1.0 INTRODUCTION

### 1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) 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 Innovation, Science and Economic Development Canada.

### 1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 18855 Adams Court, Morgan Hill, CA 95037. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

### 1.3 Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Morgan Hill, CA 95037, U.S.A.

- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.02 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).
- PCTEST facility is a registered (22831) test laboratory with the site description on file with ISED.

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## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Apple Tablet Device FCC ID: BCGA1954**. The test data contained in this report pertains only to the emissions due to the EUT's 2G/3G licensed transmitters.

**Test Device Serial No.:** F9FVT00LJM4W, F9FVT00RJM4W

### 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 WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE),

The following capabilities are not supported in Canada and for USA only: 850/1900 CDMA/EvDO Rev0/A.

### 2.3 Antenna Configuration

Following antennas were used for testing

Frequency (MHz)	Antenna Gain (dBi)
700-800	-0.74
820-960	0.43
1700-1800	2.13
1820-2100	2.88
2300-2520	1.59
2540-2700	1.71

**Table 2-1. Test Peak Antenna Gain**

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## 2.4 Test Support Equipment

1	Apple MacBook	Model:	A1502	S/N:	C02P4004G1R8
	w/ AC/DC Adapter	Model:	A1435	S/N:	C04325505K1F288BG
2	Apple USB Cable	Model:	Kanzi	S/N:	3251F5
3	Apple Earphone	Model:	N/A	S/N:	N/A
4	USB Lightning Cable	Model:	N/A	S/N:	N/A
5	w/ 12 W AC Adapter	Model:	A1401	S/N:	N/A
6	DC Power Supply	Model:	EP20571-110V	S/N:	N/A

**Table 2-2. Test Support Equipment Used**

## 2.5 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

There are two vendors of the radio modules, variant 1 and variant 2. Both radio modules have the same mechanical outline, same on-board antenna matching circuit, identical antenna structure, and are built and tested to conform to the same specifications and to operate within the same tolerances. The worst case configuration was found between the two variants. The EUT was also investigated with and without charger.

The emissions below 1GHz and above 18GHz were tested with the highest transmitting power channel and the worst case configuration.

The EUT was manipulated through three orthogonal planes of X-orientation (flatbed), Y-orientation (landscape), and Z-orientation (portrait) during the testing. Only the worst case emissions were reported in this test report. The worst orientation was found to be Y-orientation (landscape).

## 2.6 Software and Firmware

The test was conducted with firmware version 15E61570I installed on the EUT.

For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance.

## 2.7 EMI Suppression Device(s)/Modifications

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

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## 3.0 DESCRIPTION OF TESTS

### 3.1 Evaluation Procedure

The measurement procedures described in the “Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards” (ANSI/TIA-603-E-2016) and “Measurement Guidance for Certification of Licensed Digital Transmitters” (KDB 971168 D01 v03) were used in the measurement of the EUT.

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

### 3.2 Cellular - Base Frequency Blocks

§22.905



BLOCK 1: 869 – 880 MHz (A\* Low + A)

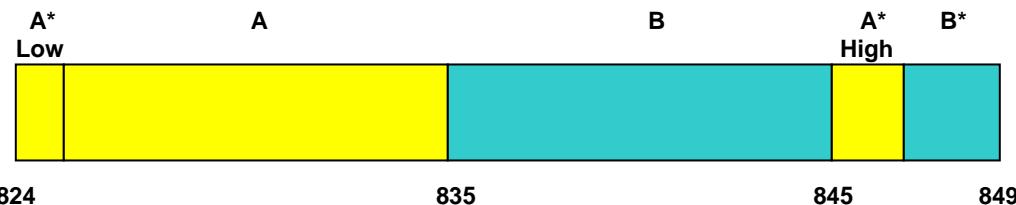
BLOCK 3: 890 – 891.5 MHz (A\* High)

BLOCK 2: 880 – 890 MHz (B)

BLOCK 4: 891.5 – 894 MHz (B\*)

### 3.3 Cellular - Mobile Frequency Blocks

§22.905



BLOCK 1: 824 – 835 MHz (A\* Low + A)

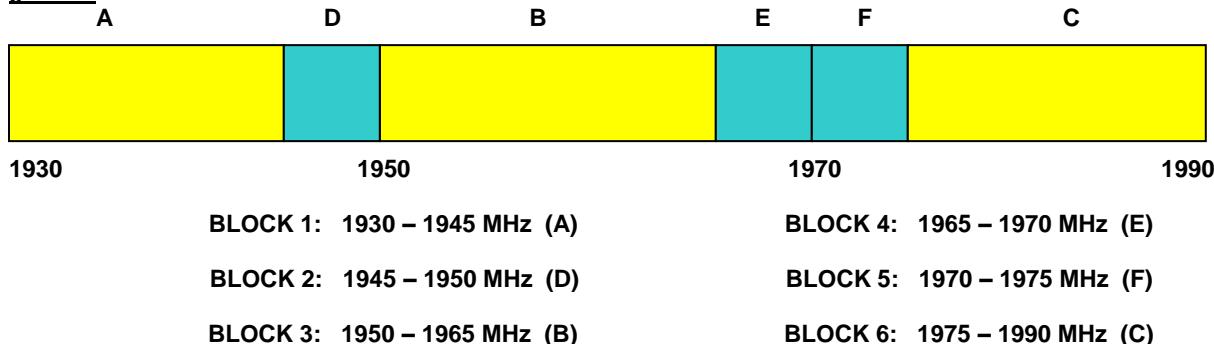
BLOCK 3: 845 – 846.5 MHz (A\* High)

BLOCK 2: 835 – 845 MHz (B)

BLOCK 4: 846.5 – 849 MHz (B\*)

### 3.4 PCS - Base Frequency Blocks

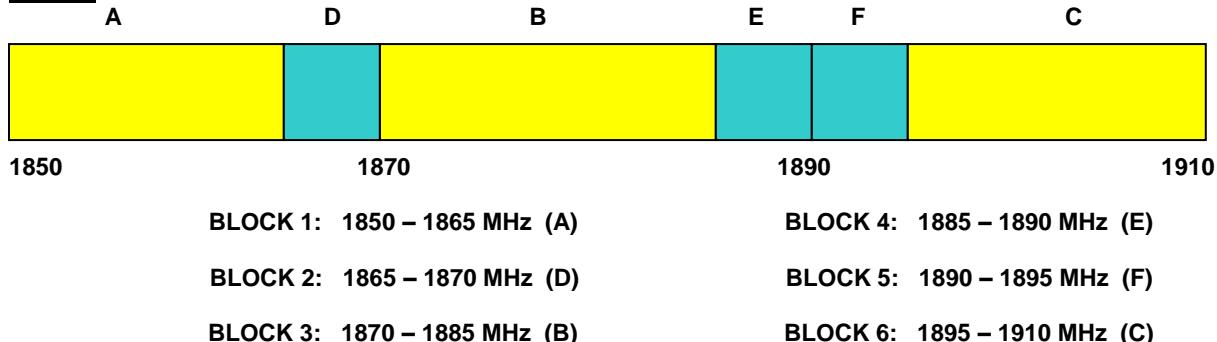
§24.229



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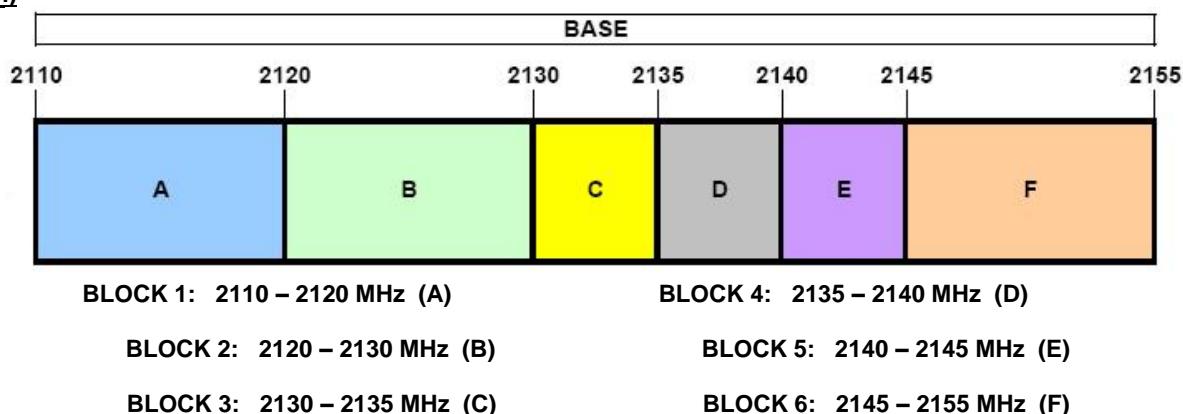
### 3.5 PCS - Mobile Frequency Blocks

§24.229



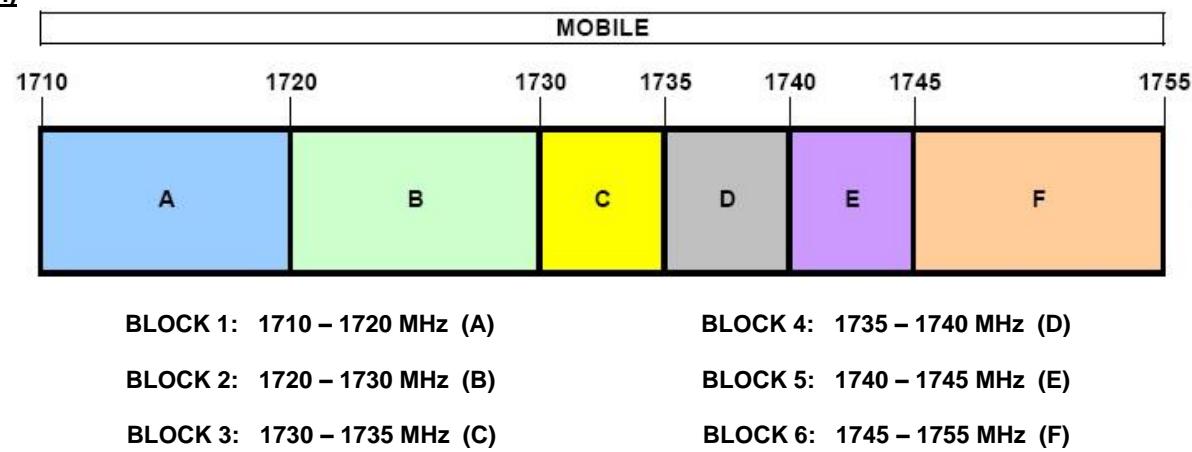
### 3.6 AWS - Base Frequency Blocks

§27.5(h)



### 3.7 AWS - Mobile Frequency Blocks

§27.5(h)



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### 3.8 Radiated Measurements

§2.1053 §22.913(a)(2) §22.917(a) §24.232(c) §24.238(a) §27.50(d)(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. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

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 guidelines of KDB 412172 D01 v01r01, radiated power levels are measured using the following formula:

$$\text{ERP or EIRP} = P_T + G_T - L_c$$

Where  $P_T$  is the transmitter output power, expressed in dBm,  $G_T$  is the gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP), and  $L_c$  signal attenuation in the connecting cable between the transmitter and antenna in dB.

Per the guidance of ANSI/TIA-603-E-2016, a half-wave dipole is substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

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

Where,  $P_d$  is the dipole equivalent power,  $P_g$  is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to  $P_g \text{ [dBm]} - \text{cable loss [dB]}$ . The calculated  $P_d$  levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of  $43 + 10\log_{10}(\text{Power [Watts]})$ .

Radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI C63.26.

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## 4.0 MEASUREMENT UNCERTAINTY

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

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

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## 5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	AM LTx1	Licensed Transmitter Cable Set	3/17/2017	Annual	3/17/2018	AM LTX1
-	EMI 3117-ESW1	Radiated Cable Set	3/1/2017	Biennial	3/1/2018	N/A
-	EMI HL562E-ESW1	Radiated Cable Set	2/28/2017	Biennial	2/28/2018	N/A
ESPEC	SU-241	Temperature Chamber	3/10/2017	Annual	3/10/2018	92009574
Keysight Technologies	N9030A	3Hz-44GHz PXA Signal Analyzer	3/13/2017	Annual	3/13/2018	MY49430244
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	11/9/2016	Annual	11/9/2018	152026
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	5/8/2017	Annual	5/8/2018	161616-DF
Rohde & Schwarz	ESW26	ESW26 EMI Test Receiver	7/15/2017	Annual	7/15/2018	101299
Rohde & Schwarz	OSP130	Open Switch and Control Unit	1/18/2017	Annual	1/18/2018	100970
Rohde & Schwarz	SFUNIT-RX	TS-SFUNIT SHIELDED FILTER UNIT	2/3/2017	Annual	2/3/2018	102131
Rohde & Schwarz	TS-PR8	Pre-Amplifier (30MHz - 8GHz)	2/3/2017	Annual	2/3/2018	102325
Rohde & Schwarz	TC-TA18	CROSS POL. VIVALDI ANT (400MHz - 18GHz)	11/13/2017	Annual	11/13/2018	101056-AE

**Table 5-1. Test Equipment**

**Notes:**

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.

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## 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.

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## 7.0 TEST RESULTS

### 7.1 Summary

Company Name: Apple Inc.  
 FCC ID: BCGA1954  
 FCC Classification: PCS Licensed Transmitter (PCB)  
 Mode(s): GSM / GPRS / EDGE / CDMA / WCDMA

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1049	RSS-Gen (4.6.1) RSS-133(2.3) RSS-139(2.3)	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 7.2
2.1051 22.917(a) 24.238(a) 27.53(h)	RSS-132(5.5) RSS-133(6.5) RSS-139(6.6)	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)	RSS-132(5.4) RSS-133(6.4) RSS-139(6.5)	Peak-Average Ratio	< 13 dB		PASS	Section 7.5
2.1046	RSS-132(5.4) RSS-133(4.1) RSS-139(4.1)	Transmitter Conducted Output Power	N/A		PASS	RF Exposure Report
2.1055 22.355 24.235 27.54	RSS-132(5.3) RSS-133(6.3) RSS-139(6.4)	Frequency Stability	< 2.5 ppm (Part 22) Emission must remain in band (Part 24, 27)		PASS	Section 7.8
22.913(a)(2)	RSS-132(5.4)	Effective Radiated Power	< 7 Watts max. ERP	RADIATED	PASS	Section 7.6
24.232(c)	RSS-133(6.4)	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS	Section 7.6
27.50(d)(4)	RSS-139(6.5)	Equivalent Isotropic Radiated Power	< 1 Watts max. EIRP		PASS	Section 7.6
2.1053 22.917(a) 24.238(a) 27.53(h)	RSS-132(5.5) RSS-133(6.5) RSS-139(6.6)	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 3.9.

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## 7.2 Occupied Bandwidth

§2.1049 RSS-Gen (4.6.1) RSS-133(2.3) RSS-139(2.3)

### 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

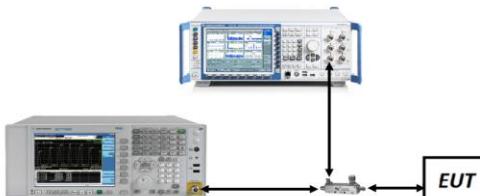
KDB 971168 D01 v03 – Section 4.2

### 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**

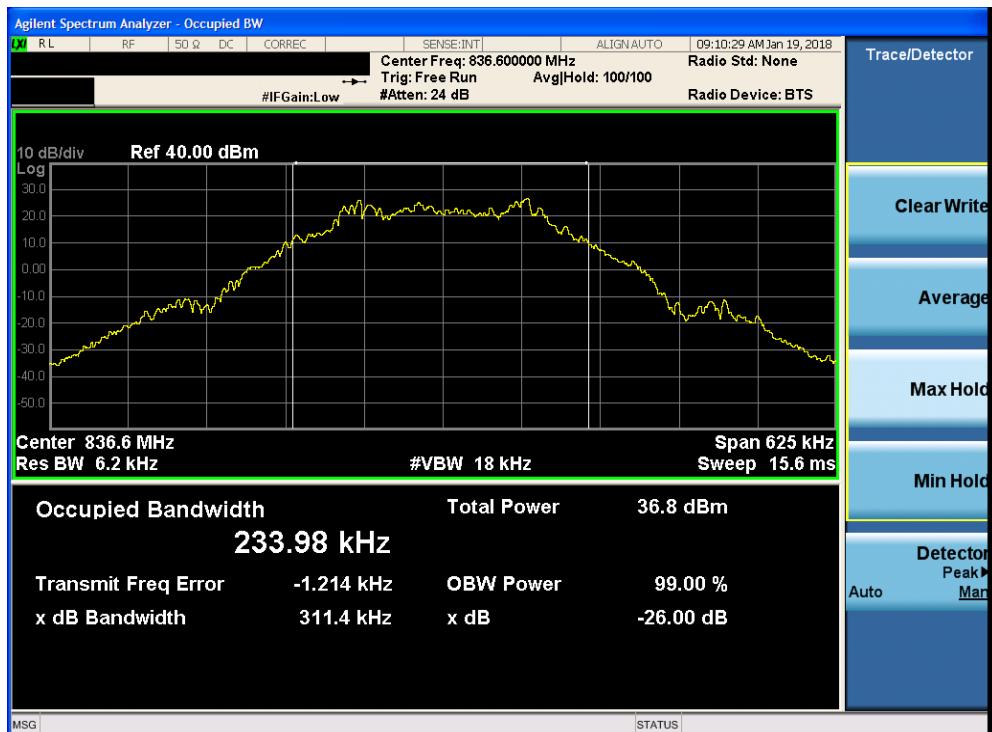
### Test Notes

None.

FCC ID: BCGA1954	 <b>PCTEST</b> <small>ENGINEERING LABORATORY, INC.</small>		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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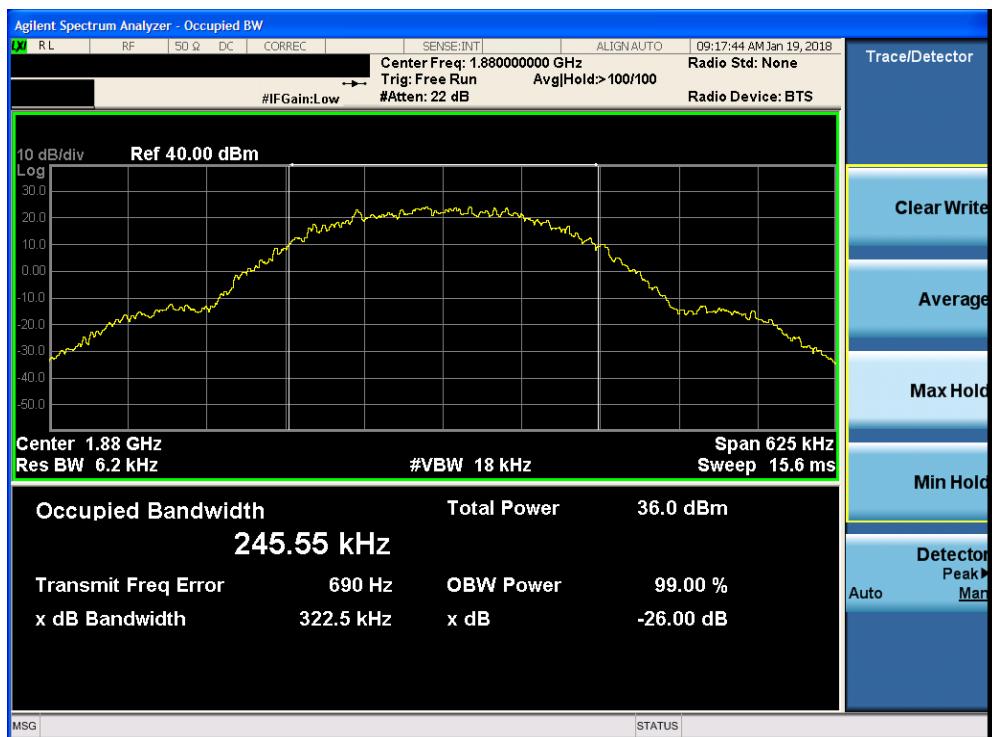


**Plot 7-1. Occupied Bandwidth Plot (Cellular GPRS Mode)**



**Plot 7-2. Occupied Bandwidth Plot (EDGE850 Mode)**

FCC ID: BCGA1954	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
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Plot 7-3. Occupied Bandwidth Plot (PCS GPRS Mode)

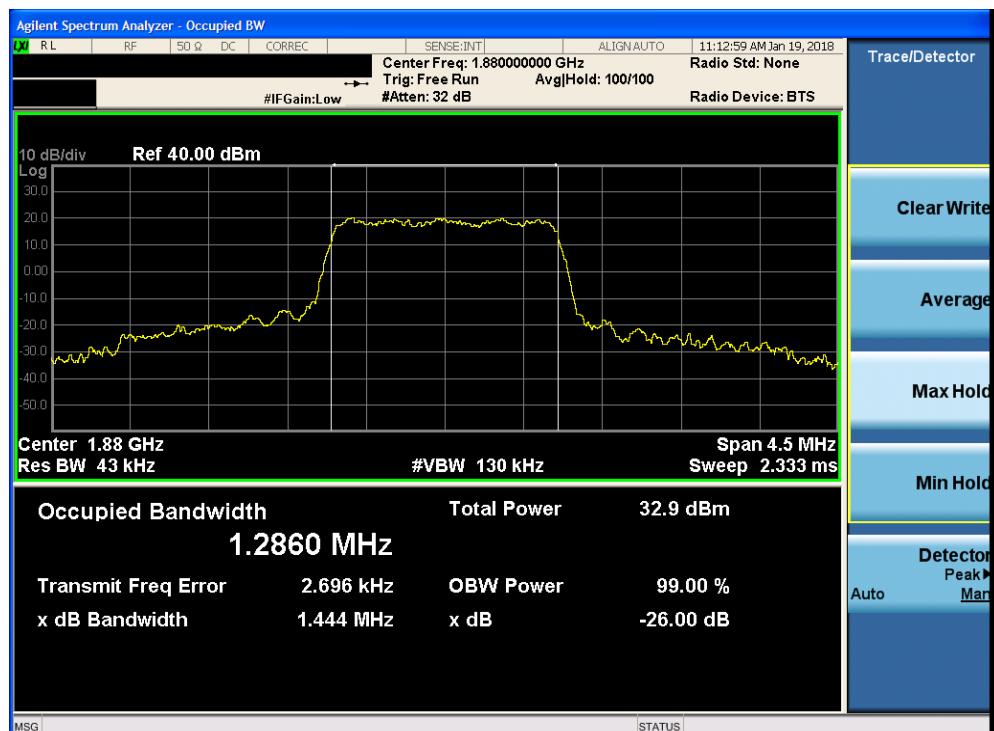


Plot 7-4. Occupied Bandwidth Plot (EDGE1900 Mode)

FCC ID: BCGA1954	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-5. Occupied Bandwidth Plot (Cellular CDMA Mode)



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

FCC ID: BCGA1954	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-7. Occupied Bandwidth Plot (Cellular WCDMA Mode)



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

FCC ID: BCGA1954	 <b>PCTEST</b> <sup>®</sup> ENGINEERING LABORATORY, INC.		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 18 of 113	



**Plot 7-9. Occupied Bandwidth Plot (PCS WCDMA Mode)**

FCC ID: BCGA1954	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 19 of 113

## 7.3 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051 §22.917(a) §24.238(a) §27.53(h) RSS-132(5.5) RSS-133(6.5) RSS-139(6.6)

### 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 10<sup>th</sup> 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  $43 + \log_{10}(P[\text{Watts}])$ , where P is the transmitter power in Watts.**

### Test Procedure Used

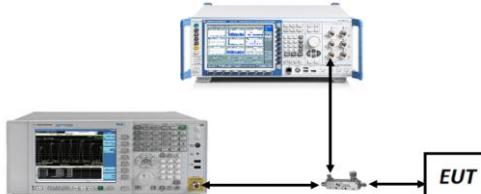
KDB 971168 D01 v03 – Section 6.0

### 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.



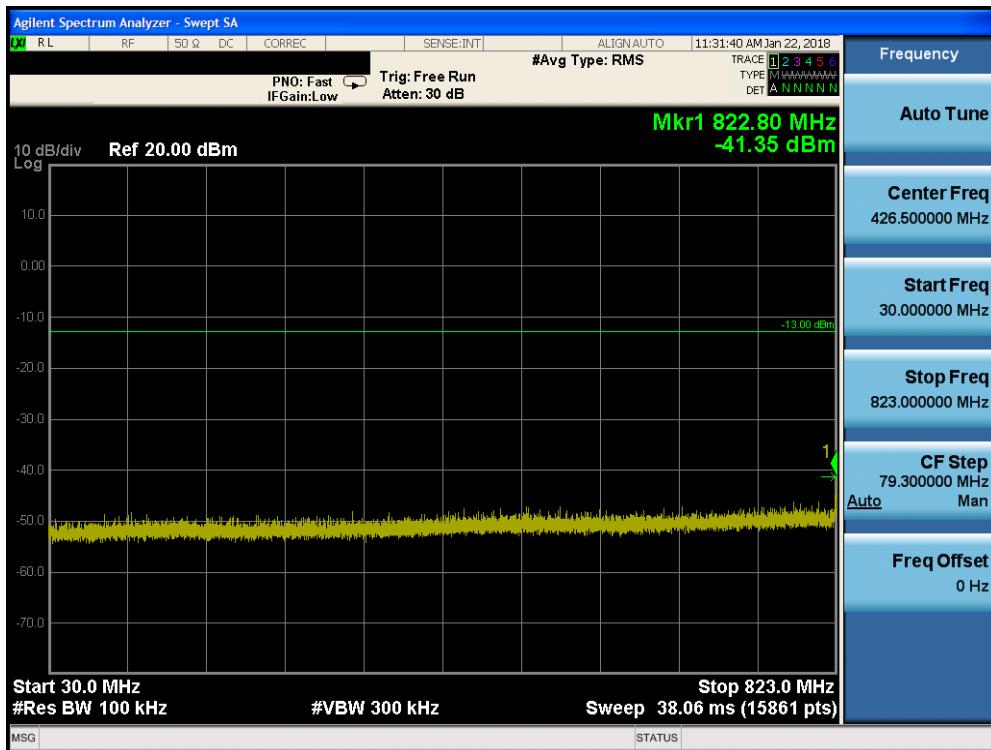
**Figure 7-2. Test Instrument & Measurement Setup**

### Test Notes

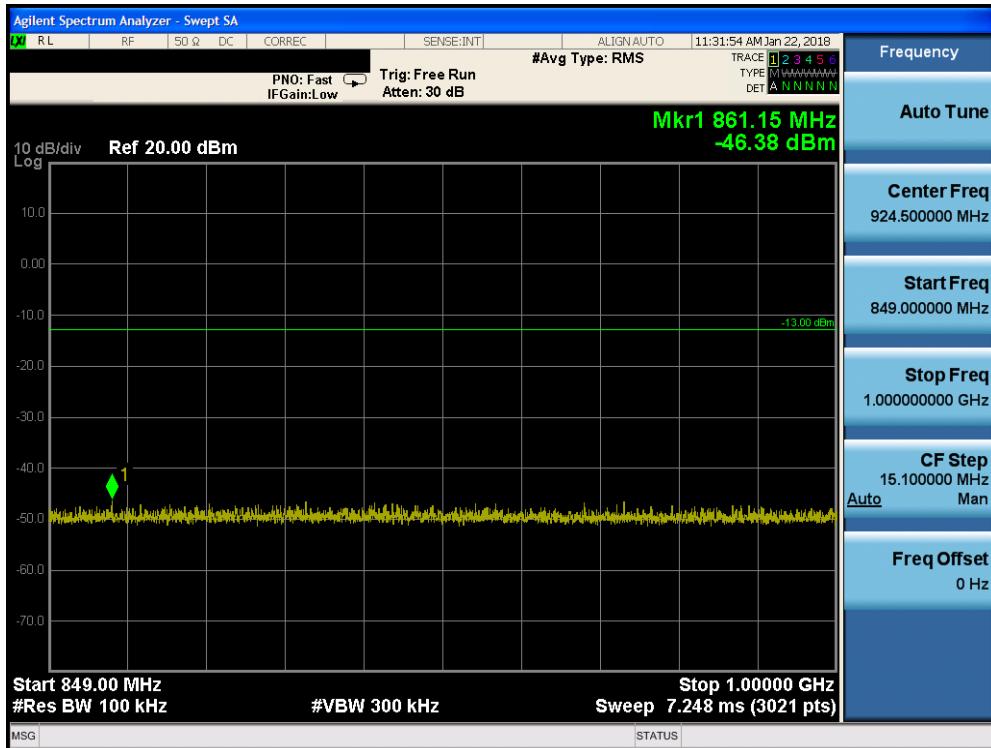
Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 1MHz, and 100 kHz or greater for Part 22 and RSS-132 measurements below 1GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth 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: BCGA1954	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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## Cellular GPRS Mode

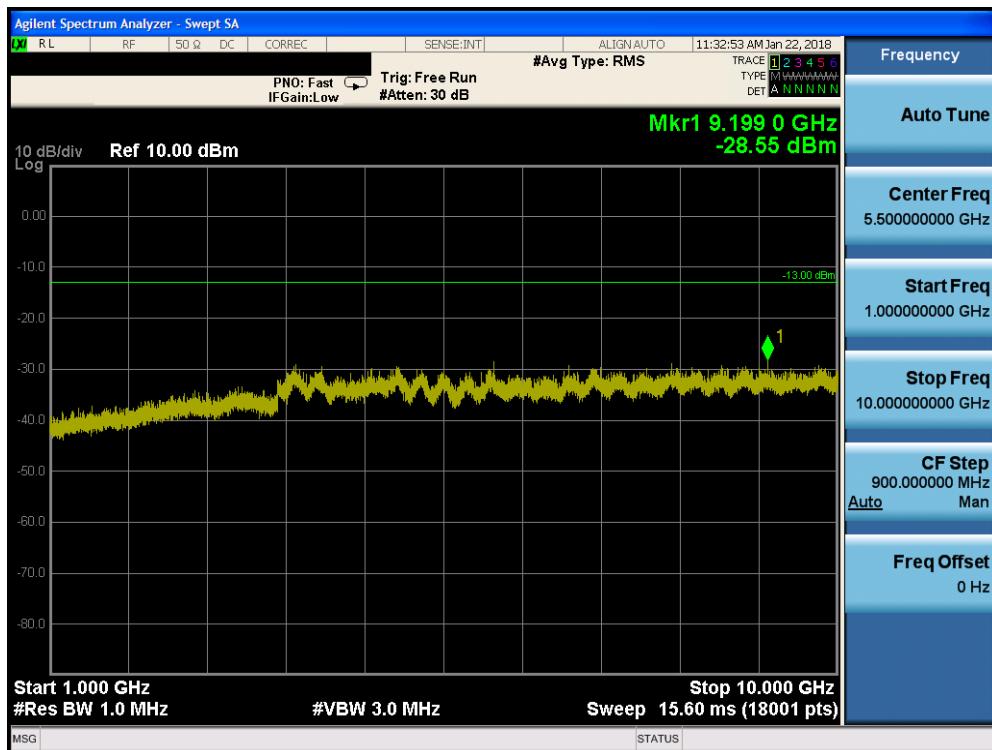


Plot 7-10. Conducted Spurious Plot (Cellular GPRS Mode - Low Channel)

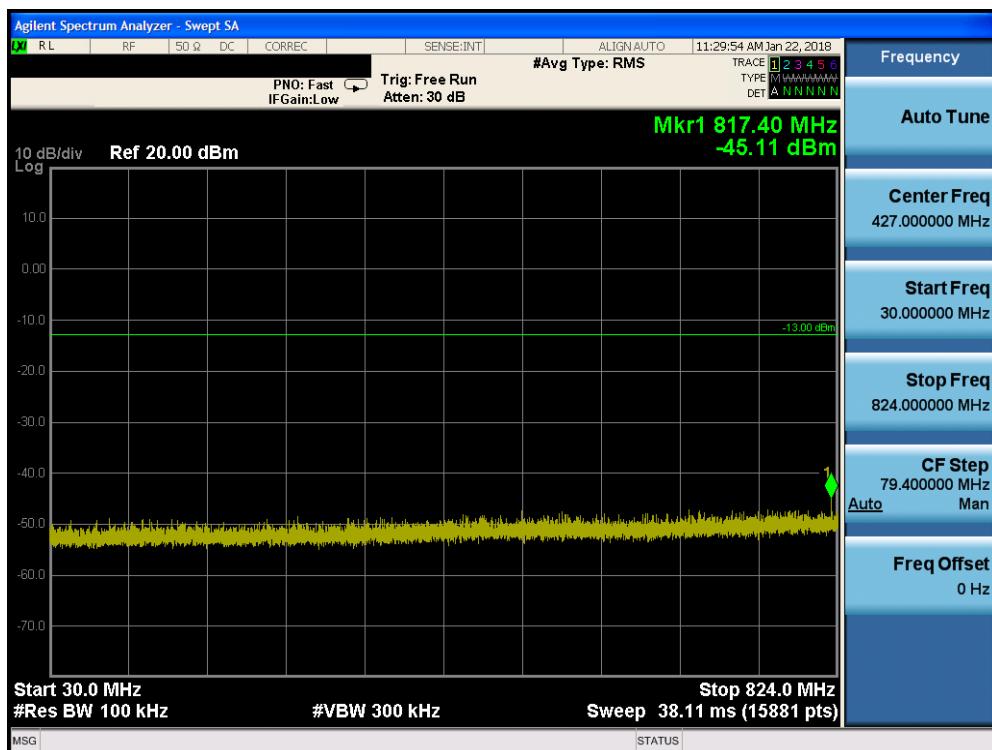


Plot 7-11. Conducted Spurious Plot (Cellular GPRS Mode - Low Channel)

FCC ID: BCGA1954	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>		Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 21 of 113

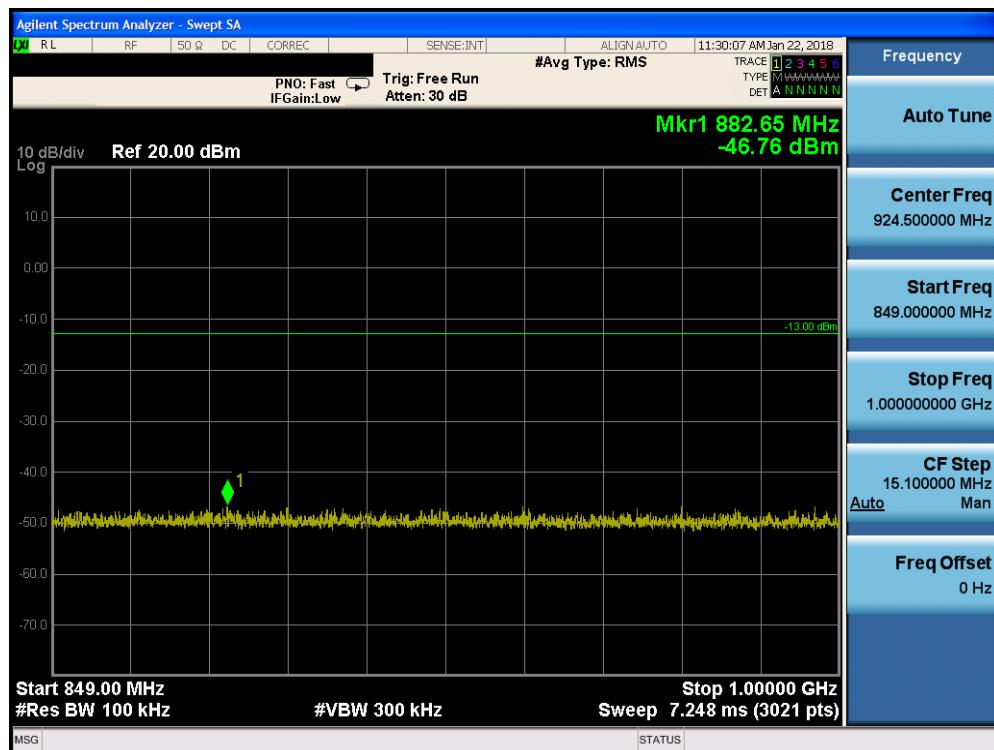


Plot 7-12. Conducted Spurious Plot (Cellular GPRS Mode - Low Channel)

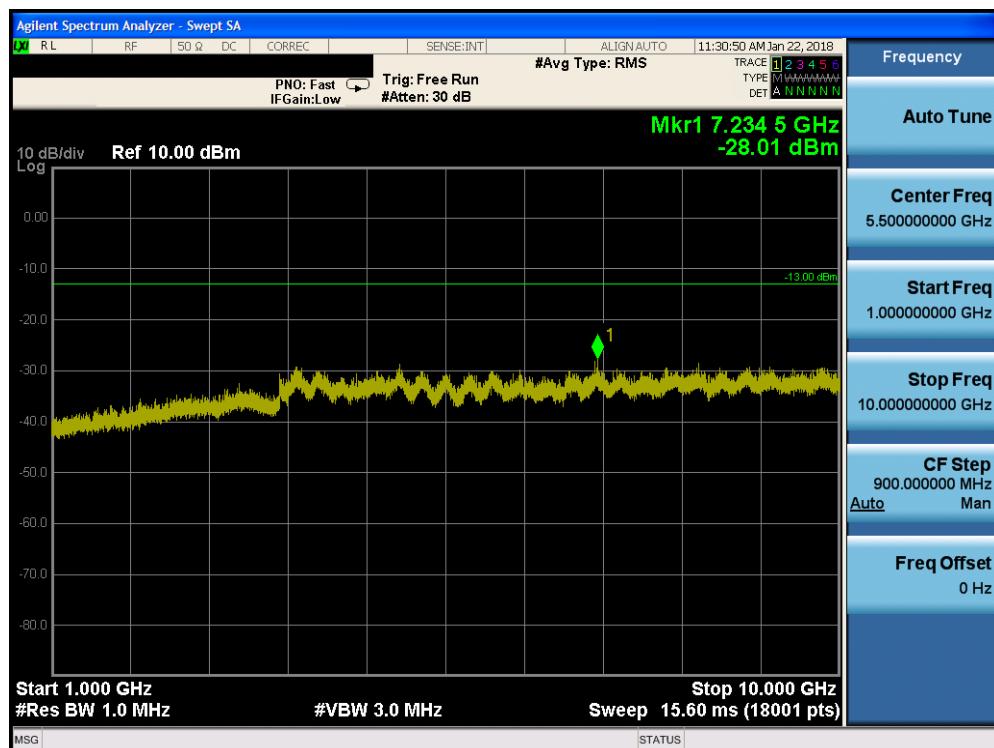


Plot 7-13. Conducted Spurious Plot (Cellular GPRS Mode - Mid Channel)

FCC ID: BCGA1954	 <b>MEASUREMENT REPORT</b> (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 22 of 113

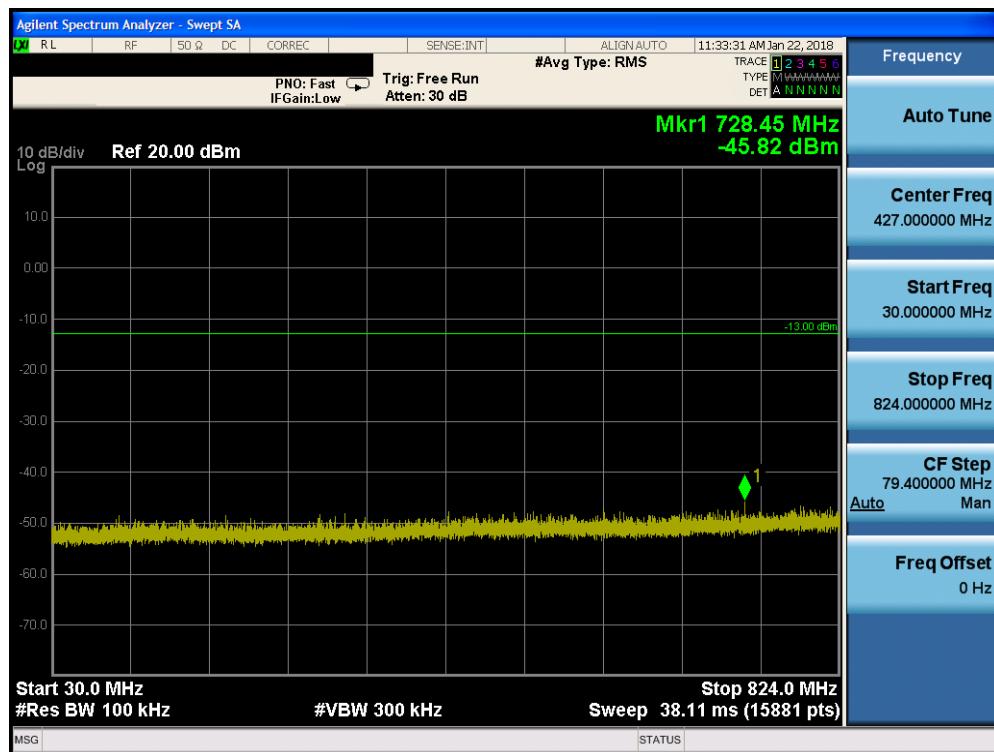


Plot 7-14. Conducted Spurious Plot (Cellular GPRS Mode - Mid Channel)

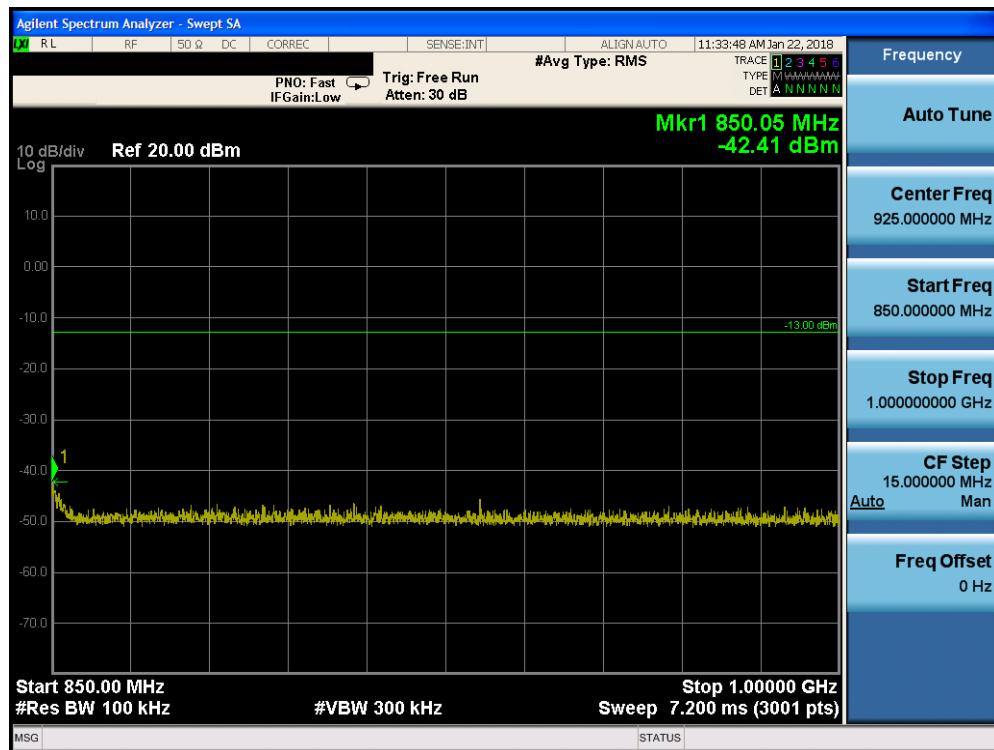


Plot 7-15. Conducted Spurious Plot (Cellular GPRS Mode - Mid Channel)

FCC ID: BCGA1954	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 23 of 113

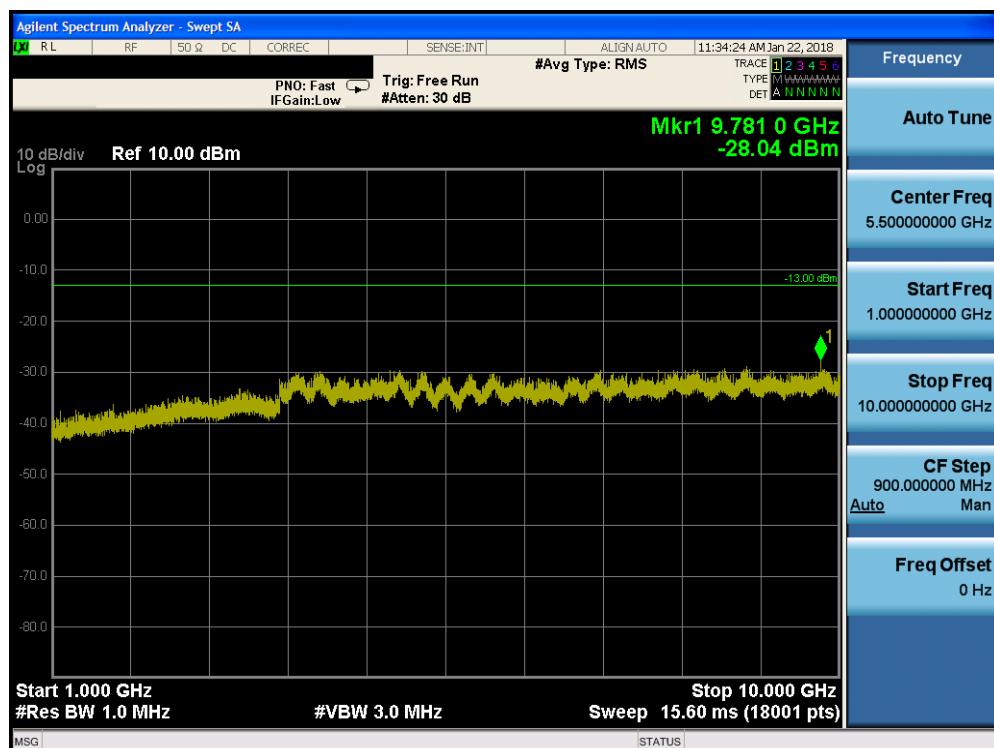


Plot 7-16. Conducted Spurious Plot (Cellular GPRS Mode - High Channel)



Plot 7-17. Conducted Spurious Plot (Cellular GPRS Mode - High Channel)

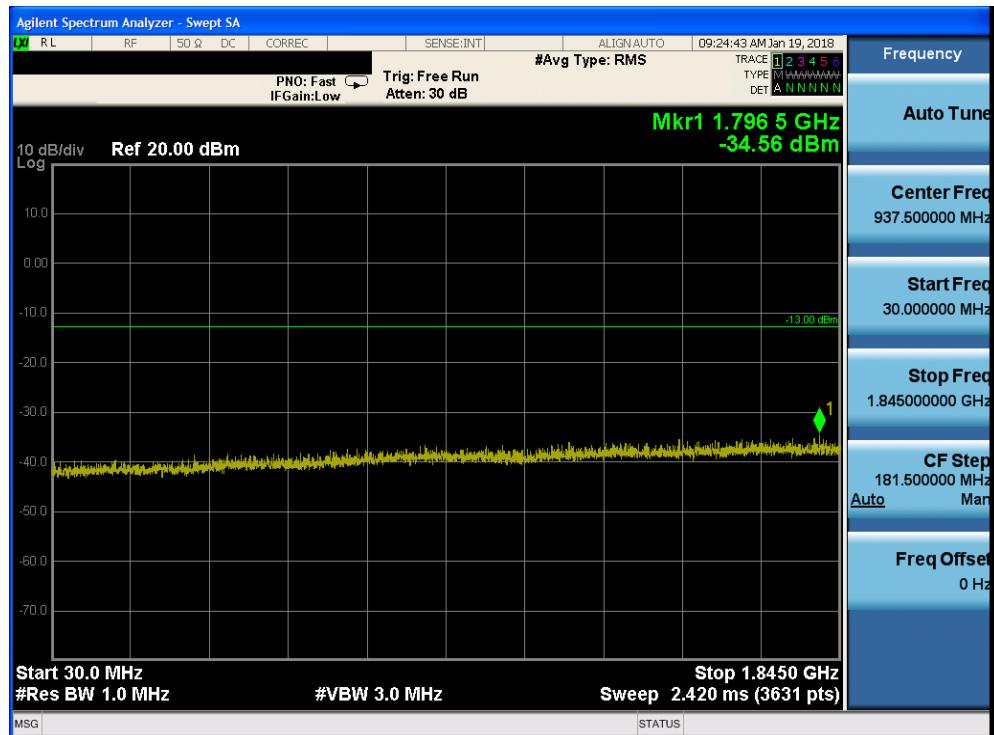
FCC ID: BCGA1954	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 24 of 113



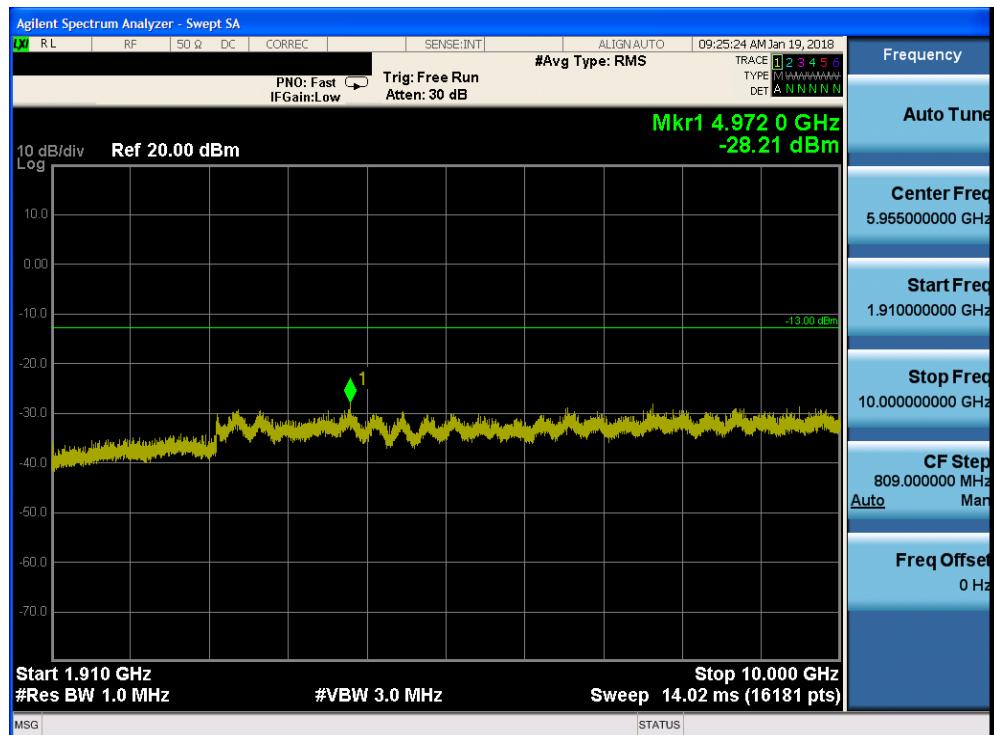
Plot 7-18. Conducted Spurious Plot (Cellular GPRS Mode - High Channel)

FCC ID: BCGA1954	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 25 of 113

## PCS GPRS Mode

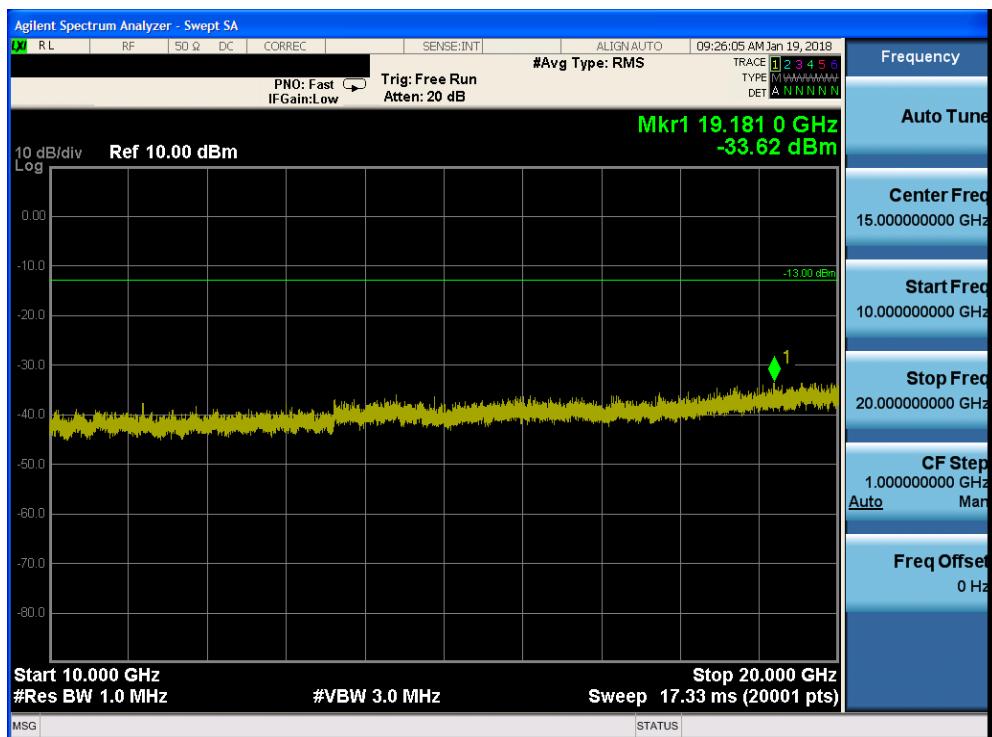


Plot 7-19. Conducted Spurious Plot (PCS GPRS Mode - Low Channel)

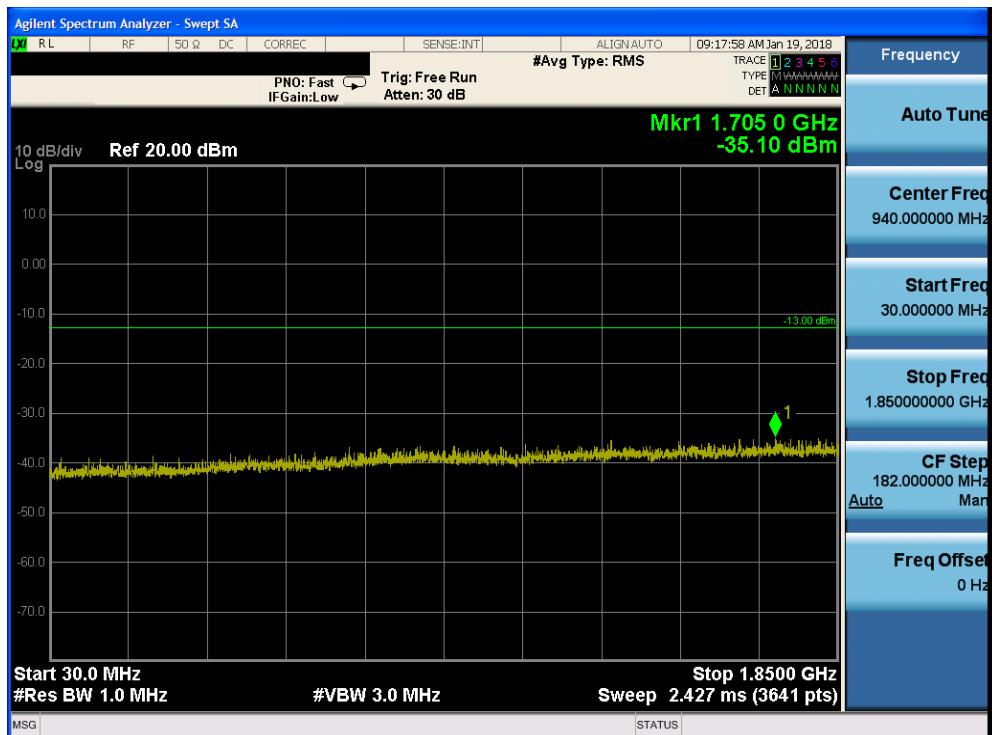


Plot 7-20. Conducted Spurious Plot (PCS GPRS Mode - Low Channel)

FCC ID: BCGA1954	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>		Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 26 of 113

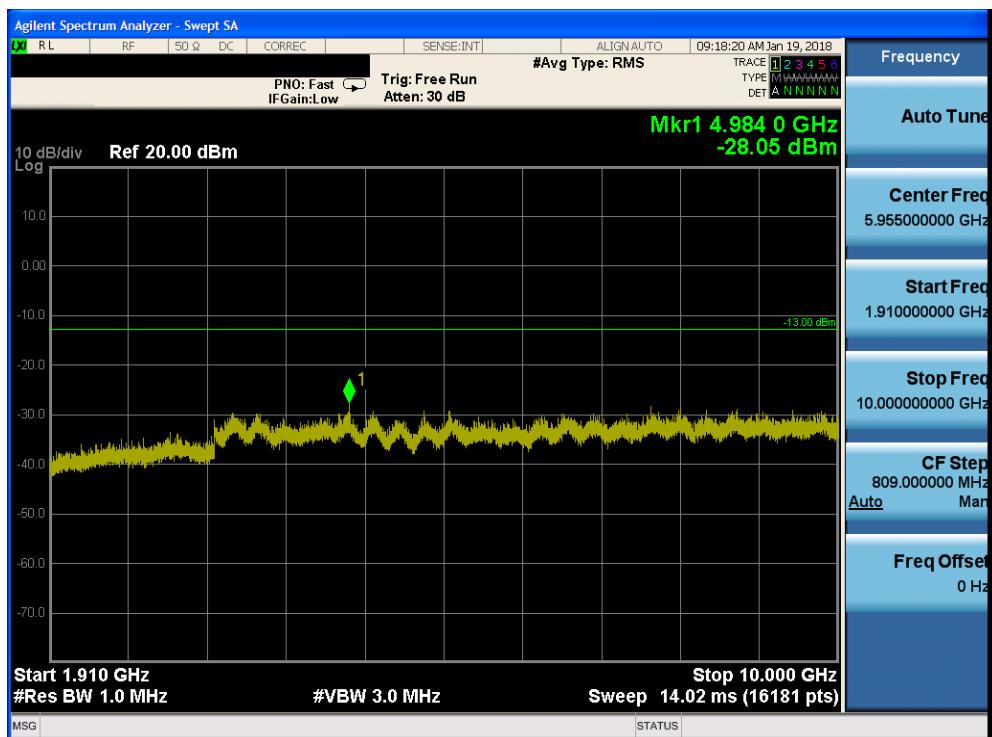


Plot 7-21. Conducted Spurious Plot (PCS GPRS Mode - Low Channel)

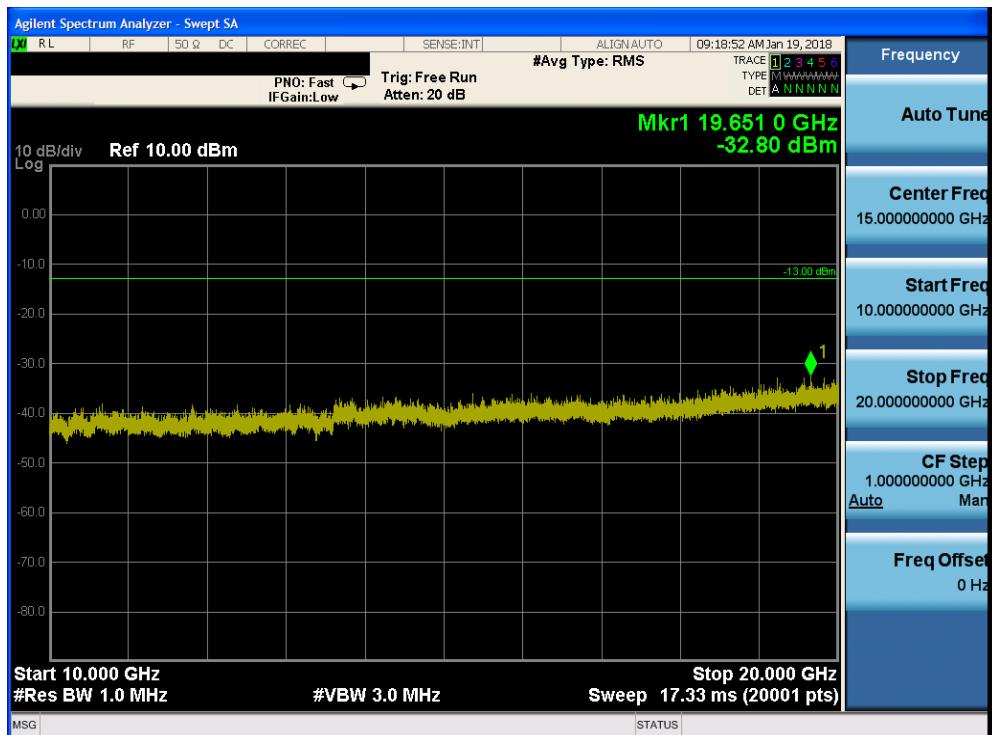


Plot 7-22. Conducted Spurious Plot (PCS GPRS Mode - Mid Channel)

FCC ID: BCGA1954	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device		Page 27 of 113

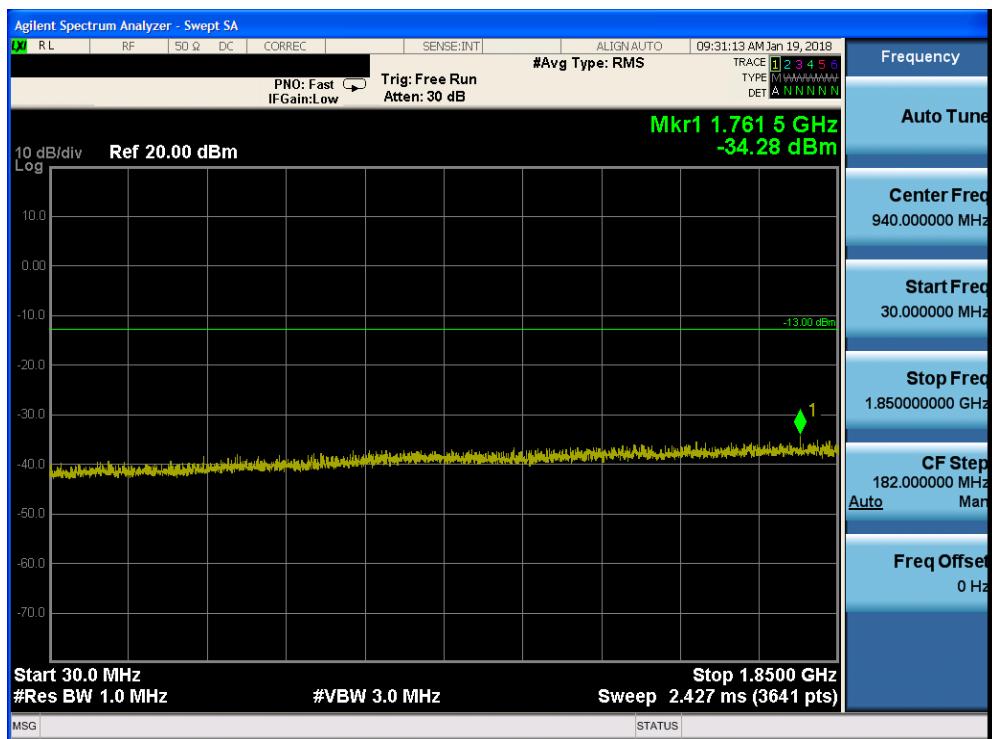


Plot 7-23. Conducted Spurious Plot (PCS GPRS Mode - Mid Channel)

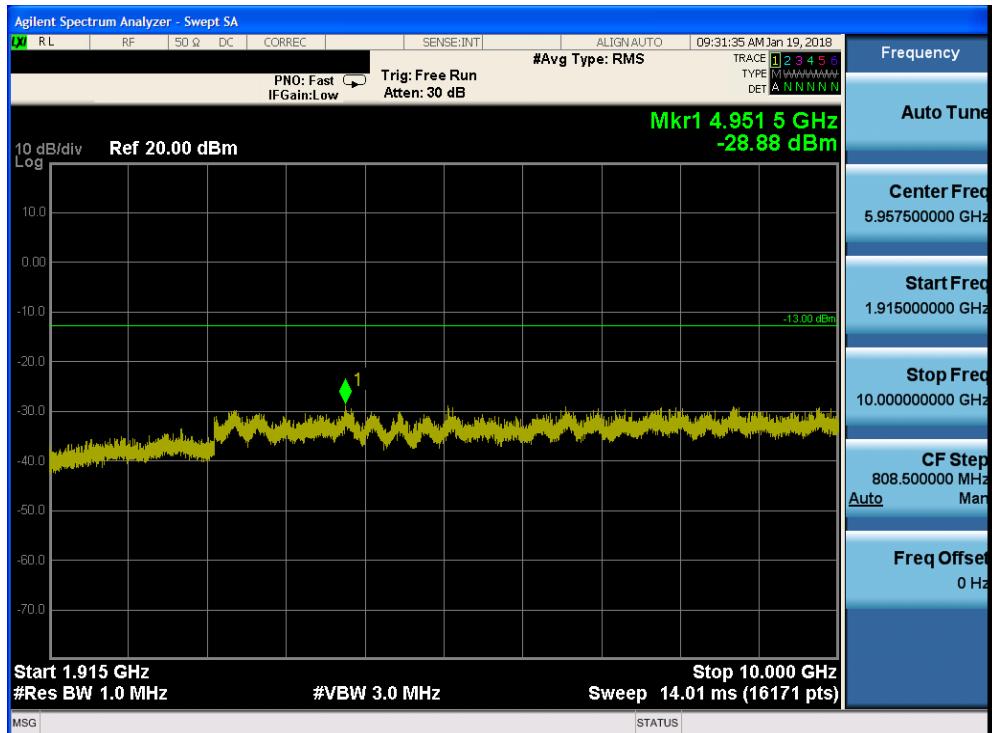


Plot 7-24. Conducted Spurious Plot (PCS GPRS Mode - Mid Channel)

FCC ID: BCGA1954	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device		Page 28 of 113

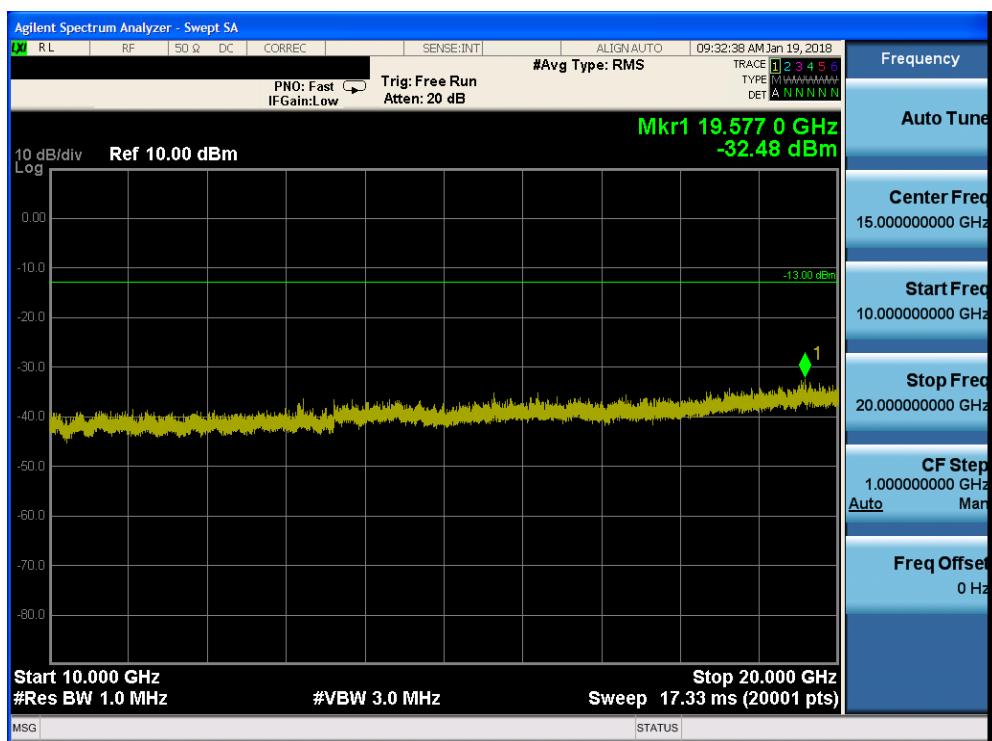


Plot 7-25. Conducted Spurious Plot (PCS GPRS Mode - High Channel)



Plot 7-26. Conducted Spurious Plot (PCS GPRS Mode - High Channel)

FCC ID: BCGA1954	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 29 of 113	



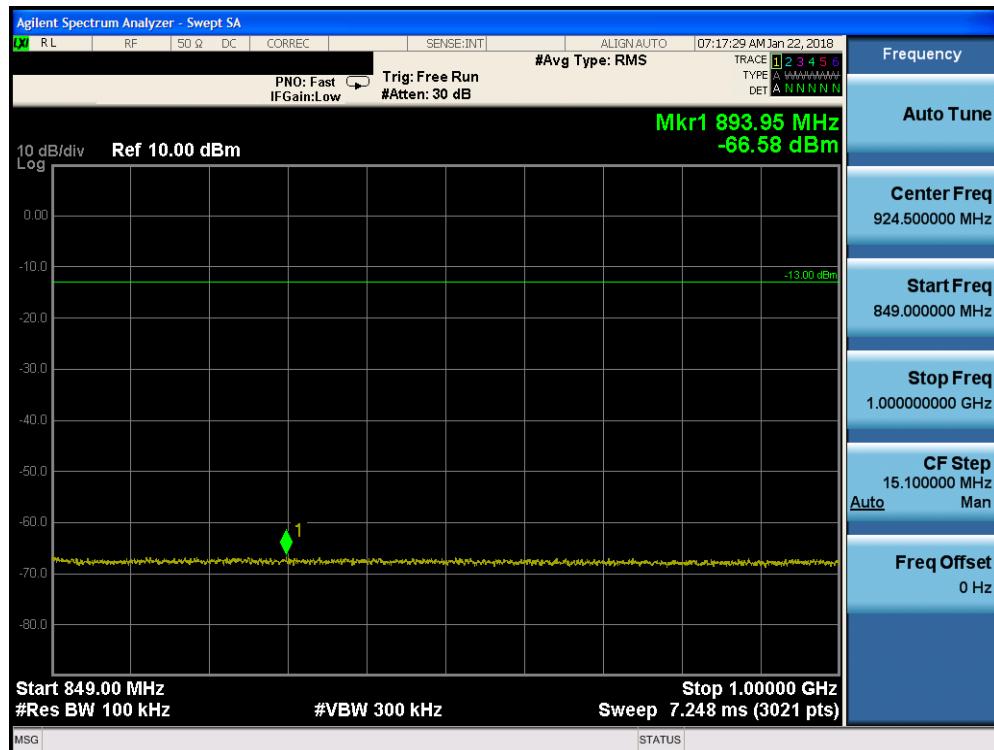
Plot 7-27. Conducted Spurious Plot (PCS GPRS Mode - High Channel)

FCC ID: BCGA1954	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 30 of 113

## Cellular CDMA Mode

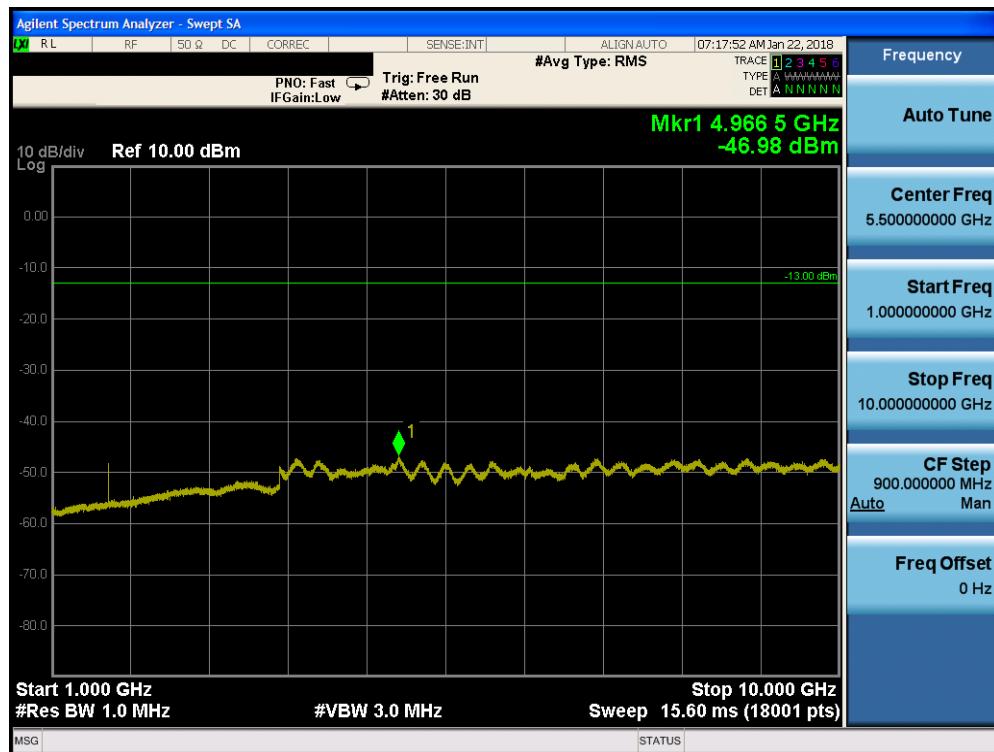


Plot 7-28. Conducted Spurious Plot (Cellular CDMA Mode - Low Channel)

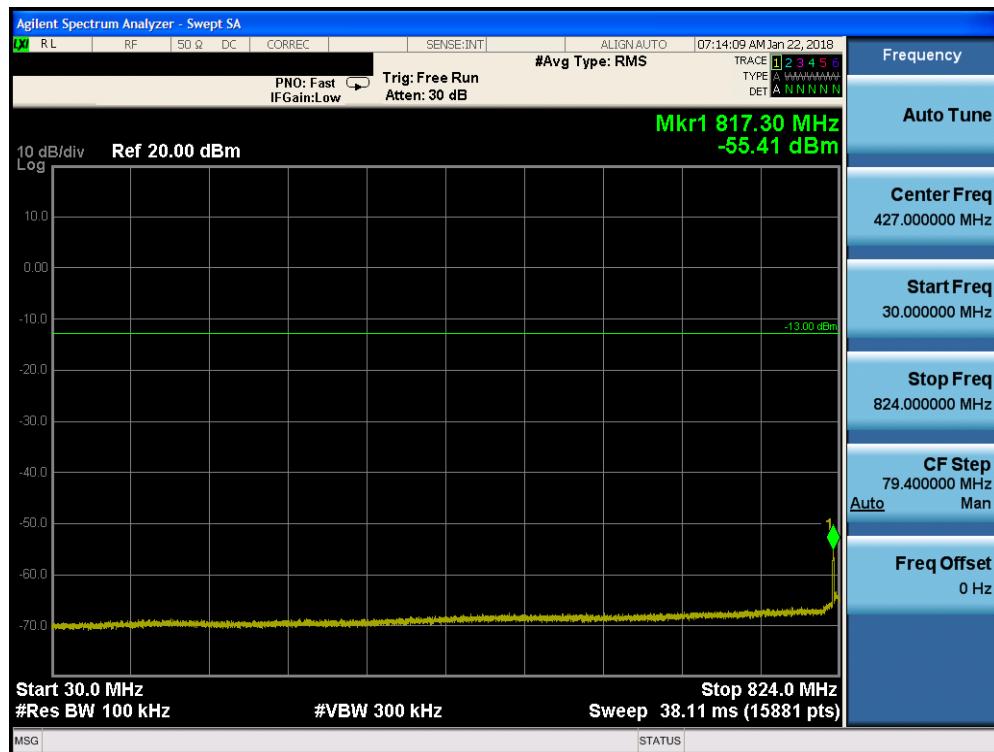


Plot 7-29. Conducted Spurious Plot (Cellular CDMA Mode - Low Channel)

FCC ID: BCGA1954		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 31 of 113

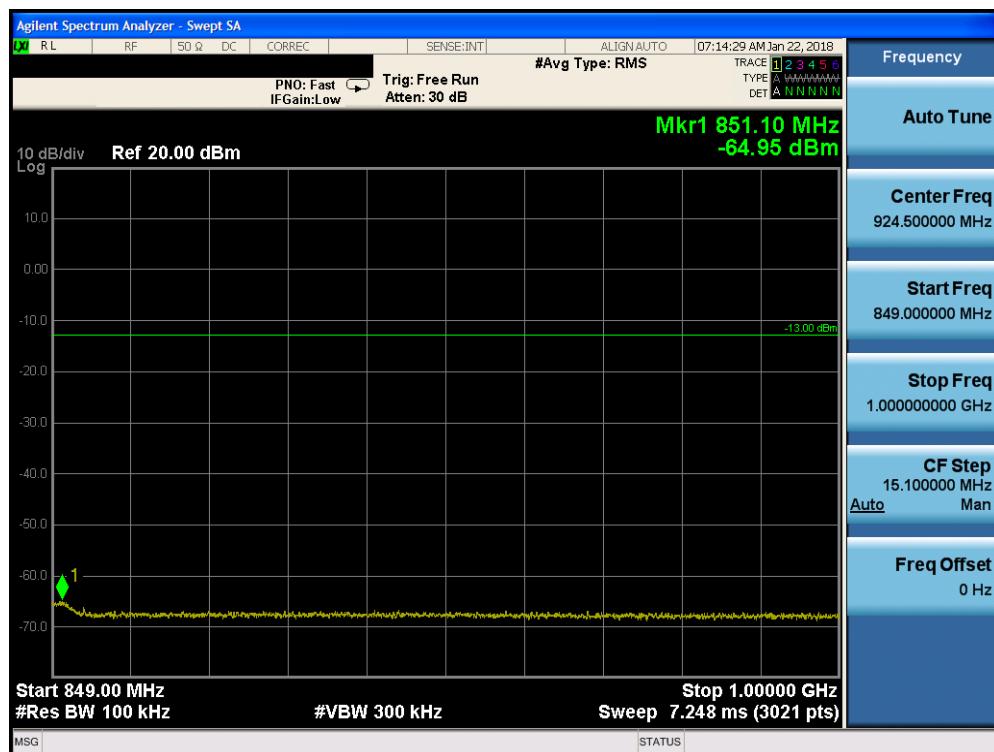


Plot 7-30. Conducted Spurious Plot (Cellular CDMA Mode - Low Channel)

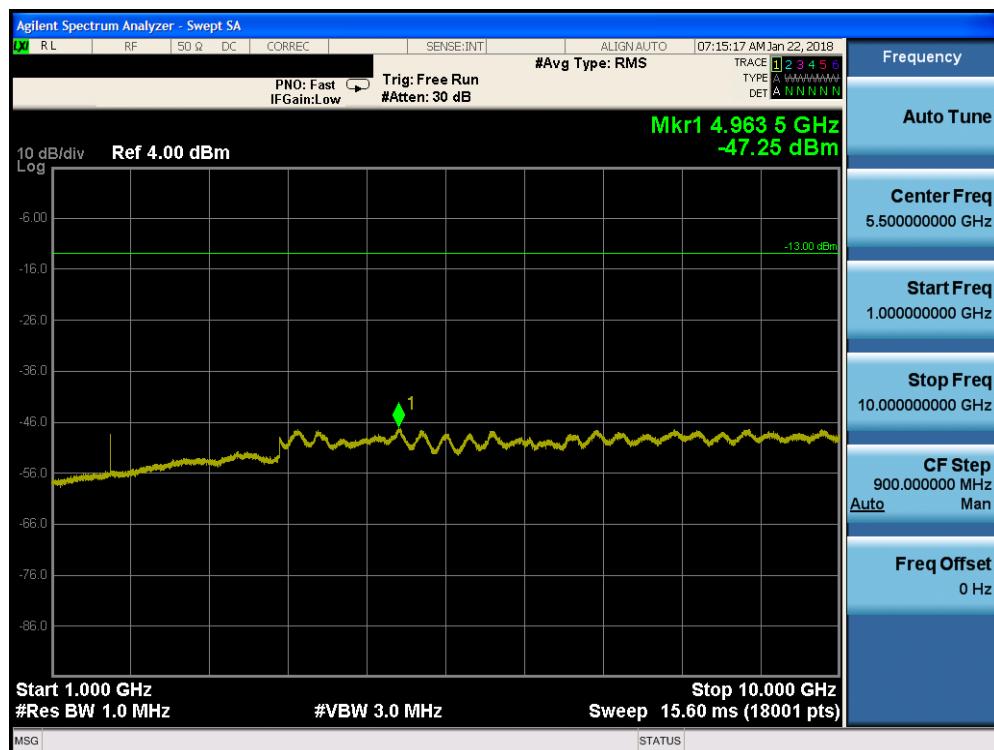


Plot 7-31. Conducted Spurious Plot (Cellular CDMA Mode - Mid Channel)

FCC ID: BCGA1954	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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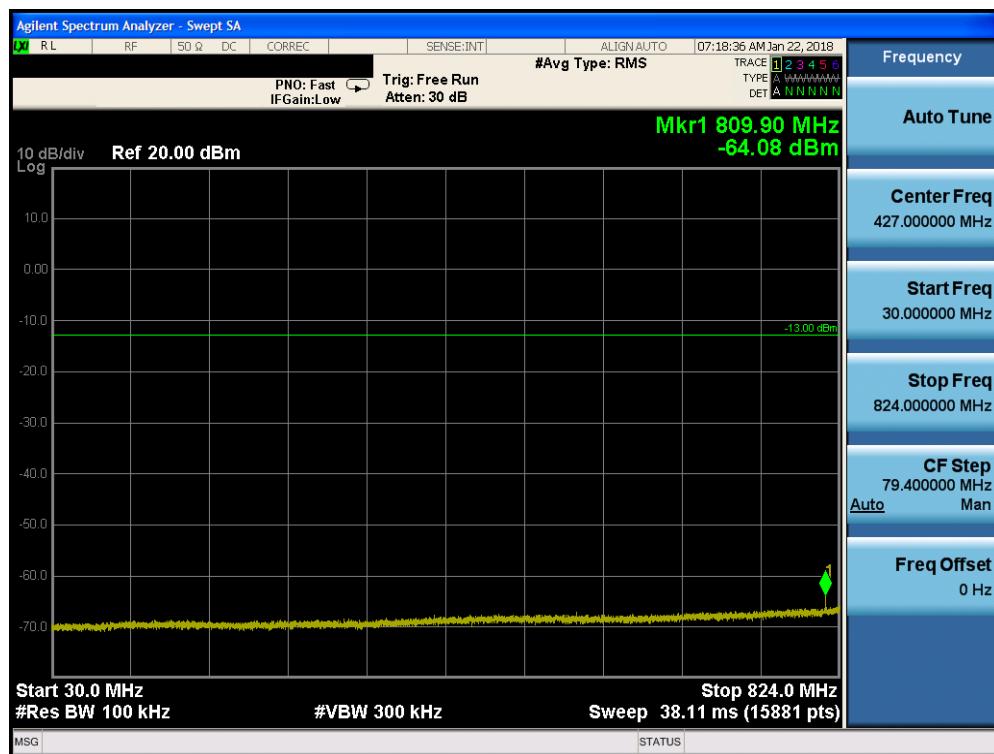


Plot 7-32. Conducted Spurious Plot (Cellular CDMA Mode - Mid Channel)

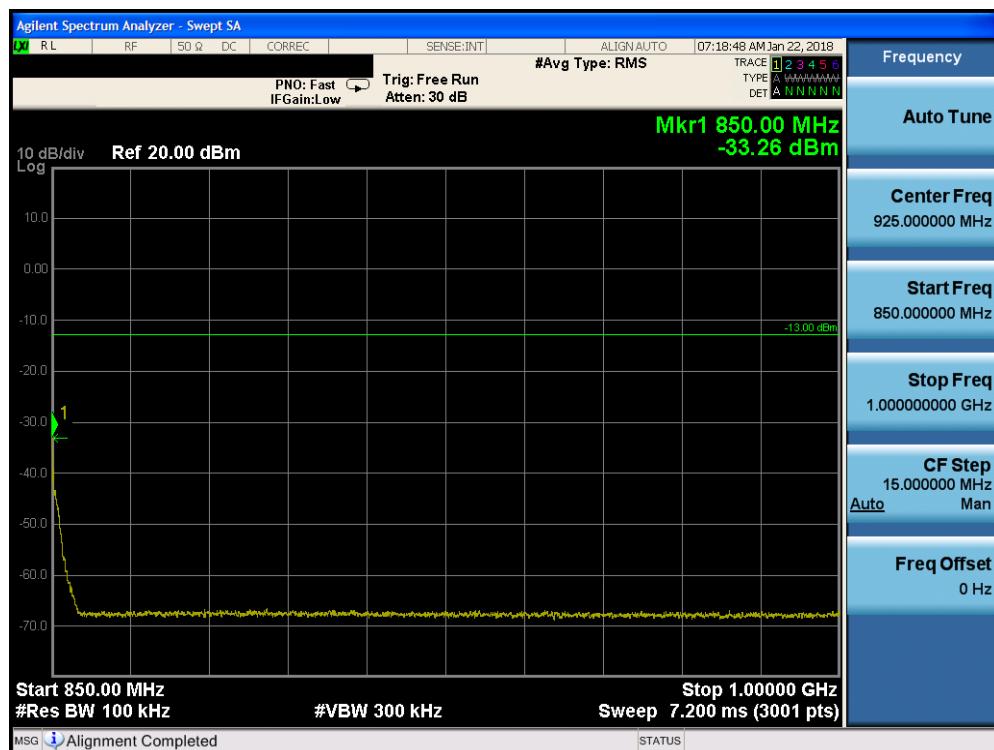


Plot 7-33. Conducted Spurious Plot (Cellular CDMA Mode - Mid Channel)

FCC ID: BCGA1954	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 33 of 113

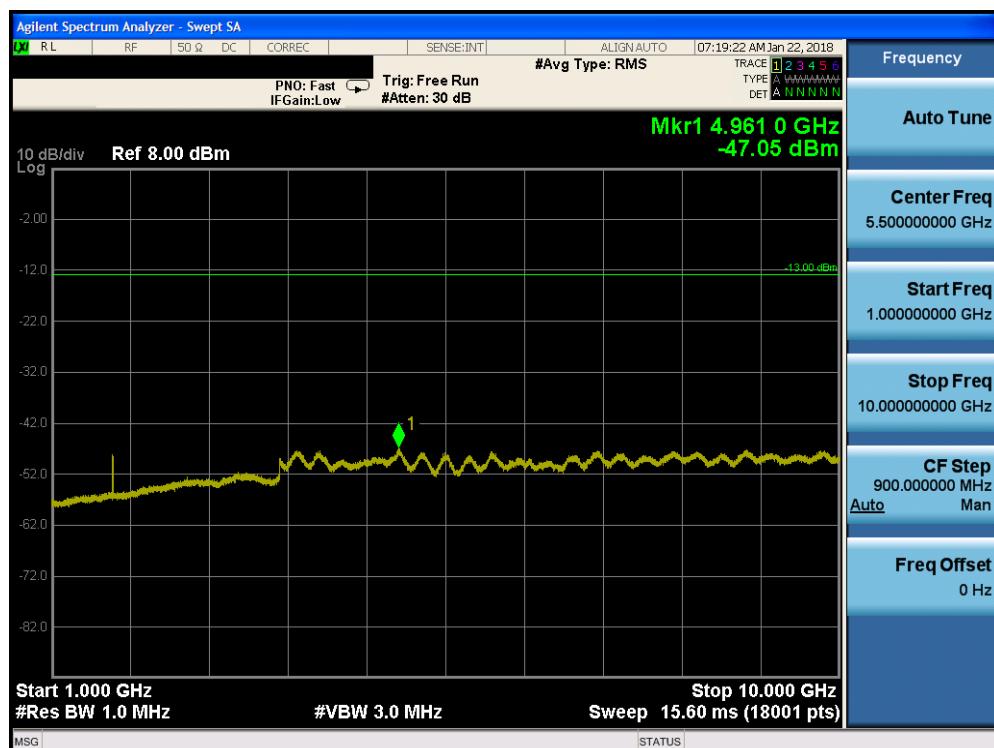


Plot 7-34. Conducted Spurious Plot (Cellular CDMA Mode - High Channel)



Plot 7-35. Conducted Spurious Plot (Cellular CDMA Mode - High Channel)

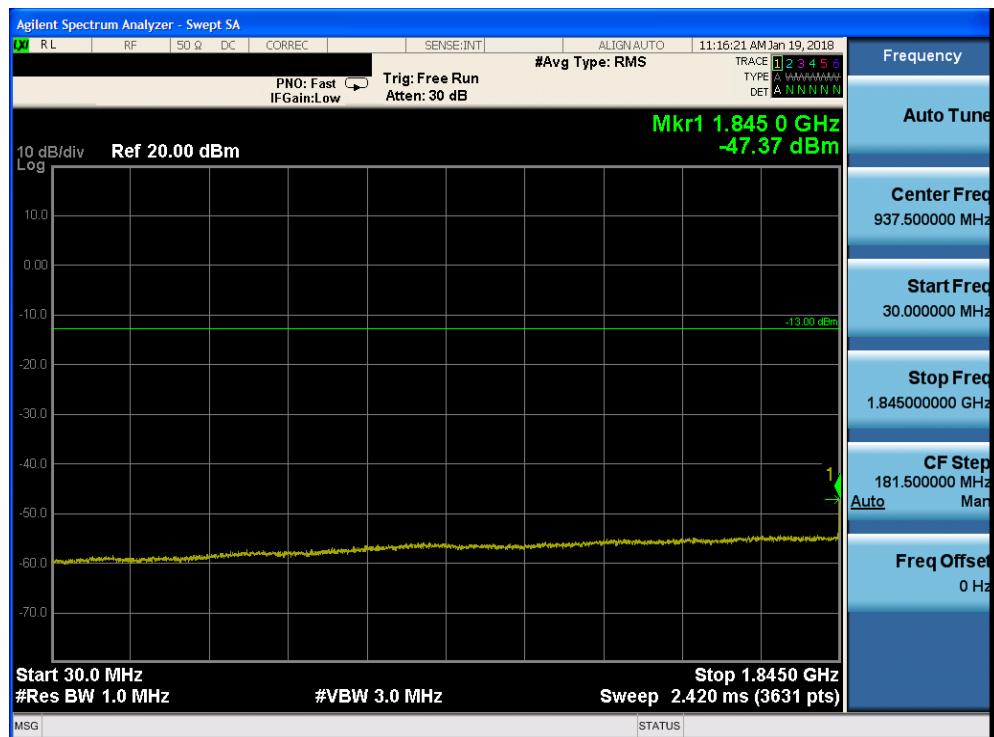
FCC ID: BCGA1954	 <b>PCTEST</b> <sup>®</sup> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 34 of 113



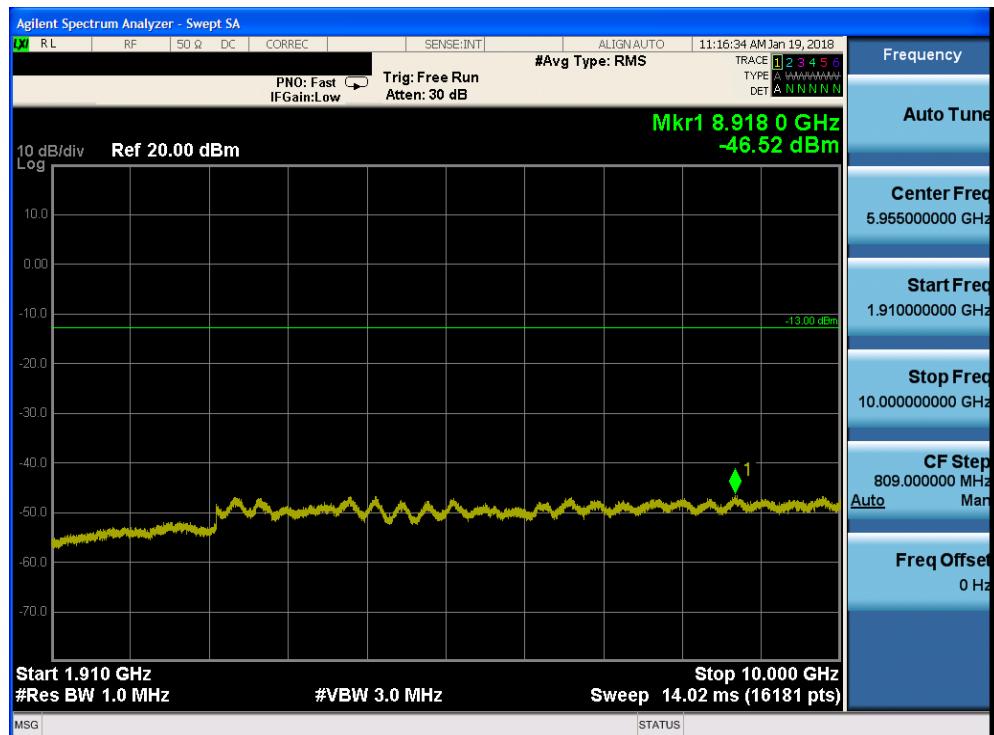
Plot 7-36. Conducted Spurious Plot (Cellular CDMA Mode - High Channel)

FCC ID: BCGA1954	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 35 of 113

## PCS CDMA Mode

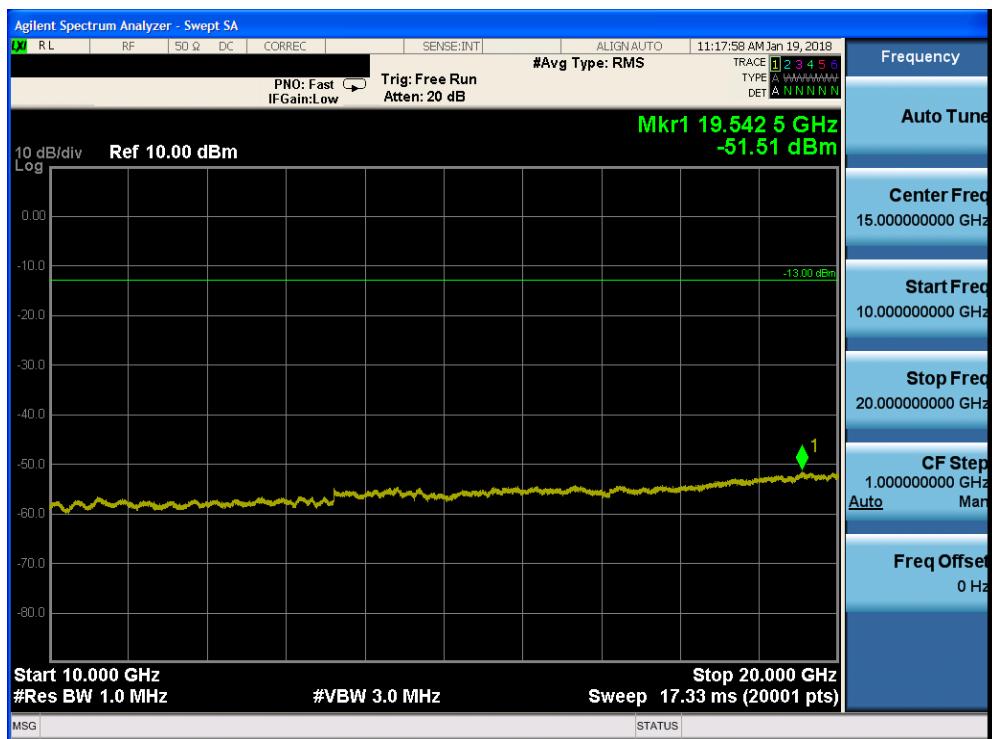


Plot 7-37. Conducted Spurious Plot (PCS CDMA Mode - Low Channel)



Plot 7-38. Conducted Spurious Plot (PCS CDMA Mode - Low Channel)

FCC ID: BCGA1954	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>		Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 36 of 113

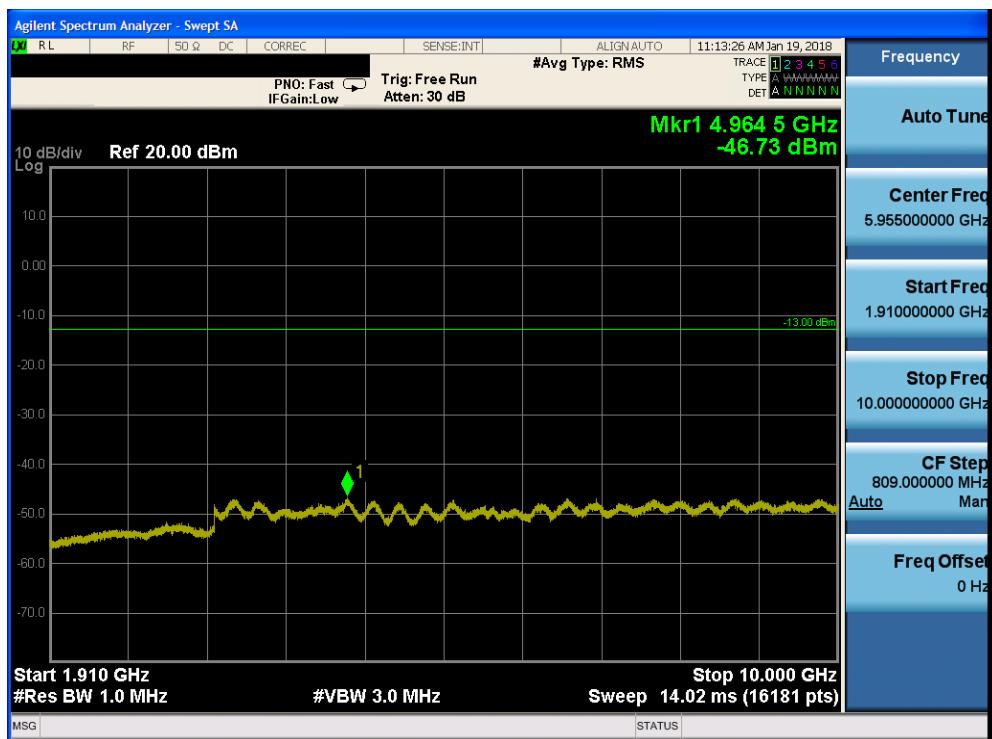


Plot 7-39. Conducted Spurious Plot (PCS CDMA Mode - Low Channel)

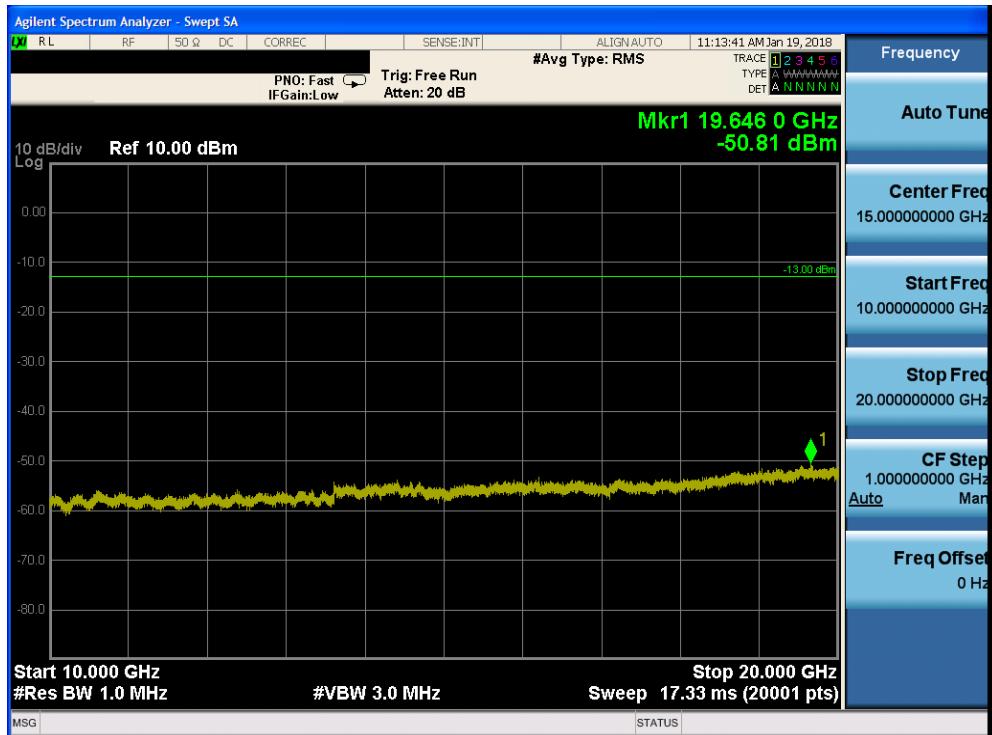


Plot 7-40. Conducted Spurious Plot (PCS CDMA Mode - Mid Channel)

FCC ID: BCGA1954	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device		Page 37 of 113



Plot 7-41. Conducted Spurious Plot (PCS CDMA Mode - Mid Channel)

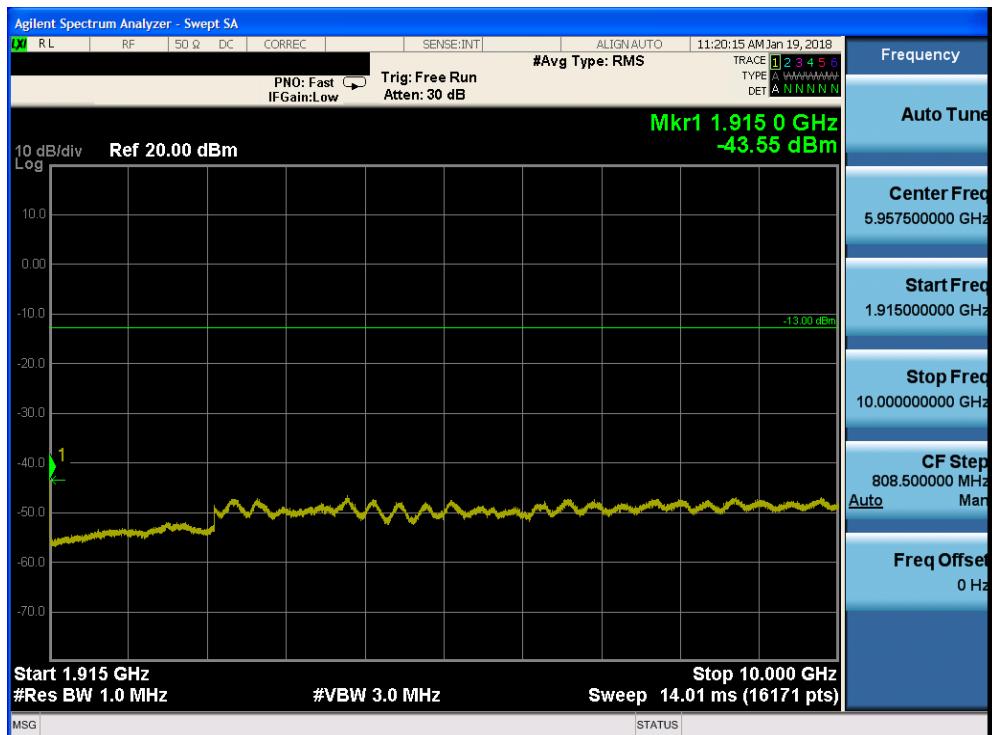


Plot 7-42. Conducted Spurious Plot (PCS CDMA Mode - Mid Channel)

FCC ID: BCGA1954	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device		Page 38 of 113

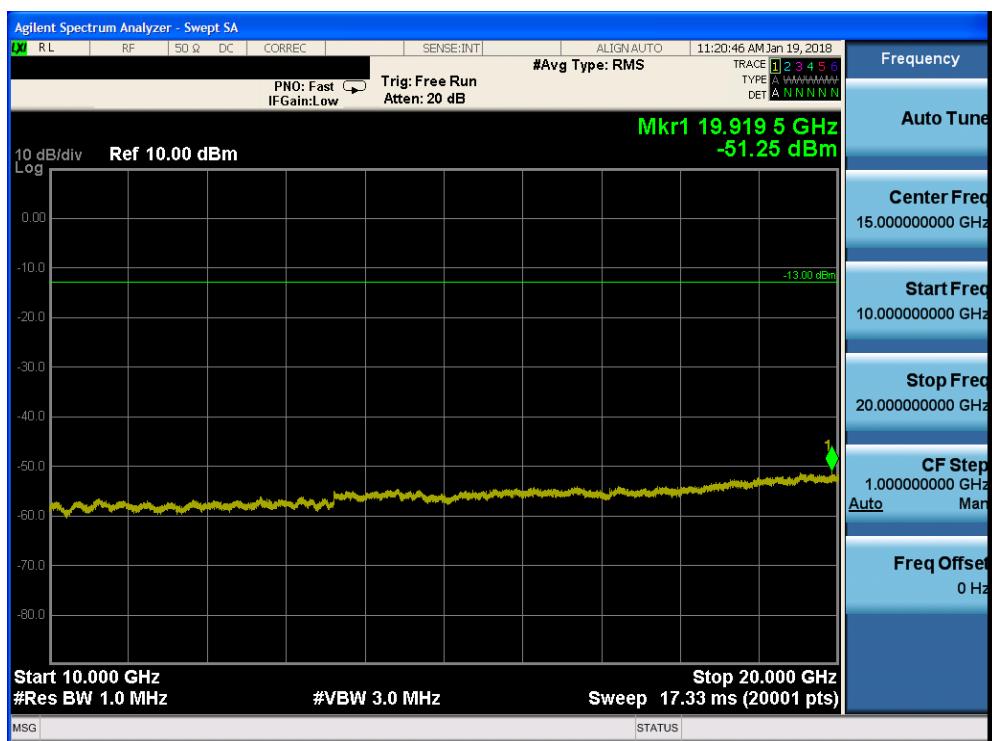


Plot 7-43. Conducted Spurious Plot (PCS CDMA Mode - High Channel)



Plot 7-44. Conducted Spurious Plot (PCS CDMA Mode - High Channel)

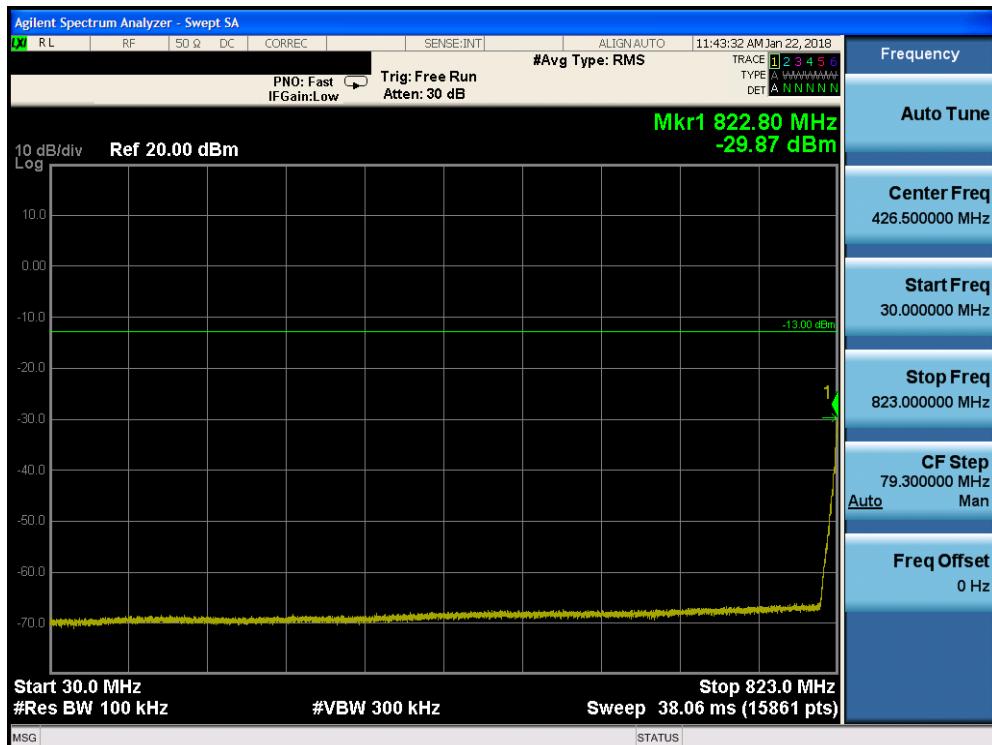
FCC ID: BCGA1954	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>		Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 39 of 113



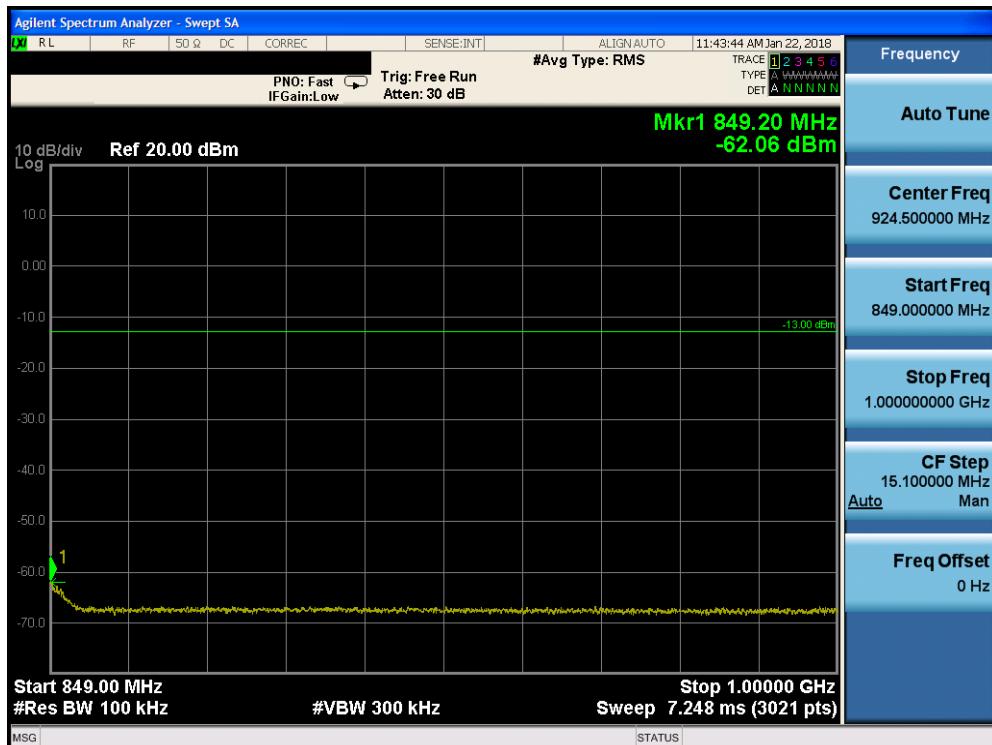
Plot 7-45. Conducted Spurious Plot (PCS CDMA Mode - High Channel)

FCC ID: BCGA1954	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 40 of 113

## Cellular WCDMA Mode



Plot 7-46. Conducted Spurious Plot (Cellular WCDMA Mode - Low Channel)

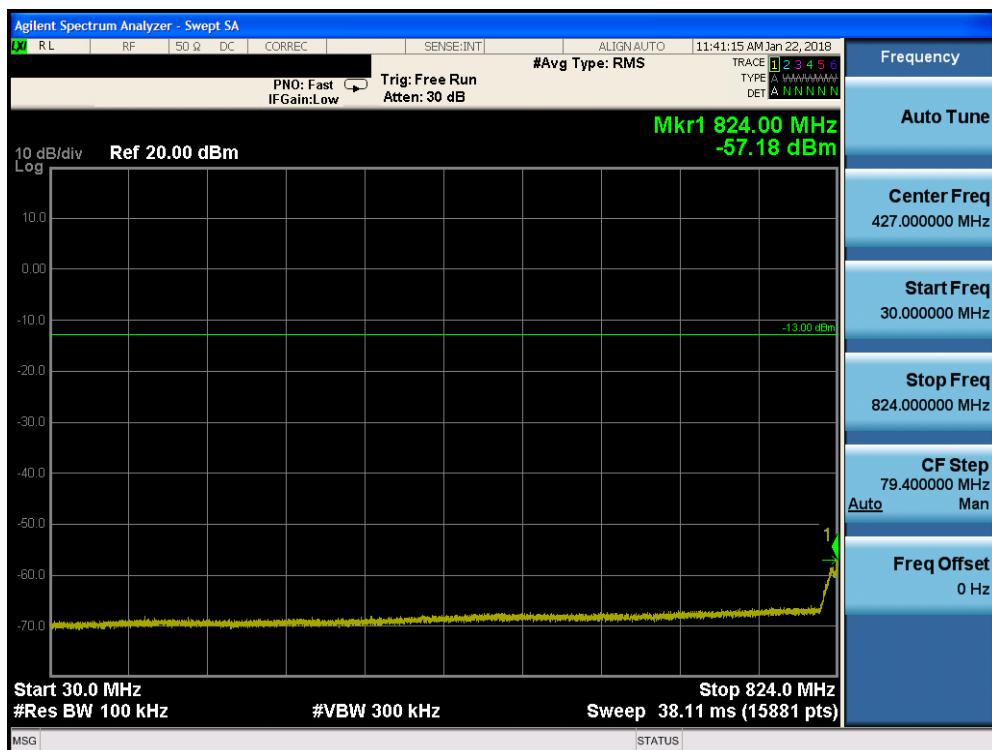


Plot 7-47. Conducted Spurious Plot (Cellular WCDMA Mode - Low Channel)

FCC ID: BCGA1954	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>		Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 41 of 113

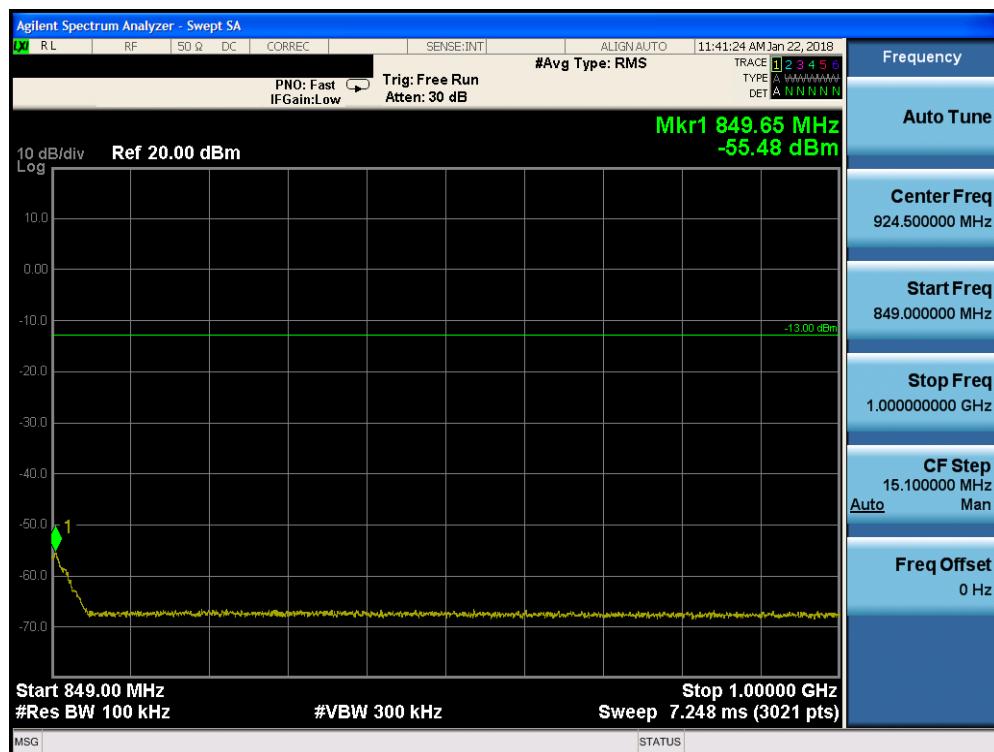


Plot 7-48. Conducted Spurious Plot (Cellular WCDMA Mode - Low Channel)

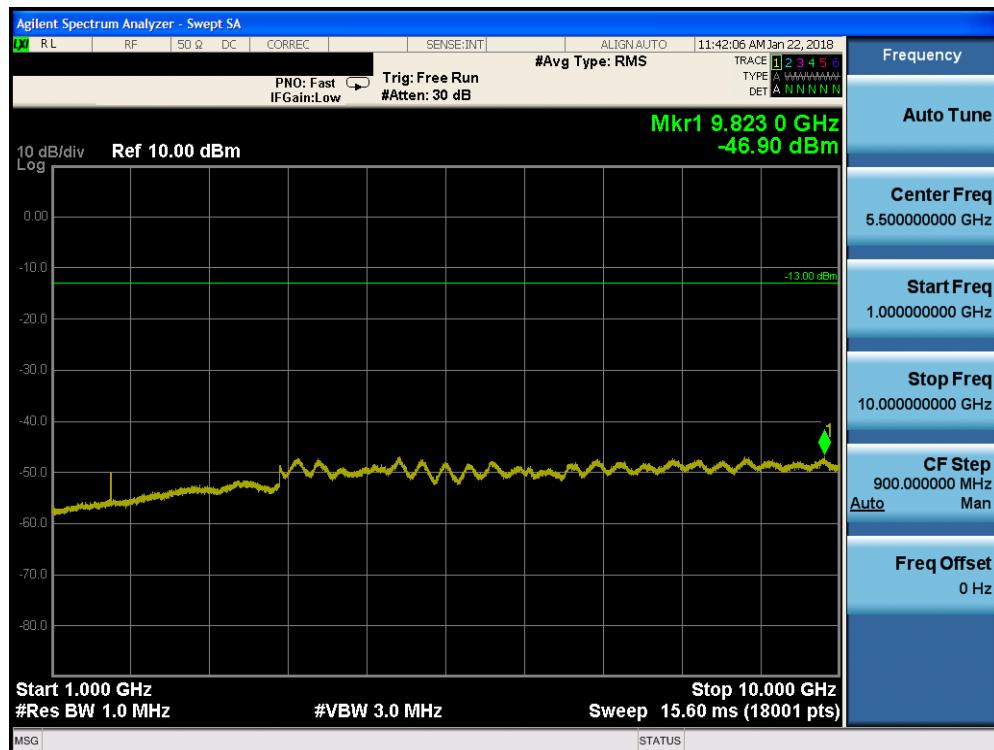


Plot 7-49. Conducted Spurious Plot (Cellular WCDMA Mode - Mid Channel)

FCC ID: BCGA1954	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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**Plot 7-50. Conducted Spurious Plot (Cellular WCDMA Mode - Mid Channel)**

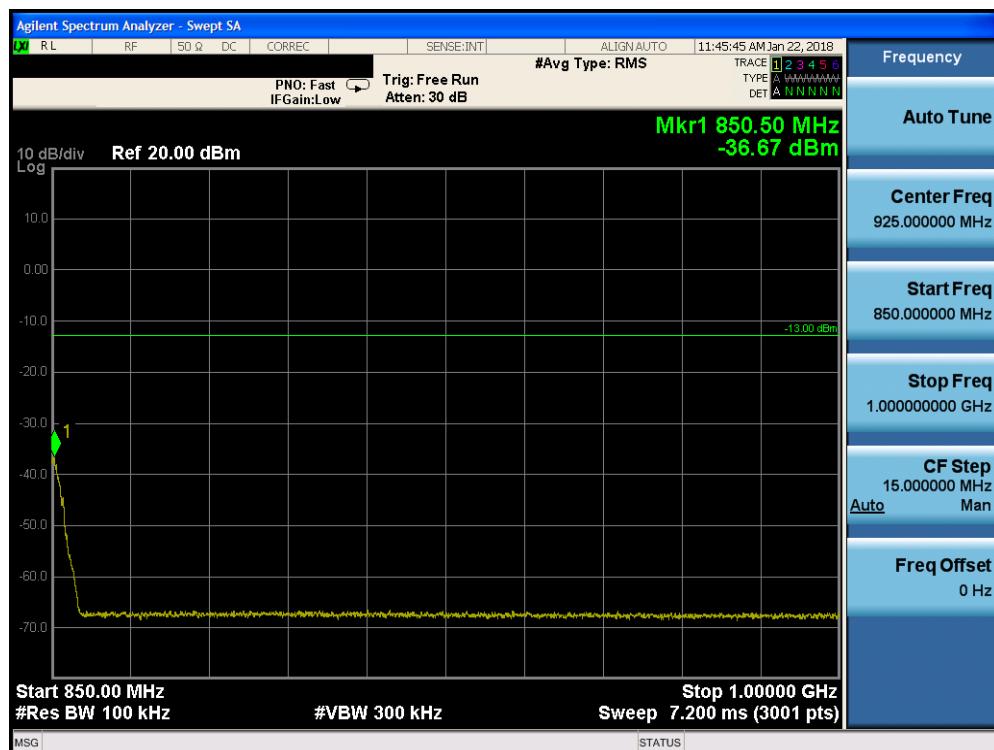


**Plot 7-51. Conducted Spurious Plot (Cellular WCDMA Mode - Mid Channel)**

FCC ID: BCGA1954	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 43 of 113

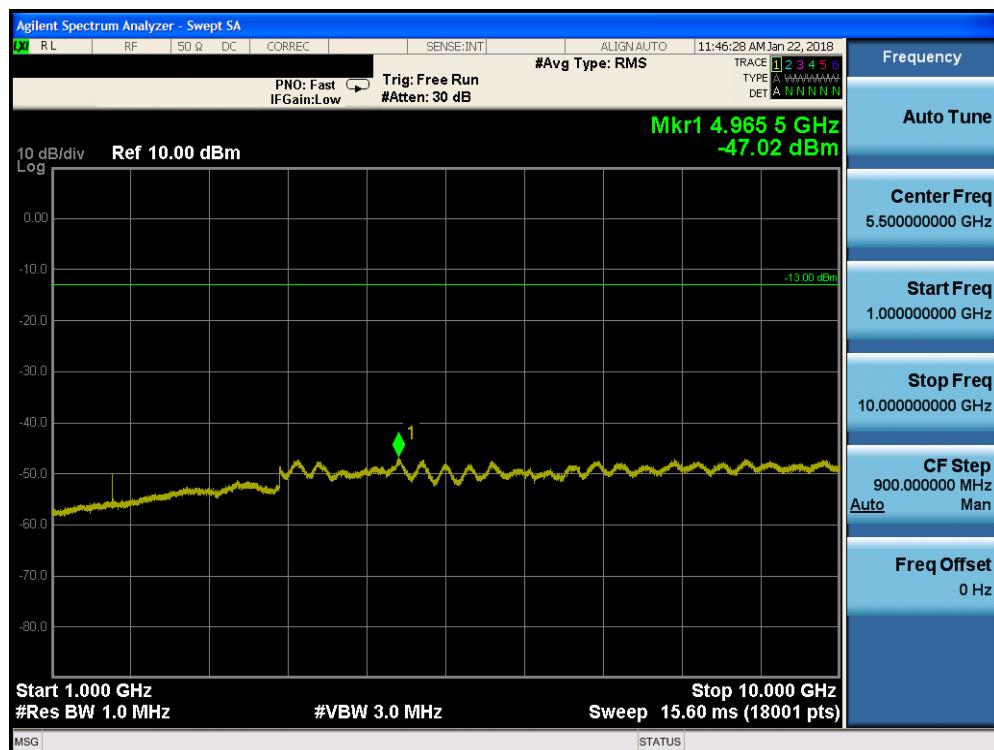


Plot 7-52. Conducted Spurious Plot (Cellular WCDMA Mode - High Channel)



Plot 7-53. Conducted Spurious Plot (Cellular WCDMA Mode - High Channel)

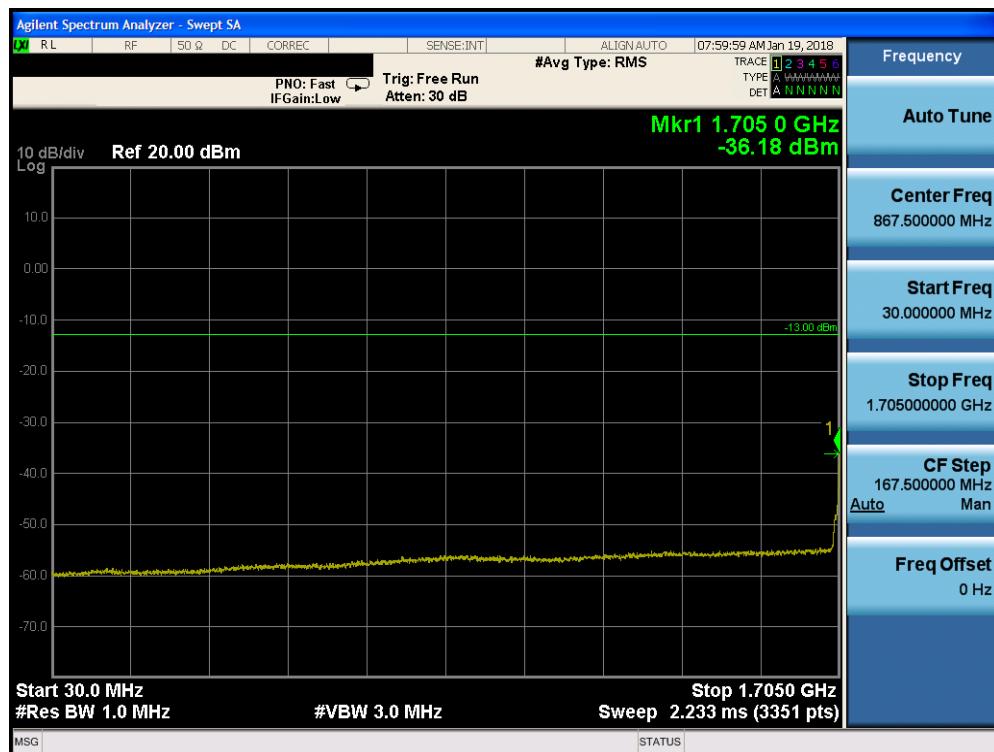
FCC ID: BCGA1954	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 44 of 113



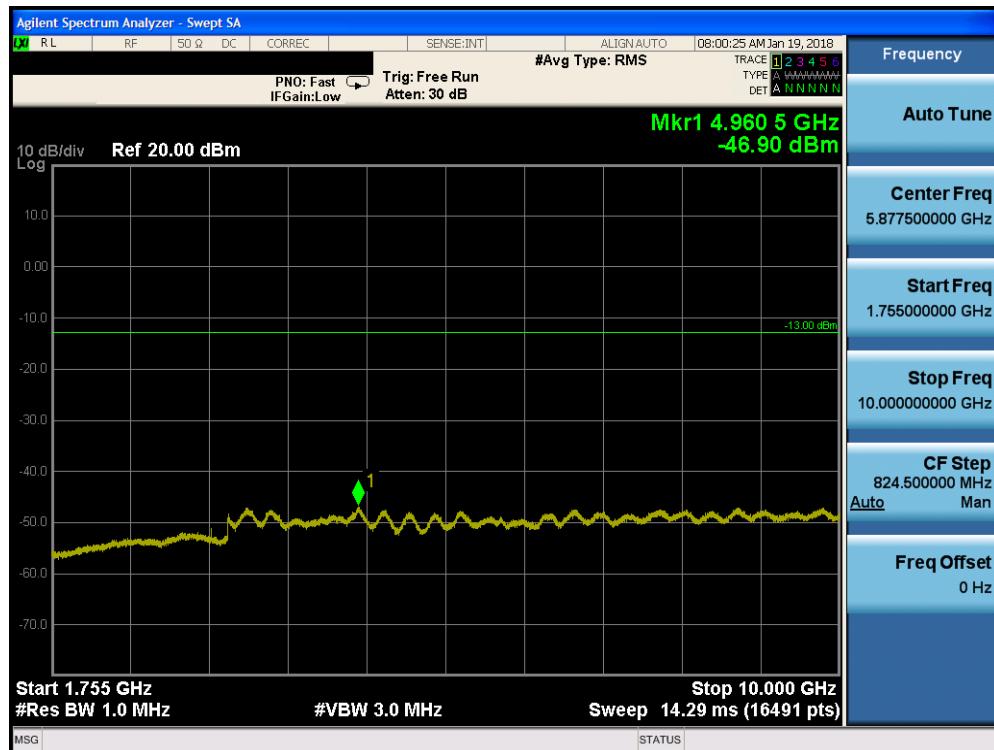
Plot 7-54. Conducted Spurious Plot (Cellular WCDMA Mode - High Channel)

FCC ID: BCGA1954	 PCTEST <sup>®</sup> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 45 of 113

## AWS WCDMA Mode

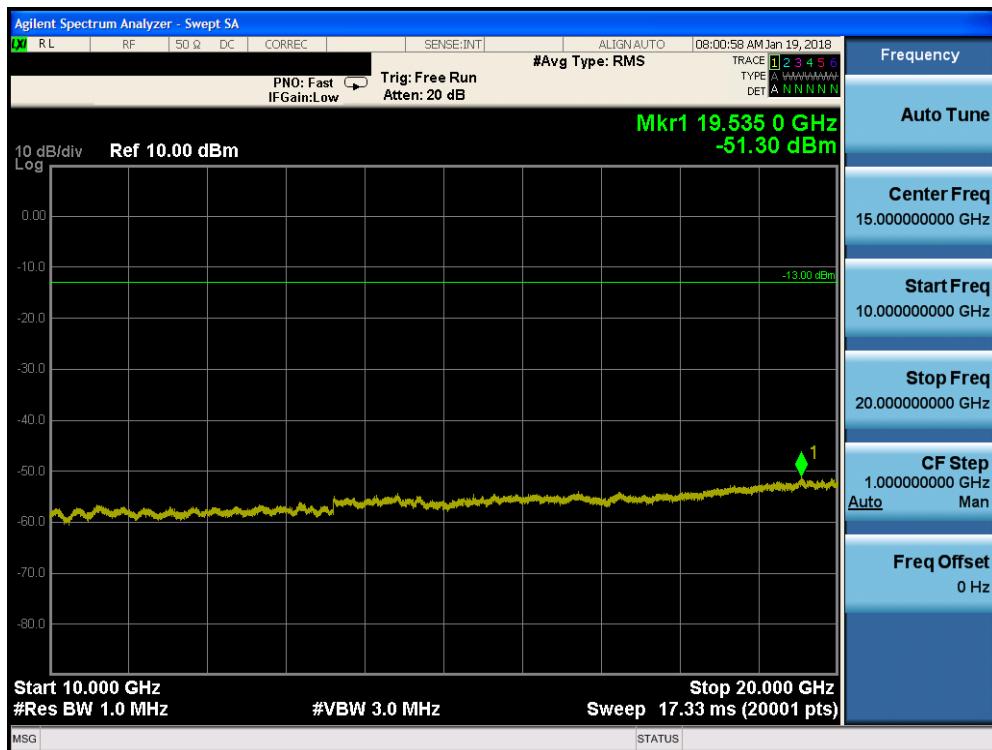


Plot 7-55. Conducted Spurious Plot (AWS WCDMA Mode - Low Channel)



Plot 7-56. Conducted Spurious Plot (AWS WCDMA Mode - Low Channel)

FCC ID: BCGA1954		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 46 of 113

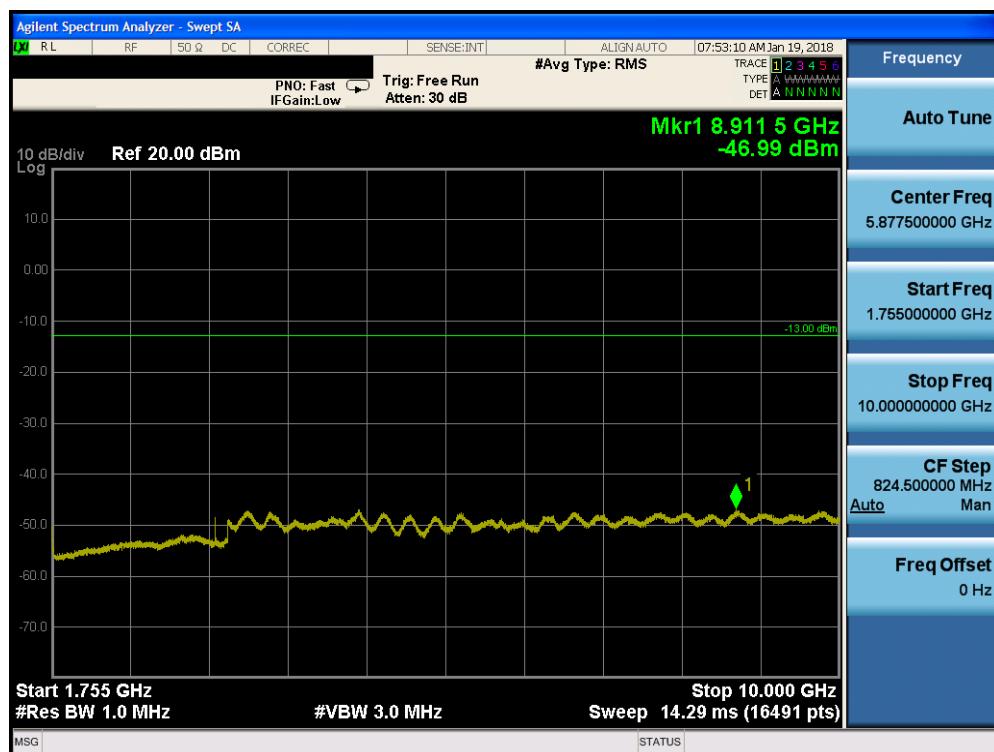


Plot 7-57. Conducted Spurious Plot (AWS WCDMA Mode - Low Channel)

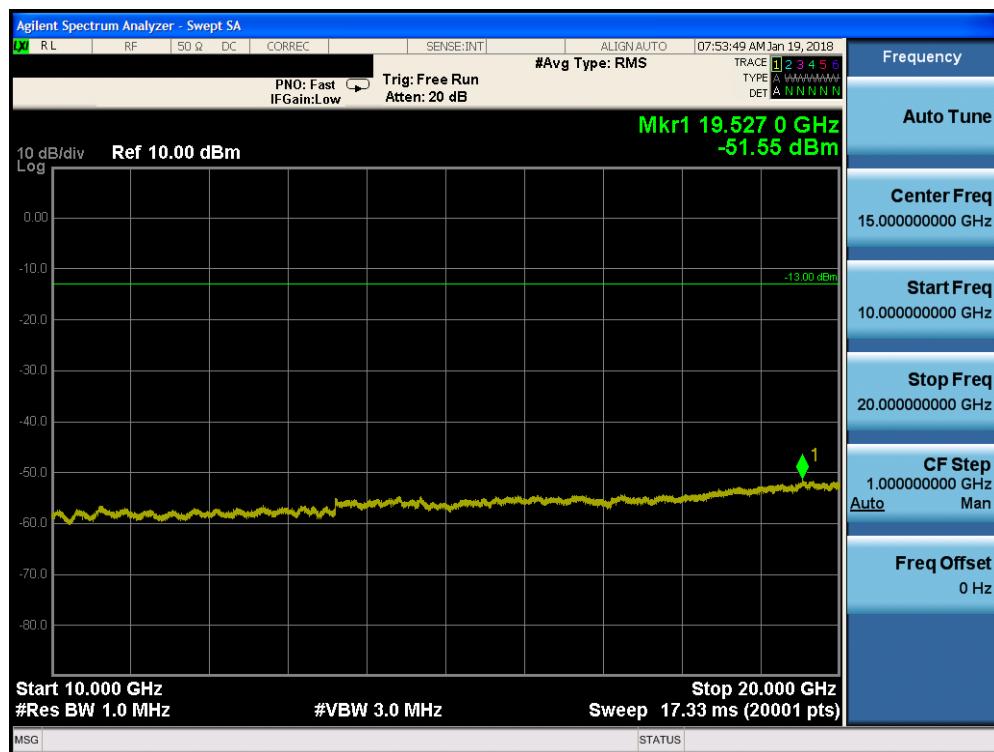


Plot 7-58. Conducted Spurious Plot (AWS WCDMA Mode - Mid Channel)

FCC ID: BCGA1954	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 47 of 113



Plot 7-59. Conducted Spurious Plot (AWS WCDMA Mode - Mid Channel)

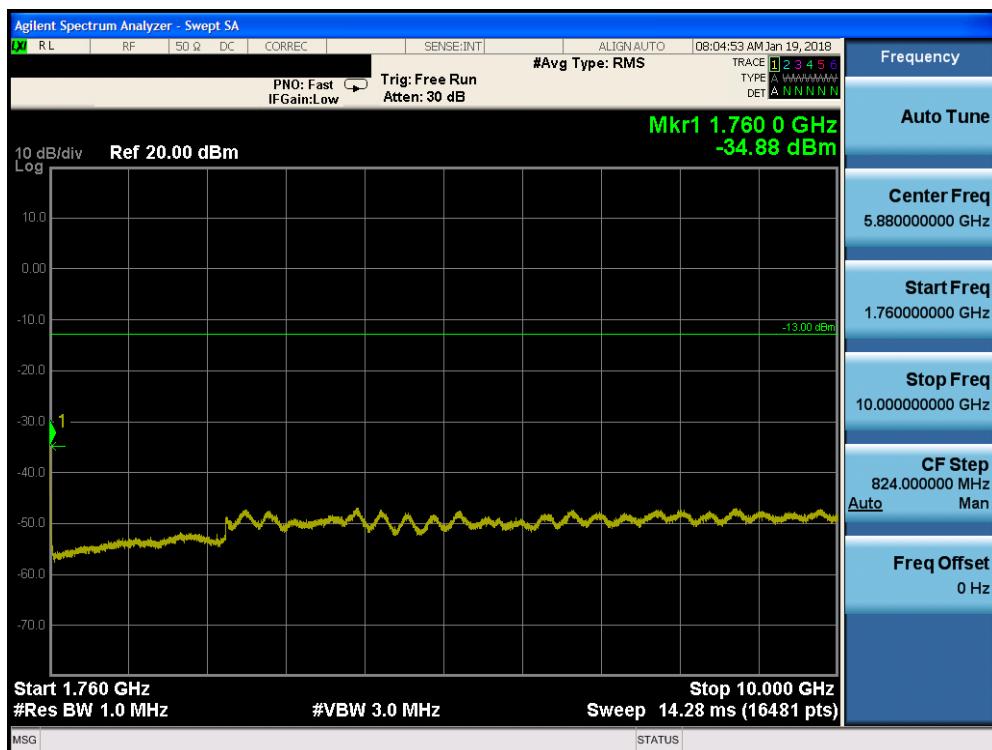


Plot 7-60. Conducted Spurious Plot (AWS WCDMA Mode - Mid Channel)

FCC ID: BCGA1954	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device		Page 48 of 113

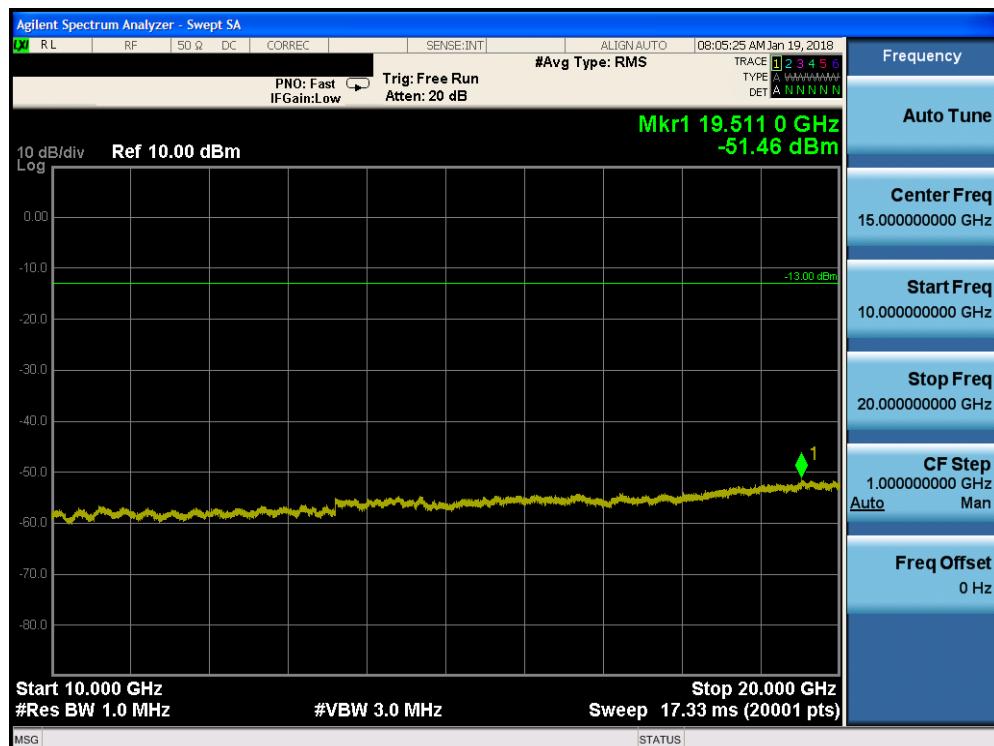


Plot 7-61. Conducted Spurious Plot (AWS WCDMA Mode - High Channel)



Plot 7-62. Conducted Spurious Plot (AWS WCDMA Mode - High Channel)

FCC ID: BCGA1954	 PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 49 of 113



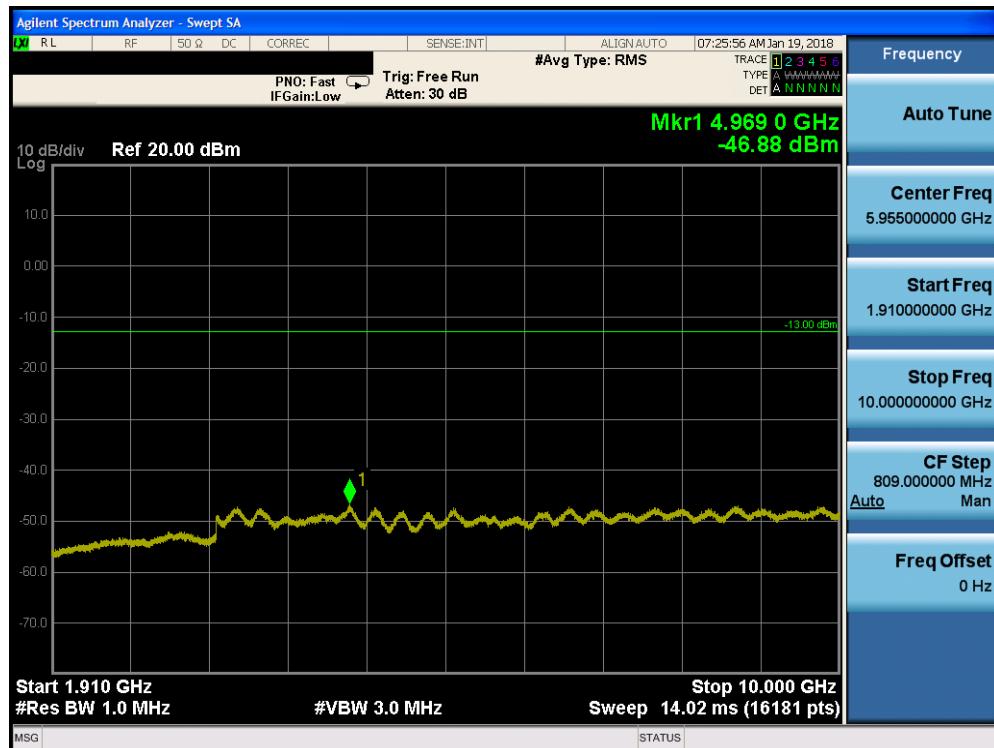
Plot 7-63. Conducted Spurious Plot (AWS WCDMA Mode - High Channel)

FCC ID: BCGA1954	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>		Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 50 of 113

## PCS WCDMA Mode

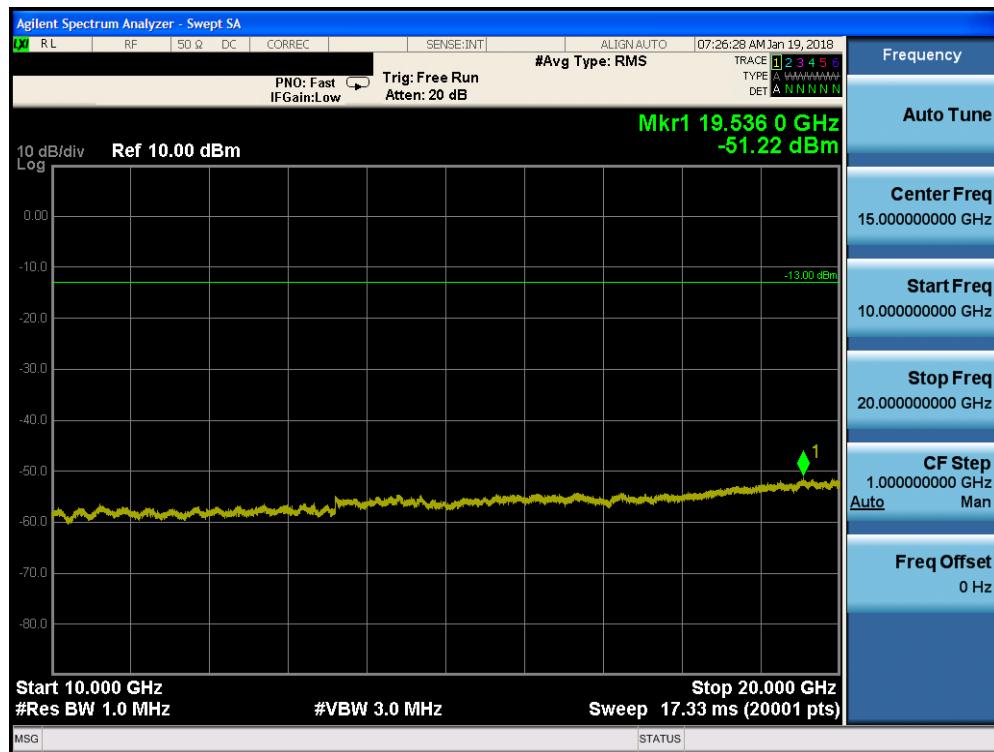


Plot 7-64. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)



Plot 7-65. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)

FCC ID: BCGA1954	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>		Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 51 of 113



Plot 7-66. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)



Plot 7-67. Conducted Spurious Plot (PCS WCDMA Mode - Mid Channel)

FCC ID: BCGA1954	 PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1C1710060006-02-R2.BCG	Test Dates: 10/31/2017-2/15/2018	EUT Type: Tablet Device	Page 52 of 113