

## MEASUREMENT REPORT LTE

**Applicant Name:**

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

**Date of Testing:**

12/11/2019 - 12/29/2019

**Test Site/Location:**

PCTEST Lab. Columbia, MD, USA

**Test Report Serial No.:**

1M2001240011-03.A3L

**FCC ID:**

**A3LSMF700U**

**APPLICANT:**

**Samsung Electronics Co., Ltd.**

**Application Type:**

Class II Permissive Change

**Model:**

SM-F700U/DS

**Additional Model(s):**

SM-F700U1/DS, SM-F700W/DS

**EUT Type:**

Portable Handset

**FCC Classification:**

PCS Licensed Transmitter Held to Ear (PCE)

**FCC Rule Part(s):**

22, 24, & 27

**Test Procedure(s):**

ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01,  
KDB 648474 D03 v01r04

**Class II Permissive Change:**


Please see FCC change document

**Original Grant Date:**



01/30/2020

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



  
Randy Ortanez  
President



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<b>Test Report S/N:</b> 1M2001240011-03.A3L	<b>Test Dates:</b> 12/11/2019 – 12/29/2019	<b>EUT Type:</b> Portable Handset		Page 1 of 61

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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 7185 Oakland Mills Road, Columbia, MD 21046. 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 Columbia, MD 21046, U.S.A.

- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 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 ISSED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISSED.

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## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMF700U**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

**Test Device Serial No.:** 1401M, 1486M, 1549M, 1552M, 4729J

### 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, 802.11 b/g/n, 802.11 a/n/ac, Bluetooth (1x, EDR, LE), NFC, ANT+, Wireless Power Transfer



### 2.3 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03r01. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

This device supports wireless charging capability and, thus, is subject to the test requirements of KDB 648474 D03 v01r04. Additional radiated spurious emission measurements were performed with the EUT lying flat on an authorized wireless charging pad (WCP) EP-N5100 while operating under normal conditions in a simulated call or data transmission configuration. The worst case radiated emissions data is shown in this report.

### 2.4 EMI Suppression Device(s)/Modifications

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

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## 3.0 DESCRIPTION OF TESTS

### 3.1 Measurement Procedure

The measurement procedures described in the document titled "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-E-2016) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems" (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

### 3.2 Radiated Power and Radiated Spurious Emissions

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. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions' occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168 D01 v03r01.



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

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

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

The calculated  $P_d$  levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of  $43 + 10 \log_{10}(\text{Power [Watts]})$ . For Band 7 and 41, the calculated  $P_d$  levels are compared to the absolute spurious emission limit of -25dBm which is equivalent to the required minimum attenuation of  $55 + 10 \log_{10}(\text{Power [Watts]})$ . For Band 30, the calculated  $P_d$  levels are compared to the absolute spurious emission limit of -40dBm which is equivalent to the required minimum attenuation of  $70 + 10 \log_{10}(\text{Power [Watts]})$ .



All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 474788 D01.

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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  $U_{\text{CISPR}}$  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
-	LTx2	Licensed Transmitter Cable Set	10/30/2019	Annual	10/30/2020	LTx2
Agilent	N9030A	PXA Signal Analyzer (44GHz)	5/2/2019	Annual	5/2/2020	MY49430494
Anritsu	MT8821C	Radio Communication Analyzer	3/6/2019	Annual	3/6/2020	6201381794
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2019	Biennial	10/10/2021	121034
Emco	3115	Horn Antenna (1-18GHz)	3/28/2018	Biennial	3/28/2020	9704-5182
Emco	3116	Horn Antenna (18 - 40GHz)	6/7/2018	Triennial	6/7/2021	9203-2178
Espec	ESX-2CA	Environmental Chamber	6/13/2019	Annual	6/13/2020	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/28/2018	Biennial	3/28/2020	128337
Huber + Suhner	Sucoflex 102A	40GHz Radiated Cable Set	10/31/2019	Annual	1/31/2020	251425001
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	4/19/2019	Annual	4/19/2020	11401010036
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			102060
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	6/5/2019	Annual	6/5/2020	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/23/2019	Annual	9/23/2020	100348
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/8/2019	Annual	7/8/2020	102133
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	10/31/2019	Annual	1/31/2020	100040
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44 GHz	10/16/2019	Annual	10/16/2020	101716
Rohde & Schwarz	SMB100A03	SMB100A Signal Generator	5/30/2018	Biennial	5/30/2020	180862
Rohde & Schwarz	HL562E	Ultralog Antenna	3/29/2018	Biennial	3/29/2020	101012
Rohde & Schwarz	HFH2-Z2E	Loop	9/5/2019	Annual	9/5/2020	100854
Rohde & Schwarz	IN600	Bias Unit	9/5/2019	Annual	9/5/2020	100859
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/9/2019	Annual	7/9/2020	102138
Rohde & Schwarz	TC-TA18	Vivaldi Antenna	8/17/2018	Biennial	8/17/2020	101072
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	4/30/2018	Biennial	4/30/2020	9105-2404
Seekonk	NC-100	Torque Wrench	5/9/2018	Biennial	5/9/2020	22217
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107

**Table 5-1. Test Equipment**

### Notes:

- Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

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## 6.0 SAMPLE CALCULATIONS

### Emission Designator

#### QPSK Modulation

**Emission Designator = 8M62G7D**

LTE BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

#### QAM Modulation

**Emission Designator = 8M45W7D**

LTE BW = 8.45 MHz

W = Amplitude/Angle Modulated



7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

### Spurious Radiated Emission – LTE Band

#### **Example: Middle Channel LTE Mode 2<sup>nd</sup> Harmonic (1564 MHz)**

The average 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 1564 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm – (-24.80).

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## 7.0 TEST RESULTS

### 7.1 Summary



Company Name: Samsung Electronics Co., Ltd.  
 FCC ID: A3LSMF700U  
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)  
 Mode(s): LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
22.917(a) 27.53(h) 27.53(m)	Uplink Carrier Aggregation	Undesirable emissions must meet the limits detailed in the applicable rule parts listed	CONDUCTED	PASS	Section 7.2
22.917(a) 27.53(h) 27.53(m)	Uplink Carrier Aggregation	Undesirable emissions must meet the limits detailed in the applicable rule parts listed	RADIATED	PASS	Section 7.3

**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 (Section 7.2) 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 "LTE Automation," Version 5.3.

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## 7.2 Uplink Carrier Aggregation

### Test Overview

The EUT is set up to transmit two contiguous LTE channels. The power level of both carriers 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 its maximum duty cycle, 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.

***For Band 41, the minimum permissible attenuation level of any spurious emission is  $55 + 10 \log_{10}(P_{\text{Watts}})$ .***

### Test Procedure Used

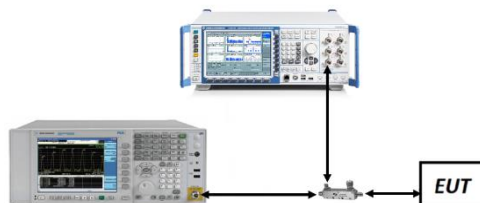
KDB 971168 D01 v03r01 – Section 6.0

### Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to at least 10 \* the fundamental frequency (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 7-1. Test Instrument & Measurement Setup**

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## Test Notes

1. Conducted power and spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device. The worst case (highest) powers were found while operating with QPSK modulation, as shown in Table 7-2 and 7-3 below, with both carriers set to transmit using 1RB.
2. Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. 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.

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## Uplink CA Configuration 5B

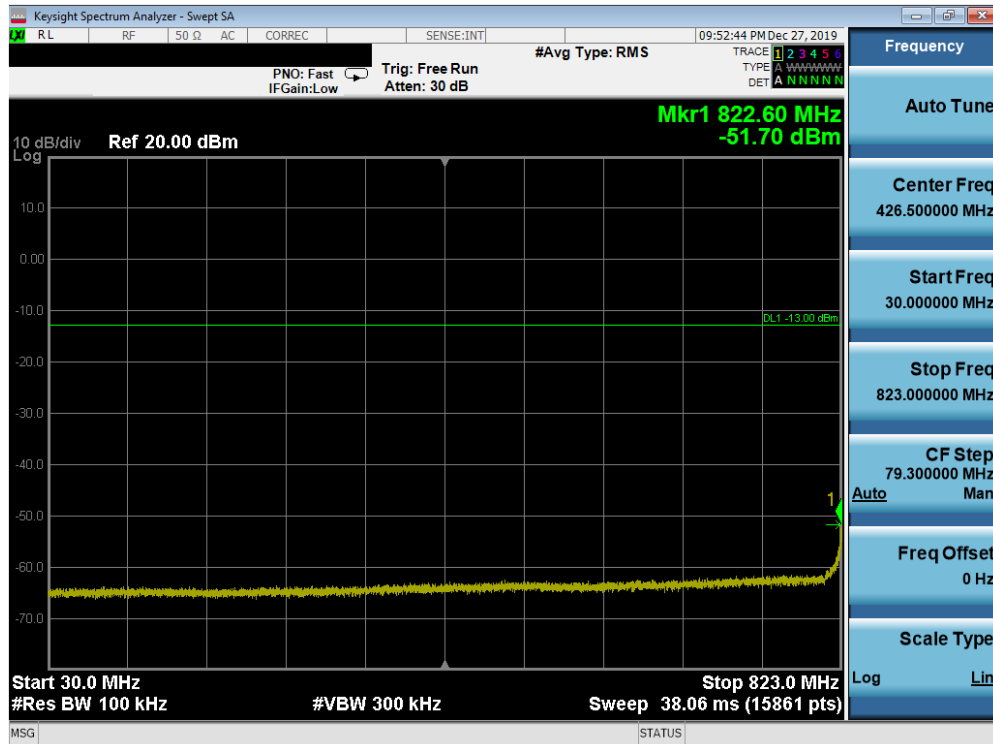
Power State	PCC							SCC							Power ULCA Tx.Power (dBm)
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	
Max	LTE B5	10	20450	829	QPSK	1	49	LTE B5	10	20549	838.9	QPSK	1	0	24.35
Max	LTE B5	10	20525	836.5	QPSK	1	49	LTE B5	5	20597	843.7	QPSK	1	0	24.22
Max	LTE B5	10	20600	844	QPSK	1	0	LTE B5	10	20501	834.1	QPSK	1	49	24.31

**Table 7-2. Conducted Powers (B5 – PCC/SCC: RB Size 1)**

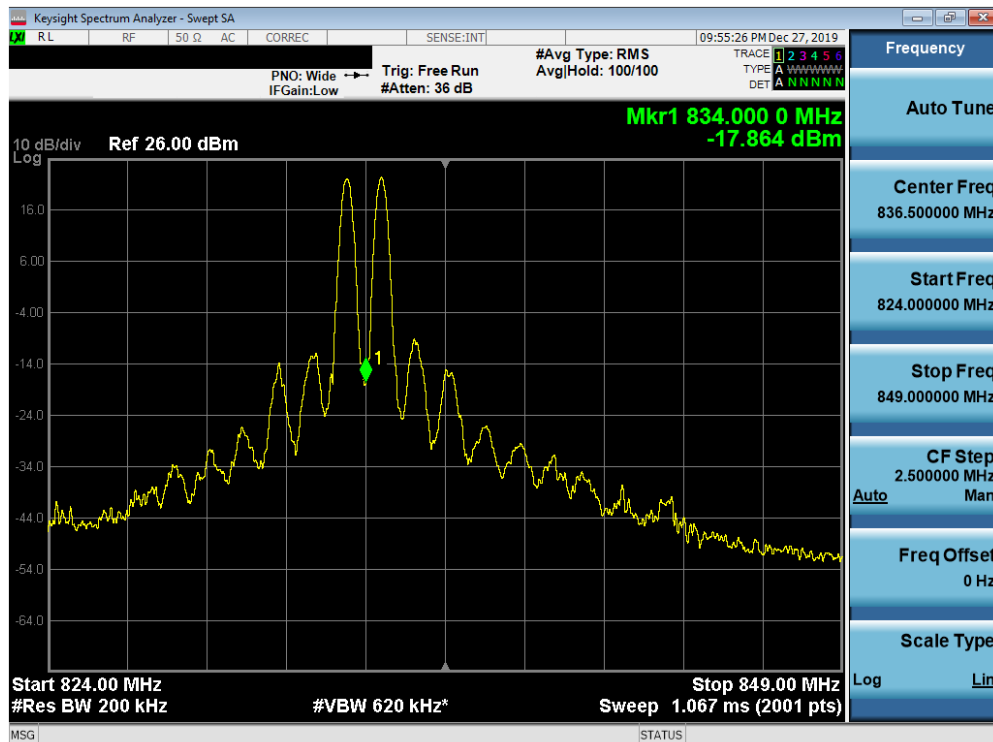
Power State	PCC							SCC							Power ULCA Tx.Power (dBm)
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	
Max	LTE B5	10	20450	829	QPSK	50	0	LTE B5	10	20549	838.9	QPSK	50	0	23.59
Max	LTE B5	10	20450	829	16-QAM	50	0	LTE B5	10	20549	838.9	16-QAM	50	0	22.56
Max	LTE B5	10	20450	829	64-QAM	50	0	LTE B5	10	20549	838.9	64-QAM	50	0	21.47

**Table 7-3. Conducted Powers (B5 with Various Combinations for 10MHz Channel Bandwidth)**

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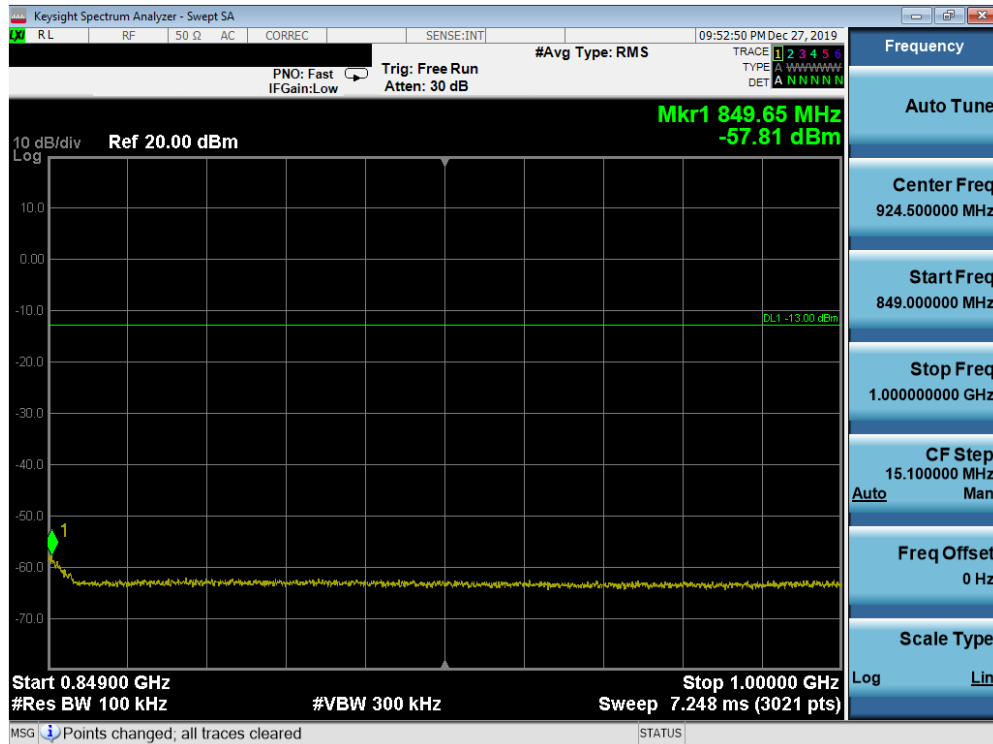


Plot 7-1. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Low Channel)

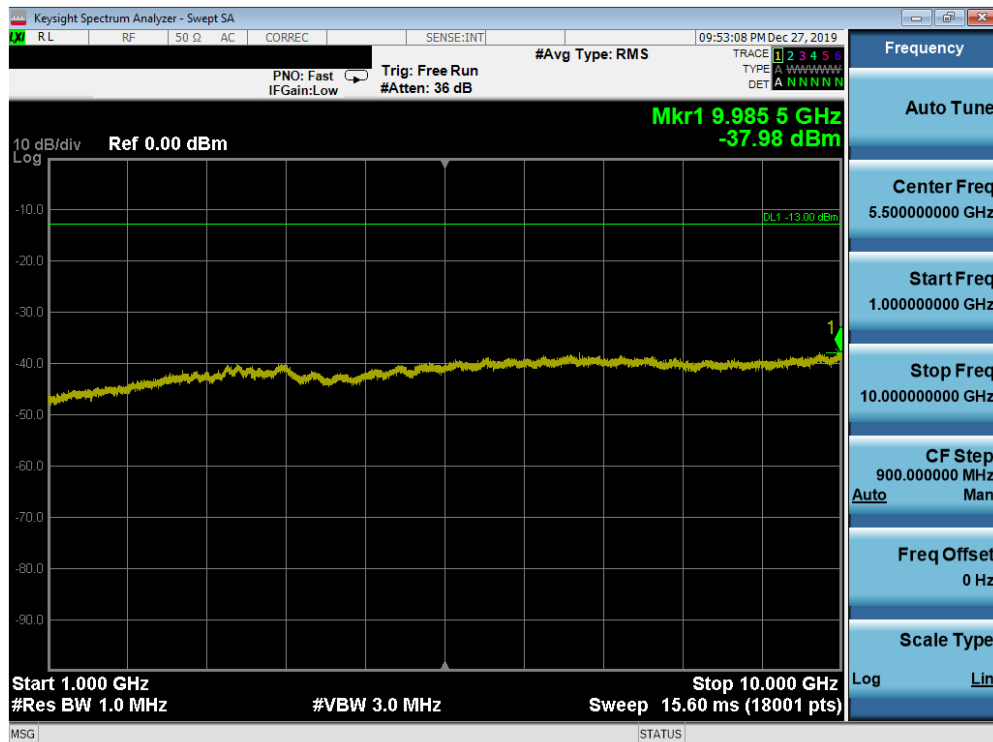


Plot 7-2. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Low Channel)



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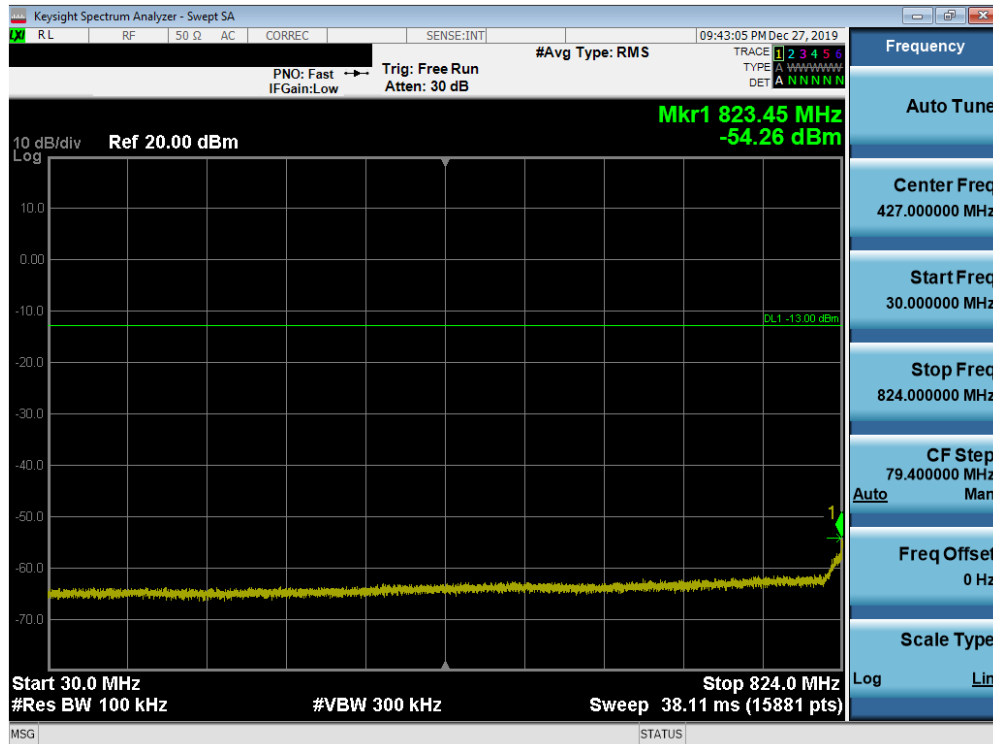


Plot 7-3. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Low Channel)

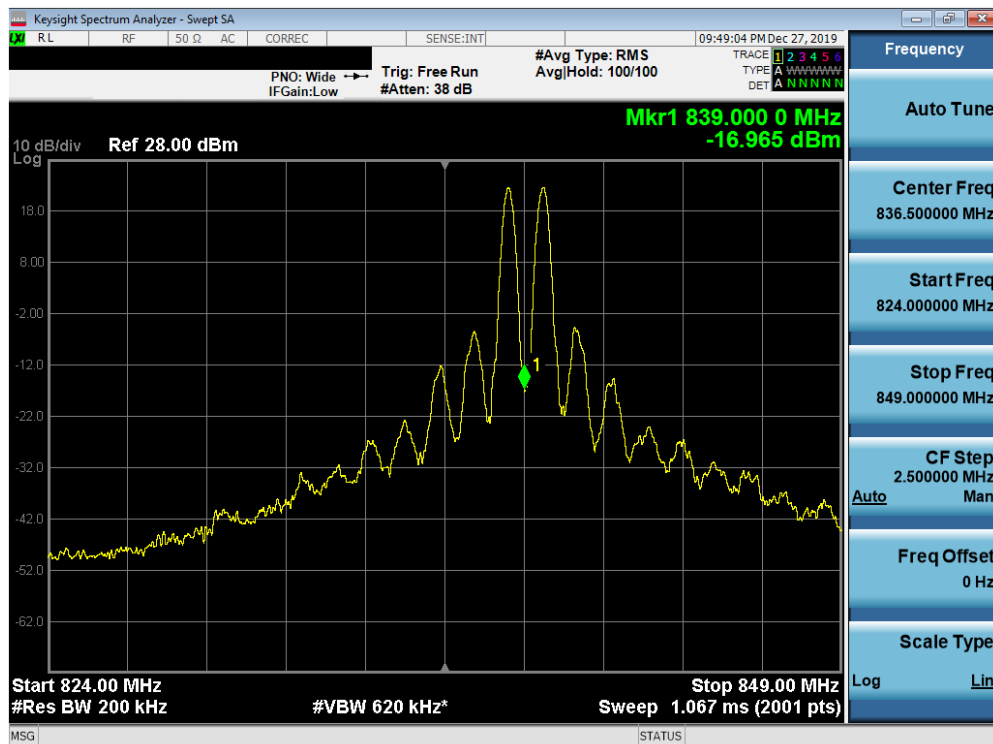


Plot 7-4. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Low Channel)

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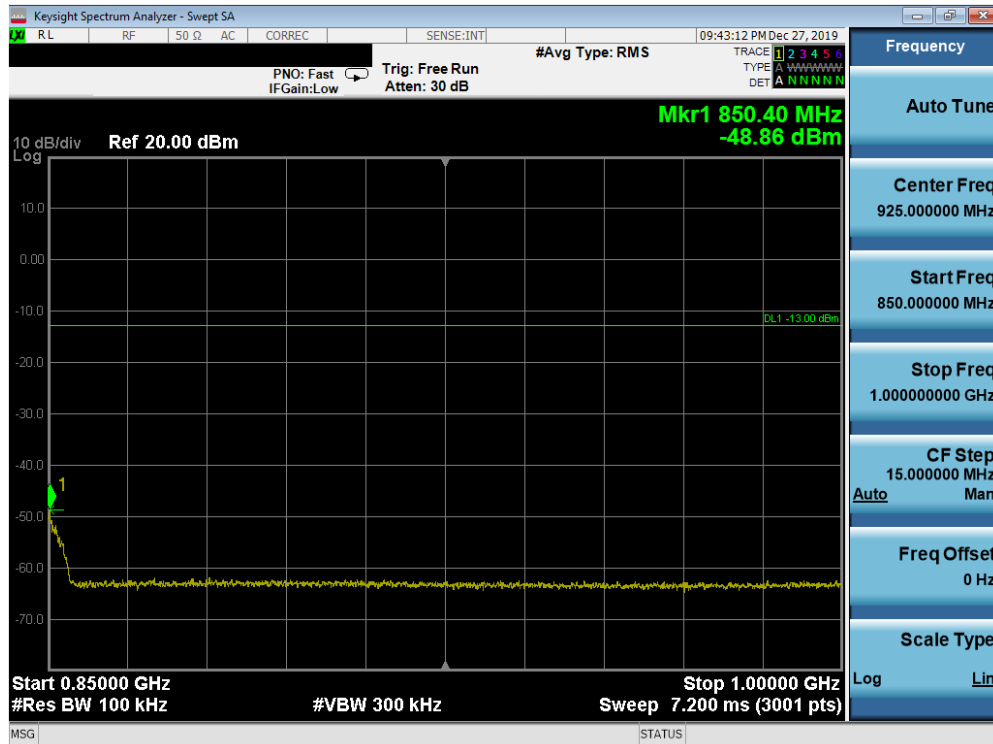


Plot 7-5. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/0 SCC 1/49 – High Channel)

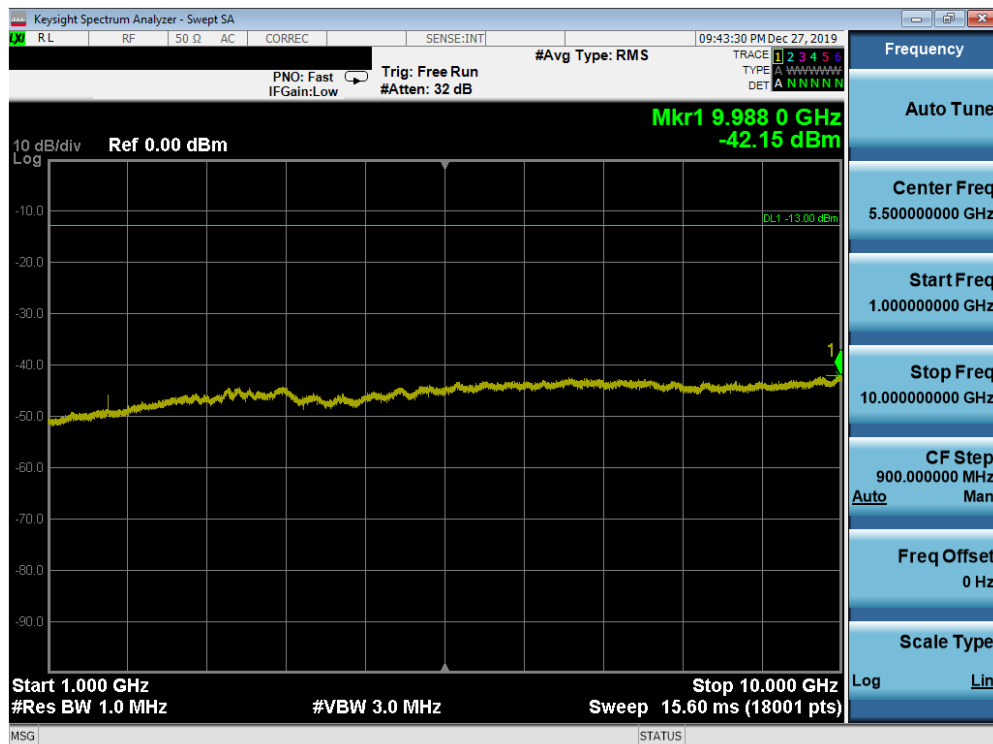


Plot 7-6. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/0 SCC 1/49 – High Channel)

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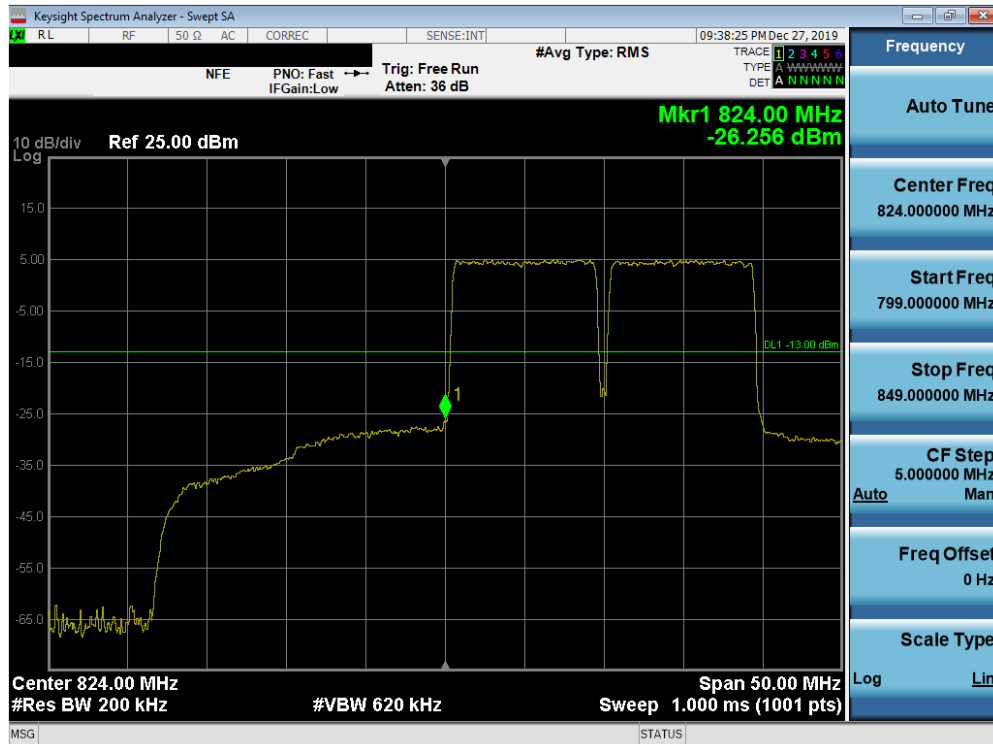


Plot 7-7. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/0 SCC 1/49 – High Channel)

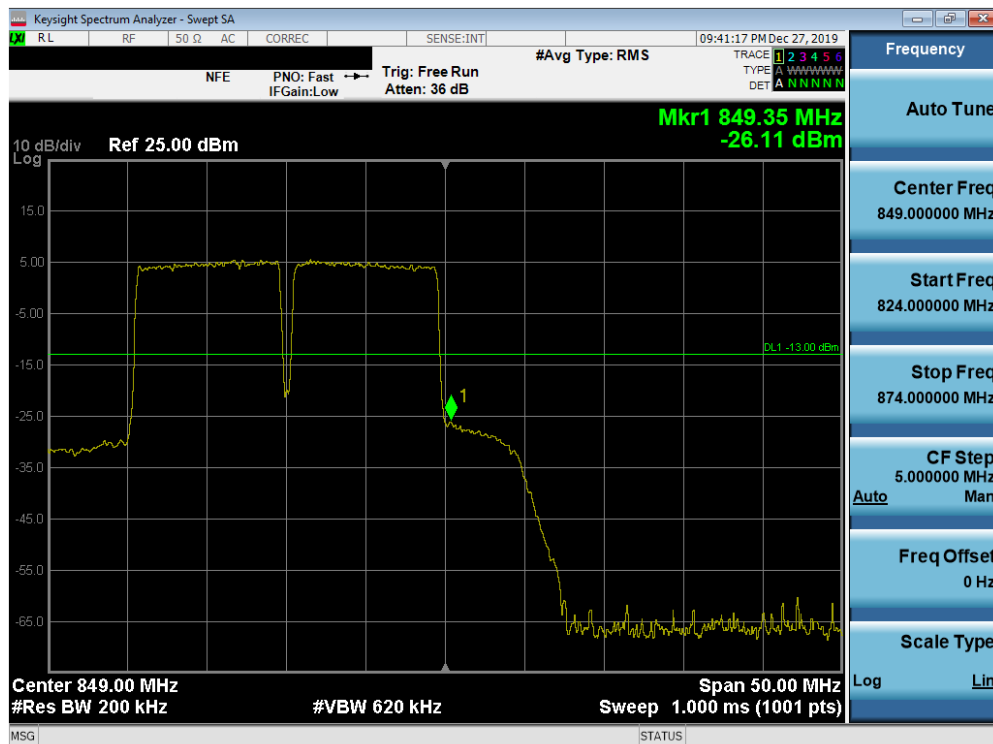


Plot 7-8. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/0 SCC 1/49 – High Channel)

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 16 of 61



Plot 7-9. Lower Band Edge Plot (Band 5 QPSK – PCC:10 MHz SCC:10 MHz – Full RB)



Plot 7-10. Upper Band Edge Plot (Band 5 QPSK – PCC:10 MHz SCC:10 MHz – Full RB)

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 17 of 61

## Uplink CA Configuration 66B/C

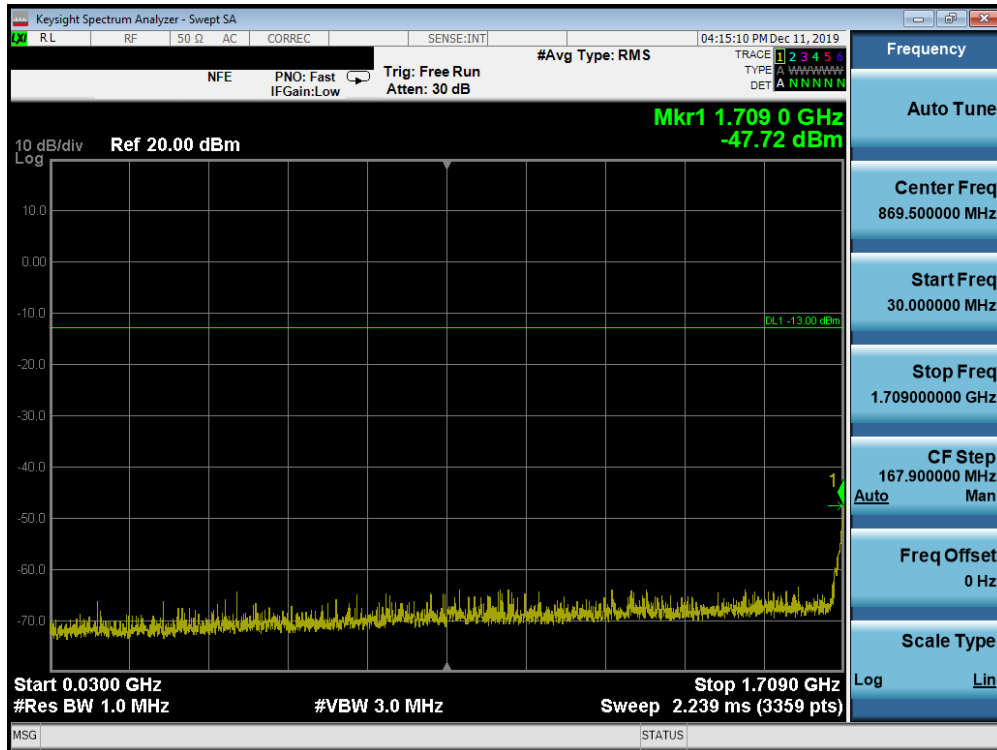
Power State	PCC							SCC							Power ULCA Tx.Power (dBm)
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	
Max	LTE B66	20	132072	1720	QPSK	1	99	LTE B66	20	132270	1739.8	QPSK	1	0	23.82
Max	LTE B66	20	132322	1745	QPSK	1	99	LTE B66	20	132520	1764.8	QPSK	1	0	24.76
Max	LTE B66	20	132572	1770	QPSK	1	0	LTE B66	20	132374	1750.2	QPSK	1	99	24.66

**Table 7-4. Conducted Powers (B66 – 20MHz + 20MHz Channel Bandwidth – PCC/SCC: RB Size 1)**

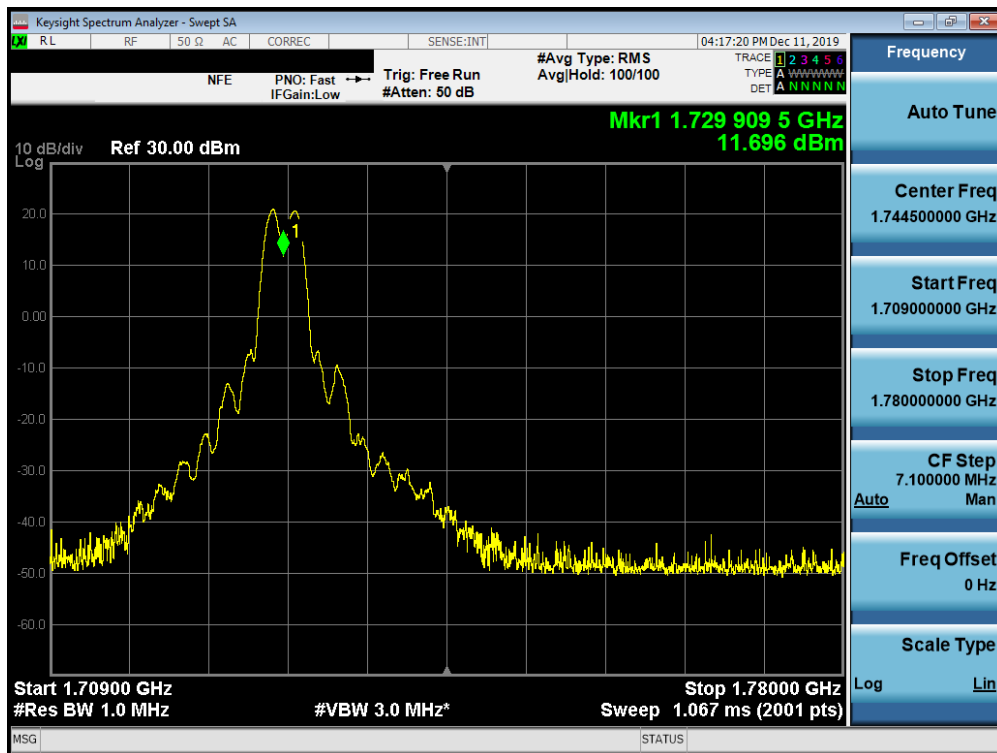
Power State	PCC							SCC							Power ULCA Tx.Power (dBm)
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	
Max	LTE B66	20	132322	1745	QPSK	100	0	LTE B66	20	132520	1764.8	QPSK	100	0	22.80
Max	LTE B66	20	132322	1745	16-QAM	100	0	LTE B66	20	132520	1764.8	16-QAM	100	0	21.77
Max	LTE B66	20	132322	1745	64-QAM	100	0	LTE B66	20	132520	1764.8	64-QAM	100	0	20.83

**Table 7-5. Conducted Powers (B66 with Various Combinations for 20MHz + 20MHz Channel Bandwidth)**

FCC ID: A3LSMF700U			MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset			Page 18 of 61

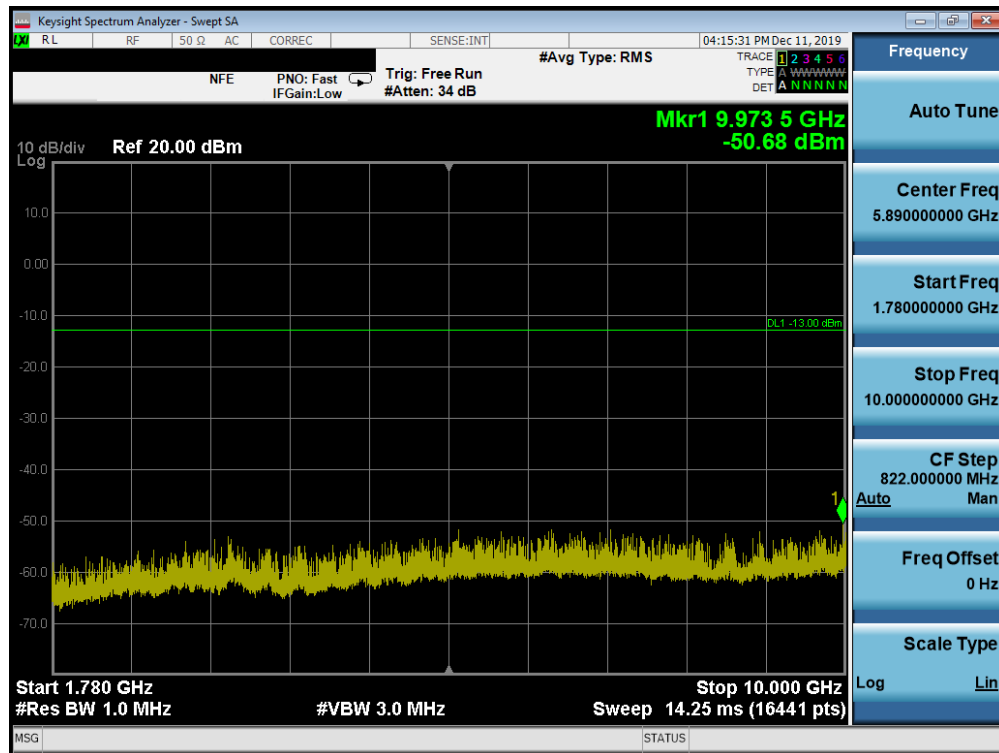


Plot 7-11. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)

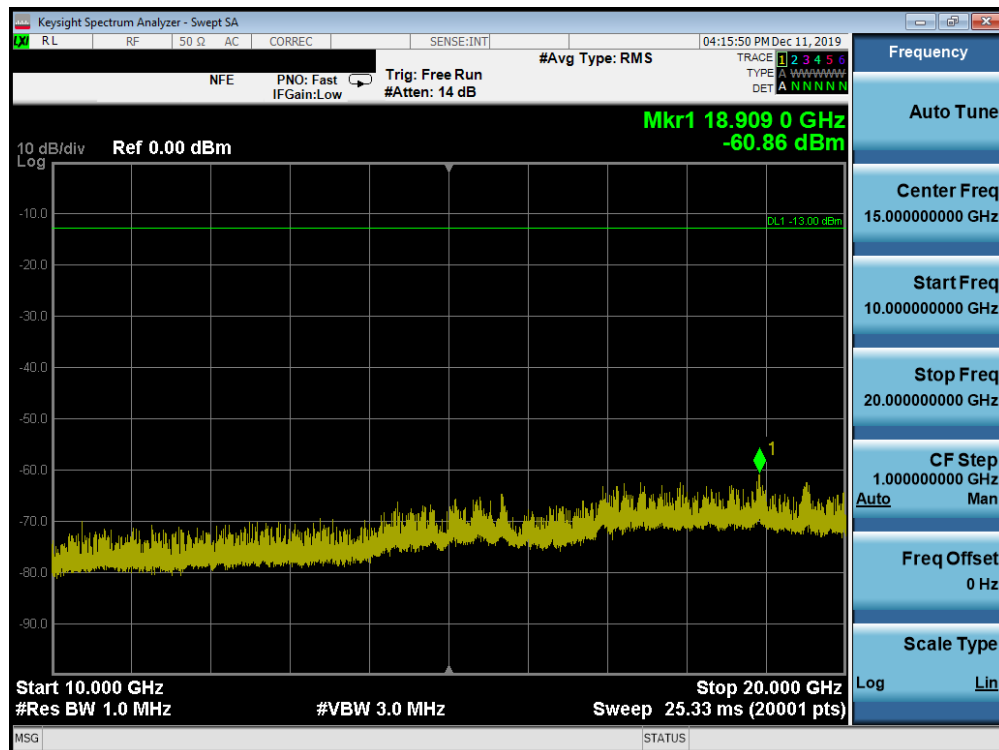


Plot 7-12. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)

FCC ID: A3LSMF700U	<b>MEASUREMENT REPORT</b> (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 19 of 61

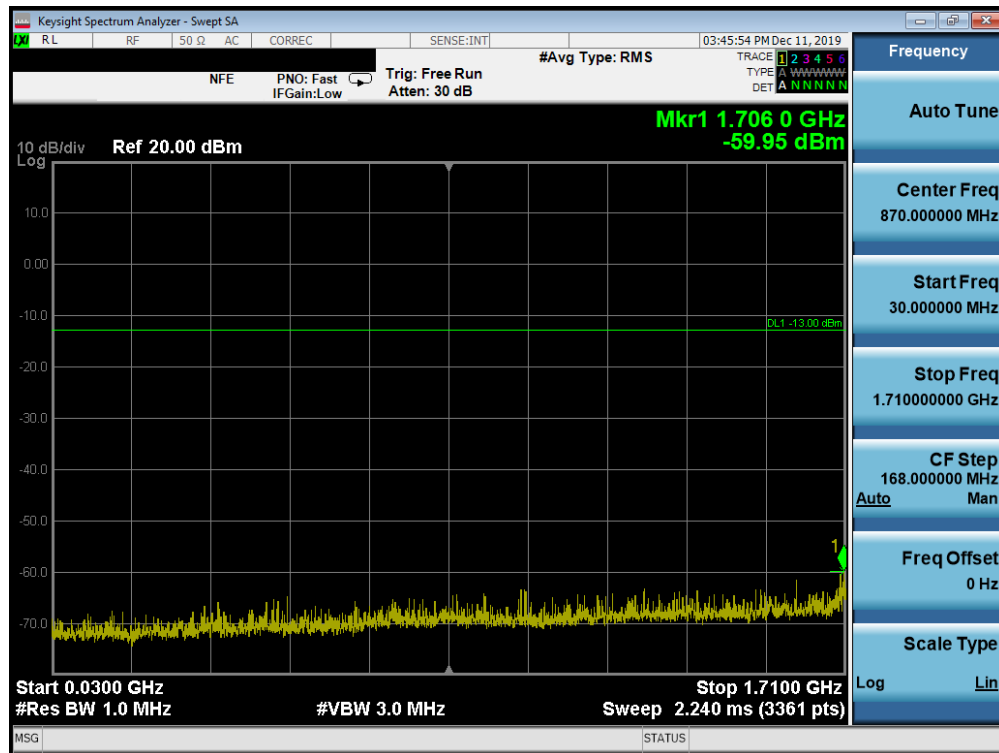


Plot 7-13. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)

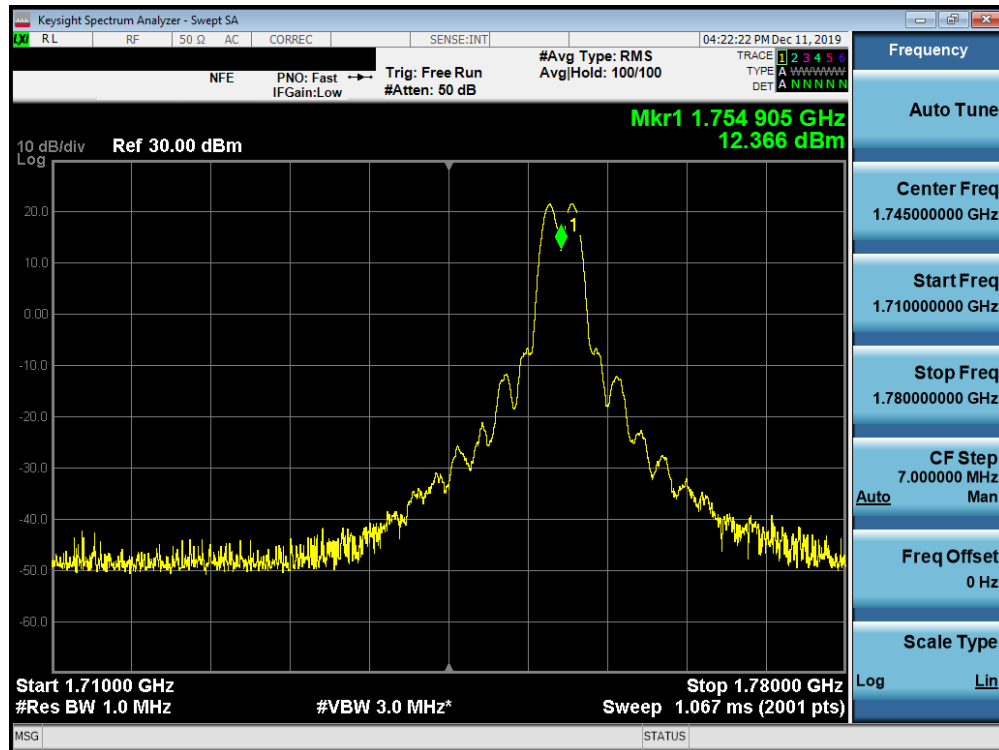


Plot 7-14. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 20 of 61

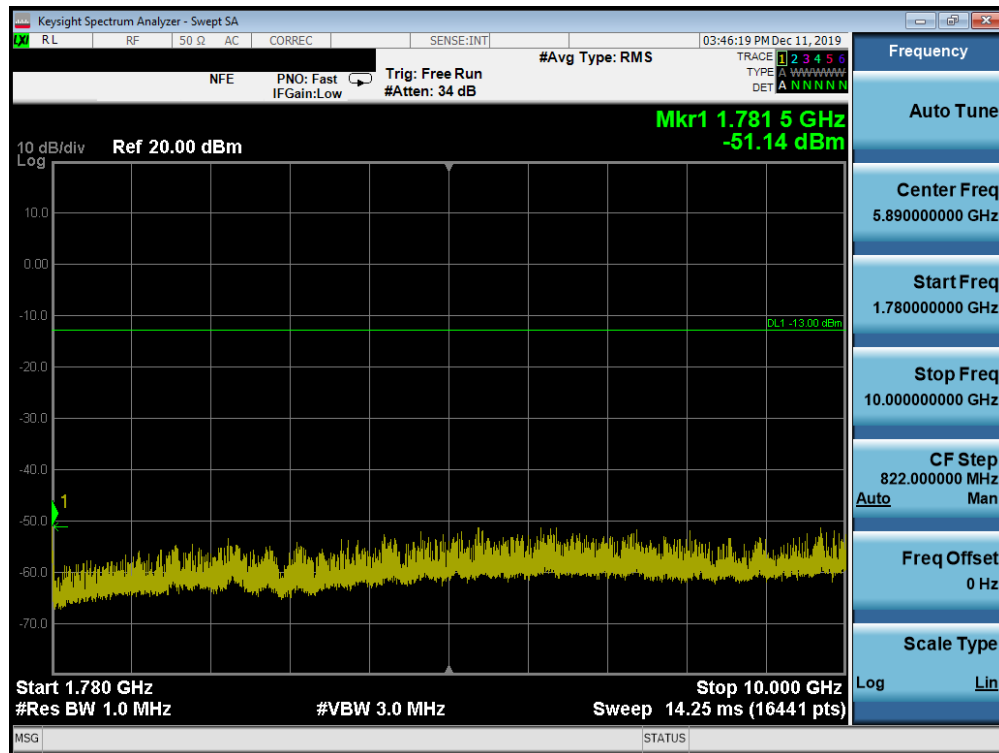


Plot 7-15. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

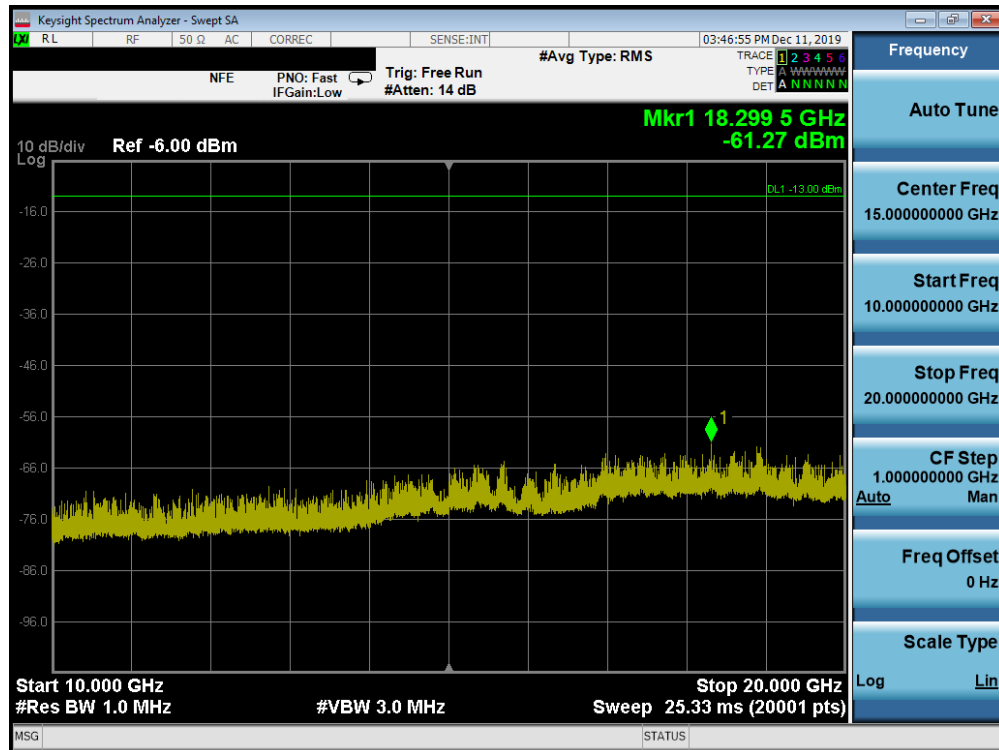


Plot 7-16. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 21 of 61

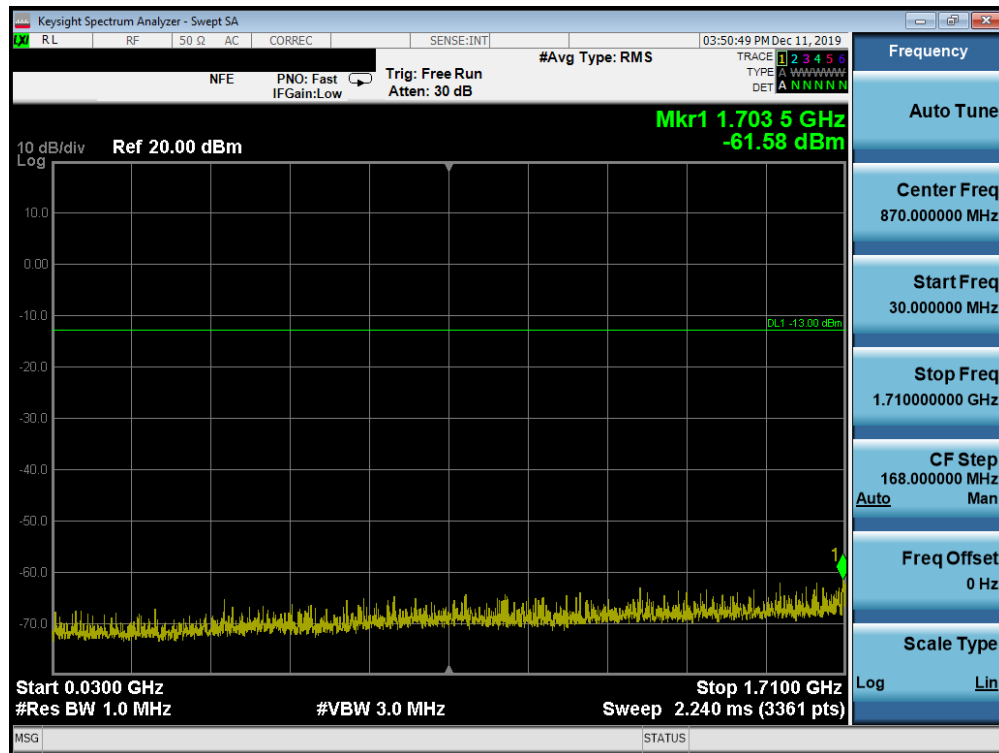


Plot 7-17. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

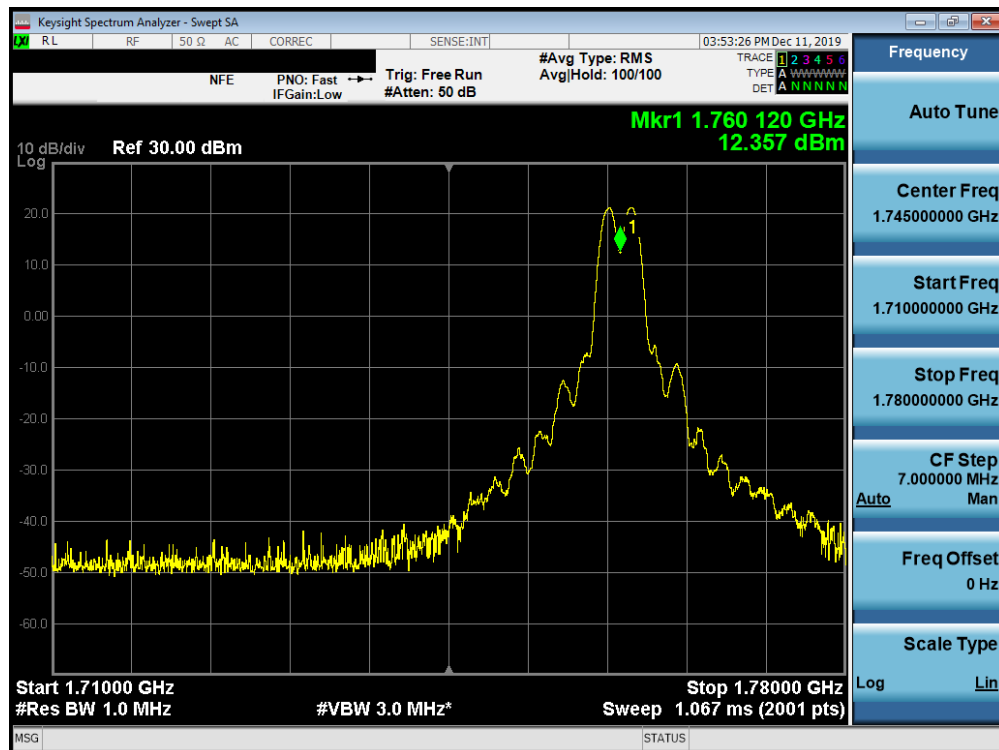


Plot 7-18. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 22 of 61

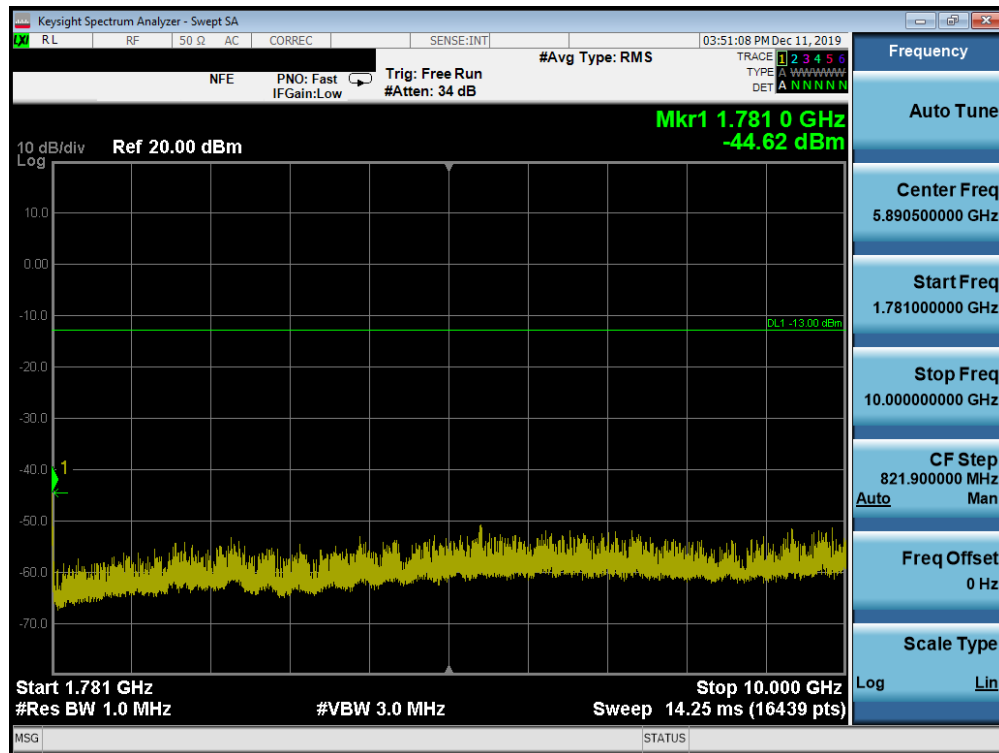


Plot 7-19. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

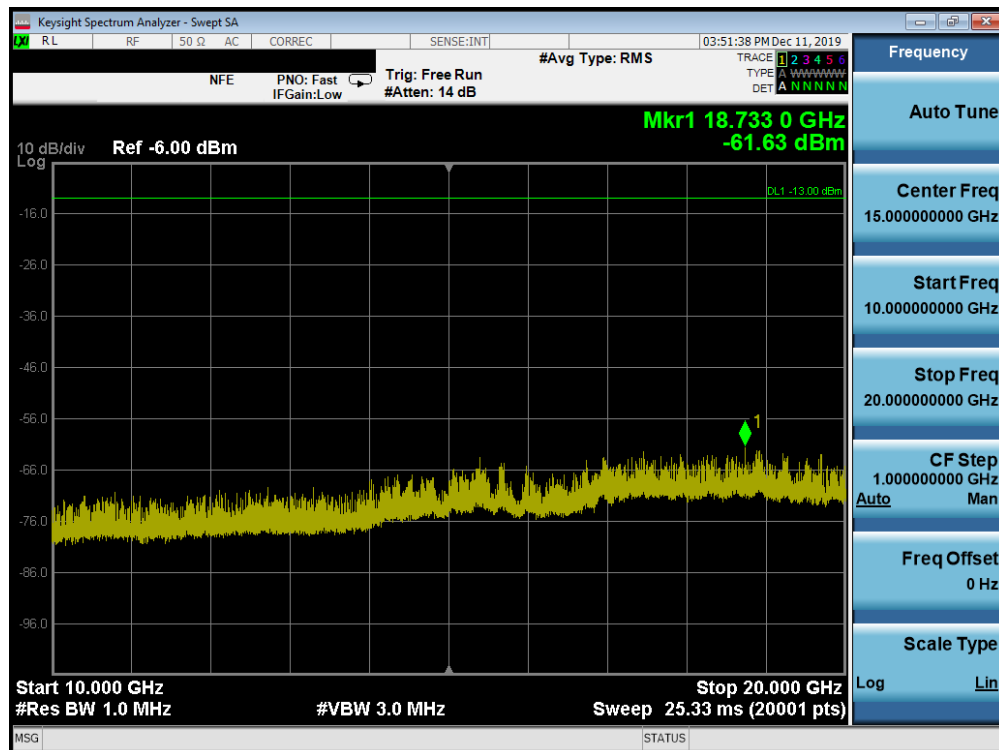


Plot 7-20. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 23 of 61

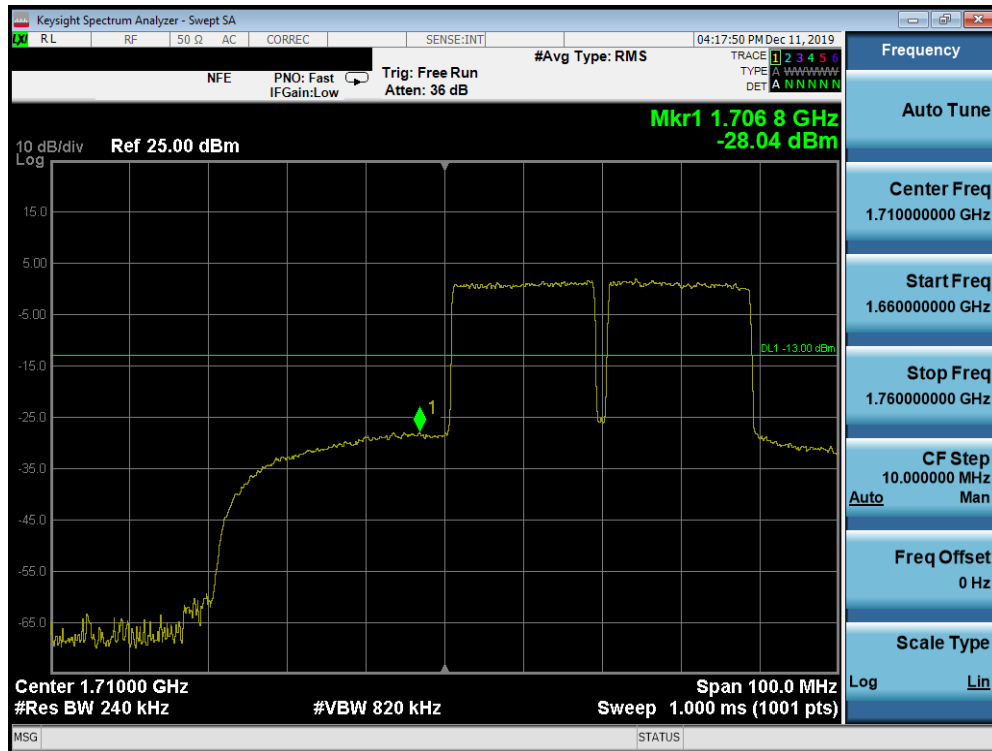


Plot 7-21. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

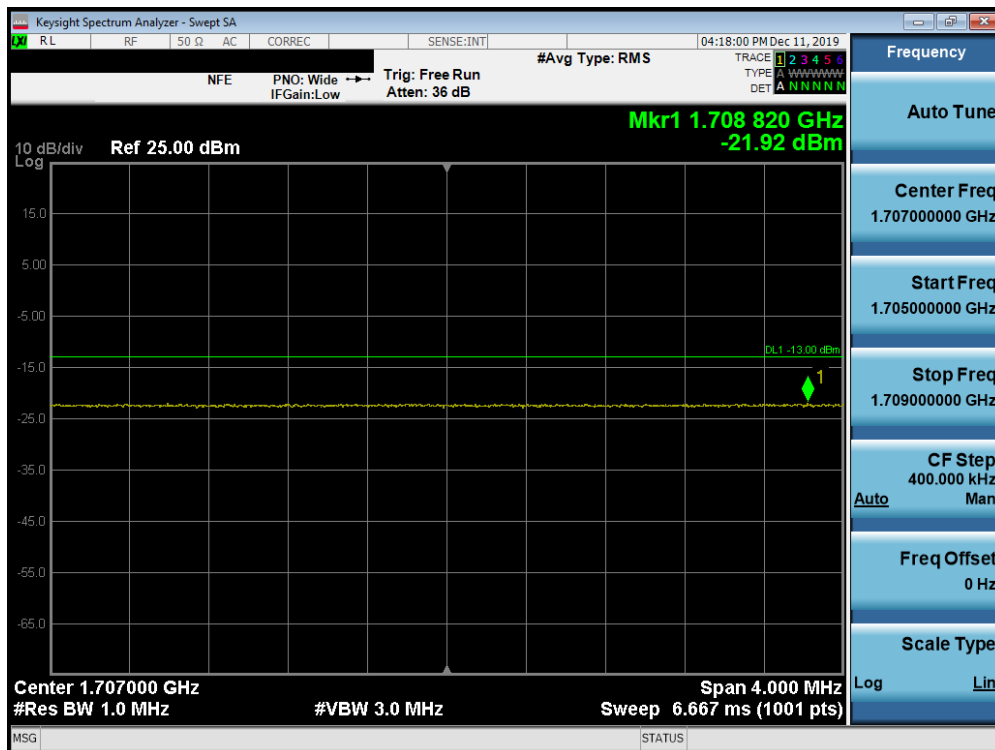


Plot 7-22. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 24 of 61

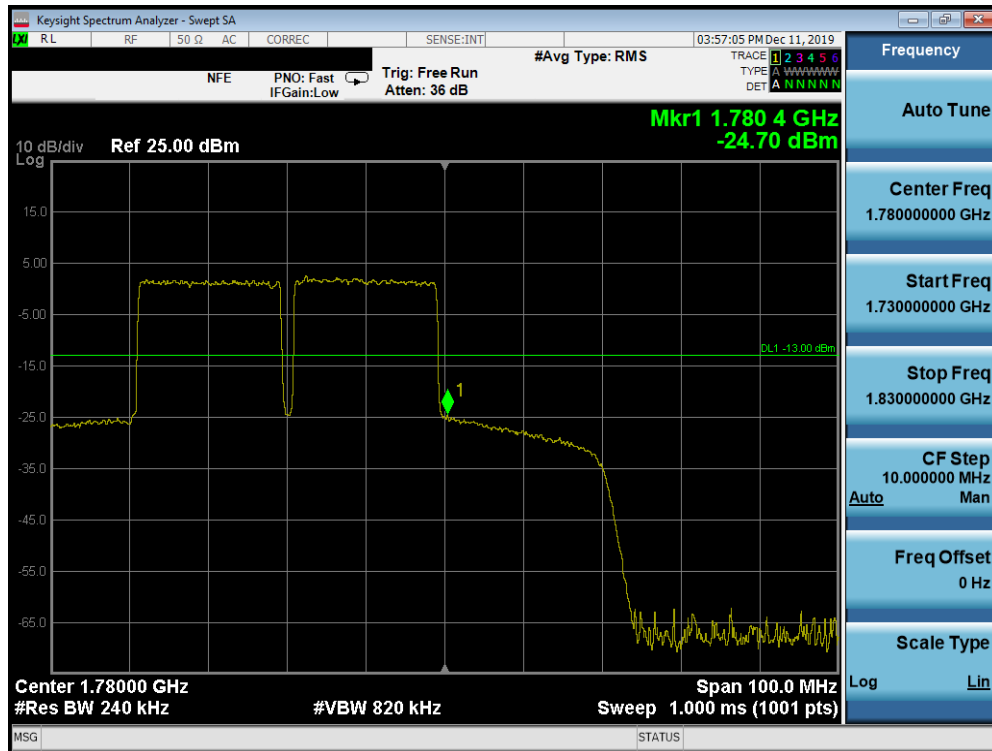


Plot 7-23. Lower Band Edge Plot (Band 66 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)

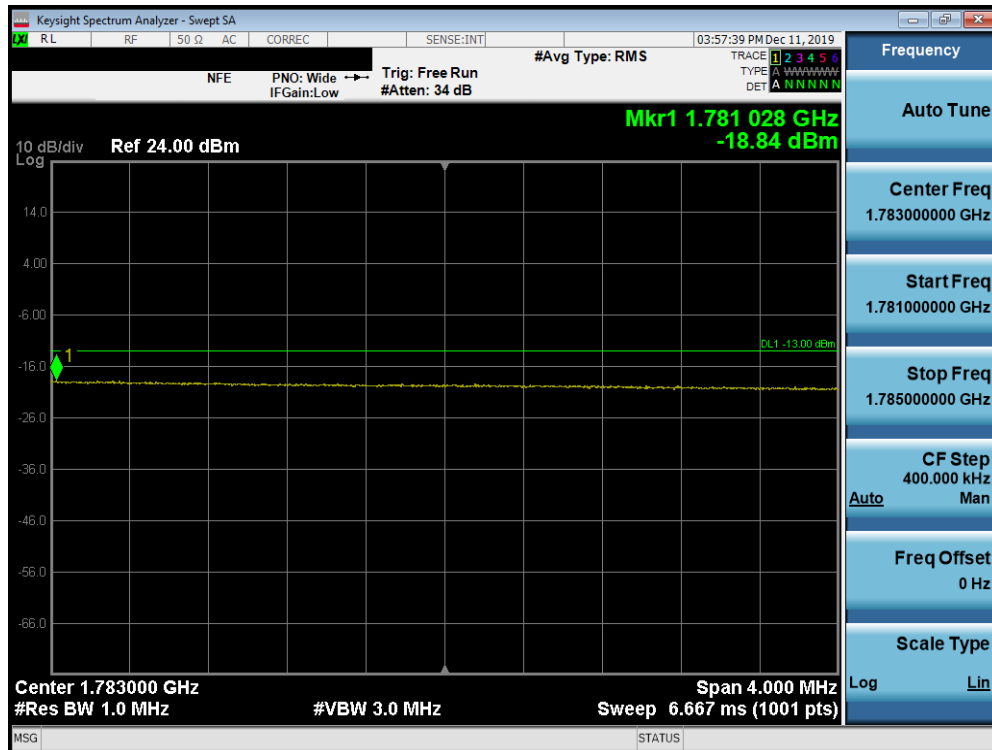


Plot 7-24. Extended Lower Band Edge Plot (Band 66 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 25 of 61



Plot 7-25. Upper Band Edge Plot (Band 66 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)



Plot 7-26. Extended Upper Band Edge Plot (Band 66 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 26 of 61

## Uplink CA Configuration 41C PC2

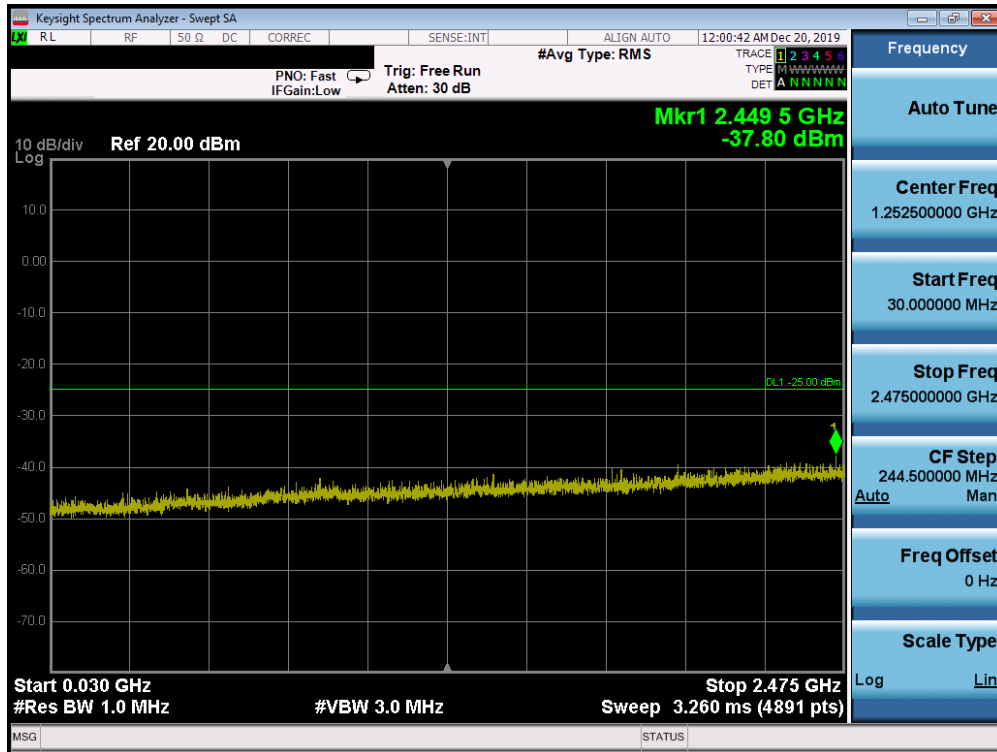
Power State	PCC							SCC							Power
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	20	39948	2525.8	QPSK	1	0	26.86
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	20	40818	2612.8	QPSK	1	0	26.95
Max	LTE B41	20	41490	2680	QPSK	1	0	LTE B41	20	41292	2660.2	QPSK	1	99	25.80

**Table 7-6. Conducted Powers (B41 – Left Carrier: RB Size 1 Offset Max Right Carrier: RB Size 1 Offset 0)**

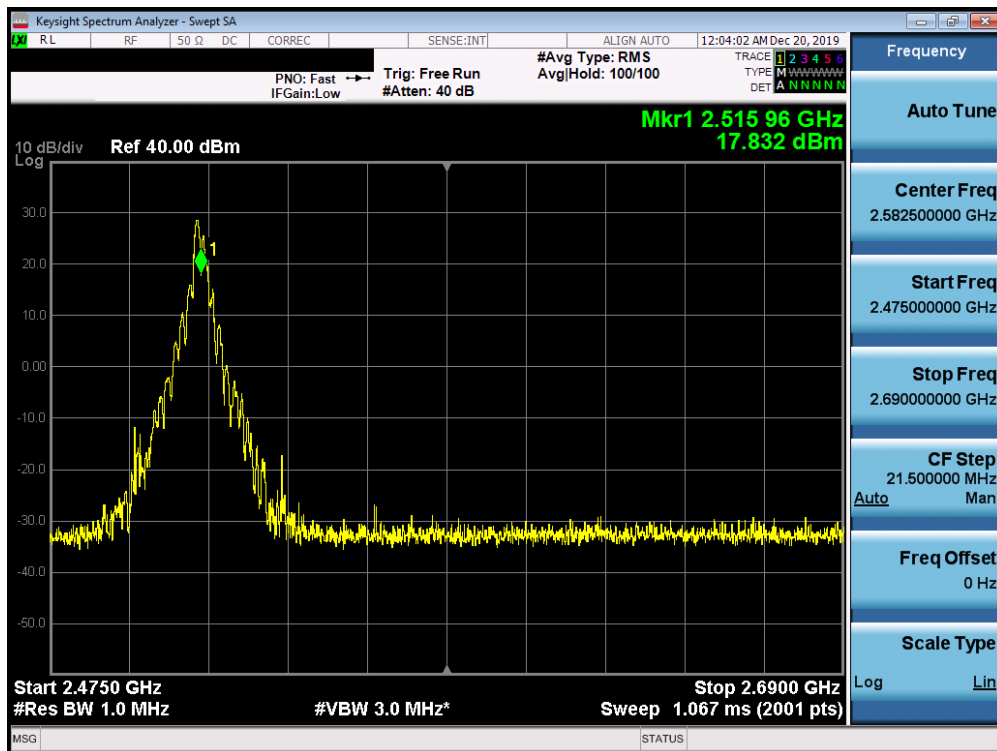
Power State	PCC							SCC							Power
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B41	20	40620	2593	QPSK	100	0	LTE B41	20	40818	2612.8	QPSK	100	0	24.66
Max	LTE B41	20	40620	2593	16-QAM	100	0	LTE B41	20	40818	2612.8	16-QAM	100	0	23.66
Max	LTE B41	20	40620	2593	64-QAM	100	0	LTE B41	20	40818	2612.8	64-QAM	100	0	22.56

**Table 7-7. Conducted Powers (B41 with Various Combinations for 20MHz Channel Bandwidth)**

FCC ID: A3LSMF700U			MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset			Page 27 of 61



Plot 7-27. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – Low Channel)

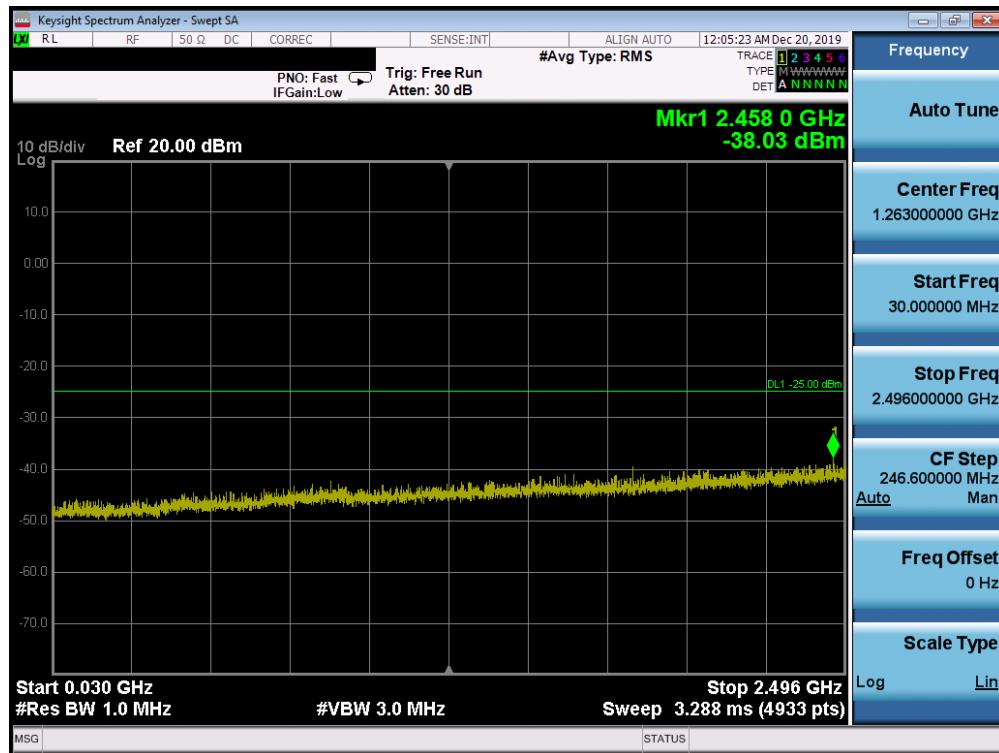


Plot 7-28. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – Low Channel)

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 28 of 61



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Plot 7-31. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – Mid Channel)

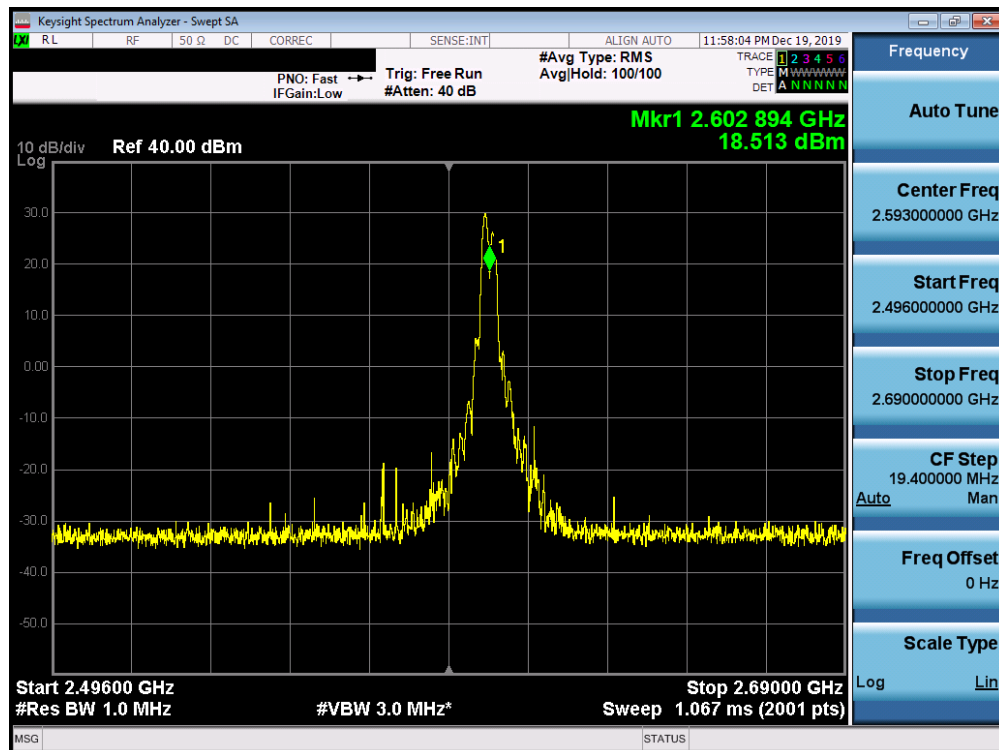
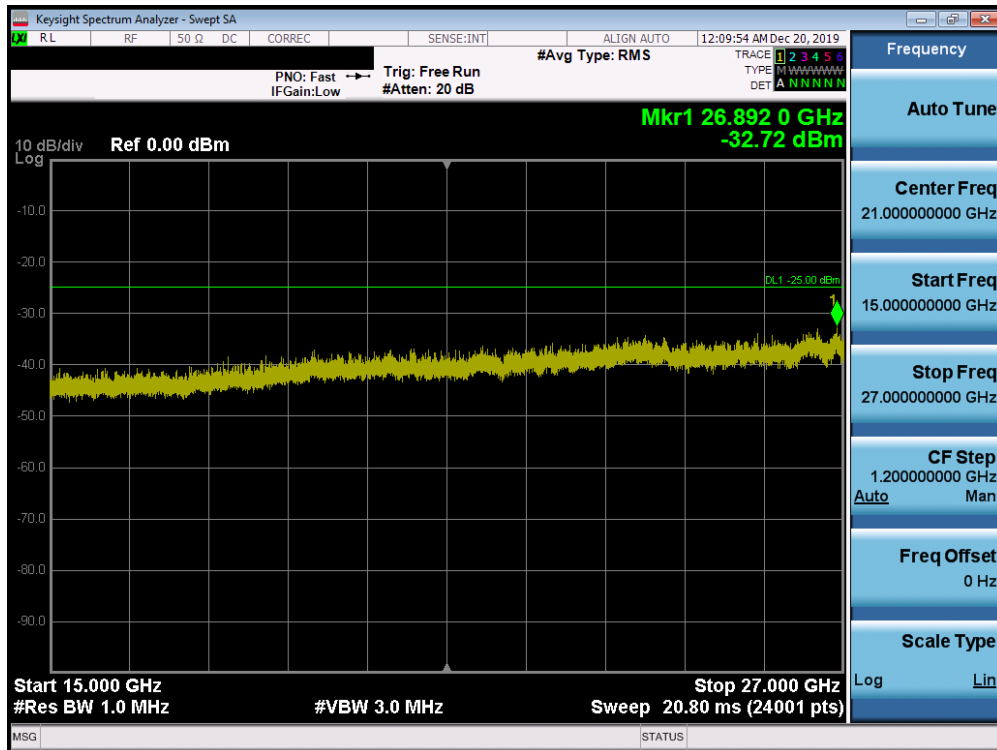


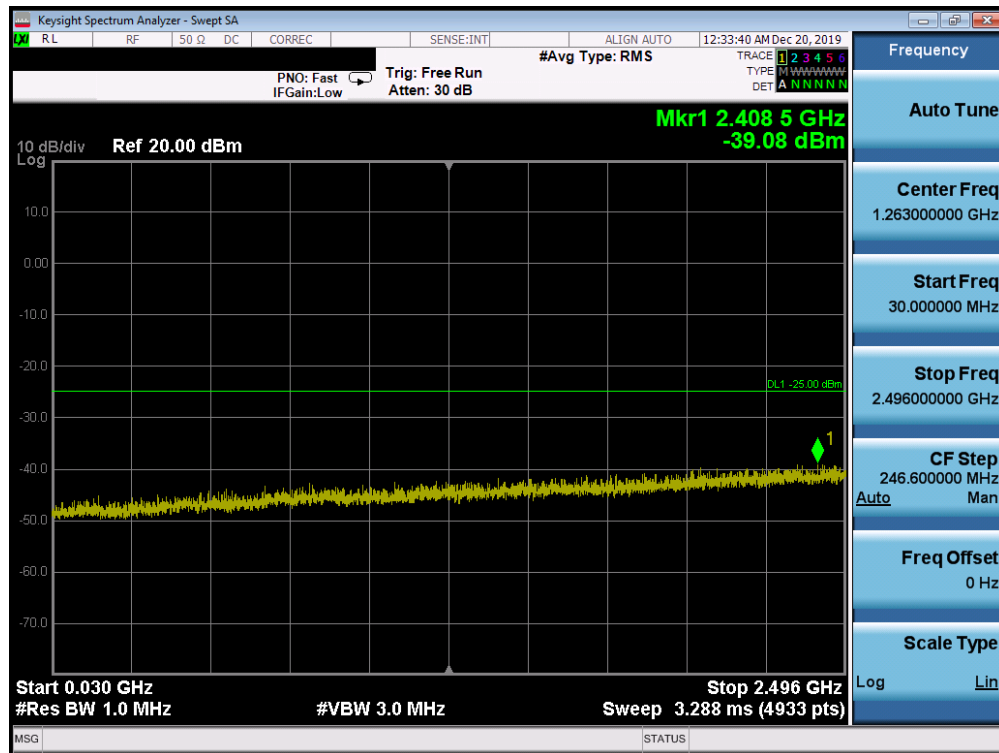


Table 7-32. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – Mid Channel)

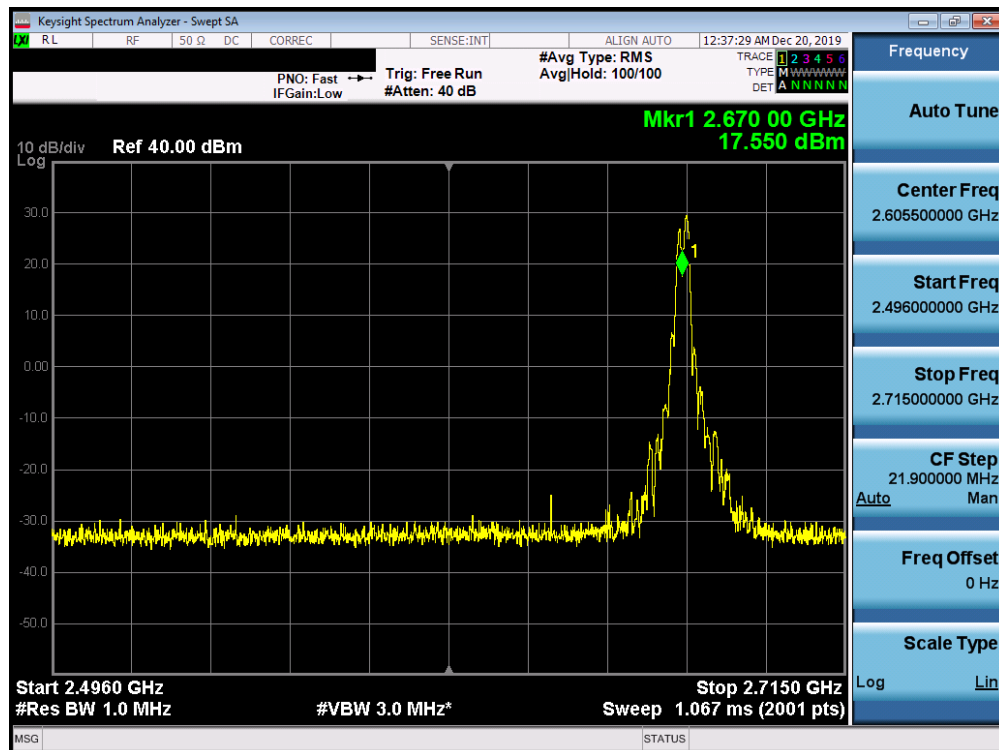
FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 30 of 61



FCC ID: A3LSMF700U	 <b>MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b> 		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M2001240011-03.A3L	<b>Test Dates:</b> 12/11/2019 – 12/29/2019	<b>EUT Type:</b> Portable Handset	Page 31 of 61

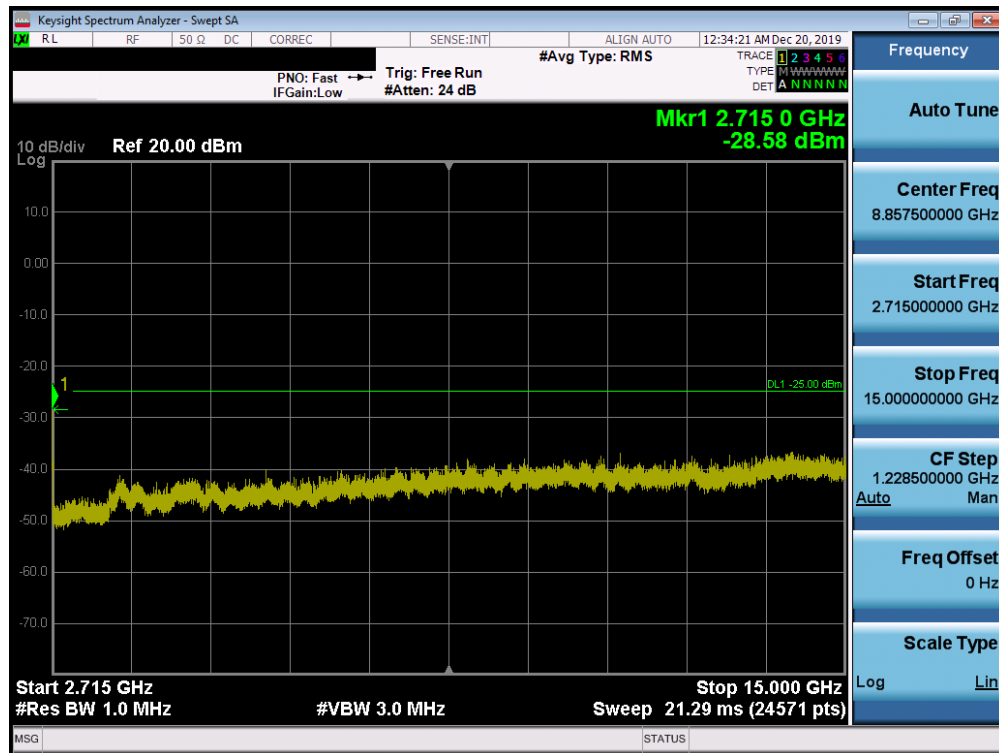


Plot 7-35. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – High Channel)

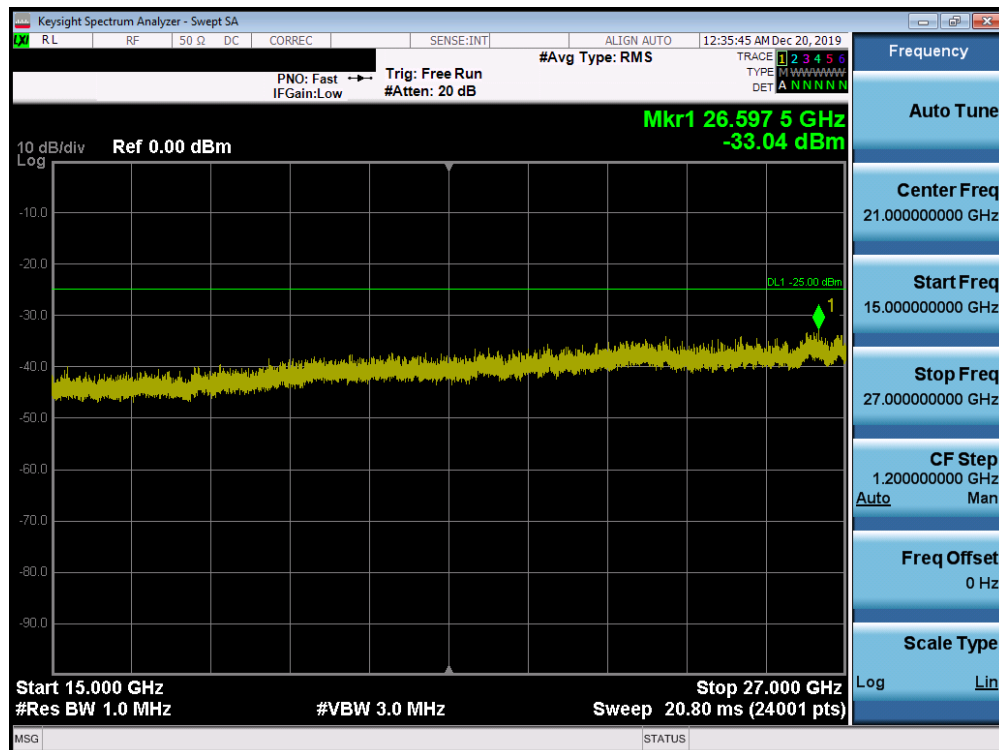


Plot 7-36. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – High Channel)

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 32 of 61

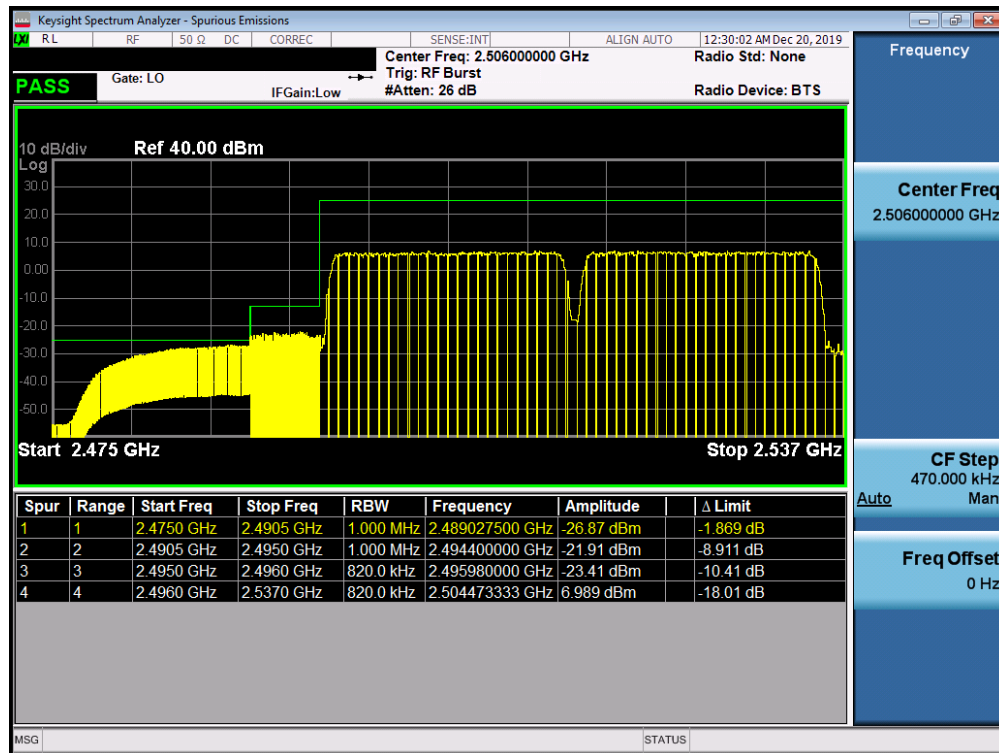


Plot 7-37. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – High Channel)

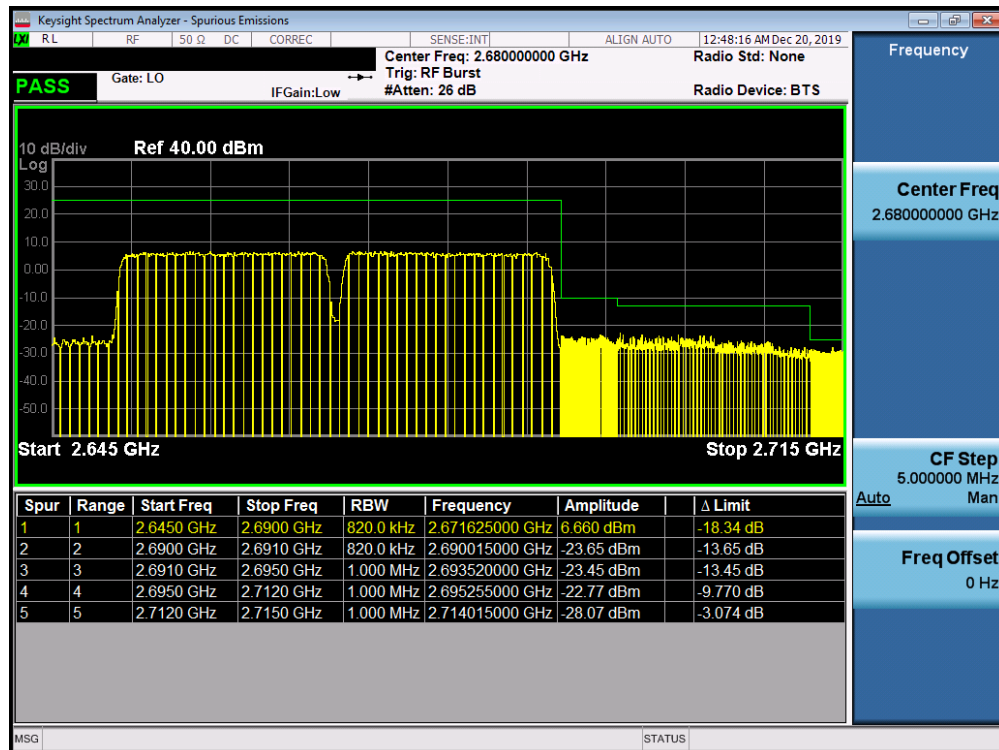


Plot 7-38. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – High Channel)

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 33 of 61



Plot 7-39. Lower ACP Plot (Band 41 QPSK – Left Carrier:20 MHz Right Carrier:20 MHz – Full RB)



Plot 7-40. Upper ACP Plot (Band 41 QPSK – Left Carrier:20 MHz Right Carrier:20 MHz – Full RB)

FCC ID: A3LSMF700U	<b>MEASUREMENT REPORT</b> (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 34 of 61

## Uplink CA Configuration 41C PC3

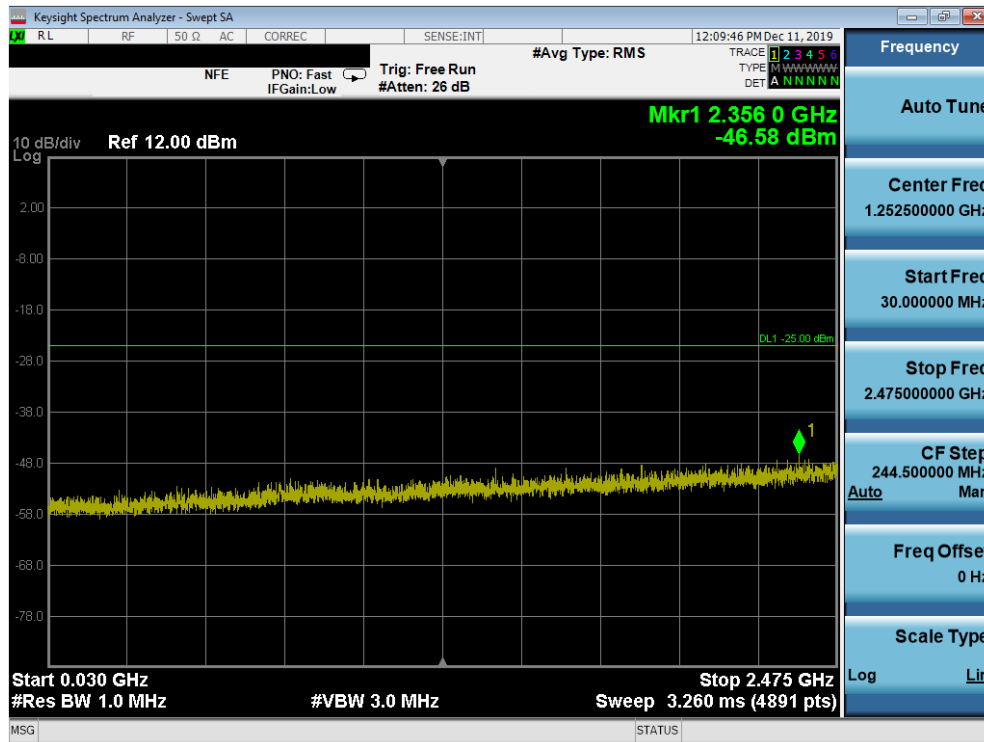
Power State	PCC							SCC							Power
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	20	39948	2525.8	QPSK	1	0	24.23
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	20	40818	2612.8	QPSK	1	0	24.96
Max	LTE B41	20	41490	2680	QPSK	1	0	LTE B41	20	41292	2660.2	QPSK	1	99	24.91

**Table 7-8. Conducted Powers (B41 – Left Carrier: RB Size 1 Offset Max Right Carrier: RB Size 1 Offset 0)**

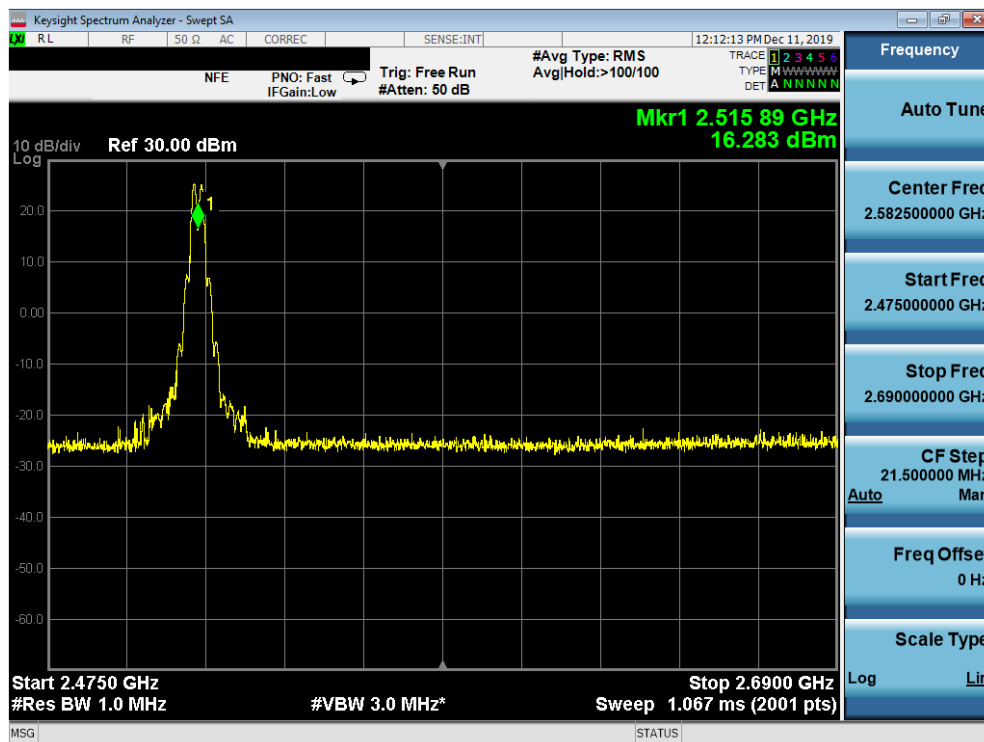
Power State	PCC							SCC							Power
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B41	20	40620	2593	QPSK	1	0	LTE B41	20	40818	2612.8	QPSK	1	0	18.71
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	20	40818	2612.8	QPSK	1	99	18.91
Max	LTE B41	20	40620	2593	QPSK	1	0	LTE B41	20	40818	2612.8	QPSK	1	99	16.41
Max	LTE B41	20	40620	2593	QPSK	1	50	LTE B41	20	40818	2612.8	QPSK	1	50	20.34
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	20	40818	2612.8	QPSK	1	0	24.98
Max	LTE B41	20	40620	2593	QPSK	100	0	LTE B41	20	40818	2612.8	QPSK	100	0	23.11
Max	LTE B41	20	40620	2593	16-QAM	100	0	LTE B41	20	40818	2612.8	16-QAM	100	0	22.01
Max	LTE B41	20	40620	2593	64-QAM	100	0	LTE B41	20	40818	2612.8	64-QAM	100	0	20.56

**Table 7-9. Conducted Powers (B41 with Various Combinations for 20MHz Channel Bandwidth)**

FCC ID: A3LSMF700U			MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset			Page 35 of 61

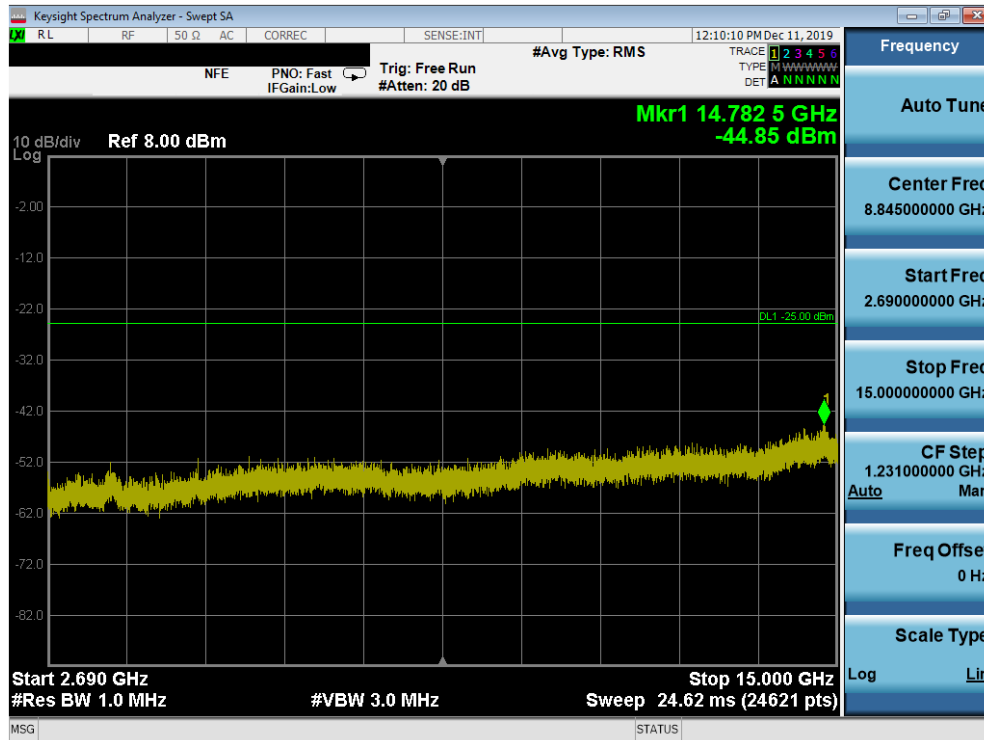


Plot 7-41. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – Low Channel)

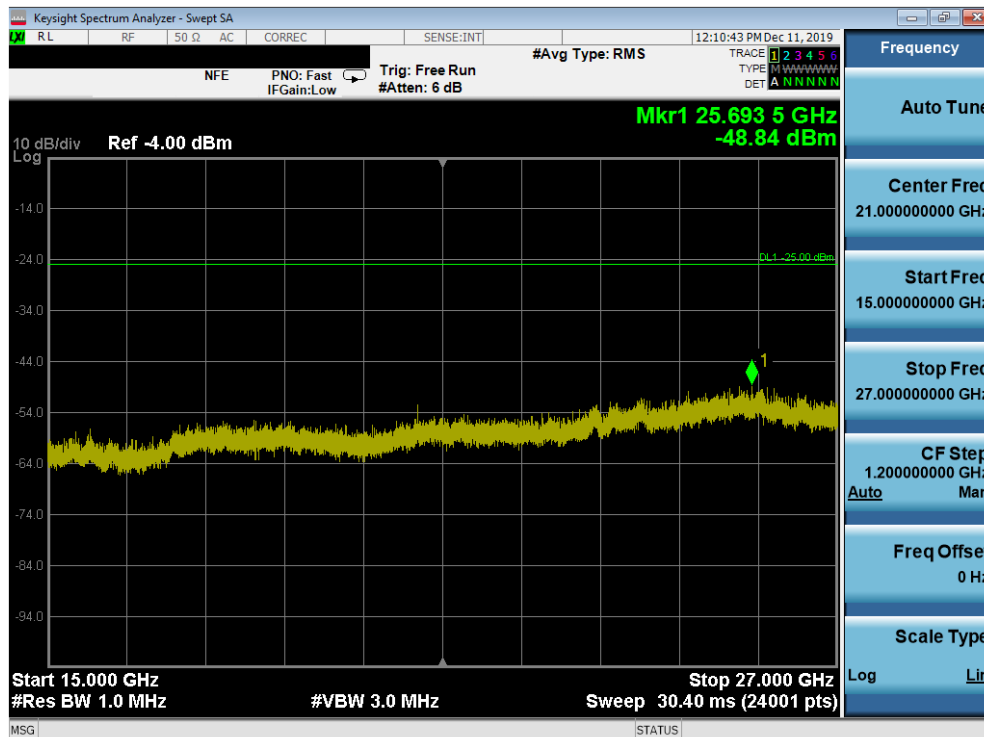


Plot 7-42. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – Low Channel)

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 36 of 61

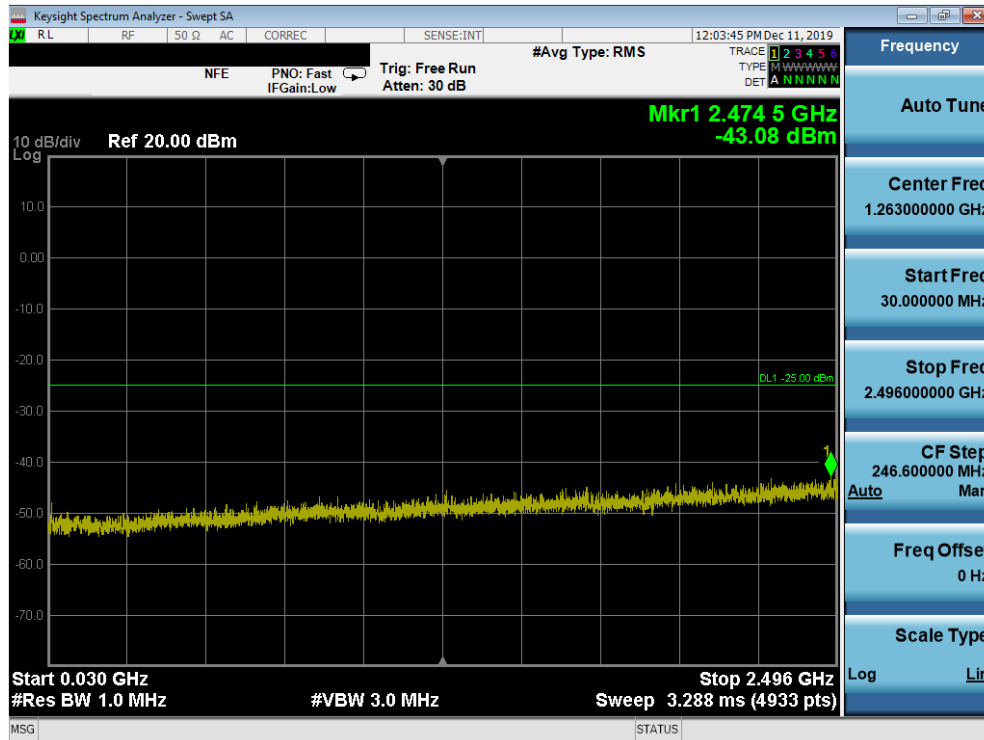


Plot 7-43. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – Low Channel)

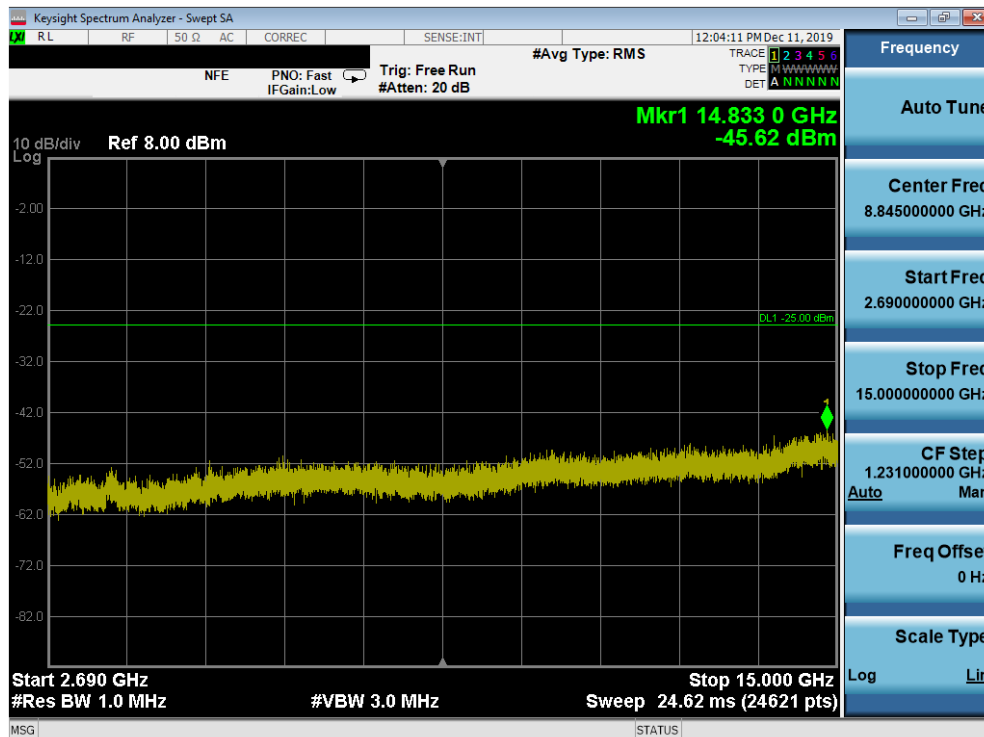


Plot 7-44. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – Low Channel)

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 37 of 61

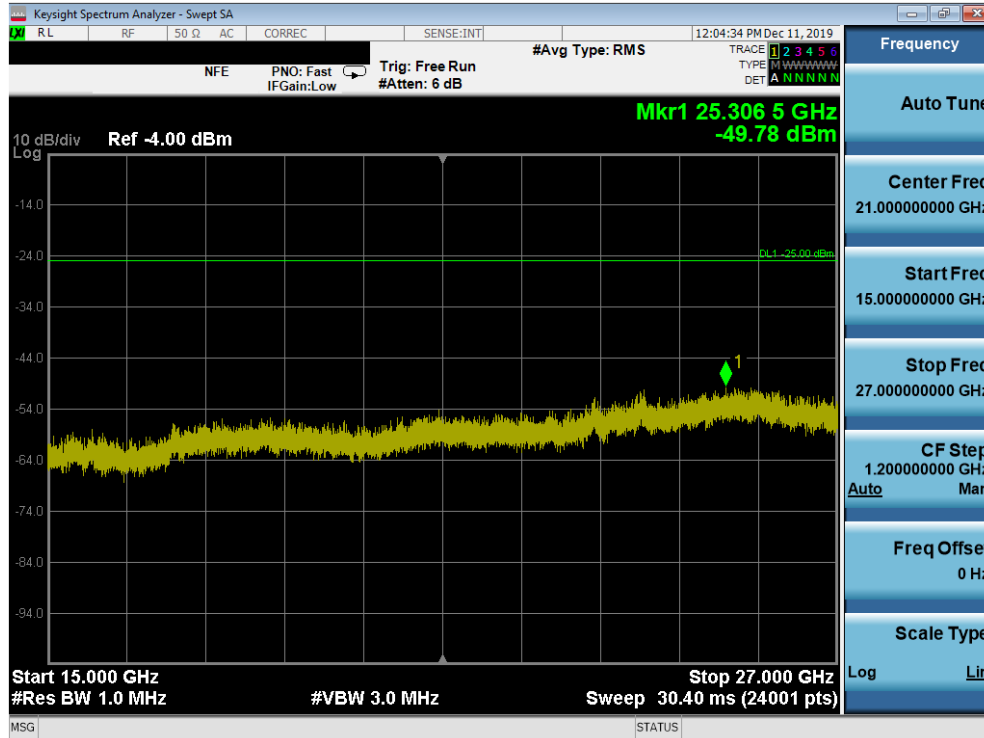


Plot 7-45. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – Mid Channel)

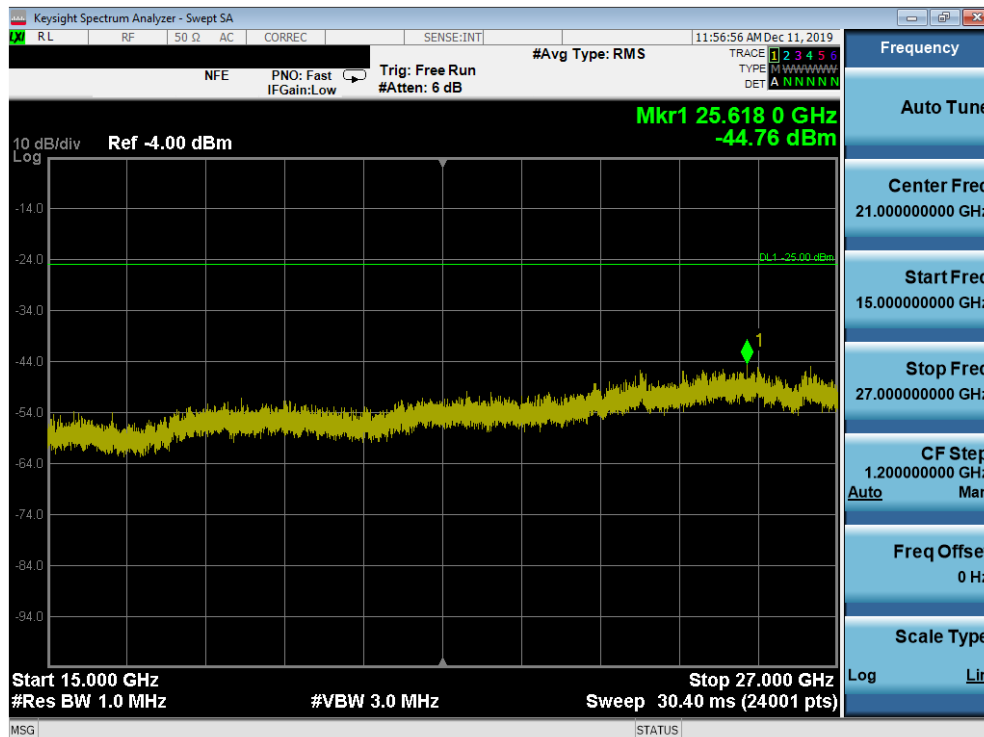


Plot 7-46. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – Mid Channel)

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 38 of 61

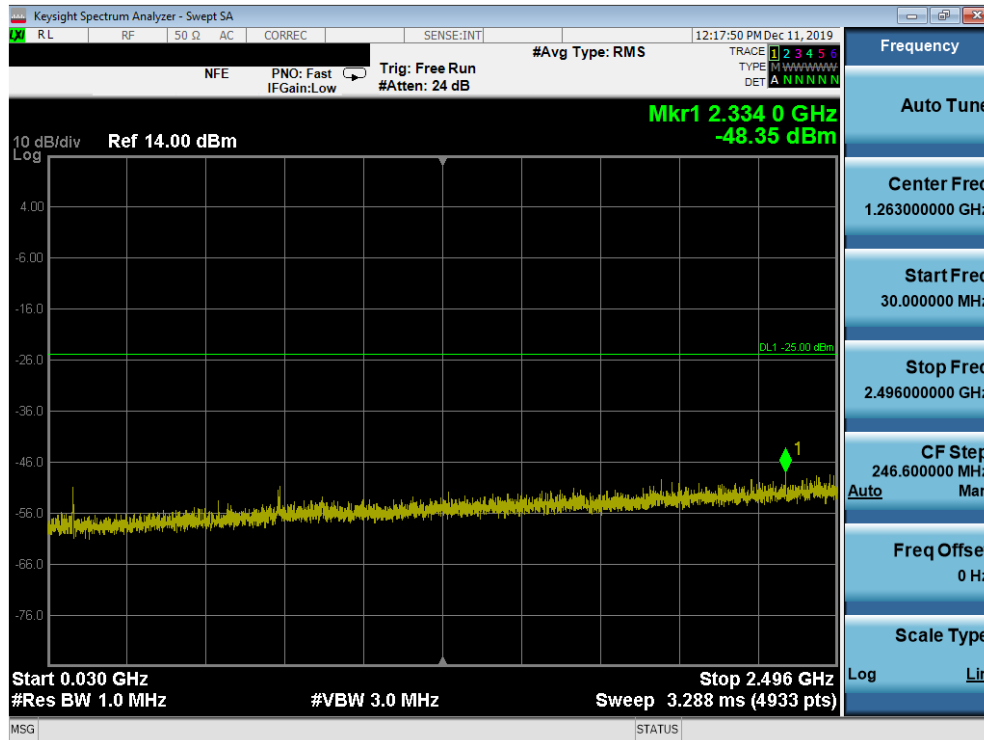


Plot 7-47. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – Mid Channel)

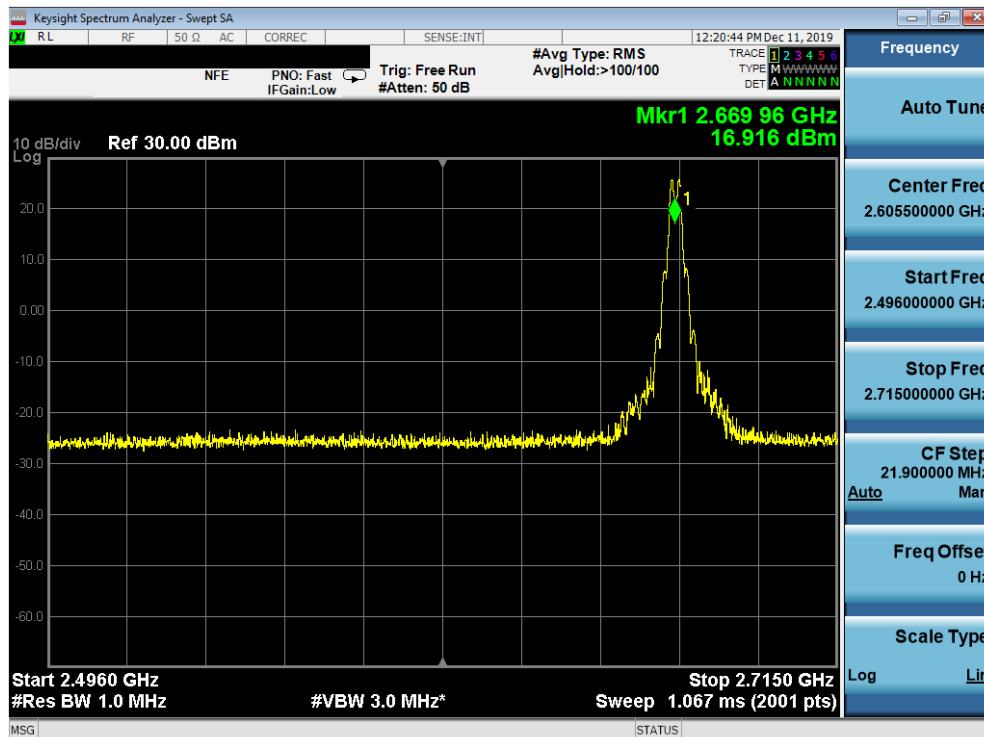


Plot 7-48. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – Mid Channel)

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 39 of 61

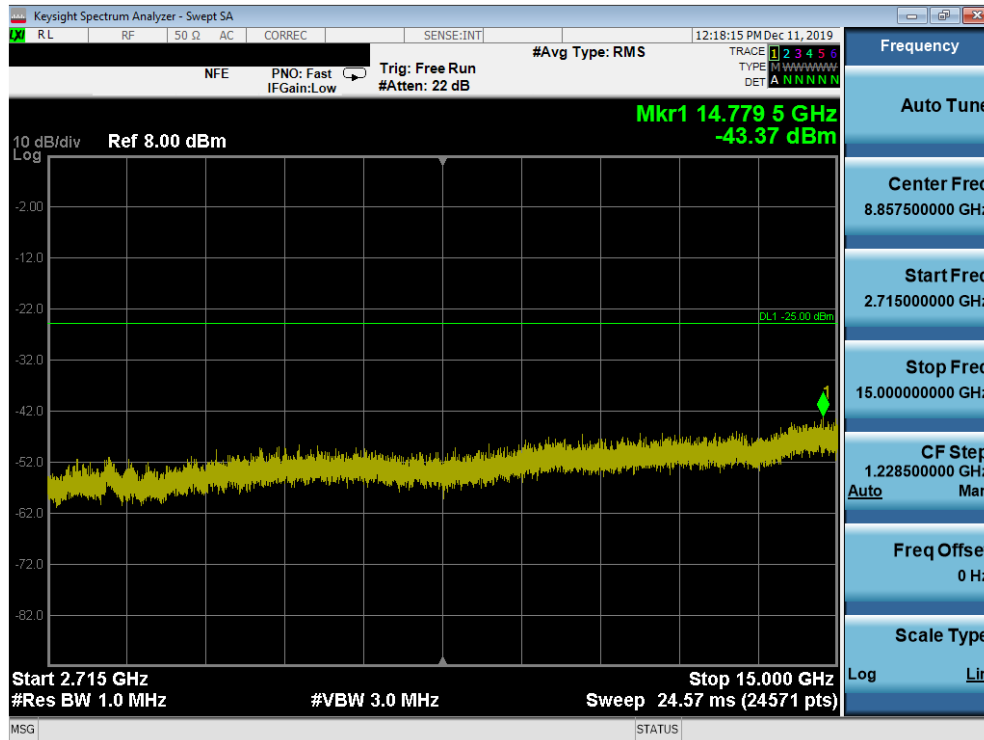


Plot 7-49. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – High Channel)

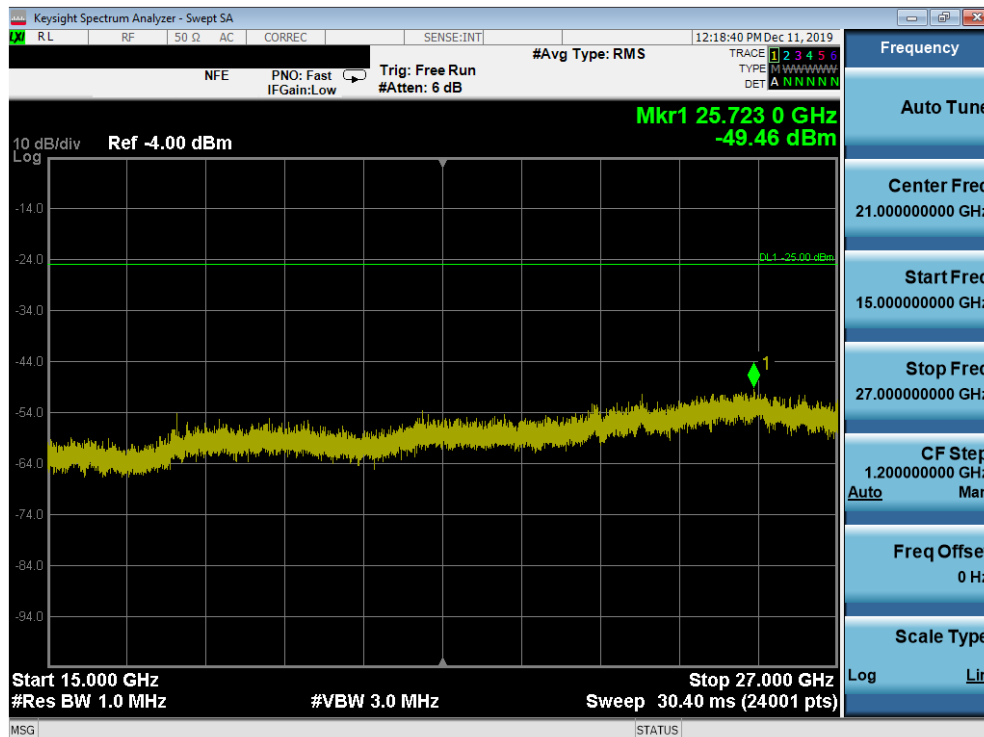


Plot 7-50. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – High Channel)

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 40 of 61

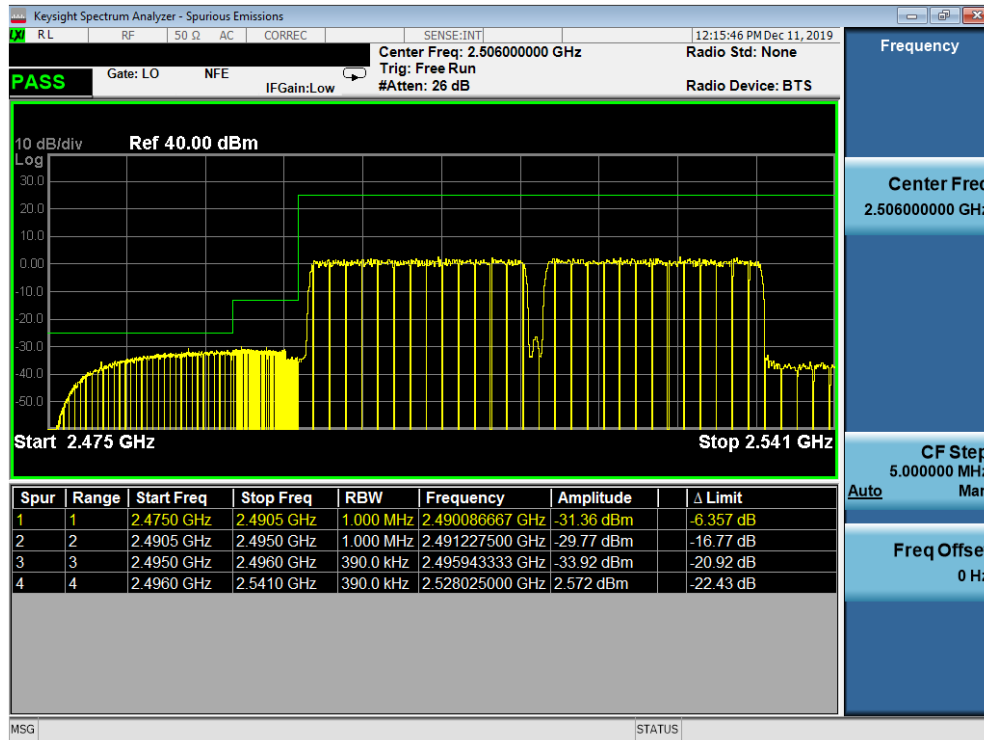


Plot 7-51. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – High Channel)

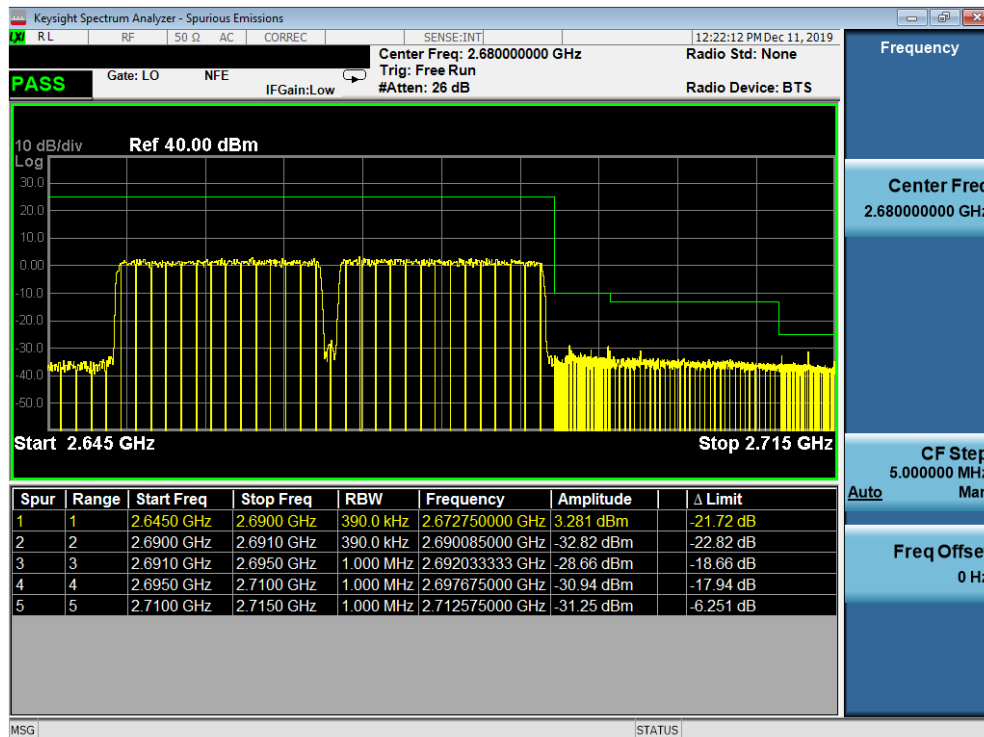


Plot 7-52. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – Left Carrier 1/99 Right Carrier 1/0 – High Channel)

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 41 of 61



Plot 7-53. Lower ACP Plot (Band 41 QPSK – Left Carrier:20 MHz Right Carrier:20 MHz – Full RB)



Plot 7-54. Upper ACP Plot (Band 41 QPSK – Left Carrier:20 MHz Right Carrier:20 MHz – Full RB)

FCC ID: A3LSMF700U	<b>PCTEST</b>		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 42 of 61	

## 7.3 Uplink Carrier Aggregation Radiated Measurements

### 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 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 peak measurements while the EUT is operating at its maximum duty cycle, 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

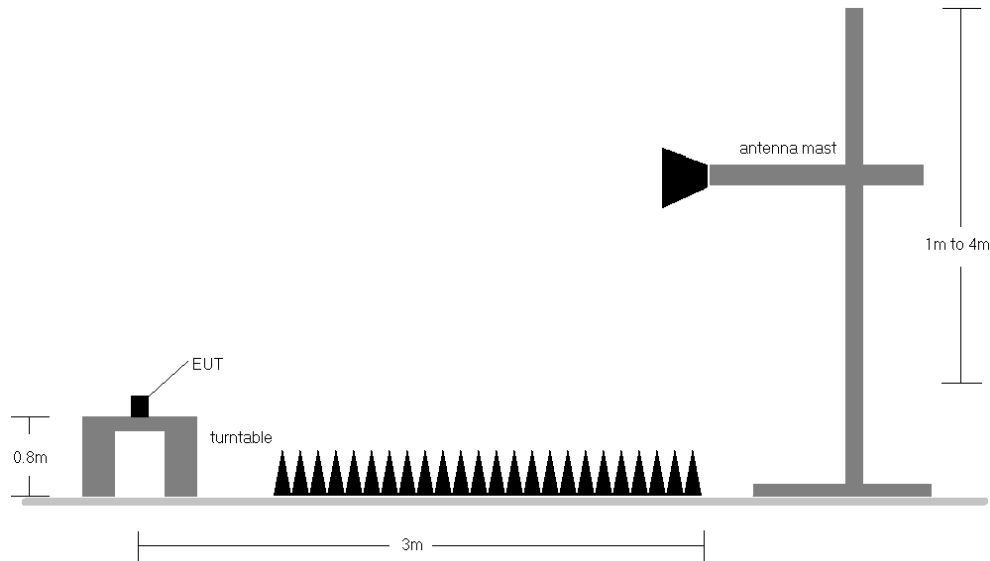
### Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW  $\geq 3 \times$  RBW
3. No. of sweep points  $\geq 2 \times$  span / RBW
4. Detector = RMS
5. Trace mode = trace average for continuous emissions, max hold for pulse emissions
6. The trace was allowed to stabilize

FCC ID: A3LSMF700U		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset	Page 43 of 61	

## Test Setup



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



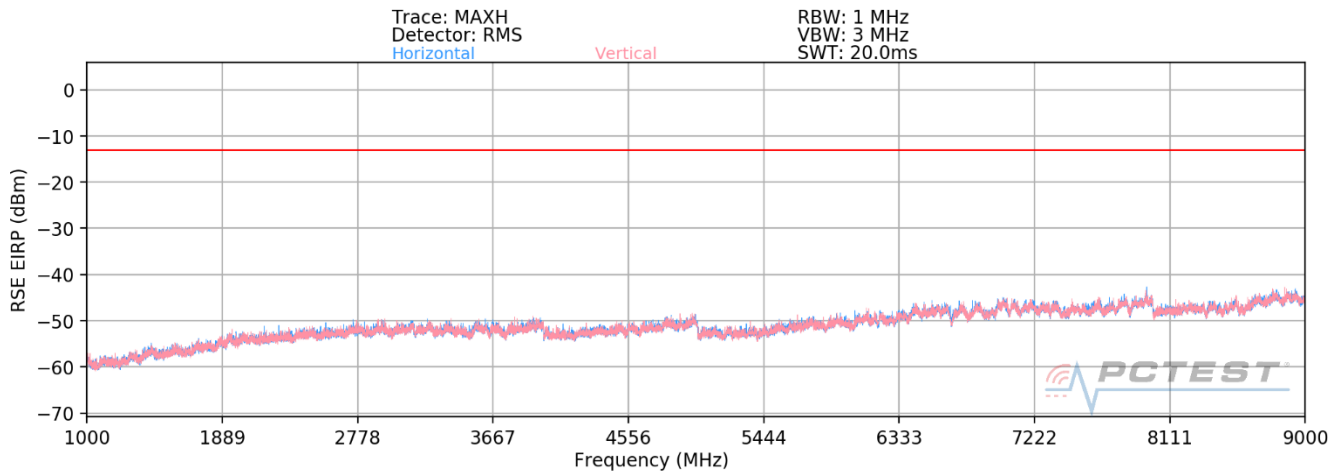
**Figure 7-2. Test Instrument & Measurement Setup**

## Test Notes

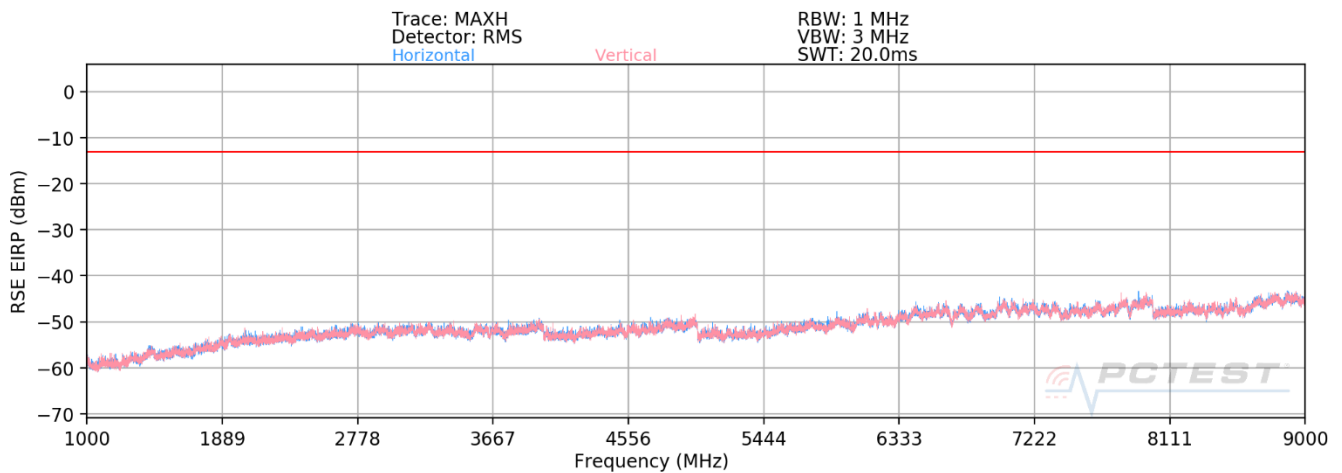
- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- 3) Radiated spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. The worst case (highest) emissions were found while operating with QPSK modulation with both carriers set to transmit using 1RB.
- 4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 5) 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.
- 6) No significant emissions were found as a result of two uplink carriers operating contiguously.

FCC ID: A3LSMF700U		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 44 of 61

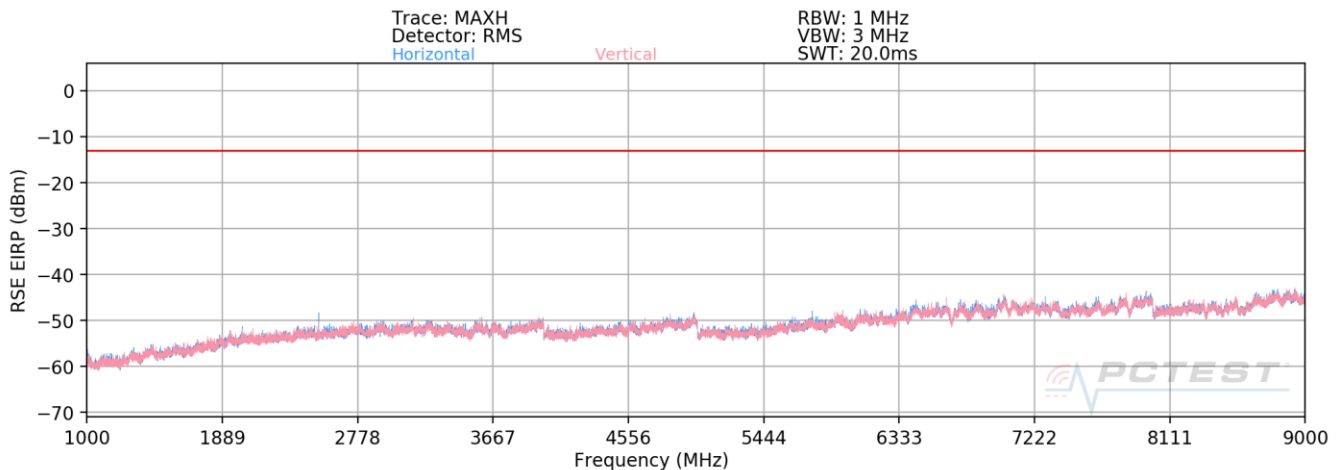
## Uplink CA Configuration 5B



**Plot 7-55. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 5 Low Channel – PCC/SCC: 1RB) – OPEN**

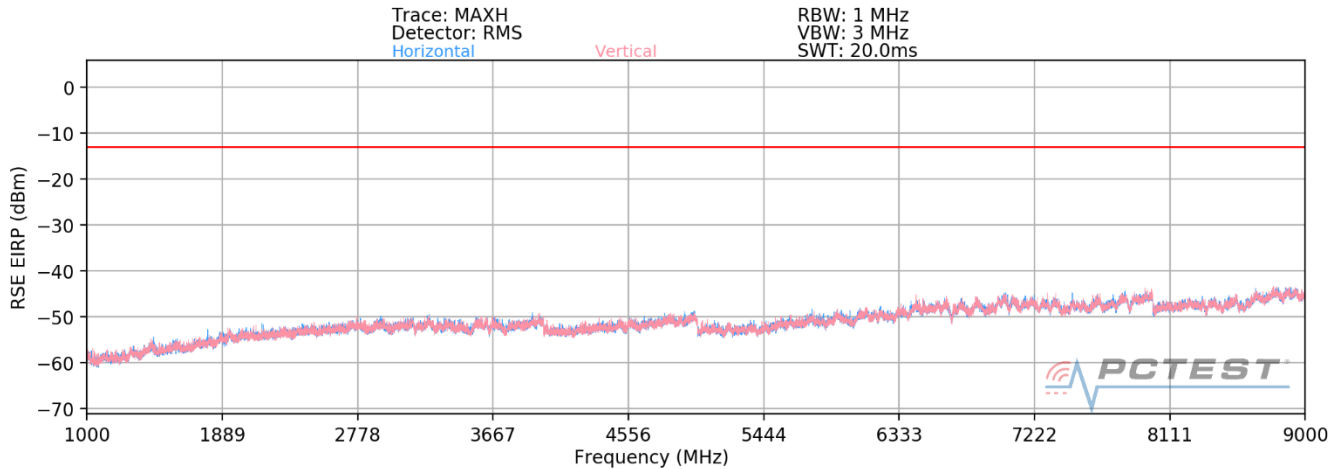


**Plot 7-56. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 5 Low Channel – PCC/SCC: 1RB) – CLOSED**

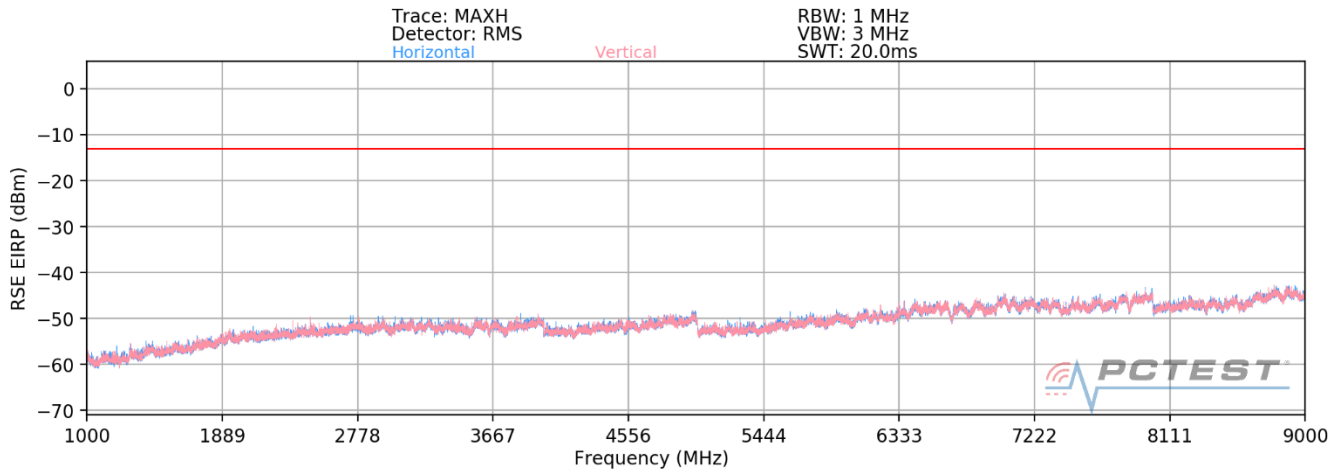


**Plot 7-57. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 5 Mid Channel – PCC/SCC: 1RB) – OPEN**

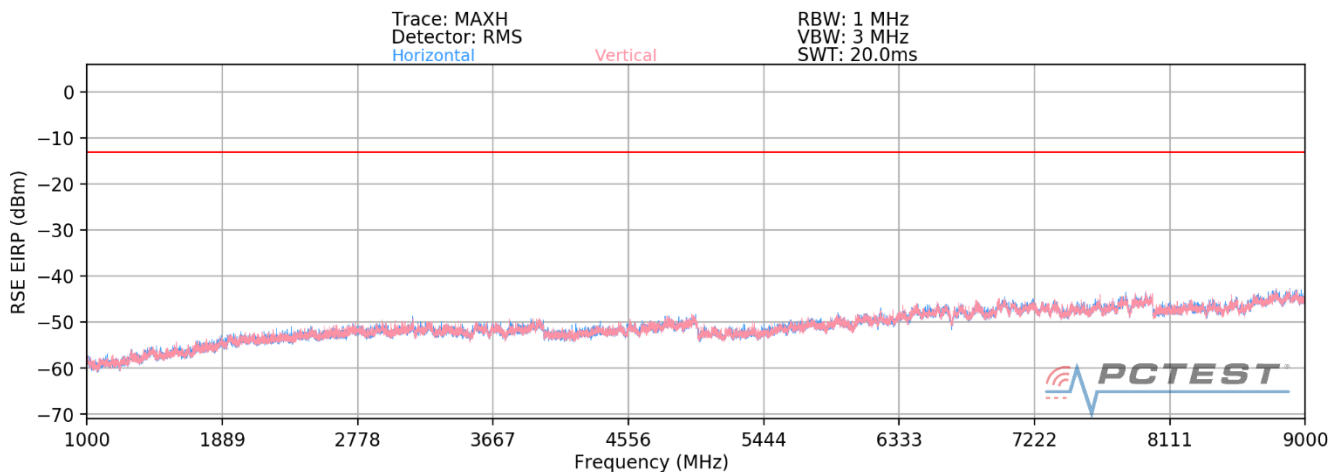
FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 45 of 61





**Plot 7-58. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 5 Mid Channel – PCC/SCC: 1RB) – CLOSED**



**Plot 7-59. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 5 High Channel – PCC/SCC: 1RB) – OPEN**



**Plot 7-60. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 5 High Channel – PCC/SCC: 1RB) – CLOSED**

FCC ID: A3LSMF700U	 <b>MEASUREMENT REPORT</b> (CLASS II PERMISSIVE CHANGE)		 <b>Approved by:</b> Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset	
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OPERATING FREQUENCY (PCC): 829.00 MHz  
 OPERATING FREQUENCY (SCC): 838.90 MHz  
 CHANNEL (PCC): 20450  
 CHANNEL (SCC): 20549  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -13 dBm

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]	Margin [dB]
1658.00	H	-	-	-69.82	3.94	-65.88	-52.9
2487.00	H	102	235	-63.12	4.64	-58.48	-45.5
3316.00	H	-	-	-67.77	6.04	-61.73	-48.7
4145.00	H	-	-	-69.86	7.77	-62.09	-49.1

Table 7-10. Radiated Spurious Data (ULCA B5 PCC: RB 1 Offset 49, SCC: RB 1 Offset 0 – Low Channel)

OPERATING FREQUENCY (PCC): 836.50 MHz  
 OPERATING FREQUENCY (SCC): 843.70 MHz  
 CHANNEL (PCC): 20525  
 CHANNEL (SCC): 20597  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10+5 MHz  
 DISTANCE: 3 meters  
 LIMIT: -13 dBm

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]	Margin [dB]
1673.00	H	-	-	-68.91	3.10	-65.81	-52.8
2509.50	H	124	323	-54.79	4.02	-50.77	-37.8
3346.00	H	-	-	-68.19	6.03	-62.17	-49.2
4182.50	H	-	-	-69.58	7.79	-61.79	-48.8



Table 7-11. Radiated Spurious Data (ULCA B5 PCC: RB 1 Offset 49, SCC: RB 1 Offset 0 – Low Channel)

FCC ID: A3LSMF700U	 <b>MEASUREMENT REPORT</b> (CLASS II PERMISSIVE CHANGE)			<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M2001240011-03.A3L	<b>Test Dates:</b> 12/11/2019 – 12/29/2019	<b>EUT Type:</b> Portable Handset	Page 47 of 61	

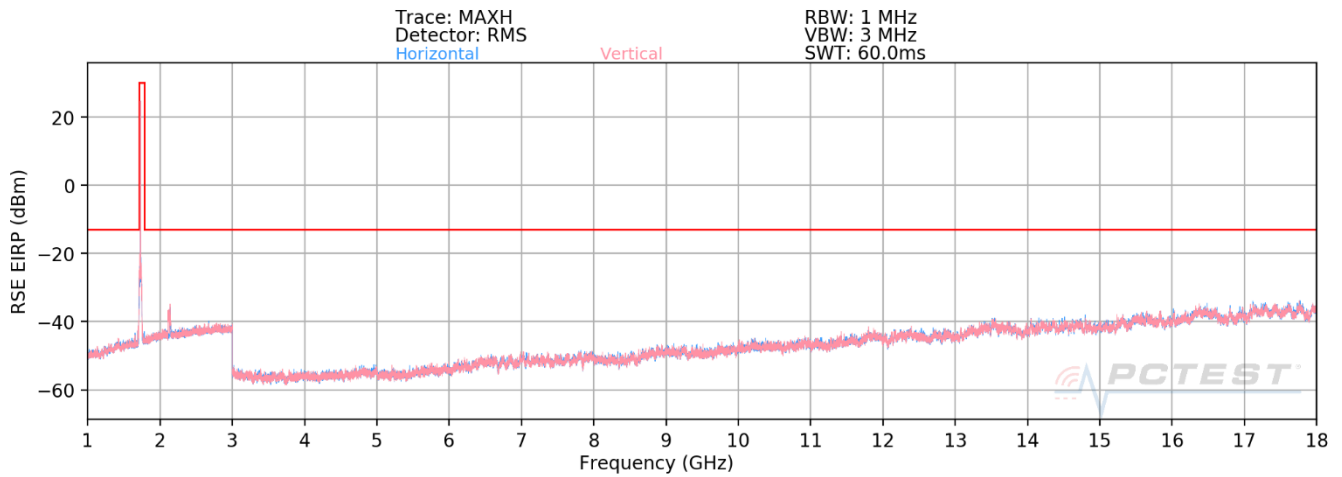
OPERATING FREQUENCY (PCC): 844.00 MHz  
 OPERATING FREQUENCY (SCC): 834.10 MHz  
 CHANNEL (PCC): 20600  
 CHANNEL (SCC): 20501  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -13 dBm

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]	Margin [dB]
1688.00	H	-	-	-70.36	3.90	-66.46	-53.5
2532.00	H	101	308	-58.64	4.80	-53.84	-40.8
3376.00	H	-	-	-67.64	6.25	-61.39	-48.4
4220.00	H	-	-	-68.15	7.88	-60.27	-47.3

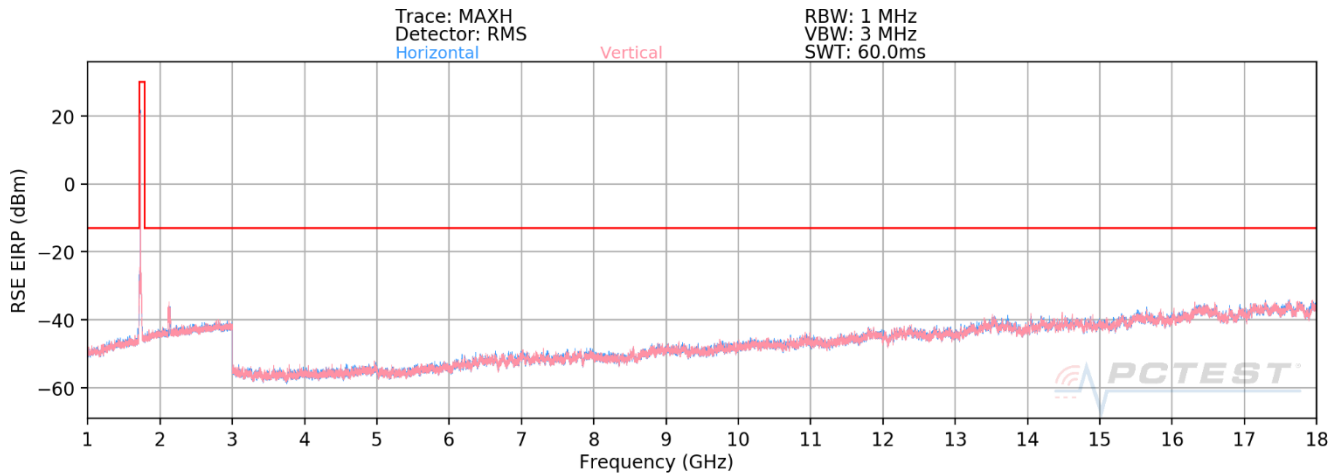
Table 7-12. Radiated Spurious Data (ULCA B5 PCC: RB 1 Offset 0, SCC: RB 1 Offset 49 – High Channel)

FCC ID: A3LSMF700U		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 48 of 61

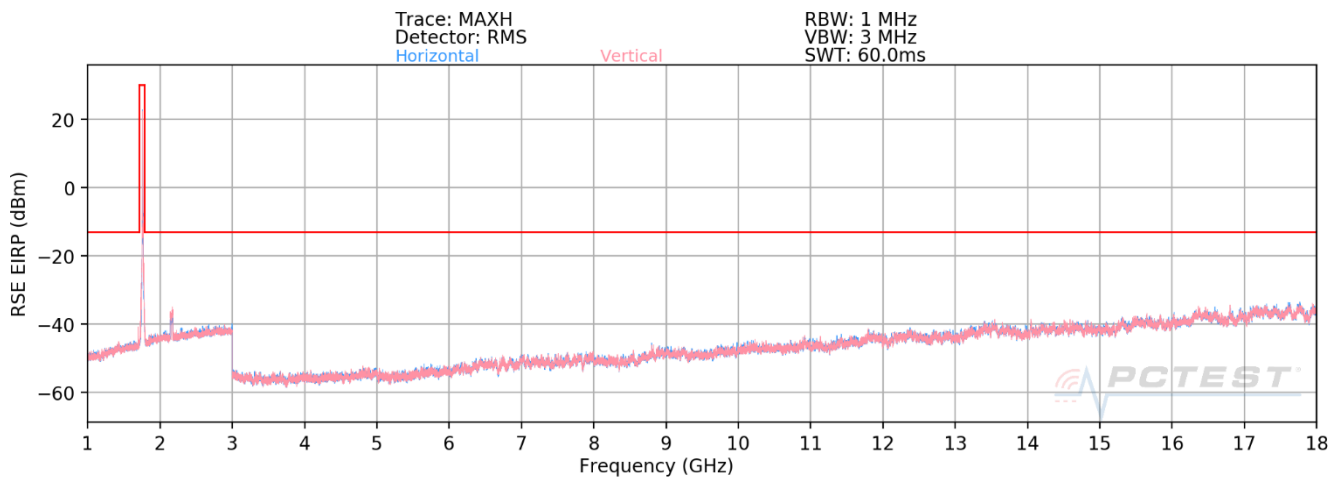
## Uplink CA Configuration 66B/C



**Plot 7-61. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 66 Low Channel – PCC/SCC: 1RB) – OPEN**

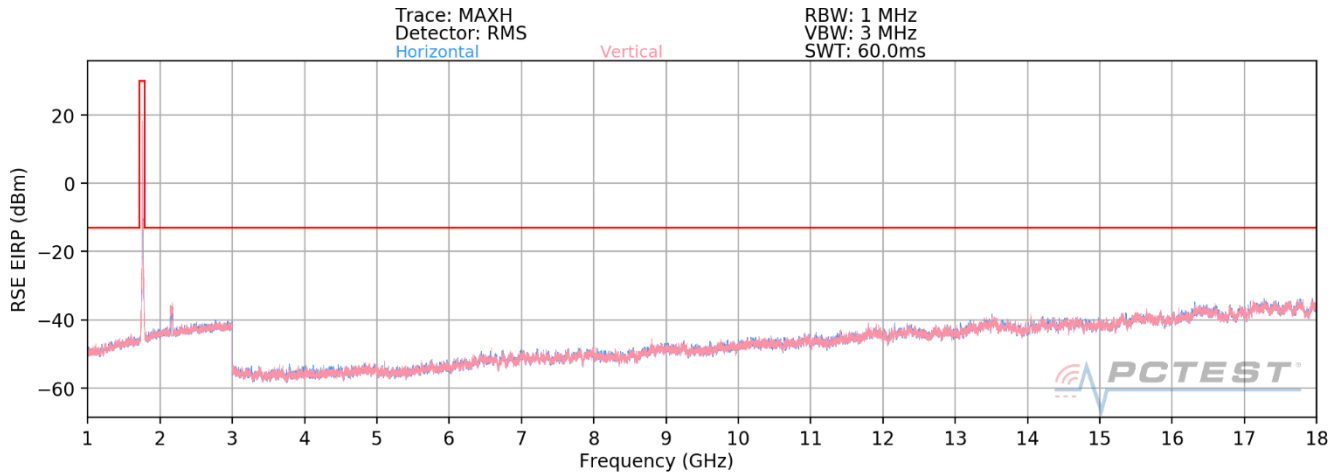


**Plot 7-62. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 66 Low Channel – PCC/SCC: 1RB) –CLOSED**

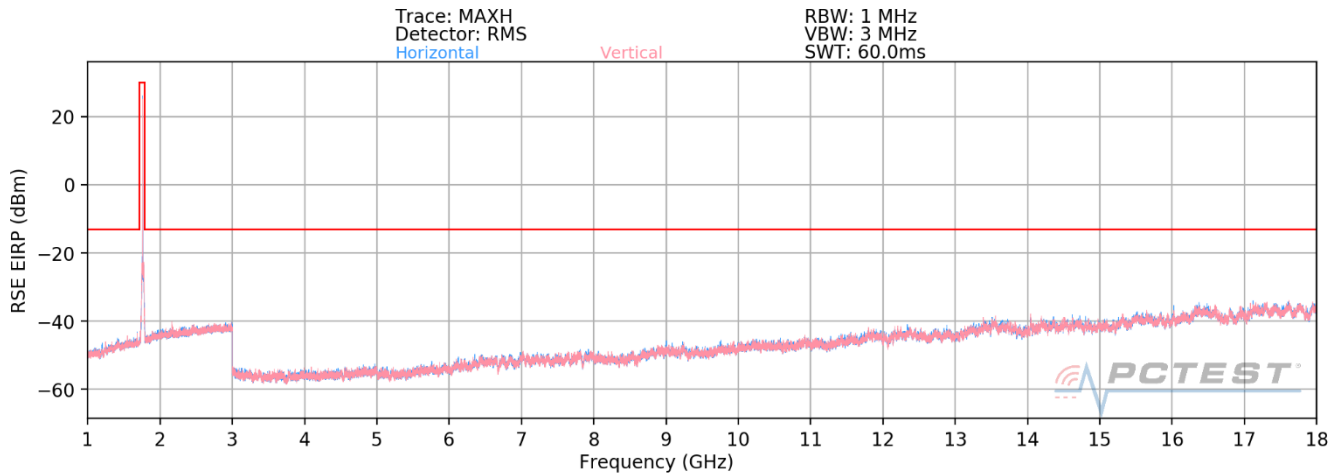


**Plot 7-63. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 66 Mid Channel – PCC/SCC: 1RB) - OPEN**

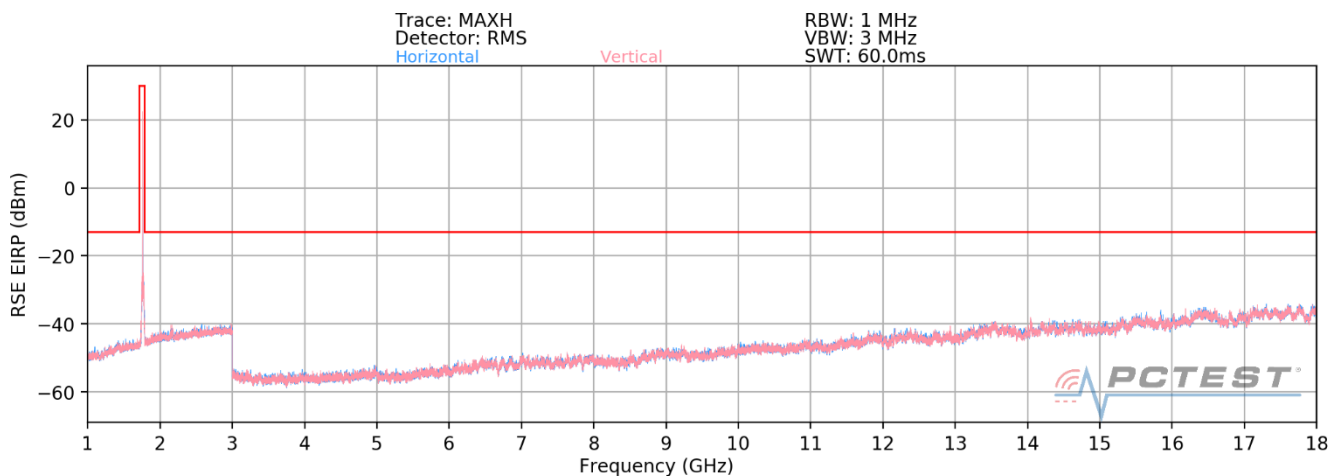
FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 49 of 61



**Plot 7-64. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 66 Mid Channel – PCC/SCC: 1RB) – CLOSED**



**Plot 7-65. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 66 High Channel – PCC/SCC: 1RB) – OPEN**



**Plot 7-66. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 66 High Channel – PCC/SCC: 1RB) – CLOSED**

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 50 of 61

OPERATING FREQUENCY (PCC): 1720.00 MHz  
 OPERATING FREQUENCY (SCC): 1739.80 MHz  
 CHANNEL (PCC): 132072  
 CHANNEL (SCC): 132270  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 20.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -13 dBm

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]	Margin [dB]
3440.00	H	-	-	-68.09	6.28	-61.81	-48.8
5160.00	H	-	-	-69.36	8.98	-60.38	-47.4
6880.00	H	-	-	-68.03	9.42	-58.61	-45.6
8600.00	H	135	51	-61.08	9.62	-51.46	-38.5
10320.00	H	102	18	-57.03	9.56	-47.46	-34.5
12040.00	H	-	-	-60.88	9.24	-51.63	-38.6
13760.00	H	-	-	-57.29	8.72	-48.56	-35.6

Table 7-13. Radiated Spurious Data (ULCA B66 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel)

OPERATING FREQUENCY (PCC): 1745.00 MHz  
 OPERATING FREQUENCY (SCC): 1764.80 MHz  
 CHANNEL (PCC): 132322  
 CHANNEL (SCC): 132520  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 20.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -13 dBm

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]	Margin [dB]
3490.00	H	-	-	-67.88	6.47	-61.41	-48.4
5235.00	H	110	350	-66.67	8.97	-57.70	-44.7
6980.00	H	-	-	-67.35	9.23	-58.13	-45.1
8725.00	H	135	55	-58.54	9.59	-48.95	-35.9
10470.00	H	101	13	-58.04	9.43	-48.62	-35.6
12215.00	H	-	-	-59.82	9.17	-50.66	-37.7
13960.00	H	-	-	-57.74	8.59	-49.16	-36.2



Table 7-14. Radiated Spurious Data (ULCA B66 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel)

FCC ID: A3LSMF700U		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 51 of 61

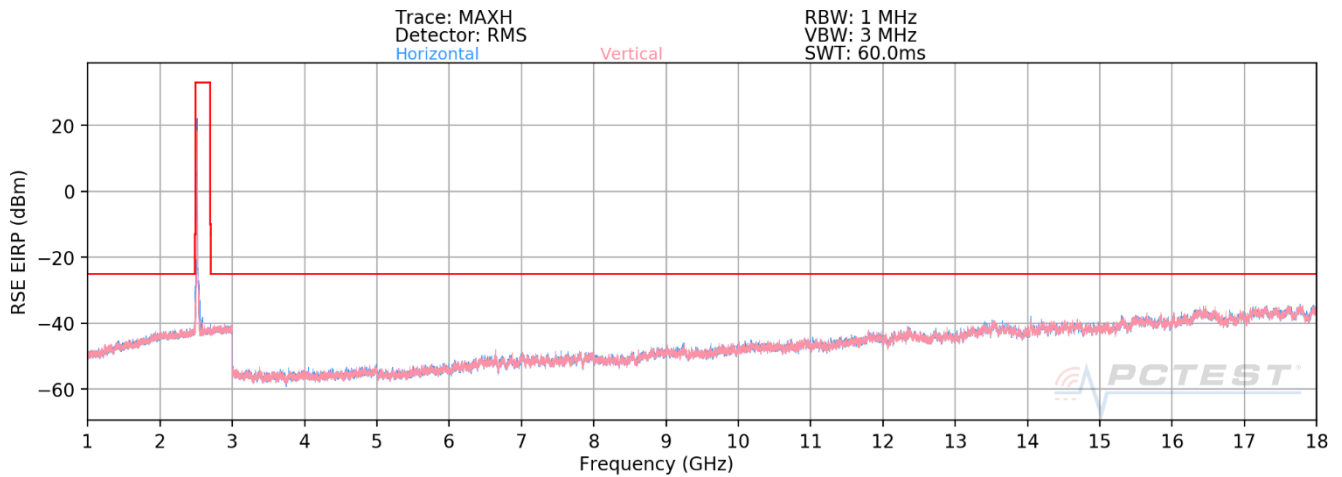
OPERATING FREQUENCY (PCC): 1770.00 MHz  
 OPERATING FREQUENCY (SCC): 1750.20 MHz  
 CHANNEL (PCC): 132572  
 CHANNEL (SCC): 132374  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 20.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -13 dBm

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]	Margin [dB]
3540.00	H	-	-	-67.77	6.45	-61.32	-48.3
5310.00	H	-	-	-68.83	9.09	-59.74	-46.7
7080.00	H	-	-	-65.99	9.17	-56.82	-43.8
8850.00	H	133	59	-57.63	9.57	-48.07	-35.1
10620.00	H	116	12	-58.58	9.55	-49.02	-36.0
12390.00	H	-	-	-59.16	9.11	-50.05	-37.0
14160.00	H	-	-	-56.78	8.45	-48.33	-35.3

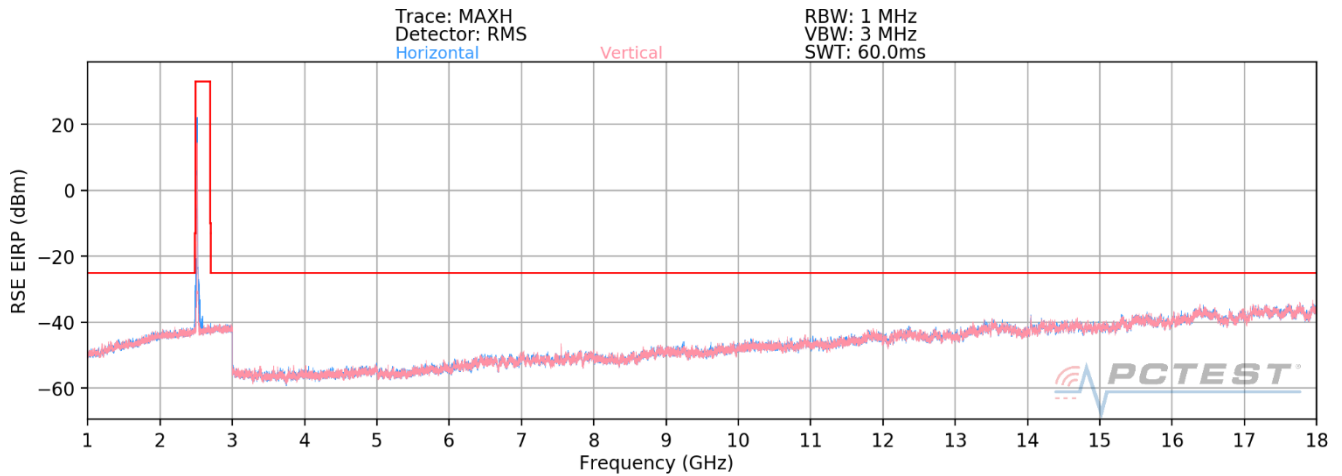
Table 7-15. Radiated Spurious Data (ULCA B66 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel)

FCC ID: A3LSMF700U	 <b>MEASUREMENT REPORT</b> (CLASS II PERMISSIVE CHANGE)		 <b>Approved by:</b> Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset	
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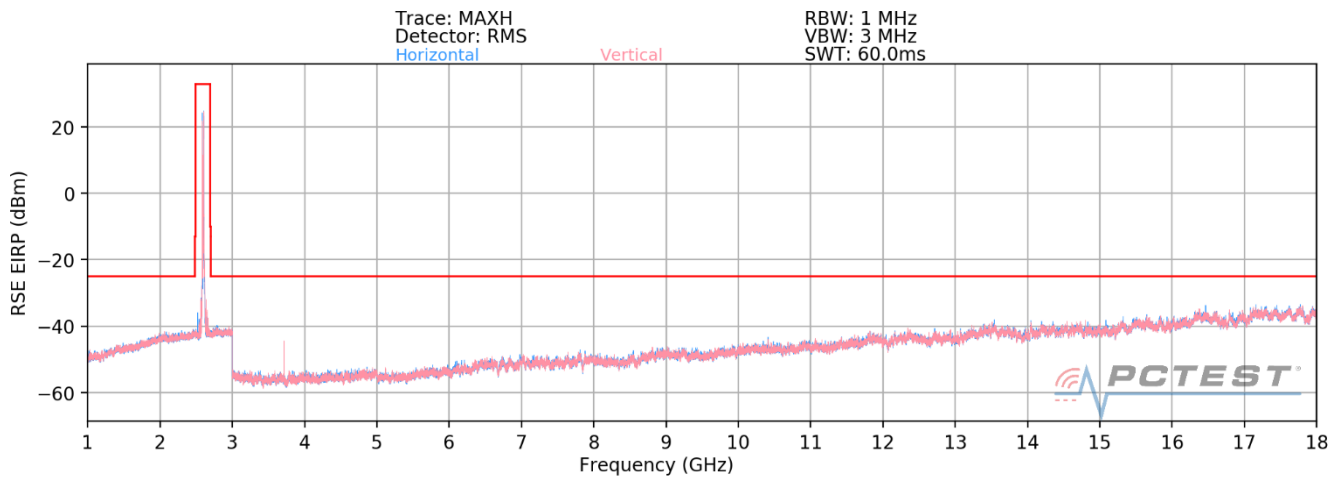
## Uplink CA Configuration 41C (PC2)



**Plot 7-67. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 41 Low Channel – PCC/SCC: 1RB) – OPEN**

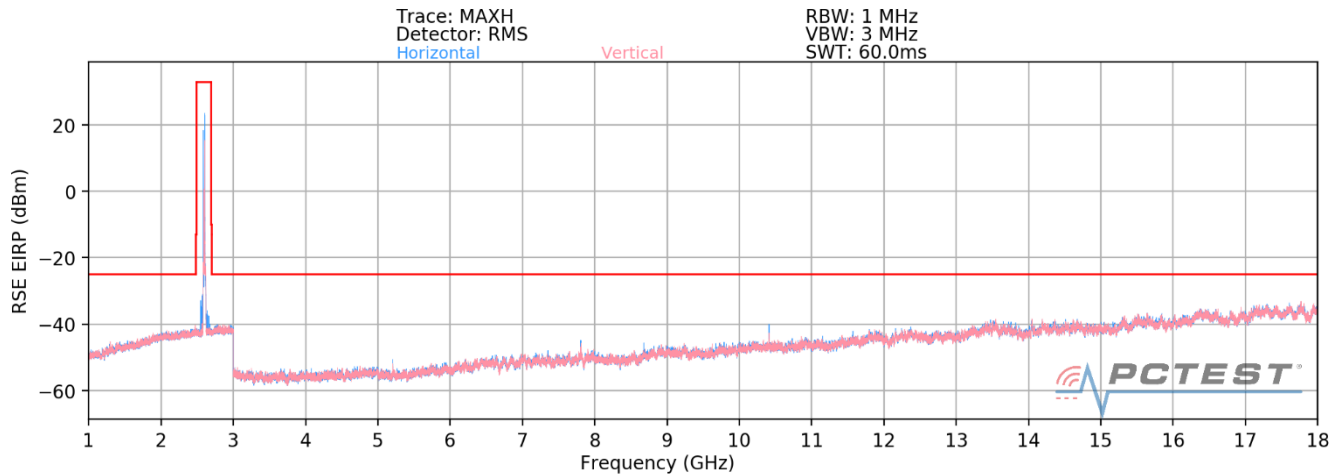


**Plot 7-68. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 41 Low Channel – PCC/SCC: 1RB) – CLOSED**

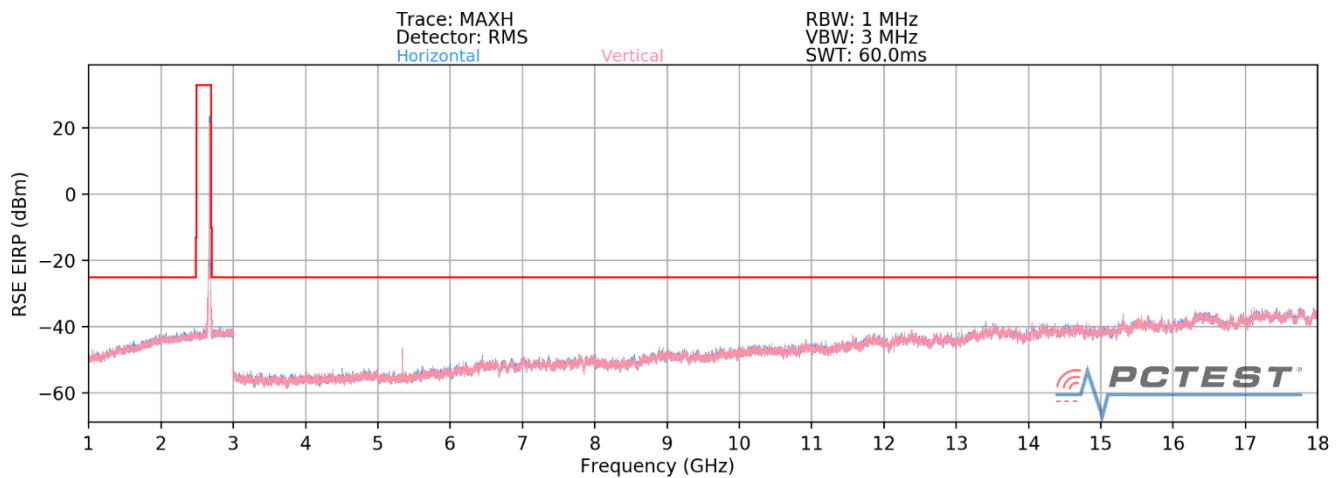


**Plot 7-69. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 41 Mid Channel – PCC/SCC: 1RB) – OPEN**

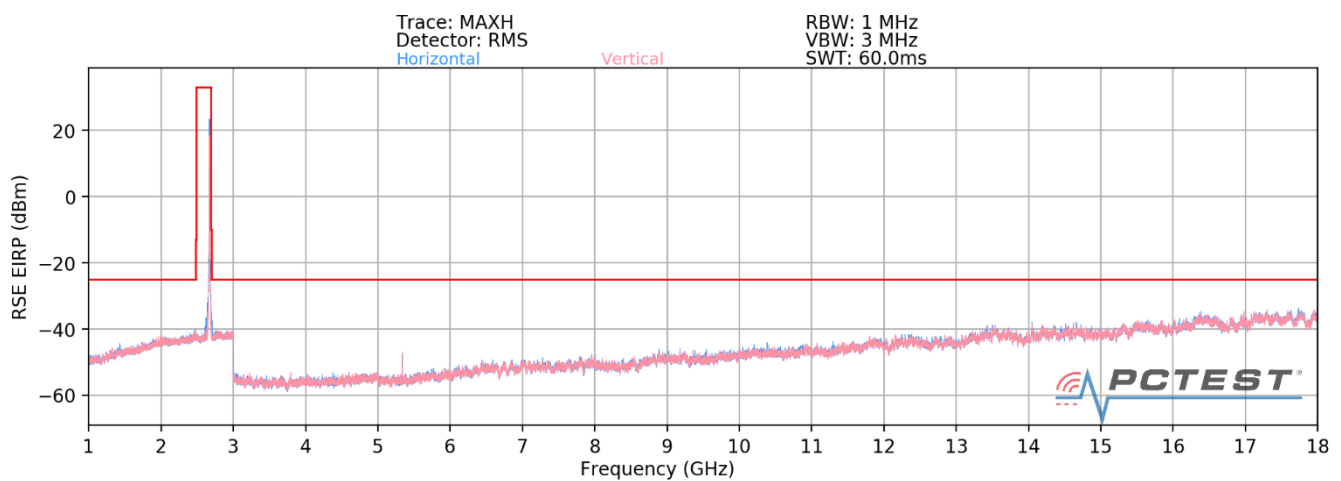
FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 53 of 61





**Plot 7-70. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 41 Mid Channel – PCC/SCC: 1RB) – CLOSED**



**Plot 7-71. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 41 High Channel – PCC/SCC: 1RB) – OPEN**



**Plot 7-72. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 41 High Channel – PCC/SCC: 1RB) – CLOSED**

FCC ID: A3LSMF700U		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 54 of 61

OPERATING FREQUENCY (PCC): 2506.00 MHz  
 OPERATING FREQUENCY (SCC): 2525.80 MHz  
 CHANNEL (PCC): 39750  
 CHANNEL (SCC): 39948  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 20.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -25 dBm


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]	Margin [dB]
5012.00	V	110	79	-59.04	8.63	-50.41	-25.4
7518.00	V	101	7	-53.66	8.42	-45.24	-20.2
10024.00	V	103	139	-44.87	9.80	-35.07	-10.1
12530.00	V	-	-	-49.96	9.03	-40.93	-15.9
15036.00	V	-	-	-46.86	8.57	-38.29	-13.3

Table 7-16. Radiated Spurious Data (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel)

OPERATING FREQUENCY (PCC): 2593.00 MHz  
 OPERATING FREQUENCY (SCC): 2612.80 MHz  
 CHANNEL (PCC): 40620  
 CHANNEL (SCC): 40818  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 20.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -25 dBm

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]	Margin [dB]
5186.00	V	118	78	-59.59	8.75	-50.83	-25.8
7779.00	V	120	9	-52.80	8.65	-44.16	-19.2
10372.00	V	118	145	-50.42	9.55	-40.87	-15.9
12965.00	V	-	-	-49.53	8.88	-40.64	-15.6
15558.00	V	-	-	-43.86	8.27	-35.60	-10.6



Table 7-17. Radiated Spurious Data (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel)

FCC ID: A3LSMF700U		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 55 of 61

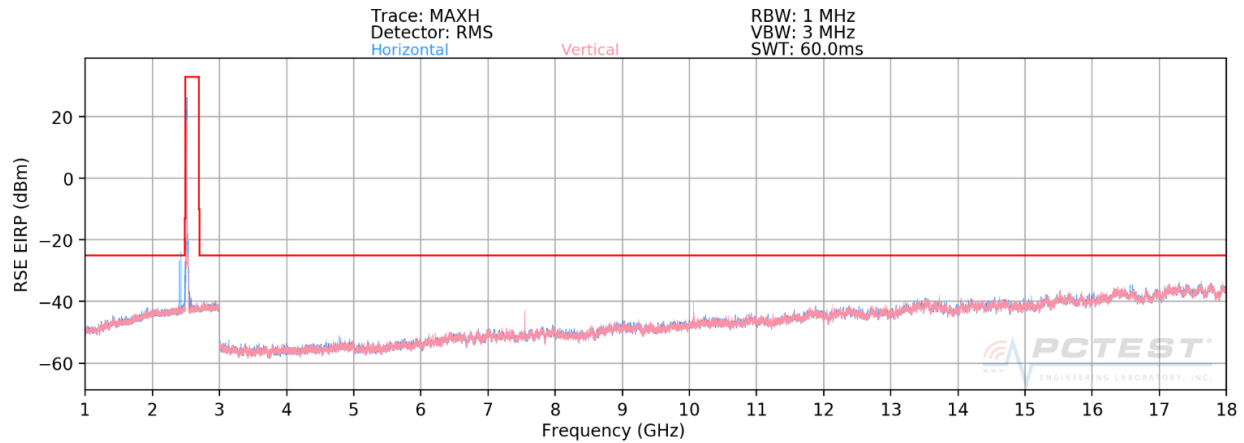
OPERATING FREQUENCY (PCC): 2680.00 MHz  
 OPERATING FREQUENCY (SCC): 2660.20 MHz  
 CHANNEL (PCC): 41490  
 CHANNEL (SCC): 41292  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 20.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -25 dBm

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]	Margin [dB]
5360.00	V	115	315	-57.33	8.69	-48.64	-23.6
8040.00	V	109	200	-51.29	8.83	-42.45	-17.5
10720.00	V	109	0	-48.74	9.29	-39.45	-14.4
13400.00	V	-	-	-47.09	8.57	-38.52	-13.5
16080.00	V	-	-	-43.75	7.96	-35.80	-10.8

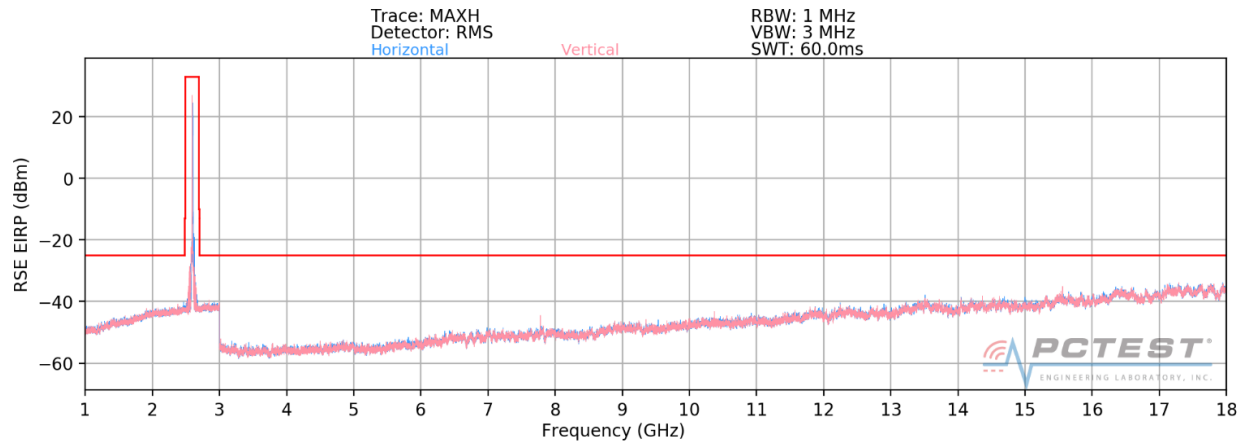
**Table 7-18. Radiated Spurious Data (ULCA B41 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel)**

FCC ID: A3LSMF700U	 <b>MEASUREMENT REPORT</b> (CLASS II PERMISSIVE CHANGE)		 <b>Approved by:</b> Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset	
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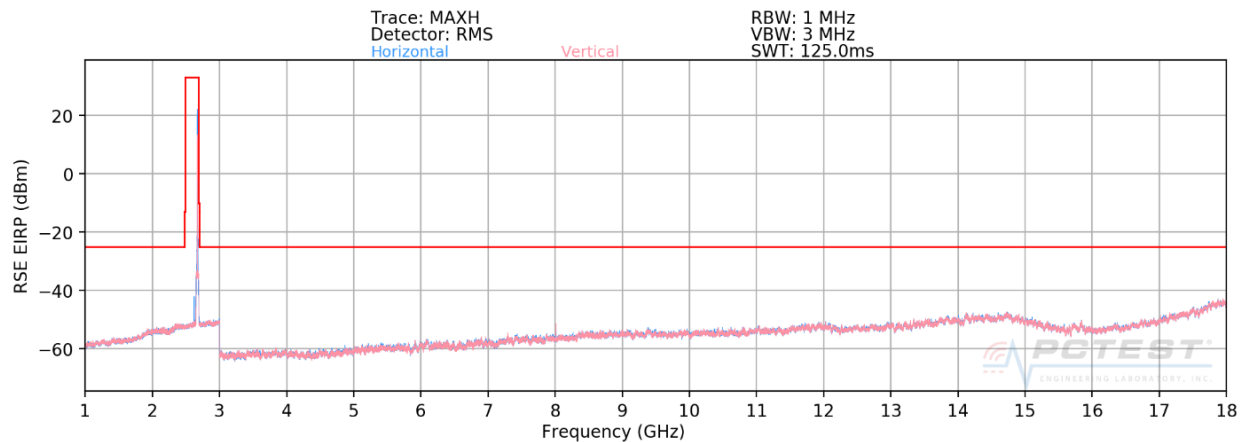
## Uplink CA Configuration 41C (PC3)



Plot 7-73. Radiated Spurious Plot (ULCA 41C PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel) – OPEN

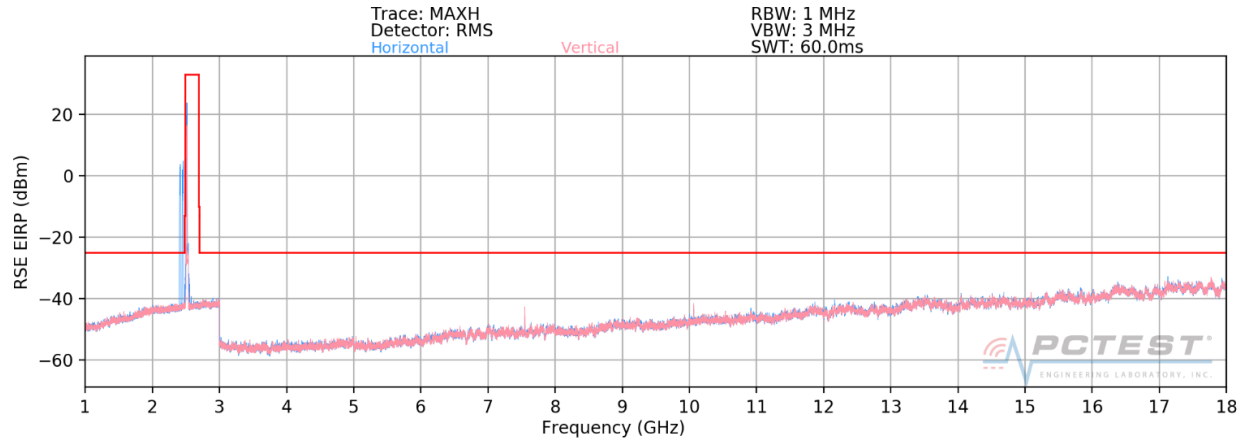


Plot 7-74. Radiated Spurious Plot (ULCA 41C PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel) – OPEN

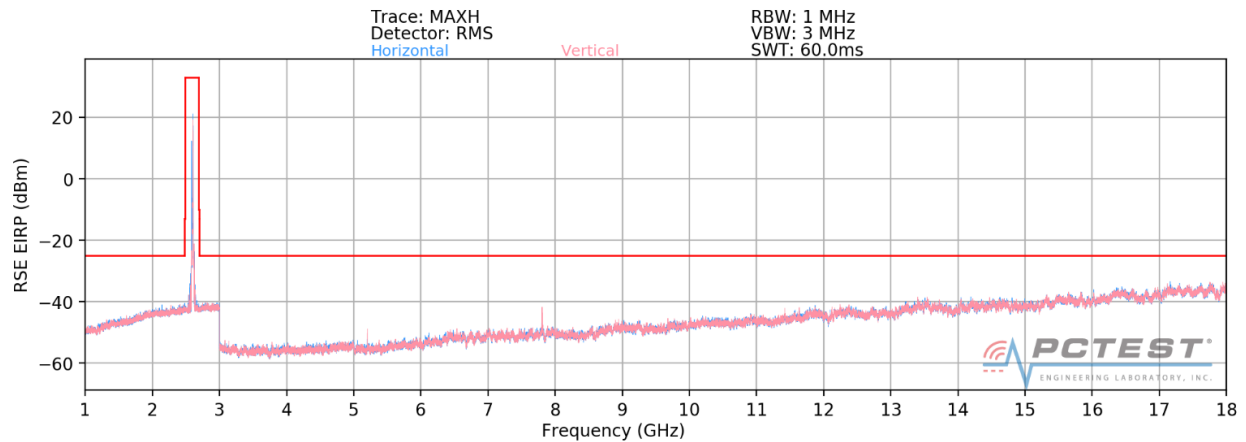


Plot 7-75. Radiated Spurious Plot (ULCA 41C PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel) - OPEN

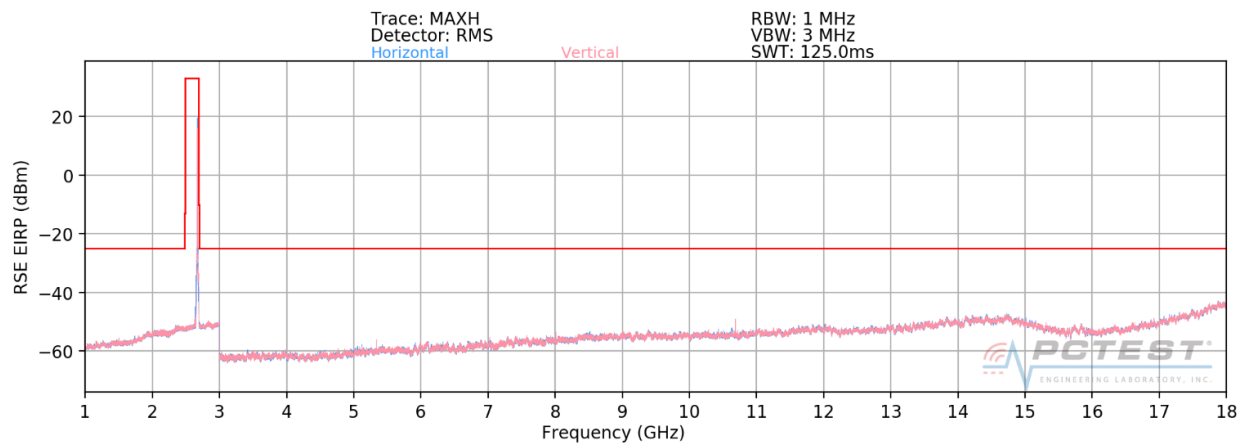
FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 57 of 61



**Plot 7-76. Radiated Spurious Plot (ULCA 41C PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel) – CLOSED**



**Plot 7-77. Radiated Spurious Plot (ULCA 41C PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel) – CLOSED**



**Plot 7-78. Radiated Spurious Plot (ULCA 41C PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel) - CLOSED**

FCC ID: A3LSMF700U	<b>PCTEST</b>	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	<b>SAMSUNG</b>	Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 58 of 61

OPERATING FREQUENCY (PCC): 2506.00 MHz  
 OPERATING FREQUENCY (SCC): 2525.80 MHz  
 CHANNEL (PCC): 39750  
 CHANNEL (SCC): 39948  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 20.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -25 dBm

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]	Margin [dB]
5012.00	V	136	67	-57.22	8.75	-48.46	-23.5
7518.00	V	101	254	-44.97	9.32	-35.65	-10.7
10024.00	V	102	217	-48.03	9.80	-38.23	-13.2
12530.00	V	-	-	-50.05	8.87	-41.18	-16.2
15036.00	V	-	-	-45.76	8.84	-36.91	-11.9
7518 (Closed)	V	332	292	-46.67	9.32	-37.35	-12.4

Table 7-19. Radiated Spurious Data (ULCA 41C- PC3 - PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel)

OPERATING FREQUENCY (PCC): 2593.00 MHz  
 OPERATING FREQUENCY (SCC): 2612.80 MHz  
 CHANNEL (PCC): 40620  
 CHANNEL (SCC): 40818  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 20.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -25 dBm

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]	Margin [dB]
5186.00	V	131	52	-56.70	9.03	-47.67	-22.7
7779.00	V	106	183	-50.76	9.29	-41.48	-16.5
10372.00	V	115	143	-51.53	9.50	-42.03	-17.0
12965.00	V	-	-	-49.06	8.75	-40.31	-15.3
15558.00	V	-	-	-44.45	8.47	-35.99	-11.0
7779 (Closed)	V	314	268	-52.69	9.29	-43.41	-18.4

Table 7-20. Radiated Spurious Data (ULCA 41C- PC3 - PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel)

FCC ID: A3LSMF700U		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 59 of 61

OPERATING FREQUENCY (PCC): 2680.00 MHz  
 OPERATING FREQUENCY (SCC): 2660.20 MHz  
 CHANNEL (PCC): 41490  
 CHANNEL (SCC): 41292  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 20.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -25 dBm

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]	Margin [dB]
5360.00	V	145	65	-54.88	8.99	-45.88	-20.9
8040.00	V	141	251	-51.51	9.35	-42.15	-17.2
10720.00	V	103	131	-49.55	9.39	-40.15	-15.2
13400.00	V	-	-	-47.09	8.67	-38.42	-13.4
16080.00	V	-	-	-43.68	8.46	-35.22	-10.2
10720 (Closed)	V	301	265	-50.92	9.39	-41.52	-16.5

Table 7-21. Radiated Spurious Data (ULCA 41C – PC3 - PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel)

OPERATING FREQUENCY (PCC): 2506.00 MHz  
 OPERATING FREQUENCY (SCC): 2525.80 MHz  
 CHANNEL (PCC): 39750  
 CHANNEL (SCC): 39948  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 20.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -25 dBm



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]	Margin [dB]
5012.00	V	114	89	-59.12	8.75	-50.36	-25.4
7518.00	V	109	175	-48.41	9.32	-39.09	-14.1
10024.00	V	122	196	-50.75	9.80	-40.95	-16.0
12530.00	V	-	-	-50.12	8.87	-41.25	-16.2
15036.00	V	-	-	-45.47	8.84	-36.62	-11.6

Table 7-22. Radiated Spurious Data with WCP (ULCA 41C- PC3 - PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel)

FCC ID: A3LSMF700U	 <b>MEASUREMENT REPORT</b> (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 60 of 61

## 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMF700U** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

FCC ID: A3LSMF700U		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2001240011-03.A3L	Test Dates: 12/11/2019 – 12/29/2019	EUT Type: Portable Handset		Page 61 of 61